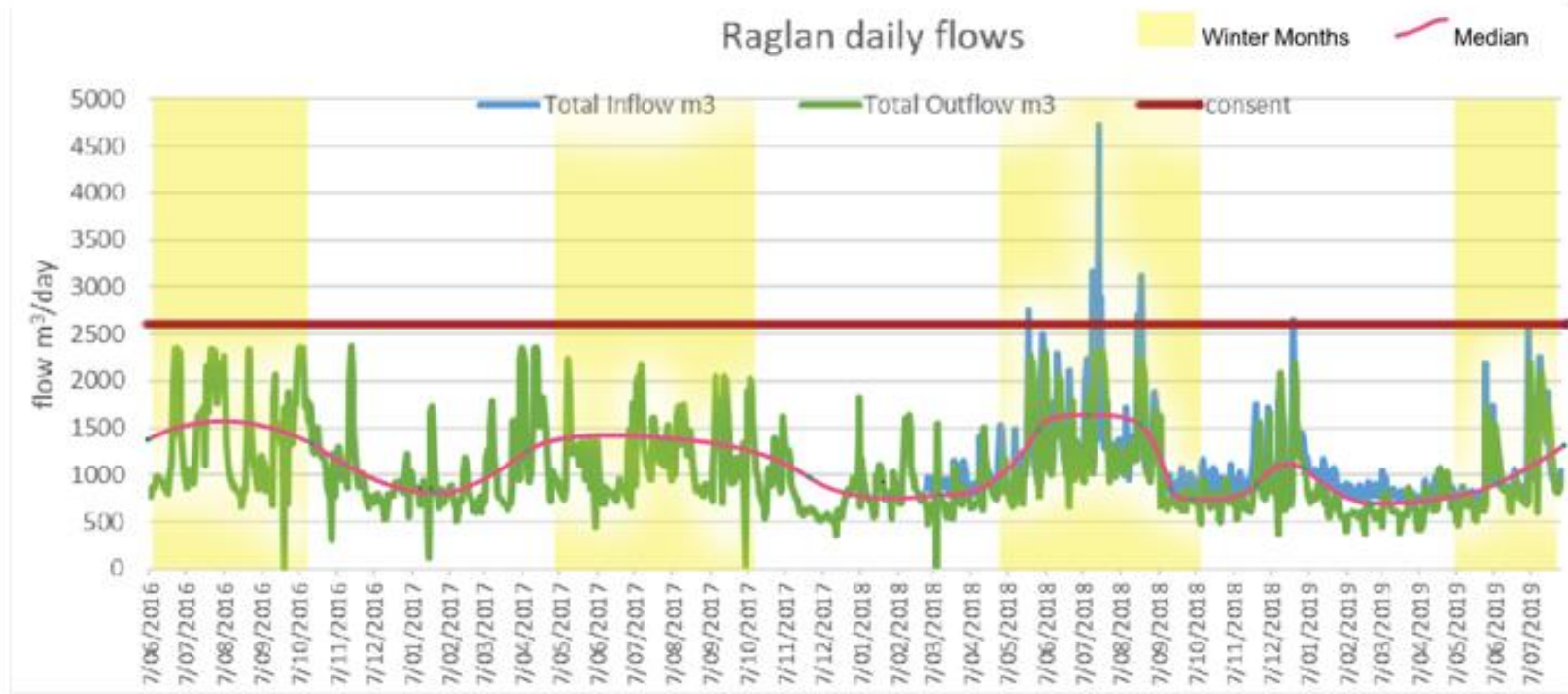


# Raglan Consent Application Project

## Quick Matters to Cover –

- Visualisation of Raglan treated WW flows;
- Lessening of volumes to reticulation principles (I&I)
- Land discharge/range of treatment process in a '101' manner;
- RMA application methodology needed

