

Cultural Impact Assessment of Wairoa Wastewater Discharges to Wairoa River

Prepared for

Wairoa District Council

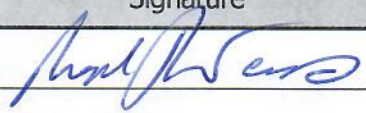

Prepared by

Nigel How

26 November 2018

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Quality Assurance Statement		
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Ref: Wairoa_wastewater_discharge_CIA-181121-final.docx

Date: 26 November 2018

Revision Status			
Version	Date	Author	What Changed and Why
1	27.6.2018	LEI, PL	Initial Draft provided by Phil Lake (Lowe Environmental Impact), which provided report structure and initial information for consideration.
2	18.7.2018	NH	Revised Draft 1. Information analysed and further contributions made. Initial assessments made and further information required to complete.
3	31.7.2018	NH	Revised Draft 2. PL provided more information and guidance on report content through email 27.7.2018. Draft completed with information available.
4	11.11.2018	NH	Revised Draft 3. PL provided draft document 'Conceptual Design for Wairoa Wastewater Treatment and Discharge' for consideration along with update instructions for CIA. Draft annotated accordingly.
5	21.11.2018	DC	Duane Culshaw added macrons throughout report.

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Appendix A – Map of Cultural Landscape Significant Sites within 2 kilometres of the Wairoa WWTP

1 INTRODUCTION

1.1 Background

Wairoa District Council (WDC) own and operate the Wairoa wastewater treatment plant (WWWTP) and its connecting reticulation. WWWWTP is located near Rangihoua (also known as Pilot Hill), above the Wairoa River mouth. Treated wastewater currently discharges into the Wairoa River during out-going tides at night time.

WDC require a replacement discharge resource consent following expiry of the current consent on 31 May 2019. The preferred discharge option was identified through engagement with the community, hapu, and interested stakeholders to assist with deciding on a preference for a proposed system. This included direct engagement with tangata whenua around the appropriateness of the proposal, including the discharge mechanism and its location. A key outcome of this process was that the discharge to the river will continue to operate for the foreseeable future but will reduce over time (at least during summer months) as irrigation schemes are developed on nearby farmland and storage is constructed.

In February 2018 WDC agreed to implement a series of actions known as The Package which included wastewater irrigation to a series of farms, reductions of reticulation leakage, installation of filtration and UV treatment at the WWWWTP outlet, installation of treated wastewater storage, reductions in discharges to the river, and support for wider Wairoa River catchment improvement projects.

1.2 Purpose

This report provides a cultural impact assessment (CIA) of all of the current and future effects of the Wairoa wastewater discharges on the Wairoa River as modified by reticulation, treatment, storage, and irrigation improvements and in the context of the cultural impacts of implementing the wider package of improvements across the entire Wairoa River catchment. This CIA informs WDC's applications for Wairoa's wastewater discharge resource consents.

1.3 Scope

This CIA report includes:

- descriptions of the future changes to Wairoa's wastewater reticulation, treatment, and discharge system;
- summary of the planning framework for assessing the cultural effects of the discharge;
- description of relevant cultural values and tikanga specific to the river discharge of treated wastewater;
- identification of geographical areas of cultural significance in and around the discharge;
- assessment of the cultural impacts of the current wastewater discharges on the Wairoa River and connected environments;
- assessment of the cultural impact of each stage of the proposed package, with a particular focus on changes to wastewater discharges to the river resulting from effluent filtration and UV treatment, pump station and reticulation improvements, irrigation to farms, increased storage, and ceasing of summer discharges to the river;
- recommendations for any cultural mitigation measures; and
- recommendations of appropriate resource consent conditions including cultural health monitoring for the future river discharge.

The contents of this CIA report are consistent with guidance from the Quality Planning website regarding CIA's.

1.4 Report Production

This report has been a team effort in its production. Lowe Environmental Impact (LEI) have coordinated the structure of this report and provided relevant planning framework information and details of the proposed future changes to the wastewater system and its discharges for consideration of their effects on cultural values.

Nigel How B.A. of the Wairoa Museum has analysed information provided and is the principal contributor to this assessment. This follows his earlier work on the 2017 tangata whenua Worldviews report. Nigel is a member of Ngāti Rāhui, one of the traditional hapu affiliated to the area in question. He has been involved in past cultural audits of the area and represented Ngāti Rāhui and other hapū during the Medlock Whakamahia Development consultation. Nigel is involved in several local groups and organisations and was the Inaugural Chairman of the Kaumatua Council of Tātau Tātau o Te Wairoa Trust.

2 DESCRIPTION OF CURRENT AND FUTURE DISCHARGES

2.1 Current Wastewater System and Discharges

The current system consists of gravity flow reticulation to four pump stations which lift each catchment's wastewater into the next section of gravity mains. The final pump station at Fitzroy Street receives all of Wairoa's wastewater and pumps it via a rising main to the inlet of WWTP which is located north-west of Rangihoua. WWTP consists of an aerated lagoon and a large oxidation pond. Storage of up to 5,400 m³ is available at WWTP by managing water levels within the 500 mm operating freeboard of the oxidation pond.

The treated wastewater flows by gravity to an outfall pipe into the Wairoa River opposite Fitzroy Street, and is discharged only during overnight out-going tides except when storm flows force it to discharge outside those hours. During storm events the pump stations have also overflowed to the river in the past but recent reticulation improvements and pump reconfiguration and upgrades have reduced the frequencies and volumes of these events.

Daily average discharge volumes from WWTP are about 2,700 m³/d and vary between summer average flows of about 2,000 m³/d and winter average flows of about 4,000 m³/d. These reflect the strong influence of groundwater and stormwater flows entering the leaky reticulation system. The median treated wastewater quality is generally meeting the expected targets for the WWTP design, with ammoniacal nitrogen of 16 g/m³, total suspended solids of 52 g/m³, and E. coli of 5,200 cfu/100 ml.

