Kaituna-Maketu Re-diversion project

Option Pre-Feasibility and Consentability

Bay of Plenty Regional Council
Internal Report 2012/06

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Working with our communities for a better environment
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Bay of Plenty
REGIONAL COUNCIL

Kaituna-Maketū Rediversion Project

Option Pre- Feasibility and Consentability

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June 2012

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- Jim Dahm, Coastal Scientist, Eco Nomos
- Phil Wallace, Engineer, River Edge Consulting
- Dan Bates

Executive summary

This report is a pre-feasibility level report and informs on technical suitability, cost, potential environmental effects and risk associated with land access and consenting. Its purpose is to provide information that allows an informed decision to be made on an option for which consents might be sought.

Three options have been considered for the rediversion of the Kaituna River back into the Ongatoro/Maketū Estuary:

1 Low Flow Partial Diversion – Small increase in existing diversion through Fords Cut while keeping Te Tumu open.

2 Maximum Flow Partial Diversion – Maximum diversion possible while keeping Te Tumu open.

3 Full Diversion - Te Tumu closed and full daily flow back through estuary with provision for flood flows in some manner.

Note, this report does not discuss the exact flow paths of river water back to the estuary i.e. the split between Fords Cut and Papahikahawai Channel or other routes. This debate has distracted previous deliberations and can wait until a decision is made on this report.

Figure 1 Existing situation

Option 1 – this can be achieved relatively easily and inexpensively but provides minimal ecological and cultural benefit.

Option 2 – this is worthy of further consideration. Preliminary studies indicate 600,000 m^3/tidal cycle can be directed from the river to the estuary (up from the existing 150,000 m^3).

This option is not without consenting risk and there is significant investigation and consultation yet to be undertaken before an application is lodged for resource consents. However it has a good chance of success with reasonable time and cost.

The Department of Conservation (DOC) should be alerted to the need to renew their consent for the existing control structure. Following on, discussions should be held with DOC to increase the volume of diversion.

Option 3 – the full diversion, also not recommended, has the maximum cultural, ecological and hydrological benefits but has major disadvantages that will be very difficult, time-consuming and costly and will create inherent risk. These disadvantages are:

- Rise in upstream river flood water and day-to-day water levels.
- Resulting in a need for a control structure at Te Tumu, or need for stopbank raise, or need for upstream flood storage.
- Need to pass 400-500 cumecs through the estuary (up from 30 cumecs approximately) if a control structure cannot be found.
- Significant decrease in water quality.

As there will be continuing pressure to implement full diversion the resolution of these issues should continue.

Recommendations

Option 1 – Low Flow Partial Diversion is not recommended at this time but may be considered as a fall-back position.

Option 3 – Full Diversion is not recommended at this time due to the large uncertainty and hence consenting risk associated with its effects and their mitigation.

Option 2 – Maximum Flow Partial Diversion is recommended to take into consent level investigations and consultation and that the findings of this report be presented to and discussed with the Maketū community to point out the major risks of trying to consent the full diversion and to seek compromise by opting for the partial diversion, with maximum flow.

Immediately confirm the predicted 600,000m^3/tidal cycle estimate.

It is also recommended that concurrent investigations continue so as to resolve the issues preventing full diversion. Such resolution may enable full diversion at some time.

Initiate discussions with DOC to renew their existing consent and seek additional flow.

Initiate discussions with Central Government for funding.

Table 1 Summary of options

	Status quo	Low flow partial diversion	Maximum flow partial diversion	Full diversion
Volume per tidal cycle	150,000m^3	300,000m^3	600,000m^3	2,900,000m^3
Technicalities	None Ongoing dispute with Alan Brain over erosion along his property	Solve dispute with Alan Brain over erosion along his property Modify Fords Cut and inlet culverts	Solve dispute with Alan Brain over erosion along his property. Significant modification or change to Fords Cut and its control structure; install culverts under Fords Rd to let water into Papahikahawai Chanel and remove stopbanks from channel; stopbank round Brain property. Limit peak flow through estuary using the control structure Leave Te Tumu open	Solve dispute with Alan Brain over erosion along his property. Block Te Tumu. Significant modification or change to Fords Cut and its control structure; install culverts under Fords Rd to let water into Papahikahawai Chanel and remove stopbanks from channel; stopbank round Brain property. Provide flood storage upstream or build risk free control gates. Design for peak flow (500 cumecs) through estuary
Staging?	N/A	None needed – just do it	Seek consent for 600,000m^3/tidal cycle; build structure for full volume incorporating flow control; incrementally increase flow as result of monitoring. Ten years to get to maximum diversion	Seek consent for 2,900,000m^3/tidal cycle including flood rise mitigation and boat entry mitigation; implement Maximum Partial Diversion scheme; solve upstream flooding and drainage levels; block Te Tumu mouth and remove/modify partial diversion structure.
Water quality	N/A	Minor decrease	Decrease	Significant decrease
Planning constraints	N/A	Minor	Moderate	Major
Potential adverse environmental effects	Ongoing deterioration of the estuary.	Minor	Moderate – mitigate against reduced water quality, potential change to Te Tumu navigability	Significant – Mitigate against day-to-day rise in water levels, flood levels, Te Tumu closure, reduced water quality, high flows through estuary;
Cost	$0	$500k - $1M	$3 - $4M	$10 - $15M
Consenting Risk	N/A	Minor	Moderate	Major
Benefits achieved	Nil	Minor	Moderate	Significant

Contents

Appendices

Part 1: Report purpose

The purpose of this report is to discuss three broad options to redivert the Kaituna River back through the Maketū/Ongatoro estuary, particularly the technical pre-feasibility and consenting risk associated with each option. The three options discussed are:

1 A small increase in the existing flow diverted (Low Flow Partial Diversion).

2 An increase in this existing flow up to the maximum hydraulically feasible while keeping the Te Tumu mouth open (Maximum Flow Partial Diversion).

3 Closure of the Te Tumu mouth resulting in the full daily flow of the river going through the estuary with some provision for flood flows (Full Diversion).

A recommendation is made on the option that ***both*** maximises the increase in the amount of water diverted back through the estuary ***and*** has a reasonable chance of success through the consenting process.

Part 2: Report scope

This report summarises three general options to re-divert the Kaituna River back through the Maketū/Ongatoro estuary. The report is made available to the Strategy[1] Project Manager for inclusion in a Strategy Progress Report and potentially as the basis for consent level investigations.

The three options are:

1 Low Flow Partial Diversion – a small increase in the existing flow already diverted through Fords Cut by modifying the existing control structure and leaving Te Tumu cut open; also ensuring full diversion can occur at a later date (generally known as Options I and J described in Appendix 7).

2 Maximum Flow Partial Diversion – Diversion of a large proportion of the river flow through the same locality but leaving Te Tumu cut open; ensuring full diversion can occur at a later date (generally known as Options P, K, L and N Appendix 7). The limit on the amount of water that can diverted will depend on the water levels between the river and the estuary and the amount of flow through Te Tumu to keep it navigable.

3 Full Diversion - Closure of the Te Tumu mouth resulting in the full daily flow of the river going through the estuary with some provision for flood flows. Achieved through some combination of changes to Fords Cut, Papahikahawai Channel and through/over land owned by Alan Brain; plus closure of Te Tumu cut (generally known as Options H and R Appendix 7).

The three options are compared to the status quo.

Each of these options has potential environmental and landownership effects that need to be assessed and discussed and either accepted, avoided, remedied or mitigated e.g. changes to flood and day-to-day river water levels, drainage scheme operation, water quality and ecology in the estuary, recreational access, cultural values, erosion, land access etc. Each option has differing levels of community and political support.

This report is a pre-feasibility level report and informs on technical suitability, cost, potential environmental effects and consenting and land access risk and allows an informed decision to be made on an option for which consents might be sought.

The report includes sections on:

- Background to rediversion including history of physical diversion, deliberations on rediversion and resource consents,
- Key constraints that limit rediversion,
- Option discussion including advantages, disadvantages, planning and consent risks,
- Council direction on rediversion, and
- Presents conclusions and makes recommendations to progress rediversion.

[1] Kaituna River and Ongatoro/Maketū Estuary Strategy, BOPRC Sept 2009

Part 3: Background

Background to Kaituna River to Maketū Estuary rediversion is presented in sections on the history of physical rediversion both natural and man-made, then some history of central government deliberation and recent Regional Council deliberation, and finally a section on the consents associated with rediversion.

3.1 History of diversion

- 1902 River flowed into estuary via Papahikahawai Channel.
- 1907 River breaks out at Te Tumu then mouth slowly migrates to east.
- 1925/8 Fords Twin Cut constructed to get river back into estuary.
- 1956 Te Tumu diversion opened and Fords Cut and Papahikahawai Channel blocked.
- 1995 Seepage continues under Ford Rd into estuary.
- 1979 Kaituna Catchment control scheme started with stopbanking.
- 1992/94 DOC consent application and tribunal resulting in some re-diversion through Fords Cut.
- 1996 Construction of Fords Cut control structure with subsequent legal battles to get it operating.

