

**Wellington Metropolitan  
Emergency Water Supply Planning Group**

**Mitigation and Preparedness  
Strategy and Action Plan**

**September 2003**

**Water Asset Owners:**

<b>Hutt City Council</b>
<b>Porirua City Council</b>
<b>Upper Hutt City Council</b>
<b>Wellington City Council</b>
<b>Greater Wellington Water</b>

# Emergency Water Supply to the Wellington Metropolitan Area Following a Major Earthquake

## Mitigation and Preparedness Strategy and Action Plan

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## Executive Summary

### Introduction

A project was established in February 2002 to improve existing response and recovery strategies for the delivery of water to end users following a major earthquake. The Emergency Water Supply Planning Group involves the water supply managers and emergency managers from each of the councils of the Wellington metropolitan area (Hutt, Porirua, Upper Hutt and Wellington) and Greater Wellington Regional Council along with representation from public health agencies, the New Zealand Fire Service and the Institute of Geological and Nuclear Sciences.

This group is co-ordinated by Greater Wellington Water and funded from the water supply levy. This group operates on the collaborative interagency Lifelines Group model and is considered to be a good example of sector-based projects to be encouraged by the Wellington Civil Defence Emergency Management (CDEM) Group. The water supply agencies, as Lifeline Utilities, are actively participating in CDEM planning as required under section 60 of the Civil Defence Emergency Management Act 2002. The involvement of the respective emergency managers and emergency services' representatives ensures a direct linkage with community response and recovery planning.

### Background

During the 1990s, considerable "toughening" of the Wellington metropolitan area's wholesale and urban water supply infrastructure was undertaken. Impetus for this work came from first-hand observations made by Wellington Lifelines Group study teams following the 1994 Los Angeles and 1995 Kobe earthquakes. On the urban water supply systems, seismic upgrading of key reservoirs and the associated installation of automatic shut-off valves was commenced. The focus of this work was on holding stored water within the reservoirs in the likely event of breakages of water mains at lower levels. On the wholesale water system, enhancing the seismic resistance of critical water treatment and distribution assets was the main priority.

### Improved Understanding of the Impacts

Over the past few years there has been continuing work to understand the implications of a major earthquake involving a rupture of the Wellington Fault. With a probability of occurrence of approximately 10 percent over the next 50 years, this event requires specific planning and preparation. The planning undertaken for Exercise Phoenix in July 2002 enhanced the understanding of both the direct physical impacts and the specific difficulties associated with the repair and restoration of utility services.

The bulk water mains operated by Greater Wellington Water cross the Wellington Fault in no fewer than six locations. One of the bulk mains also runs along the liquefaction-susceptible Petone foreshore. The extensive damage likely at these and other locations remains a key physical vulnerability of the system. As well as the potential damage, the logistical challenges in gaining access and suitable contract resources to carry out repairs after a major earthquake significantly extend the previously anticipated repair periods.

As Upper Hutt is close to one of the major water treatment facilities at Te Marua, it is anticipated that bulk supplies could be restored to their local reservoirs within a week of a major fault movement. By contrast, it could be several weeks before basic repairs to the considerably longer bulk water mains leading through Porirua to Wellington City could be carried out.

While physical mitigation and response planning to reduce the repair time for the bulk water system continues, emphasis is also required to be placed on enhancing local emergency water supplies.

Local water supplies include both the emergency water held by key community facilities, households and businesses, and the water able to be retained in local reservoirs. Reasonable levels of emergency water can currently be expected to be retained in key reservoirs in Lower Hutt, Upper Hutt and Porirua Cities because of the progressive installation of automatic shut-off valves and associated seismic upgrading. A similar programme for this mitigation work is currently underway in Wellington City.

## Greater On-site Storage of Water Required

The work of this planning group has highlighted that key community facilities and households need to store a greater quantity of water for emergency purposes. The Public Health Service and District Health Boards view this as an important health issue in terms of the potential impact on the wider community, as well as from the operational perspective of hospitals and medical centres.

Traditional Civil Defence messages have referred to the need to store 3 litres per person per day for 3 days at household level. This amount however only covers direct drinking water needs. Each person requires an additional 10 to 20 litres of water per day for personal hygiene requirements and food preparation. Understanding and communicating the implications of this requirement is fundamental to being able to meet the CDEM objective of maximising the continued habitation of people in their homes following a major earthquake.

