Kaituna River Re-diversion and Wetland Creation Project: Scoping Report for Assessment of Environmental Effects

Bay of Plenty Regional Council
Environmental Publication 2013/05

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NEW ZEALAND

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Bay of Plenty
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May 2013

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Cover photo: Kaituna River and Ongatoro/Maketū Estuary at Te Tumu.

Executive summary

As a partner to the Kaituna River and Ongatoro/Maketū Estuary Strategy, Bay of Plenty Regional Council has set up a Project Team to implement the strategic and management options assigned to it through the Strategy. The goal of the Kaituna River Re-diversion and Wetland Creation Project is:

> ***To re-divert as much of the Kaituna River as possible through Ongatoro/Maketū Estuary, and in the process to create new wetlands, (by 2018) to maximise ecological and community benefits while ensuring the cost and environmental effects are also acceptable.***

This report presents two options to achieve this goal. Bay of Plenty Regional Council is currently seeking feedback from landowners, iwi, stakeholders and the wider community to help determine the scope and direction of further investigations. The options will be studied in detail to assess their environmental effects compared with the existing situation, and prepare applications for resource consents and other permissions required to carry out the work.

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Part 1: Background

Since 1900 there has been major work undertaken in the lower Kaituna River catchment to reduce the flood risk to surrounding property, including the 1956 Te Tumu diversion which directed the River out to sea before it reached Ongatoro/Maketū Estuary. Some of this work resulted in negative ecological and cultural effects, such as:

- accelerated in-filling of the estuary largely due to increased water velocities through the Ongatoro/Maketū estuary entrance on the incoming tide, with up to 70% of the tidal prism lost since 1956 (Goodhue, 2007),
- a reduction in the habitat for native plants and animals with 95% of estuarine salt marsh disappearing since 1956 (Goodhue, 2007),
- a decline in the size and abundance of kaimoana species (Elaine, Maru and Clem Tapsell, Raewyn Bennett; pers comm, 2012),
- a decline in the mauri or life-force of the estuary and lower river (various tangata whenua; pers comm, 2012 and 2013).

These effects have resulted in calls for the Kaituna River to be re-diverted back into the Ongatoro/Maketū Estuary from the Maketū community. It is recognised that the human history of this area goes back well before European settlement of the area.

As part of a process to address these negative effects, Bay of Plenty Regional Council and other agencies together with the community developed the non-statutory 'Kaituna River and Ongatoro/Maketū Estuary Strategy'. This was finalised in 2009.

The vision in the Strategy is to ensure that by 2018 there is an improvement in the sustainable management of the river and estuary resources through local and central government policies, plans and actions. The Strategy sets out why people value the Kaituna, their concerns (the issues), and a vision for the future.

The Strategy includes a number of strategic actions to improve water quality, restore healthy ecosystems, ensure sustainable resource use and support kaitiakitanga and local people's stewardship. Strategic actions were assigned to the Bay of Plenty Regional Council, Western Bay of Plenty District Council, the Department of Conservation, Fish and Game, local community groups and different iwi.

Bay of Plenty Regional Council is investigating options for two significant actions in the Strategy:

- Increase the flow of water, particularly freshwater, from the Kaituna River into Ongatoro/Maketū Estuary, while keeping Te Tumu Cut open for flood relief, and
- Create wetlands in the lower Kaituna catchment as opportunities arise.

Approval and funding for these investigations was granted by the Regional Council in the Ten Year Plan 2012-22, and updated at the Operations, Monitoring and Regulation Committee meetings in September 2012 and March 2013.

This report presents two options to achieve this goal. Bay of Plenty Regional Council is currently seeking feedback from landowners, iwi, stakeholders and the wider community to help determine the scope and direction of further investigations. The options will be studied in detail to assess their environmental effects compared with the existing situation, and prepare applications for resource consents and other permissions required to carry out the work.

The key features of the area are shown in Figure 1.

Figure 1 Key features.

In June 2012 the Bay of Plenty Regional Council (BoPRC) received a report[1] that recommended investigation of options to maximise the flow of water from the Kaituna River into the Ongatoro/Maketū Estuary without blocking Te Tumu Cut in recognition of its important contribution to flood relief. This idea is referred to as "Maximum Flow Partial Re-Diversion".

Since that time Bay of Plenty Regional Council (BoPRC) has established a Project Team consisting of internal staff and external consultants and contractors with skills in consultation, engineering, data collection, ecology, water quality assessment, computer modelling and coastal processes. This team has reached a point in the project where it is necessary to report on its findings and obtain feedback before proceeding with more detailed studies.

