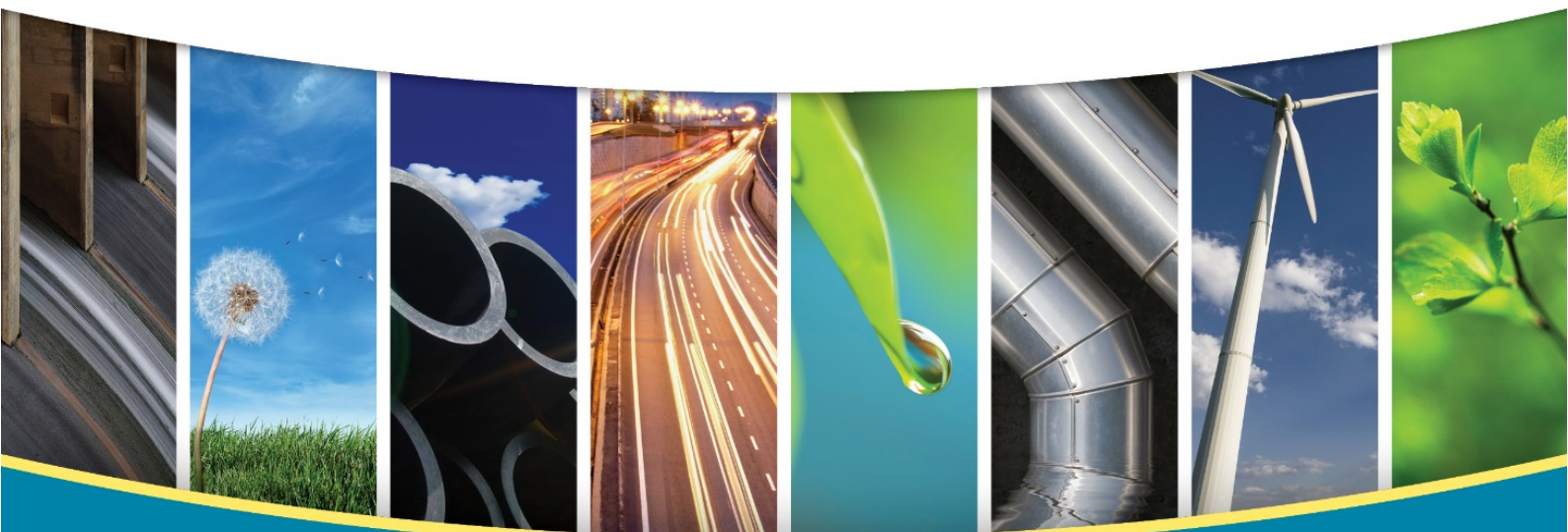


MAUNGATUROTO DROUGHT MANAGEMENT PLAN

Prepared for Kaipara District Council

September 2016



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Kaipara District Council

Maungaturoto Drought Management Plan

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1 Introduction

The existing resource consents for the Maungaturoto Water Supply (AUT.009888.0101-Pukekaroro and AUT.007582.01.02-Piroa) requires the production of a Drought Management Plan (DMP). Conditions of consent require that a DMP is produced (as part of the Maungaturoto Water Supply System Management Plan) that includes, but not limited to, the following:

- General water conservation measures;
- Drought stream flow trigger levels and actions to be taken specific to each water source;
- Water restriction measures and procedures
- Communication strategies; and
- Crisis management

2 Maungaturoto Water Supply Scheme Description

2.1 Raw Water Sources

The Maungaturoto water supply network is operated by Kaipara District Council (KDC) to provide treated water to Maungaturoto Township. The network also supplies raw water to the Fonterra's Maungaturoto Manufacturing Site and a number of farming properties with raw water connections.

Figure 2-1 depicts the water supply network. Water is sourced from three locations, namely the intakes at Cattlemount / Boar Hill, the Piroa Stream intake and the Baldrock Dam.

The Brynderwyn Stream was historically used as an emergency source, however due to poor water quality, the consent for this source was allowed to lapse. This location is therefore no longer considered part of the water supply scheme.

During periods of low water demand and above normal stream flows the raw water is sourced from Cattlemount / Boar Hill and the Piroa Stream. When these two sources cannot meet demand, supplementary raw water is sourced from the Baldrock Dam. The Piroa Stream pump and the Baldrock Dam pump cannot be operated at the same time due to the capacity of the main pipeline to Maungaturoto (Kaipara District Council, 2014).

