

TOWNPLANNING
GROUP

Hawkeswood Mining Limited:
Dust Management Plan

Millers Flat Gold Mine
1346-1536 Teviot Road

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1 Introduction

1.1 Scope

This management plan has been prepared to manage dust as part of the Hawkeswood Mining Limited gold mine at 1346-1536 Teviot Road, Millers Flat.

The objectives of this management plan are:

- To operate in full compliance with the resource consent requirements and demonstrate this through reporting procedures;
- To liaise closely with neighbours in the local community regarding dust management during operation;
- To minimise and limit nuisance impacts to local residents and adjacent land users from dust generated by mining operations;
- To provide the methods to be employed to avoid, remedy or mitigate any adverse effects on the environment due to dust as a result of mining activities.

The plan will provide methods to be used to achieve these objectives.

1.2 Resource Consents

Resource consents from Central Otago District Council and the Otago Regional Council are currently being sought. This plan will be revised and updated if required once conditions of these resource consents are decided.

2 Description of Operation

The site will be used by Hawkeswood Mining Limited to establish and operate an alluvial gold mining operation. The operation generally involves the following activities.

Site establishment

- Test pitting
- Development of a starter pit
- Construction of access roads and bunds

Mining operations

- Stripping of topsoil and overburden
- Transport and stockpiling (where required) of overburden and topsoil
- Processing the target alluvial material through the gold plant
- General site activities

Site rehabilitation

- Backfill of mine void and topsoil
- All bunds will be removed
- The land will be restored to the pre-existing land contour as closely as possible (with the exception of a terminal void)
- Grass will be established over the disturbed land
- Rehabilitation will be undertaken progressively as overburden from the next stage is used to fill in the mine pit from the previous stage

2.1 Site location and layout

The site is located at 1346-1536 Teviot Road, Millers Flat, Central Otago (**Figure 1**). The layout of the site is shown in **Figure 2** below.



Figure 1 Site Location indicated by red arrow (Source: CODC GIS)



Figure 2 Site layout plan

2.2 Surrounding land uses

The surrounding area is rural with land predominantly used for pastoral farming activities.

The township of Millers Flat is located approximately 700m to the southeast at the closest point. The township of Ettrick is located approximately 800m northwest of the site at the closest point. Rural residences are located in the surrounding area.

The Clutha River / Mata-Au is located to the west and southwest of the site. The river is a Statutory Acknowledgement Area and has a range of intrinsic, cultural, recreational and aesthetic values, and is used by the general public for fishing, boating and other recreational uses.

The Clutha Gold Cycle Trail (the “cycle trail”) is a compacted gravel track, running between Roxburgh and Lawrence, and linking to other cycle trails in Central Otago. The cycle trail runs along the Clutha River / Mata-Au to the west and south-west of the site, before cutting through the site via the paper road, to then travel along Teviot Road toward Millers Flat.



Figure 3 Approximate path of Clutha Gold Cycle Trail indicated in yellow. Extent of application site area indicated in red outline (Source: CODC GIS)

2.3 Local meteorological conditions

The closest meteorological station with historical records is adjacent to the site on the opposite bank of the Clutha River / Mata-Au. A wind rose (**Figure 4**) has been

developed from the data from 1 January 2011 to 9 December 2022. The wind rose shows that prevailing winds are from east-southeast and west-northwest.

