Waihi Estuary and Kopurererua Stream Hydrological Assessment

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DRAFT

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Table of Contents

List of Figures

List of Tables

List of Appendices

Glossary

Ephemeral: A briefly flowing stream; during and immediately following a period of rainfall in close proximity. Typically lasts hours or days.

Intermittent: A periodically flowing stream, during periods of increased rainfall. May last weeks or months.

Node: The point at which an ephemeral stream becomes an intermittent or perennial stream. This report identifies nodes as the point at which a peak runoff control structure could be constructed.

Overland flow: Surface or surficial runoff is generated during rainfall when soil is saturated, or infiltration capacity has been met. Measured as the percentage of annual rainfall that will create surficial runoff throughout the year.

Perennial: A continuously flowing stream, water is present in its stream bed all year round during years of normal rainfall.

Abstract

The retention of surficial runoff has been identified as an issue within the Bay of Plenty's Kopurererua Stream and Waihi Estuary catchments. Several interventions or mitigations have been explored with Peak Runoff Control (PRC) Structures identified as a potentially significant option to reduce the contaminant load to downstream receiving environments of both catchments. This report focuses on the Kopurererua Stream and Waihi Estuary and identifies where these interventions are best placed using a hierarchical ranking classification. The classification prioritises sites by annual runoff volume, overland flow potential, and potential contaminant load from various land uses.

Concepts of what these interventions and/or PRC Structures should look like are included, however the exact design specifications would need to be engineered for each site based on site specific information not limited to measurement of free board and flow within drains at any given site.

The authors recommend trialling several mitigation options, most likely Peak Runoff Control (PRC) structures in the headwaters of the Pongakawa Stream & Canal and/or the Pukehina Canal catchments.

1 Introduction

In the coastal lowland areas of both the Kopurererua and Waihi Estuary catchments, as with much of lowland, coastal New Zealand, waterlogging in poorly drained soils were overcome through the installation of extensive drainage systems. These areas also have an inherently high risk of overland flow (surficial runoff) which is reduced through improved soil drainage. The drainage of land for agricultural production has resulted in water leaving the landscape at a much faster rate (Hudson and Harding, 2004). However, this acceleration of drainage water, also increases the potential for contaminants, such as nitrogen (N), phosphorus (P), sediment (S) and microbes (M), to be transported and deposited into waterways. Overland flow is cited as a key pathway for land-based contamination to enter waterways (Deakin et al., 2016; Goldsmith and Ryder, 2013; Orchiston et al., 2013; Curran Cournane et al., 2011; McKergow et al., 2007; McDowell, 2006; Smith and Monaghan, 2003).

Recent work by AgResearch assessed the suitability of controlled drainage as an intervention to reduce the contaminant load entering Waituna Lagoon (Southland, New Zealand) (McDowell et al., 2012). One option identified for the catchment of Waituna Lagoon was the use of peak runoff control (PRC) structures. These structures are detainment dams or bunding that are specifically designed to hold back water for a short period of time, but never completely stop the flow of the drainage system (Figure 1). PRC is designed to be most effective during large runoff events by retaining water for 1-5 days during periods of high flow, allowing sedimentation and nutrient retention in the bed of the drain behind the structure. It is these events that have been identified to transport a disproportionally large flux of contaminants to waterways (McDowell, 2006; Monaghan et al., 2016; Rissmann and Beyer, 2018).

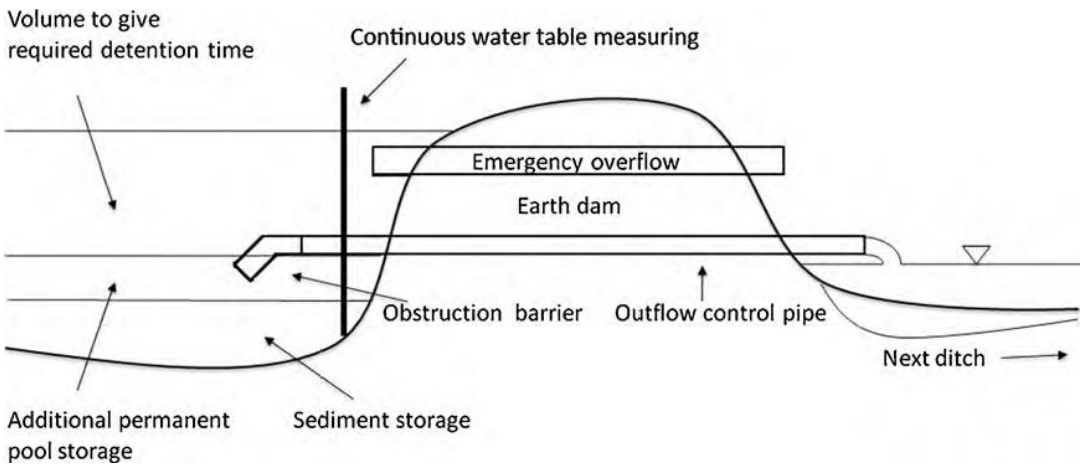

Figure 1: Diagram of a peak runoff control structure (Marttila and Klove, 2010).

1.1 Objectives

This project assesses the suitability of different mitigations and interventions, specifically PRC structures. It also incorporates recent high-resolution physiographic mapping for the Bay of Plenty to identify the locations where PRC structures would be most effective using a recent high-resolution physiographic assessment of the catchment employing the methodology (Rissmann et. al. 2019) developed recently for this type of screening. A key requirement of the PRC structures recommended are that they do not require substantial engineering, are simple, easy to install and maintain, and are low cost with minimal risk of failure.

2 Background

The Kopurererua Stream is located in the Bay of Plenty and its catchment captures a drainage basin with a total area of 73 square kilometres or 7,288 hectares and flows into the Tauranga Harbour in the central city area of Tauranga.

The catchment of the Waihi Estuary is also in the Bay of Plenty Region and lies at the bottom of several subcatchments which include the drainage basins of various streams and canals. Its four main tributaries include the Pongakawa Stream & Canal, the Wharere Stream & Canal, the Pokopoko Stream and the Pukehina Canal. The total area of the catchment is 346 square kilometres or 34,630 hectares. The Waihi Estuary drains into the sea near the coastal town of Maketu, between the cities of Tauranga and Whakatane.

Simple land cover and land use maps for both catchments are provided in Figures 2 and 3.

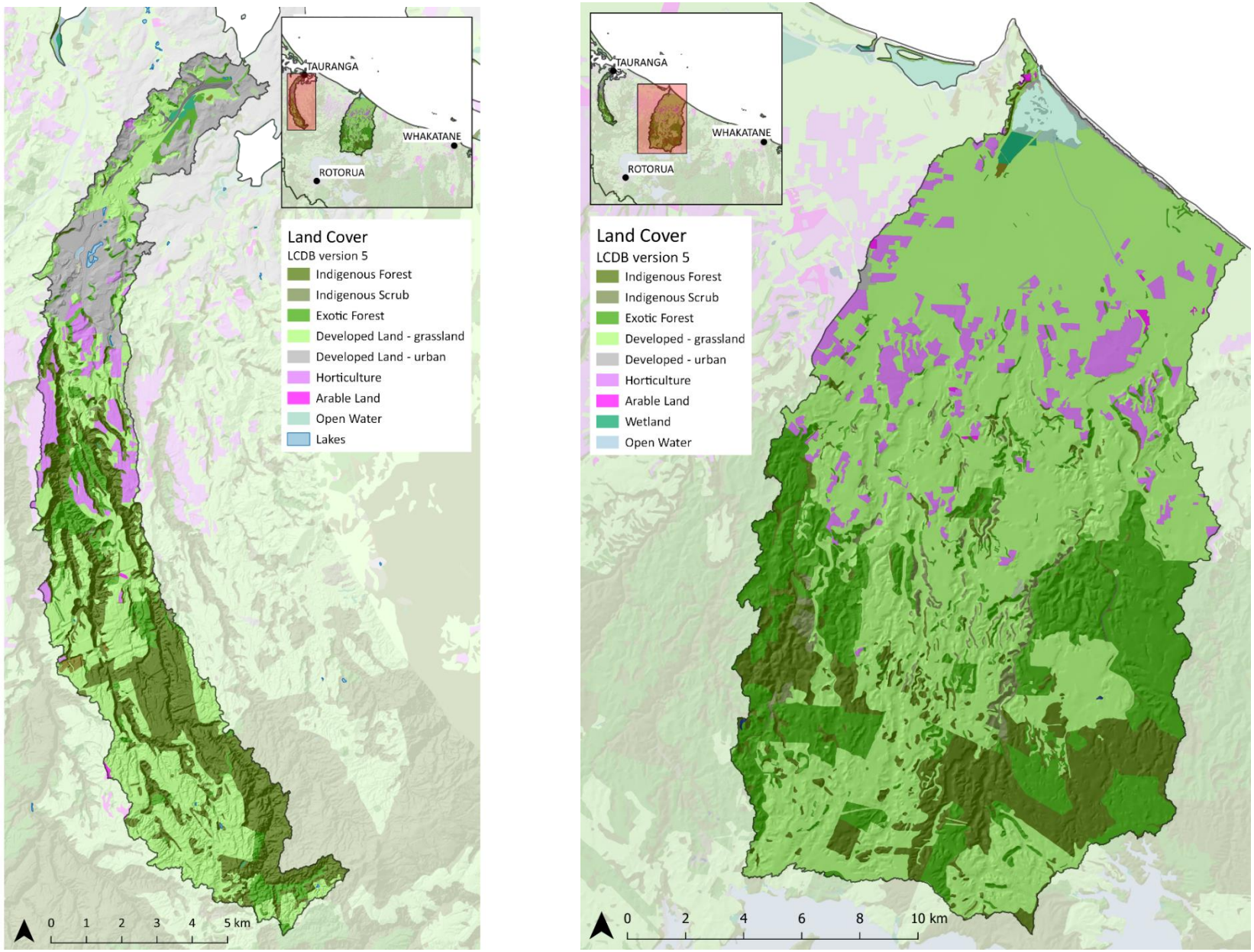

Figure 2: The Land Cover of the Kopurererua Stream catchment (left) and the Waihi Estuary catchment (right); data from the Land Cover Database version 5.

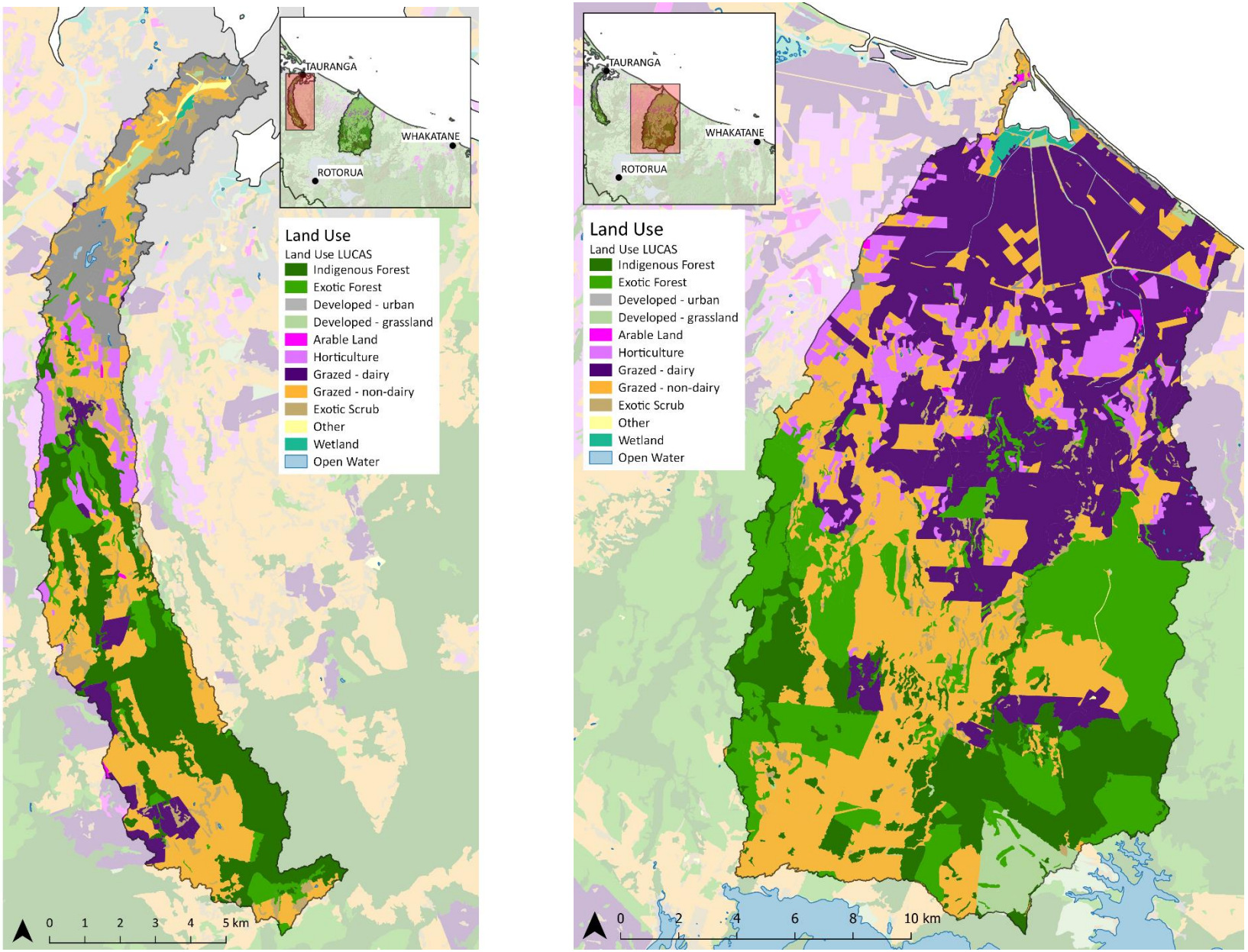

Figure 3: The Land Use of the Kopurererua Stream catchment (left) and the Waihi Estuary catchment (right); data from the Land Use and Carbon Analysis System (LUCAS).

A high-resolution physiographic assessment of the Bay of Plenty mapped the hydrological flow paths for the catchment, specifically areas susceptible to overland flow, areas of artificial (open ditch and subsurface) drainage densities (Figure 4) and evaluated the risk of contaminant transport by these mechanisms (Rissmann et al., 2019).

The method used to assess overland flow and artificial drainage can be found in Rissmann et. al. 2019 and Pearson et. al. 2019. In summary, overland flow risk was assessed using soil and topographical information in GIS to spatially show overland flow risk for the Bay of Plenty region (Figure 5). Overland flow risk is increased in areas where soils have poor internal drainage and are structurally vulnerable to slaking and dispersion, and/or or in areas where there is sufficient slope to generate runoff. The GIS layer was created by firstly combining soil texture and slaking/dispersion characteristics of the soil to calculate a hydrologic index, which was subsequently multiplied by a slope factor and expressed as a percentage of effective annual rainfall (Rissmann et. al. 2019; Pearson et. al. 2019). The hydrological index represents the likelihood of overland flow occurring due to the soil properties, while the slope index indicates whether the topography is a significant factor. The risk assessment was independent of land use management practices or vegetation cover, though it was noted that these factors do have a significant impact on overland flow occurrence (Rissmann et. al. 2019; Pearson et al. 2019).

Note how the Overland Flow intensity as a percentage of rainfall is highest in the middle sections of the catchments – upper reaches of the streams, but not at the watershed margin (headwaters). This is due, to the geology and topography combining with ignimbrite domes at the water shed flow divide with neighbouring catchments. So, the highest stream and land gradients are just off the edge of the domes, including a different more erodible geology.

Subsurface drainage across the Bay of Plenty was also estimated by Rissmann et. al. 2019 and Pearson et al. 2019, using the soil properties of permeability and drainage class, combined with land cover and topographical information to produce a framework to estimate drainage density for the Bay of Plenty region. Areas where artificial drainage is likely to be present were identified using the Land Cover Database, version 5 (LCDB5) by a selection of areas where land cover was classified as ‘high producing exotic grassland’, ‘low producing grassland’ or ‘short-rotation cropland’ to identify the area of New Zealand likely in agricultural production. Areas not in agricultural production are either in a natural state (DOC or QEII areas) or under other land uses (such as forestry) and were deemed unlikely to have artificial subsurface drainage.

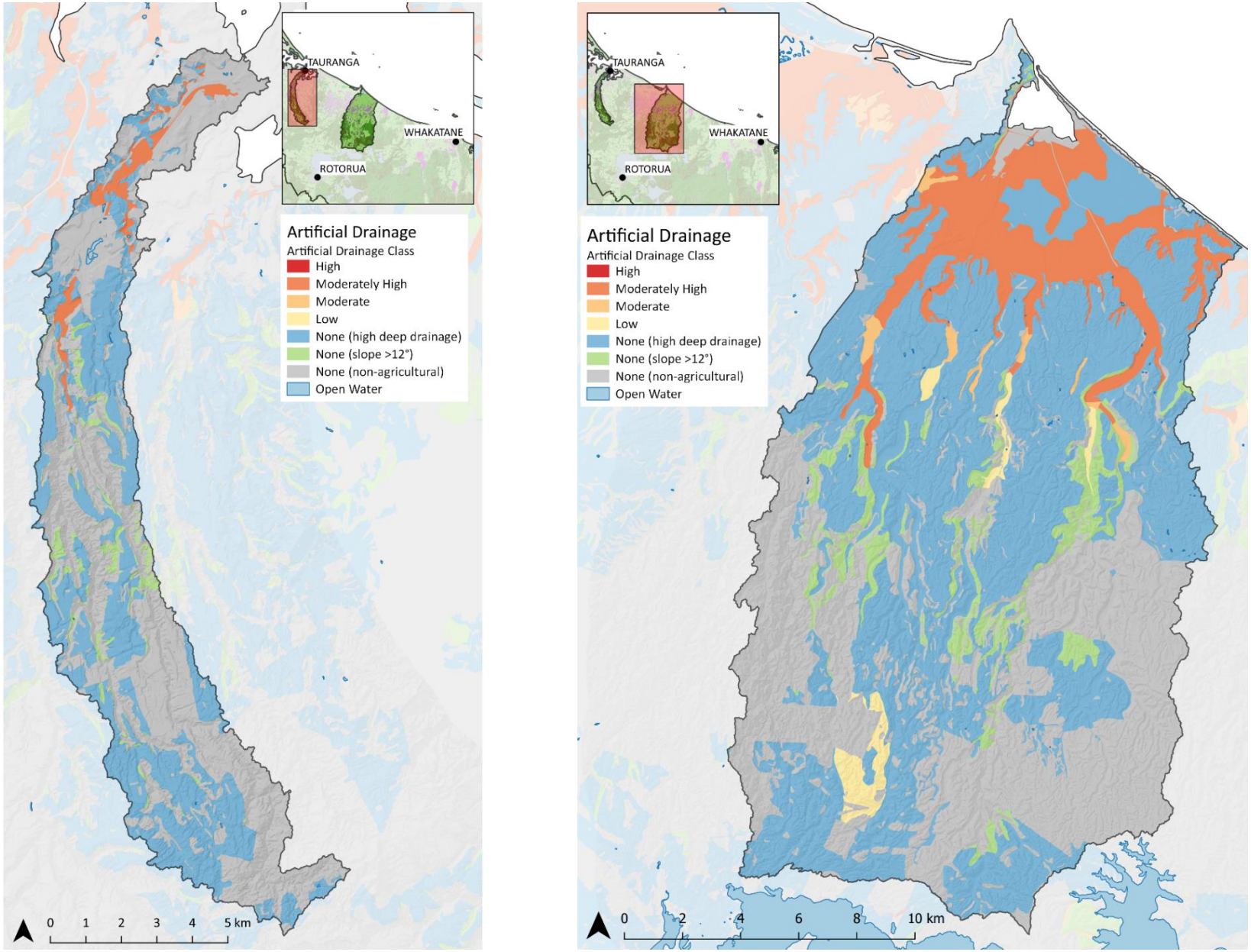

Figure 4: Artificial Drainage density classes of the Kopurererua Stream catchment (left) and the Waihi Estuary catchment (right); adapted from Rissmann et. al. 2019.

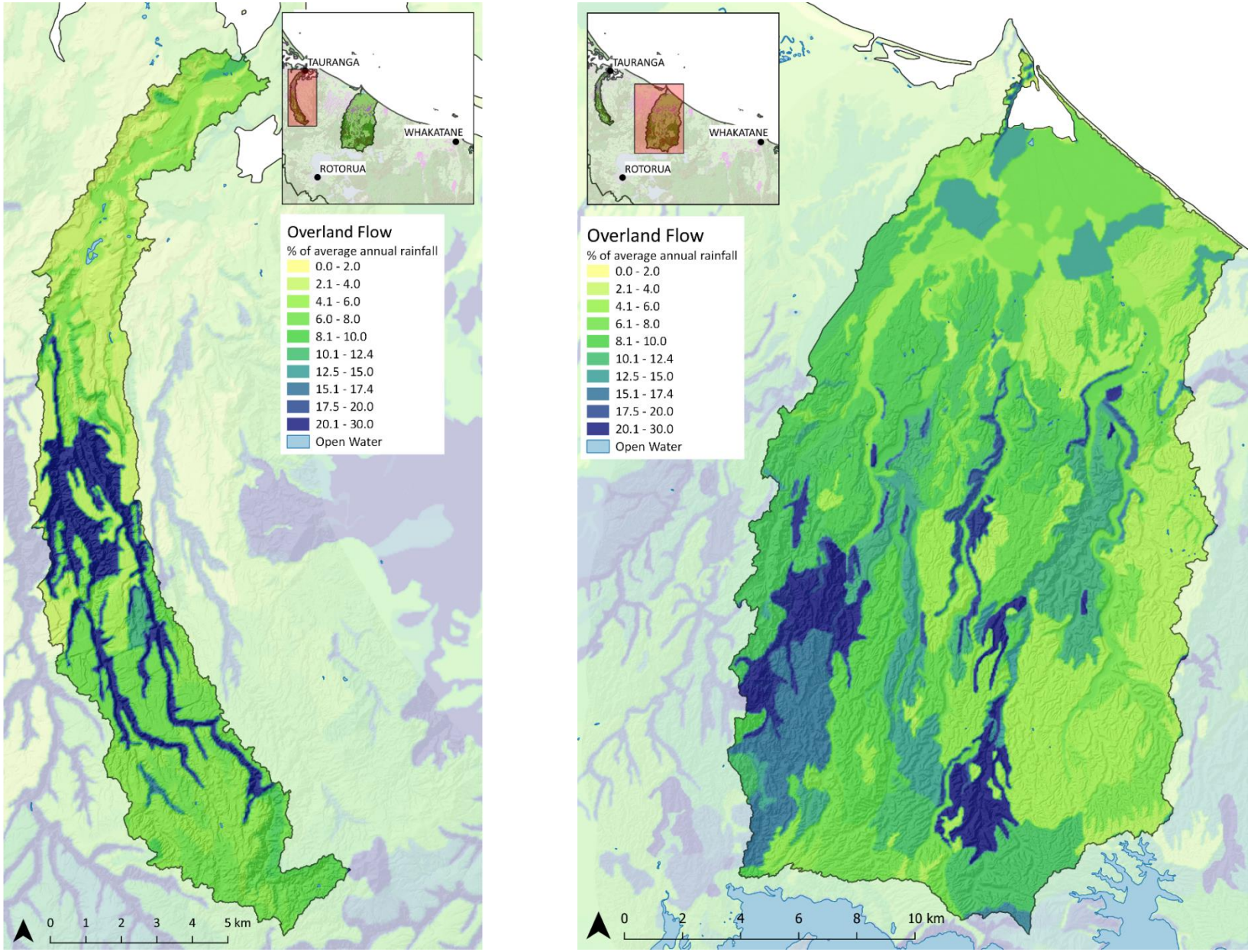

Figure 5: Overland Flow percentage classes of the Kopurererua Stream catchment (left) and the Waihi Estuary catchment (right); adapted from Rissmann et. al. 2019.

