CULTURAL IMPACT ASSESSMENT

FOR

CRANFORD BASIN – PROPOSED REZONING FOR URBAN ACTIVITIES

Prepared by Tipa & Associates on behalf of Te Ngāi Tūāhuriri Rūnanga

August 2016

Title page photo sources:
1. Kyle Nelson

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EXECUTIVE SUMMARY

Te Ngai Tūāhuriri Rūnanga have a responsibility as the kaitaki runanga to assess how any activity in their takiwa will impact upon their cultural values. Therefore, the Christchurch City Council are to acknowledge the kaitiaki responsibilities of Te Ngai Tūāhuriri Rūnanga in undertaking any activities within their takiwa.

Impacts and issues

Te Ngai Tūāhuriri Rūnanga have serious concerns with the proposed rezoning of the Cranford Basin for urban activities and potential residential development.

The impacts and issues are the following:

- Artefacts being discovered and potentially impacted.
- Stormwater from future residential development within Cranford Basin, or surrounding area, being discharged into Horseshoe Lake or Avon River:
    - Horseshoe Lake is an wahi tapu / wahi taonga;
    - Could have an impact on taonga species.
- Springs being negatively impacted from residential development, either directly or indirectly
- Land contamination within the Cranford Basin impacting the health of humans and taonga species.
- Uncertainty around the timeframes for "required" infrastructure development (stormwater, wastewater) within the Cranford Basin.
- Increased pressure on the wastewater and stormwater networks having short and potential long term impacts on taonga species.

Priorities

From the site visit and discussions with whanau there are some issues they would like to be addressed. They are as follows:

1. Christchurch City Council to provide Te Ngai Tūāhuriri Rūnanga will a detailed timeline or timeframes when planned infrastructure development is to start within the Cranford Basin. As well as the following:
    a. When infrastructure development including stormwater basins / wetland treatment, wastewater and Northern Arterial extension will be started and completed
    b. Any other planned infrastructure development or upgrades
    c. Who would be responsible for the required infrastructure
    d. Below is the only information relating to stormwater basins /wetland treatment timeframes available

Definite timeline for development in the Cranford Basin
2017 – Northern Arterial Extension construction to begin
2019 – Northern Arterial Extension completed (includes some stormwater basins to mitigate NAE)

General timeline for development in the Cranford Basin
Short to Medium term – • Pastoral farming for area proposed for stormwater basins and wetland treatment • Proposed requirement for first flush stormwater basin for residential development (if urban rezoning occurs)
Long term – • Cranford Basin stormwater basin and wetland treatment • Proposed requirement for first flush stormwater basin for residential development (if urban rezoning occurs)
Te Ngai Tūāhuriri Rūnanga would like confirmation of the timeframes for development within the Cranford Basin.

2. Christchurch City Council to provide Te Ngai Tūāhuriri Rūnanga on potential conditions they will be putting upon developers whom choose to carryout residential development within the rezoned area. It should cover all areas of concern for development residential development within Cranford Basin.

   a. These conditions would include stormwater, wastewater, springs, land contamination, ADP, geotechnical

   b. Te Ngai Tūāhuriri Rūnanga would like the opportunity to provide feedback on their conditions

3. Te Ngai Tūāhuriri Rūnanga would like Christchurch City Council to prepare a development strategy for the Cranford Basin if the proposed area is rezoned for residential development. This report would outline the requirements or conditions the Christchurch City Council need to meet for residential development to occur along with developers. This report would include the following:

   a. This report would show clearly what is required by the developers for residential development to occur (i.e. potential conditions) along with what is required by the Christchurch City Council

   b. This report would give some certainty on how infrastructure requirements would be integrated into future residential development

   c. This report would show how future infrastructure development by the Christchurch City Council would be integrated with proposed infrastructure requirements by developers

   d. This report would also show whom would be responsible for each area of development

4. Christchurch City Council to confirm to Te Ngai Tūāhuriri Rūnanga where the stormwater discharges from the proposed rezoned area within the Cranford Basin will occur. As well as the following:

   a. Short term and long term stormwater discharges

b. Amount of treatment that would be required and standards which need to be meet

c. The monitoring of stormwater discharges which will occur both at CCC level and developer level

    i. Monitoring for both impact on human health and taonga species (short and long term)

5. Te Ngai Tūāhuriri Rūnanga would like following assurances from Christchurch City Council:

    a. Stormwater will not be discharged into Horseshoe Lake

        i. Te Ngai Tūāhuriri Rūnanga would like to discuss this further with Christchurch City Council

    b. Developers will have to meet specific conditions set by the Christchurch City Council and that the Christchurch City Council will meet their requirements i.e. infrastructure development

        i. Te Ngai Tūāhuriri Rūnanga want the required infrastructure and conditions to be meet before any development occurs

    c. Required wastewater development or upgrades will be made, by them or developers, to eliminate potential "major impacts" from residential development.

    d. Springs will be protected or integrate into residential developments

        i. Te Ngai Tūāhuriri Rūnanga will be able to provide advice to developers on how springs will be integrated

    e. Those who purchase section within residential developments

6. Te Ngai Tūāhuriri Rūnanga would like confirmation CCC will make sure all developers within the proposed rezoned area within the Cranford Basin will be required to comply with the ADP within the Mahaanui Iwi Management plan

7. Te Ngai Tūāhuriri Rūnanga would like to be consulted on any individual proposed subdivisions or development which has been enabled via the proposed rezoning within Cranford Basin.

8. Christchurch City Council to provide Te Ngai Tūāhuriri Rūnanga with any future information or reports for them to review and provide feedback if necessary in relation to the proposed rezoning for urban development within the Cranford Basin.

To reiterate Te Ngai Tūāhuriri Rūnanga have serious concerns with the proposed rezoning of part of the Cranford Basin for urban development by the Christchurch City Council.

This relates to the potential impact on existing infrastructure, the required amount of new infrastructure and the range of issues with residential development within Cranford Basin.

They <u>can't support this proposal</u> until more information is provided to them to address their concerns and give them some certainty or assurance these concern will be addressed in a timely and transparent manner.

INTRODUCTION

Ngāi Tahu have a historical relationship and pattern of use in the many catchments within Canterbury. The Crown formally recognised this significance recently with the enactment of the Te Rūnanga o Ngāi Tahu Act 1996 and the Ngāi Tahu Claims Settlement Act 1998. Te Ngāi Tūāhuriri Rūnanga are the kaitiaki Rūnanga for this area. They are responsible for assessing how any activity in their takiwā impacts upon their cultural values, beliefs and practices.

Christchurch City Council are expected to acknowledge the kaitiaki responsibilities of Te Ngāi Tūāhuriri Rūnanga in undertaking this development. Christchurch City Council have commissioned this CIA to document the concerns of Te Ngāi Tūāhuriri Rūnanga have with respect to the proposed rezoning of part of the Cranford Basin for urban development.

1.1. Project Objectives

The objectives of this report are:

- To provide information on the nature and extent of cultural interests, in the area with respect to the eastern Christchurch area including the Cranford basin.
- To identify the impacts associated with the proposal that are of concern to Te Ngāi Tūāhuriri Rūnanga; and
- To identify mitigation for impacts identified by Te Ngāi Tūāhuriri Rūnanga.

1.2 Format of the report

This report has been divided into a number of chapters:

Chapter 1 - sets out the objectives and scope of the report.

Chapter 2 - describes the proposal.

Chapter 3 - provides the statutory, planning and policy frameworks within which the cultural impacts will be assessed.

Chapter 4 - provides a general discussion of the issues of concern to Te Ngāi Tūāhuriri Rūnanga that are specific to the proposal.

Chapter 5 - concludes the report, highlighting the key issues that need to be addressed from the perspective of Te Ngāi Tūāhuriri Rūnanga.

1.3 The areas considered in this report

We have included, as Figure 1, the general location of the proposed development that we are considering in this assessment. However, we acknowledge that whānau value cultural landscapes at multiple levels including the entirety of the riverscape from the mountains to the sea.

Figure 1 – General location of the Cranford Basin[1]

1.4 Understanding the Cultural Context

The discussion of the cultural values of Te Ngāi Tūāhuriri Rūnanga that is included in Appendix 1 of this report is a summary of the cultural values of Avon / Otakaro Catchment including the Cranford Basin. This summary seeks to provide a conceptual framework for the assessment of impacts in Chapter 4.

1.5 Terminology used in this report

In this document, the use of the term 'Ngāi Tahu' should be considered to include the constituent indigenous iwi, being Ngāi Tahu, Ngāti Mamoe, and Waitaha. The term 'iwi' (tribe) is used in the same context.

We have also used the term "runanga" or "Tūāhuriri Rūnanga" which is to be read as Te Ngāi Tūāhuriri Rūnanga.

The term "CCC" should be read as "Christchurch City Council" as well the term "developers" should also be read as groups or individuals who want to carryout urban development i.e. residential development within the rezoned area.

1.6 Limitation of this Report

This CIA represents best endeavours by the Te Ngāi Tūāhuriri Rūnanga to identify cultural effects of concern. They reserve the right, however, to oppose the proposal or pursue avoidance or mitigation of any subsequent impacts that are identified as a result of further site visits or further discussions with Christchurch City Council (CCC).

[1] Google Earth

1.7 Consultation with Te Ngai Tūāhuriri Rūnanga

Te Rūnanga o Ngāi Tahu (TRONT) is the tribal representative body of Ngāi Tahu Whanui (the tribal collective), and is a body corporate duly established on 24 April 1996.[2] The Te Rūnanga o Ngāi Tahu Act 1996 (the Act) provides a detailed description of the takiwā (area) of Ngāi Tahu Whānui, which confirms that the proposal is within the rohe of Ngāi Tahu.[3]

The Act states:

- *Te Rūnanga o Ngāi Tahu shall be recognised for all purposes as the representative of Ngāi Tahu Whanui.*
- *Where any enactment requires consultation with any iwi or with any iwi authority, that consultation shall, with respect to matters affecting Ngāi Tahu Whanui, be held with Te Rūnanga o Ngāi Tahu.*
- *Te Rūnanga o Ngāi Tahu in carrying out consultation under subsection 2 of this section shall seek the views of such papatipu Rūnanga of Ngāi Tahu whanui and such hapu as in the opinion of Te Rūnanga o Ngāi Tahu may have views that they wish to express in relation to the matter …* [4]

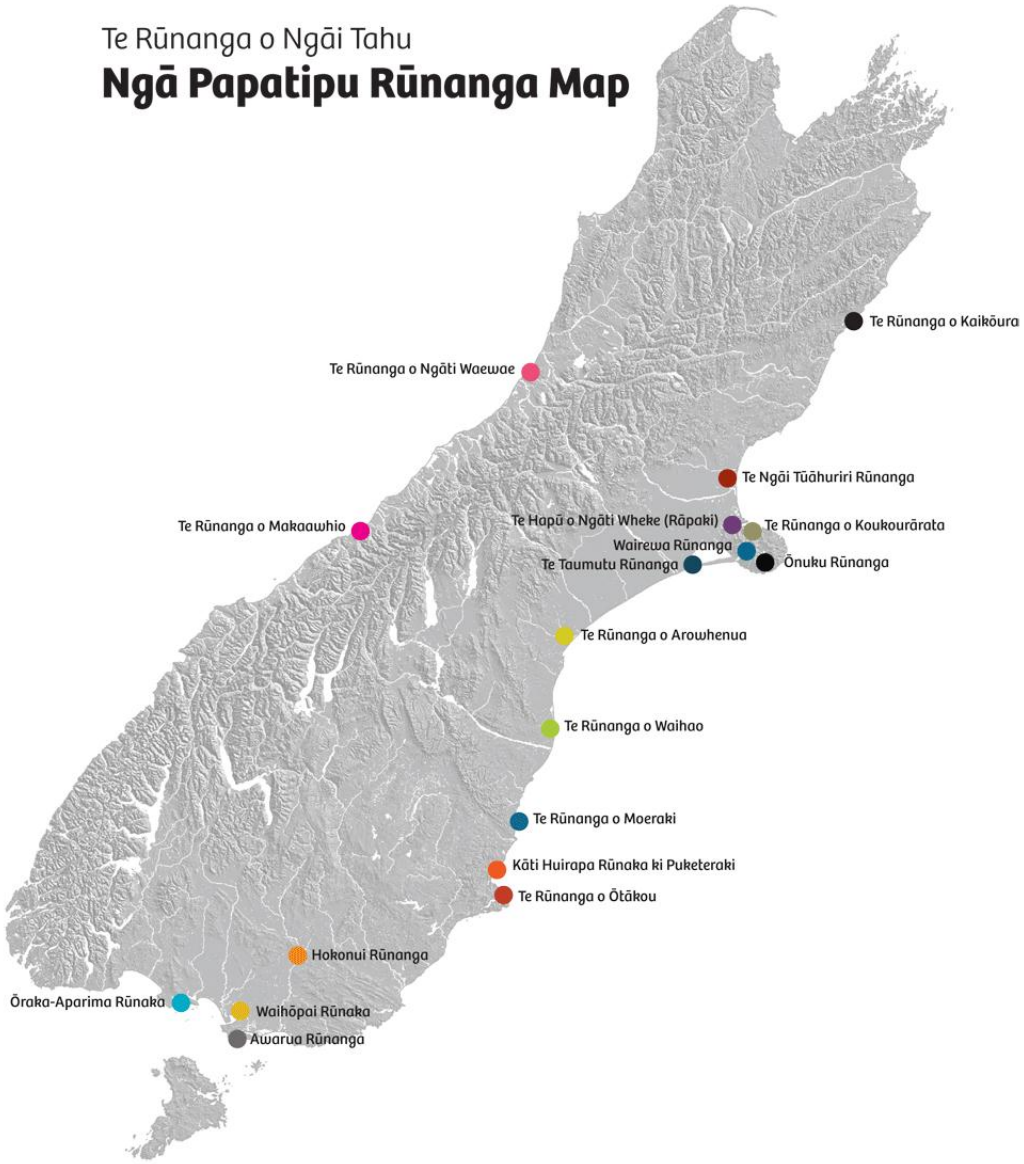
The Act therefore confirms TRONT's status as the legal representative of the tangata whenua, and the right of the Papatipu Rūnanga to express their own views on this development.
The First Schedule of the Act lists the eighteen Papatipu Rūnanga.

Te Ngāi Tūāhuriri Rūnanga whom is identified as a constituent Papatipu Rūnanga is therefore recognised by TRONT as the kaitiaki Rūnanga for the area affected by this proposal. It is common practice today for the interests of Ngāi Tahu whanui to be represented by both TRONT and the Kaitiaki Rūnanga of the area involved. Whānau from the Te Ngāi Tūāhuriri Rūnanga were interviewed in preparing this assessment.

The location of the marae that is at the centre of each of the Rūnanga is shown in Figure 3.

[2] Te Rūnanga o Ngai Tahu Act 1996, Section 6
[3] Te Rūnanga o Ngai Tahu Act 1996, Section 5
[4] Te Rūnanga o Ngai Tahu Act 1996, Sections 15(1) – 15(3)

Figure 3 – Ngāi Tahu Papatipu Runanga



1.8 Release of this CIA

Te Ngāi Tūāhuriri Rūnanga have received a draft of this CIA for comment but have yet to approve the release of this CIA.

2. THE PROPOSAL

Christchurch District Council have proposed to rezone the area around the future development area within the Cranford Basin (Northern Arterial Expansion, Stormwater treatment basin which will discharge to the Avon River via Horseshoe Lake) for urban activities/ development. (See **Figure 4**) This rezoning would enable residential development within the rezoned area. The amount of housing and the specific areas where housing will be located with this rezoned area is still to be determined along with the infrastructure which may be required to facilitate this development i.e. stormwater treatment within developments.

The stormwater treatment and management required within the rezoning area by developers could be determined by the timing of the completion of the future development of the Cranford Basins stormwater treatment basins. A temporary solution may be required.

As part of the rezoning process Christchurch City Council along with the developers are carrying out site investigations to determine the issues with the proposed rezoning.

Below we have copied information from report prepared on this proposal. Sections 2.1 to 2.3 are from the Christchurch City Council Section 32 report – Chapter 17 Rural (Cranford Basin) and 2.4 to 2.5 is from various reports which have more specific details.

2.1 Description[5]

The proposal area is located within the Cranford Basin. The Cranford Basin is 170 hectares of low lying rural land located to the north of Christchurch. It is bounded by QEII Drive to the north, Philpotts Road to the east and the suburbs of Papanui to the west, St Albans to the south east and Mairehau to the east. Cranford Street bisects the Basin.

The Cranford Basin represents an anomaly within the urban setting of Christchurch – previously a wetland; the Basin was drained in the 1960s to accommodate flood mitigation programmes and to provide access to the horticultural potential of the underlying peat soils. Suburban development now surrounds the Basin however it remains a rural landscape as a result of its low lying topography, compacting peat soils and high water table. It is characterised by a green open rural landscape arranged in a loose grid pattern of cropped fields and pasture, transected by rural fences, shelterbelts, open drains and wood lined canals.

[5] This information is from a Christchurch City Council Section 32 report [Christchurch City Council. (2015). *Stage 3 - Section 32: Chapter 17 – Rural (Cranford Basin)*]. We have not changed this information.