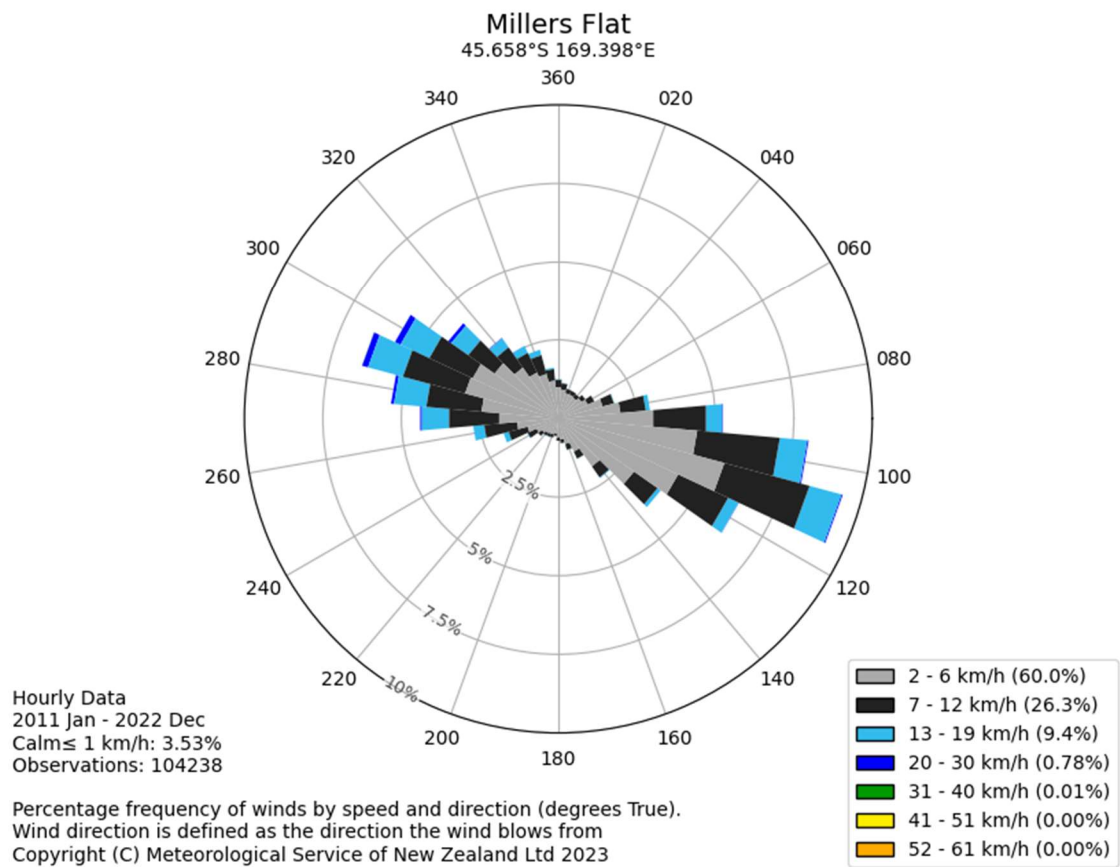


Figure 4 Wind rose for Miller's Flat (Source: Metservice)

3 Dust Sources and Generation

3.1 Potential dust sources

The activities that will take place at the mine that may generate discharges to air are:

- Earthworks, including stripping of overburden and topsoil
- Vehicle movements on unpaved surfaces
- Wind generated dust from dry exposed areas such as stockpiles, haul roads and backfill areas
- Rehabilitation
- Loading and unloading materials

A wide range of mining activities have the potential to generate dust. The source(s) are usually visible and readily identifiable. Dust from Hawkeswood Mining Limited mining activities is anticipated to be almost entirely generated by material disturbance within the mining pits, vehicle movements on unsealed roads, and exposure to wind in open areas. Processing of material through the Gold Recovery Plant is not anticipated to generate dust emissions as the process is undertaken using wet material, with added water.

3.2 Factors influencing dust generation

- Wind speed across the surface; the critical wind speed for pick-up of dust from surfaces is 5m/s, above 10m/s pickup increases rapidly
- The percentage of fine particles on the material on the surface
- Moisture content of the material on the surface
- The area of exposed surface
- Disturbances such as traffic, excavation, loading and unloading of materials
- The height of the source above the surrounding ground level

The smaller the particle size of the material on the surface of a road or exposed surface the more easily the particles are able to be picked up and entrained in the wind. Moisture binds particles together preventing them from being disturbed by wind or vehicle movements.

4 Receptors

Potential receptors that are sensitive to dust emissions generated from the site include:

- Residences

There are a number of rural residences close (within 250m) to the proposed work area and have been identified on the map in Figure 5. Those that are aligned with the prevailing wind directions of east-southeast and west-northwest may be at increased risk of experiencing effects from dust.

- Users of the Clutha Cycle Trail

These receptors will be transient, though in close proximity to the work area in places.

