Nelson City Council
te kaunihera o whakatū

Summary of Community Feedback from

Fault, Liquefaction and Flooding Hazards Engagement

1 April – 16 June 2017

October 2017

Barker & Associates

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1.0 SUMMARY OF FEEDBACK

Between 1 April and 16 June 2017, Nelson City Council sought community feedback on flooding, fault and liquefaction hazards. Feedback was received from over 400 participants including property specific feedback and response to a general questionnaire on how to manage these hazards. The majority of responders come from The Wood, Tahunanui and Stoke. The information received will help to refine the hazards information held by Council, including how hazards information is noted on property files and Land Information Memorandum (LIM) Reports. It will also help to inform the development of the natural hazards section of the Nelson Plan (resource management plan) and Council's infrastructure asset management planning.

General feedback

Flooding

Council sought feedback on new flood modelling information for a 1% Annual Exceedance Probability (AEP) flood event for both present day and the year 2100. Feedback on flood hazard indicates that there is support for the identification of high flood hazard areas.

Mitigation of flood hazard, to ensure the occupants of buildings remain safe, was the preferred approach for urban areas, both in areas of existing development and those which are yet to be developed.

For rural areas avoidance of high flood hazard areas for more vulnerable uses such as houses was preferred, while many supported the ability to locate certain buildings, such as farm buildings in flood areas.

Feedback in relation to flood hazard identified:

- Robust information is needed and should be well scrutinised before it is used for planning purposes or added to property files.
- Emergency management is required.
- In addition to site mitigations (like raising floor levels and having floodable areas) a need for better infrastructure, maintenance of streams and rivers and the consideration of the 'whole catchment' to ensure that flood hazards were not exacerbated is required.
- Respondents identified that mitigation does not resolve the hazard and raised concerns regarding who pays when damage occurs.
- Further national guidance was considered to be required.

Fault

Fault hazards are mapped in the current Nelson Resource Management Plan and a setback of 5m from the identified fault line is required for all buildings. Respondents were asked what they thought the appropriate setback from a fault hazard should be for new buildings. 31% of respondents to the survey supported the introduction of a greater setback from the fault trace.

General feedback provided on how the Nelson Plan should respond to fault hazards included:

- Support greater management of buildings and other structures in proximity to a fault hazard.
- Recommend national advice be followed and advice be sought from other councils and be based on most recent examples (Christchurch and Kaikoura).
- Questioned the benefit of restricting development because of general ground shaking during an earthquake.
- Challenged the accuracy and current knowledge of fault hazards.
- Many respondents sought further investigation and information be provided in relation to fault hazard.

Liquefaction

Liquefaction hazard is identified in the Tahunanui area of Nelson. The survey sought feedback from respondents on how liquefaction should be managed.

Feedback indicated:

- Further investigation to confirm the presence of, and identify liquefaction was required.
- Investigate suitable responses to the hazard to mitigate risks to personal safety and property damage.
- Controls or requirements should reflect the type of the building and the proposed activity.

General Themes from Site and Area Specific Feedback	
Flood	**Fault**
In addition to the general feedback received, area specific issues have also been identified and additional comments recorded. Feedback received included suggestions for specific works such as flood protection barriers or the improved management of stream or river systems. Respondents identified specific issues throughout the region including a general challenge to the accuracy of the mapping and data based on respondents experience with flooding at their own properties or in identified areas.	Site and area specific feedback on faults identified that many respondents did not consider there was a hazard risk present or that they considered there remains a degree of uncertainty relating to what information is available to identify fault lines. Respondents also considered that where fault lines were present setbacks, building design and the resilience of other infrastructure were relevant considerations.
	Liquefaction
	Feedback provided in relation to liquefaction in the Tahunanui area identified that many of the respondents believe liquefaction has not been adequately demonstrated to be an issue for the Nelson Region and Tahunanui. Feedback also sought to question how engineered fill and ground or building improvements would be reflected in the identification of at risk areas or sites.

2.0 CONSULTATION

2.1 PURPOSE AND OVERVIEW

Between 1 April and 16 June 2017, Nelson City Council (Council) undertook community engagement on three natural hazards topics:

- Flood
- Fault
- Liquefaction

This included the sharing of property specific information with landowners who are potentially affected by these hazards, gathering feedback on technical information held for each hazard, as well as seeking thoughts from the community on how Council and the community should be responding to these hazards.

This report provides a summary of feedback received during the engagement.

The information received will help to refine the hazards information held by Council, including how hazards information is noted on property files and Land Information Memorandum (LIM) Reports. It will also help to inform the development of the natural hazards section of the Nelson Plan (resource management plan) and Council's infrastructure asset management planning.

This community engagement builds on the natural hazards engagement that Council completed in 2013 on fault rupture, liquefaction and a Maitai flood model.

2.2 ENGAGEMENT METHODS

At the start of April 2017, letters were sent to 7710 properties in Nelson advising landowners and/or ratepayers of the information Council holds for their property in relation to fault, liquefaction or flood hazards.

Council's website was updated with dedicated natural hazards consultation pages, containing information and reports for each hazard being consulted on, a map where people could enter their property details and see how the hazards affected their property, and an online feedback form.

Council staff and consultants were available throughout the engagement period to respond to emails, phone calls and counter enquiries from people who wanted to discuss the hazard information. Council received a large number of enquiries during the consultation period, most were in relation to the new flood information.

2.3 WORKSHOPS

A session for professionals[1] was held on 12th April to provide them with information on the community engagement, recognising these groups could be approached by clients seeking advice during the course of the engagement.

Four community information sessions were held throughout Nelson during the first two weeks of May 2017 at Tahunanui, Stoke, Wakapuaka and Nelson central (CBD).

Attendees came to discuss technical information, provide feedback and talk to staff about their particular properties. Approximately 300 people attended the sessions – around 100 at Stoke and the CBD, and around 50 at Tahunanui and Wakapuaka. The key issues discussed at these sessions have been captured in the feedback below, as attendees were encouraged to provide written responses. Most discussion at these sessions was in relation to flood hazard and the new flood information.

2.4 FEEDBACK FORMS

Council received nearly 450 individual responses, from landowners and members of the community. Feedback on the three hazards was sought in two ways:

- General feedback in relation to how the hazard information should be used to inform the Nelson Plan, through completion of a short survey questionnaire; and
- Property specific feedback.