[1] *Kaituna-Maketu Rediversion Project Option Pre-feasibility and Consentability, BoPRC Report 2012/06.*

Part 2: Report objective

This objective of this report is to provide landowners, iwi, stakeholders and the wider community with an update on the Kaituna River Re-diversion and Wetland Creation Project, and a chance to provide feedback on two options under consideration, as well as their environmental effects. The Project Team will consider all feedback received to help refine the options, and to better define the environmental effects that need to be investigated.

This work is part of the second stage in the Kaituna River Re-diversion and Wetland Creation Project, “Pre-consent consultation: phase one”. See Figure 2 below for details on the project stages.

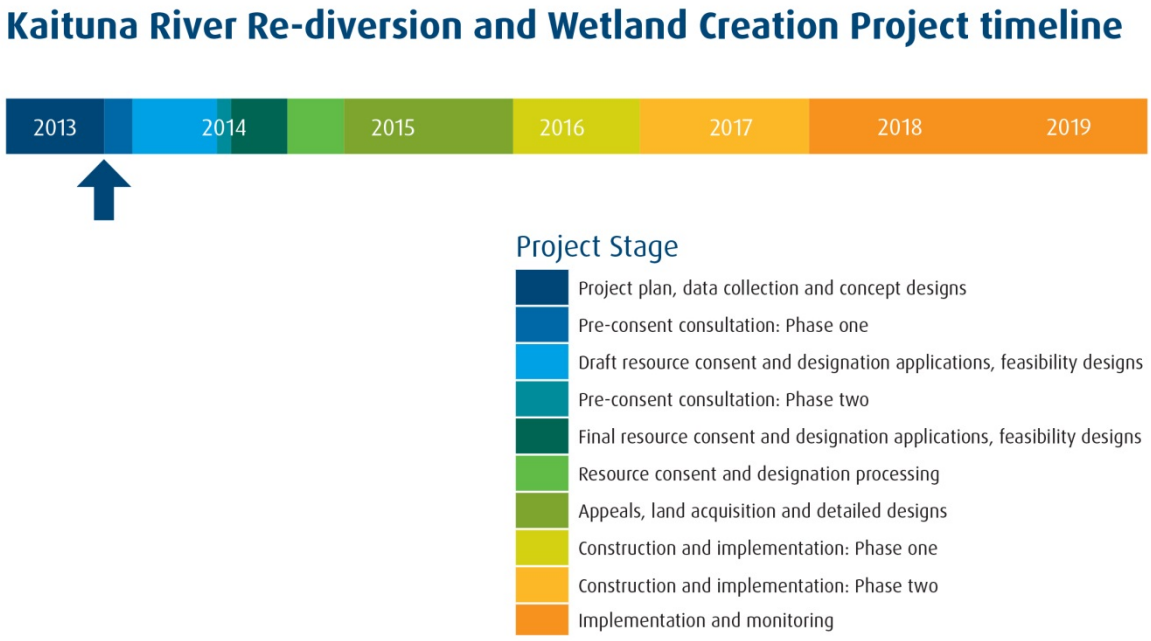

Figure 2 Kaituna River Re-diversion and Wetland Creation Project timeline.

Part 3: Technical considerations

On an average tide, at average river levels, 2,900,000 cubic metres of water flow through the lower Kaituna River on each tidal cycle. At present, there is a mean flow of 147,000 m^3/tidal cycle through Ford's Cut to Ongatoro/Maketū Estuary, and the remaining 2,753,000 m^3 flows out to sea through Te Tumu Cut. The total volume of water flowing into Ongatoro/Maketū Estuary on a mean tide is about 1,450,000 m^3, with the majority of this entering via the estuary entrance (DHI 2009).

In 1990 the Department of Conservation (DOC) applied for consent to re-divert from the Kaituna River to Ongatoro/Maketū Estuary 400,000 m^3/tidal cycle through Ford's Cut by building a structure comprising 10 to 15 box culverts 2.5 metres wide and 2.0 metres high with flapgates. This proposal was rejected because it was shown that high levels of faecal coliforms in the river water were likely to breach the water classification standards for bathing and shellfish. The consent authority subsequently approved 100,000 m^3/tidal cycle in Resource Consent 22636 and then renewed in Consent 40277 (Bay of Plenty Regional Council consent records).