5 Dust Mitigation Procedures

5.1 Site wide activities

The following dust mitigation measures will be undertaken as required to minimise the overall dust emissions from the mine;

- High risk dusty activities such as topsoil removal and replacement will cease when conditions are dry and winds are strong. The wind speed trigger for stopping dusty activities will be set to 6.3 m/s initially as a 1-hour average and an instantaneous value of 10 m/s (1-minute average), based on the existing Met service wind sensor (6m height). The wind speed trigger may be amended on consideration of local terrain and location of working areas and considering the real-time dust monitoring results obtained (Section 6 below).
- Exposed surfaces will be kept to a minimum.
- Use of a water cart and fixed sprinklers during topsoil and overburden removal to pre-dampen the material as far as practical. Mobile sprinkler systems will also operate continuously in the immediate vicinity of the excavator to keep the working area wetted and 'knock-down' any emitted dust where required.
- Water or other dust suppressants shall be applied to unsealed internal roads and other potentially dusty surfaces as necessary to minimise dust emissions.
- Vehicle speeds on site will be restricted to a maximum of 15 km/hr.
- Regularly maintain unsealed access roads using best industry practices which could include grading and laying of fresh metal.
- Existing shelter belts of trees along the boundary of the site will be maintained.

The application of dust suppression techniques will depend primarily on weather conditions, as during the months of October to March when weather conditions are normally dry and windy the potential for dust emissions will be greater and therefore dust suppression techniques will be used routinely. However, during the months of April to September weather conditions are generally wetter, subsequently dust suppression measures will be implemented on an as needs basis. Water for dust suppression is available in ample quantities from the dewatering of the mine void.

5.2 Material stockpiles

Hawkeswood Mining Limited will undertake the following to minimise dust from stockpiles:

- Limit the height of stockpiles to 7m

- Keep active stockpiles damp when necessary
- Vegetate or cover long-term stockpiles as soon as possible
- All soil stockpiled for longer than six months shall be protected from exposure to wind by covering them with a synthetic material or growing a suitable vegetative cover

Hawkeswood Mining Limited will have at least one large volume water cart on site at all times which will be used to dampen access ways and stockpiles. The water cart will be fitted with forward facing sprays and a water cannon which can also be used water stockpiles when necessary. The water cart will be supplemented with sprinkler systems where required.

The long-term stockpiles and bunds will be grassed in the areas that are not subjected to traffic. Any areas requiring vehicle access will be treated by the water cart.

5.3 Elimination of fugitive dust

The action task list for the elimination of fugitive dust at the site is as follows:

1. Reduce the pace of, or cease dust producing activities until the problem is corrected
2. Notify the site manager of dust conditions and implement dust suppression procedures
3. Increase frequency volume and/or coverage of water misting sprays to prevent soil and it from drying
4. Modify operating procedures and methods to eliminate problematic conditions
5. Increase the level of worker awareness and instruct them on the implementation of any new or modified operating procedures
6. Perform routine audits of dust suppression methods and work areas for dust sources

5.4 Sensitive Receptor Management Zone

There are four residences that are located within 250m of the work site and the prevailing wind direction, which may be sensitive to dust effects from the mining project. A Sensitive Receptor Management Zone has been created to provide additional controls within these areas, shown in **Figure 5** below and Attachment B. These additional controls may be waived in individual areas with the written approval of the associated resident.

- Potentially dusty works will be undertaken in this area during winter, where practicable.

- Stockpile heights will be reduced to 4m, to align with the height of any boundary bunding.
- Additional dust suppression will be targeted in these areas, including for example, extensive pre-damping of topsoil before removal.
- The wind speed trigger may be lowered if indicated by visual observations and the boundary dust monitoring described in Section 6 below.

