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Committee Rural Services Wairarapa Committee
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Tsunami Hazards in the Wellington Region

1. Purpose

To inform the Committee of tsunami hazards in the Wellington Region and to provide an overview of research and recommendations undertaken by Greater Wellington in response to this natural hazard.

2. What is a tsunami?

A tsunami is a long period wave or series of waves commonly referred to as a wave train. Such waves can be generated by an earthquake, volcanic eruption, submarine or coastal landslide. Tsunami waves can be either distantly or locally generated and will appear either as a non-breaking wave (rapidly moving tide) or as a breaking wave. A non-breaking wave produces strong currents associated with the run up and backwash. The backwash currents can wash people and large objects such as cars, lumps of concrete and general debris out to sea. A breaking wave also creates powerful currents but has a high impact at the shoreline causing significant destruction.

Tsunami waves can be difficult to recognise in deep water as they only have a small wave height (0.5 - 1m). As the waves approach the land they slow due to friction with the continental shelf and increase in height.

The runup height of the wave marks the maximum height of the flooding. As a 'rule of thumb' the runup height equals the maximum tsunami wave height measured from the crest to the trough. The coastal gradient and surface roughness of the coast can affect the runup height of the wave. For example for shallow coastal gradients the wave will travel further inland. While rougher surfaces and steeper gradients will reduce the runup height due to increased friction.

3. What are the effects of Tsunami?

The Tsunami waves can significantly damage coastal structures, roads and marinas changing the shape of the coast. The extent of the damage may extend

several miles inland depending upon the nature of the tsunami wave. Tsunami waves can result in significant loss of life from drowning and also because of the impact with loose debris the waves will pick up. Other impacts include salt water inundation onto prime agricultural land which create devastating economic impacts. The effects of the tsunami will be amplified in narrow river valleys and bays and inlets.

4. Tsunami and the Wairarapa coast

The Wairarapa coast is susceptible to both distantly and locally generated tsunami. The most likely source for a distantly generated tsunami is the west coast of South and North America. Other less likely sources include Japan and the Kuril Islands in the South Pacific.

Local sources for tsunami generation in the Wairarapa include the tectonically active region immediately offshore to the east of the Wairarapa coast and also fault systems belonging to the Cook Strait and Eastern Marlborough areas. It is estimated that there is 100-150 year return period for a 5-10m tsunami wave along the Wairarapa coast.

In the Wairarapa the low lying coastal land (below the 10m contour) is most vulnerable to tsunami hazards. There is potential for damage to life and property at all coastal settlements and farms below this level.

5. The tsunami warning system

The Pacific Tsunami Warning Centre based in Hawaii provides warning for distantly generated tsunami. Information is passed from the Pacific Tsunami Warning Centre to the New Zealand Ministry of Civil Defence and Emergency Management in Wellington. The Director of Emergency Management will issue civil defence warnings for any part of New Zealand's coastal community.

For locally generated tsunami there will often be little or no warning of what is about to occur. This means that people living or visiting the coast should be aware of the potential tsunami hazard. Masterton District Council currently issue tsunami information leaflets and posters to all beach front properties in tsunami hazard areas. They have also erected tsunami warning signs and have identified evacuation routes in tsunami hazard zones. In the event of a near source tsunami the Territorial Authorities will respond to the event and also notify the media.

6. What research has been done for the Wairarapa?

The tsunami hazards and risk management options for the Greater Wellington region were identified in reports by GeoEnvironmental Consultants (2001) and Tonkin & Taylor in (2002). The research from both documents fed directly into the Coastal Hazards Technical Report (2002) which was used to develop the Hazards section of the Wairarapa Coastal Strategy (2004).

In response to the recommendations in the Wairarapa Coastal Strategy, work is currently underway by Greater Wellington to map the 5m and 10m contour for

the Wairarapa coast. The map will help provide baseline information for an assessment of coastal hazards including tsunami risk and where appropriate will be incorporated into the Combined Wairarapa District Plan which is currently being prepared.

Greater Wellington also contributed to the Wairarapa Engineering and Lifelines Association Report (2003) to assess the level of risk posed to lifelines by a number of natural hazards including tsunami.

7. Future Issues

Discussions with Civil Defence Officers for Masterton and Carterton District Councils reveal that there is sufficient public education and awareness at this stage until further information becomes available following the fact finding missions to Asia.

However a strategic approach needs to be adopted with regard to development within natural hazard zones including tsunami hazard zones. A strategic approach to hazards planning would ensure that land, infrastructure and people are protected from the risks which inevitably come with new development on the coast.

8. Communication

No additional communication is proposed.

9. Recommendation

That the Committee receives the report and notes its contents

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