3.2 History of deliberations on rediversion

Since the river was diverted out through the Te Tumu cut with relatively small flow through Fords Cut there have been numerous debates on how to redivert water back through the estuary.

In 1984 a Cabinet Paper and Parliamentary Petition resulted in the preparation of a Restoration Strategy in 1989 (DOC 1989). The Cabinet Minute (Clark undated) recommendations were:

> *7(e) "Agree that any rediversion of the Kaituna River be undertaken only as part of this management strategy, and only if studies carried out under the strategy justify rediversions."*
>
> *7(f) "Agree that the scale and nature of any such rediversion be such as to neither lessen water quality in the estuary below classification standards nor impair the integrity of the Kaituna Catchment Control Scheme."*

The Optimum rediversion as recommended in the 1989 Restoration Strategy was (quoted below) very similar to what is being recommended now.

> *S.5.6.3 "An optimum rediversion of the Kaituna River in to the Maketū Estuary would entail a significant flow of between ten and twenty cumecs. Constraints on maximum flow include maintaining navigability at Te Tumu, not breaching water quality classification standards of risking public health, not compromising the Kaituna Catchment Control Scheme and maintaining a regular monitoring programme of the effects of rediversion."*

Currently and locally there is still a strong desire to return the waters to the estuary. The Kaituna River and Ongatoro/Maketū Estuary Strategy (BOPRC September 2009) was the culmination of many years of discussion around a desire to improve the health of the Maketū Estuary through better ecology, better water quality and improved (increased) flow through the estuary. It was drafted following deliberations by a Joint Council Committee and receipt of numerous submissions from interested parties. Many stakeholders desired full diversion, which became a recommendation of the strategy subject to satisfactory flood relief.

Submissions on the recent Draft Ten Year Plan reiterate this desire.

In October 2011 the Bay of Plenty Regional Council (BOPRC) made it clear it would support an option that allowed staged rediversion leading to full closure of Te Tumu. However this decision was made on the following assumptions:

1 Control could be obtained over land owned by Mr Alan Brain – no such assurance was in evidence at that time and currently exists.

2 Closing Te Tumu mouth and subsequent loss of access was seen as a minor effect – the Te Tumu Landowners Group are likely to have a differing view on this matter leading to a lengthy and costly consenting process.

3 Modifications to and structures within the Te Tumu mouth can be found and are reliable – this is a significant assumption and one that requires detailed investigation and risk assessment before expectations are raised too high. If a structure cannot be built, floods up to 500 cumecs have to be safely passed through Brain land and through the estuary. This will have significant effects taking time and money to resolve.

3.3 Resource consent history

The following provides a brief overview of the history of the planning approvals and consents for the rediversion of water from the Kaituna River back into the Maketū Estuary.

- **1990** – As a result of the government ordered Restoration Strategy (1989), an application for planning approval was lodged by the Department of Conservation for planning approval to undertake a partial rediversion (400,000 m^3 per tidal cycle) of the Kaituna River into the Maketū Estuary (application ref 02 2636). Approval was only granted for up to 100,000 m^3 per tidal cycle due to water quality concerns. The decision was appealed by several parties.
- **1994** –The last of the appeals against consent 02 2636 was dismissed by the Planning Tribunal (Decision A 5/94). A High Court injunction was sought by the Brain family.
- **1996** – High Court appeal dismissed, rediversion was implemented.
- **1997** – Resource consent 02 2636 expired.
- **1998** – Resource consent application 04 0277 was granted to the Department of Conservation. This consent replaced 02 2636 and expires in May 2013.

The rip rap walls along the bank of the Kaituna River and southern side of Fords Cut are covered by a comprehensive consent held by BOPRC for coastal structures (65213), which was issued in 2008.

Most of the effects of rediversion that have been considered over the years are still current today. Any new application for resource consents will face the same scrutiny from stakeholders and be similarly difficult to process.

Part 4: Key constraints

4.1 Water quality

The poor water quality of the Kaituna River is seen as a major constraint to rediversion. DHI (March 2011) modelled a marked reduction in water quality for full diversion in terms of requirements for shellfish growing waters and bathing standards. Partial diversion would have an intermediate impact dependant on the amount of water diverted. A reduction in water quality will be viewed as acceptable by proponents of full rediversion in light of the many project advantages. It will be unacceptable to opponents of full rediversion if it reduces estuary water quality. When DOC first applied for a consent to divert water in 1990 its application for 400,000 m^3/tidal cycle was reduced to 100,000 m^3/tidal cycle because it was not legally possible to divert more water than this due to the limitation that it would reduce the water classification of the estuary.

Proper management of water quality expectations is seen as critical to successfully obtaining consents.

4.2 Drainage and flood protection scheme

Land along the lower Kaituna River receives benefits from Kaituna Catchment Control Scheme which includes flood protection and drainage. Any change to water levels in the river resulting from a rediversion project will have to be very well understood and managed. Any effects on flood protection (both peak flood levels and daily levels requiring pumping) will need to be mitigated.

4.3 Land access issues

4.3.1 Brain Land

The land owned by Alan Brain between the Kaituna River as it heads north through Te Tumu Cut and the Maketū Estuary is key to any of the options being contemplated. At one end of the scale are options that make use of the existing flow channels of Ford's Cut and Papahikahawai Channel that are adjacent to or bisect this land. At the other end of the scale are options that propose to remove and/or inundate the land. Intermediate options propose to create new flow channels through or over this land.

Currently Mr Brain's position is:

(i) He wants the erosion repaired along the north bank of Fords Cut that is taking his land. In spite of two reports by BOPRC he is insistent this erosion is being caused by the flows through Fords Cut allowed by the DOC Consent 04 0277 to divert river water into the estuary through the Fords Cut culverts. This has been an ongoing dispute.

(ii) He wants to continue to farm his land and is not interested in converting to wetland although he does have small pockets of lower lying land he would consider adapting.

(iii) He wants his land continued to be protected from water levels in the estuary. He currently receives this protection as a result of the stopbank (causeway) from his land to Papahikahawai Island and a very short bank from the island across Papahikahawai Channel to the spit. If estuary water is allowed to flow through these stopbanks, by either culverting or removing them, then he requests some form of stopbanking around his land. Note however this requested mitigation is not a major impediment to any option (see Figures 2 and 3).

Alternatively the land could be taken under the Public Works Act. It is good practice before seeking to take land under the Public Works Act, to seek a designation under the RMA over the land that is intended to be taken. Any person having financial responsibility for the public works can seek a designation. This means that the entity funding the works would need to apply for the designation, which in this case, would likely be a Government agency and/or the Regional Council. This is one further reason why a community group should not be preferred as applicant for resource consents, as it is doubtful it would have the status to apply for a designation.

Usually consent applications and a designation application are filed and heard together when required for the same project. The criteria for consideration of a designation include consideration of other options as well as its effects on the environment.

Once the consenting and designation processes have been completed, which could include appeals to the Environment Court and to the High Court on points of law, then the process under the Public Works Act for the taking of land can commence by the issue of a Notice to take the land. The Notice to Take should not be issued until negotiations to acquire the land by agreement have been exhausted. An affected landowner has the right to object to the Notice to Take, which is ultimately decided by the Environment Court. However, as the criteria for approving a designation includes similar considerations for deciding an objection against the taking of land under the Public Works Act, many landowners do not pursue their right to object to the taking of their land if they are unsuccessful in opposing the designation. Instead, they dispute the compensation offered and that issue, if unresolved, is determined through arbitration or through the Land Valuation Tribunal.

The whole process can be protracted if land is required for this project.

4.3.2 **Papahikahawai Trust land**

The Trust owns a large amount of land bounded by the Papahikahawai Channel to the north parallel to the spit and by the edge of the old river channel to the west, south and east (see Appendix 6 Property Plan). It therefore owns land within the estuary effectively below the high tide line. Some of the land is located above the high tide line, known as Papahikahawai Island, and is farmed.

Its Position Statement to the Strategy Hearing of March 2009 and minutes of a meeting held with BOPRC dated 1 September 2009 reflect a deep emotional tie to the land, the presence of underlying issues and dissatisfaction with previous processes.

As all the options have the potential to affect Papahikahawai Land (flooding, erosion) they should be afforded some status by re-establishing relationships with them.

4.4 Consent applicant

It is not certain at this stage who would be the applicant for any resource consent applications for the rediversion. Currently the Department of Conservation holds the resource consents for the Fords Cut diversion structure. Options include:

- Bay of Plenty Regional Council
- Department of Conservation
- Western Bay of Plenty District Council
- Maketū community entity (collective group established for the purpose of the project)
- Iwi entity
- Central Government Agency

Whoever holds the resource consents will be responsible for meeting consent condition compliance requirements, which are likely to involve substantial and ongoing costs. It is anticipated that conditions would require regular monitoring and reporting and could require additional works to be undertaken to mitigate unanticipated adverse effects. The consent holder will need to be fully aware of the responsibilities and have sufficient resources to meet their obligations.

