MEMORANDUM

Our reference: Proposed District Plan Change 56

To: -

From: Nathan Geard

Date: 18 August 2022

SUBJECT: PROPOSED DISTRICT PLAN CHANGE 56: ENABLING INTENSIFICATION IN RESIDENTIAL AND COMMERCIAL AREAS

SUMMARY OF INFORMATION FOR NATURAL HAZARD AREAS

This memo is a summary of the information that has informed the identified of natural hazard areas for *Proposed District Plan Change 56: Enabling Intensification in Residential and Commercial Areas.*

Wellington Fault Hazard Overlay

The Wellington Fault Special Study Area has been identified in the District Plan since its inception in 2003. The Wellington Fault Special Study Area is a 150m wide area running the length of the inferred location of the Wellington Fault. This is to manage development within 20m of the fault because of the risk of permanent ground damage during an earthquake on the Wellington Fault. This has been estimated to involve up to 4m horizontal movement and up to 0.5m vertical movement.

GNS Science have since undertaken further evaluation to refine the area of the Wellington Fault. This updated information results in a narrowing of the existing 150m band in parts of Petone and moves the band further to the East in Manor Park. This update results in 14 properties with an increased area affected by the overlay, meanwhile 132 properties are removed from the hazard overlay. It is important to include this updated information in Plan Change 56 to ensure that the risk from fault rupture hazards is appropriately addressed and is limited to the most relevant areas when considering new development.

Plan Change 56 proposes to manage this hazard risk using the existing District Plan approach.

Flood Hazard Overlays

The Stream Corridor, Overland Flowpath and Inundation area overlays have been modelled by Wellington Water. This is based on the High Intensity Rainfall Design System (HIRDS) version 4, modelled with a 20% increase in rainfall to account for climate change projections. This is consistent with the approach to flood modelling across the Wellington Region. The flood modelling undertaken identifies the following:

Stream Corridors (High Hazard Areas);
Overland Flowpaths (Medium Hazard Area); and

Inundation Areas (Low Hazard Area).

Stream Corridors are identified as High Hazard Areas because these contain the modelled extent of high-volume and flow of water in and adjacent to existing streams and waterways.

Overland Flowpaths are identified as Medium Hazard Areas because these are areas where stormwater is modelled to be fast flowing or high volume during a storm event as it travels to lower lying land, waterways, or stormwater infrastructure.

Inundation Areas are identified as Low Hazard Areas because these are areas that are modelled to be affected by floodwaters during a storm event. As these have a lower rate of flow, mitigation measures such as raised floor heights can address the immediate risk.

Modelling for the Eastern Bays, Belmont/Kelson/Manor Park/Haywards and Wainuiomata (south of the Homedale shops) was unavailable in time to inform Plan Change 56 but will inform Council's full District Plan review which is expected to be notified in early 2024.

The Stormwater Catchment Model Build Reports for Stokes Valley, Petone, Wainuiomata and Eastern Lower Hutt contain the modelling assumptions for these catchments.

Coastal Hazard - Tsunami Hazard Overlays

Three Tsunami Hazard overlays have been undertaken by GNS Science. These models cover three different annual probabilities of occurring, 1-in-100 years, 1-in-500 years, and 1-in-1000 years and incorporate 1m of sea level rise. These frequencies, and the New Zealand Coastal Policy Statement's requirement to avoid increasing the risk of harm from coastal hazards over at least the next 100 years, informed the level of risk associated with each layer (1:100y = High hazard, 1:500y = Medium hazard, 1:1000y = Low hazard).

The modelling incorporates local tsunami sources, modelling tsunami caused by 248 local faults from around New Zealand based on estimates of fault geometry and potential magnitude. The modelling also includes methods to calculate tsunami heights from local, regional, and distant-source subductions zones such as the Hikurangi, Wairarapa and Kermadec subduction zones, as well as subduction zones in South America.

Further details on modelling and methodology can be found in *Hutt City Probabilistic Tsunami Hazard Maps*, (Burbidge et al. 2021).

Coastal Hazard – Coastal Inundation Overlays

Coastal inundation mapping has been undertaken by NIWA. These models are designed to illustrate potential exposure to Lower Hutt from a 1-in-100 year coastal storm-tide event, over a 100-year planning timeframe (extended to 2130).

This modelling approach uses a static "bathtub" model to produce inundation maps and specifically incorporates the modelled rise in sea level and vertical land movement (e.g., subsidence). The bathtub model means treating the ocean like a bathtub that fills up the same way that a tub does when you add water — this approach assumes that there is an even rise in sea level across the land affected. This means that it does not account for differences in ground type other factors that may affect the flow of rising seawater across the land.

The modelling undertaken gives effect to the New Zealand Coastal Policy Statement 2010 (particularly policies 24-27) and the Ministry for the Environment's (MfE) Coastal Hazards and Climate Change (2017) guidance to the degree possible within the scope of s77G, 77I and 77J for the inclusion and assessment of qualifying matters applied through the plan change process.

The Medium Coastal Inundation Hazard Area represents the modelled coastal inundation extent during a 1-in-100 year storm-tide event in 2130. This modelling uses the Intergovernmental Panel on Climate Change (IPCC) modelled Shared Socioeconomic Pathway (SSP) 5-8.5 model and projected land subsidence of 2.86mm/year (modelled by the NZ SeaRise project).

The High Coastal Inundation Hazard Area represents the modelled coastal inundation extent during a 1-in-100 year storm-tide event at current (2022) sea level. This is considered a high coastal hazard due to the 1-in-100 year return period and likelihood of increased frequency and severity of coastal inundation events in this area as sea levels rise over the same period.

MfE's Adapt and thrive: Building a climate-resilient New Zealand, National Adaptation Plan (2022) recommends using SSP5-8.5 to screen for hazards and risks in coastal areas to 2130, and for detailed hazard and risk assessments to use both SSP2-4.5 and SSP5-8.5 as well as vertical land movement to 2130. Plan Change 56 introduces these hazard areas as qualifying matters, to manage the level

of development the MDRS and NPS-UD would otherwise allow in coastal areas of Lower Hutt. As this is not a comprehensive review of coastal hazards, the more encompassing RCP5-8.5 model was chosen to reduce the level of intensification introduced to these areas. A full assessment of coastal hazards will take place following this plan change to inform Hutt City Council's full District Plan review which is expected to be notified in early 2024.

Further information on the modelling and methodology used can be found in *Coastal Inundation mapping for Hutt City* (MacDonald & Wadhwa, 2022).