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memorandum

TO	Cheryl Low	FROM	Jeff Bluett, Technical Director – Air Quality
	Santana Minerals Ltd	DATE	17 March 2026
RE	Bendigo-Ophir Gold Project Air Quality Assessment Addendum: Visual Dust Monitoring and Instrumental Arsenic Dust Monitoring.		

1.0 Introduction

Matakanui Gold Limited (MGL) has lodged a Fast Track consent application for the Bendigo-Ophir Gold Project (BOGP). Included as part of the application was an Air Quality Assessment (AQA) prepared by Pattle Delamore Partners Limited (PDP) (dated 13/10/2025, Fast Track Document Number B.33) and an Air Quality Management Plan (AQMP, dated 05/09/2025, Fast Track Document Number G.23).

The BOGP Fast Track consent application has been reviewed by Otago Regional Council (ORC). In a letter dated 17/12/2025, ORC provided an external peer review of the PDP AQA (SLR, 12/12/2025). Based on the SLR Review, the ORC letter posed nine questions as requests for further information. The responses to the nine questions were provided in two memoranda written by PDP C051440001M002 (dated 29 January 2026) and PDP C051440001M003 (dated 4 February 2026). Following SLR's review of those two memoranda ORC was satisfied that the key issues had been addressed by PDP, and stated that "*There are a couple of areas of minor disagreement, but nothing that I feel like I need further information on at this time*".

To assist the Fast Track Panel, Santana has asked PDP to provide information aimed at resolving these areas of minor disagreement. This memorandum responds to the following two issues:

- An improved way for BOGP staff to assess if visible dust crosses the site boundary; and
- The pros and cons of undertaking low-cost arsenic deposition monitoring.

2.0 Assessing if visible dust crosses the site boundary

SLR considers the previous response incomplete and states: "*Please provide a more detailed explanation of how the "visible dust crossing the boundary" trigger will operate in practice, given that workers in the valley cannot actually see the boundaries*".

Sections 2.1 to 2.4 of this memorandum aim to provide a more detailed explanation of how visible dust crossing the boundary will trigger a dust mitigation response.

2.1 Identifying Site Boundaries During Dust Observations

The BOGP site boundary is shown in Figure 1.