Water quality monitoring has shown a steady decline in Kaituna River base flow bacteriological contamination at Te Tumu from 1,000 *E. coli* faecal coliforming units per 100 ml in 1989 to a median of 201 in 2007/08 (Park, 2010). Note that results are still variable, and rates of contamination are significantly higher during and immediately after rainfall events.

Preliminary modelling indicates that 600,000 m^3/tidal cycle is the maximum volume that will flow from the river to the estuary irrespective of the size of the diversion structure due to hydraulic constraints, if Te Tumu Cut is left open. Work to date has shown that such a volume could be achieved with 40 flap-gated culverts (off 1.8 m diameter, invert level -1.5 m RL) leading into a 60 m wide channel excavated to a depth of -1.5 m RL into the estuary.

It is possible that up to 700,000 m^3 can be achieved but this would require a much larger number of culverts and a 120 m wide channel, in addition to retaining Ford's Cut and its four culverts. Structures of this size will obviously cost significantly more for little marginal benefit.

The Project Team has focussed on designing concept plans that primarily maximise the freshwater component of any additional re-diverted flows, but also aim to maximise total water volume and the area of wetlands created. By maximising freshwater volume the benefits to kaimoana and estuarine salt marsh will be maximised by increasing the area of the estuary with a salinity low enough to support such species and communities.

The further upstream any re-diverted flow exits the river the larger the freshwater component. This effect is marked, with the proportion of fresh water on a mean tide modelled to increase from around 0.2 if taken just inside Te Tumu Cut up to 0.55 if taken from the west side of Ford Island with a new block between Ford Island and Ford Road.

Opening the Ford river loop has little effect on total volume but increases the freshwater portion. Opening the Ford river loop *and* blocking its downstream end has the effect of further increasing the freshwater component *but reducing the total volume of water*.

One-way flow from the river to the estuary is required to maximise benefits in relation to reducing sedimentation in the estuary. This decreases flood tide inflows (which bring in sand to the estuary) and increases outflows (which remove sand). Such one-way flow is achieved by using flap-gates or mechanical gates on culverts or bridges. These gates allow water to flow from the river to the estuary but prevent water flowing from the estuary back to the river and out at Te Tumu Cut. This maximises seaward flow through the Ongatoro/Maketū estuary.

Options that allow for re-diverted flows through Papahikahawai Channel and around both sides of Papahikahawai Island have been sought, partly to reflect pre-diversion estuary morphology and partly to restore the health of the north western part of the estuary which has had very little tidal flushing for the last forty years.

The length of the engineered channel and the shape of its transition into the estuary have only a small effect on the volume entering the estuary.

The volume of water that enters the estuary in a very rare flood event (1% AEP) increases from 2,400,000 m^3 under existing conditions up to 7,300,000 m^3 with a maximum flow partial re-diversion. This will significantly increase estuarine outflows and assist with removing accumulated sediment in the vicinity of the main channel and result in temporary deepening and widening of the entrance (as occurs in other river estuaries on this coast). However, it may have some negative effects on water levels during the flood. The effects will be assessed in more detail in the modelling.

Likely advantages of a re-diversion approaching 600,000 m^3

(i) Modest increase of freshwater and total inflows to the estuary that will improve ecological values and decrease sedimentation in the estuary.

(ii) Partially restored mauri of the river.

(iii) Partially restored kaimoana to the estuary.

(iv) Restore up to 26 hectares of potential salt marsh wetland habitat on low-lying land north of Ford's Cut.

(v) Likely to facilitate the ability to actively restore further salt marsh habitat within the estuary after re-diversion.

(vi) Restore flushing and estuarine circulation to the Papahikahawai Channel and lagoon flushing these areas and restoring ecological health and estuarine ecosystems.

(vii) Maintained existing fishing and navigability at Te Tumu with significant change likely.

(viii) No rise in flood levels or day-to-day river levels upstream.

Likely disadvantages of a re-diversion approaching 600,000 m^3

(i) Reduction in estuarine water quality because of bacterial, nutrient and other contaminants in the river water. This will need to be monitored and the increase in water flows can be staged and managed to minimise issues.

(ii) Reduction in estuarine water quality. This would need to be monitored and a staged increase in water flow could be managed.

(iii) Uncertainty about lower estuary morphology because the estuary is so full of sand. Changes in the channel and banks are likely as the system adjusts to partial restoration of river flows. There may also be localised shoreline changes. These morphological adjustments will be hard to predict especially during high river inflows. Attempting to control or manage these changes by dredging the estuary and/or channelising the flow is not likely to be desirable and would also be costly. It is likely to be more desirable and effective to stage the increase in water flows over time with monitoring of changes and to design the works to enable control of peak flow rate into the estuary at the entry culverts.

