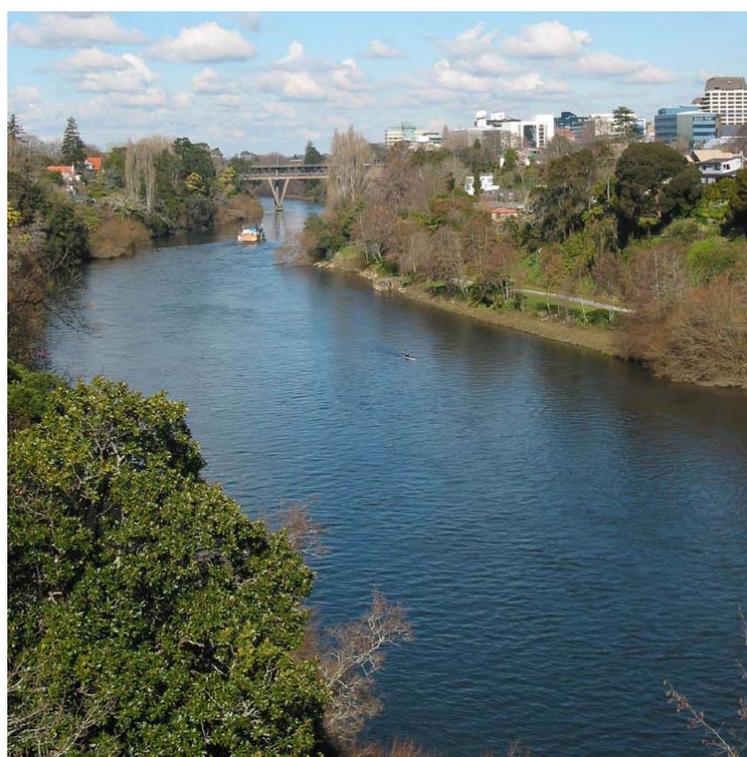




Central Waikato River Stability Management Strategy 2008 - 2058



Prepared by:
Environment Waikato

For:
Central Waikato River Stability Management Project Control Group

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Revision history

Revision No.	Prepared By	Description	Date
H	Sue Aitken, Beca Infrastructure Ltd.	Proposed Strategy with stakeholder input	31/5/06
1	Shaun Plant, Environment Waikato	Amended for Council adoption	17/11/06
2	Shaun Plant, Environment Waikato	Amended following PCG meeting 22 February 2007	12/3/07
3	Shaun Plant, Environment Waikato	Amended following PCG comments April 07.	12/6/07
4	Shaun Plant, Environment Waikato	Amended with PCG Comments.	24/9/07
5	Shaun Plant, Environment Waikato	Amended with PCG Comments	21/11/07
6	Shaun Plant, Environment Waikato	Amended final PCG comments. Issued for approval.	24/12/07

Project Control Group Approvals

The Central Waikato River Stability project has been overseen by the following parties who endorse this strategy document for presentation to the governance body of their respective organisation. The respective organisations will approve the strategy and provide ongoing support for its implementation.

Scott Fowlds	Environment Waikato
Tim Manukau	Waikato – Tainui
Tegan McIntyre	Hamilton City Council
Allan Turner	Waikato District Council
John Mills	Waipa District Council
Adam Wood	Mighty River Power

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1 Introduction

This document is the Central Waikato River Stability Management Strategy, (the Strategy) which has been developed through a collaborative process between Environment Waikato, Hamilton City Council, Waipa District Council, Waikato District Council, Waikato Raupatu Land Trust and Mighty River Power. These organisations have committed to continuing with the implementation of this Strategy in the future.

There are a number of challenges for strategy partners who are charged with the management of the Central Waikato River including:

- Balancing competing uses and values of the river,
- Recreation and visual amenity,
- Cultural and historic values,
- Natural hazards and
- Environmental quality
- High financial and environmental cost of protection works

This document presents a management strategy to sustainably manage the stability of the Waikato River system between the dam at Karapiro and the confluence with the Waipa River at Ngaruawahia. It provides a vision for what we want the river to look like in 50 years time and actions that will guide development close to the river through appropriate design and policy to ensure that the vision is achieved.