2.2 Future Wastewater System and Discharges

A series of changes, known as The Package, are planned by WDC to implement over the next 30 years in order to reduce flows to WWTP, improve the discharge quality (remove pathogens and reduce algae), reduce wastewater flows, implement irrigation to land, construct additional storage facilities, and reduce discharges (volumes and frequencies) to the river. The improved quality of the treated wastewater will enable the river discharge to occur 24/7 when storage is full while protecting the river from public health effects. The key aspects of The Package are:

Wastewater Infrastructure Improvements	Wastewater Irrigation	Catchment Advocacy
<ul style="list-style-type: none">•Extra treatment•Filtration - sand/media to remove algae and particulate•Disinfection - Ultra Violet Light Treatment to reduce bugs even further than current treatment•Reticulation upgrades•Sewer pipe replacement•Pump station upgrades•Discharge management•Ceasing illegal connections•Add storage to allow for continuous slower discharge rate•Maintain existing discharge•Make upgrades•Change to 24/7 discharge•Make changes over time	<ul style="list-style-type: none">•Irrigate neighbouring land•Adjacent land•Potentially council land including Landfill forestry•Other farmers in area as needed•Provide some storage to reduce summer river discharge•Develop over time based on willingness and funding	<ul style="list-style-type: none">•Contribute to driving catchment improvements•WDC to be part of catchment decisions•Work with HBRC and community to make changes•Work with community to create opportunities•Partial funding of catchment administration

The catchment aspects were proposed in response to community recognition that the river is already in a poor state before it reaches urban Wairoa and the treated wastewater discharge is a much smaller contributor to the river's poor condition than all of the rural contributors. WDC are intending to provide advocacy and administrative support to the community for these actions.

The intended timing of implementation of the various phases of The Package is as follows:

Within 5 Years	Within 10 years	Within 20 years	Within 30 years
<ul style="list-style-type: none"> •Improvement of sections of the reticulation system (i.e. pipe relining) •Improve treatment of effluent discharging from the WWTP to the estuary, allowing for 24 hour discharge •Add an area of irrigation (<50 ha) close to treatment ponds •WDC to advocate for Wairoa River Catchment initiatives 	<ul style="list-style-type: none"> •Expand wastewater irrigation area to WDC forestry block (landfill area) and neighbouring land •Continue reticulation improvements •Develop storage capacity to make treatment more effective and irrigation options more viable •Catchment projects underway (i.e. riparian planting and retirement of grazing land in priority sub-catchments) 	<ul style="list-style-type: none"> •Further irrigation areas identified and infrastructure put in place (i.e. up to 300 ha of irrigation) •Catchment project works have covered a significant portion (to be determined) of the catchment area 	<ul style="list-style-type: none"> •Removal of a significant portion (to be determined) of the wastewater discharge to the river •Further irrigation areas identified (i.e. up to 600 ha of irrigation) •The catchment area has had project works established over much of its area and maintenance of these areas will be ongoing

The summary of Wairoa’s Future Treated Wastewater Discharge System, as provided in the Conceptual Design Report by LEI, is as follows:

Table 2.1: Summary of Wairoa’s Future Treated Wastewater Discharge System

Stage Timing	Storage Capacity [#]	Irrigation Area [#]	River Discharge Parameters*	Pump Station Overflows [#]
Stage 1 0-5 years	No change (5,400 m ³ within the 2 nd WWTP pond).	Develop up to 50 ha	<p><u>Below ½ median river flows:</u> <1,600 m³/d discharge on outgoing tide at night only.</p> <p><u>½ median to median river flows:</u> <3,000 m³/d discharge on any outgoing tide.</p> <p><u>Median to 3 x median river flows:</u> <5,000 m³/d discharge on any outgoing tide.</p> <p><u>Above 3 x median river flows:</u> unlimited discharge at any time.</p>	Occur less often than now (<10 events/year). Triggered during larger storms.
Stage 2 6-10 years	Increase total to about 10,000 m ³	Expanded up to 100-150 ha total	<p><u>Below ½ median river flows:</u> <1,600 m³/d discharge on outgoing tide at night only but limited to no more than 30 days discharge in December to March.</p> <p><u>½ median to median river flows:</u> <3,000 m³/d discharge on any outgoing tide.</p> <p><u>Median to 3 x median river flows:</u> <5,000 m³/d discharge on any outgoing tide.</p> <p><u>Above 3 x median river flows:</u> unlimited discharge at any time.</p>	Rare (<8 events/year); only during larger storms.
Stage 3 11-20 years	Increase total to 50-100,000 m ³	Expanded up to 300 ha total	<p><u>Below ½ median river flows:</u> no discharge at any time.</p> <p><u>½ median to median river flows:</u> <3,000 m³/d discharge only on outgoing tide at night.</p> <p><u>Median to 3 x median river flows:</u> <5,000 m³/d discharge on any outgoing tide.</p> <p><u>Above 3 x median river flows:</u> unlimited discharge at any time.</p>	Very rare (<4 events/year); only during very large storms.
Stage 4 21-30 years	Increase total to 200-400,000 m ³	Expanded up to 600 ha total	<p><u>Below median river flows:</u> no discharge at any time.</p> <p><u>Median to 3 x median river flows:</u> <5,000 m³/d discharge only on outgoing tide at night.</p> <p><u>Above 3 x median river flows:</u> unlimited discharge at any time.</p>	Very rare (<4 events/year); only during unusually large storms.

Notes: * bold text highlights what is changing within each stage.

intended changes which depend on commitments outside resource consent processes.

3 PLANNING FRAMEWORK

3.1 General

WDC need to seek new resource consents from Hawkes Bay Regional Council (HBRC) to authorise the future discharges of treated wastewater upon expiry of the current resource consent. Applications for resource consents (and the subsequent decisions by consenting authorities) need to assess how consistent a proposal is with each of the relevant Objectives and Policies of the various national, regional, and district planning documents.

This CIA is one of a range of assessments that the applications for discharge resource consents will rely upon.

3.2 Tātau Tātau o Te Wairoa Trust

On 13 September 2018 the 'Iwi and Hapu of Te Rohe o Te Wairoa Claims Settlement Act 2018' gained Royal assent and the Act came in to force the following day. Sub-part 5 of this legislation provides for the establishment of 'Te Rohe o Te Wairoa Reserves Board – Matangirau' in the following six-month period.

This Board will administer 'Te Rohe o Te Wairoa' reserves as listed in Schedule 4 of the Act. These reserves are:

- Local Purpose (Esplanade) Reserve A,
- Local Purpose (Esplanade) Reserve B,
- Ngamotu Lagoon Wildlife Management Reserve,
- Rangihoua/Pilot Hill Historic Reserve and
- Whakamahi Lagoon Government Purpose (Wildlife Management) Reserve.

These five reserves are within the vicinity of the WWWTP.

3.3 RMA Provisions

The Resource Management Act 1991 (RMA) provides the primary planning framework supporting the need for a CIA and providing some guidance as to its contents and purpose.