This feedback analysis considers the general feedback received, and represents the responses to the multi choice questions. It is noted that some responders did not answer all of the survey questions and therefore response numbers vary between each question. The second half of this report analyses the property or area specific feedback received. In many cases those who responded to the site specific questionnaire also provided more general feedback about natural hazards. We have therefore included some of the key themes from these types of responses in the second half of this report.

Responses to questions vary in detail and length with some respondents identifying that they do not support the manner in which questions are framed or that they do not feel qualified to answer these questions. This may have contributed to a certain component of 'no response' which is represented in the results.

[1] Real estate agents, insurance providers, planners, engineers, etc.

2.5 USE OF INFORMATION

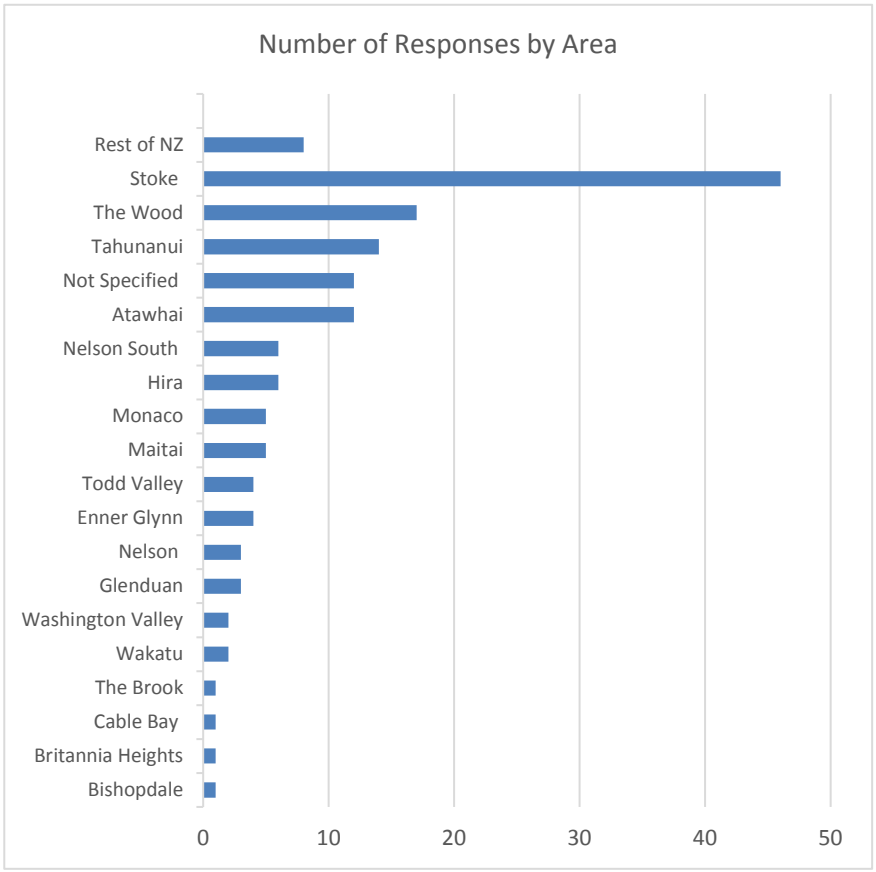
Information included in this report does not include any personal details such as names, contact details or personal information. Information has been categorised by suburb or geographic area based on details provided in the feedback form. No specific address details have been included in this report to maintain the privacy of those who have contributed feedback.

3.0 GENERAL FEEDBACK

3.1 PARTICIPATION BY AREAS

155 people responded to the 'general feedback' survey questionnaire. A broad identification of the areas that respondents reside is shown in Figure 1. The areas of Stoke, The Wood and Tahunanui have the highest response rate. Two respondents did not specify an address.

Figure 1: Respondents by area: the horizontal axis represents the number of response forms from the identified area



4.0 FLOOD HAZARD

Several questions in the survey were posed inviting both free text and multi choice answers in relation to the management of flood hazard areas. These are addressed in four sections below.

4.1 IDENTIFICATION OF 'HIGH RISK' FLOOD AREAS

The risk of flood hazard to people and property varies across Nelson depending on a combination of water depth and the force of moving water (velocity) and the level of development occurring in these areas (e.g. risk will be different in populated urban areas compared to greenfield areas). 130 people responded to the question: "**Should the Nelson Plan identify areas of a high flood hazard, where there is a greater risk to people and property?"**

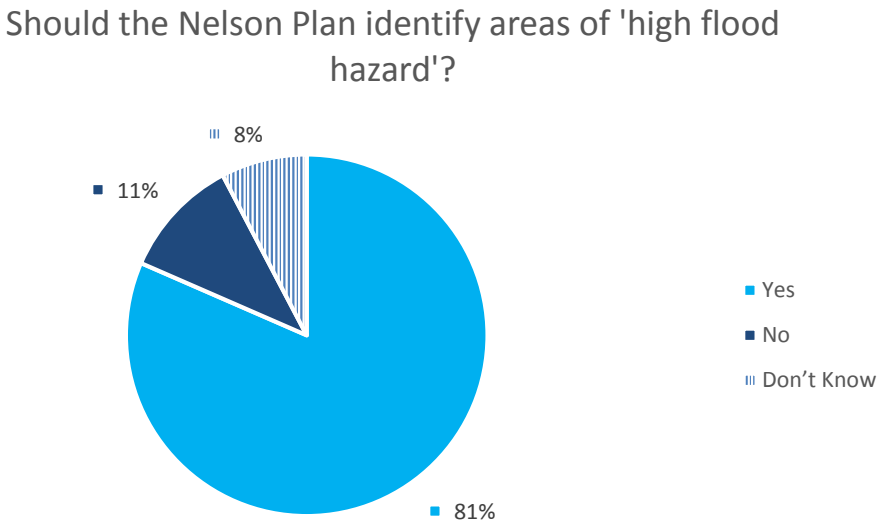


Figure 2: Response to the identification of high flood hazard areas.

The majority of respondents confirmed that the Nelson Plan should identify high hazard areas.