It should be noted that there has been no public consultation in the development of this Strategy. It is anticipated that the proposed vision and actions will be discussed with the community as part of the Long Term Council Community Plan processes and district plan variations. Community consultation may identify an immediate community need to undertake particular actions which may change the priority of some actions contained in this strategy.

Within 12 months of the Crown resolving the Waikato River Claim, the Strategy will be reviewed for the purpose of ensuring it is aligned with the provisions of the Waikato River settlement. Waikato-Tainui's involvement in the development of this strategy is without prejudice to its Waikato River Claim.

1.1 Why do we need a management strategy?

Environment Waikato and Territorial Local Authorities (TA's) within the study area have statutory responsibilities for river management under the Resource Management Act (1991), the Local Government Act (2002) and the Civil Defence Emergency Management Act (2002). These responsibilities include the control of the land to minimise the risk of hazards, and the avoidance and/or mitigation of the effects of natural hazards.

Through an investigation initiated through Project Watershed into the effects of the dam at Karapiro, it was identified that degradation of the river bed was actively occurring with a predicted lowering of the river bed by 1.5m at Hamilton within the next 50 years. Removing the dams or introducing physical structures in the river to stop degradation were not considered feasible for social, economic, cultural and environmental reasons.¹ Hazard lines have been identified indicating areas judged to have a high risk of bank instability.² These areas have been identified to assist decision makers in planning future land use. Site specific investigations of bank slope instability will be required to accurately define these lines. The technical reports and hazard maps which have been

¹ Beca Infrastructure Ltd (2006) "Middle Waikato Bed Degradation Investigation Stages III & IV. Proposed Middle Waikato River Bed Degradation Management Strategy: Appendices".

² Ibid.

developed through the investigation phase of the project are listed in Appendix 1 and are available on request.

Although the investigation into the degradation of the river bed was the catalyst for developing a management strategy, it is acknowledged that there are a number of other influences on the river system which also need to be managed under an overarching river stability strategy.

1.2 What are the key issues?

The current and potential issues and challenges which may arise in the management of the Central Waikato River over the next 50 years have been identified as :

Environmental

- The river bed and water levels are lowering through a process of degradation caused by the dam at Karapiro.
- River banks in general are typically unstable for a range of technical reasons including bank slope and materials, groundwater flow, soil moisture, tree root prising and wind throw, land uses, river flow effects, vegetation cover, bank height and river bed degradation. The relative importance of each instability factor varies throughout the river reach.
- River bank protection works can detract from the natural character and amenity values of the River.

Economic

- The Waikato River is an essential source of hydropower. There is a need to recognise the presence of the hydro system and the contribution it has to regional and national social, environmental and economic wellbeing.
- River bank protection works are very expensive and ongoing development of the riverbanks could result in substantial costs to the community.
- The effects of bank instability may threaten important infrastructure lifelines such as roads, rail, and pipelines. Within the Central Zone, for example, there are 15 bridges and numerous public and private boat ramps and water and wastewater pipelines at threat.

Cultural

- Waikato-Tainui consider they have a duty to themselves and future generations to protect the Waikato River. Waikato-Tainui wish the River to be protected, and restored to its former health and strength.
- The need to be consistent with the principles of the Waikato-Tainui River Claim currently being negotiated with the Crown, being;
 - Te Mana o te Awa – The Waikato River is the ancestor of Waikato-Tainui representing the tribes mana, prestige and mauri. The Waikato River is regarded as one body and must be treated as such to ensure her mana remains intact.
 - Mana whakahaere – The claim seeks to achieve integrated management of the Waikato River through a co-management model for the purpose of enhancing and restoring the health and wellbeing of the river.
- Potential loss of significant historic heritage assets adjacent to the River from bank instability. There is little information on the location of such assets within the margins of the Mid Waikato River, which hinders their protection.

