
AGENDA ITEM B2

**LIQUEFACTION PRONE LAND - RISKS AND IMPACT ON BUILDING
AND RESOURCE CONSENT PROCESSES**

Purpose of Report

To inform the Council about the impact of the recently introduced liquefaction standard and how it will impact on building and resource consent applications moving forward.

Recommendations

Officers recommend that the Council:

1. Receives the Liquefaction Prone Land – Risks and Impact on Building and Resource Consent Processes Report.
2. Notes the impact of the newly introduced liquefaction standard on building and resource consent applications and consequential effects on the cost of proposed buildings and potential value of the houses built within the liquefaction affected areas.
3. Notes the preferred option for the Council’s Building Consent Authority (BCA) and agrees the preferred option for the planning team.

1. Background/Context

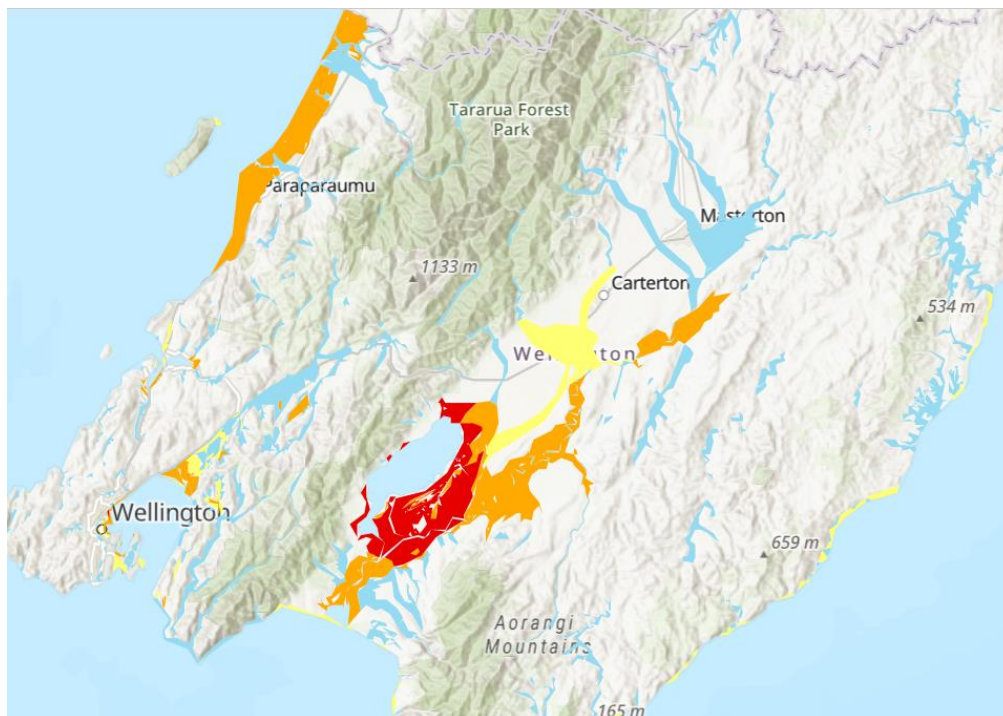
1.1 Liquefaction Prone Land and Effects on Building and Resource Consent processes

Land development needs across New Zealand are growing at a fast pace and therefore Councils are under pressure to release more land for building suitability including land that is prone to natural hazards like liquefaction. Post the Canterbury earthquakes, liquefaction is considered a potential risk across NZ to variable degrees. There is a strong linkage with both the Resource Management Act 1991 (RMA), the New Zealand Building Code and the BCA. The BCA’s have a legal requirement to complete hazard mapping in their local jurisdiction. Even though the legal requirement is to have minimum mapping done or at least some form of information to that regard, the practical implications are to be considered in the context of the BCA operations. Therefore, while it is not a requirement under the Building Act 2004 to map liquefaction areas or hazard mapping, it is recommended to have some information to help assess and inform the building consent decision making process.

The management of significant risks from natural hazards is listed in Section 6 of the RMA as a matter of national importance. Territorial Authorities can get basic hazard mapping done and this information can be supplemented by site specific hazard studies submitted through building consent applications.