(iv) Works will impact on the low-lying land belonging to the Brain family, for which agreement needs to be reached

Planning constraints

The “maximum flow partial re-diversion” approach is generally consistent with the objectives and policies contained in the relevant planning documents, such as the Regional Policy Statement, the Regional Coastal Environment Plan and the Regional Water and Land Plan. The physical works required to implement this option do not raise any obvious policy issues, provided that they are designed and implemented in an appropriate manner to avoid, remedy or mitigate potential or actual adverse effects. These aspects can be incorporated into the detailed design process once the effects have been accurately estimated.

Given a degree of uncertainty regarding the extent of any adverse effects resulting from this rediversion, it is likely that a precautionary approach will need to be adopted. This will involve a staged implementation of the re-diversion with monitoring to ensure environmental effects thresholds are met prior to increasing water volumes.

Resource consents will need to be obtained, including but not necessarily limited to large-scale earthworks (e.g. diversion channel), the diversion of coastal water; the erection, modification and removal of structures in the coastal marine area; and disturbance, excavation and deposition of material on the bed of the river and estuary.

It is also possible that a designation will need to be sought for the low-lying land north of Ford’s Cut if a suitably negotiated agreement with the landowners cannot be reached. This process could ultimately lead to compulsory acquisition of the land under the Public Works Act, subject to demonstrating the need for such action to the appropriate decision making bodies.

Part 4: Priority issues identified for investigation

The Bay of Plenty Regional Council Report 2012/06 listed key environmental issues that would need reporting on for a consent application in its Appendices.

The Project Team reviewed this list and agreed on priority issues that were critical to the success or failure of the project and that had to be understood before this Scoping Report could be prepared. They are:

- Confirming previous work which estimated that the normal, day-to-day volume per tidal cycle through the estuary from the river could be increased from the present 147,000 m^3 up to a volume approaching 600,000 m^3, and then assessing in detail the extent of any ecological or cultural benefits possible with that volume of water.
- Designing Kaituna River Re-diversion and Wetland Creation concept plans and testing them with 3D hydrodynamic models to maximise freshwater volume first, and maximising both total volume (including salt water) and the area suitable for new wetlands second.
- Acknowledging the need to restore the mauri value of the river and estuary system, including a desire from tangata whenua to reflect the pre-1926 river channels as far as practicable, including flows around both sides of Papahikahawai Island.
- Negotiating with landowners directly affected by any works on private land with the aim of finding mutually acceptable solutions, and exploring other possibilities where such agreements cannot be found.
- Identifying strategies to avoid, remedy or mitigate the potential effects of decreasing water quality in the estuary as a result of the re-diversion, including the probability that the works have to be staged.
- Maintaining existing recreational access by road to Te Tumu mole and by small boats through Te Tumu cut, and pursuing options which provide other recreational opportunities as co-benefits where possible.
- Identifying and fully assessing the full range of environmental effects associated with any option using the best advice and numerical modelling available, and developing robust plans to carry out works safely and effectively in a way that maximises ecological and cultural benefits while minimising adverse environmental effects and economic costs.

Part 5: Project options

5.1 Existing situation: Ford's Cut

The existing configuration of channels and flows in the lower Kaituna River at Te Tumu is shown in Figure 3 below. The status quo includes the re-diversion of 147,000 m^3 per tidal cycle to Ongatoro/Maketū estuary through Ford's Cut, or just under 5 percent of the river's mean flow. This represents some 10 percent of the mean tide estuary volume. The average tide freshwater component of the re-diverted water is 105,000 m^3 per tidal cycle, or 71%. Flows around the north and west sides of Papahikahawai Island are blocked by stopbanks.

The Department of Conservation holds the existing resource consent for the re-diversion through Ford's Cut, and is in the process of applying for a five year renewal of this through to 2018.

Figure 3 Existing situation at Te Tumu showing the location of channels and stopbanks.

Two options are proposed for further assessment.

5.2 Option 1: New channel

(a) Open the blocked oxbow around the west and south side of Ford Island.

(b) Excavate a 60 metre wide channel across the low-lying land from the Ford's Cut culverts in the south-west to Papahikahawai lagoon or channel in the north-east. The fill will be used to create a block and wetlands between Ford Island and Ford Road, and potentially infill Ford's Cut as well.

(c) Protect any banks or shorelines from erosion as required.

