

Contact Energy Limited

Lake Hawea

Lake Margins Monitoring Management Plan



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**Lake Margins
Monitoring Management Plan**

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1. INTRODUCTION

Condition 10 of the Hawea Water Permit to Dam No.2001.383 requires Contact to prepare and implement a management plan covering monitoring and collection of data relating to foreshore landscape management and erosion management of the lake margins and adjacent land.

Contact prepared the first Lake Margins Monitoring Management Plan in 2009 and this was approved by the Otago Regional Council, ORC. The plan was reassessed and approved by ORC in 2016.

The Plan is required to be reassessed every five years in consultation with the Crown, Queenstown Lakes District Council (QLDC) and the Hawea Community Association (HCA) before being submitted to the ORC for approval.

[Contact reassessed the Plan in 2020/2021 and consulted with the Crown, QLDC and HCA during 2021. Comments from these parties have been incorporated into this 'Issue 2' of the Plan. (to be included post consultation)]

The Plan outlines the proposed monitoring requirements in relation to erosion management and ~~dust monitoring~~ for the next five year period.

2. RELATED MANAGEMENT PLANS

Contact is required by consent conditions to prepare three other management plans relating to Hawea:

- Foreshore Landscape Management Plan – Condition 11 of consent 2001.383
- Erosion Management Plan – Condition 12 of consent 2001.383
- Clutha Catchment Public Safety Signage - Condition 15 of consent 2001.383

The Erosion Management Plan outlines a systematic process of inspections, assessments and actions in relation to shoreline erosion. The monitoring management plan does not need to repeat these and is therefore just required to specify the monitoring specifications.

The Foreshore Landscape Management Plan was recently reassessed and there were no specific monitoring requirements.

The Clutha Catchment Public Safety Signage Plan is required to warn the public of shoreline erosion risk. The Signage Plan was recently reassessed and submitted to Regional Council. After reassessment, additional signage was placed and altered to be more effective.



3. CONSENT REQUIREMENT

Condition 10 of the Hawea Water Permit to Dam No. 2001.383 is:

Lake Margins Monitoring Management Plan

- a) *Within two years of the commencement of this consent, the consent holder shall submit to the Otago Regional Council for approval, a plan covering monitoring and collection of data relating to foreshore landscape management and erosion management of the lake margin and adjacent land.*
- b) *The Plan for monitoring and collection of data shall include provision for:*
- (i) Establishing and regular surveying of topographical profiles of the near shore lake bed, foreshore and relevant lake margin land around the southern end of Lake Hawea, the precise limits to be specified in the plan, but including the area adjoining Hawea Township;*
 - (ii) Establishing inspection and/ or erosion profile measurement points at erosion prone areas of the balance of the entire lake foreshore not covered in b) (i) above. Where such points are established, subsequent inspection and/ or topographical measurement shall include the foreshore and relevant lake margin land at each defined point;*
 - (iii) Defining the extent and accuracy requirements of the profiles in (b) (i) and (b) (ii) above as well as the monitoring intervals (including after specified weather events);*
 - (iv) Collection of sediment samples from the near shore lake bed and foreshore for grain size analyses to support assessment of sediment movement and deposition;*
 - (v) Wind speed and wind and wave direction measurement and recording at a suitable place near the lakeshore at Lake Hawea township;*
 - (vi) Recording of concentrations of ambient dust in the air for five years at intervals and locations specified to ensure that representative samples are collected along the southern end of the lake and immediately to the south of Lake Hawea township;*
 - (vii) Whether there shall be control sites (e.g. at Glenorchy or in Canterbury) in respect of ambient dust quantities;*
 - (viii) Maintenance and calibration of monitoring equipment to appropriate industry standards;*
 - (ix) The reporting frequency and format, as agreed with the Otago Regional Council, which for the avoidance of doubt shall include:*
 - (1) An interpretation of monitoring results;*
 - (2) Summary information and/or graphs necessary to support the interpretation of results collected; and*



(3) *Identification of responsibilities for data collection and interpretation.*

- c) *The consent holder shall ensure that the Lake Margins Monitoring Management Plan is reassessed in consultation with the Crown, Queenstown Lakes District Council and Hawea Community Association Incorporated every five years after approval of the first Lake Margins Monitoring Management Plan and shall submit any revised Plan to the Otago Regional Council for approval within six months of the reassessment.*
- d) *The consent holder shall be responsible for implementation of the Lake Margins Monitoring Management Plan, including approved revisions of that Plan.*



4. EROSION MONITORING

Erosion monitoring continues as a combination of annual or post event visual inspections and survey profiling. Sediment sampling from the near shore lakebed was carried out in 2010 to support the assessment of sediment movement and deposition. Wind speed and direction monitoring continues. The Wave Run-up study was completed in 2013. The Dust Monitoring report was completed in 2016.