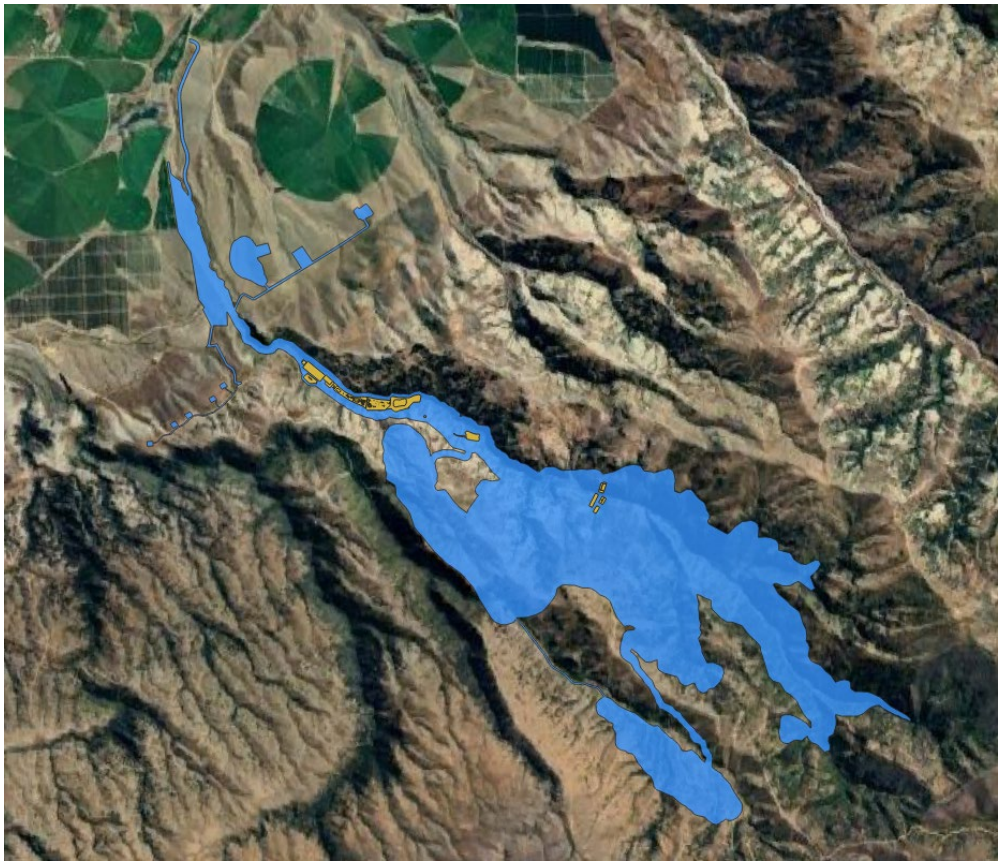

Figure 1: BOGP site boundary

There are no fences or boundary markers for the majority of the site boundary which would enable BOGP staff to assess whether dust plumes are travelling over the boundary. Therefore, they will be required to understand and identify the site boundaries using landmarks.

The main impact area is contained within two valley systems, the RAS Creek Valley and the Shepherds Creek Valley. Figure 2 shows a plan view of the two valleys within which the BOGP mine will sit. Shepherds Creek valley floor is shown by a green line, the Rise and Shine Creek valley floor is shown by a yellow line. The project outline is shown in blue. Shepherds Creek valley floor is at an approximate elevation of 595 m asl with the northern valley wall rising 290 m over a distance of 1,000 m and the southern valley wall rising high valley wall to the north and 253 m high valley wall to the south. The Rise and Shine Creek valley floor is at an approximate elevation of 756 m asl with the northern valley wall rising 100 m over a distance of 250 m.

The key landmarks which BOGP staff will use to visually identify the approximate location of the site boundary with the two-valley system (red oval in Figure 2**)** are:

- The northern floor of Shepherds Valley forms the northern site boundary;
- The eastern floor of Shepherds Valley forms the northeastern part of eastern site boundary;
- Jean Creek indicates the middle part of the northeastern part of eastern site boundary;
- Rise and Shine Creek and the Clear Water Creek indicate the approximate location of the southern site boundary; and

- The southern floor of Shepherds Valley forms the western part of the southern site boundary.

