

Whitianga Tsunami Risk Management Plan

**Whitianga Tsunami Working
Group**

June 2012

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Purpose

The purpose of this plan is to outline the proposed approach to managing tsunami risks in Whitianga in light of:

- the hazards and risks faced by Whitianga township – especially the local tsunami risks from the Tonga-Kermadec Trench
- community feedback obtained as a result of the June and December 2011 open days and subsequent written feedback
- emergency management requirements
- long-term land use planning considerations.

The fundamental purpose of this plan is to summarise recommended actions for tsunami risk management in Whitianga in light of community feedback and advice from the Whitianga Tsunami Working Group.

Background

This plan was developed by the Whitianga Tsunami Working Group (working group) – an informal working group comprised of local community board members, emergency services (via the Mercury Bay Emergency Management Committee), Mercury Bay Area School, community representatives and staff from Thames Coromandel District and Waikato Regional Councils.

The working group was set up to provide a forum for the development of a tsunami risk management plan for Whitianga town following the June, 2011 open days. The working group draws on political support, local emergency management and land use planning expertise and community knowledge and experience. The working group provides advice to the Mercury Bay Community Board, Thames Coromandel District Council and the Whitianga community. The terms of reference for the working group are attached as Appendix 1. Membership of the working group is given in Appendix 2.

This plan is the culmination of years of scientific work to understand the hazards and risks from tsunami to Whitianga township. This plan bridges the gap between scientific understanding and community action, and will lead to actions that reduce the risks from tsunami to Whitianga township.

How This Plan Was Developed

The primary sources of information for development of this plan are:

- Scientific and technical reports on tsunami hazards and risks developed since 2002
- The Eastern Coromandel Tsunami Strategy Report “Managing Tsunami Risks in Whitianga” (May, 2011)
- Scientific, emergency management, and land use planning information presented at the June and December 2011 open days
- Verbal and written feedback from the community obtained as a result of the June and December 2011 open days.

Following the June, 2011 open days, community feedback was summarised and presented to the August, 2011 Mercury Bay Community Board meeting (refer to Appendix 3). Feedback from the community falls into the following overall themes:

- Emergency management:
 - Warnings
 - Evacuation planning and management
- Public education and awareness
- Land-use planning (avoidance and/or mitigation of risks)

The working group met in September 2011 to assess the preferred approach to risk management. It was decided to use the above themes as the basis for recommendations. Within each theme, the working group discussed what was suggested by the community, and whether the suggestions were practical and workable. Following this, the working group made recommendations on each of these suggestions, and gave a brief overview of why each recommendation was made.

This plan was drafted following the first working group meeting, and sent back to working group members for comment prior to the second working group meeting held in October 2011. At the October 2011 meeting, the draft plan was discussed and refined to enable a final draft to be developed. The final draft plan was discussed and confirmed at the November 2011 working group meeting, and presented to the Mercury Bay Community Board on 29 November 2011.

The final draft plan was used as the basis for a further open day held on 30 December 2011. A limited number of submissions were received following this meeting. The draft plan was updated based on this feedback, and circulated to working group members. This plan was adopted by the Mercury Bay Community Board on 19 June 2012.

Recommendations for Managing Tsunami Risks

This section provides a summary of the working group recommendations for further work to reduce tsunami risks to Whitianga. It is important to note that work arising from these recommendations is in addition to existing ongoing work – such as emergency preparedness and public awareness programmes.

This section is supported by Appendices 3 and 4, which provide the following:

- Appendix 3: summary of community feedback from the June 2011 open days
- Appendix 4: details of the working group discussions and conclusions for each of the options suggested by the community, and reasons why various options have/have not been recommended by the working group.

As outlined above, the recommendations are broadly based on the general themes emerging from community feedback as follows:

- Emergency management:
 - Warnings
 - Evacuation planning and management
- Public education and awareness

- Land-use planning (avoidance and/or mitigation of risks)

The working group recommendations are grouped into three categories as follows:

1. **Recommended primary options:** these options will form the core activities that will be undertaken to manage tsunami risks, and are considered to be essential to risk management. It is anticipated that all primary options will become ongoing workstreams, with appropriate funding and resourcing
2. **Recommended support options:** these options will provide support to the primary options, where work will be coordinated with other ongoing programmes. Recommended support options may have a separate work programme and funding, or may simply align with other programmes
3. **Options not recommended:** options that have been discounted for various reasons. Where there may be an opportunity to revisit these in the future, this has been noted.

Table 1 shows the summary of recommended primary options, recommended support options and options not recommended. Detailed explanation of the reasons behind these recommendations are outlined in Appendix 4.

Table 1: Summary of Working Group Recommendations

Community themes	Recommended Primary Options	Recommended Support Options	Options Not Recommended
Emergency Management Warnings	<ul style="list-style-type: none"> • Natural warning systems - public awareness and information on what to look for and what to do (links to public education/awareness) • Sirens - expansion of the siren network, coupled with maintenance, exercises and public awareness programme 	<ul style="list-style-type: none"> • Radio/TV notification of warnings • Receipt of text and phone warning notifications from overseas friends and relatives • Improve Radio New Zealand coverage within Mercury Bay • Use of manual telephone trees by the community 	<ul style="list-style-type: none"> • Text messaging for warnings (noting that this may be revisited as telecommunications technology improves over time) • Indoor alerting systems as main community-wide system • Direct warning notification by emergency services
Emergency Management Evacuation	<ul style="list-style-type: none"> • Evacuation of school - shift the focus to vertical evacuation facilities and sheltering on site over time, which decreases issues with evacuation away from school (links to 	<ul style="list-style-type: none"> • Management of tourists awareness and preparedness via accommodation providers 	<ul style="list-style-type: none"> • Additional traffic and pedestrian access to evacuation routes by building new bridges/bridge capacity

