Rotorua urban water quality monitoring programme

Purpose

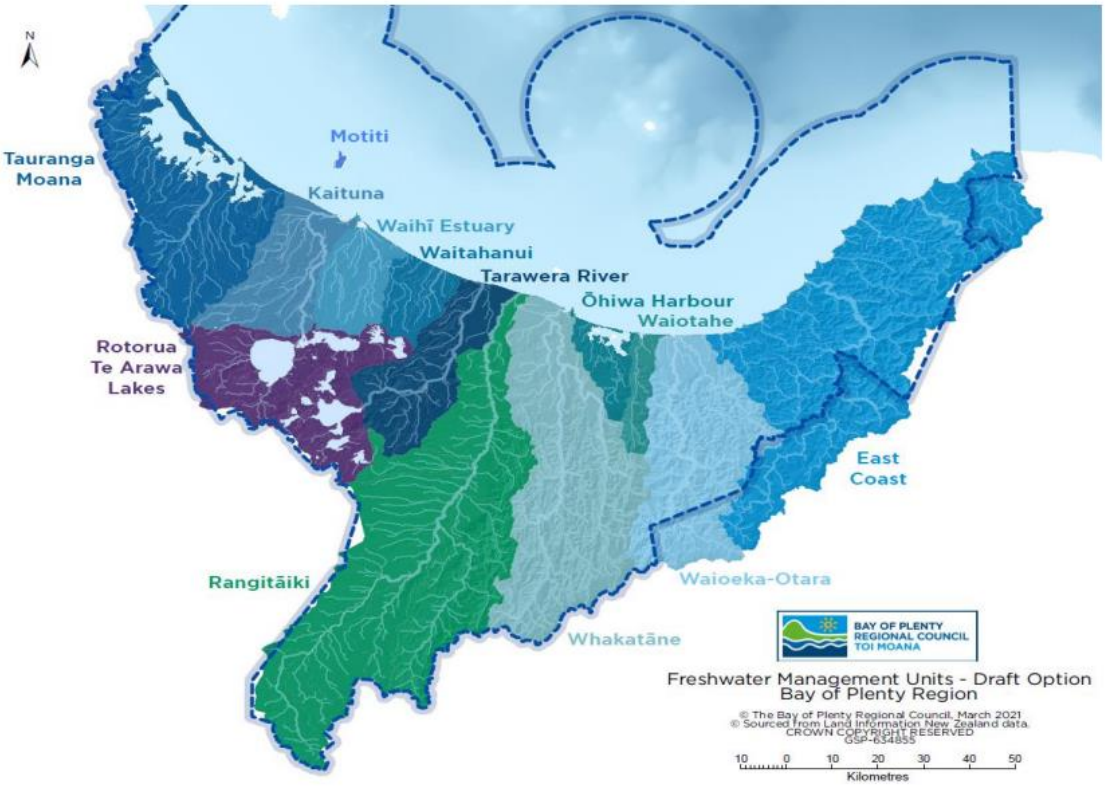
- Contribute to achieving stream water quality in the Rotorua urban area that provides for ecosystem health and human contact, by
- providing a water monitoring programme that informs freshwater quality management and that identifies potential contaminants in urban streams to inform and ensure appropriate steps are taken for mitigation
- To deliver the monitoring requirements for the Rotorua urban stormwater consent

Freshwater Quality

Rainwater runoff from the Rotorua urban environment is a component of our freshwater in the Lake Rotorua catchment.

At a national level, the National Policy Statement for Freshwater Management (NPSFM, 2020) outlines the direction all regional councils must take in the management of freshwater. Freshwater provides for ecosystem health and human contact. The following are compulsory values that must be: Ecosystem health; Human contact; Threatened species; Mahinga kai.

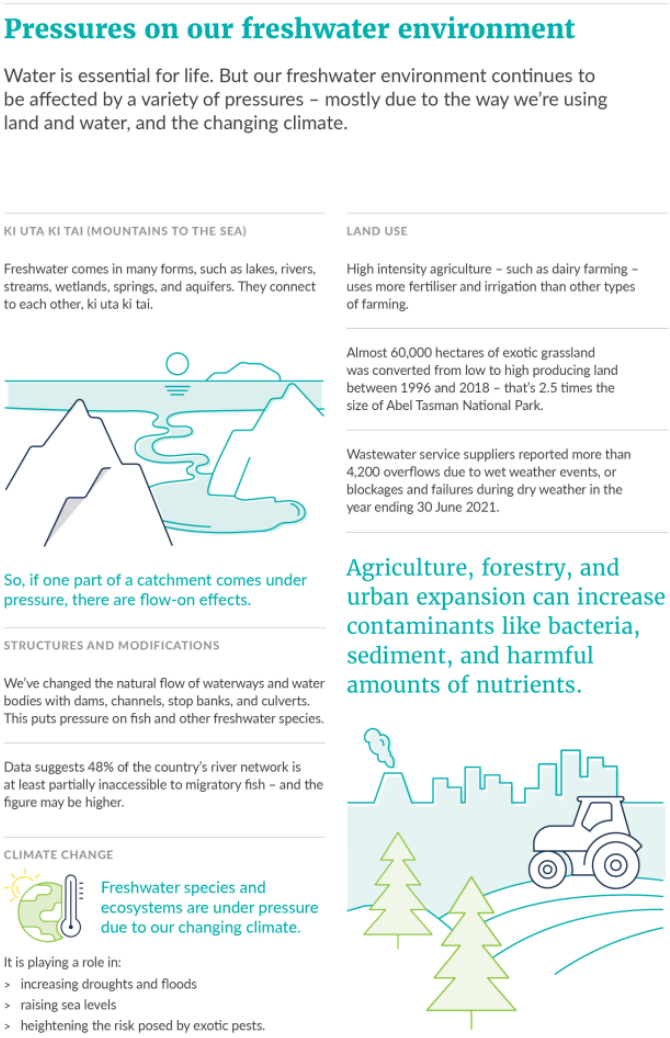
At a regional level, BOPRC is revising its Regional Policy Statement and Regional Natural Resources Plan to give effect to the NPS. BOPRC is consulting with communities and tangata whenua and is proposing a number of draft Freshwater Management Units (FMUs) throughout the region (Figure 1). When considering the health of our freshwater it is important to consider all the interrelated components of the whole catchment drained by a river from the mountains to the sea - ki uta ki tai. The draft management units relate primarily to freshwater catchment boundaries, reflect co-governance and rohe boundaries and are at a scale that may have a common management approach. Additional freshwater values and environmental outcomes for this FMU are currently being developed. Rainwater runoff from the Rotorua urban environment is a component of the draft Rotorua Te Arawa Lakes FMU.



At an iwi and rohe level, the Rotorua Te Arawa Lakes are a taonga (treasure) to the people of Te Arawa. The Te Arawa Lakes Trust (TALT) represents the interests of Te Arawa hapu and whanau in relation to the 2006 Settlement. TALT have partnered with BOPRC and RLC to protect and restore the Rotorua Lakes. Rainwater runoff from the Rotorua urban environment is a component of the Te Arawa Rotorua Lakes Programme.