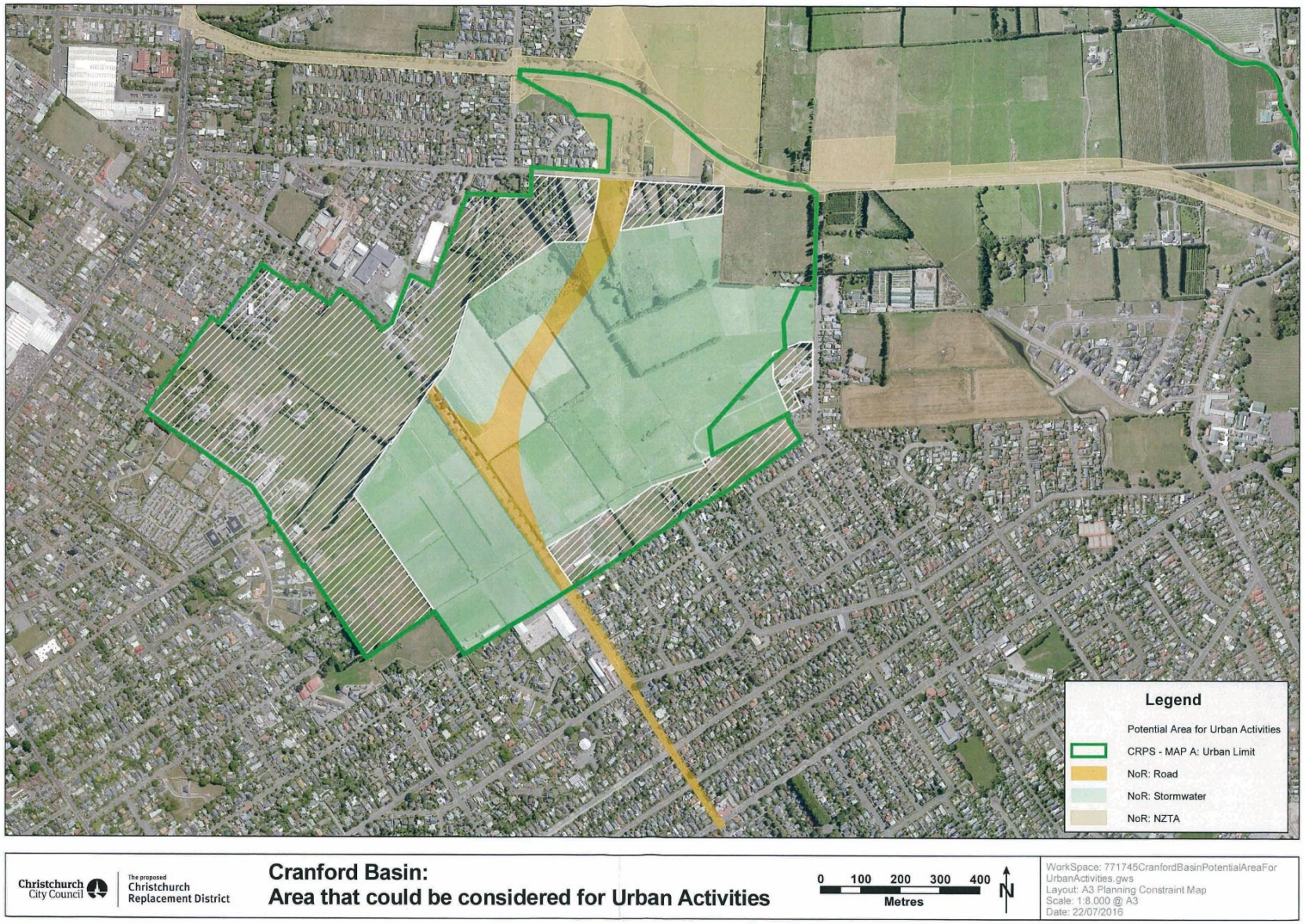


Figure 4 – Proposed area to be rezoned for urban development[6]

[6] Provided by Christchurch City Council

2.2 Physical characteristics[7]

Land conditions and geotechnical considerations

The Cranford Basin is a naturally low-lying area surrounded by higher ground. The whole of the Basin covers some 340ha with the perimeter of the outer Basin area at approximately RL15.1-15.3.

A desktop geotechnical study prepared by Christchurch Geotechnical Database (GHD) in 2015 outlines that extensive parts of the area are known to be underlain by swamp derived deposits comprising soft silts, organic silts and peat. From the investigations available from the ECan well database and CGD, the site has been determined to comprise alluvium, underlain by swamp derived deposits. This is further underlain by alluvium, underlain by the Riccarton Gravels. Additional investigations have determined that the area is characterised by a variable topsoil layer underlain by silts, sandy silts and silty sands to approximately 5 to 7 bgl. Incorporated in this are thin peat lenses (up to 0.5m) and thicker organic silt layers typically 1 to 2 m thick. Some areas have minimal organic material present. Beneath this material is sand, gravelly sand and sandy gravel encountered in layers approximately 3.0 m thick. These are underlain by sand with varying silt content until the Riccarton Gravels are encountered at approximately 20m bgl. Groundwater has been recorded in investigation logs between 0.5 and 3.7 m bgl. Where peat is present on site it is likely to be saturated, providing a higher groundwater level (GHD, 2015).

The site is located within a Liquefaction Assessment Area 1 in the pRDP. The site is considered to have a minor to moderate susceptibility to liquefaction (GHD, 2015). GHD advised that liquefaction analysis of relevant CPT's has indicated liquefaction induced settlement for most of this area as equivalent to TC2 land, with some CPT's indicating TC2/TC3 hybrid land. TC2 ground conditions for this zone are considered appropriate as minimal liquefaction has been observed following the Canterbury earthquake sequence.

The shallow soils do not meet the classification of 'good ground' in accordance with NZS 3604:2011 due to the presence of soft soils and potentially compressible organic material. There are complexities arising from development of an area where competent ground is at depth. However, there are instances of developments that have occurred around the periphery of the Cranford Basin with similar ground conditions. There are a range of treatment methods available to achieve competence in stable long term foundations to support any form of urban development and associated services, such that the land should capable of being modified to provide urban structures and supporting infrastructure. For example, foundations for new residential houses need to be designed to mitigate settlement from both swamp deposits and liquefiable materials. This can be achieved by piling building foundations. The required piling depth will vary across the site and will require further specific investigations and specific design. However, it is likely that the lower alluvium will provide a suitable strata for pile embedment, therefore piling depths could range from 5-10 m bgl (GHD, 2015). Services in this area will likely have to be constructed in ground with an allowable bearing capacity less than 50 kPa, therefore a 'soft ground' raft would be required.

The Council has also had made available to it a report prepared on behalf of some of the landowners in the south end of the Basin by Bell Geoconsulting Ltd (BGL). That report was peer reviewed on behalf of the Council by GHD Ltd, having particular regard to the MBIE Guidelines. 6 The main findings from that report are as follows:

[7]This information is from a Christchurch City Council Section 32 report [Christchurch City Council. (2015). *Stage 3 - Section 32: Chapter 17 – Rural (Cranford Basin)*]. We have not changed this information

- No surface liquefaction or lateral spreading has been identified at the site since commencement of seismic activity in the Canterbury region on 4 September 2010. No paleo-liquefaction features have been identified.
- The geotechnical investigation has shown that the site is characterised by 'soft ground', including a high organic content, to depths between 3.3m and 3.9m bgl. This interpretation is based on data obtained from twelve CPTs and numerous boreholes and hand augers completed across the site by various parties.
- Loose to medium dense sand is present beneath the organic-clay and peat "cap", and is underlain by medium dense to dense sandy gravel (Springston Formation) from 4.5 – 6.0m to 10.8 – 11.5mbgl.
- Christchurch Formation sand and silt is present beneath the Springston Formation gravel to the maximum extent of the boreholes completed on site (15m bgl). Riccarton Gravel is expected around 18m bgl in this area of Christchurch, based on known borehole data from the surrounding area.
- The shallow soils do not meet the definition of 'Good Ground' specified in NZS 3604:2011 due to the soft nature and presence of peat, and resulting in subsidence due to loading. Liquefaction susceptibility is low.
- Vertical settlements are estimated up to a maximum of 150mm in a ULS design event using the Idriss and Boulanger (2008) calculation method, but 11 of the 12 CPT profiles show less than100mm. A TC2 land classification is considered appropriate based on our analysis of the liquefaction evaluation data.
- An assessment against RMA Section 106 requirements identified that the site is not subject to falling debris, erosion or slippage because of the flat nature of the land. This is consistent with observations that the land has not been subject to ejection of liquefaction materials or inundation as a result of earthquakes.
- Liquefaction-induced subsidence is not considered to pose a geotechnical constraint for future development at the site given appropriate foundation design. Compressive loading of the organic-rich soils in the top ~3m of the profile may, however, result in consolidation and potentially non-uniform settlement. In our opinion design of individual building lots to minimise long-term settlement and inundation potential is a priority, and roading must be engineered so as to eliminate differential ground movements. Design and placement of buried infrastructure must also address acceptable tolerances in terms of settlement.

BGL consider that the ~12.5ha area is suited to one or two-storey residential dwellings with appropriate shallow ground improvement for the soft soils and organic material. Site-specific foundation design and related structural engineering considerations are critical to successful subdivision of this site.

Contaminated land

The activities that have occupied this area traditionally have consisted of small-scale agricultural and horticultural uses such as market gardening, orchards and small-scale pastoral farming.
A brief search of the ECan Listed Land Use Register (LLUR) identified several properties have Hazardous Activities and Industries List (HAIL) activities including:

- Livestock dip or spray race operations;

- Persistent pesticide bulk storage or use (multiple properties); and
- Storage tanks or drums for fuel, chemicals or liquid waste (GHD, 2015).

Change of the use of land from its current use to residential, would require Preliminary Site Investigations and subsequent Detailed Site Investigations to classify contamination presence. This work could be undertaken at any future subdivision stage.

Natural hazards
Part of the area for possible rezoning is located within the Floor Level and Fill Management Area. This is not seen as a barrier to development provided the requirements of the rules associated with flood hazard are able to be met (i.e. new development will require resource consent which will require appropriate floor levels to be established). In addition, detailed assessment work will be required to be undertaken to determine whether there will be any flooding effects associated with the necessary filling to satisfy minimum floor levels. Parts of the rezoning proposal area will be located within Flood Ponding areas.

Provided compensatory storage can be provided it is considered that this does not represent a barrier to development of the area.

No part of the proposal area is located within a High Flood Hazard Overlay.

Landscape/ecological context
A report prepared by Poppelwell, 2003 outlines that the landscape southwest of Cranford Street is characterised by the open space, tilled soils and clipped hedgerows of market gardens. North to Winters Road the landscape displays the characteristics of a picturesque landscape due to the presence of open pasture, horse grazing and unclipped rows of established shelterbelt trees.

Therefore, the landscape is considered to be significantly modified from its original pre-European/ pre-Maori state, with few remnants of native fauna and/or flora remaining.

2.3 Services/ infrastructure[8]

Three infrastructure constraints - site access, wastewater disposal, and stormwater disposal - have been major historical impediments to development in the Cranford Basin. Proposed works being promulgated through NoRs for stormwater and the NAE will to a large extent overcome the stormwater and access issues, and proposed works in the Northern Relief sewer catchment will eventually reduce the frequency of sewer overflows. There will still be a possible issue with the water supply until pipe and pump station upgrades are carried out.

In order to evaluate more precisely infrastructure constraints impact on potential development options, effects on transport, wastewater and water supply infrastructure, three potential development scenarios were modelled:

· Scenario 1: Living 1 B density 200-250 houses;
· Scenario 2: Living 1 density at 15/ha - 650-750 houses; and
· Scenario 3: Living 3 standards - 1500 houses.

The outcomes of this modelling are included in the following discussion.

[8] This information is from a Christchurch City Council Section 32 report [Christchurch City Council. (2015). *Stage 3 - Section 32: Chapter 17 – Rural (Cranford Basin)*]. We have not changed this information

Wastewater

Cranford Basin is part of the upper Northern Relief trunk sewer catchment. There are three constructed overflows on the trunk sewer itself, two of these are incorporated into the Council overflow discharge consent with ECan. One overflow is located adjacent the Rutland Reserve (Grassmere) and discharges into the Dudley Creek Diversion. There are also a number of constructed, consented and unconsented overflows in the gravity and pump station catchments which contribute flows to the Northern Relief.

Prior to the seismic events of 2010/11, the Northern Relief overflows spilled, on average, once to twice per year. With the additional infiltration into the upstream network, this frequency has increased. In addition to this, the lower sections of the Northern Relief trunk sewer have sustained significant damage. In its current damaged state, the trunk sewer continues to provide a good level of service, albeit with a reduced hydraulic capacity. The repairs are unlikely to be completed before 2023.

In order to expedite the repairs to the Northern Relief, the Council fast-tracked a major upgrade project –the Wairakei Diversion. This project provides a diversionary connection between an upper collector sewer of the Northern Relief trunk system (known as the Wairakei Collector) and the newly constructed Western Interceptor trunk sewer. Once completed, this project will enable significant flows from the Northern Relief catchment to be diverted across to the Western Interceptor, thus reducing the number of overflows from the Northern Relief to the Avon River. The primary driver is to assist with repairs to the Northern Relief itself. However, modelling suggests that this, and other upgrades will also reduce overflows from the Northern Relief to below consented levels, and create sufficient capacity to cater for the development of the Cranford Basin.

In response to the post -earthquake challenges outlined above, Council has been working closely with ECan for more than a year on the development of an interim over flow discharge consent compliance strategy. This strategy has been agreed and signed by both parties and commits Council to on -going refinement and recalibration of the wastewater model as the infrastructure rebuild progresses. Council will continue to monitor the consented overflow sites and will install monitoring equipment in any new sites that are indicated to overflow more than once every two years in the hydraulic model. At the end of 5 years, Council will re-run the model to take account of all of the rebuild work and trunk sewer upgrade work that has been carried out over that time. If, following that review the model suggests that the wastewater system is complying with the conditions of the discharge consent, the compliance strategy will terminate and Council will continue to ensure compliance for the remainder of the consent period. If, following that 5 year review, the model suggests that the wastewater system is not in compliance with the conditions of the discharge consent, the Council will be required to apply for a new consent at that time. In either case, it is expected that the ultimate containment standard required for the wastewater system will be no more than an average 1 overflow event in two years.

OPUS Consultants were asked to assess the potential impacts of development around the edge of the Basin under the three scenarios (refer Appendix 2). They advised that development of any of the re-zone areas are predicted to result in moderate or major impacts to the performance of the wastewater network, if unmitigated. The impacts predicted include increases to volume lost from manhole or constructed overflows. The south west portion of the proposed rezoning would connect into the Northern Relief, which is currently predicted to be heavily surcharged during wet weather flows (WWF), and the Grassmere overflow downstream is predicted to overflow. Any addition in flow into the Northern Relief has a corresponding increase in volume lost out the Grassmere overflow. Selection of alternative connection points is unlikely to significantly alter these conclusions due to the current status of the network issues in the area and the proximity to the Grassmere overflow location. Areas north east of Cranford Street are able to connect into existing reticulation in the PS6 catchment. However, due to surcharging in this catchment during

wet weather flows, any increase in flows during wet weather results in an additional manhole overflow and freeboard issues. The following is an outline of the recommended constraints to the rezoning of the 3 sites located within the Cranford Basin:

1. For the Grassmere site (Site A), consideration should be given to the timing of any potential development to be in line with or following on from the timing of proposed upgrades at the Grassmere overflow. If the development of the rezoned area occurs prior to the upgrades, the volume lost at the Grassmere overflow during wet weather is predicted to increase.
2. For the Case and Crozier sites (Sites B and C), it is recommended that no development occur prior to Council undertaking further assessment to determine if pipe upgrades are required immediately upstream of PS6 (refer results for specific pipes) and allowing for the implementation of these upgrades to take place if required.
3. For all re-zoned sites it is recommended that a pressure or vacuum wastewater system be considered rather than gravity.

For all re-zoned sites a system that is able to attenuate flows during wet weather should be considered. To avoid the risk of overflow and freeboard issues, attenuating WWF from the new developments until after peak WWF passes in the network is necessary.

Water supply
Any new development in the Cranford Basin will be supplied from the Saint Albans water supply zone after rezoning of the Christchurch water supply is carried out.

Water supply servicing for the development in the Cranford Basin is challenging because of the lack of pump capacity in the area, and a lack of significant sized pipes around the Grassmere pump station. The deficit of available capacity in the area near the Cranford Basin means currently pumps operate at flows above their normal operating ranges during peak demand. The pump operation results in substantial pressure drops in the zone. The lack of local pumping capacity will continue to be an issue with the proposed rezoning to create the Saint Albans water supply zone. Any additional development in the Cranford Basin will increase the deficit and reduce system performance in the Saint Albans water supply zone. Each of the three development scenarios tested are able to be serviced, but require upgrades to the source capacity and network to meet Level of Service (LOS) requirements.

Stormwater
Cranford Basin is an extensive low-lying area with high winter groundwater levels. The peaty soils within the Basin are up to 4m deep. Groundwater is within 1 to 1.5 metres of the ground surface, both in the Basin and in surrounding areas and can reach the ground surface as water table or springs in the lowest parts of the Basin. Groundwater has been controlled by drainage and pumping to facilitate intensive cultivation of the fertile soils over the last 100 years. Considerable ground subsidence has occurred over this period. The bearing capacity of the soil is very low and it is very sensitive to lowering of groundwater levels. Historically the floor of the Basin has subsided at an average rate of approximately 20 mm per annum due to shrinkage of the peaty soil. Cranford Basin has become increasingly unsuitable for horticultural use as ground levels have subsided and the frequency of inundation has increased. The bearing capacity of the soil is very low and it is very sensitive to lowering of groundwater levels.

The Basin comprises two extensive ponding areas, one north of Queen Elizabeth II (QEII) Drive (Cranford North) drains north to the Styx River, while the Basin south of QEII Drive drains south-east to the Avon River.

There is a control structure on Winters Road Drain near Winters Road intersection with QEII Drive that allows some floodwater from the upper Basin to be diverted south-east into the Avon River via Bullers Drain and some floodwater from the lower Basin to be diverted north to the Styx River via Horners Drain, depending on the circumstances.

Public pressure to relieve flooding downstream in the suburbs of Mairehau and St Albans gradually mounted as the city expanded to the north and west of Cranford Basin in the 1960s and 1970s. The Christchurch Drainage Board embarked on a series of flood improvement projects from the mid-1970s which culminated in construction of the Upper Dudley Creek Diversion.

The Upper Dudley Creek Diversion is a timber-lined channel flowing east through Cranford Basin to Pumping Station 219 (PS 219) from where water is pumped into a 1,350 mm diameter pipeline in Philpotts Road. The project was completed in 1989 to relieve flooding downstream in areas of St Albans such as the Flockton Street precinct. During significant rainfall events the Diversion overflows and water ponds in Cranford Basin. The outflow discharge from Cranford Basin into the stormwater network downstream is controlled by the pumps at PS 219 which have a combined capacity of 2.5 m3/s.

A new pumping station PS 202 has been built in Kensington Avenue to alleviate flooding in the Flockton Basin, resulting from earthquake-induced land settlement. PS 202 will discharge storm water into the Dudley Creek Diversion downstream of Philpotts Road. Capacity limitations in the Dudley Creek Diversion are likely to require reduced pumping by PS 219 and additional flood storage in Cranford Basin during times of extreme rainfall.

The Styx River Surface Water Management Plan (SMP) including the Styx SMP Blueprint set out the direction of future land use changes for Cranford Basin (amongst other areas) related to natural ponding and increased residential and business development and the management of stormwater derived from those developments. It does do not determine future land use, but addresses how surface water will be managed in response to any future land use changes.

The Cranford North area normally drains north to the Styx River, while the Cranford West and East areas normally drain south-east to the Avon River. The decision was made to include Cranford Basin catchment in its entirety in the Styx SMP area because it was considered important to implement the one integrated strategy for all of the Basin as soon as possible to facilitate the resolution of growing development pressures on the Basin.

One of the principal surface water management objectives for the Styx SMP Area is:

Investigation into the development of the Cranford Basin natural ponding area to optimise its use as a multipurpose facility for stormwater quality treatment, flood attenuation, ecological restoration and district amenity.

A stormwater management strategy for Cranford Basin that includes the following elements is recommended in the Styx SMP Blueprint:

i) CCC purchase the remaining area of Dudley Diversion and Horners/Kruses Bullers Ponding Areas (as identified in the sub-catchment plans) that are not already owned. This includes land both east and west of Cranford Street
ii) Future development within Cranford Basin Ponding Areas be limited to the NAE and other strategic transport links, and stormwater treatment wetlands for limited peripheral urban development outside the Ponding Areas that can provide for their own first flush treatment.
iii) CCC investigate in more detail the possibility of providing limited compensatory storage within the Ponding Areas purchased for limited peripheral development involving filling.