4.2 MANAGING FLOOD RISKS

The survey provided some explanatory text at the start of the section on managing flood risks as detailed below:

Through the Nelson Plan we can manage the community's risk to flood hazard through either avoiding or mitigating new development. How we respond could be different depending on if the location is in an urban environment or a rural

environment. In the urban environment, there are existing built up or developed areas as well as areas that are zoned for development but are not yet built.

'Avoidance' involves not locating buildings or land uses in flood hazard areas.

'Mitigation' is explained as allowing development but ensuring buildings are designed to keep occupants safe. For example on-site design solutions, such as raising ground levels where this does not increase off site hazard risk, floodable basements or ground floor car parking with habitable rooms above, and houses on stilts.

This explanation preceded the questions with multi-choice or free form answers.

4.3 URBAN ENVIRONMENT: HOW SHOULD THE NELSON PLAN RESPOND?

The survey asked respondents how the Nelson Plan should respond to high flood hazard areas both in the urban area with existing development and in those which are currently undeveloped.

4.3.1 Existing developed areas

In existing developed areas respondents were given the choice between three options:

- ☐ Avoid new development in identified high flood hazard areas.
  This means new development is not allowed in existing urban locations to avoid placing buildings and their occupants in areas of high flood risk.
- ☐ Mitigate new development in identified high flood hazard areas.
  This means new development is allowed in high flood hazard areas in existing urban locations but buildings are designed to keep their occupants safe.
- ☐ I don't know.

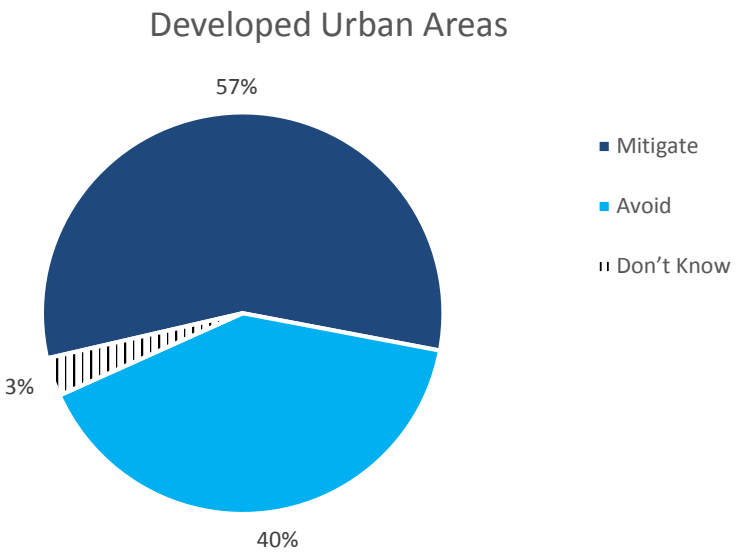


Figure 3: Response to Development in Existing Urban Areas

Of the 129 people who responded to this question, 57% of respondents preferred that development is allowed and mitigations used. Feedback in relation to urban areas identified both assumptions and suggestion that mitigations would be used and remedial works undertaken to resolve or protect against flood hazards:

"...we presume that the Council will take measures to mitigate the effects of flooding to protect existing infrastructure and development. This could include such measures as building barriers to prevent the sea coming up the Maitai River, or by building more dams or diversions to prevent significant parts of the City from being flooded."

"…some of these risks would be increasing due to climate change, but others may be mitigated such as by improved stormwater drainage, flood capacity in the Maitai or flood water storage in the Maitai Reservoir or in the Council's parks."

Respondents noted that when considering new development, impacts on existing areas should be considered:

"…New developments need to address the downwards effects with regards to flooding. Run off into existing waterways needs to cater at the other end for increased volume…"

4.3.2 Undeveloped Areas

In undeveloped urban areas respondents were asked the same question in relation to how should the Nelson Plan respond with respect to development being avoided or allowed on the basis that building occupants would be protected. The options were provided as:

☐ Avoid new development in identified high flood hazard areas.
This means new development is not allowed in existing undeveloped locations to avoid placing new buildings and their occupants in areas of high flood risk.

☐ Mitigate new development in identified high flood hazard areas.
This means new development is allowed in high flood hazard areas in existing undeveloped locations but new buildings are designed to keep their occupants safe.

☐ I don't know.

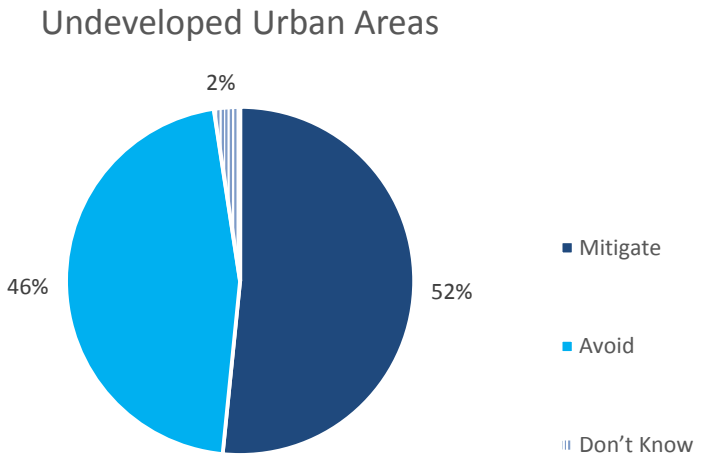


Figure 4: Responses to development in currently undeveloped urban areas.

Of the 124 responses to this question, 52% of the responses preferred mitigation while 46% avoidance, indicating a slim margin of preference for flood mitigation for new development within urban areas. Feedback in relation to undeveloped areas indicated that a 'common sense' approach should be taken and that land identified for development should be both suitable and should not exacerbate existing issues or result in new ones:

"Make sure that future housing developments don't place future stress on these streams [and] current infrastructure."

"Let common sense prevail"

"If Council has zoned any land with any hazard suitable for development it has been in my opinion negligent in it's duties."

4.4 RURAL AREAS: HOW SHOULD THE NELSON PLAN RESPOND?

The feedback form asked **"how should the Nelson Plan respond to new rural development in areas of flood risk?"** and provided a space for comments and provided an option such as avoiding more vulnerable activities and allow ancillary development such as farm buildings. Seventy-six people responded to the open ended question.

