Discharge Location: New Ocean Outfall

Description

Treated wastewater would flow from the WWTP through an overland pipeline to an outfall structure in the open sea. The outfall structure would be at least 1.5 km offshore and be at a minimum depth of 10 m. The pipeline would be slightly longer than 1.5 km due to geographical obstacles. This discharge location would remove the flow from the harbour and may not require any additional treatment. The 10 m minimum water depth enables reasonable initial dilution, and the coastal location provides for efficient dispersal of treated wastewater beyond the initial dilution.

However, practical options for outfall construction in this location are limited by:

- The extensive rock based shallow shelf that extends seaward from the harbour entrance and results in a very wide surf zone
- The presence of the landfall of the international fibre-optic cables which restrict location options and construction procedures, and
- The popular Raglan surf breaks.

Location

The nearest appropriate and accessible location is likely to be approximately 1.5 km to the west of Ngarunui Beach (offshore); thus, the outfall will have a length of approximately 2.5 km from the current discharge location.

Figure 1: Potential New Outfall Location

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 new ocean outfall 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	Offshore location likely to provide greater dilution than existing discharge and lower human health effects.	Adverse effects on Whāingaroa Harbour likely to be minimised through offshore discharge location.	Hapū have reiterated opposition to marine options and support for re-use options.	In surfing, fishing, shellfish area, knowledge of discharge. Closer to surf breaks.	Moderate embodied and operational carbon footprint associated with long outfall.	Very difficult to construct in this environment. Shallow rock platform in surf zone makes construction very challenging and possibly unfeasible.	Ocean outfalls are well proven, however the high energy coastal environment will present challenges to maintaining the outfall in the long-term.	Very high CAPEX & OPEX cost	Limited opportunities for beneficial reuse of treated wastewater.	Policy 23(2)(b)(ii) of the New Zealand Coastal Policy Statement 2010 (NZCPS) has relevance -see notes below. Potential for adverse effects on protected surf breaks. Inconsistent with Policy 16 of NZCPS.	Very high energy coastal environment makes construction and operation of an offshore outfall very challenging. Assume that construction would be from WWTP across coastal area, shoreline, intertidal and shallow marine environment with breaking waves. Would require new pipeline and potentially upgrade for pumping. Will result in total removal of discharge from existing harbour entrance.	No
Existing ponds & UV Incl TSS removal	Membrane treatment will provide additional pathogen	Improved treatment quality compared to existing	Hapū have reiterated opposition to marine options	In surfing, fishing, shellfish area, knowledge of	Moderate embodied and operational carbon footprint	Very difficult to construct in this environment. Shallow rock platform in surf	Ocean outfalls are well proven, however the high energy coastal	Very high CAPEX & OPEX cost	Membrane treatment will produce a treated wastewater quality suitable	Policy 23(2)(b)(ii) of the New Zealand Coastal Policy Statement	Same comments as existing ponds & UV. Further treatment will provide a	No

