Key Stakeholder Summary Document 19/05/2020

This document summarises the results of an internal workshop held by the project team in late April 2020. It has been put together to provide a simple table of proposed options to take forward to the next phase of investigation. Option backing documents highlight treatment and discharge scenarios that have been discounted, in order to get to the table below (note biosolid re-use options are to be investigated further also). The scoring methodology (traffic lights) is a necessary step to narrow down investigation focus. The project team think that we have the balance right to present pro's and con's of each, once greater analysis is undertaken.

The image below shows next steps in aplication preparation, which is working toward a single option. Options taken through at this point will have more intensive consultation/costing/investigation undertaken upon them. A key outcome that the project team would be keen to understand now is:

(A) Is there general satisfaction with the options proposed to go forward, shown in tables below;
(B) Will gaining knowledge on Deep Bore Injection potential enhance the project? This discharge method has been raised as part of past application discussions, but hasn't been investigated intensly (i.e. exploratory bore holes of significant depth haven't been undertaken). The project team will take direction from all to understand if this *could* be a Raglan solution from a community perspective – knowledge of this position will be very useful for the applicant; and
(C) If project objectives (Appendix A) can be broadly accepted by the community;

Lets discuss

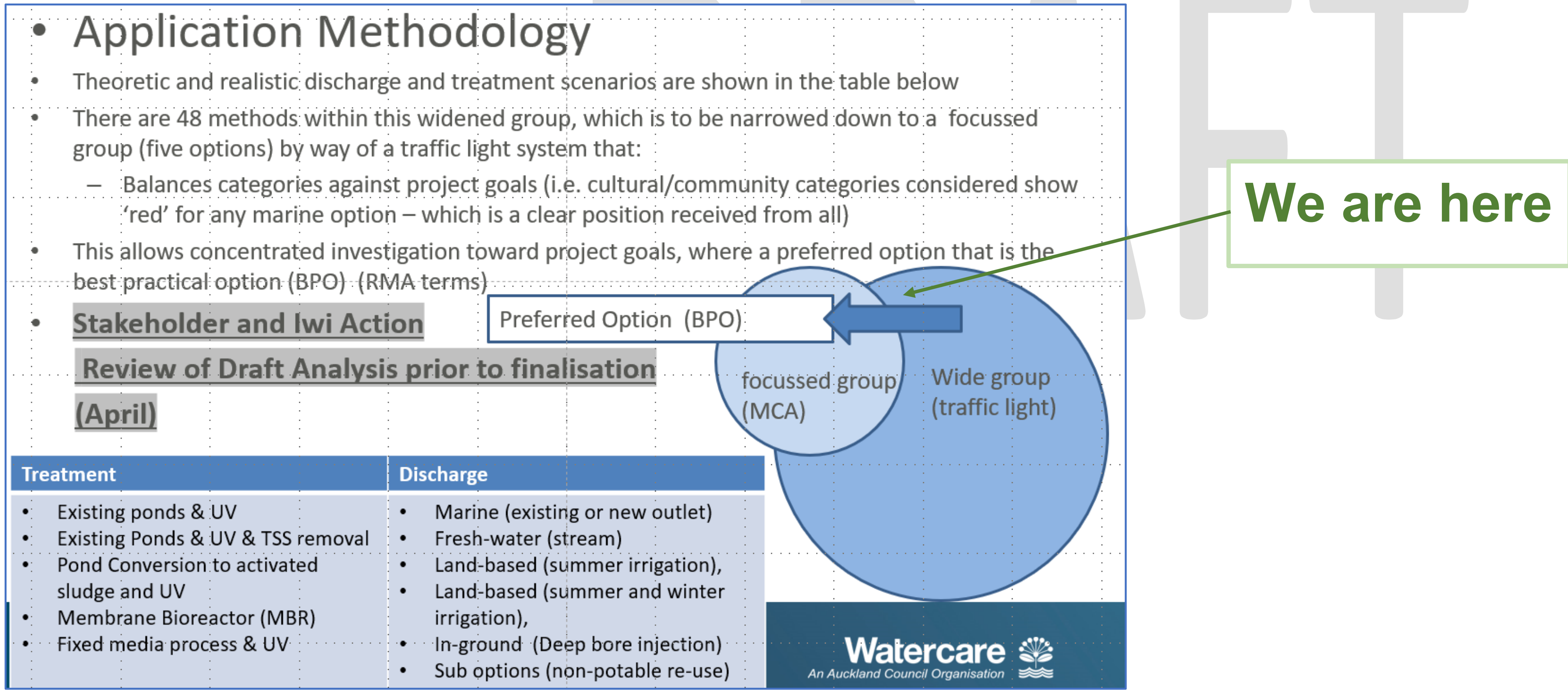


Table 1: Primary Options to be taken forward for further assessment (toward an ultimate treatment and discharge solution)