3 PRC Structures

Peak runoff control structures have been designed and engineered for various settings spanning a range of flow volumes and stream types; ephemeral, intermittent, and perennial streams (Klove, 2000; Marttila and Klove, 2010; Marttila et al., 2010; Bonaiti and Borin, 2010). Ephemeral streams flow only briefly during and immediately following a period of rainfall and typically last hours or days, intermittent streams flow periodically during periods of increased rainfall and may last weeks or months, and perennial streams are continuous with water present in the stream bed all year round during years of normal rainfall. To achieve the objective of simple, low risk, low cost structures, several small structures targeting the point where ephemeral streams meet small intermittent drains would be best suited for the Koprererua and Waihi Estuary catchments. Perennial Streams and Rivers require larger engineered mitigations and interventions. Peak Runoff Control Structures don not function in permanently flooded areas and are best suited to intermittent and ephemeral streams where the PRC structures can 'catch', retain, and treat episodic surficial runoff and overland flows.

Construction of PRC structures at this transition between ephemeral and intermittent streams, and specifically avoiding perennial streams, is less likely to impede or affect fish passage. This is because ephemeral streams only have water flowing through them during periods of high-intensity rainfall and are otherwise 'dry' for the vast majority of time. Where land is developed, ephemeral streams are typically associated with high producing grassland (farms) within the catchments.

The most common peak runoff control structure design involves flooding an area of ground upstream of the structure for a period of time (usually 3-5 days), as the water is progressively released (Fiener et al., 2005; Clark, 2013; Patterson et al., 2014). This allows for contaminants and sediment held in suspension to settle out of the water column before passing out of the impounded area. Pipes direct this water through the dam or detainment bund structure and out the other side. A spillway or release riser allows an escape for extreme floodwaters in an emergency.

PRC structures are similar to the sediment detention dams or ponds used in construction Erosion & Sediment Control Planning (ESCP) and mine site 'brown' water turbid water "sed. dams" with upstand under-pass structures. It seems that the sediment detention dam or pond concept has been adapted to suit features found within the agricultural landscape.

Figures 6, 7 and 8A show similar concepts of this design.

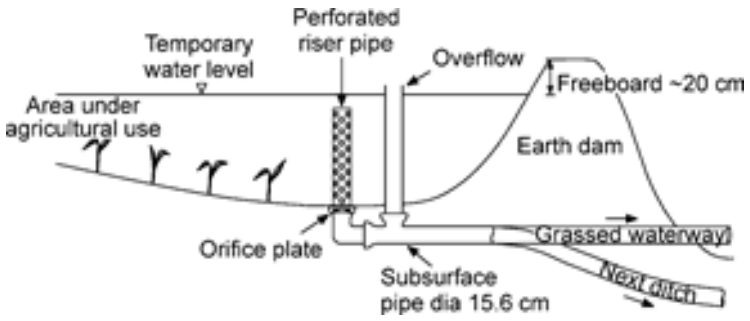

Figure 6: Earth dam peak runoff control structure (Fiener et al., 2005).

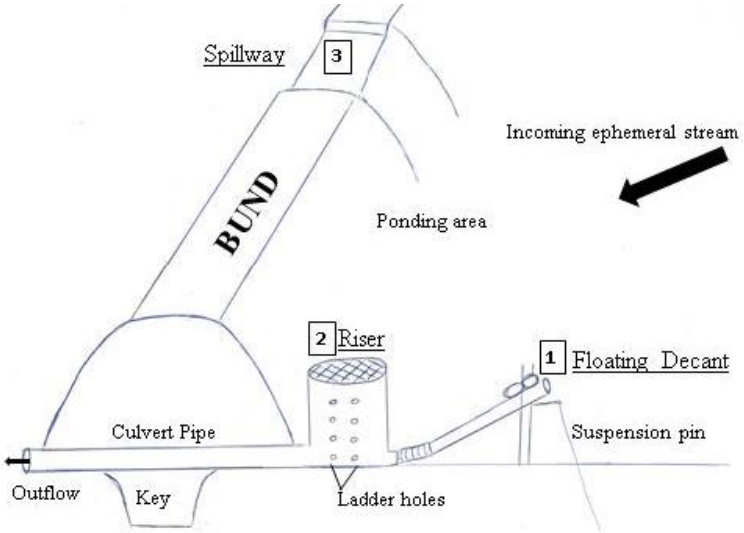

Figure 7: Detainment bund peak runoff control structure with concrete riser (Clark, 2013).

To suit the location of an open ditch, the detainment bund design in Figure 8A was modified (Figures 8B, C, and D). Figure 8B shows the preferred option by the authors of this report as the spillway is lower than the ditch height over a grassed bund and is less likely to impact on the aquatic habitat (i.e. restrict fish passage). It is also less likely to cause flooding as the emergency spillway is not restricted to a secondary pipe (Figure 8C, D).

Figure 8C is similar to the design of Marttila and Klove (2010) and was also recommended by McDowell et al. (2012) for the Waituna Catchment in Southland. However, the risk of failure, flooding, and subsequent damage to surrounding farmland or habitat is increased. The PRC structure in Figure 8D is illustrating a structure suited to higher flow conditions as the materials used are more resistant to erosion, however this would increase the cost of construction significantly.

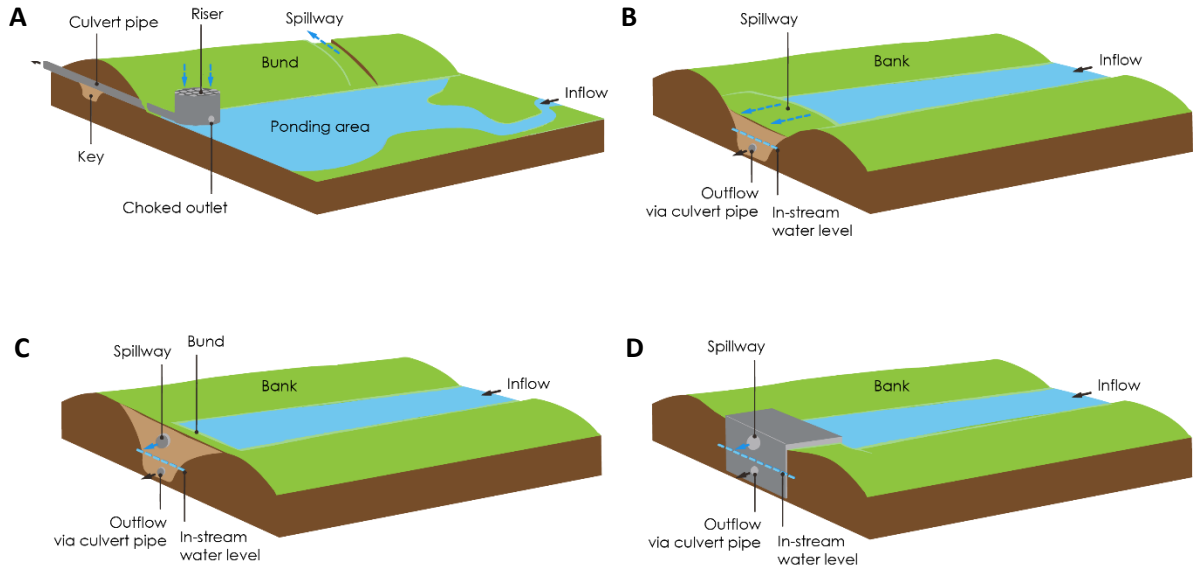

Figure 8: A) detainment bund with chocked outlet and concrete riser (Clarke, 2013; Paterson et al., 2014); B) low earth check dam with spillway; C) high earth check dam with piped spillway; D) concrete check dam with piped spillway (adapted from Paterson et al., 2014). (Note: these designs are illustrated to show the designs during a runoff event).

The recommended PRC structure design (Figure 8B) has been adapted to show a full concept of what it might look like once constructed in Figure 9. Figure 8A shows this concept with a fixed culvert inlet at a set depth above the bed of the ephemeral/intermittent channel. Once the runoff ponds and the water height reaches a set depth, the culvert will start to flow. The vegetated spillway will only function in an emergency when the runoff flow exceeds the flow of the engineered culvert diameter. Runoff will flow across the emergency spillway instead of cresting/flooding over the stop- or drain-bank.

Figure 7B shows a similar concept design, but the fixed culvert inlet is replaced by a decanting riser pipe. The floating riser (marine boat float) is attached to a separate pipe with a flexible neck allowing for only the water at the top of the water column to flow out the culvert. This exploits the hydro-dynamics of decanting by siphoning the uppermost part of the water column and leaving behind much of the larger sediment particles and debris (sticks and dry cow dung) found further below, which might otherwise block the outflow culvert pipe.

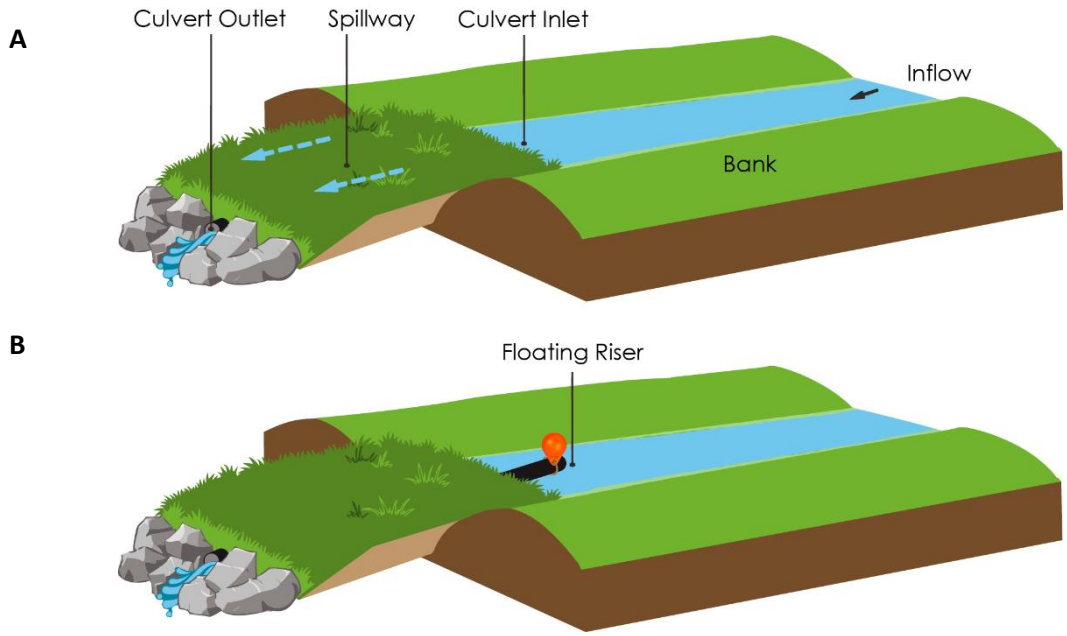

Figure 9: A) Low earth check dam with spillway; B) Low earth check dam with potential decanting riser pipe (adapted from Paterson et al., 2014). The culvert outlet will subsequently discharge back into the open ditch drain. (Note: these designs are illustrated to show the designs during a runoff event).

4 Detainment Bunds

Detainment bunding is used across New Zealand to both slow down surficial runoff and to initiate the infiltration of this water (Clarke, 2013; Patterson, 2014). Boulders and rocks placed in the ephemeral stream channels or swales reduce the stream power before the water ponds behind the bund.

The bund itself is a shallow 'bow' shape with a height of approximately 1 metre and runs the width of the valley floor. Materials commonly used to construct bunding include rocks within porous sacking material buried slightly below the surface and covered with compacted soil. The porous sacking allows water movement and infiltration through the dam, while the rocks provide stability and minimise the risk of undercutting and potential dam collapse.

A spillway is commonly constructed with the spillway inflow (point A) lower than the edges of the bund (points B). The 'bow' shaped bund also allows for an emergency overflow overtopping the dam. Two concepts have been developed for placement in different areas of the farm.

4.1.1 Native Planted Bund

Placed within the areas to be retired from production and planted with native plants these structures are incorporated into the native plantings as a sort of 'micro wetland' (Figure 10).

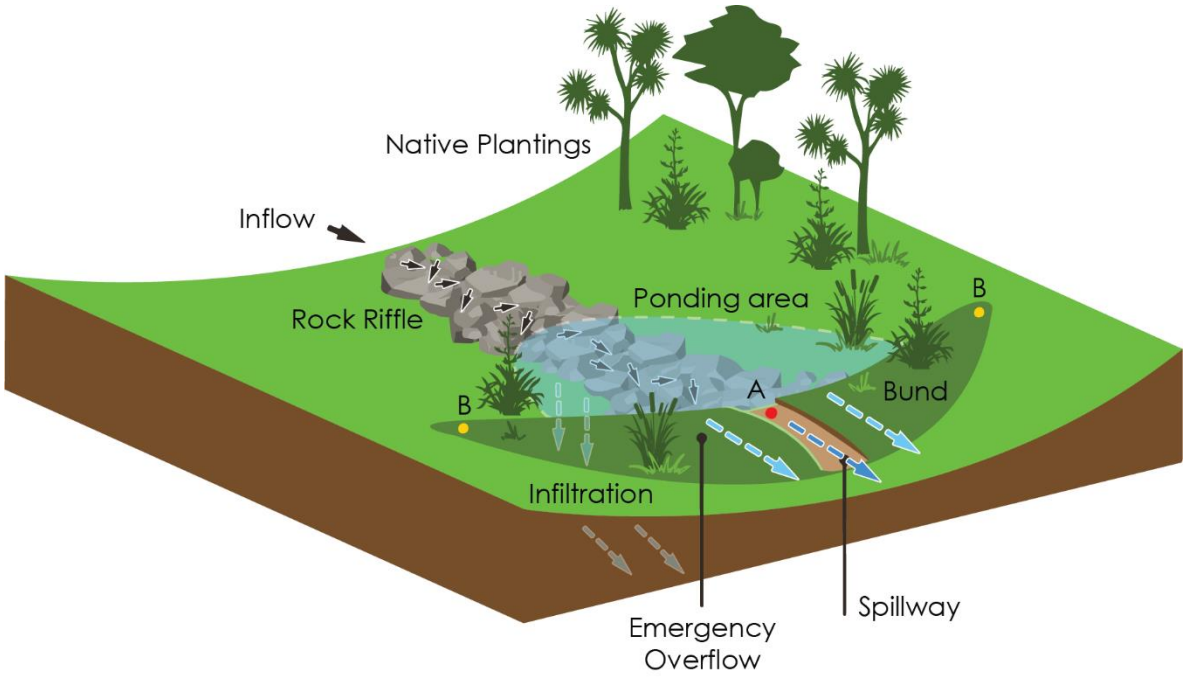

Figure 10: Conceptual planted bunding with native shrubs and trees.

4.1.2 Grassed Bund

This concept has been designed to integrate within the grazed pastoral area (Figure 11). The loss of pasture with the rock riffle is identified as a potential issue, in addition there is also the attraction of the bund to curious cattle and other stock. Temporarily fencing off the bund giving the earthworks time to settle would minimise any initial damage. After this period of time the bund could be grazed. The rock riffling could be substituted for an alternative substrate depending on the magnitude (size and elevation change) and, therefore, the erosive potential of the ephemeral stream or swale inflow. Pasture has been established on the bund, allowing it to be grazed when it is not in use.

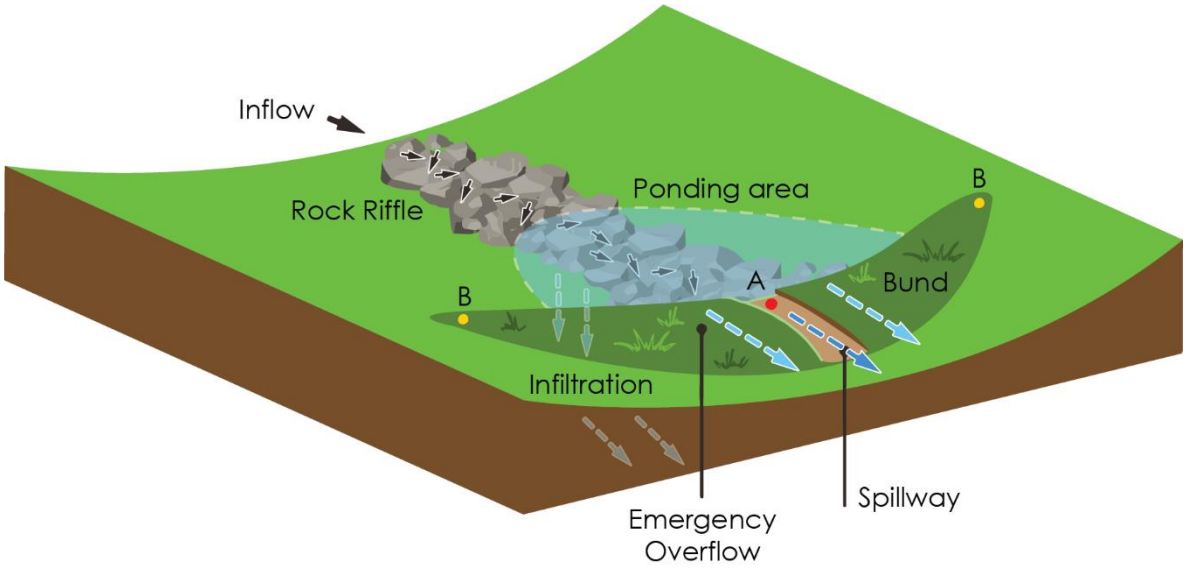

Figure 11:Conceptual grassed bunding.

5 Constructed Wetland

Constructing a modified wetland involves deepening depressions and gullies where water currently flows and ponds to form wetlands in many different configurations. The configuration of the wetland is important, many are constructed in a herring-bone type pattern with multiple twists and turns slowing the water down even further. These wetlands are planted with various different types of vegetation. They can be retired from the productive area of the property and planted with native plants or could be used as a cropping type area where plants are regularly harvested. An adaptation in the urban environment has seen the inclusion of floating wetlands (emergent wetland plants grown hydroponically on floating mats) to remove significant, additional quantities of dissolved P from artificial urban stormwater. However, it is also noted that while the regular harvesting and removal of plants growing on wetland sediments may increase P removal from the wetland, unless the biomass has an economic value, harvesting is not a cost-effective strategy.

Slowing the velocity of water movement encourages deposition of suspended sediment and entrained contaminants (e.g. P). Compared to many natural wetlands, constructed wetlands can be designed to remove contaminants from waterways by: 1) decreasing flow rates and increasing contact with vegetation – thereby encouraging sedimentation; 2) improving contact between inflowing water, sediment and biofilms to encourage contaminant uptake and sorption; and 3) creating anoxic and aerobic zones to encourage bacterial nitrogen processing, particularly denitrification loss to convert aqueous inorganic nitrogen to atmosphere. Constructed Wetland performance varies depending on wetland size and configuration, hydrological regime, and contaminant type and form. Their performance depends on intercepting the maximum amount of runoff from the catchment at the correct flow rate.

Although relatively easy to construct and maintain, constructed wetlands also remove land from production, which impairs their cost effectiveness.

6 Site Selection

To identify suitable locations for the mitigations, a method was developed that combines both a spatial and numerical assessment of the Kopurererua Stream and Waihi Estuary catchments. The spatial assessment identifies site locations while the numerical assessment provides a priority ranking for sites based on estimated annual volume of water lost as surficial runoff and the potential of contaminant loss. The spatial assessment was undertaken using two Geographic Information System (GIS) software packages, Global Mapper (v.19.1) and QGIS (v.3.10). The main steps are outlined below and explained in more detail in subsequent subsections.

- Produce a stream network map from a 15 metre Digital Elevation Model (DEM)
- Classify the stream network into ephemeral, intermittent and perennial
- Identify 'nodes' where a stream transitions from ephemeral to intermittent – swale to open ditch drain
- Identify the contributing area (capture zone) for the node
- Calculate the annual runoff contribution from a capture zone (overland flow assessment)
- Calculate an area averaged land use intensity for each capture zone using a land use map
- Identify priority sites using a hierarchical ranking classification which combines the annual runoff contribution and the land use intensity.

6.1 Spatial Stream Classification

The stream network was mapped using the 'watershed' tool and a 15 m resolution DEM in Global Mapper which maps the streams, calculates flow accumulation, and produces arrows which show flow path to the stream network. The DEM for both the Kopurererua and the Waihi Estuary catchments has full coverage of high resolution measurements of elevation collected through a remote sensing method called LiDAR (Light Detection and Ranging). LiDAR uses light from a reflected laser pulse to measure the distance between the laser source and an object, in this case the ground, and measurements are averaged for each square metre of the catchment. The 1 m LiDAR DEM was reprocessed into a 15 m grid to enable the watershed tool in Global Mapper to run effectively, while retaining the elevational accuracy of the 1 m LiDAR DEM. Figure 11 shows the river lines produced for both catchments.

The stream network, as mapped by Global Mapper can be separated into Ephemeral, Intermittent and Perennial. This was achieved using the River Environment Classification of New Zealand (REC version 2.4) and the New Zealand Topo50 map layers.

6.1.1 Intermittent

Streams identified in the River Environment Classification (REC v2.4) with a Stream Order greater than 2 were classified as Intermittent.

Stream Order or Strahler Order simplifies the branching nature of a river and its tributaries into a consecutive sequence of numbers. It is used to define the size of a stream based on the hierarchy of the tributaries flowing to a point of interest. If two tributaries of the same order combine, the next 'order' in the sequence is used to define that streams size (Figure 10). 1st order streams are typically ephemeral which means they flow only briefly during and immediately following a period of rainfall and typically last hours or days. 2nd order streams are typically intermittent and flow periodically during periods of increased rainfall and may last weeks or months. Higher order streams or 'perennial' streams are those that streams that seldom if ever run dry during years of normal rainfall. Lower order streams are best suited for intervention measures as the volume of water is small and do not require significant engineering to be successful.

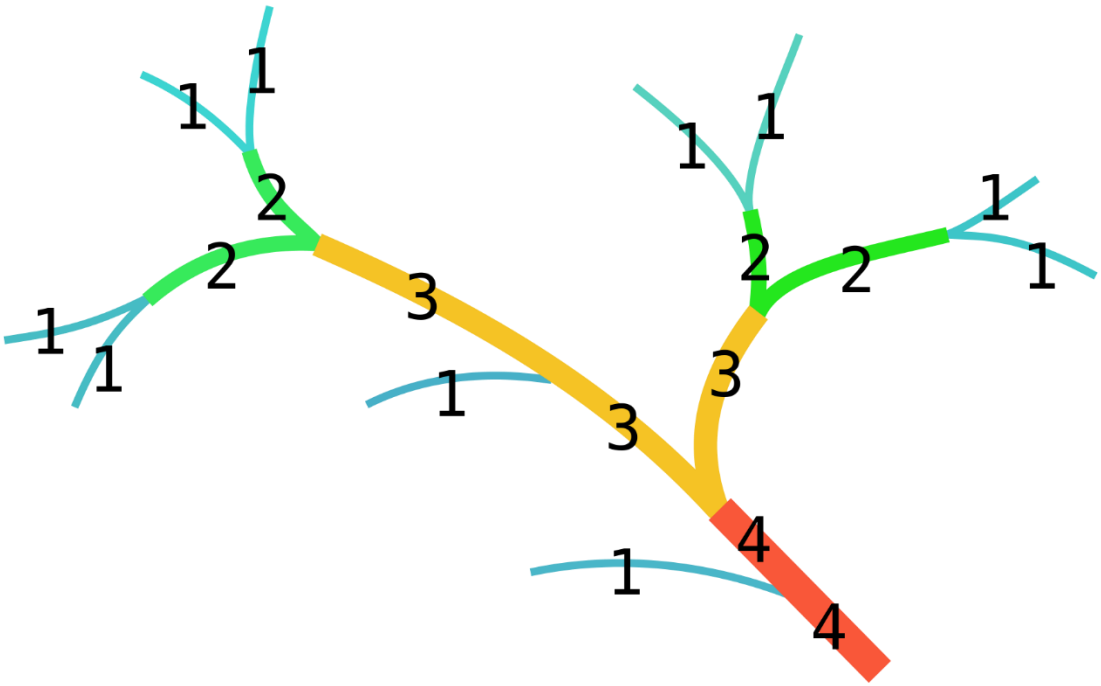

Figure 12: Diagram of the Strahler stream order. (image from https://en.wikipedia.org/wiki/Strahler_number#/media/File:Flussordnung_(Strahler).svg).

