

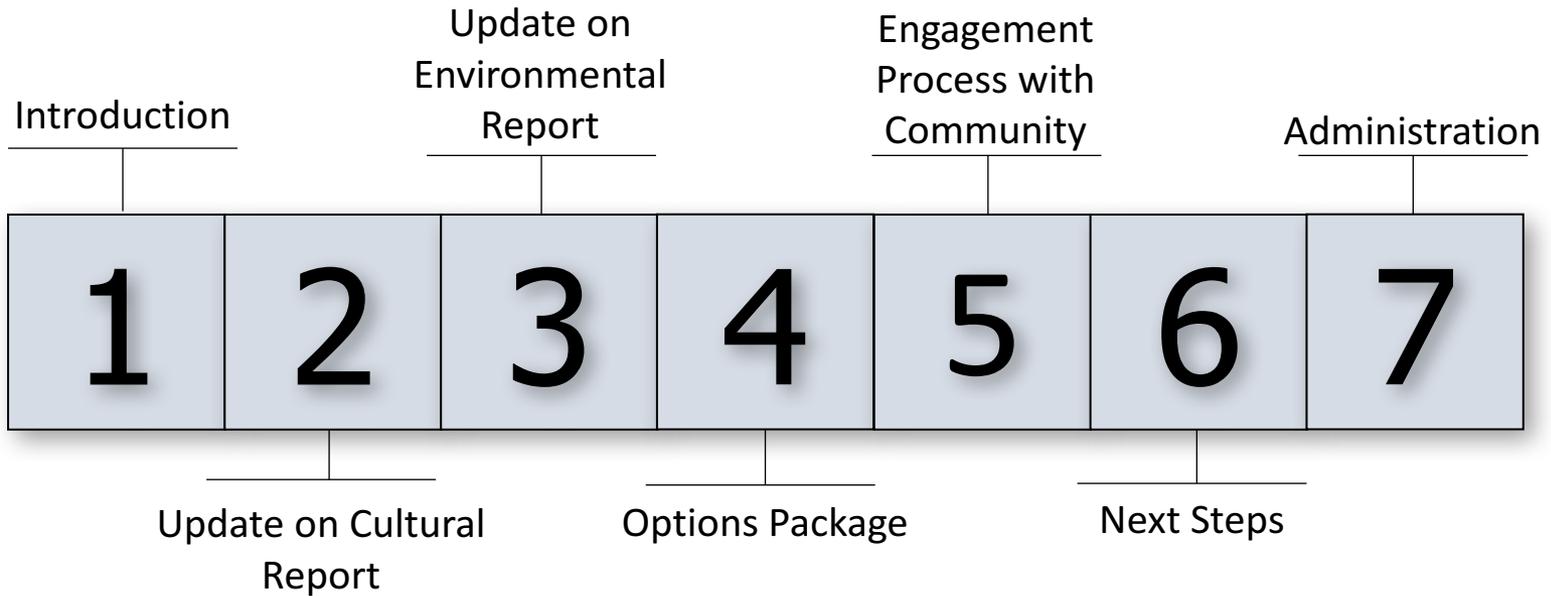


**Wairoa Wastewater
Scheme
Stakeholder Group Meeting
Meeting 9 –
13 November 2017**

INTRODUCTION



Outline

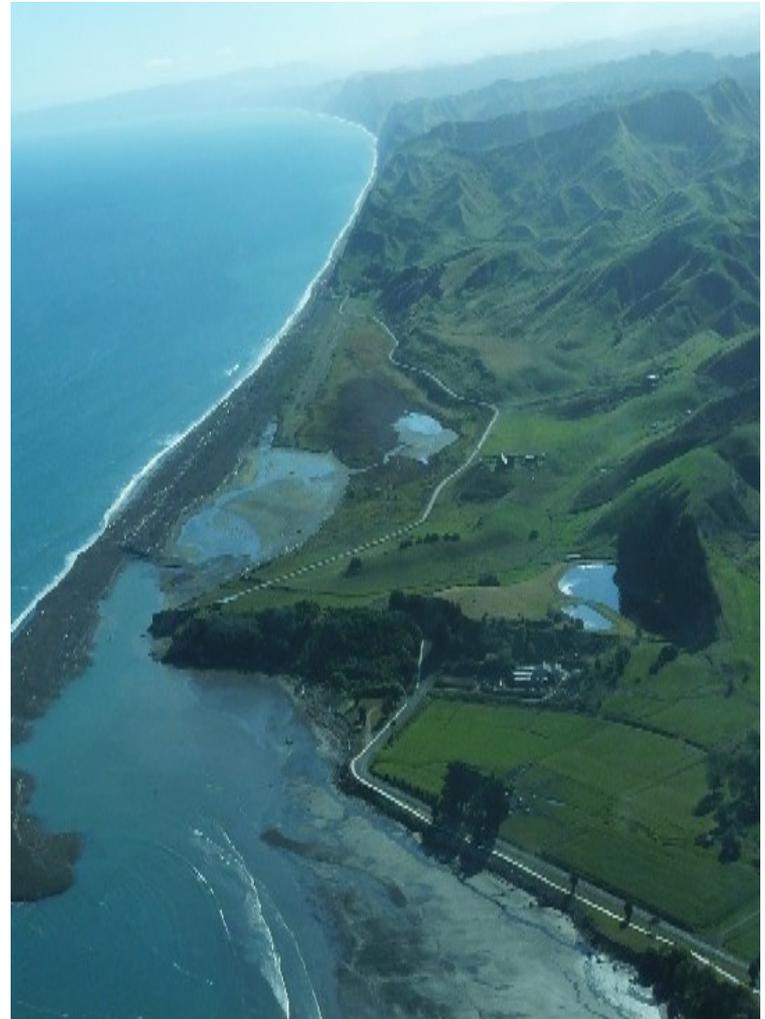


UPDATE ON CULTURAL REPORT



Tangata Whenua Worldviews for Wastewater Management in Wairoa

- Discuss report



UPDATE ON ENVIRONMENTAL REPORT



Benthic survey of river receiving environment

- Status of Report from Shade Smith



OPTIONS PACKAGE



Aim to get 100 % passing through land and ideally have not river discharge

Add extra treatment and continue river discharge

- Filtrations and UV disinfection
- Land Passage

Start adding land to the mix

- Mucalo property
- Landfill

Contribute to catchment administration

Add additional land

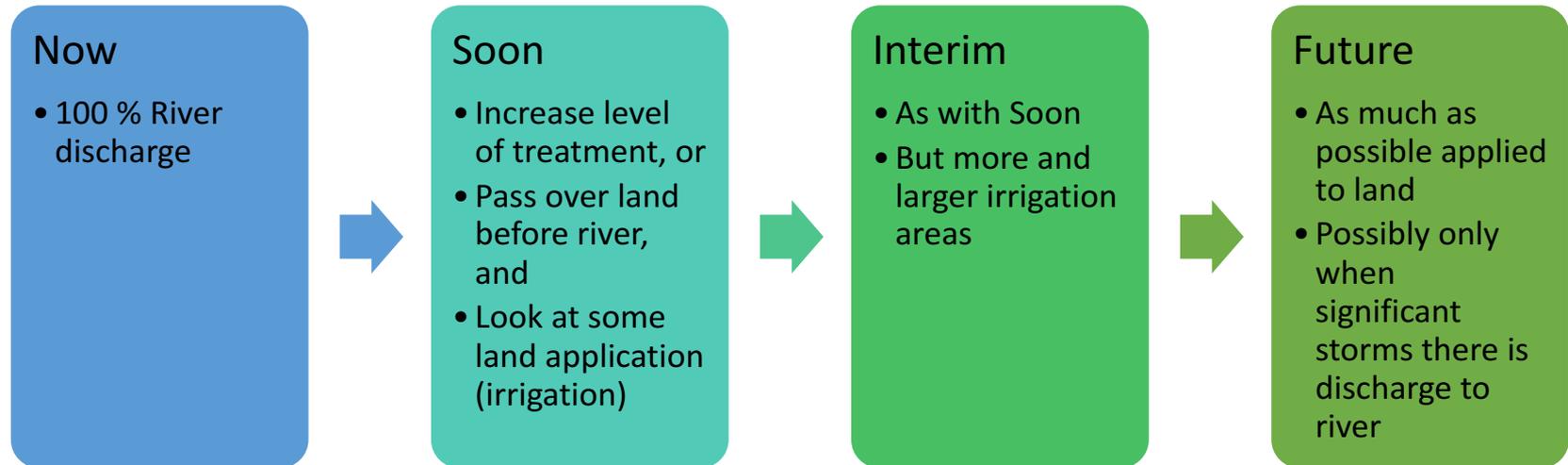
Do it over time

VISION



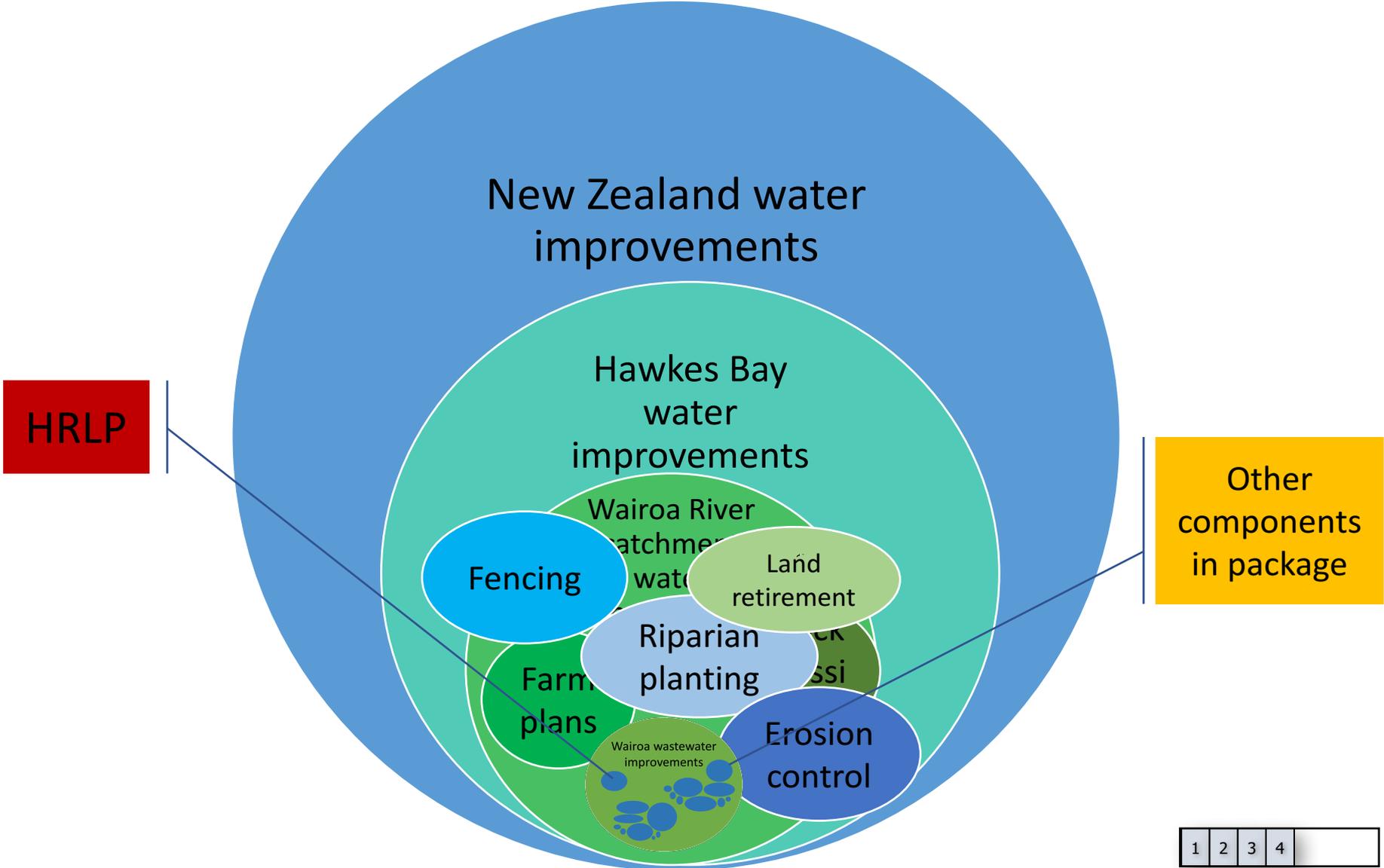
Long-term goal to remove wastewater from Wairoa River

Commitment to improve river health in a holistic way





IN CONTEXT



WASTEWATER COMPONENT





STARTING POINT

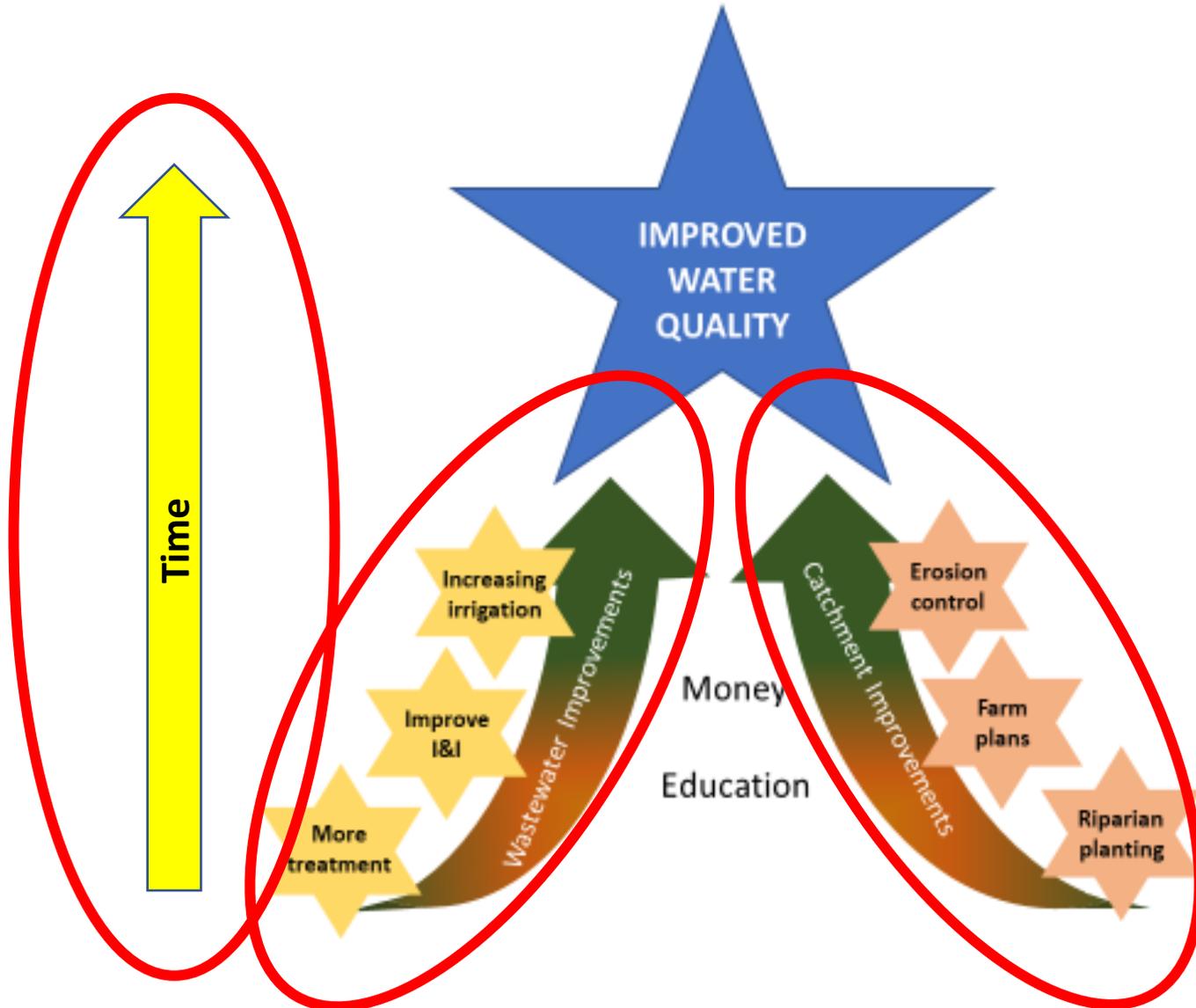
Current discharge is not acceptable to many

Pathogen and contaminants entering an environment used by locals for recreation and food gathering