- Explaining WWTP flows

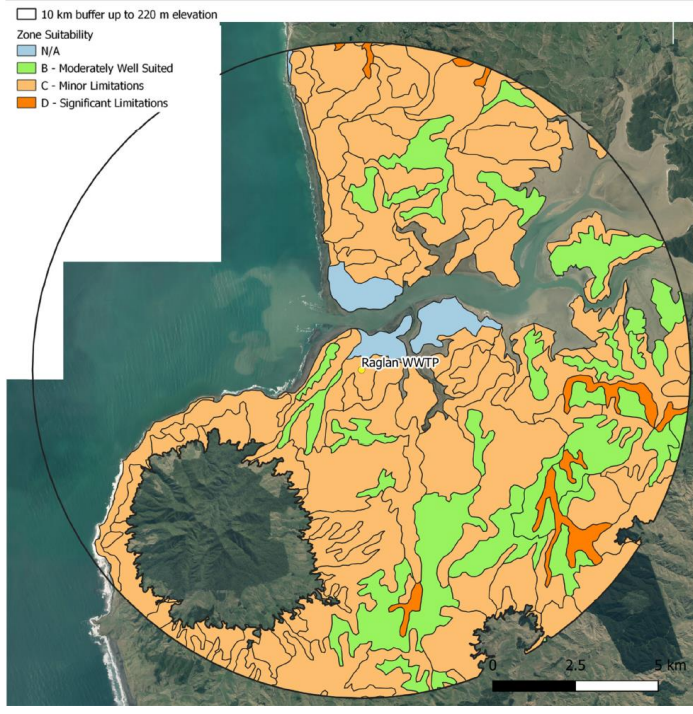


- **Visualising WWTP outflows**

- A Fonterra truck and trailer unit = 28,000L
- $1\text{m}^3/\text{day} = 1000\text{L}/\text{day}$
- An average day =  $1500\text{m}^3/\text{day}$ 
  - = 1,500,000L
  - = 54 tankers of treated wastewater



- Visualising WWTP outflows in respect to irrigation
- Raglan land suitability classification has been established;
- Parameters to consider with classification and establishment of land needs include
  - Soil attributes (slope, stability, drainage, permeability, restrictions-root growth);
  - Hydrological attributes (avoiding flood areas, riparian buffer allowance)
  - Capability/suitability for nutrient uptake potential (nutrient uptake potential)



| Zone | Description and Design Considerations   | Area (ha) | % Investigat ion Area |
|------|---|-----------|-----------------------|
| A    | Well Suited (high rate 5-20 mm/d, year round)                                 | 0         | 0                     |
| B    | Moderately Well Suited (low to moderate rate 0.8-1.2 mm/d, most of year)      | 3,462     | 19                    |
| C    | Minor Limitations (low rate 0.5-0.8 mm/d, seasonal application)               | 13,485    | 75                    |
| D    | Significant Limitations (low rate 0.3-0.5 mm/d, limited seasonal application) | 389       | 2                     |
| E    | Severe Limitations (no or minimal application recommended)                    | 0         | 0                     |
| N/A  | Town, River and Lakes   | 535       | 3                     |

| Zone         | Description and Design Considerations                                    | Area (ha) | % Investigat ion Area |
|--------------|--|-----------|-----------------------|
| <b>Total</b> | Total land within a 10 km radius of the Raglan WWTP below 300m elevation | 17,871    | 100                   |



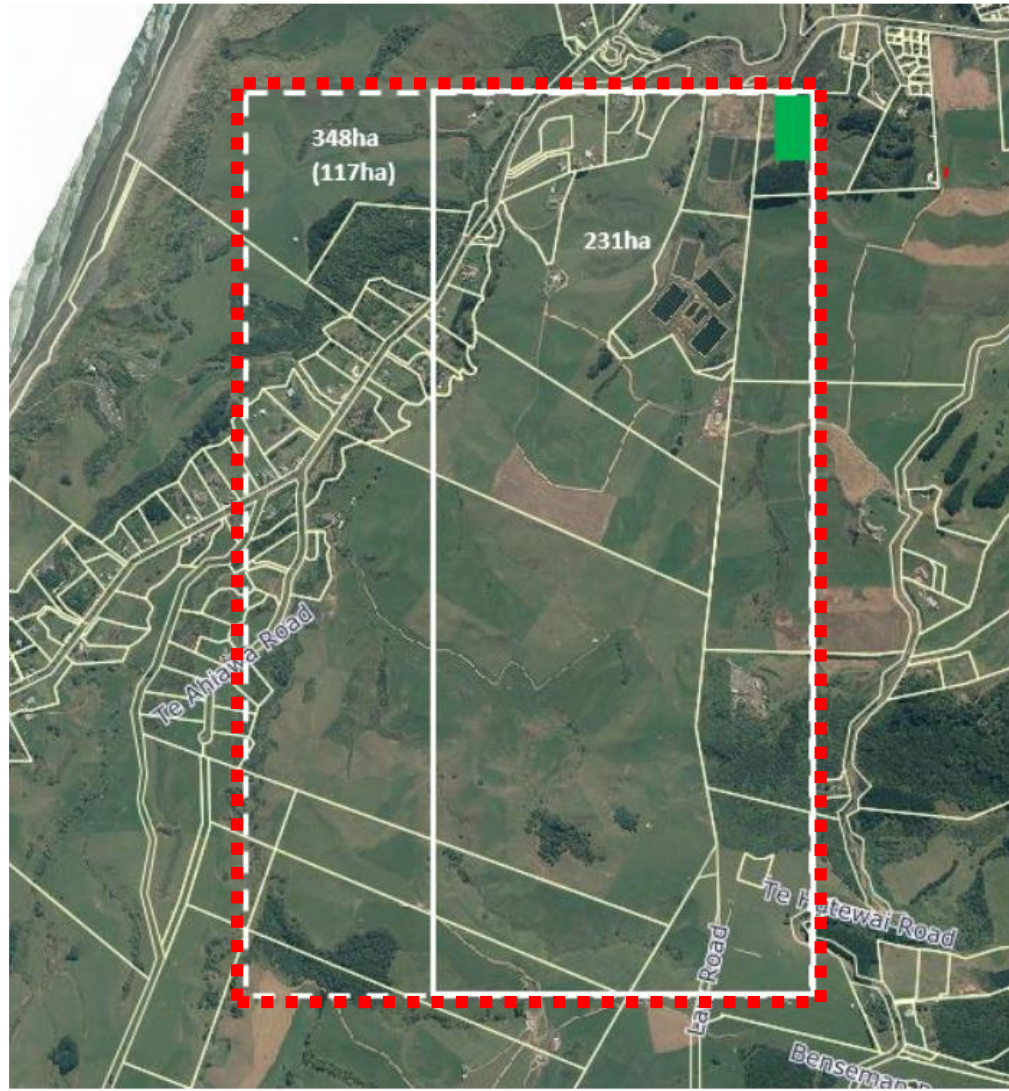
# • Visualising WWTP outflows in respect to irrigation

- Deficit irrigation occurs during drier periods (non-saturated soil);
- Non-deficit irrigation occurs during wetter periods (irrigating in excess of soil moisture requirement);
- A 100% yearly land-based solution for Raglan Zone C areas (non-deficit) is understood to require the following irrigable areas based on 2019 studies. Winter storage lessens irrigation area:
  - **231ha** for 2020 flows (2.31km<sup>2</sup>), increasing to
  - **348ha** for projected 2048 flows (3.48km<sup>2</sup>).
- 1 ha = 10000m<sup>2</sup> = 0.01km<sup>2</sup>, where a rugby field is 10080m<sup>2</sup> (144m x 70m) – this provides a scale comparison.



