



In association with



Test Report: Dust Fallout Monitoring – November 2024

Prepared for

Saldanha Bay Municipality

AQ344

Test dates: 11th October – 11th November 2024

EXECUTIVE SUMMARY

Dust fallout sampling was conducted by Argos Scientific Africa (Pty) Ltd. on behalf of Skyside South Africa (Pty) Ltd. since September 2024 at seven (7) sites in the Saldanha Bay Municipal area. Sampling commenced in February 2015 and samplers are exchanged and collected monthly.

There was valid data for seven (7) of the seven (7) samples collected for the Metal Results, resulting in 100% data capture for the period under review. This report covers the period 11 October to 11 November 2024.

There was one (1) exceedance of the South African National Dust Control Regulations residential limit of 600mg/m²/day, at SBM-01 (Airport) during the period under review.

There were no exceedances of the South African National Dust Control Regulations non-residential limit of 1200mg/m²/day during the month for sites classed as non-residential.

Results for lead are evaluated against US EPA Federal Register (40 CFR Part 745: Lead; identification of dangerous levels of lead; Final Rule). This regulation establishes:

“Hazard standards for residential dust and soil lead. As stated in Unit II.F.3. Today’s rule establishes two hazard standards for bare residential soil; 400ppm for playgrounds and an average of 1200ppm for the rest of the yard.”

This represents a cautionary approach in estimating worst-case scenarios for exposure to the general public. Lead levels for the “rest of the yard” (1200ppm) were not exceeded during the review period while the 400ppm limit was exceeded at SBM-02 and SBM-06. Care must be taken in evaluating “concentrations” figures when dust fallout mass is low. A table of “net lead (Pb) mass in mg”, Table 4.2, has been added for information purposes.

Net lead masses were low and ranged between 1µg and 19µg during the review period. These are possibly a better measure than concentration when assessing “heavy metal” levels in dust fallout.

Meteorological conditions at the Saldanha site were not available at the time of reporting.

REPORT DETAILS


REFERENCE	AQ0344/202411
REPORT TITLE	Dust Fallout Monitoring, November 2024
DATE SUBMITTED	28 November 2024
CLIENT	René Toesie Saldanha Bay Municipality Pick and Pay Centre VREDENBURG E-mail: rene.toesie@sbm.gov.za
PREPARED BY:	Dean Ravenscroft Argos Scientific (Pty) Ltd. Paarden Eiland Cape Town dravenscroft@argos-sci.c.za
SIGNED	DR
APPROVER	G Ravenscroft Signed: 
STATUS	Final
NOTICE	

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ABBREVIATIONS

BDL	Below Detection Limit
DEAT	Department of Environment Affairs and Tourism
EPA	See US EPA
ℓ/min	Litres per minute
m.s ⁻¹	Metres per second
m ³	Cubic metres
Max	Maximum
mg/m ³	milligrams per cubic metre
Min	Minimum
PM ₁₀	Particulate matter of aerodynamic diameter less than 10mm
ppm	Parts per million
SABS	South African Bureau of Standards
SW	South West
US EPA	United States Environmental Protection Agency
VOCs	Volatile Organic Compounds
WHO	World Health Organisation

1 INTRODUCTION

Dust fallout sampling was conducted by Argos Scientific Africa (Pty) Ltd. on behalf of Skyside South Africa (Pty) Ltd. since September 2024 at seven (7) sites, including the monitoring and heavy metals (iron, lead, zinc, manganese and copper), in the Saldanha Bay Municipal Area.

Sampling initially commenced in February 2015 and samplers are exchanged and collected monthly.

A dust fallout and metals contamination impact assessment will be performed using this data.

1.1 Scope of Work

Argos Scientific's understanding of the scope of work is as follows:

- To measure dust fallout rates at seven (7) sampling points.
- Monthly collection of samples for duration of the project.
- Monthly sample analysis of seven (7) gravimetric samples per month.
- Elemental sample analysis of samples for iron, lead, zinc, manganese and copper.
- Monthly results to be sent to the client in electronic format.
- Data interpretation and reporting to be submitted electronically.

