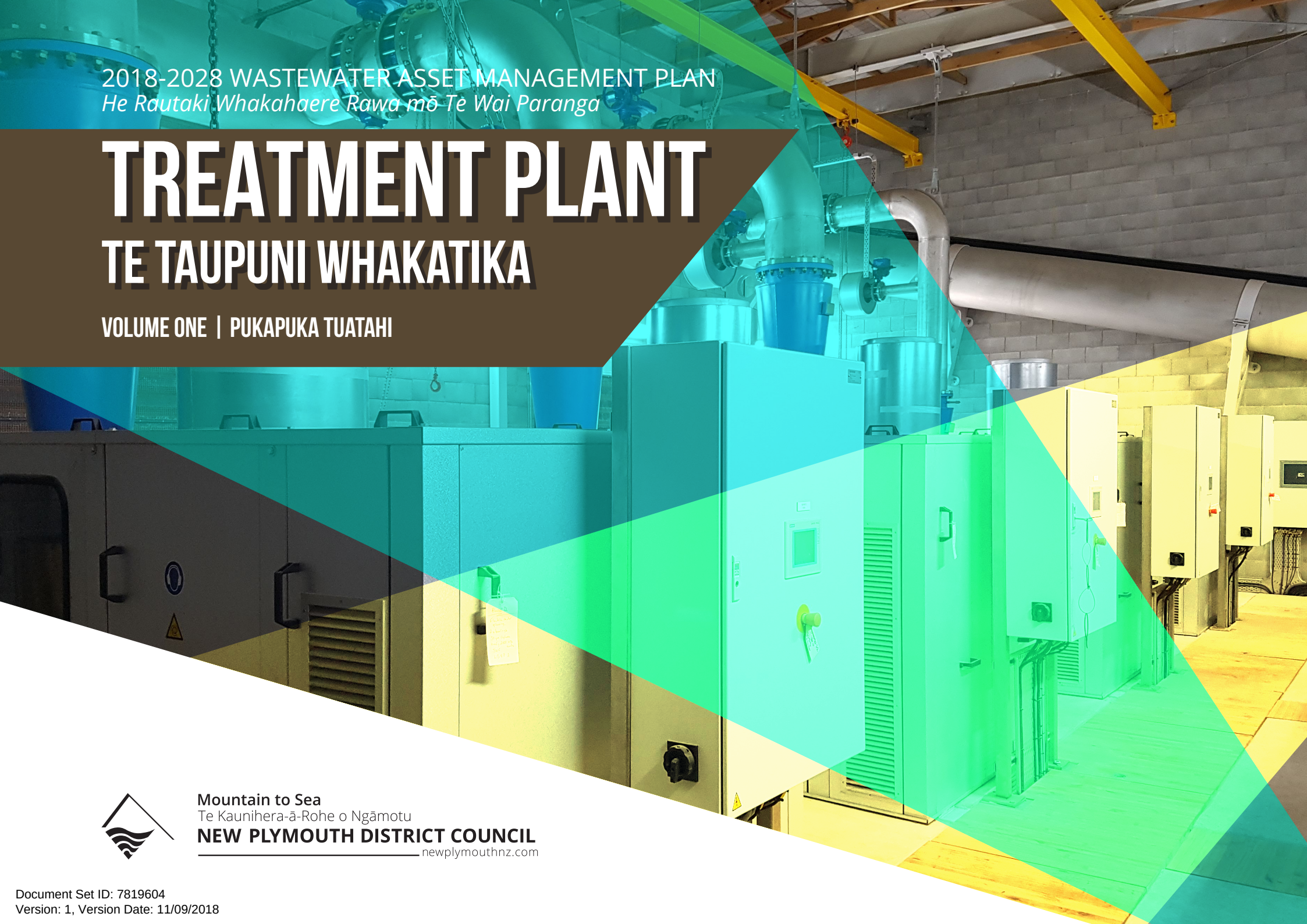
2018-2028 WASTEWATER ASSET MANAGEMENT PLAN
*He Rautaki Whakahaere Rawa mō Te Wai Paranga*

# TREATMENT PLANT
## TE TAUPUNI WHAKATIKA

### VOLUME ONE | PUKAPUKA TUATAHI



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Te Kaunihera-ā-Rohe o Ngāmotu
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# DOCUMENT CONTROL

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|---|---|
| Document Name | 2018-2028 Wastewater Asset Management Plan<br>Volume 1 - Treatment Plant |
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## August 2018

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# 1. INTRODUCTION



This volume provides details of the asset lifecycle management for the **Treatment Plant** asset category of the Wastewater AMP. The framework and key elements of the overall asset management plan are outlined in Table 1.