- Visualising WWTP outflows in respect to irrigation

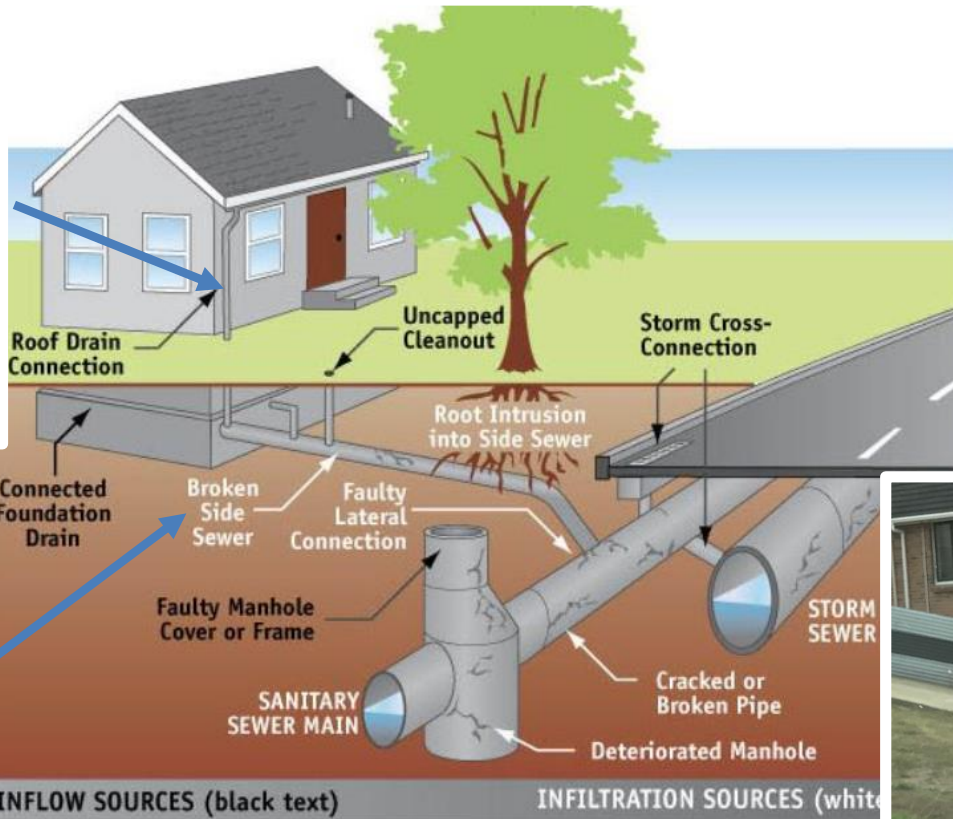
- Zone C





# • Inflow and Infiltration

- Images highlight issues, and resolution also



Raising gully traps (above)  
Replacing broken pipes (below)



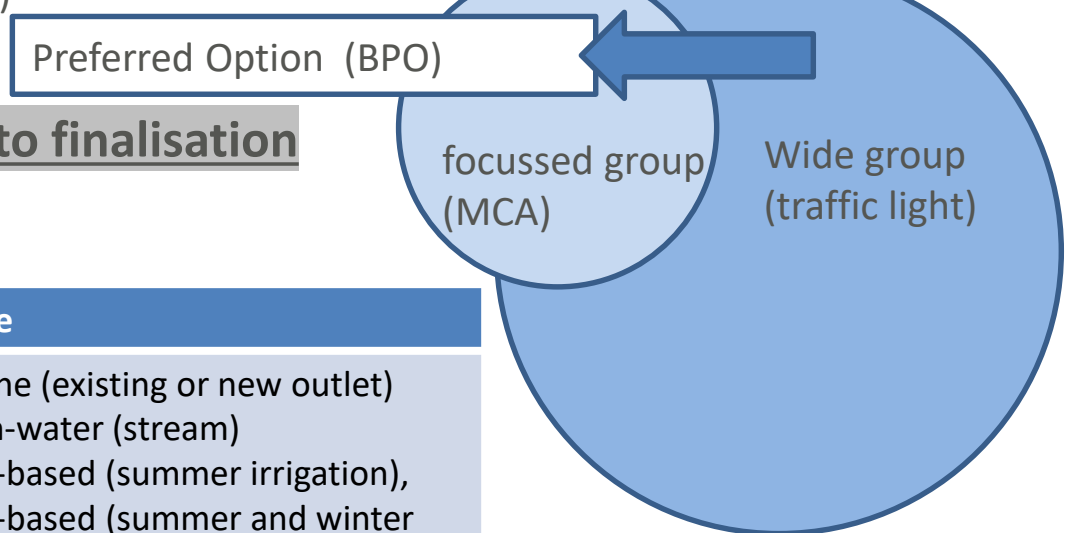
# • Application Methodology

- Theoretic and realistic discharge and treatment scenarios are shown in the table below
- There are 48 methods within this widened group, which is to be narrowed down to a focussed group (five options) by way of a traffic light system that:
  - Balances categories against project goals (i.e. cultural/community categories considered show 'red' for any marine option – which is a clear position received from all)
- This allows concentrated investigation toward project goals, where a preferred option that is the best practical option (BPO) (RMA terms)