Other contributors to the river ill-health – hill country erosion, runoff from production land and various discharges

Need for improvement in river health supported by community

OPTIONS PACKAGE





THE NEED FOR STEPS

Implement a programme to progressively cease discharge to the river

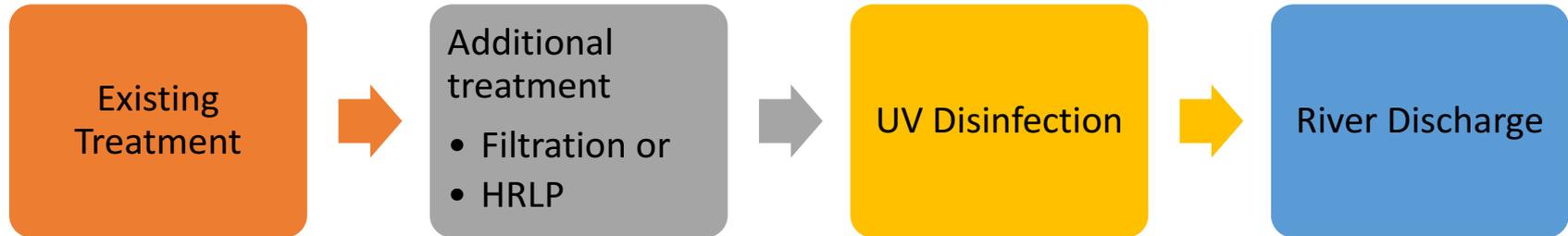
1st step – 2 Options

- Filtration and ultra violet light to remove pathogens
- High rate land passage system

Further steps – incorporation of land for irrigation – close to treatment ponds, then potentially further afield

Additional storage will be required for future irrigation and to see an end to discharging to water

STEP 1 UP CLOSER



- Land passage systems
 - aim to provide an opportunity for wastewater to pass rapidly over and/or through land on its way to reaching a receiving waterway, whether that be groundwater or surface water.
- Design concept and features:
 - replicate natural systems
 - disperse wastewater as it flows down a slope
 - flow controls for steep slopes (cascading steps or small dykes)
 - vegetated edges and/or swale channels
 - moderate or higher draining soil substrate
 - gravel and boulder substrates
 - often include wetland type environments
 - Replicate the catchment