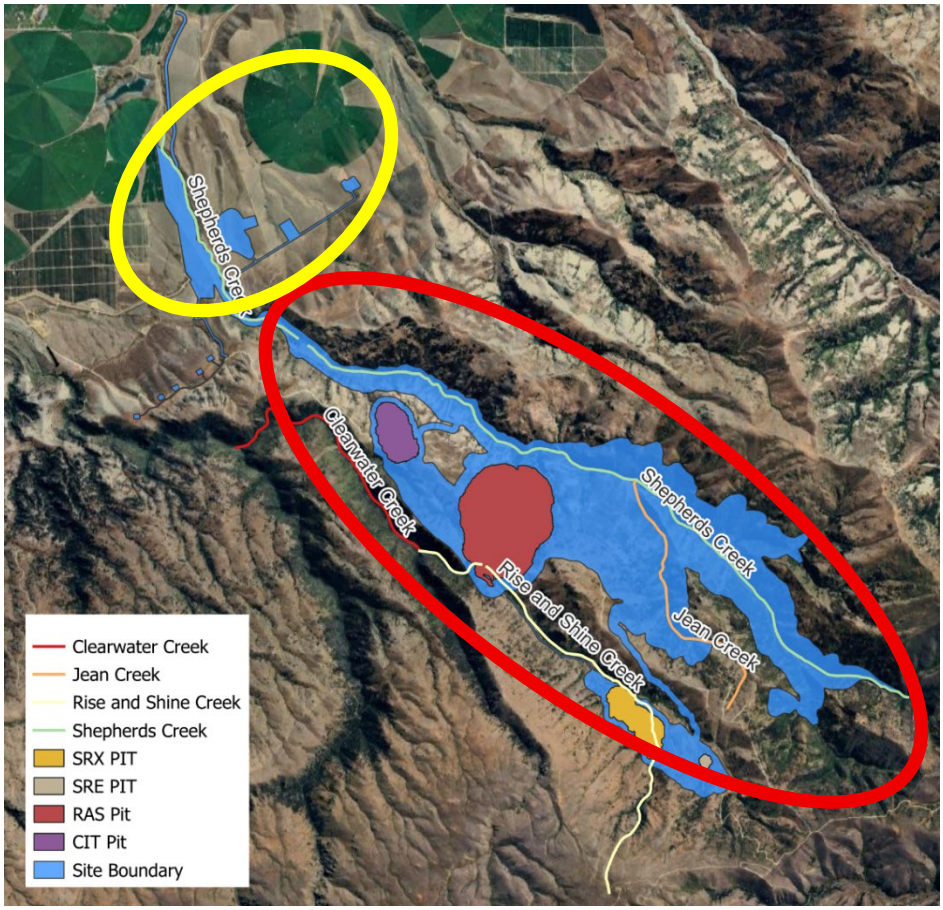

Figure 2: BOGP layout in the RAS Creek valley and the Shepherds Creek valley

The key landmarks which BOGP staff will use to visually identify the approximate location of the site boundary located on the plains to the north of the two-valley system (yellow oval in Figure 2**)** are:

- The fence lines of the accommodation and administration buildings located to the northeast of Thomson Gorge Road;
- 1.5 km Thomson Gorge Road north from the intersection of Matilda rise defines the northern boundary; and,
- 200 m west of Thomson Gorge Road 1.5 km north from the intersection of Matilda rise defines the northern boundary.

The above information which defines key landmarks which BOGP staff will use to visually identify the approximate location of the site boundary will be added to the dust monitoring section of the Air Quality Management.

2.2 Enhanced Descripton of Visible Dust Plumes

To enable BOGP staff to more effectively allocate dust suppression resources to visible dust plumes it would be beneficial to enhance the description of any dust plumes observed. PDP suggests that the dust plumes are classified by three criteria each of which has three sub-classes.

- Colour: brown, light grey, or dark grey/black;

- Opacity: low opacity (little visual impairment - can easily see through plume), medium opacity (some visual impairment – like looking through a dirty window), or high opacity (high visual impairment - cannot see through the plume); and
- Size: low (< 50 m long), medium (50 to 150), large (< 150 m).

These three factors can be combined to provide a qualitative assessment of dust plume impact. By assigning a low classification a value of 1, a medium classification a value of 2 and a high classification a score of three, the three criteria scores can be tallied to give the total impact of the dust plume as shown below:

- Low impact – total of three risk factor scores is 3-4.
- Medium impact – total of three risk factor scores is 5-6.
- High impact. – total of three risk factor scores is 7- 9.

The above information provides a three-level dust impact assessment based on three visual criteria assessed in the field by BOGP. BOGP staff will convey the dust impact assessment to the site manager as part of their visual dust observations. The dust risk assessment will used by the site manager to identify and allocate appropriate dust suppression resources. The three level dust impact assessment process and reporting will be added to the dust monitoring section of the Air Quality Management and log form.

2.3 Communication of and Response to Dust Observations and Impact Assessment

BOGP staff will convey the dust impact assessment via phone call or text message to the site manager as part of their visual dust observations. The dust risk assessment and will used by the site manager to identify and allocate appropriate dust suppression resources.

2.4 Dust Observation and Reporting Workflow Process

The anticipated dust observation and reporting workflow Process is shown in Figure 3.