This question followed those regarding the urban area and many respondents applied a similar approach preferring either avoidance or mitigation. In many cases respondents agreed with the example option given of avoiding vulnerable uses and allowing ancillary or farm buildings. Several respondents preferred a case by case approach to the consideration of flood hazards and land uses, and comments were received regarding the quality of information used to define flood hazard areas.

"This should be a case-by -case basis dependent upon the development and what the use of the land is going to be."

"…the information that you use to make these decisions needs to be good."

Feedback Included examples of mitigations or other measures:

On-site Mitigations:

- Build houses that are less susceptible to flooding.
- Build above a specified height/out of specific areas.
- Maintain conveyance of main flood channels by restricting activities in close proximity to the stream or river.

"Development should be allowed, but structures should meet specific requirements."

- Use of mitigations in less flood susceptible areas and avoidance in higher flood areas.
- Built controls such as stilts, structural controls and onsite flood flow management to mitigate effects on downstream areas.

Off-site Mitigations:

- Providing for better drainage or stormwater systems.
- Ensuring flood channels remained free of any obstructions.

"No development upstream of flood prone areas. NCC land into vegetation/forest."

- Catchment wide approaches including retaining vegetation and preventing development in the upper areas of the catchment.
- Construct stop banks.
- Improve infrastructure.

- Improved water quality through avoidance of flood areas and maintaining rivers and streams.

Other Measures:

- Mitigate through planning for flood events.
- Consider the bigger picture and involve multiple parties.
- Have national rules for building in flood hazard areas.
- 'Buyer beware' identifying flood hazards to new purchasers.
- Gather more information about flood hazards.

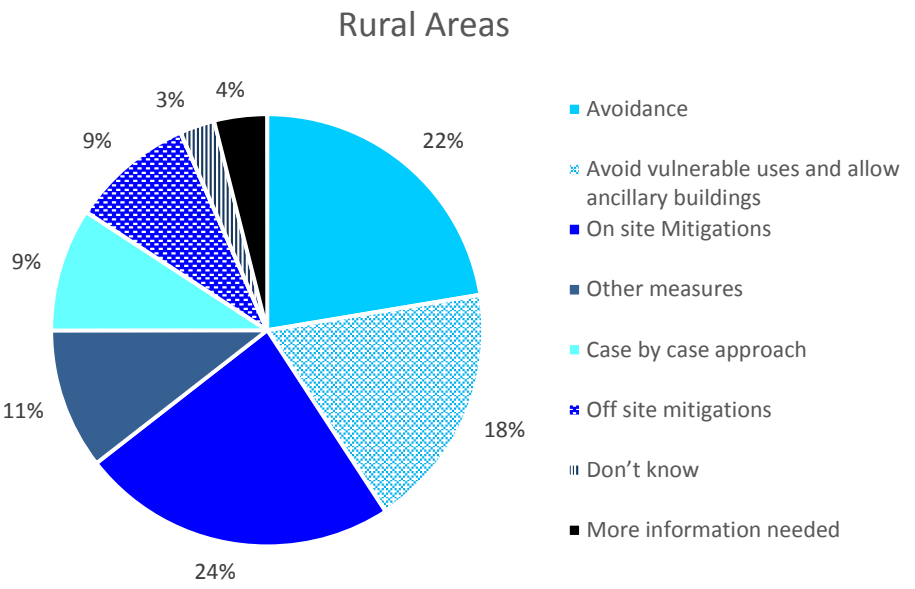


Figure 5: Grouping of responses to the open question "how should the Nelson Plan respond to new rural development in areas of flood risk?".

Reasons for Avoidance

"I've seen the results of developers unwise decisions- ultimately the costs of repair/restoration are excessive and impact on the residents. Ridiculous when avoidable."

Several respondents provided reasons for their views primarily in relation to avoidance. Concerns were raised that development of new areas can impact on existing areas exacerbating or causing flooding issues. Respondents asserted that the costs associated with flood hazards and hazard mitigation should be paid by the developers and that the Council should not be liable for flood damage costs. Other reasons for avoidance as the preferred options was the view that mitigation does not remove the hazard, and in the end the cost associated with locating in hazard areas will be borne by the wider community through the costs of repair/restoration and impact had on the residents.

Quality of information

Several respondents included comments in relation to the quality of information underpinning the understanding of flood hazards. One respondent questioned the need to plan for a flood event stating that other hazards have a higher probability of occurring.

Accurate identification of flood hazard areas including those affected by a high or low hazard was considered important so as not to unduly limit activities and land uses where flood hazard may not merit this level of control.

"We have more chance of being run over by a bus than being washed away in a flood."

Respondents referred to previous consultation (completed during 2013 and in relation to an updated model held for the Matai River) that had been undertaken and made the following points:

- Request that flood modelling is undertaken for each catchment or area and is based on sound information which is well supported.
- Ensure that flood hazard modelling and information is explained to the community in a manner that is understandable for lay people, including a greater understanding of the differing 'categories' of flood hazard.
- That flood hazard modelling is transparently shared with the community to enable it to be scrutinised and understood.
- That there is information provided to people who are already in flood hazard areas in relation to warning systems and measures to take in a flood event.
- That Council undertake a risk assessment based on the flood hazard information they now hold.

4.5 GENERAL FEEDBACK ON THE MANAGEMENT OF FLOOD HAZARDS

Following the more specific questions the survey provided an opportunity to provide a broad comment on how the Nelson Plan should respond to flood hazard. A summary of the feedback identified the following key themes:

- **Better information:** further investigation and information to be provided on the depths of flood flows, areas where different 'categories' of flood hazards apply, areas where the mapping is 'theoretical' vs where flood events have been recorded.
- **Mapping and identification of flood hazards:** mapping should reflect stormwater drainage. Enable discussion and review of assumptions in particular that all drainage is blocked. Only identify flood areas as areas where flooding is recorded as having taken place. Council should consult before placing notations on properties, should require flooding to occur three times before imposing a mapped requirement. Council should specify that the mapping and LIM notations are based on modelling as opposed to recorded flood events. Refer to 'higher' flood risk instead of 'high' flood risk. A 1 in 100 year event is excessive to consider. Peer review the flood modelling report, question the assumptions and methodology.

"We would like the Council in its planning response to…recognise that different parties have different appetites for risk and provide for this, and; consider that the lengthy time frames over which these plans can be given effect can enable different responses, including funding responses, to address these issues where the costs and benefits can be properly evaluated and attributed."