(d) Breach the stopbanks surrounding the low-lying farmland north of Ford's Cut and restore estuarine salt marsh and other wetlands, including the construction of minor channels off the main channel.

(e) Remove the two stopbanks or causeways between Papahikahawai Island and Maketu Spit.

(f) Remove the stopbank or causeway from the Brain land to Papahikahawai Island.

(g) Extend the existing Ford's Cut culvert structure or construct a new inlet structure, with 30 to 40 off 1.8 metre diameter flap-gated culverts.

(h) Engage the local community by actively planting and restoring estuarine salt marsh and other wetland plant species wherever habitat becomes available due to the works above.

Option 1 is predicted to re-divert 487,000 m^3 per tidal cycle which is about 17% of the total river volume. This volume is equivalent to 34% of the mean tidal volume of Ongatoro/Maketū Estuary. The freshwater fraction of the re-diverted flow is predicted to be 269,000 m^3 per tidal cycle, or 55%. Option 1 will direct re-diverted flows around both sides of Papahikahawai Island as was the case prior to 1956, and is shown in Figure 4.

Figure 4 *Option 1: New channel at Te Tumu showing the location of channels, proposed wetlands and stopbanks.*

5.3 Option 2: Widen Ford's Cut

(a) Open the blocked oxbow around the west and south side of Ford Island.

(b) Widen Ford's Cut to a 60 metre channel, using the fill to create a block and wetlands between Ford Island and Ford Road.

(c) Protect any banks or shorelines from erosion as required.

(d) Breach the stopbanks surrounding the low-lying farmland north of Ford's Cut and restore estuarine salt marsh and other wetlands, including the construction of minor channels off the main channel.

(e) Remove the two stopbanks or causeways between Papahikahawai Island and Maketu Spit.

(f) Remove the stopbank or causeway from the Brain land to Papahikahawai Island.

(g) Extend the existing Ford's Cut culvert structure or construct a new inlet structure, with 30 to 40 off 1.8 metre diameter flap-gated culverts.

(h) Engage the local community by actively planting and restoring estuarine salt marsh and other wetland plant species wherever habitat becomes available due to the works above.

Option 2 is predicted to re-divert 487,000 m^3 per tidal cycle which is about 17% of the total river volume (the same as Option 1). This volume is equivalent to 34% of the mean tidal volume of Ongatoro/Maketū Estuary. The freshwater fraction of the re-diverted flow is predicted to be 269,000 m^3 per tidal cycle, or 55%. This option will direct re-diverted flows into the southern part of Ongatoro/Maketū estuary, but there will still be some flows around the northern side of Papahikahawai Island. Option 2 is shown in Figure 5.

Figure 5 *Option 2: Widen Ford's Cut at Te Tumu showing the location of channels, proposed wetlands and stopbanks.*

Table 1 A comparison of flows and salinities in existing and proposed options.

	Total Kaituna volume:	Total water re-diverted to estuary	Percentage of estuary volume from Kaituna	Total freshwater re-diverted to estuary	Freshwater fraction of re-diversion
Existing situation	2,900,000	147,000	10%	105,000	71%
Option 1: new channel	2,900,000	487,000+	34%	269,000+	55%
Option 2: widen Ford's Cut	2,900,000	487,000+	34%	269,000+	55%

5.4 Possible refinements

(a) Design and install a structure such as a training wall at the western end of Ford Island to direct more fresh water, or a higher freshwater proportion, toward the estuary.

(b) Replace the numerous culverts with fewer but larger rectangular box culverts with electro/mechanical gates and controls to restrict or allow flood flows into the estuary. This would allow more precise control of water volumes and levels in Ongatoro/Maketū estuary during flood events, but would increase the cost and maintenance of the structures.

(c) Install a single small culvert from the lower Kaituna River just south of Te Tumu mole underneath Ford Road and through into the western end of Papahikahawai Channel. This is very likely to increase flows but of predominantly salty water.

(d) Carry out selective dredging of the river and/or estuary bed to optimise the bathymetry for maximising the freshwater volume of the re-diversion.

(e) Understand and account for climate change effects.

5.5 Staging and monitoring

It is conceivable that the results of some of the environmental effects assessments will be inconclusive or subject to some uncertainties. As a result it is possible that the re-diversion of the full consented flow will be staged over a number of years with monitoring of effects. Staging of the works and/or the amount of water diverted will be considered during the preparation of the assessment of environmental effects.

Effects to be monitored will likely include estuary water quality, navigability of the two entrances, erosion of coastal margins and sedimentation in the estuary.