Community themes	Recommended Primary Options	Recommended Support Options	Options Not Recommended
	<ul style="list-style-type: none"> land use planning) • Improve siting of and access to evacuation area at southern end of town - use Forestry Road/forestry block area • Provision of vertical evacuation facilities within the CBD in the long term (links to land use planning) • Investigate improvements to evacuation connections to SH 25 • Investigate resolution of traffic congestion and road access issues (note the use of public education and awareness to help resolve this) 	<ul style="list-style-type: none"> • Use of neighbourhood support groups and buddy systems for response 	<ul style="list-style-type: none"> • Increasing size of tsunami signs (although additional signs to be considered as required based on community requests) •
Public Education and Awareness	<ul style="list-style-type: none"> • Development of a comprehensive public education and awareness programme 	<ul style="list-style-type: none"> • Ongoing community open days • School-based education and awareness programmes 	
Land use planning (avoidance and/or mitigation of risks)	<ul style="list-style-type: none"> • Land use planning rules including: • Rules restricting critical facilities development or redevelopment within the hazard zones • Rules for vertical evacuation facilities at the school and within the CBD • Rules for future road and subdivision design • Location /configuration and design/ construction guidelines for commercial and residential land uses in hazard areas 	<ul style="list-style-type: none"> • Non-structural works such as dune restoration 	<ul style="list-style-type: none"> • Restriction or prohibition of development for all land uses • Structural (engineering) solutions such as bunds or stop-gates for managing tsunami hazards

Draft work programme

Table 2 provides an initial assessment of the types of tasks and activities that will be required in order to progress the recommended primary options, along with initial timeframes and cost information. Table 3 gives an indication of how the recommended support options may be undertaken in support of the primary recommended options. Tables 2 and 3 constitute the total new work programme proposed for tsunami risk management in Whitianga.

Table 2: Draft Tsunami Work Programme – Recommended Primary Options

Themes	Recommended Primary Options	Tasks/activities	Timing	Cost	Outcomes sought	Responsibility
Emergency Management Warnings	Natural warning systems - public awareness and information on what to look for and what to do	Develop approach to pushing message as part of Public Education and Awareness Programme (see below). Push via generic information and school based resources	Per Public Education and Awareness Programme timing (see below)	Minimal - part of Public Education and Awareness Programme costs. No separate budget required.	<i>People in Whitianga know what natural warning signs are and what to do about it</i>	Tsunami Project Team; supported by Communications staff from WRC and TCDC
	Sirens - expansion of the siren network, coupled with maintenance, exercises and public awareness programme	Assess and confirm requirements, confirm budget for 2012/13	March – June 2012	\$50K capital (for three more sirens); ~\$10K for staff assessment and installation. Assume \$5K per year for ongoing maintenance.	<i>Audible warnings are provided for tsunami events as a primary means of warning the Whitianga community</i>	TCDC; supported by Whitianga Emergency Management Committee and Tsunami Project Team
		Evaluate various systems, using Whangamata and Tairua/Pauanui as examples	March – June 2012			

Themes	Recommended Primary Options	Tasks/activities	Timing	Cost	Outcomes sought	Responsibility
		Confirm system, purchase and install	July – Nov 2012			
		Develop testing, maintenance and exercising arrangements	Early 2013			
		Ongoing maintenance and management	2013 onwards			
Emergency Management Evacuation	Evacuation of Mercury Bay Area School - shift the focus to vertical evacuation facilities and sheltering on site over time, which decreases issues with evacuation away from school (links to land use planning)	Develop land use planning rules (see below)	Per land use planning timing (see below)	Limited to staff time, and some technical support. Evaluation of long-term options around \$15K during 2012/13. Remainder of tasks should be covered within existing project budgets.	<i>Provision of adequate vertical evacuation facilities at Mercury Bay Area School to enable school population to shelter safely on site during any known tsunami event</i>	TCDC; supported by Mercury Bay Area School, Tsunami Project Team and TCDC District Plan review team
Continue refining current evacuation plan and support evacuation drills		Now, and ongoing per school arrangements				
Evaluate long-term options for vertical evacuation at school, and complete appropriate technical support work		2012/13 FY				
Support school in making case for vertical evacuation to Ministry of Education for new buildings		2013/14 FY				
	Siting of and access to Southern evacuation area	Discussions with Forestry landowners	February – April 2012	Limited to staff and/or EMC time. Should be covered within	<i>Confirmation of practical and workable Southern</i>	TCDC Emergency Planning Unit; supported by

Themes	Recommended Primary Options	Tasks/activities	Timing	Cost	Outcomes sought	Responsibility
	(Forestry Road)	Confirmation of emergency arrangements	By June 2012	existing project and/or agency budgets.	<i>emergency evacuation area</i>	Whitianga Emergency Management Committee
	Provision of vertical evacuation facilities within the CBD in the long term (links to land use planning)	Development of draft policy and rules for achieving vertical evacuation in the CBD	Per land use planning timing (see below)	Part of land use planning during 2012. Evaluation and agreement project estimated at \$20K over two years.	<i>Provision of adequate vertical evacuation facilities within the CBD to enable people to shelter safely on site during a maximum likely tsunami event</i>	TCDC; supported by Tsunami Project Team and TCDC District Plan review team
Evaluation of suitable vertical evacuation sites		2012/13 FY?				
Seek agreement from landowners on evacuation sites		2013/14 FY?				
Implement vertical evacuation within the CBD		2014/15 onwards?				
	Investigate improvements to evacuation connections to SH 25	Identify possible evacuation “pinch-points”	2012/13 FY	Within existing EPU budgets	<i>Provision of a practical and workable evacuation plan</i>	Emergency Planning Unit; supported by TCDC staff
Discuss possible improvement options with Transit, TCDC and developers		2012/13 FY				
Implement improvements to road layout/design		2013/14 FY?				

