Lake Pūkaki Hydro Storage and Dam Resilience Works (FTAA-2510-1120)

Expert Conferencing Joint Witness Statement - Dust Management for Rock Armouring Works

---

Participants

For the Applicant:	Peter Stacey - Air Quality Expert
	Amy Callaghan - Planner
For the Canterbury Regional Council:	Suzanne Cawood - Air Quality Expert
	Susannah Black - Planner

Conferencing details

Date:	14 May 2026
Location:	Online teams meeting
Scribe of JWS:	Susannah Black

Overview

Meridian provided an updated dust management plan (updated DMP) prior to conferencing. This updated DMP was subject of discussion and has been included as Attachment 1 to this response.

There are some matters which require Meridian to make further changes to the DMP; however subject to the inclusion of these matters there are no outstanding points of difference between experts (both dust and planners). Recommended changes to conditions have been tracked and included as Attachment 2 to this response.

The DMP included as Attachment 1 was provided by Meridian to facilitate discussions between the experts, it is a working draft and is not intended as final. A final DMP, incorporating the recommendations of the experts will be provided to the Panel by Close of Business Tuesday 19 May 2026. The expectation is this final DMP will be reviewed by the experts to confirm it is consistent with their before it is shared with the Panel.

Conditions

Table 1 has been prepared to address the condition matters raised in (2) of RFI-1A. All reference to conditions are those included within consent CRC262542 – discharge of contaminants to air. Refer to Attachment 2 for full suite of conditions for this consent.

All experts agree on recommended conditions.

Dust Management Plan

Table 2 addresses DMP matters raised in (3) of RFI-1A. Mrs Cawood and Mr Stacey both agreed the updated DMP addressed many of the matters raised by the Panel in RFI-1A. There are some further changes required to satisfy the experts that all matters have been addressed. It is anticipated that a revised DMP be prepared by Meridian in due course.

Other matters

As directed in (4) of RFI-1A, Mrs Cawood raised some relatively minor matters relating to the DMP requiring further consideration of inclusion of dam face construction areas in site maps, procedures for the handling of fine materials and the management of haul roads outside of construction periods.

Mrs Cawood is satisfied that agreed changes to conditions together with a further revised DMP to be provided in due course will satisfy her concerns.

Table 1: Matters listed in (2) of RFI-1A

#	Matter	Expert response
1	A certification procedure for the DMP, recognising that the evidence is that the contractor will need to be involved in finalising the plan.	The experts agree regarding certification process. New condition (8) providing for certification of DMP by CRC proposed.
2	Including good practice dust control requirements, such as water application by a water cart (held on site during the works period), an on-site speed limit, road sweeping/cleaning requirements for SH8, and revegetation/rehabilitation.	With respect to water cart, the experts agree that a condition under the 'dust mitigation' section of conditions is appropriate. New condition (11) is proposed. For the other matters listed by the Panel, the experts agree that these are most appropriately managed via the DMP. However, additional clauses shown in bold under condition (6) are required to ensure that the DMP does address these. The experts are satisfied that the updated DMP included with this response addresses these matters.
3	Use of water storage tank/s on site to assist with prompt dust control.	Experts have recommended new condition (11) to ensure sufficient water is available for dust control. Further, condition (6)(b)(viii) has been expanded to provide for identification of water sources for this.
4	Specifications for the on-site weather station to monitor wind and rainfall.	The experts consider a separate condition requiring on-site weather monitoring is appropriate and this has been included as new condition (13). Further the experts consider the DMP is the appropriate tool to detail weather station specifications.
5	Wind speed and direction trigger levels and actions.	The experts consider this matter is already addressed through condition 6(b)(v) and is further supported by recommended weather station condition discussed above.

		The experts agree the wind speed and direction trigger levels described in the updated DMP are appropriate and in accordance with the recommended conditions.
6	Real-time PM10 monitoring with trigger levels and actions.	Experts agree the updated DMP now includes sufficient mitigations to provide confidence that such monitoring from the on-set of works is not required. This confidence comes from: a. an understand of the practicalities of establishing monitoring for sporadic works b. the updated mitigations described in the DMP c. brief/transient nature of people visiting the area d. frequency of strong winds towards sensitive receptors Should the visual monitoring required in the DMP identify dust at the nearest sensitive receptor(s), then the experts recommend real-time PM10 monitoring of subsequent works be required. The experts agree that at such a time, the DMP should be updated detailing the nature of this monitoring. Condition (6)(b)(x) has been expanded to provide for PM10 monitoring, if required. The experts agree that the DMP should be further updated to remove the 'complaints trigger' for monitoring and instead rely on visual observations.
7	Monitoring and control of visible dust emissions in relation to SH8.	Covered in point 2.

Table 2: Matters listed in (3) if RFI-1A

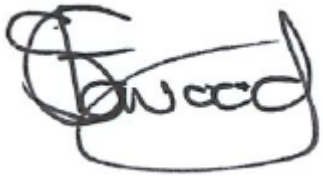
#	Matter	Expert response
1	A speed limit for vehicles on the site.	The experts agree the updated DMP provided with this response addresses speed limits. This is further supported by recommended changes to conditions as discussed above.
2	Real-time PM10 monitoring and trigger levels.	Refer to discussion above.
3	Availably of water for dust control and use of on-site storage tank/s.	The experts agree the updated DMP provided with this response addresses this matter. This is further supported by recommended changes to conditions as discussed above.
4	Regular road sweeping/cleaning of SH8.	The experts agree the updated DMP provided with this response addresses this matter. This is further supported by recommended changes to conditions as discussed above.
5	Adding a map showing the location of sensitive receptors, including addition of the Nohoanga near the Pines freedom camping area.	The experts agree that there are further areas to be identified in the maps associated with the updated DMP. Specifically, construction areas on the dam face and clear identification of boundary areas for triggers.
6	Consideration of dust effects on cyclists, walkers and traffic.	The following matters are provided for in the updated DMP: a. Construction staff are to be briefed on the possible presence of cyclists, walkers and traffic and the need to be aware of them (as receptors) when monitoring any dust clouds. b. Monitoring of SH8 for dust deposition and road sweeping if required. c. Figure 1 has also been updated to show the location of the A2O / TA trail.

		d. Inclusion of SH8 and the A2O / TA trail. Experts agree these changes are appropriate.
7	Inclusion of SH8 as a potentially affected receptor in relation to visible dust emissions.	The experts agree the updated DMP provided with this response addresses this matter. This is further supported by recommended changes to conditions as discussed above. The experts note the maps to be updated as described above will identify this area as well.

