Grange Road Water Association
Water Management Plan for
Resource Consent Application for Groundwater Take and Use - December 2019

This plan follows Environment Waikato's water use efficiency checklist.

Part 1 Data Summary and analysis

1 A Current situation

1 A 1 – Population

There are currently about 35 full time residents in the area served by the Grange Road Water Association.

The number full time residents during the summer months increases to about 45 as a result of some resident who are in Hahei only during the summer.

In addition, the population increases significantly at the weekends and during the summer by people using and renting out their holiday homes.

The peak population over the Christmas New Year period is about 250 based on almost all 72 houses being occupied with an average of occupancy of between 3 and 4.

1 A 2 – Customer Information

There are currently 72 customer connections.

None of the connections are metered and all the customers are residential.

15 houses have permanent residents, the remainder are either only resident during the summer months or only during weekends and holidays.

1 A 3 - Water Rates

The service provided is water supply only charged at a fixed annual fee, agreed each year at the water association annual general meeting. The current annual charge is $450.

1 A 4 – Current Water Use

Overall demand

The total annual production for the last 4 years was:

- Nov 2015 to Oct 2016 6851 m^3
- Nov 2016 to Oct 2017 6535 m^3
- Nov 2017 to Oct 2018 6513 m^3
- Nov 2018 to Oct 2019 6753 m^3

The average day demand was 18.3 m^3/d

The peak day demand in the last 4 years was 64 m^3/d

Monthly demand figures are given in the table below:

Month	Monthly flows in m^3				Average water taken by month
	Nov 2015 to Oct 2016	Nov 2016 to Oct 2017	Nov 2017 to Oct 2018	Nov 2018 to Oct 2019	
Nov	633	688	494	493	577
Dec	853	750	1016	862	870
Jan	1218	1252	1047	1183	1175
Feb	778	669	653	738	710
Mar	657	506	606	599	592
Apr	530	555	501	484	518
May	374	347	386	374	370
Jun	353	355	320	361	347
Jul	326	323	309	373	333
Aug	281	270	291	347	297
Sep	321	287	294	342	311
Oct	527	533	597	597	563
Annual Total	6851	6535	6513	6753	

Water use categories

All our customers are residential

The normal level of leakage/loss based on overnight flow data is about 4.5 m^3/d. During weekends and peak demand periods this leakage can increase to over 10 m^3/d as a result of leaks within property boundaries as additional house connections are turned on.

Water use per resident

The current permanent population is approximately 35. During winter the average daily demand is 10.5 m3 of which about 4.5 m3 is leakage. The supply to residents is therefore 6 m3. Therefore over winter the per capita demand from the permanent residents is approximately 170 l/d. This is probably a slight over estimate because some houses owned by non resident customers will be occupied at weekends in the winter.

Over the peak summer period the population increases to over 200. During this period the daily demand is about 40-50 m^3/d giving a per capita demand of about 200 l/d.

Seasonal water shortages

Every year we impose restrictions on the use of water during the peak Christmas and New year period. Use of the water supply for washing of boats and cars, filling swimming or spa pools and watering the garden with a sprinkler or hose is not permitted during a two to three week period. By imposing these restrictions we keep the average water demand over this period to about 50 m^3/d. At this level we are confident that we can provide a supply without further restrictions. At all other times of the year the supply is adequate to meet demand without restrictions.

1 B Estimating Future Needs

1 B 1 Population Changes

The Water Association has decided that the number of sections to be served should be limited to existing sections in the current area served by the water system. As a result the number of houses served may increase from 72 to 78 but no more. Three of the additional 6 houses are now under construction and will be occupied in 2020. The remaining houses are likely to be built within the 15 years consent period.

If the population increases by proportion to the numbers of houses served, the permanent population would increase from 35 to about 38 and the peak population served during the Christmas New Year period would increase to 271 (an 8.3% increase).

However to allow for some increase in the proportion of permanent residents and greater occupancy during the summer we propose to base demand predictions for the 15 year time horizon on a permanent population of 45 and a peak population of 320 (a further 20% increase).