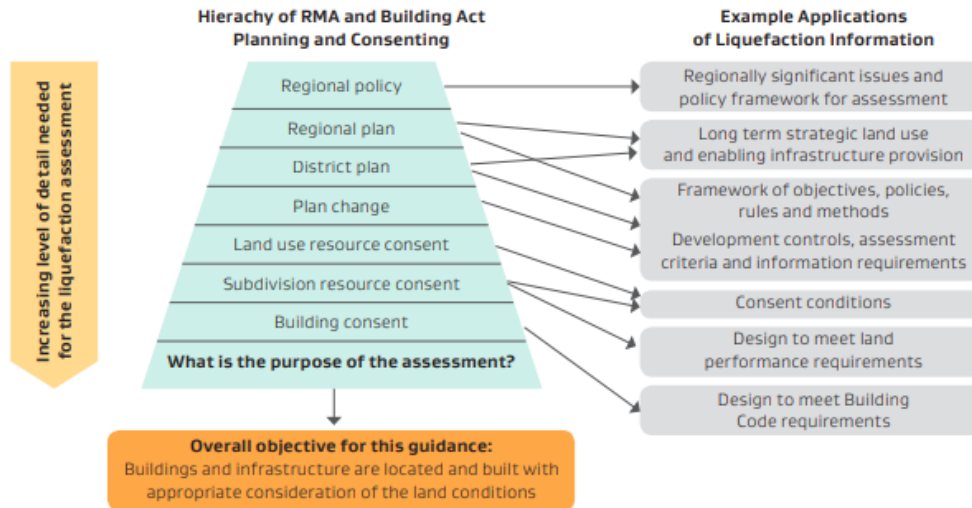
Each individual council has to set requirements to help them assess the hazard information within their local jurisdiction. Once the information is obtained the Council will decide the method and extent to which the information has to be captured by the existing operative documents including the District Plan and its associated objectives, policies, standards and rules.

Greater Wellington Regional Council has undertaken studies into liquefaction potential within the Wairarapa and liquefaction maps were created on 14 October 2014 and were updated on 13 June 2019. See map for the Wairarapa below. The maps are indicative and show potential areas for further investigation with the risk ranging between low, moderate, moderately high and high.



2. Legislative Framework

The diagram below shows the RMA & Building Act hierarchy and where liquefaction fits into this process.



2.1 Resource Management Act 1991

The management of significant risks from natural hazards is listed in Section 6 of the RMA as a matter of national importance and this needs to be considered during the assessment of any resource consent application. Section 106 gives territorial authorities powers to refuse or place conditions on subdivision consents where there is a significant risk from natural hazards and Sections 220 and 229–232 allow for conditions to be set on subdivision consents. The assessment needs to include the likelihood of a natural hazard occurring and the material damage that could occur to the land or other structures. It also needs to address any likely subsequent use of the land that would accelerate, worsen or result in material damage.

2.2 Regional Policy Statement for the Wellington Region

The RMA requires Regional Councils to take the lead on Natural Hazards as Regional Councils control the use of the land to avoid or mitigate natural hazards. This lead comes from the direction of the Regional Policy Statement which deals with natural hazards and liquefaction is a product of natural hazards.

2.3 District Plan and Resource Consents

District Plans will give effect to the Regional Policy Statement by including natural hazards and liquefaction in particular in their objectives and policies framework, filtering down to standards and rules. These rules/provisions set activity statuses, performance standards and assessment criteria to ensure that the relevant assessment can be made on the risk of subdivisions and land use activities in identified liquefaction areas and mitigation measures conditioned. The current Wairarapa Combined District Plan (WCDP) does not specifically identify liquefaction as a natural hazard although it contains natural hazards in general. The WCDP became operative in 2011.

2.4 Building Control Act and Building Consents

In 2017 the Ministry of Business, Innovation and Employment, the Earthquake Commission (EQC) and the Ministry for Environment published 'Planning and Engineering Guidance for Potentially Liquefaction Prone Land' to assist BCAs with managing these risks and gives guidance on how liquefaction risk links with planning.

In November 2019 the New Zealand Building Code was reviewed with updates coming into effect from 28 November 2019. These updates included safer housing foundations for buildings proposed to be located on liquefaction prone ground.

These changes mean that specific foundations will be required for buildings on land prone to liquefaction. This will ensure that new housing stock will have appropriate foundations for the land that they are built on. This also means that the overall construction cost of the build could increase. Such measures have already been implemented in Christchurch in the wake of the Christchurch liquefaction issues arising from the 2016 Kaikoura Earthquake impacts.