4.1 Profile Surveys

A series of 31 survey profiles have already been established around the southern and western shorelines. 12 profiles were established along the southern shoreline in 1996 and have had several repeat surveys. 18 profiles were established along the western shoreline in 2002 and repeat surveys have been undertaken in 2007, 2010, 2013, and 2018.

Contact Energy shall:

1. Survey profiles to be repeated at selected location as required. The annual or post event shoreline inspection will determine survey requirements.
2. Ensure the surveys are undertaken to the technical requirements listed below.
3. The profile survey results shall be included in a suitable report comparing changes from previous surveys.
4. The profile survey results shall be assessed for changes from previous surveys and to determine if projections indicate that erosion may potentially extend beyond the lake margin boundary or affect any infrastructure.
5. The profile survey report and assessment of the results shall be provided to the Otago Regional Council.

Profile Survey Technical Requirements

The purpose of the profile surveys is to:

- Monitor progress towards development of a new equilibrium lakeshore profile.
- Determine the rates of shore retreat/advance.
- Predict future erosion extent.
- Determine beach aggradation/degradation.

Profile end-point.	Each profile is to have a reference mark established on firm ground with coordinates and elevation above MSL datum determined. Each survey is to start at the reference point.
Orientation	The initial profile bearing shall be set normal to the shoreline. The same bearing shall be used for all repeat surveys.
Lakeward Extent	Profiles should be surveyed lakeward to elevation 339m. This will require scheduling the surveys to around September to correspond with the annual lowest draw down of the lake level.
Survey Method	Recommended method is RTK-GPS using a common base-station location. Appropriate methods should be used to ensure the same line is followed by repeat surveys.
Point Spacing	Collect points at all breaks in slope and at spacing not greater than 4 metres.
Survey Accuracy	+/- 0.02m in horizontal and +/- 0.03m in vertical.



Re-survey Frequency	Individual profiles may be re-surveyed 'on request' following an erosion event or if inspection observations suggest concerns.
Survey Reporting	The survey report should include for each profile: <ul style="list-style-type: none">• A location diagram.• A site photograph.• Metadata defining the profile location, reference point and orientation.• Profile plot overlaying relevant previous surveys.• A table of profile offsets and elevations at comparison points.• For applicable profiles a projection of the potential erosion extent and property boundary locations.• Notable field observations.

Assessment of Profile Survey Results

The profile survey results should be assessed by personnel familiar with shoreline processes and the erosion issues at Lake Hawea.

The assessment should include:

- Changes from previous surveys.
- Amounts of shore retreat/advance.
- Amounts of beach aggradation/degradation.
- Locations of any issues indicated by the survey.
- Whether projections indicate erosion could extend beyond the lake boundary or affect infrastructure.
- Recommendations for any follow up monitoring or specific assessments.

4.2 Wind Monitoring

The Lake Hawea climate station situated at Gladstone Gap was established by NIWA in July 2008. NIWA continue to operate the site for Contact.

In 2013 the wind data was analysed and compared to the Wanaka Aero site by Opus in their report *Lake Hawea Wave Run-up Assessment*. The correlation between the Lake Hawea site and the Wanaka Aero site was not strong therefore Opus recommended that in order to obtain a meaningful length of record specific to Lake Hawea that the collection of wind data continue for at least another 10 years.

In line with Opus' recommendation Contact intends to continue collecting wind data until at least 2023. The data will be stored on the national climate database and will be available for any future erosion assessments.

Contact Energy shall:

1. Continue the wind speed and wind direction measurement site near the lakeshore at Lake Hawea.
2. Ensure the wind measurements are recorded to NIWA's National Standards.
3. Ensure the wind data is archived to NIWA's national climate database.



5. DUST MONITORING

The principal air quality engineer at URS (now known as AECOM) assessed dust monitoring requirements in 2009. As recommended by URS, Contact established two dust monitoring instruments at Lake Hawea in October 2009. The dust monitoring instruments were operated over the period from October 2009 to the end of 2015 which exceeded the consent requirement for five years of monitoring. The findings were detailed in a report to the Otago Regional Council in 2016.

The 'Other Monitoring' recommended by URS to aid interpretation of the dust monitoring results is continuing to be collected (i.e. Lake level, wind speed, wind direction, rainfall and temperature). Dust levels are no longer monitored.

6. PLAN REASSESSMENT

As required by the consent condition Contact Energy shall reassess the Lake Margins Monitoring Management Plan in consultation with the Crown, Queenstown Lakes District Council and Hawea Community Association Incorporated every five years after approval of the first Plan.

Any revised Plan shall be submitted to the Otago Regional Council for approval within six months of the reassessment.