Legal advice has been received (Cooney 2012) that DOC could apply for the consent to redivert. No other viable Central Government Agencies exist. DOC must apply to replace the existing consent and then could investigate and lodge a further application to increase the diversion volume. Some shared funding could be considered. Failing this, BOPRC is considered the next best agency.

BOPRC will need to carefully consider the advantages and disadvantages of being the consent holder. Whilst there will be significant financial and resourcing implications in holding the consent, it will also provide BOPRC with control over the consenting phase of the project and provide the ability to seek variations to the resource consents in the future.

4.5 Tangata whenua

As noted above, the Maketū Estuary is an area of significant cultural value. One of the main drivers for the project is to restore the mauri of the river and estuary and enable tangata whenua are able to continue to gather kaimoana from the estuary.

There are a considerable number of different iwi with an association with the area. They are:

- Tapuika
- Ngāti Whakaue ki Maketū
- Ngāti Pikiao
- Waitaha
- Ngāti Makino
- Ngāti Whakahemo

There are also other iwi with ancestral connections.

Successfully engaging with iwi will be a critical factor in the consenting of the project. This will involve determining mandated parties for relevant iwi and working to achieve collective support for the project. Consideration may need to be given to engaging a specialist cultural advisor to assist with this work as dealing with such a large group of individual iwi each with different perspectives has potential challenges.

Part 5: Options Discussion

The three options, low flow partial diversion, maximum flow partial diversion and full diversion are compared to the status quo.

Each of these options has potential environmental and landownership effects that need to be assessed and discussed and either accepted, avoided, remedied or mitigated giving each option relative advantages or disadvantages. Each option has differing levels of community and political support.

5.1 Status quo

Table 2 below comes from Commission for the Environment (1984) and provides a summary of effects considered to have been created by the removal of the Kaituna River from the estuary. It is consistent with current opinion.

Stephen Park (September 2011 and February 2011) surmises similar effects and notes an increasing trend of sedimentation and decreasing ecological value. Ecological impacts with increased salinity and loss of large freshwater inflows, including:

- Significant loss of wetland marsh in upper estuary (about 160ha or 95%).
- Significant change in habitat of lower estuary.
- Significant changes in estuarine biota, including kaimoana species.
- Alterations in the upper estuary associated with causeways and pastoral farming.
- Problems with nuisance sea lettuce and algae.
- Significant changes in fish populations.

Significant changes in estuarine processes, sedimentation and morphology including:

- Major change in balance between outflows (significantly decreased) and flood tide inflows (significantly increased).
- Decreased tidal prism and some ongoing loss due to sedimentation as system adjusts towards new dynamic equilibrium.
- Significant expansion of flood tide delta in lower estuary – accompanied by changes in bed levels, channels and banks in this area.
- Erosion of landward shorelines associated with expansion of flood tide delta.
- Occasional spit breaching (twice in last 30 years) and associated issues (sediment input, navigation issues, bank and channel changes) with periods of flood tide delta expansion.
- Reduction in entrance and ebb tide delta dimensions and changes to shorelines around the harbour entrance (due to major decrease in outflow tidal prism).
- Decreased flows through upper harbour channels – probably accompanied by slow sedimentation (restricted by sediment supply) and changes in sediment character.

Against this backdrop of environmental degradation sit some certainty around the existing situation.

River and estuary water levels on a day-to-day basis and during high seas and high river flows are well known, understood and managed. Therefore some comfort is held by adjacent landowners and members of the Kaituna Catchment Control Scheme with the status quo. DOC and Fish and Game understand and manage the water levels within the Lower Kaituna Wetland Management Reserve although some improvement is always desired.

Navigability of the Te Tumu cut while poor is satisfactory, understood and accepted by local boaties and fishermen. The Te Tumu landowners group and Ford Land Holdings on the western side of the entrance have plans to create a marina style development in the future that will rely on access through Te Tumu. Changes to water flows into/out of the estuary at Fords Cut may impact the morphology and this understanding and expectation. While the status quo is not ideal they will likely oppose any project that reduces its serviceability unless a suitable alternative is provided.

Recreational fishermen access the mole on the eastern side of the entrance via Ford Road and is very popular. The status quo suits them. However opinion is divided as to whether the locals will simply relocate to Maketū if Te Tumu is closed.

Table 2 Maketū Estuary: Problems and effects considered to have been created by the removal of the Kaituna River from its natural estuary (CfE 1984)

	Primary	Secondary	Tertiary
1 Lack of river volume causing estuary siltation	(a) shell-fishing deterioration (b) recreational fishing in the estuary (netting, etc.) reduced (c) access for commercial fishing and recreational boating impossible (d) swimming (including school programmes) (e) surfing reduced (shallow bay, etc) (f) beach scouring, erosion (g) decline in wildlife habitat (h) duck shooting curtailed (i) blocked gravity drains leading to pumping costs (j) views, aesthetic outlook deteriorated	(a) less business for shops (b) stagnation in land values (c) increased food expense for working class budgets (d) poaching of marine resources (e) loss of Māori mana (f) increased welfare costs to taxpayer (g) difficulty of agar seaweed collection for cash (beach erosion) (h) walks for elderly restricted (ibid) (i) i) decline in use of area as natural classroom for schools	(a) emotional stress for leaders dealing with bureaucrats (b) widespread feelings of impotence, cynicism toward politicians experts, public servants (c) exacerbated community tensions (d) family problems (e) sense of declining quality of life, viable community future
2 Lack of freshwater flow combined with tidal flushing	(a) shell-fish declining (b) harm to flax, other plants and mud for dyeing flax (c) recreational fishing reduced (d) swimming unattractive (stagnant water) (e) build-up of sea lettuce etc (choking waterways, rotting) (f) deterioration of wildlife habitats (g) g) saltwater seepage under stopbanks killing pastures, new horticulture plantings	(a) less business for shops (b) loss of important marine breeding ground (c) health problems	
3 Damaging “improvements” in and around estuary, eg: • Planting spartina grass • Illegal causeways • Illegal dumping, filling • Stopbank dredging causing silting • Filling Ford’s causeway	a) accelerated silting and less freshwater flows, reinforcing numbers 1 and 2		
4 Pollution from upstream	Affecting (a) shell-fish (b) swimming (c) fishing (d) d) wildlife	(a) family menus impacts (b) marae/mana denigration (c) health risk increase	

5.2 Low flow partial diversion

5.2.1 Description

This option is that represented in the past as Options I and J in which conveyance from the river to the estuary is very similar in concept to that already existing. It is the least technically difficult and costly option with the least potential environmental effects. It has the lowest benefit in that it allows only a small amount of increase in water into the estuary. However it does not preclude increasing this flow in the future with a new consent application.

Figure 2 Low flow partial diversion

It proposes increasing the size or number of culverts at the location of the existing structure between the river and Fords Cut. If desired the conveyance of Fords Cut could be improved by minor dredging and earthworks. Some erosion protection and possible flood protection is required along Fords Cut which is consistent with the landowner's wishes. The exact details of these works are for later definition during public consultation and landowner permissions stage.

The inflows into the estuary would increase from the current 150,000m^3 to approximately 200,000m^3 per tidal cycle (Wallace, June 2007). There will likely be a small improvement in the ecology in the estuary along with some small reduction in sedimentation. Some minor decrease in water quality is also likely.

At the same time the stopbanks (causeways) between the spit and Papahikahawai Island and the island and the Brain land could either be removed or culverted to reduce the stagnant water that currently exists in this location. However, in doing so it exposes Mr Brain's land to high estuary water levels and his current position is that this will require stopbanking improvements (about 500 m long).

There is unlikely to be any change to the morphology of the Te Tumu entrance and access is maintained to the Te Tumu mole for fishing and recreating.

No effect is expected in day-to-day water levels in the river and hence the adjacent wetlands and drainage schemes. No effect is expected in river flood levels and hence no effect on the flood protection scheme works.

No erosion is expected between the spit and Papahikahawai Island.

Re-opening of the Fords Cut river loop could be considered as a refinement to increase freshwater flows into the estuary.

No dredging is proposed in the estuary.

5.2.2 Planning constraints

The relatively small increase in the volume of water entering the estuary under this option along with the associated works required to achieve this are generally consistent with the relevant objectives and policies contained in planning documents. The minor benefits anticipated from this option may not fully achieve some of the objectives and policies that relate to the potential positive outcomes from a rediversion.

The existing rediversion provides a permitted baseline for considering the effects of increasing the volume of water entering the estuary. The low flow option proposes a relatively small increase in the volume of water and the effects are proportionally minor.

Considering that the likely adverse effects of a low-flow rediversion relative to the existing permitted rediversion are minor, it is considered that the process of obtaining resource consents for this option is likely to be relatively straightforward, provided that the works are designed and constructed in an appropriate manner.

