8.0 LIFECYCLE MANAGEMENT PLAN

The Taupo District occupies a large proportion of the Central North Island Volcanic Plateau together with the complete catchment area of Lake Taupo and Upper Waikato River areas.

Whilst the majority of the District is situated within the Waikato Region, a small proportion also intrudes into the Bay of Plenty, Hawkes Bay and Manawatu-Wanganui regions. The District comprises 6354sqkm of land and 616sqkm of lake.

Prior to 1950, the District was largely undeveloped and sparsely populated. Since that time, population has increased rapidly to approximately 34,000 (June 2010). Urban growth has focused on Taupo Township and various lakeshore settlements, whilst rural land development has been dramatic with the conversion of scrub wastelands to productive farmlands and vast exotic forest plantations and future conversion to lifestyle properties.

Lake Taupo and its surrounds have also become an important national and international tourist destination, renowned for its scenic attractions and wide ranging recreational activities.

Taupo District Council provides wastewater services to many urban areas with in the district (Taupo, Turangi (and Tokaanu), Acacia Bay, Kinloch, Motuoapa, Waitahanui, Omori (Kuratau and Pukawa included), Whareroa, Motutere, Whakamaru, Atiamuri and Mangakino).

This section contains life cycle management plans for the following wastewater asset components:

Treatment Plants
Reticulation (pipes, manholes, lamp holes and pump stations)

Most of these assets are seen as critical assets where failure would have a dramatic impact. This has been discussed in further detail in the Risk Management section.

Background data for the asset type including asset description, capacity, performance, condition and valuations is included in the Asset Data section.

This section contains the general *management strategies,* to achieve the levels of service defined in Level of Service section. These strategies are divided into four main work categories (routine maintenance, renewal, capital and disposal) as illustrated in the following figure.

Detail of each of the schemes is included in the appendices.

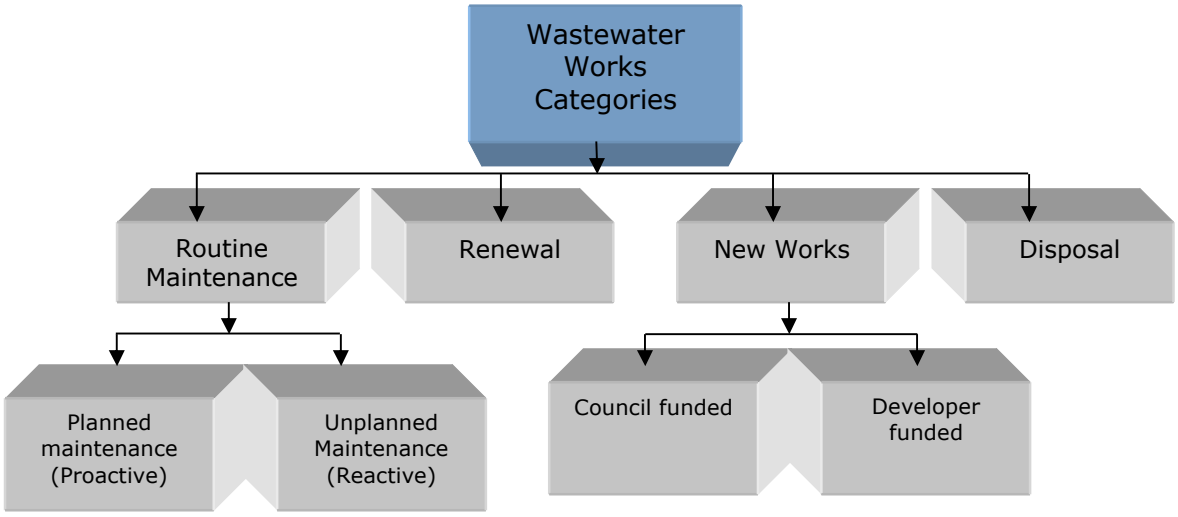

Figure 8-1: Asset Works Categories

The work categories are defined as follows:

Routine Maintenance

Routine maintenance falls into two broad categories as follows:

- Planned (Proactive) Maintenance: Proactive inspection and maintenance works planned to prevent asset failure.
- Unplanned (Reactive) Maintenance: Reactive action to correct asset malfunctions and failures on an as required basis (i.e. emergency repairs).

A key element of asset management planning is determining the most cost-effective blend of planned and unplanned maintenance as illustrated in the following figure.