## • Stakeholder and Iwi Action

### Review of Draft Analysis prior to finalisation

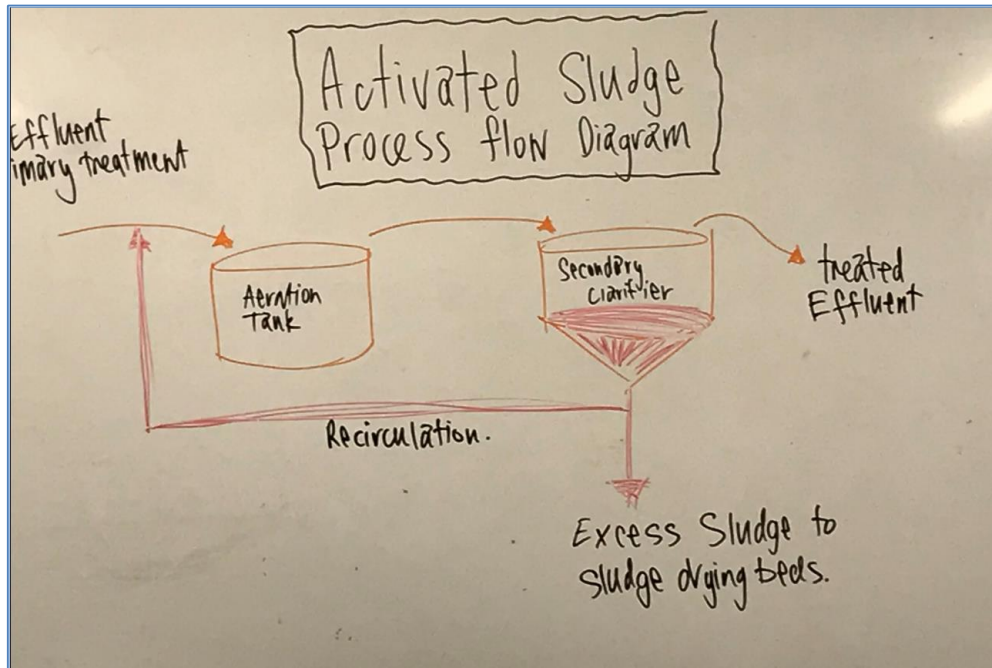
(April)



| Treatment   | Discharge   |
|---|---|
| <ul style="list-style-type: none"> <li>• Existing ponds &amp; UV</li> <li>• Existing Ponds &amp; UV &amp; TSS removal</li> <li>• Pond Conversion to activated sludge and UV</li> <li>• Membrane Bioreactor (MBR)</li> <li>• Fixed media process &amp; UV</li> </ul> | <ul style="list-style-type: none"> <li>• Marine (existing or new outlet)</li> <li>• Fresh-water (stream)</li> <li>• Land-based (summer irrigation),</li> <li>• Land-based (summer and winter irrigation),</li> <li>• In-ground (Deep bore injection)</li> <li>• Sub options (non-potable re-use)</li> </ul> |



# • Treatment processes '101'



## Activated sludge

From Wikipedia, the free encyclopedia

The **activated sludge** process is a type of [wastewater treatment](#) process for treating [sewage](#) or [industrial wastewaters](#) using [aeration](#) and a biological [floc](#) composed of bacteria and [protozoa](#).

The general arrangement of an activated sludge process for removing carbonaceous pollution includes the following items: An aeration tank where air (or oxygen) is injected in the mixed liquor. This is followed by a settling tank (usually referred to as "final clarifier" or "secondary settling tank") to allow the biological flocs (the sludge blanket) to settle, thus separating the biological sludge from the clear treated water.