Themes	Recommended Primary Options	Tasks/activities	Timing	Cost	Outcomes sought	Responsibility
Public Education and Awareness	Develop comprehensive Public Education and Awareness Programme	Assess community requirements and confirm appropriate mix of communications tools and mechanisms	By March 2012	Communications staff time to develop programme. Should be within existing budgets, unless special communications are required.	<i>Whitianga community is kept aware of tsunami hazards and risks, and knows what action to take if a tsunami occurs</i>	Tsunami Project Team; supported by Communications staff from WRC and TCDC
		Confirm strategy and programme	February – June 2012			
		Implementation	From 2012/13 onwards			
Land use planning (avoidance and/or mitigation of risks)	Develop land use planning rules and guidelines: Rules restricting critical facilities development or redevelopment within the hazard zones Rules for vertical evacuation facilities at the school and within the CBD Rules for future road and subdivision design Location /configuration and	MBCB recommendation to Council to address tsunami risks via District Plan	29 November 2011	Within existing budgets	<i>Risk to people is minimized by siting critical facilities away from hazard zones, or building them to withstand tsunami impacts and providing for vertical evacuation. Future subdivisions are designed and constructed with minimizing tsunami risks to</i>	TCDC; supported by Tsunami Project Team and TCDC District Plan review team; involvement of community stakeholders
		Initial assessment of possible rules and guidelines - best practice guidance, other Council systems and rules (overseas)	By March 2012	\$5K to cover staff time		
		Finalise draft rules for input into draft District Plan	By June 2012	\$10K?		
		Develop draft guidance material for commercial and residential buildings in hazard areas	2012/13 FY?	\$10K?		
		Confirm standards for	2012/13 FY?	\$10K?		

Themes	Recommended Primary Options	Tasks/activities	Timing	Cost	Outcomes sought	Responsibility
	design/ construction guidelines for commercial and residential land uses in hazard areas	vertical evacuation and rationale for critical facility rules			<i>people in mind. Growth and development capacity of Whitianga is maintained</i>	
		Development of final rules and consultation	2013/14?	\$10K?		
		Implementation	2013/14 onwards?	Within ongoing budgets		

Table 3: Draft Tsunami Work Programme – Recommended Support Options

Themes	Recommended Support Options	Tasks/activities	Timing	Cost	Outcomes sought	Responsibility
Emergency Management Warnings	Radio/TV notification of warnings	None – occurs as part of any tsunami warning	N/A	N/A	N/A	N/A
	Receipt of text and phone warning notifications from overseas friends and relatives	None – occurs as part of any tsunami warning	N/A	N/A	N/A	N/A
	Improve Radio New Zealand coverage within Mercury Bay	Letter to Minister of Broadcasting requesting increase in coverage for Mercury Bay	Early 2012	Within existing budgets	<i>Improved receipt of signal in Mercury Bay to increase awareness of tsunami events</i>	Mercury Bay Community Board; supported by TCDC staff
	Use of manual telephone trees by the community	Facilitate creation and usage of manual community telephone trees	2012/13	Within existing EPU budgets	<i>Same as above</i>	Emergency Planning Unit; supported by TCDC staff
Emergency Management Evacuation	Management of tourists awareness and preparedness via accommodation providers	Encourage accommodation providers and business community to plan for evacuation and make visitors aware of risks	2012	Limited to small amount of staff and community time (\$5K)	<i>Increased awareness and preparedness of tourists/visitors</i>	Mercury Bay Business Association; supported by Mercury Bay Area Manager
	Use of neighbourhood	Reinforce importance of	2012/13, aligned	Within existing	<i>Increased</i>	NZ Police;

Themes	Recommended Support Options	Tasks/activities	Timing	Cost	Outcomes sought	Responsibility
	support groups and buddy systems for response	tsunami risks via existing support groups and public education and awareness programme	with start of public education and awareness programme	public education and awareness budget	<i>awareness and planning for neighbourhood response</i>	supported by Whitianga Emergency Management Committee
Public Education and Awareness	Ongoing community open days	Raise awareness amongst community at annual emergency services open day	December annually	Within existing budgets	<i>Maintenance of profile of importance of tsunami preparedness</i>	TCDC; supported by Whitianga Emergency Management Committee
	School-based education and awareness programmes	Facilitate development of school curriculum/unit on tsunami	2012/13?	\$5k staff support time	<i>Increased awareness and preparedness of children and families</i>	TCDC; supported by Whitianga Emergency Management Committee and Tsunami Project Team
Land use planning (avoidance and/or mitigation of risks)	Non-structural works such as dune restoration	Identify all related activities and seek to align with tsunami risk management programme	2012/13	Within existing budget	<i>Non-structural works are complementary to tsunami risk management</i>	TCDC; supported by Tsunami Project Team

Appendix 1: Whitianga Working Group Terms of Reference

DRAFT TERMS OF REFERENCE Whitianga Tsunami Working Group	Authorising body	Mercury Bay Community Board
	Status	Informal, temporary community working group
	Administrative support	Area Manager, Mercury Bay

Purpose

To provide a forum for the development of a tsunami risk management plan for Whitianga town which combines all the required elements: political support and oversight, expert emergency management and land-use planning advice, local community knowledge and project management support. In addition, to enable community representation, liaison and advice to the Mercury Bay Community Board (MBCB) and Thames Coromandel District Council (TCDC) during development of the Whitianga tsunami risk management plan.

Functions

The functions of the Whitianga Tsunami Working Group (WTWG) are:

- Development of a draft risk management plan to the MBCB and TCDC for the purposes of underpinning formal consultation with the community, in light of the community feedback received during the June 2011 open days
- Provision of expert emergency management advice on the development of the draft plan, including advice on:
 - Warning systems - including identifying options available, assessment of options and recommendations
 - Evacuation planning and management – including but not limited to traffic management, evacuation routes, evacuation sites/supplies and public information management
- Provide expert advice on land-use planning, including options for general planning rules within hazard zones, vertical evacuation and siting of critical facilities
- Provide local knowledge and understanding of risk management solutions that will be a “best-fit” for the local community
- Seek input from and provide informal feedback to members of the community on progress, issues and solutions
- Provide regular updates to the Community Board on progress.

Working Group Status

The WTWG shall be an informal, temporary working group that operates in an informal manner, chaired by a member of the MBCB and facilitated by staff.