5.2.3 Discussion

Consents risk - low

Although this option has low benefits this option is still being reported because it is of low consenting risk and low cost and technical difficulty. It has already been rejected by stakeholders as being of no value.

However, it is an option to maintain some progress and it could be included as a modification to the DOC held consent 04 0277 due to expire in May 2013. Note that the original 1990 consent application for this structure sought 400,000m^3/tidal cycle (it is currently consented for 100,000 m^3/tidal cycle and in fact lets through 150,000 m^3/tidal cycle).

5.3 Maximum flow partial diversion

This option proposes to maximise the flow into the estuary while keeping Te Tumu open.

It proposes significant change to the water conveyance structures (culverts, channels) on the land between and including Fords Cut and Papahikahawai Channel between the river and the estuary. This could be achieved by more and/or larger culverts at Fords Rd and improving the conveyance of Fords Cut. As Mr Brain currently states he wishes to continue to farm his land, there is no option to construct an additional channel through his land. As in the low flow partial diversion option it is also beneficial to remove or breach the stopbanks (causeways) between the Brain land and the Papahikahawai Trust Island and the island and the spit. The option is some optimisation of the previous Options L and N which were assessed to provide 400,000 to 600,000m^3 net inflow per tidal cycle, up from 150,000m^3 currently.

Figure 3 Maximum flow partial diversion

From expert opinion and discussion if Te Tumu is left in its natural state it is likely that 600,000m^3/tidal cycle is the maximum volume that will flow from the river to the estuary irrespective of the size of the diversion structure. Te Tumu could be constricted by construction of a western training wall to force more water through the estuary but this modification is considered within the Full Diversion option below because it causes significant effects.

Back in 1990 the Department of Conservation (DOC) applied to divert 400,000m^3/tidal cycle through Fords Cut by building a structure comprising 10 to 15 box culverts 2.5 metres wide and 2.0 metres high with flapgates (Works 1989). This proposal was rejected because it was shown likely to breach the water classification and subsequently 100,000m^3/tidal cycle was approved in Consent 22636 and then renewed in Consent 40277. As an aside the consent was appealed (Appeal TCP 637/91) by Mr Don Peterson on the basis that the Papahikahawai Channel should be used not Fords Cut. The decision went against Mr Paterson.

Preliminary assessment indicates that one-way flow from the river to the estuary is required to maximise any benefits. Such one-way flow is achieved by use of flapgates or mechanical gates on culverts or bridges. In this way as the tide falls in the river, water flow is prevented from flowing from the estuary back to the river and out the Te Tumu Cut thus maximising flow through the Maketū entrance.

The exact sizing and location to maximise not only net inflow to the estuary but maximum freshwater inflow would be the focus of consent level investigations. Re-opening of the Fords Cut river loop could be considered as a refinement to increase freshwater flows into the estuary.

5.3.1 Likely advantages

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

(ii) Partial restored mauri of the river

(iii) Partial restored kaimoana to the estuary

(iv) Maintained fishing and boating access at Te Tumu with perhaps no likely change to navigability.

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

5.3.2 Likely disadvantages

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

(ii) Because the estuary is so full of sand there will be large uncertainty around the way river flows go through the estuary. Morphological changes to the river channels and sandbars will be hard to predict especially when high river flows occur i.e. estuary fringe erosion or spit blow-out could readily occur. This effect could be mitigated by dredging the estuary and/or channelising the flow - this is likely to be significant and costly. A better alternative would be to limit the peak flow rate into the estuary by controls at the control structure and monitor changes to estuary morphology and manage the increase in water flow over time.

(iii) Works impacting on Brain land for which agreement needs to be reached.

5.3.3 Planning constraints

As with the low-flow partial rediversion option discussed above, this option is generally consistent with the objectives and policies contained in the relevant planning documents. 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 adverse effects. These aspects can be incorporated into the detailed design process. This assessment is dependent, however, on the amount of water able to be re-diverted by this option and the resultant effects on the water quality of the estuary and the ecosystems within it.

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 rediversion with monitoring to ensure environmental effects thresholds are met prior to increasing water volumes.

5.3.4 Discussion

The reduction in water quality standards will have to be either accepted as a negative of the project and balanced with project benefits *or* the project delayed until water quality has been improved in the river upstream. There is major uncertainty if this is in fact achievable and if so by when. 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.

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 small 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 Fords Cut are increased up to an agreed maximum while changes are monitored.

To reduce the uncertainty of the morphological changes in the estuary dredging could be undertaken – this is likely to be significant and expensive. A better alternative would be to limit the peak flow rate into the estuary by controls at the control structure and to slowly increase these flows after monitoring.

As no rise in river levels is expected from day-to-day or during floods, no mitigation is expected to be necessary.

5.3.5 Consenting risk – moderate

Likely resistance from Te Tumu Landowners Group and the fishers and recreational boaties. The major issues will be continued access through Te Tumu. At this time there is expected to be no change but this will have to be demonstrated or an adaptive management approach agreed.

The increase in water volume through the estuary is modest with commensurate benefits but reduced water quality remains a major dis-benefit and will be a focus for opponents.

A project of moderate capital cost and environmental effects with a consenting process and outcome that is practical and of reasonable cost if issues and stakeholders are well identified.

To continue with this option will require acceptance by all proponents of a compromise position. The following issues are critical to resolve:

(i) Agreement with the affected landowner (Mr Alan Brain). Alternatively BOPRC could seek a designation and then take the land under the Public Works At – a long, costly process.

(ii) How will the reduction in water quality be mitigated?

(iii) Importance of navigability through Te Tumu entrance and the effect of any flow changes

(iv) Is an adaptive management approach practical i.e. monitoring of effects and agreement between parties before flow increases are allowed? Achievement of the agreed maximum diversion volume may take 10 years.

5.4 Full diversion

Full diversion, known as Options H and R in previous reports in which the mouth at Te Tumu is closed and the full river flow is re-diverted into the estuary utilising some combination of Fords Cut, Papahikahawai Channel and through/over Brain's land. Any such combination has to pass the full flow of the river either through some sort of flood relief at Te Tumu or through Brain's land and the estuary then out the estuary mouth. This is a considerable flow – 500 cumecs during floods (1% AEP) and maybe more brought about by climate change.

Figure 4 Full diversion

Re-opening of the Fords Cut river loop could be considered as a refinement to increase freshwater flows into the estuary.

With the loss of the Te Tumu groyne for fishing, Ford Rd in conjunction with any hydraulic conveyance, could be *either* closed permanently and deconstructed *or* re-constructed to provide limited access.

5.4.1 Likely advantages

(i) Significantly increased freshwater inflows to the estuary that will eventually improve ecological values and stop and decrease sedimentation in the estuary. But **note** likely immediate decrease in water quality.

(ii) Restored mauri of the river

(iii) Restored kaimoana to the estuary

(iv) Restored boating access from the Maketū estuary to the sea and could possibly be better than Te Tumu due to increased tidal prism.

(v) Restored anchorage in the Maketū Estuary (either immediately if the estuary is dredged or over time as the tidal flats erode in response to higher flows)

(vi) Depending on agreed deconstruction details, no access from Ford Rd to the ecological restoration and dotterel breeding areas on the spit. However there would be 4WD access along the beach to these areas with the closure of Te Tumu Cut.

5.4.2 Likely disadvantages

(i) Significant rise in day-to-day river water levels that will incur additional capital costs to upgrade pumps in the Kaituna Catchment Control Scheme and cause higher operating costs (maintenance, electrical). Increased seepages under stopbanks causing groundwater levels to rise in pasture lands causing reduced grass growth.

(ii) Initial reduction in water quality as measured by frequency of exceedance of NZ water quality guidelines for shellfish growing water standards and to a lesser extent bathing standards (DHI March 2011).

(iii) Rise in flood levels upstream in the Kaituna Catchment Control Scheme. Mitigations considered include – highly efficient channel through Brain land and the estuary (i.e. make the flow paths smooth and large enough to handle the flood flows so as to replicate the head losses that currently exist for flows through Te Tumu – unlikely to be possible); stopbank raising along the flood protection scheme; free overflow spill weir across Te Tumu mouth; gated spillway across Te Tumu mouth; flood storage on low-lying upstream land adjacent to river.

(iv) Works impacting on Brain land for which agreement needs to be reached.

(v) Because the estuary is so full of sand there will be large uncertainty with the way river flows go through the estuary. Morphological impacts to the river channels and sandbars will be hard to predict especially when high river flows occur i.e. estuary fringe erosion or spit blow-out could readily occur. This effect could be mitigated by dredging the estuary and/or channelising the flow - this will be significant and costly.

(vi) Loss of boating access through Te Tumu

(vii) Loss of fishing access off Te Tumu groyne

(viii) Beach access to the restored ecological areas on the Maketū spit and perhaps more likely damage.