## Sequencing batch reactor

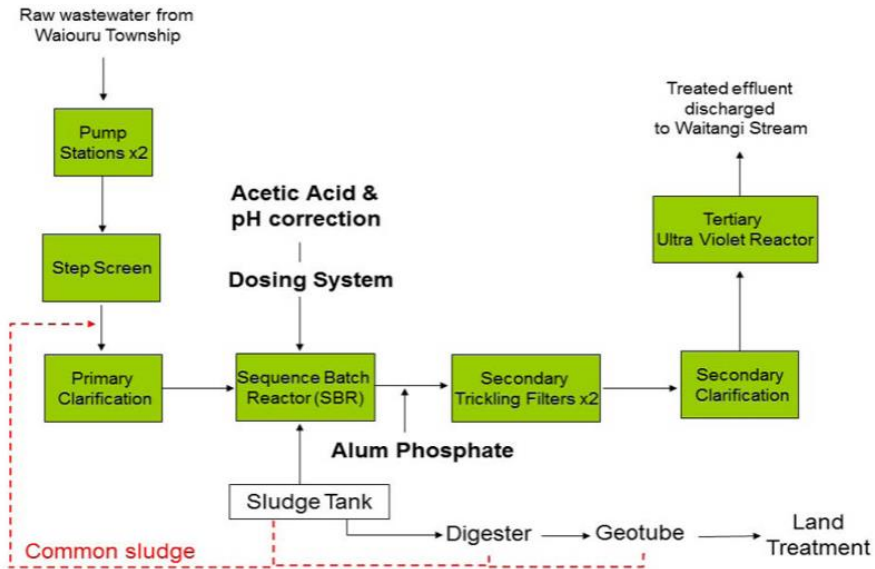
From Wikipedia, the free encyclopedia

**Sequencing batch reactors (SBR)** or **sequential batch reactors** are a type of [activated sludge](#) process for the [treatment of wastewater](#). SBR reactors treat wastewater such as [sewage](#) or output from [anaerobic digesters](#) or [mechanical biological treatment](#) facilities in batches. Oxygen is bubbled through the mixture of wastewater and activated sludge to reduce the organic matter (measured as [biochemical oxygen demand \(BOD\)](#) and [chemical oxygen demand \(COD\)](#)). The treated effluent may be suitable for discharge to surface waters or possibly for use on land.