Delegations

- There is no authority delegated to the WTWG
- The WTWG has no authority to instruct or direct staff or contractors of the Thames-Coromandel District Council

- The WTWG has no authority to carry out any construction or maintenance works or to instruct others to do so, on its behalf.

Membership

The membership of the WTWG shall comprise of:

- MBCB members: Alison Henry; one additional elected representative
- Mercury Bay Emergency Management Committee: Merv George (NZFS); Police representative; one possible additional representative as required
- Mercury Bay Area School: Principal or one other delegated representative
- Community representatives: up to three local community members with a strong interest in solutions that represent the views and aims of the community
- Staff: Peter Wishart (Strategic Relationships Manager, TCDC), Lesley McCormick (Area Manager-Mercury Bay, TCDC), Ron White (Manager, Emergency Planning Unit, TCDC); Julie Beaufill (Programme Manager, Coromandel, Waikato Regional Council); Brendan Morris (Eastern Coromandel Tsunami Project Manager, Contractor).
- The WTWG has the option of co-opting additional members who have a specialist skill, attributes and knowledge that will assist the group.
- The WTWG shall be chaired by a Community Board member.
- The Mercury Bay Community Board Chairman is ex-officio a member of the WTWG.

Relationship with Other Parties

The WTWG has a functional relationship with:

- Mercury Bay Community Board
- Strategic Relationships Manager and Mercury Bay Area Manager, Thames-Coromandel District Council
- Mercury Bay Emergency Management Committee
- Mercury Bay Area School.

All information to the media must be through TCDC via the Strategic Relationships Manager or Mercury Bay Area Manager.

Frequency of Meetings

Meetings shall be held on an as required basis during the period August – October 2011. It is anticipated that up to three meetings will be required during this time. The WTWG shall report to the Community Board after each meeting.

Term of Working Group

The WTWG shall be established by the Mercury Bay Community Board by way of a resolution, and the WTWG shall exist until the completion and approval of the draft Whitianga Tsunami Risk Management Plan, or until disestablished by the MBCB by resolution.

Conduct of Affairs

The WTWG shall conduct its affairs in accordance with Council's current Model Standing Orders New Zealand Standards (NZS) 9202;2003.

The WTWG does not have delegated authority to appoint sub-groups or delegate its functions or its affairs.

Public Access and Reporting

There will be no formal public notification of meetings due to the limited size of the group and its informal nature.

While not publicly notified, workshop meetings will not be public excluded, interested members of the community may attend in an observing and/or advisory capacity.

The outcomes of the meetings will be reported to the community from time-to-time as required.

Administrative Support

The Thames-Coromandel District Council Area Manager shall provide/arrange administrative support for the WTWG.

After each meeting, the minutes shall be presented to the Mercury Bay Community Board at its next meeting.

Quorum

There is no set quorum for the WTWG.

Amendments to the Terms of Reference

Any proposed changes during the term of the WTWG to the Terms of Reference are to be discussed with the Mercury Bay Community Board and shall only be changed by resolution of the Mercury Bay Community Board.

Approval

The above Terms of Reference for the Whitianga Tsunami Working Group were approved by the Mercury Bay Community Board at its meeting held on 26 July 2011.

.....
Chairperson

.....
Signature

.....
Date

Appendix 2: Whitianga Tsunami Working Group Membership

Political representatives

- Alison Henry, Chair Mercury Bay Community Board
- Murray McLean, Thames Coromandel District Councillor, Mercury Bay Ward

Emergency services representatives

- Merv George, New Zealand Fire Service
- Andrew Morrison, New Zealand Police

Mercury Bay Area School representative

- John Wright, Principal

Community representatives

- Jeff Riddell
- Maureen Blackburn
- Dave Hooker

Thames Coromandel District Council staff

- Peter Wishart, Strategic Relationships Manager
- Lesley McCormick, Area Manager-Mercury Bay
- Del Read, Emergency Planning Unit

Waikato Regional Council staff

- Julie Beaufill, Programme Manager, Coromandel

Contractor

- Brendan Morris, Eastern Coromandel Tsunami Project Manager.

Appendix 3: June 2011 Community Open Days feedback summary

Summary of community feedback from June 2011 open days

Purpose

To provide an overview of the key themes emerging from community feedback received during the tsunami “open days” held in Whitianga on June 3 and 4, 2011.

Background

The information presented to the Whitianga community at the open days covered three primary themes:

1. Scientific and technical information: what tsunamis are, what we know about them and their frequency, inundation modelling and mapping
2. Emergency management: warning systems, current response arrangements, evacuation planning (community-wide and school), response options
3. Land-use planning: what it is, why it is important and future options.

The purpose of the open days was both to inform the community about tsunami hazards and risks, and to seek their feedback on emergency management and land-use planning options to address the risks. Feedback from the community was provided verbally to staff over the two days, and also in writing via a comments box in the hall. It is estimated that about 400 people in total attended over both days, and there were 47 written comments received as a result of the open days.

Due to the high numbers of staff in attendance, there was ample opportunity for engagement with members of the community, and considerable verbal feedback was received by staff. Themes arising from the verbal feedback were very similar to the written comments.

Feedback summary

Community feedback falls into the following overall themes:

- Emergency management:
 - Warnings
 - Evacuation planning and management
- Public education and awareness
- Land-use planning

The following summary is based on the most commonly emerging themes from an analysis of the written feedback. The number of people who provided written comments within each theme is given where known.