Part 6: Likely environmental effects

The effects to be considered and assessed prior to submitting a resource consent application include.

- Cost and technical feasibility. The chosen option needs to provide the desired benefits at a reasonable cost.
- The existing use of low-lying land north of Ford's Cut as farmland will be significantly affected.
- Access to Papahikahawai Island.
- Flood levels and drainage levels in the Kaituna River and the integrity and operation of the Kaituna Catchment Control Scheme.
- Morphology and navigability of the Ongatoro/Maketū Estuary and its entrance, Te Tumu entrance and the lower Kaituna River, and around the boat ramp near the Ford Rd pump station. Fisher people and boaties can still use Te Tumu entrance but potential morphological changes here need to be assessed and reported. At this time there is general agreement that changes will be negligible because flows from the river through the Te Tumu mouth will be very similar over 12 hours each day and only slightly smaller over the other 12 hours i.e. any extra water going through Fords Cut will only do so on incoming river tides. Higher flows in the river will continue to provide the scouring effect at Te Tumu. Any potential morphological change could be part of an adaptive management approach in which flow rates through Ford's Cut are increased up to an agreed maximum while changes are monitored.
- Estuary water levels – on a day-to-day basis and during high river flow and high seas and any potential effect on drainage and flooding.
- Any changes to water levels within the adjacent wetlands and potential for siltation, dry-out or flooding.
- Existing land use activities on land adjacent to the lower Kaituna River and Ongatoro/Maketū Estuary.
- Cultural values such as the mauri of the area and the gathering of kaimoana.
- Kaimoana abundance and whitebait habitat in the Maketū Estuary.
- Estuary water quality and effects on ecology or suitability for bathing. Any potential reduction in water quality will either have to be either accepted as a negative of the project and balanced against project benefits *or* the project delayed until water quality has been improved in the river upstream. Alternatively an adaptive management strategy could be adopted where flow is increased in steps over time while water quality and any associated effects are monitored.
- Erosion along any new channels, around Papahikahawai Island, along the channel and past Maketū Surf Lifesaving Club.
- Influence on salt wedge in lower Kaituna River
- Recreational opportunities (e.g. shore based fishing).
- Identified significant natural landscape – Maketū Estuary.
- Identified significant ecological sites – duneland vegetation and dotterel.
- Maketū Wildlife Management Reserve.
- Recreational access to Te Tumu mole, roadway, fishing.
- Farming (response of grasslands to changing water quality).

Part 7: Next steps

Stakeholders provide feedback

Bay of Plenty Regional Council is currently engaged in a first round of pre-consent consultations with this report with potentially affected stakeholders.

Detailed engineering studies and environmental effects assessments

Once feedback has been collated and considered work scopes will be issued to various experts that include the appropriate consideration of this feedback in the preparation of engineering feasibility studies and environmental effects assessments.

Further consultation

In early 2014 when a draft assessment of environmental effects has been prepared along with any resource consent and designation applications, the Project Team will again consult with potentially affected stakeholders.

Prepare final assessment of environmental effects and application for consents and designations

The feedback collected during the second round of consultation will help refine and finalise the assessment of environmental effects along with any resource consent and designation applications. These are planned for lodgement in May 2014.

Consent and designation processing

After consent and designation application lodgement, the Project Team will respond to any directives from the consent authorities. This may include appeals in the Environment Court.

Detailed design, land acquisition, tendering and construction

Only after consents have been obtained will land be acquired, followed by detailed designs, tendering and construction. Capital funds for construction have been budgeted from 1 July 2015.

Part 8: References

Bay of Plenty Regional Council. 2012. Kaituna River Re-diversion: Option Prefeasibility and Consentability report. Bay of Plenty Regional Council Operations Publication 2012/06.

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FEEDBACK FORM

KAITUNA RIVER RE-DIVERSION AND WETLAND CREATION PROJECT

What is your response to the options presented in this report?

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Which option do you prefer, if any, and why?

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What benefits do you see?

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What modifications would you like Bay of Plenty Regional Council to consider?

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What effects are you most concerned about?

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……

Do you have any feedback about the process and timeframes the Bay of Plenty Regional Council is using for this project?

……
……
……

Name (optional) ……..

Address (optional) ……..

……..

Phone (optional) ……..

Email (optional) ……..

Return to: Pim de Monchy, Bay of Plenty Regional Council, PO Box 364, Whakatāne, or email pim.demonchy@boprc.govt.nz