ECan granted a consent in October, 2013 based on the Styx SMP for catchment-wide discharge of storm water throughout the Styx SMP area which included Cranford Basin.

Cranford Basin will provide:

- Stormwater treatment and detention for the large contributing urban catchment;
- Wetland treatment and stormwater detention for all runoff from the proposed NAE/CSU project (refer to clauses 7 and 9); and
- Compensatory storage for the flood volume displaced by NAE embankment.

A NoR for these works was lodged in November 2013 and hearings began on 20 April 2015. The Cranford Basin site is considered critical in terms of stormwater detention and stormwater quality treatment for the contributing urban catchment. Council control over the site will also provide the opportunity to enhance ecosystem, iwi and recreation values over time. The designation is reasonably necessary to achieve these Council objectives for the following reasons.

The designation will provide long-term land protection and certainty for the future. It will identify and protect the land in the City Plan removing any doubt as to its purpose. The land would be protected from uses that may be incompatible with the designated purpose. It will provide a basis for the subsequent acquisition of the land.

The Council has a short term and a long term vision for the land within the proposed designation. In the short to medium term, pastoral farming would be encouraged. The option would be available to any owner who sold land to Council to lease back and continue to graze the land, or use it for any other purpose compatible with Council's drainage objectives. Continuation of horticultural land use is not favoured because the peaty soils break down and subside under the regular operation of agricultural machinery.

Council has a long term vision of a large public open space reserve comprising wetlands, extensive open and forested areas of ecologically suitable planting criss-crossed by public pathways. Planting would begin in the stormwater quality treatment facilities for the wet, low-lying areas and gradually extend out to the periphery over time as money becomes available.

In developing the proposed ponding areas the Council will excavate to create treatment ns and wetlands, divert drains and construct walkways and planting areas. West of Cranford Street this can be expected to alter the direction of groundwater flow in some places and draw down the water table around the periphery of excavations. Water levels will be managed in basins and wetlands – typically the lowest lying parts of the basin – such that a chosen minimum water level will be maintained. Water levels will fluctuate above the minimum level as the wet areas store and release stormwater.

A future minimum water level is likely to be a little higher than the present managed water level, and this will benefit the basin soils by slowing oxidative decomposition of the peat component and slowing subsidence. However subsidence can be expected to continue at varying rates, depending on location, indefinitely.

If there is a drawdown of groundwater at the perimeter of the basin this will tend to dry the soils and accelerate peat decomposition and consolidation. Parts of the area proposed for residential zoning could be affected.

Development processes, and particularly filling, may also cause undesirable groundwater changes. It is expected that residential properties will have need of a stable platform, comprised of stable fill replacing any soft soils, over an area larger than the building. Such a platform would minimise settlement that would otherwise cause the ground to subside away from houses, which (according to the evidence of a number of geotechnical experts) will be piled. Substantial areas of fill will dam and divert groundwater, which naturally flows in a south-easterly direction. Such a dam would elevate groundwater levels to the north and west and may cause new springs.

Summary / Conclusions
The Basin, particularly the southern parts, are well located with respect to community infrastructure, public transport and the Papanui/Northlands KAC. The key to urban development in the Cranford Basin is a satisfactory resolution to the four site constraints listed earlier: water/wastewater, subsurface conditions, flooding, and access. Subject to the NORs on the NAE and stormwater being confirmed, the access and flooding constraints can be lifted. There are however significant works needed for water and wastewater infrastructure and the technical advice suggests that development should not occur ahead of improvements to these systems. Importantly however, the proposed works are needed irrespective of whether Cranford Basin is zoned or not, and would not be diverting public infrastructure away from planned expansion areas.

The geotechnical advice is that one or two storey residential development is feasible provided that appropriate construction methods are used. On site investigations are currently underway to provide more detailed geotechnical information on the subject land.

2.4 Future developments within Cranford Basin

2.41 Northern Arterial Extension and Stormwater Works[9]

The proposed NAE runs in an approximate north-south direction. It crosses the Cranford Basin from Cranford Street in the south to Winters Road in the north where it connects with the proposed Northern Arterial at QEII Drive. In total, the NAE will be 1160m in length and comprise of four lanes. The project will include the construction, operation, maintenance of the NAE as well as the associated facilities including stormwater, pedestrian and cycle facilities, earthworks, planting, lighting, signs and road safety structures. Construction of the NAE will require alteration to some of the drains in the basin – either closing or culverting the drains.

The land in the basin bordering the NAE footprint will be used for stormwater storage and treatment. It is currently proposed to construct long, narrow first flush basins along each side of the NAE and connect these to two small wetlands to the east. Further stormwater infrastructure will be developed in the Basin including 'skimming' the surface of the basin to mitigate for the loss of some storage capacity from the construction of the NAE. The proposed designation of the Cranford Basin for storm water purposes will enable the Basin to be utilised for area wide stormwater detention and treatment.

[9] This information is from an Opus International Ltd report [Coates, Annabelle. (2014). *Cranford Basin Drains – Northern Arterial Extension and Cranford Basin Storm water Area Ecological Assessment*. A report prepared by Opus International Ltd for Christchurch City Council]. We have not changed this information.

2.42 Stormwater concept for Cranford Basin[10]

Ecological context

An assessment of bird habitat in and around the Cranford Basin, carried out by CCC ornithologist Andrew Crossland in early 2004 (Crossland 2004), identified no species of particular conservation interest being present in the area, but that the area supported an assemblage of more common species. Of the native species associated with waterways and lowland wet grasslands, these included little cormorant, white faced heron, paradise shelduck, Australasian harrier, pukeko, pied stilt, black-backed gull, red-billed gull, black-billed gull, NZ kingfisher and welcome swallow. Native species of drier open country and woodland habitat included fantail, grey warbler, silvereye, bellbird, NZ pipit, and the migratory shining cuckoo.

Springs

Two significant natural springs (wai puna) are located east of Cranford Street. These natural features are of special significance to Ngai Tahu, and as such it is intended that forested buffers will be established around these spring heads, and spring water will be separated from the storm water treatment areas as much as practically possible to prevent mixing and contamination.

Proposal

The stormwater concept for Cranford Basin incorporates the following three criteria:

- Treatment and detention of the Northern Arterial Extension (NAE)
- Treatment and detention of surrounding catchment including retrofit for water quality
- Based on 50 year event and then related to cadastral boundaries (with appropriate protection for localised properties)

Two broad concepts existed for the treatment of the wider stormwater mitigation areas: 1) open ephemeral wetlands, and 2) forested basins. An open ephemeral wetland concept is likely to be periodically grazed to manage grass growth, and would see minimal initial development costs. However while such a scenario would cater well for drainage values, it is likely to cater poorly for the remaining five values: landscape, recreation, culture, heritage, and in particular ecology compared to the establishment of a forested basin.

The preferred option for the stormwater mitigation areas is for a forested stormwater facility (Figure 2). This option sees the construction of new forested flood attenuation & first flush treatment facilities on the north-western side of the NAE and the construction of a vegetated, semi-forested wetland on the eastern side of the road corridor. To the west of Cranford Street a forested first flush basin will also be established

[10] This information is from a Landscape Architect Capital Investigations [Shadbolt, Antony. (2013). *Notice of Requirement (Storm water purpose) for Cranford Basin – Landscape Ecology*. A report prepared by Landscape Architect Capital Investigation for Christchurch City Council]. We have not change this information.

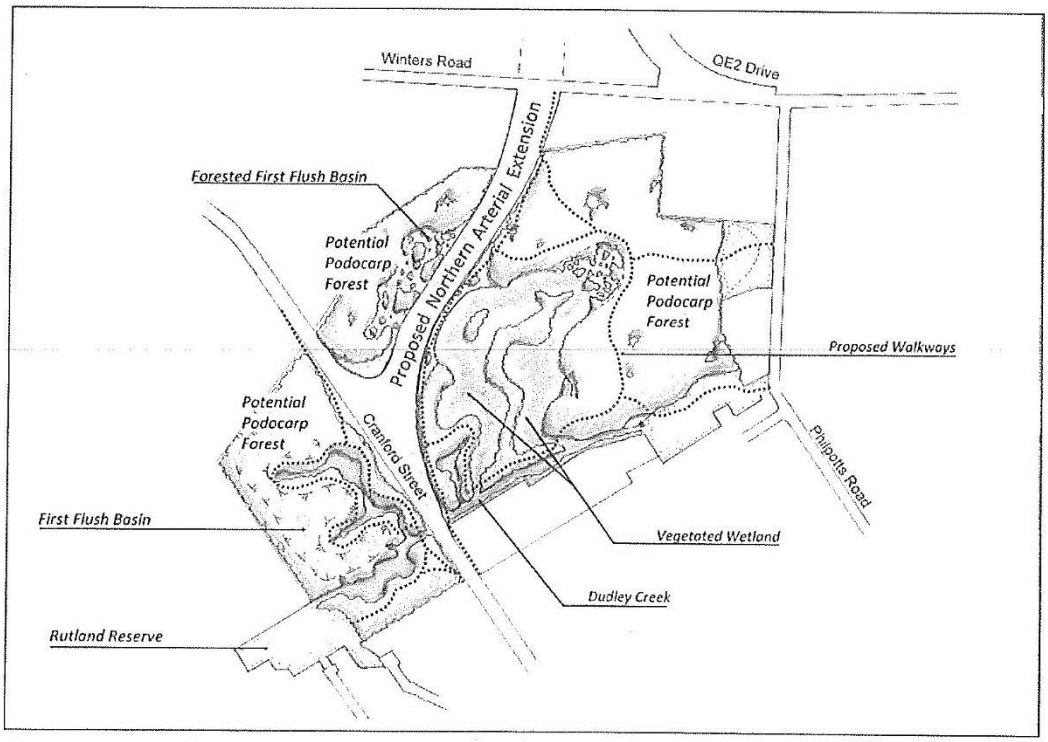


Figure 5 – Forested storm water concept for wider Cranford Basin area showing relationship between Northern Arterial Extension, first flush ponds, wetlands and core forest areas.[11]

Roading related stormwater and landscape treatment

Given that the road corridor will pass between three significant areas of wetland and/or ephemerally flooded forest, the elimination of as much mown grass/turf as possible along the road margins will be an important factor to consider to overcome potentially significant vehicle-wildlife conflict issues. Because the basins, ponding areas and flooded forest habitats are likely to attract waterfowl, mown grass verges along roads of this nature are likely to attract problem waterfowl such as Canada geese, mallard ducks and black swans which graze on open grass areas. Furthermore both adult and juvenile birds are likely to either walk or fly at low (vehicle) level from one wetland area to another across the road corridor, and this movement puts both wildlife and road users at significant risk; the latter as a result of unexpected evasive action by motorists to avoid collisions with wildlife.

Therefore it is proposed that all roadside margins (including swales) along the south- east side of the corridor are fully planted with native grasses, groundcovers, low shrubs and where appropriate frangible tree species in order to eliminate grass areas that are attractive to these problem waterfowl. Further back from the carriageway it is proposed to establish tall growing native forest species that will 1) achieve a high degree of screening of the roading corridor, 2) blend seamlessly with forest plantings proposed across the wider Cranford Basin area, and 3) encourage any bird flight movement to occur higher above the carriageway by eliminating direct flight-lines near ground level. Wherever possible, open grassed areas should be minimised along the north-west side of the corridor also. This will be achieved through the following measures:

[11] Shadbolt, Antony. (2013). Notice of Requirement (Storm water purpose) for Cranford Basin – Landscape Ecology. A report prepared by Landscape Architect Capital Investigation for Christchurch City Council. Pg6.

- Margins of roadside swales required to convey surface water to treatment facilities shall be planted to edge of seal predominantly with native tussocks and sedges.
- To avoid the need for regular mowing, and to further reduce incidence of problem waterfowl issues it is suggested the invert of all roadside swales should be constructed as a >1 m wide greywacke stone-lined low flow channel.
- Areas within the roading corridor beyond the cycleway (bordering the undisturbed areas of the wider Cranford Basin) shall be planted as dense native forest/shrubland.
- As with roadside swales and the corridor edge discussed above, minimising the open grassed areas which are known to attract problem waterfowl, all first flush retention ponds shall be established as forested basins.

2.5 Further details on environmental considerations within Cranford Basin

Contamination of soils[12]

Subsurface investigations have been completed across the site. Results confirm the use of pesticides and herbicides across the site.

The results show that contaminants in the soils do not exceed the human health criteria for Recreational and Commercial/Industrial outdoor worker (unpaved) land uses and therefore soils pose a low risk to construction workers and future users of the site.

The concentration of mercury in the majority of samples exceeded the environmental criterion, as did concentrations of arsenic and zinc in a number of samples.

Leachate testing of samples with generally elevated contaminant concentrations showed that copper leached in concentrations above freshwater ecological protection levels appropriate for the site. The ecological report concluded that the despite proposed alterations to the drains, removal of vegetation and inputs of sediment during construction, the effects on the farm drains and most of the council drains will be less than minor as a result of their current low ecological value. It is therefore considered that leaching from site soils will not have a significant adverse effect on the drains due to their already degraded nature.
Results of leachate testing have shown all concentrations of metals are below 20x drinking water standards. It is therefore considered that the metal concentrations pose a low risk of leaching and a low risk to groundwater (for the purposes of human consumption). Shallow groundwater is not being extracted for consumption in this area.

Results of leachate testing have shown that organic compounds were not detected. Organic compounds pose a low leachability risk because they do not readily dissolve in water and tend to bind strongly to soil particles. The risk posed to human health or environmental receptors by these compounds is considered to be low.

A robust sediment control plan is recommended to minimise the effects of construction generated sediment on the aquatic flora and fauna. This should also include requirements for testing of any retained water prior to release, to determine if any treatment is needed prior to release.

[12] This information is from a Beca Ltd. [Smith, Genevieve. (2014). *Northern Arterial Expansion and Cranford Stormwater Basin: Detailed site investigation (Contamination)*. A report prepared by Beca Ltd for Christchurch City Council]. We have not change this information.

A management plan is also recommended to manage the potential exposure of human and environmental receptors to soils containing contaminants during construction.

The proposed works are unable to comply with the criteria of Regulation 8(3) of the NES for soil disturbance and accordingly resource consent as a controlled activity is required. The works are considered a permitted activity under Regulation 8(4) of the NES for land use change.

Springs [13]

A total of 28 springs have been identified adjacent to, and within the Cranford Basin through a number of sources. Two of the springs have been reported to be associated with Christchurch 2010 - 2012 earthquakes. The exact flow of groundwater and depth which the identified springs originate from is not precisely known. Therefore, the likely sources of the emerging spring water in the Cranford Basin are, the Riccarton Gravel aquifer, a gravel lens within the confining layer, or associated with the water released as part of the land settlement.

Any impact the proposed road or stormwater systems will have on groundwater flows in the area will greatly depend on the exact flow of groundwater, and from what depth the springs are fed. It is likely that the springs identified in Table 2 originate from different depths, and are affected by different subsurface factors. The proposed road or stormwater systems are unlikely to have an impact on the source of any artesian springs (fed from the confined aquifer) in the Cranford Basin, as the upward hydraulic pressures and the confining layer provide a degree of protection. However the installation of the proposed road or stormwater systems could interfere with the pipe and vent system for these springs, and may ultimately effect the exact discharge location.

Springs associated with seepage of shallow groundwater from within the confining layer, are likely to be affected by any changes to the local groundwater level. However due to the rate of settlement within Cranford Basin and the high groundwater level, the seepage of groundwater into low points of the Cranford Basin is likely to be unavoidable. Note any dewatering activity will need to conducted with great care, as to not accelerate settlement of the peat layers

Ecological values assessment [14]

Four of the five ecological zones triggered none of the four criteria for significant ecological values. The ecological values present within and adjacent to the proposed road footprint within these zones are low.

The fifth zone, Winters Road Drain, triggered one of the four criteria of significance: 'Ecological Context'. The presence of longfin eels in this drain, a species with the threat classification of 'At Risk: declining', is sufficient to trigger this criterion. While the presence of longfin eels in this drain indicates there is habitat of sufficient quality to sustain this species, the quality of habitat at the point where the road will cross the drain is not considered to be high. The drain channel at the proposed crossing point is partially boxed, has steep banks and grassed margins only.

Although no fish were detected in the other drains surveyed, it is possible that eels do occupy or move through some of these drains from time to time.

[13] This information is from a Beca Ltd. [Munro, Bryan. (2013). *Cranford Basin Spring Identification*. A report prepared by Pattle Delamore Partners for Christchurch City Council]. We have not change this information.

[14] This information is from an Opus International Ltd report [Coates, Annabelle. (2014). *Cranford Basin Drains – Northern Arterial Extension and Cranford Basin Stormwater Area Ecological Assessment*. A report prepared by Opus International Ltd for Christchurch City Council]. We have not changed this information.

The absence of any notable indigenous animal species other than longfin eels and the lack of any areas of medium or high quality aquatic habitat supported by contiguous margins of well-established riparian vegetation supports the conclusion that the ecological values along and adjacent to the NAE footprint are, with the exception of eels, low. It is possible threatened avian species (pied stilt, black-billed gull, red-billed gull) may occasionally be present as the Basin lies below the flyway between the Waimakariri River and the Avon-Heathcote Estuary. None of the threatened species are reliant on the drains for habitat and are more closely associated with the surrounding grassland habitat.

Geotechnical assessment[15]

The proposed site is an area that is well known to be underlain by swamp derived deposits comprising soft silts, organic silts and peat. From the investigations available from ECan well database, the CGD, and our further investigations the site has been determined to comprise alluvium, underlain by swamp derived deposits. This is further underlain by alluvium, underlain by the Riccarton Gravels. The shallow soils do not meet the classification of 'good ground' in accordance with NZS 3604 due to the presence of soft soils and potentially compressible organic material.

Groundwater was encountered at shallow depths within the upper alluvium and silt and peat layers. The lower alluvial material is water bearing and contains gravel lenses which exhibit artesian pressures. Springs were identified across the site by PDP (2013) and Thorley (2015), many of which are characterised as shallow depression seeps within the peat/organic material. These seeps are drained to CCC drainage networks. Three artesian springs are shown on Environment Canterbury well database, which were noted as having strong and permanent flows. Excavations are likely to encounter groundwater, with deeper excavations at risk of breaching the confining material (silt) which separates the lower alluvial gravel from the surface.

Piling through the confining material will need to account for potential for increasing discharge of groundwater from the lower alluvial Springston gravel as seeps/springs.

A brief search of the Environment Canterbury List Land Use Register identified several properties have HAIL activities. If the land use is to be changed from its current land use to residential land use it is recommended a Preliminary Site Investigation and subsequent Detailed Site Investigation are undertaken.

Foundations for new residential houses need to be designed to mitigate settlement and consolidation from both swamp deposits and liquefiable materials. The greatest consolidation will result from settlement of the organic soils and there bio-gradation. Therefore design and construction of new foundations of this area will require site specific geotechnical investigations and specific engineering design.