- **Fix current and future issues and mitigate hazards:** respondents sought that drainage and flood nuisance are remedied where possible, through: public drainage being better maintained, site specific measures implemented, flood prevention, maintain vegetation in streams and watercourses, debris diversion, and prevent washouts through stabilisation of stream banks. Implement flood protection works for flood hazards (including climate change projections). Require drainage to be sized for a 1: 200 years event – consider overseas infrastructure examples. Requirement for secondary flow paths. Mitigate against sea level rise- use of concrete slabs, consider overseas examples.
- **Consider impacts on 'property rights':** Remove LIM notations. Provide rates reductions where properties are affected by hazards. Provide compensation for those affected by flooding. Council should not assume that the overlay will not affect insurance / value. Insurance is available for flood risk but does nothing for loss of value due to a note on the LIM report. Include flood mitigations on LIMs.
- **Emergency management:** evacuation planning, list/identify people requiring assistance to evacuate in a flood event.
- **Long term strategic approach:** Protect 'downstream' development from new upstream development which affects hydrology. Strategy for managed retreat from flood prone and low lying coastal area including both public and private infrastructure. Discussions with central government to advise how it will be financed. Consider further discussions with Local Government Association, Ministry for the Environment, and the Minister of Finance, PCE, and input from

the insurance companies. Provide an alternative area for residents living in flood hazard areas to relocate to. Mitigate climate change.

- **Planning responses** could include:
  - Reflect flood risk with zoning.
  - Control development in high risk areas not lower risk areas.
  - New development should reflect downstream flood risks. Apply a flood hazard designation where flooding affects a certain % of the property
  - Be clear about the use of the information and how this will be linked to planning rules (district and/or regional)
  - Better understand the communities' appetite for risk.
  - Further opportunity for discussion of climate change considerations and timeframes. Including consideration of the life time of buildings and other assets. Undertake a risk assessment
  - Undertake a cost benefit analysis of the mitigation options for specified risk (differing catchments) and further consultation. Council should engage with the affected community to discuss options before simply noting increased flood risk on planning maps or on property information.
  - Dispute probability of flood hazards (1 in 100 year event) being a concern.
  - The provisions for subdivision in flood risk areas should better reflect the flood risk as this creates risks and costs for all the 'new' sites.

5.0 FAULT HAZARD

The feedback form noted that the current Nelson Resource Management Plan requires buildings to be set 5m back from an identified and precisely located fault line, and that Council had sought expert advice on the location of fault lines in 2013 which recommended that the setback should be revised to 10m, in keeping with national guidance.

5.1 BUILDING NEAR FAULT LINES

The survey asked "**What distance from an identified fault line should the Nelson Plan allow buildings to be erected?".** Option 2 included the proviso that a more specific assessment is provided to address seismic engineering matters. Eighty-eight responses were received.

What distance from an identified fault line should the Nelson Plan allow buildings to be erected? *(Please select one)*

- ☐ 5m (status quo)
- ☐ Between 5m and 10m, on the condition that a more specific assessment is provided covering seismic engineering design
- ☐ 10m
- ☐ I don't know

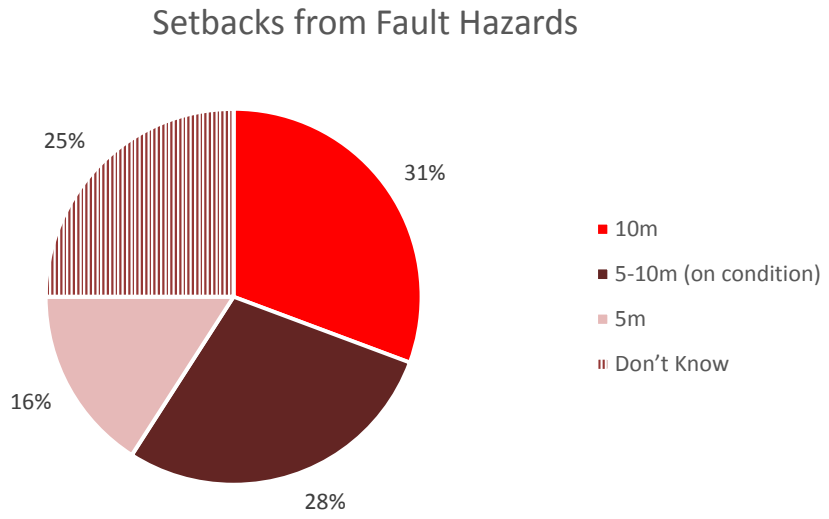


Figure 6: Response to setbacks from Fault Hazards.

The majority of respondents to this question identified that a greater distance than the status quo (5m) was appropriate. Of the total responses received 31% selected a 10m distance as appropriate with an additional 28% supporting the ability to locate buildings within 5m subject to further investigation. When considering the results 59% of those who responded selected 10m or between 5 and 10m subject to a more specific assessment. These results should be considered alongside the feedback provided as the second part of the survey questions for fault hazards.

The survey also provided respondents with the opportunity to provide any general feedback on fault hazards. Thirty-five specific responses were received which identified several key themes:

- Seeking a greater setback be applied and a greater control of activities within this area. Preventing any new development, requiring greater built structural controls and managing larger trees and considering the location of access ways.

"Limit height of large trees to avoid dangerous uprooting and toppling within urban sections."

" …the Fault Hazard Overlay does very little to negate the negative or destructive outcomes of a significant earthquake in our region. Instead it creates significant additional costs to rate payers through additional building and subdivision rules..."

- Challenged the accuracy and current knowledge of fault hazards (for the Nelson Area) and questioned the basis for a 5 or 10m setback and whether this will result in meaningful risk mitigation. Feedback sought that national advice be followed and advice be sought from other councils and be based on most recent examples (Christchurch and Kaikoura) and questioned the benefit of including restrictions.
- Many respondents sought further investigation and information be provided in relation to fault hazards and sought that this further information be used in relation to:
  - The controls in the Nelson Plan.
  - Notations on LIM reports.
  - Emergency management planning.
  - Identification and information for residents.
  - Rates reduction.
  - Structural requirements.