Emergency Management

Warnings

The need for improved initial notification and public warnings was strongly supported by the community. The most commonly received written comments were:

- The need to confirm a standard, recognisable tsunami warning siren that is nationally consistent (9 comments)
- The need for more tsunami sirens, and improved systems – particularly alternative power sourced (6 comments)
- Issues with the present sirens being difficult to hear (3 comments)
- Other options for using household alarms, a tsunami buoy, text messaging warnings and a “staged” (progressive) alarm system (4 comments – one on each)

Evacuation planning and management

Issues with evacuation planning and management were by far the most commonly cited by members of the community. Primarily the issues raised within the comments centred on traffic congestion, lack of access to the main evacuation exits (State Highway 25) and the relationship of these issues to the evacuation of the school. The most commonly received written comments were:

- Traffic congestion and road access:
 - The need for an additional bridge to reconnect the Old South Highway in order to provide an additional evacuation route for school and South Whitianga residents – either permanent road, pedestrian or foldaway bridge (23 comments)
 - The need to reopen Cook Drive, and look seriously at other connection options such as extending Jackman Road to SH 25 (10 comments)
 - The need to add additional pedestrian access to Joan Gaskill Drive Bridge (3 comments)
 - The need to add an extra bridge to the north of Joan Gaskill Drive (1 comment)
- Mercury Bay Area School:
 - Impracticality of proposed evacuation plan in terms of traffic congestion conflict with walking students and lack of pedestrian access across Kupe Street and Joan Gaskill Bridge (9 comments)
 - The need to build a bund at the school for vertical evacuation (3 comments)
 - Suggestion to leave buses at school to assist with evacuation (1 comment)
- Signage (7 comments):
 - The need for improved signage (including larger, more visible signs)
 - The need for more evacuation signs
- Evacuation areas (6 comments):
 - Look at options for better evacuation areas, such as New Wade Road
 - Ensure equipment, supplies and services (particularly water) are available
 - Control traffic flow so that it doesn't block evacuation paths
- Management of tourists (4 comments):
 - Ensure evacuation warnings and arrangements are understood by tourists
- Ensure neighbourhood support groups are active (2 comments)
- Ensure evacuations are practised regularly (1 comment).

Public Education and Awareness

The need for regular, ongoing public education and awareness initiatives in Whitianga was supported by members of the community (6 comments in total). The most commonly received written comments were:

- The need to provide generic readiness and evacuation response information to the community
- Follow-up open days to support keeping the tsunami risks and response front-of-mind for the community
- School-based education and awareness programmes
- Upgrading the Radio New Zealand transmission capability in Mercury Bay.

Land-use planning

The need for effective long-term land-use planning in Whitianga was supported by members of the community (9 comments in total). The most commonly received written comments were:

- The need to encourage or require future vertical evacuation sites – particularly via building a bund at the school, and identifying suitable existing and future buildings
- The need to improve both short-term and long-term planning for access to SH 25 as the key evacuation route. This includes better linkages from existing roads, bridge access, future link-roads between SH25 and the hills to the north of the town, and possible upgrading of farm tracks on the hills over time
- Recognition of the need to site future critical and high-risk facilities away from the high hazard zone, and recognise the impact of a growing population.

Appendix 4: Tsunami Working Group - conclusions and recommendations

Emergency Management

Warning Systems

At the June open days, a number of options for tsunami warning systems were presented to the community as a part of the emergency management/evacuation planning display. The options discussed and evaluated by the working group are based on those presented at the June open days.

It is important to note that the working group evaluated all warning options in light of the threat posed by local tsunami events, rather than distant tsunami events. The reason for this is that the working group felt that the warning time available for response to distant events, such as those from South America (with 12-15 hours warning), was ample to provide for a safe and orderly evacuation of the town by emergency services. Overall, the working group felt that the current arrangements for response to distant events works well. The working group did not feel this was the case for local events, and that local events presented by far the greatest risk to people, and therefore have the greatest need for effective warning systems.

The working group considered the following options for warning systems, and came up with the following conclusions and recommendations:

Warning Systems Options	Working Group discussion/conclusions	Recommendations/comments
Natural warnings - ground shaking, abnormal tide movements (rising or falling), roaring sound similar to jet engine near the foreshore	Overall, the best form of warning for local events. Vital for people to be able to recognise what natural warning signs are, and to understand that they must take immediate action.	Recommended that information on natural warning signs be used as a primary means of public education and awareness efforts for warnings, and become a key target for any public education and awareness programmes Most certain form of warning, and may be the only form of warning. Cannot rely on "official" warnings for local events.

Warning Systems Options	Working Group discussion/conclusions	Recommendations/comments
Sirens - provision of audible units placed at strategic locations around Whitianga township	<p>This option is the option most desired by the community. The community is already used to sirens, and many members of the community know what they are, what the sirens mean and what to do when they are activated.</p> <p>Despite this, many people are unable to hear the current sirens, are unfamiliar with the signal and may not know what to do. Non-residents and particularly overseas tourists are particularly at risk in this regard. The working group concluded that in their current state, the sirens are inadequate to provide for effective warnings for local tsunami.</p> <p>The working group noted the importance of the sirens having a distinct sound, and having an alternative power source.</p>	<p>Recommended that the current siren system be upgraded and expanded to provide comprehensive coverage for the whole town. In addition, that once installed, that maintenance, testing/evacuation drills and public education and awareness activities be implemented in support of the new system.</p> <p>The working group also recommends that the Mercury Bay Community Board write to the Ministry of Civil Defence Emergency Management requesting confirmation of a nationally consistent tsunami warning siren.</p> <p>The existing community familiarity with and demand for sirens cannot be overlooked, as community buy in and support will be a critical part of implementation.</p> <p>Consideration should be given to the relationship with other siren systems in the District (Whangamata and Tairua/Pauanui), and potentially to the Bay of Plenty as well.</p>
Text messaging/alerting - subscribed warning lists	<p>While texting is theoretically a comprehensive method, current technology cannot be relied upon to deliver warnings in a timely manner. It is common for cell phone networks to slow down or fail when placed under high instantaneous loads, such as those created by mass texting or calling.</p> <p>The working group noted that some text messages have a long delivery timeframe even under normal loads, and that for emergency management purposes, this is unsuitable for significant hazards with short warning times, such as local tsunami.</p>	<p>That text messaging not be considered as a viable option at present due to the unreliability of current technology. Despite this, that a watching brief be kept on developments in technology for possible use as a warning system in the future.</p> <p>At present, this is an unreliable option, despite its future potential.</p>
Indoor alerting systems (alarms - such as the Meerkat in-home system)	<p>These alarms are installed in private and commercial residences, and normally activated by electricity ripple control. They are considered to be impractical as a</p>	<p>That indoor alarms not be considered as a community wide warning system. However, in the future, there may be opportunities to investigate</p>