Every household and residential facility should have an independent supply of stored water to last at least 3 days. Realistically it will take 2 to 3 days for each council to launch a full emergency water distribution operation utilising the water held in local reservoirs and available from local sources. This distribution operation may need to continue for several weeks for the cities and suburbs that are furthest away from the bulk water sources at Te Marua, Wainuiomata and the Hutt Aquifer at Waterloo. During this time, residents would have to travel to collect water from community supply points at various places around each city. Clearly, residents would be better off if they held personal supplies for more than the minimum recommended time of 3 days.

It is currently estimated that only 15 percent to 20 percent of households across the Wellington Region have even the basic survival (drinking water) requirement of 3 litres per person per day in their homes.

Key medical facilities such as hospitals, local medical centres and rest homes need to make specific provision for levels of on-site water storage appropriate to their post-earthquake functions. Similarly, places of emergency assembly such as schools and community centres and emergency operations centres need to have significant volumes of water stored on-site in order for them to be able to function as intended.

## Mitigation and Preparedness Strategy and Activity Plan

The Wellington Metropolitan Emergency Water Supply Planning Group has developed a strategy to reduce the 'gap' between emergency supplies and the restoration of bulk water. The key elements of this strategy are:

- ***Reducing the duration of loss of bulk supply***
  - Continuing with mitigation programmes to reduce the physical vulnerability of the bulk water network
  - Developing specific repair strategies to address the access and resource challenges
- ***Improving the level and duration of effective local city water storage***
  - Raising the level of dependable local city storage by continuing the programmes of improving the seismic resistance of local reservoirs constructed prior to the mid-1980s
  - Developing effective plans for councils to distribute retained water in a controlled way, and over an extended period of time in some areas
  - Investigating alternative water sources and means of treatment and distribution
- ***Raising the level of household, key facility and workplace water storage***
  - by communicating the need for these different sectors of the community to significantly increase the level of stored water

A corresponding programme of mitigation and preparedness activities to be undertaken over the next 5 years has been developed, and is outlined in this report. The focus of these activities is to improve the level of emergency water supplies available to key sectors of the community following a major earthquake.

Specific subgroups have been established to address public communications issues and to work to enhance the emergency response plans of each authority.

The action plan supports the mitigation measures being undertaken by the councils as part of their asset management programmes. The planning group notes the importance of maintaining expenditure on specific major earthquake mitigation and preparedness measures at appropriate levels.

The community preparedness aspect of this programme includes short-term priorities and medium-term strategies. The short-term priorities include ensuring key community facilities such as hospitals, local medical facilities and rest homes, schools and emergency operations centres have appropriate volumes of on-site stored water, and the establishment of new public education messages to emphasise "more stored water for longer" for households and workplaces. The corresponding medium-term strategy is to support homeowners who wish to install household storage tanks by providing appropriate information.

## 1. Introduction

### 1.1 Background

The Greater Wellington Regional Council is responsible for the collection, treatment and distribution of bulk water to Wellington, Hutt, Porirua and Upper Hutt cities. The respective city councils are responsible for distributing the water to the individual users.

The proportion of the population in each of the cities is shown in Table 1, along with their indicative share of overall bulk water consumption.

**Table 1: Distribution of Population and Water Consumption Between the Cities**

	<b>% of Population</b>	<b>% of Water Consumption</b>
Wellington City	47%	53%
Hutt City	28%	26%
Porirua City	14%	11%
Upper Hutt City	11%	10%

During the 1990's, considerable 'toughening' of the metropolitan water supply networks was undertaken. This work was influenced by the Wellington Lifelines Project, and observations made in relation to major overseas earthquakes during this period.

In 1994, the Wellington Lifelines Group undertook a project to promote improved response planning for the immediate response phase, using water supply as a case study. The work that followed saw automatic shut-off valves installed at a number of key reservoirs across the region and an improvement in the short-term water storage at these reservoirs.

Discussions during 2001 between the territorial authorities involved highlighted that a potentially significant supply gap still remained in the event that repairs to the bulk water network in some locations took an extended period of time. Furthermore, the responsibilities and functions of the organisations and key individuals were not fully integrated. This applied to *firstly* the respective organisations involved in supplying water and *secondly* the water supply managers and emergency managers for responding to such a situation.

The Planning Group was established in February 2002, and involves the water supply managers and emergency managers from each of the councils of the Wellington metropolitan area (Wellington, Hutt, Porirua and Upper Hutt) and Greater Wellington Regional Council, along with representation from public health agencies, the NZ Fire Service and the Institute of Geological & Nuclear Sciences. This group is co-ordinated by Greater Wellington Water and funded from the water supply levy.

