

APPENDIX 11 – NATURAL HAZARDS S32 ASSESSMENT

Introduction and background to the topic

Parts of the District are subject to various natural hazards, the most significant of these affecting urban areas being fresh water flooding (from localised rainfall events and river breakouts), sea water inundation and land deformation as a result of earthquakes (e.g. liquefaction). Increased development density in areas subject to significant natural hazards can put more people and property 'in harm's way', increasing risk. In addition, increased building and site coverage can result in increased stormwater runoff (from increased impervious surfaces) and displacement of floodwaters. These factors can overwhelm the design capacity of existing stormwater infrastructure and exacerbate flooding risk.

A number of technical reports on natural hazards informed the PDP. A useful resource created from these was the natural hazards portal which can be accessed at the following address: <https://waimakariri.maps.arcgis.com/apps/MapSeries/index.html?appid=16d97d92a45f4b3081ffa3930b534553>.

Whilst liquefaction affects large parts of the urban environment, the PDP Natural Hazards Chapter generally considers this hazard to be able to be adequately managed by Building Act requirements. Furthermore, the areas of the district most affected by land deformation were 'Red Zoned' by central government after the Canterbury 2010/2011 earthquake sequence and are not considered within scope of the Amendment Act or the NPS-UD Policy 3 (see Part A of this s32).

As set out in the PDP Natural Hazards s32, coastal erosion is projected to be limited to the northern part of the District and will only occur within the active dune system. This leaves freshwater flooding and sea water inundation as the most prevalent natural hazards being managed by the PDP and of relevance to the Amendment Act and NPS-UD Policy 3.

The PDP proposes to manage flooding and sea water inundation risk in existing urban areas through a minimum floor level approach achieved through a certification pathway. In Kaiapoi a fixed minimum floor level approach has been adopted. These approaches also take into account the proposed density provisions applying in at risk areas and to a lesser extent the infrastructure requirements in these areas. The approach differentiates between low to medium flood risk and high flood hazard risk, as well as existing urban areas vs rural areas. The contributing matters of consideration were:

1. New developments in high flood hazard rural areas should be avoided as this generally increases natural hazard risk where there was little or none previously;
2. Some intensification and increased natural hazard risk is acceptable in existing urban areas subject to high flood hazards where:
 - the community has already accepted increased flood risk;
 - the benefits from being able to re-develop and intensify outweigh the increased natural hazard risk;
3. Increasing natural hazard risk should ideally be avoided in areas subject to sea water inundation (as per the NZCPS);
4. The CRPS sets out a framework for managing natural hazards, which includes mitigation in existing urban areas.

The area of the District within scope of the Amendment Act and NPS-UD Policy 3 and that is also subject to significant flooding and sea water inundation risk is limited to Kaiapoi. Noting the four

considerations above, parts of Kaiapoi were up-zoned from an ODP zoning comparable to the GRZ to the MRZ. This provided opportunities for Kaiapoi to grow and evolve, recognising the benefits of intensification and also that Kaiapoi greenfield growth is constrained by significant natural hazard risk. This was recognised in the DDS where it stated for Kaiapoi (page 41):

- *“Extent of hazard risk to be considered as part of the Council’s response to the National Policy Statement on Urban Development Capacity*
- *148 hectares of additional feasible residential land required for the next 21 years of growth (this includes capacity in remaining stages of existing residential developments and new greenfield areas)*
- *Future residential growth directions proposed to the north east of existing Kaiapoi*
- *Opportunities for intensification and regeneration to be identified*
- *New growth directions take into account the areas of unacceptable natural hazard risk and areas of significant environment and cultural values”*

As set out in the PDP s32, the PDP is considered the best option to respond to the identified natural hazards and the higher order planning framework (including the NPS-UD before the Amendment Act Policy 3 changes).

Issues and Options

Both the Operative District Plan and the PDP include various rules on buildings and activities proposed in flood risk locations, seeking to avoid or mitigate flood risk. As set out earlier, generally the PDP approach is to mitigate flood risk, including high flood hazard areas, in existing urban areas, through minimum floor levels. While it could be argued that high flood hazard areas should be avoided completely, this approach recognises that the Kaiapoi community is already established and currently subjected to flood risk and gives effect to CRPS Policy 11.3.1.

Providing for some intensification enables the town to evolve and landowners to modestly develop their sites. However, significant high density development would put even more assets in “harm’s way” and goes beyond providing modest opportunities for Kaiapoi to grow. For the above reasons it is considered inappropriate to apply the MDRS provisions in areas that are subject to significant flooding and sea water inundation.

Considering the Amendment Act and NPS-UD requirements, the options for the Kaiapoi areas subject to high flood hazard and sea water inundation that have been considered are set out below.

For commercial areas, the NPS-UD directs height limit changes. Adding additional floors above floodwaters does not contribute to increased risk to the same extent as additional ground floor activity and does not contribute to additional flood water displacement. In the commercial areas of Kaiapoi, the PDP requires residential activity to be above the ground floor. As such, increased height in commercial zoned areas is not as relevant to existing natural hazard risk compared to increased residential density.

NPS-UD Policy 3 also applies to areas adjacent the TCZ, LCZ and NCZ. Where these are in the flooding constrained precinct they will also be excluded via qualifying matters.

The options for the Kaiapoi residential areas that have been considered are set out below. For the above reasons it is considered inappropriate to apply the MDRS provisions in areas that are subject to significant flooding and sea water inundation.

Option	Comment	QM matter required?
Option 1 - Status Quo* Apply the MDRS in Kaiapoi irrespective of high flood risk	Highest development option Sites subject to high flood risk can be developed for 3 houses without minimum site sizes. This puts significantly more assets at risk and contributes significantly more flood water displacement (relative to the other options). <i>*The Amendment Act and NPS-UD Policy 3 are required to be applied unless qualifying matters apply. As such, they are considered to be the status quo option</i>	No
Option 2 Apply the zones as per the PDP	Preferred option Maintains the PDP development potential proposed. Density is 1 unit per 500m ² in General Residential Zone and 1 unit per 200m ² in Medium Density Residential Zone. This option provides opportunities for Kaiapoi to intensify but not at the density enabled by the MDRS.	Yes
Option 3 Apply the zones as per the ODP	Lowest development option Reduces the density from the PDP. Density is 1 unit per 300m ² in the Residential 1 zone and 1 unit per 600m ² in the Residential 2 zone. This is the lowest density approach and provides the least opportunities for Kaiapoi to grow relative to the other options.	Yes

Proposed approach

The proposed approach is to apply the zone provisions in the PDP as notified in the area affected by high flood hazard and sea water inundation, rather than the MDRS provisions. This area would be mapped as the “Flooding Constrained Precinct” or similar. The MDRS provisions will apply to the remainder of the residential zoned areas (General Residential / Medium Density Residential) in Kaiapoi.

In order to justify the proposed approach in the Flooding Constrained Precinct and apply alternative density standards to those required under the Amendment Act, qualifying matters justification is required.

Qualifying matters justification

As set out in Section 8.3 of the main report, the proposed approach within the residentially zoned areas is justified due to the modelled flood hazard risk.

NPS-UD Policy 3 also applies to areas adjacent the Town Centre, Local Centre and Neighbourhood Centre zones. Where these areas fall within the proposed Flooding Constrained Precinct they are proposed to be excluded from the requirements of NPS-UD Policy 3 via a qualifying matter for consistency and because increased height may encourage greater development and put more

significant assets at risk of natural hazards. In these areas the PDP height and other density standards will apply.

For the specified commercial zones within Kaiapoi that are also subject to flooding, the Council has chosen to implement NPS-UD Policy 3 without qualifying matters as they are not required (see the section on commercial areas within this s32).

Scale and significance statement

Scale and Significance Evaluation			
	Low	Medium	High
Degree of change from the Proposed Plan	✓		
<p>The proposed approach seeks to apply the PDP approach in Kaiapoi through the use of qualifying matters. The degree of change from the PDP is low.</p> <p>The remainder of the urban areas within scope are as per the MDRS and NPS-UD Policy 3. The degree of change from the PDP is high, however, as these are mandatory changes these matters are not relevant.</p>			
	Low	Medium	High
Effects on matters of national importance		✓	
<p>The Proposed Plan manages significant risk from natural hazards as a matter of national importance (Section 6(h) RMA). These matters are considered through this variation via qualifying matters applying in the Kaiapoi Flooding Constrained Precinct. Although a clear matter of national importance, the degree of change and scale produce a medium scale and significance result.</p>			
	Low	Medium	High
Scale of effects geographically (local, district wide, regional, national)	✓		
<p>The proposed alternative provisions are limited to the Kaiapoi Flooding Constrained Precinct and as such are a local scale only.</p> <p>The remainder of the urban areas within scope are as per the MDRS and NPS-UD Policy 3. In this respect the scale of effects is high, however, as these are mandatory changes these matters are not relevant.</p>			
	Low	Medium	High
Scale of effects on people (how many will be affected – single landowners, multiple landowners, neighbourhoods, the public generally, future generations?)		✓	
<p>The proposed alternative provisions are limited to the Kaiapoi Flooding Constrained Precinct. While of a local scale only, they affect the District's second largest urban area.</p>			

Scale and Significance Evaluation			
The remainder of the urban areas within scope are as per the MDRS and NPS-UD Policy 3. In this respect the scale of effects is high, however, as these are mandatory changes these matters are not relevant.			
	Low	Medium	High
Scale of effects on those with specific interests, e.g., Mana Whenua, industry groups	✓		
The scale of the effects on tangata whenua and special interest groups is assessed as low.			
	Low	Medium	High
Degree of policy risk – does it involve effects that have been considered implicitly or explicitly by higher order documents? Does it involve effects addressed by other standards/commonly accepted best practice? Is it consistent, inconsistent or contrary to those?	✓		
The degree of policy risk is considered to be low as the proposed approach in Kaiapoi has been justified through the PDP s32 and the use of Qualifying Matters is provided for under the Amendment Act.			
The provisions applying to the remainder of the urban areas within scope are as per the MDRS and NPS-UD Policy 3. In this respect the degree of policy risk is also low. However, as these are mandatory changes these matters are not relevant.			
	Low	Medium	High
Likelihood of increased costs or restrictions on individuals, communities or businesses	✓		
The proposed approach seeks to apply the PDP approach in Kaiapoi through the use of qualifying matters. In this regard the likelihood of increased costs or restrictions relative to the PDP is low.			
The provisions applying to the remainder of the urban areas within scope are as per the MDRS and NPS-UD Policy 3. These are mandatory changes and as such these matters are not relevant.			
Summary - Scale and Significance Overall, it is considered that the scale and significance of the proposal is low .			

Evaluation of proposed approach

The evaluation table below considers two options: the status quo approach, which is the application of the MDRS and NPS-UD Policy 3 in full with no qualifying matters applying; and the proposed approach, which applies qualifying matters to parts of Kaiapoi that are subject to high flood hazard and sea water inundation.

The Amendment Act and NPS-UD Policy 3 are required to be applied unless qualifying matters apply. As such, they are considered to be the status quo option. The proposed approach is consistent with the PDP and therefore relevant parts of the s32 from the PDP Natural Hazards Chapter has been reproduced here.

Approach	Benefits	Costs	Efficiency and Effectiveness	Risk of acting / not acting
Status Quo*	Environmental, economic, social and cultural effects anticipated	Environmental, economic, social and cultural effects anticipated		If there is uncertain or insufficient information about the subject matter of the approach
<p><i>*The Amendment Act and NPS-UD Policy 3 are required to be applied unless qualifying matters apply. As such, they are considered to be the status quo option</i></p> <p>Objectives, Policies and methods:</p> <p>Some discrete changes will be required to the PDP to implement the MDRS and Policy 3 NPS-UD (e.g. adding a new objective to recognise the national</p>	<p>Environmental:</p> <p>No direct or indirect environment benefits have been identified with the status quo that aren't already set out in the supporting reports for the MDRS and NPS-UD Policy 3.</p> <p>Economic:</p> <p><u>Direct benefits</u></p> <p>The direct economic benefits derived from the status quo include:</p> <ul style="list-style-type: none"> Increased development potential in those areas of Kaiapoi that are subject to 	<p>Environmental:</p> <p>No direct or indirect environmental costs have been identified with the status quo that aren't already set out in the supporting reports for the MDRS and NPS-UD Policy 3.</p> <p>Economic:</p> <p><u>Direct costs</u></p> <p>The following direct economic costs have been identified:</p> <ul style="list-style-type: none"> Increased costs to recover from natural hazards (such as repairing damage, loss of productivity). Increased costs to upgrade infrastructure. 	<p>Efficiency</p> <p>The status quo approach is not considered to be the most efficient because:</p> <ul style="list-style-type: none"> They do not fully give effect to higher order direction (Section 6(h), and CRPS) as significant hazard sensitive development is permitted to occur within high flood hazard areas and areas subject to sea water inundation. When a significant hazard event occurs there will likely be greater economic costs. <p>Effectiveness</p>	<p>It is considered that there is certain and sufficient information on which to assess the status quo approach on as:</p> <ul style="list-style-type: none"> The expert assessments provided show that there are a number of natural hazards that affect the District and that some of the potential impacts represent a significant risk to residential development; Higher order guidance (Section 6(h), and CRPS) provides direction on how natural hazard risk needs to be managed and addressed within District Plans. The status quo approach is less consistent with this higher order

<p>direction supporting increased density of development in existing urban areas that are subject to natural hazards).</p> <p>As this is not the preferred option these amended / new provisions have not been drafted.</p>	<p>high flood hazard and sea water inundation.</p> <p>Social:</p> <p>Greater intensification will support the continued development of Kaiapoi.</p> <p>Cultural:</p> <p>No direct or indirect cultural benefits have been identified with the status quo approach.</p>	<ul style="list-style-type: none"> There may be increased costs on ratepayers to improve infrastructure to remove or reduce flood risk. <p>Social:</p> <p>With greater assets at risk there are potentially greater social costs if a natural hazard event occurs.</p> <p>Cultural:</p> <p>No direct or indirect cultural costs have been identified with the status quo approach.</p>	<p>The status quo approach is considered to not be as effective as the preferred approach because:</p> <ul style="list-style-type: none"> They do not fully give effect to higher order direction (Section 6(h), and CRPS) as they put proportionally greater assets at risk of natural hazards with little increased benefit. 	<p>direction than the preferred approach;</p> <ul style="list-style-type: none"> The status quo approach does not fully enable the Council to undertake its functions under Section 31(b)(i) of the RMA; New Zealand has experienced a significant number of large natural hazard events in the last decade (Christchurch Earthquake Sequence, Kaikoura Earthquake, Gisborne Floods, Dunedin Floods, West Coast Floods and Southland Floods). There has been significant social and economic costs from these events. Some of these costs could have been avoided if there had been better recognition of natural hazard risks.
<p>Appropriateness to achieve the purpose of the RMA</p>				
<p>Relevance:</p> <p>The status quo approach responds to Part 2 of the RMA, but does not fully respond to Section 6(h) - the management of future development in the natural hazard and coastal hazard overlays. The approach assists the Council with undertaking their functions under s.31 of the Act. The proposed approach does not fully give effect to the higher order documents (NZCPS and CRPS), which require a risk-based approach to the management of natural hazards (as previously identified).</p> <p>Reasonableness</p>				

The status quo approach will not impose additional direct costs on the community but infrastructure will likely be required to be upgraded. In addition, developments will need to incorporate mitigation measures to ensure that the impacts from natural hazards are reduced to an acceptable level.

However, this needs to be considered in relation to the risk to life and property that can arise from undertaking development within areas susceptible to natural hazards. Development which does not take into account the natural hazard risk has the potential to have significant health and safety impacts and well as economic costs from the resulting damage.

Achievability:

Land use planning and subdivision decisions are one of the methods that councils have available to direct development. As such, the proposed approach can be realistically achieved within Council's power, skills and resources.

Opportunities for economic growth and employment

The status quo approach does not prevent economic growth or employment.

Quantification

Section 32(2)(b) requires that if practicable the benefits and costs of a proposal are quantified.

Given the assessment of the scale and significance of the proposed changes above it is considered that quantifying costs and benefits would add significant time and cost to the s32 evaluation processes. The evaluation in this report identifies where there may be additional cost(s), however the exact quantification of the benefits and costs discussed was not considered necessary, beneficial or practicable.

Approach	Benefits	Costs	Efficiency and Effectiveness	Risk of acting / not acting
<u>Preferred Option</u>	Environmental, economic, social and cultural effects anticipated	Environmental, economic, social and cultural effects anticipated		If there is uncertain or insufficient information about the subject matter of the provisions
<u>Objective: as per the PDP</u>	<u>Environmental:</u> No direct or indirect environment benefits have been identified with the	<u>Environmental:</u> No direct or indirect environmental costs have been identified with the preferred	<u>Efficiency</u> The preferred option is considered to be the most efficient because:	It is considered that there is certain and sufficient information on which to base the preferred option as:
<u>Policy: as per the PDP</u>				

Methods: as per the PDP	preferred option other than those identified in the PDP supporting material.	option other than those identified in the PDP supporting material.	<ul style="list-style-type: none"> • It gives effect to higher order direction (Section 6(h), NZCPS and CRPS). • While the proposed approach will result in some additional economic costs, it is considered that the resulting benefits to future occupants and the recovery of the District following a natural hazard event outweigh these costs. • The proposed approach would assist with the transfer of costs for addressing natural hazard risk from future property owners and local and central government onto developers at the time the developments are undertaken. • It is recognised that there are potential costs to be borne by tangata whenua. Careful consideration was given to whether an alternative framework was required to allow for the cultural aspirations of these communities to be met. However, this was decided against due to the higher order direction and that being more 	<ul style="list-style-type: none"> • The expert assessments provided show that there are a number of natural hazards that affect Kaiapoi and some pose a significant risk to life and property. • The preferred option is consistent with higher order direction. • The preferred option allows Council to undertake its functions under Section 31(b)(i) of the RMA; • New Zealand has experienced a significant number of large natural hazard events in the last decade (Christchurch Earthquake Sequence, Kaikoura Earthquake, Gisborne Floods, Dunedin Floods, West Coast Floods and Southland Floods, Nelson/Tasman, Canterbury Floods and Lake Ohau wildfires). There have been significant social and economic costs from these events. Some of these costs could have been avoided if there had been better recognition of natural hazard risks when some of the impacted communities were developed. The preferred option seeks to
	<p>Economic:</p> <p><u>Direct benefits</u></p> <ul style="list-style-type: none"> • Reducing the risk for damage to future developments from natural hazard events as a result of incorporated mitigation measures. • Likely ability to retain insurance cover for future properties as they have been able to be designed to mitigate the risks from natural hazards. • Reduced costs to recover from natural hazards (such as clean-up, repairing damage, loss of productivity). • Communities that experience less damage in a natural hazard event are able to recover faster. This ensures significantly reduced economic impacts from when a natural hazard event occurs as the loss of 	<p>Economic:</p> <p>The following economic costs have been identified:</p> <ul style="list-style-type: none"> • There will be a loss of development potential relative to the MDRS. 		