6.1.2 Perennial

Rivers and streams identified in the New Zealand Topo50 topographic map series were classified as Perennial.

Within the Topo50 map series rivers and streams are mapped using both satellite and aerial imagery. This is achieved through an image classification method, identifying areas with a 'blue' colour as being lakes, rivers, or streams. Multiple images from different time periods throughout the year are digitally stitched together creating a mosaic of the land surface. From this method it can be assumed that if it is 'blue' throughout these different time periods, it is perennially wet.

The Stream Classification of both the Kopurererua Stream and Waihi Estuary catchments is shown below in Figure 13.

The named river reaches of both catchments are also displayed in Figure 14.

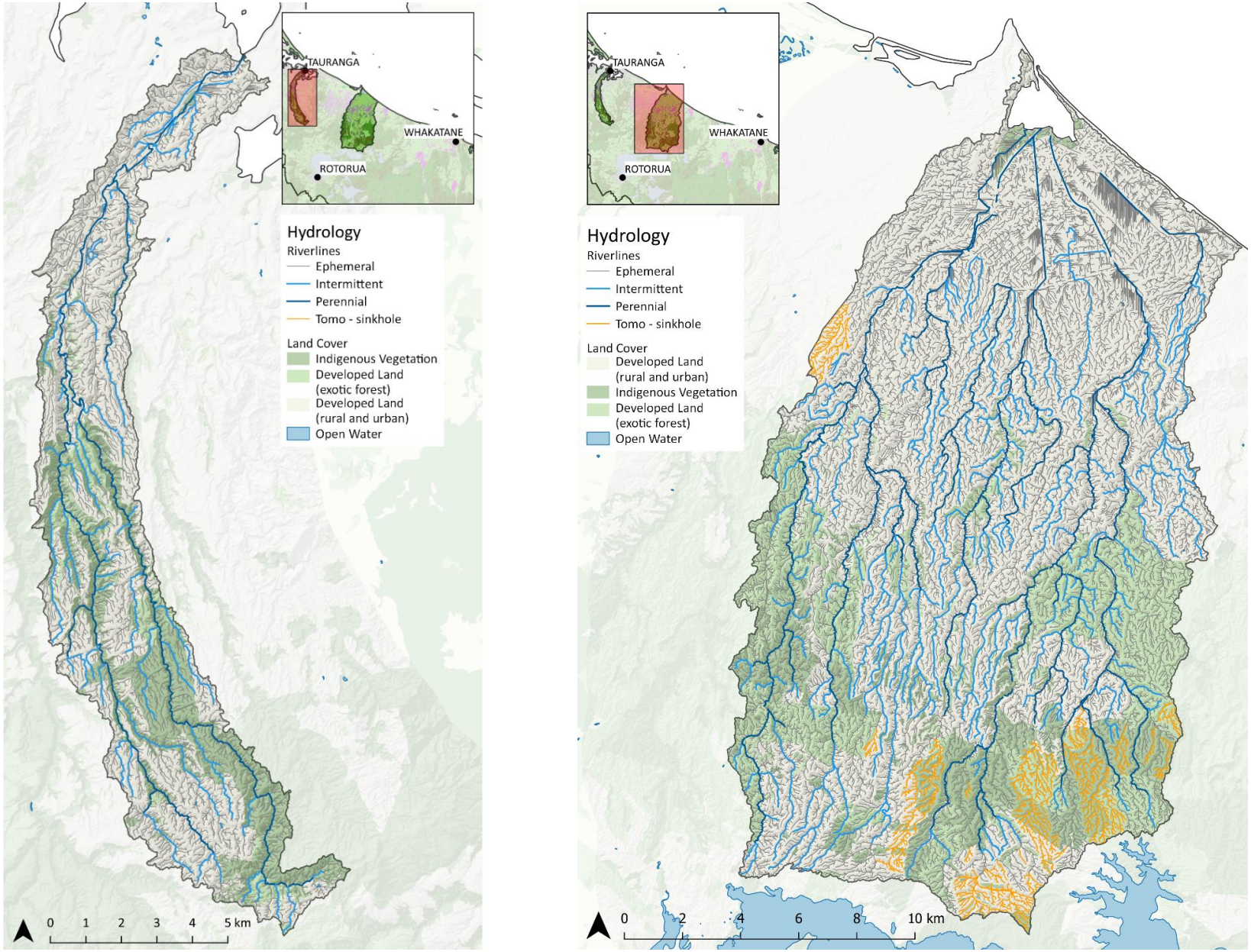

Figure 13: The Stream Classification of the Kopurererua Stream catchment (left) and the Waihi Estuary catchment (right).

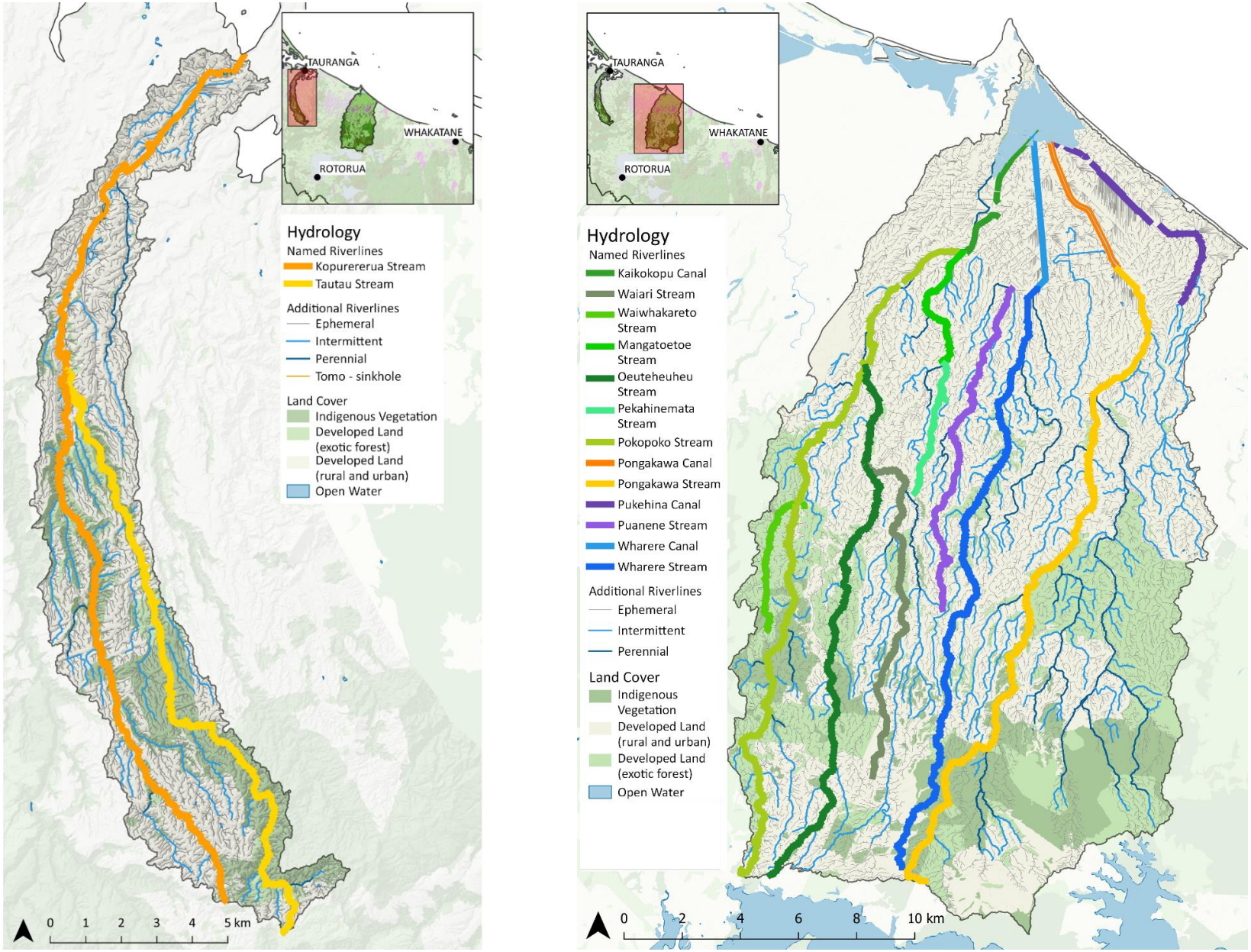

Figure 14: The named river reaches of the Kopurererua Stream catchment (left) and the Waihi Estuary catchment (right).

6.2 Node Placement

The points ('nodes') at which streams transition from ephemeral to intermittent were manually identified. These nodes identify a point in the landscape where a mitigation or intervention could be located.

Estimated Water Table Depth (Westerhoff et al. 2018) and the Natural Spring (spring information provided by Thomas Grant, 22/04/2020) locations were used to identify these Node points. Both sources provide the surface flowing water required by Constructed Wetlands, while PRC structures require the open ditch drainage channels to provide free board for holding back surficial runoff water volumes. With perennial water flowing downstream of the spring locations it is essential to have the discussion around the need to allow for fish passage. The current design concepts allow for fish passage but through discussions with ecologists it has been advised that fish are deterred from swimming through open pipes, even if provisions such as baffling to interrupt the flow are accounted for. Further discussions are ongoing through which we can account for fish passage in these concepts.

While the Artificial Drainage classes of Moderately High and High (Figure 4) was used to exclude potential areas of Node placement as modified drainage means it is difficult to predict the direction surficial runoff will take across the landscape. A detailed property scale assessment of these areas would ideally be undertaken – definitively identifying the direction and magnitude of overland flow and surficial runoff.

A total of 150 Node points was identified for the Kopurererua Stream catchment. A total of 441 Node point locations was identified for the Waihi Estuary catchment. This number of Node sites could be refined further with an intensive ground-truthing exercise and could identify further nodes where mitigation options are possible.

The contributing area to the node point is typically called a 'capture zone', as precipitation falling on the land surface within the capture area will accumulate at the node. The contributing area to the node point was mapped using Global Mapper (Figure 15). Appendix 1 provides a table for all nodes, including an identification number, location easting and northings, and other information specific to each of the generated capture zone.

Tomos /sinkholes have been mapped using the New Zealand Topo50 topographic map series. The Topo50 maps have included sinkholes and these have been introduced to this assessment also. Nodes have not been placed on these ephemeral and intermittent channels although their catchments have been included in the assessment if further nodes are placed downstream.

The overland flow assessment and hierarchical ranking is used to rank the nodes and their capture zones in order of priority.

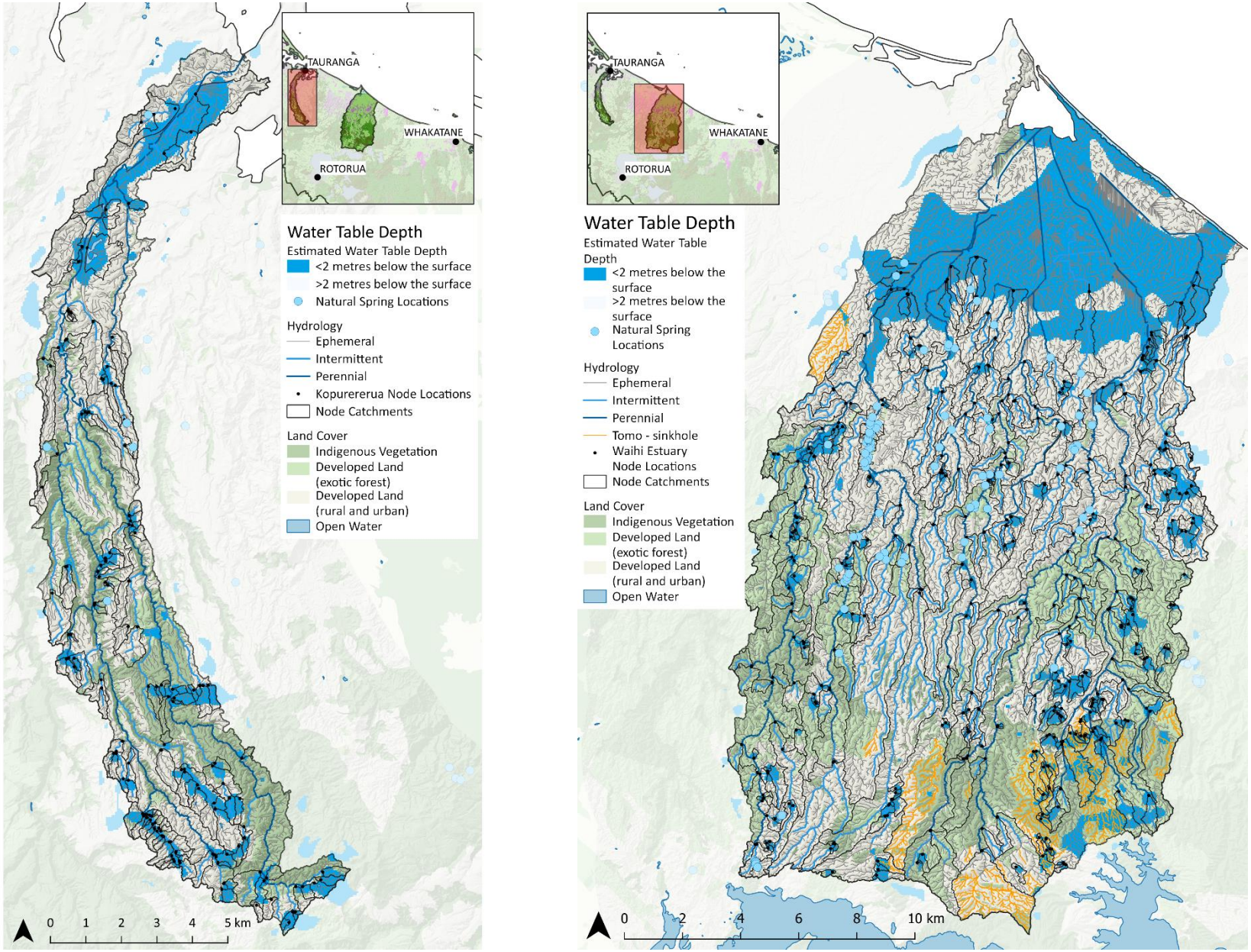

Figure 15: Node location placement and estimated water table depth within the Kopurererua Stream catchment (left) and the Waihi Estuary catchment (right)

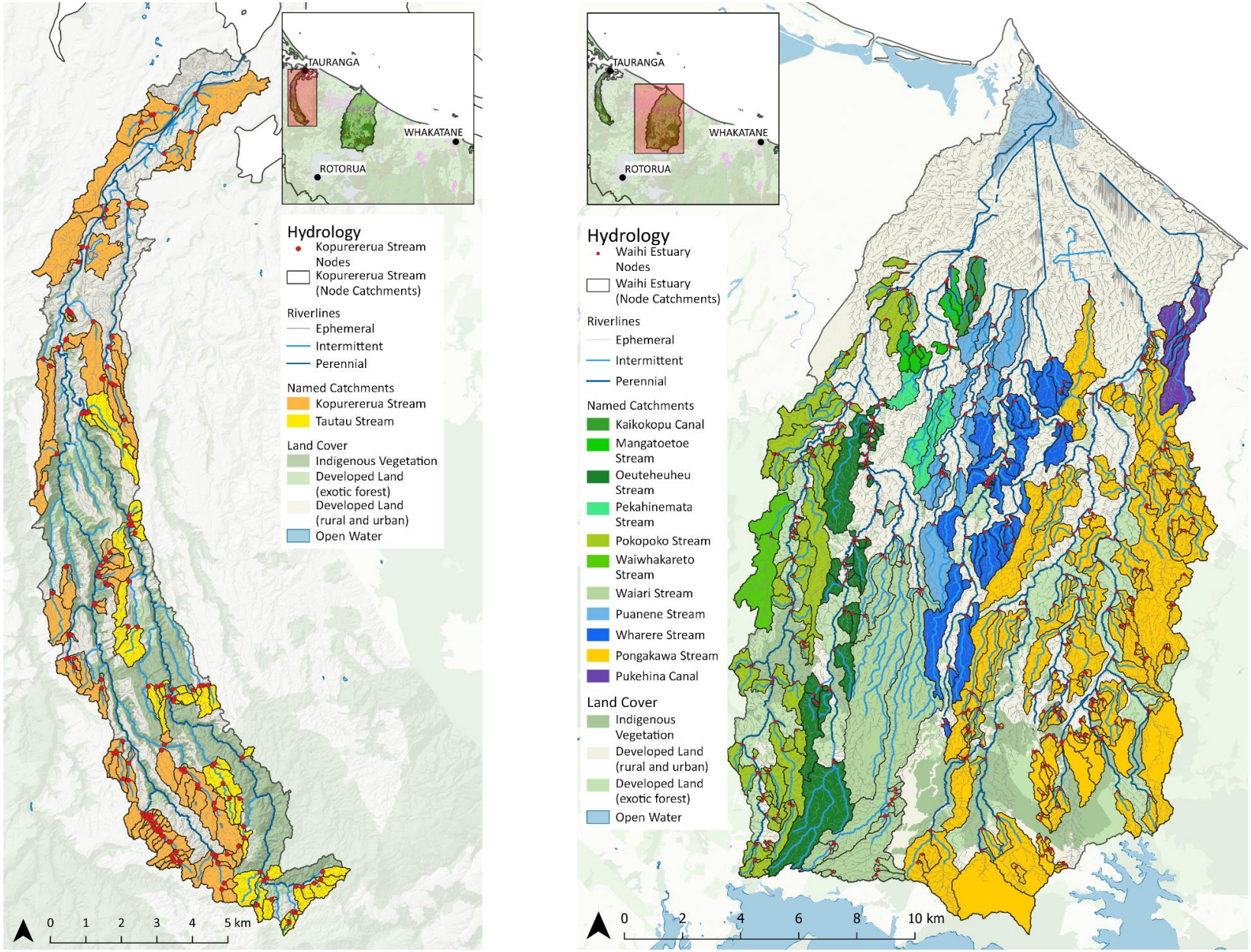

Figure 16: Named Node Catchments of the Kopurererua Stream catchment (left) and the Waihi Estuary catchment (right);

7 Hierarchical Classification

To calculate the potential proportion of annual rainfall which runs off, a map of catchment overland flow risk map (Figure 5) was intersected with the node capture zones in QGIS (Figure 17). For each polygon, the area in hectares of was calculated and exported to a Microsoft Excel spreadsheet for hydrological assessment and site prioritisation (detailed in subsequent sections).

The overland flow assessment suggests that the node catchments of both the Kopurererua Stream and the Waihi Estuary are largely uniform in their Overland Flow percentage classes. Smaller catchments in the mid sections of the catchment show higher overland flow values, with the Pokopoko Stream subcatchment of the Waihi Estuary having the majority of the higher values (darker blue areas of Figure 17).

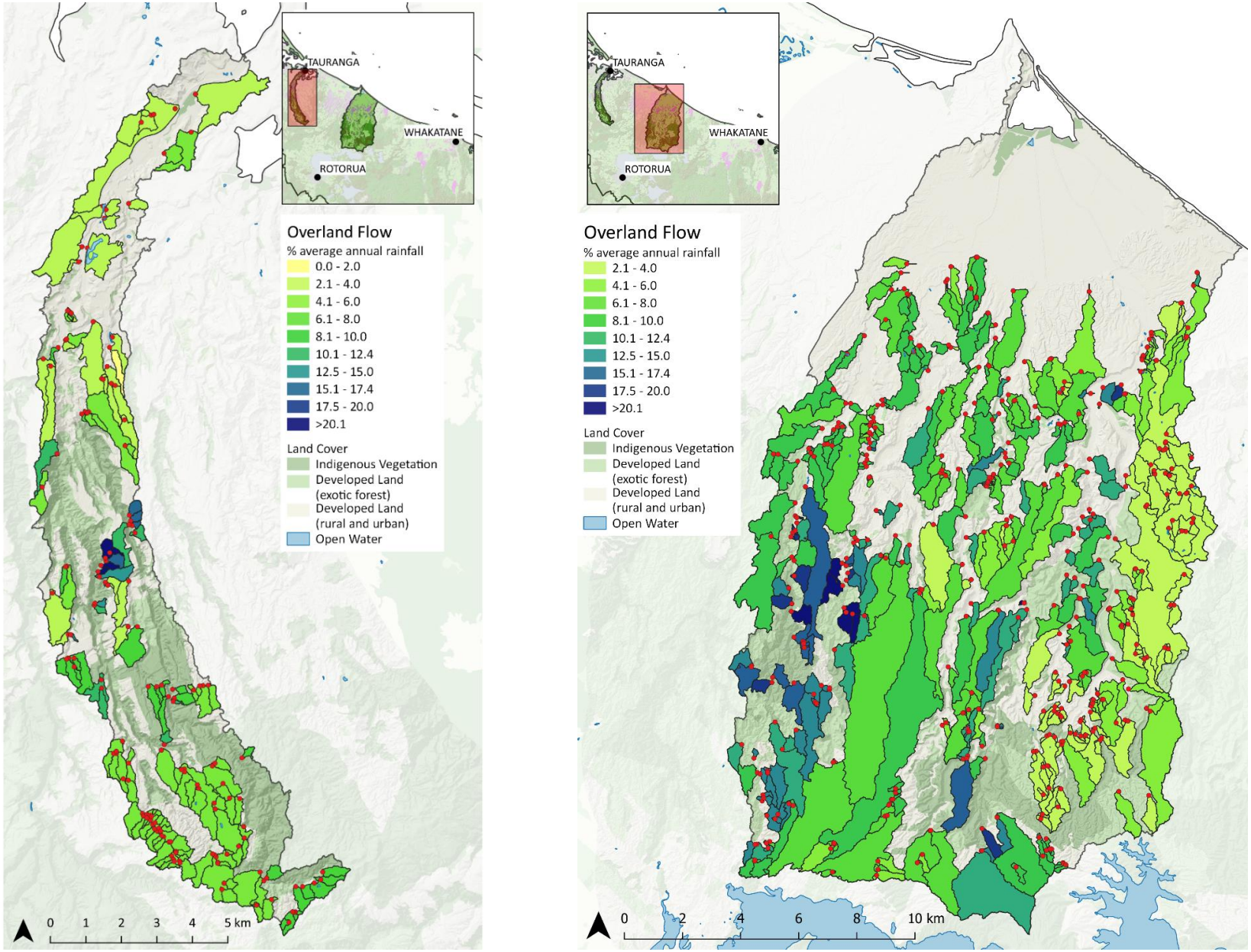

Figure 17: Overland Flow percentage classes of the Kopurererua Stream catchment (left) and the Waihi Estuary catchment (right);

7.1 Annual Runoff Volume

If 1 mm of rainfall equates to 1 litre of water per 1 m^2 of ground surface, the estimated volume of rainfall as surficial runoff can be calculated using the % overland flow (OLF) risk from Rissmann et al. (2019). Equation 1 was applied to estimate the volume of water (in litres) at the node point which enters the intermittent stream reach:

$$V = (([\%OLF]*0.01)*Rainfall_{mm})*([Area\ in\ m^2]) \quad \text{(Eq. 1)}$$

Where V = the water volume at each node in litres; % OLF = Percent Overland Flow as a fraction; $Rainfall_{mm}$ = average estimated total rainfall volume (mm) for a 1 in 30 year rainfall event (see section 7.1.1), and; Area = the watershed catchment area in m^2.

7.1.1 Average Rainfall Event

For the Kopurererua catchment a total event rainfall depth of 210.96mm was used, as displayed in Table 1. This was estimated using NIWA's HIRDS database – High Intensity Rainfall Design System V4, with an ARI or recurrence interval of 30 years.

For the Waihi Estuary catchment, a total rainfall depth was estimated using an average of the 7 sites identified within the catchment. The 1 in 30-year event volume of 176.98 mm was used for the Waihi Estuary, as displayed in Table 1.

The rainfall volume was used to determine which node catchments would generate the most runoff over a year, with those that create the most runoff considered of higher risk. The rainfall totals of all the sites in each catchment is shown in Figure 18.

Table 1: Catchment Rainfall Event Estimates for a 24 hour, 1 in 30-year event.