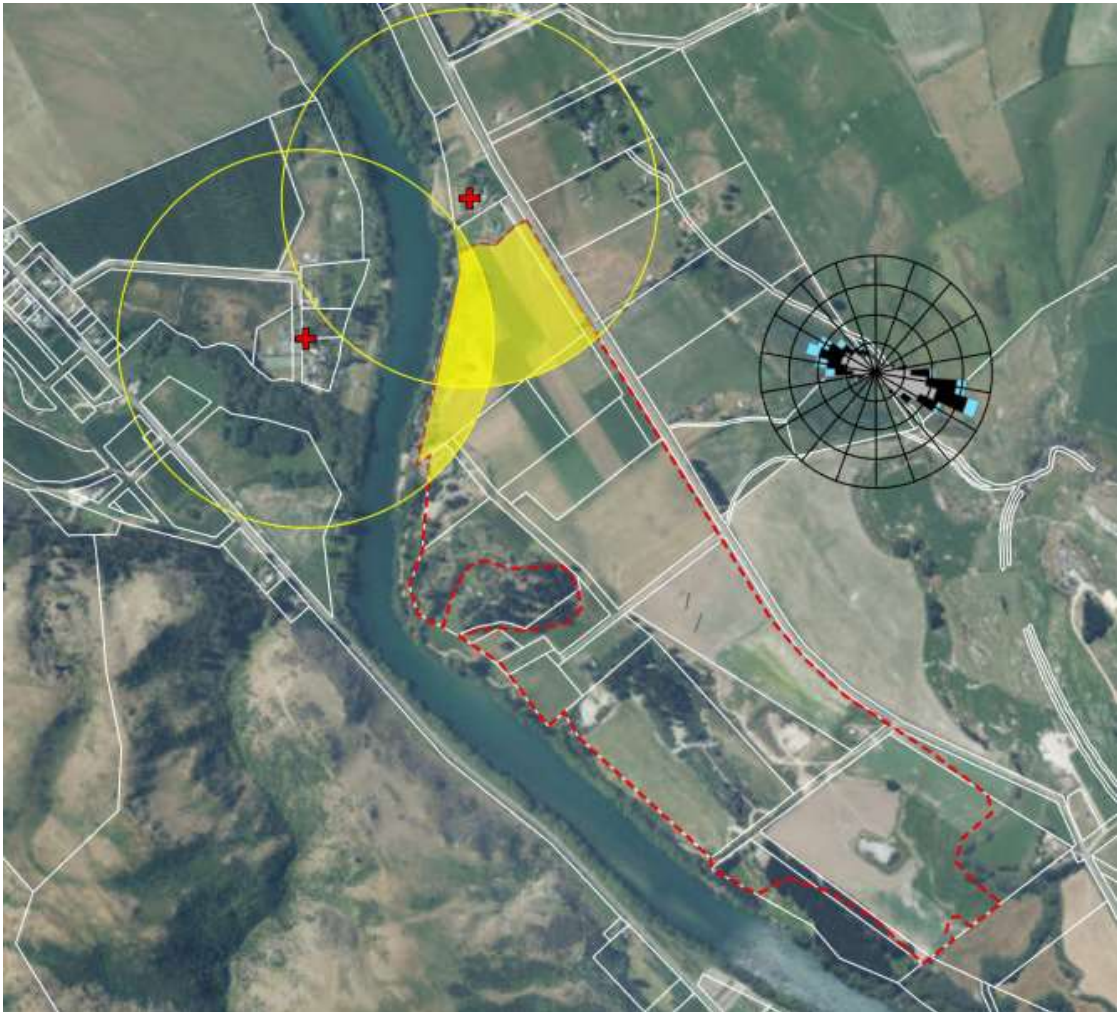


Figure 5 Sensitive Receptor Management Zone, based on houses within 250m of the work area and within the prevailing wind direction. Wind rose imposed over 1403 Teviot Road, Millers Flat, to demonstrate how prevailing wind direction impacts on the extent of the Sensitive Receptor Management Zone.

6 Monitoring

6.1 Overview

To ensure dust mitigation measures are implemented and are effective at minimising dust a dust monitoring plan as outlined in **Table 1** below has been implemented.

Table 1 Dust Monitoring Plan

Monitoring activities	Frequency
Check weather forecast for strong winds and rainfall	Daily
Observe weather conditions from observations and data from weather station	Daily and as conditions change
Inspect stockpiles to ensure a reasonable dampness is maintained	Daily and as conditions change
Inspect dust generating activities to ensure dust emissions are effectively controlled	Daily and as conditions change
Inspect watering systems to ensure equipment is maintained and functioning	Weekly
Monitor dust generating activities and water application rate	In winds over 5m/s

6.2 Instrumental monitoring

The purpose of dust monitoring is to demonstrate that the controls are adequate and allow for adaptive management if necessary.