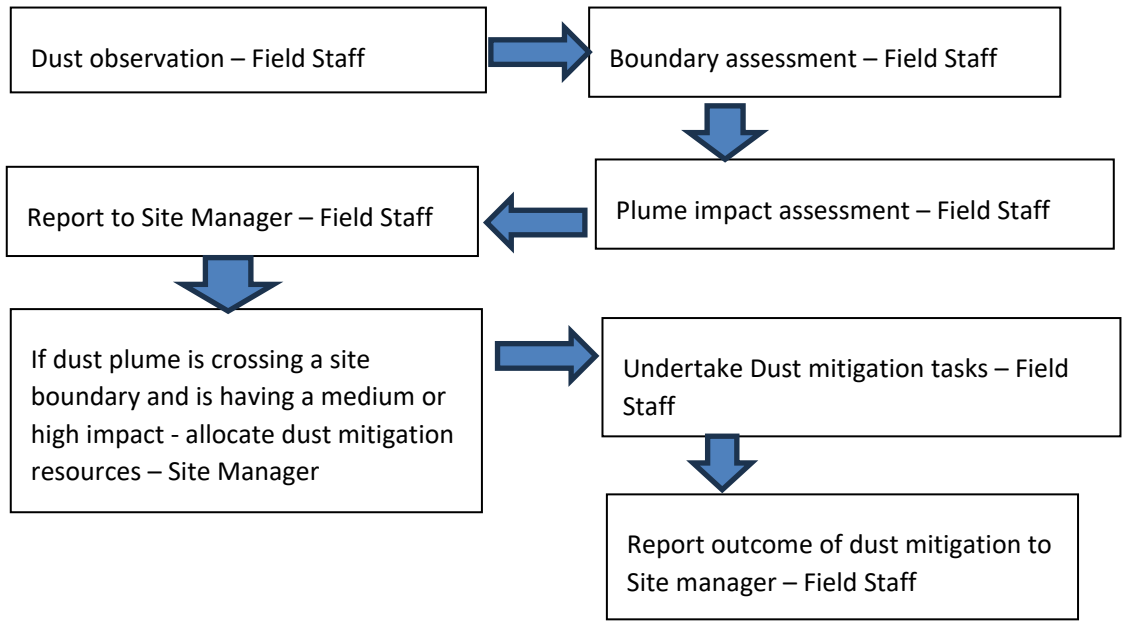

Figure 3: Dust observation and reporting workflow process

2.5 Potential Use of Boundary Dust Cameras

PDP recommend quarterly assessments on the effectiveness of visual observations. The assessment of effectiveness of visual observations should be undertaken by the site management team and consider:

- Staff visual observations as described in Sections 2.1 to 2.4;
- Any dust complaints from public; and,
- Any ORC compliance reports or non-compliance notices.

In the unlikely situation where the quarterly assessment shows that visual dust observations are not being effective then PDP recommend that BOGP consider the installation of a camera to provide an additional supporting input into the dust observations and dust mitigation responses. Any dust camera would be located to capture images of:

- Downwind dust plumes from the problematic dust source/s; and,
- The dust plume moving across the closest boundary.

The potential use of boundary dust cameras will be added to the site's AQMP.

3.0 Low-Cost Arsenic Dust Monitoring

Following SLR's review of the two previous memoranda written by PDP,SLR informed ORC that "*given high levels of Community concern about the project providing monitoring of arsenic transport via atmospheric dispersion remains an action that could be undertaken to alleviate some of these concerns. Additional low-cost arsenic deposition monitoring is still recommended to support community reassurance*."

Sections 3.1 to 3.5 of this memorandum explores the comments made by SLR and PDP's thoughts on undertaking arsenic dust monitoring.

3.1 PDP's Position on the Need to Undertaking Arsenic Dust Monitoring

PDP has undertaken a detailed impact assessment of the potential effects of dust containing arsenic being discharged to air. This is detailed in the site's air quality assessment and explored further in the PDP memorandum C051440001M002 (dated 29 January 2026). In summary PDP considers that the risk of dust from handling arsenic containing soils has been adequately assessed by the AQA and is appropriately controlled by the AQMP. One of the key points to reiterate is that the main area where arsenic containing soils will be worked in any great volume is over 200 m from the site boundary.

This leads PDP to conclude there is no need, and little benefit from undertaking arsenic dust monitoring.

3.2 Methods Available for Arsenic Dust Monitoring

In a report prepared for the Ministry for the Environment (Cavanagh, J. (2024) [1].) it is noted that "*Currently there is no commercially available method for the determination of arsenic in particulate matter. The general method outlined in the European standard EN 14902:2005 is similar to that used for determining arsenic in soils*".

[1] Cavanagh, J. (2024). Arsenic in air. In: Lohrer, D., et al. Information Stocktakes of FiftyFive Environmental Attributes across Air, Soil, Terrestrial, Freshwater, Estuaries and Coastal Waters Domains. Prepared by NIWA, Manaaki Whenua Landare Research, Cawthron Institute, and Environet Limited for the Ministry for the Environment. NIWA report no. 2024216HN (project MFE24203, June 2024).

International standards do include methods for measuring the amount of arsenic contained in dust collected from ambient air. PDP has identified the most practical method for the BOGP situation as US EPA Method IO-3.1. Very briefly this method takes pre-field tared filters, runs sample air run through them, and after exposure the filers are reweighed to determine total mass of particulate matter, then the filter and particulate matter are digested in acid (distilled HNO_3 can be used[2]) and analysed by for metals including Arsenic.