Part 2 (Sections 5-8) of the RMA provides the purpose and principles of the RMA which all resource management activities and decisions must take account of and seek to implement. Some specific cultural matters are identified in Part 2 of the RMA, as outlined below:

- Section 6 identifies matters of national importance that all resource users and decision-makers are required to recognise and provide for, including the following cultural matters:
 - (e) the relationship of Māori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga;
 - (f) the protection of protected customary rights;
- Section 7 identifies other matters that all resource users and decision-makers are required to have particular regard to, and this includes kaitiakitanga and the ethic of stewardship.
- Section 8 requires all resource users and decision-makers to take into account the principles of the Treaty of Waitangi (Te Tiriti o Waitangi).

The RMA also requires consultation with customary marine title or protected customary rights holders and iwi or hapū who have been granted statutory recognition for a geographic area. A number of iwi and hapū have applied for customary marine titles or rights under the Marine and

Coastal Area (Takutai Moana) Act which continue to be processed. The two most relevant applications to this report are:

- Application Number: MAC-01-09-11; Applicant Group: Ngāti Kaahu and Others. On 6 November 2018 Te Rauhina Marae Trustees issued a public notice in The Wairoa Star stating their Takutai Moana application had been lodged in the High Court on behalf of the hapū of Ngamotu. This application covers the area from Hikakawa Bluff to Pilot Hill (inclusive and 12 nautical miles out at sea from those points), Ngamotu lagoon and the Matangirau part of the Wairoa river.
- Application Number: MAC-01-09-17; Applicant Group: Ngāti Rāhui, Ngāi Te Apatu. This application, like the previous one, is still pending decision. This application covers the area from Poututu stream to the Wairoa river mouth.

The RMA requires all resource users and decision-makers to have regard, where relevant, to the provisions of the New Zealand Coastal Policy Statement (NZCPS), National Environmental Standards, National Policy Statements, Regional Policy Statement (RPS), Regional Plans and District Plans.

3.4 New Zealand Coastal Policy Statement

NZCPS applies to coastal land and waters, and it contains a number of specific provisions relating to cultural values and the potential effects of discharges on those values. Objective 3 requires all resource users and decision-makers to take account of Treaty of Waitangi principles, recognise the role of tangata whenua as kaitiaki, and provide for tangata whenua management of the coastal environment. Policy 2 expands on Objective 3 by ensuring that Māori heritage is protected and seeking to involve Māori in identifying cultural values, practices, and sites through consultation. Policy 23 requires decisions on discharges of treated human wastewater directly into coastal waters to be informed by an understanding of tangata whenua values and the effects on those values.

3.5 National Policy Statement for Freshwater Management

NPS-FM applies to all groundwater and surface water bodies. It also contains a number of specific provisions relating to cultural values and the potential effects of discharges on those values. It was amended in 2017 and some of those amendments were specifically intended to improve the standards, monitoring, and management of cultural values. The cultural provisions of NPS-FM are:

- Objective AA1 requires all resource users and decision-makers to consider and recognise Te Mana o te Wai in the management of fresh water;
- Objective A1 seeks to safeguard the life-supporting capacity and ecosystems of fresh water and the health of people and communities in sustainably managing the use and development of land, and of discharges of contaminants;
- Objective D1 seeks to provide for the involvement of iwi and hapū, and to ensure that tangata whenua values and interests are identified and reflected in the management of fresh water and decision-making regarding fresh water planning;
- Policy AA1 requires regional policy statements and plans to consider and recognise Te Mana o te Wai, including setting appropriate objectives and limits; and
- Policy D1 requires local authorities to take reasonable steps to involve iwi and hapū in the management of fresh water, identify tangata whenua values and interests in fresh water, and reflect those in the management of, and decision-making regarding, fresh water.

3.6 Regional Planning Provisions

HBRC have incorporated their RPS into the early chapters of their Regional Resource Management Plan (RRMP). Objectives 34-37 are the key cultural provisions of the RPS, and they seek the following outcomes:

34. To recognise tikanga Māori values and the contribution they make to sustainable development and the fulfilment of HBRC's role as guardians, as established under the RMA, and tangata whenua roles as kaitiaki, in keeping with Māori culture and traditions.
35. To consult with Māori in a manner that creates effective resource management outcomes;
36. To protect and where necessary aid the preservation of waahi tapu...;
37. To protect and where necessary aid the preservation of... mahinga mātaītai (sea-food gathering places).

Policies 64-66 support Objectives 36 and 37. Policies 64 and 65 state that activities should not have any significant adverse effects on wāhi tapu, mahinga mātaītai, and other taonga. Policy 66 states that "The importance of coastal, lake, wetlands and river environments and their associated resources to Māori should be recognised in the management of those resources."

The Regional Coastal Environment Plan (RCEP) has a number of relevant Objectives and Policies that reflect the RMA, NZCPS, NPS-FM, and RPS provisions as they relate to the coastal environment's terrestrial, aquatic, estuarine, and marine ecosystems.

The RRMP and RCEP are the regional planning documents that provide the regional Rules. These rules determine what activities require resource consents and the activity classification for each activity (permitted through to prohibited).

The Wairoa District Plan also has objectives, policies, and rules that protect cultural values and sites on land. Of particular relevance is the protection of archaeological sites, coastal reserves, existing infrastructure, and a Designation of the WWWT site for wastewater treatment.

4 CULTURAL VALUES AND TIKANGA

4.1 Background

The tangata whenua worldviews report provides details of the cultural values and tikanga for Te Wairoa iwi and hapū, and it should be consulted for further details where necessary. This section of the CIA summarises the values and tikanga relevant to human wastewater treatment and discharges to the Wairoa River.

4.2 Cultural Values

Summary of cultural values relating to wastewater, land, and Wairoa River.

- Water is a living entity – it has a mauri and is a mauri itself;
- Tikanga are cultural law, not cultural lore;
- Kawa are unchanging. Tikanga adapt based on kawa and sound modern practice;
- Karakia/Inoi are an essential part of any development; and
- Wāhi Tapu are traditionally the only category of significant sites that need to be actively avoided by development.

4.3 Tikanga

Summary of tikanga relating to human waste management and protection/revitalisation of waterway mauri.

- Wastewater is a modern creation – it did not traditionally exist;
- Direct discharge of wastewater to any waterway, including the sea, is culturally offensive;
- Land-based discharge of wastewater is culturally appropriate;
- Wastewater discharge location(s) should be land based;
- Wastewater discharge location(s) should avoid wāhi-tapu areas; and
- Ideally after complete treatment, wastewater should be fit for human consumption.

4.4 Cultural Aspirations for Wastewater Management

In specific regards to the application of tangata whenua worldviews to wastewater management, ideally wastewater should be 100% discharged to land as part of the process of renewing the wastewater. The goal is that after holistic treatment the wastewater should be fit for human consumption before reaching any waterway.

In considering the implications of tangata whenua worldviews for human wastewater discharges, the order of preference is to:

- avoid adverse effects;
- minimise the scale of adverse effects;
- remediate adverse effects;
- implement mitigation practices;
- off-set mitigation; or
- facilitate some form of compensation.

All of these are ideally done through open dialogue with hapū who hold mana whenua and mana moana in the area and collaborative decision-making. Ideally consultation to avoid adverse effects of development to tangata whenua worldviews should include:

- open dialogue from the initial stages between all parties involved;
- true effort to include tangata whenua worldviews in development planning;
- archaeological survey if required;
- cultural assessment if required;
- buffer zones around known wāhi-tapu sites; and
- acknowledgement by tangata whenua that tikanga are adaptable and through dialogue can be adjusted with the advent of acceptable new technologies and/or practices.

5 CULTURAL LANDSCAPE

5.1 General

This section identifies the currently known areas of significant value to tangata whenua affected by Wairoa's WWTP and its discharges to the river. Appendix A contains a map and incomplete list of significant sites located within 2 kilometres of the WWTP. The Tangata Whenua Worldviews report provides details of Wairoa's cultural landscape including maps of a wider area, and it should be consulted for further details where necessary.

It is important to note that while all sites hold value to local tangata whenua, wāhi tapu are the only sites to be actively avoided by any development. This is due to the spiritual ramifications of disturbing strong mauri and wairua resident in these wāhi tapu areas.

5.2 Geographical Features

The key culturally significant geographical features are:

- **Te Wairoa Hōpūpū Hōnengenenge Matangirau.** The full name of Wairoa River which starts at Te Kapu (Frasertown) and ends at the sea. The river is divided into three parts - Te Wairoa Hōpūpū from Frasertown to Turiroa; Te Wairoa Hōnengenenge from Turiroa to Kaimango (Spoooner's Point); Te Wairoa Matangirau from Kaimango to the sea. These are fishing boundaries where, in former times, you only fished on the part of the river that you lived beside. All three parts of the river are affected by tidal movements;
- **Te Ari a Tapuwae.** Name given to the western side of the Wairoa Bar;
- **Te Ari a Te Maaha.** Name given to the eastern side of the Wairoa Bar;
- **Waiparuparu.** A stream; and
- **Wairoa Hard.** A geographical seafloor feature which covers some 300 square kilometres and extends out 18 kilometres to where the ocean is 50 metres deep. It is recorded as an area of national importance as it provides a nursery for juvenile fish including snapper, John Dory, trevally, hammerhead shark and bronze whalers.

5.3 Historical Pā and Settlement Sites

The key historical pa and settlement sites relevant to the river discharges are:

- **Whare o Koro.** Fortified settlement on the hard flat on the eastern sand spit of the Wairoa river mouth;
- **Te Motu o Te Rauhina.** Settlement and fishing center. Te Rauhina had one of her kāinga here. This area was once attached to Ngamotu then flooding cut it off from the mainland. Later it was known as Deighton's Reserve and eventually it was washed away and thus is no longer in existence;
- **Ahipaniki.** Fortified settlement also known as Riwhera. All remnants have eroded into the river;
- **Rangihoua.** Two parts - Tupapeke (south), Kaiaha (north). Large kūmara gardens were situated here as well as living quarters and the meeting-house Pō-Te-Rangi. Kaiaha contained sentry watchtowers. The greater part of this complex has eroded into the water; and

- **Waiopaoa.** Settlement of Ngāti Rāhui. Artefacts and coins were found in this area as recorded in an archaeological survey. This part of the Waiopaoa settlement is in the exact location of the current oxidation ponds.

5.4 Wāhi Kai and Mahinga Kai

The key wāhi kai and mahinga kai sites are:

- **Te Manga.** Lagoon for pipi, inanga, kokopu and tuna, the latter reputed to once having multiple tails;
- **Whakamahia.** Kātahi tērā, whakamahia ai tērā mātau, ko ngā kai he tangata tonu. Name given to the area by servant hapū who worked there and were fed with human flesh. The oven which is the source of this name still contains human remains;
- **Mana.** Lagoon at Ngamotu used for food gathering; and
- **Tawhara.** Stream which once flowed from the Tawhara Valley across the township plains and came out at the foot of Rangihoua. Re-directed as part of the town drainage scheme.

5.5 Wāhi Mahi

The key wāhi-mahi sites are:

- **Te Wairoa Matangirau.** Te Wairoa Matangirau is the part of the Wairoa river from the mouth of the Awatere stream to the sea. Traditional fishing and wood gathering area of those hapū who lived alongside it; and
- **Wāhi Pakanga.** Battlefields containing the remains and relics of fallen soldiers, which were left to turn in to the ground by tangata whenua.

5.6 Wāhi Tapu

The key wāhi tapu sites are:

- **Toha's Tomb.** On the hill behind the old Wairoa Brickworks stands the large concrete tomb of Toha Rahurahu - rangatira of Ngāti Rāhui and the first Wairoa River Pilot, from where Pilot Hill takes its second name;
- **Kaiaha.** The cemetery containing Toha's tomb. Part of the original cemetery was excavated to provide base material to supply the Wairoa Brickworks – including the bones of those who were buried there. The original cemetery stretches north of Toha's Tomb, then back along the hillside where the Wairoa Brickworks building and existing private home are located;
- **Ngā Puna.** Series of springs in the Rangihoua reserve. One is a healing spring;
- **Tahuna Mai Hawaiki.** Cemetery where Ruawhoro deposited sands from Hawaiki. Burial place of Tapuwae. Most of this has slipped into the sea;
- **Te Toka a Tupaeheke.** Flat-topped rock under which Tupaeheke lives. Tupaeheke is the guardian of the river mouth and is considered dangerous to non-locals. Rock located at the Wairoa river mouth and is covered over with sand; and
- **Tuhinapo.** A tūāhu embedded in a geological form. Location recorded as 'Wairoa Heads' but exact location currently unknown. Tūāhu used as a place to offer the "first fruits".