	Key: Red – Largely fails to meet the criteria, Amber - Marginally meets the criteria, Green - Meets criteria well									
Treatment Process Option	**Public Health**	**Environment**	**Cultural**	**Social & Community**	**Sustainability**	**Constructability**	**Technology**	**Financial Implications**	**Opportunities and Benefits**	**Statutory Considerations**
Option A Existing ponds & UV Incl TSS removal, existing outfall	Membrane treatment will provide additional pathogen removal (multi-barrier approach). Human health effects will be lower than existing discharge.	Improved treatment quality compared to existing		Existing discharge located close to shore, knowledge of discharge. Offset by improved discharge quality.	Low energy treatment and conveyance system. Additional embodied and operational carbon associated with membrane treatment.	Replacement of existing outfall and membrane process can be readily constructed.	Reliable and proven technology.	Relatively low-cost solution.	Membrane treatment will produce a treated wastewater quality suitable for non-potable reuse.	See Note 1 below
Comment: A membrane upgrade will provide additional pathogen and TSS removal with an overall improvement in treated wastewater quality delivered at an affordable cost.										
Option B Existing ponds & UV Incl TSS removal, extended outfall	Membrane treatment will provide additional pathogen removal (multi-barrier approach). Human health effects will be lower than existing discharge.	Improved treatment quality compared to existing		Improved dilution and dispersion may improve community perception. Some opposition from community to marine discharge.	Low energy treatment and conveyance system. Additional embodied and operational carbon associated with membrane treatment.	Membrane process can be readily constructed. New outfall difficult to construct in coastal area with high-currents. Further geotechnical investigation required to confirm construction methods for outfall.	Reliable and proven technology.	Relatively low-cost solution.	Membrane treatment will produce a treated wastewater quality suitable for non-potable reuse.	See Note 1 below
Comment: A membrane upgrade will provide additional pathogen and TSS removal with an overall improvement in treated wastewater quality delivered at an affordable cost. Extended outfall will provide greater dilution and dispersion of the discharge on the outgoing tide.										
Option C MBR	Membrane filtration and UV disinfection will produce a treated wastewater with minimal pathogens. Public health risk likely to be low.	Potential adverse due to low dilution and nutrient content – lessened due to nutrient removal.		Potential for adverse effects on amenity values and aesthetics in freshwater environment.	Carbon footprint higher	New discharge structure and new MBR process can be constructed. Further site investigations needed to determine site suitability for new tanks.	Reliable and proven technology.	High CAPEX & OPEX cost	Very-high quality treated wastewater suitable for non-potable reuse.	See Note 2 below
Comment: Discharged treated wastewater would end up in harbor with potential adverse effects on the water quality and ecology of the harbor. However, MBR + UV will provide a very high quality treated wastewater and a high degree of nutrient removal could be achieved.										
Option D	Low risk of public contact. WWTP	Disposal location		Need to consider community	Initial carbon footprint increase	Required confirmation of	DBI not common but	Moderate cost. Higher risk of	Potential for all year-round	See Note 3 below

	Key: Red – Largely fails to meet the criteria, Amber - Marginally meets the criteria, Green - Meets criteria well									
Treatment Process Option	**Public Health**	**Environment**	**Cultural**	**Social & Community**	**Sustainability**	**Constructability**	**Technology**	**Financial Implications**	**Opportunities and Benefits**	**Statutory Considerations**
Deep Bore Injection DBI at either (i) Okete Formation - marine migration (Wainui Reserve) Or (ii) Karioi Formation - marine migration	treatment to include disinfection. At the Okete Formation, loading rate to reduce risk of break out on beach	selected to avoid environmental effects.		perception of migration to coastal area. Potential for recreational issues in terms of community perception	associated with drilling	geology and soakage rates (In respect to the Okete formation thickness of basalt layer potentially a limiting factor)	example in NZ (Russell). Common oversees with numerous examples in Hawaii. .	cost increase depending on soakage rates (TBC).	disposal option.	
Comment: *Okete:* Carried forward due to potential location within Wainui Reserve, low public health risk and close location to WWTP. Karioi: Carried forward due to potentially favourable geology and low public health risk										
Option E Non- deficit irrigation (Year-round with seasonal storage)	Risk of spray drift but disinfection and buffer distances will mitigate this	Potential to promote nutrient migration but can be managed with appropriate land use		Generally, well thought of but land purchase and opposition from neighbours may be challenging	Generally sustainable but need to be careful not to displace key food production land. Potential carbon sink if trees utilised.	Moderate land requirement and may be challenges in obtaining access and pipeline route.	Common Technology. Treatment: Pond system and UV	Land purchase may be high cost. Irrigation construction and pipeline costs moderate. Large storage volume cost may be high.	Beneficial Reuse	See Note 4 below
Comment: Carried forward due to smaller land area (compared with other land treatment options) while not requiring a seasonal alternative disposal options.										
Option F Non-deficit irrigation with alternative disposal location	Risk of spray drift but disinfection and buffer distances will mitigate this	Potential to promote nutrient migration but can be managed with appropriate land use		Generally, well thought of but land purchase and opposition from neighbours may be challenging	Generally sustainable but need to be careful not to displace key food production land. Potential carbon sink if trees utilised	Smaller land requirement but may be challenges in obtaining access and pipeline route.	Common Technology. Treatment: Depends on alternative discharge	Land purchase may be moderate cost. Irrigation construction and pipeline costs moderate. Costs of supporting disposal pathway needs consideration.	Beneficial Reuse	See Note 5 below
Comment: Carried forward due to smaller land area (compared with other land treatment options). Feasibility depends on availability of suitable seasonal alternative disposal options.										