TIMING

As technology and funds become available package can be enhance by:

- Education about water use
- Affordable and effective wastewater treatment technology
- The use of alternative beneficial uses for wastewater

HOW TO INCORPORATE THE CATCHMENT



Contributing to improving the catchment would be further steps within this package

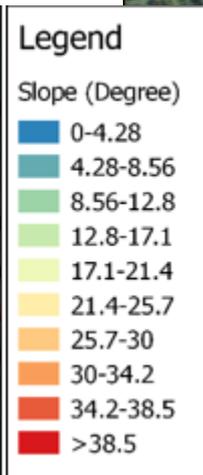
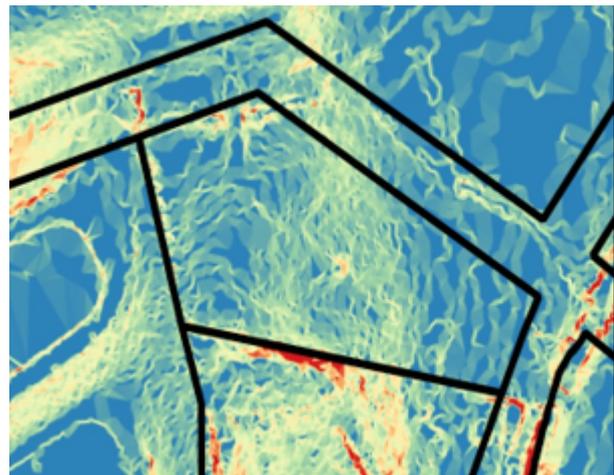
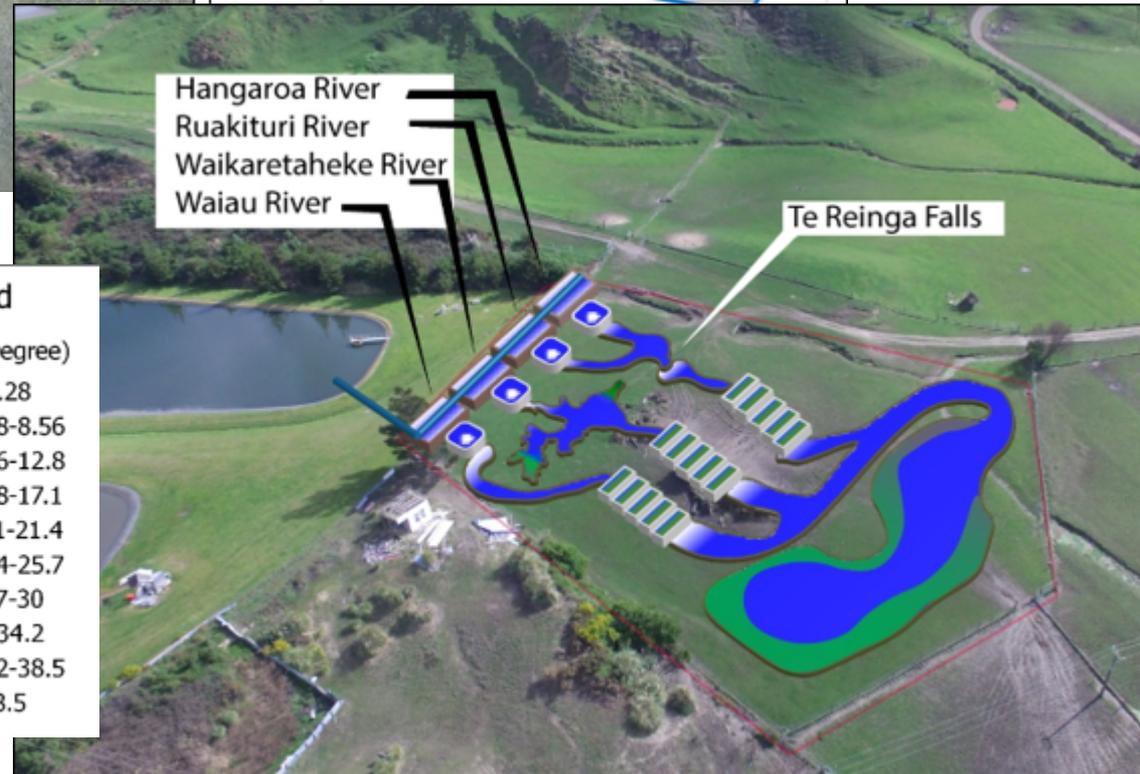
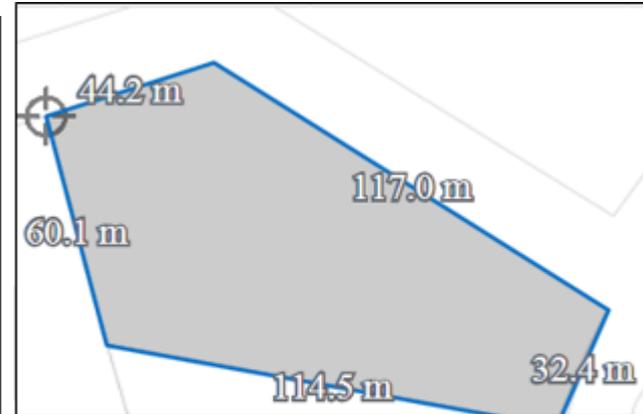
High rate land passage can be used for education on catchment processes

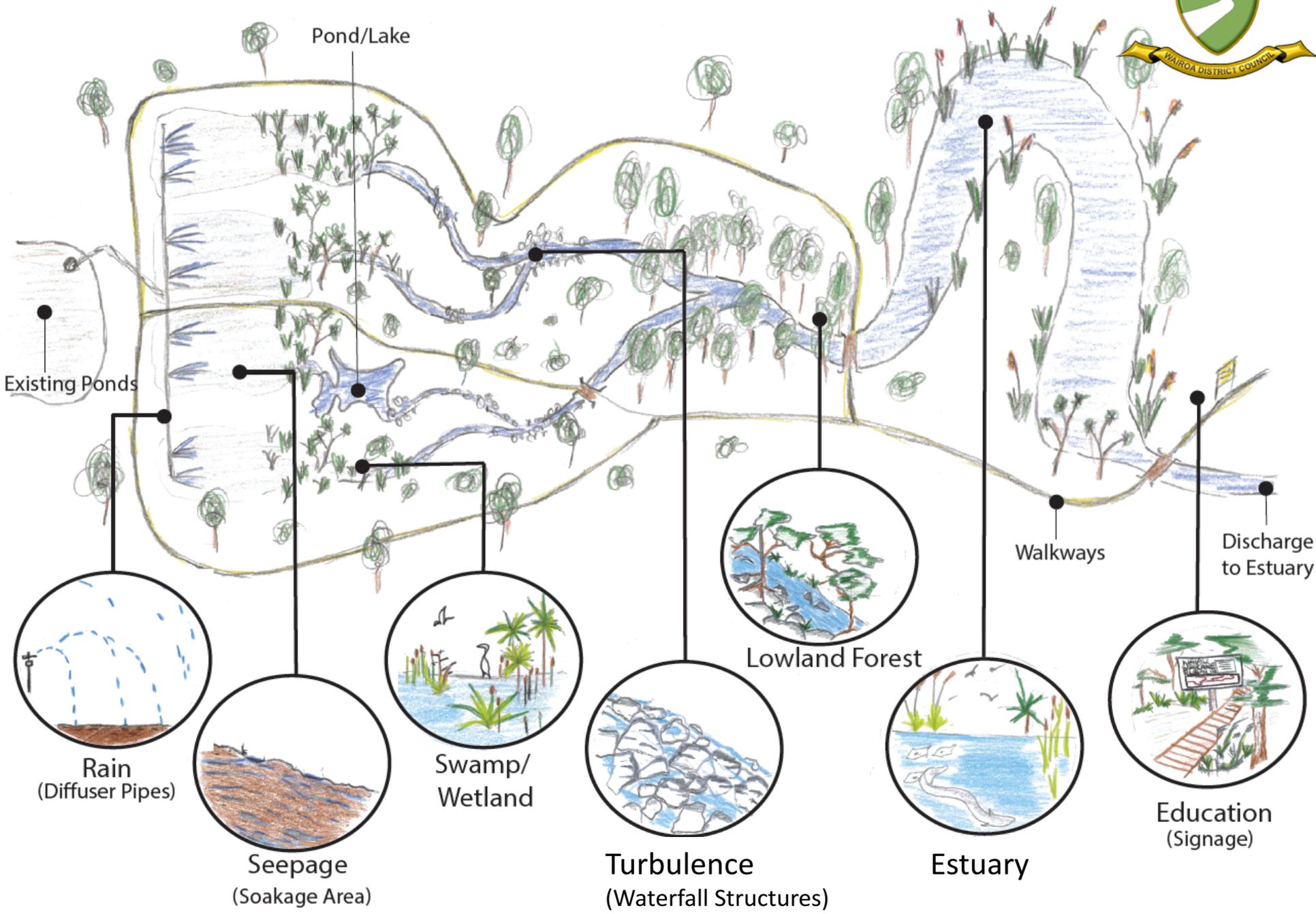
There is an opportunity to understand the topography, land management limitations and vegetation that make the Wairoa River Catchment unique