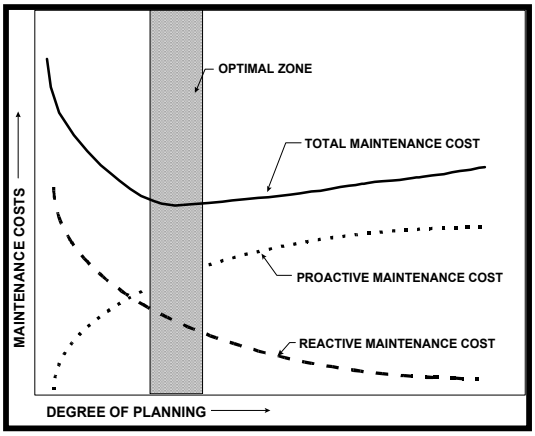

Figure 8-2: Balancing Proactive and Reactive Maintenance

Renewals

This includes replacement and rehabilitation of existing assets to their original condition and capacity.

New Works

Creation Works: New works which extend or upsize assets, which are required to cater for new development and growth. Creation works fall into two separate categories as follows:

- Council funded - Works funded and constructed by TDC.
- Developer funded - Works funded by developers as part of sub divisional development or by way of contributions that are then vested in Council.
- Asset disposal: Retirement or sale of surplus assets.

A forecast of the 10 year expenditure for each asset group in each of the categories outlined above has been provided in the Financial Summary section.

8.1 Overarching issues/ Strategies for Wastewater

Council is responsible for collection, treatment and disposal of wastewater from residential, commercial and industrial properties within designated drainage areas of the district in a way, which safeguards the environment and protects public health. The objective is to provide cost-effective wastewater treatments that meet the scheme capacity requirements and also the resource consent conditions (refer section 8.3).

Reducing nitrogen discharge by at least 20% of into Lake Taupo Catchment by 2020 is also the part of responsibilities under the lake Taupo protection project.

Council has developed a long term plan to meet these requirements and the activities include:

- Carry out condition assessment of the sewerage network and CCTV
- To progressively upgrade wastewater reticulation network.
- Develop a wastewater strategy for total nitrogen discharges
- Regular assessment of wastewater quality throughout district as required by resource consent conditions
- Review asset performance by monitoring the operational data.
- Implementation of the Trade Waste Bylaw
- Improve Asset Management Systems

8.2 Service delivery & rationale

The wastewater services are carried out by a number of providers.

Service	Provider	Rationale (Why?)
Asset Management	Council	We retain in-house knowledge
WTP operation	Council	We retain in-house knowledge
Management of Maintenance Contracts	Council Business unit	Control of cost and we retain in-house knowledge
Minor concept design	Council	We retain in-house knowledge
Major detail design	Tendered	To capitalise on external expertise resource/ experience and take advantage of competition.
Maintenance	Tendered	To capitalise on external specialist resource/ experience and take advantage of competition.

The following table shows a summary of all TDC maintenance and renewals contracts:

Contract Name	Contract No.	Approx. Value ($)	Term (yrs)	Comments	Maintenance/Renewal/ Creation
Three Waters Network Maintenance Contract	TDC/1516/155	$11,399,600 (total for 5 years)	5 +2+2	Contractor: Downer Contract Start: 1 July 2016	Mostly reactional electrical and mechanical maintenance but includes some renewal and new works. Includes water wastewater and stormwater.
Sludge cartage Contract	TDC/1314/115	$914,840 (total for 4years)	4+1+1	Contractor: Hydra-Care Ltd Contract started July 2014	Maintenance
Effluent Disposal Farms Crop Harvesting	TDC/1516/163	$800k per year	2+1+1+1	Contractor: Pritchard Agricultural Contractors	Maintenance

Table 8-1: TDC Maintenance and Renewal Contracts

Contract types

TDC has a Procurement Policy and procurement guide that sets out how TDC procures the products and services it need. Refer the Procurement Policy for details.

Asset Type

8.2.1 TREATMENT PLANTS

Overall Objective:	To provide affordable wastewater treatment that meet the scheme capacity requirements and resource consent conditions.

Key wastewater treatment issues are:

- The nitrogen discharge loading limits in the Lake Catchment WWTP's imposed by WRC Variation 5.
- The ability of SBR treatment technology to meeting EW consent requirements.
- Continual increasing of effluent discharge quality
- Treatment of infiltration (groundwater and stormwater)
- Individual scheme information is included in the appendices.