Signed

Peter Stacey
14/05/2026

Amy Callaghan
14/05/2026



Suzanne Cawood
14/05/2026

Susannah Black
14/05/2026

Dust Management Plan (DRAFT)

Lake Pūkaki Dam Resilience Works

Meridian Energy Limited

13 May, 2026

→ **The Power of Commitment**

Project name		Meridian - WPS Pūkaki FTC					
Document title		Dust Management Plan (DRAFT) | Lake Pūkaki Dam Resilience Works					
Project number		12656630					
File name		12656630-Meridian Energy - Lake Pūkaki Resilience Works Dust Management Plan_Ver04_Updated 130526.docx					
Status Code	**Revision**	**Author**	**Reviewer**		**Approved for issue**		
			Name	**Signature**	**Name**	**Signature**	**Date**
S4	01	R Wilson	S Douglass		N Eldred		5/11/25
S4	02	R Wilson	S Douglass		N Eldred		26/1/26
S4	03	R Wilson	S Douglass		N Eldred		27/1/26
S4	04	R Wilson/P Stacey	N Eldred		N Eldred		13/4/26
S4	05	P Stacey	N Eldred		N Eldred		13/5/26

GHD
Contact: Rebecca Wilson, Senior Air Quality Consultant | GHD
27 Napier Street, GHD Centre Level 3
Freemans Bay, Auckland 1010, New Zealand
T +64 9 370 8000 | **F** +64 9 370 8001 | **E** aklmail@ghd.com | **ghd.com**

Contents

Table index

Appendices

1. Introduction

Meridian will create dust emissions as part of construction works at Lake Pūkaki. GHD was commissioned by Meridian to create a Draft Dust Management Plan (Management Plan) to support site construction works and minimise impacts to the surrounding community. This plan was developed in accordance with the Good Practice Guide for Assessing and Managing Dust (MFE, 2016), which outlines management options for dust emitting sites.

This document is a preliminary Dust Management Plan. Prior to construction commencing, a final version of this Management Plan will be developed with input from the selected Construction Contractor (Contractor) and submitted to Environment Canterbury for certification. As outlined in Section 1.4 and 6, the Management Plan will be subject to continuous improvement and updates as the project progresses. Management options include prevention, mitigation and rectification measures, all of which may become necessary during the construction of the Project. The management plan outlines strategies to minimise dust impacts at sensitive receptors, resulting from construction processes and activities.

1.1 Purpose of this plan

This purpose of this Management Plan is to:

– Comply with the *Good Practice Guide for Assessing and Managing Dust*, the *Canterbury Regional Air Plan,* and other relevant regulatory requirements
– Provide a description of the regulatory requirements relevant to dust and air quality that must be met in the course of undertaking construction works at the Project site.
– Identify the most likely sources of dust emissions that will be encountered during the construction works.
– Provide employees and contractors with clear descriptions of their responsibilities in relation to dust management during the construction works.
– Provide a description of the measures to be implemented by Meridian (and their contractors) to manage and mitigate dust impacts associated with operations.
– Provide a process for responding to feedback and complaints from affected sensitive receptors.

1.2 Assumptions

This Management Plan is subject to the following assumptions:

– Based on the proposed works, planned activities include stockpiling, creation of temporary access tracks, material handling, and hauling. Planned construction activities for the rip-rap works are described in GHD 2025B.
– Other construction activities, such as bulk earthworks, drilling, or excavation (other than dam materials) are not proposed to occur and are not considered in this Management Plan. Should these activities be required, a revision to this plan will be required.
– No baseline monitoring has been undertaken at this site to support this plan.
– An air quality assessment report, including dispersion modelling, has been considered in the development of this plan (GHD 2025A).
– This plan is to be read in conjunction with the GHD 2025A report and addresses the construction site, emissions sources, and proposed activities only.
– There may be dust impacts arising from construction activities that are not addressed in the GHD 2025A Report. Should additional activities occur, a revision to this Management Plan will be required.
– Compliance with relevant legislation and guidelines

Meridian is required to comply with conditions of consent in additional to relevant legislation and guidelines when undertaking construction activities at the project site. The criteria presented in Table 1.1 are those presented in New

Zealand's *Ambient Air Quality Guidelines* (2002), which provide details about the requirements for this plan. The ambient criteria are applied everywhere in the open air, including residences, businesses, and parks.

Table 1.1 Ambient air quality guidelines for particulate matter

Pollutant	Concentration limit (µg/m^3)	Averaging period	Comment
PM_{10}	50	24 hours	Allowance of one exceedance per year
	20	Annual	-
$PM_{2.5}$	25	24 hours	-
	10	Annual	-

The Ministry for Environment's *Good Practice Guide for Assessing and Managing Dust* has a 'trigger level' for managing Total Suspended Particulates (TSP) and PM_{10}. These are values that can be used when there is an active monitor that provides feedback to an activity. Exceedance of these values, shown in Table 1.2 means there is a likelihood of exceeding the ambient air quality guidelines, if mitigations are not implemented. Thus, trigger levels may be considered a 'warning' that permits active operations to be modified before exceedances occur.

Table 1.2 Amenity air quality Trigger Levels for particulate matter in a high sensitivity environment

Pollutant	Averaging time	Trigger concentration (µg/m^3)
PM_{10}	1 hour	150
TSP	5-minute	250
	1 hour	200
	24 hours	60

1.3 Revisions and updates

This Management Plan is not a static document. It is a working document that requires regular review and updating to ensure ongoing stability and effectiveness for environmental management of the construction process.

The Management Plan shall be reviewed and updated regularly:

– To remain consistent with relevant regulations and guidelines.
– Should improvements to the management measures be required.
– To take advantage of new technologies, innovations, and methodologies that are superior to the management measures presented in the current version of the management plan.
– After changes are made with regards to construction processes that may affect management measures in the current version of the management plan.
– If there are repeated non-conformances against dust objectives and targets outlined in Section 1.2.
– In the event of repeated complaints (more than once for the same aspect).

Changes made to the Management Plan, as well as the reasons for the changes made, will be documented as part of the review process. Copies of the original management plan, as well as all future versions of the management plan, shall be retained by Meridian and made available upon request. The most recent version will be implemented.

1.4 Responsibilities

The Meridian appointed Contractor for the rock protection works at Lake Pūkaki is responsible for ensuring the completeness and effective implementation of the Management Plan. To accomplish this, the contractor's employees

will be trained in this plan and their responsibilities designated. Responsibilities will include the deployment, maintenance, monitoring and inspection of equipment and the performance of effective actions to control and minimise dust emissions.

The Site Manager is responsible for:

– Maintaining this plan.
– Providing training to staff.
– Providing guidance on dust control measures
– Ensuring inspections are being undertaken.
– Ensuring that proper records are maintained.