Social

- An increasing appreciation that the river, particularly in urban areas is a major amenity and river banks face increasing pressures for development.
- Erosion and bank instability may pose a risk to public safety. Communities may suffer property damage, economic disruption and risk injury or death if the erosion risk is not identified and mitigated.

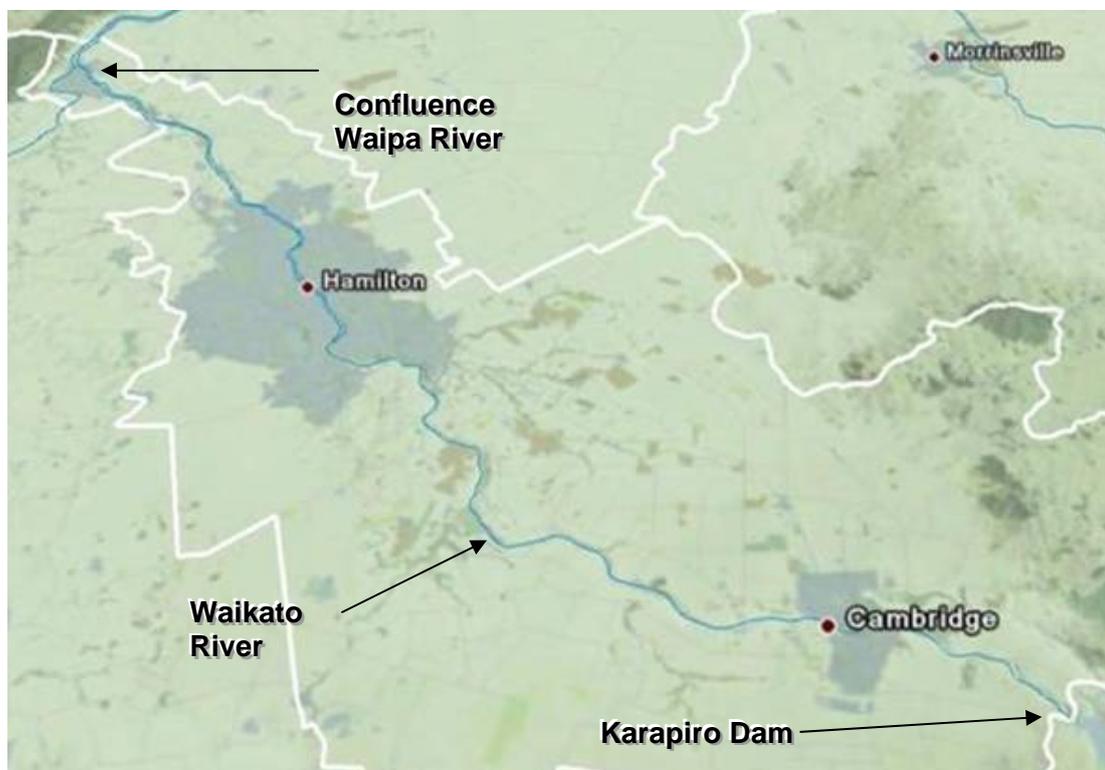


Figure 1 Central Waikato zone

1.3 Vision

“To protect the unique values and sense of place inherent to the Waikato River and its surrounds and promote long term availability of the river for all existing and potential uses consistent with the concept of sustainable management.”

This Strategy Vision has been developed to promote a desired outcome for this section of the River over the next 50 years and beyond. It has been based on community outcomes identified through the respective Council Long Term Council Community Plan (LTCCP) processes and also through consultation with key stakeholders. It is anticipated that the Vision and associated Actions in this Strategy will be further refined through as a result of community responses to the various planning processes.