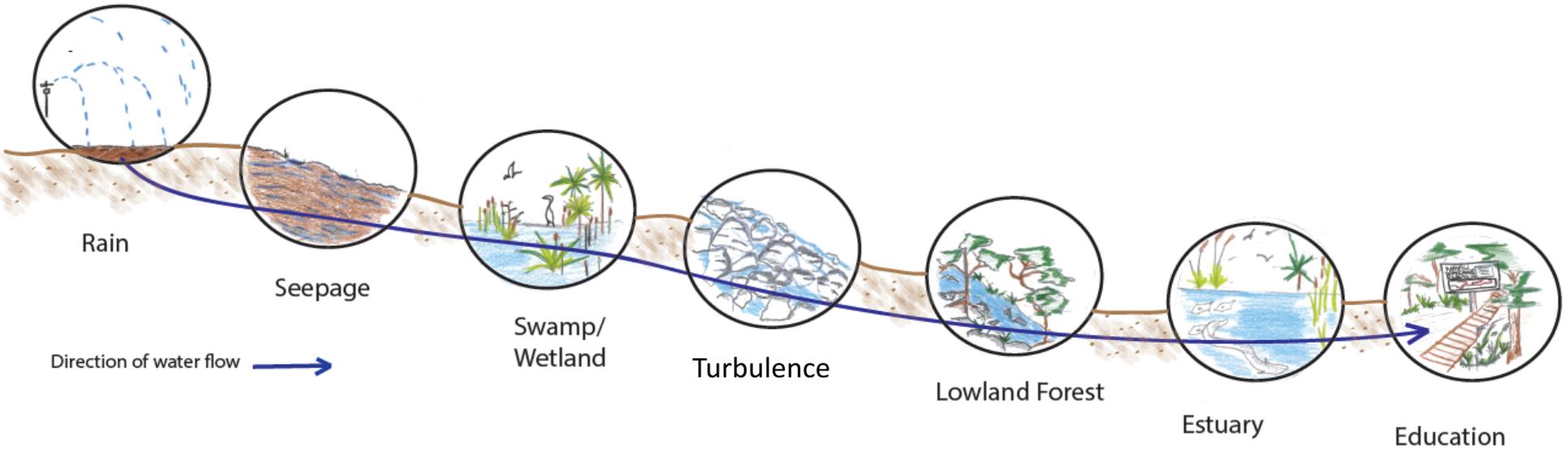
WAIROA DISTRICT COUNCIL

THE PACKAGE – HIGH RATE LAND PASSAGE

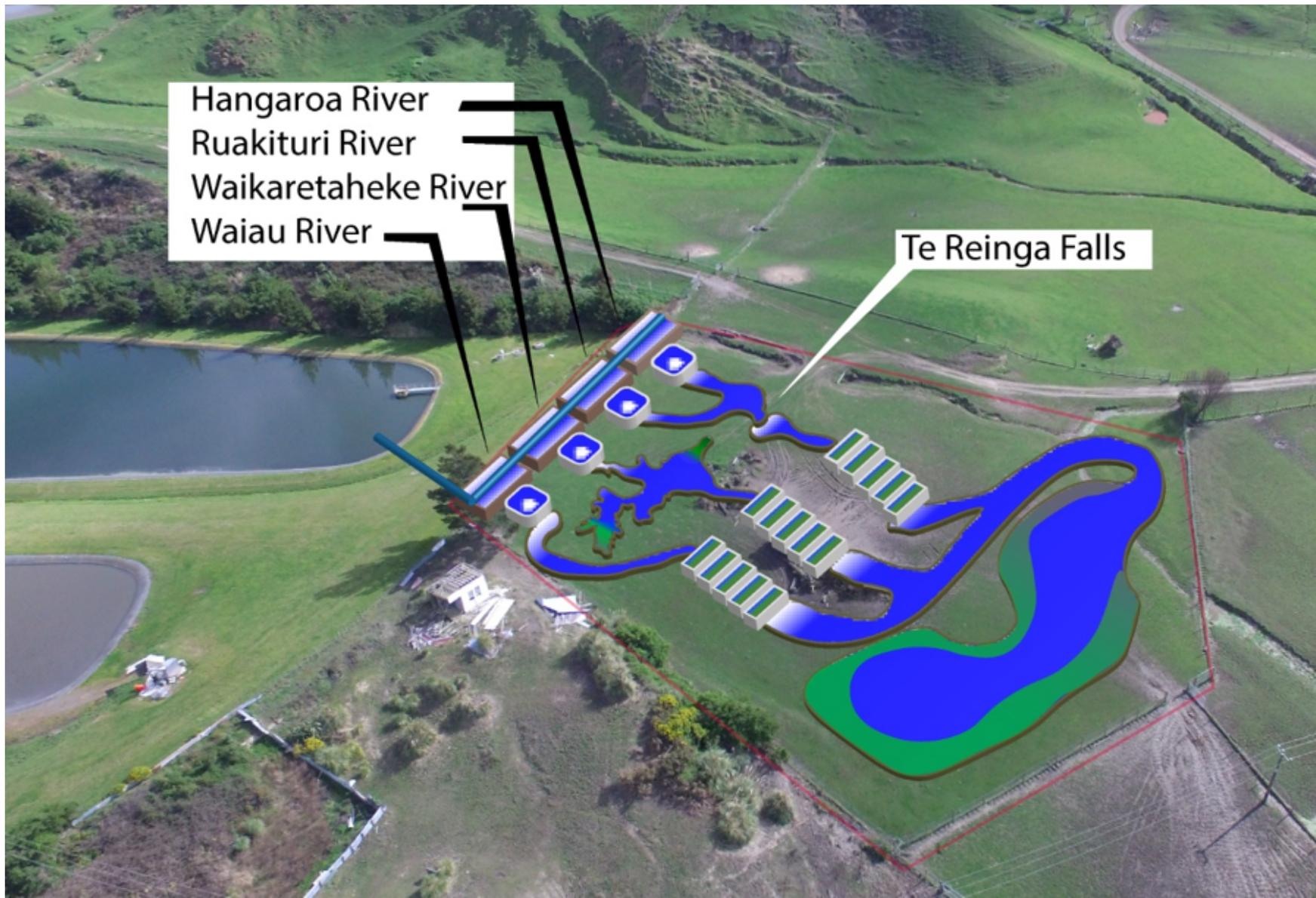




OPTIONS PACKAGE



OPTIONS PACKAGE – HIGH RATE LAND PASSAGE

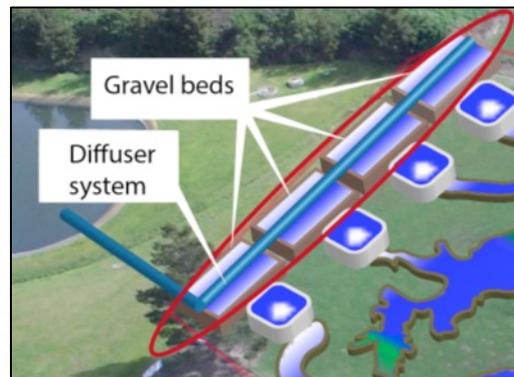
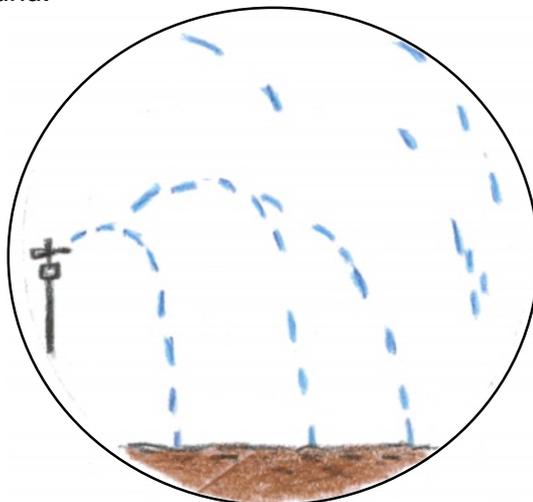


Hangaroa River
Ruakituri River
Waikaretaheke River
Waiaiu River

Te Reinga Falls

PART 1 - RAIN

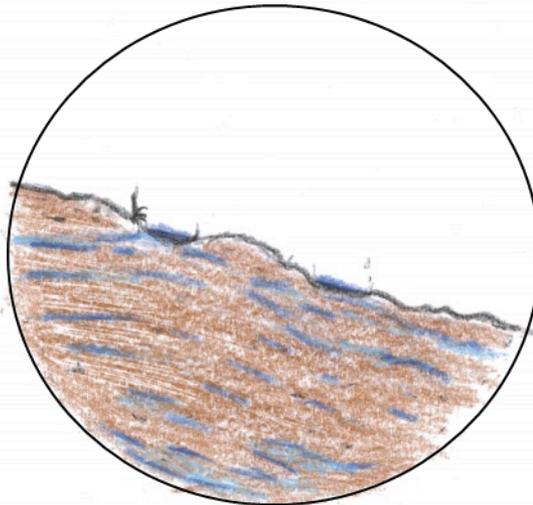
A spray system (diffuser) is used to simulate rain and allow the water to soak into the ground.