6 CULTURAL IMPACT ASSESSMENT OF DISCHARGES

6.1 General

This section assesses the effects of the river discharge on cultural values as each stage of The Package is implemented. The gradual implementation of The Package will change the nature, frequency, duration, and scale of effects of the discharge on the river and its cultural values over time. In summary, the timing and scope of changes proposed for The Package will be:

Within 5 Years	Within 10 years	Within 20 years	Within 30 years
<ul style="list-style-type: none">•Improvement of sections of the reticulation system (i.e. pipe relining)•Improve treatment of effluent discharging from the WWTP to the estuary, allowing for 24 hour discharge•Add an area of irrigation (<50 ha) close to treatment ponds•WDC to advocate for Wairoa River Catchment initiatives	<ul style="list-style-type: none">•Expand wastewater irrigation area to WDC forestry block (landfill area) and neighbouring land•Continue reticulation improvements•Develop storage capacity to make treatment more effective and irrigation options more viable•Catchment projects underway (i.e. riparian planting and retirement of grazing land in priority sub-catchments)	<ul style="list-style-type: none">•Further irrigation areas identified and infrastructure put in place (i.e. up to 300 ha of irrigation)•Catchment project works have covered a significant portion (to be determined) of the catchment area	<ul style="list-style-type: none">•Removal of a significant portion (to be determined) of the wastewater discharge to the river•Further irrigation areas identified (i.e. up to 600 ha of irrigation)•The catchment area has had project works established over much of its area and maintenance of these areas will be ongoing

6.2 Current Wastewater Discharges

The current wastewater discharges have the following features:

- treatment does not include UV or filtration to reduce algae and pathogens prior to discharging to the river;
- limited storage of 5,400 m³ within the WWTP ponds;
- no irrigation to land;
- river discharge regime for treated wastewater from WWTP is limited to overnight outgoing tides; and
- occasional pump station overflows to the river occur during storms.

The effects of the current discharge regime on the river's cultural values are at odds with tangata whenua worldviews and is culturally offensive.

6.3 Consultation

- **WDC commissioning of the Tangata Whenua Worldviews on Wastewater Management in Wairoa report.** This 3-month body of work, advocated for by WWSG, was completed 7 November 2017. This report provided a framework for:

- identifying WDC Treaty Settlement obligations with Tātau Tātau o Te Wairoa Trust.
- addressing the RMA Provisions as listed in Section 3.3 of this report.
- providing information to identify groups with strong Customary Marine Title (Takutai Moana) claims within the immediate area of the WWTP.
- addressing the New Zealand Coastal Policy Statement provisions as listed in Section 3.4 of this report;
- addressing the National Policy Statement for Freshwater Management provisions as listed in Section 3.5 of this report; and
- addressing the Regional Planning Provisions as listed in Section 3.6 of this report.

This report provided a platform of understanding of tangata whenua perspectives in regards to wastewater practices. It also provided proactive groundwork for other future projects in the Wairoa District.

- **Wairoa Wastewater Stakeholder Group (WWSG).** The decision to establish this group was made in late 2016 with the terms of reference completed early 2017. This group had representation in the form of:
 - two Wairoa District Councillors;
 - three tangata whenua representatives, each representing the three traditional boundaries of the Wairoa river;
 - one Wairoa Senior Citizen representative;
 - one Wairoa Business representative; and
 - one Wairoa Youth representative.

The group was made up of a cross-section of the affected community to ensure that a wide variety of views and perspectives were taken into consideration during the project planning, resulting in stronger relationships. Formal discussion began in April 2017 and continued until November 2017. These discussions have been described as intense and vigorous, which ultimately focused on the best outcome for the Wairoa community.

WWSG was nominated by WDC for the 2018 Local Government New Zealand Excellence Awards and was shortlisted as a finalist in the Fulton Hogan Excellence Award for Community Engagement. On 16 July 2018 WWSG was awarded a Highly Commended placing in that category and part of this was due to 'meaningful engagement with iwi and Māori'. The judges stated the project was a genuine move away from traditional consultation to be more inclusive and commitment to listen. Furthermore, the approach was praised as an inclusive, solutions-focused and pragmatic response that included strong iwi participation and two-way community engagement.

WWSG provided the vehicle to successfully address:

- the RMA provisions as listed in Section 3.3 of this report. Customary Marine Titles have not yet been granted for the area in question, nor has Statutory obligation being implemented between WDC and Tātau Tātau o Te Wairoa Trust;
- the New Zealand Coastal Policy Statement provisions as listed in Section 3.4 of this report;
- the National Policy Statement for Freshwater Management provisions as listed in Section 3.5 of this report; and
- the Regional Planning Provisions as listed in Section 3.6 of this report. It is important to note that Part 36 of these provisions has only in part being fulfilled, as protecting the one wāhi tapu site directly affected by wastewater discharge (Te Toka a Tupaeheke) is currently unobtainable. This is elaborated further in Section

7.2 of this report. However, The Package does address increased preservation of the site to a point over the 30-year plan period.

WWSG was the key to successful dialogue with and meaningful participation of tangata whenua in the consultation process, ultimately resulting in The Package.

- **WDC wider public consultation.** This occurred during July 2017 and was part of the wider formal consultation involving the Wairoa Wastewater Stakeholder Group.
 - This provided opportunity for wider consultation with tangata whenua in further consideration of RMA, New Zealand Coastal Policy Statement, National Policy Statement for Freshwater Management and Regional Planning provisions respectively.

This consultation step complimented the groundwork being undertaken by WWSG.

6.4 Stage 1 Implementation – First 5 Years

During the first 5 years of implementation, the following features will be developed:

- some reticulation and pump station improvements will limit flows into WWTP and reduce the frequency and volume of pump station overflows so that they only occur during larger storm events (targeted to less than 10 times per year from each pump station);
- filtration and UV treatment system will be installed at the WWTP facultative pond’s outlet for algae and pathogen reductions but with a partial bypass for elevated flows;
- existing storage of 5,400 m³ within the WWTP ponds will remain unchanged;
- the river discharge pipeline and outfall will be relocated closer to the river channel;
- the daily discharge volumes will continue to reflect the daily inflows and limited storage until irrigation has been commissioned;
- a small area (<50 ha) of farm land and perhaps the landfill forest near WWTP will be developed to receive summer irrigation of some treated wastewater and the subsequent discharges to the river during will be able to occur as follows:
 - summer discharges to the river will reduce in volume, duration, and frequency due to irrigation taking some of the flows;
 - during summer storms and every day throughout autumn, winter, and spring discharges to the river will be changed to reflect the assimilative capacity of river flows (if that is accepted by HBRC) as follows:

River Flow Rate	Maximum Daily Discharge Volume	Discharge Timing Restrictions
Below ½ median	1,600 m ³ /d	Only overnight out-going tides
½ median to median	3,000 m ³ /d	All out-going tides
Median to 3 x median	5,000 m ³ /d	All out-going tides
Above 3 x median	No limit	Continuous 24-hour

These river discharge limits are intended to reflect the modelled discharge scenarios and improved storage management.

