

**Proposed Plan Change 4A  
(Groundwater and  
North Otago Volcanic Aquifer)**

**to the  
Regional Plan: Water for Otago**

**Officer's Report on  
Decisions Requested**



## **Introduction**

### **Key aspects of the proposed plan change**

The Otago Regional Council has prepared Proposed Plan Change 4A (Groundwater and North Otago Volcanic Aquifer) to the Regional Plan: Water for Otago. Key aspects of the proposed plan change are:

#### **Groundwater management framework**

- Add a new schedule of matters to be considered when setting maximum allocation volumes and restriction levels.
- Provide a framework for calculation of consented groundwater allocation.
- Define the purpose and use of restriction levels.
- Allow the effect of groundwater take on an aquifer's properties to be considered under the restricted discretionary rule.
- Provide for management of groundwater takes where there is a risk of aquifer contamination.
- Correct Roxburgh Aquifer restriction levels to reflect mean sea-level datum.
- Simplify groundwater volumes that can be taken without consent.

#### **North Otago Volcanic Aquifer**

- Extend the boundaries of the North Otago Volcanic Aquifer.
- Replace management of the Deborah and Waiareka Aquifers with the North Otago Volcanic Aquifer.
- Set a maximum allocation volume for the North Otago Volcanic Aquifer.

#### **Community groundwater supplies**

- Provide for restriction levels to be applied to groundwater takes used for community supply.
- Provide for connected groundwater takes used for community supply to be exempt from minimum flows.
- Update groundwater takes used for community supply.

### **Notification process**

The proposed plan change was publicly notified in the Otago Daily Times on Saturday 18 September 2010 and submissions closed on Monday 18 October 2010. A total of 9 submissions were received (2 of which were received after the formal submission period).

The *Summary of Decisions Requested*, which requested further submissions, was notified on Saturday 13 November 2010, with further submissions closing on Friday 26 November 2010. There were 2 further submissions received.

### **The purpose of this report**

This report evaluates decisions requested by submitters and further submitters, and makes recommendations to the Hearing Committee. Provisions with amendments that did not receive submissions are not discussed, so these amendments should be approved without change.

## Documents referred to in this report

This report should be read in conjunction with the following documents:

- Proposed Plan Change 4A (Groundwater and North Otago Volcanic Aquifer) to the Regional Plan: Water for Otago (18 September 2010).
- Summary of Decisions Requested (8 April 2011).

Reasoning for the proposed plan change (as notified), and consideration of alternatives, benefits and costs, is detailed in:

- Section 32 Report – Consideration of alternatives, benefits and costs (18 September 2010).

<b>Abbreviations</b>	
Mm <sup>3</sup> /year	Million cubic metres per year
NES	National Environmental Standard
ORC	Otago Regional Council
Proposed plan change / plan change	Proposed Plan Change 4A (Groundwater and North Otago Volcanic Aquifer) to the Regional Plan: Water for Otago
RMA	Resource Management Act 1991
Section 32 report	The report assessing alternatives, benefits and costs for proposed plan change 4A to the Water Plan as required by Section 32 of the RMA
Water Plan	Regional Plan: Water for Otago
<b>Note: use of section/Section:</b>	
section	A reference to another section in this report. A reference to a section of the Water Plan.
Section	A Section of the RMA.

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# CHAPTER 1 - GROUNDWATER MANAGEMENT FRAMEWORK

## Introduction

The Water Plan allows for the taking of groundwater<sup>1</sup>:

- within an aquifer's "maximum allocation volume";
- subject to relevant restriction levels;
- avoiding contamination of groundwater or surface water; and
- avoiding permanent aquifer compression.

A review of the provisions for groundwater highlighted the need for further clarification regarding maximum allocation volumes and the use of restriction levels, and how adverse effects on the aquifer are avoided. The proposed plan change also provided the opportunity to simplify and streamline the permitted activity rules for taking groundwater.

## 1.1 Setting maximum allocation volumes and restriction levels

A new schedule is proposed to list the matters to which consideration will be given when setting a maximum allocation volume or restriction level in the Water Plan.

*For detail of new Schedule 4C, and the submissions it received, refer to:*

- *Proposed Plan Change 4A: page 27*
- *Summary of Decisions Requested: pages 15-16*

### 1.1.1 Matters raised by submitters

Three submitters request decisions on Schedule 4C, for recognition of:

- the cumulative effect of groundwater takes on existing lawful surface water uses, such as hydro-electric power generation; and
- the relationship between recharge and maximum allocation volume; and
- restriction levels sustaining the life-supporting capacity of an aquifer (in relation to Policy 6.4.10AB).

### 1.1.2 Discussion

#### Cumulative effects on surface water

The list in 4C.1 identifies matters considered when setting maximum allocation volumes. It includes "interaction with surface water bodies and their values", so a specific provision recognising existing lawful surface water uses, and in particular hydroelectric generators, is not necessary. Chapter 5 of the Water Plan clearly identifies water body values as both natural and human use.

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<sup>1</sup> For the purposes of this discussion, excluding groundwater with a clear connection to surface water.

The list also includes “any other relevant matter in giving effect to Part 2 of the RMA”. Listing each of those matters from Section 5 to Section 8 in the Water Plan is unnecessary. In addition, renewable energy is one of eleven matters for consideration listed in Section 7 of the RMA, and should not be given preference over any other such matters.

### **Recharge and maximum allocation volume**

The list in 4C.2 identifies matters considered when setting restriction levels. Item (c) is “the amount and characteristics of recharge to the aquifer”, while item (d) is “the proposed or existing maximum allocation volume”. More explicit recognition of their relationship by adding “and the extent to which the aquifer recovers from maximum allocation volumes” to (c) is unnecessary and unhelpful, as item (d) addresses the matter.

### **Life supporting capacity**

The explanation to Policy 6.4.10AB highlights restriction levels assist in avoiding reduced outflows to surface water, and a submitter requests amendment to further recognise that restriction levels can sustain the life supporting capacity of an aquifer. While the matters considered when setting maximum allocation volumes lists “interaction with surface water bodies and their values” it is not listed in the matters considered when setting restriction levels (as notified), which was an oversight that should be amended.

## **1.1.3 Recommendations**

Recognise restriction levels can assist in avoiding reduced outflows to surface water by amending Schedule 4C.2 as follows:

**4C.2** When setting restriction levels in Schedule 4B for an aquifer, consideration will be given to the following matters:

- (a) Physical properties of the aquifer;
- (b) Variance of groundwater levels in the aquifer;
- (c) The amount and characteristics of recharge to the aquifer;
- (d) The proposed or existing maximum allocation volume;
- (e) Interaction with surface water bodies and their values;
- (ef) Any actual or potential effect of drawdown on groundwater quality; and
- (fg) The environmental, social, cultural and economic effects of the restriction level on existing users of groundwater from the aquifer.

*Reasons:*

- The list in 4C.1 already provides for consideration of effects on surface water bodies and Part 2 of the RMA, and is consistent with the Regional Policy Statement for Otago.

- Renewable energy should not be given preference over any other matters provided for in Section 5, 6, 7 or 8, nor is it necessary to repeat Part 2 of the RMA.
- More explicit recognition of the relationship between recharge and the maximum allocation volume is unnecessary and unhelpful.
- How an aquifer interacts with surface water and its values is a key consideration when setting a restriction level, and is consistent with Policy 6.4.10AB.

## 1.2 Calculation of consented take

Policy 6.4.10A defines the “maximum allocation volume” of an aquifer. It is the greater of the amount listed in Schedule 4A or 50% of an aquifer’s calculated mean annual recharge, and the “assessed maximum annual groundwater take”. New method 15.8.3 clarifies the calculation of “assessed maximum annual groundwater take”.

*For detail of new Method 15.8.3, and the submissions it received, refer to:*

- *Proposed Plan Change 4A: pages 20-21*
- *Summary of Decisions Requested: page 12*

### 1.2.1 Matters raised by submitters

One submitter requests decisions on:

- Allowance for adjustment of the annual volume when it is calculated using instantaneous or weekly figures.
- Clarification of the purpose of the method.

### 1.2.2 Discussion

#### **Annual volumes**

Many older consents are restricted by instantaneous, daily, weekly or monthly limits (or a combination of those limits), rather than by an annual limit. As the maximum allocation volume of an aquifer is an annual limit, the consent limits require conversion. Unless the take is for a seasonal activity, a 12 month take is assumed: takes for frost-fighting are considered over a 20 day period, while for irrigation a conversion is used to simulate total take over an irrigation season.

The conversion of daily or monthly limits to a typical irrigation season is simple (multiply by 90, or by 6, respectively). The conversion of a weekly limit requires an additional step (multiply by 4.3 then multiply by 6). It is better to use daily, weekly or monthly limits rather than an instantaneous limit, because they are more likely to reflect actual use, and the greater time increment thereby lessens the likelihood of error. Additional assumptions

are made for an instantaneous limit, such as the hours per day that take is exercised. Such assumptions could result in compounding a small error into a larger one.

While it would be useful for ORC to assess and adjust volumes on a case-by-case basis, this does not provide an acceptable level of certainty to the process.

Until all takes are metered and at least five years data collected, or until new consents are sought and assessments of take and use are made, there remains a risk of miscalculating the assessed maximum annual take from an aquifer. If the ORC has underestimated take, consents to take water from the aquifer could inadvertently be granted beyond the maximum allocation volume. If the ORC has overestimated take, water not taken from the aquifer will not be able to be reallocated until all old consents have been replaced.

The risks of significantly underestimating or overestimating takes is considered low, as a typical irrigation season is known, and unlike surface water, groundwater is not pumped to storage (as the aquifer functions as a storage reservoir). There are few consents with only an instantaneous limit on them. As such, the risk of adopting Method 15.8.3 is acceptable.

### **Purpose of the method**

The purpose of the method is to allow the ORC to establish assessed maximum annual take from an aquifer, to determine if further volumes may be consented within the maximum allocation volume. The method could result in limitations being imposed on new consents, to ensure new takes granted remain within an aquifer's maximum allocation volume. It is not necessary to state the purpose of the method, which is clarified by the headings of sections 15.8 and 15.8.3, and the explanation to Policy 6.4.10A.

Method 15.8.3 would benefit from amendment to clarify which consents are not counted within the maximum allocation volume. This is currently stated in Policy 6.4.10A(a). Method 15.8.3.1 should be amended to be consistent with Policy 6.4.10A(a), and clarify certain consents should not be included in the calculation.

### **1.2.3 Recommendation**

Be consistent with Policy 6.4.10A(a) by amending Method 15.8.3.1 as follows:

15.8.3.1 The assessed maximum annual take of groundwater from any aquifer for the purposes of Policy 6.4.10A(a), will be the sum of:

- (a) ... and
- (b) ...

less any quantity in a consent where all of the water taken is immediately returned to the aquifer or connected surface water

body.

*Reasons:*

- The method of calculation must be stated in certain and definitive terms to ensure consistent application across aquifers over time.
- The risk of compounding errors is low.
- The headings of sections 15.8 and 15.8.3 and the explanation to Policy 6.4.10A clarify the purpose of the method.
- The method could result in limitations being imposed on new consents in some circumstances.
- Method 15.8.3.1 should be consistent with Policy 6.4.10A(a).

### **1.3 Purpose and use of restriction levels**

New Policy 6.4.10AB provides for restriction levels to be defined, where needed, to protect aquifer properties and water storage.

*For detail of new Policy 6.4.10AB, and the submissions it received, refer to:*

- *Proposed Plan Change 4A: page 6*
- *Summary of Decisions Requested: pages 6-8*

#### **1.3.1 Matters raised by submitters**

Three submitters request decisions on:

- Recognition that restriction levels can sustain the life-supporting capacity of an aquifer.
- Clarification that aquifer recharge volumes are an important part of establishing restriction levels.
- Recognition of the adverse impact restrictions will have on community water supplies (which is discussed in section 3.1 of this report).

#### **1.3.2 Discussion**

##### **Life-supporting capacity**

The explanation to Policy 6.4.10AB states restriction levels “can assist in avoiding...reduced outflows to surface water”. The habitat of aquatic species that live within river gravels can be sustained by outflows of groundwater in “gaining reaches” of rivers (i.e. where the river gains water from, rather than loses water to, the aquifer), so the explanation should be amended to recognise this.

### **Recharge volumes**

It is not necessary to add to the explanation that the extent of the aquifer recharge volumes will be an important part of establishing restriction levels. Policy 6.4.10AB provides for restriction levels to be set. The explanation details why they can be useful, and states “Schedule 4C.2 provides detail of the matters that may be considered when setting restriction levels”. Aquifer recharge volumes are one factor considered when setting restriction levels, and are already included in the schedule as item (c).

### **1.3.3 Recommendations**

Recognise groundwater outflows can support aquatic ecosystems by amending the explanation to Policy 6.4.10AB as follows:

#### **Explanation**

Groundwater restriction levels can be useful for protecting an aquifer from over-depletion due to extended periods of low recharge, or in managing localised areas of high demand. They can assist in avoiding land subsidence, aquifer compression, ~~and~~ reduced outflows to surface water, and the life supporting capacity of those water bodies. Near the coast or contaminated sites restrictions can minimise the potential for water quality effects by intrusion. ...

#### *Reasons:*

- Groundwater outflows to surface water can support aquatic ecosystems.
- Schedule 4C.2 provides detail of matters considered when setting restriction levels.
- The submissions regarding the adverse impact restrictions will have on community water supplies are discussed in section 3.1 of this report.

## **1.4 Consideration of the effects of take on an aquifer’s properties**

Rule 12.2.3.4 lists matters to which the ORC’s discretion is restricted when considering certain applications to take groundwater.

*For detail of amendments proposed to Rule 12.2.3.4, and the submissions it received, refer to:*

- *Proposed Plan Change 4A: pages 16-17*
- *Summary of Decisions Requested: pages 11-12*

#### **1.4.1 Matters raised by submitters**

One submitter requests decisions on:

- Clarification on the relationship between maximum allocation volume, mean annual recharge, and an aquifer's physical properties.

#### **1.4.2 Discussion**

##### **Maximum allocation volume and mean annual recharge**

The maximum allocation volume for an aquifer is the greater of either the limit specified in Schedule 4A or 50% of the calculated mean annual recharge, and the "assessed maximum annual take" from an aquifer (discussed in section 1.2). When assessing the effect of a take under Rule 12.2.3.4 the ORC needs to be able to consider both (a) the maximum allocation volume and (b) the mean annual recharge of the aquifer, particularly where the maximum allocation volume for the aquifer is the assessed maximum annual take.

##### **An aquifer's physical properties**

The physical properties of an aquifer that would be considered under clause (c) are its hydrodynamic properties (e.g. porosity, permeability, hydraulic conductivity, transmissivity, storativity and leakage coefficients), and its geology (e.g. composition, grain size and texture). Hydrodynamic properties allow assessment of whether the aquifer can sustain such a take and how it will respond. In conjunction with the geology of the aquifer an assessment of its vulnerability to compaction<sup>2</sup> can be made. While a maximum allocation volume and restriction level can protect these physical properties an assessment should still be made of the likely effects of each individual take as aquifers are not uniform across their extent.

While the ORC may hold information about the general hydrodynamic properties and geology of an aquifer, an applicant is expected to provide detail about the hydrodynamic properties and geology at their bore. A bore log provides a description of aquifer geology, and an aquifer test allows hydrodynamic properties to be determined.

Schedule 4 of the RMA broadly sets out matters that should be included in an assessment of effects on the environment, and section 16.3.1 of the Water Plan provides detail of information required when making an application to take water. To provide further clarity to applicants, section 16.3.1 should be updated to reflect the proposed discretions in Rule 12.2.3.4.

#### **1.4.3 Recommendations**

Clarify what effects of taking on an aquifer the ORC will consider, by amending Rule 12.2.3.4 as shown below:

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<sup>2</sup> Issue 6.2.1A and Policy 6.4.10A incorrectly refer to aquifer "compression", rather than "compaction". Compression is a stress (an action) that an aquifer is permanently subject to from the weight of overlying material, which results in compaction of the aquifer (an effect).

12.2.3.4 Restricted discretionary activity considerations

In considering any resource consent for the taking and use of groundwater in terms of Rule 12.2.3.2A, the Otago Regional Council will restrict the exercise of its discretion to the following:

- (a) The maximum allocation volume for the aquifer; and
- (b) The mean annual recharge of that aquifer; and
- (c) The effect of the take on the physical hydrodynamic properties of the aquifer and the vulnerability of the aquifer to compaction; and ...

Reflect the discretions in Rule 12.2.3.4 by amending Information Requirement 16.3.1 as shown below:

**16.3.1 The taking of surface water or groundwater**

...

5B. In the case of the taking of groundwater, results of the aquifer test.

...

Use the correct terminology by amending Issue 6.2.1A and 6.4.10A as shown below:

**6.2.1A The taking of water from Otago's aquifers can lead to:**

...

**(e) Aquifer ~~compression~~ compaction.**

**6.4.10A To enable the taking of groundwater by:**

...

**(d) In any aquifer, avoiding permanent aquifer ~~compression~~ compaction.**

**Explanation**

...

**(iii) Aquifer contamination or ~~compression~~ compaction will be avoided.**

*Reasons:*

- To make an adequate assessment of environmental effects, both the maximum allocation volume and annual recharge need to be considered.
- To clarify what the physical properties of the aquifer are.

- To clarify what information is required to determine the hydrodynamic properties of the aquifer when making a consent application to take water.
- Compression is a stress (an action) that an aquifer is permanently subject to from the weight of overlying material, which results in compaction of the aquifer (an effect).

## 1.5 Managing take where there is risk of aquifer contamination

Policy 6.4.10AC requires aquifer contamination be avoided. One means is through identifying areas vulnerable to seawater intrusion. Maps C10 and C10a show a seawater intrusion risk zone in the North Otago Volcanic Aquifer.

*For detail of new Policy 6.4.10AC and Maps C10 and C10a, and the submissions they received, refer to:*

- *Proposed Plan Change 4A: pages 6-7, 33, 34*
- *Summary of Decisions Requested: pages 8-9-16*

### 1.5.1 Matters raised by submitters

Four submitters request decisions on:

- That restriction levels will only be set where needed.
- That ORC will monitor groundwater quality and levels.
- Recognition of the adverse impact restrictions will have on community water supplies (which is discussed in section 3.1 of this report).
- Increased soil and water testing in the North Otago area (which is discussed in section 2.3 of this report).

### 1.5.2 Discussion

#### Setting restriction levels

Policy 6.4.10AB is “to define restriction levels *where needed...*” [emphasis added]. To avoid aquifer contamination, Policy 6.4.10AC(d) identifies “setting aquifer restriction levels”. It does not need to state “where needed”, because this is where it will assist to “avoid aquifer contamination”.

#### Monitoring groundwater quality and levels

The requirement to monitor groundwater quality and levels by Policy 6.4.10AC(f) replaces that formerly in Policy 9.4.22 (to be deleted), which requires consents to take groundwater to monitor water quality “where appropriate”. Most consented groundwater takes are restricted discretionary activities, and a matter to which discretion is restricted is “any adverse effect on the existing quality of groundwater in the aquifer”.

Aquifer contamination could result when groundwater is taken near a contaminated site, or from areas vulnerable to seawater intrusion. When considering an application to take groundwater, if there is a risk of aquifer contamination due to take then monitoring of groundwater quality and/or levels should be a condition of consent. Amendment of the explanation to the policy would clarify this.

To ensure requirements under the RMA are met, ORC undertakes “state of the environment” groundwater monitoring. However, this is not specifically to avoid aquifer contamination as required by Policy 6.4.10AC.

### 1.5.3 Recommendations

Clarify who will monitor groundwater quality by amending the explanation to Policy 6.4.10AC as shown below:

#### 6.4.10AC To avoid aquifer contamination by: ...

##### Explanation

...

Where there is risk of aquifer contamination, a consent holder will be required to monitor groundwater levels, and the rate, volume, timing and frequency of take may be restricted, and groundwater levels monitored, to control the degree to which groundwater levels are lowered. Groundwater quality monitoring may also be required.

...

Adopt Seawater Intrusion Risk Zones as shown on Maps C10 and C10a.

#### *Reasons:*

- Policy 6.4.10AC is to avoid aquifer contamination, so a restriction level under this policy will only be set where needed to achieve this.
- To clarify a consent holder may be required to monitor groundwater quality and levels.
- The submitter supports management of seawater intrusion risk.
- The submission regarding the adverse impact restrictions will have on community water supplies is discussed in section 3.1 of this report.
- The submission regarding increased soil and water testing in the North Otago area is discussed in section 2.3 of this report.

## 1.6 Simplify permitted groundwater taking

Rule 12.2.2.2 permits the take of varying amounts of groundwater from aquifers. It is proposed to simplify the rule by allowing take of 25 m<sup>3</sup>/day from all aquifers. This is an increase from 10 m<sup>3</sup>/day in some aquifers, and a decrease from 30 m<sup>3</sup>/day in others.

*For detail of the proposed changes to Rule 12.2.2.2, and the submissions it received, refer to:*

- *Proposed Plan Change 4A: pages 14-15*
- *Summary of Decisions Requested: page 10*

### 1.6.1 Matters raised by submitters

One submitter requests decision on:

- The default provisions of 12.2.2.2 (e) are amended to continue to allow take of 30 m<sup>3</sup>/day (instead of 25 m<sup>3</sup>/day), or alternatively retention of the operative rule.

### 1.6.2 Discussion

Those currently taking 30 m<sup>3</sup>/day from the aquifers listed in operative Rule 12.2.2.2(c) will need to obtain a resource consent if the permitted limit is reduced to 25 m<sup>3</sup>/day as proposed.

The difference of 5 m<sup>3</sup>/day is a small quantity of water and its take would not make a significant difference to either the taker or to those aquifers. For this reason, it would result in no more than minor adverse effects if the volume limit under Rule 12.2.2.2 (e) was 30 m<sup>3</sup>/day.

Amending Rule 12.2.2.2 (e) to allow take of 30 m<sup>3</sup>/day, however, would result in inconsistency between these groundwater takes and surface water takes under permitted activity 12.1.2.5 (where up to 25 m<sup>3</sup>/day can be taken). It is intended to reduce complexity in the Water Plan: if those taking surface water, connected groundwater and unconnected groundwater for such minor uses, all have access to the same permitted daily volume.

### 1.6.3 Recommendations

Adopt Rule 12.2.2.2 as proposed:

*Reasons:*

- Permitted activity rules should be consistent and simple.
- Those taking surface water, connected groundwater and unconnected groundwater for such minor uses should have access to the same permitted daily volume.

- Groundwater modelling shows there is only low risk to aquifers where the volume of take is increased from 10 to 25 m<sup>3</sup>/day.
- The difference of 5 m<sup>3</sup>/day between 25 and 30 is a small quantity of water and its take would not make a significant difference to either the taker or to those aquifers.

## CHAPTER 2 - NORTH OTAGO VOLCANIC AQUIFER

### Introduction

The first aquifer for which a maximum allocation volume is proposed is the North Otago Volcanic Aquifer. The aquifer and its management is detailed in the technical report “*North Otago Volcanic Aquifer Study*” (dated 10 July 2008), which in addition to setting a maximum allocation volume, recommends extending aquifer boundaries, establishing a seawater intrusion management area, and amending existing restriction levels.

### 2.1 Amending the restriction level for the North Otago Volcanic Aquifer

The “North Otago Volcanic Aquifer” boundaries encompass the Deborah and Waiareka Aquifers, which were previously managed using restriction levels at Webster’s and Isbister’s Wells, respectively. With the proposed new management regime, the restriction levels measured at Webster’s Well would be relaxed, and applied across the North Otago Volcanic Aquifer.

*For detail of the amendment proposed to Schedule 4B, and the submissions it received, refer to:*

- *Proposed Plan Change 4A: page 25*
- *Summary of Decisions Requested: page 15*

#### 2.1.1 Matters raised by submitters

Two submitters request decisions on:

- Justification and rationale for amending the restriction levels.

#### 2.1.2 Discussion

Groundwater restriction levels can be useful for protecting an aquifer during prolonged drought, or for managing localised areas of high demand. They protect an aquifer by avoiding land subsidence and aquifer compression, and maintaining outflows to surface water. Near the coast or contaminated sites they can minimise the potential for intrusion by seawater or other contaminants. However, restriction levels are an imprecise tool for managing localised groundwater level decline: they may only represent the situation in part of an aquifer, and are influenced by the distance to groundwater takes from the monitoring well.

Prior to this proposed plan change, the Deborah and Waiareka Aquifers were managed as distinct hydrological units. Restriction levels in the Deborah Aquifer were imposed at Webster’s Well to protect against the risk of seawater intrusion near the coast, if high groundwater demand coincided with drought. In the Waiareka Aquifer restriction levels were imposed at Isbister’s Well to protect against potential loss of outflows to Waiareka

Creek. At both locations groundwater levels were permitted to fluctuate 3 m between the maximum-recorded groundwater level and the 100% restriction level. Intermediate restriction levels were set at 2 m (25%) and 2.5 m (50%) below the maximum.

Webster's Well is recommended for continued use as a monitoring site for the North Otago Volcanic Aquifer, as it is situated near a well-used part of the aquifer and shows a good response to pumping. Isbister's Well would no longer be used as it is not sensitive to climate stresses due to its proximity to Waiareka Creek.

Groundwater levels rise in wet years and fall in subsequent dry years. Estimates of take suggest current pumping removes only 6% of water from the aquifer, therefore the decrease in groundwater levels is mostly due to natural discharge of the aquifer to surface water. Despite this small influence on aquifer outflows, Waiareka groundwater takes have been subject to restrictions since 2004, and Deborah groundwater takes have been subject to restrictions from 1999 to 2001, and 2004 to 2007. Computer modelling supports restriction periods being primarily caused by climatic episodes and recharge conditions. Because pumping (at current levels) has little influence on groundwater levels, restriction levels should be relaxed so that the restrictions come into force during more extreme climatic conditions or actual pumping-induced groundwater depletion.

Lowering groundwater levels over a wide area reduces groundwater contribution to surface water bodies. Maintaining groundwater levels within limits consistent with natural variation will preserve baseflow to surface water.

Computer modelling determined that if a maximum allocation volume of 7 Mm<sup>3</sup>/year was taken from the aquifer during a very dry year, there would be a significant decline in groundwater levels at Webster's Well (from its recorded maximum of around 131 m above sea level to 122 m). To avoid this, and keep groundwater within its naturally recorded levels, the 100% restriction level should be set at 125 m, with 50% cut off at 125.5 m and 25% restriction at 126 m. These restriction levels will allow the use of the resource during dry years by allowing up to a 6 m drop in groundwater levels.

At the coast it is important to maintain groundwater levels above mean sea level to prevent seawater intrusion to the aquifer, however, restriction levels are not the best method to manage the risk in this aquifer. A new "seawater intrusion risk zone" has been proposed at Kakanui, to ensure the risk is addressed.

### **2.1.3 Recommendation**

Relax the restriction levels at Webster's Well for the North Otago Volcanic Aquifer as proposed.

*Reasons:*

- Restriction levels should protect aquifer characteristics and therefore come into effect during extreme climatic conditions or pumping-induced groundwater depletion.
- Current restriction levels are within the upper range of groundwater levels observed during normal climate and recharge conditions, and breaches of them are not due to pumping.
- The proposed restriction levels are within the lower range of groundwater levels observed during normal climate and recharge conditions.
- The proposed restriction levels will preserve baseflow to surface water bodies supported by the aquifer.

## **2.2 A maximum allocation volume for the North Otago Aquifer**

A maximum allocation volume of 5 Mm<sup>3</sup>/year for the North Otago Volcanic Aquifer is proposed to be listed in Schedule 4A.

*For detail of the amendment proposed to Schedule 4A, and the submissions it received, refer to:*

- *Proposed Plan Change 4A: page 25*
- *Summary of Decisions Requested: pages 13-15*

### **2.2.1 Matters raised by submitters**

Five submitters request decisions on:

- Support for a maximum allocation volume of 5 Mm<sup>3</sup>/year, which will sustain the aquifer's life-supporting capacity, and is consistent with the proposed National Environmental Standard (NES) for Ecological Flows and Water Levels.
- Support for increasing the maximum allocation volume to 7 Mm<sup>3</sup>/year in accordance with the technical recommendation
- Opposition to increasing allocation at all, until more data is obtained, and water quality is addressed.

### **2.2.2 Discussion**

The maximum allocation volume should enable the take of groundwater while protecting the aquifer and connected surface water bodies. ORC groundwater scientists made a technical recommendation to set the maximum allocation volume at 7 Mm<sup>3</sup>/year<sup>3</sup>. This volume considers physical properties of the aquifer and enables further taking within mean

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<sup>3</sup> Reported in *North Otago Volcanic Aquifer Study*, December 2008.

annual recharge, while providing for stream outflows and protection against seawater intrusion. However, the community expressed concerns over the uncertainty of actual volumes taken, and the modelled data not matching anecdotal observations. A risk management approach was adopted and a maximum allocation volume of 5 Mm<sup>3</sup>/year was notified in the proposed plan change. The default maximum allocation volume proposed in Plan Change 1C is 50% of the calculated mean annual recharge of an aquifer<sup>4</sup>, which equates to 10 Mm<sup>3</sup>/year.

### **Obtaining further data and addressing water quality**

Delaying setting a tailored maximum allocation volume in Schedule 4A until further aquifer data is collected means the default maximum allocation volume prevails. This allows more water to be taken (10 Mm<sup>3</sup>/year) than the technical assessment recommends (7 Mm<sup>3</sup>/year).

Further data may be beneficial, however, there is always uncertainty associated with aquifers because they are underground, 3-dimensional and not uniform. There will also be a period of uncertainty relating to the actual volumes taken, is due to older consents where limits were not always imposed, or metering required<sup>5</sup>.

Current aquifer knowledge, the data held and assumptions made are considered reasonable, and the risk of not setting a maximum allocation volume outweighs the costs and benefits of collecting further data over the coming years.

Water quality in this aquifer is independent of water quantity management, so there is no advantage in addressing water quality before setting a maximum allocation volume. An up-coming plan change will address the effect of discharges on water quality.

### **Bore Interference**

The inability to take full consented volumes may not be caused by insufficient water available, but by bores being:

- inappropriately located (e.g. within a less permeable part of the aquifer) or poorly maintained; and
- shallow or poorly constructed and subject to interference effects from other bores.

The most productive zone of the aquifer lies at 40-70 m below ground level, but depending on location bores typically vary from 20 -120 m in depth. The bores most likely to require replacement if groundwater level declines are the shallow wells in the Alma-Totara-Kakanui area. It is noted yield from these bores is already reduced when groundwater levels decline naturally (due to lower recharge).

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<sup>4</sup> This has been appealed. The appellant seeks the default as 35%.

<sup>5</sup> Note that all new consents are subject to conditions limiting annual take, and a metering requirement. A National Environmental Standard requires metering of all takes 5 l/s or more by 10 November 2016. Proposed new Method 15.8.3 specifies how the ORC calculates take from an aquifer.

When an application is made to take groundwater, other groundwater takers affected by the application must be consulted<sup>6</sup>. While each application and its effects are considered on a case-by-case basis, poorly located, constructed or maintained existing bores should not inhibit new users accessing an available resource<sup>7</sup>.

### **Environmental, social, cultural and economic values**

A discussion document for the proposed National Environmental Standard (NES) for Ecological Flows and Water Levels was released in March 2008. Where there is no specific allocation limit in a plan, it proposes an interim limit of 35% of an aquifer's average annual recharge. Plan Change 1C proposes a default limit of 50% of the calculated mean annual recharge of an aquifer<sup>8</sup>. For the North Otago Volcanic Aquifer, these equate to 7 Mm<sup>3</sup>/year and 10 Mm<sup>3</sup>/year, respectively. The NES discussion document states that the interim limits are set at a level that caters for most water bodies to accommodate environmental, recreational, natural character, and cultural values. Considering both the NES and the ORC technical assessment of the aquifer, 7 Mm<sup>3</sup>/year is a conservative limit on taking, and protects the environmental, social and cultural values associated with the aquifer.

The maximum allocation volume is one of three key factors when assessing a consent application. The effects of individual takes on other water users and outflows to surface water bodies are always considered, and any adverse effects must be avoided, remedied or mitigated. In addition, aquifer restriction levels will assist in protecting the aquifer and connected surface water bodies.

Using 2004 values, irrigation in Otago has been estimated to have a value of \$1270/ha<sup>9</sup>. Increasing the maximum allocation volume from 5 Mm<sup>3</sup>/year to 7 Mm<sup>3</sup>/year allows irrigation of an additional 303 ha<sup>10</sup>, which has a value of \$385,000 per year.

The ORC has records for 350 bores in the aquifer, of which 42 have consents to take groundwater. The most productive zone of the aquifer lies at 40-70 m below ground level, but depending on location bores typically vary from 20 -120 m in depth. As already noted, the bores most likely to require replacement if groundwater level declines are the shallow hand-dug wells in the Alma-Totara-Kakanui area. The advised one-off cost of

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<sup>6</sup> The Water Plan identifies affected parties in unconfined aquifers as those whose bore levels are caused to decline more than 0.2 metres.

<sup>7</sup> In *Opiki Water Action Group Inc vs Manawatu Wanganui Regional Council* (2004), a groundwater consent granted would cause loss of artesian pressure, requiring neighbours to install new bores and pumps. The Court upheld the decision to grant consent, as existing users have no right to artesian pressure, so their existing means of access would need revision. While the take would affect nearby bores, it would not make water unavailable.

<sup>8</sup> This has been appealed. The appellant seeks the default as 35%.

<sup>9</sup> *The Economic Value of Irrigation in NZ*, MAF Technical Paper No: 04/01, April 2004

<sup>10</sup> Based on the North Otago figures given in *Water Requirements for Irrigation Throughout the Otago Region*, Aqualinc Research Ltd, October 2006

replacing the 14 known bores less than 15 m deep<sup>11</sup> is \$245,000. This brief economic analysis suggests the economic benefit of increasing the maximum allocation volume outweighs the cost of upgrading bores.

### Ongoing adaptive management

The ORC has monitored groundwater levels at two locations in the North Otago Volcanic Aquifer since 1985 (Isbister's and Webster's Wells). Should any unexpected adverse long-term trends emerge, then it may be appropriate to review aquifer restriction levels, rather than the maximum allocation volume.

### 2.2.3 Recommendations

Amend the maximum allocation volume for the North Otago Volcanic Aquifer to 7 Mm<sup>3</sup>/year, as shown below:

<b>4A Maximum allocation volumes for groundwater takes from aquifers</b>		
<b>Aquifer Name</b>	<b>Map Reference</b>	<b>Maximum Allocation Volume (million cubic metres per year)</b>
North Otago Volcanic Aquifer	C10	<u>7</u>

*Reasons:*

- 7 Mm<sup>3</sup>/year is shown to protect the environmental, social and cultural values associated with the aquifer.
- The data and assumptions behind the technical assessment are adequate and reasonable.
- Poorly located, constructed or maintained bores should not inhibit new users accessing an available resource.
- Water quality in this aquifer is independent of water quantity management.

## 2.3 Monitoring soil and water quality

Groundwater from the Waiareka Aquifer has high nitrate concentrations, which are cause for concern if it is used as a potable supply. High sodium concentrations have historically been reported, which can be cause for a concern when applied to soil.

<sup>11</sup> Which bores may eventually require replacement depends on the location of any new groundwater takes .

*For detail of amendments proposed to Policy 6.4.10AC and Policy 9.4.23, and the submissions received, refer to:*

- *Proposed Plan Change 4A: pages 6-7, 11*
- *Summary of Decisions Requested: pages 8-9*

### **2.3.1 Matters raised by submitters**

One submitter requests decisions on:

- Increasing soil and water quality measurements in the North Otago area to monthly (Policies 6.4.10AC and 9.4.23 partly address this matter. Note that other submissions on Policy 6.4.10AC are discussed in section 1.5 of this report).

### **2.3.2 Discussion**

#### **State of the environment monitoring**

The ORC has been undertaking “State of the environment” (SOE) groundwater monitoring across Otago annually since 1995, and six-monthly from 2008. Groundwater quality has been monitored in the North Otago Volcanic Aquifer since 1985, due to concerns with high nitrate-nitrogen and sodium concentrations in groundwater.

#### **Nitrogen**

Nitrate-nitrogen is highly soluble and mobile, and can cause serious health effects if consumed. SOE monitoring shows nitrate-nitrogen concentrations in the North Otago Volcanic Aquifer have been gradually but steadily increasing. This would be a cause for concern if the groundwater was consumed as it exceeds the drinking water standard. High nitrate-nitrogen is attributed to market gardening, soil properties and the low flushing rate of the underlying aquifer. Irrigation can mobilise nitrate-nitrogen, but other practices like cultivating bare soils, and applying fertiliser or effluent also contribute.

#### **Sodium**

Elevated sodium concentrations occur naturally in volcanic aquifers, and water quality tends to decline with depth. Deeper wells draw on older water that has had a longer residence time, while shallow wells tend to draw water from the top of the aquifer where rainwater has infiltrated. Use of high sodium groundwater for irrigation may breakdown the soil structure, resulting in nutrient loss (especially calcium). Soil structure break-down reduces the water-holding capacity of soils. High sodium levels may also reduce or prevent plant growth. SOE monitoring has not determined any identifiable groundwater trend for sodium.

#### **Consent requirements**

A requirement to monitor groundwater quality and levels may be imposed on consents to take and use groundwater, where that take could result in

aquifer contamination, in accordance with Policy 6.4.10AC and Rule 12.2.3.4(xii).

Policy 9.4.2 seeks to avoid irreversible or long-term degradation of soils arising from the use of water for irrigation, in preference to remedying or mitigating. The policy cross-references all rules for which consent is required. Applications to take and use groundwater are generally restricted discretionary activities under Rule 12.2.3.2A, and Rule 12.2.3.4 lists the matters to which discretion is restricted. Information requirement 16.3.1(7) is a description of groundwater quality where there is likely to be an adverse effect on soils. However, the list in Rule 12.2.3.4 does not allow the consideration of the effects of the use of that groundwater on soils. This discrepancy should be corrected.

Consents requiring ongoing monitoring of groundwater and soil quality are uncommon. Applications to take and use groundwater from the Waiareka Aquifer are typically required to provide a sodium absorption ratio (SAR). Generally, a SAR below 3 represents no problems, whilst a SAR above 9 would be borderline for irrigation. Most report a SAR of less than 3, but in 1999 one groundwater sample gave a SAR of 32<sup>12</sup>. A consent to use that groundwater was issued for ten years, provided that detailed soil testing was undertaken. When reassessed in 2009, groundwater from the same bore provided a SAR of 1.2, and soil testing showed sodium content to be minor. Ten years of bore pumping is likely to have flushed the aquifer and decreased sodium levels, with further dilution of the groundwater occurring through mixing with surface water imported by the North Otago Irrigation Company. Ongoing monitoring was not considered necessary.

### **Water quality and quantity management**

Water quality in this aquifer is independent of water quantity management. The current quality of groundwater raises concern only if it is consumed. Increasing available groundwater allocation increases potential irrigation, however, the maximum allocation volume of the North Otago Aquifer (whether 5 Mm<sup>3</sup>/year or 7 Mm<sup>3</sup>/year) is small in comparison to the volumes sourced from local surface water bodies, or imported from the Waitaki River. An up-coming plan change will address the effect of discharges on water quality, including nitrate-nitrogen.

### **2.3.3 Recommendations**

- (1) Except as provided for by the recommendations in section 1.5.3, adopt Policy 6.4.10AC as proposed.
- (2) Adopt Policy 9.4.23 as proposed.
- (3) To be consistent with Policy 9.4.2, add a new discretion to Rule 12.2.3.4 as follows:

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<sup>12</sup> subsequent reassessment suggests this anomaly could have been caused by inadequate flushing of the bore before sampling.

#### 12.2.3.4 Restricted discretionary activity considerations

In considering any resource consent for the taking and use of groundwater in terms of Rule 12.2.3.2A, the Otago Regional Council will restrict the exercise of its discretion to the following: ...

Any irreversible or long term degradation of soils arising from the use of water for irrigation

#### *Reasons:*

- Policy 6.4.10AC requires groundwater monitoring if there is a risk a take may result in aquifer contamination.
- Policy 9.4.23 supports the voluntary efforts of landholders in managing soil.
- A new discretion is required in Rule 12.2.3.4 to enable consideration of the effects on soils from water used for irrigation, to be consistent with Policy 9.4.2.
- State of the Environment monitoring and reporting is undertaken by the ORC.
- Other submissions on Policy 6.4.10AC are discussed in section 1.5 of this report.

## CHAPTER 3 - COMMUNITY GROUNDWATER SUPPLIES

### Introduction

The proposed plan change provided the opportunity to recognise existing community groundwater supplies in Schedule 3B (groundwater takes used for community supply in existence prior to 28 February 1998). Such takes are controlled activities, and were previously not subject to restriction levels. However, because restriction levels protect aquifer characteristics, and should only come into effect during extreme climatic conditions, it is proposed to allow consideration to be given to imposing restriction levels on such takes. A proposed correction of an inconsistency between Rule 12.2.2A.1 and Policy 6.4.8 ensures identified connected groundwater takes for community supply are exempt from minimum flows.

### 3.1 Community water supplies and restriction levels

Rule 12.2.2A.1 provides for community groundwater supplies identified in Schedule 3B, to take up to the rate or volume authorised as at 28 February 1998, to be taken as a controlled activity. It is proposed to add the “need to observe a restriction level” to the list of matters to which ORC can control, and to add groundwater community supplies in existence as at 28 February 1998 to Schedule 3B.

*For detail of the proposed changes to Rule 12.2.2A.1 and Schedule 3B, and the submissions they received, refer to:*

- *Proposed Plan Change 4A: pages 15-16, 24*
- *Summary of Decisions Requested: pages 10-11, 12-13*

#### 3.1.1 Matters raised by submitters

Four submitters requested decisions on:

- Community supplies and restriction levels, including:
  - Exemption for community groundwater supplies from restriction levels (in relation to Policy 6.4.10AB and 6.4.10AC); and
  - Consideration of how community supplies will meet restriction levels.
- Change of the date in the rule and change to the schedule:
  - So that increases in the volume taken, or new community water supplies can be considered as a controlled activity; and
  - Listing of an additional volume of water for Clydevale-Pomahaka in Schedule 3B.
- Exemption of the Maheno community supply bore from restriction levels in Schedule 4B.

- Consequential amendment to the reference to Sections 93 and 94 of the RMA, in accordance with a recent RMA amendment.

### **3.1.2 Discussion**

#### **Background – surface water community supplies**

Upon notification of the Water Plan on 28 February 1998, identified takes from surface water bodies for community supply were controlled activities, and exempt from minimum flow provisions. Community supplies created after that date are considered equally against any other use for water, and are subject to minimum flows to meet Objective 6.3.1 (retaining flows for aquatic ecosystems and natural character). Those establishing communities were required to consider the risk of minimum flow restrictions.

#### **Groundwater community supplies and restriction levels**

Plan Change 1C<sup>13</sup> introduced equivalent Rule 12.2.2A.2 for groundwater takes<sup>14</sup> for community supply, exempt from restriction levels. However, minimum flows and restriction levels do not perform the same function. When groundwater levels are very low in some aquifers the ability to impose a restriction level on any consented groundwater take may be needed to avoid aquifer contamination, compaction and land subsidence, and reduced outflows to surface water. However, there could be circumstances where existing groundwater takes for community supply may be exempt from a restriction level, or given a different restriction level, to allow for human health and sanitation. This can be determined on a case-by-case basis under discretionary Rule 12.2.4.1.

To ensure efficient water use in accordance with Policy 6.4.0A, community supplies are often subject to consent conditions requiring reasonable action to minimise leakage and promotion of efficient water use to subscribers. There is no specific policy for water takes to apply conservation measures when water supply is reduced (i.e. before restriction levels or minimum flows apply), nor is it considered necessary.

#### **28 February 1998 and Schedule 3B**

There are requests to allow an additional volume of water to be taken as a controlled activity by existing community supplies, either by deleting the date in the rule (and in Schedule 3B), or amending it to the date of notification of this plan change. This potentially makes all groundwater takes (or those active as at 18 September 2010) for community supply a controlled activity, and exempts those connected groundwater takes from minimum flows.

Consent applications for activities that are controlled must be granted, and conditions can only be imposed relating to the matters over which control is

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<sup>13</sup> Plan Change 1C was notified on 20 December 2008 and ORC's decisions on submissions were notified on 10 April 2010. Rule 12.2.2A.1 was not appealed, so is effectively operative.

<sup>14</sup> And "connected groundwater" takes (i.e. groundwater takes that are managed as surface water).

reserved. Applications for new groundwater takes should not be controlled activities under Rule 12.2.2A.1 as the matters over which control is reserved does not allow a full assessment of the effects, e.g. effects on the aquifer, connected surface water bodies or other lawful users, or determining if it is the most appropriate water source, cannot be considered. Such applications cannot be declined.

Exempting all connected groundwater takes for community supply from minimum flows would not meet Objective 6.3.1 (retaining flows for aquatic ecosystems and natural character). Those who establish new communities, or increase the supply to existing communities do so knowing the risk of minimum flow restrictions.

Providing for all currently consented volume of takes listed in Schedule 3B under Rule 12.2.2A.1 was considered on a case-by-case basis, particularly with regard to minimum flow exemptions. Previous applications for each supply were considered as either discretionary or unclassified activities, subject to a full assessment under the Water Plan and RMA. The effects of taking were found to be minor. Excluding the Dunedin-Outram and Arrowtown supplies, connected groundwater takes in the schedule are adjacent to water bodies to which no minimum flow will, or is likely to, apply.

The Dunedin and Outram community supply takes from gravels adjacent to the Taieri River. It has been considered under the operative Water Plan as if it were a direct surface water take, and has been exempt from Taieri minimum flows. The volume consented in 2005 is less than that consented in 1998.

In 1998, the Arrowtown community supply comprised 3000 m<sup>3</sup>/day from gravels adjacent to Bush Creek (a tributary of the Arrow River). In 2007, a right to take additional water was transferred from a deemed permit in Bush Creek (for the purpose of town supply), to the gravels. The consent allowed for the take from two additional bores, approximately 300 and 400 m east of the original bore, and is exempt from minimum flows. The new bores are also adjacent to Bush Creek, within the same alluvial gravel formation. As a deemed permit, the Bush Creek supply is not identified in Schedule 1B; it must be granted and is not subject to minimum flows<sup>15</sup>. A minimum flow is likely to be set for the Arrow River; the effect of the community supply take on the river will be better considered during this process.

To allow for the current consented amounts of existing community supplies to be considered under Rule 12.2.2A.1, the date should be removed from the rule, and the current consented rate and volume should be identified in Schedule 3B.

The following table summarises the Schedule 3B takes, and recommendations for each one:

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<sup>15</sup> Deemed permits expire on 1 October 2021. A future plan change should give consideration to including this supply in Schedule 1B, as it was in existence prior to 28 February 1998.

**Table 1: Schedule 3B community water supplies**

Site	Community Water Supply Take	Amount authorised on 28 February 1998	Current amount authorised* as recommended to be included in Schedule 3B	Reasons
1	Glenorchy Water Supply, adjacent to Buckler Burn.	600 m <sup>3</sup> /day	63 l/s 5,400 m <sup>3</sup> /day	<ul style="list-style-type: none"> <li>• 2009 consent discretionary.</li> <li>• Buckler Burn unlikely to be subject to catchment minimum flow.</li> </ul>
2	Arthurs Point Water Supply, adjacent to Shotover River.	49 l/s 1844 m <sup>3</sup> /day	49 l/s; 3,385 m <sup>3</sup> /day	<ul style="list-style-type: none"> <li>• 2005 consent discretionary.</li> <li>• Shotover River unlikely to be subject to catchment minimum flow.</li> </ul>
3	Dalefield Water Supply, adjacent to Shotover River.	6.1 l/s 528 m <sup>3</sup> /day	6 l/s 300 m <sup>3</sup> /day	<ul style="list-style-type: none"> <li>• 2003 consent discretionary.</li> <li>• Shotover River unlikely to be subject to catchment minimum flow</li> </ul>
4	Arrowtown Water Supply, adjacent to Bush Creek (tributary of Arrow River).	3000 m <sup>3</sup> /day	108 l/s 7,800 m <sup>3</sup> /day	<ul style="list-style-type: none"> <li>• 2007 consent unclassified.</li> <li>• Arrow River is likely to be subject to minimum flow, but transfer of allocation from Bush Creek deemed permit (for town supply).</li> </ul>
5	Cromwell Water Supply, adjacent to Lake Dunstan.	18,000 m <sup>3</sup> /day	210 l/s 18,000 m <sup>3</sup> /day	<ul style="list-style-type: none"> <li>• 1998 consent unclassified.</li> <li>• Lake Dunstan not subject to minimum flow.</li> </ul>
6	Alexandra Water Supply, adjacent to Clutha River/Mata-Au	400 l/s 23,000 m <sup>3</sup> /day	420 l/s 21,600 m <sup>3</sup> /day	<ul style="list-style-type: none"> <li>• 2003 consent discretionary.</li> <li>• Clutha River/Mata-Au not subject to minimum flow.</li> </ul>
	Alexandra Water Supply, Molyneux Park (not connected groundwater)	25,200 l/hr [7 l/s or 605 m <sup>3</sup> /day]	12.5 l/s 675 m <sup>3</sup> /day	<ul style="list-style-type: none"> <li>• 2003 consent discretionary.</li> <li>• Within maximum allocation volume of aquifer.</li> <li>• No effect on surface flows</li> </ul>
	Alexandra Water Supply, Pioneer Park, (not connected groundwater)	14,400 l/hr [4 l/s or 345 m <sup>3</sup> /day]	Expired: include 1998 amount	<ul style="list-style-type: none"> <li>• No change to 1998 amount.</li> </ul>
7	Roxburgh Water Supply, adjacent to Clutha River/Mata-Au	3000 m <sup>3</sup> /day	58 l/s 3000 m <sup>3</sup> /day	<ul style="list-style-type: none"> <li>• No change to 1998 amount.</li> <li>• Clutha River/Mata-Au not subject to minimum flow.</li> </ul>
8	Dunedin and Outram Water Supplies, adjacent to Taieri River	15 million gallons/ day [~68,000 m <sup>3</sup> /day]	Combined total of 382 l/s 33,000 m <sup>3</sup> /day	<ul style="list-style-type: none"> <li>• Decrease in 1998 volume.</li> <li>• Previously consented as if surface water, and exempt from minimum flows.</li> </ul>
11	Owaka Water Supply (not connected groundwater)	4.4 l/s [380 m <sup>3</sup> /day]	1998 consent still current	<ul style="list-style-type: none"> <li>• No change to 1998 amount.</li> <li>• Within maximum allocation volume of aquifer.</li> <li>• No effect on surface flows.</li> </ul>
12	Mosgiel Water Supply at: (not connected groundwater)	Combined total of ~10,182 m <sup>3</sup> /day	Combined total of 10,104 m <sup>3</sup> /day	<ul style="list-style-type: none"> <li>• 2006 consent discretionary.</li> <li>• Within maximum allocation volume of aquifer.</li> <li>• No effect on surface flows.</li> </ul>
13	Clydevale-Pomahaka Water Supply, adjacent to Clutha River/Mata-Au	Combined total of 2082 m <sup>3</sup> /day	60 l/s and 4387 m <sup>3</sup> /day	<ul style="list-style-type: none"> <li>• 2006 consent discretionary.</li> <li>• Clutha River/Mata-Au not subject to minimum flow.</li> </ul>

\*instantaneous and daily limits only

## The Maheno Water Committee Incorporated take

Consent 2006.006 allows the Maheno Water Committee Incorporated to take and use groundwater from the Kakanui-Kauru Alluvium Aquifer for the purpose of community water supply. It is not sourced from the North Otago Volcanic Aquifer, therefore will not be subject to the restriction levels proposed for the aquifer in Schedule 4B.

### Non-notification provisions of the Rule

Rule 12.2.2.1A allows applications to be considered without notification or service on affected parties, as formerly provided for by Sections 93 and 94(1) of the RMA. These sections were repealed in 2009 and replaced by Sections 95 to 95F. While the amendments to the RMA do not affect an operative plan's non-notification and non-service clauses, the plan change provides an opportunity to update those clauses.

### 3.1.3 Recommendations

Allow the Mosgiel and Clydevale-Pomahaka supplies to take their currently consented rate or volume by amending Rule 12.2.2A.1 as shown below:

12.2.2A.1 The taking and use of groundwater for community water supply, ~~up to any volume or rate authorised as at 28 February 1998,~~ by any take identified in Schedule 3B, up to any volume or rate listed in Schedule 3B, is a *controlled* activity. ...

Allow the Mosgiel and Clydevale-Pomahaka supplies to take their currently consented rate or volume by amending Schedule 3B as shown below:

### Schedule 3B Schedule of groundwater takes for the purpose of community supply

Site No.	Community Water Supply Takes (at NZMS 260 Series Map Grid Reference)	<u>Rate (litres per second) and volume (cubic metres per day) authorised</u>
1*	Glenorchy Water Supply at E41:459-841.	<u>63 l/s; 5400 m<sup>3</sup>/day</u>
2*	Arthurs Point Water Supply at E41:686-713.	<u>49 l/s; 3385 m<sup>3</sup>/day</u>
3*	Dalefield Water Supply at F41:739-724.	<u>6 l/s; 300 m<sup>3</sup>/day</u>
4*	Arrowtown Water Supply at: F41:806-773; <u>F41:808-774; and</u> <u>F41:809-774</u>	<u>108 l/s; 7800 m<sup>3</sup>/day</u>
5*	Cromwell Water Supply at G41:119-671.	<u>210 l/s; 18,000 m<sup>3</sup>/day</u>
6*	Alexandra Water Supplies at: G42:253-444; G42:263-454; and	<u>420 l/s; 21,600 m<sup>3</sup>/day</u> <u>12.5 l/s; 675 m<sup>3</sup>/day</u>

	G42:271-442	4 l/s; 345 m <sup>3</sup> /day
7*	Roxburgh Water Supply at G43:210132.	58 l/s; 3000 m <sup>3</sup> /day
8*	Dunedin and Outram Water Supplies at: I44:956-803; I44:956-805; and I44:956-804.	<u>Combined total take of 382 l/s; 33,000 m<sup>3</sup>/day</u>
11*	Owaka Water Supply at H46:533-124.	4.4 l/s; 380 m <sup>3</sup> /day
12	Mosgiel Water Supply at: I44:048-789; I44:042-779; I44:036-776; I44:048-789; I44:036-788*; I44:051-787; I44:032-782; I44:051-789; and I44:042-784.	<u>The combined total take shall not exceed 10,104 m<sup>3</sup>/day.</u>
13*	Clydevale-Pomahaka Water Supply at G45:417-507; volume as at 28/2/98: 2082 m <sup>3</sup> /day.	60 l/s; 4387 m <sup>3</sup> /day

\* Point of take located within 100 metres of a surface water body.

Correct the non-notification and non-service clauses of Rule 12.2.2A.1 as shown below:

~~Applications may be considered without notification under Section 93 and without service under Section 94(1) of the Resource Management Act on persons who, in the opinion of the consent authority, may be adversely affected by the activity.~~

The Consent Authority is precluded from giving public notification and limited notification of an application for a resource consent under this rule.

*Reasons:*

- The ability to require observance of a restriction level on a community supply identified in Schedule 3B is appropriate to achieve Objective 6.3.2A (to maintain long term groundwater levels and water storage in Otago's aquifers).
- Community supplies must ensure efficient water use in accordance with Policy 6.4.0A, which may include water conservation measures.
- Applications for new groundwater takes should not be controlled activities under Rule 12.2.2A.1 as this would not allow a full assessment of the effects of the take, or allow for the application to be declined.

- Providing for currently consented volumes of takes in Schedule 3B is appropriate as individual assessments of effects were made during each consent application and found to be minor. Those connected groundwater supplies (except Arrowtown) where there has been an increase in volume since 28 February 1998 are located next to water bodies in catchments where there is not, or is not likely to be, a catchment-wide minimum flow imposed. The Arrowtown community supply has increased due to a transfer of water from a deemed permit for town supply. The deemed permit was in use prior to 28 February 1998, and is not subject to minimum flows. The community supply would be taken into consideration when setting a minimum flow for the Arrow River.
- The Maheno Water Committee Incorporated take is from the Kakanui-Kauru Alluvium Aquifer, and therefore will not be subject to the restriction levels proposed for the North Otago Volcanic Aquifer in Schedule 4B.
- To reflect amendments to the RMA and provide for ongoing and consistent administration of the Water Plan.

### **3.2 Community water supplies from connected groundwater and minimum flows**

Policy 6.4.8 provides an exemption from minimum flows for connected groundwater takes for community supply listed in Schedule 3B.

*For detail of the changes proposed to Policy 6.4.8, and the submissions it received, refer to:*

- *Proposed Plan Change 4A: pages 2-3*
- *Summary of Decisions Requested: page 6*

#### **3.2.1 Matters raised by submitters**

Three submitters requested decisions on:

- Enabling the exemption to apply to relocated community water supplies.
- Retention of the reference to human health and safety in the explanation.

#### **3.2.2 Discussion**

##### **Relocated community water supplies**

Groundwater takes for community supply listed in Schedule 3B (and surface water takes listed in Schedule 1B) are a controlled activity. Consent applications for activities that are controlled must be granted, and conditions can only be imposed to the matters over which control is reserved.

The rights associated with listing in Schedule 3B (or 1B) should not transfer to a community water supply, when the point of take for that supply is

relocated to another water body that has water available for allocation. A full assessment of the effects of the new take is required, which is not possible under Rule 12.2.2A.1. The provider of the community supply must consider the costs and benefits of relocating an existing take, including the risks of minimum flows restricting the take.

Once a consent is granted, a community water supply could seek to be included in Schedule 3B through a plan change, where the public are offered the opportunity to assess and submit on the proposal and its effects.

### **Human health and safety**

Reference to human health and safety was made twice within the explanation to the policy (which is proposed to be deleted):

The first reference was in relation to residual flows. An explanation of residual flows does not belong in a policy for minimum flows, so it should be removed. Policy 6.4.7 addresses residual flows, and the proposed plan change did not seek to amend this policy.

The second reference is made in relation to the explanation that community water supplies beyond primary allocation are taken as supplementary allocation. The supplementary allocation framework maintains aquatic ecosystem values, but has no specific regard for human health and safety.

The need to provide for human health and safety by exempting identified takes from minimum flow requirements is accurately described in the principal reasons for adopting the policy.

### **3.2.3 Recommendations**

Adopt Policy 6.4.8 as proposed.

#### *Reasons:*

- Groundwater takes for community supply listed in Schedule 3B that transfer the point of take should not be considered as a controlled activity under Rule 12.2.2A.1, as a full assessment of the effects of the new take is required.
- Once a consent is granted, a community water supply may seek to be included in Schedule 3B through a plan change.
- The reference to human health and safety should be deleted from the explanation to the policy, as it is used in reference to matters beyond Policy 6.4.8. It is accurately referred to in the principal reasons for adopting the policy.

## CHAPTER 4 – OTHER MATTERS

### Introduction

This section evaluates submissions received in response to Proposed Plan Change 4A that are considered to be beyond the scope of the plan change, and makes recommendations on .... Other stuff.

### 4.1 Matters beyond the scope of the proposed plan change

*For detail of the submissions received, where decisions requested were considered beyond the scope of the plan change, refer to:*

- *Summary of Decisions Requested: pages 17-20*

#### 4.1.1 Matters raised by submitters

Four submitters requested decisions that are considered beyond the scope of plan change 4A, relating to:

- Water and soil quality.
- Plan implementation.
- Consistency with Land and Water Forum.
- 35 year terms for resource consents.
- Bore construction.
- Water metering.
- Default maximum allocation volume.
- Amending of provisions relating to surface water community supplies.

#### 4.1.2 Discussion

These submissions seek relief that is beyond the scope of the proposed plan change. The purpose of this plan change is to build on the groundwater management system of taking water within a maximum allocation volume, established under Proposed Plan Change 1C, with focus on the North Otago Volcanic Aquifer.

Giving consideration to any of these matters would require a variation to the plan change, or a new plan change, to ensure persons potentially affected by these matters are consulted and heard.

#### 4.1.3 Recommendations

Reject the submissions.

*Reason:*

- These requests relate to matters which are outside of the scope of this proposed plan change.

## **4.2 Adopting the proposed plan change**

There were no submissions on any other provisions in the proposed plan change. It is recommended those provisions be adopted as notified, and the provisions evaluated in this report be adopted or amended as recommended throughout this report.