Catchment	Site Name	TYPE	ID	Easting	Northing	Rainfall Event (total mm)
Kopurererua	Kopurererua	HIRDS V4	B76812	1874306	5807801	210.96
Catchment Average						210.96
Waihi Estuary	Maketu	HIRDS V4	B76741	1904794	5812283	155.63
	Maniatutu	HIRDS V4	B76842	1904032	5805053	184.50
	Pongakawa	HIRDS V4	B76841	1906830	5807761	184.24
	Rotoehu Forest	HIRDS V4	B76951	1908442	5799031	188.17
	Pongakawa at Pongakawa	BOPRC	769402	1906241	5798824	175.70
	Rotoehu Raws	HIRDS V4	O00883	1908227	5794515	170.15
	Tokerau	HIRDS V4	B76941	1901780	5792721	180.50
Catchment Average						176.98

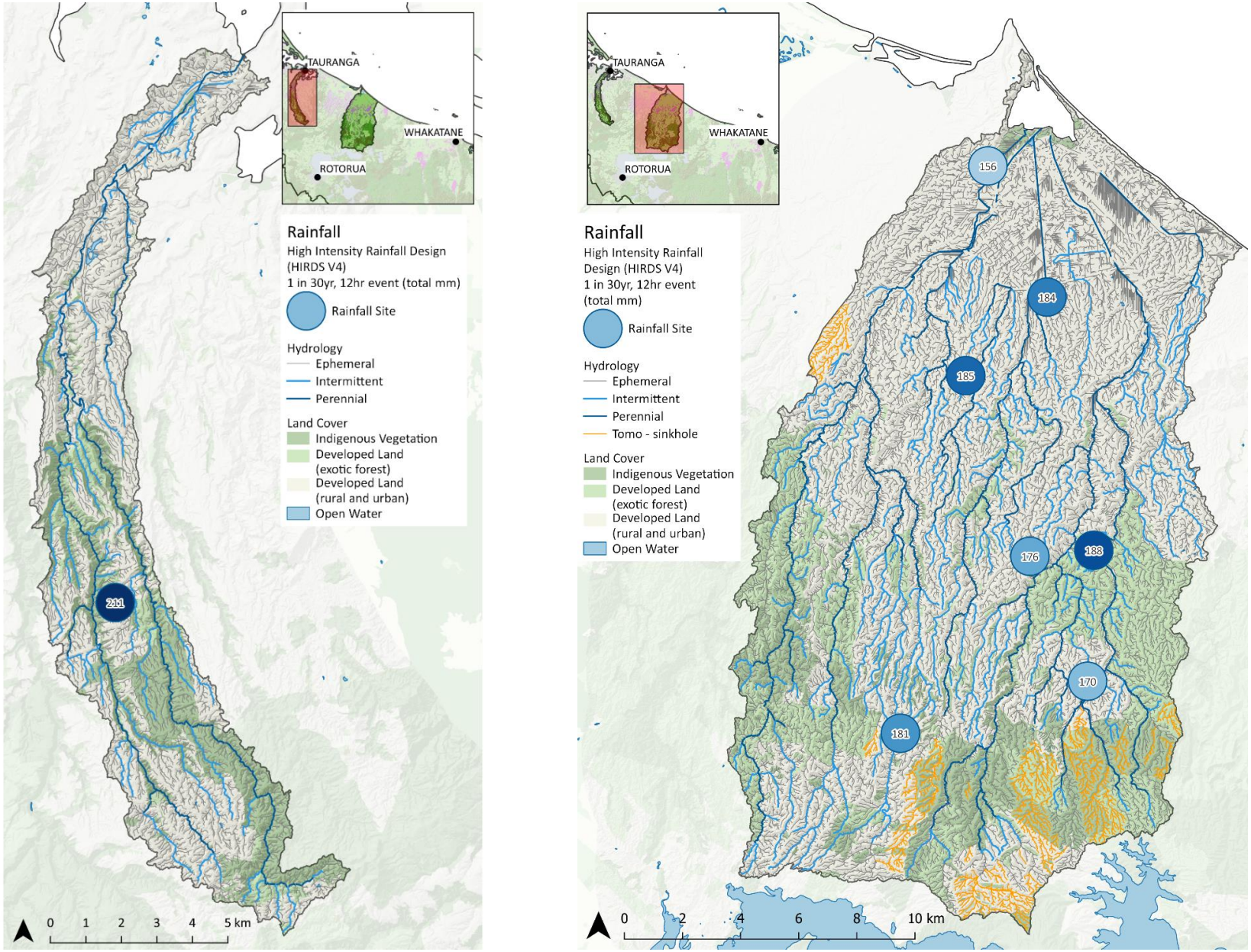

Figure 18: Total estimated rainfall volume (mm) of a 1 in 30 year rainfall event for the Kopurererua Stream catchment (left) and the Waihi Estuary catchment (right).

7.1.2 Runoff Index

A runoff index was calculated to evaluate and compare the annual runoff volumes for each of the mapped capture zones (Equation 2).

Runoff Index = Volume of water in litres (Eq. 2)

Where RI = index value, V = average annual runoff volume at each transitory node in litres/event.

The index values were then simplified into four categories according to Table 2.

Table 2: Runoff Index Classification.

Index value (litres)	Reclassified Value	Category Name
<200,000	1	Very Low
200,000 – 1,000,000	2	Low
1,000,000 – 2,000,000	3	Moderately Low
2,000,000 – 10,000,000	4	Moderate
10,000,000 – 20,000,000	5	Moderately High
20,000,000 – 100,000,000	6	High
100,000,000+	7	Very High

The runoff index shows that the smaller capture zones spread throughout the subcatchments do not produce a large volume of surficial runoff when compared to the larger catchments predominantly in the south. The runoff index shows that due to the largely uniform Overland Flow values, the overall size of the catchment plays a dominating role in the volume of water estimated at the node points (Figure 19).

It is the Moderate to Moderately High capture zones that peak runoff control structures area most suited. The Kopurererua catchment has a predominance of capture zones in this range of Runoff Index compared to the Waihi Estuary catchment where High and Very High RI capture zones are more widespread. Some smaller High catchments would also be suited, but very large catchments with high volumes of water would require a more substantial structure, as the risk of failure of smaller structures is high. Very High catchments require large, specifically engineered mitigation options and are outside the scope of this work.

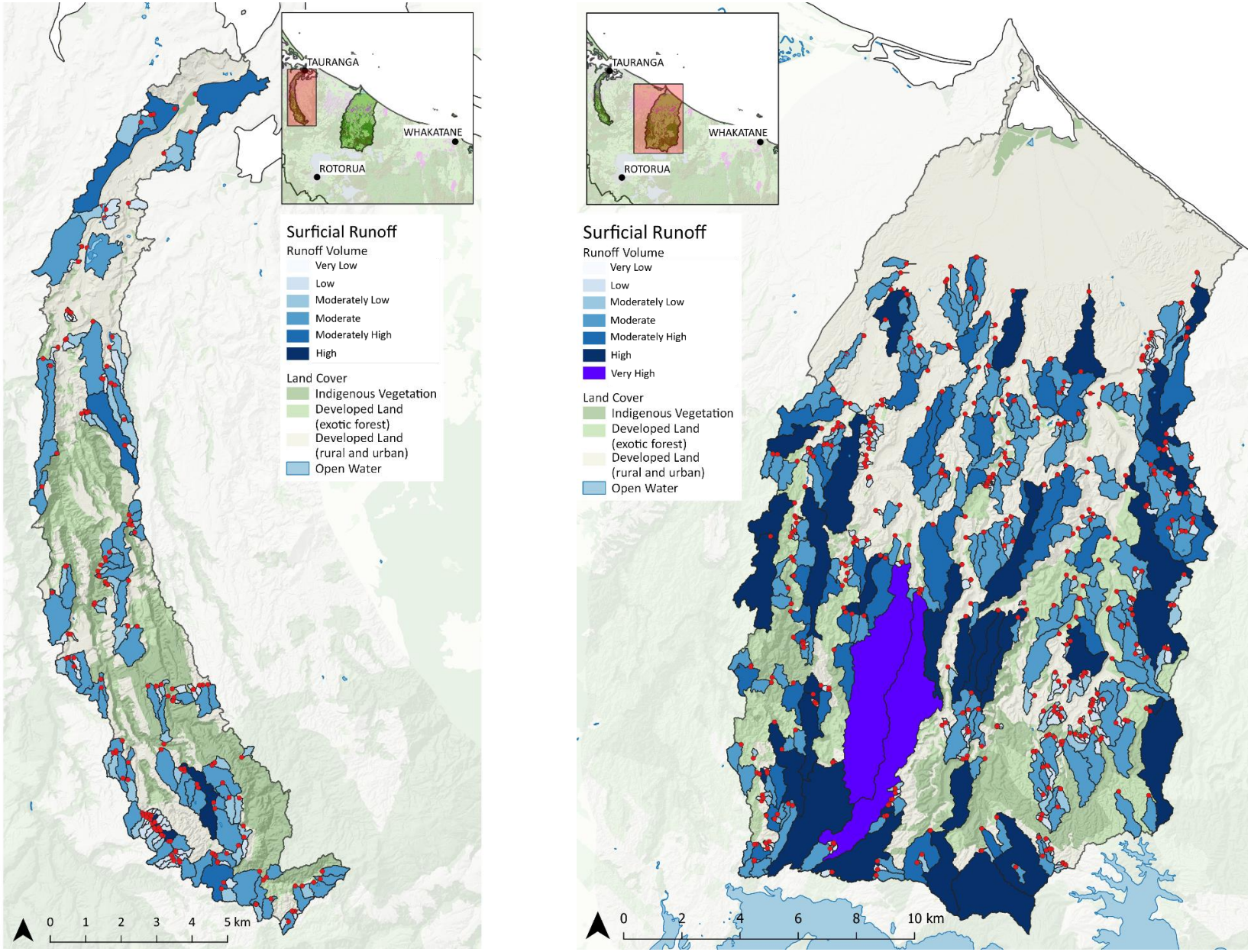

Figure 19: Surficial Runoff Volume classes of the Kopurererua Stream catchment (left) and the Waihi Estuary catchment (right);

7.2 Land Use

Consideration of contaminant source from various land uses is incorporated with the catchment index to aid in the prioritisation of sites. This is to ensure that sites with a High runoff potential also have a contaminant loads worth retaining for water quality control. Specific contaminant loss values are not estimated for this exercise, land uses are indexed on the intensity of inputs and the risk of contaminants being emitted.

7.2.1 Land Use Index

Land use information for the catchment was obtained from The Land Use Carbon Analysis System (LUCAS) from Manaaki Whenua - Landcare Research. The different catchment land uses are summarised as:

Low (1)

- **Indigenous Forest:** Native forest and scrub areas.
- **Wetland:** Native wetland vegetation.

Moderately Low (2)

- **Exotic Forest:** Planted exotic forestry – most likely Pinus radiata.
- **Residential:** Urban areas, commercial and industrial areas.
- **Other:** Areas of roads and other land uses not previously identified.

Moderate (3)

- **Grazed – Non-Dairy:** Pastoral or arable area that is not dairy, most likely Sheep and Beef, Deer or Dairy Grazing land.

Moderately High (4)

- **Arable Land:** Annual cropping land.
- **Horticulture:** Perennial cropping land.

High (5)

- **Grazed - Dairy:** Dairy milking platform and land owned by dairy farms.

In QGIS, the land use categories were intersected with generated capture zones (Figure 20), and the hectares of each land use category calculated. A land use index for capture zone was calculated from equation 3.

LU Index = (((area Indigenous Forest + area Wetland) x1) + ((area Exotic Forest + area Other + area Residential) x2) + (area Grazed Non-Dairy x3) + (area Arable Land + area Horticulture x4) + (area Grazed - Dairy x5)) / capture zone area (Eq. 3)

Where LUI = index value, area [land use category] in hectares multiplied by a land intensity factor, divided by the area of the node capture area. The land intensity factor identifies land uses with higher inputs and potential contaminants, this does not reflect specific loss values.

The index values were then simplified into five classes from low to high according to Table 3.

Table 3: Land Use Index Classification

Index value	Category Name
1	Low
2	Moderately Low
3	Moderate
4	Moderately High
5	High

The land use index shows most capture zones were classified as Moderate to High indicating the capture zone is predominantly draining agricultural land (Figure 21). Importantly the land use index, identifies a small number of nodes that are unlikely to be contributing much to the contaminant load in times of peak runoff due to dominance by natural state or conservation land.

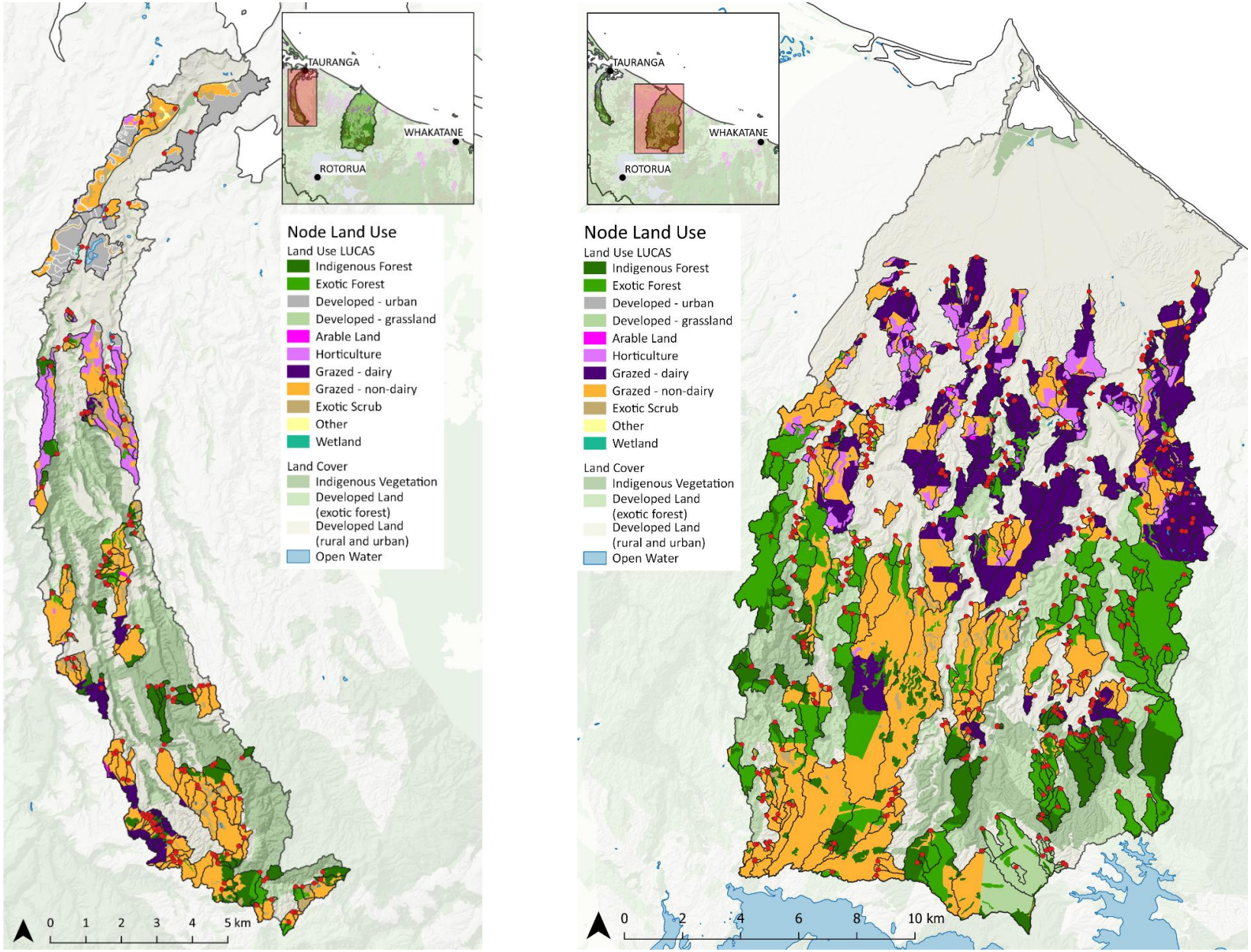

Figure 20: Node Land Use of the Kopurererua Stream catchment (left) and the Waihi Estuary catchment (right).

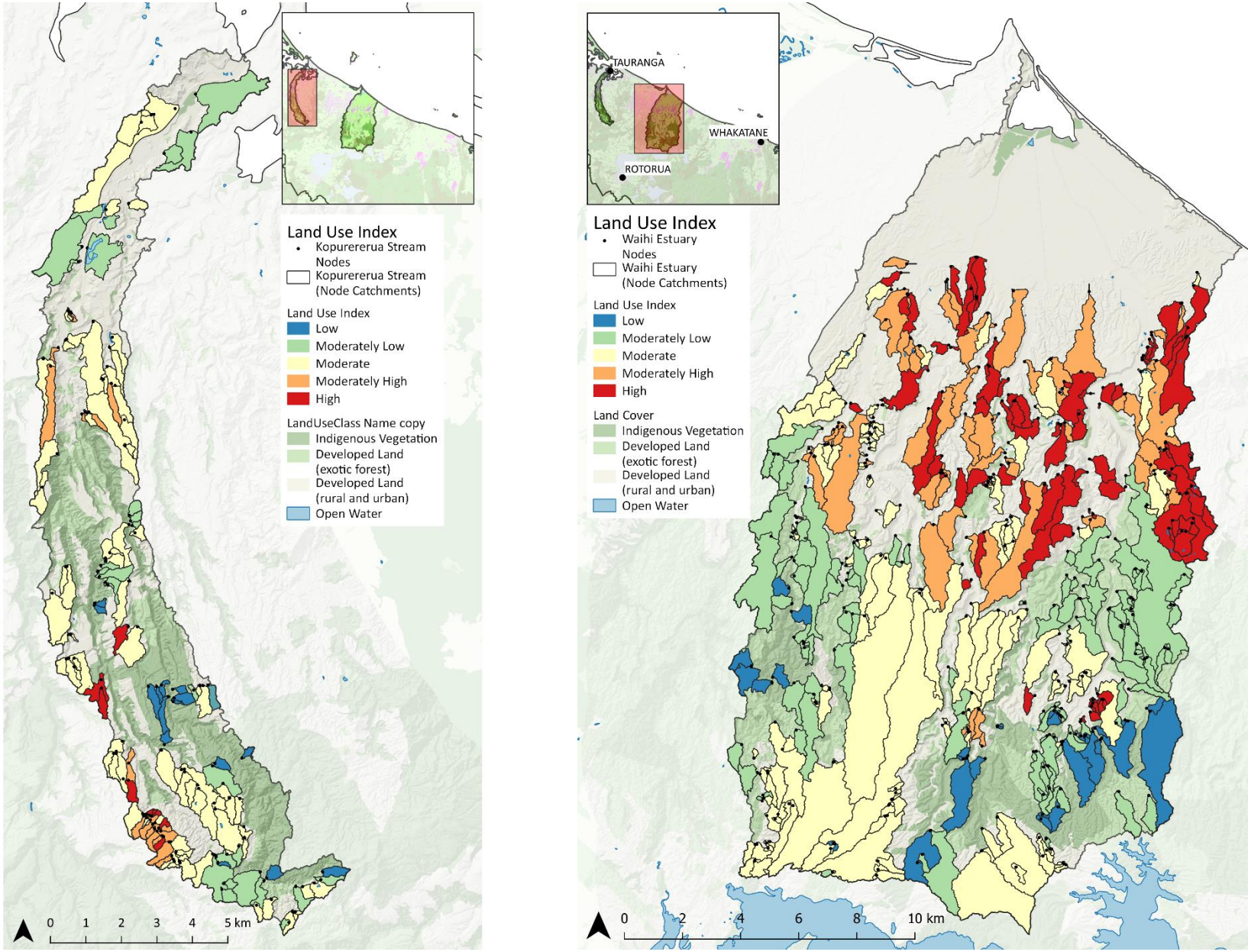

Figure 21: Land Use Index of the Kopurererua Stream catchment (left) and the Waihi Estuary catchment (right).

7.3 Priority Index or Ranking

Each capture zone was ranked in order of priority for the catchments by combining the runoff index with the land use index using equation 4.

Priority = (Runoff index x Land use index) / 5 (Eq.4)

Where 5 refers to the number of classes the indexes are simplified into (i.e., Low, Moderately-Low, Moderate, Moderately-High, and High).

Figure 22 shows the areas within the catchment that are considered most suited to various mitigation types. Of the main subcatchments of the Waihi Estuary, the Pongakawa Stream and Canal, has the highest number of sites classified as High, followed by the Pukehina Canal (Table 4).

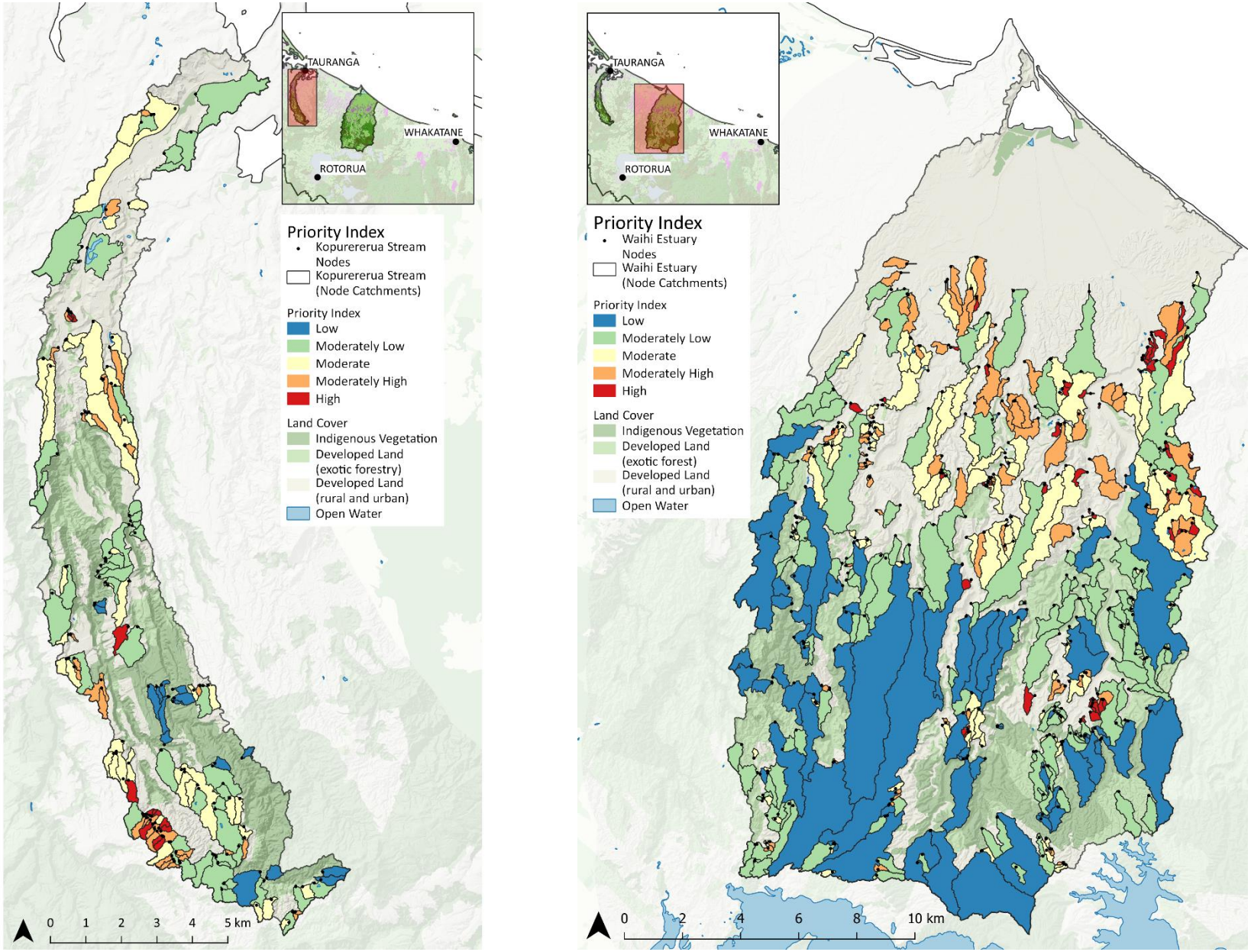

Figure 22: Priority Index of the Kopurererua Stream catchment (left) and the Waihi Estuary catchment (right).

