

# Groundwater sourced heat-exchange consenting requirements

Matt Smith

# Outline

- RMA
- Effects
- Environment Canterbury Plans and Rules

# Resource Management Act

- Drill a well – land use s9
- Take water s14
- Use water s14
- Discharge water to water s15
- Discharge contaminant to water s15

# RMA cont.

The RMA defines “contaminant” as including:

“any substance (including gases, odorous compounds, liquids, solids, and micro-organisms) or energy (excluding noise) or heat that either by itself or in combination with the same, similar, or other substances, **energy or heat** –

(a) When discharged into water, changes or is likely to change the physical, chemical, or biological condition of water; or

(b) When discharged onto or into land or into air, changes or is likely to change the physical,

chemical, or biological condition of the land or air onto or into which it is discharged.”

# Effects to consider

- Water allocation
- Aquifer stability
- Well interference
- Water temperature - Ecological impacts
- Water temperature - Thermal loading

# Water Allocation

Although the mechanism of energy harvest/sink will be unlikely to result in a significant consumptive use of water, the mechanism of the return of water does need to be considered.

For example, a take from an aquifer that is discharged to a river may be considered a consumptive take from the groundwater system.

The taking from, and discharge to, the same aquifer would not be considered consumptive, nor would the taking from one aquifer and discharge to another, as the allocation limits are not currently set on a per aquifer basis.

# Aquifer Stability

Dewatering of aquitard material can result in localised consolidation and subsidence of those confining sediments.

While unlikely to occur at a large scale the effects on a local structure can be significant.

# Well interference

Depending on the mechanism/location of the water take and disposal wells interference may be an issue.

Any take will result in reduced water pressures and this has the potential to reduce well performance. The injection of water back to an aquifer has the opposite effect, but can increase water levels which may cause/exacerbate flooding.

The discharge to the same aquifer near the abstraction point minimises the effects as the take is mitigated by the injection. The discharge to an different aquifer will not, as will large distances between take and discharge points



# Water temperature - Ecological impacts:

Form a groundwater perspective this is unlikely to cause issues.

If, however, the water was to be discharged to surface water, or where groundwater may emerge into surface water, there is the potential for adverse ecological effects to occur.

# Water temperature - Thermal loading:

May affect other heat-exchange users system performance or compliance with conditions if the new discharge is in proximity to another heat exchange discharge or take.

Numerical modelling – aquifer testing

# RMA Resource Consents

- Permitted activity
- Resource consent

# Regional Plan (LWRP)

## Policy 4.58

“Non-consumptive groundwater takes, including the taking of heat from or adding heat to groundwater and any taking which in conjunction with other activities on a site results in a neutral or positive water balance, will not be subject to any groundwater allocation zone limits, and will generally be supported, provided the water either remains in the aquifer, or is returned to the same groundwater allocation zone within 24 hours and is protected from contamination, other than heat.”

Note: Groundwater to surface water not addressed directly but may be counted as consumptive.

# LWRP Rules

5.131

The non-consumptive taking and using of groundwater, including for heating or cooling purposes, and the associated discharge to groundwater, is a **permitted activity** provided the following conditions are met:

1. The discharge of the groundwater is to the same aquifer or groundwater source as the abstraction, and the discharge is within 50 m of the abstraction point; and
2. The use of the water is for domestic purposes; and
3. No contaminants, other than water of the same or different temperature, enter the groundwater.

# LWRP Rules

5.132

The non-consumptive taking and use of ground water and associated discharge to groundwater that does not meet one or more of the Conditions in Rule 5.131 is a **discretionary activity**.

discretionary activity = **consent required**

# LWRP Rules Christchurch CBD

## Rule 9.5.13

The non-consumptive taking and using of groundwater for district heating or cooling schemes, and the associated discharge to groundwater, is a **permitted activity** provided the following conditions are met:

1. The take and discharge is located within the area bounded by Moorhouse Avenue, Fitzgerald Avenue, Bealey Avenue, Harper Avenue and Deans Avenue; and
2. The take shall only be from a bore or bores screened at a depth of no less than 30 metres and no more than 100 metres; and
3. The discharge shall only be to the Riccarton gravel aquifer being the first gravel aquifer encountered below 20 metres;
4. The discharge is only groundwater abstracted under this rule; and
5. Prior to the first abstraction of groundwater, the direct **cumulative interference effect** is classified as being acceptable as determined in accordance with Schedule 12, except that for the purposes of this condition "direct cumulative interference effect" includes those effects on any existing authorised or permitted takes; and

# LWRP Rules Christchurch CBD cont.

Rule 9.5.13 conditions cont.

6. The discharge from the heating and cooling scheme does not result in any loss of **operational efficiency** in any temperature sensitive bore that existed prior to the time the discharge first commences; and
7. Monthly records of the temperature and rate of water abstraction and water discharge, measured in accordance with the Resource Management (Measurement and Reporting of Water Takes) Regulations 2010, are retained and supplied to the Canterbury Regional Council upon request; and
8. A record of the modelling undertaken in accordance with condition 5 is retained and provided to Canterbury Regional Council upon request; and
9. The Canterbury Regional Council is advised in writing of the installation of any district heating or cooling scheme prior to the commencement of any take or discharge associated with that scheme.

For the purposes of this rule "district heating or cooling scheme" means a system that abstracts and discharges groundwater for the purposes of heating or cooling residential developments comprising three or more residential units, or any commercial or industrial development



# LWRP Rules Christchurch CBD cont.

## Rule 9.5.14

The non-consumptive taking and use of ground water for district heating or cooling schemes, and the associated discharge to groundwater that does not meet one or more of the Conditions in Rule 9.5.13 is a **discretionary activity**.

# Consent Process

Pre App Meeting            1 hr free

Complete application processed in 20 working days

Further information may be requested

Notification determined once information received

# Application requirements

- Wells Drilled
- Wells Tested

AEE to include:

- Interference modelling
- Thermal modelling

Note: New RMA requirements for applications