To mitigate against settlement and consolidation it is recommended that residential building foundations are piled through the very soft soils and organic material. The required piling depth will vary, it is likely that the lower alluvium will provide a suitable strata for pile bearing and embedment, therefore piling depths could range from 5-7 m bgl.

The potential consolidation of the organic material under a shallow foundation is likely to be greater than 25 mm, therefore shallow foundations are not considered appropriate for this site.

[15] This information is from a GHD Ltd. [GHD. (2015). *Cranford Basin Geotechnical Investigation Report*. A report prepared by GHD for Christchurch City Council]. We have not change this information.

Shallow foundations maybe appropriate for small areas of the site that are identified with further investigation as having no or minimal organic material.

3. THE STATUTORY CONTEXT: RECOGNISING AND PROVIDING FOR CULTURAL VALUES

3.1 Te Tiriti O Waitangi

In 1840, Te Tiriti o Waitangi (Treaty of Waitangi) was signed between the Chiefs of Aotearoa and Her Majesty the Queen of England formalising an agreement to allow British subjects to settle in areas such as Te Wai Pounamu, under formal British colonial rule, and which guaranteed to Maori the protection of their taonga (possessions) for so long as they wished. Such taonga included their waters[16], lands, fisheries and mahinga kai.

Te Tiriti o Waitangi reaffirmed these rights thus:-

> *Maori Text:*
>
> *"Ko te Kuini o Ingarani ka whakarite ka whakaae ki nga Rangatira, ki nga Hapu, ki nga tangata katoa o Nu Tirani, te tino rangatiratanga o ratou whenua o ratou kainga me o ratou taonga katoa. Otiia ko nga Rangatira o te Whakaminenga me nga Rangatira katoa atu, ka tuku ki te Kuini te hokonga o era wahi whenua e pai ai te tangata nona te whenua, ki te ritenga o te utu e whakarite ai e ratou ko te kai hoko e meatia nei i te Kuini hei kai hoko mona".*
>
> *English Text:*
>
> *"Her Majesty the Queen of England confirms and guarantees to the Chiefs and Tribes of New Zealand to the respective families and individuals thereof the full exclusive and undisturbed possession of their Lands and Estates, Forests, Fisheries and other properties which they may collectively or individually possess so long as it is their wish and desire to retain the same in their possession…."*.

The words "their lands and estates, forests, fisheries…" in the Treaty of Waitangi encapsulates the right to mahinga kai, to places where the resources are harvested, the activity and business of gathering kai and includes the type of resources that were caught or gathered. It was upheld by the Waitangi Tribunal that Maori fishing rights have endured to the present day.

[16] The Waitangi Tribunal has defined taonga value as including the value of the water itself, the resources living in the water and the resources sustained by the water.

3.2 Cultural and Traditional Principles for Sustainable Management[17]

Traditional management was founded on a set of cultural values that arose from the Ngāi Tahu worldview. These cultural values include a set of principles upon which the relationship between people and the environment must be based in order to sustain the balance between the needs and demands of humans and the health of the natural world that sustains them. The following principles are significant elements of the Ngāi Tahu worldview which, when understood together, approximate the non-Maori concept of "sustainable management".

Te Ao Maori: The principle of holism: Sustainable management must consider the environment and its component parts as a whole and assess effects from actions across all dimensions, spiritual, mental, biophysical, and social [te taha wairua, te taha hinekaro, the taha tinana, te taha whanau].

Whanaungatanga: The principle of kinship, connectedness, and inter-dependence between all things within the natural world including people: sustainable management must be based on ethics of Whanaungatanga reflecting and giving life to the inter-relationship between all things. Sustainable management should seek to sustain the health, wealth and well-being of the natural environment while sustaining the communities of people dependent upon them.

Whakapapa: The principle of cause and effect, descent and transmission: Sustainable management must be predicated on an understanding that all actions cause effects which in turn cause other effects. Eventually the cycle of effects returns in kind to the original actor. Sustainable management decisions must consider all immediate and downstream effects in the present and, as far as possible, into the future.

Taonga Tuku Iho: The principle of generational continuity and responsibility: Present generations are one with those who have gone before us and those yet to be born. This applies to people and to generations or successive cycles of other species or natural phenomenon. Present generations have an overriding obligation to control the effects of their actions so as to ensure that resources are passed on to future generations in at least as healthy and productive a condition as they were inherited from the ancestors.

In the Ngāi Tahu worldview, all elements within the world are linked by mutual descent from the atua (dieties) and the primeval parents, Rakinui and Papatuanuku. Thus all parts of the environment are related to one another and exist within a mutually inter-dependent whole.[18]

The paragraphs that follow summarise (via a series of dot points) key cultural values as understood and approved by Ngāi Tahu.

[17] This section draws on the work of Hana Crengle (2002) in Tipa et al (2002). Crengle has written extensively about cultural values, Treaty values and the Resource Management Act 1991. She has previously worked for Ngai Tahu Maori Trust Board and Te Runanga o Ngai Tahu as the Natural Resource Manager.

[18] "Maori developed a system of resource management in which people were no more than another living part of the whole ecosystem, capable of a care-taking role alongside other creatures…People lived within and as a part of a whole to which they were intimately and genealogically related." Love (1992)

Whakapapa incorporating:

- Traditional knowledge and scientific classification of relationships between parts of the ecology (e.g. the relationship between water and fisheries, or between individual ecological functions);
- Ancestral descent rights that define authority as between individuals and groups of people to control, manage and act as kaitiaki guardians, for the benefit of present and future generations;[19] and
- Approval from the Gods and non-human kaitiaki guardians conferred on certain individuals, whanau, and hapu who are designated by mana Atua expressed through whakapapa ancestral right and obligation, to be the rightful people entitled to benefit from the resources and to carry the associated mandate to protect the environment and to speak on its behalf.

Whanaungatanga incorporating:

- Inter-relationship between all parts of the ecology;
- Inter-relationship between the ecology and the well-being of mana whenua; and
- Obligations on decision-makers to ensure that all parts of the ecosystem including people and their communities are cared for.

Mauri incorporating:

- The life force[20]; and
- The "Environmental Benchmark" by which Ngā Rūnanga measure the present health of the environment, the inter-linked well-being of mana whenua, and the actual and likely effects, positive or adverse, of the proposed mine development

Mana (Rangatiratanga) incorporating:

- Tribal areas of land and waters which are the exclusive territories of Ngāi Tahu, the holders of exclusive rights of authority over those areas as against other tribes.
- Chiefly authority conferring and defining rights to control and manage and the activities of people affecting the environment; and
- The Article II guarantee of the Treaty of Waitangi.

Mana Whenua incorporating:

- Spiritual power and authority that creates rights and obligations flowing from the lands that sustain and are cared for by an iwi, hapu, or whanau;
- The people holding traditional rights of exclusive authority as Tangata whenua of their tribal territories; and
- The concept of allocation of use and management rights to the "right" people on the basis of ancestry i.e. whakapapa descent.

[19] "In addition to the interconnection between all things, whakapapa defines ancestral rights as between people. Rights flowing from whakapapa include rank and status in society, mana to belong to a specific group or a number of hapu or whanau kinship groups, and authority to exercise rakatirataka or chieftainship." Lifeforms Focus Group, Ministry of Commerce Maori and the Patenting of Lifeform Inventions (1999)

[20] "Mauri is the life-force which generates, regenerates, and upholds creation. It is the bonding element that knits all the diverse elements within the Universal Process giving creation its unity in diversity. It is the bonding element that holds the fabric of the universe together". Rev Maori Marsden The Holistic World View of the Maori (1992)

Taonga incorporating:

- All things prized, tangible and intangible, animate and inanimate;
- The concept of a resource, its utility, and notions of sustainability, the wise use of resources, and the obligation to maintain the mauri;
- Respect for the past and the obligation to preserve resources and cultural wealth and well-being for future generations;
- Intrinsic values; and
- Cultural use, heritage, and amenity values.

Kaitiaki incorporating:

- Guardian spirits who communicate with the living world to warn of danger and herald the times and limits of harvest seasons, sometimes manifested through guardian animals, birds, fish, insects or taniwha;[21]
- Intergenerational responsibilities as resource caretakers (i.e. responsibilities to protect the interests of future generations including the ecology, species, and people);
- The obligation to guard, foster, and protect resources and people, including the obligation to consent to or refuse access to resources to protect sustainability;
- The power to assess effects and to allocate responsibility or liability for actions that harm the environment;
- Tohunga and whanau kaitiaki people with the matauraka (training and knowledge) to interpret signs in the environment (such as environmental indicator species or natural events) that were utilized to understand the changing ecology, who act as monitors of resource health and well-being

Wahi Tapu and Wahi Taonga incorporating[22]:

- Sites that are or have been made tapu in nature to protect their intrinsic values and/or because of their association with the Gods, the tupuna, or important historic and cultural events and activities; and
- Other sites particularly valued for their utilitarian significance as places from which resources are customarily sourced, that are ecologically significant (for e.g. as breeding or migratory habitats) or that were particularly significant species or taonga resources are located.

Mahinga kai incorporating:

- The bounty given by Papatuanuku to its people;

[21] "Kaitiaki or guardian spirits are left behind by deceased ancestors to watch over their descendants and to protect sacred places. Kaitiaki are also messengers and a means of communication between the spirit realm and the human world. There are many representations of guardian spirits, but the most common are animals, birds, insects, and fish." Cleve Barlow Tikaka Whakaaro: Key Concepts in Maori Culture

[22] "All the lands of Papatuanuku are sacred. Any time you want to disturb the surface of that land and do something with it, certain protocols and procedures need to be carried out in order to make it noa (non-sacred). This would usually involve a tapu lifting ceremony and karakia to appease the essence of the earth."

Huirangi Waikerepuru of Taranaki, quoted in Solomon and Schofield The Resource Management Act and the Treaty of Waitangi: A Starting Point and Framework (1992)

- Places and resources (e.g. species) important for sustaining the cultural, social, and economic well-being of mana whenua; and
- The activities associated with gathering and use of the resources, including cultural harvest, whanau experience and knowledge, and transmission of cultural values and tikanga practices between generations.

Tikanga incorporating:

- Rules and regulations controlling the actions of people and the practices associated with these rules and regulations;
- Sustainable management kawa (protocols, use controls, and culturally-sound techniques) designed to ensure the results of human action are consistent with the cultural values and desired environmental, social, and economic outcomes sought by Ngā Rūnanga;
- Environmental standards for measuring the effects of people's behaviour on the environment; and
- Traditional biophysical and cultural indicators that are used to monitor ecological states and effects from human activity.

The descriptions in this section inform the structure of the impact assessment in Chapter 4.

3.3 Resource Management Act 1991 (RMA)

The Resource Management Act 1991 is the principal legislation under which the natural and physical resources of New Zealand are to be sustainably managed.
Section 5. Purpose –

> *(1) The purpose of this Act is to promote the sustainable management of natural and physical resources.*
>
> *(2) In this Act, "sustainable management" means managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic and cultural wellbeing and for their health and safety while -*
>
> *(a) Sustaining the potential of natural and physical resources to meet the reasonably foreseeable needs of future generations;*
>
> *(b) Safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and*
>
> *(c) Avoiding, remedying, or mitigating any adverse effects of activities on the environment.*

The duties and the obligations that Part 2 of the RMA imposes for all people who exercise functions or powers under the Act in relation to the use of natural resources are detailed below.

Section 6 sets out the matters that are of national importance

> *Matters of national importance – In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, shall recognise and provide for the following matters of national importance:*
>
> *….*

(e) The relationship of Maori and their culture and traditions with their ancestral lands, water, sites waahi tapu, and other taonga.

(g) The protection of protected customary rights

Section 7 sets out other matters to which particular regard is to be had to

Other matters - In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, shall have particular regard to –

(a) Kaitiakitanga

Section 8 states that the principles of the Treaty of Waitangi need to be taken into account.

Treaty of Waitangi - In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, shall take into account the principles of the Treaty of Waitangi (Te Tiriti o Waitangi).

Court of Appeal in *Court of Appeal v Attorney General 1987 CA 54/87 has defined the principles of the Treaty as including*:

(i) The principle of partnership.

(ii) The principle of active protection of Maori people in the use of their lands and waters to the fullest extent practicable.

(iii) The principle of utmost good faith in dealings with the other Treaty partner.

The Environment Court has noted that active protection of Maori interests requires positive action, which will at times oblige both the decision making authority and the applicant to consult. Consultation must be conducted in a spirit of good will and open mindedness, and over a reasonable span of time, and to a degree sufficient for the local authority to be informed on the matters in issue.

3.4 Iwi Plans

Te Ngāi Tūāhuriri Rūnanga are the kaitiaki Rūnanga for this area. The following iwi management plans apply to this area:

- Tau Maire, Te. Goodall, A. Palmer, D. Tau, Rakiihia. (1990). *Te Whakatau Kaupapa – Ngai Tahu Resource Management Strategy for the Canterbury Region*.
- Ngāi Tūāhuriri Rūnanga, Te Hapū o Ngāti Wheke (Rāpaki), Te Rūnanga o Koukourārata, Ōnuku Rūnanga, Wairewa Rūnanga, Te Taumutu Rūnanga. (2013). *Mahaanui Iwi Management Plan*.
- Te Rūnanga o Ngāi Tahu. (1999). *Freshwater Policy*.

3.5 The Ngāi Tahu Claims Settlement Act 1998

The Ngāi Tahu Claims Settlement Act includes a number of provisions that are relevance to the management of the freshwater resources of catchments, including

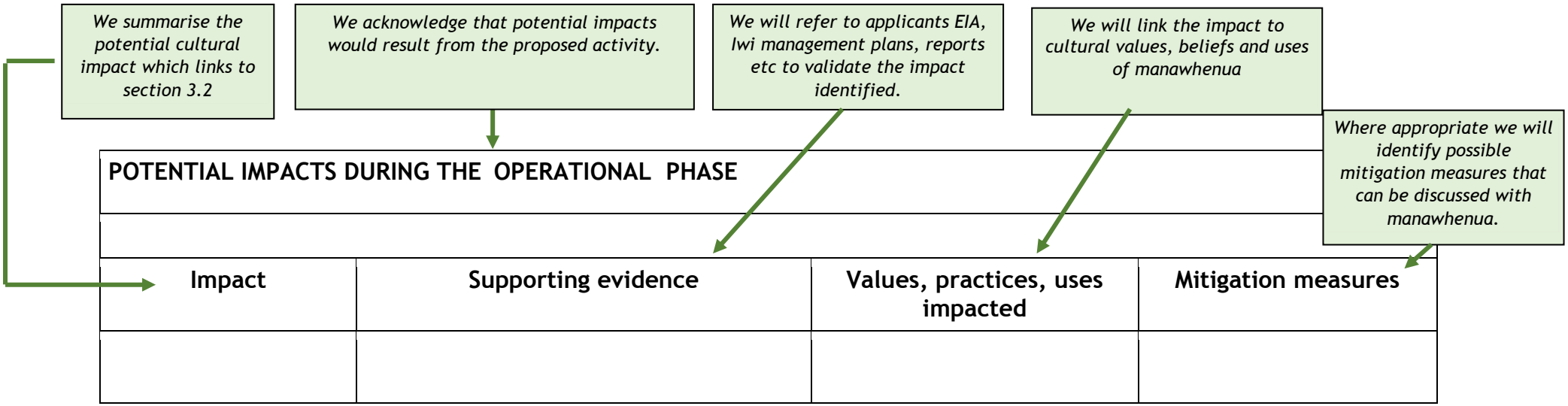
- Inclusion of Statutory Acknowledgements where the Crown recognises the significance of certain areas to Ngāi Tahu
- Recognition as Statutory adviser to Minister of Fisheries;

- Development of protocols and a closer working relationship with Department of Conservation;
- Identification of taonga species (in schedule 97 of the Act)
- Provision for nohoanga (campsites).

4. CULTURAL IMPACT ASSESSMENT

4.1 IMPACT ASSESSMENT METHODOLOGY

The impacts of the proposed development have been evaluated using a qualitative assessment of the potential direct and indirect impacts of the development through a literature review and a site visit by whanau. We have also chosen to present the data within a standard format.



It needs to be noted that, although whanau have identified how some of the impacts could be mitigated, this is not to be interpreted as whanau accepting that the impact is to occur. Whanau reserve the right to oppose and/or change their position in respect of the impacts.

In the following section specific impacts and issues in relation to the proposed development have been identified. In general as a guide *Appendix 2 – Ngai Tahu Subdivision and development guidelines* gives overview of specific policies relating this type of development.

4.1 IDENTIFICATION & MANAGEMENT OF CULTURAL IMPACTS / ISSUES –

POTENTIAL IMPACTS OF PROPOSAL – Earthworks within the rezoned area may lead to artefacts			
Impact	**Supporting evidence[23]**	**Description of values impacted**	**Mitigation measures**
Wahi taonga **Wahi tapu**	The proposed area to be rezoned for urban development within the Cranford Basin will require a range of remediation works to make the land suitable for residential development. Specifically, it may require piling depths could range from 5-7m bgl (below ground level). The report by GHD suggests the need for specific analysis for potential development sites. This would include specific geotechnical investigations and specific engineering designs. Therefore a range of earthworks could be required. The CIA for NZTA Northern Arterial Project also describes the cultural values and significance of the area to Tūāhuriri Rūnanga therefore there is potential for artefacts to be found.	Tūāhuriri Rūnanga have a responsibility to their tupuna (ancestors) to make sure artefacts found within their takiwa aren't disturbed or damaged by any development.	Tūāhuriri Rūnanga would like any development within the proposed rezoned area to be subject to the accidental discovery protocol (ADP) found within the Mahaanui Iwi Management Plan (MIMP). Depending on the type of residential development and the earthworks required, if site specific geotechnical investigation are carried out, Tūāhuriri Rūnanga may require further information from specific developers. This could also include a site visit by a Tūāhuriri Rūnanga representative being on site during specific earthworks or within specific areas which may be of concern to Tūāhuriri Rūnanga. See **Appendix 2 – Ngai Tahu Subdivision and development guidelines: Earthworks 3.1** and **Appendix 3: Accidental Discovery Protocol within the Mahaanui Iwi Management plan**)

[23] GHD. (2015). *Cranford Basin Geotechnical Investigation Report*. A report prepared by GHD for Christchurch City Council. Pg. 17

POTENTIAL IMPACTS OF PROPOSAL – Stormwater from rezoned area being discharged into Avon River (via Horseshoe Lake or Dudley Creek) having an impact on water quality and taonga species present			
Impact	**Supporting evidence [24]**	**Description of values impacted**	**Mitigation measures**
Kaitiakitanga **Taonga species** **Mahinga kai**	The Christchurch City Council (CCC) have proposed as part of the Northern Arterial Extension to construct a stormwater basin / wetland treatment area within the Cranford Basin. This future development is to address the future storm water volume and storm water quality issues within the surrounding urban area. (see ***Chapter 2.42: Stormwater concept for Cranford Basin for further details***) As shown in Chapter 2.42 this storm water concept is a complex and large scale solution to address storm water issues. It is also seen as an long term vision by the CCC whom stated have stated: *"The Council has a long term vision of a large public open space reserve comprising wetlands, extensive open and forested areas of ecologically suitable planting criss-crossed by public pathways"(see **Chapter 2.3: Stormwater for further details**)* In contrast to this if the proposed rezoning goes ahead the stormwater treatment requirements for three potential residential developers is possible and the requirements are: *"Stormwater disposal is possible at all three (Grassmere black, Case and Crozier) site although subject to city wide discharge consent conditions"[25]* *"Stormwater can be disposed of into waterways in the adjacent basin subject to first flush treatment in conformance within condition of the Council storm water discharge consent"[26]* During a site visit to the Cranford Basin a CCC representative said the stormwater discharge from the future development of the Stormwater basin / wetland treatment area within the Cranford Basin would be pumped and piped to be discharge into Horseshoe Lake.[27]	Tūāhuriri Rūnanga as kaitaki want to protect taonga species including mahinga kai species found within their takiwa. The quality of water can have an impact on the taonga species themselves as well as those whom eat or use these mahinga kai species.	Tūāhuriri Rūnanga oppose stormwater being discharged into Horseshoe Shoe Lake as it's a wahi tapu / wahi taonga. It is unclear if they rezoned area urban area will discharge into the future stormwater basin / wetland treatment or into waterways within the basin (i.e. Dudley Creek) are part of the Avon / Otakaro River catchment. They are also concerned with stormwater potentially having an impact on the water quality of the Avon River / Otakaro which will likely receive storm water from proposed rezoned urban development area. For Tūāhuriri Rūnanga they see a contrast between the amount of stormwater treatment that will be carried out within the urban area. Each potential developer will require a first flush treatment basin and then discharge into the any of the basin waterways. These stormwater discharges will likely not receive the amount of treatment if they were discharged into the future storm water basin / wetland treatment area. Tūāhuriri Rūnanga would like CCC to confirm how or if a potential developer first flush basin treatment will be integrated into the stormwater basin / wetland treatment area. They would also like to know if the amount of treatment required by the potential developers within the rezoned area will be comparable to the future stormwater basin / wetland treatment. Finally, Tūāhuriri Rūnanga would like to know if CCC has any preference for which waterways they would like developers within the rezoned urban area to discharge storm water.