(ix) Potential for river blowout through the spit and scour along the Papahikahawai Channel.

(x) Potential flooding and erosion of road to Maketu, potential need for flood protection/mitigation of road and other Maketu urban structures.

5.4.3 Planning constraints

A full rediversion raises a number of potential policy issues. The NZ Coastal Policy Statement and Regional Policy Statement both promote public access to and along the coast. A full rediversion that involves lowering of the existing causeway leading to the eastern side of the Te Tumu entrance and thereby restricting or removing public access may be seen as inconsistent with these provisions but perhaps

mitigated by access along the beach. The diversion of water in a manner that increases the risk of flooding is inconsistent with policies contained in the Regional Coastal Environment Plan.

One of the key factors considered as part of the consenting of the original partial rediversion through Ford's Cut was the impact of introducing poor quality water from the Kaituna River into the Maketū Estuary. This was the primary reason why the volume of water permitted under this consent was reduced from 400,000m^3 as originally sought to 100,000m^3/tidal cycle. Water quality issues will also be an important consideration as part of any proposal to divert additional water into the Maketū Estuary.

The Bay of Plenty Regional Coastal Environment Plan includes a set of water quality standards applying to all harbours and estuaries within the region. These standards are based on Section 107(1) of the RMA but also require water quality to be maintained at a standard sufficient for contact recreation and maintenance of shellfish at a quality suitable for consumption. Discharges that cannot meet the minimum water quality standards are unlikely to be granted a consent[2].

Section 107(2) of the Act allows consent to be granted for a discharge that does not meet the standard when there are exceptional circumstances, or the discharge is of a temporary nature or associated with necessary maintenance works. Further consideration will be necessary to determine whether the factors associated with this proposal constitute "exceptional circumstances" in this context. It is likely that a case for exceptional circumstances would be based around the long-held community aspirations to re-divert the river back to its natural course through the estuary including the cultural importance of restoring mauri as well as kaitiaki responsibilities. Another important aspect would be how the project fits within the overall Kaituna River/Maketū Estuary Strategy and the other actions within the document, which aim to address the water quality issues within the Kaituna River.

Overall, a full rediversion is likely to be inconsistent with a number of policies, mostly in regional plans. It will, however, result in benefits that assist in achieving objectives and policies across all of the planning documents. Inconsistency with some objectives and policies does not in itself determine consentability of the proposal. A process of weighing up the adverse effects against the positive benefits of a full rediversion and determining whether it achieves the overriding sustainable management purpose of the RMA will be necessary.

5.4.4 Discussion

With respect to increased capital and higher operating and maintenance costs to operate the drainage scheme, it is possible that some form of financial mitigation can be agreed. However, the increased seepage under stopbanks into pasture land will be difficult to quantify, predict effects of and mitigate against and could result in long-term concerns for some affected landowners.

The reduction in water quality standards will have to be *either* accepted as a negative of the project and balanced with project benefits *or* the project delayed until water quality has improved in the river upstream. Staged increase of rediversion flow is not considered possible for Full Diversion (see discussion on flood rise mitigation below) i.e. it is unlikely that a reliable control structure can be constructed at Te Tumu.

[2] Bay of Plenty Regional Coastal Environment Plan pg 46

Mitigations for rise in flood levels by:

- Efficient hydraulic conveyance across Brain land and down through the estuary are likely to be very expensive i.e. dredging or concrete lined channels and preliminary assessments show this to be unachievable. The peak flood flows during the 100 year event are in the order of 400 to 500 cumecs.
- Raise Scheme stopbanks – raising of stopbanks is already identified and at a cost of at least $2.8 m (Wallace Jan 2009); any additional raising will add further cost and compromises the ability to raise stopbanks to compensate for climate change effects; increases the probability of stopbank breach (due to higher operating head) and the resulting flood impacts – problems of this nature already exist on many BOPRC stopbanks. Extensive investigation and risk assessment will be necessary.
- Construction of a spill weir at Te Tumu – preliminary work (Wallace 2009) indicates that a weir that provides this flood release needs to be set at RL 0 m (mid-tide) and is 70 metres wide and this is non-conservative i.e. the weir would need to be wider and/or deeper. Furthermore a weir set at this level will reduce the net inflows of freshwater into the estuary because water can flow out of the estuary on an outgoing tide. This could be countered by raising the weir to promote uni-directional (river) flow into the estuary and flood release would then be provided by increasing the weir length. However, the higher the weir the less flows to keep it clear and hence its reliability decreases. Increases probability of flooding upstream as a result of unreliable operation of the spill weir due to sand build-up. Increases project cost.
- Construction of a gated spillway at Te Tumu – Increased probability of flooding upstream as a result of unreliable operation of the gates and will require constant maintenance, testing and removal of sand-build ups. Increases project cost considerably. Passage for recreational boating could be incorporated. Interestingly this type of structure was considered by Andrew Murray in 1951 (CfE 1984). There will need to be very careful thought given to the design and operation of this structure and a thorough risk assessment of its reliability and consequence of failure i.e. mal-operation. It is considered unlikely that such a structure is practical, affordable, reliable and hence consentable.
- Creation of flood storage further upstream – technically feasible if land can be obtained and could be done in conjunction with wetland creation if double-purpose use was acceptable. Use of the LKWMR for flood storage will be difficult to justify to DOC and F and G in light of perceived sedimentation effects. Increases project cost. This is the most technically feasible of the flood rise mitigation options. However during the 100 year flood in the Kaituna even with upstream storage as mitigation for rise in flood levels the flow through the estuary is 400-500 cumecs. This is a significant flow to manage.

Fisher people and boaties can relocate to Maketū although this too has its own infrastructure (parking, toilets) and social issues. The public resistance to this is hard to predict.

To reduce the uncertainty of the morphological changes in the estuary dredging could be undertaken – this is likely to be significant and expensive. Alternatively limit the peak flow rate into the estuary by some form of control structure (weir?) at Fords Road, temporarily store the high flows upstream for later release. Some variation of this control structure could be investigated to allow this peak flow rate to be increased over time as changes were monitored in the estuary.

5.4.5 **Consenting risk – high**

Likely strong opposition from scheme (drainage, flood protection) landowners, Te Tumu Landowners Group and the fishers and recreational boaties. The major issues will be rise in the drainage scheme operating and maintenance costs and an ongoing concern with seepages into pasture land, and mitigation for flood rise and continued access through Te Tumu. There will need to be significant work to show that the Maketū estuary entrance is better.

Perceived high benefits but water quality reduction remains a major dis-benefit and will be a focus for opponents.

A major project of high cost, high risk and large environmental effects and high risk of costly and lengthy consenting processes. Long term reliability is low of the various scheme components and mitigations, particularly any gate control structure. Even to suggest it is achievable in the longer term following the partial diversion is tenuous.

To continue with this option will require tenacity, patience, diplomacy and funding. The following issues are critical to resolve:

(i) How will the rise in river flood levels be mitigated?

(ii) How will the rise in day-to-day river levels be mitigated?

(iii) How will the reduction in water quality be mitigated?

(iv) Is the loss of boating and recreational access at Te Tumu a significant environmental effect and if so how is it mitigated?

(v) How can high flows through the estuary be controlled to avoid unpredictable channel behaviour?

(vi) How can flows through the estuary be controlled, monitored and increased over time?

Part 6: Council direction

Concurrently with the preparation of this report the Council has been deliberating its 10 Year Plan and in particular expenditure on this project for consent level investigations, consultation, consent applications, design and construction.

At the 28 October 2011 Council Ten Year Plan Workshop, four variations of Option P were presented (Option P proposes major land use change to the low-lying Brain land and as discussed in Part 4 above this creates some stumbling blocks to progress) to councillors for their direction and funding. Minutes from that workshop indicate that:

> *"Councillors provided the following direction:*
>
> - *It is desirable to take an approach that will be most effective in terms of increasing flows to the estuary, balanced with costs; and,*
> - *Include expenditure in the draft Ten Year Plan of: $1.8 m in Year 1 for consenting and initial Stage 1 engineering works; and $2 m in Year 2 for final Stage 1 engineering works."*

Subsequently the Sustainable Coastal Implementation Programme budget presented to 9-10 November 2011 Ten Year Plan Workshop included $50,000/year for Kaituna Maketū strategy coordination and $17.05 m over 10 years for full re-diversion of the Kaituna River to the Maketū estuary. The minutes of that workshop indicate that staff:

> *"Amend the 28 October workshop direction:*
>
> - *Take out $1.3m (Year 1) and report to Council in the current 11/12 year on options around potentially affected land;*
> - *Include $250k for investigations and $250k for consenting in Year 1;*
> - *Include $500k for consenting in Year 2;*
> - *Include $2m (capex) for engineering works in Year 3;*
> - *Put pressure on government to help fund."*

In February 2012 the Council released its draft 10 Year Plan which included costs for investigation, consenting and construction of a rediversion. The exact nature of the rediversion (i.e. partial, full, location etc) was not stated.