Individual engagement in Hapū is underway. Ability of traffic light scoring for the blank category will be determined in time, however simple 'bottom lines' of Hapū are well known given the history of marine outfall consenting. Re-use initiatives are favoured by Hapū. Option refinement that meets known bottom lines should enable project progression.

Option A

Discharge Location: Existing Outfall

Description

Presently, the Raglan WWTP consent allows discharges up to 2,600m³ of treated wastewater daily into the Whāingaroa harbour on outgoing tides. The existing treated wastewater outfall, which is simply an open-ended pipe without a diffuser (see figure below), was constructed in the late 1970s, and has remained in place since. Thus, it is beyond its useful life and requires replacement. Any future upgrade to the existing outfall would be fitted with a diffuser or duck-bill type arrangement to improve initial mixing of the discharged treated wastewater.

Location

The treated wastewater enters the Whāingaroa Harbour at a location close to the harbour mouth, marked on the aerial image below.

Treatment Option	Description
Existing ponds & UV	This is the existing process at Raglan WWTP. Wastewater is received at the inlet works, from where wastewater is piped to aerated ponds with aquamats installed. The pond wastewater discharges into a day pond for storage prior to discharge on the outgoing tide. From the day pond treated wastewater is pumped via an inline UV disinfection system to a discharge point near the mouth of the Whāingaroa (Raglan) Harbour.
Existing ponds & UV incl TSS removal	Additional TSS removal can be achieved via tertiary treatment using a membrane. Wastewater flows through membrane modules, allowing only smaller particles to pass through. Some pathogens are removed through the membrane by a filtration process, whilst UV disinfection would provide additional pathogen removal.
Convert pond to activated sludge & UV	Converting one or more of the current ponds to an activated sludge process will target the TSS, BOD and ammoniacal nitrogen parameters. Total nitrogen and phosphorus can also be targeted if required. A new clarifier would need to be installed.
New separate activated sludge plant & UV	Construction of a new purpose-built activated sludge plant at the existing location, which is a more resilient option than conversion of one of the existing ponds to the activated sludge process. A new clarifier would need to be installed.
MBR & UV	A membrane bioreactor is an activated sludge process which uses membranes instead of a clarifier to separate solids from the treated wastewater. Nitrogen and phosphorus can be removed from this process.
Existing ponds + fixed film process with clarification + UV	Utilising the same bacteria as activated sludge, a fixed film process (e.g. submerged aerated filter, trickling filter) uses biological material (biofilm) attached to media in a tank to treat the wastewater. A clarification step is also required to separate the solids that slough off the media. Fixed film processes could be used with the existing ponds, and will target BOD and ammoniacal nitrogen parameters.

Option B

Discharge Location: Extension of Existing Harbour Outfall into the Channel

Description

Presently, the Raglan WWTP has consent to discharge up to 2,600m³ of treated wastewater daily into the Whāingaroa Harbour on outgoing tides. The existing treated wastewater outfall could be optimised by extending it further into the channel, such that it is further from the harbour edge. This would lead to improved dispersion efficiency due to deeper water and stronger currents, and a reduction in likelihood of treated wastewater re-entering the harbour or being retained further around the coast due to eddying.

Any new discharge structure would be fitted with a diffuser or duck-bill type arrangement to improve initial mixing of the discharged treated wastewater. The new outfall could be either trenched or directionally drilled to depths between 2-4m at low tide depending on the nature of the bed material at the outfall site. Possible cross-sections are shown below.