PDP has been involved in projects where this method has been used to quantify the amount of metals contained in ambient dust downwind of a metal recycling plant. Our experience with this monitoring method is:

- A filter and pump air sampler system is required; and;
- A meteorological monitoring system should be operated in parallel with the air sampler;

PDP note there are at least two commercially available pieces of equipment that measure dust and metal content of that dust in real time. However, the purchase, shipping, installation and operation of this type of equipment would easily run into a six-figure cost. PDP have not considered these real-time arsenic monitoring options for the BOGP in any detail because in this context, where any sensitive receptors are a long way from the source of dust, the cost of this type of monitoring far outweighs the management benefits gained.

3.3 Ambient Air Health Impact Assessment Criteria for Arsenic

The Ministry for the Environment's New Zealand Ambient Air Quality Guidelines include an annual average guideline for arsenic of 0.0055 $\mu g/m^3$. If any arsenic monitoring were undertaken, then this is the guideline which the measurements would be compared against.

3.4 Practical Considerations of Monitoring Arsenic Dust on the BOGP site

PDP have identified the following practical consideration which would have to be considered if arsenic dust were to be monitored on the BOGP site:

- Potentially one of the air sampling monitors currently operated by BOGP could be quite easily converted to provide the arsenic filter collection function;
- A meteorological monitoring system would need to be installed and operated in parallel with the arsenic air sampler monitor;
- Potentially one of the meteorological monitoring sites operated by BOGP could be quite easily moved to support the arsenic filter collection function;
- Repurposing one of the current dust and wind monitors would compromise monitoring environmental monitoring in another location on site;
- Repurposing BOGP's current kit would encounter labour, engineering and electrical costs. PDP estimate these costs to be in the order of $10,000;
- Purchasing and installing new dust and meteorological monitoring equipment for the purposes of arsenic monitoring would likely incur costs of around $40,000;
- Operating the sites, collecting the filters and having them analysed by a laboratory would be in the order of $1,000 per sample;

[2] https://pmc.ncbi.nlm.nih.gov/articles/PMC10002384/

- After a 33-day exposure period in the PDP project mentioned earlier, the results for arsenic were below detection levels. Therefore, a long exposure period for any soil dust sampling will likely be required; and,
- To improve the quality of the data an upwind and downwind monitor would potentially be required.

In summary, there is a lot of planning and work required before an arsenic monitoring programme could be implemented on the BOPG.

3.5 PDP's Position on the Benefits of Undertaking Arsenic Dust Monitoring

PDP concludes that it is possible, but not easy to implement an arsenic dust monitoring programme. PDP considers that before the Fast Track Panel decide on whether an arsenic dust monitoring programme might be required, the costs of such a programme (high) be considered alongside the potential risks of the impact from the discharge of dust (low).

If the Fast Track Panel decides that an arsenic dust monitoring programme is required, PDP recommend that an initial screening monitoring programme be undertaken that occurs for three months over summer when the arsenic containing soils are being worked.

If the results of the screening monitoring clearly indicate that concentrations of arsenic will be well below the health assessment criteria then the arsenic monitoring programmed can be ceased. If in the unlikely circumstances concentrations of arsenic are measured which indicate that the annual guideline might be exceeded, then Santana and PDP will work with ORC to discuss if and how the screening programme could be extended.

4.0 Conclusion

This memorandum has responded to the two outstanding issues from the review of the air quality assessment and air quality management plan that SLR undertook for the ORC.

PDP has developed an improved method for BOGP staff to assess and report if visible dust crosses the site boundary. PDP have recommended this new dust monitoring and reporting material be incorporated into an updated Air Quality Management plan for the site.

PDP has explored the pros and cons of undertaking arsenic dust monitoring on the BOGP site. While PDP does not believe the arsenic risk profile of the dust generating activity justifies monitoring, if the Fast Track Decision panel see that a monitoring programme would be beneficial, we have provided a compromise path forward which involves a screening monitoring programme which would be undertaken for a period of three months over one summer period.

5.0 Closing

PDP trust the information provided in this memorandum satisfactorily addresses the two outstanding issues from the SLR review undertook for ORC on the Air Quality Assessment and Air Quality Management. We appreciate the opportunity to revisit these issues and would be happy to engage with SLR or ORC should they have any follow up questions.

Disclaimer

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