### 1.2 Planning Group Objectives and Target Outcomes

The principal objective of the Planning Group is to establish an agreed approach to the mitigation and preparedness activities that are of common interest to the water supply asset managers and emergency managers of the metropolitan councils.

The wider target outcome that is sought is an increase in the level of preparedness activity by all sectors involved in the supply of water following a major emergency, including end users.

## 1.3 Legal Framework

### *Water Supply*

For the supply of water in an everyday situation, the principal legal responsibilities of the respective parties are outlined in the Wellington Regional Water Board Act. This Act sets out that the responsibility of Greater Wellington Water (GW Water) is to provide bulk water to the TAs, who in turn are responsible for the supply of water to the inhabitants within their cities. It is understood that other than the bulk water levy, which is set each year following customer consultation, there are currently no detailed or more specific supply conditions beyond these broad responsibilities.

The question of emergency supply is also not directly addressed in any of the legislative provisions relating to water supply by local authorities. Neither GW Water nor the TAs are legally bound to supply water to their respective customers in all circumstances. Logic however suggests that the primary relationship responsibilities would remain during or following a declared emergency situation – that is, *GW Water to TAs*, and *TAs to end users*.

The Health (Drinking Water) Amendment Bill contains a definition of ‘adequate supply’ in relation to domestic and sanitary needs (69B), and requires drinking water suppliers to take all practicable steps to ensure adequate supply (69M). It also allows regulation to describe the quantity that is ‘adequate’ (69ZZM), and enables the Director of Health to declare a drinking water emergency if health and safety issues arise due to lack of drinking water (69ZN). The implications of these new provisions warrant further consideration.

### *Civil Defence Plans*

The Civil Defence and Emergency Management (CDEM) Act 2002 and current civil defence plans indicate the roles and planning responsibilities without prescribing specific functions. The CDEM Act 2002 also emphasises the need for all parties to develop appropriate plans before such an event. Specifically, section 60 requires each lifeline utility to ensure that it is able to function to the fullest possible extent during and after an emergency.

The National Civil Defence Plan notes the responsibility of local civil defence and emergency management agencies to establish arrangements for the distribution of food, water, medical and other essential supplies. Based on information sourced from international humanitarian guidelines, the Plan recommends a minimum of 20 litres per person per day for distribution planning purposes to meet public health requirements and emergency medical needs.

The Regional Civil Defence Plan requires local and regional civil defence agencies to monitor and report on the status of key utilities such as water supply. Other than noting the powers of the Regional Controller, it does not make mention of specific measures that civil defence organisations should undertake in the event that water supplies are disrupted.

Both of these plans remain current until formally replaced by the new Wellington CDEM Group Plan and the National CDEM Plan (due by mid 2005 and the beginning of 2006 respectively). The process of developing a CDEM Group Plan requires the identification of risks where the assistance of other CDEM Groups should be specifically planned for. Issues of national significance where the scale of impacts is beyond the ability of the CDEM Group and its neighbouring groups to manage are also to be identified, and conveyed to the Ministry of Civil Defence and Emergency Management for inclusion in the National CDEM Plan. The likelihood of the prolonged non-availability of mains water to significant sections of the Wellington region from a major earthquake clearly warrants specific planning with neighbouring CDEM Groups and the Ministry.

Notwithstanding the absence of specific legal requirements, it is apparent that GW Water and the TA water supply agencies have both an individual and a collective responsibility to consider and make provision for the supply of water in the event of a major emergency. The community have the expectation that some form of arrangements would have been made by the councils on their behalf.

## 2. Supply Reinstatement: Issues and Planning Objectives

### 2.1 Understanding the Reality

Recent analysis has highlighted the many logistical challenges in gaining access and suitable contract resources to carry out repairs to the bulk water mains following a major earthquake. These challenges are likely to significantly extend the previously anticipated repair periods, resulting in a 'gap' from the relatively limited dependable local emergency water storage. The local emergency water storage comprises two components - *local city storage in reservoirs*, and *household emergency supplies*.

Figure 1 below provides a diagrammatic representation of this gap.