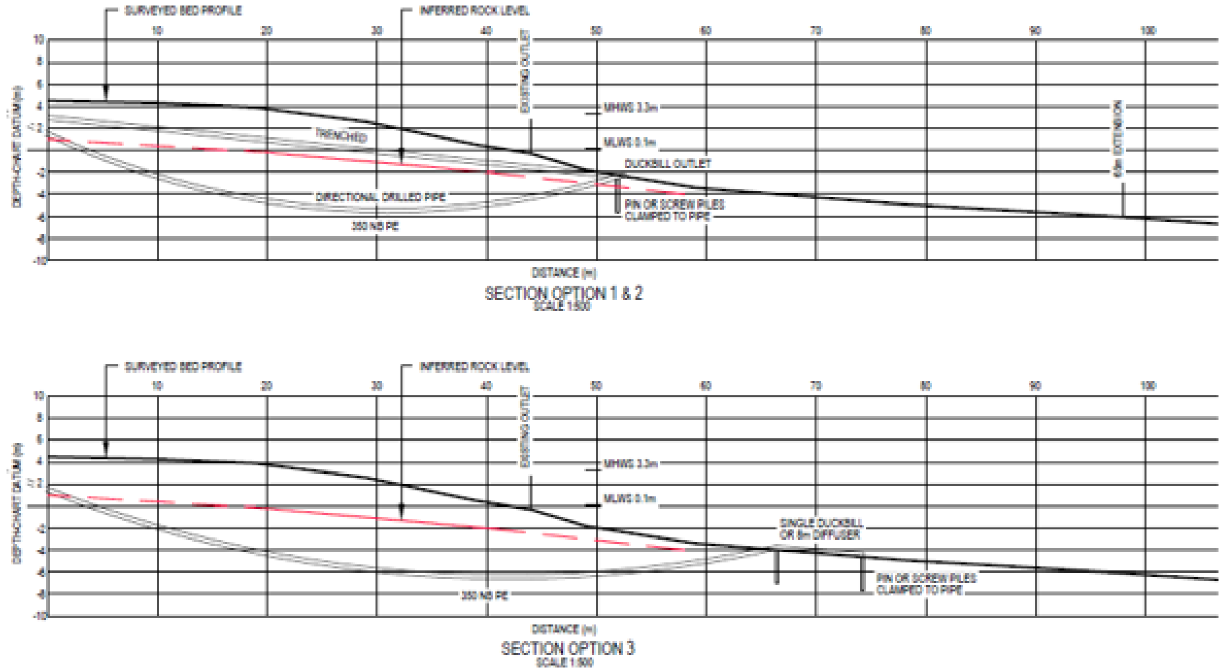


Figure 1: Cross-Sections for Potential Extended Outfall Options

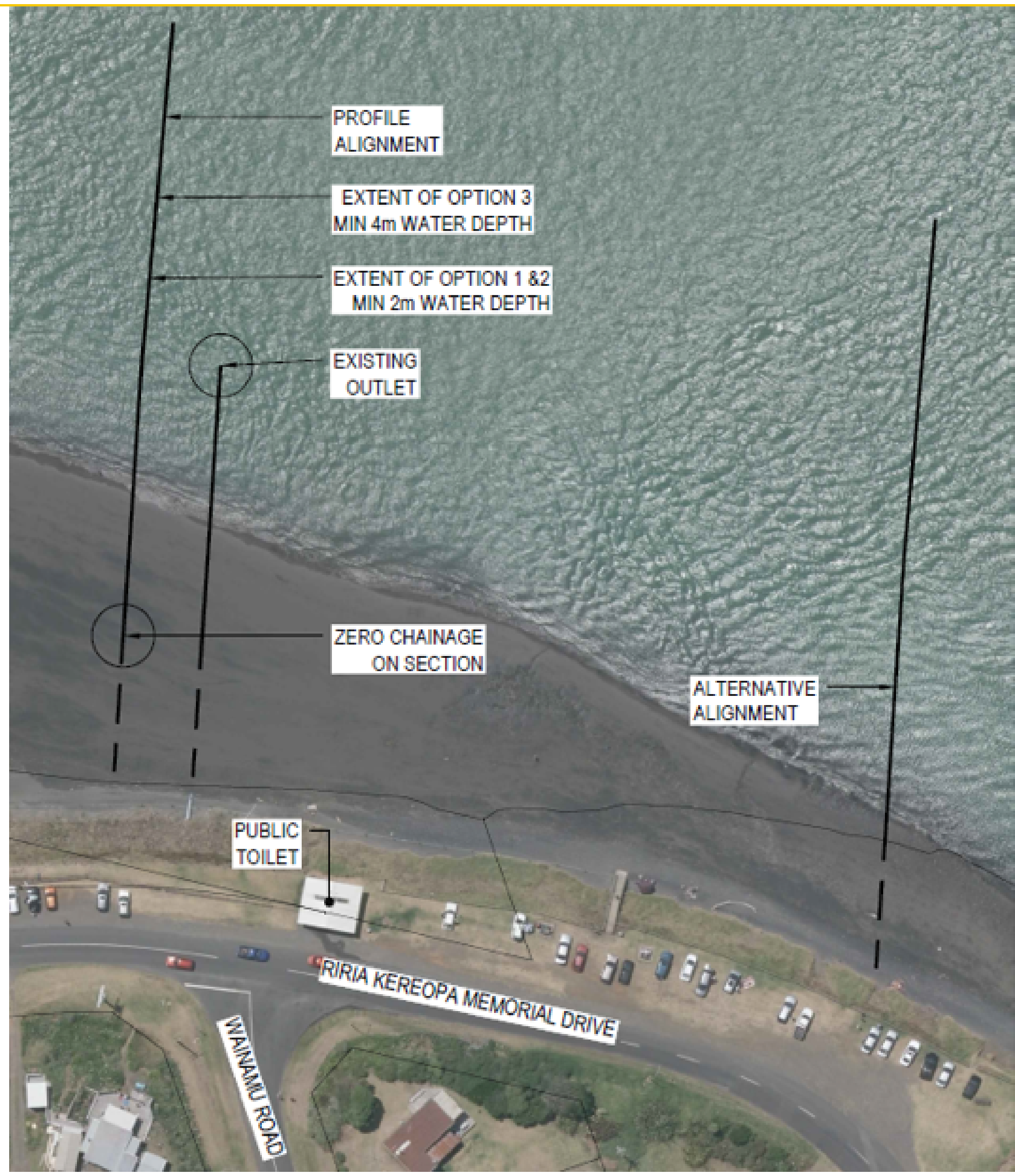


Figure 2: Extended Outfall Possible Location and Alternative Alignment Options

Given the high current speeds and semi-exposed nature of the outfall location to larger waves, constructing a longer outfall at this location would be challenging. Maintenance would also be an issue given the large changes in seabed levels from shifting sand. For these reasons relatively short outfall extensions are proposed.