For Councils who have not yet mapped for liquefaction, the current foundations and 'good ground' system will remain in place until the 28th November 2021. This gives these Councils adequate time to complete liquefaction mapping to determine liquefaction areas and determine where specific foundations will be required

3. Defining the problem

3.1 Current processes

The SWDC BCA is currently using the Greater Wellington liquefaction maps as a guide only when requesting for specific foundations for liquefaction prone land. Depending on the severity of the assumed liquefaction, the BCA would either request a structural or geotechnical report to determine the specific type of foundation that may be required for a given build.

For all areas identified as having a Low risk of liquefaction the BCA will accept foundation designs to NZS3604 unless information is provided that queries the ground conditions. All areas identified as having a Moderate risk of liquefaction will require a report from a suitably qualified person who would have assessed the ground conditions and confirmed if there is a risk of liquefaction based on soil type. In the first instance this could be a structural or civil engineer with a chartered professional status. Their report will need to be considered during the design of the foundation.

If this investigation identifies that there is potential for liquefaction, further investigation by a Geotechnical engineer will be required to assist in establishing a suitable foundation type. All areas identified as having a High to Very High risk of liquefaction would require a report by a Geotechnical engineer to establish a suitable foundation type for the ground conditions.

The SWDC planning team are treating liquefaction like any other hazard under Section 6(f) that deals with the management of significant risks from natural hazards and Section 106 of the RMA gives territorial authorities powers to refuse or place conditions on subdivision consents where there is a significant risk from natural

hazards in assessing subdivisions. The team are also using advice notes for land use applications made within liquefaction prone areas.

The planners will use section 6 and 106 of the RMA to assess and condition for liquefaction on every subdivision application. With regards to land use consents, an advice note will be included to notify the applicant that there would be a requirement for a specialised foundation at the building consent stage.

3.2 *Required changes*

Council requires the liquefaction issue to be properly defined and required information to be sourced and provided so that the BCA and Planning teams can confidently request the required information to support building consents and planning consents.

3.3 *Cooperation with Wairarapa districts*

While the South Wairarapa District is the most affected area with liquefaction within the Wairarapa Region, based on the GWRC map, there is need for cooperation with the other two councils, CDC and MDC, so that a joint approach for the Wairarapa region can be considered. Communications to date at the officer level indicated that each council is dealing with the issue in their own way and this is not desirable.

3.4 *Regional cooperation*

The Regional Council had provided mapping for the region, as indicated above. While the mapping is a result of some desk top analysis, it gives a reference point for districts in the region to build their liquefaction information base on.

Following on from the BCA regional meeting, held back in September 2019 on liquefaction mapping, the Porirua District Council District Plan team raised this at their regional meeting, and it seems that no one was considering liquefaction for District Plan inclusion as it is seen as a Building Act rather than an RMA issue. However, GWRC has indicated that it could coordinate a regional co-funded approach to mapping. Confirmation of the later will be required. The Porirua District Council at the operational level was seeking interest from other councils in the region on the joint approach, so as to advise GWRC who will make contact and pull this together.

During consultation with the Hutt City Council, it was confirmed that the Hutt City District Plan currently has no provision for liquefaction risk and the consenting planners are heavily reliant upon section 106 of the RMA. The Hutt City policy team advised that they are looking to work with Wellington Water, GWRC and the other District Councils and that a liquefaction survey/investigation is likely to be undertaken at a regional level.

3.5 *Mapping*

The dataset that created the Greater Wellington liquefaction maps was prepared by the Institute of Geological and Nuclear Sciences Limited (GNS Science) for GNS Science Report 2014/16 and should be used in conjunction with that Report. As there is always uncertainty inherent within the nature of natural events GNS Science gives no warranties of any kind concerning its assessment and estimates, including accuracy, completeness, timelines or fitness for purpose and accepts no responsibility for any actions taken based on, or reliance placed on them by any person or organisation.

It is in this context the maps should be “ground-truthed” to provide increased certainty for the resource consent and building consenting processes. Ground truthing involves confirmation of the extent of the liquefaction within mapped areas by practically surveying the area and confirming the degree to which the areas are prone to liquefaction. A Geotechnical Engineer has been approached regarding estimated costing to have the existing GWRC mapping ground-truthed for the South Wairarapa District. Estimated costs were obtained including mapping. The estimate may need to be reaffirmed in light of the delay resulting from the Corona epidemic.

4. Options and analysis

Section 77 of the Local Government act sets the following requirements in relation to Council decisions:

(a) A local authority must, in the course of the decision-making process, seek to identify all reasonably practicable options for the achievement of the objective of a decision; and assess the options in terms of their advantages and disadvantages.

It is in this context that the following options are being assessed by way of the table below.