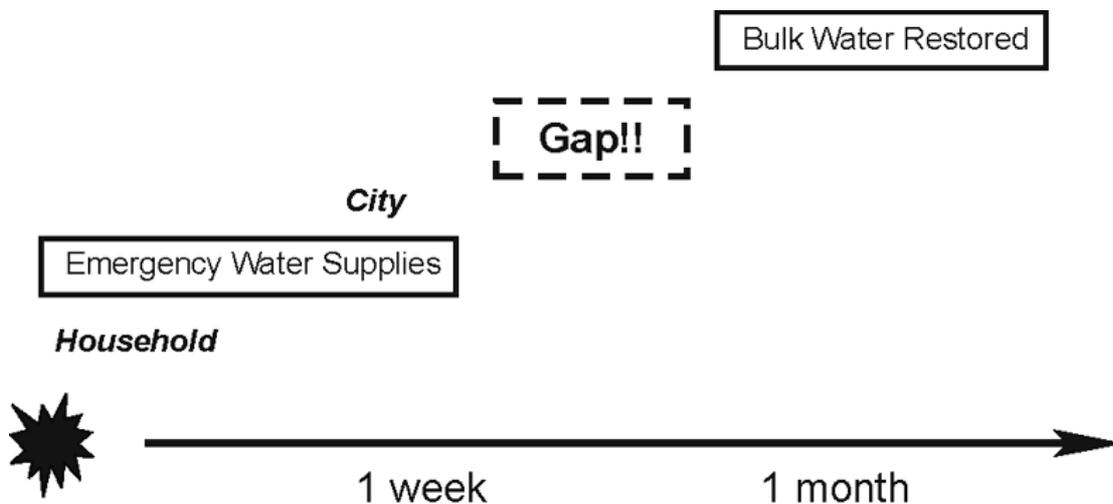


Figure 1: The Potential 'Gap' Between Emergency Supplies and Restoration of Bulk Service

### 2.2 Planning Objectives

Consideration has been given to expressing the supply reinstatement planning objectives in terms of target repair timelines.

The restoration of water supply to all households following the 1995 Kobe earthquake took 72 days, noting that full repairs extended well beyond this time period. Later analysis showed that 15 days was the critical time frame beyond which the public of Kobe became extremely impatient. Kobe City subsequently established restoration targets which aim at an average supply of 250 litres/person/day within four weeks of a major earthquake. This is considered to represent a very demanding target, and an impractical form of expression for the Wellington metropolitan area given the organisational separation of the *bulk transmission* and *local distribution* components.

The process of restoring mains water supply following a major earthquake involves in the first instance the availability of water in the network, and subsequently the progressive improvement of the quantity and quality of the water. These steps can be characterised in terms of the restoration of a *basic supply* and a *functional supply*, defined as follows:

- *Basic supply* – water available through the mains at points of supply that will still require boiling, and may be restricted in volume and subject to frequent disruption

- *Functional supply* – treated water available through mains with intermittent outages for local repairs, and some capacity constraints/ restrictions

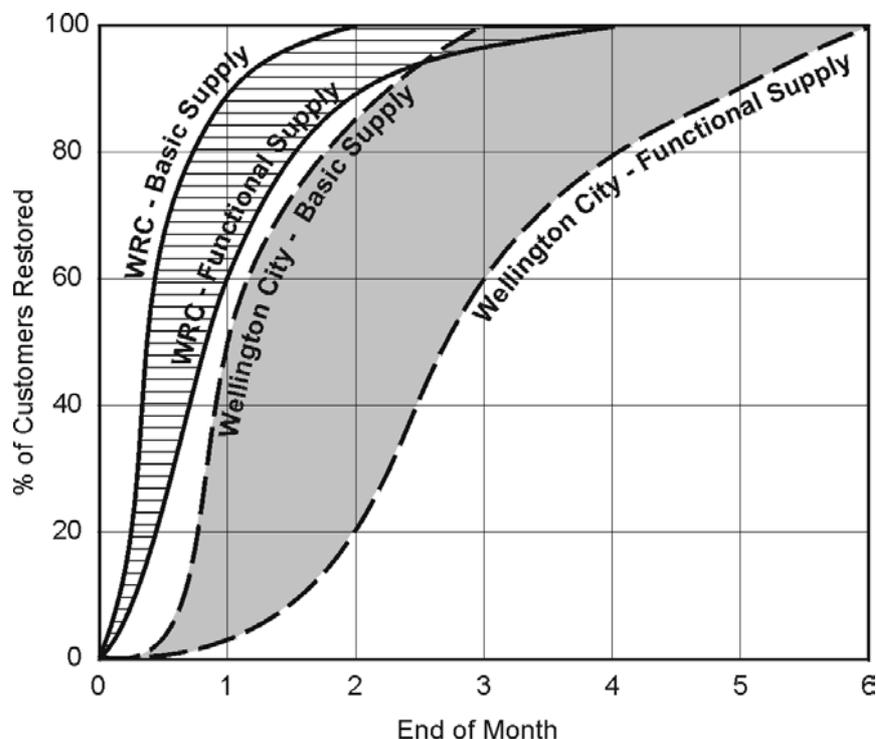
Figure 2 below represents indicative restoration curves for the bulk water supply and Wellington City customers respectively following a rupture of the Wellington fault. These attempt to portray the anticipated time frames for the restoration of a *basic supply* and a *functional supply*. These timelines are only notional in nature, and it is recommended that they be used only as a communications tool rather than as a planning guideline.