Location

The treated wastewater enters the Whāingaroa Harbour at a location close to the harbour mouth, at a depth of between 2 and 4m (at low tide), marked on Figure 2.

Option C

Discharge Location: Freshwater Discharge – Stream Restoration

Description

Treated wastewater could be discharged via a local stream (either Wainui Stream or one of the tributaries that flow along the western border of the plant), where it will mix and then flow to the harbour. This option will require additional solids, nutrient and pathogen removal.

This discharge location is an opportunity for stream restoration. For example, habitat-enhancing planting and restoration techniques such as bank rehabilitation, riparian planting for shade and temperature buffering, and re-introduction of aquatic species could be employed alongside a high-quality treated wastewater discharge.

Potential locations in close proximity to the WWTP include the unnamed tributary that runs through the WWTP site and the Wainui Stream. The water quality of the Wainui Stream is expected to be high given the catchment has been subject to significant planting over several decades.

The water quality of the Unnamed Tributary is expected to be moderate given the upstream pastoral farming land use. The lower margins of both streams are anticipated to be whitebait spawning habitat.

Location

Key:

- Wainui Stream (red)
- Unnamed tributary (yellow)

Figure 1: Potential Stream Restoration Discharge Locations

Option D

Discharge Option: Deep Bore Injection

Description

Deep Bore Injection (DBI) is the purposeful injection of treated wastewater to the subsurface; whereby the intention is that the applied water ultimately permeates the subsurface and enters groundwater or an aquifer(s). The practice can harness an aquifer(s) storage, transmission/dissipation, and filtration properties whilst potentially providing water quality improvement benefits.

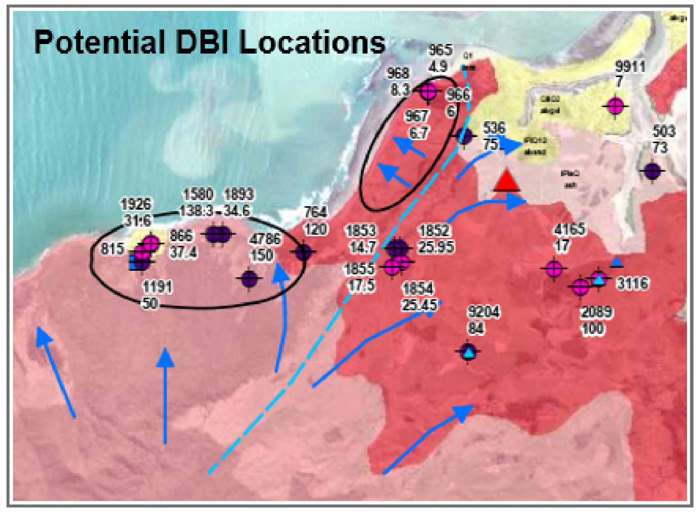
Treated wastewater would be injected into an array of deep bores that extend below groundwater level. The upper section of the borehole has a solid casing to contain the water while the lower section has a screen casing to discharge the treated wastewater into the subsurface where it disperses through fractures in the rock. The favourable volcanic geology of the Raglan area suggests that DBI may be a possible option for treated wastewater discharge.

Options for deep bore injection include two main geological options, based around injection into two different volcanic formations, being the older volcanic Okete Formation and the more recent volcanic Karioi Formation.

Location

The potential deep bore injection sites have been based around accessing the Karioi Formation or the Okete formation but vary depending on where the treated wastewater will ultimately migrate. In western areas, migration to the coastal marine environment is more likely.

It may be possible to inject into the Karioi or Okete Formations further east and south of Raglan, though ultimate migration of the injected wastewater via fresh water and harbour pathways needs to be considered.



DBI Option	Description
Okete Formation - marine migration (Wainui Reserve)	This incorporates injection into an older and thinner Okete volcanic layer, potentially accessed via the Wainui Reserve (public land). Positioning of the bores would likely be along the western extent of the reserve, spaced to promote even distribution. Migration of the injected treated wastewater would likely be westward, towards the coastal marine environment. Consideration would need to be given to mitigating potential break out on Ngarunui Beach. The existing wastewater treatment system, with membrane filtration tertiary treatment would likely be suitable for this option.
Karioi Formation - marine migration	This option would incorporate injection into the more recent Karioi volcanic layer, which is thicker than the Okete formation. The bore location would be at a suitable location near Manu Bay or Whale Bay, with migration of injected treated wastewater being north and north west, to the coast. The existing wastewater treatment system, with membrane filtration tertiary treatment would likely be suitable for this option.
Karioi/Okete Formation - freshwater/harbour migration	This option would incorporate deep bore injection into either the Okete or Karioi formations but at a location east of the coast, where injected treated wastewater would likely flow north to north east, potentially breaking out at surface water locations (freshwater) and migrating to the harbour. Consideration would need to be given to potential groundwater and surface water users. Additional wastewater treatment, potentially to a potable standard, including improved nutrient removal and tertiary membrane filtration and/or reverse osmosis would likely be required for this option.