Warning Systems Options	Working Group discussion/conclusions	Recommendations/comments
	<p>single warning system due to the lack of full coverage (not possible to put one into every building), responsibility for purchase and maintenance resting with individuals, and dependence upon electricity availability and speed of response.</p> <p>Effectiveness of this system would also depend heavily upon the willingness of community members to warn their neighbours, and the need to make people aware of the importance of doing this via public education and awareness.</p>	<p>usage in areas where sirens are less audible. This is due primarily to a lack of full coverage, cost to private individuals and reliability issues. The importance of warning neighbours was noted, and supported via public education and awareness.</p>
Direct notification by emergency services	<p>Possible methods include loudspeakers on police cars and sirens on fire appliances. Short timeframe for response to local event means emergency services would need to focus on setting up a secure response point from which to operate following the event, rather than remain in the hazard zone.</p>	<p>Unreasonable for community to expect this from emergency services in a local tsunami event, and impossible for emergency services to deliver. Not recommended due to short timeframe for local tsunami event – this discounts it as a realistic option</p>
Radio/TV notification	<p>Useful form of widespread notification. May not be fast enough for local event, and effectiveness will depend upon time of day. Also issues with limited availability of national radio access in Whitianga. One disadvantage is that messages from national media sources may not provide enough specific information for local response. However, media coverage will occur regardless.</p>	<p>Recommended that media be used as a key support mechanism - especially local radio stations. Also recommended that efforts be made to improve coverage of national radio in Whitianga. Should not be relied upon as the sole mechanism however. It is a useful mechanism, with wide coverage and will happen anyway.</p>
Receive text/phone call from friends or relatives overseas	<p>Some notification will occur regardless, but not considered to be a widespread and reliable mechanism given short timeframes. Also depends upon reliability of telecommunications networks.</p>	<p>Not recommended as a primary warning system. Useful as an additional warning mechanism. Unreliable, non-comprehensive and does not meet short timeframe requirements.</p>
Automated telephone tree system (landline).	<p>Automated systems difficult to maintain and prone to failure. However, community-based manual systems may prove beneficial, but not as a primary warning system</p>	<p>Recommended that community-based manual systems be used as a support system, facilitated by the Emergency Planning Unit.</p>

Evacuation planning and management

The ability to evacuate people from a hazard area within the shortest possible period of time is critical to saving lives. Advance planning for the management of evacuations is vital to ensure a safe and orderly response, and includes pre-defined evacuation routes, awareness-raising, preparation for issues such as welfare and routine exercising.

The working group considered the following options for evacuation planning and management, and came up with the following conclusions and recommendations:

Evacuation Planning and Management Options	Working Group discussion/conclusions	Recommendations/comments
Resolve traffic congestion and road access issues	The majority of the issues with traffic congestion are caused by school evacuation issues - both from pedestrians and traffic (particularly from school parents trying to pick up students). Existing road layout is difficult to change, and additional access to SH25 is unlikely to be granted. Traffic congestion and road access issues very difficult to engineer around with the existing road layout. Despite the difficulties outlined above, it is advisable to at least investigate the possible options to deal with traffic congestion by working with Transit NZ, TCDC and developers. This is due to on-going concerns raised by the community.	Investigation of the options available is recommended as a primary option. This should be supported by the use of public education and awareness about evacuation behaviour (such as not blocking other motorists paths, and walking as a preference if traffic is congested). In addition, it is also recommended that new worst case scenario modelling work and maps be released help further refine evacuation routes and procedures. It is noted that traffic congestion issues are very difficult (if not impossible) to resolve, and the current road layout cannot be easily changed to help resolve the issues. However, it is noted that future evacuation can be assisted by road design and construction that takes tsunami evacuations into account (see land use planning section)
Additional pedestrian and vehicle evacuation capacity via existing or new bridges	Additional bridge capacity is an expensive option that would be hard to justify on a cost/benefit basis. Even if an additional bridge were available, this may not resolve existing traffic issues. Any type of floating or temporary bridge at the Old South Highway would be a dangerous and impractical option - primarily due to lack of usage and maintenance over time, and the fact that the canal will have deeper water and be subject to higher velocity	Not recommended as a primary option. Better to manage the demand for evacuation routes by providing for vertical evacuation in high population areas (see land use planning section).

Evacuation Planning and Management Options	Working Group discussion/conclusions	Recommendations/comments
	flows than the surrounding land. Putting anyone into this environment would be too risky.	
Mercury Bay Area School - number of staff and students to be evacuated and traffic congestion issues	The current evacuation plan is impractical, and creates a number of pedestrian and vehicle traffic congestion issues. Recent modelling of the worst case tsunami event from the Tonga-Kermadec Trench indicates that the school (along with the rest of the township) is subject to inundation (worst case scenario being a Magnitude 9.4 earthquake on the Tonga-Kermadec Trench, resulting in a 30m vertical fault displacement). Despite this, the recent modelling also suggests that the school is one of the safest areas in the town in the worst case scenario event.	Recommended that the primary strategy in the long term be to shelter on site, by providing vertical evacuation areas at the school. These could be provided by new or retrofitted buildings, or by raising land.
Inadequate signage - too few signs and too small in size	Tsunami signs are designed to be directional indicators - not warning signs in their own right. The signs are consistent with the national standard, and are based on international best practice. The signs will fulfil their function if they indicate evacuation routes and safe areas. Concern was expressed that large signs all around the town might scare people by overstating the risks - especially tourists.	Recommended that the current signs remain in place, but that options for additional signs be reconsidered on a case-by-case basis if requested.
Improve evacuation connection options to SH25 - such as Cook Drive and extension to Jackman Road	There are few further options for connecting to a limited access highway, such as SH25. While there are a lot of dead-ends in the waterways at present, this will change with the ongoing development of the waterways. Cook Drive can be opened in an emergency if need be, and the community needs to understand the need to evacuate by foot if there is significant vehicle congestion. Despite the above discussion points, further investigation of options is warranted due to on-going community concerns.	Investigation of options recommended as a primary option. This recommendation is complemented by focussing on encouraging long-term vertical evacuation options in the CBD, as this would reduce the number of vehicles trying to evacuate. While there are limited options for improving road access at present, significant improvements could be made to new development areas in the future - in terms of designing to ensure easy access to high ground and main evacuation routes.
Vertical evacuation options for the school	Several options are available, including options to raise new buildings, build in upper floors for evacuation	Recommended as the primary option in the long term. One of the safest locations in the town, and