The priority index for the capture zones were sorted from largest to smallest, and then sorted in terms of the catchment capture area – from the smallest to the largest (Table 4).

Capture zones in the Kopurererua Stream catchment were then sequentially numbered from 1 to 150. Node Capture zones in the Waihi Estuary catchment sequentially numbered from 1 to 441.

Sites are ranked from 1 – 150; and 1 – 441 respectively, in order of the potential for contaminants to be lost and the lowest numbers (1, 2, 3) should considered first for mitigation implementation and installation. See Appendix 1 for the results of the Priority Index (hierarchy rank) classification.

Table 4: Priority of sites summarised by subcatchment.

Catchment	Subcatchment	High	Moderately High	Moderate	Moderately Low	Low	Total
Kopurererua Stream	Kopurererua Stream	12	27	30	34	3	106
	Tautau Stream	1	6	11	13	13	44
Kopurererua Stream	Catchment Total	13	33	41	47	16	150
Waihi Estuary	Kaikokopu Canal	1	3	1			5
	Mangatoetoe Stream	1	4	5			10
	Oeuteheuheu Stream	1	15	12	7	8	43
	Pekahinemata Stream			3	1		4
	Pokopoko Stream	2	10	16	31	15	74
	Pongakawa Stream	36	24	40	65	36	201
	Puanene Stream	2	6	5	4		17
	Pukehina Canal	2	3	2	1		8
	Waiari Stream		4	4	13	6	27
	Waiwhakareto Stream					2	2
	Wharere Stream	3	18	16	8	5	50
Waihi Estuary	Catchment Total	48	87	104	130	72	441

8 Trial Sites and Monitoring Plan

To identify trial sites, staff will need to approach landowners with a high priority rank to trial mitigation options on their properties. Once potential sites are identified a site visit needs to be undertaken at a time when the water table is high (June-September) to establish design specifics regarding discharge heights, pipe diameters and storage volumes.

Following construction of any mitigation option, a monitoring plan should be implemented to quantifying how effective the mitigation is at retaining and attenuating nutrients and sediment.

If constructing a PRC structure, a simple approach would be to use fence standards (or sediment plate) placed in the upstream channel of the drain to provide a permanent fixture from which to take repeatable measurements and monitoring samples (Figure 23). Three standards placed approximately 3 metres apart (one towards the base of the earth dam and two further upstream), will show a gradient of sediment depth and contaminant concentration, with most of the accumulated sediment and contaminants found immediately behind the containment dam.

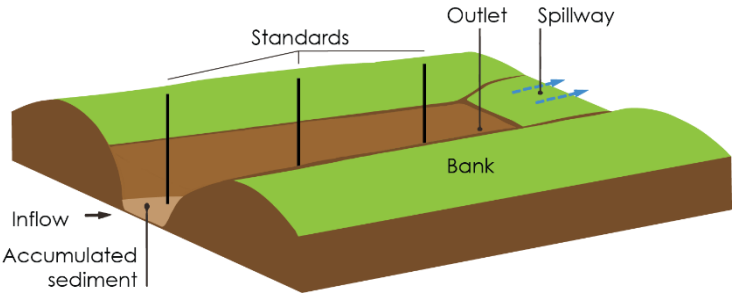

Figure 23: Recommended low earth check dam concept with monitoring locations.

The main steps for monitoring are detailed below:

- Standards placed upstream of the PRC structure to provide easy repeat sample locations (approx. 3 metres apart to provide a gradient upstream of the dam).
- Baseline/benchmark measurements of sediment depth (measure the distance from the top of the standard to the stream bed and the width of the drainage channel (benchmark).
- After one year of PRC operation, measure that distance again to determine the depth of sediment that has accumulated, and multiply by drainage channel width = volume of sediment.
- Collect sediment samples near the standards at the same time to analyse (simple soil test at Hill Laboratories).
- Use an average of the sediment concentration measures and the volume of retained sediment to quantify the retained N and P load.

A more detailed analysis of the effectiveness of the structures in terms of attenuation of nitrate, via denitrification and the mobility and generation of organic and ammoniacal nitrogen and dissolved phosphorus species could be achieved via:

- Direct sampling of sediment pore waters using a range of established methods e.g. centrifuging of sediments, pore-water sediment samplers and subsequent analysis of waters

This monitoring would provide key information over the *in situ* biogeochemical processes occurring within the retained sediment that commonly influence the production of organic and ammoniacal nitrogen and phosphorus, dissolved oxygen concentrations, denitrification and if relevant the incubation of faecal coliforms within retained sediments. Such samples would be collected following accumulation of significant sediment and processes *via* Hills Laboratory using a common analyte suite used for investigation of biogeochemical processes. Such monitoring address key questions as to the role of PRC in denitrification processes, but also the retention and/or production of dissolved ammonium, organic nitrogen and phosphorus and its potential release to the overlying water column.

After a number of structures have been installed in the subcatchments, the Bay of Plenty Regional Council long-term water quality monitoring sites can be used to assess whether a significant decrease in surficial contaminant load is detectable.

9 Summary and Next Steps

The inherent properties of the landscape determine the placement and use of different drainage methods. These same inherent properties also determine where rainfall is more likely to runoff the landscape as surficial runoff or overland flow.

The eastern subcatchments of the Pongakawa Stream and Canal, as well as the Pukehina Canal, had the largest number with Moderately-High to High priority sites for the placement of effective mitigation options. These sites are likely to be generating the largest load of contaminants during peak runoff events.

It is recommended that the next steps for this project include:

- Choosing a subcatchment, or multiple subcatchments to trial the placement of these structures. Ideally the catchment selected would be located within the capture zone of an Bay of Plenty Regional Council long-term surface water quality monitoring site, which would enable historical and future water quality comparisons.
- The Land Use Index could be further refined with the addition of farm plan data collected by Land Management staff with farm lanes and winter forage crop paddocks identified and catchments with large proportions of intensive land use practises prioritised further.
- Site visits to potential locations during periods of high water table to take measurements of freeboard and assess the sites suitability.
- Engineer PRC structure design specifications for selected sites based on Section 3.
- Gain resource consent and install structures.
- Assess the impact the structures are having on the subcatchment.

Further recommendations would include an in depth study of the lowland areas, surrounding the estuary, identified as having an Artificial Drainage class of Moderately High or High. This would include retaining the resolution of LiDAR at 1 metre, instead of resampling it to 15 metres. However, the catchment area of the entire Waihi Estuary is large and required substantial computing power to accommodate this spatial resolution. It is therefore recommended an assessment restricted to these areas should be undertaken – definitively identifying the direction and magnitude of overland flow and surficial runoff using the 1 metre LiDAR resolution.

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Appendix 1: Node Information

NODE_ID	Easting	Northing	Catchment	Subcatchment Name	OLF mean value	OLF mean Rainfall Total	Capture Area (m2)	Capture Area (ha)	Surficial Runoff Volume	Land Use Index	Runoff Volume Index	Priority	Rank
46	1875273	5801803	Kopurererua Stream	Kopurererua Stream	4.8	0.547	17680	1.768	179036.4	5	7	5	1
47	1875328	5801768	Kopurererua Stream	Kopurererua Stream	4.8	0.547	26270	2.627	266025.4	4.81614	6	5	2
38	1875668	5801198	Kopurererua Stream	Kopurererua Stream	6.888061	0.785	63710	6.371	925706.4	4.72108	6	5	3
33	1874673	5802788	Kopurererua Stream	Kopurererua Stream	4.8	0.547	156060	15.606	1580237	4.603294	5	5	4
49	1875538	5801436	Kopurererua Stream	Kopurererua Stream	4.8	0.547	52570	5.257	532302.3	4.582461	6	5	5
141	1874668	5807124	Kopurererua Stream	Tautau Stream	3.84399	0.438	196740	19.674	1595404	4.576904	5	5	6
45	1875198	5801818	Kopurererua Stream	Kopurererua Stream	4.8	0.547	23230	2.323	235175.3	4.496771	6	5	7
50	1875588	5801352	Kopurererua Stream	Kopurererua Stream	4.8	0.547	43150	4.315	436968	4.380533	6	5	8
39	1875618	5801223	Kopurererua Stream	Kopurererua Stream	6.765259	0.771	38930	3.893	555644.2	4.269458	6	5	9
42	1875360	5801543	Kopurererua Stream	Kopurererua Stream	4.8	0.547	89950	8.995	910863.1	4.076153	6	5	10
117	1873063	5815973	Kopurererua Stream	Kopurererua Stream	3.273127	0.373	20930	2.093	144506.3	3.71333	7	5	11
113	1873003	5816016	Kopurererua Stream	Kopurererua Stream	4.219454	0.481	11160	1.116	99367.47	3.653226	7	5	12
114	1872988	5816020	Kopurererua Stream	Kopurererua Stream	5.339946	0.609	14980	1.498	168798.6	3.438585	7	5	13
127	1873920	5805388	Kopurererua Stream	Kopurererua Stream	9.226497	1.052	149820	14.982	2916023	5	4	4	14
128	1873908	5805623	Kopurererua Stream	Kopurererua Stream	8.553858	0.975	381850	38.185	6890413	4.630221	4	4	15
44	1875103	5801783	Kopurererua Stream	Kopurererua Stream	4.8	0.547	109010	10.901	1103811	3.938813	5	4	16
40	1875486	5801353	Kopurererua Stream	Kopurererua Stream	6.191946	0.706	103040	10.304	1345933	3.92236	5	4	17
107	1874193	5813986	Kopurererua Stream	Kopurererua Stream	2.213133	0.252	208160	20.816	971821.7	3.733955	6	4	18
41	1875413	5801419	Kopurererua Stream	Kopurererua Stream	4.8	0.547	48970	4.897	495891	3.714111	6	4	19
103	1873363	5813123	Kopurererua Stream	Tautau Stream	7.880348	0.898	22130	2.213	367838.8	3.691369	6	4	20
46	1875273	5801803	Kopurererua Stream	Kopurererua Stream	5.405959	0.616	1654400	165.44	18867033	3.665982	5	4	21

NODE_ID	Easting	Northing	Catchment	Subcatchment Name	OLF mean value	OLF mean Rainfall Total	Capture Area (m2)	Capture Area (ha)	Surficial Runoff Volume	Land Use Index	Runoff Volume Index	Priority	Rank
101	1873557	5813181	Kopurererua Stream	Tautau Stream	8.439282	0.962	85260	8.526	1517906	3.660333	5	4	22
112	1872697	5814998	Kopurererua Stream	Kopurererua Stream	7.433439	0.847	51000	5.1	799703.2	3.536275	6	4	23
52	1875898	5800647	Kopurererua Stream	Kopurererua Stream	4.81322	0.549	67130	6.713	681600.8	3.525845	6	4	24
98	1874583	5812228	Kopurererua Stream	Kopurererua Stream	2.28573	0.261	60090	6.009	289728.6	3.485439	6	4	25
115	1872962	5816038	Kopurererua Stream	Kopurererua Stream	5.538515	0.631	28750	2.875	335853.4	3.416696	6	4	26
149	1874144	5815003	Kopurererua Stream	Kopurererua Stream	1.889884	0.215	210630	21.063	839733.4	3.383943	6	4	27
105	1873923	5814121	Kopurererua Stream	Kopurererua Stream	2.234481	0.255	15430	1.543	72751.22	3.044718	7	4	28
53	1875943	5800557	Kopurererua Stream	Kopurererua Stream	4.8	0.547	48670	4.867	492853.5	3.009246	6	4	29
48	1875194	5801728	Kopurererua Stream	Kopurererua Stream	4.8	0.547	25320	2.532	256417.3	3.001185	6	4	30
69	1876689	5805453	Kopurererua Stream	Tautau Stream	5.951448	0.678	37080	3.708	465595.1	3.000809	6	4	31
77	1873147	5805987	Kopurererua Stream	Kopurererua Stream	6.000044	0.684	39680	3.968	502293.6	3.000756	6	4	32
55	1876018	5800778	Kopurererua Stream	Kopurererua Stream	5.676737	0.647	65430	6.543	783540.9	3.000459	6	4	33
54	1875968	5800497	Kopurererua Stream	Kopurererua Stream	4.8	0.547	37680	3.768	381587.4	3	6	4	34
106	1873968	5814102	Kopurererua Stream	Kopurererua Stream	2.974181	0.339	53620	5.362	336414.1	3	6	4	35
7	1879383	5799073	Kopurererua Stream	Tautau Stream	6.772708	0.772	20030	2.003	286140.5	3	6	4	36
133	1877456	5800703	Kopurererua Stream	Kopurererua Stream	5.903865	0.673	24970	2.497	311021.7	3	6	4	37
57	1876112	5800513	Kopurererua Stream	Kopurererua Stream	5.84998	0.667	36340	3.634	448414.2	3	6	4	38
43	1875298	5801667	Kopurererua Stream	Kopurererua Stream	4.8	0.547	13740	1.374	139082.2	3	7	4	39
76	1873145	5806233	Kopurererua Stream	Kopurererua Stream	6.000052	0.684	48700	4.87	616409.2	3	6	4	40
79	1873047	5806895	Kopurererua Stream	Kopurererua Stream	10.99514	1.253	20350	2.035	472104.7	3	6	4	41
8	1879346	5799063	Kopurererua Stream	Tautau Stream	6.242074	0.712	20780	2.078	273586.9	2.998556	6	4	42
56	1876012	5800746	Kopurererua Stream	Kopurererua Stream	4.845295	0.552	9020	0.902	92148.93	2.996674	7	4	43
15	1877943	5801163	Kopurererua Stream	Tautau Stream	4.8	0.547	78540	7.854	795268	2.990323	6	4	44

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122	1874044	5818889	Kopurererua Stream	Kopurererua Stream	2.510681	0.286	147220	14.722	779738.3	2.947154	6	4	45
125	1875993	5821738	Kopurererua Stream	Kopurererua Stream	2.100778	0.239	36690	3.669	162581.1	2.649768	7	4	46
37	1875822	5801048	Kopurererua Stream	Kopurererua Stream	5.869887	0.669	205400	20.54	2543496	4.310857	4	3	47
131	1874680	5803273	Kopurererua Stream	Kopurererua Stream	4.802488	0.547	303580	30.358	3075583	3.823901	4	3	48
147	1872483	5814473	Kopurererua Stream	Kopurererua Stream	3.945603	0.45	567790	56.779	4725985	3.676271	4	3	49
100	1873457	5813182	Kopurererua Stream	Tautau Stream	4.831963	0.551	1242240	124.224	12662535	3.457359	5	3	50
60	1874333	5803543	Kopurererua Stream	Kopurererua Stream	4.800347	0.547	140980	14.098	1427611	3.438573	5	3	51
142	1874684	5808408	Kopurererua Stream	Tautau Stream	3.330719	0.38	328950	32.895	2311330	3.394862	4	3	52
148	1872276	5814678	Kopurererua Stream	Kopurererua Stream	3.764633	0.429	921180	92.118	7315715	3.374009	4	3	53
129	1874333	5803603	Kopurererua Stream	Kopurererua Stream	4.80013	0.547	375830	37.583	3805688	3.348376	4	3	54
99	1874563	5812958	Kopurererua Stream	Kopurererua Stream	2.541582	0.29	269510	26.951	1445030	3.341805	5	3	55
61	1874257	5803544	Kopurererua Stream	Kopurererua Stream	4.931338	0.562	109210	10.921	1136105	3.295944	5	3	56
116	1873683	5815726	Kopurererua Stream	Kopurererua Stream	2.298486	0.262	1072780	107.278	5201664	3.275518	4	3	57
130	1874508	5803889	Kopurererua Stream	Kopurererua Stream	5.004158	0.57	610030	61.003	6439825	3.269429	4	3	58
104	1874077	5814463	Kopurererua Stream	Kopurererua Stream	2.504887	0.286	890110	89.011	4703514	3.243431	4	3	59
26	1876264	5803023	Kopurererua Stream	Kopurererua Stream	5.81549	0.663	223410	22.341	2740798	3.240007	4	3	60
74	1872963	5806228	Kopurererua Stream	Kopurererua Stream	6.697332	0.763	329410	32.941	4654011	3.169212	4	3	61
75	1872928	5806207	Kopurererua Stream	Kopurererua Stream	6.234127	0.711	121550	12.155	1598523	3.121102	5	3	62
91	1874148	5809210	Kopurererua Stream	Kopurererua Stream	16.14738	1.841	44730	4.473	1523600	3.000671	5	3	63
72	1876928	5805471	Kopurererua Stream	Tautau Stream	5.970276	0.681	152610	15.261	1922045	3	5	3	64
22	1877814	5802269	Kopurererua Stream	Tautau Stream	4.802327	0.547	144490	14.449	1463804	3	5	3	65
23	1877528	5802283	Kopurererua Stream	Kopurererua Stream	4.8	0.547	173560	17.356	1757438	3	5	3	66
27	1876618	5802661	Kopurererua Stream	Kopurererua Stream	5.728362	0.653	161030	16.103	1945880	3	5	3	67

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134	1877928	5801477	Kopurererua Stream	Tautau Stream	4.800523	0.547	157550	15.755	1595514	2.995367	5	3	68
102	1873513	5813153	Kopurererua Stream	Tautau Stream	8.513358	0.971	68800	6.88	1235662	2.96657	5	3	69
138	1878288	5799263	Kopurererua Stream	Tautau Stream	6.107457	0.696	91220	9.122	1175329	2.941131	5	3	70
24	1876256	5803103	Kopurererua Stream	Kopurererua Stream	5.787594	0.66	2187290	218.729	26705168	2.896246	6	3	71
137	1878708	5799422	Kopurererua Stream	Tautau Stream	5.550671	0.633	167260	16.726	1958566	2.895731	5	3	72
109	1874223	5815290	Kopurererua Stream	Kopurererua Stream	2.207207	0.252	214600	21.46	999218.4	2.889049	6	3	73
111	1872933	5815237	Kopurererua Stream	Kopurererua Stream	5.04474	0.575	129470	12.947	1377791	2.878968	5	3	74
86	1872903	5808813	Kopurererua Stream	Kopurererua Stream	7.614635	0.868	107910	10.791	1733465	2.862756	5	3	75
51	1875428	5801589	Kopurererua Stream	Kopurererua Stream	4.8	0.547	43380	4.338	439245	2.825496	6	3	76
110	1872903	5815207	Kopurererua Stream	Kopurererua Stream	3.985222	0.454	63760	6.376	536024.1	2.808814	6	3	77
31	1876168	5803086	Kopurererua Stream	Kopurererua Stream	5.490473	0.626	88650	8.865	1026835	2.797518	5	3	78
78	1872983	5806898	Kopurererua Stream	Kopurererua Stream	3.447579	0.393	63530	6.353	462075.6	2.776169	6	3	79
152	1875038	5821353	Kopurererua Stream	Kopurererua Stream	2.544764	0.29	2312450	231.245	12413974	2.699678	5	3	80
4	1879588	5799787	Kopurererua Stream	Tautau Stream	6.881302	0.784	106930	10.693	1552238	2.680819	5	3	81
146	1875317	5821558	Kopurererua Stream	Kopurererua Stream	1.848857	0.211	414860	41.486	1618065	2.511184	5	3	82
124	1874682	5819063	Kopurererua Stream	Kopurererua Stream	2.720848	0.31	127260	12.726	730471.1	2.503693	6	3	83
6	1879203	5798777	Kopurererua Stream	Tautau Stream	6.020268	0.686	50540	5.054	641905.7	2.443609	6	3	84
83	1874098	5808293	Kopurererua Stream	Kopurererua Stream	3.870242	0.441	16680	1.668	136203.6	2.384293	7	3	85
123	1874002	5818648	Kopurererua Stream	Kopurererua Stream	2.181274	0.249	122150	12.215	562059	2.166189	6	3	86
70	1876515	5805333	Kopurererua Stream	Tautau Stream	5.999956	0.684	60830	6.083	769990.7	2.0988	6	3	87
132	1875868	5801051	Kopurererua Stream	Kopurererua Stream	5.422467	0.618	677270	67.727	7747277	3.075686	4	2	88
108	1874302	5813928	Kopurererua Stream	Kopurererua Stream	2.507691	0.286	533440	53.344	2821933	3.062594	4	2	89
135	1877343	5802698	Kopurererua Stream	Tautau Stream	4.800319	0.547	289160	28.916	2928165	3.000104	4	2	90

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21	1877048	5800707	Kopurererua Stream	Kopurererua Stream	5.933922	0.676	269510	26.951	3373669	3	4	2	91
25	1876657	5802558	Kopurererua Stream	Kopurererua Stream	5.396875	0.615	219740	21.974	2501698	2.999863	4	2	92
68	1876781	5805458	Kopurererua Stream	Tautau Stream	5.967986	0.68	256150	25.615	3224828	2.987781	4	2	93
139	1875607	5803638	Kopurererua Stream	Kopurererua Stream	5.616355	0.64	458510	45.851	5432401	2.962029	4	2	94
3	1879916	5799888	Kopurererua Stream	Tautau Stream	7.157111	0.816	207460	20.746	3132370	2.945435	4	2	95
58	1876133	5800458	Kopurererua Stream	Kopurererua Stream	5.794104	0.661	196910	19.691	2406851	2.942106	4	2	96
150	1872532	5808068	Kopurererua Stream	Kopurererua Stream	3.155333	0.36	710290	71.029	4727949	2.934675	4	2	97
36	1875073	5801848	Kopurererua Stream	Kopurererua Stream	4.986584	0.568	273780	27.378	2880068	2.922091	4	2	98
136	1877093	5802143	Kopurererua Stream	Kopurererua Stream	5.011898	0.571	814660	81.466	8613252	2.912221	4	2	99
59	1877124	5801973	Kopurererua Stream	Kopurererua Stream	5.043992	0.575	706970	70.697	7522609	2.898892	4	2	100
73	1872994	5806235	Kopurererua Stream	Kopurererua Stream	6.016449	0.686	390770	39.077	4959637	2.849502	4	2	101
85	1872942	5808823	Kopurererua Stream	Kopurererua Stream	4.889262	0.557	302840	30.284	3123501	2.784639	4	2	102
97	1872663	5812003	Kopurererua Stream	Kopurererua Stream	9.697024	1.105	395090	39.509	8082200	2.699436	4	2	103
143	1872244	5811058	Kopurererua Stream	Kopurererua Stream	4.146861	0.473	275320	27.532	2408486	2.695118	4	2	104
96	1874692	5810002	Kopurererua Stream	Tautau Stream	9.192537	1.048	314740	31.474	6103535	2.663818	4	2	105
140	1874931	5807117	Kopurererua Stream	Tautau Stream	7.888806	0.899	536560	53.656	8929291	2.657615	4	2	106
126	1875393	5821577	Kopurererua Stream	Kopurererua Stream	1.936544	0.221	628430	62.843	2567302	2.645784	4	2	107
87	1874043	5808977	Kopurererua Stream	Kopurererua Stream	12.73662	1.452	137460	13.746	3693223	2.625782	4	2	108
9	1879303	5799074	Kopurererua Stream	Tautau Stream	6.132193	0.699	171010	17.101	2212198	2.574937	4	2	109
88	1874028	5809058	Kopurererua Stream	Kopurererua Stream	17.93237	2.044	188980	18.898	7148839	2.570854	4	2	110
92	1874863	5809768	Kopurererua Stream	Tautau Stream	9.335157	1.064	108610	10.861	2138849	2.568364	4	2	111
5	1879393	5799788	Kopurererua Stream	Tautau Stream	6.925198	0.789	188160	18.816	2748891	2.437075	4	2	112
16	1877787	5800928	Kopurererua Stream	Kopurererua Stream	4.942888	0.563	107910	10.791	1125169	2.416273	5	2	113