The effects of this discharge regime on the river’s cultural values are:

- reticulation and pump station improvements to reduce the frequency and volume of pump station overflows is a positive step in regards to addressing cultural values;

- installing filtration and UV treatment to improve the wastewater quality takes the process a step closer to drinkable water. This is an important component for two reasons:
 1. Tangata whenua acknowledge that wastewater is a modern creation and there need to be modern solutions for discharging wastewater; and
 2. the quality of the wastewater being discharged is improved;
- no change in existing storage within the WWTP ponds retains a negative impact of continued discharges to the river;
- the river discharge pipe-line and outfall being relocated closer to the river channel has a positive effect on discharge diffusion, but ultimately does not contribute to removing discharge from the river completely nor does it deliver drinkable quality wastewater;
- daily discharge volumes continuing to reflect the daily inflows and limited storage until irrigation has been commissioned is not ideal to cultural values; and
- land-based discharge being implemented on a minor scale is an important feature of The Package in acknowledging the cultural value of 100% human waste being discharged to land and is an important fundamental in incorporating tangata whenua worldviews. 24/7 discharges to the river when irrigation can't receive flows and during autumn, winter and spring is not ideal to cultural values.

As part of this, future cultural audits of land identified for wastewater discharge should be conducted in order to mitigate disturbances of archaeological sites or publicly unidentified wāhi tapu.

The effects of this discharge regime on the river's cultural values and health acknowledge tangata whenua worldviews and positively begin to incorporate them into the daily operations of the WWTP. However, wastewater discharges to water bodies which are not 100% drinkable water remain.

The initial 5-year stage establishes a solid framework for mitigating tangata whenua worldview concerns.

6.5 Stage 2 Implementation – Years 6-10

During years 6-10 of implementation, the following features will be developed:

- further reticulation improvements will reduce flows into the WWTP and will reduce the frequency and volume of pump station overflows so that they only occur rarely during larger storm events (targeted to less than 8 times per year from each pump station);
- filtration and UV treatment will continue to operate but partial bypasses of storm flows will reduce in volume and frequency due to reticulation improvements;
- the river discharge outfall will be maintained close to the river channel and modified to prevent siltation during summer periods of zero discharges;
- some additional storage capacity of up to 10,000 m³ (in addition to the existing 5,400 m³ within the WWTP ponds) will be constructed outside the existing the WWTP ponds for irrigation;
- additional areas of farm land near WWTP (up to a total of about 100-150 ha including the previous stage) will be developed to receive summer irrigation of treated wastewater and the subsequent discharges to the river will be able to occur as follows:
 - summer discharges to the river will reduce in volume, duration, and frequency (and may cease at times such as when the river is at or below half median flow) due to reduced inflows, increased storage, and expanded irrigation taking more of the flows;
 - discharges to the river will remain as follows when irrigation can't receive flows (during summer storms and every day throughout autumn, winter, and spring):

River Flow Rate	Maximum Daily Discharge Volume	Discharge Timing Restrictions
Below ½ median	1,600 m ³ /d	Overnight out-going tides
½ median to median	3,000 m ³ /d	All out-going tides
Median to 3 x median	5,000 m ³ /d	All out-going tides
Above 3 x median	No limit	Continuous 24-hour

Discharges to the river when it is flowing below ½ median during summer months should be rare, as the combination of irrigation and increased storage should usually be able to handle all wastewater flows while the river is flowing so slowly. Despite this, it is proposed that discharges when the river is below ½ median flow to be limited to **no more than 30 days of discharge in the months of December through to March** (with no limit on the numbers of days of discharge when the river is below ½ median outside of those months).

The effects of this discharge regime on the river’s cultural values are:

- further reticulation improvements, continued filtration and UV treatment positively impact on the river’s cultural values though rare overflows remain present;
- the river discharge outfall being maintained close to the river channel, while improving efficiency of the system, does not contribute to the removal of discharges from the river; and
- the additional storage capacity and additional land based discharge contribute significantly to enhancing the river’s cultural values.

The effects of this discharge regime on the river’s cultural values and health acknowledge tangata whenua worldviews and positively continue to incorporate them into the daily operations of the WWTP. However, wastewater discharges to water bodies which are not 100% drinkable water remain.

The 6-10 year stage positively builds on the framework established for mitigating tangata whenua worldview concerns.

6.6 Stage 3 Implementation – Years 11-20

During years 11-20 of implementation, the following features will be developed:

- further reticulation improvements will further reduce flows into WWTP and reduce the frequency and volume of pump station overflows so that they only occur very rarely during very large storm events (targeted to less than 4 times per year from each pump station);
- filtration and UV treatment will continue to operate with less frequent and smaller volume partial bypass of storm flows;
- the river discharge outfall will be maintained close to the river channel and modified if necessary to prevent siltation during extended periods of zero discharges;
- additional storage capacity (up to a total of 50-100,000 m³) will be constructed outside the existing WWTP ponds and/or on irrigated farms;
- additional areas of farm land (up to a total of about 300 ha including the previous stages) near WWTP will receive summer irrigation of treated wastewater from the expanded storage facilities and the subsequent discharges to the river will be able to occur as follows:
 - summer discharges to the river will cease except during long wet periods due to increased storage and irrigation taking all of the flows almost all the time;
 - discharges to the river will continue to occur as follows when irrigation and storage can’t receive flows (during winter and parts of autumn and spring):

River Flow Rate	Maximum Daily Discharge Volume	Discharge Timing Restrictions
Below ½ median	No discharge	No discharge at any time
½ median to median	3,000 m ³ /d	Only overnight out-going tides
Median to 3 x median	5,000 m ³ /d	All out-going tides
Above 3 x median	No limit	Continuous 24-hour

Discharges to the river when it is flowing between ½ median and median during summer months should cease and during autumn months will be rare, as the combination of irrigation and increased storage should usually be able to handle all wastewater flows while the river is flowing at or below its median flow.

The effects of this discharge regime on the river’s cultural values are:

- WWWTTP improvements including additional storage capacity, increased discharge to land and pump station overflows becoming rare events all build on the commitment to incorporating tangata whenua worldviews into daily operations; and
- wastewater discharges to waterways almost ceasing in summer and in parts of spring and autumn (dependant on extreme weather events) is a major positive step in removing wastewater discharge to waterways from operations.