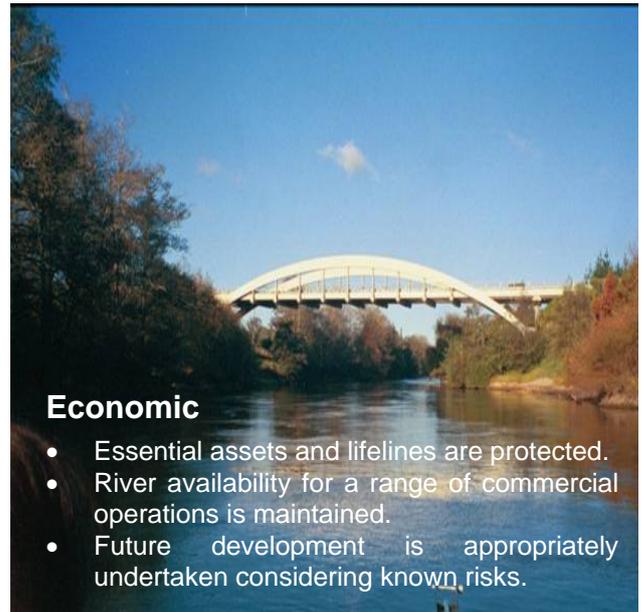
1.4 Objectives

An environment where



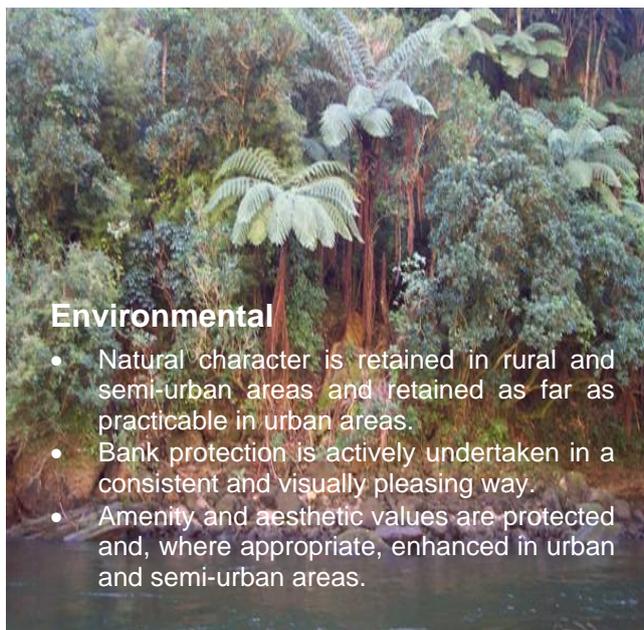
Social

- Public access to the river is maintained
- Public safety is provided for as a priority.
- Existing urban development is protected



Economic

- Essential assets and lifelines are protected.
- River availability for a range of commercial operations is maintained.
- Future development is appropriately undertaken considering known risks.



Environmental

- Natural character is retained in rural and semi-urban areas and retained as far as practicable in urban areas.
- Bank protection is actively undertaken in a consistent and visually pleasing way.
- Amenity and aesthetic values are protected and, where appropriate, enhanced in urban and semi-urban areas.



Cultural

- Significant cultural and historic sites and values are protected.
- The health and well being of the river is enhanced and restored.
- The mana, prestige and mauri of the river is restored and protected.

1.5 Policies

In order to achieve the social, environmental, cultural and economic objectives of this strategy, it is essential the following policies are adhered to:

Development and protection

- Natural river and riverbank processes should be allowed to occur except where essential assets require protection.
- Existing essential high-value built assets and infrastructure should be protected from riverbank instability.
- Undeveloped areas that are at risk from riverbank instability should remain free of capital intensive development so as not to increase the need for new riverbank protection works.

- Development should only occur where it does not require new structural bank protection works to be installed.
- New infrastructure or major capital works on existing infrastructure should be designed and located to take account of the long term effects of riverbed lowering and bank instability. As sites and structures are developed, maintained, retrofitted or renewed in the future, the responsible Authorities will need to ensure they are appropriately protected, designed to accommodate predicted changes (e.g. height of stormwater pipes outfall, depth of bridge piles) or relocated if necessary
- Riverbank development within the Hamilton CBD may involve structural protection works where the overall development reflects Council strategies for intensification and appreciation of the river.
- Recognised sites of cultural and historical significance should be protected from riverbank instability.
- Riverbank walkways in areas of instability should be realigned, or protected if realignment is not considered appropriate.
- Remnant areas of indigenous riverbank vegetation should be retained.
- The national social and economic wellbeing derived from the hydro system should be recognised.