Option E and F

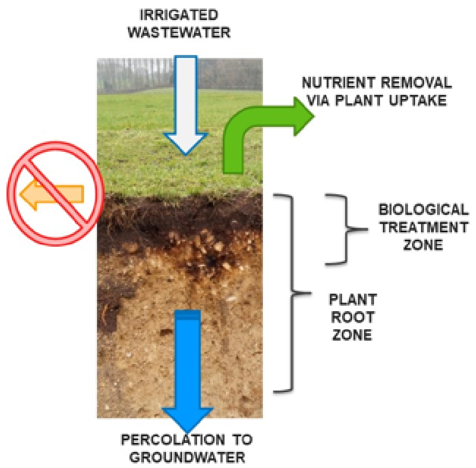
Discharge Option: Irrigation to Land

Description

Irrigation of treated wastewater to land provides an opportunity to not only utilise the wastewater as a water source and nutrient source for beneficial use on land but an opportunity to avoid, or reduce, the need for direct discharge of treated wastewater to surface water. Irrigation of treated wastewater to land, if managed at appropriate levels, can also provide for further treatment of the wastewater, reducing nutrients and pathogen migration to surface water.

Wastewater irrigation can be conducted at varying rates, depending on what the land use, soil type and receiving environment, can manage. Variations include:

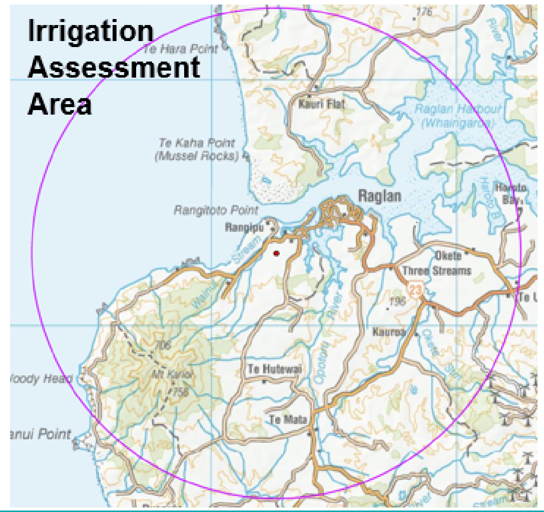
- Rapid infiltration (high rate).
- Non-deficit irrigation (irrigating in excess of soil moisture requirements).
- Deficit irrigation (only irrigating when soil moisture levels demand irrigation).



Location

Irrigation of treated wastewater can occur to suitable land within a reasonable conveyance distance from the wastewater treatment plant. Irrigation of treated wastewater traditionally occurs on well to moderately well drained soils, on rural type land. The soils need to be reasonably well drained to minimise the occurrence of saturated conditions or runoff. The irrigation site also needs to be on land that is away from receptors and on land that can be maintained or developed into a land use in keeping with irrigation, such as pasture or trees. Topography is also a key consideration as steep slopes can promote instability or runoff of the wastewater.

A GIS based assessment has been conducted to identify potentially suitable irrigation locations within a 10 km radius of the wastewater treatment plant.



Irrigation Options	Description
Rapid infiltration	This option would involve construction of a smaller footprint irrigation area over an area of highly permeable ground conditions. Topsoil layers are often removed and replaced with higher permeable gravels to improve infiltration rates. This option was considered previously in the Wainui Reserve and beach frontage (PDP 2001), however, it was considered that underlying geology may limit infiltration, requiring excessive infiltration areas. The existing wastewater treatment system may be suitable for this but with filtration also required.
Non-deficit irrigation (with seasonal storage)	Non-deficit irrigation would involve irrigation to land at slow rates (several mm per day on average) when soil conditions allow. Irrigation could occur when soil moisture levels are elevated (above field capacity) but not at risk of saturation. An indicative soil moisture model indicates that a non-deficit irrigation system at Raglan may require 110 ha to 140 ha of irrigable land but 150,000 m^3 of partial storage would be required during extended wet weather periods (winter months, May to September). The existing wastewater treatment system would likely be suitable for this option.
Close to deficit irrigation (with seasonal storage)	Deficit irrigation would incorporate irrigation of treated wastewater to land at slow rates (several mm per day on average) but generally only when soil moisture levels demand irrigation (below field capacity). When irrigation is not achievable under this scenario, wastewater is stored in a lagoon (likely 300,000 m^3 to 400,000 m^3) and then irrigated when soil conditions allow. This option would likely require an active irrigation area of 300 ha to 550 ha. Irrigation would likely occur from October to April and storage would likely occur from May to September. The existing wastewater treatment system would likely be suitable for this option.
Non-deficit irrigation with alternative disposal location	This non -deficit irrigation option would operate similar to the above non-deficit irrigation option, however, instead of storing treated wastewater during elevated soil moisture conditions, treated wastewater could be discharged via an alternative pathway during wet soil

1) Secondary Side-stream Re-use Options for Treated Wastewater (see biosolids sheet also)