"It is difficult to give specific opinion on the matter without further information, eg. When the Kaikoura earthquake occurred how far away from the known fault line were the surface ruptures? <5m, 5m-10m or >10m?"

Grouping of the 35 responses received to the question are represented as below in Figure 7.

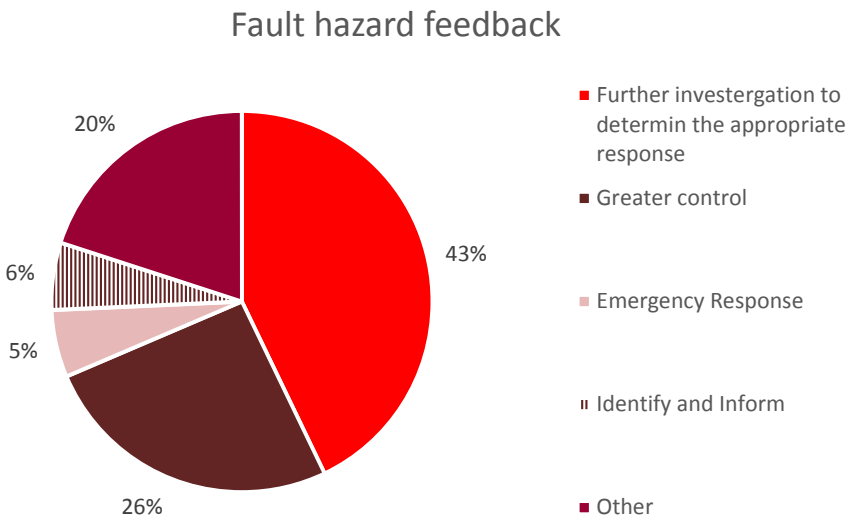


Figure 7: General feedback on fault hazards.

More specifically some of the following suggestions were made in the feedback received:

- Respondents identified they were not qualified to assess the setbacks required.
- Consider resilience of infrastructure, roading, food supply and local power supply.
- Identify/map all areas of concern and communicate information to the community and residents. Let the 'buyer beware' where information is available on the location of fault lines.
- Emergency management measures are also required, including safe areas to congregate and the evacuation of residents.
- Council should undertake property specific investigations and remove notations from LIM reports where faults are not identified.
- Provide rates reductions for people with a fault identified on their property/ Land Information memorandum (LIM).
- Avoidance of hazard areas may not be feasible use insurance to manage risks.

"Inform all residents, commercial or domestic of said fault. Be very proactive in providing information to ratepayers. Deter foolish developers."

6.0 LIQUEFACTION HAZARD

The third hazard discussed in the survey is Liquefaction. The survey advises that current Nelson Resource Management Plan does not include liquefaction as a hazard, but Council practice is to seek geotechnical advice at the time of subdivision consent (under the Resource Management Act 1991) or building consent (under the Building legislation) in liquefaction areas. Following the Christchurch earthquakes the profile of liquefaction as a hazard risk has been raised, and in general local government is working with their communities to better understand the implications and risks.

The survey discusses the options to address liquefaction hazard when erecting new buildings in liquefaction areas. Options outlined were reliance on the building consent process or inclusion of controls in the Nelson Plan which may require a resource consent or to impose controls depending on the type of building.

A commentary was provided in the survey and a question posed **"How should Council address liquefaction hazard when erecting new buildings in liquefaction areas?"**

Sixty-eight responses were received. The two key themes were evident from this feedback:

1. Further investigation should be undertaken to confirm the presence of a liquefaction hazard and the suitable response to the hazard, these areas should be clearly identified. Respondents identifying a need to consider the areas which may be affected overtime due to the effects of climate change.

"Clearly specify what is a liquefaction hazard. So we can understand ruling."

"All reclaim land should have special building restrictions no matter how long it has been reclaimed."

"This issue is also going to increase over time with climate change bringing more rain (waterlogged soils) and sea level rise raising the groundwater table. …"

2. Where control is required this should mitigate risks to safety and mitigate property damage. Controls or requirements should respond to the type of the building and the proposed activity.

Feedback provided contrasting opinions on whether the building legislation was appropriate and whether a resource consent process was required. A process that considered the site-specific circumstances at the time of development was supported as was a general avoidance of areas prone to liquefaction.

"Different consent types or controls depending on the type and use of a building - a one size fits all approach is seldom practical or sensible."

"…I suspect this will be a national issue for all councils and could potentially be a great collaborative exercise."

"…from Christchurch experience there shouldn't be any hazardous substance stored in the liquefaction prone area as the bunding cracks and distorts."

Feedback identified a desire for further consideration of how to respond to liquefaction at a national level, suggesting following national guidance or best practice guidance from the Ministry of Building and Employment (MBIE).

Emergency management and remediation following the occurrence of liquefaction were commented on as relevant considerations.

The significant costs associated with property and infrastructure damage was raised, with respondents identifying that either council or developers should be liable for these costs.

"Areas of potential liquefaction should be clearly identified and any development in such areas be controlled by individual specific consent. Any other options loads the financial cost on to all taxpayers in the event of a disaster."

Several respondents also identified concerns with the identification of liquefaction on LIM reports or property files. Noting that if liquefaction were to be included then other hazards such as tsunami risk, landslide, lateral shift subsidence and severe ground acceleration (shaking) should also be included.

"To be consistent liquefaction hazard information should be included in LIM. Also landslide, lateral shift subsidence and severe ground acceleration (shaking) should be included in LIM. (ie all of Nelson)"

7.0 GENERAL THEMES FROM AREA AND PROPERTY SPECIFIC FEEDBACK

Two hundred and ninety-three (293) responses were received regarding property specific feedback, as shown in Figure 8. Respondents' views on flood, fault and liquefaction have been considered and the general themes identified below.