Two real-time dust monitors will be installed in predominate downwind locations on (or near) the site boundary to measure the concentrations of fine particulate matter (PM10). Where practical priority should be given to locating the monitors between the work site and sensitive receptors, with the precise location to be determined in consultation with a suitably qualified person.

If the following trigger levels are exceeded, an investigation into the cause and a review of controls will be undertaken (refer to Appendix D).

Trigger Type	Averaging Period	Trigger Value
PM ₁₀	1 hour	150 µg/m ³
Visible Dust	Instantaneous	Visible dust emissions beyond the site boundary

6.3 Recording

Dust monitoring will be recorded on the forms in Appendix C at the frequency specified in Section 6.1. Alternatively, data from automated dust monitors may be recorded electronically instead of using paper forms.

7 Complaints

Any complaints received by Hawkeswood Mining Limited will be recorded on a complaint form noting the following:

- Time, identity of contact details of complainant
- Nature of the complaint
- Weather conditions at time of complaint
- Actions taken and any remedial actions as necessary. If complaint was related to an event in the recent past note any dust producing activities
- If it is apparent that there is a source of dust other than from the mine area causing a dust nuisance, evidence of this source must be recorded.

The complaint forms shall be kept in a register and submitted to Central Otago Regional Council and Otago Regional Council on request. An after-hours telephone number is available and will be distributed to neighbouring properties following the commencement of the operation.

8 Responsibility

A minimum of two individuals will be trained to implement the dust management plan. These individuals will be responsible for ensuring the dust management plan is fully implemented and maintained. The mine employees must take ownership of the dust management plan to ensure its success. Employees at the plant must receive training to understand the role of implementing and maintaining the dust plan including conducting inspections and taking corrective actions.

The site manager will have ultimate responsibility in ensuring that the objectives of the dust management plan are met.

9 Contingency

In the event that dust monitoring results reveal significant exceedances above background levels, or repeated complaints are received, the site operations, dust monitor data and recorded metrological information will be analysed to establish the problem source. The site manager will then be responsible for implementing the procedures described in Section “Elimination of fugitive dust” to immediately reduce dust generation from the problem area. If the problem persists, operations in the problem area shall cease while a solution is investigated and implemented.

10 Review

The dust management plan shall be reviewed at least on an annual basis and may be amended during the period of this consent as appropriate to improve management and contingency procedures.