Treatment Plant Operations and Maintenance

Maintenance is carried out on treatment plants to ensure that the levels of service outlined in the Level of Service section of this document and effluent discharge consent conditions are met. A summary of the additional operating costs due to changes in demand and consent conditions is included in Section 6, with a full financial summary in Section 9.

The treatment plants are operated by TDC operators and the maintenance is mostly carried out internally by a maintenance team. Specialist maintenance such as equipment calibration, probe maintenance, electrical and telemetry works are carried out by specialist contractors.

Each treatment plant has operational procedures and management plans. These can be found in the wastewater files in objective (obj ref A15515 and A16040).

Historical and Projected Treatment Operation and Maintenance

	Actuals 2014/15	Actuals 2015/16	Actuals 2016/17	Annual Plan 2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28
Treatment Expences	2,618,654	1,789,792	1,830,025	1,818,858	1,788,926	1,789,826	1,759,826	1,759,826	1,789,826	1,789,826	1,789,826	1,759,826	1,759,826	1,789,826

Note: Opex expenditure do not include, Overhead cost, financial cost,Interest – Loans, Depreciation etc.

8.2.1.1 Treatment Plant Renewal

Renewal expenditure is major work that restores an existing asset to its original capacity or the required condition. By renewing plant equipment as required the quality level of service is met. Where assets become surplus to requirements or no longer meet the required level of service, they are renewed and the existing asset is removed either used in other schemes or sold as surplus where possible or disposed of, which occurs normally at the end of useful life.

Over the last three years more information has been obtained which in term enables a more detailed renewals programme to be developed. Unfortunately more information and better planning does not automatically mean reduced expenditure requirements in the short term.

Undertaking renewals at the identified time will ultimately reduce the reactive maintenance, spillages and renewal spending enabling better budget planning with reduced unbudgeted spending.

The renewal programme is prepared through condition rating of the above ground assets – this information is currently stored in an excel file in objective and is updated as required with no more than three years between condition rating and review. A copy of the condition rating and renewals required is included in the appendices.

Renewals work over $50,000 is listed individually for the first three years of the LTP, all the rest for each plant is grouped to together for the respective financial year. Project sheets for these works are included in the appendices. If an unexpected renewal is required the lesser prioritised renewal (or renewals) is deferred till the next year. Renewals that are grouped together include smaller pump replacements, valve or bearing replacements, seals, small motors.

A summary of the renewals is given in the following table.

Project Name	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28
Acacia Bay Wastewater Operations equipment renewals	65,920	59,648	38,272	130,240	117,376	11,776	20,224	37,248	9,984	55,680
Atiamuri Wastewater Operations equipment renewals	21,760	2,560	2,560	2,560	15,360	25,600	2,560	3,840	0	1,920
Districtwide water IT Server renewal	0	0	0	0	0	0	15,000	0	0	15,000
Kinloch Wastewater Operations equipment renewals	25,216	105,472	41,472	106,432	20,288	45,760	76,544	94,016	121,664	72,960
Mangakino Wastewater Operations equipment renewals	21,440	59,520	40,448	40,960	24,576	30,144	20,480	17,920	20,224	48,960
Motuoapa Wastewater Operations equipment renewals	70,528	21,632	7,680	14,592	18,560	30,336	73,216	105,152	36,096	30,080
Motutere Wastewater Operations equipment renewals	14,016	4,224	5,440	50,560	36,608	21,952	5,632	5,504	32,000	13,376
Omori Wastewater Operations equipment renewals	33,216	19,520	9,280	29,760	15,040	13,120	11,136	103,488	44,992	80,320
Rakaunui & View Rd LDS renewals	216,995	211,310	141,130	185,570	210,155	234,190	193,490	181,830	390,170	249,645
Septage plant renewals	19,264	21,760	6,528	16,512	3,904	20,736	38,208	88,704	13,440	30,336
Small Plant renewals	0	7,600	0	0	9,400	1,000	0	0	8,000	0
Taupo Wastewater Operations equipment renewals	248,640	258,560	546,688	373,504	205,056	330,304	352,448	307,520	371,328	630,720
Turangi Wastewater Operations equipment renewals	501,312	317,696	304,960	266,624	265,664	252,096	251,904	349,952	320,512	280,320
Vehicle renewals	83,000	0	0	76,000	78,000	0	0	38,000	121,000	0
Whakamaru Wastewater Operations Equipment Renewals	6,400	10,240	96,000	18,240	8,000	0	6,400	65,600	0	1,920
Whareroa Wastewater Operations equipment renewals	71,360	8,320	13,312	2,560	3,520	7,616	4,736	4,480	8,000	4,864

Table 8-4: Future Treatment Plant Renewal Expenditure

8.2.1.2 Treatment Plant Creation

The section covers strategies for the creation of new assets (including those created through subdivision and other development) or works which upgrade or improve an existing asset beyond its existing capacity/performance in response to changes in capacity requirements, legislation or influent quality.

Project Name	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28
Atiamuri wastewater TP Upgrade	0	0	0	50,000	350,000	0	0	0	0	0
District wide FOG reception facility extension	0	0	0	0	0	0	0	150,000	0	0
Districtwide water compliance reporting software	30,000	0	0	0	0	0	0	0	0	0
Districtwide water IT Server purchase	0	0	0	15,000	0	0	0	0	0	0
Kinloch wastewater land disposal system	2,200,000	0	0	0	0	0	0	0	0	0
Kinloch wastewater TP balance tank	100,000	1,700,000	0	0	0	0	0	0	0	0
Kinloch wastewater TP capacity upgrade	0	0	0	0	250,000	2,500,000	0	0	0	0
Motutere wastewater TP capacity upgrade. Moved outside of year 3 due to project uncertaintly.	100,000	0	0	0	0	0	0	0	0	0
Omori wasteater oxiation pond (Pukawa) fencing	25,000	0	0	0	0	0	0	0	0	0
Turangi wastewater - Balance Pond	1,800,000	0	0	0	0	0	0	0	0	0
Turangi wastewater - Disposal system improvement	0	0	0	0	1,000,000	0	0	0	0	0
Turangi wastewater - Pond Remediation	0	0	0	0	1,000,000	0	0	0	0	0

Table 8-5: New Treatment Works Capital Budget

8.2.1.3 Treatment Plant Asset Disposal

In general where assets become surplus to requirements or no longer meet the required level of service, they are renewed and the existing asset is removed either used in other schemes or sold as surplus where possible or disposed of, which occurs normally at the end of useful life.

The wastewater treatment plant at Waitahanui has been decommissioned; some of the assets repurposed to other sites. The remaining assets are disposed of.

8.2.2 RETICULATION AND PUMP STATIONS

Overall Objective:	To convey wastewater from houses and businesses to the wastewater treatment plants without the wastewater spills.

Key issues relating to the pipes and pump stations are:

- Blockages due to the fat build up
- Damage of pipes through ground instability
- Failure of key equipment within pump stations
- Discharges to lakes or river as a result of asset failure
- Limited capacity during peak flow periods for some assets
- Groundwater and stormwater infiltration into the system.
- Individual scheme information is included in the appendices.

8.2.2.1 Network Operations and Maintenance

The network is maintained under the maintenance contract. Some specialist maintenance such as equipment CCTV, pipe lining or renewals and electrical renewals works are carried out by specialist contractors. The Three Waters maintenance contractor routinely manages inspection and cleaning of septic tanks, sewer pump stations, that discharge directly to the treatment plants as this sewerage network is hugely affected by root intrusion, rags and fat build up, which causes the spillages / overflows. The proactive maintenance reduces the amount of localised spillages / overflow incidents from block sewer/ manhole.

Council undertakes network condition assessment by way of analysing the KPI of the three waters maintenance contract. The contractor undertakes CCTV works for the sewerage network as well as regular inspections of manholes systems, this report data along with service requests are then collated and analysed for future maintenance and renewal requirements.

Council operates an electronic service request system that links directly with the three waters maintenance contractor. The public can access this system through Councils fix my street/ application on the website and phone caller's information is placed directly into the service request. Service requests have response times and ramp through the Council hierarchy if not completed on time.

	Actuals 2014/15	Actuals 2015/16	Actuals 2016/17	Annual Plan 2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28
Network Expences	1,345,271	1,122,431	1,426,819	1,189,848	1,647,499	1,537,499	1,537,499	1,517,499	1,517,499	1,517,499	1,517,499	1,517,499	1,517,499	1,517,499

Note: Opex expenditure do not include, Overhead cost, financial cost, Interest – Loans, Depreciation etc.

8.2.2.2

8.2.2.2 Reticulation and Pump Station Renewal

The majority of renewals are due to sewer main issues, overflows, pump or valve failure in the case of reactive renewals or planned renewals based on condition rating provided by the network maintenance staff /contractors. Council has adopted a service level for the network

but will not retrospectively upgrade the network unless there is a known serious network spillages /overflow to lake / waterways issue. To understand the current network capacity and identify the under capacity areas that are causing problems, the maintenance contract and service requests are analysed. Future developments are funded by developers who must increase the capacity of the downstream network if their development requires additional capacity.

At this stage in the asset age the major of renewals are for old sewerage system district wide, sewer manhole restoration, electrical panels and pump station components. The renewal programme for pump stations is developed using condition rating information supplied by the maintenance contractors. A manhole inspection and a CCTV programme have been proposed for inclusion in the operations budget. The first sections of CCTV will be the CBD, Rising Main to Rakaunui Road and the Huka Falls Rising main. It is expected that future pipe renewal work will be identified during this CCTV inspection process and subsequently a future budget will be planned in due course. In the interim a lump sum budget is allowed.

A summary of the 30 years network renewals budget from 2018-48 for district is given in the following table. For details of each project please refer to the objective reference A1054737 and or project sheets.

Project Name	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28
District wide Sewer Manhole Restoration	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000
District wide sewer renewals (not allocated)	70,000	70,000	70,000	70,000	70,000	70,000	70,000	70,000	70,000	70,000
District wide WW Pump staiton renewals	175,000	175,000	175,000	175,000	175,000	175,000	175,000	175,000	175,000	175,000
District wide WWPS Electrical and Telemetry	400,000	400,000	400,000	400,000	0	0	0	0	0	0
Mangakino wastewater sewer Renewals	0	600,000	600,000	0	0	0	0	0	0	0
Omori wastewater AC rising mains renewals	38,333	38,333	38,333	0	0	0	0	0	0	0
Taupo wastewater AC rising mains renewals	173,333	173,333	173,333	0	0	0	0	0	0	0
Taupo wastewater sewer Renewals	0	150,000	150,000	150,000	150,000	150,000	150,000	100,000	0	0
Turangi wastewater sewer renewals	200,000	0	200,000	200,000	200,000	200,000	200,000	200,000	0	0
Turnagi wastewater AC rising mains renewals	333,334	333,333	333,333	0	0	0	0	0	0	0

Table 8-2: Future Reticulation Asset Renewal Expenditure

8.2.2.3 Reticulation Asset Creation

There is currently no significant expected reticulation or pump station asset creation that is not growth related. All growth related information is included in Section 6.

There will be a process of identifying properties that remain on septic tanks and are within reticulated sewer areas. Once the septic tanks are identified TDC will work with the property owners to make connection to the sewer network where practicable. These assets will largely be private with TDC providing the sewer lateral for connection.

Project Name	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28
Taupo wastewater Control gate bridge siphon	0	0	100,000	550,000	0	0	0	0	0	0
Taupo wastewater Eastern trunk main capacity upgrade (stage 1)	0	0	0	0	0	0	0	150,000	1,050,000	0
Taupo wastewater Eastern trunk main capacity upgrade (stage 2)	0	0	0	0	0	0	0	0	60,000	540,000
Taupo wastewater Southern trunk main upgrade (stage 1)	0	100,000	750,000	0	0	0	0	0	0	0
Taupo wastewater Southern trunk main upgrade (stage 2)	0	0	0	0	100,000	750,000	0	0	0	0
Taupo wastewater Southern trunk main upgrade (stage 3)	0	0	0	0	0	0	0	50,000	430,000	0
Taupo wastewater waitahanui septic tank replacement	0	0	0	150,000	70,000	70,000	70,000	70,000	70,000	70,000

Table 8-9: Future Reticulation Capital Expenditure

8.2.2.4 Reticulation and Pump Station Asset Disposal

There is currently no disposal of asset is expected for reticulation or pump station because it is anticipated that a few pumps it may be possible to renew or repair and retained as spare for emergencies.

8.2.2.5 Resource Consents

TDC have acquired numerous resource consents for the wastewater reticulation and treatment. The table below summarises the consented wastewater discharges for each scheme, along with the date that the consent expires.

The annual resource consent and monitoring costs are included in the operations budget. Any costs associated with applying for new consent (or replacements consents) are budgeted.