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29	1877043	5803193	Kopurererua Stream	Tautau Stream	4.885304	0.557	798480	79.848	8228936	2.36582	4	2	114
82	1874028	5808373	Kopurererua Stream	Kopurererua Stream	3.845479	0.438	133360	13.336	1081845	2.320786	5	2	115
84	1873858	5808531	Kopurererua Stream	Kopurererua Stream	10.02256	1.143	248160	24.816	5246946	2.320318	4	2	116
10	1878493	5799949	Kopurererua Stream	Tautau Stream	5.820954	0.664	278640	27.864	3421603	2.293676	4	2	117
144	1875683	5820474	Kopurererua Stream	Kopurererua Stream	4.080232	0.465	205980	20.598	1772952	2.268618	5	2	118
94	1874738	5810104	Kopurererua Stream	Tautau Stream	13.39371	1.527	74900	7.49	2116152	2.241522	4	2	119
20	1877106	5800683	Kopurererua Stream	Kopurererua Stream	5.994978	0.683	1008150	100.815	12749755	2.228369	5	2	120
151	1876568	5822148	Kopurererua Stream	Kopurererua Stream	3.8753	0.442	1519430	151.943	12421602	2.21799	5	2	121
95	1874701	5810263	Kopurererua Stream	Tautau Stream	13.14005	1.498	118600	11.86	3287524	2.208263	4	2	122
153	1873366	5817841	Kopurererua Stream	Kopurererua Stream	2.251641	0.257	1316650	131.665	6254036	2.161379	4	2	123
121	1873960	5818987	Kopurererua Stream	Kopurererua Stream	2.62206	0.299	218100	21.81	1206378	2.074507	5	2	124
119	1873273	5817413	Kopurererua Stream	Kopurererua Stream	2.650732	0.302	47250	4.725	264220.9	2.012698	6	2	125
118	1873518	5817808	Kopurererua Stream	Kopurererua Stream	2.617405	0.298	809530	80.953	4469845	2.006053	4	2	126
145	1876443	5821078	Kopurererua Stream	Kopurererua Stream	4.244185	0.484	552980	55.298	4950997	2	4	2	127
12	1877373	5799883	Kopurererua Stream	Kopurererua Stream	5.986333	0.682	70970	7.097	896270.2	1.958292	6	2	128
90	1873819	5808674	Kopurererua Stream	Kopurererua Stream	19.52901	2.226	43030	4.303	1772723	1.939345	5	2	129
93	1874783	5809974	Kopurererua Stream	Tautau Stream	12.51954	1.427	35760	3.576	944498.3	1.933725	6	2	130
13	1877311	5799708	Kopurererua Stream	Kopurererua Stream	6	0.684	137220	13.722	1736894	1.900015	5	2	131
18	1877148	5800627	Kopurererua Stream	Kopurererua Stream	5.980157	0.682	205750	20.575	2595624	1.892345	4	2	132
89	1873903	5808851	Kopurererua Stream	Kopurererua Stream	19.09181	2.176	69050	6.905	2781098	1.886749	4	2	133
19	1877196	5800443	Kopurererua Stream	Kopurererua Stream	6	0.684	35310	3.531	446946.6	1.436703	6	2	134
2	1880101	5799983	Kopurererua Stream	Tautau Stream	7.264519	0.828	142060	14.206	2177108	1.677812	4	1	135
11	1878388	5800197	Kopurererua Stream	Tautau Stream	5.851022	0.667	561900	56.19	6935613	1.589589	4	1	136

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1	1880153	5800199	Kopurererua Stream	Tautau Stream	7.610074	0.868	171600	17.16	2754916	1.14866	4	1	137
80	1873713	5807727	Kopurererua Stream	Kopurererua Stream	9.519153	1.085	56970	5.697	1143929	1.097771	5	1	138
81	1873733	5807783	Kopurererua Stream	Kopurererua Stream	10.62476	1.211	49700	4.97	1113904	1.042254	5	1	139
14	1878573	5800029	Kopurererua Stream	Tautau Stream	7.897502	0.9	142570	14.257	2375180	1.017535	4	1	140
32	1875687	5803793	Kopurererua Stream	Kopurererua Stream	8.165428	0.931	77440	7.744	1333968	1.003874	5	1	141
62	1875968	5805105	Kopurererua Stream	Tautau Stream	6.861864	0.782	143590	14.359	2078603	1.000696	4	1	142
30	1877118	5803268	Kopurererua Stream	Tautau Stream	5.43414	0.619	109700	10.97	1257614	1	5	1	143
28	1877877	5803418	Kopurererua Stream	Tautau Stream	7.662293	0.874	67200	6.72	1086234	1	5	1	144
63	1875938	5805008	Kopurererua Stream	Tautau Stream	9.9571	1.135	23050	2.305	484169.5	1	6	1	145
71	1875923	5805353	Kopurererua Stream	Tautau Stream	6.133012	0.699	58660	5.866	758960.2	1	6	1	146
64	1875803	5805147	Kopurererua Stream	Tautau Stream	6.456316	0.736	150690	15.069	2052368	1	4	1	147
67	1875609	5805473	Kopurererua Stream	Tautau Stream	7.753726	0.884	66000	6.6	1079625	1	5	1	148
66	1875472	5805428	Kopurererua Stream	Tautau Stream	6	0.684	47650	4.765	603108.6	1	6	1	149
65	1875236	5805433	Kopurererua Stream	Tautau Stream	6.0419	0.689	186680	18.668	2379312	1	4	1	150

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6	1910908	5801685	Waihi Estuary	Pongakawa Stream	4.85428	0.445	12105.84	1.210584	104005.3	5.001718	7	5	1
3	1911807	5802223	Waihi Estuary	Pongakawa Stream	3	0.275	22089.75	2.208975	117286.5	5.000056	7	5	2
136	1908003	5793193	Waihi Estuary	Pongakawa Stream	3.608346	0.331	22839.85	2.283985	145860.4	5.000032	7	5	3
178	1910145	5805748	Waihi Estuary	Pongakawa Stream	6.117186	0.56	9410.216	0.941022	101879.5	4.999885	7	5	4
163	1911473	5799699	Waihi Estuary	Pongakawa Stream	3.082525	0.282	27431.38	2.743138	149654.6	4.999749	7	5	5
192	1904733	5801282	Waihi Estuary	Wharere Stream	10.54051	0.966	6190.793	0.619079	115489.8	4.99936	7	5	6
177	1910283	5806030	Waihi Estuary	Pongakawa Stream	6.027893	0.552	14502.2	1.45022	154716	4.999242	7	5	7
191	1904718	5801255	Waihi Estuary	Wharere Stream	9.348238	0.856	6090.942	0.609094	100774.3	4.999227	7	5	8

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2	1910906	5802733	Waihi Estuary	Pongakawa Stream	3.347609	0.307	19144.7	1.91447	113427.7	4.998774	7	5	9
175	1910108	5805599	Waihi Estuary	Pongakawa Stream	5.190955	0.475	10233.92	1.023392	94021.01	4.998086	7	5	10
254	1903508	5806024	Waihi Estuary	Mangatoetoe Stream	3.774609	0.346	22716.55	2.271655	151757.5	4.947494	7	5	11
167	1908638	5804073	Waihi Estuary	Pongakawa Stream	11.35871	1.04	5865.924	0.586592	117923.7	4.802312	7	5	12
158	1908289	5800438	Waihi Estuary	Pongakawa Stream	10.99267	1.007	6514.953	0.651495	126750.6	4.704562	7	5	13
42	1908424	5793878	Waihi Estuary	Pongakawa Stream	5.462303	0.5	17148.51	1.714851	165782.2	4.675626	7	5	14
174	1910106	5805673	Waihi Estuary	Pongakawa Stream	5.123456	0.469	25035.64	2.503564	227016.5	5.00087	6	5	15
162	1911022	5799787	Waihi Estuary	Pongakawa Stream	3	0.275	56685.13	5.668513	300972	5.000429	6	5	16
180	1910358	5806308	Waihi Estuary	Pongakawa Stream	5.265517	0.482	75805.59	7.580559	706444.4	5.000291	6	5	17
139	1908402	5793751	Waihi Estuary	Pongakawa Stream	4.76583	0.437	63476.9	6.34769	535414.3	5.000245	6	5	18
140	1908729	5793888	Waihi Estuary	Pongakawa Stream	4.209065	0.386	66447.12	6.644712	494991.3	5.000216	6	5	19
176	1910297	5806043	Waihi Estuary	Pongakawa Stream	5.36408	0.491	64798.03	6.479803	615166.7	5.000152	6	5	20
179	1910433	5806458	Waihi Estuary	Pongakawa Stream	6.03962	0.553	31650.1	3.16501	338314.4	4.999984	6	5	21
14	1911824	5799973	Waihi Estuary	Pongakawa Stream	3.275435	0.3	93400.82	9.340082	541446.3	4.999956	6	5	22
257	1904397	5807718	Waihi Estuary	Kaikokopu Canal	8.892347	0.815	45332.75	4.533275	713451.1	4.999696	6	5	23
199	1903224	5801693	Waihi Estuary	Puanene Stream	5.487558	0.503	25612.46	2.561246	248751.8	4.99952	6	5	24
189	1906744	5801288	Waihi Estuary	Pongakawa Stream	6.883865	0.631	46404.52	4.640452	565364.3	4.999513	6	5	25
33	1908361	5793658	Waihi Estuary	Pongakawa Stream	5.311389	0.487	41186.43	4.118643	387166.7	4.999219	6	5	26
263	1904808	5805407	Waihi Estuary	Puanene Stream	8.160858	0.748	43959.55	4.395955	634928.4	4.998914	6	5	27
286	1901153	5804214	Waihi Estuary	Oeuteheuheu Stream	11.77952	1.079	21793.71	2.179371	454354.3	4.997313	6	5	28
54	1904219	5798018	Waihi Estuary	Wharere Stream	3.859359	0.354	86771.75	8.677175	592692.2	4.996327	6	5	29
169	1907429	5804843	Waihi Estuary	Wharere Stream	3.266149	0.299	50996.94	5.099694	294792.1	4.969514	6	5	30
138	1908321	5793453	Waihi Estuary	Pongakawa Stream	3.602884	0.33	96101.53	9.610153	612796.6	4.917507	6	5	31

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5	1911058	5801604	Waihi Estuary	Pongakawa Stream	3.050964	0.279	70138.78	7.013878	378731.2	4.907128	6	5	32
31	1908417	5800283	Waihi Estuary	Pongakawa Stream	11.10582	1.017	23264.07	2.326407	457269.2	4.852548	6	5	33
1	1910923	5802535	Waihi Estuary	Pongakawa Stream	3	0.275	40161.39	4.016139	213238.6	4.818558	6	5	34
7	1911808	5801248	Waihi Estuary	Pongakawa Stream	3.520065	0.322	88783.1	8.87831	553116.6	4.681409	6	5	35
186	1907237	5803388	Waihi Estuary	Wharere Stream	8.409436	0.77	80651.99	8.065199	1200377	4.999877	5	5	36
168	1908331	5804438	Waihi Estuary	Pongakawa Stream	12.97129	1.188	46004.19	4.600419	1056128	4.999545	5	5	37
404	1908217	5801723	Waihi Estuary	Pongakawa Stream	8.959214	0.821	113226	11.3226	1795362	4.824243	5	5	38
441	1911619	5806358	Waihi Estuary	Pukehina Canal	4.440574	0.407	239469.9	23.94699	1882027	4.736712	5	5	39
141	1908772	5793888	Waihi Estuary	Pongakawa Stream	4.269063	0.391	35844.44	3.584444	270825.8	4.56054	6	5	40
249	1900067	5804093	Waihi Estuary	Pokopoko Stream	8.349527	0.765	96537.8	9.65378	1426576	4.554175	5	5	41
375	1906413	5794022	Waihi Estuary	Pongakawa Stream	3.6	0.33	194506.3	19.45063	1239287	4.545919	5	5	42
181	1910423	5806548	Waihi Estuary	Pongakawa Stream	4.431791	0.406	101140.2	10.11402	793302.9	4.441852	6	5	43
444	1911478	5807563	Waihi Estuary	Pukehina Canal	3.043345	0.279	133113.3	13.31133	716982.1	4.411506	6	5	44
172	1910586	5805573	Waihi Estuary	Pongakawa Stream	4.727334	0.433	83119.1	8.31191	695429.1	4.211186	6	5	45
216	1904083	5792878	Waihi Estuary	Pongakawa Stream	4.581645	0.42	50700.09	5.070009	411117.4	4.115969	6	5	46
94	1899483	5803193	Waihi Estuary	Pokopoko Stream	8.990078	0.823	14080.15	1.408015	224030.2	4.019843	6	5	47
11	1910962	5800958	Waihi Estuary	Pongakawa Stream	3	0.275	35044.51	3.504451	186070.2	3.832555	7	5	48
170	1907363	5804598	Waihi Estuary	Wharere Stream	3.021171	0.277	60157.98	6.015798	321665.4	3.811132	6	5	49
195	1904793	5801364	Waihi Estuary	Wharere Stream	6.749985	0.618	9261.197	0.92612	110638.3	3.593488	7	5	50
217	1904122	5792763	Waihi Estuary	Pongakawa Stream	4.581645	0.42	16775.21	1.677521	136027	3.37522	7	5	51
173	1910107	5805194	Waihi Estuary	Pongakawa Stream	4.600045	0.421	22289.94	2.228994	181470.8	3.352184	7	5	52
420	1905497	5804948	Waihi Estuary	Wharere Stream	11.99271	1.099	102945.9	10.29459	2185055	5.000197	4	4	53
422	1905691	5804178	Waihi Estuary	Wharere Stream	7.472935	0.685	295755	29.5755	3911642	5.000084	4	4	54

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423	1905723	5804203	Waihi Estuary	Wharere Stream	8.323545	0.762	316897	31.6897	4668337	5.000047	4	4	55
424	1905499	5804393	Waihi Estuary	Wharere Stream	7.899138	0.724	709556.5	70.95565	9919789	5.000024	4	4	56
338	1902008	5807873	Waihi Estuary	Pokopoko Stream	8.285823	0.759	177792.9	17.77929	2607268	4.999919	4	4	57
161	1911154	5800063	Waihi Estuary	Pongakawa Stream	3.302108	0.302	883218.9	88.32189	5161731	4.998059	4	4	58
12	1911870	5800133	Waihi Estuary	Pongakawa Stream	3.350086	0.307	762061.3	76.20613	4518367	4.9978	4	4	59
13	1911612	5799683	Waihi Estuary	Pongakawa Stream	3.178198	0.291	453153.7	45.31537	2548955	4.996274	4	4	60
403	1908291	5802178	Waihi Estuary	Pongakawa Stream	10.70864	0.981	431281.6	43.12816	8173930	4.991332	4	4	61
418	1904333	5804107	Waihi Estuary	Puanene Stream	8.60087	0.788	240093.1	24.00931	3654752	4.983441	4	4	62
345	1904428	5809138	Waihi Estuary	Kaikokopu Canal	8.132119	0.745	669406.6	66.94066	9634506	4.956584	4	4	63
8	1911663	5801014	Waihi Estuary	Pongakawa Stream	3.164451	0.29	358551.8	35.85518	2008103	4.953677	4	4	64
259	1904399	5807759	Waihi Estuary	Kaikokopu Canal	8.87291	0.813	192390	19.239	3021233	4.937211	4	4	65
419	1904838	5805383	Waihi Estuary	Puanene Stream	6.870688	0.629	544987.6	54.49876	6627085	4.93514	4	4	66
184	1907307	5803363	Waihi Estuary	Wharere Stream	8.498479	0.778	611841.8	61.18418	9202717	4.92052	4	4	67
329	1903778	5801831	Waihi Estuary	Puanene Stream	7.437757	0.681	409870.2	40.98702	5395406	4.905065	4	4	68
431	1905053	5806348	Waihi Estuary	Puanene Stream	6.864501	0.629	759392.9	75.93929	9225953	4.895963	4	4	69
400	1907735	5799603	Waihi Estuary	Pongakawa Stream	9.721229	0.89	402135.9	40.21359	6918784	4.890088	4	4	70
439	1910919	5802773	Waihi Estuary	Pongakawa Stream	3.049035	0.279	641179.5	64.11795	3460013	4.856643	4	4	71
330	1903208	5802285	Waihi Estuary	Puanene Stream	7.334161	0.672	241996.2	24.19962	3141193	4.847639	4	4	72
443	1911683	5806706	Waihi Estuary	Pukehina Canal	4.416868	0.405	346425.6	34.64256	2708072	4.794709	4	4	73
409	1905247	5801978	Waihi Estuary	Wharere Stream	7.344063	0.673	237094.8	23.70948	3081726	4.790363	4	4	74
421	1905284	5804188	Waihi Estuary	Wharere Stream	7.383111	0.676	172391.4	17.23914	2252634	4.768509	4	4	75
32	1908579	5794068	Waihi Estuary	Pongakawa Stream	4.662245	0.427	256901.8	25.69018	2119815	4.763805	4	4	76
260	1901798	5808603	Waihi Estuary	Pokopoko Stream	6.891683	0.631	181563.6	18.15636	2214572	4.691083	4	4	77

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425	1906526	5803588	Waihi Estuary	Wharere Stream	9.025155	0.827	347125.8	34.71258	5544691	4.669805	4	4	78
165	1909388	5804737	Waihi Estuary	Pongakawa Stream	18.80837	1.723	143127.2	14.31272	4764408	4.662358	4	4	79
445	1911438	5807553	Waihi Estuary	Pukehina Canal	3.325571	0.305	682318.7	68.23187	4015958	4.660168	4	4	80
166	1908757	5804643	Waihi Estuary	Pongakawa Stream	13.42189	1.229	262742.2	26.27422	6241359	4.659396	4	4	81
389	1904655	5799658	Waihi Estuary	Wharere Stream	5.146341	0.471	333280.1	33.32801	3035594	4.605136	4	4	82
255	1903443	5806109	Waihi Estuary	Mangatoetoe Stream	8.691365	0.796	152676.4	15.26764	2348527	4.598813	4	4	83
402	1909537	5801223	Waihi Estuary	Pukehina Canal	11.10373	1.017	398156.5	39.81565	7824533	4.587769	4	4	84
258	1904208	5808058	Waihi Estuary	Kaikokopu Canal	8.59089	0.787	438052.7	43.80527	6660399	4.566094	4	4	85
182	1907924	5803733	Waihi Estuary	Pongakawa Stream	8.987765	0.823	316588.5	31.65885	5035963	4.558884	4	4	86
337	1902053	5807843	Waihi Estuary	Pokopoko Stream	8.399667	0.769	367691.9	36.76919	5466154	4.557648	4	4	87
343	1903518	5808813	Waihi Estuary	Mangatoetoe Stream	5.748611	0.527	283257.9	28.32579	2881912	4.530712	4	4	88
261	1901998	5808908	Waihi Estuary	Pokopoko Stream	5.290134	0.485	219258.8	21.92588	2052860	4.49925	4	4	89
430	1906054	5805534	Waihi Estuary	Wharere Stream	5.851973	0.536	304214.8	30.42148	3150782	4.447779	4	4	90
10	1911396	5800983	Waihi Estuary	Pongakawa Stream	3.132822	0.287	234877.4	23.48774	1302305	4.434143	5	4	91
427	1909502	5804418	Waihi Estuary	Pongakawa Stream	6.978897	0.639	176799.5	17.67995	2183754	4.408213	4	4	92
342	1903398	5808373	Waihi Estuary	Mangatoetoe Stream	6.777487	0.621	209641.3	20.96413	2514672	4.390547	4	4	93
93	1899610	5803293	Waihi Estuary	Pokopoko Stream	8.984956	0.823	100583.3	10.05833	1599475	4.294552	5	4	94
262	1901273	5806984	Waihi Estuary	Pokopoko Stream	6.555796	0.601	111215.2	11.12152	1290403	4.199335	5	4	95
252	1902418	5806086	Waihi Estuary	Mangatoetoe Stream	8.4	0.769	82330.31	8.233031	1223981	4.168089	5	4	96
235	1900626	5802153	Waihi Estuary	Oeuteheuheu Stream	9.12034	0.835	26162.63	2.616263	422306.9	3.587559	6	4	97
85	1898692	5802383	Waihi Estuary	Pokopoko Stream	8.982574	0.823	78040.97	7.804097	1240678	3.583502	5	4	98
256	1905059	5806803	Waihi Estuary	Puanene Stream	6.999333	0.641	23340.19	2.334019	289132.4	3.570666	6	4	99
198	1904923	5801548	Waihi Estuary	Wharere Stream	6.713707	0.615	17399.04	1.739904	206739.5	3.299032	6	4	100

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48	1907233	5794518	Waihi Estuary	Pongakawa Stream	3.6	0.33	129976.9	12.99769	828141.4	3.29697	6	4	101
196	1904808	5801418	Waihi Estuary	Wharere Stream	6.919626	0.634	7963.127	0.796313	97521.87	3.136959	7	4	102
159	1910233	5800538	Waihi Estuary	Pongakawa Stream	3.000648	0.275	75131.66	7.513166	399000.8	3.060361	6	4	103
247	1900843	5803610	Waihi Estuary	Oeuteheuheu Stream	7.615646	0.698	14404.41	1.440441	194150.3	3.009495	7	4	104
238	1900684	5802868	Waihi Estuary	Oeuteheuheu Stream	7.143635	0.654	59689.91	5.968991	754667.9	3.007711	6	4	105
233	1900608	5801918	Waihi Estuary	Oeuteheuheu Stream	8.478815	0.777	39194.11	3.919411	588154.8	3.005809	6	4	106
391	1905372	5799188	Waihi Estuary	Wharere Stream	6.599936	0.605	12456.34	1.245634	145501	3.004093	7	4	107
236	1900613	5802316	Waihi Estuary	Oeuteheuheu Stream	7.880887	0.722	13031.43	1.303143	181761.9	3.003508	7	4	108
160	1910275	5800593	Waihi Estuary	Pongakawa Stream	3.018188	0.276	19045.04	1.904504	101733.5	3.000781	7	4	109
393	1905413	5799879	Waihi Estuary	Wharere Stream	3.78334	0.347	108088.2	10.80882	723751.1	3.000698	6	4	110
280	1899338	5794283	Waihi Estuary	Oeuteheuheu Stream	14.49062	1.327	37422.38	3.742238	959741.3	3.000611	6	4	111
207	1899493	5791744	Waihi Estuary	Oeuteheuheu Stream	6.835909	0.626	12307.64	1.230764	148904.1	3.000576	7	4	112
61	1901613	5790668	Waihi Estuary	Waiari Stream	9.533344	0.873	22767.14	2.276714	384139.9	3.000377	6	4	113
232	1900945	5800404	Waihi Estuary	Oeuteheuheu Stream	14.12979	1.294	26586.88	2.658688	664873.2	3.000352	6	4	114
209	1901518	5790443	Waihi Estuary	Waiari Stream	9.548553	0.875	26287.09	2.628709	444238.2	3.000332	6	4	115
97	1900741	5801548	Waihi Estuary	Oeuteheuheu Stream	7.252396	0.664	48705.41	4.870541	625164.7	3.000282	6	4	116
119	1907383	5788255	Waihi Estuary	Pongakawa Stream	9.298591	0.852	20518.67	2.051867	337677.4	3.000195	6	4	117
234	1900553	5802038	Waihi Estuary	Oeuteheuheu Stream	8.562915	0.784	25338.91	2.533891	384012.4	3.00013	6	4	118
213	1904132	5793538	Waihi Estuary	Pongakawa Stream	4.581645	0.42	37219.94	3.721994	301809.5	3.000005	6	4	119
63	1901008	5788025	Waihi Estuary	Waiari Stream	6.058793	0.555	80784.18	8.078418	866259.7	2.999845	6	4	120
115	1906992	5788728	Waihi Estuary	Pongakawa Stream	9.298591	0.852	22091.36	2.209136	363559.4	2.999815	6	4	121
50	1908183	5794808	Waihi Estuary	Pongakawa Stream	3.60024	0.33	43632.74	4.363274	278022.3	2.999812	6	4	122
46	1908048	5794689	Waihi Estuary	Pongakawa Stream	3.6	0.33	52943.6	5.29436	337327.5	2.999796	6	4	123