The 11-20 year stage is a significant step to incorporating the river’s cultural values as part of daily operations, with significant reduction of wastewater discharge to the river.

6.7 Stage 4 Implementation – Years 21-30

During years 21-30 of implementation, the following features will be developed:

- further reticulation improvements will further reduce flows into WWWTTP and reduce the frequency and volume of pump station overflows so that they only occur very rarely during unusually large storms (targeted to less than 4 times per year from each pump station);
- filtration and UV treatment will continue to operate and storm flows will rarely bypass it;
- the river discharge outfall will be maintained close to the river channel and modified if necessary to prevent siltation during extended periods of zero discharges;
- additional storage capacity (up to a total of 200-400,000 m³) will be constructed within irrigated farms;
- additional areas of farm land (up to a total of about 600 ha including the previous stages) may be identified and developed to receive summer irrigation of treated wastewater from the expanded storage facilities and the subsequent discharges to the river during will be able to occur as follows:
 - discharges to the river may cease during summer, autumn, and some or all of winter due to increased storage and irrigation taking all of the flows;
 - discharges to the river during late winter and maybe parts of spring when irrigation and storage can’t receive flows will continue to occur as follows:

River Flow Rate	Maximum Daily Discharge Volume	Discharge Timing Restrictions
Below ½ median	No discharge	No discharge at any time
½ median to median	No discharge	No discharge at any time
Median to 3 x median	5,000 m ³ /d	Only overnight out-going tides
Above 3 x median	No limit	Continuous 24-hour

Discharges to the river when it is flowing between median and 3 x median during summer months should cease and during winter and spring months will be rare, as the combination of irrigation and increased storage should usually be able to handle all wastewater flows while the river is flowing at or below its 3 x median flow. The ability to discharge during river flows above median is necessary to ensure that wastewater flows during winter and spring months do not risk overflowing the storage facilities before the next irrigation season commences.

The effects of this discharge regime on the river's cultural values are:

- Tangata whenua worldviews are incorporated into daily operations of the WWWT in meaningful, proactive and practical operations. However, the ideal of either drinkable quality of wastewater discharge to water and/or 100% wastewater discharge to land is not achieved;
- discharges of wastewater, including pump station overflows, to the river are significantly reduced;
- the quality of wastewater discharges is significantly improved; and
- very significant increases in storage capacity and irrigation are projected which will have a corresponding positive effect on the river's cultural values.

The 21-30 year stage continues to greatly improve the operations of the WWWT in a manner which incorporates tangata whenua worldviews, but does not fulfil them completely by removing wastewater discharge to waterways completely nor delivering 100% drinkable quality water to the river.

However, by year 30 The Package will have delivered an achievable, positive result for the river's cultural values and health in a manner which has been well consulted upon and which is realistically achievable, acceptable and, with good planning, affordable for the Wairoa Community.

7 MITIGATION MEASURES

7.1 General

Mitigation may occur when the Cultural, Environmental, Social and Financial bottom-lines do not sit comfortably with tangata whenua worldviews. This will occur when there is a direct conflict with the kawa of tangata whenua, as kawa are unchanging. Mitigation will be required in the event that development:

- is deemed culturally inappropriate to the kawa and perhaps the tikanga of tangata whenua;
- encroaches on or disturbs wāhi-tapu sites; or
- unearths human remains.

7.2 Cultural Matters Requiring Mitigation

- **Wastewater discharge to the river.** The Package is a 30-year plan which incorporates and mitigates tangata whenua worldviews. However, kawa is unchanging and thus so is the cultural law that human waste (in this case in the form of wastewater) is discharged to land, not water. Complete discontinuation of wastewater discharge to waterways is not provided by The Package.

Part of human waste kawa features traditional land composting/filtration which, after completed, any water that found its way into a waterway was purified and fit for human consumption. Current wastewater in its massive volume is a modern creation. If future technology reaches an affordable and applicable stage where wastewater can be efficiently converted to drinkable water quality, then this clean type of wastewater discharge to waterways will be acceptable to tangata whenua worldviews as a complete alternative to the ideal of 100% land discharge.

- **Te Toka a Tupapeke.** This is the only wāhi tapu site to be knowingly directly affected by the WWTP wastewater discharges, as it sits in the river itself at the Wairoa River mouth. The only acceptable options in this instance are:
 - complete wastewater discharge to land, or;
 - wastewater discharge being fit for human consumption before it enters the river.

The Package offers no resolution for this matter and there are no current circumstances where suitable mitigation to tangata whenua could be offered presently. However, the commitment to improving the quality of the wastewater discharge and decreasing the volume over time is important to reducing the negative cultural effect of the discharge to the river and thus this wāhi tapu.

- **WWTP and surrounding sites.** The WWTP is situated on an old papa kāinga and is surrounded by sites of historic battles and heavy occupation pre-1900. Thus there is a likelihood that, in the event of future earthworks as indicated in The Package, two types of objects may be unearthed. These are:
 - **Human Remains.** The resolution process already exists and would be:
 - Bones unearthed.
 - Police contacted first and foremost.
 - Police usually contact a forensic pathologist to ascertain the nature and age of the bones.
 - If the bones are found to be human, the Coroner becomes involved.

- As bones which may be found in any earthwork associated with the WWTP will not be in a recognised cemetery, the Coroner may enlist an archaeologist to ascertain the age of the burial site.
- If the bones are found to be historic, usually Heritage New Zealand is enlisted to liaise with tangata whenua. Wairoa Museum in the past has assisted with this.
- For the WWTP site and surrounding area, reintering of past bones has been done in a physically unmarked fashion in the Rangihoua/Pilot Hill reserve.
- The site of burial will be recorded with a GPS coordinate to avoid future disturbance.

In addition to this process:

- WDC should maintain a register of such burials.
- **Taonga Tuturu & Artefacts.** The resolution process already exists and would be:
 - Wairoa Museum contacted first and foremost.
 - Wairoa Museum will then follow their procedure based on the Protected Objects Act 1975 and the associated Ministry for Culture and Heritage guidelines. This may include further archaeological advice and appropriate tangata whenua consultation.