Public submissions were received in May and debated in June 2012 by the full Council who resolved that:

> *"Agrees that the operating and capital budgets provided in the draft Ten Year Plan for the Kaituna-Maketū rediversion project be amended to:*

Year 1	*Year 2*	*Year 3*	*Year 4*	*Year 5*	*Year 6*
$250k	*$250k*	*$500k*	*$2.216M*	*$1.716*	*$0*
Investigation and consents	*Investigation and consents*	*Consents*	*Capital Work*	*Capital Work*	

> *With the opex to be funded from investment reserves, and with all expenditure after Year One to be reviewed as part of the Annual Plan 2013/14 process, following consideration of seeking alternative funding sources from the Crown, finding the most cost-effective solution, and taking into account the intentions of Local Government reform on regulations efficiency (resource consents)."*

Obviously the results of these deliberations constrain the solution to a Partial Diversion due to insufficient funding for full diversion.

If it is decided that the Full Diversion or aspects of it must be pursued then extra funding will need to be sought. In any event, Council strongly urged staff to seek alternative funding sources from the Crown and resolved to review the funding allocated to this project after a year.

Part 7: Conclusions and recommendations

7.1 Conclusions

The history of dissatisfaction with the existing state of the Maketū Estuary is well documented as are the previous attempts to improve the situation by re-diverting more water from the river in to the estuary. These past attempts have been frustrated by difficult technical issues, the poor water quality in the Kaituna River, differing views on how exactly the diversion should be undertaken, differing cultural perspectives, lack of funding and lack of a coherent vision and approach.

These attempts are no better illustrated than by the lengthy consenting and appeal processes to enable DOC to pass 100,000m^3/tidal cycle through their structure, noting they first applied to pass 400,000m^3/tidal cycle. This consent will expire in May 2013 and DOC will need to make application to renew this shortly. Such a renewal request does not preclude DOC from seeking to divert more water and this option needs to be discussed with them. In this way a small increase in diversion flow might be achieved relatively easily. However the benefits are correspondingly small.

The project has been side-tracked somewhat by debate over how much water should be passed through the Papahikahawai Channel and how much through Fords Cut. This debate has detracted from the real question of Full or Partial Diversion – the exact split of flows is a matter for later consideration.

Full Diversion will be very difficult to achieve and if pursued the following issues need to be resolved early in some logical sequence:

1 Control of Brain land/

2 Confirmation that a flood-gate structure can be built at Te Tumu that has sufficient reliability; and/or Investigation, risk assessment and costing to raise scheme stopbanks; and/or confirmation in principle that land can be found and used for upstream flood storage/

3 Assessment of the effects of rise in day-to-day water levels in the river on the operating and maintenance costs of the drainage schemes/

4 If a control gate cannot be found for Te Tumu, confirmation of how 400 to 500 cumecs can be passed through the Maketū Estuary.

5 The effect of poorer quality river water on the estuary/

6 Additional funding/

While these issues are not impossible to resolve they will require tenacity, funding and time and will slow implementation of any solution.

Hence it is concluded that, the Maximim Flow Partial Diversion designed to maximise flow from the river to the estuary and in which Te Tumu is left open best fits the objectives of the project i.e. technically feasible within reasonable cost up to the maximum flow that the system can hydraulically allow with reasonable chance of consenting success. The maximum amount expected is 600,000m^3/tidal cycle up from 150,000m^3 presently. This amount though needs to be confirmed using more rigorous analysis as it is crucial to the perceived benefits of the proposal. In order to manage potential adverse water quality effects and morphological changes at Te Tumu, any new diversion control structure could be built to allow staged increase of flows back in to the estuary.

7.2 Recommendations

1 Discuss the findings of this report with key interested stakeholders from the Maketū Community.

2 Recommend to them the Maximum Flow Partial Diversion Option.

3 If agreed, proceed with the preparation of a Project Plan for the investigation and consent level investigations and public consultations.

4 Irrespective of whether partial or full diversion is finally agreed, Central Government should be approached to provide further funding to complement BOPRC funding in light of the 1984 Cabinet deliberations.

5 Advise DOC to lodge an application to renew the consent for the existing Fords Cut Control Structure.

6 Commence discussions with DOC on increasing this flow and their willingness to be the Applicant.

7 If resolved by the Community, continue to investigate the issues that prevent full diversion i.e. flood release, day-to-day water level rise, water quality reduction, passage of high flows through the estuary.

Part 8: References

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Appendices

Appendix 1 – Interested parties and issues

Party	Interest	Issue
Bay of Plenty Regional Council/Kaituna Catchment Control Scheme	Current managers of Kaituna Catchment Control Scheme. Responsible for flood protection and farmland drainage. Consent holders of Te Tumu groyne structure, erosion protection along the Kaituna and the south side of Fords Cut. Manage Maritime recreation.	Do not want to increase 1% design flood levels. Do not want to increase daily levels for drainage reasons. Implications for scheme stopbank top-ups
Department of Conservation	Current owners & co-managers of LKWMR. Current consent holders of Fords Cut & Fords Cut culvert structures. Own and Manage reserve land on Maketū Spit.	Do not want to decrease daily river levels. Want additional flow in LKWMR. Want increased protection of the Maketū Spit. Want additional wetlands added to network and rehabilitate existing ones.
New Zealand Fish & Game	Current co-managers of LKWMR. Co-manage reserves on Maketū spit. Interests in providing environments for freshwater hunting by maintaining & enhancing native flora and fauna.	Do not want to decrease daily river levels. Want additional flow in LKWMR. Want increased protection of the Maketū Spit. Want additional wetlands added to network and rehabilitate existing ones.
Tauranga City Council	District boundary extends up to the western boundary of the Kaituna River. Has implications for land use, land management, various consents, and governing rights within the Kaituna Catchment and adjacent to the River. Involved in the planning of Pāpāmoa East.	Possible interest in drainage levels from Pāpāmoa East.
Western Bay of Plenty District Council	District boundary extents to cover large areas of the Kaituna catchment, and includes the estuary, and eastern bank of the Kaituna River. Has implications for land use, land management, various consents, and governing rights within the catchment and particularly in Maketū.	Support option N. Concerned about boat navigation at Te Tumu.
Maketū Taiapure Committee of Management	Conglomerated Māori board for control and management of fisheries and estuary health and wellbeing. Want to enhance the estuary and maintain in a sustainable fashion for use by community for food, cultural, historic, and spiritual reasons.	Improved ecological health in the estuary for improved kaimoana gathering.
Maketū District	Do not want increased flood levels in the estuary that would increase risk to Maketū Road and surrounding properties. Want to see estuary restored to a healthy ecosystem.	The community values will be provided in Maketū Community Development Plan being led by WBOPDC due to be finished by Sept/Oct 2011
Local Fishermen	Generic representation of fishermen (boating and land based) that use the Kaituna River, Te Tumu mouth, or Estuary for recreation purposes	Want the Te Tumu mouth to improve in navigability. Want the flow from Te Tumu to continue for land based fishing. Want access to the Te Tumu Groyne for camping and general recreation. Want improved health in the Estuary. Improved habitat for whitebait spawning
Tapuika	Iwi group that occupies areas of the lower Kaituna Catchment. Has marae in Te Puke along the Kaituna River. Currently have Treaty claim lodged.	
Whakaue ki Maketū	Iwi group that historically inhabited the Lower Kaituna/Maketū Region and utilised the Maketū Estuary. Interested in seeing the ecological health of the estuary restored and Kaimoana gathering improved.	Improved ecological health in the estuary for improved kaimoana gathering.