At a local Level, Council provides stormwater network to convey the rainwater that falls on the urban environment to our freshwater bodies. Council needs a consent to discharge the conveyed water into our freshwater bodies. One of Council's priorities is supporting the protection and restoration of our natural environment. Rainwater runoff from the Rotorua urban environment is a component of the natural environment in our District.

Key components of freshwater ecosystems include aquatic life, biodiversity, habitats, water quantity and flows, ecological process, and water quality. Urbanisation is one of many human activities that are impacting our freshwater. (Our freshwater 2023 | Ministry for the Environment).



Pressures on our freshwater environment

Water is essential for life. But our freshwater environment continues to be affected by a variety of pressures – mostly due to the way we're using land and water, and the changing climate.

KI UTA KI TAI (MOUNTAINS TO THE SEA)

Freshwater comes in many forms, such as lakes, rivers, streams, wetlands, springs, and aquifers. They connect to each other, ki uta ki tai.

So, if one part of a catchment comes under pressure, there are flow-on effects.

STRUCTURES AND MODIFICATIONS

We've changed the natural flow of waterways and water bodies with dams, channels, stop banks, and culverts. This puts pressure on fish and other freshwater species.

Data suggests 48% of the country's river network is at least partially inaccessible to migratory fish – and the figure may be higher.

CLIMATE CHANGE

Freshwater species and ecosystems are under pressure due to our changing climate.

It is playing a role in:

- increasing droughts and floods
- raising sea levels
- heightening the risk posed by exotic pests.

LAND USE

High intensity agriculture – such as dairy farming – uses more fertiliser and irrigation than other types of farming.

Almost 60,000 hectares of exotic grassland was converted from low to high producing land between 1996 and 2018 – that's 2.5 times the size of Abel Tasman National Park.

Wastewater service suppliers reported more than 4,200 overflows due to wet weather events, or blockages and failures during dry weather in the year ending 30 June 2021.

Agriculture, forestry, and urban expansion can increase contaminants like bacteria, sediment, and harmful amounts of nutrients.

The quality of rainwater runoff from the Rotorua urban environment is one of a number of components of: our local natural environment, our Te Arawa Rotorua Lakes, our freshwater ecosystem. Measures of all of these components are required to understand the health of our freshwater.

Rotorua Comprehensive Stormwater Consent

A stormwater monitoring programme is an essential component of the application for the comprehensive stormwater consent (CSC) for the Rotorua urban area and its ongoing implementation through the Catchment Management Plan(s). The monitoring programme is aligned with the purpose of the resource consent, which is to:

a) Authorise the discharge of stormwater from Council land and activities and associated infrastructure and works in the Rotorua urban area including the temporary discharges of sediment- contaminated stormwater from earthworks related to the replacement of stormwater infrastructure

The application for the consent does not include:

a) Authorising discharges of stormwater from HAIL Sites or potential HAIL sites (sites zoned Industrial or are deemed high risk (other than Council sites) – these must be authorized separately by the Regional Council if they do not meet the permitted criteria in the NRP
b) Authorizing discharges of geothermal water– these must be authorised separately by the Regional Council.
c) The discharge of stormwater from greenfield development and new subdivisions. RLC will enter into a partnership approach with Mana whenua to create Stormwater Mgt Plans for greenfield developments. These activities will require authorisation by a third-party resource consent. Once greenfield developments are complete, the consent may be transferred to the Rotorua District Council once the development is complete, subject to sufficient monitoring to demonstrate the discharge will not exceed NRP permitted levels, not exceed trigger values in the RLC CSC, and subject to RLC agreement.

Scope

Water quality is one of a number of key components required for understanding the health of our freshwater.

The urban water quality programme monitors the quality of urban streams to identify the presence of contaminants higher than permitted levels or the presence of any condition likely to be injurious to health or offensive. The programme includes ensuring all proper steps are taken to reduce contaminants to permitted levels and remove nuisance conditions. The scope and approach proposed reflects the roles and responsibilities of local Councils and more details is provided in Appendices 1 and 2.

The scope includes identifying contaminants in our water, narrowing down the location and source so contaminants can be removed or mitigated and the quality and mauri of the water restored.

Geothermally-influenced waters are not excluded from the programme – inclusion will improve our understanding of the extent of the impact of geothermal fields (seen in the image below) on water quality. Naturally elevated levels exceeding trigger levels will not be treated as contaminants or considered a nuisance condition.

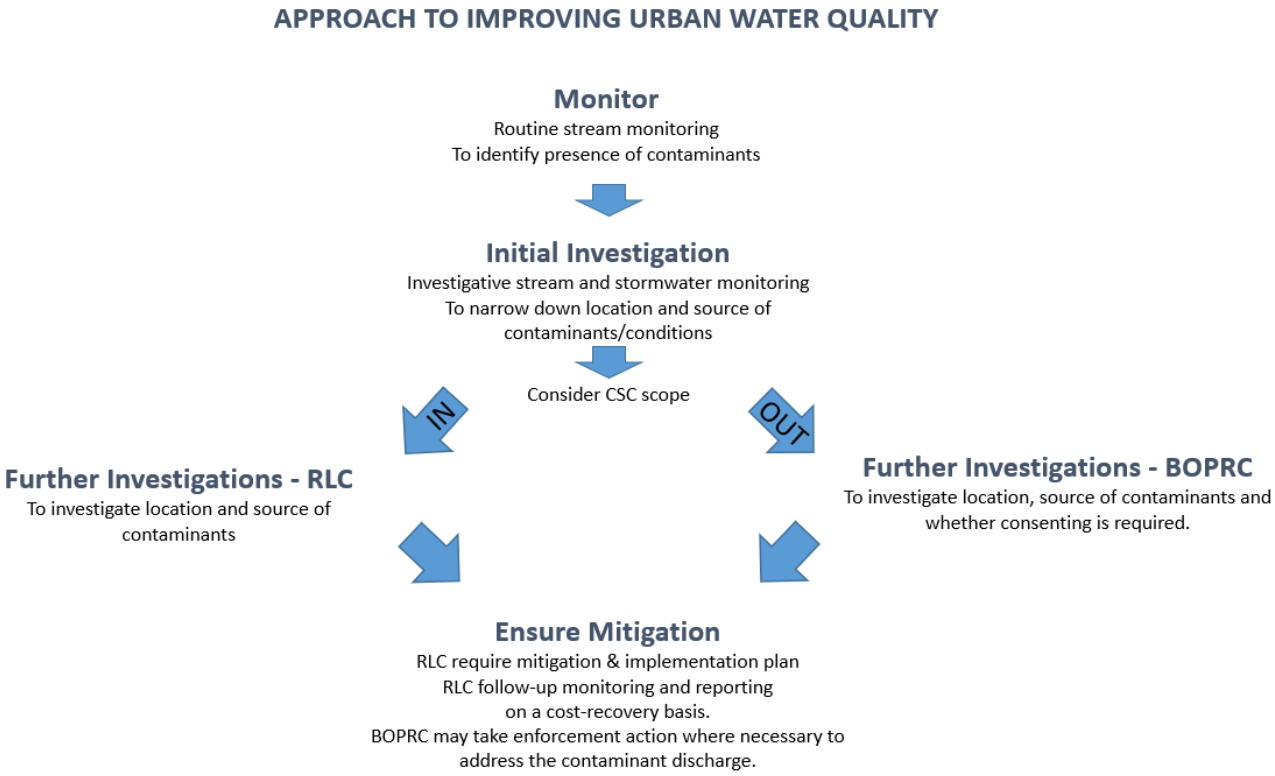
The scope does not replicate but complements the following activities:

- BOPRC consents for the discharge of stormwater other than the RLC urban stormwater consent for the discharge of stormwater from RLC land use activities
- BOPRC bathing water quality monitoring
- BOPRC NERMN environmental monitoring
- BOPRC NPS attribute state monitoring
- BOPRC focus sub-catchment monitoring
- Tangata whenua cultural indicator monitoring

Approach

1. RLC will monitor the quality of the freshwater receiving environment for urban stormwater discharges to establish long term trends and identify presence of contaminants and conditions likely to be injurious to health or offensive
    - Stream sites above and below the urban areas
    - Stream sites above and below industrial areas (areas predominantly with hail sites and potential hail sites)
2. RLC will carry out initial investigations and monitoring of the quality of stream and inflows to narrow down the location and source of contaminants
3. Where the source is likely within the scope of the urban comprehensive consent (RLC-controlled rather than BOPRC controlled) then RLC will carry out further investigations and monitoring to identify the location and source of contamination
4. Where the source is likely outside the scope of the urban comprehensive consent (BOPRC-controlled rather than RLC controlled) then RLC will inform BOPRC that further investigations and monitoring is required to identify the location and source of contamination. RLC will assist with monitoring if required and funded.

5. RLC will cause all proper steps to be taken to mitigate the contamination or nuisance condition by requiring a mitigation and implementation plan from the responsible party or organisation. Mitigation might include changing practices or adding devices to capture contaminants in runoff prior to entering the stormwater network. If the source of contaminants is wastewater then the wastewater will be discharged to sewer or broken pipes repaired. If the contaminants are heaving metals and the source is geothermal they will not be discharged to sewer because heavy metals are toxic to microorganisms at specific concentrations and can have a serious effect on the functioning and efficiency of biological wastewater treatment plants. Heavy metals also accumulate in the biosolids and can prevent the boisolids from being beneficially used. Monitoring data from the programme will help us understand where contaminants are naturally elevated.
6. RLC will share water quality data, as one of the components required to understand the health of our freshwater, with those responsible for other monitoring programmes as requested (BOPRC, tangata whenua etc)



Urban surface water monitoring sites

A suite of stream sites have been identified to (1) help determine the impact of urban stormwater on stream water quality and (2) to help narrow down the extent of a stream that might be impacted. Monitoring site information is provided in Table 1 and site locations are shown in the appended maps (Appendices 3-5). Once there is evidence of contamination further investigation will attempt to identify, isolate and potentially locate the source of contaminants and this will includes monitoring stormwater discharges and stormwater within the network as required.

Priority 1 sites

- Stream sites that are required to determine the impact of urban land on water quality
    - stream sites upstream and downstream of urban land
    - stream sites upstream and downstream of industrial land (HAIL sites and potential HAIL sites)
- Long-term water quality trends will be established from priority 1 sites.

Priority 2 sites

- Additional sites within sections of urban streams to understand localised water quality
- The number of potential sites is too extensive to monitor routinely therefore a suite of 6-12 additional sites will be monitored at any point in time
- Sites will be removed when water quality is consistently below trigger levels and additional sites will be added.

Investigative monitoring sites

- Priority 1, 2 , and additional stream and stormwater and stormwater discharge sites will be monitored as required once there is evidence of contamination in the receiving environment, in an attempt to identify, isolate and potentially locate the source of contaminants.

Table 1. Stream, tributary and stormwater sampling sites

Stream and Tributary sample sites

Site Name	Priority level	Main catchment	Rationale for Priority 1 sites	Sampling Runs	Likely geothermal influence (Y/N)
Waikawau Stream at Hannah's Bay upstream	1	Waikawau	Below industrial	Eastern	Y
Waingaehe Stream at SH30	1	Waingaehe	Below urban	Eastern	N
Waingaehe Stream at lake edge	1	Waingaehe	Above urban	Eastern	N
Waingaehe Stream tributary at lake edge	1	Waingaehe	Below urban	Eastern	N
Kaipakau Stream at Carroll Place	1	Kaipakau	Below urban	Eastern	N
Kaipakau Stream at 70 Morey St	1	Kaipakau	Above urban	Eastern	N
Kaipakau Stream at 28 Morey St	1	Kaipakau	Above urban	Eastern	N
Waitawa Stream at Selwyn Road	1	Waitawa	Above urban	Eastern	N
Waitawa Stream at Vaughan Road	1	Waitawa	Below industrial	Eastern	N
Drain/Stream at 366 Te Ngae Road	1	Waitawa	Above industrial	Eastern	N
Waitawa Stream East at Te Ngae Road	1	Waitawa	Above industrial	Eastern	N
Waitawa Stream West at Te Ngae Road	1	Waitawa	Above industrial	Eastern	N
Drain/Stream at Te Araki Place	1	Puarenga	Below industrial	Eastern	Y
Waitawa Stream at 87 Iles Road	1	Waitawa	Above urban	Eastern	N
Waitawa Stream at 11 Walford Drive	1	Waitawa	Above urban	Eastern	N
Waikawau Stream at Hannah's Bay downstream	2	Waikawau		Eastern	N
Puarenga Stream N at WWTP	1	Puarenga	Below urban/industrial	Puarenga	Y
Puarenga Stream at Hemo Gorge	1	Puarenga	Above urban	Puarenga	N
Puarenga Stream at 117 Sala St	1	Puarenga	Above industrial	Puarenga	Y
Puarenga Stream at 90 Sala St M1	2	Puarenga		Puarenga	Y
Waipa Stream at confluence	2	Puarenga		Puarenga	Y
Waihuahuakakahi Stream at SH5	2	Puarenga		Puarenga	Y
Kauaka Stream at confluence	2	Puarenga		Puarenga	Y
Drain/Stream at Scott St	2	Puarenga		Puarenga	Y
Puarenga Stream at Te Ngae Road	2	Puarenga		Puarenga	Y
Utuhina Stream at headworks	1	Utuhina	Above urban	Utuhina	N
Tauwhakapae Stream at Clayton Road	1	Utuhina	Above urban	Utuhina	N
Otamatea Stream at Icarus Place	1	Utuhina	Above urban	Utuhina	N
Mangakakahi Stream at Pukehangi Road	1	Utuhina	Above urban	Utuhina	N