[24] Christchurch City Council. (2015). *Stage 3 - Section 32: Chapter 17 – Rural (Cranford Basin)*. Pg. 26.
[25] Christchurch City Council. (2015). *Statement of evidence of Paul Bennett Dickson on behalf of the Christchurch City Council – Stormwater*. Pg. 4
[26] Christchurch City Council. (2015). Statement of evidence of Paul Bennett Dickson on behalf of the Christchurch City Council – Stormwater. Pg. 8,9,10
[27] Per comms from Christchurch City Council representative during site visit on 12th August with Beca and MKT representatives.

POTENTIAL IMPACTS OF PROPOSAL – Impact on springs from rezoning area for urban development			
Impact	**Supporting evidence [28] [29]**	**Description of values impacted**	**Mitigation measures**
Kaitiakitanga **Mauri** **Cultural Landscape**	Many springs have been identified as being present within or surrounding the Cranford Basin. Many of the springs identified were located in the western bottom corner of the basin. (see ***Appendix 4***) The proposed rezoning for urban development within the Cranford Basin will include some areas where springs have been identified. (See ***Appendix 3 and Figure 4***). During a site visit to the Cranford Basin at two stops (Cranford Street and at Rutland Reserve) lying water or springs were observed. Both of these spots appear to be outside of the proposed rezoned area for urban development but one was within the stormwater basin / wetland treatment area.	Natural springs (puna) are important to Tūāhuriri Rūnanga and as kaitiaki. Tūāhuriri Runanga have a role in protecting them. Springs (puna) are an important part of the cultural landscape and can play an important role in many waterways function.	Natural Puna (springs) are taonga to Tūāhuriri Rūnanga and their protection is a priority to the runanga. Tūāhuriri Rūnanga oppose the use of spring's water for flushing stormwater or keeping artificial wetlands wet is not supported. Tūāhuriri Rūnanga would like puna (springs) within the proposed rezoned urban area to be protected and if the urban rezoning goes ahead the puna should be integrated into the design of any residential development. If residential development does occur near or beside the springs they would like to be consulted and be able to make recommendations to developers. This viewpoint and the significance of these springs are reinforced within the CIA prepared by Mahaanui Kurataiao Ltd for the Northern Arterial Project. [30]

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[28] Munro, Bryan. (2013). Cranford Basin Spring Identification. A report prepared by Pattle Delamore Partners for Christchurch City Council.

[29] Lobb, Andrea. Orchard, Shane. (2012). *Cultural Impact Assessment for NZTA Northern Arterial Project*. Prepared Mahaanui Kurataiao Ltd on behalf of Te Ngāi Tūāhuriri Rūnanga

POTENTIAL IMPACTS OF PROPOSAL – Land contamination impact on human and taonga species health			
Impact	**Supporting evidence[31] [32] [33]**	**Description of values impacted**	**Mitigation measures**
Kaitiakitanga **Manaakitanga** **Taonga species** **Mahinga kai**	Historically, the area within the Cranford Basin was used for horticulture and farming. This past activity has led to land within the Cranford Basin being contaminated. This past land use was identified using an ECAN listed land use register. It identified several properties had HAIL (Hazardous Activities and Industries Act) activities. (See ***Chapter 2.2: Contaminated Land***) This past land contamination within the Cranford Basin was assessed by Beca Ltd in 2014 for the Northern Arterial Extension. (***See Chapter 2.5: Contamination of soils***). This report made a range of conclusions including: • "*The concentration of mercury in the majority of samples exceeded the environmental criterion, as did concentrations of arsenic and zinc in a number of samples*." • *"Concentrations of DDT in several areas of site exceeded the environmental criterion. There is a risk posed by these soils to ecological receptors"* • A robust sediment control plan to minimize the impact created from construction along with water testing of any discharge • Management plan for construction workers and the environment to manage exposure to soil • "The proposed works are unable to comply with the criteria of Regulation 8(3) of the NES for soil disturbance and accordingly resource consent as a controlled activity is required" The CCC Section 32 report reinforced the land contamination potential impact on the proposed rezoning for urban development within the Cranford Basin. The report suggested the need for Preliminary site investigations and detailed site investigations before and subdivision is carried out. In terms of taonga species an ecological assessment carried out in 2014 found shortfin and longfin eels within the Cranford Basin drain network and another ecological assessment is planned for the Cranford Basin in September 2016.	Tūāhuriri Rūnanga as kaitiaki have a responsibility to protect the many taonga species within their takiwa. They also have a responsibility to manaaki visitors and those who live within their takiwa. A part of this role in playing their part in making sure visitors (and whanau) are safe within their takiwa.	Tūāhuriri Rūnanga have concerns with the potential land contamination within the Cranford Basin having an impact on both humans and taonga species (including those within the Avon River). Tūāhuriri Rūnanga would like the CCC to confirm to them that if this area is rezoned for urban development that developers will have to remediate the land contamination issues so that human health and taonga species health are not affected. Specifically, they would like assurance from the CCC that the Avon River, Horseshoe Lake or any potential waterbody which could be impacted from this proposed future developments will be protected. The range and extent of land contamination identified within the Beca Ltd report is concerning to Tūāhuriri Rūnanga along with the management plans required for the Northern Arterial Extension. This level of mitigation is only for construction activities not residential development which the proposed rezoning would allow. This adds to Tūāhuriri Rūnanga concerns.

[31] Smith, Genevieve. (2014). *Northern Arterial Expansion and Cranford Stormwater Basin: Detailed site investigation (Contamination*. Pg. 16, 22.

[32] Christchurch City Council. (2015). *Stage 3 - Section 32: Chapter 17 – Rural (Cranford Basin)*. Pg. 21

[33] Coates, Annabelle. (2014). *Cranford Basin Drains – Northern Arterial Extension and Cranford Basin Stormwater Area Ecological Assessment*. A report prepared by Opus International Ltd for Christchurch City Council.

POTENTIAL IMPACTS OF PROPOSAL – Potential increased pressure on wastewater network			
Impact	**Supporting evidence [34]**	**Description of values impacted**	**Mitigation measures**
Kaitiakitanga **Mauri** **Taonga species** **Mahinga kai**	The proposed area within the Cranford Basin to be rezoned for urban development or residential development will require wastewater and stormwater infrastructure. Opus international Ltd have identified the potential impact on the wastewater infrastructure for three proposed sites of residential development and potential upgrades needed to mitigate impacts. In terms of potential impacts they state: *"Development of any of the re-zone areas proposed by the submissions assessed for this report, are predicted to result in moderate or major impacts to the performance of the wastewater network, if unmitigated. The impacts predicted include increases to volume lost from manhole or constructed overflows*." Within the Opus International Ltd report (and stated in the CCC Section 32 report) it lists the recommended upgrades and the timing of these upgrades to mitigate these "moderate or major impacts". Many of these upgrades are required before these three development are to go ahead. (See ***Chapter 2.2: Stormwater***)	As kaitiaki Tūāhuriri Rūnanga has a responsibility to protect cultural landscape within their takiwa. This includes the many waterways within their takiwa and taonga species found within these waterways. Specially, the Avon / Otakaro River is of significance to Tūāhuriri Rūnanga.	Tūāhuriri Rūnanga would like assurance from CCC that if the rezoning goes ahead that sufficient wastewater infrastructure will be in place to deal with the increased pressure on the network. The Opus International Ltd report states the clearly potential "moderate or major impacts" of residential developments along with the required wastewater infrastructure needed before development would occur. Tūāhuriri Rūnanga have concerns with development in this rezoned area if it causes increased pressure on the network and potential impacts on the surrounding environment including the Avon / Otakaro River and other residents in the area.

[34] Mahar, Tess. (2015). Cranford Basin Re-zoning – Wastewater Review. Prepared by Opus International Consultants Ltd for Christchurch City Council. *Stage 3 - Section 32: Chapter 17 – Rural (Cranford Basin) – Appendix 2 – Cranford Basin Proposed rezoning wastewater report*.

POTENTIAL IMPACTS OF PROPOSAL – Concerns relating to timing of urban development and timing of future developments within Cranford Basin (storm water)			
Impact	**Supporting evidence [35]**	**Description of values impacted**	**Mitigation measures**
Kaitiakitanga **Mauri**	The future development within the Cranford Basin includes the NAE and proposed Stormwater basin / wetland treatment. Within the resource application by Beca Ltd it gives construction programme timeframe for the NAE starting in 2017. It doesn't specify when the stormwater basin / wetland treatment will begin construction. It states this is "proposed in the longer term" The CCC section 32 report reinforces this long term vision for the stormwater basin / wetland treatment. Its states that CCC have both a short to medium term vision for this stormwater basin / wetland treatment area and a long term vision. The CCC short to medium term vison being: "*In the short to medium term, pastoral farming would be encouraged*." ***(see Chapter 2.3: Stormwater for further details)*** While the CCC long term vision being: *"Council has a long term vision of a large public open space reserve comprising wetlands, extensive open and forested areas of ecologically suitable planting criss-crossed by public pathways. Planting would begin in the stormwater quality treatment facilities for the wet, low-lying areas and gradually extend out to the periphery over time as money becomes available*" (**see *Chapter 2.3: Stormwater for further details***) Therefore, when the stormwater basin / wetland treatment area is to be started and ultimately completed with the range of planting proposed is unknown accept it a "long term" goal. As mentioned above (***Stormwater from rezoned area …. impact on water quality and taonga species present***) the temporary solution or the solution proposed by CCC as "first flush basin" being required maybe an medium term solution and how this would be integrated into the stormwater basin / wetland treatment area is unknown.	Tūāhuriri Rūnanga as kaitiaki have a responsibly to protect the waterways and taonga species within their takiwa. To carry this out this role they need to be sure the all considerations are being made to reduce or mitigate the impact of developments on the receiving environment.	Tūāhuriri Rūnanga don't support short term solutions becoming long term solutions as the lack of information from the CCC suggests in relation to the proposed stormwater basin / wetland treatment area. Tūāhuriri Rūnanga would like to know when the CCC have proposed to start construction of the stormwater basin / wetland treatment area and how or if developers will need to integrate their stormwater treatment (i.e. first flush basin) into the future storm water basin / wetland treatment area within the Cranford Basin. The need for good stormwater management and treatment for Tūāhuriri Rūnanga is a priority because of the issues (i.e. land contamination) within the Cranford Basin. Tūāhuriri Rūnanga prefer stormwater infrastructure is in place before urban development begins within the proposed rezoned area. Fundamentally, Tūāhuriri Rūnanga don't want temporary solutions or smaller scale solutions becoming long term solution for the stormwater issues within the Cranford Basin. They would also like clear timeframes for stormwater issues within the Cranford Basin along with a plan for integration of NAE, stormwater basin / treatment and proposed urban development rather than the current ad hoc framework.

[35] Thorley, Mike. Whyte, Paul. (2014). *Northern Arterial Extension and Associated Stormwater Works - Resource Consents Application*. Prepared by Beca Ltd for Christchurch City Council.

POTENTIAL IMPACTS OF PROPOSAL – Concern with focus upon developers delivering solutions to potential impacts (stormwater, wastewater)			
Impact	**Supporting evidence [36]**	**Description of values impacted**	**Mitigation measures**
Kaitiakitanga	For the proposed rezoning of part of the Cranford Basin for urban development CCC have received three plan change submissions by individual or groups (Grassmere site, Case site, Croizer site). For these three sites specific wastewater and stormwater analysis has been carried out along with general geotechnical analysis. During a site visit with a CCC representative they mentioned that it would be up to developers to meet the requirements for development from the CCC. [37] In terms of requirement for residential development within the Cranford Basin, as mentioned above, they relate to geotechnical, stormwater, wastewater and the other future developments within the basin (i.e. NAE)	Tūāhuriri Rūnanga as kaitiaki have a responsibly to protect the waterways and taonga species within their takiwa.	Tūāhuriri Rūnanga would like assurance from the CCC that they will put in place strict conditions for potential developers if the proposed area within the Cranford Basin is rezoned. For Tūāhuriri Rūnanga they have concerns around development that is led by developers without sufficient guidance by the CCC. This guidance by the CCC would give Tūāhuriri Rūnanga more certainty around potential residential development within the Cranford Basin.

[36] Christchurch City Council. (2015). *Stage 3 - Section 32: Chapter 17 – Rural (Cranford Basin)*.

[37] Per comms from Christchurch City Council representative during site visit on 12th August with Beca, and MKT representatives.

POTENTIAL IMPACTS OF PROPOSAL – Concerns relating to development on land with significant issues (springs, land contamination) which will require significant remediation			
Impact	**Supporting evidence**	**Description of values impacted**	**Mitigation measures**
Manaakitanga	The potential rezoning part of the Cranford Basin for urban development has many constraints or conditions which will need to be address beforehand. These have been listed in detail in above within this Chapter and Chapter 2 of this document. Some of these constraints or conditions which need to be addressed include: • Geotechnical – springs, land stability • Land contamination • Stormwater • Wastewater	Looking after visitors to both the Marae and those to their takiwa is important to Tūāhuriri Rūnanga. This philosophy is encompassed in the value of Manaakitanga.	Tūāhuriri Rūnanga have a role to manaaki those whom live or visitors to their takiwa. This value is commonly associated with those visiting the Marae. By reviewing the information available on the proposed rezoning of the part of the Cranford Basin for residential development Tūāhuriri Rūnanga can see a range of potential issues. These issues could constraint residential development or at least be of potential concern for those whom purchase sections if residential development occurs. Using the value of manaakitanga as a guide Tūāhuriri Rūnanga would like assurance that the CCC will carry out the required remediation work that is required as well as making sure developers carried out the required work. For Tūāhuriri Rūnanga they would like CCC to assure that those whom purchase within future residential developments are fully informed of past and potential issues within the Cranford Basin.

5. CONCLUDING COMMENTS

This section:

1. Identifies the priorities of Tūāhuriri Rūnanga
2. Outlines areas for ongoing discussion with Tūāhuriri Rūnanga.
3. It describes the expectations of Tūāhuriri Rūnanga going forward.

5.1 Priorities of Te Ngāi Tūāhuriri Rūnanga:

Priorities of Te Ngāi Tūāhuriri Rūnanga include the following:

- Stopping storm water discharges into Horseshoe Lake which is an wahi tapu / wahi taonga
- Protecting the waterbodies within the Avon River Catchment from storm water discharges (or other potential discharges) which could have potential impacts on human and taonga species health:
    - These impacts could be short or long term depending on how they are dealt with by developers or Christchurch City Council
- Protecting and / or enhancing puna (springs)
- Addressing land contamination as it can have an impact on human and taonga species
- Making sure both Christchurch City Council and potential developers are committed to carrying out the required infrastructure development for future residential development.

5.2 Adverse effects to be avoided

Te Ngāi Tūāhuriri Rūnanga are committed to:

- Protecting the wahi taonga or wahi tapu present within Cranford Basin and Avon Catchment;
- Increasing and enhancing native plants species which create native habitats for taonga species, provides cultural outcomes and increases the cultural landscape.
- Protecting taonga species including mahinga kai species within the Cranford Basin and Avon Catchment.

When assessing the impacts associated with the proposal Te Ngāi Tūāhuriri Rūnanga want to see the following adverse effects avoided:

- Any loss or impact on habitats or life cycles of taonga species, especially mahinga kai species;
- Any direct or indirect negative impact on taonga species health or abundance, especially mahinga kai species;
- Any impact on wahi tapu and wahi taonga.

As is noted above, some of these issues can be addressed by consent conditions and monitoring. Others require ongoing discussions with Te Ngāi Tūāhuriri Rūnanga.

5.3 Ongoing Discussions

1. Te Ngai Tūāhuriri Rūnanga would like to Christchurch City Council to provide them with the following information:
    a. Any future information relating to the Cranford Basin area;
    b. Timeframes for future infrastructure development within the Cranford Basin;
        i. Future development by the Christchurch City Council

ii. When would residential development start if proposed rezoning occurs

c. Potential conditions the Christchurch City Council will place on developers who want to carry out residential development within the Cranford Basin;

d. Development strategy for the Cranford Basin;

i. Stormwater, wastewater, residential development

e. Assurances from the Christchurch City Council on the following issues:

i. Stormwater will not be discharged into Horseshoe Lake (further hui with Te Ngai Tūāhuriri Rūnanga and Christchurch City Council is sort on this issue)

ii. Developer conditions for development within Cranford Basin will be placed on developers and Te Ngāi Tūāhuriri Rūnanga will be able to review these conditions

iii. Required infrastructure within Cranford Basin will be carried out by developers or Christchurch City Council

iv. Springs will be protected to a level satisfactory to Te Ngāi Tūāhuriri Rūnanga

v. Accidental discovery protocol within Mahaanui Iwi Management Plan will be used by potential developers

2. Te Ngai Tūāhuriri Rūnanga would like to have an hui with Christchurch City Council at future date to discuss the following:

a. The information Christchurch City Council has provided;

b. Stormwater infrastructure within the Cranford Basin.

i. Stormwater discharges to Horseshoe Lake is opposed by Te Ngāi Tūāhuriri Rūnanga

ii. Potential alternatives or solutions to address Te Ngāi Tūāhuriri Rūnanga concerns

c. Any other areas of concern Te Ngāi Tūāhuriri Rūnanga have with the proposed rezoning for urban activities (i.e. residential development) within the Cranford Basin

5.4 Going forward – Te Ngāi Tūāhuriri Rūnanga expectations

It is expected that the impacts specific to the proposed activities relating to Christchurch City Council proposed rezoning of part of the Cranford Basin for urban activities (residential development) will become the focus of discussions between Te Ngāi Tūāhuriri Rūnanga and Christchurch City Council.

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APPENDICES

Appendix 1 – Ngāi Tūāhuriri Rūnanga, Te Hapū o Ngāti Wheke (Rāpaki), Te Rūnanga o Koukourārata, Ōnuku Rūnanga, Wairewa Rūnanga, Te Taumutu Rūnanga. (2013). ***Mahaanui Iwi Management Plan – 6.5 Ihutai & 1880 Taiaroa map extract for Canterbury*****. Pg. 229, 230, 233, 238, 239, 240, 242 and 346**

Appendix 2 – Ngāi Tūāhuriri Rūnanga, Te Hapū o Ngāti Wheke (Rāpaki), Te Rūnanga o Koukourārata, Ōnuku Rūnanga, Wairewa Rūnanga, Te Taumutu Rūnanga. (2013). ***Mahaanui Iwi Management Plan – Ngai Tahu subdivision and development guidelines*****. Pg. 107 – 109.**

Appendix 3 - Ngāi Tūāhuriri Rūnanga, Te Hapū o Ngāti Wheke (Rāpaki), Te Rūnanga o Koukourārata, Ōnuku Rūnanga, Wairewa Rūnanga, Te Taumutu Rūnanga. (2013). ***Mahaanui Iwi Management Plan – Appendix 3: Accidental Discovery Protocol***

Appendix 4 – Munro, Bryan. (2013). ***Cranford Basin Spring Identification*****. A report prepared by Pattle Delamore Partners for Christchurch City Council.** ***Cranford Basin Spring Identification – Location of springs adjacent to, and within the Cranford Basin.***

<u>Response from Christchurch City Council to CIA</u>

Appendix 5 – Osborne, Richard. (2016). ***Re: Cultural Impact Assessment for Cranford Basin- Proposed Rezoning for Urban Activities*****. Response to CIA from Christchurch City Council.**

Appendix 6 – Whyte, Paul. (2016). ***Cranford basin rezoning*****. Email response to CIA from Christchurch City Council.**

Appendix 7- Thorley, Mike. (2016). ***Spring identification and groundwater management for potential rezoning at the Grassmere Block*****. Report prepared by Beca Ltd for Christchurch City Council. Response to CIA from Christchurch City Council. (For full report see PDF - Appendix 5 and Appendix 7 - CCC Response to Cranford Basin CIA)**

Appendix 1 – Ngāi Tūāhuriri Rūnanga, Te Hapū o Ngāti Wheke (Rāpaki), Te Rūnanga o Koukourārata, Ōnuku Rūnanga, Wairewa Rūnanga, Te Taumutu Rūnanga. (2013). Mahaanui Iwi Management Plan – 6.5 Ihutai & 1880 Taiaroa map extract for Canterbury. Pg. 229, 230, 233, 238, 239, 240, 242 and 346

6.5 IHUTAI

This section addresses issues of particular significance associated with the Ihutai catchment. The catchment area includes the Ōtakaro and Ōpāwaho rivers, and Te Ihutai (the estuary), and generally follows the boundaries of the urban environment of Ōtautahi (Map 12).

The Ihutai catchment is an area of immense cultural and historical importance to tāngata whenua. The area was a place of significant settlement and food gathering for Waitaha, Ngāti Mamoe and Ngāi Tahu for over 600 years. While the estuary itself provided an abundance of valuable food resources, equally important was the estuary's catchment, which was made up of an extensive network of springs, waterways, swamps, grasslands and lowland podocarp forests.

The effect of the city's historical and ongoing urban development on Ngāi Tahu cultural values is a key kaupapa underlying issues and policies in this section. The catchment is a highly modified environment that has undergone dramatic change in the last 160 years, particularly with regard to the loss of mahinga kai, natural areas and indigenous habitats and ecosystems, and the decline of water quality. Ngāi Tahu cultural health assessments undertaken in 2007 and 2012 found the catchments are generally in a poor state of cultural health, based on cultural health assessment factors such as suitability of harvesting mahinga kai, water quality, physical and legal access, degree of external pressure on site, degree of modification, and the presence and abundance of native fish, bird and plants species, as well as introduced species (see Figure 1).

The rebuild and redevelopment of Ōtautahi provides a unique opportunity to re-establish a strong and visible indigenous presence on the city landscape (Issue IH1), enhancing a sense of identity and belonging for Ngāi Tahu in the city.

Ngā Paetae Objectives

(1) Ngāi Tahu have a prominent and influential role in the rebuild and redevelopment of Ōtautahi, post-earthquake.

(2) Ngāi Tahu has a more visible cultural presence in the urban environment, both on the physical landscape and in city planning and decision making processes.

(3) Ngāi Tahu sense of place and identity is enhanced through the restoration of the cultural health of the Ihutai catchment.

(4) Discharges of wastewater and stormwater to waterways in the urban environment are eliminated, and a culturally appropriate alternative to the discharge of urban wastewater to the sea is developed.

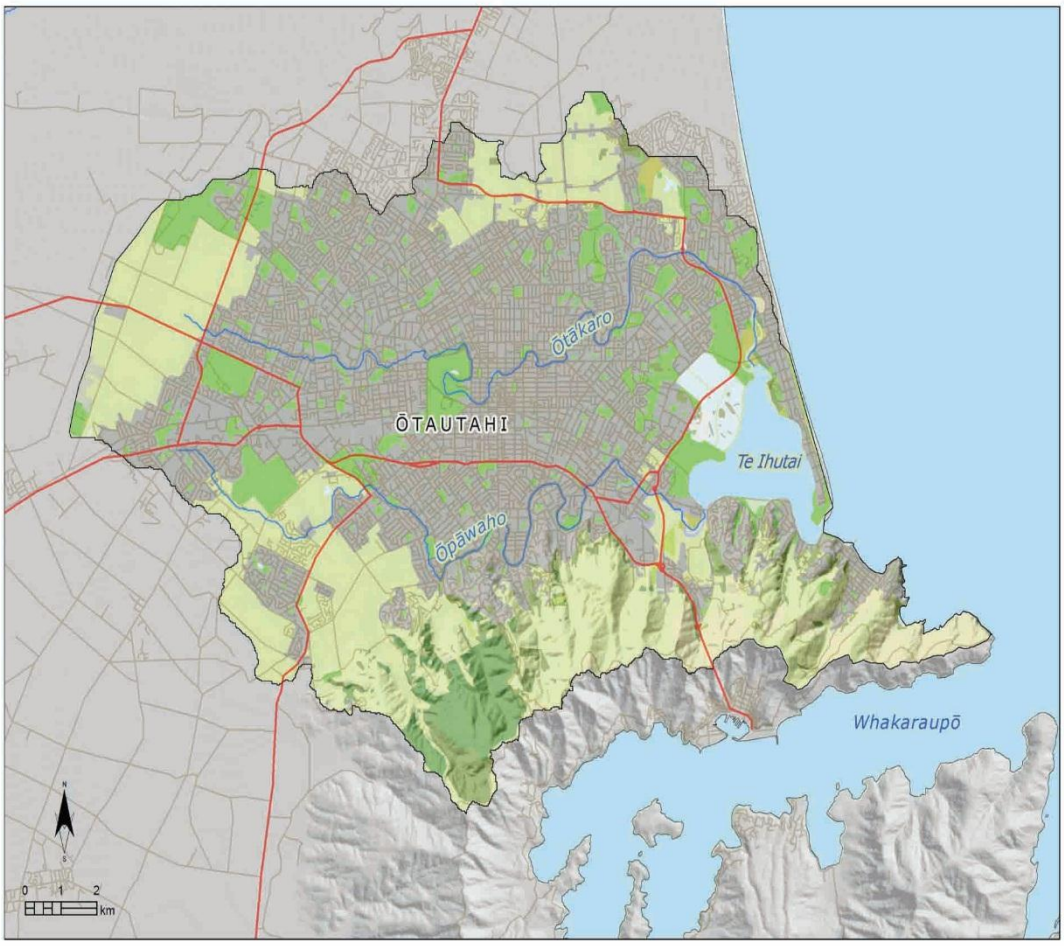
(5) Mahinga kai values and associations with the Ihutai catchment are re-established, alongside the urban built environment.

(6) The restoration and enhancement of indigenous biodiversity is an essential part of the image and brand of Ōtautahi, and an improved balance between exotic and indigenous plant species is achieved.

(7) Urban development reflects low impact urban design principles and a strong commitment to sustainability, creativity and innovation with regard to water, waste and energy issues.

(8) Wāhi tapu and wāhi taonga values are protected from inappropriate urban development.

Map 12: Ihutai catchment



NOTE: See Section 5.1 (Issue K1 - Recognising Manawhenua) for guidance on identifying the Papatipu Rūnanga with manawhenua and kaitiaki interests in this area.

NGĀI TAHU AND THE URBAN ENVIRONMENT

Issue IH1: Ngāi Tahu have a key role to play in planning and managing the urban environment, as tāngata whenua and Treaty partner.

Ngā Kaupapa / Policy

Rebuild of Ōtautahi

IH1.1 To ensure that Ngāi Tahu maintains a prominent and influential role in the re-build of Ōtautahi post-earthquake, with specific focus on achieving tāngata whenua aspirations for:
- (a) Ngāi Tahu culture and identity as a unique aspect and asset of Ōtautahi;
- (b) A more visible cultural presence in the urban environment, and respect for shared cultural and natural heritage of the city;
- (c) Designing the urban environment in a way that respects the wāhi taonga status of the Ōtakaro and Ōpāwaho rivers, and ensures that urban development works with these wai tūpuna rather than against them;
- (d) Protection and enhancement of cultural landscape values in the urban environment, particularly indigenous biodiversity;
- (e) Improving the cultural health of waterways and drains;
- (f) Protection of waipuna;
- (g) Protection of wāhi tapu and wāhi taonga from inappropriate land use and development;
- (h) General 'greening' of the city through low impact urban design and a strong sustainability focus on the redevelopment of residential, public and commercial spaces; and
- (i) Improved stormwater and wastewater management and infrastructure, reflecting Ngāi Tahu values and tikanga.

Participation in urban planning

IH1.2 To require early, appropriate and effective involvement of Papatipu Rūnanga in the development and implementation of urban development plans and strategies, including but not limited to:
- (a) Urban development strategies;
- (b) Plan changes and Outline Development Plans;
- (c) Area plans;
- (d) Urban planning guides, including landscape plans, design guides and sustainable building guides;
- (e) Integrated catchment management plans (ICMP);
- (f) Reserve plans;
- (g) Structure plans; and
- (h) Infrastructure and community facilities plans.

IH1.3 To require that the urban development plans and strategies give effect to this IMP and recognise and provide for the relationship of Ngāi Tahu and their culture and traditions with ancestral lands, water and sites by:
- (a) Supporting and providing for traditional communities to maintain their relationship with ancestral land;
- (b) Identifying and protecting sites and places of importance to tāngata whenua;
- (c) Identifying and protecting specific values associated with places, and threats to those values;
- (d) Identifying desired outcomes; and
- (e) Ensuring outcomes reflect Ngāi Tahu values and desired outcomes.

He Kupu Whakamāhukihuki / Explanation

Ngāi Tahu have a cultural, spiritual and historical association with Ōtautahi that is centuries old. The resources of the waterways, wetlands and forests were important as mahinga kai, supplying kāinga within the area and further afield. The name Ōtautahi links the city of Christchurch back to the ancestor Tautahi. While the last 160 years have seen a dramatic change to the natural and cultural landscape that once characterised Ōtautahi, Ngāi Tahu remain connected to this landscape, and continue to advocate for the recognition of the city as a shared landscape and a more visible indigenous presence in the urban environment.

The restoration of cultural landscape values in Ōtautahi is critical to rebuilding the relationship of Ngāi Tahu to this ancestral place. This was an important kaupapa for tāngata whenua prior to the stirring of Rūamoko, and has become even more important in the post earthquake environment. The rebuild and redevelopment of the city presents the opportunity for local government, Ngāi Tahu and the community to incorporate and showcase Ngāi Tahu cultural identity and values in a more visionary and integrated way. Enhancement of cultural landscape values contributes to the cultural and social well being, through enhancing a sense of identity and belonging for Ngāi Tahu in the city.

Cross reference:

» *General policy on Ngāi Tahu participation in urban planning (Section 5.4, Issue P3)*

WAIPUNA

Issue IH5: Loss and inappropriate management of waipuna as a result of urban development and redevelopment.

Ngā Kaupapa / Policy

IH5.1 To require that the waipuna in the catchment are recognised and managed as wāhi taonga, as per general policy on *Wetlands, waipuna and riparian margins* (Section 5.3, Issue WM13), with particular attention to:

(a) Ensuring that waipuna are protected from the discharge of contaminants;
(b) Ensuring that there are appropriate and effective setbacks from waipuna, to protect from urban development or re-development;
(c) Restoring degraded waipuna; and
(d) Enabling flow to return to waterways in naturalised channels.

He Kupu Whakamāhukihuki / Explanation

Waipuna are taonga and highly valued by tāngata whenua. They are known for their purity, and can have a number of specific cultural associations, including wāhi tapu and mahinga kai. Protecting the purity of waipuna is an important kaupapa, in both urban and rural environments.

Cross reference:

» *General Policy on Wetlands, waipuna and riparian margins (Section 5.3 Issue WM13)*

PHYSICAL MODIFICATION OF WATERWAYS

Issue IH6: Physical modification of natural waterways in the catchment for flood control, drainage, stormwater, recreation and land development purposes.

Ngā Kaupapa / Policy

IH6.1 To consistently and effectively advocate for a change in perception and treatment of waterways in the urban environment: from public utility to wāhi taonga.

IH6.2 To require that any physical works on waterways in the urban environment occurs in a manner that does not reduce the width of margins or riparian plantings, and is consistent with the re-naturalisation of the waterway.

IH6.3 To require that the multiple uses of waterways and their headwaters and margins in the urban environment are consistent with the protection of cultural and ecological values.

IH6.4 To recognise and progressively restore the natural ability of waterways in the catchment to provide flood protection, filtration and other ecosystem services, by:

(a) Establishment of native riparian vegetation along waterways;
(b) Restoration of wetlands and springs;
(c) Restoration of natural form and function of the floodplain system, including providing for its dynamic characteristics; and
(d) Naturalisation of the existing drainage network.

Legal status

IH6.5 To require that land subdivision, purchase or use of any kind, including public reserve use and ownership, does not obtain legal entitlement to the beds or margins of any waterway without approval of the Papatipu Rūnanga.

He Kupu Whakamāhukihuki / Explanation

The historic and continued physical modification of waterways has occurred at the expense of Ngāi Tahu values associated with waterways, and the ecosystem services these waterways once provided.

River dredging, straightening, the conversion of streams into boxed drains, and the widespread modification of riparian margins, along with the extensive drainage of wetlands and springs, have compromised the natural ability of the region's waterways to contain, store and clean water, and provide habitat for mahinga kai.

LOSS OF INDIGENOUS BIODIVERSITY

Issue IH7: Widespread loss and degradation of indigenous ecosystems, habitat and species in the Ihutai catchment and effects on the cultural and ecological health of the catchment.

Ngā Kaupapa / Policy

IH7.1 To require that indigenous biodiversity is recognised and provided for as an integral part of the natural and cultural heritage of the Ihutai catchment and the city landscape.

IH7.2 To require that city and regional plans and strategies, including design guidelines, recognise and provide for indigenous biodiversity as a legitimate and distinctive part of the 'Garden City' image and brand, as well as an important part of Ngāi Tahu culture and identity.

IH7.3 To enhance the presence of indigenous biodiversity within the urban landscape by:
(a) Identifying, protecting and enhancing all indigenous remnants;
(b) Riparian margins of appropriate indigenous species along all waterways;
(c) Appropriate margins and set back areas along waterways (at least 20 metres);
(d) Expanding on existing native/indigenous restored areas;
(e) Incentives for home owners to use native plants in gardens, including species lists and landscaping guides;
(f) Use of medium and large appropriate indigenous specimen trees along riverbanks in parks and reserves and streetscape/street renewal planting;
(g) Use of appropriate indigenous species groups in public open space; and
(h) Requirements for developers to establish indigenous species in residential subdivisions and commercial developments.

IH7.4 To require that city and regional plans include specific policy and rules to protect, enhance and extend existing remnant and restored natural habitat areas in the catchment, including but not limited to:[4]
(a) Jellie Park
(b) Pūtarikamotu (Deans Bush)
(c) Waipapa (Little Hagley Park)
(d) Waikākāriki (Horseshoe Lake)
(e) Ōruapaeroa (Travis Wetland)
(f) Lower Avon River area near Bridge Street
(g) Sumner Beach and edge of estuary
(h) Jellicoe Park
(i) Wigram Basin, including Templetons Road
(j) Pioneer Stadium
(k) Westmorland, at Francis Reserve
(l) Ōpāwaho
(m) Ferrymead
(n) New Brighton Beach.

He Kupu Whakamāhukihuki / Explanation

Indigenous biodiversity is an integral part of the natural heritage of the Ihutai catchment, and to Ngāi Tahu's sense of place, cultural identity and connection to the catchment.

Prior to urbanisation, Ihutai was characterised by extensive wetlands and waipuna, grasslands and lowland podocarp forests, and waterways with densely vegetated riparian areas. The number of historical mahinga kai and food production sites in the area highlighted the importance of the landscape as mahinga kai (Table 4).

The 1856 Black Map illustrates the extent of indigenous vegetation and ecosystems in pre-european times. When compared to the Ōtautahi landscape today, the map is a powerful expression of the extent of loss of original vegetation cover (see Maps 13 and 14).

"...places such as Travis Swamp and Bottle Lake are the only places that faintly remind us that Christchurch was once a swamp".[5]

For tāngata whenua, the significance of indigenous vegetation cannot be overstated. The loss of indigenous ecosystems and biodiversity is a key contributor to poor cultural health of catchments. A cultural health assessment for the Ihutai catchment in 2007 found that 70% of all sites surveyed had less than 15% of the total vegetation cover in native vegetation, and no site had greater than 40% native vegetation dominance.[6]

State of the Takiwā assessments in 2007 and 2012 noted that some sites have undergone extensive restoration and/or conservation initiatives. Examples include Pūtarikamotu (Deans Bush), Ōruapaeroa (Travis Wetland), Waikākāriki (Horseshoe Lake) and Wigram Basin sites. These sites typically scored well across a variety of cultural health indicators demonstrating the importance of indigenous vegetation cover to Ngāi Tahu values. Protecting and expanding remnant and restored areas is one of the most important challenges for the future management of the Ihutai catchment. A major concern for Papatipu Rūnanga is that urban planning will continue to promote the planting of exotic species at the expense of natives, as part of the Garden City brand.