	Key: Red – Largely fails to meet the criteria, Amber - Marginally meets the criteria, Green - Meets criteria well									
Treatment Process Option	**Public Health**	**Environment**	**Cultural**	**Social & Community**	**Sustainability**	**Constructability**	**Technology**	**Financial Implications**	**Opportunities and Benefits**	**Statutory Considerations**
Sub-Option X Existing ponds & UV Incl TSS removal	Higher quality treated wastewater – suitable for indirect potable re-use.	Potential adverse effects related to discharge into another environment.		Option unlikely to have any adverse amenity and aesthetic effects	Low energy treatment and conveyance system. Additional embodied and operational carbon associated with membrane treatment.	Membrane process can be readily constructed.	Reliable and proven technology.	Relatively low-cost solution.	Membrane treatment will produce a treated wastewater quality suitable for non-potable reuse.	Dependent on ultimate discharge environment – to be assessed as part of preferred wastewater scheme.
Comment: Treatment options involving tertiary filtration and UV disinfection (membrane upgrade) provide greater opportunities for beneficial reuse of treated wastewater.										
Sub- Option Y Existing ponds + use of sludge ponds as fish nursery (Raglan Eels proposal)	Treated wastewater quality not sufficient for beneficial reuse (from a human health perspective). .	Potential adverse effects related to discharge into another environment. However, offset by potential beneficial effects of providing native fish habitat.		Option unlikely to have any adverse amenity and aesthetic effects	Low energy treatment and conveyance system, very low additional embodied carbon.	Minimal new infrastructure.	Unproven technology – no other demonstration sites. Potential for a trial at the Raglan site.	Low cost solution.	Opportunities for beneficial reuse of treated wastewater. Some opportunity for beneficial reuse of biosolids.	Dependent on ultimate discharge environment – to be assessed as part of preferred wastewater scheme.
Comment: Raglan Eels proposal is not proven but could be trailed at a small scale, depending on how sludge storage lagoons are incorporated into wider options.										
Sub - Option Z MBR & UV	Higher quality treated wastewater – suitable for indirect potable re-use.	Potential adverse effects related to discharge into another environment.		Option unlikely to have any adverse amenity and aesthetic effects	Carbon footprint higher	New MBR process can be readily constructed. Further site investigations needed to determine site suitability for new tanks.	Reliable and proven technology.	Very high CAPEX & OPEX cost	Very-high quality treated wastewater suitable for non-potable reuse.	Dependent on ultimate discharge environment – to be assessed as part of preferred wastewater scheme.
Comment: Treatment options involving tertiary filtration and UV disinfection (membrane upgrade and MBR) provide greater opportunities for beneficial reuse of treated wastewater. MBR will provide additional nutrient removal.										

Option E and F

Treated Wastewater Reuse

Description

Treated wastewater could be reused for activities such as a plant nursery or golf course irrigation. Reuse treats wastewater as a resource, reducing the volume to be discharged elsewhere.

Improved treatment such as the addition of a tertiary membrane plant would be required to avoid public health impacts. Wastewater would not be suitable for stock or human potable uses, but would be suitable for a range of non-potable reuse options.

These options are likely to be sub-options of a wider wastewater treatment and discharge scheme.

Location

This would be dependent on the location of an activity that can accept significant volumes, or can provide year-round takes, of treated wastewater for use.

Examples of potential locations in and around Raglan are:

- Raglan Golf Club irrigation
- Boat wash at the boat ramp (with controls to limit risk of potable use)
- Irrigation to crops
- Use of existing storage ponds as a fish nursery (Raglan Eels proposal)

APPENDIX A

Project Objectives

The aim of the project is to identify the best practicable option to provide wastewater services for the Whāingaroa community. In doing this we aim to:

- Keep communities healthy
- Protect the environment, particularly the water quality and ecology of the Whāingaroa Harbour
- Recognise the significance of the Whāingaroa Harbour to mana whenua and support the kaitiaki management of customary fishing
- Protect the community use of the area, along with the visitor experience
- Work in partnership with the community and hapū
- Retain flexibility for future, sustainable, long-term solutions including potential reuse of treated wastewater
- Keep the overall costs of the wastewater solution to affordable levels

Long-List Assessment Criteria

Criteria	Issue/Topic	Description/Explanation
Public Health	Microbiological quality of treated wastewater	Risk of public exposure to waterborne pathogens through:
		- Direct contact with the conveyance or treatment process
		- Direct contact with the receiving environment, for example through contact recreation
		- Indirect exposure, through food gathering (such as shellfish, fish, watercress, etc) and groundwater use.
	Health effects from irrigation	Risk of public exposure to pathogens from irrigation.
	Treated wastewater re-use	Risk of contamination from treated water for non-potable re-use.
Environment	Water quality	Potential effects on freshwater (surface and ground) and coastal/marine receiving environments
	Aquatic ecology	Potential effects on aquatic ecosystems
	Terrestrial ecology	Potential effects on terrestrial ecosystems and soils
	Coastal environment and resources	Potential effects on significant coastal and marine areas, existing harbour and coastal processes, and physical footprint within the harbour and coastal marine area.
Cultural	Mauri	Potential effects on mauri of land, water and air
	Kai moana	Potential effects on kai moana and the kaitiaki management of customary fishing
	Cultural values	Potential effects on the relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu and other taonga
	Health and Wellbeing	Potential effects on the ability of the land, sea and air to support wairua in order to maintain health and wellbeing for Maori
Social and community	Amenity value and aesthetics	Potential effects on the natural and built environment (e.g. visual, odour, noise)
	Urban development	Extent to which the option enables residential and commercial development within the projected timeframe