Mangakakahi Stream at Linton Park East	1	Utuhina	Above industrial	Utuhina	N
Utuhina Stream at Old Taupo Road	1	Utuhina	Above industrial	Utuhina	N
Utuhina Stream at Lake Road	1	Utuhina	Below industrial	Utuhina	Y
Utuhina Stream at Lake edge	1	Utuhina	Below urban	Utuhina	Y
Tauwhakapae Stream at confluence	2	Utuhina		Utuhina	N
Otamatea Stream at confluence	2	Utuhina		Utuhina	N
Mangakakahi Stream at Depot St	2	Utuhina		Utuhina	N
Drain/Stream at Depot St	2	Utuhina		Utuhina	N
Drain/Stream at Tarewa Rd	2	Utuhina		Utuhina	Y
Geothermal flow from Kuirau park	2	Utuhina		Utuhina	Y
Drain/Stream at Tui Road	1	Waiowhiro	Above industrial	Northern	N
Drain/Stream at Walker Road	1	Waiowhiro	Below industrial	Northern	N
Waiowhiro Stream at SH5	1	Waiowhiro	Above urban	Northern	N
Waiowhiro Stream at lake edge	1	Waiowhiro	Below urban	Northern	N
Waikuta Stream at SH5	1	Waikuta	Above urban	Northern	N
Waikuta Stream at 41 Waikuta Road	1	Waikuta	Below urban/industrial	Northern	N
Waikuta Stream at 104 Parawai Road	1	Waikuta	Below urban/industrial	Northern	N
Ngongotaha Stream at SH5	1	Ngongotaha	Above urban	Northern	N
Ngongotaha Stream at Cycleway bridge	1	Ngongotaha	Below urban	Northern	N
Waiteti Stream at SH36	1	Waiteti	Above urban	Northern	N
Waiteti Stream at lake edge	1	Waiteti	Below urban	Northern	N
Drain/Stream at Paraone Street	1	Between Ngongotaha & Waiteti	Below urban/industrial	Northern	N
Drain/Stream at 11 Luke Place	2	Waiowhiro		Northern	N
Drain/Stream at Aquarius Drive Reserve	2	Waiwhiro		Northern	N
Waiowhiro Stream at Aquarius Dr Reserve Nth	2	Waiowhiro		Northern	N
Waiowhiro Stream at Aquarius Dr Reserve Sth	2	Waiowhiro		Northern	N
Ngongotaha Stream at SH36	2	Ngongotaha		Northern	N

Stormwater Sites

GPT outfall at Amohau St	1			Central - Commerical	
GPT outfall at Eruera St	1			Central - Commerical	
GPT outfall at Oruawhata Drive	1			Central - Commerical	
As required when triggered	1			Industrial	

Urban surface water monitoring frequency

The monitoring frequency depends on the purpose of the monitoring and the characteristics being monitored.

Routine monitoring - ongoing

- Priority 1 sites - to understand urban receiving water quality and potential impacts as well as to establish long term trends
- 4 samples per year: 2x dry weather, 2x wet weather – to understand whether contaminants are arising from stormwater or not

Routine monitoring – short-term

- Priority 2 sites - to indicate potential localised impacts and as such are subject to change every 1-2 years if below trigger levels
- 2 samples per year: 1x dry weather, 1x wet weather

Stormwater discharges and stormwater within the network

- Investigative monitoring Routine monitoring is for a short period of time - to understand localised water quality and potential impacts
- 2 samples per year: 1x dry weather, 1x wet weather

Where dry and wet weather days are defined as

- Dry days - In the time intervals prior to sampling rainfall is insufficient to generate runoff into the stream
- Wet days - In the time intervals prior to sampling the rainfall is sufficient to generate some stormwater runoff into the stream and less than the 10 year return period in Table 2.

Table 2. Rainfall depth data for Rotorua at Whakawerawera without climate change scenario applied

10 year return	10 min	20 min	30 min	1 hr	2 hr	6 hr	12 hr	24 hr	48 hr	72 hr	96 hr	120 hr
Rainfall depth (mm)	16.3	23.7	29.2	40.8	55.7	86.6	111	138	168	187	200	210

Urban surface water monitoring characteristics

Routine monitoring

The suite of characteristics that will be routinely monitored in the receiving environment includes: E. Coli, total suspended solids (TSS), suspended fine sediment (visual clarity), visual colour, visual oil and grease, copper, zinc, dissolved oxygen (DO), pH, conductivity, temperature, total-nitrogen, ammoniacal-nitrogen, dissolved inorganic nitrogen, total phosphorus, dissolved reactive phosphorus. These characteristics can indicate the presence of contaminants that

- may arise from the urban environment
- may impact freshwater health
- may contribute to the load of nutrients to the lake
- could exceed BOPRC NRP permitted levels for stormwater discharges
- could exceed ANZEC guidelines for toxicants for aquatic species
- could impact NPS attribute states

Investigative monitoring

When routine monitoring indicates potential contamination, further investigations will be carried out to help narrow down and potentially identify the source of contaminants.

Further investigations may include considering data from other sources, considering incident reports, considering activities in the vicinity, and carrying out further investigative monitoring.

Investigative monitoring may include any of the routine characteristics as well as the additional characteristics total petroleum hydrocarbons (TPH), microbial source tracking (MST), arsenic, chloride, only as required.

Investigative monitoring and mitigation – triggered by exceedances

Initial investigations

- Trigger values for the urban streams are provided in Table 3. Two consecutive exceedances of trigger values in an urban stream monitoring site triggers an initial investigation by RLC to identify the area the contaminant(s) appear to be arising from and the potential source. If there is 1 exceedance of a characteristic that is not assessed in the field, an initial investigation is optional.
- The triggered action does not necessarily apply to the geothermal streams (eg Scott Street drain) or geothermally-influenced waterways. Streams falling within the Rotorua geothermal field (the lower reaches of the Utuhina Stream and Puarenga Stream from Whakarewarewa Village and below) contain naturally occurring heavy metals and suspended solids and therefore exceedances of some characteristics may not indicate contamination. For this reason some triggers are an “atypical” result and the trigger levels for NH4, pH, DRP, do not apply.
- Initial investigations may include: considering results from other monitoring programmes, monitoring a suite of samples up-stream, monitoring stormwater discharges into the stream, considering the industrial activities database, microbial source tracking, sampling on different days, times and weather conditions etc as appropriate at the discretion of the RLC water quality monitoring scientist.
- While initial investigations would attempt to locate the source they might only narrow down the area and potential source.