Party	Interest	Issue
Ngāti Pikiao		
Alan Brain	Landowner near the Kaituna River mouth. Fords Cut currently divides his land. Portion of his land divides the Kaituna River from Maketū Estuary. Current land use is grazing. Scheme member.	Wants his land protected from erosion on all sides (along Fords cut, and adjacent to estuary and Papahikahawai Channel). Wants his lands' stopbanks upgraded to protect from flooding and sea level rise. Wants Fords Road returned to his title. Wants public access on Fords Road eliminated. Wants Access maintained across Fords Cut. Wants causeway to Papahikahawai Trust island maintained.
Te Tumu Landowners Group (TTLG) representing Ford Land Holdings Pty Ltd, Te Tumu Kaituna 14 Trust, Te Tumu Kaituna 11B2 Trust and Carrus-Hickson Group – represented by Jeff Fletcher	Owners of 660 hectares of land on the northern bank of the Kaituna River between Bell Rd and Te Tumu mouth. Currently planning a major suburban development, Papamoa East, to be adjacent to the River. Implications for recreation interest, and land use.	Want a professional investigation, reporting and consenting process implemented starting with a Process Stocktake and Approval (*this report effectively*). Want to create a boat marina in the Lower Kaituna River. Want the Te Tumu mouth to remain navigable for boating access. Support option N. Support creation of wetlands. *Q – what is existing navigability of Te Tumu i.e. what value does it have?*
Additional Landowners adjacent to river & estuary	Various landowners (Titchmarsh, Bydeley, Pamment, Johnson & Underwood, etc.) that border the river or estuary. Interests extend beyond those of the general scheme due to implications for water tables, saltwater intrusion, and land value.	Do not want to increase daily water levels due to saltwater intrusion. Do not want to increase pumping costs, or flood risk. Want property values to be unaffected or increase.
Papahikahawai Trust 1 & 2	Want the estuary to be restored and healthy once again. Do not support any options involving Papahikahawai Channel without the provision of erosion and flood protection for Papahikahawai island.	Papahikahawai Trust wants the Papahikahawai Island restored to the original state before initial diversion and to protect the island from erosion.
Maketū Ongatoro Estuary Care Group	Restore ecological health of the Estuary.	
Maketū Ongatoro Wetland Society (MOW) – Julian Fitter	Maintain or enhance the current ecological values of the Maketū Spit (Dotterel sanctuary). This includes prohibiting vehicle access to the spit, which is currently restricted by natural boundaries of the Te Tumu Cut to the west and the estuary mouth to the east. Remove causeway to Papahikahawai Island to promote flushing of the Papahikahawai channel.	Accept that access will always be needed to the mole. Don't want full flow of river down Papahikahawai Channel, just enough to remove stagnant water.
Maketū Community Group for the Environment – Ray Bushell		

Appendix 2 – Schedule of discussions held by S Everitt March to June 2012

This table records informal discussions held by Steve Everitt with Maketū locals in order to understand issues and depth of feeling. They are not consultation meetings for the purposes of consent applications.

Date	Who with	Impressions
29 March	Raewyn Bennett, Elaine Tapsell, Pia Bennett, Tim Fergusson	Summary of present objective i.e. consentability report. Resignation that report is necessary to avoid costly and lengthy delays. Discussed Brain Land, Papahikahawai Trust Land, likely supporters and opposition, other locals who can help.
2 April	Maketū Community Projects Group (Chair Petera Tapsell, Elaine Tapsell, Julian Fitter, Trevor Hughes, Raewyn Bennett, Robyn Skelton, Colin Meadowcroft, Coastguard)	Some frustration for lack of progress. Some thought approval had been given to proceed. Diverse opinion on best way to achieve diversion and expression of strong individual agendas. Vision for diversion lacks coherency.
10 April	Trevor Hughes (individual, previously on Community Board) and Julian Fitter (Maketū Ongatoro Wetland Society)	Both want diversion to some greater or lesser extent. Trevor's project is the regeneration of the Kotukutuku Valley, wants more wetlands and more water into Te Arawa wetland. Concerned about sea wall at surf club and resulting increase in visitor numbers. Julian has a long term view of the creation and maintenance of wetlands and has a restoration plan (both plant and animal) for the spit. Wants the spit and dotterels protected from erosion and people. Ideally would like spit to be an island but accepts unlikelihood. Sees closure of Te Tumu as detrimental to his objective.
16 April	Clem Tapsell (Whakaue ki Maketū) and Ray Bushell (Maketū Environmental Protection)	Both passionate, frustrated and persistent and Ray is very persistent. Both want full diversion back into estuary as soon as possible. Both accept full diversion might be difficult and that a partial diversion might be acceptable, but only for a large flow. Small diversion not worth it. Clem is of the opinion that a large amount of water needs to be put back through Papahikahawai in order to prevent the channel further downstream cutting into the spit – this last happened about 10 years ago. The estuarine and coastal morphologist needs to consider this. There used to be a sandy beach in front of the café. Consider the government should pay '*cos they stuffed it up originally*. The local fishermen and boaties using Te Tumu will soon adapt to a new entry at Maketū if Te Tumu is closed. The non-local visitors to Te Tumu will relocate and their potential opposition is far outweighed by the benefits of rediversion and is worth the fight it might cause. Te Tumu navigability is already very poor. Ray believes a weir across Te Tumu at RL 0.8m will prevent salt-water back in and will act as flood relief. Both note that water quality may decrease and but consider that resolution to be part of the BOPRC's wider responsibilities. Furthermore the benefits arising from restoration of the mauri of the river and reduced sedimentation outweigh the water quality dis-benefit.

Date	Who with	Impressions
24 April	Maketū Community Board (Carol Poihipi Chair, Secretary, Kevin Marsh, Sue Matthews, Rachel Clark, Shane Beech Coastguard, Stephan Simpson, WBOPDC Asset Manager).	I summarised state of project and objective to prepare a consentability report. Some frustration that solutions were being revisited. I emphasised that was not the intent but rather to highlight the consent risks for each set of broad options. Among the members there was disagreement as to the preferred solution. Some expectation that Te Tumu could be blocked and all the water could go back through the estuary and flood flows would go through Te Tumu. Other expectation that Te Tumu would be left open and just a partial diversion. Desire to have one very good entrance instead of two poor ones.
1 May	Don Paterson also tried to meet Petera Tapsell (unsuccessful)	Don is totally convinced that any diversion of the Kaituna needs to have a significant portion come down through the Papahikahawai Channel to prevent breakthrough of the spit that is imminent. He has lots of ideas on the detail to implement this. He wants any consent application to emphasise the potential benefits of a deeper estuary at Maketū for fishing businesses and a re-vitalised environment in the estuary for whitebait spawning and consequently ocean fishing. Is adamant the BOPRC must pay and has little concern for farmers protected by the scheme or by TTLG's future marina interests. He makes his view very clear in his many emails.
4 May	Gary Ellis (Assets Manager WBOPDC) by phone	Wants assets protected (sea wall, roads, carparks, services) no matter what the extent of diversion. Passes comment that the Te Tumu cut is extensively used and a partial diversion that keeps this open will be easier to consent. Explained that sea wall was not built as specified (rocks breaking down) and some criticism leveled at Council. Also, the Te Arawa Memorial is on Te Arawa Lakes Trust land which is politically charged and hence the perceived inadequacies of the protection afforded or allowed.
7 May	Petera Tapsell, Lucy Tapsell, Ngaire Tapsell (Whakaue ki Maketū)	Want the full flow of the river returned to the estuary and accept flood relief at Te Tumu if necessary. Want the estuary as it was – deep, clean, abundant with kaimoana. Contrary to Don Patterson, state the bulk of the river did not flow through Papahikahawai Channel but rather through the channel on the south side of the estuary. Are prepared to strenuously debate this desire with potential opposers (TTLG and property owners) but they will also discuss alternatives. Will consider Partial Diversion if water quantity is acceptable and if Full Diversion is the ultimate goal. Do not agree with scientists that water quality will decrease under full diversion. Consider there are plenty of good reasons to re-divert. Claim there was a Cabinet Decision to re-divert.
15 May	Alan Brain	His personal opinion on success of diversion – either leave as is or go full. Wants to continue to farm his land, so any change to the existing stopbank protection e.g. removal of causeway or spit access, resulting from diversion works will have to be made good. He is negotiable around the future of the stopbank to the island and the stopbank from the island to the spit (these are also used as access). He does not provide access for Papahikahawai Trust only to his lessee. His land is not for sale, he does not believe in sea-level rise and does not want to convert his land to wetlands. Happy to have very minor amount of land in wetland. Non-negotiable – he wants the erosion fixed up along the north side of Fords Cut and his land protected with stop-banking (*in spite of the 1998 Titchmarsh and 2008 Wallace Reports that state the DOC diversion does not contribute*). Will oppose renewal of DOC consent for diversion.

Appendix 3 – Planning issues

Planning framework

The Kaituna River defines the local authority boundary between Tauranga City (land west of the river) and Western Bay of Plenty districts (land east of the river). At this stage it is not anticipated that the rediversion works associated with any of the options would require consents from Tauranga City Council, although there is the potential for some environmental effects on land within the district (e.g. drainage, flooding effects).

The statutory planning documents relevant to the rediversion activities are:

- New Zealand Coastal Policy Statement
- Bay of Plenty Regional Policy Statement (operative and proposed documents)
- Bay of Plenty Regional Coastal Environment Plan
- Bay of Plenty Regional Water and Land Plan
- Western Bay of Plenty District Plan (operative and proposed documents)

Bay of Plenty Regional Policy Statement

The Bay of Plenty Regional Council has recently released decisions on submissions and further submissions to the Proposed Bay of Plenty Regional Policy Statement 2010.

It will be necessary to demonstrate that the selected rediversion option does not conflict with the objectives and policies of the RPS. The main aim of the project, which is to improve the ecological health of the Maketū Estuary, is in keeping with the sustainable management approach of the RPS, particularly in terms of safeguarding the life-supporting capacity of coastal ecosystems. Depending on the rediversion option selected there will potentially be changes to public access to the coast.

