PROPERTY ECONOMICS

WCC CAPACITY MODELLING

NATURAL AND COASTAL HAZARDS MEMO

Client: Wellington City Council

Project No: 52144

Date: June 2023

W: www.propertyeconomics.co.nz E: tim@propertyeconomics.co.nz P: 09 479 9311 PO: Box 315596, Silverdale 0944

30 June 2023

ECONOMIC MEMORANDUM

To: Jamie Sirl
Senior Principal Advisor
District Planning Team
Wellington City Council
Email: Jamie.Sirl@wcc.govt.nz

RE: Explaining how Natural and Coastal Hazards were Modelled in the QFM Capacity Assessment and Investigating the Impact of Changes to Hazard Provisions and Extent

INTRODUCTION

Property Economics was engaged by Wellington City Council (**WCC**) to assess feasible residential and business capacity within Wellington City. This included an assessment of the economic impacts of feasible capacity as a result of various Qualifying Matters (QFM).

Following this report, the Council's S42A report has recommended changes to the Natural Hazard Coastal Environment chapters including a reduction in the extent of the inundation overlays and a removal of any permitted residential development in the Wellington and Ohariu Fault Overlays.

This report outlines the impact on capacity of these proposed changes on the assessed Theoretical and Feasible Capacity.

For context, Table 1 shows the combined hazard impacts on Feasible and Realisable Capacity as shown in the original QFM report and in Mr Phil Osborne's evidence. Scenario 1 represents the original sales value and construction costs as reported in the original capacity 2022 assessment while Scenario 2 represents the capacity with a 10% reduction in Sales Price and a 10% increase in Construction Cost. This latter scenario has been adopted as new baseline as it better reflects the recent changes in the market and is therefore the scenario that is assessed on in this report.

The combined hazards QFM represented the QFM with the highest total impact in regard to the Feasible and Realisable Capacity. Note that the impact on Realisable Capacity is higher than the Feasible Capacity.

As is explained further in this memorandum, the modelling for the Ponding Flood Overlay included the capacity in the Theoretical Assessment that could be built as a Restricted Discretionary Activity, but at a reduced realisation rate. Therefore, the impacts on the capacity potential of the Hazards QFM goes beyond the reduction in Theoretical potential. This is evidenced by the nominally larger impact on Realisable Capacity under Scenario 1 than the loss in Theoretical Capacity.

TABLE 1: CAPACITY IMPACTS ON FEASIBLE AND REALISABLE CAPACITY OF HAZARD QFM

Capacity Impact	Scenario	Theoretical	Apartment	Standalone	Terraced	Total
Feasible	S1	-12,714	-3,967	-308	-5,313	**-9,588**
Realisable			-3,925	-852	-8,329	**-13,106**
Feasible	S2		-2,379	-574	-3,116	**-6,069**
Realisable			-2,404	-1,347	-4,058	**-7,809**