Table 3. Proposed urban stream monitoring and trigger levels

	Sites monitored (Priority 1, 2, Investigative)	Trigger	Trigger dry-weather	Trigger wet-weather	Unit
E.Coli	1, 2, I		> 540	>5000	mpn or cfu/100ml
Total Suspended Solids	1, 2, I	> 150			mg/l
Suspended fine sediment (visual clarity)	1, 2, I	Atypical			tbc
Visual colour	1, 2, I	Colour Change			Possibly mansell colour chart
Copper	1, 2 (Wet only), I	>0.0025			mg/l
Zinc	1, 2 (Wet only), I	> 0.031			mg/l
Visual oil and grease	1, 2, I	Presence, touch, odour			presence/absence
DO	1, 2, I	Atypical			mg/l
pH	1, 2, I	<6 or >9			pH units
Conductivity	1, 2, I	Atypical			microsemens
Temperature	1, 2, I	Atypical			^{0}C
TN	1	X			mg/l
TP	1	X			mg/l
Total oxidised-N (DIN)	1	1.5			mg/l
Ammoniacal-N	1	0.24			mg/l
DRP	1	0.10			mg/l
Other	I				

Other investigative monitoring can include any of the routine characteristics plus TPH, MST, As, Cl (only as required)

NH4, pH, DRP, triggers do not apply to geothermally-influenced waterways

Oil and grease – some naturally occurring minerals can look like oil and grease

Follow-up investigations and mitigation

RLC will fund routine monitoring and initial investigations to identify the potential source of contaminants.

Where initial investigations could only narrow down the general area and potential source, subsequent investigations and monitoring may be required. This may include additional monitoring, microbial source tracking, testing for petroleum hydrocarbons or other characteristics to identify the extent of the contamination and the potential source.

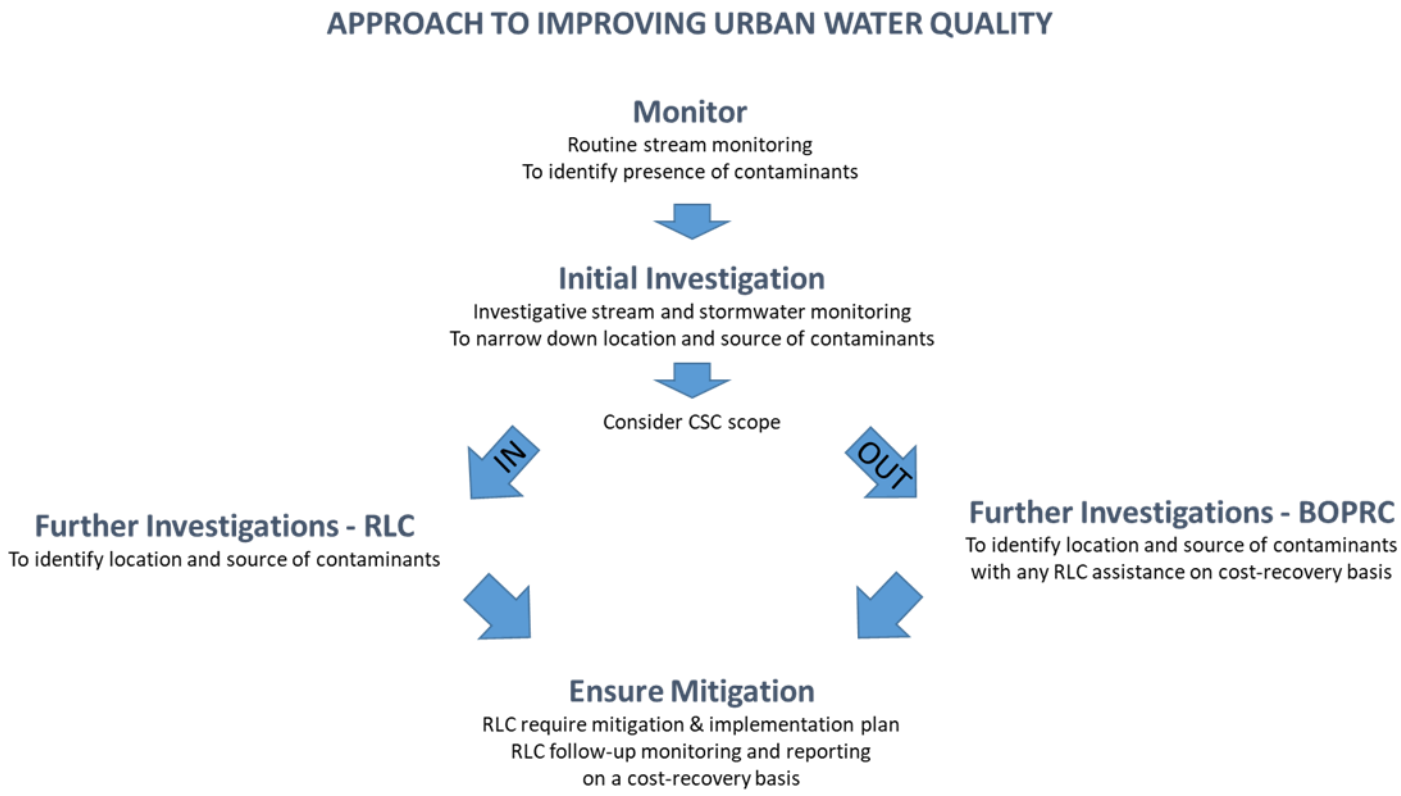
RLC may carry out further investigations and recover costs, or assist the responsible party with further investigations.

Identifying mitigation actions and options to reduce contaminants (in this section include the table of responsibilities eg cease inappropriate actions of a urban resident (eg paint down drain), sewage to TRILITY to investigate and take action, industrial work with BOPRC to mitigate with potential additional monitoring and potential consenting, rural pathogens to BOPRC to investigate and mitigate, earthworks for BOPRC to follow up

RLC will ensure appropriate steps are taken to locate the source and mitigate contamination.

- Where the exceedances and RLC initial investigation to indicate the contaminant source is originating from an area included in the scope of the comprehensive consent, RLC will investigate further to identify the likely source of contaminants and work to reduce or eliminate further discharge of contaminants. While the investigation is underway or while specific mitigation actions are being planned and implemented, exceedances will not trigger further investigation.
- Where the exceedances and investigation indicate the contaminant source is likely originating from an area outside of the scope of the CSC, BOPRC will investigate further to identify the likely source of contaminants and work to reduce or eliminate further discharge of contaminants. RLC may assist with additional investigations and monitoring at BOPRCs request subject to being funded. While the investigation is underway or while specific mitigation actions are being planned and implemented, exceedances will not trigger further investigation.
- Where urban waterway contamination is not arising from a single site or is not able to be readily mitigated, RLC will ensure appropriate steps are being taken to mitigate the source of contamination. RLC will require those responsible for the contamination to develop and appropriate action plan to mitigate the contamination within an appropriate timeframe. RLC may assist with additional investigations and monitoring at the request of the responsible party subject to being funded. While the investigation is underway or while specific mitigation actions are being planned and implemented, exceedances will not trigger further investigation.