Sections 2.1.1 to 2.1.3 provide further details for each of the three raw water sources.

2.1.1 Cattlemount/Boar Hill

KDC is authorised to take up to 2,650 m³/day from three tributaries of the Pukekaroro Stream under resource consent AUT.009888.01.01. All three takes are gravity fed through a concrete weir structure having a 5 mm screen (Kaipara District Council, 2014). Access from the nearest vehicular access point is via a narrow bush track that is cut into steep rock embankments for part of its length (CPG New Zealand Ltd, 2010).

Each of the three weirs gravity feeds a balance reservoir through 150 mm diameter pipes. There are control valves on each line and water taken from each weir enters the system until the balancing reservoir is full. Once the balancing reservoir is full, and provided there is no raw water demand within the water supply scheme, water overflows the weirs and re-enters the main water body downstream of the confluence between Cattlemount and Boar Hill Stream (CPG New Zealand Ltd, 2010) i.e. remains in the catchment area.

2.1.2 Piroa Stream

KDC is authorised to take up to 1,000 m³/day from the Piroa Stream when flows in the stream are greater than 11 L/s. Water is pumped through two submersible pumps which operate on a duty/standby arrangement.

The submersible pumps lift the water from the pump chamber beside the stream into a buffering tank located slightly above the stream. From the buffering tank the water is gravity fed into the raw water network.

A v-notch weir is located immediately downstream of the water intake to record the continuation flow in the Piroa Stream. This is connected to a water supply telemetry system and is used to manage the abstraction rate to ensure flows in the stream are not reduced to below the consent minimum continuation flow (11 L/s) (Kaipara District Council, 2014).