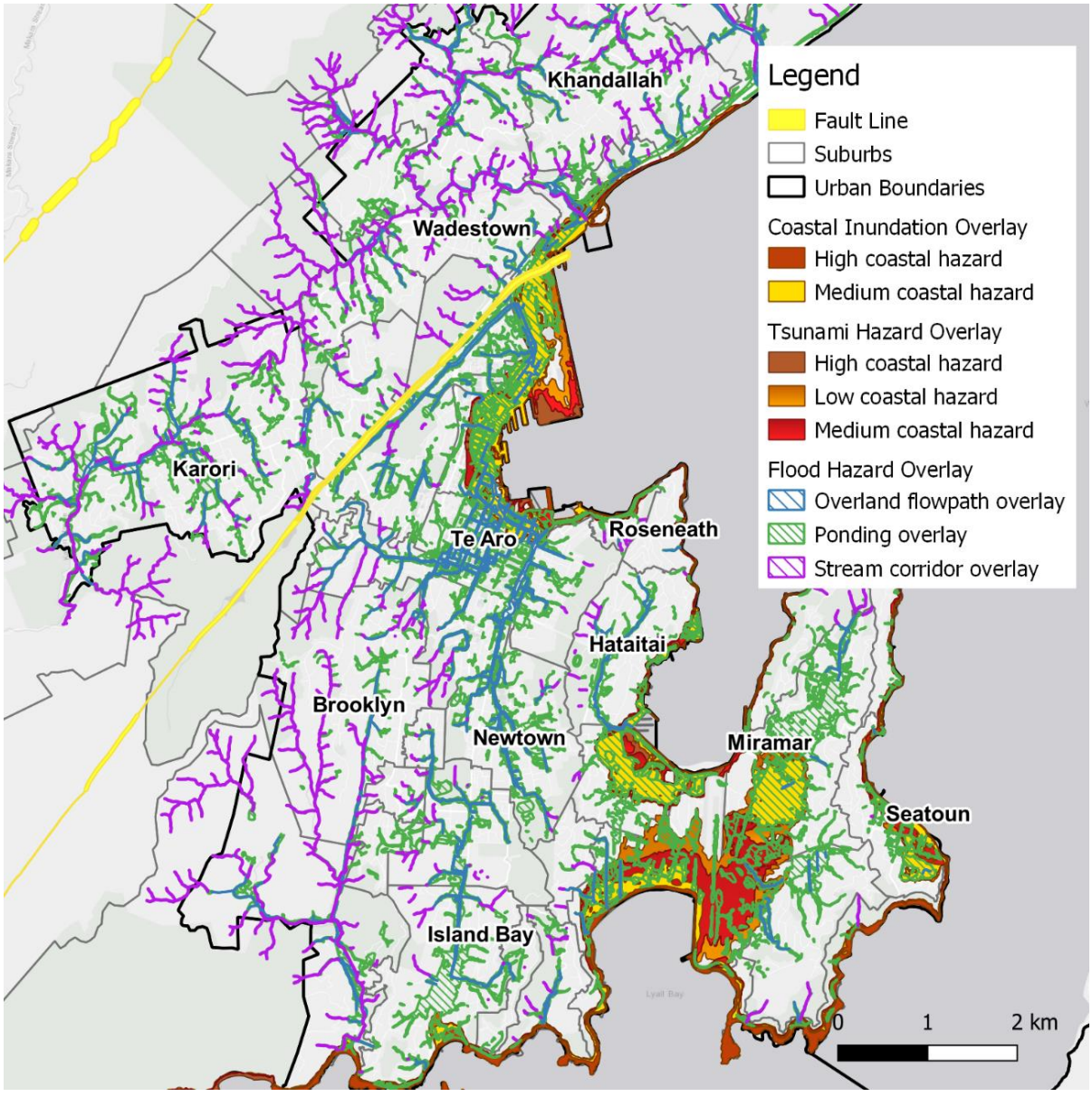
Source: Property Economics

NATURAL AND COASTAL HAZARDS

Figures 1 and 2 shows a map of the Hazard areas for the Wellington City Proposed District Plan. These were the areas assessed as part of Property Economics original QFM assessment.

Many of the Hazard Overlays affect the same areas, particularly in regard to the coastal areas which are subject to both Tsunami and Inundation Coastal Hazards and in some places, the Flood Hazard area as well. In particular, the low-lying areas around the Airport including Miramar to the east of the Airport and Kilbirnie to the West are affected by all three of these hazards to varying extents.