**Table 1 Asset management document structure**

| No. | Document Name | Key Document Contents |
|---|---|---|
| 1 | Long Term Plan (LTP) | Infrastructure Strategy<br>• Strategic Framework<br>• Guiding Themes<br>• High Level Information for Each Asset Class<br>Council Services<br>• High Level Information<br>• Levels of Service<br>• Financial Plan |
| 2 | Asset Management Strategy | General Asset Management Principles and Overview |
| 3 | Asset Class General Volumes | General Information and Glossary about each asset class<br>• Executive Summary<br>• Introduction<br>• Levels of Service<br>• Future Demand<br>• Risk Management Plan<br>• Financial Summary<br>• Plan Improvement and Monitoring |
| 4 | Asset Category Lifecycle Management Volumes | Asset Life Cycle Management for each asset category within each asset class<br>• Description<br>• Condition<br>• Remaining Lives<br>• Valuation<br>• Operations & Maintenance<br>• Renewals<br>• Acquisition and Augmentation<br>• Disposals<br>• Annual Work Plan<br>• Risk Management<br>• Financial Summary<br>• Improvement Plan |

## Purpose and key issues

We operate the New Plymouth Wastewater Treatment Plant (WWTP) to protect public health and minimise adverse effects of wastewater on the environment. Our 2008 Wastewater Bylaw (part 14) covers wastewater treatment. The discharge of industrial effluent into the public wastewater system is regulated by the Trade Wastes Bylaw 2008 (part 11).

The WWTP system uses mechanical, biological and chemical processes to remove harmful constituents from wastewater before discharging the treated liquid portion (effluent) to the sea via our outfalls. Discharge of treated effluent to the sea is regulated by conditions in the specific resource consents, ensuring water quality is at accepted environmental levels.

Wastewater solids from mechanical screening plant are disposed of to landfill. Activated sludge solids produced from the bioreactors are mechanically dewatered, thermally dried and sold as the fertiliser Bioboost ® through a private distributer Bioboost Ltd.

The key issues in relation to the WWTP are:

- Capacity – with regard to population and industrial growth and maximum capacity of the WWTP.
- Compliance – in relation to environmental impact and minimising the impact of overflows.
- Biological and Chemical Oxygen Demands – with regard to capacity to process waste given the changing and growing demand.
- Dewatering and drying capacity for wastewater solids.
- Biosolids specifications - to meet pathogen and vector attraction specifications.
- Controlling contaminants entering the plant through Trade Waste bylaws enforcement.

Our operators continually monitor the effluent quality to ensure that both public health and the environment are protected.

## Levels of Service

The levels of service for the WWTP are mainly determined by the requirements of resource consents for discharge from our wastewater systems, biosolids specifications and by the demand on the system caused by population growth.

The WWTP supports keeping customers satisfied with our wastewater service and the community expectation that we will manage wastewater discharges to comply with all resource consent conditions. Also producing a high quality biosolid Bioboost ® that meets product specifications.

## Future Demand

Over recent years a number of projects have been completed to ensure the capacity of the wastewater network and its components is sufficient to meet future demand forecasts. An Upgrade Master Plan was published in 2010 and since then the following major works have been completed, aimed at meeting forecast capacity through to 2040:

- Completion of the Waitara to New Plymouth sewage transfer pipeline and reconfiguration of the Waitara WWTP to a pump station.
- Upgrade of the aeration process capacity at NPWWTP.
- Installation of new improved sludge thickening facilities.
- Installation of new inlet works to be commissioned in 2018/19.

Over the period of this AMP we plan to conduct further studies of potential future growth to ascertain system capacity limits and produce a Wastewater Master Plan.

**Note:** All financial forecasts are shown in inflation adjusted dollar values.

## 2.1 Asset Description

### 2.1.1 General

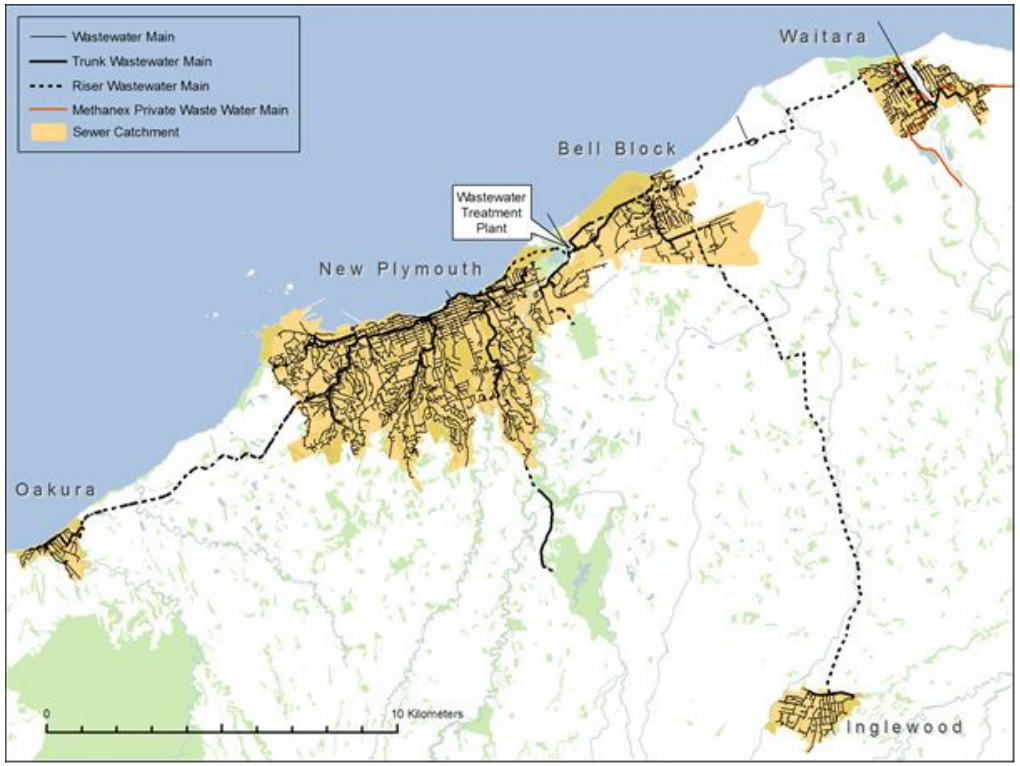
We own and operate the WWTP in New Plymouth (NPWWTP), which treats raw wastewater prior to discharge of the treated liquid effluent to the sea. We also own two outfall lines at New Plymouth and Waitara and oxidation ponds at Inglewood. The Waitara outfall was associated with the former Waitara wastewater treatment plant, which was modified to a pump station and trunk main in 2013. Wastewater from Waitara is now pumped to the NPWWTP. The location of the NPWWTP is shown in Figure 1.

We treat and dry the solid component of NPWWTP wastewater to produce a biosolids fertiliser Bioboost ®. Biosolids are high in nutrients, such as nitrogen and phosphorus, and in New Plymouth's case can be used safely as a general fertiliser.

Our current resouce consents allowing discharge into sea or water courses are detailed at:
https://intranet/sites/Projects/Infrastructure/Quality/Lists/Resource%20Consents/AllItems.aspx

The accuracy of data presented in this AMP has been assessed and graded in accordance with Section 5 of the Asset Management Strategy.

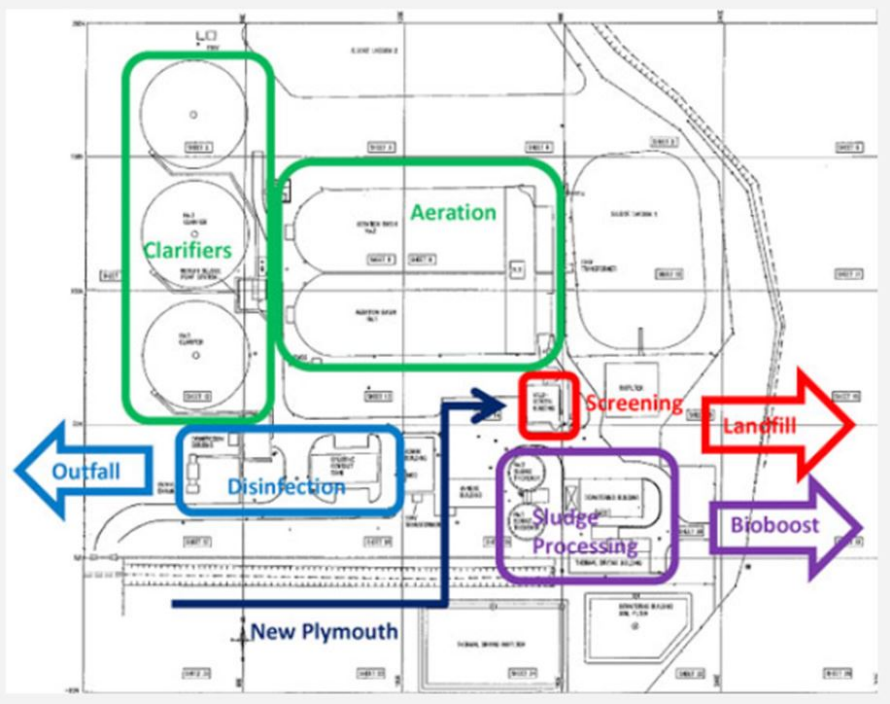
**Figure 1 Location of waste water treatment plant**



### 2.1.2 New Plymouth Wastewater Treatment Plant

The general layout and main process components of the NPWWTP are shown in Figure 2.

**Figure 2 NPWWTP process diagram**




The NPWWTP has the following characteristics:

- Located in the eastern area of New Plymouth, on the lower Waiwhakaiho River Basin.
- Takes raw sewage and trade wastes from New Plymouth City, Bell Block, Inglewood, Waitara and Oakura.
- Treats an average of 25 million litres of wastewater daily.
- Uses a biological treatment process known as activated sludge aeration to produce a high quality effluent.
- Discharges clean effluent to the Tasman Sea via a 480m ocean outfall.
- Dries the sludge (solid) component thermally to produce a fertiliser called 'Bioboost'.

## Asset Capacity/Performance

The original plant was designed for a peak flow of 840 l/s. Following the aeration upgrade in 2015 we anticipate the plant has capacity to sustain growth through to 2040, with a predicted future peak instantaneous flow of 1,220 l/s in 2025.

A significant proportion of the total waste received at the NPWWTP comes from trade waste. Raw untreated waste from industry is accepted by individual agreements, sometimes with consent conditions applied under our 2008 Trade Waste Bylaw (as amended and readopted July 2013).

The Chemical Oxygen Demand (COD) is monitored seven times per month by a 24 hour proportional flow sampler. In March 2017, the average COD was 9,277 kg/day and maximum 15,047 kg/day. Industrial COD level is 20% of which Tegel Foods in Bell Block contribute 13%.

## Milliscreens

Milliscreens remove solid debris from wastewater and protect the downstream processes. There are currently three milliscreens in service used on a duty/duty assist/standby basis. Based on the information available, we assess that each milliscreen has the capacity of 420 l/s. This provides a capacity of 840 l/s with one milliscreen out of service and 1,260 l/s with all three milliscreens in service.

New inlet works to be commissioned in 2018/19 have three band screens each with 765 l/s capacity at 50% blinding. With both the new band screens in service the capacity will be 1,530 l/s.

## Grit Removal

The existing grit trap has an estimated design capacity in the order of 880 l/s. However, this grit trap has not been tested at such flows to determine if there is a marked drop-off in grit removal performance.

A new grit trap will be commissioned in 2018/19 which will address historic grit removal problems. The capacity of the new grit trap is 915 l/s but is capable of handling 1,220 l/s at reduced efficiency.

# 2. LIFECYCLE MANAGEMENT PLAN



## Aeration Basins and Clarifiers

The two bioreactors have a hydraulic capacity of 610 l/s each (1,220 l/s total). The current inlet works struggle to pass this flow rate. A peak instantaneous flow of 1,102 l/s measured in 2013 and the anticipated peak instantaneous flow of 1,220 l/s predicted for 2025.

The new inlet works to be commissioned in 2018/19 will be more than capable of passing 1,220 l/s and flows above this rate will have to be throttled at the Te Henui and other wastewater pump stations.

Storage at Shearer Reserve and Waitara wastewater pump stations help to reduce peak flow to the plant. It is anticipated that storage at the plant will need to be increased to handle peak flows in the future.

## Clarifiers

There are three clarifiers which have adequate capacity to handle future peak flows up to 1,220 l/s.

## Chlorination

The current chlorination plant has a design capacity of a maximum daily flow of 28,800m3/day. This is adequate for both the current and forecast average daily flows through up to 2040, but not adequate for the current and forecast peak daily flows. On this basis, we need to provide additional contact volume in the near future or increase the chlorine dosage to meet the chlorine contact time requirements of the current discharge consent. New dosing and bulk storage equipment scheduled to be installed in 2018/19 will ensure chemical storage is compliant with the Health and Safety at Work (Hazardous Substances) Regulations 2017 and dosing equipment is fit for future plant capacity and usage.

## Outfall

The outfall has a design capacity of 1,250 l/s under gravity flow. Therefore, the future peak flow of 1,220 l/s can be accommodated without pumping.

## Sludge Stream

The existing sludge processing consists of:

- Gravity thickeners reconditioned in 2017 and one converted to a buffer tank.
- Belt press dewatering replaced in 2017 with new screw press thickeners.
- Thermal Drying Facility (TDF) with all dried product being sold as Bioboost ® with scheduled replacement in 2020.
- Sludge lagoon – used for emergency storage of sludge (usually when the dryer is out of service).

## Settling Lagoon

The small lagoon is used to buffer plant solids inventory in case of prolonged TDF breakdowns. Two 7.5 kW aerators were installed in 2017 on this lagoon to address potential odour releases. The large lagoon is not used but contains historic quantities of contaminated sludge.

## Thermal Drying Facility (TDF)

The TDF is used to produce Bioboost® from the surplus bugs (micro-organisms) that eat waste in the wastewater in the aeration basins at the NPWWTP. The bugs are separated from the effluent (water) in our clarifiers; concentrated in the thickeners; squeezed of excess water in the belt presses; then dried, sterilised and palletised in the rotary drier. At the end of this process, the bugs are dead and in a material form suitable for beneficial reuse.

Biosolids are manufactured in accordance with the 2003 Guidelines for the Safe Application of Biosolids to Land in New Zealand, which grade the product according to its quality and level of contaminants. Bioboost® has the highest grade for pathogens, 'A', which means the product is sterilised and safe to use. Bioboost® meets the highest grade 'a' for the eight metals of concern, apart from zinc and copper. Zinc is over the 300 mg/kg limit, with a recent annual average of 580 mg/kg and copper [at 180 mg/kg] is marginally over the 100 mg/kg limit. When used at the correct agronomic nitrogen rates of 200 kg total nitrogen per hectare per year, metal contaminants are not an issue and comply with recommended soil limits in the guidelines. This equates to a maximum Bioboost® application rate of 33 kg/100m2/year (or 330 g/m2/year). Production of biosolids for the 12017/18 year was 1,779 tonnes of which 1,731 tonnes was sold as Bioboost® and 48 tonnes was sent to landfill due to being out of specification.

The typical nutrient analysis advertised by Bioboost Limited for the Bioboost® product is shown in Table 2.

**Table 2 Typical nutrient analysis**

| Element | Percentage |
|---|---|
| Nitrogen (N) | 5.50% |
| Phosphorus (P | 2.40% |
| Potassium (K) | 0.40% |
| Calcium (Ca) | 1.20% |
| Magnesium (Mg) | 0.30% |
| Sulphur (S) | 0.80% |
| Iron (Fe) + TE | 0.80% |

The Beca report, 'NPWWTP Review of Dewatering Technology' dated 15th July 2014, identified that replacing the existing belt dewatering process with a screw press would be advantageous and a project was completed in 2017. Sludge cake dry solids fed to the TDF are now at 19-20% DS compared to a historic typical value of 14%.

The NPV analysis shows a clear cost advantage with the new technology extending the life of the thermal drying facility (TDF) and widening the options as far as sludge disposal is concerned in the event the TDF becomes inoperable.

Assuming the dewatering plant is upgraded to produce a sludge cake of >20% DS, the TDF will not require replacement to increase capacity. However, the plant is now 18 years old and requires major refurbishment to maintain it in service, estimated at $15.7m over the next 10 years. Given that the TDF is very expensive to operate in terms of energy, maintenance and operator time, in 2016 we investigated alternate drying technologies to establish whether it is more beneficial to replace the current TDF facility with a more cost effective technology than continue to repair and renew the existing facility. This investigation resulted in the production of a Solids Master Plan and further scoping studies for replacement technologies was undertaken in 2017. It is now planned to replace the TDF in 2020/21 based on the outcomes of these investigations.

### 2.1.3 Inglewood Oxidation Ponds

The oxidation ponds are no longer used in the water treatment process. They now work as equalisation ponds to store wastewater during high flow events when the pump station is overloaded, mainly during heavy rain.

## 2.2 Asset Condition

Asset condition grades are given in accordance with Section 5 of the Asset Management Strategy.

No formal asset conditions are recorded in the asset inventory for the wastewater treatment plant and all assets conditions are recorded as **6 - Unknown**. Therefore the data accuracy for asset condition is classed as grade **E – Unknown**. **This is a data integrity issue and is recorded as an action in Section 5 – Improvement and Monitoring Plan.**

## 2.3 Asset Remaining Lives

The life expectancy data for wastewater treatment plant assets has been recorded in EAM. This data was provided by Beca as part of the 2016 statutory plant and equipment valuation and is therefore classed as grade **B – Reliable**.

## 2.4 Asset Valuation

The value of the wastewater treatment plant assets is shown in the table below.

**Table 3 Asset valuation**

| Asset Category | Gross Current Replacement Cost ($) | Annual Depreciation ($) | Optimised Depreciated Replacement Cost ($) |
|---|---|---|---|
| Waste Water Treatment Plant | 109,424,268 | 2,185,055 | 62,160,400 |

Beca valued each asset component as part of the general plant and equipment valuation during the 2016 statutory valuation. Therefore, in conjunction with a well maintained and updated asset inventory, the data is classed as **B – Reliable**.

## 2.5 Operations and Maintenance

### 2.5.1 Operations

The operations and maintenance plan for the treatment plant at New Plymouth includes routine monitoring of key processes by operations staff. Staff utilise daily, weekly and monthly work schedules to ensure the plant equipment is monitored, cleaned and serviced appropriately. Operations staff undertake first level diagnosis of any faults before engaging our mechanical or electrical contractors to carry out repairs.

Outside of manned hours, a dedicated on call operator monitors key trends via a laptop with remote access to the SCADA system.

### 2.5.2 Maintenance

Our general approach to asset maintenance is outlined in the Asset Management Strategy.

*Instrumentation and Electrical (I&E) Maintenance*

The in-house water and waste Electrical & Systems team maintains instrumentation and electrical (I&E) equipment at the WWTP. Any faults are either reported automatically or via the duty operator. The Electrical & Systems team administers a dedicated I&E contractor who undertakes all required I&E repairs, servicing and maintenance.

Planned and reactive maintenance for electrical equipment and instrumentation at the WWTP is managed by the Wastewater Treatment Plant Coordinator, who is supported in□house by the wastewater treatment technicians and the Electrical & Systems team. Faults are managed via the duty operator who contacts our electrical contractor directly and if necessary escalates it to Electrical & Systems team. The Electrical & Systems team maintains an inventory of all instrumentation and electrical preventative and predictive maintenance required at the water treatment plant.

*Mechanical Maintenance*

The Wastewater Treatment Plant Coordinator with the assistance of the Mechanical Maintenance Coordinator oversee mechanical maintenance, ensuring maintenance activities are planned and carried out. We use the Maintenance Scheduling module in EAM to plan and issue maintenance tasks. Implementation and development of the maintenance management regime at the plant is a key focus for the coming years. We have a contract with City Care to provide dedicated mechanical maintenance services at the WWTP. They sometimes use subcontractors to provide mechanical maintenance.

Planned and reactive mechanical maintenance at the WTP and facilities is managed by the Wastewater Treatment Plant Coordinator with the assistance of the Mechanical Maintenance Coordinator and Optimisation Engineer and supported by our wastewater treatment technicians. External support is provided by our mechanical maintenance contractor and by various specialist suppliers/providers. Plant technicians conduct front line reactive maintenance and some smaller planned works. The duty technician will typically contact the mechanical contractor as a first responder. The projects team and other specialist service providers are called upon to facilitate works beyond reactive maintenance e.g. major repairs, upgrades and major works in general. All preventative and predictive mechanical maintenance activities are recorded and managed in T1.

*Building and Grounds Maintenance*

Building and ground maintenance work is managed on the same basis as mechanical maintenance. Approved building services contractors provide building maintenance services, including 10-yearly painting of buildings. Grounds keeping work is mainly conducted by the in-house Parks team or by approved contractors under a grounds keeping agreement. Any grounds work required outside of the agreement is undertaken by approved contractors as required.

*Major Maintenance*
Major repairs are conducted on a case-by-case basis, subject to prior justification and approval, and within approved budgets.

Each year we programme a shutdown of the Thermal Drying Facility (TDF) to repair equipment, typically for three weeks. Work undertaken is based on a planned replacement/renewal regime and also on plant condition investigations carried out prior to the shutdown. If the shutdown reveals any previously un-observable equipment faults, we also conduct any reactive maintenance required.

To ensure sufficient capacity is maintained, the large lagoon requires sludge removal at approximately 10-yearly intervals. We anticipate that this will be required in 21/22, at a cost of $1.0m.

### 2.5.3 Critical Spares

An assessment of the critical spares required has not yet been conducted for the wastewater treatment plant.**This is an asset integrity issue and is recorded as an action in Section 5 – Improvement and Monitoring Plan.**

### 2.5.4 Opex Forecast

The general 10-year Opex forecast for wastewater treatment plant assets is included in the Wastewater General Volume. It includes the Opex forecast for the maintenance and operation of the treatment plant.

## 2.6 Renewals Plan

As the wastewater treatment plant assets continue to age, investment in renewal will be required to maintain current levels of reliability. We have included general allowances for planned general and emergency renewals of plant and equipment based on historical performance, and general building component renewals: (Project codes WW1068, WW1001, WW1056, WW1072, WW2005, WW2023, WW1054 and WW2026). These values are approximate to the currently recorded accounting expiries in EAM.

Prior to confirming expenditure on renewal projects, we will undertake condition and criticality assessments and review the remaining life of the assets to ensure we achieve optimum value from the assets.

Other specific renewal projects include:

- WW1066 - Replace thermal drier with new technology that is significantly more energy efficient, is able to use solid fuel (i.e. Dried sludge as a fuel source) and has sufficient capacity to meet future sludge processing requirements. NB the current drier is 14yrs old and has approximately $5m worth of renewals due over next five years. This will secure the long term route for sludge disposal.

- WW1070 - Re-orientate the lunchroom and hallway to provide new room for laboratory microbiology. Refurbish interior of administration building and workshop mezzanine floor service area.

- WW2011 - The layout of the showers and smoko room makes the risk of cross contamination is high as workers need to move though the workshop once they have finished showering and changing. The number of staff has increased following upgrades for growth; some renewal is also needed as facilities are beyond their life. This will meet minimum expected hygiene level for staff facilities.

- WW2017 - The pipes between the splitter box and clarifiers 1 & 2 has potential to become blocked and restrict flow to clarifiers. In 2015, Clarifier #1 pipework was found to be 25% blocked when work was undertaken to fix its penstock. This work was possible because Clarifiers 1 & 3 have weir plates in the splitter box. Clarifier #2 pipework and penstock does not have a weir plate. Installing a weir plate will enable inspection of the pipework, cleaning if necessary and also repair of the penstock. This will ensure the NPWWTP will be able to pass peak flow of 1,220 L/s through the treatment process so the plant does not need to be bypassed.

# 2. LIFECYCLE MANAGEMENT PLAN



- WW2015 – We have plans to conduct a review of the critical spares held for emergency repairs. This is likely to result in additional spares being required to ensure we can provide the desired level of waste water treatment for the community.

- WW2016 - Current blower control means the combination of blowers run does not match the air demand. Often two blowers are called to run with one of the blowers running at minimum rate, when one larger blower would suffice. This results in more energy costs for aeration and machinery using up there life capacity unnecessarily Benefically, this project will reduce aeration costs by enabling the correct combination of large and small blowers for any given air flow demand.

- WW2018 - A significant quantity of sand has accumulated in the anaerobic and aerobic sections of Bioreactor One (estimate about 100 tonnes). This poses a significant risk to the diffuser operation should it migrate to aeration zones. To remove the sand, a large crane needs to be able to park very close to B1. This rquires constuction of a large crane pad, similar to that existing on the south side of the blower building, before B1 is next taken out of service for cleaning and diffuser servicing. This project will protect the bioreactor diffusers and thereby maintain plant capacity.

- WW1074 – Estimate for the completion of previous year's Wai Taatari project to upgrade the inlet works including the milliscreens, grit traps, civil structures and buildings.

The Capex forecast for the wastewater treatment plant renewals is shown in Table 4.