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214	1903343	5793088	Waihi Estuary	Wharere Stream	4.698643	0.43	29182.17	2.918217	242675.4	2.999777	6	4	124
98	1900708	5801548	Waihi Estuary	Oeuteheuheu Stream	7.965096	0.73	16451.51	1.645151	231917	2.999725	6	4	125
102	1897218	5788762	Waihi Estuary	Pokopoko Stream	10.38344	0.951	46785.56	4.678556	859783.3	2.999644	6	4	126
243	1900909	5803263	Waihi Estuary	Oeuteheuheu Stream	8.39043	0.769	54247.26	5.424726	805559.7	2.999599	6	4	127
59	1901403	5790282	Waihi Estuary	Waiari Stream	9.548553	0.875	18073.98	1.807398	305440.8	2.99934	6	4	128
215	1903953	5793433	Waihi Estuary	Pongakawa Stream	4.581645	0.42	8612.276	0.861228	69835.32	2.999207	7	4	129
116	1906943	5788737	Waihi Estuary	Pongakawa Stream	9.298591	0.852	13204.91	1.320491	217314.3	2.998885	6	4	130
242	1900718	5803093	Waihi Estuary	Oeuteheuheu Stream	6.906144	0.633	17774.66	1.777466	217256.4	2.998651	6	4	131
171	1907263	5804476	Waihi Estuary	Wharere Stream	3.133739	0.287	7937.876	0.793788	44025.35	2.997023	7	4	132
147	1907448	5794349	Waihi Estuary	Pongakawa Stream	3.6	0.33	72614.12	7.261412	462657.1	2.99501	6	4	133
86	1898623	5802538	Waihi Estuary	Pokopoko Stream	8.742609	0.801	21445.03	2.144503	331820.7	2.983908	6	4	134
241	1900727	5803058	Waihi Estuary	Oeuteheuheu Stream	5.940508	0.544	31405.2	3.14052	330187.7	2.957153	6	4	135
100	1897281	5788983	Waihi Estuary	Pokopoko Stream	6.278794	0.575	35026.71	3.502671	389234.5	2.922341	6	4	136
72	1899908	5798500	Waihi Estuary	Oeuteheuheu Stream	16.83199	1.542	19672.11	1.967211	586032.8	2.919362	6	4	137
197	1904881	5801492	Waihi Estuary	Wharere Stream	7.196941	0.659	10010.07	1.001007	127503.1	2.743239	7	4	138
194	1904758	5801243	Waihi Estuary	Wharere Stream	7.160603	0.656	9011.573	0.901157	114205.2	2.702081	7	4	139
406	1907197	5801643	Waihi Estuary	Pongakawa Stream	6.585026	0.603	977538.1	97.75381	11392705	5.00001	3	3	140
407	1904843	5801546	Waihi Estuary	Wharere Stream	11.94423	1.094	609789.6	60.97896	12890621	4.983654	3	3	141
405	1907483	5801954	Waihi Estuary	Pongakawa Stream	5.339654	0.489	1841122	184.1122	17399285	4.944399	3	3	142
9	1911627	5800993	Waihi Estuary	Pongakawa Stream	3.516886	0.322	2868061	286.8061	17851816	4.903853	3	3	143
442	1911643	5806403	Waihi Estuary	Pukehina Canal	5.242202	0.48	1455962	145.5962	13508267	4.843443	3	3	144
344	1904387	5809137	Waihi Estuary	Kaikokopu Canal	7.912231	0.725	739606.2	73.96062	10357031	4.683357	3	3	145
333	1903223	5804503	Waihi Estuary	Pekahinemata Stream	9.175029	0.84	1100745	110.0745	17874332	4.559767	3	3	146

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334	1902733	5805229	Waihi Estuary	Pekahinemata Stream	8.664504	0.794	913727.3	91.37273	14011868	4.549793	3	3	147
183	1908002	5805195	Waihi Estuary	Pongakawa Stream	6.763738	0.62	1451371	145.1371	17374048	4.544461	3	3	148
412	1905388	5802388	Waihi Estuary	Wharere Stream	12.70524	1.164	343364	34.3364	7720994	4.359077	4	3	149
155	1908318	5800082	Waihi Estuary	Pongakawa Stream	11.04442	1.012	190505.4	19.05054	3723796	4.341241	4	3	150
264	1904484	5805348	Waihi Estuary	Puanene Stream	7.527073	0.689	615516.7	61.55167	8199771	4.327405	4	3	151
185	1907443	5803435	Waihi Estuary	Wharere Stream	8.805951	0.807	137689.2	13.76892	2145911	4.325976	4	3	152
341	1903343	5808288	Waihi Estuary	Mangatoetoe Stream	7.09749	0.65	401609.8	40.16098	5044811	4.303605	4	3	153
417	1904022	5803733	Waihi Estuary	Puanene Stream	7.494905	0.687	532012.4	53.20124	7057057	4.245052	4	3	154
287	1903343	5801598	Waihi Estuary	Puanene Stream	7.570938	0.693	295666.7	29.56667	3961757	4.138342	4	3	155
190	1905523	5802037	Waihi Estuary	Wharere Stream	8.065662	0.739	180753.4	18.07534	2580253	4.080753	4	3	156
388	1904048	5799473	Waihi Estuary	Wharere Stream	12.03756	1.103	207891.9	20.78919	4429062	4.033442	4	3	157
336	1902139	5806338	Waihi Estuary	Mangatoetoe Stream	8.451701	0.774	359178.9	35.91789	5372676	4.01165	4	3	158
410	1905400	5802230	Waihi Estuary	Wharere Stream	7.925999	0.726	223439.4	22.34394	3134364	4.006635	4	3	159
413	1909533	5804432	Waihi Estuary	Pongakawa Stream	5.694769	0.522	515193.4	51.51934	5192567	3.990599	4	3	160
157	1908053	5800188	Waihi Estuary	Pongakawa Stream	11.03019	1.01	267262.2	26.72622	5217426	3.958061	4	3	161
335	1902118	5806360	Waihi Estuary	Mangatoetoe Stream	8.4	0.769	441536.5	44.15365	6564197	3.925111	4	3	162
390	1904672	5799658	Waihi Estuary	Wharere Stream	4.209949	0.386	897437.7	89.74377	6686778	3.903313	4	3	163
332	1903224	5804488	Waihi Estuary	Pekahinemata Stream	7.65147	0.701	736544.3	73.65443	9974232	3.898516	4	3	164
356	1904590	5792278	Waihi Estuary	Pongakawa Stream	8.989181	0.823	302401	30.2401	4811041	3.892183	4	3	165
253	1902234	5805878	Waihi Estuary	Mangatoetoe Stream	8.475792	0.776	244619.9	24.46199	3669508	3.887501	4	3	166
288	1903158	5801697	Waihi Estuary	Puanene Stream	7.491642	0.686	489735.2	48.97352	6493428	3.854369	4	3	167
428	1906978	5805642	Waihi Estuary	Wharere Stream	4.883839	0.447	741742.3	74.17423	6411359	3.849059	4	3	168
290	1899649	5803433	Waihi Estuary	Pokopoko Stream	8.857999	0.811	546404	54.6404	8566141	3.818603	4	3	169

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357	1904470	5793558	Waihi Estuary	Pongakawa Stream	4.736333	0.434	331684.1	33.16841	2780370	3.672018	4	3	170
92	1899782	5803293	Waihi Estuary	Pokopoko Stream	8.853727	0.811	403430.7	40.34307	6321655	3.628306	4	3	171
437	1910405	5801983	Waihi Estuary	Pongakawa Stream	3.525077	0.323	459279	45.9279	2865372	3.588146	4	3	172
386	1904492	5793548	Waihi Estuary	Pongakawa Stream	5.627313	0.515	233128.9	23.31289	2321844	3.56305	4	3	173
84	1898798	5802263	Waihi Estuary	Pokopoko Stream	7.803026	0.715	568777.8	56.87778	7854913	3.53646	4	3	174
408	1904988	5801653	Waihi Estuary	Wharere Stream	7.501998	0.687	317575.4	31.75754	4216571	3.489691	4	3	175
411	1905498	5802743	Waihi Estuary	Wharere Stream	7.909084	0.724	429628	42.9628	6013876	3.480546	4	3	176
347	1904804	5807213	Waihi Estuary	Puanene Stream	8.472592	0.776	327113.5	32.71135	4905130	3.460389	4	3	177
435	1910516	5801783	Waihi Estuary	Pongakawa Stream	3.12286	0.286	1052113	105.2113	5815012	3.436741	4	3	178
251	1902463	5806083	Waihi Estuary	Mangatoetoe Stream	8.430656	0.772	182359.3	18.23593	2720978	3.435909	4	3	179
90	1899278	5802693	Waihi Estuary	Pokopoko Stream	8.947433	0.82	155681	15.5681	2465300	3.42431	4	3	180
414	1910058	5805194	Waihi Estuary	Pongakawa Stream	5.591548	0.512	736592.3	73.65923	7289453	3.401637	4	3	181
392	1905669	5799343	Waihi Estuary	Wharere Stream	6.599678	0.605	141737.3	14.17373	1655551	3.378928	5	3	182
91	1899426	5802638	Waihi Estuary	Pokopoko Stream	8.781241	0.804	235992.2	23.59922	3667661	3.359306	4	3	183
248	1900999	5804036	Waihi Estuary	Oeuteheuheu Stream	7.852139	0.719	85677.51	8.567751	1190667	3.34767	5	3	184
187	1905603	5800186	Waihi Estuary	Wharere Stream	6.6	0.605	213853.4	21.38534	2498019	3.337146	4	3	185
297	1900538	5806429	Waihi Estuary	Pokopoko Stream	8.257164	0.756	555613.4	55.56134	8119688	3.285234	4	3	186
395	1905442	5800083	Waihi Estuary	Wharere Stream	4.399771	0.403	403971	40.3971	3145690	3.213028	4	3	187
47	1907608	5794503	Waihi Estuary	Pongakawa Stream	3.600185	0.33	244524.8	24.45248	1558057	3.194973	5	3	188
434	1910547	5801658	Waihi Estuary	Pongakawa Stream	3.00001	0.275	575367.4	57.53674	3054947	3.194568	4	3	189
394	1905439	5799883	Waihi Estuary	Wharere Stream	5.93603	0.544	314378.3	31.43783	3302816	3.170925	4	3	190
447	1912000	5808613	Waihi Estuary	Pukehina Canal	11.00993	1.009	58356.68	5.835668	1137132	3.000171	5	3	191
65	1897463	5789771	Waihi Estuary	Pokopoko Stream	14.67538	1.344	48557.91	4.855791	1261203	3.000129	5	3	192

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208	1901612	5790813	Waihi Estuary	Waiari Stream	8.680158	0.795	85376.87	8.537687	1311606	3.00011	5	3	193
275	1908117	5794818	Waihi Estuary	Pongakawa Stream	3.638765	0.333	193851.6	19.38516	1248415	2.999975	5	3	194
246	1900728	5803333	Waihi Estuary	Oeuteheuheu Stream	6.917369	0.634	96262.74	9.626274	1178514	2.999915	5	3	195
244	1900862	5803467	Waihi Estuary	Oeuteheuheu Stream	7.700762	0.705	139874.6	13.98746	1906374	2.999902	5	3	196
358	1904243	5794108	Waihi Estuary	Pongakawa Stream	4.587961	0.42	239645	23.9645	1945915	2.999645	5	3	197
29	1907513	5795780	Waihi Estuary	Pongakawa Stream	10.67747	0.978	63627.63	6.362763	1202402	2.987539	5	3	198
121	1907478	5788188	Waihi Estuary	Pongakawa Stream	9.298591	0.852	63328.28	6.332828	1042199	2.974816	5	3	199
164	1910943	5803043	Waihi Estuary	Pongakawa Stream	3.31353	0.304	86862.33	8.686233	509399.1	2.913116	6	3	200
69	1898843	5793798	Waihi Estuary	Oeuteheuheu Stream	14.67538	1.344	47034.11	4.703411	1221625	2.911929	5	3	201
267	1904153	5792783	Waihi Estuary	Pongakawa Stream	5.229026	0.479	73166.78	7.316678	677127.5	2.881909	6	3	202
66	1897203	5791421	Waihi Estuary	Pokopoko Stream	13.7806	1.262	25839.43	2.583943	630212	2.860357	6	3	203
49	1907123	5794823	Waihi Estuary	Pongakawa Stream	3.6	0.33	47502.6	4.75026	302660.4	2.833318	6	3	204
101	1897164	5788933	Waihi Estuary	Pokopoko Stream	14.28603	1.309	18125.06	1.812506	458275.7	2.82206	6	3	205
212	1903223	5792997	Waihi Estuary	Wharere Stream	4.624871	0.424	91191.11	9.119111	746427.9	2.82045	6	3	206
250	1901168	5804048	Waihi Estuary	Oeuteheuheu Stream	9.779244	0.896	23865.71	2.386571	413062.2	2.780558	6	3	207
351	1904589	5788673	Waihi Estuary	Pongakawa Stream	13.13698	1.203	80455.11	8.045511	1870618	2.769992	5	3	208
237	1900703	5802542	Waihi Estuary	Oeuteheuheu Stream	16.87822	1.546	20520.65	2.052065	612990.4	2.767456	6	3	209
240	1900778	5803027	Waihi Estuary	Oeuteheuheu Stream	8.141367	0.746	46783.04	4.678304	674095.6	2.741592	6	3	210
114	1906812	5788688	Waihi Estuary	Pongakawa Stream	9.298591	0.852	121090.9	12.10909	1992803	2.710443	5	3	211
120	1907400	5788228	Waihi Estuary	Pongakawa Stream	9.298591	0.852	28381.69	2.838169	467079.7	2.702447	6	3	212
70	1898888	5793748	Waihi Estuary	Oeuteheuheu Stream	14.67538	1.344	13556	1.3556	352092.3	2.69401	6	3	213
38	1907322	5792433	Waihi Estuary	Pongakawa Stream	3.77116	0.345	30803	3.0803	205590.8	2.684479	6	3	214
80	1898156	5799713	Waihi Estuary	Pokopoko Stream	18.92672	1.734	24441.02	2.444102	818710.7	2.670919	6	3	215

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318	1897070	5790485	Waihi Estuary	Pokopoko Stream	12.53331	1.148	62414.04	6.241404	1384471	2.650045	5	3	216
79	1898068	5799644	Waihi Estuary	Pokopoko Stream	19.40814	1.778	35226	3.5226	1209993	2.637541	5	3	217
204	1896733	5791863	Waihi Estuary	Pokopoko Stream	13.82852	1.267	41967.49	4.196749	1027128	2.635611	5	3	218
230	1900646	5799388	Waihi Estuary	Oeuteheuheu Stream	10.91294	1	45709.74	4.570974	882848.9	2.621323	6	3	219
239	1900729	5802733	Waihi Estuary	Oeuteheuheu Stream	12.49621	1.145	44086.94	4.408694	975043.5	2.611431	6	3	220
83	1898208	5800157	Waihi Estuary	Pokopoko Stream	18.94017	1.735	8288.457	0.828846	277839.1	2.589143	6	3	221
193	1904753	5801268	Waihi Estuary	Wharere Stream	7.632552	0.699	33275.38	3.327538	449498.8	2.570068	6	3	222
229	1900293	5799372	Waihi Estuary	Oeuteheuheu Stream	10.83418	0.992	74793.44	7.479344	1434152	2.56239	5	3	223
82	1898158	5800218	Waihi Estuary	Pokopoko Stream	17.27343	1.582	9836.298	0.98363	300708.6	2.554823	6	3	224
231	1900213	5799463	Waihi Estuary	Oeuteheuheu Stream	8.919796	0.817	42689.39	4.268939	673923.4	2.505775	6	3	225
39	1906827	5792633	Waihi Estuary	Pongakawa Stream	3.6	0.33	27333.5	2.73335	174154	2.428156	7	3	226
36	1907283	5793339	Waihi Estuary	Pongakawa Stream	3.6	0.33	12455.98	1.245598	79362.67	2.418918	7	3	227
203	1901828	5798623	Waihi Estuary	Waiari Stream	8.035221	0.736	33551.57	3.355157	477140.6	2.335509	6	3	228
37	1907338	5792333	Waihi Estuary	Pongakawa Stream	3.771841	0.346	60532.61	6.053261	404090.4	2.244741	6	3	229
118	1906803	5789085	Waihi Estuary	Pongakawa Stream	9.298591	0.852	45306.13	4.530613	745606.7	2.226189	6	3	230
223	1898468	5795675	Waihi Estuary	Pokopoko Stream	14.67538	1.344	9411.857	0.941186	244455.8	2.224853	6	3	231
272	1906713	5793488	Waihi Estuary	Pongakawa Stream	3.6	0.33	43009.74	4.300974	274034.3	2.153233	6	3	232
103	1899438	5787935	Waihi Estuary	Waiari Stream	6.131	0.562	80312.01	8.031201	871460.2	2.138535	6	3	233
40	1907088	5792593	Waihi Estuary	Pongakawa Stream	3.6	0.33	24837.15	2.483715	158248.6	2.015932	7	3	234
105	1899374	5788748	Waihi Estuary	Waiari Stream	6.007894	0.55	16152.24	1.615224	171747.6	2.005295	7	3	235
51	1909403	5796448	Waihi Estuary	Pongakawa Stream	4.264881	0.391	11507.05	1.150705	86857.38	2.000513	7	3	236
154	1909882	5798393	Waihi Estuary	Pongakawa Stream	5.266954	0.482	20318.15	2.031815	189399.8	2.000182	7	3	237
52	1909402	5796388	Waihi Estuary	Pongakawa Stream	4.729329	0.433	16599.12	1.659912	138937.7	2.000106	7	3	238

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144	1910183	5795286	Waihi Estuary	Pongakawa Stream	3.000634	0.275	28180.74	2.818074	149658.5	1.999947	7	3	239
150	1911091	5797143	Waihi Estuary	Pongakawa Stream	3	0.275	22863.77	2.286377	121396.1	1.99967	7	3	240
53	1909723	5797014	Waihi Estuary	Pongakawa Stream	5.503316	0.504	17023.37	1.702337	165808.1	1.999604	7	3	241
16	1909802	5797338	Waihi Estuary	Pongakawa Stream	5.503316	0.504	13354.1	1.33541	130069.3	1.999386	7	3	242
41	1907324	5793288	Waihi Estuary	Pongakawa Stream	3.618916	0.331	24637.35	2.463735	157800.5	1.992097	7	3	243
446	1911878	5808160	Waihi Estuary	Pukehina Canal	4.941577	0.453	2806760	280.676	24547460	4.845116	2	2	244
438	1910854	5802488	Waihi Estuary	Pongakawa Stream	3.445044	0.316	4547037	454.7037	27724200	4.837935	2	2	245
4	1911129	5801843	Waihi Estuary	Pongakawa Stream	3.464751	0.317	4227343	422.7343	25922400	4.835418	2	2	246
339	1901913	5808048	Waihi Estuary	Pokopoko Stream	6.980461	0.639	1919655	191.9655	23716090	4.48567	2	2	247
440	1910603	5805578	Waihi Estuary	Pongakawa Stream	3.943329	0.361	9205478	920.5478	64245851	4.481801	2	2	248
433	1908283	5807953	Waihi Estuary	Pongakawa Stream	5.665927	0.519	3275463	327.5463	32845764	4.432354	2	2	249
188	1906736	5801308	Waihi Estuary	Pongakawa Stream	6.813989	0.624	2610699	261.0699	31484293	4.293394	2	2	250
245	1900763	5803434	Waihi Estuary	Oeuteheuheu Stream	7.808768	0.715	2953121	295.3121	40813086	4.085106	2	2	251
289	1903211	5801798	Waihi Estuary	Puanene Stream	7.436676	0.681	881510.9	88.15109	11602252	4.074482	3	2	252
415	1904943	5803539	Waihi Estuary	Wharere Stream	9.515378	0.872	917360.8	91.73608	15449055	3.983209	3	2	253
416	1905168	5803742	Waihi Estuary	Wharere Stream	9.618979	0.881	952907.7	95.29077	16222416	3.973186	3	2	254
346	1904781	5807208	Waihi Estuary	Puanene Stream	8.723184	0.799	776076.2	77.60762	11981609	3.910814	3	2	255
331	1902746	5803917	Waihi Estuary	Pekahinemata Stream	11.1857	1.025	931396.3	93.13963	18438826	3.878231	3	2	256
387	1904023	5800193	Waihi Estuary	Wharere Stream	8.567311	0.785	737990.8	73.79908	11190030	3.86849	3	2	257
432	1905668	5807978	Waihi Estuary	Puanene Stream	7.839073	0.718	1636568	163.6568	22705677	3.847857	2	2	258
436	1910699	5802536	Waihi Estuary	Pongakawa Stream	3.464875	0.317	2031648	203.1648	12458672	3.725807	3	2	259
328	1902917	5799918	Waihi Estuary	Puanene Stream	3.903941	0.358	2057941	205.7941	14219093	3.584433	3	2	260
429	1906932	5805618	Waihi Estuary	Wharere Stream	7.55823	0.692	852504.1	85.25041	11403871	3.380113	3	2	261

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89	1899168	5802680	Waihi Estuary	Pokopoko Stream	8.178649	0.749	1013029	101.3029	14663549	3.31497	3	2	262
340	1901468	5808022	Waihi Estuary	Pokopoko Stream	7.676622	0.703	360134.2	36.01342	4892944	3.112396	4	2	263
293	1899898	5804101	Waihi Estuary	Pokopoko Stream	7.671629	0.703	1303778	130.3778	17702188	3.06813	3	2	264
426	1906418	5803991	Waihi Estuary	Wharere Stream	7.567689	0.693	167720.2	16.77202	2246386	3.038215	4	2	265
276	1908567	5794093	Waihi Estuary	Pongakawa Stream	4.146483	0.38	1305623	130.5623	9581494	3.005907	4	2	266
294	1899463	5804598	Waihi Estuary	Pokopoko Stream	8.660852	0.793	627845.4	62.78454	9623855	3.002363	4	2	267
361	1904213	5797197	Waihi Estuary	Wharere Stream	11.45386	1.049	185924.4	18.59244	3768980	3.00009	4	2	268
112	1905763	5788108	Waihi Estuary	Pongakawa Stream	9.298591	0.852	153019.6	15.30196	2518256	3.000008	4	2	269
364	1905835	5796718	Waihi Estuary	Pongakawa Stream	7.823429	0.717	166349.8	16.63498	2303325	3.000003	4	2	270
58	1901473	5790439	Waihi Estuary	Waiari Stream	9.548553	0.875	193770.3	19.37703	3274617	2.999995	4	2	271
295	1899482	5804563	Waihi Estuary	Pokopoko Stream	8.400234	0.769	244381	24.4381	3633243	2.999988	4	2	272
322	1901772	5800588	Waihi Estuary	Waiari Stream	11.50093	1.053	287361.5	28.73615	5849211	2.999984	4	2	273
99	1897563	5789929	Waihi Estuary	Pokopoko Stream	14.67538	1.344	114167	11.4167	2965279	2.999554	4	2	274
313	1897178	5789884	Waihi Estuary	Pokopoko Stream	14.18585	1.299	457992.6	45.79926	11498723	2.997647	3	2	275
62	1901003	5788311	Waihi Estuary	Waiari Stream	5.567525	0.51	250539.5	25.05395	2468733	2.994099	4	2	276
284	1900541	5796773	Waihi Estuary	Waiari Stream	10.88861	0.997	316224.4	31.62244	6094014	2.987498	4	2	277
111	1897940	5790292	Waihi Estuary	Pokopoko Stream	14.31807	1.312	139756.3	13.97563	3541535	2.985626	4	2	278
201	1901103	5798851	Waihi Estuary	Waiari Stream	11.1918	1.025	989562.7	98.95627	19601028	2.979003	3	2	279
64	1900958	5787823	Waihi Estuary	Waiari Stream	5.467898	0.501	265393.4	26.53934	2568303	2.964505	4	2	280
327	1902518	5797677	Waihi Estuary	Waiari Stream	4.268142	0.391	278268.8	27.82688	2102031	2.956925	4	2	281
67	1897207	5791348	Waihi Estuary	Pokopoko Stream	14.39201	1.318	219822	21.9822	5599230	2.953026	4	2	282
314	1896833	5788895	Waihi Estuary	Pokopoko Stream	10.15747	0.93	845665.1	84.56651	15202660	2.935536	3	2	283
296	1899948	5805798	Waihi Estuary	Pokopoko Stream	8.411293	0.77	231598.2	23.15982	3447733	2.9315	4	2	284