WIKIPEDIA  
The Free Encyclopedia

### Waiouru Wastewater Schematic



# • Treatment processes '101'



WIKIPEDIA  
The Free Encyclopedia

## Membrane bioreactor

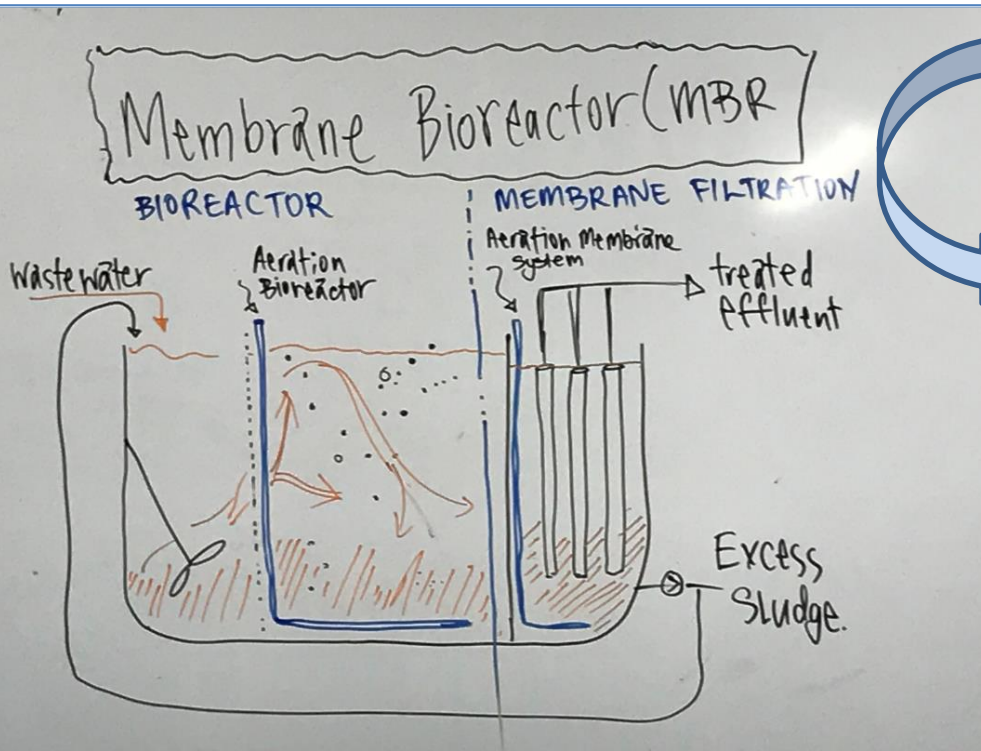
From Wikipedia, the free encyclopedia

**Membrane bioreactor (MBR)** is the combination of a [membrane process](#) like [microfiltration](#) or [ultrafiltration](#) with a biological [wastewater treatment](#) process, the [activated sludge](#) process. It is now widely used for [municipal](#) and [industrial wastewater treatment](#).<sup>[1]</sup>

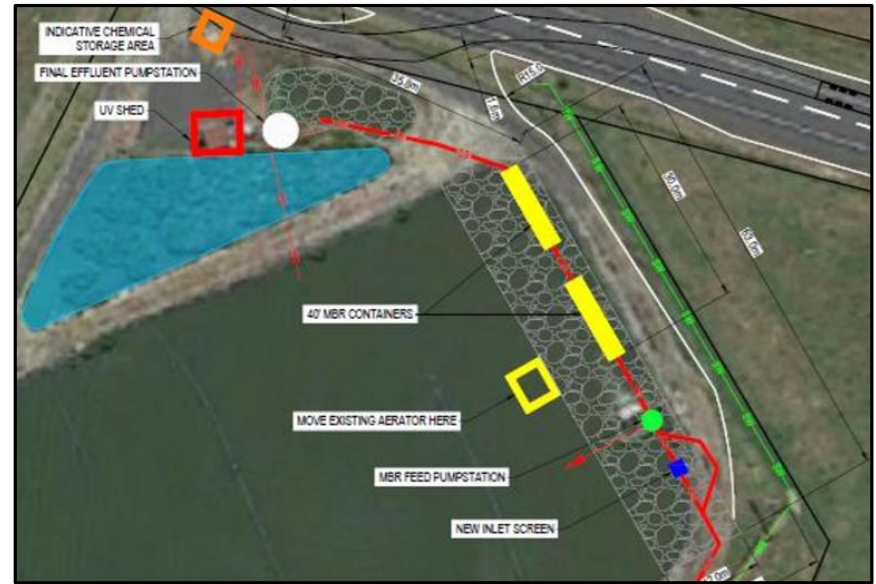
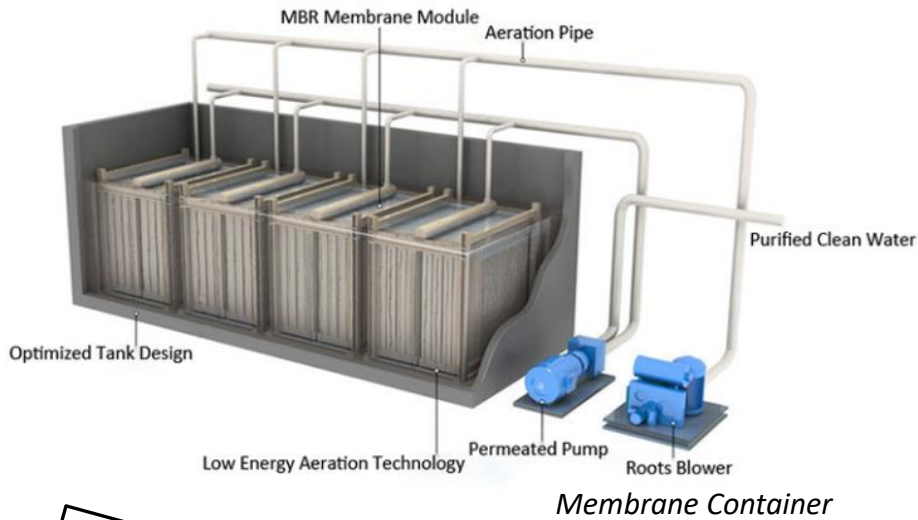
## Microfiltration