**Table 4 Renewals expenditure forecast**

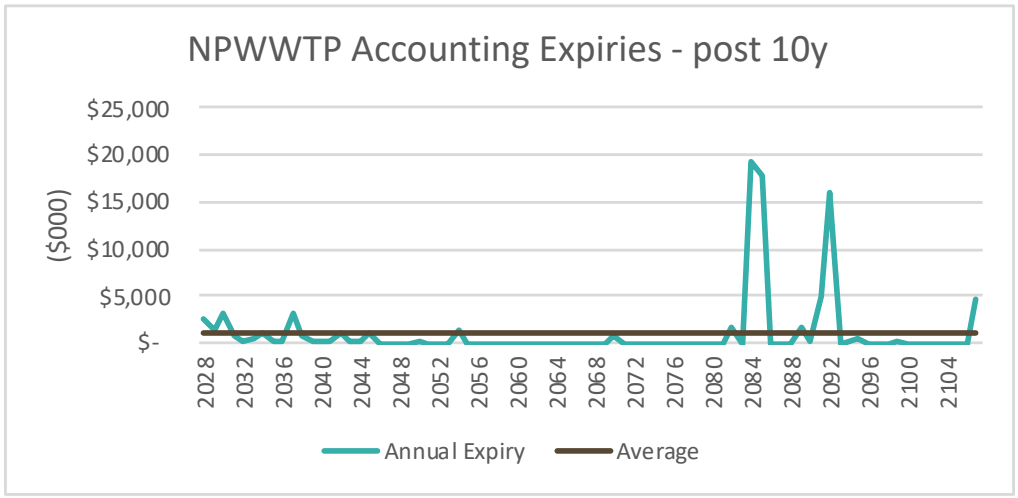
| Waste Water Treatment Plants Renewal Forecast ($000) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Activity | 18/19 | 19/20 | 20/21 | 21/22 | 22/23 | 23/24 | 24/25 | 25/26 | 26/27 | 27/28 | LTP Total |
| WW1066 - Thermal Dryer Upgrade and Renewal | - | 5,186 | 10,478 | - | - | - | - | - | - | - | 15,664 |
| WW1070 - NPWWTP Admin and Work Shop Interior Refurbishment | - | - | 316 | - | - | - | - | - | - | - | 316 |
| WW1074 - Wai Taatari Projects | 1,514 | - | - | - | - | - | - | - | - | - | 1,514 |
| WW2011 - NP WWTP Staff Welfare Modifications | 505 | - | - | - | - | - | - | - | - | - | 505 |
| WW1068 - Bioreactor Aeration System Major Servicing and Renewals | 71 | 73 | 74 | 76 | 78 | 79 | 81 | 83 | 85 | 87 | 787 |
| WW2017 - NP WWTP Splitter Box Clarifier Two Weir Plate Installation | 61 | - | - | - | - | - | - | - | - | - | 61 |
| WW1001 - Laboratory Minor Equipment Renewals | 7 | 7 | 8 | 8 | 8 | 8 | 8 | 9 | 9 | 9 | 82 |
| WW1054 - PLC Upgrades - Various | 50 | 51 | 53 | 54 | 55 | 56 | 58 | 59 | 60 | 62 | 558 |
| WW1056 - Resource Consent Renewals Wastewater | 8 | 8 | 8 | 8 | 9 | 9 | 9 | 9 | 9 | 10 | 86 |
| WW1072 - General P&E and I&E Renewals | 353 | 463 | 578 | 591 | 604 | 618 | 633 | 648 | 664 | 682 | 5,834 |
| WW2005 - Emergency Wastewater P&E Renewals | -41 | -41 | 63 | 65 | 66 | 67 | 69 | 71 | 73 | 74 | 466 |
| WW2015 - Wastewater Critical Spares | - | 102 | - | - | - | - | - | - | - | - | 102 |
| WW2016 - NP WWTP Siemens Blower Air Control Upgrade | 71 | - | - | - | - | - | - | - | - | - | 71 |
| WW2018 - Bioreactor One Crane Pad | - | 31 | - | - | - | - | - | - | - | - | 31 |
| WW2023 - Wastewater Building Renewals | 5 | 5 | 5 | 5 | 5 | 6 | 6 | 6 | 6 | 6 | 55 |
| WW2026 - Laboratory Major Equipment Renewals | 30 | 31 | 31 | 32 | 33 | 33 | 34 | 35 | 36 | 37 | 332 |
| Total | 2,634 | 5,916 | 11,614 | 839 | 858 | 876 | 898 | 920 | 942 | 967 | 26,464 |

# 2. LIFECYCLE MANAGEMENT PLAN



The accounting expiries for the years beyond 27/28 are shown in Figure 3. The major renewal items occurring beyond 27/28 are in 2085 are the outfall, aeration basins and clarifiers.

**Figure 3 NPWWTP accounting expiries post 10Y**




## 2.7 Acquisition and Augmentation Plan

### Acquisition

No acquisitions are planned during the next ten years.

### Growth

The treatment plant requires a buffer flow facility to effectively manage the predicted peak flows into the plant. This will significantly reduce the likelihood of effluent overflows. The Capex forecast for this project is shown Table 5.

**Table 5 Growth expenditure forecast**

| Waste Water Treatment Plant Growth Forecast ($000) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Activity | 18/19 | 19/20 | 20/21 | 21/22 | 22/23 | 23/24 | 24/25 | 25/26 | 26/27 | 27/28 | LTP Total |
| WW2004 - Enfulent Buffer Lagoon | - | 772 | - | - | - | - | - | - | - | - | 772 |
| Total | - | 772 | - | - | - | - | - | - | - | - | 772 |

### Levels of Service

Projects planned to meet community levels of service expectations are:

- WW1004 – Project to extend the laboratory area to create a dedicated microbiological workspace for laboratory staff and assist with maximising the efficiency of the aeration biological processes (refer to DM1221311).

- WW2013 - Illegal trade waste discharges put wastewater and process staff at risk and can cause harm to both the wastewater network and treatment process. Treating high load events from unidentified sources costs money that is not recovered. Currently, we have no ability to identify an event in real time making it very difficult to identify the cause and source. Installing online monitoring equipment in the new inlet works (pH, NH3, UV multi wavelength analyser) would enable identification of these events, automatically raising alarms and triggering sampling equipment. This will greatly enhance our ability to identify causes and source. It would also give accurate understanding of load into the plant and could be used to reduce operating costs.