Protection methods

- Non-structural approaches to bank protection such as tree planting are preferable to structural approaches wherever they are effective.
- Riverbank planting should involve eco-sourced indigenous species unless effective protection requires exotic species to be used.
- Structural protection works should follow a consistent design, take into account public access requirements, and should not detract from the natural character or amenity value of the river.
- Vegetation on the riverbanks should be managed in a way that promotes long-term bank stability.

Funding

Funding for future protection works will be in accordance with current regional and local authority policies although a review is being undertaken through 2008/09 of Project Watershed funding policies. The conclusions of the technical investigations will be assessed against the present funding policy for the zone.

The focus of Project Watershed funding is to ensure stability of the river channel and water quality. For instance, funding for flood protection will be provided where a community approach is deemed appropriate. Whereas funding will not generally be provided solely for the purpose of protecting private, Crown or local authority land such as marginal strips or reserves unless there is a clear justification and purpose, and wider community benefits are involved. In many of these areas it may be more appropriate to allow the natural processes to occur with minimal intervention.

- EW has a primary focus of stability of the river channel. With the predicted effects of river stability it is recognised lifelines and valuable community assets may need to be considered for support and funding.
- Asset owners are responsible for maintaining the integrity of their assets and funding will not generally be provided through Project Watershed for direct protection of site specific infrastructure assets.

It is expected that this strategy will help to guide responsible asset management practice to ensure future maintenance works are undertaken recognising the predicted long term river instability.

2 The River Stability Management Strategy

The management approach which will be taken, will be to adequately protect river banks, accept river changes through ongoing river processes and address the effects of lowering of water levels and bank instability. The aim is to future proof the River environment by acting now to protect existing urban and essential assets, and to adopt a passive-first approach in less developed areas. Ultimately the community faces the choice of either strongly armoured river banks at areas of risk, or the use of soft engineering and retreat back to allow a safety margin whilst allowing the continued enjoyment of the natural beauty of the river.

Ultimately this strategy is a blend of these approaches reflecting the extent to which the riverbank has already been developed. A range of actions have been identified and listed in the following section.

2.1 Management actions

Prioritisation of actions

An important part of implementation of these actions is programming and staging to make sure capacity and funding issues are addressed. Simple prioritisation criteria have been devised and actions have been grouped into the following time periods:

H = High - within 1 - 3 years (2008 to 2011).

M = Medium - within 3-10 years (2011 to 2018).

L = Low - beyond 10 years (2018 to 2057).

0 = Ongoing - continuing over the 50-year implementation period. The level of activity is likely reassessed over time.

It is anticipated that these actions may change as a result of the community feedback through the LTCCP process.