To support investigations and the identification of potential additional HAIL sites, RLC may maintain a database of industrial properties that to the best of their knowledge carry out an activity that is on the HAIL register or identified in Schedule 4 of the BOPRC NRP as being a high risk to stormwater.



References

Bhat A, Guangyu C, Wenjiao L, Yongfen W and L Fusheng. 2019. Effect of heavy metals on the performance and bacterial profiles of activated sludge in a semi-continuous reactor

BOPRC Natural Resources Plan.

Freshwater 2020 and NPS-FM.

Gadd, J. and Milne, J. 2019. *Monitoring water quality in urban streams and stormwater: Guidance for NZ Practitioners*.

NIWA Client Report 2019168AK prepared for EnviroLink. MBIE Contract No. CO1x1701

Phillips, N., Stewart, M., Olsen G., Hickey, C. (2011). Contaminants in kai – Te Arawa rohe. Part 1 Data report. NIWA Hamilton. HAM2010-021.

Appendix 1. Rational for considering whether to include or exclude sites in industrial zones and high risk activities from the CSC.

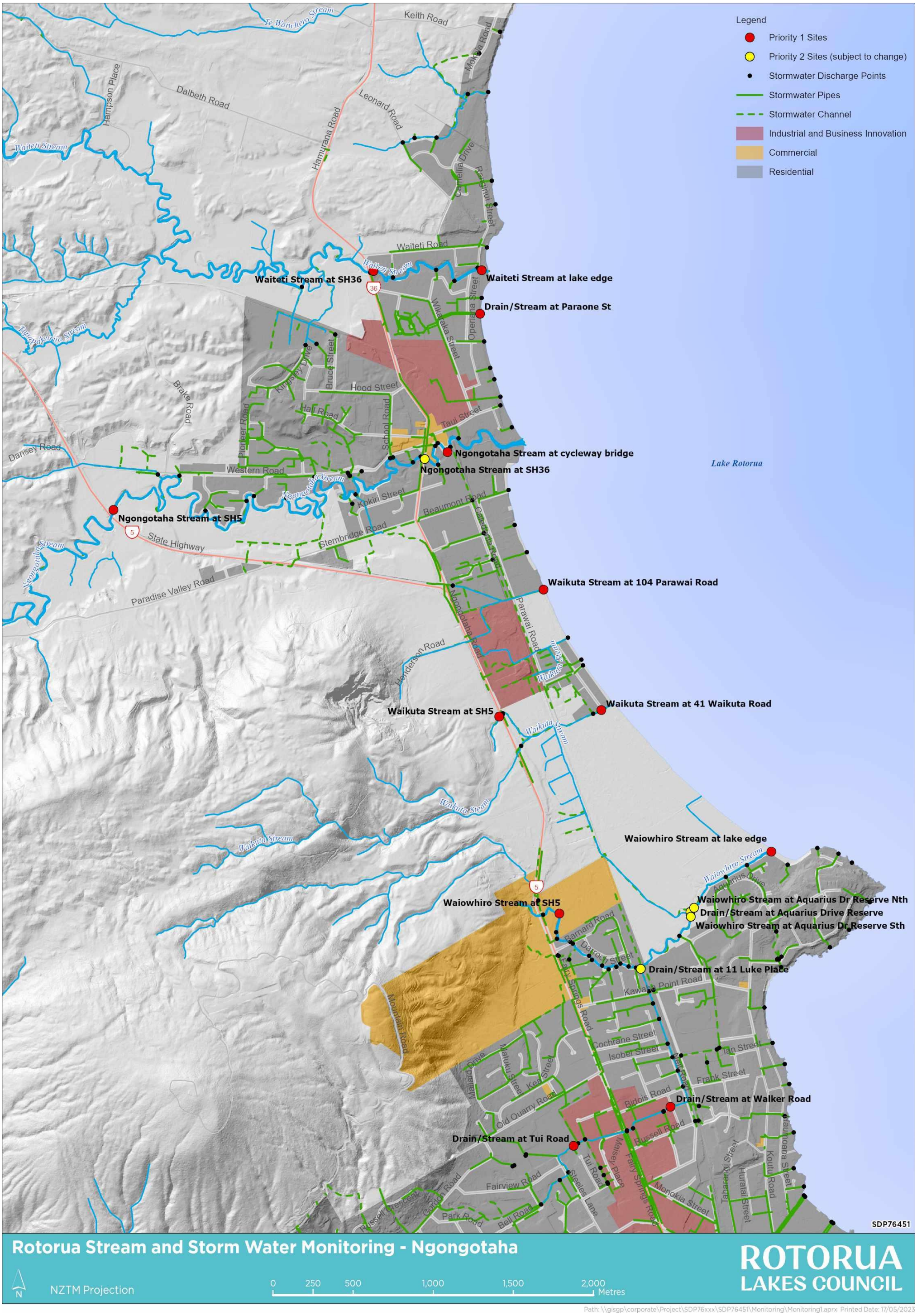
Water Quality	High Risk excluded from CSC	High Risk included in CSC	Rationale
Monitor and maintain data			We all have a role to play to help improve water quality. Data is shared to inform steps
BOPRC – Long term trends for key streams into Lake (NPS, NERMN, SOE, Bathing water quality, Focus catchments etc)	√	√	
Mana whenua - Cultural monitoring (Mana whenua Plans)	√	√	
RLC – Urban water quality monitoring (RLC CSC)	√	√	
High Risk Urban sites			TLA responsibilities associated with identifying and mitigating nuisance factors under the Local Government and Public Health Act
RLC maintain map of Industrial Zones & High Risk	√	√	
RLC maintain High Risk Register (stormwater licences)	√	√	
Investigate			
RLC reactive monitoring to identify contaminant source	√	√	
Mitigate – RLC initial steps			
RLC take reasonable steps to mitigate if source identified (LGA and Public health requirement)	√	√	
RLC notify BOPRC when 3 exceedances if source not identified	√	√	
RLC notify BOPRC when 3 exceedances from identified source for consenting	√	√	
Mitigate - Follow up steps			Regional Council functions under the RMA and responsibility for enforcing Regional Plan rules.
BOPRC investigate, monitor, enforce RP rules (identified for follow-up by RLC)	√	X	
Mitigate - Consent			Regional Council functions under the RMA and responsibility for enforcing Regional Plan rules.
BOPRC consent discharges to water that exceed Regional Plan permitted levels (RLC as key stakeholder requires coordinated independent monitoring)	√	X	
Compliance			
BOPRC responsible for ensuring compliance, working together with Mana whenua and RLC for solutions where required	√	X	