Cross reference:
- *General policies in Section 5.5 - Issue TM1: Mahinga kai; Issue TM2: Indigenous biodiversity; Issue TM3: Restoration of indigenous biodiversity*
- *General policy on Activities in the beds and margins of rivers and lakes (Section 5.3, Issue WM12)*

Map 13: Christchurch area, showing waterways, swamps and vegetation cover in 1856. Christchurch Drainage Board map compiled from the 1856 Black maps.

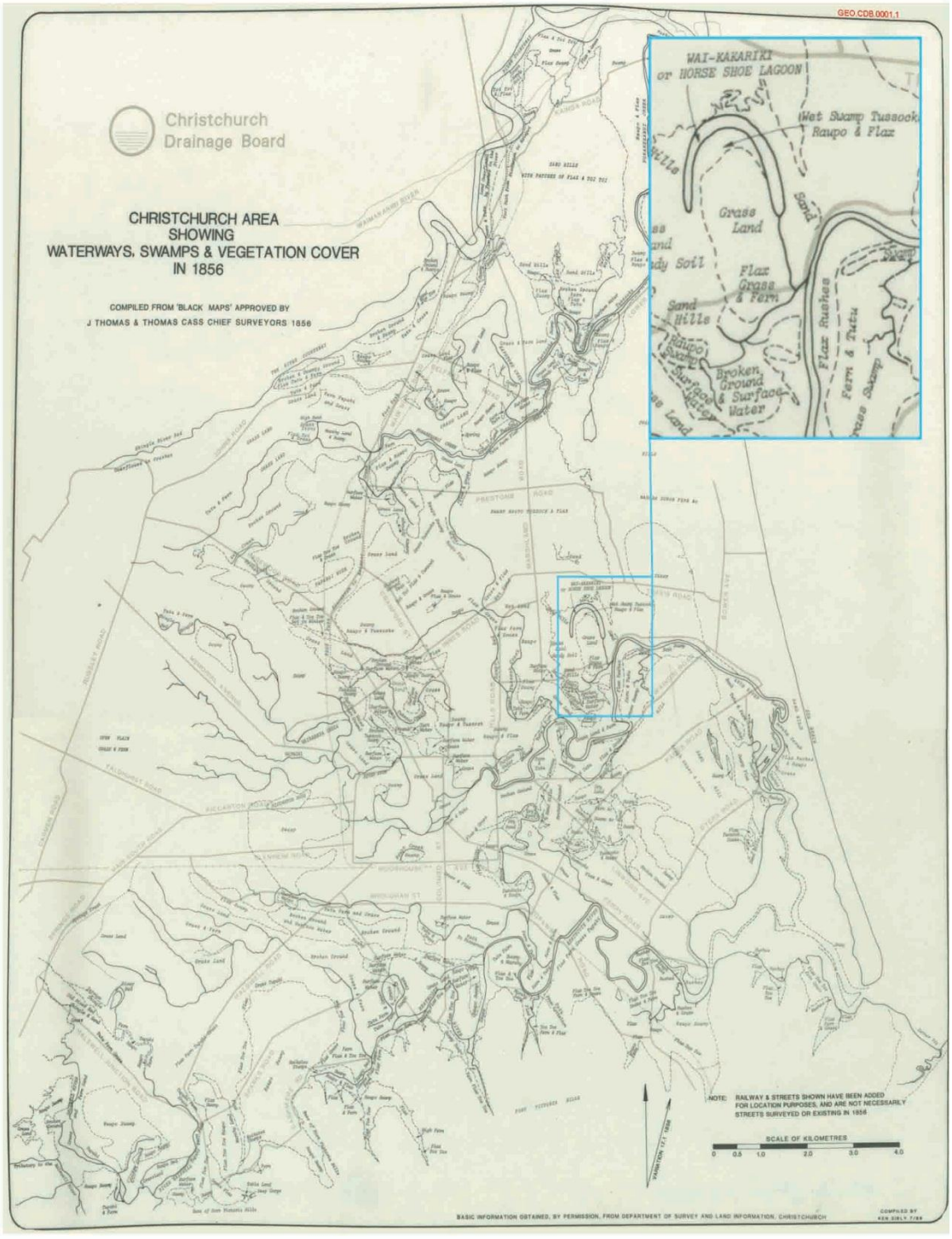
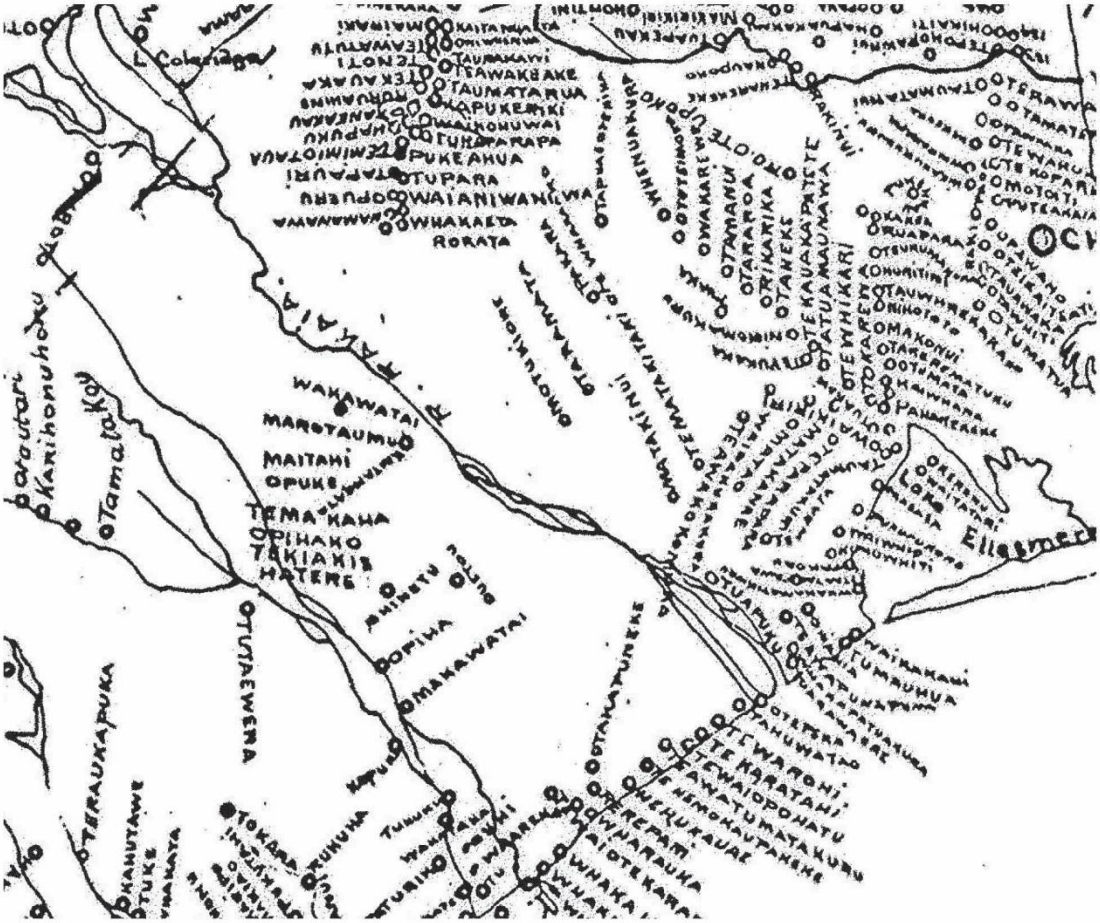


Table 4: Examples of traditionally significant sites with the Ihutai catchment and the types of mahinga kai species traditional found at each site. Source: Te Āhuatanga o Ihutai 2007: 22

Name	Location	Significance	Mahinga Kai	Reference
Ō-Rakipāoa	Upper Riccarton, Fendalton	A settlement and food gathering site	Tuna, Aruhe, Hīnau, Pōkākā, Kanakana, Korari	Tau 2006 CCL 2007 Tau et al 1990
Motu-iti	Locality in Bryndwr	A settlement and food production site	Kāuru, Aruhe, Inaka, Tuna, Kiore	Tau 1994 Taiaroa 1880
Wairārapa	Ilam	A settlement and food production site	Kāuru, Aruhe, Inaka, Tuna, Kiore	Tau 1994 Taiaroa 1880
Hereora	Locality in Harewood	A settlement and food production site	Kāuru, Aruhe, Inaka, Tuna, Kiore	Tau 1994 Taiaroa 1880
Pū-tarika-motu	Deans Bush, Riccarton	A settlement and food gathering site	Tuna, Kanakana, Aruhe, Hīnau, Matai, Pōkākā, Kahikatea, Kererū, Kākā, Kōkō, Koparapara, Mohotatai	Tau 2006 CCL 2007 Tau et al 1990
Puari	On the banks of the Avon River from modern day Carlton Mill Corner, past Victoria Square to the loop in the Avon near Lichfield Street	Waitaha pā with associated urupā. Ngāi Tahu mahinga kai site. Market (Victoria) Square used by Ngāi Tūāhuriri to sell produce grown at Tuahiwi to early settlers.	Tuna, Inaka, Kokopū, Kokopara, Parera, Pūtakitaki	CCL 2007 Taylor 1950
Waipapa	Little Hagley Park (between Harper Avenue and Carlton Mill corner)	A temporary whare site used on journeys between Kaiapoi and Banks Peninsula and during the operation of Market Square.		CCL 2007 Tau et al 1990 Taylor 1950
Ō-Tautahi	Between Barbados and Kilmore Streets	The pā of Te Potiki Tautahi of Koukourārata	Tuna, Inaka, Kōkopu, Kūmara, Aruhe, Pārera, Rāipo Pūtakitaki, Pāteke, Tataa	Beattie 1945 Tau et al 1990 CCL 2007
Waikākāriki	Horseshoe Lake	The site of a significant settlement called Te Oranga		Tau et al 1990 CCL 2007
Waitākari	Bottle Lake Forest	A significant coastal lagoon used as a mahinga kai (since drained).		Tau et al 1990 CCL 2007
Ō-rua-paeroa	QE II park, near Travis Wetland	Kaika or settlement site within an extensive wetland area that was often connected to the sea.	Shark (at certain times), other marine fish	Tau et al 1990 CCL 2007
Ō-pā-waho	Opawa, where present day Judges Street and Vincent Place intersect	Ngāi Tahu 'outpost' (waho) pā that provided a resting place on the journey from Rāpaki to Kaiapoi, known as Pohoareare in earlier times.	Tuna, Kanakana, Inaka, Mātā, Aruhe, Tutu. Also Kokopū, Waikoura, herrings	Taiaroa 1880 Tau et al 1990 CCL 2007
Ō-mōkihi	Spreydon area	A settlement and food production site	Hao (eel), Waikoura, Pipiki, Kāuru, Aruhe, Kiore, Tutu	Taiaroa 1880 CCL 2007 Tau 2006

Map 25: Extract from the Taiaroa 1880 Mahinga Kai Maps, showing mahinga kai sites in the Rakaia and Te Waihora catchments. During the 1879 Royal Commission on the Ngāi Tahu Land Claims, Hori Kerei Taiaroa from Ōtākou gathered information from Ngāi Tahu kaumātua about their traditional food gathering sites and the foods gathered at these sites The information collected by Taiaroa provides some of the earliest records from Ngāi Tahu kaumātua on mahinga kai sites in the 1840's.



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NGĀI TAHU SUBDIVISION AND DEVELOPMENT GUIDELINES

Note: *These guidelines are to be read in conjunction with Policies P4.1, P4.2 and P4.3*

Cultural landscapes

1.1 A cultural landscape approach is the most appropriate means to identify, assess and manage the potential effects of subdivision and development on cultural values and significant sites [refer Section 5.8 Issue CL1].

1.2 Subdivision and development that may impact on sites of significance is subject Ngāi Tahu policy on *Wāhi tapu me wāhi taonga and Silent Files* (Section 5.8, Issues CL3 and CL4).

1.3 Subdivision and development can provide opportunities to recognise Ngāi Tahu culture, history and identity associated with specific places, and affirm connections between tāngata whenua and place, including but not limited to:

(i) Protecting and enhancing sites of cultural value, including waterways;
(ii) Using traditional Ngāi Tahu names for street and neighborhood names, or name for developments;
(iii) Use of indigenous species as street trees, in open space and reserves;
(iv) Landscaping design that reflects cultural perspectives, ideas and materials;
(v) Inclusion of interpretation materials, communicating the history and significance of places, resources and names to tāngata whenua; and
(vi) Use of tāngata whenua inspired and designed artwork and structures.

Stormwater

2.1 All new developments must have on-site solutions to stormwater management (i.e. zero stormwater discharge off site), based on a multi-tiered approach to stormwater management that utilises the natural ability of Papatūānuku to filter and cleanse stormwater and avoids the discharge of contaminated stormwater to water [refer to Section 5.4, Policy P6.1].

2.2 Stormwater swales, wetlands and retention basins are appropriate land based stormwater management options. These must be planted with native species (not left as grass) that are appropriate to the specific use, recognising the ability of particular species to absorb water and filter waste.

2.3 Stormwater management systems can be designed to provide for multiple uses. For example, stormwater management infrastructure as part of an open space network can provide amenity values, recreation, habitat for species that were once present on the site, and customary use.

2.4 Appropriate and effective measures must be identified and implemented to manage stormwater run off during the construction phase, given the high sediment loads that stormwater may carry as a result of vegetation clearance and bare land.

2.5 Councils should require the upgrade and integration of existing stormwater discharges as part of stormwater management on land rezoned for development.

2.6 Developers should strive to enhance existing water quality standards in the catchment downstream of developments, through improved stormwater management.

Earthworks

3.1 Earthworks associated with subdivision and development are subject to the general policy on *Earthworks* (Section 5.4 Issue P11) and *Wāhi tapu me wāhi taonga* (Section 5.8, Issue CL3), including the specific methods used in high and low risk scenarios for accidental finds and damage to sites of significance.

3.2 The area of land cleared and left bare at any time during development should be kept to a minimum to reduce erosion, minimise stormwater run off and protect waterways from sedimentation.

3.3 Earthworks should not modify or damage beds and margins of waterways, except where such activity is for the purpose of naturalisation or enhancement.

3.4 Excess soil from sites should be used as much as possible on site, as opposed to moving it off site. Excess soil can be used to create relief in reserves or buffer zones.

Water supply and use

4.1 New developments should incorporate measures to minimise pressure on existing water resources, community water supplies and infrastructure, including incentives or requirements for:

(i) low water use appliances and low flush toilets;
(ii) grey water recycling; and
(iii) rainwater collection.

4.2 Where residential land development is proposed for an area with existing community water supply or infrastructure, the existing supply or infrastructure must be proven to be able to accommodate the increased population *prior* to the granting of subdivision consent.

4.3 Developments must recognise, and work to, existing limits on water supply. For example, where water supply is an issue, all new dwellings should be required to install rainwater collection systems.

Waste treatment and disposal

5.1 Developments should implement measures to reduce the volume of waste created within the development, including but not limited incentives or requirements for:

(i) Low water use appliances and low flush toilets;
(i) Grey water recycling; and
(ii) Recycling and composting opportunities (e.g. supporting zero waste principles).

5.2 Where a development is proposed for an area with existing wastewater infrastructure, the infrastructure must be proven to be able to accommodate the increased population *prior* to the granting of the subdivision consent.

5.3 New rural residential or lifestyle block developments should connect to a reticulated sewage network if available.

5.4 Where new wastewater infrastructure is required for a development:

(i) The preference is for community reticulated systems with local treatment and land based discharge rather than individual septic tanks; and
(ii) Where individual septic tanks are used, the preference is a wastewater treatment system rather than septic tanks.

Design guidelines

6.1 New developments should incorporate low impact urban design and sustainability options to reduce the development footprint on existing infrastructure and the environment, including sustainable housing design and low impact and self sufficient solutions for water, waste, energy such as:

(i) Position of houses to maximise passive solar gain;
(ii) Rainwater collection and greywater recycling;
(iii) Low energy and water use appliances;
(iv) Insulation and double glazing; and
(v) Use of solar energy generation for hot water.

6.2 Developers should provide incentives for homeowners to adopt sustainability and self sufficient solutions as per 6.1 above.

6.3 Urban and landscape design should encourage and support a sense of community within developments, including the position of houses, appropriately designed fencing, sufficient open spaces, and provisions for community gardens.

6.4 Show homes within residential land developments can be used to showcase solar hot water, greywater recycling and other sustainability options, and raise the profile of low impact urban design options.

Landscaping and open space

7.1 Sufficient open space is essential to community and cultural well being, and the realization of indigenous biodiversity objectives, and effective stormwater management.

7.2 Indigenous biodiversity objectives should be incorporated into development plans, consistent with the restoration and enhancement of indigenous biodiversity on the landscape.

7.3 Indigenous biodiversity objectives to include provisions to use indigenous species for:

(i) street trees;
(ii) open space and reserves;
(iii) native ground cover species for swales;
(iv) stormwater management network; and
(v) home gardens.

7.4 Indigenous species used in planting and landscaping should be appropriate to the local environment, and where possible from locally sourced seed supplies.

7.5 Options and opportunities to incorporate cultural and/or mahinga kai themed gardens in open and reserve space can be considered in development planning (e.g. pā harakeke as a source of weaving materials; reserves planted with tree species such as mātai, kahikatea and tōtara could be established with the long term view of having mature trees available for customary use).

7.6 Developers should offer incentives for homeowners to use native species in gardens, including the provision of lists of recommended plants to avoid, discounts at local nursery, and landscaping ideas using native species.

Appendix 3 - Ngāi Tūāhuriri Rūnanga, Te Hapū o Ngāti Wheke (Rāpaki), Te Rūnanga o Koukourārata, Ōnuku Rūnanga, Wairewa Rūnanga, Te Taumutu Rūnanga. (2013). Mahaanui Iwi Management Plan – Appendix 3: Accidental Discovery Protocol

Appendix 3: Accidental Discovery Protocol

PRIOR TO COMMENCEMENT OF ANY WORKS, A COPY OF THIS ADP SHOULD BE MADE AVAILABLE TO ALL CONTRACTORS WORKING ON SITE.

Purpose

This Accidental Discovery Protocol (ADP) sets out the procedures that must be followed in the event that taonga (Māori artefacts), burial sites/kōiwi (human remains), or Māori archaeological sites are accidentally discovered.

The Protocol is provided by [----] Rūnanga. [----] Rūnanga is the representative body of the tangata whenua who hold manawhenua in the area defined as [-----].

Background

Land use activities involving earthworks have the potential to disturb material of cultural significance to tangata whenua. In all cases such material will be a taonga, and in some cases such material will also be tapu. Accidental discoveries may be indicators of additional sites in the area. They require appropriate care and protection, including being retrieved and handled with the correct Māori tikanga (protocol).