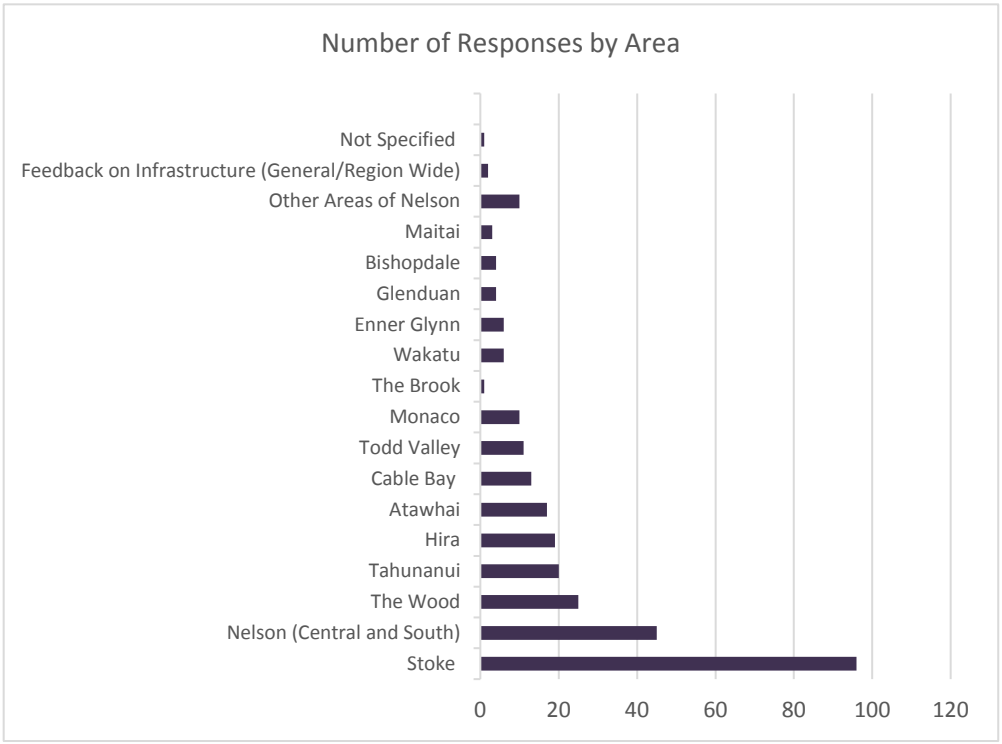


Figure 8: Respondents to the area and property specific feedback by area: the horizontal axis represents the number of response forms from the identified area

7.1 FLOOD HAZARD

In addition to the general feedback received in relation to flood hazards included at section 4.0 above, area specific issues have also been identified and additional comments recorded. Feedback received includes suggestions for specific works or identification of particular issues in the following areas:

Specific works and issues:

- Many respondents identified that they did not agree with the flood hazard mapping. Comments included that flooding at their property or in a particular

area either had not occurred (to their knowledge) or was not likely to occur and/or there were particular site features which prevent flooding (e.g. site topography, raised ground/floor levels, landscaping features) and therefore disputed the accuracy of the flood mapping/modelling.

- Some respondents noted that their properties are only just included within the extent of the flood mapping. An example included driveways being within the mapped area but the remainder of the property including the house/ancillary buildings being outside the area of risk.
- Quebec Road culvert and Washington Road culvert, requires cleaning out to ensure they do not become blocked in flood events and can convey stormwater.
- Enlarge Waimea Rd Culvert.
- Maintain the Poorman Valley Stream as it has become full of weeds and stones, when it was excavated some years ago the difference was noticeable. There is a potential problem area at the culvert under Main Road Stoke.
- Jenkins Creek between Ridgeway and Beatson Road should be maintained to remove vegetation.
- The 'top end' of Grove Street becomes blocked due to the drain being covered with leaves and garden debris.
- At Broadgreen Intermediate School the maps show flooding over the playing fields, mainly in the North East. Respondents identified that having lived in the area over a number of years this level of flooding had never been observed.
- Identify Murphy Street and Emano Street as flood affected as both have had serious events over the last 35 years.

Suggestions for managing flood hazards:

- Deepening the Maitai River channel from Nile Street to the port would assist in clearing the water flow.
- Council should investigate the provision of flood retention ponds in the Maitai.
- Work with other agencies; for example, the New Zealand Transport Agency and the Department of Conservation to enable joint approach to enlarging culverts on highways and allow controlled use of conservation land for flood plains.
- The Stoke by-pass should be raised by NZTA to allow Saxton Creek (Champion Road) to flow freely. Without attending to this choke hold point, flooding is inevitable.
- Identify where the flood hazards are on predictive modelling only (for example the Nelson North area), differently in the mapping to areas where flooding has been experienced.
- Some respondents had an expectation that Council would build barriers to prevent the sea coming up the Maitai River or that dams or diversion would/could be constructed to prevent significant parts of the City from being flooded.

7.2 FAULT HAZARD

Feedback was received for 39 respondents who provided feedback in relation to site and area specific fault hazards and more generally commented on the approach taken to merging risks from fault hazards. The feedback is identified as area specific, and as more generally applicable comments.

Area specific

- Areas subject to identified faults and unstable ground should not be developed. References made to faults such as Glen to Wairoa Gorge, Walters Bluff and Ridgeways, Tui Glen to Walters and Suffolk Road and the Hill Street South (Tasman) areas.
- Where the Flaxmore Fault is deeply buried (in proximity to Walters Bluff) and the exact location is not known, respondents seek that no fault hazard overlay is identified. Reference is made to the GNS report undertaken in August 2013 in support of the request that no fault hazard overlay should be applied.
- Property owners question the origin of the new data, particularly in relation to the Flaxmore Fault where the area affected by the overlay has increased.
- Some property owners confirmed they were aware of the identified fault hazards and acknowledged Council's further work to investigate fault lines.

"My property is close to the Faultline overlay, and I knew this when I bought my property 5 or so years ago. I understand the risks and I am pleased the council has researched this fault line and provided this on the LIMs."

Comments on information used to identify faults:

- Multiple respondents identified that they did not consider there was a risk present.
- Many of the responses illustrated that there remains a degree of uncertainty relating to what information is available and what can be relied on to inform

the identification of fault lines and decision making related to them. Responses included:

- This decision should be made by qualified geotechnical experts not the general public.
- Respondents questioned where fault hazards have been reduced or removed from a property how does this serve to reflect the actual risk to that property or the inhabitants.
- Some preferring that where the precise location of a fault is not known then a fault hazard 'planning zone' should incorporate the ground inferred to contain the fault in addition to a setback from that fault.
- Respondents felt that Council have not carried out enough tests to prove that specific properties are affected and provided suggestions on the information required to support the identification of fault hazards.
- Several respondents considered that the identification of faults was undertaken on a theoretical basis and that there is no proof of actual fault location in certain areas.
- Respondents identified that in their view every property could be at risk in an earthquake, therefore questioned the identification of fault hazard alone.