Cultural Aspects	Catchment Aspects	Treatment Processes
<p>The tears of Ranginui represent the rain as a symbol of his sadness for his separation from Papatūānuku. The settling of his tears upon Papatūānuku represents the evaporation of rainfall as a symbol of her sadness. Both the rainfall and the evaporation is a symbol of the close bond between Ranginui and Papatūānuku. By mixing rainwater with air, the mauri of the water is enhanced due to its oxygen transfer process.</p>	<p>Rain falls in the mountainous headwaters of the river and soaks into the soils and sub-alpine vegetation. During storms, heavy rainfall flows across the land surface.</p>	<p>Aeration, vaporisation, and sunlight exposure all help to kill any residual pathogens. Volatilisation of ammonia and nitrogen transformation will occur. Soakage into the media and interaction with soil biota and plants enables nutrient and water uptake, pathogen and algae filtration, controlled drainage to groundwater, and nitrogen transformation.</p>

PART 2 - SEEPAGE

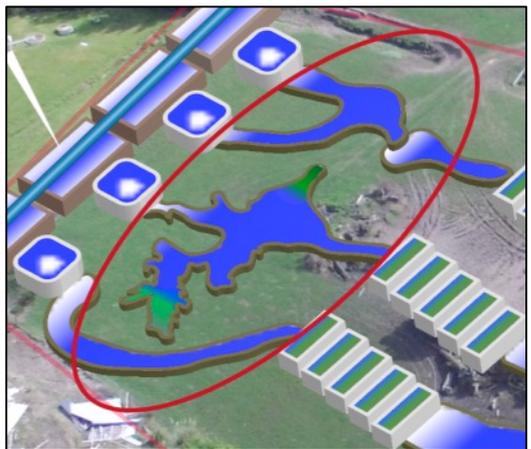
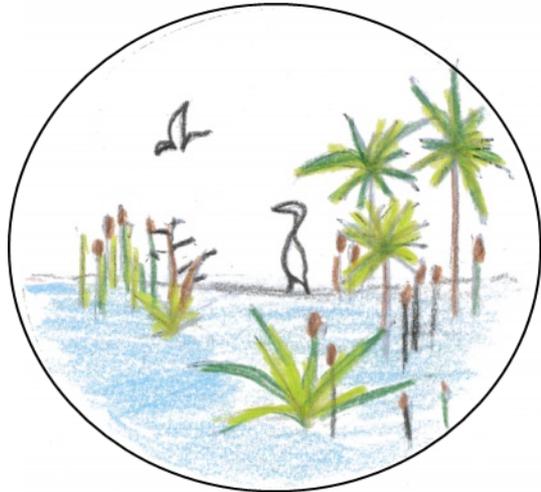
Groundwater passage through the media and upwelling through media at a lower elevation, representing springs.



Cultural Aspects	Catchment Aspects	Treatment Processes
<p>Papatūānuku absorbs the rainfall and nourishes the sub-alpine wetlands and bush. Te Urewera and key skyline or upland landmark deities occupy this area. Wainui is the guardian of fresh water. The water passes through Papatūānuku and returns to the world of light. This process revitalises the mauri of the water.</p>	<p>Rainfall soaks into the soils and percolates downhill to re-emerge by seepage and springs through rocks and soil (sourced from each catchment) to form sub-alpine wetlands or bogs. Wetland plants, mosses, and surrounding trees reflect the respective upland catchment characteristics.</p>	<p>Soakage through soil and upwelling through springs enables nutrient and water uptake, pathogen and algae filtration, drainage down to groundwater, and nitrogen transformation.</p>

PART 3 – SWAMP/WETLAND

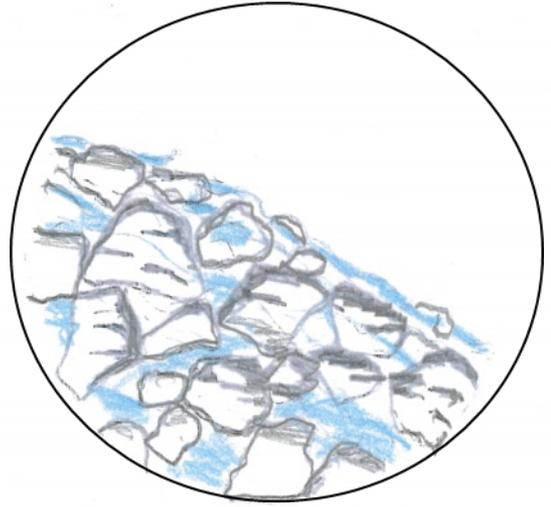
The release from springs form sub-alpine wetland and bog areas through to lakes and streams.



Cultural Aspects	Catchment Aspects	Treatment Processes
<p>Tāne is the deity related to the forest, and Te Urewera and key skyline or upland landmark deities also occupy this area.</p> <p>Te Urewera headwaters start in the form of sub-alpine wetlands and bogs which feed into lakes and streams. Ground-water and surface water have intimate contact with Papatūānuku which provides mauri to the water. The water flow at the surface then nourishes the mauri of the sub-alpine wetlands and bush.</p>	<p>Springs feed sub-alpine wetlands or bogs. Wetland plants and surrounding trees reflect Te Urewera character and plants that are found in this zone. Soakage occurs through soil, surface flow over gravel, merging of spring seepage, and contact with riparian plants and trees.</p>	<p>Slow flow over and constant contact with soil and riparian plants enables nutrient and water uptake. There may be some drainage to groundwater which will provide for further filtration. The organic influence of the vegetation will provide for nitrogen transformation (denitrification).</p>

PART 4 – TURBULENCE

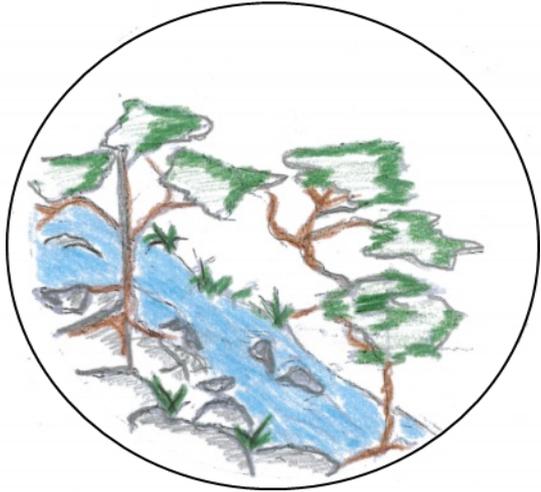
From the headwaters of the individual streams there will be rapids and waterfalls in gorges as they descend the upper part of the catchment to merge into larger streams and rivers.



Cultural Aspects	Catchment Aspects	Treatment Processes
<p>Waterfalls have individual character and spiritual and cultural significance. Taheke and Te Reinga Falls are key examples. Each river draws its identity from its waterfalls and similar characteristics such as steep gorges and rapids.</p> <p>The mixing of water with air transfers oxygen and mauri into the water. Splashing against and flowing over rocks provides close contact with Papatūānuku.</p>	<p>Each stream and river is turbulent and swiftly flowing and in places cascades over steep rapids and waterfalls.</p> <p>The special character of each river will be reflected in overall layout, rocks, and plants. Cascading structures representing the Taheke and Te Reinga Falls will feature here.</p>	<p>Soil soakage, aeration, algae on stream beds, and contact with riparian plants enables nutrient and water uptake, drainage to groundwater, and nitrogen transformation. The turbulence allows for any degradable organic matter from the treatment process to be further reduced. It also provides for UV treatment of pathogens, and potentially volatilisation of ammonia to some limited extent.</p>

PART 5 – LOWLAND FOREST

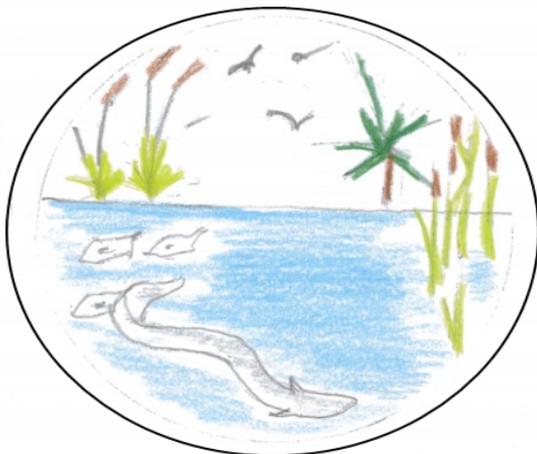
Each river flows through meandering channels across the lowlands which were once densely forested.



Cultural Aspects	Catchment Aspects	Treatment Processes
<p>Tāne resided here, within the tall podocarp forests and the understorey tree ferns and bush. This was an important area for birds, lizards, and abundant food sources and other resources for Maori. It was an important navigation route to Te Urewera.</p> <p>Mauri is exchanged as water supports the forest and its inhabitants. Contact with Papatūānuku and soakage of water into soils also occurs in slower flowing areas.</p>	<p>Each river has its own character of gorges, open valleys, gentler gradient, vegetation cover, and tight or broad curves. Water flow is generally less turbulent and slower moving on the surface due to the gentler gradient.</p> <p>The terrestrial and aquatic habitats were richly diverse and abundant.</p>	<p>The slower flow areas allow for nutrient uptake by plants and aquatic life, and for soakage into the soils. Some transformation of nitrogen also occurs.</p>

PART 6 – ESTUARY

As the Wairoa River flows through the estuary it has a meandering form and has lagoons immediately prior to where the river mouth meets Hawke Bay.