Resource Consent	Purpose	Location	Granted Date	Expiry Date	Status
930464	Discharge up to 9000 cubic metres of treated domestic waste on to land and gases and aerosols from sewage treatment and spray irrigations into air at Rakaunui Road	Taupo - Rakaunui Road	30/08/1994	31/12/2015	New application made
930620	Emergency discharge of 9000 m^3/year of secondary treated effluent into the Waikato River during times of emergency	Taupo - Waikato River	30/08/1994	31/12/2015	New application made
950671	Discharge up to 128 m^3/day of treated domestic sewage per day onto land in Motutere	SH1 - Motutere	7/10/1996	31/01/2016	New application made
951023	Discharge up to 1000 m^3/day of treated domestic effluent into the ground per day in the vicinity of Mangakino Reserve, Lake Maraetai.	Mangakino	28/01/1997	30/12/2016	New application made
953652	Discharge up to 800 m^3/daytreated domestic sewage onto land in the vicinity of Omori	Kuratau/Omori/Pukawa Sewage	27/06/1996	31/01/2016	New application made
101542	Construct a dam (site 1) and associated bunding to contain stormwater	Rakanui Rd - Taupo	28/09/1998	31/08/2018	Current
101543	Contain and control stormwater (site1)	Rakanui Rd - Taupo	28/09/1998	31/08/2018	Current
101550	Discharge stormwater (site 1) from a containment dam and associated bunding	Rakanui Rd - Taupo	28/09/1998	31/08/2018	Current
101551	Construct a dam (site 2) and associated bunding to contain stormwater	Rakanui Rd - Taupo	28/09/1998	31/08/2018	Current
101552	Contain and control stormwater (site2)	Rakanui Rd - Taupo	28/09/1998	31/08/2018	Current
101553	Discharge stormwater (site 2) from a containment dam and associated bunding	Rakanui Rd - Taupo	28/09/1998	31/08/2018	Current
102927	Discharge treated domestic effluent to the Hangarito Stream & Taupo South wetland	(Turangi Sewage) Awamate Rd - Turangi	23/06/2003	23/06/2018	Current
109488	Discharge up to 64 cubic metres per day of treated municipal sewage effluent into the ground	(Atiamuri Village) SH1 - Atiamuri	6/05/2004	1/03/2024	Current
113031	Discharge treated wastewater from the Whareroa Wastewater Treatment Plant to land and associated contamiannts to air	Whareroa Road	26/04/2013	26/04/2028	Current
113402.01	Discharge up to 1500 m^3/day of treated wastewater from the Kinloch WWTP to various disposal sites in the Kinloch are	(Kinloch Sewage) Kinloch	22/01/2014	31/01/2039	Current
113402.02	Discharge contaminants to air in association with the operation of the Kinloch WWTP	(Kinloch Sewage) Kinloch	22/01/2014	31/01/2039	Current
113402.03	Undertake earthworks and soil disturbance activities in high risk erosion areas in asociation with new treatment plant, storage reservoirs and disposal fields	(Kinloch Sewage) Kinloch	22/01/2014	31/01/2039	Current
116596	Discharge up to 15,000 cubic metres per day of treated wastewater from the Taupo Pollution Control Plant to land via surface irrigation, and associated discharges to air	Taupō Urban Sewage (Taupō)	11/03/2008	31/12/2032	superceded by S127 Change of conditon
121289	Discharge contaminants to air (odour) arising from the storage, transfer, treatment and disposal of liquid and solid waste, the production and collection of biogas, and operation of a standby diesel generator in the vicinity of the Taupo Wastewater Treatment Plant	Rickit Street, Taupo	7/10/2010	31/12/2032	Current
122515	Discharge up to 500 cubic metres per day of treated wastewater to ground from the Motuoapa SBR wastewater plant.	Parekawa Drive - Motouapa	13/11/2013	13/11/2033	Current
122517	Discharge contaminants to air in association with the operation of an SBR wastewater plant Treatment Plant	Parekawa Drive - Motouapa	13/11/2013	13/11/2033	Current
122518	Discharge up to 920 m^3/day of treated wastewater to land	Acacia Bay Road, Taupō	15/10/2015	25/10/2035	Current
122519	Discharge contaminants to air from a wastewater treatment plant	Acacia Bay Road, Taupō	15/10/2015	25/10/2035	Current
130354	Discharge treated municipal wastewater to land and contaminants to air from the Whakamaru WWTP	Whakamaru Village Pokuru Road Whakamaru	24/05/2016	31/05/2036	Current

Table 8-10: Summary of Wastewater Resource Consents