Options for BCA	Risk	Cost	Benefit
1-Do nothing	There is a risk to Council if the foundations fail as Council would have failed to exercise due diligence as required by the Building Act.	Cost to Council for redressing the foundation failures	No current cost to Council or added cost to applicant
2-Use of the current information including maps & requiring structural report for moderate liquefaction and Geotech report for high to very high Liquefaction. Proposed phased approach during which the first year will see the collection of data using reports submitted as part of the ongoing building consent applications. Each reported site will be entered on a spreadsheet and over a one-year period. The information may help in indicating affected areas that require further investigation. Ground truth maps, as in 3 below, for the second year.	The structural engineer's report might not cover the potential risk as required by the Building Act. Information collected on the spreadsheet might not be useful enough to have an impact on the cost of ground-truthing. A one-year delay in ground-truthing the maps may expose the Council to risk	Cost to Council redressing foundations if structural engineering report fails to cover risk Cost to applicant to get the required engineering reports Potential cost to Council associated with the delays in ground-truthing the maps.	No cost to council as the applicant prepares the reports. Reduced ground-truthing cost as the information on the spread sheet can reduce the areas requiring ground-truthing.
3-Ground truth current maps and request foundations proportionate with or appropriate for the level of liquefaction	Council bears limited risk as applicants will rely on technical information supplied to Council.	There is a one-off cost to Council for the required ground-truthing investigation.	Applicants are exempted from the cost associated with the engineering assessment
4-Ask for a Geotech report for any building within the liquefaction mapped areas, similar to requirement by the Kapiti District Council	No risk to Council as a formal geotechnical report will significantly reduce the risk factor to the foundations.	No cost to Council as the applicant will source the required geotechnical report.	No risk to Council as buildings will be backed by sound technical reports

Options for BCA	Risk	Cost	Benefit
		Cost to applicant to get the required engineering reports and significant delays in getting the appropriately qualified engineer to complete the report.	
Options for Planning	Risk	Cost	Benefit
1-Do nothing	There is risk to Council if the developments on a subdivision and or a landuse proposals fail as a result of the omitted natural hazard assessment.	Cost to council for redressing the failures	No current cost to Council or applicant
2-Use Section 6 and 106 to assess and condition for liquefaction as a natural hazard for subdivision applications and use an advice note to default the liquefaction to the building consent stage for land use consents	There is partial risk to Council if the developments on a landuse proposals fail as a result of the omitted natural hazard assessment. Subdivisions will be covered by the section 6 and section 106 requirements.	Cost to council redressing any failure on land use proposals. Cost to applicant as the application will default to a slightly more expensive activity status.	Council risk will be limited to landuse proposals only.
3-Create a liquefaction overlay post ground truthing, and associated objectives, policies and rules just like any other natural hazard and applicants will seek resource consent to establish buildings within the liquefaction overlay. (Note this can be done by SWDC as a separate plan change or be rolled out as part of the on-going District Plan review).	No risk to Council as both the subdivision and landuse proposals will be properly assessed for liquefaction.	There is a one-off cost to Council for the required groundtruthing	Very limited Council risk as both the landuse and subdivision applications are assessed for liquefaction

5. Recommendation

In light of the potential for regional investigation and mapping and the analysis above, the BCA and planning officers propose that a staged approach be used on liquefaction as follows:

5.1 First Year

The collection of soil condition data using reports submitted as part of the ongoing building consent applications. Each reported site will be entered on an active spreadsheet and over a one-year period. The information will help in indicating liquefaction affected areas that require further investigation.

5.2 *Second year*

Ground truth current maps and request foundations proportionate with or appropriate for the level of liquefaction for building consents. Create a liquefaction overlay post ground truthing, and associated objectives, policies and rules just like any other natural hazard and applicants will seek resource consent to establish buildings within the liquefaction overlay. (Note this can be done by SWDC as a separate plan change or be rolled as part of the on-going District Plan review).

6. Consultation

Consultation with officers at a number of other councils has been carried out, as identified in paragraph 3 above. This issue concerns Council's and the BCA's processes for building and resource consents and consultation with the public is not considered to be necessary. However, communication with the public about the broader liquefaction situation in the district is recommended.

7. Legal implications

The legal requirements and implications of this issue are identified in paragraphs 3 and 4 above.

8. Financial considerations

The financial costs relating to this issue are identified in paragraphs 3 and 4 above. The costs of mapping will need to be budgeted for the 2021/22 financial year.

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