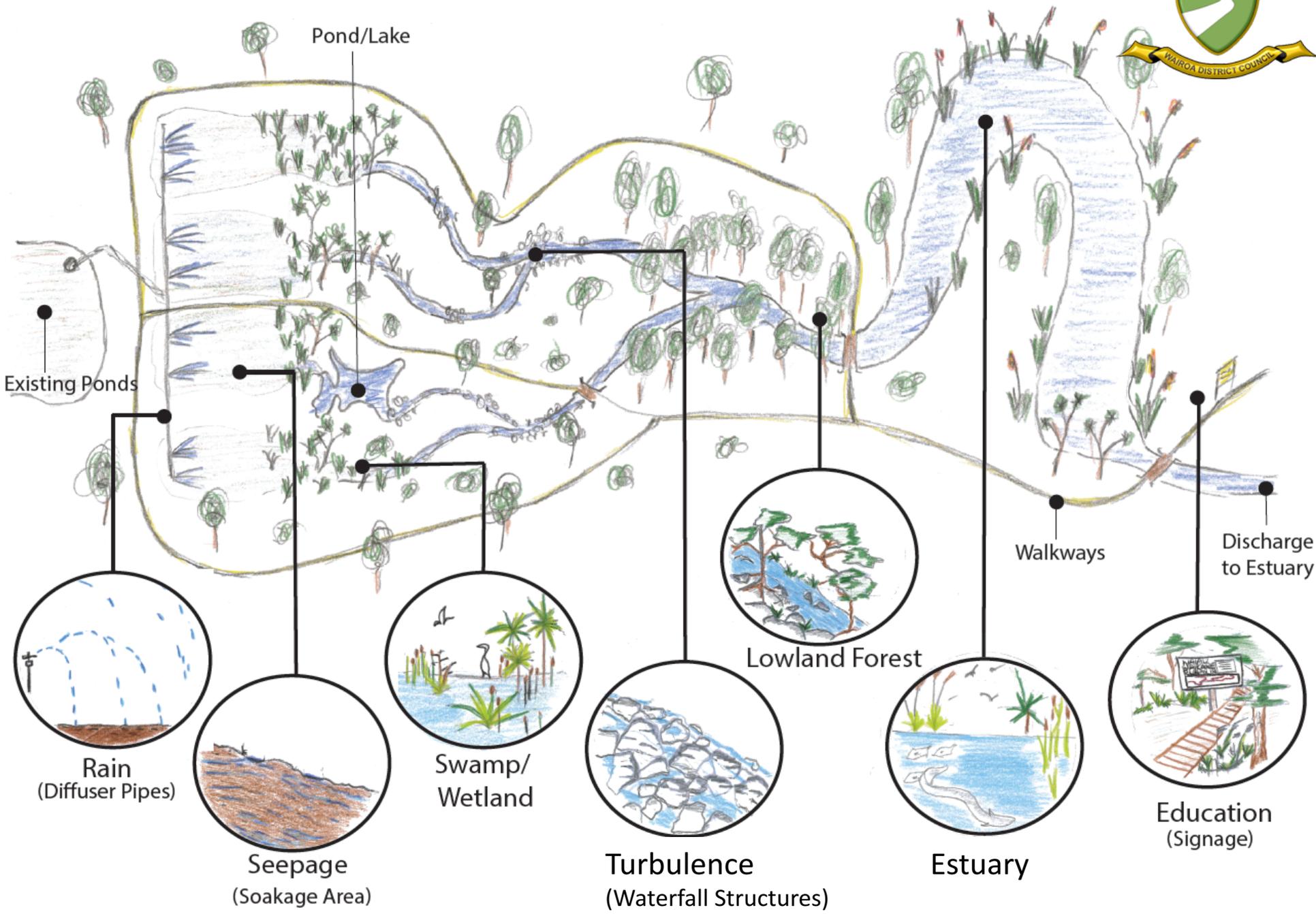
Cultural Aspects	Catchment Aspects	Treatment Processes
<p>Papatūānuku meets and mixes with Tangaroa in this inter-tidal zone, and mauri exchanges between the two deities and environments. Slow water movement is also important.</p> <p>Two taniwha, Tapuwae and Te Maaha, form the gravel bars on each side of the river mouth.</p> <p>This area has a rich and lengthy history of human occupation. There has historically been an abundance of kai from and adjacent to the estuary and in the sea.</p>	<p>Special character of the estuary will be reflected in shape, soil, and surrounding plants. The slow meandering nature of this part of the catchment is critical. Tidal nature and variety of habitats are also important features. The tidal sequence of the estuary can be reflected in the capture and release of the treated water in synch with the actual estuary cycle. To reflect the aspect of food gathering, the created structure could be stocked with tuna.</p>	<p>A pond with variable water levels, and contact with riparian plants, enables nutrient and water uptake, further oxygenation, evaporation, UV treatment of pathogens. There may be some additional nitrogen transformation.</p>

PART 7 – EDUCATION

Telling the story of the catchment, alongside the story of the high rate land passage system and community efforts to improve the health of the Wairoa River.



Cultural Aspects	Catchment Aspects	Treatment Processes
<p>Education of tamariki and mokopuna is a strongly held Maori value. It is important for future generations to learn from kaumatua their ancestry and tikanga Maori. It is important to transfer the knowledge of how to care for their environment and maintain healthy mauri, and balanced tapu and noa.</p>	<p>Each catchment has a story to tell, and many different aspects can be educational. There are stories to be told about Maori creation history, ecological history, physical development, and human history. The water quality changes and challenges for the wider catchment can also be explained with restoration projects as examples of work to clean up the river.</p>	<p>The treatment processes can be described in some detail at each stage of the high rate land passage in order to improve public understanding of how wastewater is treated. It can also link to the wider catchment nutrient inputs and transformations.</p>





WHAT REFINEMENT IS NEEDED

Has to be done by the community for the community

Deity and tangata whenua relationship needs to be told

Need to realistic about level of treatment



BRINGING IT TOGETHER

Pre-Discharge

- Reticulation upgrades to limit I&I
- Filtration and UV treatment regardless of discharge system

Post-Discharge

- Staged process to remove discharge to water – cost and infrastructure restrictions
- High rate land passage
- Progression towards 100% land application over time

Phasing over Time

- Costs of package need to be spread over time (30 years)
- Need to think strategically with infrastructure purchases
- Acquisition of land will take time

Catchment Works

- River health reflects catchment geology and use
- Key areas -
 - Oversight & Governance
 - Planning & Prioritisation
 - Whole farm planning
 - Implementation & works
 - Auditing & reporting