Evacuation Planning and Management Options	Working Group discussion/conclusions	Recommendations/comments
	purposes, retrofit existing buildings or raise ground levels in parts of the school or nearby. Vertical evacuation would eliminate the need to manage evacuation of students of site and the issues associated with this, including students walking across areas of deeper and faster flows (during the worst case scenario).	lowers risks to students by avoiding areas of higher flow and depth.
Improve siting of, access to and facilities at designated evacuation areas	There are significant issues with the currently identified evacuation area at Wade Road. These include narrowness of road and congestion issues, lack of parking space and a lack of space to provide welfare services.	Recommended that the primary evacuation point for the southern part of town be relocated the forestry access road above New Wade Road. It is noted that this will require negotiations and agreement on access and usage with the forestry landowners.
Management of tourists	Important to make tourists aware of warnings and evacuation arrangements.	Recommended that work in partnership with business association be undertaken to improve understanding and preparedness of tourists/visitors.
Use of neighbourhood support groups	There are 61 groups in Whitianga, and while it may not be worth talking to every group separately, these networks are a good channel to push preparedness messages.	Recommended that neighbourhood support groups be used to support pushing messages of helping neighbours and setting up "buddy" systems for tsunami response.
Vertical evacuation - CBD	Likely to be the most practical option, due to difficulties in guaranteeing safe and rapid evacuation routes to designated safe zones at present. Designated facilities would allow for rapid evacuation, and would be easy to signpost for public awareness. Issues at present include the lack of national standards for evaluating the safety and suitability of facilities, and design standards that incorporate both earthquake and tsunami hazards.	Recommended that this become the primary long-term option for the future for the CBD, due to population density, large distance to high ground and difficulties with current evacuation arrangements - mainly traffic congestion. There may be options for designing purpose built facilities as part of other projects - such as a new car parking building in the CBD. It should be noted that there will not be immediate solutions from this option, and that public education and awareness of existing evacuation procedures will still need to be a strong focus in the short term.

Public Education and Awareness.

Rather than a separate work stream in its own right, public education and awareness is more a collection of activities that supports both community preparedness and planning. Without a comprehensive public education and awareness programme, the effectiveness of warnings, evacuations and long term land use planning is greatly reduced.

The working group considered the following options for public education and awareness, and came up with the following conclusions and recommendations:

Public Education and Awareness Options	Working Group discussion/conclusions	Recommendations/comments
Generic readiness and evacuation response information.	<p>There is a strong need for comprehensive readiness and evacuation response information within the community. This includes information on:</p> <ul style="list-style-type: none"> • Natural warning signs • Evacuation procedures • How to obtain further information • Scientific understanding of the hazards and risks • Essential survival kit information 	<p>Development of a comprehensive public education and awareness programme tailored to the Whitianga community. It is important to note that any such programme must be maintained over time to reflect ongoing changes to readiness and response procedures.</p> <p>Public education and awareness is a vital component of any successful and sustainable tsunami risk mitigation programme.</p>
Community open days.	<p>These are useful forums to promote understanding of hazards, risks and readiness/response procedures.</p>	<p>Recommended to combine tsunami open days with annual emergency services open days, and align with New Zealand Fire Service awareness activities. This may be combined with annual evacuation exercises, or with national emergency management awareness activities.</p>
School based education and awareness programmes.	<p>The school already utilizes the “What’s the plan Stan?” resources for all major hazards. It is understood that pushing emergency management messaging through schools is often a highly effective mechanism for awareness raising.</p>	<p>Recommended that a specific tsunami unit be added to the school curriculum, and aligned with other public education and awareness activities.</p>
Radio New Zealand transmission capability.	<p>Concern was raised at the current lack of reception, and the possible loss of opportunity for awareness raising.</p>	<p>Recommended that tsunami risk management be used as leverage to help improve reception capability within Mercury Bay.</p>

Land use planning.

The two main mechanisms for managing long term tsunami risk via land use planning are avoidance and mitigation. In theory, avoiding new development within tsunami hazard areas and/or restricting the type and extent of new development is the most effective way of reducing risk. In practice, this is not always possible in areas where there is existing development. Mitigation generally involves some form of physical works or design standards to reduce the severity of damage from tsunami. Physical works can be either structural or non-structural, while design standards are rules and regulations that govern how buildings and infrastructure are developed within tsunami hazard zones.