The GW Water *basic supply* curve attempts to reflect the restoration sequence for this particular scenario. Emphasis is likely to be placed on the restoration of the Te Marua to Karori pipeline, given the considerable vulnerability of the bulk mains along the Petone foreshore. The progressive process of repairing and re-living the Te Marua to Karori bulk water main indicates (with reference to Table 1) that the first 11% of GW Water customers to have a basic service restored would be those in Upper Hutt, whereas the last 47% of GW Water customers are those in Wellington City.

Delivery from GW Water to its customers (ie. the cities) is at the established points of supply, whereas this occurs from the cities to their customers at each private boundary.

It is considered that the basic supply restoration curve for Upper Hutt would closely mirror that of the GW Water *basic supply* curve. The corresponding curves for Hutt and Porirua would lie in between those for Upper Hutt and Wellington City.

The indicative restoration curves in Figure 2 are considered to reasonably reflect the situation following mitigation of the notable physical vulnerabilities of the bulk water network over the next 3 to 5 years. Mitigation work beyond this is likely to only achieve relatively minor reduction in restoration times for bulk water due to the inherent physical vulnerability of the bulk water transmission mains to fault rupture and other forms of permanent ground deformation. Greater emphasis must therefore be given to managing the gap that will affect some of the cities involved.



**Figure 2: Indicative Timeframes for the Restoration of Water Supply Following a Rupture of the Wellington Fault**

### 3. Integrated Plan to Distribute Water Following a Major Earthquake

One of the initial objectives of the Planning Group was to establish an agreed approach amongst the five Territorial Authorities to the sourcing and delivery of water to end users during the various stages following a major earthquake whilst repairs and reconstruction are underway. The key elements of an integrated plan to distribute water to the end users at the various post-earthquake stages are outlined in this section.

The purpose of this high-level plan is to clarify the respective roles of (i) GWW and the TAs from a water supply perspective and (ii) water supply managers and emergency managers. The importance of individual members of the community taking responsibility for maintaining their own emergency water supplies is also highlighted.

It is also intended that this high-level plan be used as the basis for improving the response and recovery plans of the organisations involved.

The underlying philosophy for this plan can be summarised under the headings of *short-term focus* and *medium-term focus* as follows:

***Short-term focus***

*(individual responsibility)*

- People use their own emergency water supplies
- When these run out, they will need to go to community supply points

***Medium-term focus***

*(water supply authorities)*

- Progressively re-livening the trunk mains and moving the community supply points down towards the centres of the affected populations
- Restoration of a *basic supply* at individual properties, followed by a *functional supply* (refer to definitions on page 8)

There are a number of planning implications for TAs and their communities arising from this philosophy. The general public need to upgrade their household supplies to between 10 and 20 litres per person per day (ie. making allowance for hygiene requirements as well as basic potable needs) for at least three days. Indications from assessments made under this project are that a longer period of storage is needed for residents of Wellington City due to their physical distance from the bulk water supply sources, older and more vulnerable mains and access difficulties.

TAs need to have plans to supply this volume for an extended period. The ability to access water held in key reservoirs and from other sources for at least 15 days is recommended for Hutt, Upper Hutt and Porirua. A corresponding period of at least 20 days is recommended for Wellington City. Analysis undertaken for this project indicates that this target will be met for significant proportions of each city once the proposed reservoir mitigation measures are implemented over the next 3 to 5 years. The key issue is to identify and address the remaining areas with lower levels of potential reservoir storage.

The following high-level plan focuses on *what* has to be done and *when* with regard to the indicative timing and sequencing. The *how* is to be established by the Territorial Authorities individually and collectively as appropriate. In many cases, including the issue of the logistical assistance to be provided by GWW to the cities where a 'gap' is apparent, the details of the *how* have yet to be addressed. This includes identifying sources of supply from outside the region.