"It is unfair to retrospectively blight my property value with a statistical estimate which Council cannot prove and I cannot disprove. If Council was genuine about risks to existing properties they would conduct test bores to prove it. The house is a greater risk from continued operation of Flaxmore Quarry with regular blasting into bed-rock over the faultlines causing shockwaves."

"Fault hazard overlay has been applied to a corner of our property I have seen no comprehensive data to show a Fault exists near my property or data to pinpoint the location of the Fault. I would appreciate the NCC provide such data to me prior to zoning my property. If the location of the Fault is in fact not well described, it would be appropriate to either:

(a) collect the data prior to the plan becoming active,

(b) remove the Fault zone until such data has been collected, or

(c) state clearly that the zoning is approximate and the Fault may or may not be located in the zone.

I prefer option b ."

General feedback and suggestions

- Feedback identified that a discussion of the broader approach to natural hazards management within the Plan review is required, with a focus on life-line infrastructure and consideration of the secondary effects of fault hazards, including slips. For example State Highway 6 is identified as intersecting with

known fault hazards in two locations – through the Whangamoas and from Hira to Wakapuaka.

- Feedback identified that other infrastructure including the Walters Bluff reservoir is built across a 6m wide fault line.
- Several respondents sought that council consider the role of building design such as pole buildings vs brick or other structures in proximity to fault lines.
- Feedback sought further consideration of when a hazard should be identified noting that in some cases the fault may only affect a small portion on a property, particularly in rural areas.

> *"Neither our house nor any of our property [*aside from an access road*] is on the fault zone. …I believe it [*council*] should look more closely to where properties are actually situated related to the hazards themselves. If they deem a property to be in a fault zone because the zone clips the start of a joint access road, possibly kilometres from the zone or hazard, then I believe the data the council has, especially in rural areas, is inaccurate and would effect resource planning."*

7.3 LIQUEFACTION

Feedback provided specifically in relation to liquefaction in the Tahunanui area identified that in many of the respondents view liquefaction has not been adequately demonstrated to be an issue for the Nelson Region/Tahunanui.

Feedback identified the following themes:

- Consider what percentage of a property should be affected by liquefaction in order to quality a reference on a property file.
- How should houses built on engineered fill which has been approved by Council be treated. Examples referred to Tahunanui and the Port Nelson area being subject to engineering, noting that this should be considered when identifying liquefaction risk (and inclusion of this on LIMs).
- Recognise mitigations which have been undertaken to protect buildings from liquefaction (such as ground treatment) when identifying liquefaction risks.

- Low probability hazard areas and/or areas where little information is available should not be noted on LIMs.
- There is limited evidence to suggest that there is a hazard that requires a management response, therefore question the need to manage Liquefaction through the Nelson Plan.
- The need to consider that the effects from liquefaction are not limited to buildings and that roads and other infrastructure may be equally affected. If liquefaction is to be considered in the Nelson Plan then impacts on infrastructure (including, ports, roads and lifeline utilities) is also sought to be considered.

"In spite of a number of significant earthquakes in the Nelson region no liquefaction has been recorded. This question was put to your experts at a recent meeting and confirmed."

"There is insignificant knowledge about liquefaction to even consider that Tahunanui should be singled out as a potential liquefaction zone."

"… no justification for this to be noted on our property records…"

8.0 FEEDBACK ON LIM REPORTS

A substantive amount of feedback was received in relation to the noting of natural hazards on property files and LIM reports[2]. The following feedback was received:

- Respondents identified concern that notations on LIM reports would impact on their ability to sell property and on the overall property values.
- Many respondents also raised the possibility that notations would result in higher insurance premiums or complicate their ability to obtain cover.
- Concerns were identified regarding the quality of information relied on in identifying the various hazard areas.
- Respondents sought more 'nuanced' information be recorded including differentiation between 'modelled' flood hazards and experienced floods and differentiation between 'high' and 'low' hazards.
- Qualification sought as to why certain hazards (faults, flooding and liquefaction) had been selected to be identified (and included on LIMS).

[2] The Local Government Official Information and Meetings Act 1987 and the Building Act 2004 both contain requirements which relate to Council's obligation to disclose information related to natural hazards.

- Further ability to peer review or independently review the reports identifying the hazards. Suggesting that Council should ensure this occurs.
- Questions were raised through feedback relating to the ability for people to provide site specific assessments to remove hazard notations (subject to Council's agreement), particularly where these notations appear in LIMs or in planning maps.

"We understand our property is located on a fault in Nelson but obviously there is nothing we can do about that as it is just that, a natural hazard. We are also aware that this is noted on the property file but don't believe this will effect our property for potential sales in the future as numerous properties around NZ have this and then there are the ones that don't know they are living on a fault (such as the properties in Christchurch earthquakes) and the risk that an earthquake could trigger numerous faults to rupture (such as the Kaikoura earthquakes) so potentially not only our property would be effected but hundreds, if not thousands."

9.0 OTHER MATTERS

In addition to feedback related to flood, fault and liquefaction respondents identified a number of other matters or hazards that Council should consider:

1. **Multi Hazards Approach:** Consideration of multi hazards approach (where a property or area may be subject to multiple hazards, including for example a fault hazard, river flooding and coastal hazards).
2. **Risk Based Approach:** Further identification of other potential natural hazards should be undertaken and a risk based approach applied to the management of these hazards. Other hazards identified by respondents include wildfire, tsunami, coastal hazards.
3. **Reflection of National Guidance:** Recognition of national guidance (such as the Ministry for the Environment exploration of a National Policy Standard for Natural Hazards, the updated guidance in relation to climate change and coastal hazards (unofficially released in draft form) and the Ministry for the Environment and the Ministry for Business, Innovation and Employment development of liquefaction guidance) to assist in guiding policy development and responses.
4. **Collaboration:** The further ability for Council to work with major infrastructure providers in looking at mitigations and management methods.
5. **Emergency Management:** The need for more work to be undertaken in relation to civil defence planning
6. **Mitigations and Future Infrastructure Works:** Respondents sought that Council engage further in relation to the steps taken by Council to mitigate or remedy hazards to the community.