From Wikipedia, the free encyclopedia

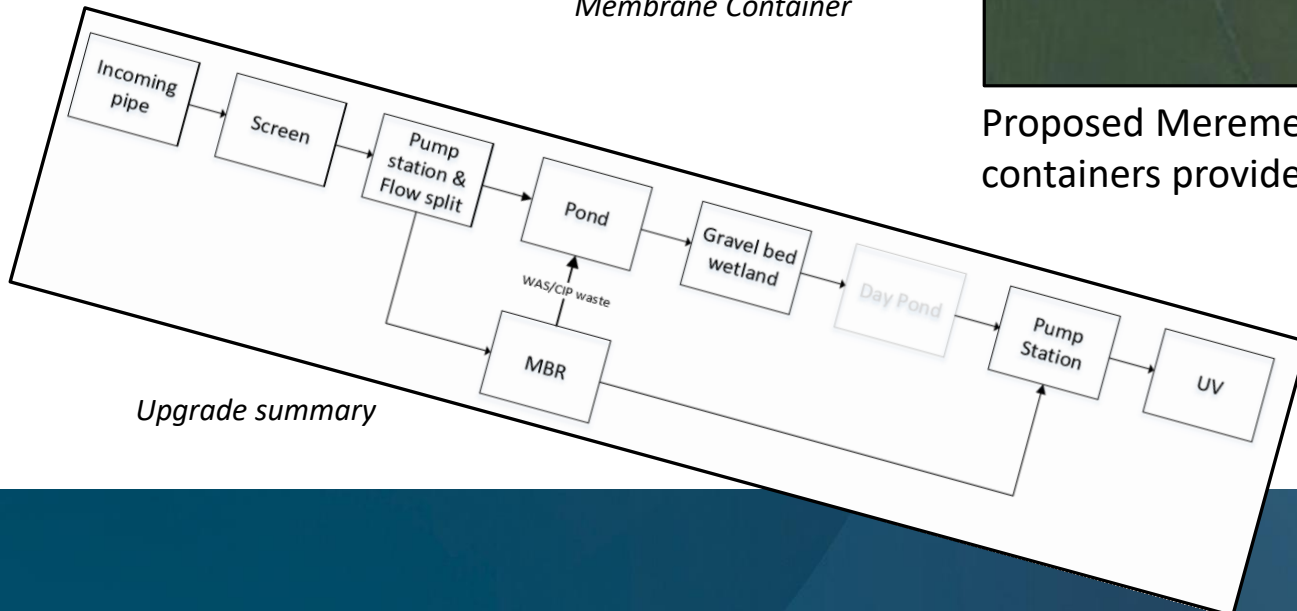
**Microfiltration** is a type of physical [filtration](#) process where a contaminated fluid is passed through a special [pore-sized](#) membrane to separate [microorganisms](#) and suspended particles from process [liquid](#). It is commonly used in conjunction with various other separation processes such as [ultrafiltration](#) and [reverse osmosis](#) to provide a product stream which is free of undesired [contaminants](#).







Proposed Meremere Solution (note: Dual containers provide MBR treatment up to 250m<sup>3</sup>/d)



- More Information on waste water treatment in New Zealand



<https://www.waternz.org.nz/WWTPInventory>

The above link provides national data on how community wastewater is treated and discharged; Comparison may be useful in better understanding consented solutions in operation elsewhere

- Where we are at

| Task                            | April | May | June | July | August | September | October | November |
|---------------------------------|-------|-----|------|------|--------|-----------|---------|----------|
| Long-list assessment            | █     |     |      |      |        |           |         |          |
| Short-list assessment           | █     | █   | █    | █    |        |           |         |          |
| Best Practical Option confirmed |       |     |      |      | █      | █         |         |          |
| Water/Air/Pond Seepage          |       |     |      |      |        |           | █       |          |
| Completing AEE and Application  |       |     |      |      |        | █         | █       | █        |
| Lodge Consents                  |       |     |      |      |        |           | █       | █        |