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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?
	removal. Human health effects will be lower than existing discharge.		and support for re-use options.	discharge. Closer to surf breaks.	associated with long outfall.	zone makes construction very challenging and possibly unfeasible.	environment will present challenges to maintaining the outfall in the long-term. Membrane is proven technology.		for non-potable reuse. However, outfall will represent a sunk asset and reuse less likely to be implemented alongside this option.	2010 (NZCPS) has relevance -see notes below. Potential for adverse effects on protected surf breaks. Inconsistent with Policy 16 of NZCPS.	higher quality wastewater.	
Convert pond to activated sludge & UV	Activated sludge and UV will provide additional pathogen removal. Human health effects will be lower than the existing discharge.	Improved treatment quality compared to existing	Hapū have reiterated opposition to marine options and support for re-use options.	In surfing, fishing, shellfish area, knowledge of discharge. Closer to surf breaks.	Moderate embodied and operational carbon footprint associated with long outfall. Moderate energy requirements associated with activated sludge treatment process.	Very difficult to construct in this environment. Shallow rock platform in surf zone makes construction very challenging and possibly unfeasible.	Ocean outfalls are well proven, however the high energy coastal environment will present challenges to maintaining the outfall in the long-term. Activated sludge is proven technology.	Very high CAPEX & OPEX cost High energy environment	Activated sludge and UV will produce a treated wastewater quality suitable for non-potable reuse. Possibly some form of tertiary filtration may be required. However, outfall will represent a sunk asset and reuse less likely to be implemented alongside this option.	Policy 23(2)(b)(ii) of the New Zealand Coastal Policy Statement 2010 (NZCPS) has relevance -see notes below. Potential for adverse effects on protected surf breaks. Inconsistent with Policy 16 of NZCPS.	Same comments as existing ponds & UV. Further treatment will provide a higher quality wastewater.	No
New separate activated sludge plant & UV	Activated sludge and UV will provide additional pathogen removal. Human health effects will be lower	Improved treatment quality compared to existing	Hapū have reiterated opposition to marine options and support for re-use options.	In surfing, fishing, shellfish area, knowledge of discharge. Closer to surf breaks.	Moderate embodied and operational carbon footprint associated with long outfall. Moderate energy requirements	Very difficult to construct in this environment. Shallow rock platform in surf zone makes construction very challenging and possibly unfeasible.	Ocean outfalls are well proven, however the high energy coastal environment will present challenges to maintaining the outfall in the long-term.	Very high CAPEX & OPEX cost High energy environment	Activated sludge and UV will produce a treated wastewater quality suitable for non-potable reuse. Possibly some form of tertiary filtration may be required.	Policy 23(2)(b)(ii) of the New Zealand Coastal Policy Statement 2010 (NZCPS) has relevance -see notes below.	Same comments as existing ponds & UV. Further treatment will provide a higher quality wastewater.	No

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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?
	than the existing discharge.				associated with activated sludge treatment process.		Activated sludge is proven technology.		However, outfall will represent a sunk asset and reuse less likely to be implemented alongside this option.	Potential for adverse effects on protected surf breaks. Inconsistent with Policy 16 of NZCPS.		
MBR	MBR and UV will provide additional pathogen removal. Human health effects will be lower than the existing discharge.	Improved treatment quality compared to existing	Hapū have reiterated opposition to marine options and support for re-use options.	In surfing, fishing, shellfish area, knowledge of discharge. Closer to surf breaks.	Carbon footprint higher due to MBR operational energy requirements.	Very difficult to construct in this environment. Shallow rock platform in surf zone makes construction very challenging and possibly unfeasible.	Ocean outfalls are well proven, however the high energy coastal environment will present challenges to maintaining the outfall in the long-term. MBR is proven technology.	Very high CAPEX & OPEX cost High energy environment	MBR and UV will produce a treated wastewater quality suitable for non-potable reuse. Possibly some form of tertiary filtration may be required. However, outfall will represent a sunk asset and reuse less likely to be implemented alongside this option.	Policy 23(2)(b)(ii) of the New Zealand Coastal Policy Statement 2010 (NZCPS) has relevance -see notes below. Potential for adverse effects on protected surf breaks. Inconsistent with Policy 16 of NZCPS.	Same comments as existing ponds & UV. Further treatment will provide a higher quality wastewater.	No
Fixed media process & UV	Fixed media and UV will provide additional pathogen removal. Human health effects will be lower than the existing discharge.	Improved treatment quality compared to existing	Hapū have reiterated opposition to marine options and support for re-use options.	In surfing, fishing, shellfish area, knowledge of discharge. Closer to surf breaks.	Moderate embodied and operational carbon footprint associated with long outfall. Moderate energy requirements associated with fixed film	Very difficult to construct in this environment. Shallow rock platform in surf zone makes construction very challenging and possibly unfeasible.	Ocean outfalls are well proven, however the high energy coastal environment will present challenges to maintaining the outfall in the long-term. Fixed media is proven technology.	Very high CAPEX & OPEX cost High energy environment	Fixed media and UV will produce a treated wastewater quality suitable for non-potable reuse. Possibly some form of tertiary filtration may be required. However, outfall will represent a	Policy 23(2)(b)(ii) of the New Zealand Coastal Policy Statement 2010 (NZCPS) has relevance -see notes below. Inconsistent with Policy 16 of NZCPS. Potential for adverse effects	Same comments as existing ponds & UV. Further treatment will provide a higher quality wastewater.	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?
					treatment process.				sunk asset and reuse less likely to be implemented alongside this option.	on protected surf breaks. Inconsistent with Policy 16 of NZCPS.		

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.