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109	1896767	5788348	Waihi Estuary	Pokopoko Stream	8.994702	0.824	556861.7	55.68617	8864820	2.915284	4	2	285
108	1896755	5788313	Waihi Estuary	Pokopoko Stream	8.018089	0.734	304481.9	30.44819	4320839	2.911175	4	2	286
200	1901275	5798763	Waihi Estuary	Waiari Stream	7.554918	0.692	1335660	133.566	17859170	2.892653	3	2	287
110	1898080	5790228	Waihi Estuary	Pokopoko Stream	8.527579	0.781	598096.5	59.80965	9026778	2.874586	4	2	288
325	1902458	5797692	Waihi Estuary	Waiari Stream	11.8561	1.086	96609.9	9.66099	2027212	2.872169	4	2	289
73	1899922	5798753	Waihi Estuary	Oeuteheuheu Stream	17.12061	1.568	72996.45	7.299645	2211855	2.79493	4	2	290
366	1907258	5796153	Waihi Estuary	Pongakawa Stream	3.744725	0.343	1102155	110.2155	7304630	2.792412	4	2	291
352	1904593	5789436	Waihi Estuary	Pongakawa Stream	17.87384	1.637	320871.4	32.08714	10150434	2.751974	3	2	292
354	1905109	5789823	Waihi Estuary	Pongakawa Stream	13.23073	1.212	336071.8	33.60718	7869584	2.734773	4	2	293
315	1896773	5788888	Waihi Estuary	Pokopoko Stream	14.67273	1.344	177582.2	17.75822	4611541	2.708942	4	2	294
117	1906560	5789128	Waihi Estuary	Pongakawa Stream	9.298591	0.852	461548.8	46.15488	7595747	2.67794	4	2	295
206	1897713	5792168	Waihi Estuary	Pokopoko Stream	14.67538	1.344	160003	16.0003	4155786	2.668888	4	2	296
156	1907915	5799783	Waihi Estuary	Pongakawa Stream	10.94347	1.002	158630.7	15.86307	3072401	2.667264	4	2	297
210	1901248	5789863	Waihi Estuary	Waiari Stream	8.6735	0.794	191450.7	19.14507	2938915	2.606467	4	2	298
266	1899498	5788938	Waihi Estuary	Waiari Stream	5.399901	0.495	644296.4	64.42964	6157540	2.604298	4	2	299
113	1906687	5788488	Waihi Estuary	Pongakawa Stream	9.298591	0.852	225806.8	22.58068	3716121	2.51693	4	2	300
68	1897208	5791371	Waihi Estuary	Pokopoko Stream	14.67242	1.344	527321.1	52.73211	13693442	2.51234	3	2	301
279	1899336	5794228	Waihi Estuary	Oeuteheuheu Stream	14.66397	1.343	404756.2	40.47562	10504634	2.502667	3	2	302
30	1906043	5797213	Waihi Estuary	Pongakawa Stream	25.587	2.344	25261.92	2.526192	1143988	2.492288	5	2	303
381	1909438	5794568	Waihi Estuary	Pongakawa Stream	4.554968	0.417	582637	58.2637	4696984	2.485235	4	2	304
317	1897043	5790592	Waihi Estuary	Pokopoko Stream	14.05682	1.288	47110.14	4.711014	1172026	2.46741	5	2	305
227	1899968	5798248	Waihi Estuary	Oeuteheuheu Stream	18.07535	1.656	56195.26	5.619526	1797720	2.412481	5	2	306
202	1902087	5799210	Waihi Estuary	Waiari Stream	11.48734	1.052	118628.3	11.86283	2411812	2.400439	4	2	307

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274	1907326	5793578	Waihi Estuary	Pongakawa Stream	3.60405	0.33	259054.8	25.90548	1652411	2.397099	5	2	308
205	1898188	5792833	Waihi Estuary	Pokopoko Stream	14.67538	1.344	299682.4	29.96824	7783705	2.373913	4	2	309
226	1899773	5798585	Waihi Estuary	Oeuteheuheu Stream	23.43672	2.147	208905.2	20.89052	8665266	2.370549	4	2	310
360	1903425	5795010	Waihi Estuary	Wharere Stream	7.557995	0.692	130008.8	13.00088	1739062	2.311075	5	2	311
81	1898211	5799977	Waihi Estuary	Pokopoko Stream	11.65137	1.067	256492.3	25.64923	5289162	2.271959	4	2	312
323	1901610	5799538	Waihi Estuary	Waiari Stream	8.236735	0.754	242076.1	24.20761	3528927	2.231365	4	2	313
374	1907073	5797133	Waihi Estuary	Pongakawa Stream	6.08698	0.558	477348.8	47.73488	5142490	2.214251	4	2	314
359	1904229	5794124	Waihi Estuary	Pongakawa Stream	4.688307	0.429	1101277	110.1277	9137939	2.132761	4	2	315
221	1898453	5795860	Waihi Estuary	Pokopoko Stream	14.68076	1.345	180397.7	18.03977	4687219	2.095037	4	2	316
78	1898008	5799495	Waihi Estuary	Pokopoko Stream	18.08461	1.657	8513.17	0.851317	272480.9	2.055638	6	2	317
399	1907543	5798993	Waihi Estuary	Pongakawa Stream	10.71389	0.981	129726.2	12.97262	2459860	2.048853	4	2	318
44	1906840	5791603	Waihi Estuary	Pongakawa Stream	3.6	0.33	62005.71	6.200571	395066.2	2.046586	6	2	319
228	1899913	5798002	Waihi Estuary	Oeuteheuheu Stream	13.62442	1.248	174252.4	17.42524	4201773	2.043702	4	2	320
316	1897018	5790388	Waihi Estuary	Pokopoko Stream	13.54925	1.241	20846.39	2.084639	499898.3	2.039682	6	2	321
27	1907633	5792728	Waihi Estuary	Pongakawa Stream	3.67603	0.337	256631.2	25.66312	1669645	2.037866	5	2	322
71	1900128	5796838	Waihi Estuary	Oeuteheuheu Stream	20.10708	1.842	212922.5	21.29225	7577156	2.031819	4	2	323
282	1898118	5798675	Waihi Estuary	Pokopoko Stream	8.958677	0.821	534678.6	53.46786	8477589	2.026769	4	2	324
28	1907643	5795900	Waihi Estuary	Pongakawa Stream	10.71002	0.981	16724.39	1.672439	317012.2	2.00964	6	2	325
43	1906876	5791588	Waihi Estuary	Pongakawa Stream	3.6	0.33	121564.9	12.15649	774544.6	2.007899	6	2	326
380	1909638	5794249	Waihi Estuary	Pongakawa Stream	4.975984	0.456	305843.5	30.58435	2693482	2.000696	4	2	327
146	1909916	5795778	Waihi Estuary	Pongakawa Stream	3.000643	0.275	41385.11	4.138511	219783	2.000236	6	2	328
153	1909867	5798388	Waihi Estuary	Pongakawa Stream	5.501487	0.504	43257.26	4.325726	421186.8	2.000127	6	2	329
148	1909879	5795463	Waihi Estuary	Pongakawa Stream	3	0.275	39138.63	3.913863	207808.2	2.00007	6	2	330

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385	1909238	5797608	Waihi Estuary	Pongakawa Stream	5.503449	0.504	210097.1	21.00971	2046400	2.000028	4	2	331
372	1907783	5798083	Waihi Estuary	Pongakawa Stream	10.71002	0.981	75609.01	7.560901	1433176	2.000026	5	2	332
149	1911207	5797143	Waihi Estuary	Pongakawa Stream	3	0.275	244287.4	24.42874	1297054	2.000022	5	2	333
20	1911006	5795633	Waihi Estuary	Pongakawa Stream	3	0.275	127148.6	12.71486	675100.9	2.000021	6	2	334
396	1908622	5798693	Waihi Estuary	Pongakawa Stream	10.56599	0.968	302358	30.2358	5654149	2.000013	4	2	335
382	1909078	5795298	Waihi Estuary	Pongakawa Stream	4.342148	0.398	538806.8	53.88068	4140697	2.000012	4	2	336
18	1909626	5796483	Waihi Estuary	Pongakawa Stream	3.598802	0.33	749127.8	74.91278	4771441	2.000006	4	2	337
397	1909183	5799428	Waihi Estuary	Pongakawa Stream	3.835496	0.351	1165127	116.5127	7909161	2.000005	4	2	338
369	1907928	5797372	Waihi Estuary	Pongakawa Stream	9.797024	0.897	431689.2	43.16892	7485160	2.000004	4	2	339
17	1909783	5796813	Waihi Estuary	Pongakawa Stream	3.922795	0.359	928572.1	92.85721	6446841	1.999996	4	2	340
19	1910273	5795338	Waihi Estuary	Pongakawa Stream	3.505678	0.321	348351.6	34.83516	2161352	1.999991	4	2	341
371	1908083	5797803	Waihi Estuary	Pongakawa Stream	9.704856	0.889	480582.3	48.05823	8254534	1.99999	4	2	342
383	1908940	5796993	Waihi Estuary	Pongakawa Stream	4.875848	0.447	445182.1	44.51821	3841702	1.99999	4	2	343
151	1911558	5798198	Waihi Estuary	Pongakawa Stream	3	0.275	335641.8	33.56418	1782104	1.99999	5	2	344
298	1898244	5802103	Waihi Estuary	Pokopoko Stream	9.320026	0.854	412902.6	41.29026	6810836	1.999988	4	2	345
379	1910338	5790578	Waihi Estuary	Pongakawa Stream	3.791153	0.347	404313.4	40.43134	2712846	1.999983	4	2	346
370	1907983	5797366	Waihi Estuary	Pongakawa Stream	13.63617	1.249	234313.7	23.43137	5654914	1.999968	4	2	347
384	1908993	5797038	Waihi Estuary	Pongakawa Stream	5.455652	0.5	219183.5	21.91835	2116364	1.999968	4	2	348
373	1907508	5798178	Waihi Estuary	Pongakawa Stream	10.71002	0.981	184293.1	18.42931	3493291	1.999967	4	2	349
145	1910884	5795673	Waihi Estuary	Pongakawa Stream	3.004753	0.275	228514.1	22.85141	1215227	1.999964	5	2	350
126	1906704	5790608	Waihi Estuary	Pongakawa Stream	3.6	0.33	58461.27	5.846127	372483	1.999956	6	2	351
152	1910094	5798308	Waihi Estuary	Pongakawa Stream	5.061216	0.464	147393.9	14.73939	1320292	1.999947	5	2	352
15	1909718	5797387	Waihi Estuary	Pongakawa Stream	5.503316	0.504	46602.13	4.660213	453906.1	1.999909	6	2	353

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74	1898039	5798798	Waihi Estuary	Pokopoko Stream	8.930259	0.818	141154.7	14.11547	2230977	1.996108	4	2	354
95	1897567	5802343	Waihi Estuary	Pokopoko Stream	9.385762	0.86	304229.8	30.42298	5053671	1.970189	4	2	355
222	1898443	5795808	Waihi Estuary	Pokopoko Stream	14.67969	1.345	19198.19	1.919819	498784.5	1.964768	6	2	356
378	1909303	5790713	Waihi Estuary	Pongakawa Stream	4.536252	0.416	613766.1	61.37661	4927604	1.952063	4	2	357
128	1906362	5792093	Waihi Estuary	Pongakawa Stream	3.6	0.33	39764.82	3.976482	253359.5	1.946696	6	2	358
129	1906916	5792678	Waihi Estuary	Pongakawa Stream	3.6	0.33	675072.7	67.50727	4301191	1.923422	4	2	359
311	1896853	5791362	Waihi Estuary	Pokopoko Stream	9.709796	0.889	427416	42.7416	7345082	1.909194	4	2	360
310	1896310	5792333	Waihi Estuary	Pokopoko Stream	11.67478	1.069	334619.8	33.46198	6914104	1.906641	4	2	361
127	1906457	5792103	Waihi Estuary	Pongakawa Stream	3.6	0.33	950433.3	95.04333	6055637	1.895325	4	2	362
26	1907812	5792693	Waihi Estuary	Pongakawa Stream	3.6	0.33	66023.58	6.602358	420665.9	1.873725	6	2	363
377	1907310	5790805	Waihi Estuary	Pongakawa Stream	3.6	0.33	231371.4	23.13714	1474171	1.861596	5	2	364
142	1909213	5793079	Waihi Estuary	Pongakawa Stream	3.6	0.33	61678.93	6.167893	392984.1	1.78732	6	2	365
125	1906902	5790828	Waihi Estuary	Pongakawa Stream	3.6	0.33	189137.6	18.91376	1205080	1.706747	5	2	366
137	1907973	5793123	Waihi Estuary	Pongakawa Stream	3.6	0.33	169064.6	16.90646	1077187	1.683084	5	2	367
273	1907105	5793638	Waihi Estuary	Pongakawa Stream	3.6	0.33	239011.6	23.90116	1522850	1.518044	5	2	368
57	1902534	5788543	Waihi Estuary	Pongakawa Stream	5.032406	0.461	127489.3	12.74893	1135495	1.514087	5	2	369
35	1907198	5793403	Waihi Estuary	Pongakawa Stream	3.6	0.33	148324	14.8324	945038.7	1.48088	6	2	370
131	1907998	5792628	Waihi Estuary	Pongakawa Stream	3.6	0.33	33473.52	3.347352	213274.8	1.382287	6	2	371
23	1909520	5793178	Waihi Estuary	Pongakawa Stream	3.6	0.33	25510.2	2.55102	162537	1.110928	7	2	372
56	1903910	5798543	Waihi Estuary	Wharere Stream	6.629938	0.607	2217577	221.7577	26020994	3.229155	2	1	373
365	1906131	5796988	Waihi Estuary	Pongakawa Stream	10.67076	0.977	1730465	173.0465	32680877	2.991734	2	1	374
324	1901846	5798613	Waihi Estuary	Waiari Stream	7.933544	0.727	9914381	991.4381	1.39E+08	2.932175	1	1	375
363	1905163	5796963	Waihi Estuary	Pongakawa Stream	12.89334	1.181	1136007	113.6007	25922820	2.86529	2	1	376

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367	1907599	5796408	Waihi Estuary	Pongakawa Stream	7.151484	0.655	1617087	161.7087	20467520	2.859655	2	1	377
353	1905118	5789842	Waihi Estuary	Pongakawa Stream	9.895666	0.906	2706673	270.6673	47404167	2.82043	2	1	378
265	1899463	5791718	Waihi Estuary	Oeuteheuheu Stream	7.148064	0.655	4970459	497.0459	62881167	2.796849	2	1	379
283	1904045	5796758	Waihi Estuary	Wharere Stream	9.595115	0.879	1285876	128.5876	21836606	2.746251	2	1	380
211	1901328	5789885	Waihi Estuary	Waiari Stream	6.623989	0.607	3418821	341.8821	40080367	2.742203	2	1	381
60	1901375	5790243	Waihi Estuary	Waiari Stream	6.826031	0.625	3733544	373.3544	45105061	2.739212	2	1	382
350	1904569	5788666	Waihi Estuary	Pongakawa Stream	10.31463	0.945	4213395	421.3395	76916885	2.731498	2	1	383
309	1897461	5793108	Waihi Estuary	Pokopoko Stream	12.26135	1.123	2652446	265.2446	57559956	2.728108	2	1	384
312	1896943	5791317	Waihi Estuary	Pokopoko Stream	14.42813	1.322	841862.9	84.18629	21497452	2.658271	2	1	385
326	1902440	5797555	Waihi Estuary	Waiari Stream	8.089314	0.741	13112825	1311.282	1.88E+08	2.584705	1	1	386
362	1905143	5796968	Waihi Estuary	Pongakawa Stream	7.983004	0.731	2528384	252.8384	35722761	2.570619	2	1	387
301	1898512	5801213	Waihi Estuary	0	15.51393	1.421	2541114	254.1114	69772065	2.45645	2	1	388
398	1908933	5799488	Waihi Estuary	Pongakawa Stream	9.387995	0.86	814593.4	81.45934	13534725	2.439205	3	1	389
368	1907844	5796728	Waihi Estuary	Pongakawa Stream	9.367206	0.858	621116.7	62.11167	10297197	2.413846	3	1	390
401	1909543	5801608	Waihi Estuary	Pongakawa Stream	3.321571	0.304	8415861	841.5861	49474085	2.321623	2	1	391
278	1899058	5794370	Waihi Estuary	Oeuteheuheu Stream	14.0442	1.286	1676630	167.663	41674456	2.301199	2	1	392
320	1899788	5797813	Waihi Estuary	Oeuteheuheu Stream	23.44659	2.148	388602.5	38.86025	16125787	2.27101	3	1	393
349	1902828	5789373	Waihi Estuary	Pongakawa Stream	7.282351	0.667	1830591	183.0591	23593836	2.200312	2	1	394
308	1898114	5794458	Waihi Estuary	Pokopoko Stream	15.15966	1.389	634018.7	63.40187	17010894	2.196339	3	1	395
292	1899083	5803232	Waihi Estuary	Pokopoko Stream	9.226055	0.845	1583131	158.3131	25850482	2.180413	2	1	396
277	1898793	5794068	Waihi Estuary	Oeuteheuheu Stream	13.88367	1.272	1336432	133.6432	32838759	2.177148	2	1	397
321	1900168	5799288	Waihi Estuary	Oeuteheuheu Stream	14.07542	1.289	505405.5	50.54055	12590329	2.126748	3	1	398
225	1899837	5797048	Waihi Estuary	Oeuteheuheu Stream	20.14627	1.845	669200.6	66.92006	23860892	2.024968	2	1	399

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224	1899909	5796893	Waihi Estuary	Oeuteheuheu Stream	20.44893	1.873	286369.4	28.63694	10364133	2.000004	3	1	400
271	1903933	5793418	Waihi Estuary	Pongakawa Stream	4.73291	0.434	765672.1	76.56721	6413673	1.860026	4	1	401
300	1897323	5799513	Waihi Estuary	Waiwhakareto Stream	9.248098	0.847	2567299	256.7299	42020821	1.841064	2	1	402
299	1898153	5800664	Waihi Estuary	Waiwhakareto Stream	9.271052	0.849	3763199	376.3199	61747868	1.835646	2	1	403
45	1906703	5791558	Waihi Estuary	Pongakawa Stream	3.6	0.33	363697.5	36.36975	2317280	1.825253	4	1	404
302	1898038	5797189	Waihi Estuary	Pokopoko Stream	18.33367	1.679	269027.7	26.90277	8729357	1.796097	4	1	405
291	1897408	5802352	Waihi Estuary	Pokopoko Stream	9.503483	0.871	251528.7	25.15287	4230640	1.790969	4	1	406
220	1898418	5795893	Waihi Estuary	Pokopoko Stream	14.83609	1.359	333633.9	33.36339	8760431	1.778177	4	1	407
76	1898123	5798147	Waihi Estuary	Pokopoko Stream	17.76872	1.628	368785.8	36.87858	11597547	1.690602	3	1	408
281	1898113	5796032	Waihi Estuary	Pokopoko Stream	17.05103	1.562	528212.6	52.82126	15940243	1.684	3	1	409
376	1907288	5790812	Waihi Estuary	Pongakawa Stream	3.831426	0.351	473054	47.3054	3207797	1.551091	4	1	410
319	1899508	5795598	Waihi Estuary	Oeuteheuheu Stream	11.59543	1.062	851469.1	85.14691	17473968	1.54244	3	1	411
285	1897935	5797728	Waihi Estuary	Pokopoko Stream	14.20254	1.301	286154.2	28.61542	7192865	1.479167	4	1	412
306	1897353	5794474	Waihi Estuary	Pokopoko Stream	19.59165	1.795	235526.5	23.55265	8166701	1.477753	4	1	413
21	1910258	5793583	Waihi Estuary	Pongakawa Stream	4.932575	0.452	3572783	357.2783	31190051	1.451902	2	1	414
348	1902801	5789363	Waihi Estuary	Pongakawa Stream	6.151508	0.563	1439381	143.9381	15670871	1.448491	3	1	415
22	1910384	5793483	Waihi Estuary	Pongakawa Stream	4.913351	0.45	3409016	340.9016	29644397	1.425575	2	1	416
124	1907210	5790183	Waihi Estuary	Pongakawa Stream	3.951199	0.362	311350.3	31.13503	2177278	1.362549	4	1	417
304	1896653	5795052	Waihi Estuary	Pokopoko Stream	12.91299	1.183	322435.4	32.24354	7368945	1.248126	4	1	418
303	1898020	5796923	Waihi Estuary	Pokopoko Stream	23.34533	2.138	330139.6	33.01396	13640596	1.245413	3	1	419
305	1896643	5795012	Waihi Estuary	Pokopoko Stream	16.45174	1.507	522461.4	52.24614	15212544	1.162536	3	1	420
143	1909622	5793143	Waihi Estuary	Pongakawa Stream	3.60192	0.33	925406.1	92.54061	5899322	1.118201	4	1	421
104	1899518	5788907	Waihi Estuary	Waiari Stream	6.04543	0.554	31230.93	3.123093	334154.9	1.094748	6	1	422

NODE_ID	Easting	Northing	Catchment	Subcatchment Name	OLF mean value	OLF mean Rainfall Total	Capture Area (m2)	Capture Area (ha)	Surficial Runoff Volume	Land Use Index	Runoff Volume Index	Priority	Rank
130	1907383	5792442	Waihi Estuary	Pongakawa Stream	4.101689	0.376	1079341	107.9341	7835328	1.04939	4	1	423
34	1907071	5793493	Waihi Estuary	Pongakawa Stream	3.6	0.33	45755.34	4.575534	291527.8	1.015838	6	1	424
307	1897378	5794652	Waihi Estuary	Pokopoko Stream	16.17147	1.481	269327.4	26.93274	7708428	1.006025	4	1	425
219	1905118	5792947	Waihi Estuary	Pongakawa Stream	15.62615	1.431	11507.79	1.150779	318258.1	1.000192	6	1	426
25	1908713	5792557	Waihi Estuary	Pongakawa Stream	3.6	0.33	69067.86	6.906786	440062.4	1.000031	6	1	427
355	1904703	5791849	Waihi Estuary	Pongakawa Stream	9.930896	0.91	222145.5	22.21455	3904467	1.00002	4	1	428
218	1905123	5792986	Waihi Estuary	Pongakawa Stream	14.81645	1.357	16799.87	1.679987	440540.6	1.000008	6	1	429
135	1908666	5792494	Waihi Estuary	Pongakawa Stream	3.6	0.33	94129.4	9.41294	599740.7	1.000006	6	1	430
133	1908408	5792783	Waihi Estuary	Pongakawa Stream	3.610858	0.331	711675.8	71.16758	4548083	1.000006	4	1	431
122	1906618	5789768	Waihi Estuary	Pongakawa Stream	3.97594	0.364	132099.3	13.20993	929557.3	1.000005	6	1	432
269	1904098	5791943	Waihi Estuary	Pongakawa Stream	10.51845	0.963	91240.22	9.124022	1698533	0.999998	5	1	433
123	1906673	5789925	Waihi Estuary	Pongakawa Stream	3.6	0.33	41861.45	4.186145	266718.1	0.999965	6	1	434
132	1908125	5792628	Waihi Estuary	Pongakawa Stream	3.6	0.33	34821.35	3.482135	221862.5	0.999961	6	1	435
134	1908163	5792658	Waihi Estuary	Pongakawa Stream	3.6	0.33	22140.88	2.214088	141069.5	0.99996	7	1	436
24	1908483	5792896	Waihi Estuary	Pongakawa Stream	3.6	0.33	74684.42	7.468442	475848	0.999941	6	1	437
268	1903943	5791835	Waihi Estuary	Pongakawa Stream	10.22109	0.936	22591.68	2.259168	408678.4	0.999926	6	1	438
106	1899473	5788913	Waihi Estuary	Waiari Stream	6.058793	0.555	21944.09	2.194409	235309.5	0.999814	6	1	439
107	1902362	5788259	Waihi Estuary	Pongakawa Stream	5.077728	0.465	11683.01	1.168301	104992.9	0.999742	7	1	440
270	1904063	5791858	Waihi Estuary	Pongakawa Stream	16.85945	1.544	1374173	137.4173	41003478	1.128395	2	0	441