Under the *Historic Places Act 1993*, an archaeological site is defined as any place associated with pre-1900 human activity, where there is material evidence relating to the history of New Zealand. It is unlawful for any person to destroy, damage or modify the whole or any part of an archaeological site (known or unknown) without the prior authority of the NZ Historic Places Trust (NZHPT). This is the case regardless of the legal status of the land on which the site is located, whether the activity is permitted under the District or Regional Plan or whether a resource or building consent has been granted. The NZHPT is the statutory authority for archaeology in New Zealand.

Note that this ADP does not fulfill legal obligations under the Historic Places Act 1993 *regarding non-Māori archaeology. Please contact the Historic Places Trust for further advice.*

Immediately following the discovery of material suspected to be a taonga, kōiwi or Māori archaeological site, the following steps shall be taken:

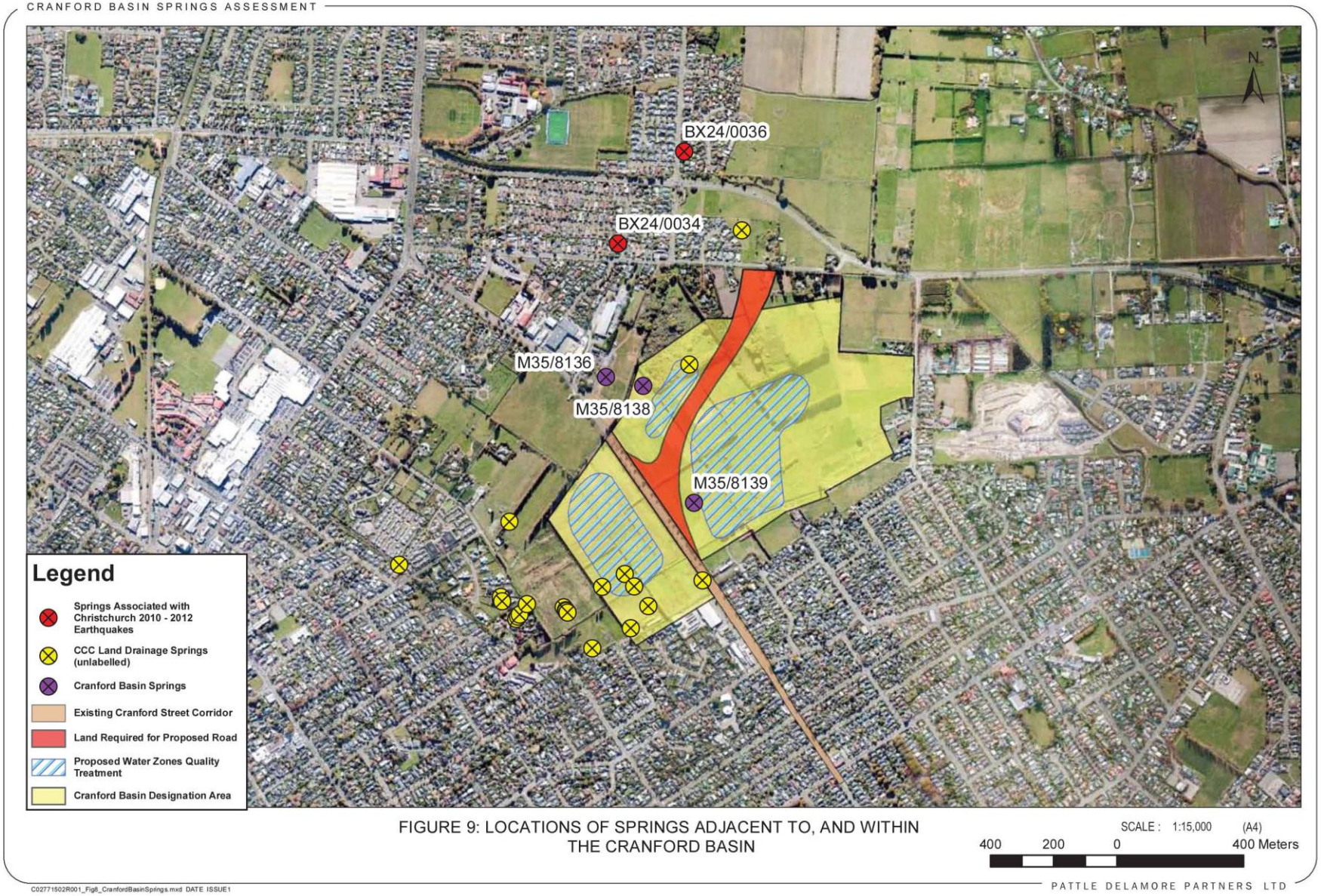
1. All work on the site will cease immediately.
2. Immediate steps will be taken to secure the site to ensure the archaeological material is not further disturbed.
3. The contractor/works supervisor/owner will notify the Kaitiaki Rūnanga and the Area Archaeologist of the NZHPT. In the case of kōiwi (human remains), the New Zealand Police must be notified.
4. The Kaitiaki Rūnanga and NZHPT will jointly appoint/ advise a qualified archaeologist who will confirm the nature of the accidentally discovered material.
5. If the material is confirmed as being archaeological, the contractor/works supervisor/owner will ensure that an archaeological assessment is carried out by a qualified archaeologist, and if appropriate, an archaeological authority is obtained from NZHPT before work resumes (as per the *Historic Places Act* 1993).
6. The contractor/works supervisor/owner will also consult the Kaitiaki Rūnanga on any matters of tikanga (protocol) that are required in relation to the discovery and prior to the commencement of any investigation.
7. If kōiwi (human remains) are uncovered, in addition to the steps above, the area must be treated with utmost discretion and respect, and the kōiwi dealt with according to both law and tikanga, as guided by the Kaitiaki Rūnanga.
8. Works in the site area shall not recommence until authorised by the Kaitiaki Rūnanga, the NZHPT (and the NZ Police in the case of kōiwi) and any other authority with statutory responsibility, to ensure that all statutory and cultural requirements have been met.
9. All parties will work towards work recommencing in the shortest possible time frame while ensuring that any archaeological sites discovered are protected until as much information as practicable is gained and a decision regarding their appropriate management is made, including obtaining an archaeological authority under the *Historic Places Act* 1993 if necessary. Appropriate management may include recording or removal of archaeological material.
10. Although bound to uphold the requirements of the *Protected Objects Act 1975,* the contractor/works supervisor/owner recognises the relationship between Ngāi Tahu whānui, including its Kaitiaki Rūnanga, and any taonga (Māori artefacts) that may be discovered.

IF IN DOUBT, STOP AND ASK; TAKE A PHOTO AND SEND IT TO THE NZHPT ARCHAEOLOGIST

Contact Details		
Kaitiaki Rūnanga	Xxx	xxx
NZHPT Archaeologist	03 357 9615	archaeologistcw@historic.org.nz
NZHPT Southern Regional Office	03 357 9629	infosouthern@historic.org.nz
NZHPT Māori Heritage Advisor	03 357 9620	mhadvisorcw@historic.org.nz
NZ Police	XXX	

Appendix 4 - Appendix 4 – Munro, Bryan. (2013). *Cranford Basin Spring Identification*. A report prepared by Pattle Delamore Partners for Christchurch City Council.

Cranford Basin Spring Identification – Location of springs adjacent to, and within the Cranford Basin.



Appendix 5 – Osborne, Richard. (2016). *Re: Cultural Impact Assessment for Cranford Basin- Proposed Rezoning for Urban Activities*. Response to CIA from Christchurch City Council.

Christchurch City Council

17 October 2016

Mahaanui Kurataiao Ltd
PO Box 3246
Christchurch
Attention: Tania Wati

Dear Tania,

Re: Cultural Impact Assessment for Cranford Basin- Proposed Rezoning for Urban Activities

Thank you for the meeting on Friday 23 September 2016 to discuss the Cultural Impact Assessment (CIA) and in particular the matters highlighted in the Executive Summary on pages 5-7 of that document. As indicated at the meeting please find our response to these in writing below. The number and headings (in an abbreviated form) correspond to the numbering and headings in the CIA Executive Summary.

1. Timeframes of planned infrastructure development within the Cranford Basin

- **Northern Arterial Extension (NAE)**
  Construction of the NAE is proposed to be begin in March 2017 and be completed by the end of 2020. Construction will commence at the Cranford Street end with the associated stormwater treatment facilities for the road completed prior to the road opening.

- **Cranford Basin Stormwater Facilities**
  Cranford Basin is to be developed as a flood ponding and stormwater treatment facility to conform with the Styx Stormwater Management Plan. A major part of this project has been achieved with the purchase of approximately 60 hectares, representing the floodable part of the basin both east and west of Cranford Street. There is a funding stream from 2018 – 2027 for the Cranford Basin Project. The project objectives include:

  - Cranford West and East Basins contain a 50 year ARI event, and discharge is controlled so that levels of service for Bullers Drain, the DCD Pipe, PS 202 and Flockton Basin, Winters Road Drain and neighbouring land drainage is not adversely affected;
  - First flush treatment of stormwater from the upper Dudley Creek catchment is provided within the basin;
  - Passive recreation opportunities are provided where practicable;
  - Opportunities for wildlife refuges and habitat provided by the size and location of the basin are realised;
  - Winters Road basin is rehabilitated and altered if necessary so that the best use can be made of its storage capacity, and its conveyance capacity if this is relevant; and
  - A best environmental solution is implemented to minimise peat settlement within CCC land and the surrounding area influenced by CCC activities.

- **Wastewater and Water**
  The Council has $46 million in its Long Term Plan to construct a wastewater storage facility at Grassmere, to reduce wastewater overflows to waterways during large storms. This is due for completion by 2024. A project is underway to determine the best combination of projects to reduce wastewater overflows, including whether a storage facility at Grassmere is the best solution.
  Given the poor ground conditions and high groundwater table in the Cranford Basin, it is likely that a pressure sewer system would be easier to construct, lower cost and more resilient in future earthquakes. Such a system includes a pump on each property, in a tank that can store 24 hours' wastewater flow. Most new greenfield development areas will be developed using pressure sewer

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systems, with a control panel on each pump that allows the Council to remotely monitor and control the pumps. This will allow the Council to prevent these pumps from discharging during a storm, when the wastewater network is at capacity. This means that the Council can accommodate growth without exacerbating overflows.

Therefore, the proposed wastewater system for Cranford is a pressure sewer system with remote control and monitoring by Council. This can be included in the narrative of any outline development plan, and in subdivision consent conditions.

As noted during the meeting, some of the information in the first four paragraphs on page 18 of the CIA regarding wastewater is out of date. Please refer to Attachment A for current information, which the Rūnanga may wish to use to update the CIA.

2. Potential conditions that may be imposed on residential developers

If areas are rezoned for residential development, developers will need to apply for subdivision consents. Typically subdivision consents contain detailed conditions covering such matters as wastewater, water, stormwater and roading. Conditions relating to matters such as ground conditions, setbacks from springs and Accidental Discovery Protocol (ADP) can also be imposed.

Assessment and conditions of subdivision are guided by the matters of control and discretion outlined in Chapter 8 of the Christchurch District Plan. These matters include infrastructure, natural hazards, open space and natural and cultural values. As you are aware the matters relating to natural and cultural values may be amended as part of any decision from the Independent Hearings Panel on the Natural and Cultural Heritage hearing.

An outline development plan will be developed as part of the rezoning and will form an important part of assessing any future subdivision proposals, which are required to be developed in accordance with the relevant outline development plan or achieve similar or better outcomes. The outline development plan is accompanied by a narrative that is included in the Christchurch District Plan. Specific provisions relating to the outline development plan and its narrative could be developed as part of the Cranford Regeneration Plan to address concerns raised by the Rūnanga. This could include a requirement to consult with the Rūnanga.

Developers may also need to obtain resource consent in respect of any contaminated land under the National Environmental Standards for Contaminated Land and consents from Environment Canterbury in respect of water related matters including earthworks and groundwater.

3. Preparation of development strategy for the Cranford Basin

The matters outlined to be covered in a "development strategy" will be addressed in the development of the draft Cranford Regeneration Plan and its amendments to any Resource Management Act documents, such as the inclusion of an outline development plan and its associated narrative in the Christchurch District Plan. In particular the outline development plan will specify the location of infrastructure including its funding, staging, and integration with adjoining sites.

4. Stormwater Discharges from Proposed Rezoned Area

Developers will be required to attenuate and treat stormwater on their own sites in accordance with the Council's infrastructure standards and comply with any necessary Environment Canterbury standards. Any outline development plan will indicate where these stormwater facilities should be located. It is then envisaged that the stormwater will be discharged into Cranford Basin where it will receive further treatment.

Conditions imposed by Council on any subdivision consents and by Environment Canterbury for any regional consent are likely to contain appropriate monitoring conditions.

5. Assurances from Christchurch City Council

a. Stormwater discharge into Horseshoe Lake

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Council acknowledges that the Rūnanga consider that the discharge of the Upper Dudley Creek Diversion into Horseshoe Lake is offensive. As suggested in the CIA, we would also like the opportunity to discuss this issue further with Te Ngai Tuahuriri Rūnanga.

b. **Developers to meet specific conditions**
Developers will be required to comply with any relevant conditions of resource consents that will among other matters stipulate the installation of infrastructure prior to the completion of development.

c. **Required wastewater upgrades**
Development will only proceed if appropriate measures are put in place so that wastewater overflows are not exacerbated as a result of the development. This includes pressure sewer systems with remote control and monitoring by the Council and/or the Grassmere storage facility. A pressure sewer system would be installed by the developer. The Grassmere storage facility is included in the Council's Long Term Plan.

d. **Protection of Springs**
As indicated at the meeting, the Council has now comprehensively mapped the springs in the Cranford Basin. These springs include larger flowing springs and also a number of "seeps" which tend to only become apparent or discharge in wetter conditions. The location of these features will be taken into account when developing the outline development plan including the provision of appropriate protection and mitigation measures for these features.

A copy of the finalised hydrogeology report is provided as Attachment B.

6. **Compliance with ADP within the Mahaanui Iwi Management Plan**

As indicated above conditions relating to the ADP can be imposed as subdivision conditions.

7. **Consultation on proposed subdivisions**

As indicated above a requirement to consult with the Rūnanga can be included as part of the outline development plan or as a rule.

8. **Christchurch City Council to provide the Rūnanga with future reports for review and feedback if necessary**

Council is committed to engaging with the Rūnanga during the development of the draft Cranford Regeneration Plan, particularly the development of an outline development plan and how it addresses the springs. We would welcome discussion with the Rūnanga, or representatives, as to the most appropriate way to engage throughout the development of the draft Cranford Regeneration Plan.

We trust this information addresses some of the concerns expressed in the CIA. The development of the draft Cranford Regeneration Plan will provide the opportunity to fully consider the matters raised in the CIA.

Please do not hesitate to contact the undersigned if you wish to discuss further.

Yours sincerely

Richard Osborne
Head of Planning and Strategic Transport
Strategy and Transformation

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Attachment A: Current information about wastewater

Cranford Basin lies beside the upper Northern Relief trunk sewer. There are two constructed wastewater overflow locations upstream of the Cranford Basin in the Northern Relief catchment, one of which is monitored and discharges to the Dudley Creek diversion (Grassmere overflow) which flows east through the south side of the Cranford Basin. There are some 130 constructed overflows in the Christchurch wastewater network. The major or more frequent overflow locations (20) are fully monitored.

Prior to the seismic events of 2010/11, the Northern Relief overflow at Grassmere spilled, on average, once to twice per year. This site has overflowed 8 times in the five years post-earthquakes. This site has not overflowed in the last two years.

The damaged sections of the Northern Relief are being repaired by SCIRT with increased capacity is some areas. These repairs will be completed by mid-2017. Two diversions (Wairakei Diversion and Colombo Street Diversion) have been constructed (one planned pre-earthquakes and brought forward) that have assisted with enabling the repairs on the Northern Relief. These diversions allow for better utilisation of the network capacity and also provide a degree of resilience in future disaster events. The Wairakei Diversion allows a significant portion of the Wairakei Collector flow to be diverted to the Western Interceptor. This diversion will slightly reduce the frequency and volume of the Grassmere overflow.

Due to earthquake damage to the wastewater network, an Overflow Consent Compliance Strategy was agreed between Environment Canterbury and Christchurch City Council in March 2012, which requires the Council to comply with its overflow consent or apply for a new consent by March 2017. The wastewater network model has been updated to include the changes to the network by SCIRT and the Council, and 15 years of historical rainfall data is being run through the model to assess compliance with the current consent. This work is in progress, but is not yet completed. It is suspected that the current consent conditions cannot be met, so a new consent application for wet weather overflows is being prepared in parallel with the modelling assessment. The new consent application is being prepared using an effects based approach, rather than a frequency based approach. The Council continues to monitor the consented overflow sites.

Appendix 6 – Whyte, Paul. (2016). *Cranford basin rezoning*. Email response to CIA from Christchurch City Council.

From: Paul Whyte [mailto:paul.whyte@beca.com]
Sent: Monday, 21 November 2016 10:24 a.m.
To: Lizzie Thomson
Cc: Ivan Thomson
Subject: Cranford Basin rezoning

Good morning Lizzie

At the meeting on 9 November 2016 between CCC and MKT reference was made to updated information in respect of the CIA undertaken by Gail Tipa. I believe this primarily refers to an updated situation on wastewater which was provided in attachment A to Councils response of 17 October 2016 to MKT (addressed attention of Tania).

Reference was also made to Council's Infrastructure Design Standards. This is a technical compliance manual which subdivision consents are assessed against. The link is as follows:

https://www.ccc.govt.nz/consents-and-licences/construction-requirements/infrastructure-design-standards

Reference was also made to Environment Canterbury standards. There are no standard conditions as such but in addition to any City Council consents applicants developing in Cranford Basin are required to obtain resource consent from Ecan if they breach rules in respect of such matters as:

-dewatering of groundwater
-discharge of stormwater from earthworks
-take, divert and use of groundwater
-excavation of land in areas of high groundwater (such as this site)
-works in riparian areas

If consent is granted typical conditions can include a requirement to prepare management plans (such as erosion and control sediment plans), limits on Total Suspended Solids (sediment) concentrations, water quality conditions including construction of treatment facilities, storage of hazardous substances etc.

The link on the Ecan website for resource consents is as follows:

http://ecan.govt.nz/advice/resource-consents/applying-resource-consent/pages/default.aspx

Let me know if you require further clarification

Regards

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Appendix 7- Thorley, Mike. (2016). *Spring identification and groundwater management for potential rezoning at the Grassmere Block*. Report prepared by Beca Ltd for Christchurch City Council. Response to CIA from Christchurch City Council. (For full report see PDF - *Appendix 5 and Appendix 7 - CCC Response to Cranford Basin CIA*)

Beca

www.beca.com

Report

Spring identification and groundwater management for potential rezoning at the Grassmere Block

Prepared for Christchurch City Council

Prepared by Beca Ltd (Beca)

28 September 2016