## Integrated Response & Recovery Plan for Water Supply Following Major Earthquake

### Initial 24 hours – *Impact Assessment*

Community	Emergency Management	GW Water	Local Councils
<ul style="list-style-type: none"> <li>Looking after themselves wherever possible</li> <li>Utilising own stored emergency water supplies</li> </ul>	<ul style="list-style-type: none"> <li>Gathering impact information</li> <li>Checking that priority facilities/ vulnerable community sectors have basic requirements met</li> <li>Co-ordinating &amp; communicating key messages to the community</li> </ul>	<ul style="list-style-type: none"> <li>Ensuring maximum retention of stored water</li> <li>Identifying locations of worst damage</li> <li>Establishing network &amp; system status</li> <li>Assessing the network functionality in pre-determined priority order</li> </ul>	

### Days 2 & 3 – *Using Personal Emergency Water Supplies & Preparing to Distribute Local Supplies*

Community	Emergency Management	GW Water	Local Councils
<ul style="list-style-type: none"> <li>Looking after themselves wherever possible</li> </ul>	<ul style="list-style-type: none"> <li>Co-ordinating &amp; communicating key messages to the community</li> </ul>	<ul style="list-style-type: none"> <li>Determine level of stored/ available water &amp; how to distribute</li> <li>Impact assessment continuing</li> <li>Establishing resources and arrangements for detailed damage assessment &amp; initial repairs</li> <li>Planning for the transportation of emergency water supplies into areas where a subsequent gap appears likely</li> </ul>	
<ul style="list-style-type: none"> <li>Utilising own stored emergency water supplies</li> </ul>	<ul style="list-style-type: none"> <li>Conveying impact and situation and short-term procedures to the community</li> </ul>	<ul style="list-style-type: none"> <li>Assisting TAs with the provision of water treatment</li> <li>Liaising with Public Health services</li> <li>Organising mutual aid</li> <li>Establish which bulk mains to have repair priority and estimating likely time frames for restoration of basic services</li> </ul>	<ul style="list-style-type: none"> <li>Organise distribution of stored water held in reservoirs &amp; from bores and alternative sources</li> <li>Establishing initial community supply points</li> </ul>

### Days 4 to 20 – Managing the Allocation & Use of Local Stored Water

Community	Emergency Management	GW Water	Local Councils
<ul style="list-style-type: none"> <li>• Accessing community supply points</li> <li>• Limiting use of water to bare minimum for personal needs</li> </ul>	<ul style="list-style-type: none"> <li>• Advising community supply points</li> <li>• Establishing &amp; communicating which sectors of CBDs etc cannot be used due to lack of water (with Environmental Health)</li> </ul>	<ul style="list-style-type: none"> <li>• Managing the receipt and deployment of mutual aid</li> <li>• Focusing on intakes, treatment facilities and priority bulk mains</li> </ul>	<ul style="list-style-type: none"> <li>• Monitoring levels of stored water</li> <li>• Liaising with Public Health</li> <li>• Overseeing the distribution of water from distribution points (maintaining human resources)</li> <li>• Moving community supply points progressively down towards population centres where possible</li> </ul>

### Week 3 Onwards – Managing the Restoration of Basic Service/ Dealing with “Gaps”

Community	Emergency Management	GW Water	Local Councils
<ul style="list-style-type: none"> <li>• Those in ‘gap’ areas limiting their use of water</li> </ul>	<ul style="list-style-type: none"> <li>• Keeping affected ‘gap’ areas informed (all agencies, GWW and TAs)</li> <li>• Arranging for the transportation of water into ‘gap’ areas (all agencies, GWW and TAs)</li> <li>• Assistance from outside the region is to be sought for the importation of water (other CDEM Groups, National Controller)</li> </ul>		
<ul style="list-style-type: none"> <li>• Those in areas with some mains water also restricting use and accepting service interruption</li> </ul>		<ul style="list-style-type: none"> <li>• Focusing on priority bulk mains</li> </ul>	<ul style="list-style-type: none"> <li>• Sequencing initial/ temporary repairs to match the progressive restoration of bulk supplies</li> </ul>

**Note:** Other concurrent water supply management processes such as managing detailed damage assessments, planning and designing major repairs to facilities and re-laying of badly affected mains are not included in the above tables

## 4. Proposed Mitigation and Preparedness Strategy and Action Plan

### 4.1 Strategy

The Wellington Metropolitan Emergency Water Supply Planning Group has developed a strategy to reduce the 'gap' between emergency supplies and the restoration of bulk water. The key elements of this strategy can be grouped into the following areas:

- ***Reducing the duration of loss of bulk supply***
  - Continuing with mitigation programmes to reduce the physical vulnerability of the bulk water network
  - Developing specific repair strategies to address the access and resource challenges
- ***Improving the level and duration of effective local city water storage***
  - Raising the level of dependable local city storage by continuing the programmes of improving the seismic resistance of local reservoirs constructed prior to the mid-1980s
  - Developing effective plans for councils to distribute retained water in a controlled way, and over an extended period of time in some areas
  - Investigating alternative water sources and means of treatment and distribution
- ***Raising the level of household, key facility and workplace water storage***
  - by communicating the need for different sectors of the community to significantly increase the level of stored water

### 4.2 Action Plan

The post-earthquake emergency water supply Action Plan involves individual and collective *reduction* and *readiness* activities necessary to achieve an effective *response* and *recovery*, as summarised below:

#### ***Reduction***

- Identify priority major asset mitigation measures and incorporate them into medium and long-term financial plans
- Systematic incorporation of seismic considerations within asset renewal programmes
- Review the settings/ triggers for automatic shut-off valves
- Research on consequences and operational impacts

#### ***Readiness***

- Develop an integrated communications plan which addresses both pre-event and post-event messages to the community
- Establish hierarchy of critical community supply points
- Ensure appropriate national arrangements and mutual aid agreements are in place

- Identify alternative water source options and develop plans for their use (incl. minimum local treatment requirements and bulk water options such as desalination)
- Upgrade water supply response plans, placing emphasis on local and regional water distribution arrangements, and specialist technical resources needed for initial assessment and repairs
- Hold exercises to test the preparedness and effectiveness of the councils' response

The objective of these activities is to achieve an effective **response** in which each organisation is clear on their roles with a minimum of overlap, particularly for the following key aspects:

- Reconnaissance and reporting locally and regionally
- Resource deployment
- Communication with each other, other sectors and the public

and to have a platform established from which the **recovery** can be managed efficiently.

Details of the Action Plan are provided in the following tables, with the proposed lead organisation or group for each element shown, and recommended priorities indicated. The assigning of a 'B' priority to some activities typically reflects that other activities need to be undertaken or completed first.

A **Public Communications Group** has been established to progress *communications* issues, as these typically involve more than one organisation or sector. It is intended that a **Response Planning Group** be formed in due course to deal with inter-agency *response planning* issues. It is also proposed that the water supply managers of the metropolitan area meet to more systematically exchange information on aspects such as flow settings and triggers for the automatic shut-off valves at reservoirs.

Members of the Wellington Metropolitan Emergency Water Supply Planning Group will also be actively contributing to the Operational Issues section of the Wellington Region Civil Defence Emergency Management Group Plan.

## Reduction

Element	Specific Projects/ Activities	Lead Organisation/ Group	Recommended Priority/ Status
R1.1 Identify priority major asset mitigation measures and plan their implementation	<p><i>TA projects to be identified and programmed by each TA</i></p> <p><i>To maintain the focus on reservoir seismic security, mains adjacent to the Wellington Fault and to include consideration of enhancing network interconnection to improve the ability to interzone feed within local distribution networks</i></p>	GW Water and Individual Councils	Ongoing
R1.2 Incorporation of seismic considerations in mains renewals within asset management plan	<p>Develop common mains renewal philosophy</p> <ul style="list-style-type: none"> <li>– focusing on key mains leading up to and down from reservoirs, and brittle mains in soft ground</li> <li>– understanding of preferred materials for mains renewals for the various size ranges and associated preferred connection details</li> </ul>	<b>Water Supply Managers Group</b>	A
R1.3 Review settings/ triggers for automatic shut-off valves	Review by water supply managers of the criteria they use for the flow settings and triggers for automatic shut-off valves at reservoirs		
R1.4 Research on consequences and operational impacts	Research project to quantify the gap by enhanced modelling of the networks	GNS	Underway
	Consideration is to be given to promoting in-building storage – initially via a research project and examination of regulatory implications	BRANZ/ GNS	B