11 Appendices

Contents

A: Resource Consents

B: Sensitive Receptor Management Zone Plan

C: Forms

Complaints Investigation Form

Dust Monitoring Record Form

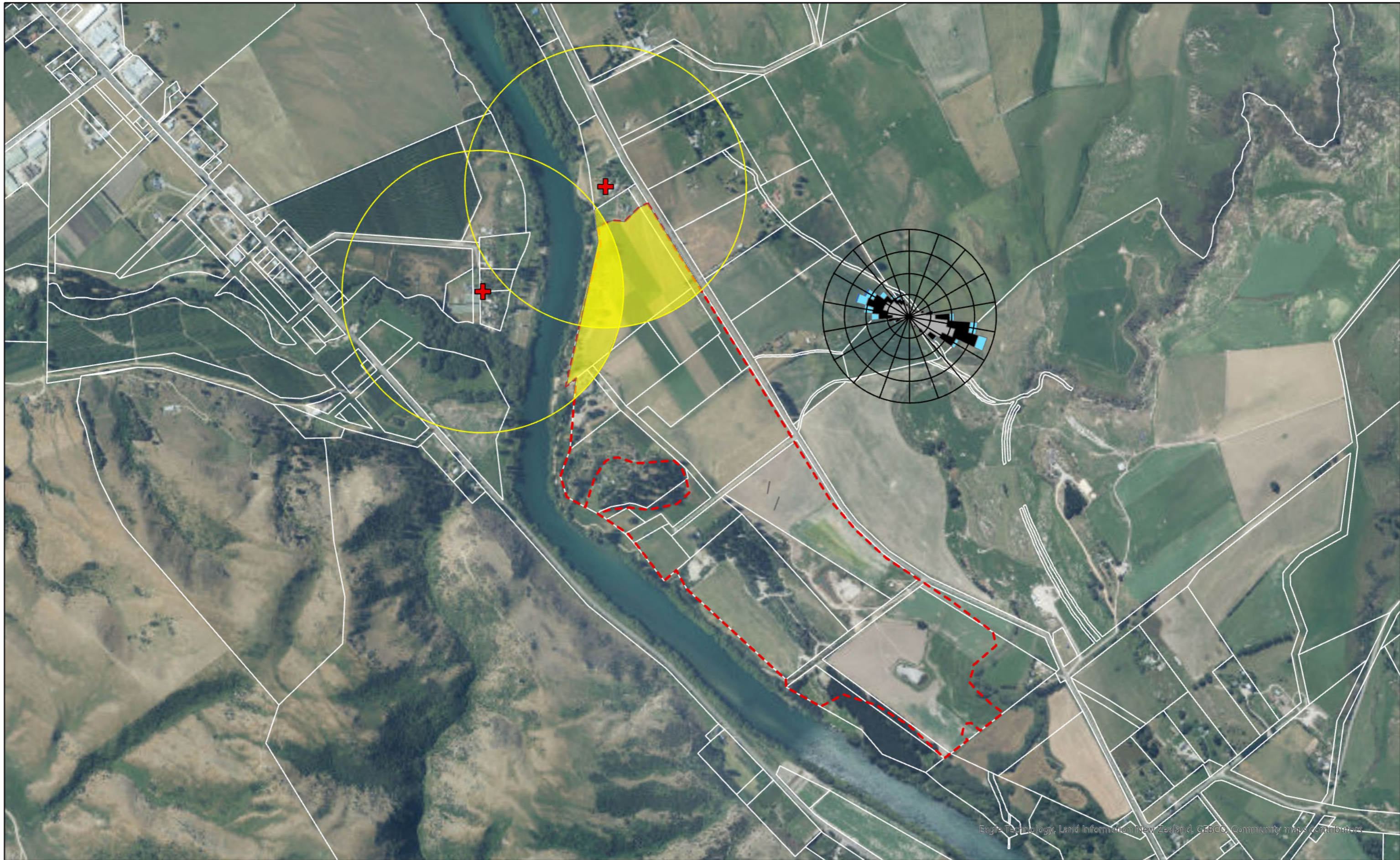
Dust Level Exceedance Investigation Form

Appendix A: Resource Consents



Appendix B: Sensitive Receptor Management Zone Plan





Esri Technology, Land Information New Zealand, GEBCO, Community maps contributors

LEGEND

- Site extent
- + Houses
- Sensitive receptor management zone
- 400m radius

DUST MANAGEMENT PLAN: SENSITIVE RECEPTOR MANAGEMENT ZONES

Wind Rose

- 2-6 km/h (60.0%)
- 7-12 km/h (26.3%)
- 13-19 km/h (9.4%)
- 20-30 km/h (0.78%)

2753-22 | Hawkeswood Mining Ltd

30/11/2023 SCALE: 1:14,000 @A3

SOURCE: LINZ



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Appendix C: Forms



MILLERS FLAT MINE

DUST MONITORING RECORD FORM



Week commencing _____

Daily Monitoring Activities (initial as completed)	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Check weather forecast for strong winds and rainfall							
Observe weather conditions from observations and data from weather station							
Inspect stockpiles to ensure a reasonable dampness is maintained							
Inspect dust generating activities to ensure dust emissions are effectively controlled							

Weekly Monitoring Activities	Checked by	Date
Inspect watering systems to ensure equipment is maintained and functioning		

Winds over 5m/s	Wind speed	Time	Date
Monitor dust generating activities and water application rate			

Tiggers	Notes	Measurement	Time	Date

MILLERS FLAT MINE

DUST EXCEEDANCE INVESTIGATION FORM



Trigger/Exceedance	
Date and time	
What work was happening on site	
What work caused the problem	
Actions taken to solve the problem	
Monitoring actions	
Other notes	

Form completed by		Date	
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MILLERS FLAT MINE



COMPLAINTS INVESTIGATION FORM

Date			
Name of complainant			
Address of complainant			
Date of incident			
Weather conditions at time of incident (sun, rain, dry)			
Wind direction and strength at time of incident (still, light, gusts)			
Description of dust and potential source (thick, light, location)			
Actions taken (incl. any remedial actions)			
Follow up with complainant to advise of actions taken (date, time, and note of conversation)			

Form completed by		Date	
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