Discharge Location: Freshwater Discharge – Stream Recharge

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

Figure 1: Potential Stream Restoration Discharge Locations

Treatment Option	Description
Existing ponds & UV	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 the stream discharge location.
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.

Options 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
	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.
	Re-use potential of option	Extent that treatment by-products can be utilised beneficially now and into the future (i.e. irrigation/nutrients for food production)
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 provision of beneficial reuse of treated wastewater. (i.e. with emphasis on food production)
		The potential for beneficial reuse of biosolids. (i.e. with emphasis on food production)
Statutory Considerations	Consistency of the option with National Policy Statements (NPS)	Includes consistency with the New Zealand National Coastal Policy Statement (NZCPS), National Policy Statement for Freshwater Management (NPS-FM) and any other relevant NPS

	Consistency of the option with any other relevant legislation outside of the Resource Management Act	Includes consistency with the Reserves Act, and any other relevant Act

Options Assessment

Treatment options for this discharge location are assessed based on the above criteria in the following table.

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	Comments	Carry forward to short list?
Existing ponds & UV	Likely adverse effects due to low dilution in small streams and subsequent effects on harbour water quality.	Potential adverse effects due to low dilution and nutrients adversely affecting harbour water quality.	Hapū have reiterated opposition to marine options and support for re-use options. Avoidance of adverse public health and environmental effects obviously aligns with hapū ethics. Any option with elevated risk wouldn't be supported.	Potential for adverse effects on amenity values and aesthetics in freshwater environment.	Low energy treatment and conveyance system, very low additional embodied carbon	Only new infrastructure is new conveyance and discharge structure.	Reliable and proven technology.	Low cost solution	Limited opportunities for beneficial reuse of treated wastewater. Some opportunity for beneficial reuse of biosolids.	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, the New Zealand Coastal Policy Statement 2010 (NZCPS) has relevance – see notes	Discharged treated wastewater would end up in harbour with potential adverse effects on the water quality and ecology of the harbour. Potential adverse effects related to pathogen and nutrient content of treated wastewater.	No
Existing ponds & UV Incl TSS removal	Membrane filtration and UV disinfection will produce a treated wastewater with minimal pathogens. Public	Potential adverse effects due to low dilution and nutrient content	Hapū have reiterated opposition to marine options and support for re-use options. Avoidance of adverse public health and environmental effects obviously aligns with hapū	Potential for adverse effects on amenity values and aesthetics in freshwater environment.	Low energy treatment and conveyance system. Additional embodied and operational carbon associated with	New conveyance, discharge structure 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.	Potential for adverse effects on freshwater quality. Further work required to assess consistency with the NPS-FM.	Discharged treated wastewater would end up in harbour with potential adverse effects on the water quality and ecology of the harbour.	No

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	Comments	Carry forward to short list?
	health risk likely to be low.		ethics. Any option with elevated risk wouldn't be supported.		membrane treatment.					Given discharge will flow to the coastal environment, the New Zealand Coastal Policy Statement 2010 (NZCPS) has relevance – see notes	Potential adverse effects related to nutrient content of treated wastewater.	
Convert pond to activated sludge & UV	Potential adverse effects due to low dilution in small streams and subsequent effects on harbour water quality.	Potential adverse due to low dilution and nutrient content – lessened due to nutrient removal.	Hapū have reiterated opposition to marine options and support for re-use options. Ability for the option to achieve these requirements would need to be presented. (i.e. incorporating Māori knowledge and principles/values to discharge methods) Avoidance of adverse public health and environmental effects obviously aligns with hapū ethics. Any option with elevated risk wouldn't be supported.	Potential for adverse effects on amenity values and aesthetics in freshwater environment.	Moderate energy requirements associated with activated sludge treatment process. Low embodied carbon as existing assets reused.	New discharge structure and conversion to activated sludge can be readily constructed. Further work re	Reuse of existing pond liner is a risk – potential leakage resulting from damaged liner.	Moderate cost option	Activated sludge and UV will produce a treated wastewater quality suitable for non-potable reuse. Possibly some form of tertiary filtration may be required.	Potential for adverse effects on freshwater quality. Further work required to assess consistency with the NPS-FM. Given discharge will flow to the coastal environment, the New Zealand Coastal Policy Statement 2010 (NZCPS) has relevance – see notes	Discharged treated wastewater would end up in harbour with potential adverse effects on the water quality and ecology of the harbour.	No