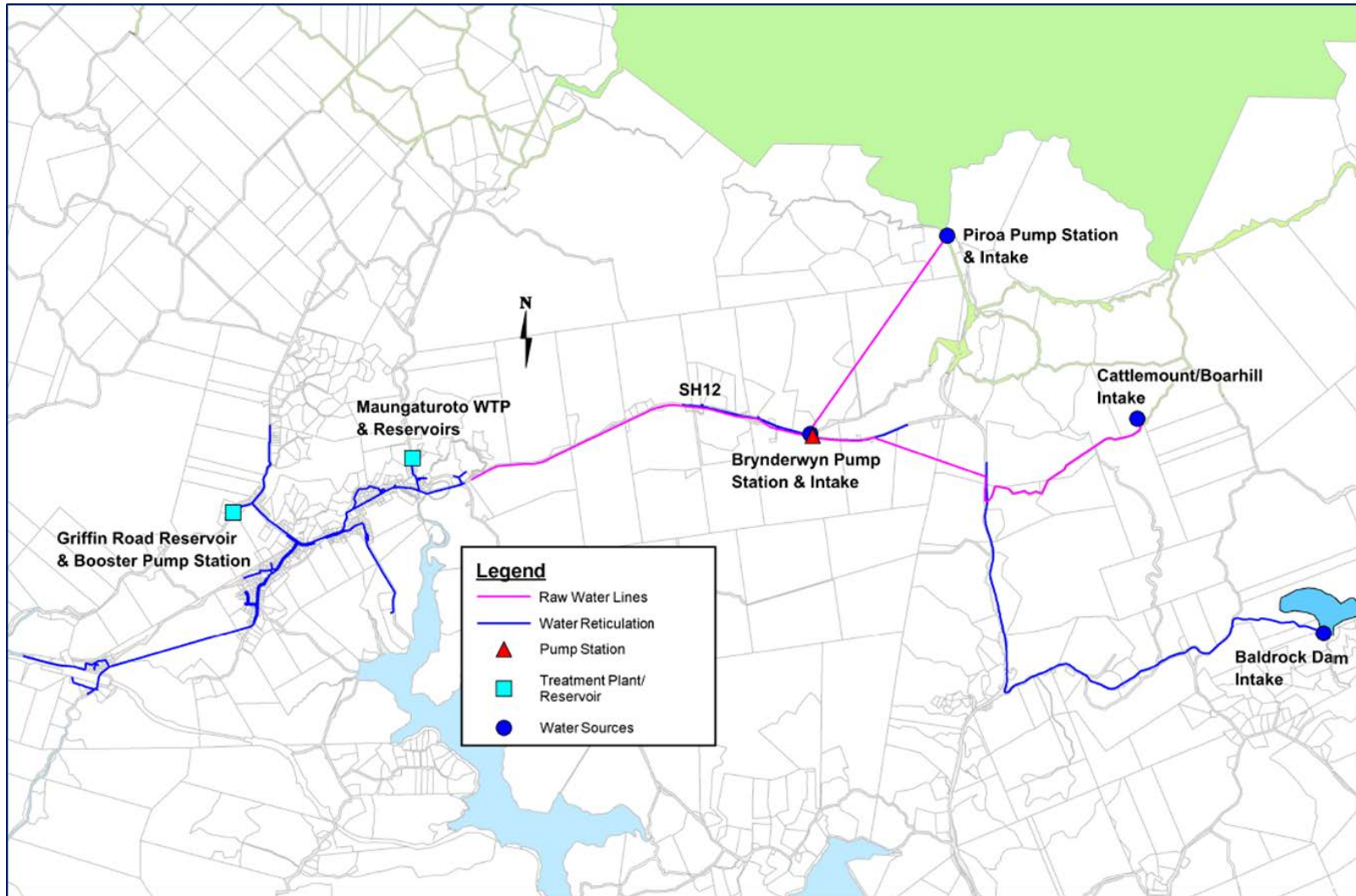


Figure 2-2: Maungaturoto Raw Water Supply

2.1.3 Baldrock Dam

The Baldrock Dam (also sometimes referred to as the Brooklands Dam) is a private 21 hectare irrigation reservoir created by the construction of an earth dam on private farm land to the east of Maungaturoto Township.

The volume of water that can be supplied by the dam to the network is restricted by the hydraulic capacity of the pipeline and the agreement between the KDC and the dam owners. These restrictions mean that this source alone cannot meet peak demand volumes.

2.2 Raw Water Reticulation Network Constraints

The raw water reticulation network is divided into four parts, the pipeline from Cattlemount, the pipeline from Piroa, the Baldrock Dam pipeline and the combined raw water pipeline from the corner of SH12 and Brynderwyn Road to the Maungaturoto water treatment plant (WTP) (as shown in Figure 2-1).

The Cattlemount pipeline and the combined raw water pipeline were installed in the late 1960s and are the oldest of the raw water lines. The majority of these pipes are made up of 200 mm diameter asbestos cement (AC). This pipe is coming to the end of its anticipated life and is prone to breakages due to pressure fluctuations.

The Piroa pipeline is a 100 mm diameter AC pipe and was installed in the year 2000. The Baldrock Dam pipeline was built in 2009. This line is 180 mm diameter polyethylene (PE) and is in excellent condition.

Given the age of the main 200 mm diameter AC raw water line, it is not operationally possible to operate the Piroa and Baldrock dam pump stations at the same time as this may lead to over-pressurisation and breakages in this pipeline resulting in no supply to the Maungaturoto Township and Fonterra Manufacturing Site.

All four pipelines have the same basic design with the pipe generally laid between 500 mm - 1,000 mm below ground level. The lines have a number of valves along the length of the pipeline for sections to be isolated and repairs completed.

Due to the hilly topography, the pipeline is located above ground at a number of points (stream crossings) along the route. Sections of pipe located above ground are constructed of spiral welded steel pipe.

The agreement between the KDC and the Brooklands Irrigation Scheme allows KDC to take up to 270,000 m³ per year from the dam. The pumps and pipeline constraints mean that this supply allows for a maximum of 1,200 m³/day to be supplied to the network.

Fonterra draws water from the raw water line just before the Maungaturoto WTP for up to 18 hours per day. During the remaining six hours, three hours during the morning and three hours at night, raw water is discharged to the Maungaturoto WTP to be treated for community supply.

2.3 Water Demand

There are three sources of water demand on the Maungaturoto water supply, residential (community), industrial (Fonterra) and agricultural for irrigation and stock watering.

The average daily treated water output from the Maungaturoto WTP is 650 m³/day, rising to a peak demand of approximately 1,050 m³/day.

Approximately 20 farms are connected to the raw water lines. All these connections are metered and include backflow prevention devices (Kaipara District Council, 2014). It is estimated that the peak raw water demand from these farms is approximately 39 m³/day.