Bay of Plenty Regional Coastal Environment Plan

The Regional Coastal Plan contains objectives, policies, and rules controlling a variety of activities within the coastal environment. Those relevant to the proposed rediversion include:

- Disturbance of the foreshore and seabed (including dredging).
- Structures within the coastal marine area (weirs, erosion protection walls etc), including the occupation of space.
- Diversion of coastal water (diversion of the Kaituna River to the Ōngātoro/Maketū Estuary).
- Reclamation (possible infilling of the Te Tumu entrance as a result of a full rediversion).

Parts of the lower Kaituna River and Maketū Estuary are identified as significant indigenous vegetation areas (SSCMA-33 and SSL-33) in the Seventh Schedule of the plan. The Maketū Estuary is identified as an area of significant cultural value (ASCV-7) in the Third Schedule. Parts of the coastal margin are also identified as being sensitive to coastal hazards (ASCH). The environmental assessments prepared for the resource consent applications will need to have particular regard to these factors.

Bay of Plenty Regional Water and Land Plan

The Bay of Plenty Regional Water and Land Plan covers activities affecting land and water areas outside the coastal marine area. In the context of the proposed rediversion, the provisions controlling earthworks are relevant.

Western Bay of Plenty District Plans

Land on the eastern side of the Kaituna River is within the Western Bay of Plenty District. The Western Bay of Plenty District Council has an Operative District Plan (2002) and a Proposed District Plan (2010). There are also a number of plan changes currently being processed.

The planning maps in the Operative and Proposed District Plans are very similar in relation to the project area. The key features/constraints include:

- Rural G Zone (Operative Plan), Rural (Proposed Plan).
- Land to the north of Papahikahawai channel is Recreation Reserve.
- Land to the east of Papahikahawai channel is within the Maketū Wildlife Management Reserve.
- Land south of Papahikahawai channel is identified as Floodable Area (Operative Plan) and Flood hazard (Proposed Plan).
- To the north of Fords Cut are two significant ecological sites
    - V14/1 (Maketū Sandspit I – Duneland Vegetation)
    - V14/2 (Maketū Estuary – Saltmarsh and Wetlands)
- A proposed esplanade strip/reserve is indicated along the eastern margin of the Kaituna River (upstream of Fords Cut), along both sides of Fords Cut, and around the margins of the Maketū Estuary
- The Maketū Estuary and land 40m inland on areas zoned Rural G and Rural is identified as a Scheduled Significant Landscape Feature

The relevant provisions of the Operative and Proposed District Plans relate to earthworks, native vegetation removal, and coastal and river protection works.

Appendix 4 – Resource consent requirements

The activities associated with any of the rediversion options will require a range of resource consents from the Bay of Plenty Regional Council and the Western Bay of Plenty District Council. The types of consents required will generally be the same across the options and are outlined below:

Bay of Plenty Regional Council

- Coastal Permit for disturbance, dredging, and/or excavation within the Maketū Estuary and Kaituna River
- Coastal Permit for discharges to the Maketū Estuary and Kaituna River associated with dredging and excavation works
- Coastal Permit for the diversion of water from the Kaituna River into the Maketū Estuary
- Coastal Permit for the erection of structures within the Kaituna River and Maketū Estuary (such as erosion protection / bank reinforcement structures, weirs, gates etc)
- Coastal Permit for the ongoing occupation of space by structures (see above)
- Coastal Permit for reclamation of the foreshore and seabed (potentially if the rediversion works result in the closure of the existing entrance at Te Tumu)
- Land Use consent for earthworks

Western Bay of Plenty District Council

- Land Use consent for earthworks
- Land Use consent for native vegetation removal or destruction (associated with earthworks) within an identified area of ecological significance (Proposed Plan)
- Land use consent for coastal and river protection works (Operative Plan)

Information requirements

It is anticipated that one report and assessment of environmental effects would be prepared for all resource consent applications and lodged jointly with both councils. The application for resource consents will need to be supported by a comprehensive assessment of environmental effects, including the following components:

- Planning assessment
- Engineering design supported by river and coastal modelling considering the effect on flood levels, coastal morphology, water quality, navigability etc
- Construction methodology
- Terrestrial ecology
- Aquatic ecology
- Landscape and visual assessment
- Cultural impact assessment

Consultation

Iwi

As noted above, the Maketū Estuary is an area of significant cultural value. One of the main drivers for the project is to restore the mauri of the river and estuary and enable tangata whenua are able to continue to gather kaimoana from the estuary.

There are a considerable number of different iwi with an association with the area. They are:

- Tapuika
- Ngāti Whakaue ki Maketū
- Ngāti Pikiao
- Waitaha
- Ngāti Makino
- Ngāti Whakahemo

There are also other iwi with ancestral connections.

Successfully engaging with iwi will be a critical factor in the consenting of the project. This will involve determining mandated parties for relevant iwi and working to achieve collective support for the project. Consideration may need to be given to engaging a specialist cultural advisor to assist with this work as dealing with such a large group of individual iwi each with different perspectives has potential challenges.

Interested parties

A list of parties with a known interest in the project will need to be collated using submissions received to the Kaituna River and Maketū Estuary Strategy. This can then be used to provide an indication of the likely level of support/opposition to various rediversion options.

Consultation Strategy

Identifying all relevant stakeholders and interested parties will be useful in developing a consultation strategy for the project. Resources within BOPRC may be available to assist with this.

Next steps

1 Undertake community consultation on the various options using the findings from this report.

2 Consider the consultation responses, refine the preferred option and undertake a detailed scoping exercise to confirm resource consent requirements, costs, and any other uncertainties. Select a rediversion option

3 Undertake investigations and environmental assessments required for the resource consent applications and undertake consultation to confirm acceptability of proposal prior to lodging resource consent application

4 Resource consent processes.

Appendix 5 – Key environmental issues

- Morphology of Maketū Estuary
- Flood levels and drainage levels in Kaituna River / Integrity of Scheme and associated sea-level rise scenarios
- Estuary water levels – day-to-day, high river flow, high seas
- Water levels and siltation within wetlands
- Navigability of Te Tumu entrance
- Navigability of Maketū Estuary entrance
- Existing land use activities on land adjacent to the lower Kaituna River and Maketū Estuary
- Cultural values e.g. mauri of estuary
- Kaimoana abundance in Maketū Estuary
- Suitability for bathing
- Recreational opportunities (e.g. shore based fishing)
- Identified significant natural landscape – Maketū Estuary
- Identified significant ecological sites – duneland vegetation and Maketū Spit
- Maketū Estuary saltmarsh and wetlands
- Maketū Wildlife Management Reserve
- NZ dotterel habitat – Maketū Spit
- Lower Kaituna River wetland
- Estuary water quality and ecology (terrestrial, marine, freshwater)
- Recreational access to Te Tumu mole, roadway, fishing
- Dotterels
- Farming (response of grasslands to changing water quality)
- Te Tumu land ownership and development plans
- Estuary and bar morphology (both Te Tumu and Maketū)
- Cultural, archaeological
- Erosion through Fords Cut, around Papahikahawai Island and along channel
- Erosion past Maketū SLSC
- Sedimentation patterns due to sediment load in the river

Appendix 6 – Property ownership

Appendix 7 – Kaituna River diversion options

Option Name	Option Description
Status Quo	Status quo. Leave the river and estuary in their current states with 4% of flow going through Fords Cut, Papahikahawai Channel closed, and no other modifications.
N	Fords Cut structure is left unmodified. Open Papahikahawai Channel with a box culvert configuration that is 20 m wide and 3 m deep (i.e. (2) 10 x 3 box culverts). Culverts are floodgated. Remove spit causeways and removal/retention of island causeway.
N3	Add (3) 3m x 3.5 m box culverts at Fords Cut @ -1.6 m RL Open Papahikahawai Channel with (3) 1.8 m diameter culverts @ -0.95 m RL. All culverts are floodgated. Remove spit causeways, leave island causeway in place.
P	Create additional flow paths across Fords Road – install (4) 4m x 4m box culverts under Fords Road allowing high tide flow from river to adjacent farmland (potential nutrient stripping wetlands).
H	Full diversion. Mouth at Te Tumu completely closed off. Fords Cut structures and causeway removed. Fords loop block removed. Papahikahawai Channel opened. No bridges included, spit access is cut off.
R	Full diversion with flood relief. Installation of two mechanically controlled gate structures at Te Tumu and at Fords Cut. Te Tumu gate closed in normal flow conditions, opened in flood conditions. Fords Cut gate open in normal conditions and closed in flood conditions.
I	Status quo and double the number of culverts between Fords Cut and estuary including flapgates.
J	Status quo, with culverts at Fords Cut lowered to be submerged at mid tide (invert level at -1.6 m RL)
K	Remove culverts and causeway between river and estuary at Fords Cut, but with the opening between Fords Cut and the estuary defined by two large culverts (as a bridge).
L	Remove culverts and causeway between river and estuary at Fords Cut, but with the opening between Fords Cut and the estuary defined by two large culverts that are floodgated to prevent backflow into the river.