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	Comments	Carry forward to short list?
New separate activated sludge plant & UV	Potential adverse effects due to low dilution in small streams and subsequent effects on harbour water quality.	Potential adverse due to low dilution and nutrient content – lessened due to nutrient removal.	Hapū have reiterated opposition to marine options and support for re-use options. Ability for the option to achieve these requirements would need to be presented. (i.e. incorporating Māori knowledge and principles/values to discharge methods) Avoidance of adverse public health and environmental effects obviously aligns with hapū ethics. Any option with elevated risk wouldn't be supported.	Potential for adverse effects on amenity values and aesthetics in freshwater environment.	Moderate energy requirements associated with activated sludge treatment process. Moderate embodied carbon as new treatment assets required.	New discharge structure and new activated sludge process can be constructed. Further site investigations needed to determine site suitability for new tanks.	Reliable and proven technology.	High CAPEX & OPEX cost	Activated sludge and UV will produce a treated wastewater quality suitable for non-potable reuse. Possibly some form of tertiary filtration may be required.	Potential for adverse effects on freshwater quality. Further work required to assess consistency with the NPS-FM. Given discharge will flow to the coastal environment, the New Zealand Coastal Policy Statement 2010 (NZCPS) has relevance – see notes	Discharged treated wastewater would end up in harbour with potential adverse effects on the water quality and ecology of the harbour.	No
MBR	Membrane filtration and UV disinfection will produce a treated wastewater with minimal pathogens. Public health risk	Potential adverse due to low dilution and nutrient content – lessened due to nutrient removal.	Hapū have reiterated opposition to marine options and support for re-use options. Ability for the option to achieve these requirements would need to be presented. (i.e.	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.	Potential for adverse effects on freshwater quality. Further work required to assess consistency with the NPS-FM. Given discharge will	Discharged treated wastewater would end up in harbour with potential adverse effects on the water quality and ecology of the harbour.	**YES**

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	Comments	Carry forward to short list?
	likely to be low.		incorporating Māori knowledge and principles/values to discharge methods) Avoidance of adverse public health and environmental effects obviously aligns with hapū ethics. Any option with elevated risk wouldn't be supported.							flow to the coastal environment, the New Zealand Coastal Policy Statement 2010 (NZCPS) has relevance – see notes	However, MBR + UV will provide a very high quality treated wastewater and a high degree of nutrient removal could be achieved. Whenua (land)	
Fixed media process & UV	Potential adverse effects due to low dilution in small streams and subsequent effects on harbour water quality.	Potential adverse due to low dilution and nutrient content – lessened due to nutrient removal.	Hapū have reiterated opposition to marine options and support for re-use options. Ability for the option to achieve these requirements would need to be presented. (i.e. incorporating Māori knowledge and principles/values to discharge methods) Avoidance of adverse public health and	Potential for adverse effects on amenity values and aesthetics in freshwater environment	Carbon footprint higher	New discharge structure and new fixed media process can be constructed. Further site investigations needed to determine site suitability for new tanks.	Reliable and proven technology.	Moderate CAPEX & OPEX cost	Fixed media and UV will produce a treated wastewater quality suitable for non-potable reuse. Possibly some form of tertiary filtration may be required.	Potential for adverse effects on freshwater quality. Further work required to assess consistency with the NPS-FM. Given discharge will flow to the coastal environment, the New Zealand Coastal Policy Statement 2010 (NZCPS) has relevance – see notes.	Discharged treated wastewater would end up in harbour with potential adverse effects on the water quality and ecology of the harbour.	No

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	Comments	Carry forward to short list?
			environmental effects obviously aligns with hapū ethics. Any option with elevated risk wouldn't be supported.									
Notes In reference to Policy 23(2)(b)(ii) of the New Zealand Coastal Policy Statement 2010 (NZCPS), a clear understanding from Raglan tangata whenua after engagement is that the present treated wastewater marine discharge is offensive to their values, with a substantial adverse effect resulting. Any alternative discharge method that enables satisfactory whenua contact and re-use potential, should have in principle support.												