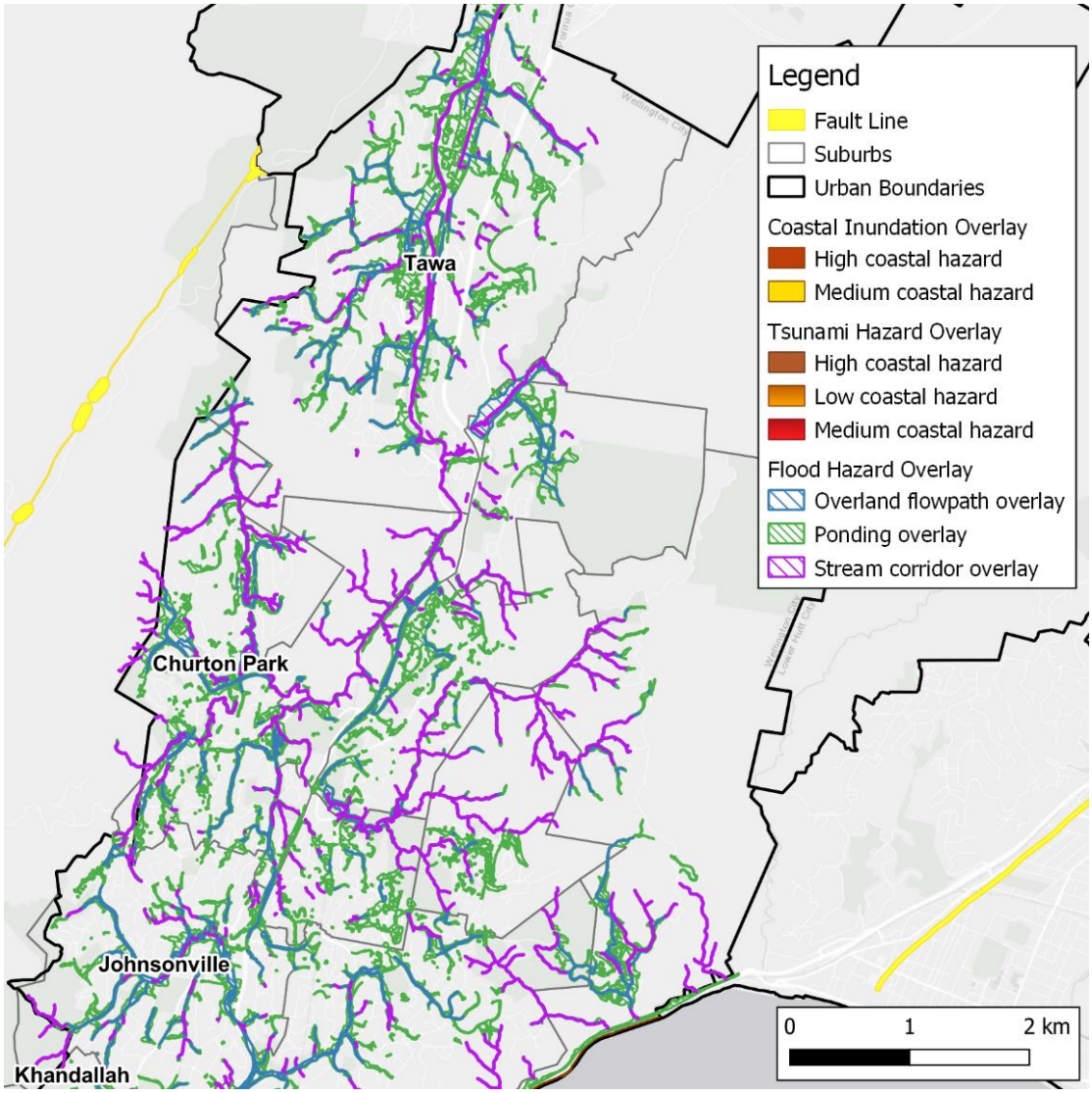
FIGURE 1: MAP OF HAZARD AREAS



Source: Property Economics, WCC

Figure 1 also shows that the Flood Hazard Overlays are extensive, running all throughout the city. Most of this contained to running through roads and only affecting parts of sites. However, in Island Bay and Karori in particular (in addition to the aforementioned areas around the Airport), the Ponding Overlay is extensive, affecting the entirety of a large number of sites.

FIGURE 2: MAP OF HAZARD AREAS (NORTH)



Source: Property Economics, WCC

Figure 3 shows a close up of some sites affected by the Flood Hazards layer in Karori. This highlights that the area of each property that is covered either the stream corridor or the overland flow path overlay has been cut out of the property.

This reduces the buildable area on the site, although in many cases, the impact is minor as 30% of the land is required to be permeable surfaces and site coverage maximum in the Medium Density Zone is 50%.

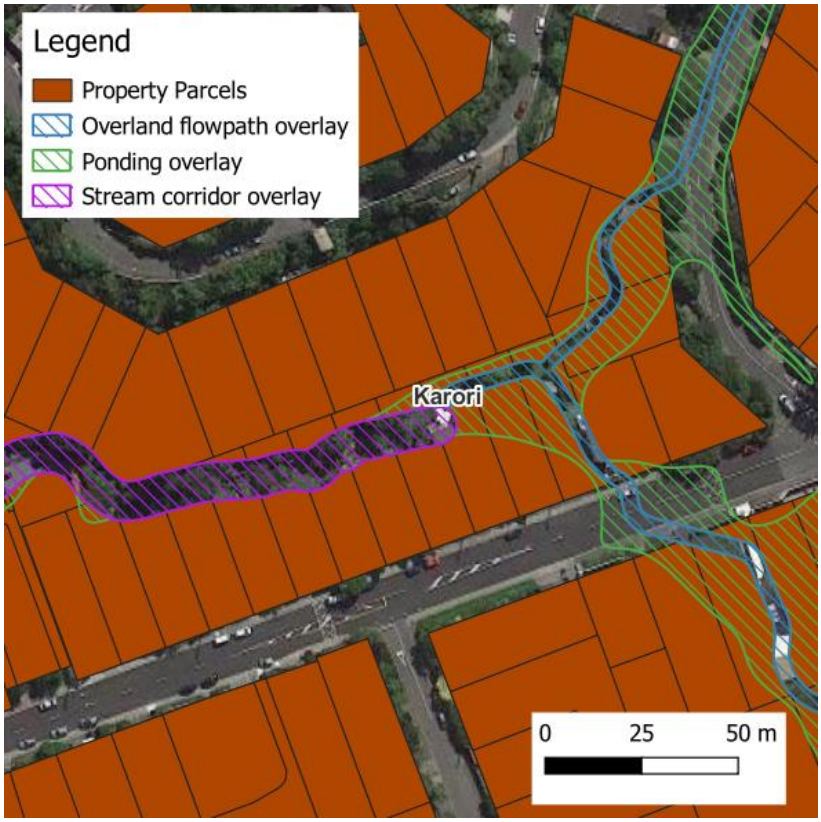
These flood overlays have been removed as building a 'Hazard Sensitive' activity such as residential dwellings within the overlay would classify the building as either a Discretionary or Non-Complying Activity.

Although Discretionary activities can and will realistically occur in the market, the capacity assessment is limited to Permitted and Restricted Discretionary activities.

The same approach has been applied to the Medium and High Coastal Hazards the area affected having been removed from the buildable area.

Building a residential dwelling in the Ponding / Flooding Inundation overlay, however, is classed as Restricted Discretionary Activity provided that the finished floor levels is located above the 1% Flood Annual Exceedance Probability level. To model this, Property Economics have included additional mitigation costs to account for the additional foundations required to lift the ground floor.

FIGURE 3: FLOOD HAZARDS CAPACITY MODELLING CLOSE UP



Source: Property Economics

Furthermore, a higher profit margin is required for the property to be classified as "Realisable" if it is covered by the Ponding Overlay.

"Realisable Capacity" represents the capacity that is reasonably expected to be realised and in Property Economics Feasibility model is directly related to the differing risk profile of the development options. While all three typologies (Standalone, Terrace and Apartments) may be feasible, the development model identifies the site scenario with the highest profit margin when reporting the Feasible Capacity.

However, practically while the model assesses the standard 20% profit margin, there is greater risk in some typologies. The assessment of "Realisable Capacity" therefore endeavours to consider these risks and motivation differentials.

This risk is accounted for by increasing the required profit level for a development to be classified as 'realisable', on top of being feasible. Table 2 below shows the profit levels required for each combination of typology and development option to be considered realisable by the model.

TABLE 2 – DEVELOPER REALISABLE PROFIT RATES

	Comprehensive Developer	Infill Developer	Infill Owner
Standalone	**20%**	**17%**	**25%**
Terraced	**23%**	**20%**	**28%**
Apartment	**32%**	**28%**	**39%**

Source: Property Economics,

Applying for a Restricted Discretionary Consent represents an additional risk to a potential developer / landowner and we have assumed that not all consents will be granted. Where the site is covered by the Ponding Overlay, up to 15% is added to the required profit margin depending on the site coverage of the overlay. For example, if half (50%) of the site was covered by the overlay, then a 30.5% profit margin (23% + 15% * 50%) would be required for a Comprehensive development of Terraces to be classified as "Realisable".

Therefore, the impact of the Ponding overlay has been modelled by both increasing the cost of development and decreasing the realisation rate of development occurring. It has no impact on the assessment of Theoretical Capacity.

For the Low Coastal Hazard, Residential Development is permitted up to a maximum of three residential units. This limit has been applied to sites affected by this overlay, resulting in a reduction in Theoretical Capacity but not further costs or reductions to realisation rates have been applied.

The impacts on Feasible and Realisable Capacity are only those that result from the reduction in development potential on the site.

Table 3 provides a high-level summary of how each hazard affects the capacity assessment on the sites. Note that in all cases, the impacts to Theoretical has flow-on effects to the Feasibility of development. For example, a site within the Low Coastal Hazard area may be feasible to develop down to 8 dwellings, but not feasible to develop to the three dwellings it is limited to.

TABLE 3: SUMMARY OF HOW HAZARDS AFFECT THE CAPACITY ASSESSMENT UNDER THE PDP

Hazard	Activity Status	How the Hazard Impacts Capacity	
Low Coastal Hazard	**Permitted**	**Theoretical:**	Development is limited to a maximum of three units on a site. Further Subdivision is an RD activity that has not been considered.
Ponding Flooding Overlay (Low Hazard)	**Restricted Discretionary**	**Theoretical:**	No Change
		Feasible:	Adds a Flood Mitigation Cost
		Realisable:	Decrease in Realisation Rate
Medium and High Natural and Coastal Hazards	**Discretionary / Non-Complying**	**Theoretical:**	Area covered by the hazard overlay has been removed and development is calculated on the remaining unaffected land.
Wellington Fault Line	**Permitted**	**Theoretical:**	Development is limited to a maximum of two units on a site. Further subdivision is a NC activity and therefore not enabled.

Source: Property Economics

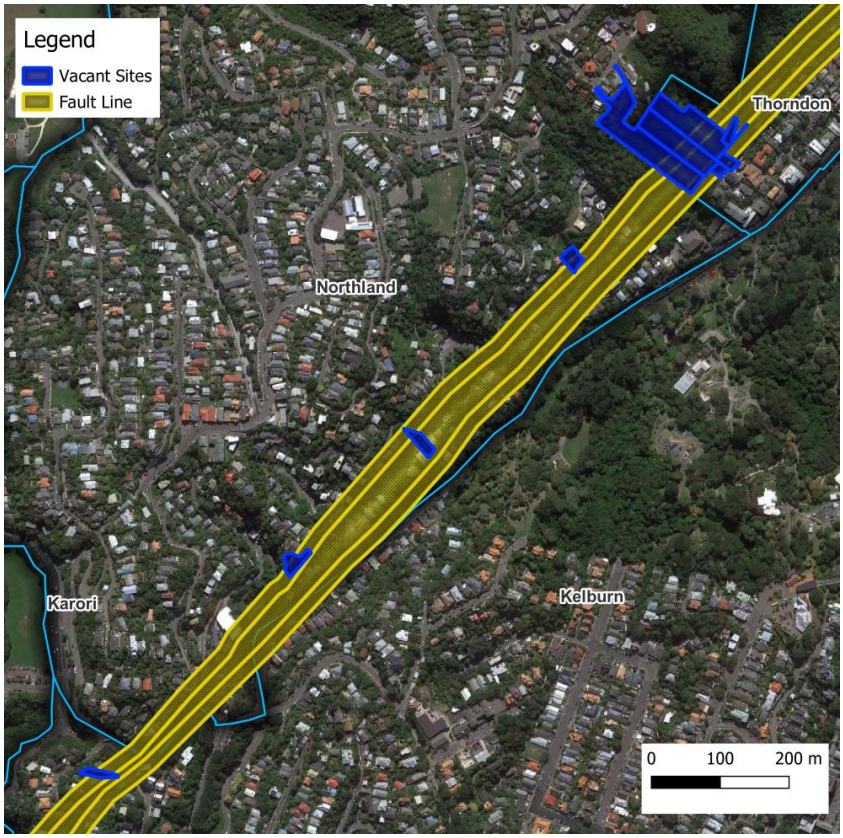
WELLINGTON FAULT LINE

Currently the Proposed District Plan allows for one additional dwelling / two dwellings per site to be built for sites within the Wellington Fault line. As this is the only fault line that runs through the urban area, the capacity of sites within the other fault lines has not been modelled.

The Section 42A officer recommends changing all new residential development to a non-complying activity.