Table 1 Management actions

ID	Actions	How we will do it	Who will lead?	Priority	Indicative cost (2007)
1.	Finalise the River Stability Management Strategy	Consult with key partners to finalise the strategy.	EW	H	
2.	Facilitate a coordinated approach between Council's, communities, tangata whenua and key stakeholders to managing the hazards caused by river instability hazard.	<p>Establish a River Stability Management Working Group with representatives from key stakeholder groups that meets regularly to discuss management of bed degradation.</p> <p>Establish a Central Waikato River Mana Whenua Group to discuss possible collaboration on future bed degradation and bank instability management decisions.</p> <p>Educate riverside property owners on the erosion effects of removing trees and provide information on native and /or best stabilising plant species.</p> <p>Continue to implement planting programmes in conjunction with the community and encourage the replacement of willows with native bank stabilising plant species progressively over time</p>	<p>EW</p> <p>EW</p> <p>EW & TA's</p> <p>EW/TA's</p>	<p>O</p> <p>O</p> <p>H</p>	5-10% 1 FTE staff member time for duration of project.
3.	Develop an approach to manage riverbank sections identified as being most at future risk.	<p>Prepare a map of the reach to identify areas in which physical protection works will be undertaken as a first approach and areas where the river and banks will be allowed to take its own course.</p> <p>Update the riverbank slope hazard map and priority riverbank areas for revised risk when new information comes to light.</p>	<p>EW/TAs</p> <p>EW</p>	<p>O</p> <p>O</p>	<p>\$5k</p> <p>\$20k every 5 years</p>
4.	Funding policy review	Undertake a funding policy review of Project Watershed contributor/beneficiary to determine an equitable basis for funding future works.	EW	H	\$25k
5.	Maintain amenity of the River environment.	Develop a range and select structural options for river stability management to minimise effects on public access, natural character, and amenity values and ensure consistency in appearance. Ensure an assessment is undertaken to determine and minimise the consequential effects of introducing structures.	EW/TA's	H	<p>\$20k to develop range of options.</p> <p>Cost of engineered options selected.</p>

6.	Effectively manage development within hazard areas.	Investigate and where appropriate implement mechanisms including, but not limited to, district/city /regional plan changes e.g. identify hazard zones and establish building setbacks, codes or practice and development design criteria to address issues associated with development and land use within confirmed hazard areas, and detailed subsurface assessments as part of resource consents.	TA's	H	15-20% FTE staff member time for 2 years.
7.	Monitor river for actual bed degradation effects over time.	<p>Establish monitoring programme and baseline for river cross sections to determine ongoing bed degradation and identify any critical data gaps.</p> <p>Consult with, and document information from landowners in high-risk areas to get an idea of the rate of erosion and/or other effects.</p> <p>Allow yearly contingency to resurvey the riverbed cross sections after a 10-year flood event.</p> <p>Complete systematic photographic records on regular time intervals from river reconnaissance.</p> <p>Continually update bed degradation data to reflect riverbed cross section monitoring.</p> <p>Undertake bed load and sediment sampling to determine the rate of degradation.</p>	EW/MRP	H M O O O	\$10k
8.	Monitor the effects of bed degradation on the Turangawaewae Marae.	Set up appropriate monitoring programme of riverbank areas adjacent to Turangawaewae Marae.	EW/ tangata whenua	M	
9.	Identify all significant cultural/heritage sites adjacent to the river that may be at risk.	Collate existing knowledge of the Central Waikato River to identify sites of significance and map these against areas subject to present or future high risk from the effects of river instability.	EW and tangata whenua	M	
10.	Identify accessibility (walkway and cycle routes issues)	<p>Investigate what walkways are needed adjacent to the River in the long term which are at risk from present and future bank instability.</p> <p>Consider existing and strategic requirements for walkway routes in district plans taking into account areas of identified bank stability risk.</p> <p>Investigate vegetation/engineering options to stabilise banks where inland diversion of walkways is not possible.</p>	TAs	M	<p>\$40-50k.</p> <p>20% of 1 FTE staff member's time for 2 years.</p> <p>\$5-\$10k per site</p>