WHAT DOES IT COST

Some costs are already committed eg reticulation improvements

This selection process

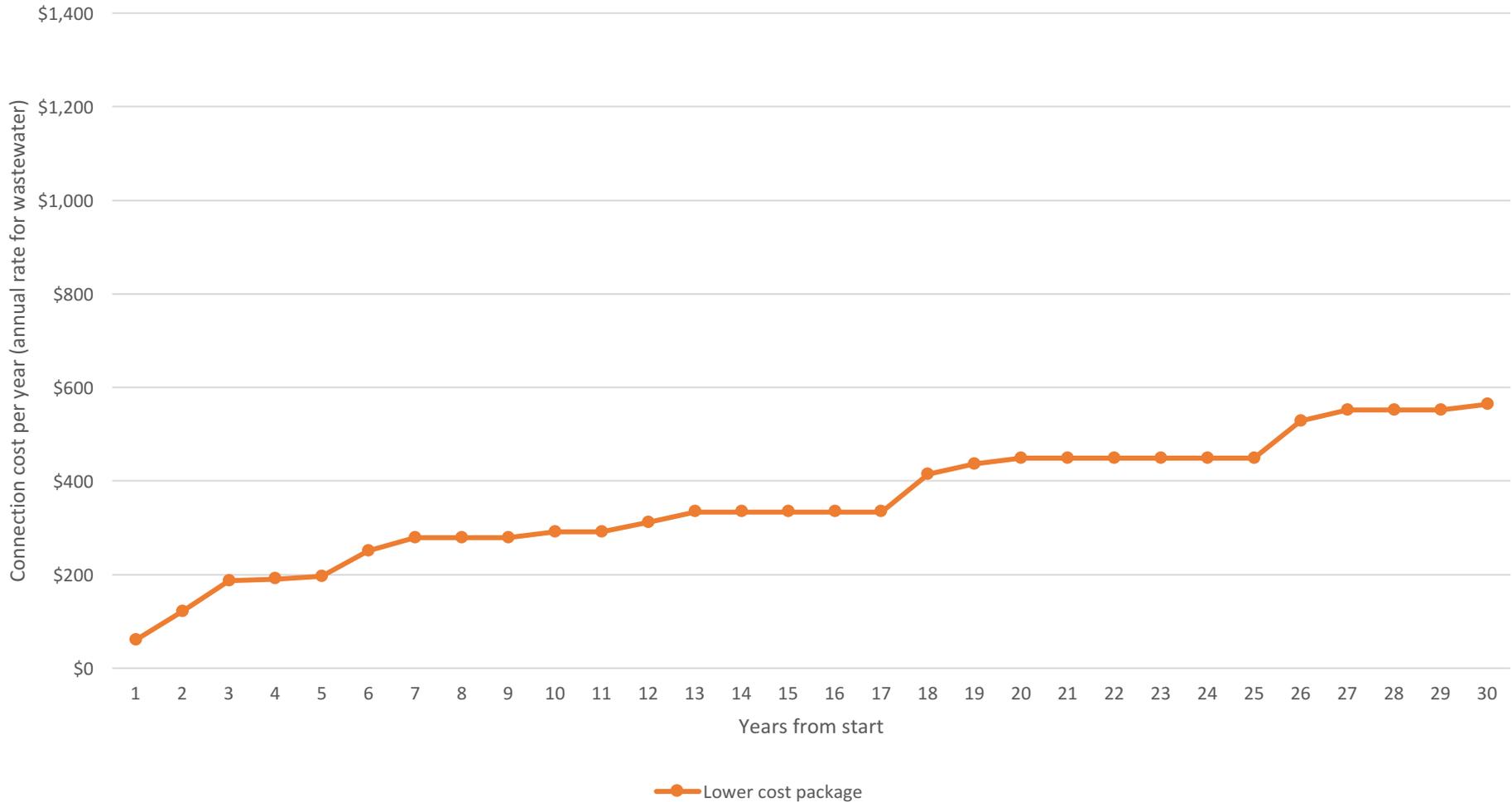
Resource Consent costs

Progressive option design (very high level)

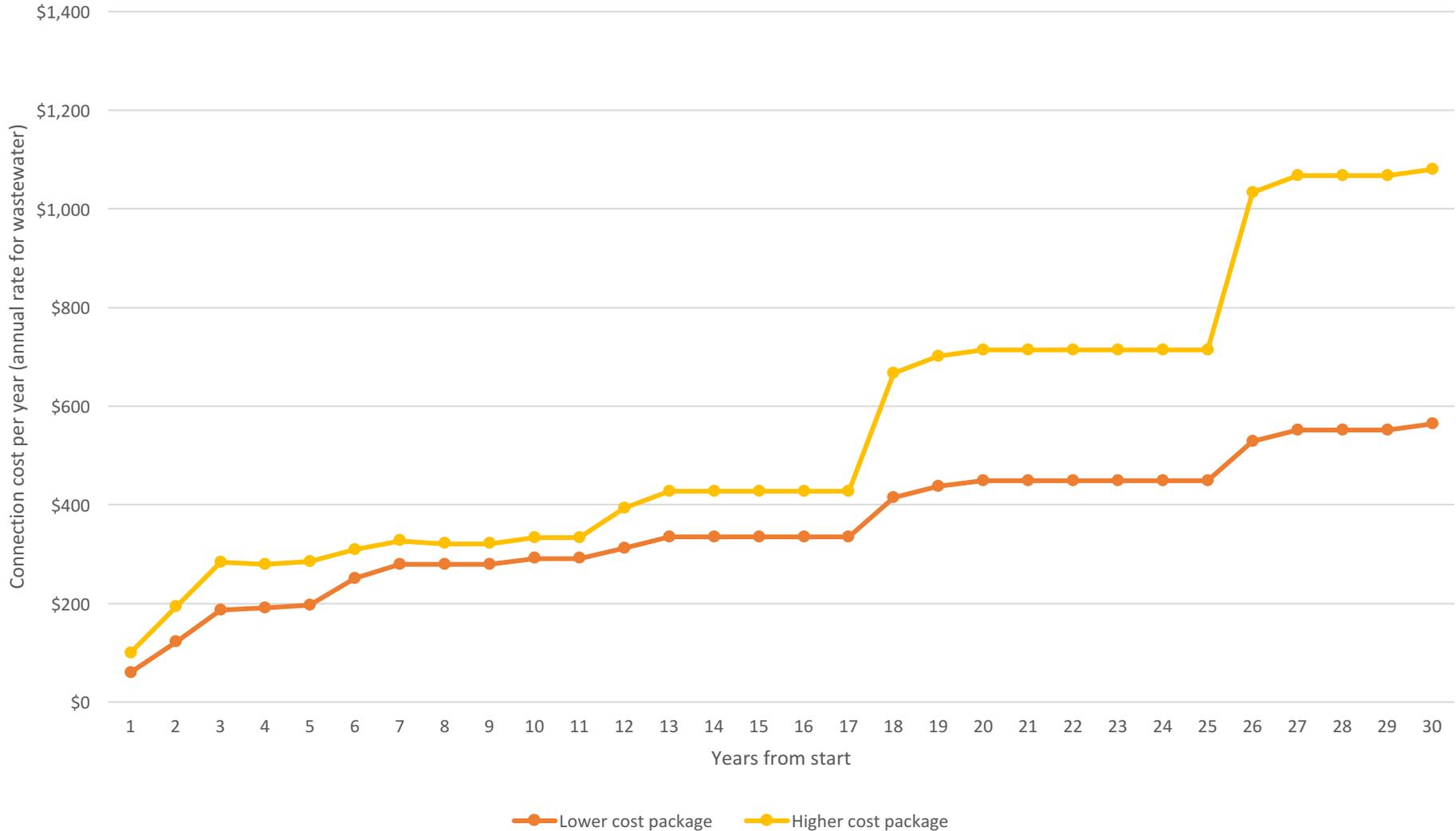
OPTIONS PACKAGE - COSTS



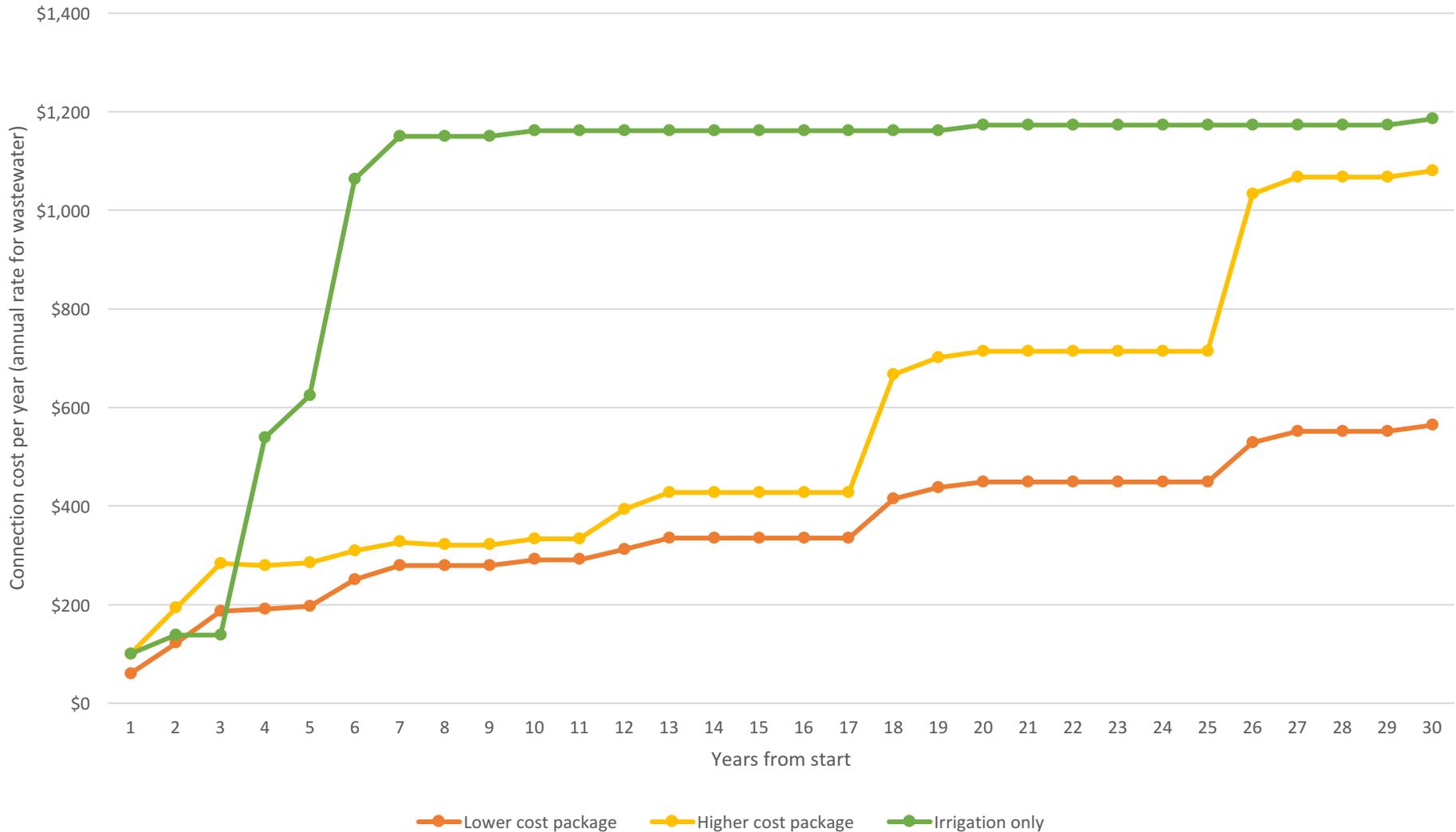
Lower cost package



OPTIONS PACKAGE - COSTS



OPTIONS PACKAGE - COSTS



OPTIONS PACKAGE – 30 YEAR COSTS



	Lower Cost Package	Higher Cost Package	Irrigation Only
Wastewater Reticulation	\$ -	\$ -	\$ -
Consenting	\$ 1,500,000	\$ 2,500,000	\$ 2,500,000
Treatment Plant	\$ 1,525,000	\$ 1,850,000	\$ 1,850,000
Wastewater Treatment	\$ 3,500,000	\$ 4,850,000	\$ -
Discharge	\$ 9,510,000	\$ 20,050,000	\$ 28,500,000
Catchment works	\$ 430,000	\$ 520,000	\$ -
Total Current Value Investment	\$ 16,815,000	\$ 30,240,000	\$ 32,850,000



FUNDING

Assistance of funding will see goals achieved quicker

Catchment programme needs to be affordable to funders first (i.e. rate payers, council)

Volunteering and charitable organisations are key to success of such a programme

Central government funding opportunities –
MfE Freshwater Improvement Fund

NEXT

Should we be dealing with a package?