Criteria	Issue/Topic	Description/Explanation
	Recreation	Extent to which the project enhances or detracts from local recreational activities and opportunities
	Food gathering	Extent to which the project enhances or detracts from people's ability to collect food within the area
	Access to the coast	Extent to which an option effects access to the coastal marine area
Sustainability	Carbon footprint	Potential embodied and operational carbon footprint
Constructability	Geology, soil, groundwater conditions	Option suited to local environmental conditions
	Land availability, accessibility	Adequate and secure land must be available for the required infrastructure, timescales that fit within project timing
	Existing infrastructure	Potential to maximise use of existing infrastructure that has a valuable remaining economic life, e.g. power supply, treatment plants, pumps, conveyance pipes and existing sites.
Technology	Reliable, proven and robust technology	To be sustainable, an option should be based on proven technology and have adequate redundancy (spare operational capacity to provide back-up in case of failure)
	Adaptable and flexible	Due to the uncertainty associated with future growth, a feasible option must be able to adapt to changing conditions such as increased flows and loads, discharge quality requirements, input requirements, and energy availability.
	Able to be staged	The extent to which an option could be staged (e.g. through modularised components).
	Operational and engineering resilience	The option must be sufficiently resilient to natural hazards and operational failure.
Financial Implications	Capital cost	Is the cost of the project appropriate for the project area and the population served?
	Operating and maintenance cost	Can the capital infrastructure be maintained and operated in a cost-effective manner?
	Whole of life cost	How do the whole of life costs pf the various options compare?
	Financial risk	Is the option affordable even if growth does not occur as predicted?
Opportunities and Benefits	Opportunity for resource recovery	The potential for beneficial reuse of treated wastewater.
		The potential for beneficial reuse of biosolids

APPENDIX B

Note 1: Further engagement with mana whenua required to assess consistency against Policy 23(2)(b)(ii) of the New Zealand Coastal Policy Statement 2010 (NZCPS). The upgraded existing treated wastewater discharge will be of a relatively high quality and adverse effects on ecosystems and habitats are likely to be avoided.

Note 2: Potential for adverse effects on freshwater quality. Further work required to assess consistency with the National Policy Statement for Freshwater Management 2014 (NPS-FM). Given discharge will flow to the coastal environment, further engagement with mana whenua required to assess consistency against Policy 23(2)(b)(ii) of the NZCPS.

Note 3: Potential for discharge to coastal waters if located in proximity to the coast. Further engagement with mana whenua required to assess consistency against Policy 23(2)(b)(ii) of the NZCPS. Unlikely to have significant adverse water quality effects on coastal waters.

Note 4: Potential for adverse effects on freshwater quality as a result of nutrient migration. Further work required to assess consistency with the NPS-FM. Given groundwater discharge will potentially flow to the coastal environment, further engagement with mana whenua required to assess consistency against Policy 23(2)(b)(ii) of the NZCPS.

Note 5: Potential for adverse effects on freshwater quality as a result of nutrient migration. Further work required to assess consistency with the NPS-FM. Other effects dependent on alternative disposal location, however given groundwater discharge will potentially flow to the coastal environment, further engagement with mana whenua required to assess consistency against Policy 23(2)(b)(ii) of the NZCPS.

Policy 23: Discharge of contaminants

In the "*New Zealand Coastal Policy Statement 2010*"

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1. In managing discharges to water in the coastal environment, have particular regard to:
   a. the sensitivity of the receiving environment;
   b. the nature of the contaminants to be discharged, the particular concentration of contaminants needed to achieve the required water quality in the receiving environment, and the risks if that concentration of contaminants is exceeded; and
   c. the capacity of the receiving environment to assimilate the contaminants; and:
   d. avoid significant adverse effects on ecosystems and habitats after reasonable mixing;
   e. use the smallest mixing zone necessary to achieve the required water quality in the receiving environment; and
   f. minimise adverse effects on the life-supporting capacity of water within a mixing zone.
2. In managing discharge of human sewage, do not allow:
   a. discharge of human sewage directly to water in the coastal environment without treatment; and
   b. the discharge of treated human sewage to water in the coastal environment, unless:
      i. there has been adequate consideration of alternative methods, sites and routes for undertaking the discharge; and
      ii. informed by an understanding of tangata whenua values and the effects on them.
3. Objectives, policies and rules in plans which provide for the discharge of treated human sewage into waters of the coastal environment must have been subject to early and meaningful consultation with tangata whenua.
4. In managing discharges of stormwater take steps to avoid adverse effects of stormwater discharge to water in the coastal environment, on a catchment by catchment basis, by: