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DRAFT Plan Change 11 (Geothermal)

to the

Bay of Plenty Regional Natural Resources Plan

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GEO – Geothermal – Wai Ariki

This chapter addresses the **effects** of the use and development of **geothermal water, heat, and energy**, and other activities within **geothermal systems** across the Bay of Plenty region.

All objectives, policies and rules in the main section of the Geothermal chapter apply to Geothermal Management Group 2 (**Ngā Wai Ariki o Rotorua**), except where they are explicitly excluded. Further provisions for Geothermal Management Group 2 (**Ngā Wai Ariki o Rotorua**) are in sub-section GEO-ROT.

The take, use, damming, **diversion, discharge**, and **drilling** in Geothermal Management Group 5 (where **groundwater** can be heated by geothermal means to between 30°C and 70°C, therefore becoming defined as **geothermal water**) is addressed under the provisions in the *[Draft Freshwater chapter]** of this plan. All other provisions not relating to take, use, damming, **diversion**, discharge, and **drilling** in this chapter still apply to Geothermal Management Group 5.

Discharge of **geothermal water** to **water** or into or onto **land** is addressed in this chapter. Discharge of **geothermal water** to surface **fresh water bodies** may also be subject to the relevant provisions of the *[Draft Freshwater chapter]** of this plan to address impacts on **water** quality.

The control of activities associated with the use and development of **geothermal water, heat, and energy** on the seaward side of **Mean High Water Springs** (MHWS) is addressed under the provisions of the Bay of Plenty Regional Coastal Environment Plan (RCEP).

The discharge of geothermal gas and steam to air is addressed in the Air chapter of this Plan.

The discharge of gas to **land** is not controlled by this chapter of this plan.

**Drafting note: The Freshwater chapter of the RNRP is currently being reviewed. The specific provisions being referred to here will be made available for your feedback through that process.*

Objectives

- GEO-O1** In accordance with the classification and purpose of the geothermal management group within which they are located:
- (1) **geothermal systems** are sustainably managed in an integrated way;
 - (2) **geothermal water, heat, and energy** are used efficiently;
 - (3) **significant geothermal features** are protected from use and development; and
 - (4) adverse **effects** from development and the use of **geothermal water, heat, and energy** are avoided, remedied, or mitigated.
- GEO-O2** **Customary practices** are protected and provided for.
- GEO-O3** The **effects** of **geothermal natural hazards** on people, property and **lifeline utilities** are avoided or mitigated.

Policies

GEO-P1 Geothermal management framework – Te anga whakahaere wai ariki

Use the following geothermal management groups and their management purposes to guide decisions on land-use activities, and the take, use, discharge, damming and **diversion** of **geothermal water, heat, and energy**:

GEO-Table 1: Geothermal management group framework

Geothermal management group		Management purpose	
(1)	Group 1: Protected (>70°C) Waimangu-Rotomāhana-Tarawera Whakaari (White Island) Moutohorā (Whale Island)	(a)	In these systems, ensure the protection of the natural, intrinsic, scenic, landscape, cultural, heritage and ecological values of the systems in this group, by: (i) avoiding adverse effects on the geothermal landscape, including geothermal features and significant geothermal features ; (ii) only providing for takes and discharges of geothermal water for scientific research or monitoring purposes, where all adverse effects on system values can be avoided or remedied; (iii) avoiding all other new takes of geothermal water, heat, and energy ; (iv) providing for the continuation of existing activities (e.g. maintenance of existing walking tracks, replacement culverts) where any adverse effects on the system values are minimised as far as reasonably practicable; and (v) only providing for any other new activities where adverse effects can be avoided, or there is a functional need and any adverse effects on the system values are minimised as far as reasonably practicable.
(2)	Group 2: Ngā Wai Ariki o Rotorua (>70°C) Rotorua Excludes Rotorua Research Management Area, being that part of Ngā Wai Ariki o Rotorua greater than a depth of 100m (NZVD2016).	(a)	Achieve integrated system management and ensure the system is healthy by: (i) avoiding adverse effects on significant geothermal features , including by maintaining geothermal aquifer pressure and temperature; (ii) only providing for the take and use of geothermal water, heat, and energy in accordance with the objective, policies and rules as set out in the Ngā Wai Ariki o Rotorua section of this chapter, including the use of allocation limits and prioritisation; (iii) manage the damming, diversion , and discharge of geothermal water, heat, and energy in accordance with the rest of the policies and rules in this chapter; and (iv) take into account the Rotorua System Management Plan for applications in Nga Wai Ariki o Rotorua .
(3)	Group 3: Conditional development (>70°C) Tikitere-Ruahine Rotokawa-Mokoia Island Rotomā-Tikorangi Taheke	(a)	The Conditional development management group includes a number of systems with differing levels of existing use and geothermal values, and as such they will be managed on a case-by-case basis, with any use and development highly dependent on the latest information for the particular system and assessment of potential adverse effects , including those on neighbouring connected systems. In these systems, provide for sustainable use and development of the geothermal resource by: (i) prioritising the values of significant geothermal features over extractive use; (ii) avoiding adverse effects on significant geothermal features in connected systems; (iii) providing for take, use, damming, diversion and discharge of geothermal water, heat, and energy where adverse effects on significant geothermal features within the same system are avoided where reasonably practicable, or otherwise remedied or mitigated; (iv) providing for the continuation of existing activities (e.g. maintenance of existing walking tracks, replacement culverts) where any adverse effects on the system are minimised as far as reasonably practicable; (v) only providing for any other activities where adverse effects on the system can be avoided, or are minimised as far as reasonably practicable; and (vi) requiring up to date technical information for the area or system be provided with any consent application, to reduce uncertainty when implementing the above.
(4)	Group 4: Development (>70°C) Kawerau Lake Rotoiti (Centre Basin) Rotomā-Puhihuhi	(a)	In these systems, enable the sustainable use and development of the geothermal resource by: (i) providing for the take, use, damming, diversion and discharge of geothermal water, heat, and energy , where adverse effects on significant geothermal features are remedied or mitigated; (ii) providing for the continuation of existing activities (e.g. maintenance of existing walking tracks, replacement culverts) where any adverse effects on the system are remedied or mitigated; (iii) only providing for any other activities where adverse effects on the system can be avoided, or are remedied or mitigated; (iv) take into account the Kawerau System Management Plan for applications in the Kawerau system; and (v) requiring any new development not already subject to a system management plan to provide a system management plan with any consent application.

(5)	Group 5: Low temperature (30°C - 70°C) Tauranga-Mount Maunganui (Mauao)-Pāpāmoa-Maketū Awakeri Tūhua (Mayor Island)	(a) The low-temperature geothermal management group are those systems where the geothermal aquifer is effectively cold ground water, naturally heated by warm rocks to between 30-70 degrees Celsius. Despite it being a cooling geothermal system, science has shown that the water quantity will run out before the heat, so volume is the limiting factor rather than heat resource. Ensure these systems and the geothermal water, heat and energy are managed in a sustainable, integrated way by: (i) managing the take, use, damming, diversion, discharge and drilling in these systems through the provisions in the <i>[Draft Freshwater plan change]*</i> of this plan; (ii) managing the adverse effects on significant geothermal features using the provisions in this Geothermal chapter; (iii) applying the policies and/or rules in this Geothermal chapter for system classification, geothermal natural hazards, system management plans, and identifying significant geothermal features; and (iv) take into account the Tauranga System Management Plan for applications for the above in the Tauranga-Mount Maunganui (Mauao)–Pāpāmoa-Maketū system. <i>*Drafting note: The Freshwater chapter of the RNRP is currently being reviewed. The specific provisions being referred to here will be made available for your feedback through that process.</i>
(6)	Group 6: Research/unclassified Any geothermal area not classified elsewhere in this policy, requiring more information to support their reclassification into groups 1-5. Rotorua Research Management Area, being that part of Ngā Wai Ariki o Rotorua greater than a depth of 100 m (NZVD2016). Makatiti Dome West Lake Rotorua	(a) The Research group is to allow for investigation into the characteristics of geothermal systems in order to enable their reclassification into the appropriate management group. A precautionary approach will need to be undertaken and effects minimised by: (i) only allowing limited takes and discharges for research and investigation purposes, and only where it can be demonstrated that there will be no permanent threat to significant geothermal features or to the natural characteristics of the system (including the geothermal aquifer), or neighbouring system/s; and (ii) prohibiting any other activities associated with geothermal use and development.
(7)	Group 7: Geothermal occurrences Those areas not included in any mapped system extent where there is geothermal water, heat, and energy at the surface (but not at depth), including: Lake Tarawera – Humphries Bay Lake Tarawera – Kanaehepa Bay Lake Ōkātina – Otangimoana Bay Mount Tarawera Manaōhau Pukehīnau-Waikokopu Pongakawa	(a) The Geothermal occurrences group is to manage those areas where there is an occurrence of geothermal water, heat and energy at the surface but not at depth, and therefore are not included in any mapped system extent and not intended to be reclassified into another geothermal management group. A precautionary approach will need to be undertaken and adverse effects minimised by: (i) only allowing limited takes and discharges for research and investigation purposes, and only where it can be demonstrated that there will be no permanent threat to significant geothermal features or to the natural characteristics of the area; and (ii) prohibiting any other activities associated with geothermal use and development.

Refer to the [RNRP Geothermal Chapter Spatial Overlay](#) for the location of **geothermal systems** in the Bay of Plenty. It is noted that these maps are indicative only.

Where there is uncertainty about which **geothermal system** an activity may be located within, a suitably qualified and experienced person (SQEP) or BOPRC Consents Officer will determine which **geothermal system** is applicable. This is to be done prior to any application being made.

GEO-P2 New geothermal systems and requesting a change to a geothermal management group classification – Ngā pūnaha wai ariki hou e tono ana i ngā panonitanga ki te rōpūtanga whakahaere wai ariki

Recognise new and re-classification of **geothermal systems** within the geothermal management group framework as follows:

- (1) newly identified **geothermal systems** are classified as research systems (management group 6).
- (2) provide for the re-classification of research systems and those systems in groups 3-6, where it can be shown that the **geothermal system** more appropriately falls within another geothermal management group as specified in GEO-P1 above and having regard to Policy GR 1A of the RPS.
- (3) any re-classification under (2) will need to be implemented through a regional plan change process. Where a re-classification is requested outside a plan review process an Applicant will be required to undertake a private plan change to the regional plan.

GEO-P3 System management plans – Ngā mahere pūnaha whakahaere

Enable integrated system management by requiring that:

- (1) in development systems, or where the total take in any **geothermal system** uses 1000 tonnes or more of **geothermal water** per day, a system management plan must be in place for the entire **geothermal system**;
- (2) the system management plan shall be prepared in accordance with Policy GR 7B of the RPS, and be reviewed every 5 years or where there is a change to the development strategy; and
- (3) when assessing resource consents, any relevant system management plan shall be taken into account.

GEO-P4 Geothermal matters of significance to Māori – Ngā take wai ariki hira ki te Māori

Recognise and provide for the relationship of **tangata whenua** with the geothermal **taonga** in accordance with the objectives and policies in the **Kaitiakitanga** chapter of this plan*.

**Drafting note: This is an existing chapter of the Regional Natural Resources Plan.*

GEO-P5 Efficiency – Whāomotanga

Except in Geothermal Management Group 5, ensure the efficient use of **geothermal water, heat, and energy** by:

- (1) requiring **efficiency** assessments for all consent applications; and
- (2) allocating only what is required for the intended use.

GEO-P6 Allocation – Tuaritanga

Except in Geothermal Management Group 5, allocate **geothermal water, heat, and energy** according to GEO-P1, GEO-P5 and GEO-ROT-P4, and the following:

- (1) adopt a **precautionary approach** and constrain resource allocation based on the level of understanding of system dynamics and resource availability, while

recognising that perfect knowledge of the **effects** of geothermal resource use is not possible. This may include staged development of a system.

GEO-P7 Discharge of geothermal water – Te tuku i te wai o te wai ariki

Except in Geothermal Management Group 5, manage the **discharge** of **geothermal water** in accordance with GEO-P1, and by:

- (1) requiring **reinjection** where practicable and appropriate to the production method, system characteristics and safety considerations;
- (2) seeking increased **reinjection** of **geothermal water** over time where this is technically feasible; and
- (3) manage the **effects** of **reinjection** through consideration of location, temperature, depth, and other adverse **effects** on other users and the receiving environment (including on **fresh water bodies**).
- (4) where **reinjection** is not possible, allowing the **discharge** of **geothermal water** into **water** only where it is safe to do so, where **effects** can be remedied or mitigated, where there is no suitable alternative location, and where the **discharge** meets the relevant **fresh water** assessment matters.
- (5) allowing **discharges** of **geothermal water** into and onto **land** by soakage only where there is no suitable alternative and where the adverse **effects** of the activity on other natural and physical resources including overlying **structures** (the built environment) can be remedied or mitigated.
- (6) requiring all **discharges** to occur in accordance with a geothermal **discharge** strategy.

GEO-P8 Identifying geothermal features – Ngā tūāhua tūtohu wai ariki

- (1) **Geothermal features** (including **significant geothermal features**) already identified by Regional Council are captured in the Bay of Plenty Regional Council RNP Geothermal Chapter Spatial Overlay.
- (2) Where not already identified by the Regional Council, Applicants shall identify **geothermal features** that could be impacted by their proposal, and the significance of such features. This shall be assessed in accordance with the significance criteria in Appendix F (RPS), by a suitably qualified and experienced practitioner. This information shall be peer-reviewed by Regional Council to establish the degree of protection needed. This will be done through the consent process.
- (3) Criteria assessments to identify **culturally significant geothermal features** have not been undertaken by Regional Council. These shall be assessed in accordance with the Set 4 criteria in Appendix F (RPS) and can only be assessed by the relevant **ngā tangata pūkenga** of the area.

GEO-P9 Geothermal wells – Ngā punawai wai ariki

Except in Geothermal Management Group 5, avoid the adverse **effects** of **geothermal wells** on the environment by requiring:

- (1) the use of the most up to date NZ Drilling Standards and Codes of Practice for shallow or deep wells, whichever is applicable;
- (2) conditions and, where appropriate, bonds that recognise the potential for the **drilling** of **geothermal wells** to cause significant adverse **effects** on **significant geothermal features** and other natural and physical resources, including overlying **structures** (the built environment); and

- (3) information (including well logs, pump and **bore** testing information) to be collected and provided to the Regional Council for the purpose of establishing an accurate record of geothermal resources in the region.

GEO-P10 Bonds – Ngā Herenga

Consider the use of bonds:

- (1) where non-compliance may lead to adverse **effects**, and where such **effects** may extend beyond the life of the activity and/or require on-going monitoring, management, mitigation or remediation; and
- (2) to ensure the complete and compliant **abandonment** of **geothermal wells** and associated **structures**, where Regional Council determines that there may be a higher level of risk involved.

GEO-P11 Geothermal natural hazards – Ngā mōrearea taiao o te wai ariki

Avoid or mitigate the adverse **effects** of **geothermal natural hazards** by requiring that city and district councils:

- (1) require land use and development to avoid areas with a high risk of **geothermal natural hazards**, unless the level of risk is reduced to at least a medium level or the development is not defined as a new hazard-sensitive development, a **functional or operational need** exists, no other practicable locations exist, and the risk is reduced to as low as reasonably practicable;
- (2) require land users and developers to take effective measures to remedy or mitigate the adverse **effects** of **geothermal natural hazards** at sites that have a medium or low actual or potential **geothermal natural hazard** risk;
- (3) adopt a precautionary approach towards planning for activities in areas of actual or likely **geothermal natural hazard** risk where limited information is available; and
- (4) recognise and provide for cultural, historical and economic values associated with geothermal in the **sensitive management areas**, where hazardous areas are subject to some existing land use.

Rules

TAKE, USE, AND DISCHARGE IN ACCORDANCE WITH TIKANGA MĀORI

GEO-R1 **Permitted – Take and use of geothermal water, heat and energy in accordance with tikanga Māori for customary practices – E whakaaehia ana – Te tango me te whakamahi i te wai, i te pūmahana, me te ngao wai ariki i runga anō i te tikanga Māori**

The take and use of **geothermal water, heat, and energy** as provided for under section 14(3)(c) of the Act, where:

- (1) the **geothermal water, heat, and energy** is taken and used in accordance with **tikanga Māori for customary practices** for the communal benefit of **tangata whenua** of the area;
 - (2) the activity does not use a **geothermal well**; and
 - (3) the activity does not have an adverse **effect** on the environment,
- is a permitted activity.

GEO-R2 **Permitted – Discharge of geothermal water in accordance with tikanga Māori – E whakaaehia ana – Te tuku i te wai o te wai ariki i runga anō i te tikanga Māori**

The **discharge** of **geothermal water** in accordance with **tikanga Māori** where:

- (1) the **discharge** is associated with a take and use of **geothermal water, heat, and energy** permitted by GEO-R1;
- (2) the method of **discharge** is:
 - (a) by soakage or to a **geothermal feature** or **water body**; or
 - (b) consistent with methods identified in a hapū or iwi management plan submitted to Regional Council; and
- (3) the **discharge** does not result in the following adverse **effects**, either individually or in combination with any other **discharge**:
 - (a) visible discolouration, scum, particulates;
 - (b) flooding; or
 - (c) reduction of bank and/or bed stability of the receiving **water body**,

is a permitted activity.

GEO-R3 **Restricted Discretionary - Discharge of geothermal water in accordance with tikanga Māori – Matawhāitihanga – Te tuku i te wai o te wai ariki i runga anō i te tikanga Māori**

The **discharge** of **geothermal water** in accordance with **tikanga Māori** not provided for by GEO-R2, is a restricted discretionary activity.

Matters of discretion are restricted to:

- (1) benefits of the use for **customary practices** using **geothermal water, heat, and energy**;
- (2) method, location, depth, volume, rate and temperature of **discharge**;

- (3) method of treatment of **discharge**;
- (4) **effects** on the **geothermal system** and **geothermal features**;
- (5) measures to avoid, remedy or mitigate adverse **effects** on **fresh water bodies**, including **groundwater**; and
- (6) measures to avoid, remedy or mitigate **erosion**, scour or damage to surrounding infrastructure.

TAKE AND USE

GEO-R4

Restricted Discretionary – Take and use of geothermal water, heat, and energy from a geothermal feature – Matawhāitihanga – Te tango me te whakamahi i te wai, i te pūmahana, me te ngao wai ariki i runga anō i te tikanga Māori i tētahi tūāhua ngāwhā

Except in Geothermal Management Groups 2 and 5, the take and use of **geothermal water, heat, and energy** from a **geothermal feature** not permitted by GEO-R1, where:

- (1) the maximum rate of take does not exceed natural outflow rates of the **geothermal feature**;
- (2) the take does not exceed the quantity required to meet the efficient end use; and
- (3) the matters in policy GEO-P8 have been met,
- (4) the take and use is not prohibited by GEO-R6 in this regional plan,

is a restricted discretionary activity.

Matters of discretion are restricted to:

- (a) method, location, volume, and rate of take;
- (b) the type and significance of the **geothermal feature**;
- (c) likely adverse **effects** on the **geothermal feature**;
- (d) measures to avoid, remedy or mitigate adverse **effects** on the **geothermal feature** and hydraulically connected **geothermal features**;
- (e) cumulative **effect** of takes from the **geothermal feature** and hydraulically connected **geothermal features**;
- (f) the quantity of **geothermal water, heat, and energy** required to meet the efficient end use of that **geothermal water, heat, and energy**; and
- (g) positive **effects** of the end use of **geothermal water, heat, and energy**.

GEO-R5

Discretionary – Take and use of geothermal water, heat, and energy – Ka whiriwhirihia – Te tango me te whakamahi i te wai, i te pūmahana, me te ngao wai ariki

Except in Geothermal Management Groups 2 and 5, the take and use of **geothermal water, heat, and energy**, including the extraction of heat from a **down hole heat exchanger**, that:

- (1) is not provided for under section 14(3)(c) of the Act (as detailed in GEO-R1); or
- (2) is not otherwise provided for by GEO-R4; and

- (3) is not prohibited by GEO-R6 in this regional plan,
is a discretionary activity.

GEO-R6

Prohibited – New or increased take and use of geothermal water, heat, and energy in Geothermal Management Groups 1, 6 and 7 – E aukati ana – Ngā tangohanga, ngā whakarahinga me ngā whakamahinga hou, nui ake rānei o te wai, o te pūmahana, me te ngao wai ariki kei Ngā Rōpū Whakahaere Wai Ariki 1, 6 me 7

Any new or increased take and use of **geothermal water, heat, and energy** in Geothermal Management Groups 1, 6 and 7 that:

- (1) does not comply with section 14(3)(c) of the Act; or
(2) is not for monitoring or scientific research purposes,
is a prohibited activity.

GEO-THERMAL WELLS

GEO-R7

Restricted Discretionary – Drilling, construction, installation, maintenance and abandonment of all geothermal wells, and take and use of geothermal water, heat, and energy for geothermal well testing – Matawhāitihanga – Ngā mahi wiri, waihanga, tāuta, tapitapi, whakarere hoki i ngā punawai wai ariki, me te tango me te whakamahi i te wai, i te pūmahana me te pūngao wai ariki mō ngā whakamātautau wai ariki

Except where prohibited by GEO-R6, or within Geothermal Management Group 5, the:

- (1) **drilling**, construction and installation of any new **geothermal well** or replacement **geothermal well** for the purposes of obtaining **geothermal water, heat, and energy**;
(2) **drilling**, construction or installation of any **reinjection geothermal well**;
(3) take and use of **water** (including **geothermal water**), **heat, and energy** for **geothermal well** testing purposes; and
(4) the related **discharge** of **drilling** fluids and **geothermal water** to the environment,
is a restricted discretionary activity, where:
(a) the matters in policy GEO-P8 have been met; and
(b) the **drilling** or associated activity is a minimum setback of 100m from any **significant geothermal feature**.

Matters of discretion are restricted to:

- (i) type of **geothermal well**;
(ii) location of the **geothermal well**;
(iii) construction of the **geothermal well**;
(iv) **geothermal well** log information;
(v) compliance with the most up to date National Drilling Standards;

- (vi) compliance with the most up to date New Zealand Standard: Code of Practice for Deep Geothermal Wells or Health and Safety Guidelines for Shallow Geothermal Wells, whichever is applicable;
- (vii) **effects** on existing **geothermal wells**;
- (viii) pump and **geothermal well** testing information;
- (ix) measures to be undertaken for the **abandonment** of the **geothermal well**;
- (x) measures to protect **significant geothermal features**, landscapes, significant indigenous vegetation and significant habitats of indigenous fauna;
- (xi) measures to protect geothermal **taonga**;
- (xii) measures to avoid, remedy or mitigate adverse **effects** from the **discharge** of **geothermal water**; and
- (xiii) the volume and rate of take of **geothermal water, heat and energy**.

Where **drilling** is undertaken in any **geothermal system** that either does not intercept the **water** table or **aquifer**, or where it does intercept the **water** table or **aquifer**, but it is not for the purposes of constructing a **geothermal well**, *[Draft Freshwater provisions]** will apply.

**Drafting note: The Freshwater chapter of the RNRP is currently being reviewed. The specific provisions being referred to here will be made available for your feedback through that process.*

DAMMING AND DIVERSION OF GEOTHERMAL WATER

GEO-R8 **Discretionary – Damming or diversion of geothermal water and associated structures – Ka whiriwhirihia – Ngā mahi pāpuni, whakarerekē i te wai o te wai ariki mō ngā hanganga whai pānga**

Except in Geothermal Management Group 5, or where provided for by GEO-R2 or GEO-R3, the:

- (1) damming or **diversion** of **geothermal water** (including interference with the natural outflow from a **geothermal feature**); and
- (2) associated **structures**,

is a discretionary activity.

DISCHARGE OF GEOTHERMAL WATER

GEO-R9 **Restricted Discretionary – Discharge of geothermal water by reinjection – Matawhāitihanga – Ngā putunga wai o te wai ariki mā te pūwero atu anō**

The **discharge** of **geothermal water** by **reinjection**, excluding in Geothermal Management Group 5, is a restricted discretionary activity, where:

- (1) the method of **discharge** is **reinjection** to the **geothermal aquifer**, unless it is for the purpose of maintaining or enhancing a **geothermal feature**; and
- (2) there is no **discharge** of **geothermal water** to any **fresh water body**,

is a restricted discretionary activity.

Matters of discretion are restricted to:

- (a) method, location, depth, volume, rate, and temperature of **discharge**;
- (b) method of treatment of **discharge**;
- (c) measures to avoid, remedy or mitigate adverse **effects** on the **geothermal system** and **geothermal features**;
- (d) **effects** on **culturally significant geothermal features** or **customary practices** in that area;
- (e) measures to avoid, remedy or mitigate adverse **effects** on **fresh water bodies**, including **groundwater**;
- (f) measures to avoid, remedy or mitigate **erosion**, scour or damage to surrounding infrastructure;
- (g) measures to minimise risk of subsidence; and
- (h) measures to minimise risk of hydrothermal eruptions.

GEO-R10 Discretionary – Discharge of geothermal water – Ka whiriwhirihia – Te putunga o te wai o te wai ariki

The **discharge** of **geothermal water**, excluding in Geothermal Management Group 5:

- (1) to **water**; or
- (2) onto or into **land** (including land soakage); or
- (3) not meeting the performance standards in GEO-R9,

is a discretionary activity.

Discharges to sewer require authorisation from the relevant City or District Council prior to the **discharge** occurring.

ACTIVITIES NEAR SIGNIFICANT GEOTHERMAL FEATURES

GEO-R11 Restricted Discretionary – Activities near significant geothermal features – Matawhāitihanga – Ngā mahi e pātata ana ki ngā tūāhua wai ariki hira

Activities not covered by s14(3)(c) or not lawfully established at the operative date of this Plan, in or within 20 metres of a **significant geothermal feature**, including:

- (1) the damming, **diversion**, or **discharge** of non-geothermal **water** to **water**, or onto or into **land** (including land soakage);
- (2) **land** and **soil disturbance** by **vegetation clearance**, including for **plantation forestry** activities;
- (3) **land** and **soil disturbance** by planting, including for **plantation forestry** activities;
- (4) **structures** (other than those to protect the feature); and
- (5) **earthworks**,

are a restricted discretionary activity, where:

- (a) the matters in policy GEO-P8 have been met.

Matters of discretion are restricted to:

- (i) the extent to which consultation with **tangata whenua** and key stakeholders has been undertaken and the recognition of concerns has been taken into account;
- (ii) the extent to which adverse **effects** on **significant geothermal features** will be avoided, remedied or mitigated and if mitigated how this will be achieved, for example 'like for like' enhancement;
- (iii) the extent to which the activity mitigates pre-existing adverse **effects** on a natural **geothermal feature**;
- (iv) the extent to which associated infrastructure such as **structures**, pipelines and **geothermal wells** will be designed, constructed and placed to avoid, remedy or mitigate adverse **effects** on biodiversity, landscape and **amenity values**;
- (v) the extent to which the following factors are taken into account:
 - the practicality and costs of alternative locations or methodologies and the benefits that each option provides;
 - the use of a **precautionary approach** in situations of scientific uncertainty;
- (vi) the expected duration of the activity;
- (vii) whether the activity is the **best practicable option**; and
- (viii) the extent to which the risk of **geothermal natural hazards** is assessed and addressed.

GENERAL ACTIVITIES

GEO-R12 Discretionary – General activities – Ka whiriwhirihia – Nga mahinga noa

Any take, use, **discharge**, damming, **diversion**, **drilling** or other geothermal activity that cannot comply with any permitted activity rule, and which is not specifically addressed by any other rule in this chapter, is a discretionary activity.

GEO – ROT – Ngā Wai Ariki o Rotorua

All objectives, policies and rules in the main section of the Geothermal chapter above also apply to Geothermal Management Group 2 (**Ngā Wai Ariki o Rotorua**) except where they are explicitly excluded.

Objective

- GEO-ROT-01** The **mauri** and health of **Ngā Wai Ariki o Rotorua** is maintained or enhanced, and **ngāwhā** and **significant geothermal features** are protected.

Policies

GEO-ROT-P1 Sensitive management area framework – Anga rohe whakahaere āritarita

In the **sensitive management areas**, a greater level of protection shall be afforded. In addition to the matters set out in GEO-P1 for **Ngā Wai Ariki o Rotorua**, use the following framework to guide decision-making in the following **sensitive management areas**:

GEO-Table 2: Sensitive management area framework

Sensitive management area		Management purpose
(1)	Whakarewarewa Geyser Protection Area	(a) Protect the identified values of the significant geothermal features in the Whakarewarewa Geyser Protection Area by: (i) enabling takes of geothermal water, heat, and energy for customary practices that do not have an adverse effect on Ngā Wai Ariki o Rotorua; (ii) avoiding new or increased takes and uses of geothermal water, heat, and energy using a geothermal well; and (iii) adverse effects of takes, uses and discharges of geothermal water, heat, and energy are avoided, or are minimised as far as reasonably practicable.
(2)	Ngāpuna-Oruawhata Management Area and Kuirau-Ōhinemutu Management Area	(a) Protect the identified values of the significant geothermal features in the Ngāpuna-Oruawhata Management Area and Kuirau-Ōhinemutu Management Area by: (i) enabling takes of geothermal water, heat, and energy for customary practices that do not have an adverse effect on Ngā Wai Ariki o Rotorua; (ii) avoiding new or increased takes and uses of geothermal water, heat, and energy using a geothermal well that do not use a down hole heat exchanger; and (iii) adverse effects of takes, uses and discharges of geothermal water, heat, and energy are avoided, or are minimised as far as reasonably practicable.

GEO-ROT-P2 Efficiency – Whāomotanga

In addition to GEO-P5, ensure efficient use of **geothermal water, heat, and energy** by:

- (1) encouraging **production reinjection systems** and **enhanced down hole heat exchangers** to be replaced by **down hole heat exchangers**;
- (2) for takes of 100 tonnes per day or larger, requiring continuous metering of use, and that these records be provided to Council; and
- (3) for all other takes, requiring consent holders to keep records proportionate to the take and use, and provide those records to Regional Council.

GEO-ROT-P3 Limits to take and use of geothermal water, heat, and energy – Tepenga ki te tango me te whakamahi i te wai, i te pūmahana me te pūngao wai ariki

Protect the **mauri** and health of **Ngā Wai Ariki o Rotorua** by:

- (1) managing takes to maintain the **mauri** and health of **ngāwhā** and **significant geothermal features**;
- (2) enforcing the system-wide allocation limits for takes of **geothermal water, heat, and energy** utilising a **geothermal well**, as specified in GEO-ROT-Table 1;
- (3) avoiding takes of **geothermal water, heat, and energy** utilising a **geothermal well** which would cause a limit in GEO-ROT-Table 1 to be exceeded; and
- (4) only providing for new or increased take and use of **geothermal water, heat, and energy** utilising a **geothermal well** in accordance with the values-based allocation priorities in GEO-ROT-P4, or where the take is offset in accordance with GEO-ROT-P7.

GEO-ROT-P4 Values based allocation – Ngā uara tuaritanga

Only provide for new or increased take and use of **geothermal water, heat, and energy** within the allocation limits specified in GEO-ROT-Table 1 in the following order of priority:

- (1) first, communal use that directly benefits the health and wellbeing of **tangata whenua**, including for marae use such as cooking and heating, communal bathing and papakāinga; then
- (2) second, takes for mineral bathing and **wellness therapies**; then
- (3) third, any other use of **geothermal water, heat, and energy** consistent with GEO-P1, GEO-ROT-P1 and GEO-ROT-P3; or
- (4) where the take is enabled in accordance with GEO-ROT-P7.

For clarity, **customary practices** are provided for as a permitted activity under GEO-R1 and do not use a **geothermal well**. Therefore, they are not subject to the allocation limits set out in GEO-ROT-Table 1.

GEO-ROT-P5 Maintaining and restoring minimum geothermal aquifer water levels – Te whakanoho me te whakaora i te mōkito taumata wai manawawhenua wai ariki

Require through conditions of consent on every new and existing resource consent to take and use **geothermal water, heat, and energy**, a 10% reduction in the taking of **geothermal water, heat, and energy** to restore **minimum geothermal aquifer water levels** if the **water** level of the monitor wells equal or fall below the specified limit in GEO-

ROT-Table 2 and remain reduced until the specified limit in GEO-ROT-Table 2 is restored or exceeded.

GEO-ROT-P6 Stages of reduction of take to restore minimum geothermal water aquifer levels – Ngā kōekenga whakaiti i ngā tangohanga ki te rauora i ngā mōkito taumata manawawhenua wai ariki

- (1) To implement GEO-ROT-P5, a 10% reduction of takes of **geothermal water, heat, and energy** is to be applied to resource consents in the following order:
 - (a) first, takes of **geothermal water** which are not **reinject**ed;
 - (b) second, if the **minimum geothermal aquifer water levels** remain below the limits specified in GEO-ROT-Table 2, takes of **geothermal water, heat, and energy** using a **production reinjection system**;
 - (c) third, if the **minimum geothermal aquifer water levels** remain below the limits specified in GEO-ROT-Table 2 for an additional 20 consecutive days, takes of **geothermal heat** used an **enhanced down hole heat exchanger**; and
 - (d) lastly, if the **minimum geothermal aquifer water levels** remain below the limits specified in GEO-ROT-Table 2 for an additional 20 consecutive days, takes of **geothermal heat** using a **down hole heat exchanger**.
- (2) The reduction of takes of **geothermal water, heat, and energy** may be applied generally over the whole system or to a specifically defined part or parts of the system.
- (3) The release of reductions is to occur in the opposite order.

GEO-ROT-P7 Transfer of consent to enable new or increased take and use – Te whakawhiti i ngā whakaaetanga ki te whakamana i ngā tangohanga me ngā whakamahinga hou, nui ake rānei

Where an allocation limit has been reached, provide for the new or increased take and use of **geothermal water, heat, and energy** where the new or increased take and use of **geothermal water, heat, and energy** is wholly offset by the transfer of an existing consent/s from another site/s, and where the transfer of consent:

- (1) does not cause an allocation limit specified in GEO-ROT-Table 1 to be exceeded;
 - (2) does not result in a new or increased take using a **geothermal well** in the **Whakarewarewa Geyser Protection Area**; and
- either:
- (a) provides for the take of geothermal **water**, heat, and energy for a use listed in GEO-ROT-P4(1)-(2); or
 - (b) results in the relocation of the point of take from a **sensitive management area** to a location outside a **sensitive management area**.

Rules

ALLOCATION LIMITS AND MINIMUM GEOTHERMAL AQUIFER WATER LEVELS

The following allocation limits and **minimum geothermal aquifer water levels*** are to be applied when reading policies and rules in the GEO - ROT – Ngā Wai Ariki o Rotorua section of this plan.

**Drafting note: The figures in the tables may be subject to change prior to notification of the proposed plan as a result of further technical input and feedback on this draft.*

GEO-ROT-Table 1: Allocation Limits

Parameter	Limit
Net take of geothermal water from the geothermal aquifer of Ngā Wai Ariki o Rotorua	1,400 tonnes per day.
Net take of geothermal heat from the geothermal aquifer of the Ngā Wai Ariki o Rotorua	23,000 kW _{th} per day.

GEO-ROT-Table 2: Minimum Geothermal Aquifer Levels

Parameter	Limit
Minimum geothermal aquifer water level	A measured water level of: (a) 281.5 metres relative to NZVD2016 in Monitor Bore M24 (or its replacement); (b) 281.0 metres relative to NZVD2016 in Monitor Bore M262 (or its replacement); or (c) 284.1 metres relative to NZVD2016 in Monitor Bore M28 (or its replacement).

GEO-ROT-R1 Existing consents – Ngā whakaaetanga

Under s68(7)(a) of the RMA, all existing consents for take and use in **Ngā Wai Ariki o Rotorua** shall be subject to conditions of consent in accordance with GEO-ROT-P5, GEO-ROT-P6 and GEO-ROT-Table 2.

TAKE AND USE OF GEOTHERMAL WATER, HEAT, AND ENERGY

GEO-ROT-R2 **Controlled – Take and use of geothermal water, heat, and energy from a geothermal feature or from the geothermal aquifer for communal use that directly benefits the health and wellbeing of tangata whenua – Ka whakahaeretia – Ngā tangohanga me ngā whakamahinga o te wai, o te pūmahana me te pūngao wai ariki i te tūāhua wai ariki, i te manawawhenua wai ariki rānei mō tētahi whakamahinga hapori e hāngai pū ana ki te hauora me te toiora o te tangata whenua**

The take and use of **geothermal water, heat, and energy** from a **geothermal feature** or from the **geothermal aquifer** for communal use that directly benefits the health and wellbeing of **tangata whenua**, where:

- (1) the take does not cause an allocation limit specified in GEO-ROT-Table 1 to be exceeded;
- (2) the take is for marae use such as cooking and heating, communal bathing and papakāinga;
- (3) in the **Whakarewarewa Geyser Protection Area**:
 - (a) The application is for a replacement resource consent for a lawful take existing as at [notification date]; and
 - (b) The take does not cause an increase in the total abstraction of heat from the **Whakarewarewa Geyser Protection Area**;
- (4) the take will be subject to conditions of consent which direct the staged reduction of take and use of **geothermal water, heat, and energy** in accordance with GEO-ROT-P6;
- (5) the matters in policy GEO-P8 have been met; and
- (6) if the end use is not communal bathing, the take uses a **down hole heat exchanger**, is a controlled activity.

Matters of control:

- (a) consistency of the application with GEO-ROT-P4(1);
- (b) the method, location, depth, volume, rate, and temperature of take;
- (c) measures to avoid, remedy or mitigate adverse **effects** on the **geothermal feature** and hydraulically connected **geothermal features**;
- (d) the quantity of **geothermal water, heat, and energy** required to meet the efficient end use of that **geothermal water, heat, and energy**; and
- (e) **geothermal well maintenance and abandonment**.

GEO-ROT-R3 **Restricted Discretionary – Take and use of geothermal water, heat, and energy from the geothermal aquifer for mineral bathing and wellness therapies – Matawhāitihanga – Te tango me te whakamahi i te wai, i te pūmahana me te ngao o te manawawhenua wai ariki mō ngā kauranga ngāwhā kōhuke me ngā haumanu whakaora**

The take and use of **geothermal water, heat, and energy** from the **geothermal aquifer** for mineral bathing and **wellness therapies**, where:

- (1) the take is not located within the **Whakarewarewa Geyser Protection Area**;
- (2) the take does not cause an allocation limit specified in GEO-ROT-Table 1 to be exceeded;
- (3) the take will be subject to conditions of consent which direct the staged reduction of take and use of **geothermal water, heat, and energy** in accordance with GEO-ROT-P6; and
- (4) the matters in policy GEO-P8 have been met,

is a restricted discretionary activity.

Matters of discretion are restricted to:

- (a) the method, location, depth, volume, rate, and temperature of take;
- (b) measures to avoid, remedy or mitigate adverse **effects** on any **geothermal feature** and hydraulically connected **geothermal features**;
- (c) **effects** on **culturally significant geothermal features** or **customary practices** in that area;
- (d) the quantity of **geothermal water, heat, and energy** required to meet the efficient end use of that **geothermal water, heat, and energy**;
- (e) positive **effects** of the end use of **geothermal water, heat, and energy**;
- (f) cumulative **effect** of takes from the **geothermal feature** and hydraulically connected **geothermal features**; and
- (g) **geothermal well maintenance** and **abandonment**.

GEO-ROT-R4 **Restricted Discretionary – Take and use of geothermal water, heat, and energy from a geothermal feature not provided for by GEO-R1 – Matawhāitihanga – Te tango me te whakamahi i te wai, i te pūmahana me te ngao i te tūāhua wai ariki kāore e whakaratohia ana ki te GEO-R1**

The take and use of **geothermal water, heat, and energy** from a **geothermal feature** not provided for by GEO-R1, where:

- (1) the maximum rate of take shall not exceed natural outflow rates of the geothermal feature;
- (2) the maximum rate of take does not exceed the quantity required to meet the efficient end use;
- (3) in the **Whakarewarewa Geyser Protection Area**:
 - (a) The application is for a replacement resource consent for a lawful take existing as at [notification date]; and
 - (b) The take does not cause an increase in the total abstraction of heat from the **Whakarewarewa Geyser Protection Area**;
- (4) the take is subject to conditions of consent which direct the staged reduction of take and use of **geothermal water, heat, and energy** in accordance with GEO-ROT-P6; and

(5) the matters in policy GEO-P8 have been met,

is a restricted discretionary activity.

Matters of discretion are restricted to:

- (i) the method, location, depth, volume, rate, and temperature of take;
- (ii) the type and significance of the **geothermal feature**;
- (iii) measures to avoid, remedy or mitigate adverse **effects** on the **geothermal feature** and hydraulically connected **geothermal features**;
- (iv) **effects** on **culturally significant geothermal features** or **customary practices** in that area;
- (v) the quantity of **geothermal water, heat, and energy** required to meet the efficient end use of that **geothermal water, heat, and energy**;
- (vi) positive **effects** of the end use of **geothermal water, heat, and energy** having particular regard to GEO-ROT-P4;
- (vii) cumulative **effect** of takes from the **geothermal feature** and hydraulically connected **geothermal features**; and
- (viii) **geothermal well maintenance and abandonment**.

GEO-ROT-R5 **Restricted Discretionary – Take and use of geothermal water, heat, and energy from the geothermal aquifer not provided for by GEO-R1 – Matawhāitihanga – Te tango me te whakamahi i te wai, i te pūmahana me te ngao i te manawawhenua wai ariki kāore e whakaratohia ana ki te GEO-R1**

The take and use of **geothermal water, heat, and energy** from a **geothermal aquifer** not provided for by GEO-R1, where:

- (1) the take uses a **down hole heat exchanger**;
- (2) the maximum rate of take does not exceed the quantity required to meet the efficient end use;
- (3) the take does not cause an allocation limit specified in GEO-ROT-Table 1 to be exceeded;
- (4) in the **Whakarewarewa Geyser Protection Area**:
 - (a) The application is for a replacement resource consent for a lawful take existing as at [notification date]; and
 - (b) The take does not cause an increase in the total abstraction of heat from the **Whakarewarewa Geyser Protection Area**;
- (5) the take is subject to conditions of consent which direct the staged reduction of take and use of **geothermal water, heat, and energy** in accordance with GEO-ROT-P6; and
- (6) the matters in policy GEO-P8 have been met,

is a restricted discretionary activity.

Matters of discretion are restricted to:

- (i) the method, location, depth, volume, rate, and temperature of take;
- (ii) proximity to and type of **geothermal features** and **effects** on those **geothermal features**;
- (iii) measures to avoid, remedy or mitigate adverse **effects** on the **geothermal system** and **geothermal features**;
- (iv) **effects** on **culturally significant geothermal features** or **customary practices** in that area;
- (v) the quantity of **geothermal water, heat, and energy** required to meet the efficient end use of that **geothermal water, heat, and energy**;
- (vi) positive **effects** of the end use of **geothermal water, heat, and energy**;
- (vii) cumulative **effects**; and
- (viii) **geothermal well maintenance** and **abandonment**.

GEO-ROT-R6

Restricted Discretionary – New or increased take and use of geothermal water, heat, and energy via transfer of consent – Matawhāitihanga – Ngā tangohanga hou, rahi ake rānei ki te tango i te wai, i te pūmahana me te ngao wai ariki mā te whitinga whakaaetanga

The new or increased take and use of **geothermal water, heat, and energy**, where:

- (1) the new or increased take and use is wholly offset by the transfer of an existing consent/s for take and use within **Ngā Wai Ariki o Rotorua**;
- (2) the point of take is not located in the **Whakarewarewa Geyser Protection Area**;
- (3) either:
 - (a) the take of **geothermal water, heat, and energy** is for a use listed in GEO-ROT-P4(1)-(2); or
 - (b) the take results in the relocation of the point of take from a location within a **sensitive management area** to a location outside a **sensitive management area**;
- (4) there is no change in the end use of the **geothermal water, heat, and energy**; and
- (5) the take is subject to conditions of consent which direct the staged reduction or suspension of take and use of **geothermal water, heat, and energy** in accordance with GEO-ROT-P6,

is a restricted discretionary activity.

Matters of discretion are restricted to:

- (i) method, location, depth, volume, rate, and temperature of take;
- (ii) the quantity of **geothermal water, heat, and energy** required to meet the efficient end use of **geothermal water, heat, and energy**;
- (iii) changes to the nature, location, scale, and intensity of **effects** on:

- (i) neighbouring takes and **discharges**;
- (ii) **fresh water** and the **geothermal aquifer**;
- (iii) **geothermal features**;
- (iv) the level, temperature, and pressure of the **geothermal system**;
- (v) measures to minimise risk of subsidence;
- (vi) measures to minimise risk of hydrothermal eruptions;
- (vii) cumulative **effects**;
- (viii) measures to avoid, remedy or mitigate any adverse **effect** associated with the take or **discharge** of **geothermal water, heat, and energy**; and
- (ix) **geothermal well maintenance** and **abandonment**.

GEO-ROT-R7 **Discretionary – Take and use of geothermal water, heat, and energy from a geothermal feature or the geothermal aquifer in Ngā Wai Ariki o Rotorua not provided for or prohibited by another rule – Ka whiriwhirihia – Ki te tango me te whakamahi i te wai, i te pūmahana me te ngao wai ariki i te tūāhua wai ariki, i te manawawhenua wai ariki rānei o Ngā Wai Ariki o Rotorua kāore i te whakaratohia, e aukatia ana rānei e tētahi atu tikanga**

Any take and use of **geothermal water, heat, and energy** from a **geothermal feature** or the **geothermal aquifer**, that is not provided for or prohibited by another rule, is a discretionary activity.

GEO-ROT-R8 **Prohibited – New or increased take and use of geothermal water, heat, and energy from the geothermal aquifer or a geothermal feature in Ngā Wai Ariki that would exceed the allocation limit in GEO-ROT-Table 1 – E aukati ana – Ngā tangohanga me ngā whakamahinga hou, rahi ake rānei o te wai, o te pūmahana me te manawawhenua wai ariki i te manawawhenua wai ariki, i te tūāhua wai ariki rānei o Ngā Wai Ariki ka kake ake i te tepenga tuari ki te GEO-ROT-Papatau 1**

Any new or increased take and use of **geothermal water, heat, and energy** from the **geothermal aquifer** or a **geothermal feature** in **Ngā Wai Ariki o Rotorua** that would exceed the allocation limit in GEO-ROT-Table 1, is a prohibited activity.

GEO-ROT-R9 **Prohibited – New or increased take and use of geothermal water, heat, and energy from the geothermal aquifer in the Whakarewarewa Geyser Protection Area not provided for by GEO-R1, GEO-ROT-R2, or GEO-ROT-R5 – E aukati ana – Ngā tangohanga me ngā whakamahinga hou, rahi ake rānei o te wai, o te pūmahana me te ngao wai ariki mai i te manawawhenua wai ariki ki te Rohe Haumarua Puia o Whakarewarewa kīhai e whakaratohia ana ki te GEO-R1, ki te GEO-ROT-R2, ki te GEO-ROT-R5 rānei**

Any new or increased take and use of **geothermal water, heat, and energy** from the **geothermal aquifer** in the **Whakarewarewa Geyser Protection Area** not provided for by GEO-R1, GEO-ROT-R2 or GEO-ROT-R4, is a prohibited activity.

Draft Definition of Terms – PC 11 (Geothermal)

**Drafting note: The definitions shown below are only those used in the draft Geothermal chapter. Tracked changes show where proposed changes have been made to the relevant existing RNRP definitions. Where a definition is new but is required by the National Planning Standards, it is shown as an existing definition but will be identified as an NPS definition, and any proposed amendments shown as tracked changes.*

Terms in *italics* are defined by the Act. The Act italicised definitions are included in this regional plan for information only, and are correct at the date of public notification of this regional plan.

Abandon – in relation to geothermal drilling, means to seal a geothermal well to render it permanently inoperative; and **abandonment** has a corresponding meaning.

Aquifer – means a permeable geological formation, group of formations, or part of a formation, beneath the ground, capable of receiving, storing, transmitting and yielding water. *[Drafting note: National Planning Standards definition]*

Best Practicable Option – In relation to a discharge of a contaminant or an emission of noise, means the best method for preventing or minimising the adverse effects on the environment having regard, among other things, to -

- (a) The nature of the discharge or emission and the sensitivity of the receiving environment to adverse effects; and
- (b) The financial implications, and the effects on the environment, of that option when compared with other options; and
- (c) The current state of technical knowledge and the likelihood that the option can be successfully applied.

~~**Bore** – any structure or hole in the ground, which is drilled or constructed for the purpose of accessing, taking or using groundwater, or which results in groundwater being taken or used. For the purposes of this regional plan, a bore and a well have the same definition.~~

Bore – means any hole drilled or constructed in the ground that is used to:

- (a) Investigate or monitor conditions below the ground surface; or
- (b) Abstract gaseous or liquid substances from the ground; or
- (c) Discharge gaseous or liquid substances into the ground;

But it excludes test pits, trenches, soak holes and soakage pits. See also geothermal well. *[Drafting note: National Planning Standards definition]*

Contaminant – Includes any substance (including gases, 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.

Culvert – a pipe in the bed of a stream, river or modified watercourse that conveys water beneath a stream crossing which supports a path, road or track. Excludes the piping of a stream for the purpose of stormwater management, or the development or reclamation of land.

Customary practice – The use of geothermal in accordance with tikanga Māori for the communal benefit of the tangata whenua of the area and does not have an adverse effects on the environment, as provided for under s14(3)(c) of the RMA. Excludes the use of a geothermal well.

Decommission – to permanently abandon a hole, bore, well or infiltration gallery or take a hole, bore, well or infiltration gallery out of service. For geothermal wells, see abandon.

Downhole Heat-Exchange System/Down hole heat exchanger – a device installed down a geothermal well bore to remove heat from a geothermal field system without removing geothermal water fluid, using fresh water circulated through a heat exchanger at depth. Excludes Enhanced down hole heat exchanger.

Discharge – Includes emit, deposit, and allow to escape. *[National Planning Standards definition]*

Diversion – The diversion of water within the same stream or river. The transfer of water into another catchment of a watercourse is deemed to be a take and discharge of water. Excludes geothermal water.

Drilling – means the drilling of, or in, a bore; and includes –

- (a) The making, completion, suspension, or abandonment of a bore:
- (b) The deepening, repair, or re-drilling of a bore:
- (c) Any operation that renders any part of the primary pressure containment system of the bore inactive or inoperable:
- (d) Any on-site ancillary operation to the making, completion, suspension, or abandonment of a bore, whether of not before, during, or after the actual making, completion or abandonment takes place.

Earthworks – ~~Any activity that exposes, disturbs, places or deposits land and soil. Such activities include, but are not limited to, tracking, roading, cleanfill sites, cut and fill operations, quarrying, mining, and recontouring. Excludes area-wide treatment (pavement overlay and strengthening) and road resealing (pavement rehabilitation) of existing roading, normal domestic gardening practices, maintenance of roads and tracks (including railway tracks), the formation of walking tracks, cultivation (except where re-contouring is involved), maintenance of linear network utility support structures, and maintenance (including minor realignment) of existing foot tracks within public reserves and the conservation estate.~~

Earthworks – means the alteration or disturbance of land, including by moving, removing, placing, blading, cutting, contouring, filling or excavation of earth (or any matter constituting the land including soil, clay, sand and rock); but excludes gardening, cultivation, and disturbance of land for the installation of fence posts. *[National Planning Standards definition]*

Effect – The term “effect” ... includes -

- (ii) Any positive or adverse effect; and
- (iii) Any temporary or permanent effect; and
- (iv) Any past, present, or future effect; and
- (v) Any cumulative effect which arises over time or in combination with other effects -
- (vi) regardless of the scale, intensity, duration, or frequency of the effect, and also includes¹⁰ -
- (vii) Any potential effect of high probability; and

(viii) Any potential effect of low probability which has a high potential impact.

Efficiency – For the purposes of measuring efficiency of geothermal resource use (section 7 RMA) efficiency has several dimensions. Efficiency includes the comparison of the overall benefit to society (economic efficiency), of competing uses (allocative efficiency), productive efficiency, and the ability of productive efficiency to increase over time through technology improvements and better understanding of the resource (dynamic or innovative efficiency).

Enhanced down hole heat exchanger – A modified down hole heat exchanger with perforated casing or promoter tubes to enhance convection.

Erosion – the processes of the wearing away of the land's surface by natural processes and human activities, and the transporting of the resulting sediment.

Fresh Water – Means all water except coastal water and geothermal water.

Functional need - means the need for a proposal or activity to traverse, locate or operate in a particular environment because the activity can only occur in that environment. [National Planning Standards definition]

Field Pressure – averaged dynamic pressure of a geothermal field within its geothermal reservoir.

Geothermal aquifer – A permeable geological formation, group of formations, or part of a formation, beneath the ground, capable of receiving, storing, transmitting and yielding geothermal water. Groundwater is heated at depth by surrounding heated rocks and may also receive input from magmatic fluids. Geothermal heat and hot water is transported within and between different hydrogeological units by convection, advection and/or conduction.

Geothermal aquifer pressure – The force exerted by water (including steam) across a geothermal aquifer, dependent on water level and temperature. Pressure response is influenced by recharge, and the replacement of water as it is abstracted and reinjected, as well as changed to boiling zones and volumes of non-compressible gases. Usually measured in bar.

Geothermal aquifer water level – The water level of a geothermal aquifer, usually measured in geothermal wells, in meters above New Zealand Vertical Datum (NZVD 2016).

Geothermal Ecosystem/Ecology – a dynamic life-supporting system made up of a group of living organisms (including plants and animals) that has adapted to, and is reliant on, geothermal resources.

Geothermal energy – Means energy derived or derivable from and produced within the earth by natural heat phenomena; and includes all geothermal water.

Geothermal feature – means active and remnant geothermal surface expression, vegetation and habitats. There are many different geothermal feature types (such as geysers, heated ground, and geothermal habitat) which are defined in Annex A of the Bay of Plenty Regional Policy Statement. Some geothermal features are defined as **Significant Geothermal Features**.

Geothermal Field – A body of natural geothermal heat, energy or water as defined by the extensive scientific investigation which have been conducted, in particular, detailed resistivity surveys, and by the filling and testing of deep drillholes. The energy content and productive potential of the locality have been reasonably assessed.

Geothermal natural hazard – Any natural hazard caused by geothermal activity, including (but not limited to) geothermal features, heated ground, geothermal gases, hydrothermal eruptions, and ground instability and subsidence.

Geothermal Surface Feature – includes structures formed by deposition from, or the release of, geothermal water (including steam and energy) from geothermal areas and any resulting earthforms, any geothermally activated geysers, fumaroles, sinter structures, tomos, mud pools, hot and cold water pools, springs, steam and gas vents, and also includes inactive structures formed by extinct or intermittent geothermal activity.

Geothermal System - (sometimes also referred to as a geothermal field) - A system defined by scientific investigation comprising geothermal energy stored as geothermal water or steam and the rocks confining them and associated water, steam and gas emissions and the geothermal features resulting from these emissions and is believed to have no hydrological connection to another system.

Geothermal Water – Means water heated within the earth by natural phenomena to a temperature of 30 degrees Celsius or more; and includes all steam, water, and water vapour, and every mixture of all or any of them that has been heated by natural phenomena.

Any geothermally sourced water which is initially greater than 30° Celsius but falls below 30° Celsius as a result of an activity will continue to be considered as geothermal water under this regional plan.

Geothermal well – Any drilled hole intended to take or reinject geothermal water, heat, and energy, or to investigate or monitor the geothermal resource. When used in the context of 'geothermal bore' the meaning remains the same.

For the purposes of this Plan does not include hand dug wells less than 2m deep.

~~**Groundwater** – All the water contained in the void space within rocks. The term is generally taken to include vadose water (water travelling between the surface and the water table). Most groundwater derives from surface sources (meteoric water), the remainder is either introduced by magmatic processes (juvenile water) or is connate water.~~

Groundwater – means water occupying openings, cavities, or spaces in soils or rocks beneath the surface of the ground. *[National Planning Standards definition]*

Grout – as a noun means a mixture of cement and water which may or may not contain additives considered by an Inspector as suitable for geothermal purposes; and **grout** as a verb means the act of using the grout in a geothermal well.

Hole - any excavation of the ground created by drilling.

Iwi – tribe or grouping of Māori.

Iwi Authority – *Means the authority which represents an iwi and which is recognised by that iwi as having authority to do so.*

Kaitiakitanga – *Means the exercise of guardianship by the tangata whenua of an area in accordance with tikanga Māori in relation to natural and physical resources; and includes the ethic of stewardship.*

Kuirau-Ōhinemutu Management Area – means the area shown as the Kuirau-Ōhinemutu Management Area in the RNRP Geothermal Spatial Overlay, to a depth of 100mRL (NZVD2016).

Land – *Includes land covered by water and the air space above land.*

Land and Soil Disturbance – the excavation, drilling, tunnelling, disturbance, placement, exposure, or deposition of land or soil by an activity. Also refer to the definitions of Earthworks, Vegetation Clearance, and Cultivation.

Maintenance – regular activities which retain a structure, asset or a location to its original authorised standard and purpose, and where the character, intensity and scale of the structure, asset or site remains the same or similar. Excludes alteration, extension or reconstruction of structures or assets, or change in location.

Mauri – Refer to the Kaitiakitanga section for explanation.

Mean High Water Springs (MHWS) – the average line of spring high tides. Spring tides occur at or near each new and full moon.

Minimum Geothermal Aquifer Water Levels - refer to a water level in the **geothermal aquifer**, monitored using geothermal monitoring wells, that indicates the lower limit of the **geothermal aquifers' safe operating space**. The levels indicate the point at which **geothermal features** are likely to be at risk.

Natural and Physical Resources – Includes land, water, air, soil, minerals, and energy, all forms of plants and animals (whether native to New Zealand or introduced), and all structures.

Natural Character – the qualities of the environment that give recognisable character to an area. There are varying degrees of natural character. Natural character relates to:

- (a) Natural systems – landscapes, physical processes and ecological systems.
- (b) Landform.
- (c) Landcover.
- (d) Waterscapes – seascapes, harbours, estuaries, wetlands, lakes and rivers.
- (e) Natural habitats of fauna.

Advisory Note – Also refer to the Bay of Plenty Regional Policy Statement for further explanation.

New Zealand Vertical Datum (NZVD 2016) - Means the official vertical datum used to define heights in New Zealand and its offshore islands.

Ngāpuna-Oruawhata Management Area – means the area shown as the Ngāpuna-Oruawhata Management Area in the RNRP Geothermal Spatial Overlay, to a depth of 100mRL (NZVD2016).

Ngā Tangata Pūkenga – Tangata whenua persons acknowledged by their iwi and hapu as having the appropriate knowledge, expertise and genealogical linkages to allow them to assist kaitiaki to determine and express the groups' relationships and their culture and traditions with their ancestral lands, waters, waahi tapu, special sites and other taonga.

Ngā Wai Ariki o Rotorua – means the Rotorua Geothermal System.

Ngāwhā – A hot or boiling pool, including hot springs and mud holes.

Operational need – means the need for a proposal or activity to traverse, locate or operated in a particular environment because of technical, logistical or operational characteristics or constraints. *[National Planning Standards definition]*

Plantation Forest or Plantation Forestry means a forest deliberately established for commercial purposes, being-

- (a) at least 1ha of continuous forest cover of forest species that has been planted and has or will be harvested or replanted; and
- (b) includes all associated forestry infrastructure; but
- (c) does not include-
 - (i) a shelter belt of forest species, where the tree crown cover has, or is likely to have, an average width of less than 30 m; or
 - (ii) forest species in urban areas; or
 - (iii) nurseries and seed orchards; or
 - (iv) trees grown for fruit nuts; or

- (v) long-term ecological restoration plantation of forest species; or
- (vi) willows and poplars space planted for soil conservation purposes.

Point Source Discharges – a discharge of contaminants from a specific and identifiable outlet onto or into land, air, or water.

Precautionary approach – refer to Section 2.5 of the Bay of Plenty Regional Policy Statement.

Production Reinjection Systems - Geothermal water is extracted from the **geothermal aquifer** and brought to the surface using a **geothermal well**. The heat from the **geothermal water** is extracted using a heat exchanger. The cooler water is reinjected back into the same **geothermal aquifer** via a reinjection or injection well.

Reinjection – ~~The return of geothermal water (including condensates and gases) into the geothermal field reservoir from which it was taken.~~ The return of **geothermal water** into the **aquifer** or aquifer system from which it was taken.

Rotorua Research Management Area – means that part of Ngā Wai Ariki o Rotorua greater than a depth of 100m (NZVD2016).

Sensitive Management Areas – the Ngāpuna-Oruawhata Management Area, Kuirau-Ōhinemutu Management Area and Whakarewarewa Geyser Protection Area within Ngā Wai Ariki o Rotorua.

Significant Geothermal Feature – means **geothermal features** that have been identified as significant through the application of the criteria of Appendix F Set 7 – Geothermal features, in accordance with Method 22 of the Regional Policy Statement. **Culturally significant geothermal features** can only be assessed by the relevant **ngā tangata pūkenga** of the area.

Structure – Means any building, equipment, device, or other facility made by people and which is fixed to land; and includes any raft.

Sustainable management – Means managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural wellbeing and for their health and safety while -

- (a) Sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and
- (b) Safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and
- (c) Avoiding, remedying, or mitigating any adverse effects of activities on the environment.

Taking of geothermal water – The activity of taking geothermal surface water, or the taking of geothermal water from the geothermal aquifer using a production well, regardless of whether it is reinjected. Does not include the extraction of geothermal heat using a downhole heat exchanger.

- **Gross water take** – Represents the total amount of geothermal water allocated through consents or taken from the geothermal system over a period of time, normally one day, regardless of the end use or whether it is reinjected.
- **Net water take** – The amount of water that is not reinjected back into the geothermal system after use. This is expressed by the difference between the total daily take of geothermal water and total daily water reinjected back into an aquifer effectively interconnected with the geothermal system.

Tangata Whenua – In relation to a particular area, means the iwi, or hapu, that holds mana whenua over that area.

Taonga – Treasure or property. Taonga are prized and protected as sacred possessions of the tribe. The term carries a deep spiritual meaning and taonga may be things that cannot be seen or touched. Taonga include waahi tapu, waterways, fishing grounds and mountains.

Tikanga Māori – Means Māori customary values and practices.

Vegetation Clearance – The disturbance of land and soil resulting from the disturbance of vegetation by removal, clearance, destruction, and crushing of all forms of scrub, tree, and ground cover vegetation. This excludes:

- (a) normal gardening practices,
- (b) routine maintenance of existing private and public roads, railways lines or tracks,
- (c) maintenance of public reserves and the conservation estate,
- (d) trimming and mowing,
- (e) pruning,
- (f) thinning to waste,
- (g) harvesting of plants for scientific, cultural, or traditional medicinal purposes,
- (h) the formation and maintenance of tracks constructed by hand, to a width no greater than 1.5 metres,
- (i) the harvesting of crops (excluding forestry),
- (j) the removal or disturbance of plant pest species,
- (k) weed control,
- (l) clearance around network utilities, and
- (m) cultivation.

Except within 20m of a geothermal feature these exclusions shall not apply.

Wai Ariki - Geothermal. Chiefly waters or water from the gods. A term to also describe a warm pool that doesn't boil.

Water –

- (a) Means water in all its physical forms whether flowing or not and whether over or under the ground:
- (b) Includes fresh water, coastal water, and geothermal water:
- (c) Does not include water in any form while in any pipe, tank, or cistern.

Water Body – Means fresh water or geothermal water in a river, lake, stream, pond, wetland, or aquifer, or any part thereof, that is not located within the Coastal Marine Area.

Watt – A unit of power expressed in joules per second. 1kW equals 1000W. Usually used to quantify the amount of energy used over a period of time e.g. kilowatts per hour (kWh).

~~**Well**—refer to the definition of a bore.~~

Wellness therapies – Use of geothermal water for human health and wellness e.g. mineral bathing and treatments.

Whakarewarewa Geyser Protection Area – means that area measured as a 1.5km radius from Pōhutu Geyser to a depth of 100mRL (NZVD2016).