	<p>productivity and employment opportunities are not as significant.</p> <ul style="list-style-type: none"> The proposed provisions allow for some development within the existing urban area to still occur, providing appropriate hazard mitigation measures are incorporated into the development. This assists people in the urban area to provide for their economic well-being. <p><u>Indirect benefits</u></p> <ul style="list-style-type: none"> Potentially lower future costs to respond to natural hazard events as they have been planned for. This includes events like sea level rise and flooding which are impacted by climate change. This has the potential for reduced increasing rates of insurance premiums, reduced Council rates increases (to pay for mitigation to reduce the 		<p>permissive in the natural hazard overlays could put life and future developments at considerable risk, which would result in worse outcomes for these communities in the longer term.</p> <p>Effectiveness</p> <p>The preferred approach is considered to be the most effective because:</p> <ul style="list-style-type: none"> It gives effect to higher order direction (Section 6(h), NZCPS and CRPS), which the proposed objectives also respond to. The proposed approach relates to the natural hazards that have the potential to have the greatest impact within Kaiapoi. The activity status and the regulatory response associated with the proposed approach is directly proportionate to risk to development from a natural hazard. 	<p>ensure that future development is undertaken in a manner to ensure that these future social and economic costs do not continue to increase.</p> <ul style="list-style-type: none"> The preferred option allows Council to meet its requirements under CDEM Group Plan, by providing a risk-based approach to the management of natural hazard risk.
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	impacts from natural hazards).			
	<p>Social:</p> <p><u>Direct benefits</u></p> <ul style="list-style-type: none"> Purchasers of new properties that are located in the flood hazard constrained precinct will have more confidence these have been appropriately developed. This will reduce the potential for future social costs such as stress, strain on mental health, illness and loss of work days. <p><u>Indirect benefits</u></p> <p>No indirect benefits have been identified.</p>	<p>Social:</p> <p>No direct or indirect social costs have been identified.</p>		
	<p>Cultural:</p> <p>No direct or indirect cultural benefits have been identified.</p>	<p>Cultural:</p> <p>Te Ngāi Tūāhuriri Rūnanga Opposes any intensification of the Settlement Zone, underlying the Special Purpose Māori Zone at Tuahiwi. Therefore the proposed approach will not impact on tangata whenua aspirations to further develop</p>		

		their land. However, it is understood that tangata whenua accept that the response to and management of natural hazards is equally applicable to development of Māori land and descendent land within Māori Reserve 873.		
Appropriateness to achieve the purpose of the RMA				
<p>Relevance:</p> <p>The preferred option gives effect to Part 2 of the RMA as follows:</p> <ul style="list-style-type: none"> - s5 - it provides for the sustainable management of the District by ensuring developments are designed to avoid or mitigate the effects of the natural hazard, which also provides for the social, economic and cultural well-being of the local community as well as their health and safety. - Section 6(h) - the framework manages future development in the natural hazard and coastal hazard overlays. - Section 7(i) – the flood modelling and coastal inundation modelling has taken into account climate change. <p>The proposed approach also assists Council with undertaking their functions under s.31 of the Act.</p> <p>The proposed approach also gives effect to higher order documents (NZCPS and CRPS), which require a risk-based approach to the management of natural hazards (as previously identified).</p> <p>Reasonableness</p> <p>The proposed approach will impose additional costs on some in the Kaiapoi community as some sites will not be able to be developed to the extent envisaged by the MDRS. In addition, developments will need to incorporate mitigation measures to ensure that the impacts from natural hazards are reduced to an acceptable level.</p> <p>However, this needs to be considered in relation to the risk to life and property that can arise from undertaking development within areas susceptible to natural hazards. Development which does not take into account the natural hazard risk has the potential to have significant health and safety impacts and well as economic costs from the resulting damage. Overall, it is considered that the costs of the proposed approach on the community are justifiable, although some properties will be more impacted than others.</p>				

<p>Achievability:</p> <p>Land use planning and subdivision decisions are one of the methods that councils have available to manage the risks associated with natural hazards and it is a fundamental consideration under the RMA. As such, the proposed approach can be realistically achieved within Council's power, skills and resources.</p>
<p>Opportunities for economic growth and employment</p> <p>The preferred option only covers a small portion of Kaiapoi. The MDRS apply in the balance of the District and thereby provide significant opportunities for growth and economic development.</p>
<p>Quantification</p> <p>Section 32(2)(b) requires that if practicable the benefits and costs of a proposal are quantified.</p> <p>Given the assessment of the scale and significance of the proposed changes above it is considered that quantifying costs and benefits would add significant time and cost to the s32 evaluation processes. The evaluation in this report identifies where there may be additional cost(s), however the exact quantification of the benefits and costs discussed was not considered necessary, beneficial or practicable.</p>

Summary / conclusions

It is considered that the preferred approach provides a more balanced response to the competing aims of appropriately managing natural hazard risk while providing opportunities for Kaiapoi to grow and evolve, including through intensification as sought through the Amendment Act and NPS-UD Policy 3.