Appendix 2. Rationale for proposed scope based on roles and responsibilities

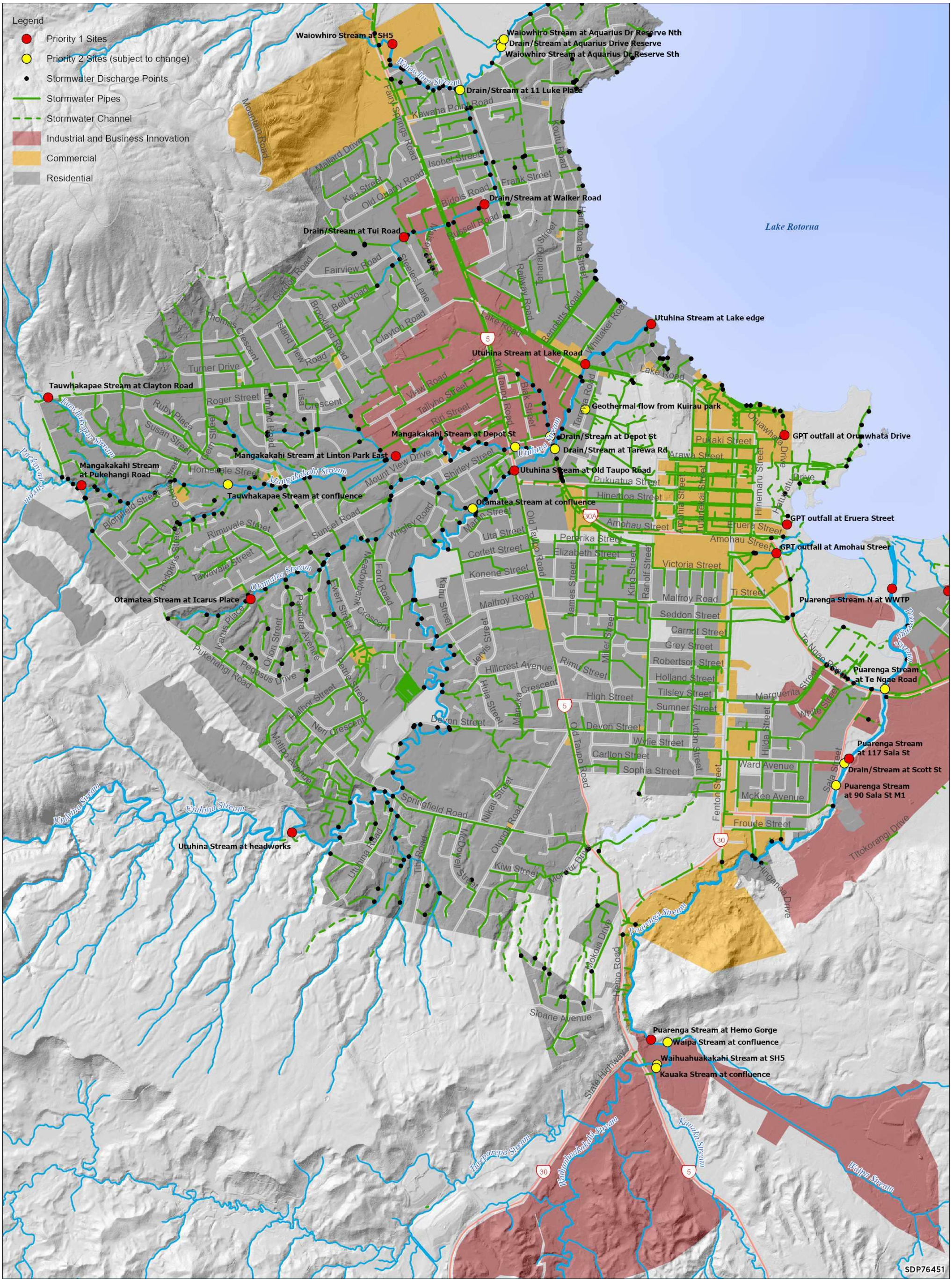
- The volume and quality of stormwater from Industrial Zones & High Risk Activities or Sites is excluded from the scope of the CSC.
- RLC will continue to identify, investigate and ensure all proper steps are taken to abate contaminants in water that impact public health, and to identify the source of contaminants exceeding permitted levels and notify BOPRC for Consenting and Enforcement.

Water Quality	Mana Whenua	RLC	BOPRC	Rationale
Monitor and maintain data				• We all have a role to play related to Te Mana O Te Wai to protect and improve water quality. Data is shared to inform water quality improvements.
BOPRC – Long term trends for key streams into Lake (NERMN), Bathing water quality, Focus catchments			√	
Mana whenua - Cultural monitoring (Mana whenua Plans)	√			
RLC – Urban water quality monitoring (RLC CSC)		√		
Identify High Risk Urban sites				• Every local authority and consent authority must enforce the observance of national environmental standards to the extent to which their powers enable them to do so. • RLC has general bylaw making powers for protecting, promoting and maintaining public health and safety (LGA section 145 • If satisfied that any nuisance, or any condition likely to be injurious to health or offensive, exists in the district, RLC is empowered and directed to cause all proper steps to be taken to secure the abatement of the nuisance or the removal of the condition (Public Health Act Part 2 Section 23)
RLC maintain map of Industrial Zones & High Risk		√		
RLC maintain High Risk Register (stormwater licences)		√		
Investigate				
RLC reactive monitoring to identify contaminant source		√		
Mitigate – RLC initial steps				
RLC take reasonable steps to mitigate if source identified (LGA and Public health requirement)		√		
RLC notify BOPRC when 3 exceedances if source not identified		√		
RLC notify BOPRC when 3 exceedances from identified source for consenting		√		
Mitigate – BOPRC follow up steps				• Every local authority and consent authority must enforce the observance of national environmental standards to the extent to which their powers enable them to do so. • Regional Council is responsible for controlling the use of land to maintain the quantity of water and to maintain and enhance the quality of water. It is a BOPRC function to control the quantity, level and flow of water and the discharge of contaminants into or onto land or into water. BOPRC rules require consent to discharge contaminants to water or to lane where it might enter water in excess of permitted levels.
BOPRC investigate/monitor, enforce RP rules (identified for follow-up by RLC)			√	
Mitigate - Consent & Consent Compliance & Consent review				
BOPRC consent discharges to water that exceed Regional Plan permitted levels, ensure compliance with Consent and review as required (RLC as key stakeholder requires coordinated independent monitoring)			√	
General Improvements Work together on solutions where polluter not identified	√	√	√	• We all have a role to play related to Te Mana O Te Wai to protect and improve water quality.