11.	Ensure appropriate construction of access structures to the river (eg boat ramps, jetties) in areas of present and future high bank instability risk.	Add to Proposed Waikato Regional Plan assessment criteria the consideration of identified present or future high bank instability risk, requiring information on appropriateness of the structure in that area.	EW	M	
12.	Identify important recreational sites subject to potential future river instability hazards.	Identify important recreational sites at risk, now and in the future.	TAs	H	15% 1 FTE staff member time for 6 months
13.	Identify lifelines utilities at threat from the effects of bank instability and bed degradation.	Condition/risk assessments of infrastructure based on priority ranking of river sections. Review the recorded drawings for water intake structures to assess the impact of falling water levels. If necessary, relocate water intake structures into deeper water.	TAs with Waikato Lifelines Group	H	\$30-50k
14.	Protection works: Recreational Sites High Value Developments Stormwater Outfalls Significant Cultural Sites Important Lifelines Upgrade landings & boat ramps	Consider and implement options for the protection of important recreational sites to maintain access and implement. Confirm all high value developments and when non-structural options are shown to be ineffective at minimising effects of bed degradation bank instability consider structural options where development is at risk, or integrate with existing structural protection works in the area. Place new or extended toe erosion protection around stormwater outfalls to mitigate against effects of falling river levels. Investigate alternative methods for protection or alternatively, lower or extend the outfall structure. Investigate, in conjunction with mana whenua, the use of options that will provide protection to areas of significant cultural and heritage value from erosion, without detracting from these values. Confirm important lifelines. Assess appropriate options for the protection of lifeline utilities. Develop options to protect, modify or move important lifeline utilities. Extend landings into deeper water by adding an extra flight of steps, or consider alternatives to provide sufficient water depth.	TAs EW/TAs tangata whenua	M	Dependent on extent of protection required and design. Will depend on impact and infrastructure at risk. \$5k per investigation. Engineering costs vary depending on option chosen. Depends on option selected. \$5-10k per site investigation.

	Areas of significant vegetation	Extend boat ramps into deeper water as required, or reconstruct boat ramp at lower level. Identify areas of significant vegetation adjacent to the river and monitor these areas for effects from bank erosion. Implement protection to areas that may be at risk from erosion	TAs and commercial operators EW/TA's		Will depend upon extent of impact and type of infrastructure. 5% 1 FTE staff member time for duration of project.
15.	Focus remediation measures after flood events in areas of high priority.	Focus remediation efforts following floods to areas where public safety, lifelines, key infrastructure or community/cultural sites of significance are at risk.	EW/TAs	O	-
16.	Remove trees that are causing instability of riverbanks.	Identify trees that are causing instability (on both private and public land) and in river sections where public health and safety and/or lifelines are affected and consider replacing with appropriate plant species to aid in stabilisation of banks.	TAs	M	\$10-20k per TA
17.	Investigate native and/or best plant species that can survive fluctuating river levels whilst providing bank stabilisation.	Commission an ecological report to identify bank stabilising native plant species that are suitable for the Waikato River environment. Link to work previously done by LandCare Trust on appropriate stabilising native species.	EW	H	
18.	Confirm that the 15 River bridges are managed to reduce or avoid the effects of bed degradation.	Transit , rail and TAs to ensure that bridge condition assessments are current or underway with necessary management actions.	TAs/ Transit	H	-
19.	Refine knowledge available on the management of bed degradation by directly stopping or limiting bed degradation.	Undertake further research on the effects of ramping of Karapiro outflows on bed degradation. Further research on the feasibility and acceptability of weirs.	MRP EW	M	\$20k \$20-30k
20.	Visually monitor the river and tributaries following all flood events to assess changing levels of bed degradation hazard.	Visually assess the river and main tributaries in urban areas following any flood events for impact on hazard levels. Maintain a systematic photographic record. Reassess and update priority areas/actions following flood events.	EW	O	

Appendix 1

Relevant Technical Documents

Smart, G.M (2003) "Degradation of the Waikato River, Karapiro to Ngaruawahia, Review of Existing Knowledge & Recommendations for Future Work".

Smart, G.M (2005) "Analysis of Stage II Degradation Studies Waikato River, Karapiro to Ngaruawahia".

Smart, G.M (2005) "Relative Importance of factors causing degradation in the Middle Waikato River Discussion document".

Beca Infrastructure Ltd (2005) "Middle Waikato Bed Degradation Investigation Stages III & IV. Stage IV: Bed Degradation Management Strategy".

Beca Infrastructure Ltd (2006) "Middle Waikato Bed Degradation Investigation Stages III & IV. Proposed Middle Waikato River Bed Degradation Management Strategy: Appendices".

River Stability Hazard Lines : Central Waikato River Stability Management Strategy. October 2006.

URS NZ Ltd. (2007) "Waikato River Erosion Study".