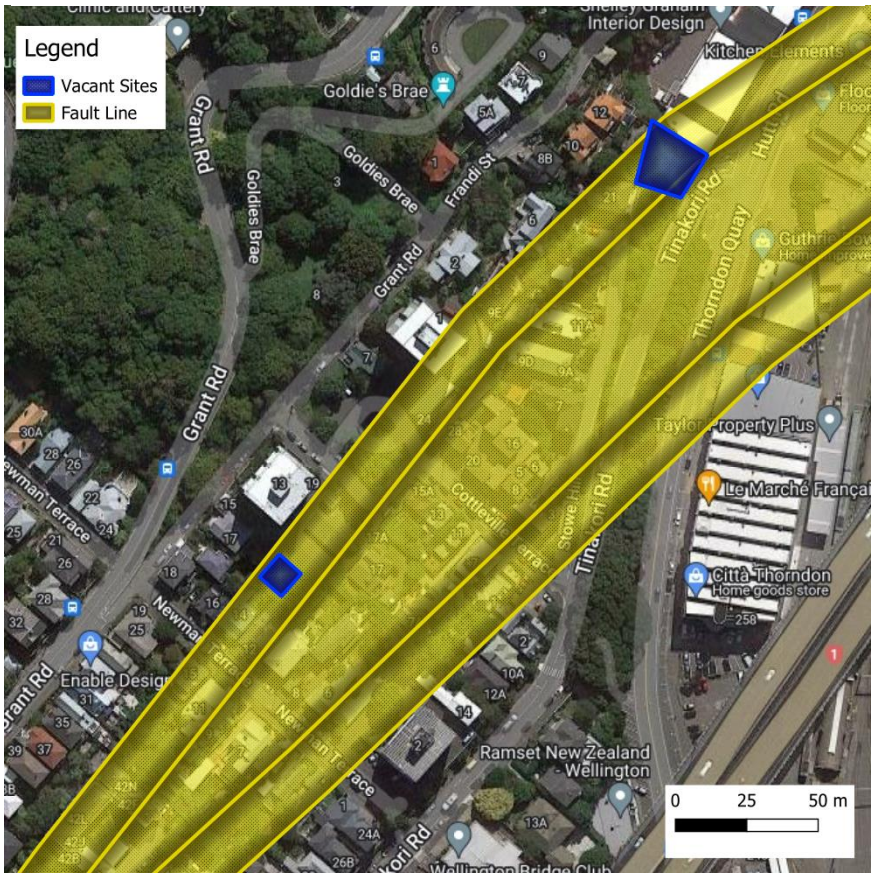
In assessing the likely impacts of this change Property Economics started by looking at the vacant sites that lie within the Fault Line. These are shown geo-spatially on Figures 4 and 5. Eleven sites were identified as being vacant, with five of those being in the cluster at the top of Figure 4. These sites are on a steep slope that had been classified as Significant Natural Areas in the Draft District Plan. Even with this restriction removed in the PDP, their development potential is limited by natural topography.

FIGURE 4: VACANT SITES WITHIN THE WELLINGTON FAULT LINE



Source: Property Economics, WCC

FIGURE 5: VACANT STIES IN UNDER THE FAULT LINE - THORNDON



Source: Property Economics, WCC

Table 4 outlines the additional capacity lost due to the removal of any permitted residential activity within the fault line.

TABLE 4: COMPARISON OF THE QFM IMPACTS OF THE FAULT LINE QFM UNDER THE PDP AND S42A PROVISIONS

All QFM	Fault Line	Theoretical	Apartment	Standalone	Terraced	Total
Feasible	PDP	238,357	13,194	17,799	45,938	76,931
	S42A	238,222	13,194	17,791	45,932	76,917
	Difference	-135	0	-8	-6	-14
Realisable	PDP	238,357	8,041	21,994	32,405	62,440
	S42A	238,222	8,041	21,984	32,401	62,426
	Difference	-135	0	-10	-4	-14

Source: Property Economics, WCC

This shows that although there is a Theoretical Capacity loss of 135 dwellings, impact on Feasible and Realisable Capacity is minimal at only 14 dwellings. This is due to the limitations imposed upon the sites affected by the Fault Line make them highly unfeasible in the first place.

Subsequent to the initial drafting of this memorandum, the recommendation (of moving to NC for all new Residential Units) has been updated to provide for one residential unit on an existing vacant site as a Restricted Discretionary Activity.

At most, this change will reduce the total theoretical capacity by eleven dwellings, i.e., the number of vacant sites shown in Figure 4. However, given some of the other constraints on these sections including high slopes and the Restricted Discretionary Consenting requirements, the impact on Realisable Capacity is likely to be considerably less than eleven dwellings. In essence, the difference this change makes to the capacity assessment is negligible.

PROPOSED REDUCTIONS IN THE COASTAL INUNDATION AND TSUNAMI OVERLAYS

Wellington City Council has informed us that the Section 42A planning officer has also recommended a reduction in the coastal inundation and tsunami overlays specifically the removal of the hazard overlay for properties with less than 0.05m inundation depths. Unfortunately, revised hazard overlays have not been able to be provided in time for this memo and therefore we are unable to quantify the effects of this recommendation. At a high level however, this is likely to result in an increase in the Theoretical Capacity (as the low, medium, and high hazard overlays are expected to reduce) and as a result, an increase in the Feasible and Realisable Capacity as well. This Memorandum will be updated with the quantification of this impact once the revised hazard overlays have been provided.