1 C – Determining Actual Requirements

1 C 1 – Current Use and Consent

Current Resource Consent limits on water taken are (Consent112856):

- Maximum water taken shall not exceed 100 cubic meters in 24 hours
- Maximum annual volume of water taken shall not exceed 9000 cubic meters
- Maximum abstraction rate shall not exceed 1.5 litres per second

We have good flow data automatically recorded every 15 min for the last 4 years. All the daily, monthly and annual results below are based on this 4 years of data.

Water taken in 24 hours

The maximum water taken in 24 hours was 64 cubic meters over 6 and 7 January 2019.

The maximums in previous years were 53 m^3/d in 2018 and 62 m^3/d in 2017.

The peak populations over the Christmas New Year period each year generates the highest daily demands. High daily demands up to 50 m^3/d can also occur during January and February, over Easter and Labour weekend.

Annual volume of water taken

The annual volumes of water taken were:

- Nov 2015 to Sept 2016 6851 m^3
- Nov 2016 to Sept 2017 6535 m^3
- Nov 2017 to Sept 2018 6513 m^3
- Nov 2018 to Sept 2019 6753 m^3

Maximum extraction rate

The bore pumps have been set up by manual calibration to give a maximum abstraction within the consent limit of 1.5 l/s.

In December 2018 flow meters were installed on each of the three bores. Data from these meters indicate the average abstraction rate from the three bores combined is about 0.8 l/s.

Changes in demand

The monthly variation in demand over the last 4 years is shown on the table in Section 1 A 4. This shows little change in the overall pattern of demand through the year over that period.

However there was a significant reduction in annual demand from 2015/16 to 2017/18 (6851 to 6535 m^3/d), which probably resulted from a reduction in water lost through leaks. In 2016 we brought in a requirement on customers to turn off their supply at the road when they are not in residence. This will have reduced leakage from house connections to unoccupied houses and made leak detection easier.

This reduction was followed by an increase in demand to 2018/19 (6513 to 6753 m^3/d), which probably resulted from the construction and connection of three additional houses within the service area.

1 C 2 – Future Demand

As presented in Section 1 B 1 we propose to base demand predictions for a 15 year period on a permanent population of 45 and a peak population of 320.

Assuming that the per capita demand does not change the peak water take in 24 hours and annual consumption for these population estimates are:

	Current demand (m^3)	Future demand (m^3)
Maximum taken in 24 hrs	64	82
Annual consumption	6753	8682

As explained in Section 1 A 4 we currently impose restrictions on water use during the Christmas New Year period to minimise the peak daily demand as described in an extract from the newsletter below:

Between this weekend and early January the following activities are not permitted:

- *Washing cars, boats or houses*
- *Filling spas, pools etc*
- *Use of sprinklers or hoses for watering gardens*

Please also flush toilets only when necessary, turn off taps when washing teeth, avoid baths and keep showers short.

The daily demand estimate given above assumed these restrictions continue to be imposed.

Part 2 Action Steps and Plans

2 A Water Efficiency Plans

2 A 1 Current Options

To minimize water loss through leakage we carry out the following measures:

- Monitor water use daily and investigate any excess water use by selectively turning off zones and visual inspection within zones identified as having excess use. Repair of any leaks found. Ask customers to investigate properties for leaks or other reasons for excess use.
- Request customers to turn off their supplies at the road when they are not in residence.

To minimize consumption during the peak demand period we issue a newsletter in December to impose the restrictions given in Section 1 C 2 above. Newsletters are also issued at other times, which encourage good water use practices.

2 A 2 Possible New Options

The normal level leakage/loss based on overnight flow data is about 4.5 m^3/d. At weekends and during peak periods this leakage can increase over 10 m^3/d as a result of leaks within property boundaries as additional house connections are turned on.

To help investigate of leakage we plan to install additional flow meters in the distribution system to allow overnight flows to be monitored by zone. We are also considering the installation of a pressure reducing value to reduce the supply pressure in the highest pressure zone.

Further measures could include customer metering and encouraging residents to install rainwater tanks for non potable water use.

2 A 3 Implementation Plan

In 2020 install flow meters in the distribution system and a pressure reducing valve on the high pressure zone. Investigate overnight flows to identify locations of leaks or excess use. Consider actions needed to reduce leakage including:

- Visual inspections of the pipeline routes including excavation of inspection holes where appropriate
- Communication to residents to investigate potential reasons for excess use

In 2021 we will review the benefits of customer metering .