Appendix 3. Rotorua stream and stormwater monitoring - Ngongotaha



Appendix 4. Rotorua stream and stormwater monitoring – Central



Rotorua Stream and Storm Water Monitoring - Central

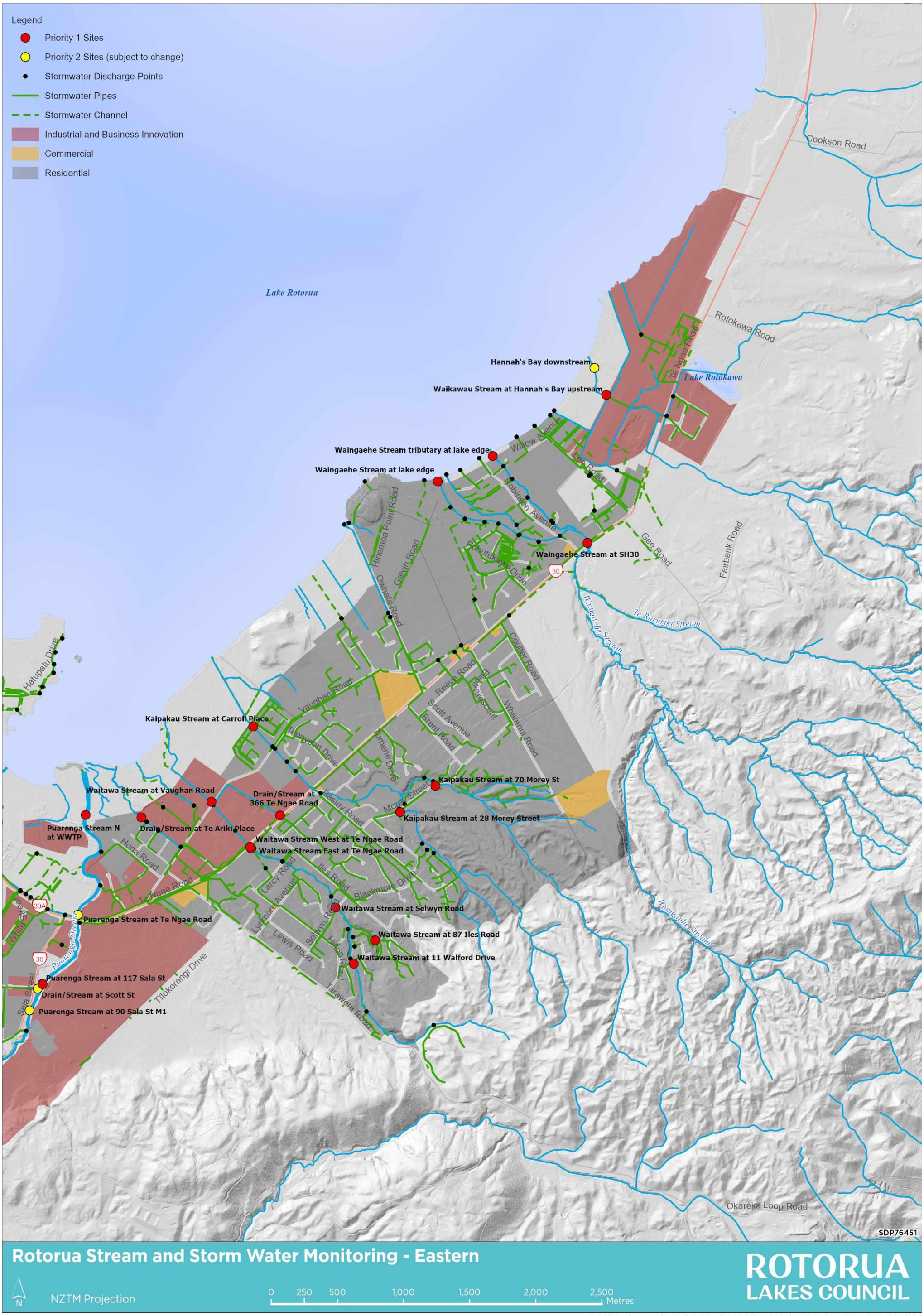
NZTM Projection

0 250 500 1,000 1,500 2,000 2,500 Metres

ROTORUA LAKES COUNCIL

Path: \\gisgp\corporate\Project\SDP76xxx\SDP76451\Monitoring\Monitoring1.aprx Printed Date: 17/05/2023

Appendix 5. Rotorua stream and stormwater monitoring – Eastern



Path: \\gisgp\corporate\Project\SDP76xxx\SDP76451\Monitoring\Monitoring1.aprx Printed Date: 17/05/2023

Appendix 6. Sampling template for routine monitoring

SAMPLING TEMPLATE (Move sampling events to suit weather and staff availability)

Quarter 1						Quarter 2				Quarter 3				Quarter 4			
2/01/2023	Week 1					3/04/2023	Week 14			3/07/2023	Week 27			2/10/2023	Week 40		
9/01/2023	Week 2					10/04/2023	Week 15			10/07/2023	Week 28			9/10/2023	Week 41	1 W	
16/01/2023	Week 3					17/04/2023	Week 16			17/07/2023	Week 29	1 & 2 W		16/10/2023	Week 42		
23/01/2023	Week 4					24/04/2023	Week 17			24/07/2023	Week 30			23/10/2023	Week 43	1 & 2 D	
30/01/2023	Week 5					1/05/2023	Week 18	1 & 2 W	1 & 2 W	31/07/2023	Week 31			30/10/2023	Week 44		
6/02/2023	Week 6					8/05/2023	Week 19		1 W	7/08/2023	Week 32			6/11/2023	Week 45	1 & 2 W	
13/02/2023	Week 7					15/05/2023	Week 20	1 & 2 D		14/08/2023	Week 33	1 & 2 D		13/11/2023	Week 46		
20/02/2023	Week 8	1 D	1 D	1 D	1 D	22/05/2023	Week 21	1 & 2 D		21/08/2023	Week 34			20/11/2023	Week 47		
27/02/2023	Week 9					29/05/2023	Week 22			28/08/2023	Week 35			27/11/2023	Week 48	1 W	
6/03/2023	Week 10					5/06/2023	Week 23			4/09/2023	Week 36		1 W	4/12/2023	Week 49		
13/03/2023	Week 11					12/06/2023	Week 24			11/09/2023	Week 37			11/12/2023	Week 50		
20/03/2023	Week 12					19/06/2023	Week 25			18/09/2023	Week 38	1 W		18/12/2023	Week 51	1 W	
27/03/2023	Week 13					26/06/2023	Week 26			25/09/2023	Week 39			25/12/2023	Week 52		

Test details	
	Eastside - Priority **1** or **2** - **D**ry or **W**et
	Puarenga - Priority **1** or **2** - **D**ry or **W**et
	Utuhina - Priority **1** or **2** - **D**ry or **W**et
	Northern - Priority **1** or **2** - **D**ry or **W**et
	Central - Priority **1** - **W**et
Priority 1 Dry	TSS, E.Coli, Cu, Zn, TN, TP, TOXN, DRP, Ammonia-N, time/location data + Clarity, pH, Conductivity, DO, temp
Priority 1 Wet	TSS, E.Coli, Copper, Zinc, time/location data + Clarity, pH, Conductivity, DO, temp
Priority 2 Dry	TSS, E.Coli, time/location data + Clarity, pH, Conductivity, Temperature
Priority 2 Wet	T SS, E.Coli, Copper, Zinc, time/location data + Clarity, pH, Conductivity, DO, temp