## Readiness

Element	Specific Projects/ Activities	Lead Organisation/ Group	Recommended Priorities/ Status
R2.1 Develop an integrated communications plan which addresses both pre-event and post-event messages to the community	Re-focus <i>pre-event</i> messages to the community regarding raising the level of emergency water stored in residences and key facilities. The message of 'more stored water for longer' is to be developed.	<b>Public Communications Group</b>	Underway
	Consideration of suggestion to make 10 litre containers available to residents (using a similar approach to recycling bins)		
	Hospitals, medical centres, rest homes, emergency services operations centres and schools are to be actively encouraged to have specific site storage.		
	Develop an integrated <i>post-event</i> communications plan		B
R2.2 Establish hierarchy of critical community supply points	Establish the hierarchy of critical community supply points to: <ul style="list-style-type: none"> <li>(i) key facilities such as hospitals, medical centres, rest homes and retirement villages and emergency services operations centres;</li> <li>(ii) CBD areas; and</li> <li>(iii) general residential areas</li> </ul>	Individual Councils (Emergency Managers & Water Supply Managers)	A
R2.3 Ensure appropriate national arrangements and mutual aid agreements are in place	Highlight emergency water supplies for the Wellington Metropolitan area as being an issue of national significance in the CDEM Group Plan, and work with MCDEM and neighbouring groups	Emergency Managers	A
	Develop plans for receiving and allocating mutual aid crews, and managing them over extended periods of time. Consider how repair crews with experience with smaller diameter mains would be deployed e.g. <i>Porirua branches of bulk mains; working for TAs</i>	<b>Water Supply Managers Group</b>	B
R2.4 Identify alternative water source options	Establish appropriate methods for treating local water	GW Water (lead) with Public Health	A
	Identify & verify alternative local sources, and develop plans for collecting water from these sources	Individual Councils	
	Identify alternative bulk water options (e.g. desalination, portable treatment plants) and international sources for such plant	GW Water	
	Accessing and permissioning for using private bores in Hutt and Upper Hutt	HCC, UHCC	

## Readiness (cont)

Element	Specific Projects/ Activities	Lead Organisation/ Group	Recommended Priorities/ Status
R2.5 Upgrade water supply response plans	<p>Water supply response plans require a sharper focus on the automatic actions following a major earthquake and methods of communication with each other. The plans must:</p> <ul style="list-style-type: none"> <li>- Reflect the high-level objectives of the integrated plan (refer Section 3), including linkages with regional reconnaissance and Lifelines Co-ordination</li> <li>- Clearly identify the roles and expectations of all contractors involved (prepare additional Standard Operating Procedures and contract procedures where necessary)</li> <li>- Identify technical resources that are currently available for assessment and initial repairs, and subsequent recovery work (designers and contractors), and outline contingency plans to mobilise additional resources where needed</li> <li>- Include the equipping and resourcing of the operation of distributing water to their communities from reservoirs, zone hydrants and alternative water sources, with preferred initial community supply points identified.</li> </ul> <p>Human resource options (e.g. Parks and Reserves staff, parking wardens, security firms or community groups) and physical equipment (e.g. water bladders, standpipes/ manifolds) are to be organised, and must be able to cover an extended period of time</p> <p>Progressively increase the level of pipes and fittings held for emergency repairs</p>	<p>Individual Councils (Emergency Managers &amp; Water Supply Managers)</p> <p><i>A Response Planning Group comprising people responsible for their organisation's response plans should work together.</i></p> <p><i>Initial workshop to be held in June/ July 2004</i></p>	B
	<p>Develop a general logistics plan for transporting water into areas where there is a gap between local emergency supplies and the restoration of bulk water</p> <ul style="list-style-type: none"> <li>(i) redistributing water supplies around the Wellington area (e.g. Hutt to Wellington City)</li> <li>(ii) water sourced from outside the region</li> </ul>	GW Water (lead) with the <b>Response Planning Group</b>	B
R2.6 Hold response exercises	Plan and hold exercises to test the preparedness and effectiveness of the councils' individual & collective response	<b>Response Planning Group</b>	B

## **5. Implementation and Monitoring**

Implementation of this mitigation and preparedness strategy and action plan is the responsibility of each council working individually and collectively as appropriate. While this document outlines the strategy and defines collective activities, the specific individual actions to be followed are to be determined and undertaken by each council.

The Wellington Metropolitan Emergency Water Supply Planning Group will continue to meet at approximately six-monthly intervals in order to provide a framework to exchange relevant information and to monitor overall progress. This is in addition to the various meetings of the activity sub-groups to progress the individual technical and planning items proposed in the preceding tables. The outcomes of each identified sub-project will be reported back to the wider Planning Group.

The Planning Group will remain as a joint water supply and emergency management endeavour, with progress reports being made to the CDEM Group. The Planning Group is to continue to be co-ordinated by Greater Wellington Water and funded from the water supply levy. This group operates on the collaborative interagency Lifelines Group model, and is considered to be a good example of sector-based projects to be encouraged by the Wellington Civil Defence Emergency Management (CDEM) Group.