The Capex forecast for these projects is shown in the table below.

**Table 6 Level of service expenditure forecast**

| Waste Water Treatment Plant Level of Service Forecast ($000) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Activity | 18/19 | 19/20 | 20/21 | 21/22 | 22/23 | 23/24 | 24/25 | 25/26 | 26/27 | 27/28 | LTP Total |
| WW1004 - Expansion of lab for dedicated microbiololgical workspace | - | 206 | - | - | - | - | - | - | - | - | 206 |
| WW2013 - NP WWTP Inlet Works Instrumentation | 101 | - | - | - | - | - | - | - | - | - | 101 |
| Total | 101 | 206 | - | - | - | - | - | - | - | - | 307 |

## 2.8 Disposal Plan

Disposal is the retirement or sale of assets when they become surplus or superseded by new or improved systems. Assets may become surplus to requirements for any of the following reasons:

- Under-utilisation
- Obsolescence
- Provision exceeds required level of service
- Replacement before end of predicted economic life
- Uneconomic to upgrade or operate
- Policy changes
- Service provided by other means (e.g. private sector involvement)
- Potential risk of ownership (financial, environmental, legal, social)

No asset disposals are planned over the 10-year period of this AMP.

## 2.9 Annual Work Plan

We will base our detailed work plans for Annual Plans on the asset renewal forecasts included in section 2.6 and the augmentation projects identified in section 2.7

# 3. RISK MANAGEMENT PLAN

## 3.1 Critical Assets

We have not yet conducted criticality ratings for wastewater treatment plant assets; therefore, there is currently no data recorded in EAM. **This is an asset integrity issue and is recorded as an action in Section 5 – Improvement and Monitoring Plan.**

However, there are wastewater treatment plant assets recognised as critical for monitoring and controlling wastewater discharge water quality. These are:

- Air distribution control valves
- Anaerobic mixers (bioreactors)
- Butterfly isolation valves (bioreactors)
- Pumps
- Transmitters
- Level radar

Following asset criticality assessment we will develop a focused management plan to ensure the integrity and resilience of critical assets.**This is recorded as an action in Section 5 – Improvement and Monitoring Plan.**

## 3.2 Risk Assessment

Details of our Risk Management Framework are included in section 6.2 of the Water Supply General AMP volume and section 7 of the Asset Management Strategy.

## 3.3 Infrastructure Resilience Approach

During the development of the Wastewater Master Plan we will consider the criticality and resilience of the system and identify any opportunities for increasing asset resilience.

Following on from ex-cyclone Gita which damaged one of our water supply trunk mains crossing a pipe-bridge in February 2018 and the Havelock North Water Inquiry; the importance of our wastewater network has been highlighted. This has caused us to consider the resilience of our wastewater assets based on cost versus risk assessments. Section 6.3 of the General Wastewater volume gives details the items selected for investment in improving asset resilience.

# 4. FINANCIAL SUMMARY



A summary of the Capex forecasts included in this volume is shown in Table 7.

**Table 7 Capex forecast summary**

| Waste Water Treatment Plant Forecast Expenditure ($000) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Activity | 18/19 | 19/20 | 20/21 | 21/22 | 22/23 | 23/24 | 24/25 | 25/26 | 26/27 | 27/28 | LTP Total |
| Renewals | 2,634 | 5,916 | 11,614 | 839 | 858 | 876 | 898 | 920 | 942 | 967 | 26,464 |
| Service Level | 101 | 206 | - | - | - | - | - | - | - | - | 307 |
| Growth | - | 772 | - | - | - | - | - | - | - | - | 772 |
| Total | 2,735 | 6,894 | 11,614 | 839 | 858 | 876 | 898 | 920 | 942 | 967 | 27,543 |

The Opex forecast for operations and maintenance is included in the overall Opex forecast for Wastewater detailed in the LTP. It is also included in the Wastewater General Volume.

# 5. IMPROVEMENT AND MONITORING PLAN



Our general Asset Management Maturity Improvement Plan is included in the Asset Management Strategy.

General improvements to Wastewater assets are included in the Wastewater General Volume.

The specific areas of improvement identified for treatment plant assets are listed in Table 8.

**Table 8 Improvements summary**

| No | Improvement Area | Owner | Start Date | End Date |
|---|---|---|---|---|
| 1 | Assess asset condition and record results in EAM | Asset Operations Planning Lead | Jul 2018 | Jun 2020 |
| 2 | Assess critical spares and procure any required components | Manager Three Waters | Jul 2018 | Jun 2019 |
| 3 | Conduct criticality assessment and record results in EAM | Asset Operations Planning Lead | Jul 2018 | Jun 2020 |
| 4 | Produce a focused management plan for those assets identified as critical | Manager Three Waters | Jul 2018 | Jun 2020 |

2018-2028 WASTEWATER ASSET MANAGEMENT PLAN

*He Rautaki Whakahaere Rawa mō Te Wai Paranga*

# TREATMENT PLANT

# TE TAUPUNI WHAKATIKA

## VOLUME ONE | PUKAPUKA TUATAHI