Fonterra has an existing agreement with KDC to take raw water from the Maungaturoto water supply scheme prior to discharge to the Maungaturoto WTP. Section 2.3.1 summarises the demand for water from the Fonterra Manufacturing Site.

2.3.1 Fonterra Maungaturoto

Fonterra's demand for water is seasonal with greatest demand occurring between September and December and low demand occurring between May and July.

The Fonterra Manufacturing Site produces whole milk powder, butter milk powder, casein, skim milk powder, and whey powder. During peak operation the Manufacturing Site is capable of processing 2,300,000 L of milk and buttermilk per day.

Fonterra undertakes audits of its water use efficiency, these audits include an assessment of the ratio of water consumed to milk produced. A best practice water efficiency score of 1.02 is based on Fonterra's internal best practice standard. The May 2015 audit calculated a water efficiency index of 0.89 which suggests that the Manufacturing Site's current water efficiency is already better than the best practice.

The May audit also noted that while water use at the site was better than best practice standards; the overall use of water has increased recently. This increase is attributed to greater milk production and higher food safety standards. The Manufacturing Site will be making process changes to further improve product quality, particularly in the casein plant to address the changes in the food safety standards. This will potentially result in increased demand for water.

Table 2-1 summarises the current and projected water demand from Fonterra.

Table 2-1: Fonterra Current and Projected Water Demand

Period	Water Use (m ³ /day)		
	2015	2016	Medium/Long Term
Peak Daily	2,433	2,750	2,900
Average Daily based on Peak Weekly	2,219	2,500	2,500
Average Daily based on Peak Monthly	2,135	2,400	2,500

3 Drought Management Triggers and Restrictions

3.1 General

Water restrictions can be considered a blunt instrument and should only be used when there are water shortage conditions whereas demand management programmes are ongoing and aim to continually improve the efficiency in which water is used by urban communities. Restriction rules are designed to reduce demand when water levels get low. They are temporary actions, which rely upon a reduction in discretionary demand such as outdoor water use.

3.2 Current Restrictions

The most efficient way to temporarily reduce water consumption in times of drought or water shortage is to introduce water restrictions. Water restrictions theoretically allow the water source to last longer under a variety of usage and drought scenarios. Under KDC's Water Supply Bylaw 2008, KDC has the legal power to determine, implement and enforce water restrictions.

New Zealand water suppliers typically have a staged approach to water restrictions, with the first stages involving a variety of garden watering restrictions and later stages including complete hosing bans. These restrictions target garden watering due to its high proportion of peak demands and discretionary nature during the summer months.

KDC has had a DMP in place since 2010. The 2010 DMP set out three alert levels (green, amber and red) based on flow trigger values, corresponding actions to manage the raw water intakes and communications. However, the 2010 DMP was prepared before the current consents for Pukekaroro and Piroa were granted in 2014.

3.3 Proposed Trigger Points and Restrictions

From December 2016 it is proposed that KDC introduces and implements a four stage restriction level.

The proposed trigger points, related restrictions, community actions, KDC actions and KDC communications operations staff actions relating to the Water Alert Levels are described in Table 3-1 below. The KDC Communications Manager is drafting templates for each of the Water Alert Levels, a sample is attached under Appendix A.

Appendix B and C have been included to show the specific actions for KDC communications and operations staff that relate to each proposed Water Alert Level.

Table 3-1: Water Alert Levels and Restrictions

Water Alert Level	Triggers		Available Flow from Cattlemount (m ³ /day)	Actions			KDC General Actions	Community Actions
	Flow in Piroa Stream (m ³ /d)	Baldrock Dam – Cumulative Annual Usage (m ³ /year)		Piroa Stream	Baldrock Dam	Cattlemount/Boar Hill Intakes		
Business as usual	>1500 (17.4L/sec)	<270,000	2650	Continue as normal.	Supply not needed.	Continue as normal.	Monitor year to date water usage at Baldrock Dam.	No restrictions in place. Minimise losses and efficient use of water encouraged.
1	1500-1000 (17.4-11.6 L/sec)	<270,000	2650	Check the filter screens at all intakes to ensure they are clear. Check intake pipes and areas where high breakages of pipes are known to occur to ensure minimal leaks are occurring. Monitoring intake to ensure minimum levels of flows are still being achieved. Flow in stream to be monitored such that it does not fall below 11L/sec. Piroa stream generally gets dry first and hence monitor the stream flow.	Confirm Baldrock Dam Intake operational – check filter screen for clogging and all pipes for breakages. Establish a date to bring in Baldrock supply – assume maximum period of 20 days before Piroa Stream flow reduces to 950m ³ /day. Begin discussions with dam owners on raw water availability.	Check the filter screens at all intakes to ensure they are clear. Check intake pipes and areas where high breakages of pipes are known to occur to ensure minimal leaks are occurring.	Monitor overall raw water availability and demand on daily basis and report to Operations Engineer. Begin discussions with Fonterra on raw water availability. Monitor year to date water usage at Baldrock Dam.	Issue Community Notice Water Alert Level 1 . KDC Communications Manager to publish notice in local newspaper. General water conservation awareness. No restrictions in place.
2	<1000 (11.6 l/sec)	<270,000	<1000	Adjust water take to comply with minimum take of 11 L/sec. If required cease take.	Bring Baldrock Dam supply on line. Monitor pump station intake and dam level. Continue discussions with dam owners on raw water availability.	Check the filter screens at all intakes to ensure they are clear. Check intake pipes and areas where high breakages of pipes are known to occur to ensure minimal leaks are occurring.	Monitor overall raw water availability and demand on daily basis and report to Operations Engineer. Advise Fonterra that Piroa take has ceased operation and raw water supply may be restricted depending on Fonterra's demand.	Issue Community Notice Water Alert Level 2 . KDC Communications Manager to publish notice in local newspaper. Notice to conserve water. No sprinkler notice

Water Alert Level	Triggers		Available Flow from Cattlemount (m³/day)	Actions			KDC General Actions	Community Actions
	Flow in Piroa Stream (m³/d)	Baldrock Dam – Cumulative Annual Usage (m³/year)		Piroa Stream	Baldrock Dam	Cattlemount/Boar Hill Intakes		
								<p>KDC Communications Manager to publish media release on river levels, rainfall and dam levels.</p> <p>KDC Communications Manager to contact Fire Service and Rural Fire Service requested to stop practicing and testing from live fire hydrants.</p>
3	<1000 (11.6 l/sec)	<270,000	<1000	Ceased operation.	<p>Continue usage at average daily year to date take.</p> <p>Monitor pump station intake and dam level.</p> <p>Continue discussions with dam owners on raw water availability.</p>	<p>Check the filter screens at all intakes to ensure they are clear.</p> <p>Check intake pipes and areas where high breakages of pipes are known to occur to ensure minimal leaks are occurring.</p>	<p>Monitor overall raw water availability and demand on daily basis and report to Operations Engineer.</p> <p>Advise Fonterra that raw water supply is limited and only certain volumes can be provided. This is dependent on the overall raw water availability.</p>	<p>Issue Community Notice Water Alert Level 3. KDC Communications Manager to publish notice in local newspaper.</p> <p>Sprinkler ban.</p> <p>Hose ban.</p> <p>Communicate with raw water farms supplies on reducing water usage.</p> <p>KDC Communications Manager to publish media release on river levels, rainfall and dam levels.</p> <p>KDC Communications Manager to organise radio advertising.</p> <p>Water Alert Level 3 to front page of KDC website.</p>

Water Alert Level	Triggers		Available Flow from Cattlemount (m ³ /day)	Actions			KDC General Actions	Community Actions
	Flow in Piroa Stream (m ³ /d)	Baldrock Dam – Cumulative Annual Usage (m ³ /year)		Piroa Stream	Baldrock Dam	Cattlemount/Boar Hill Intakes		
4	<1000 (11.6 l/sec)	>270,000 (difficulties taking water from Baldrock Dam)	<1000	Ceased operation.	Continue usage at average daily year to date take. Monitor pump station intake and dam level. Continue discussions with dam owners on raw water availability.	Check the filter screens at all intakes to ensure they are clear. Check intake pipes and areas where high breakages of pipes are known to occur to ensure minimal leaks are occurring.	Monitor overall raw water availability and demand on daily basis and report to Operations Engineer. Advise Fonterra that raw water supply is limited and only certain volumes can be provided. This is dependent on the overall raw water availability. If the situation continues, KDC will advise commercial operations to close and will provide water supply to residents through water tankers depending on the availability of water in the region.	Issue Community Notice Water Alert Level 4 . KDC Communications Manager to publish notice in local newspaper. Sprinkler ban. Hose ban. No pool filling. Communicate with raw water farms supplies on reducing water usage. KDC Communications Manager to publish media release on river levels, rainfall and dam levels. KDC Communications Manager to organise radio advertising. Water Alert Level 4 to front page of KDC website. Letter drop to all Maungaturoto residents advising of restrictions. KDC Communications Manager to contact dialysis patients by contacting Northland District Health Board.

4 Implementation

4.1 Drought Management Response Team

KDC has established the following Drought Management Response Team (DMRT) to be led by the Water Services Manager. The Drought Management Response Team shall be convened on an 'as needs' basis to oversee the implementation of restrictions, review performance, conduct post event reviews and recommend any changes to the DMP.

The team consists of:

- Water Services Manager – Overall responsibility for the DMP and reporting to the General Manager Infrastructure;
- Planning and Design Engineer – Responsible for co-ordination of KDC responsibilities for implementing the DMP actions; and
- Operations Engineer – Responsible for liaising with contractors for operational changes to the water supply scheme and reporting to NRC.

The Drought Management Response Team members are shown in the organisation chart in Figure 4-1.

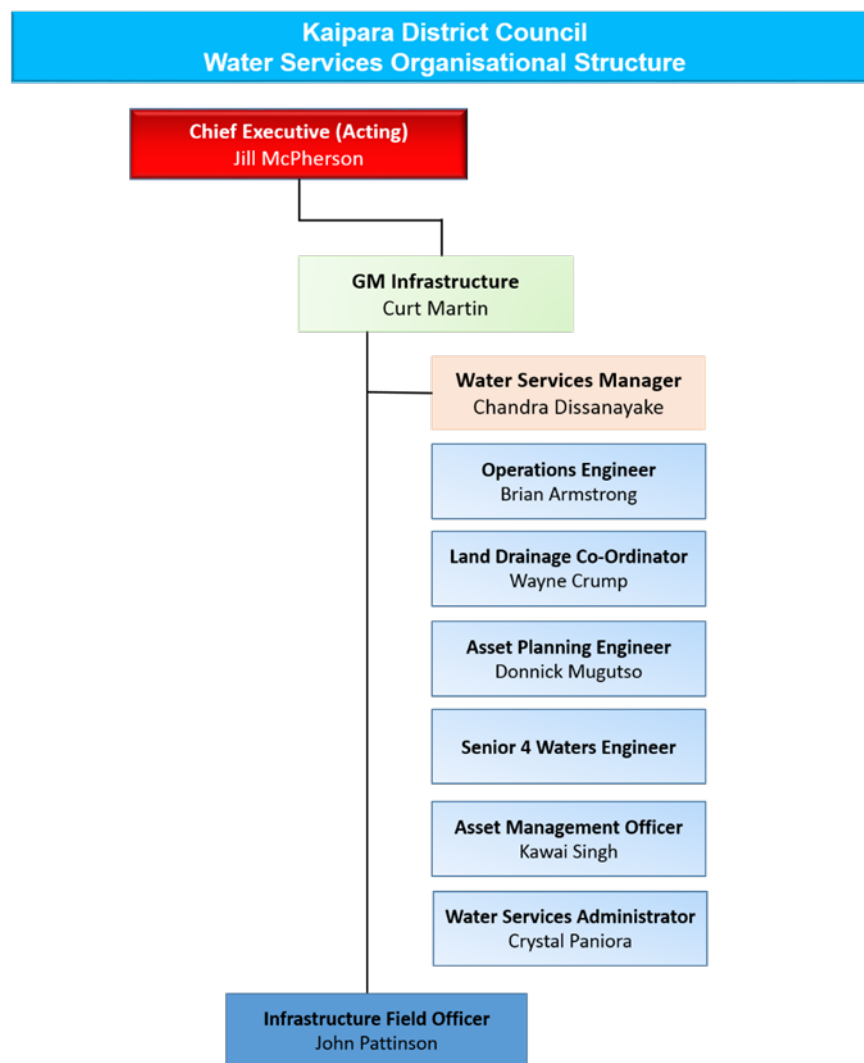


Figure 4-1: KDC Water Services Organisation Chart

4.2 Authorising Provisions

In emergency situations KDC may impose water restrictions in accordance with the Water Supply Bylaw 2008 and the provisions of the Local Government Act 2002.

4.3 Communications Plan

4.3.1 General Communications

KDC will actively promote permanent water conservation measures and when required, the introduction of water restrictions. To ensure effective communication is achieved a Communication Plan should be developed.

The Communication Plan should:

- Inform the community of the current water supply situation and the reasons for introducing water restrictions;
- Provide an explanation of the water restriction requirements;
- Provide an explanation of the enforcement procedures;
- Include an educational campaign to encourage water conservation practices; and
- Provide ongoing feedback to the community on the water supply situation.

It is anticipated that the Communication Plan would include:

- Advertising the restrictions in the local newspapers;
- Advertising the restrictions on local radio;
- Direct mail;
- Notices sent out with rates notices;
- Media releases;
- Electronic road signage on main highway traffic areas; and
- Signage in information centres, libraries, and public places.

4.3.2 Baldrock Dam

KDC will maintain regular contact with the Baldrock Dam owners. Year to date consumption should be monitored on a continual basis. Should Water Alert Level 1 be triggered discussions should commence with the Dam owners on overall water availability.

4.4 Monitoring Plan

The DMP must be responsive, effective and flexible. In order to achieve this it is critical to monitor the water supply systems on a regular basis (from Water Alert Level 1 onwards) to allow proper implementation of the Plan.

The following monitoring is proposed:

- Daily monitoring of demands;
- Daily monitoring of flows in the Kaihu River and levels in the Waiatua dam;
- Baldrock Dam year to date consumption levels; and
- The impact of restrictions on consumption.

4.5 Annual Review

At the beginning of the summer dry season (prior to November 1) the Water Services Manager will organise and facilitate a meeting between KDC and NRC.

The meeting will address but not be limited to the following:

- Key staff introduced, staff changes highlighted;
- Contact details collated and distributed;
- Climate outlook;
- Trigger levels in the Piroa Stream;
- Effectiveness of KDC and Media Actions as described in Table 3-1 of this DMP;
- Results of any monitoring undertaken;
- Statutory requirements (changes or additions highlighted); and
- General expectations of all parties.

Appendices



Appendix A Example Water Conservation Notices

Water Conservation

The drier weather is upon us and Council is urging all residents to think about conserving water.

Everyone can help save water by using some of the following tips:

- not using garden sprinklers
- using hoses to a minimum
- avoiding washing vehicles
- not filling swimming pools
- checking that taps are not dripping.

For more information and tips on saving water visit our website www.kaipara.govt.nz or contact the

Appendix B Water Alert Levels – KDC Communications Staff Tasks

Water Alert Level	Triggers			Community Actions
	Flow in Piroa Stream (m ³ /d)	Baldrock Dam – Cumulative Annual Usage (m ³ /year)	Available Flow from Cattlemount (m ³ /day)	
Business as usual	>1500 (17.4L/sec)	<270,000	2650	No restrictions in place. Minimise losses and efficient use of water encouraged.
1	1500-1000 (17.4-11.6 L/sec)	<270,000	2650	Issue Community Notice Water Alert Level 1 . KDC Communications Manager to publish notice in local newspaper. General water conservation awareness. No restrictions in place.
2	<1000 (11.6 l/sec)	<270,000	<1000	Issue Community Notice Water Alert Level 2 . KDC Communications Manager to publish notice in local newspaper. Notice to conserve water. No sprinkler notice KDC Communications Manager to publish media release on river levels, rainfall and dam levels. KDC Communications Manager to contact Fire Service and Rural Fire Service requested to stop practicing and testing from live fire hydrants.
3	<1000 (11.6 l/sec)	<270,000	<1000	Issue Community Notice Water Alert Level 3 . KDC Communications Manager to publish notice in local newspaper. Sprinkler ban. Hose ban. Communicate with raw water farms supplies on reducing water usage. KDC Communications Manager to publish media release on river levels, rainfall and dam levels. KDC Communications Manager to organise radio advertising. Water Alert Level 3 to front page of KDC website.

Water Alert Level	Triggers			Community Actions
	Flow in Piroa Stream (m ³ /d)	Baldrock Dam – Cumulative Annual Usage (m ³ /year)	Available Flow from Cattlemount (m ³ /day)	
4	<1000 (11.6 l/sec)	>270,000 (difficulties taking water from Baldrock Dam)	<1000	<p>Issue Community Notice Water Alert Level 4. KDC Communications Manager to publish notice in local newspaper.</p> <p>Sprinkler ban.</p> <p>Hose ban.</p> <p>No pool filling.</p> <p>Communicate with raw water farms supplies on reducing water usage.</p> <p>KDC Communications Manager to publish media release on river levels, rainfall and dam levels.</p> <p>KDC Communications Manager to organise radio advertising.</p> <p>Water Alert Level 4 to front page of KDC website.</p> <p>Letter drop to all Maungaturoto residents advising of restrictions.</p> <p>KDC Communications Manager to contact dialysis patients by contacting Northland District Health Board.</p>

Appendix C Water Alert Levels – KDC Operations Staff Tasks

Water Alert Level	Triggers			Actions			KDC General Actions
	Flow in Piroa Stream (m³/d)	Baldrock Dam – Cumulative Annual Usage (m³/year)	Available Flow from Cattlemount (m³/day)	Piroa Stream	Baldrock Dam	Cattlemount/Boar Hill Intakes	
Business as usual	>1500 (17.4L/sec)	<270,000	2650	Continue as normal.	Supply not needed.	Continue as normal.	-
1	1500-1000 (17.4-11.6 L/sec)	<270,000	2650	<p>Check the filter screens at all intakes to ensure they are clear.</p> <p>Check intake pipes and areas where high breakages of pipes are known to occur to ensure minimal leaks are occurring.</p> <p>Monitoring intake to ensure minimum levels of flows are still being achieved.</p> <p>Flow in stream to be monitored such that it does not fall below 11L/sec.</p>	<p>Confirm Baldrock Dam Intake operational – check filter screen for clogging and all pipes for breakages.</p> <p>Establish a date to bring in Baldrock supply – assume maximum levels of 20 days before Piroa Stream gets to 950m³/day.</p> <p>Begin discussions with dam owners on raw water availability.</p>	<p>Check the filter screens at all intakes to ensure they are clear.</p> <p>Check intake pipes and areas where high breakages of pipes are known to occur to ensure minimal leaks are occurring.</p>	<p>Monitor overall raw water availability and demand on daily basis and report to Operations Engineer.</p> <p>Begin discussions with Fonterra on raw water availability.</p>
2	<1000 (11.6 l/sec)	<270,000	<1000	<p>Adjust water take to comply with minimum take of 11 L/sec.</p> <p>If required cease take.</p>	<p>Bring Baldrock Dam supply on line.</p> <p>Monitor pump station intake and dam level.</p> <p>Continue discussions with dam owners on raw water availability.</p>	<p>Check the filter screens at all intakes to ensure they are clear.</p> <p>Check intake pipes and areas where high breakages of pipes are known to occur to ensure minimal leaks are occurring.</p>	<p>Monitor overall raw water availability and demand on daily basis and report to Operations Engineer.</p> <p>Advise Fonterra that Piroa take has ceased operation and raw water supply may be restricted depending on Fonterra's demand.</p>

Water Alert Level	Triggers			Actions			KDC General Actions
	Flow in Piroa Stream (m ³ /d)	Baldrock Dam – Cumulative Annual Usage (m ³ /year)	Available Flow from Cattlemount (m ³ /day)	Piroa Stream	Baldrock Dam	Cattlemount/Boar Hill Intakes	
3	<1000 (11.6 l/sec)	<270,000	<1000	Ceased operation.	Continue usage at average daily year to date take. Monitor pump station intake and dam level. Continue discussions with dam owners on raw water availability.	Check the filter screens at all intakes to ensure they are clear. Check intake pipes and areas where high breakages of pipes are known to occur to ensure minimal leaks are occurring.	Monitor overall raw water availability and demand on daily basis and report to Operations Engineer. Advise Fonterra that raw water supply is limited and only certain volumes can be provided. This is dependent on the overall raw water availability.
4	<1000 (11.6 l/sec)	>270,000 (difficulties taking water from Baldrock Dam)	<1000	Ceased operation.	Continue usage at average daily year to date take. Monitor pump station intake and dam level. Continue discussions with dam owners on raw water availability.	Check the filter screens at all intakes to ensure they are clear. Check intake pipes and areas where high breakages of pipes are known to occur to ensure minimal leaks are occurring.	Monitor overall raw water availability and demand on daily basis and report to Operations Engineer. Advise Fonterra that raw water supply is limited and only certain volumes can be provided. This is dependent on the overall raw water availability.



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