2. Site description

2.1 Location

Lake Pūkaki is located in the South Island of New Zealand and makes up part of the Mackenzie Basin. It is located approximately 200 km west-southwest of Christchurch, in the middle of New Zealand's South Island and almost directly south of Aoraki (Mount Cook).

Lake Pūkaki is approximately 30 km long (north to south) and 5 km wide (east to west). It is approximately rectangular in shape. The lake sits at the southern end of the Tasman River delta, which is comprised primarily of glacial till and sediments. The lake comprises a surface area of approximately 172 km² based on an average lake level of 528 m RL.

The Pūkaki High Dam is located at the southern end of the lake. The nominal flow direction in the lake is from north to south, with water discharging from the lake via Gate 18 (into the Pūkaki canal) or Gate 19 into the Pūkaki Riverbed.

The project Site will generally encompass the key areas shown on Figure 1,2 and 3. These are:

- The Northern and Southern stockpiles shown on Figure 1 and the associated haul roads providing access to SH8.
- The left abutment work area shown on Figure 2
- The right abutment and dam face work area shown on Figure 3.
- The sections of SH8 that provide connections between the above work sites

The final work site and boundary will be confirmed by the appointed contractor. Note in addition to SH8, the project site is also crossed by the Alps to Ocean/Te Araroa trail (A2O/TA). Figure 1 shows the current location of the A2O/TA trail. Sections will likely require relocation during construction to manage the safety of the trail users. GHD 2025B discusses the possible relocation requirements – these requirements will be confirmed with the A2O/TA trail managers as part of the construction planning process.

Figure 1 *Site Layout*

Figure 2 *Eastern Construction Site*

Figure 3 *Western Construction Site*

2.2 Background

Lake Pūkaki is a modified natural lake and is managed as part of the Waitaki Power Scheme. It is New Zealand's largest hydro storage lake and provides an average of 1,767 GWh of stored water in normal operating conditions, with an additional 546 GWh available during a national hydro shortage.

Meridian is currently authorised to dam the Pūkaki River to control and operate Lake Pūkaki between the levels of 518 m RL (normal consented minimum lake level) and 532.5 m RL (maximum consented storage level). The proposed construction works are associated with Meridians Fast Track Approvals Act application to access the 546 GWh of contingent storage held below 518 mRL.

3. Programme of works

3.1 Proposed construction activities

When the lake levels are low, Meridian is proposing to extend rip-rap armouring to reduce the risk of erosion on the dam face and other critical infrastructure. Rip-rap currently exists along the dam upstream face; however the rock armouring is inadequate to protect the dam and associated infrastructure if water levels were drawn below 518 m RL. Further details on the required works are provided in GHD 2025B.

3.2 Programme

The rip-rap placement programme is scheduled to be completed over a period of approximately 18 weeks. This will likely occur in shorter phases over a period of several years, as lake levels allow.

The construction methodology is based on the following programme.

- Construction activities may be short in duration (a few weeks) and occur over multiple stages.
- It may take multiple years to complete all the required works.
- Access is expected to be more frequent at higher lake levels within the 518 m to 513 m range, rather than at the lower end.
- The assumed approach is for rip-rap placement in a multi-stage process with rip-rap being placed when lake levels allow.
- Forecasting lake levels within a period of a few weeks is generally achievable based on predicted generation flows from the lake, predicted inflows, and predicted rainfall events in a 1-to-2-week window.
- Based on this data, guidance can be provided to a contractor as to when lake levels are likely to reach required levels for construction to commence and how long they are likely to stay low in the short to medium term.
- Given the time required to mobilise and demobilise from the site, contractor guidance indicates that the minimum duration for any construction stage is 3 weeks.
- Inflow events, whether predicted or not, can result in a relatively rapid rise in lake level. Historical data indicates that the lake can rise up to 1 m in one day and 3 m in one week. Therefore, the construction sequence must include contingency plans for rapid site demobilisation, ensuring the site is left in a safe and environmentally appropriate condition prior to water inundating the works area.
- Historical data indicates that low lake levels at Lake Pūkaki most frequently occur during mid to late winter and early spring.
- Construction activities will be restricted to the following schedule:
  - Daily: 6:00 a.m. to 7:30 p.m.
  - No work during the following periods:
    - Good Friday to Easter Monday (inclusive)
    - 24, 25 and 26 December (inclusive) and 31 December to 1 January (inclusive)
    - New Zealand Public Holidays

3.3 Dust emission sources

Potential dust sources are grouped into the following:

- Material handling of rip-rap (storage, loadings onto trucks, unloading and placement). Note rip- rap materials that have been stored on site for a number of years and are not likely to be overly “dusty” due to exposure to rainfall and the generally very course nature of the materials.

- Haulage along identified, unpaved haul roads.
- Creation of temporary haul roads on the abutments and upstream dam face to facilitate rip-rap works (see Figures 2 and 3 for approximate locations).
- Temporary stockpiling of excavated materials to allow access and rip-rap placement on the dam face.

4. Surrounding environment

4.1 Sensitive receptors

A detailed list of identified potentially sensitive receptors around the whole lake is provided in GHD (2025A). A consolidated list of lake environs receptors is also provided in GHD (2025A).

The sensitive receptors closest to the dam earthworks sites (and potentially most affected by proposed construction activities) are identified as the following and shown on Figure 4:

– A residence is located about 760 m from the Left abutment work site.
– A publicly accessible observation and photo point immediately adjacent to the Left abutment site. This is a place where people will transit through.
– A business (Mt Cook Alpine Salmon Shop) is immediately adjacent to the Right abutment construction site, but it is to be closed for the duration of any works and is therefore not required to be assessed.
– The Pines freedom camping area is considered to be potentially the most exposed to a potential change in air quality associated with the proposed works, located at a distance of about 105 m from the northeast corner of the Left abutment construction site.
– A Nohoanga site near the Pines freedom camping area.
– A second freedom camping location is considered to have high exposure but less than the one described above due to a greater distance from the Left abutment work zone.
– The A2O/Te Araroa that that crosses the site area. It is noted that the most likely time the works will occur (late winter/early spring) is the trails low to shoulder season when the number of users is expected to be significantly below the summer peaks.
– State Highway 8.

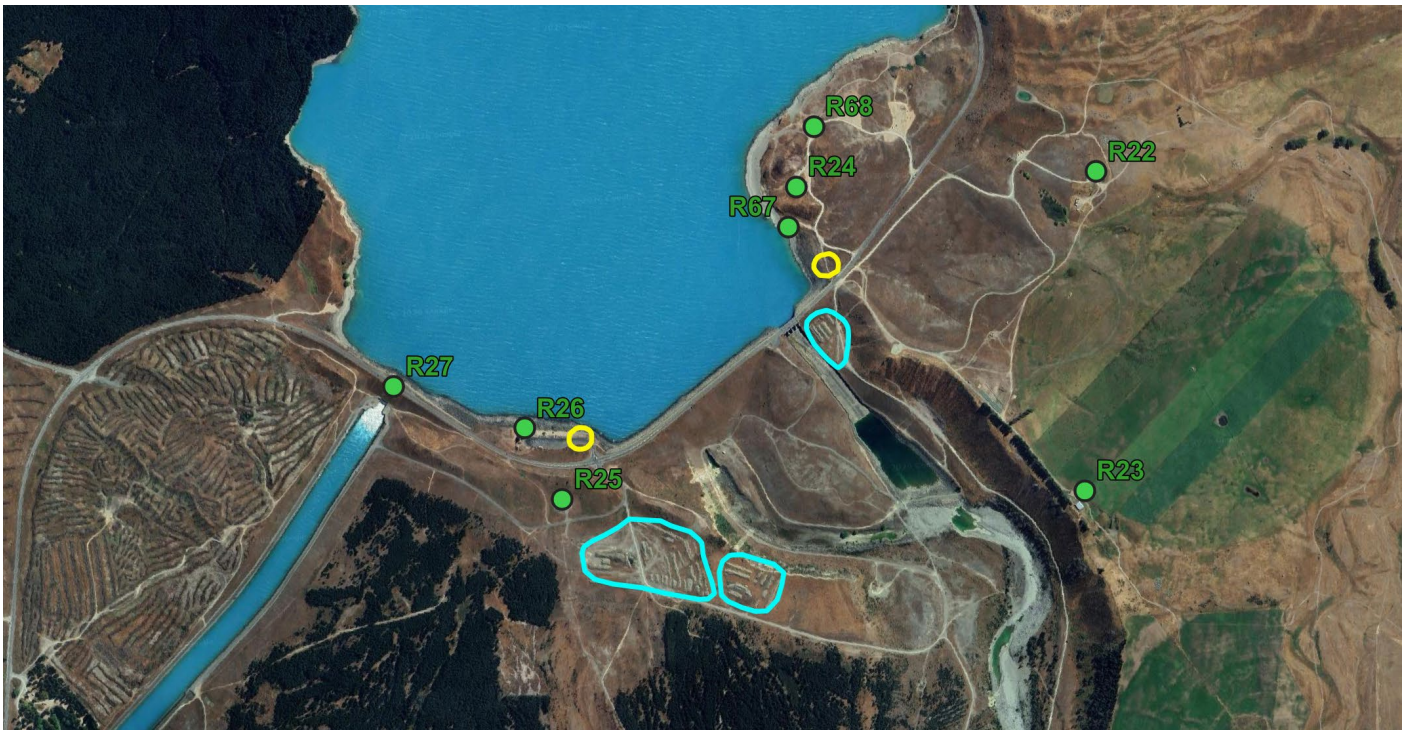


Figure 4 *Sensitive Receptor Locations* ***NOTE THIS FIGURE TO BE FINALISED***

5. Meteorology

Given that wind can generate and transport dust, it is important that site staff understand the local wind patterns experienced at the Project site, particularly in relation to the identified sensitive receptors surrounding the dam earthworks areas.

A weather station will be installed on-site to assist with the management of potential dust events and provide real time meteorological information to support operational decision making. Weather conditions, including wind speed and wind direction, should be reviewed at the beginning of each workday and monitored throughout active construction periods to identify periods of elevated dust risk. Particular attention should be given to dry and windy conditions, where there is increased potential for dust generation and transport toward sensitive receptors.

Understanding prevailing wind conditions in relation to active work areas allows site staff to proactively identify higher risk activities and implement additional mitigation measures where required. For example, during periods of strong winds blowing toward the Pines camping area, A2O/Te Araroa trail, observation areas, or SH8, additional watering, pre-wetting of exposed surfaces, reduced working areas, relocation of stockpiles, or temporary suspension of particularly dust generating activities may be required to minimise off site dust effects.

The weather station data and site observations should also be used to support routine visual dust inspections, complaint investigations, and decisions regarding when additional mitigation or operational restrictions are necessary.

Based on the data from the Lake Pūkaki weather station, presented in Figure 5, the prevailing winds are predominantly from the west to northwest sector, with the highest frequency of winds occurring from the west-northwest. The data also indicates that the winds with the greatest potential to generate and transport dust are generally associated with the northwest to northeast sectors, as these directions are more frequently associated with higher wind speeds.

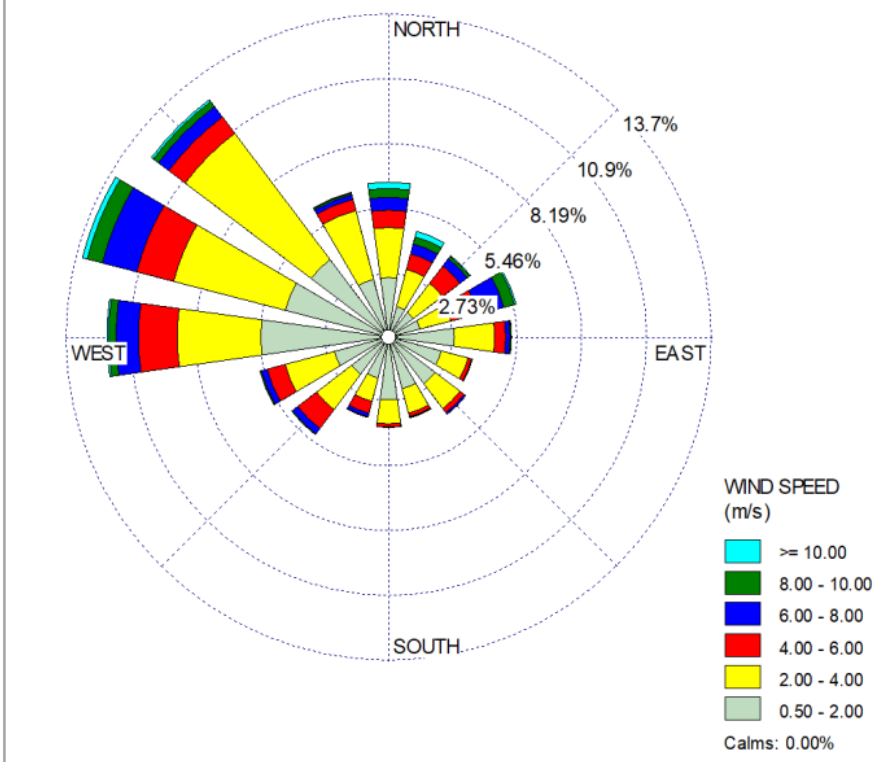
Site	Annual wind rose
Pūkaki Aero Avg WS = 2.8 m/s Years = 2008 to 2025	

Figure 5: Wind Rose from the Lake Pūkaki Weather Station

6. Dust management

The main features of the dust management strategy are based on prevention, mitigation, and rectification. The mitigation and rectification measures will be implemented as required and their exact details will be determined on a case-by-case basis depending upon the situation and the technical solutions available at the time. The proposed management strategies are described in the following sections.

6.1 Mitigation measures

The following prevention measures should be taken at the Project site:

6.1.1 General site management and training

– Prepare dust management education material for inclusion in site inductions, training, and daily toolbox meetings. The education material must include identification of A2O/TA trail users and SH8 as potential dust receptors.
– Prepare and undertake a regular audit to ensure compliance with conditions of the permit (at least once during any construction event or monthly for longer construction events). Audit records should be stored in the Site Office.
– Plan construction activities to keep exposed areas to a minimum and, where possible, avoid scheduling major emissions-generating activities to occur at the same time.
– All plant and equipment should be fitted with the appropriate emissions controls and maintained according to the manufacturer's specifications.
– Bins, rubbish, and storage areas will be monitored during regular audits and emptied at regular intervals.

6.1.2 Weather monitoring and operational management

– Undertake daily reviews of forecast wind speed and wind direction prior to commencing works to identify periods of elevated dust risk.
– Increase watering frequency during dry and windy conditions.
– Restrict particularly dust generating activities during periods of strong winds where effective dust mitigation cannot be achieved.
– Where practicable, avoid leaving disturbed areas exposed ahead of forecast high wind events.
– Undertake routine visual dust inspections throughout the day during active earthworks, particularly during dry or windy conditions.
– If visible dust is observed crossing the site boundary or travelling towards receptors, the activity generating the dust will be modified, temporarily suspended, or additional mitigation measures implemented until dust emissions are effectively controlled.

6.1.3 Water suppression and exposed surface management

– Pre-wet exposed work areas prior to undertaking earthworks, excavation, or material handling activities during dry conditions.
– Minimise the size and duration of exposed surfaces and progressively stabilise disturbed areas as soon as practicable following completion of works.
– Retain as much vegetative screening between the Project site and the nearest sensitive receptors as possible.

– Instigate progressive rehabilitation as soon as practicable to encourage the establishment of vegetation (where appropriate) as soon as possible after the completion of works.
– The Draft Erosion and Sediment Control Plan (ESCP - GHD 2026) for the project requires the progressive re-grassing of any cleared stockpile areas and temporary tracks at the end of each work period and once all works are complete with the intent of minimising the duration that areas are left as bare ground, where practicable. This requirement will also assist with dust control.

6.1.4 Traffic management and track out controls

– Implement on-site traffic and operational controls to prevent unnecessary dust generation from vehicle movements, including:
  - Regular watering of access roads if rainfall is insufficient to suppress dust (see Section 6.1.6) below for suggested watering rates).
  - Trucks transporting material may need to be covered (depending on the nature of the materials and climatic conditions)
  - Ensure tailgates are firmly fixed
  - Enforce speed limits. Speed limits in themselves are not a primary mitigation measure for dust but can assist in combination with the above measures to mitigate dust effects. A maximum speed limit of 30 km/h will be applied on haul roads (excludes SH8).
– Inspect haul roads, access points, and exposed surfaces daily for evidence of excessive dust generation or material tracking and implement corrective actions where required.
– Ensure water carts and road sweeping equipment remain operational and available onsite throughout active construction periods.
– The ESCP for the project (GHD 2026) includes requirements for regular (multiple times per day, as required) sweeping of the SH8 to remove any tracked material. This will include the requirement to initiate sweeping if visible dust is being generated from the SH8 associated with the site. The ESCP also includes the option to installing stabilised site entrances/exists, shaker ramps and wheel washes if deemed necessary to control the tracking of materials onto the state highway.

6.1.5 Stockpile management

– Locate stockpiles, where practicable, away from receptors and minimise stockpile heights during dry and windy conditions.
– Consider covering loads in trucks, or spray loads as an alternative if transported materials warrant these measures.
– Consider installing wind breaks surrounding primary temporary stockpile locations. Given the often-extreme wind conditions experienced at the site, porous wind breaks should be considered in favour of solid wind breaks. Whilst this is a less effective mitigation measure, it will ensure that the wind break does not become a safety hazard under excessive load.

6.1.6 On-Site Weather Station

To assist in site management the Contractor will install an on-site weather station during any periods of construction work to monitor wind and rain conditions. The data will be used to support decision making regarding dust mitigation activities and will provide a record of site conditions.

The weather station will:

- Measure wind speed as 1-minute scalar averages with maximum resolution of 0.1 metres per second (m/s), have an accuracy of at least within +/-0.2 m/s, and a stall speed no greater than 0.5 m/s;

- Measure wind direction as 1-minute vector averages with maximum resolution of 1.0 degree and accuracy of at least within +/- 1.0 degree, and a stall speed no greater than 0.5 m/s;
- Measure screened temperature with accuracy of +/- 0.5 degree;
- Measure relative humidity with an accuracy of +/- 1%;
- Measure rainfall with an accuracy of +/- 0.2mm;
- Be located on or immediately adjacent to the site in accordance with AS/NZS 3580:14-2014 (Methods for sampling and analysis of ambient air – Part 14 Meteorological monitoring for ambient air quality monitoring applications). If the monitoring station cannot be located in accordance with AS/NZS 3580:14-2014 an alternative location shall be agreed in writing with Environment Canterbury;
- Maintain a date and time stamped electronic record of meteorological monitoring results, recorded as rolling 10-minute averages, which are up-dated every one-minute in real-time.
- Send an alarm to the Site Manager (for example via mobile phone) if the wind speed trigger level of 7 m/s (10 minute scalar average) is reached or exceeded. Site Manager to then undertake additional mitigation as deemed necessary.
- Be maintained and calibrated in accordance with the manufacturer's specifications.
- All meteorological monitoring data shall be made available to the Environment Canterbury on request.

6.1.7 Water Requirements

The general guidance on water requirements is based on the MfE Good Practice Guide for Assessing and Managing Dust (November 2016).

A conservative estimate is that dust generating areas of track and other dust generating areas should be watered starting 12 hours after no rainfall (assuming sandy soils that dry quickly) at a rate of 1 Litre/m^2/hour. However, if dust liftoff is observed from roads or stockpiles, water application rates should be applied at a rate of 2 Litre/m^2/hour.

Sufficient water will be stored on site at all times along with a water cart to allow water application to commence when required.

6.2 Visible Dust Emissions

Site inspections of visible dust emissions will be carried out routinely throughout the day. Findings and mitigation actions are to be recorded in the daily inspection form (Refer to Appendix A.1).

Inspections ensure control measures are effective, while also assisting in the analysis of dust events for managing and responding to complaints. The specific procedures are outlined below:

- Staff on-site will routinely watch for dust plumes.
- If a visible dust plume moves beyond the Site boundary, the following must be recorded:
    - The dust emissions source;
    - The level/extent of the visible dust emissions beyond the Site boundary;
    - The person in charge of the investigation and response;
    - Description of the dust emissions;
    - The possible source of the incident, preventative, and corrective actions taken;
- The dust mitigation measures set out in Section 6.1 always apply. If the level of visible dust drifts beyond the Site boundary, the Site Manager must be notified and take further action. When notified, the Site Manager will investigate and take necessary steps to ensure dust levels do not impact off-site locations. These actions are

to be recorded in the daily inspection form (see Appendix A.1).

6.2.1 Contingency Measures

In addition to the operational preventive measures outlined above, the Contractor will consider the following contingency measures to further prevent exposure to dust emissions:

Weather forecast

– Assess upcoming weather conditions for the day and plan site activities accordingly. Pay particular attention to periods of forecast or observed high winds.
– If meteorological conditions deteriorate consider:
  - Modifying or ceasing activities that generate dust which have a direct impact at nearby sensitive receptors, or
  - Adding additional mitigation measures at source to control adverse dust conditions.
– This may include:
  - Ceasing dust generating construction activities within 200 m of a sensitive receptor location when wind speed reaches or exceeds 7 m/s (10 minute scalar average) and activities would be upwind of the sensitive receptor (10 minute average wind direction).

Restricting public access

– Consider closure of the public toilets immediately adjacent to the construction area.
– Short-term closure of the campsite to the north of the left abutment construction area when construction works are being undertaken and conditions are adverse.

Air quality monitoring

Air quality monitoring can be undertaken at any time at the discretion of the Contractor and Meridian but is required to be implemented during any construction event if the following occur:

- Visible dust is observed leaving the Site boundary after the application of controls described in Section 5.1 and 5.2; or
- Three or more complaints are received from the public or nearby residents.

If required, air quality monitoring will be undertaken at locations that can be used to best assess potential offsite dust emissions. Likely locations are southeast of the primary stockpile site to enable the effect of the frequent northwest winds to be assessed, and/or near the campsite adjacent to the left abutment.

Should air quality monitoring be implemented at the site, a Trigger Action Response Plan (TARP) will need to be developed for use in conjunction with this Management Plan. This will include agreed trigger PM_{10} concentrations and agreed responses.

6.3 Rectification measures

The following rectification measures are to be taken at the Project site:

– Record environmental complaints and maintain regular reviews and reporting of performance. Complaints made during an initial block of works will inform preventative measures to be undertaken during subsequent construction works (see Appendix A.3 for Draft Complaints Report form).
– Consider increasing water sprays as needed (see section 5.1) and/or cover temporary stockpiles when not in use.

– Develop alternative methods to reduce dust generation.

6.4 Corrective actions

Corrective actions are to be undertaken to a level proportional to the severity of complaint. Upon receipt of a valid complaint, the following tasks will be undertaken:

– Conduct a detailed review of all on-site activities undertaken at the time when the complaint was received.
– Identify key on-site activities contributing to off-site impacts. This will be achieved by:
  - Undertaking a visual inspection of construction processes and activities to ascertain the source of dust emissions relevant to the complaint.
  - Assessing weather data during the time period for which the complaint was made.
– Upon identification and attribution of the likely activities/sources responsible for the complaint, revised operations or additional mitigation measures will be trialled to improve (reduce) emissions from the source.
– If the trial proves effective at managing the source, a revision to the standard operating procedures will be documented and implemented across site. If the trial did not prove effective, alternative mitigation options may be trialled until an effective solution is found.
– Once investigations are complete, a response will be provided to the complainant setting out the findings and conclusions (see Appendix A.4 - template to be added by Contractor once appointed).

6.5 Site Management After Hours

- A site contact will be available at all times, including outside normal working hours, to respond to any complaints or incidents. Signage will be provided on the site boundary with this information.
- The site will be left in a condition that minimises the potential for dust generation at the end of each work period, including stabilisation of exposed surfaces where practicable.
- Dust-prone areas, such as access roads and disturbed surfaces, will be appropriately treated prior to leaving site (e.g. watering or compaction where required).

6.6 Site Closure

As discussed in Section 3, the works are likely to be undertaken over several discrete periods of activity. Several months or years may elapse between periods of construction. Therefore, the site must be left in a condition that minimises the potential for dust generation to the extent practicable at the end of each construction event. As outlined in GHD 2025A, this will include:

- Removal of temporary stockpiles and haul roads on the dam face and abutments and restoration (likely with rip-rap that has been temporarily removed). Some sections of temporary haul road may be left in place but they must be left in a non-dust generating condition.
- Any areas of the rock storage sites which will no longer be required for storage will be restored to a vegetated condition similar to the surrounding site.
- Any other potential sources of significant dust generation will be remediated, as required.

Once all the works are complete, a similar approach to completion of the works will be adopted. Note that the rock storage sites will continue to be required beyond this project. Rock is stored at the site for a variety of purposes in addition to this project.

6.7 Training

All personnel should receive induction training prior to entering site. Training should include:

– Location of sensitive receptors.
– Implementation of the dust mitigation measures outlined above.
– Roles and responsibilities regarding dust mitigation and management.
– Incident response, management and reporting procedures.
– Environmentally safe work methods relating to dust.

Supervisors and workforce representatives that are nominated to undertake monitoring and inspections will be trained specifically for this task. Mitigation measures outlined above will be consistently covered in toolbox talks to serve as a reminder to the workforce.

Other specific topics covered by the toolbox talks will be planning and preparation for high wind or regional dust events. Lessons learned during the construction and operation of the site and updates to this Management Plan will be communicated to the workforce in toolbox talks.

A log of site staff training is to be maintained (see Appendix A.2 -form to be added by Contractor once appointed).

6.8 Consideration of cultural impacts

It is recognised that temporary restriction of access to areas around the lake could have cultural impacts – particular for the Nohoanga site identified on Figure 4. Therefore, any discussions and decisions should be made with consultation between all potentially affected parties.

6.9 Communications strategy

Meridian are to develop and implement a communications strategy that includes stakeholder engagement procedures. The communications strategy should include, but not be limited to:

– Procedures for issuing works notification to nearby residents and property owners to informed them of Project staging and operational activities.
– Provides communications avenues for members of the public to ask questions and lodge complaints regarding the operations of the site.

Notification regarding specific construction activities should be provided to adjacent residents and property owners likely to be affected by dust emissions from works. Such notification should be provided prior to the activity commencing (typically one week notice) and should provide the following details:

– the reason for the activity
– types of equipment required
– the expected commencement of the activity
– activity hours of operation
– the likely duration and impact of operation at the site and any requirement for subsequent additional works
– contact details for further information and complaints.

Schedule follow-ups and check-ins with adjacent residents and property owners regarding dust impacts, where reasonable and practicable.

7. Continuous improvement

This Dust Management Plan is a Site-specific document that identifies fugitive sources of dust emissions from the Site and the Best Management Practices for controlling these sources. This plan will be reviewed and updated on an annual basis, or more frequently as required to reflect changing Site conditions. It will build on current and known practices with a commitment to continuous improvement.

8. References

GHD 2025A - Lake Pūkaki Hydro Storage and Dam Resilience Works – Air Quality Assessment – Rip-Rap Placement. Prepared for Meridian Energy by GHD 5 Nov 2025

GHD 2025B – Lake Pūkaki Hydro Storage and Dam Resilience Works - Pūkaki Dam Rip-Rap Design and Construction Methodology. Prepared for Meridian Energy by GHD 26 Oct 2025.

GHD 2026(April 2026 – Ver04) - Lake Pūkaki Hydro Storage and Dam Resilience Works – DRAFT Erosion and Sediment Control Plan. Prepared for Meridian Energy by GHD 26 Oct 2025.

9. Version control

Table 7.1 Document Version Control

Version	Date	Description of Changes
1.0	5/11/2025	DRAFT
2.0	23/01/2026	DRAFT – added draft forms
3.0	26/02/26	DRAFT – updated text
4.0	13/04/26	Description of the “Site” added Construction of temporary haul roads included as an activity Trigger levels defined for dust monitoring Wind speed and direction trigger levels included for sensitive receptors After hours and site closure activities included Water requirements included Requirement for a weather station
5.0	15/05/26	Included reference to road sweeping Confirmation that water will be stored on site Inclusion of a speed limit Updated list of sensitive receptors to include A2O/TA Trail, SH8 and Nohoanga Included plan showing A2O/TA route (Figure 1 and 4) Re-arrangement of mitigation measures discussion and addition of more detail

Appendices

Appendix A.1

Daily Inspection/Maintenance Report

Daily Inspection Record / Maintenance Report

Lake Pukaki Hydro Storage and Dam Resilience Works

Day		
Construction works underway:		
Date		
Time		
Inspector name		
Monitoring Location / Work Zone		
Wind Direction		
Wind Speed		
Rain forecast / Actual rain for the day (mm)		
Dust Monitoring (e.g. visual, air sampling pumps, OPC / CPC)		
Dust Rating 1-5 (1=Ok, 5= no visibility)		
Dust Source		
Dust management and mitigation controls implemented		
Stockpile(s) condition (e.g. dust generation)		
Noise reading (dBa)		
Road inspection (material tracking)		
Complaints received (if yes add details)		
Environmental Management Plan and Erosion and Sediment Control Plan Observations		
General Site Observations		

Appendix A.2

Site Training Log

Appendix A.3

Dust Complaint Report

Dust Complaint Report

Lake Pukaki Hydro Storage and Dam Resilience Works

Date:		**Time:**	

Complainant Details		**Receiver Details**	
Name:		**Name:**	
Contact:		**Contact:**	

Complaint Details

Investigation and Assessment

Physical Location of the Complaint:	*Or indicate below*
Wind Direction at the Time:	*Or indicate below*

Wind Speed at the Time:	

Most Likely Cause of Dust:

Corrective Action:

Closeout Detail:

Appendix A.4

Complaint Response Letter

ghd.com

The Power of Commitment

Note: These conditions are up to date as at 14/05/26. They include changes that have been made as a result of expert conferencing. Meridian continues to engage with Waitaki Rūnaka, Environment Canterbury and the Department of Conservation so further changes may continue to be made. Should that occur an updated version (Version 5) will be provided to the Panel for consideration.

Version 4

CRC262542 Section 15 Consent – Discharge of Contaminants to Air

CONSENT SCOPE

1. The discharge of contaminants to air shall be limited to matter arising from the following activities associated with the rock armouring of Pūkaki Dam:

    a. Constructing access tracks and ramps.

    b. Transporting rock from the existing stockpile sites to the temporary construction stockpile areas.

    c. Constructing work benches.

    d. Constructing toe along the Dam.

    e. Rock placement on the Dam.

    f. Rock placement on abutments.

    g. Establishment of temporary buildings within or adjacent to the main carpark and adjacent to the left abutment.

    h. Decommission of all temporary work sites.

    i. Maintenance/management of temporary stockpiles within the construction area.

At or about NZTM 1371515E, 5103020N and shown on plan CRC 262542 attached to and forming part of this resource consent.

2. The discharge to air authorised by condition (1) shall not cause objectionable or nuisance deposits and/or discharges of particulate matter beyond the boundary of the application site.

3. The Site Manager, or another nominated person, must be available at all times during rock armouring activities to respond to dust emissions complaints and issues. The contact details shall be displayed on signage at the entrance to the main carpark (being the carpark that services the public toilets, visitor centre and salmon shop at NZTM 1371515E, 5103020N).

4. The consent holder must notify Te Rūnanga o Ngāi Tahu (nohoanga@ngaitahu.iwi.nz), and Canterbury Regional Council attention: Manager Compliance:

    a. At least ten working days before the start of any activities listed in condition one.

    b. Notification shall include:

        i. The proposed start and end dates of the period of work;

ii. The proposed start and end time of activity on each day during the period of works; and

c. Where the consent is to be exercised by a person other than the consent holder, the name, address and contact telephone number of the persons exercising the consent.

d. If the consent holder is considering closing the campsite and campervan parking area as a result of dust generation authorised by this consent. Any decisions to close the campsite shall be undertaken in consultation with Te Rūnanga o Ngāi Tahu Nohoanga Team and LINZ.

e. Where works have been discontinued for more than eight consecutive days, the Canterbury Regional Council, Attention: Compliance Manager shall be re-notified at least five working days prior to the recommencement of works.

DUST MANAGEMENT PLAN

5. The Consent Holder must produce and comply with a Dust Management Plan at all times.

6. The purpose of the Dust Management Plan is to provide a framework for managing dust emissions from the activities authorised under Condition (1a-1i)) of this resource consent to minimise any effects of dust discharges on the surrounding environment.

a. The Dust Management Plan shall:

i. Be prepared in accordance with Schedule 2 of the Canterbury Air Regional Plan; and

ii. Be retained on site at all times; and

iii. Be provided to all persons operating or carrying out the activities authorised by this resource consent; and

iv. Be prepared by a suitably qualified experienced practitioner in air quality; and

v. Include details on how the conditions of this resource consent will be complied with.

b. The Dust Management Plan shall include, but not be limited to:

i. A description of the site location and the receiving environment; and

ii. A system for training employees and contractors to make them aware of the requirements relating to dust mitigation and the conditions of this resource consent; and

iii. Identifying staff responsibilities for implementing and reviewing the Dust Management Procedures; and

iv. A description of all on-site activities as described in Condition (1a-1i) and dust sources on site; and

v. A description of the weather conditions that trigger the requirement for dust suppression activities; and

vi. Details of location(s) of and appropriate installation of an onsite weather station; and

vii. The methods to be used for controlling dust at each source during on-site activities, **including speed restrictions for internal access roads, and additional procedures for handling high risk dust-generating materials,** and

viii. A description of the methods for the use **and source** of water for dust suppression on all exposed areas on dry and/or windy days (in accordance with the weather criteria identified in condition 6(b)(v), including how and when water will be applied to maintain damp surfaces; and

ix. The frequency and triggers of when water will be used to maintain damp surfaces, and when these measures are to commence on dry and/or windy days in accordance with the weather criteria identified in condition 6(b)(v); and

x. A description of the contingency measures to be used on-site, **including sensitive receptor triggers to initiate PM10 monitoring;** and

xi. Procedures, processes and methods for managing dust when staff are not on site.

xii. Procedures to be undertaken to ensure dust is managed during times when works may be delayed for an extended period of time **and upon completion of works**.

xiii. A requirement to visually monitor State Highway 8 road conditions during all works periods and undertake road sweeping if there is excessive deposition on the road surface.

Advice Note: *If water is required for dust suppression, water will be brought to site in water trucks. This will be the responsibility of the contractor. Other consents held by Meridian Energy Ltd do not provide for this use.*

7. Works shall be undertaken in accordance with Dust Management Plan dated XXX, attached to and forming a part of this consent.
8. **Before first exercise of this resource consent, the consent holder must provide a copy of their proposed Dust Management Plan to Canterbury Regional Council attention: Manager Compliance for confirmation that it complies with the conditions of this consent (the Approved Dust Management Plan). If no response from Canterbury Regional Council is provided within 20 working days of submitting the Plan for certification the consent holder shall proceed as if the Plan has been Approved.**
9. The Dust Management Plan may be amended by the consent holder provided such amendments are consistent with the objective of minimising any effects of dust discharges on the surrounding environment. Any amended Dust Management Plan shall be submitted to Canterbury Regional Council attention: Manager Compliance for certification that it complies with the conditions of this consent.
10. The consent holder may implement any amended Dust Management Plan after 20 working days of it being submitted for certification if Canterbury Regional council has not notified the consent holder of its decision. If Canterbury Regional Council notify the consent holder that the amended Dust Management Plan does not comply with the conditions of this consent the consent holder shall immediately (within 5 working days) revert to implementing the Approved Dust Management Plan.

DUST MITIGATION

11. The Consent Holder shall ensure a water cart is held on site for the duration of each works period, with sufficient availability of water to meet dust suppressant requirements in the Dust Management Plan.

12. The Consent Holder must utilise all reasonably practicable measures to minimise the discharge of dust from rock armouring activities on-site:

    a. On dry days when dust suppression activities are triggered by the Dust Management Plan; and

    b. When there is any visible emission of dust from the site.

13. The consent holder shall install an on-site weather station during any periods of construction work to monitor wind and rain conditions. The weather station shall:

    a. Be located on or immediately adjacent to the site in accordance with AS/NZS 3580:14-2014 (Methods for sampling and analysis of ambient air – Part 14 Meteorological

monitoring for ambient air quality monitoring applications). If the monitoring station cannot be located in accordance with AS/NZS 580:14-2014 an alternative location shall be agreed in writing with Environment Canterbury;

b. Maintain a date and time stamped electronic record of meteorological monitoring results, recorded as rolling 10-minute averages, which are up-dated every one-minute in real-time.

c. Send an alarm to the Site Manager (for example via mobile phone) if the wind speed trigger level identified in the DMP is reached or exceeded. Site Manager to then undertake additional mitigation as deemed necessary.

d. Be maintained and calibrated in accordance with the manufacturer's specifications.

e. All meteorological monitoring data shall be made available to the Environment Canterbury on request.

COMPLAINTS

14. A record of all complaints relating to dust discharged to air from the site and associated activities must be maintained and shall include:
    a. The location where the dust was detected by the complainant; and
    b. The date and time when the dust was detected; and
    c. A description of the wind speed and wind direction when the dust was detected by the complainant; and
    d. The most likely cause of the dust detected; and
    e. Any corrective actions undertaken by the Consent Holder to avoid, remedy, or mitigate the effects of the dust detected by the complainant.
15. The Consent Holder must maintain a record of any complaints and any responses or investigative actions taken as a result. This record shall be provided to the Canterbury Regional Council, Attention: Compliance Manager.

ANNUAL REPORT

16. The Consent Holder shall prepare an annual monitoring report for the period of 1 July to 30 June to the CRC, Attention: Regional Leader Compliance Monitoring, by 30 September each year that the consent is exercised (i.e. if there have been no rock armouring activities over the 12-month period no report is required).
17. The annual monitoring report shall include but not be limited to:
    a. A record of any periods when construction work was undertaken, including the dates and duration of the work.
    b. The complaints record required in accordance with Condition 11.

ADMINISTRATION

18. The Canterbury Regional Council may, once per year, on any of the last five working days of May or November, serve notice of its intention to review the conditions of this consent for the purposes of:

a. Dealing with an adverse effect on the environment occurring as a result of the exercise of this resource consent; or

b. Requiring best practicable options to be adopted by the consent holder to remove or reduce any adverse effect on the environment as a result of the exercise of this resource consent; or

c. Requiring the consent holder to carry out monitoring and reporting instead of, or in addition to, that required by the resource consent; or

d. Requiring the consent holder to comply with a relevant rule in an operative regional plan.

19. If this consent is not exercised within 35 years then it shall lapse in accordance with section 125 of the Resource Management Act 1991.

Advice Note: *A 35-year duration was sought by Meridian as part of the Fast-track process. 'Exercised' is defined as implementing any requirements to operate this consent and undertaking the activity as described in these conditions and/or application documents.*