The working group considered the following options for land use planning, and came up with the following conclusions and recommendations:

Avoidance

Avoidance Options	Working Group discussion/conclusions	Recommendations/comments
Restriction or prohibition of new development.	<p>There is a need to achieve a balance between community safety concerns and the right to use private land without unfairly disadvantaging landowners. This however depends upon the type of land use proposed, such as residential or commercial usage, and whether critical facilities are proposed.</p> <p>The working group noted that much of the land within the highest hazard areas has already been developed, and that new development would be subject to lower risks due its distance from the shore.</p>	<p>Recommended that restriction of new development be limited to critical public facilities initially¹. Rules along the following lines may be considered:</p> <ul style="list-style-type: none"> • Need to give primary consideration to avoiding critical facilities in tsunami hazard zones – especially the high and medium hazard zones • If unable to avoid, need to minimise risk of inundation and flow velocity damage to facility • Raise floor levels above anticipated inundation level • Ensure supporting infrastructure is able to withstand tsunami impacts • Must provide for vertical evacuation • Site works do not exacerbate impacts to neighbouring sections etc. <p>It is not recommended to impose restrictions upon</p>

¹ Critical public facilities include emergency services, hospitals, rest homes, libraries, Government Departments, pools, schools, preschools, and water/wastewater treatment plants

Avoidance Options	Working Group discussion/conclusions	Recommendations/comments
		commercial or residential development - rather address these via public education and awareness and evacuation planning. It is important that the Regional Policy Statement provides strong support for the District Plan provisions for tsunami risk management.
Restriction or prohibition of redevelopment.	Similar to the comments above, there is a need to balance community safety with landowner rights. A strong case can be made for avoiding redevelopment of critical facilities.	Recommended that rules be developed to limit redevelopment of critical public facilities – especially in the high and medium hazard zones. Rules would be the same as those outlined above for development.
Locating or relocating critical infrastructure and facilities away from hazard zones.	The importance of critical facilities has been recognized by the community, and there has been strong support for avoidance where possible. Where location of critical facilities in hazard areas is unavoidable, there is a strong case to be made for mitigation. The working group noted that some new critical facilities are already taking tsunami hazards and risks into consideration.	Recommended that location of new critical facilities and be addressed via rules, but that rules requiring relocation of existing infrastructure not be developed, but rather be dealt with via mitigation actions – such as strengthening.

Mitigation

Mitigation Options	Working Group discussion/conclusions	Recommendations/comments
Physical		
Structural.	There are numerous disadvantages associated with structural works – the most serious of these being the lack of effectiveness. In addition, high costs, poor visual amenity and incompatibility with other coastal uses often make structural works a poor option.	Not a recommended option, due to high costs, significant negative effects, and lack of any guarantee of effectiveness.
Non-structural	Normally compatible with other coastal uses, often cost effective and blends well with the natural environment.	Recommended that non-structural works are a support for risk mitigation, and combined with other coastal restoration initiatives such as dune

Mitigation Options	Working Group discussion/conclusions	Recommendations/comments
		care whenever possible.
Buildings		
Location and configuration	Examples include designing to avoid maximum inundation areas, to slow/steer flows, providing maximum spacing between buildings or using hardened structures to provide shelter for other buildings. Consideration of location and configuration of new buildings is common sense, and takes account of/advantage of site-specific conditions. It is a practical form of mitigation that ensures development is geared towards minimising risks. Despite this, it will increase costs for building. Road design is often considered alongside this (see below).	<p>Rules not recommended for private residences and commercial facilities, but information on hazards, risks and possible options for retrofit should be provided to landowners. Recommend the development of comprehensive guidelines. Guidelines would likely cover:</p> <ul style="list-style-type: none"> • Nature of hazard and risks – tsunami sources, frequency, inundation depth, flow velocity etc. for various events • Damage to buildings in tsunami – historical experience, typical costs and risks • Mitigation options – best practice for location and configuration, design and construction and retrofit • Financial considerations – cost/benefit assessment • Legal issues – meeting District Plan and Regional Plan requirements, Building Code etc.
Design and construction	Examples include raising floor levels, deepening or reinforcing foundations, improving tie-downs to foundations, opening ground floors to accommodate flows, ensuring appropriate standards are enforced and defining expected performance level of buildings. Design and construction to support vertical evacuation is often considered alongside these options (see below). This form of mitigation is practical, focussed on minimising damage to buildings and infrastructure, but also has considerable benefits to saving lives. Like locating and configuring buildings, it will increase costs of	Same as above

Mitigation Options	Working Group discussion/conclusions	Recommendations/comments
	construction, and this has to be balanced with potential benefits.	
Protection of existing development	Usually done as a retrofit as part of a renovation or redevelopment within high hazard areas. Involves strengthening of existing or redeveloped structures, which may help protect other structures and reduce the total amount of debris produced during an event. Has similar benefits to location and configuration and design and construction points above.	Same as above
Design of critical infrastructure and facilities	Usually considered when relocation of critical facilities is not practicable. Similar considerations and benefits to those outlined above, but arguably more important due to the importance of the facilities and infrastructure.	Addressed under “Avoidance Options Restriction or prohibition of new development above”.
Vertical evacuation	Likely to be the most practical solution for populated areas that are at distance from high ground. A good case can be made for requiring designated vertical evacuation facilities in the CBD, at the school and in critical facilities - including rest homes, hospitals (depending upon their location in relation to the foreshore).	<p>Recommended as the primary option for the school and CBD, and that appropriate rules be developed to support this. Rules may be along the following lines:</p> <ul style="list-style-type: none"> • Requirement to provide for large numbers of vulnerable people who are at considerable distance from high ground • Requirement for consideration of vertical evacuation when new development or redevelopment occurring in some areas within CBD and for critical facilities <p>Rules may be complemented by other incentives such as rates reductions.</p>
Roads		
Design and configuration	Future designs provide plenty of opportunities to mitigate risks. There is an opportunity to ensure that all future road and subdivision development takes tsunami risks into account, and is designed to maximise community	Recommended that this is an important option for all future road design and construction, and that appropriate planning rules be developed. Rules may be developed along the following lines:

Mitigation Options	Working Group discussion/conclusions	Recommendations/comments
	<p>safety and minimise risks. Examples include providing direct access to high ground in new development areas, and aligning new roads to minimise flow concentrations and velocities.</p>	<ul style="list-style-type: none"> • All future subdivisions and roads will be designed to take tsunami hazards and risks into account • Designs will seek to: <ul style="list-style-type: none"> ○ Maximise evacuation efficiency (without compromising subdivision) by linking to roads and pedestrian evacuation access points ○ Prevent channelling of flow into evacuation access areas ○ Establish floor levels that minimise risk of inundation in maximum likely event ○ Take hazard zone characteristics into account • Tag all rules to maximum likely event zones (not worst-case scenario)