Tell us what is right

- Timing
- Options

What can be improved

What could be added

What should be taken out

What other catchment works could be considered

ENGAGEMENT PROCESS WITH THE COMMUNITY



Hui-a-hapu

- Whaakirangi Marae (Frasertown Road), Sunday, 26 November 2017 at 10.00 am – to be confirmed

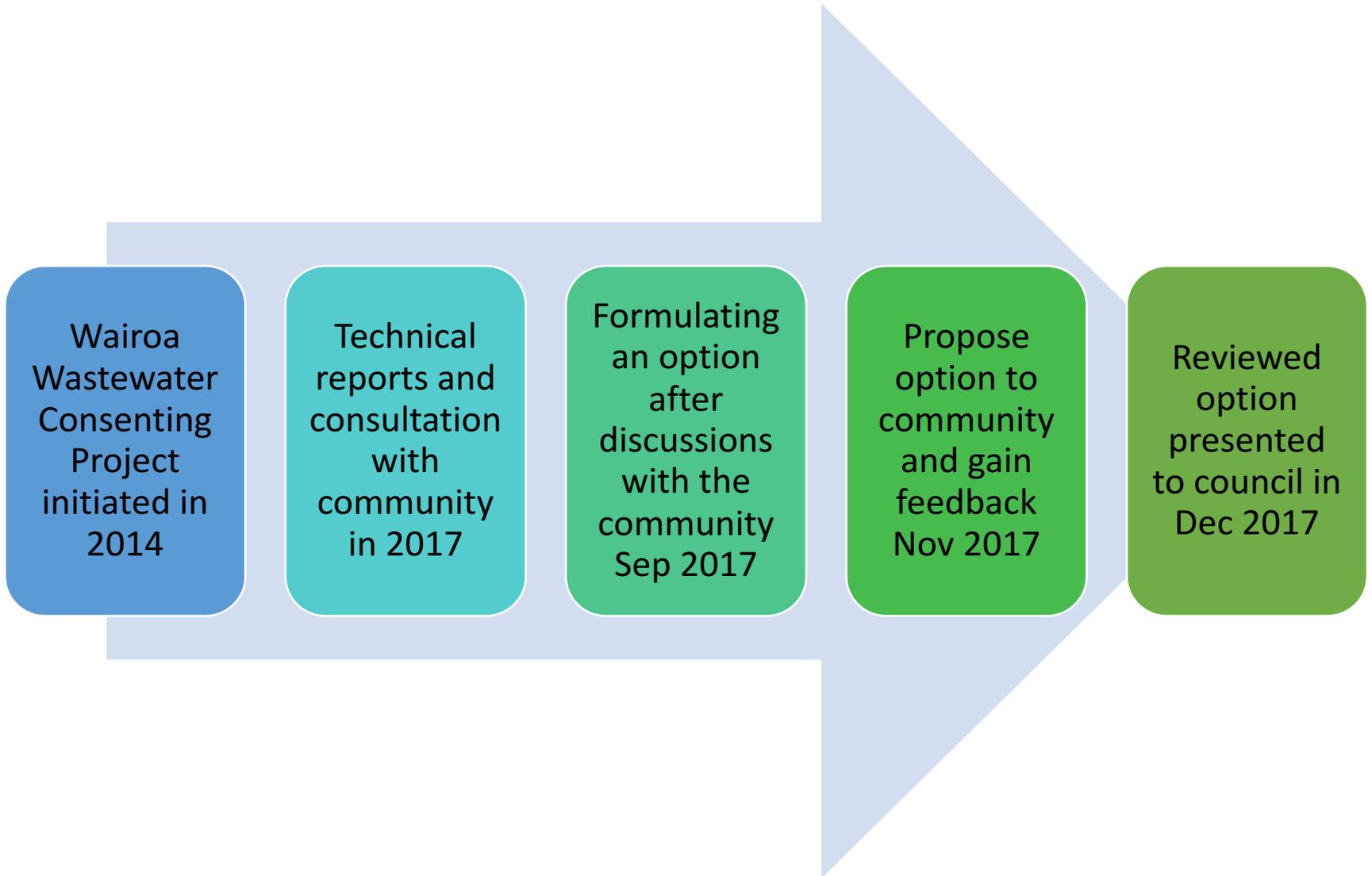
Public Meeting

- Presbyterian Hall (Queen Street), Tuesday 28 November 2017 at 5pm

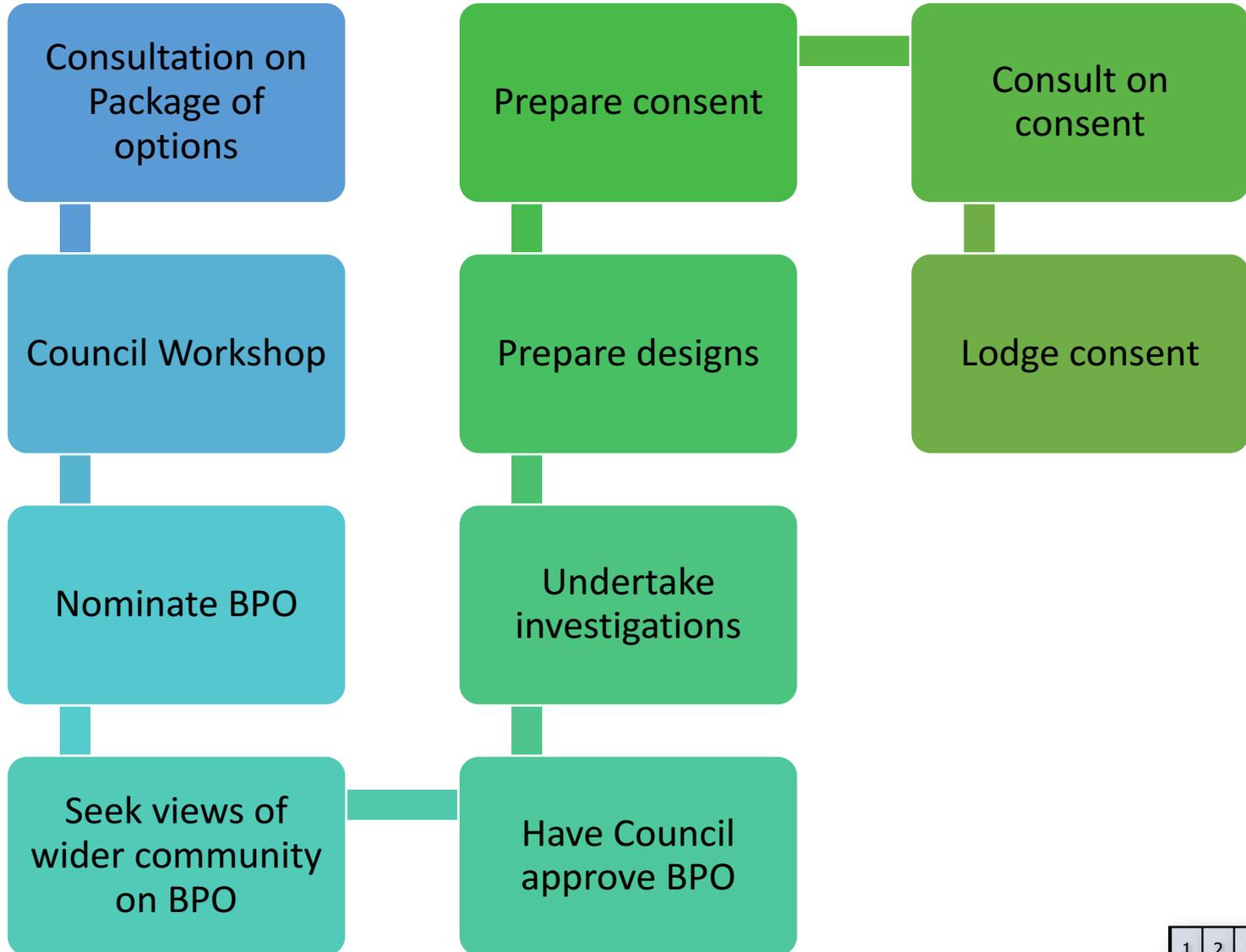
Council Workshop in December

- Will bring together package and ideas from consultation

NEXT STEPS – JOURNEY SO FAR



NEXT STEPS



ADMINISTRATION



Catch up of material

Next meeting Focus

Meeting date and time