7.3 Mitigation Measures Proposed by the Existing Package

- **Wastewater Infrastructure Improvements.** The modern methods of filtration and UV treatment for treating wastewater to improve its quality are significant in mitigating tangata whenua worldviews, but currently do not mitigate them entirely as the wastewater is not of a drinkable quality at the end of the process. The other improvements to infrastructure are also significant in mitigating tangata whenua worldviews by reducing the amount of wastewater which is released into waterways over time by securing the infrastructure for its intended purpose.
- **Wastewater Irrigation.** During the 30-year implementation of The Package a significant amount of wastewater will be discharged to land, but waterways discharge will not be completely discontinued. The impact of the discharges will be less and thus more acceptable than the current situation, but remains culturally inappropriate to a lesser extent than the current situation.
- **Catchment Advocacy.** This is already in place and are positive, proactive activities WDC are involved with. All of these measures are acceptable and appropriate and they are:
 - WDC's positive involvement with the Wairoa Wastewater Stakeholder Group;
 - WDC's continued support for the Wairoa Awa Restoration Project (WARP) and the associated Wairoa Community Ngahere Nursery; and
 - WDC's involvement with establishing the Eastland Group Wairoa Contestable Community Grant which targets the establishment or development of community services or projects focused on the river.

In addition to these, WDC will:

- be part of establishing Te Rohe o Te Wairoa Reserves Board – Matangirau; and
- will possibly be required to establish working relationships with standing Takutai Moana applications MAC-01-09-11 and MAC-01-09-17.

7.4 Additional Potential Mitigation Measures

Future mitigation measures for WDC to consider supporting include:

- further consultation with Wairoa river hapu to develop and implement a regular Cultural Health Index Monitoring Programme for Wairoa river and possibly the entire Wairoa river catchment;
- possible WDC involvement in the Toi Mauri Tū proposal being established by Fay Tutahi, which would see poupou installed at Whakamahia as a community based project; and
- a commitment to continued research into achieving 100% drinkable water quality for wastewater discharge to waterways as an alternate option to 100% land based wastewater discharge.

8 CONSENT CONDITIONS AND MONITORING

Proposed resource consent conditions for the WDC Replacement Discharge Resource Consent for the WWTP as evaluated in this report include:

- the continuation of the Wairoa Wastewater Stakeholders Group (WWSG) as a positive consultation mechanism for future planning, works evaluation and project implementation. This should include the yet to be formed Te Rohe o Te Wairoa Reserves Board – Matangirau and may also include standing Takutai Moana applications MAC-01-09-11 and MAC-01-09-17;
- WDC's continued support for the Wairoa Awa Restoration Project (WARP) and the associated Wairoa Community Ngahere Nursery;
- further consultation with Wairoa river hapu (possibly through WWSG and WARP) to develop and implement a regular Cultural Health Index Monitoring Programme for Wairoa river; and
- the processes as described in Section 7.2 for unearthing human remains, Taonga Tuturu and Artefacts are agreed to and complied with.

9 RECOMMENDATIONS

Recommendation that WDC should implement as culturally important aspects of the future wastewater treatment and river discharge system is:

- a commitment made to continued research into achieving 100% drinkable water quality for wastewater discharge to waterways as an alternate option to 100% land based wastewater discharge.

Recommendations that WDC should implement as mitigation measures for the river discharge are:

- implement the WWTP and town wastewater infrastructure improvements;
- implement wastewater irrigation to land;
- continued catchment environmental advocacy support; and
- consider supporting the Toi Mauri Tu proposal.

Recommendations of culturally relevant resource consent conditions including cultural monitoring for the river discharge are:

- WDC continue the Wairoa Wastewater Stakeholders Group including the yet to be formed Te Rohe o Te Wairoa Reserves Board - Matangirau and in the future possibly include standing Takutai Moana applications MAC-01-09-11 and MAC-01-09-17;
- WDC continue support of the Wairoa Awa Restoration Project;
- WDC develop and implement a permanent Cultural Health Index Monitoring Programme; and
- WDC adopt a clear procedure for the handling of unearthed human remains, taonga tuturu & artefacts if found during the implementation of The Package.

10 CONCLUSIONS

The key cultural values for the river discharge are:

- Water is a living entity – it has a mauri and is a mauri itself;
- Tikanga are cultural law, not cultural lore;
- Kawa are unchanging. Tikanga adapt based on kawa and sound modern practice;
- Karakia/Inoi are an essential part of any development; and
- Wāhi-Tapu are traditionally the only category of significant sites that need to be actively avoided by development.

The effects of implementing each stage of the package (improved effluent quality and reduced discharge frequencies) on those values are:

- the current wastewater discharges are culturally unacceptable;
- the initial 5-year stage of The Package establishes a solid framework for mitigating tangata whenua worldview concerns;
- the 6-10 year stage of The Package positively builds on the framework established for mitigating tangata whenua worldview concerns;
- the 11-20 year stage of The Package is a significant step to incorporating the river's cultural values as part of daily operations, with significant reduction of wastewater discharge to the river; and
- the 21-30 year stage of The Package continues to greatly improve the operations of the WWWT in a manner which realistically incorporates tangata whenua worldviews, but does not fulfil them by removing wastewater discharge to waterways completely or providing wastewater discharge of drinkable quality.

The effectiveness of mitigation measures, monitoring, and consent conditions on protecting cultural values are:

- mitigation measures almost fully align with legislative requirements and tangata whenua requirements to incorporate their worldviews as part of the cultural and physical health of the river and sites affected by the WWWT wastewater discharges;
- monitoring measures provide a platform for tangata whenua and WDC to continue to work collaboratively to assess and enhance the cultural and physical health of the river; and
- consent conditions provide a platform for tangata whenua and WDC to continue to work collaboratively to assess and enhance the cultural and physical health of the river and sites affected by the WWWT wastewater discharges.

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12 APPENDICES

Appendix A – Map of Cultural Landscape Significant Sites within 2 kilometres of the Wairoa WWTP

APPENDIX A

Cultural Landscape Significant Sites within 2 kilometres of the Wairoa WWTP



Appendix C

1. Te Wairoa-Tapoko-Rau.
2. Te Ari-a-Tapuwae.
3. Te Ari-a-Te Maha.
4. Taumata-a-Tuna.
5. Waiparuparu.
6. Whare-o-Koro.
7. Te Motu-o-Te Rauhina.
8. Waiparuparu.
9. Ahipaniki.
10. Rangihoua.
11. Waiopaoa.
12. Model Pa.
13. Area of unrecorded occupation.
14. Te Rauwa.
15. Parekereke.
16. Te Manga.
17. Whakamahia.
18. Mana.
19. Tawhara.
20. Te Wairoa-Matangi-Rau.
21. Wahi-Pakanga.
22. Toha's Tomb.
23. Kaiaha.
24. Nga Puna.
25. Tahuna Mai Hawaiki.
26. Te Toka a Tupapeke.
27. Tuhinapo. (location unknown).