2 METHODOLOGY

2.1 Sample Location

Dust fallout sampling was conducted the seven (7) sites detailed in Table 2.1 below.

Table 2.1 Dust Fallout Monitoring Sites

Saldanha Bay Dust Fallout Monitoring Network Monitoring Site Locations		
<i>Vredenburg Electricity Dept.: SBM-06</i>	32° 54' 27.2" S	17° 59' 13.7" E
<i>Vredenburg Reservoir: SBM-05</i>	32° 54' 56.1" S	17° 59' 12.9" E
<i>Juffroushoogte: SBM-07</i>	32° 56' 13.8" S	18° 04' 33.6" E
<i>Airport: SBM-01</i>	32° 57' 34.5" S	17° 58' 12.5" E
<i>Saldanha AQM Freeport Station: SBM-02</i>	32°58'56.16"S,	17°59'21.57"E
<i>Blue Water Bay: SBM-04</i>	32° 59' 43.8" S	17° 58' 24.7" E
<i>Curro School: SBM-03</i>	33° 02' 16.2" S	18° 02' 59.9" E

Sites selected had to be:

- Along the prevailing wind vector for the area.
- Distributed evenly within the Saldanha Bay Municipality Area and near areas of possible contamination.

Figure 2.1.: Location of Dust Fallout samplers for Saldanha Bay Municipality



2.2 Dust Fallout

Dust fallout samplers were initially deployed in November 2015 and samples are collected and analysed monthly at a SANS 17025 accredited facility for insoluble matter content using a gravimetric methodology, in accordance with ASTM D1739: 1970, or demonstrable equivalent, a requirement in terms of the SA National Standards (SANS 1929:2005 - Edition 1.1) and Dust Fallout Regulations.

The insoluble matter content is then analysed for heavy metals using ICP (OES) by a SANAS Accredited Laboratory for Iron (Fe), Lead (Pb), Manganese (Mn), Copper (Cu) and Zinc (Zn).

3 GUIDELINES AND AIR QUALITY STANDARDS

3.1 Dust Fallout

In terms of the *Government Gazette* Volume 476, No. 27318, the South African Air Quality Act 39 of 2004 was promulgated in 2005. The South African National Dust Control Regulations describes the proposed guidelines for dust fallout, an extract of which is discussed briefly below.

A standard for the acceptable dustfall rate is set out in Table 3.1. The target, action and alert thresholds are shown in Table 3.2.

Table 3.1: Evaluation criteria for Dust Fallout

Restriction Areas	Dust Fall rate (D) mg/m ² /day. (30-day average)	Comment
Residential	D < 600	Permissible for residential and light commercial
Non-Residential	600 < D < 1200	Permissible for heavy commercial and industrial

For heavy commercial and industrial regions, the new guidelines state that monthly average dust fallout concentrations below 1200mg/m²/day “are permissible”. For residential regions, monthly average dust fallout concentrations not exceeding 600mg/m²/day “are permissible”.

Table 3.2: Acceptable Dust Fall Rates

Restriction Areas	Dust fallout rate (D) mg/m ² /day (30-day average)	Averaging period	Permitted frequency of exceeding dust fall rate
residential	D<600	30 days	2 within a year, not sequential months
Non-residential	600<D<1200	30 days	2 within a year, not sequential months

The target annual average dust fallout concentration is 300mg/m²/day. This is an ultimate goal set to achieve “ongoing improvement”, even in areas where compliance with all other guidelines can be demonstrated. The monthly average “action level” for residential regions is 600mg/m²/day and for industrial regions 1200mg/m²/day. Exceptions are granted where elevated concentrations arise on a regional scale from adverse meteorological conditions. Background dust monitoring sites can be used to identify and monitor impacts of such exceptions. Access to historical and

current meteorological information, particularly wind conditions, can be used to distinguish between “adverse” and “normal” meteorological conditions.

4 RESULTS

4.1 Dust fallout and heavy metal results:

Table 4.1 Dust fallout and Heavy Metal Results for review period. Exceedance of Dust Fallout Industrial Standards in **Red**

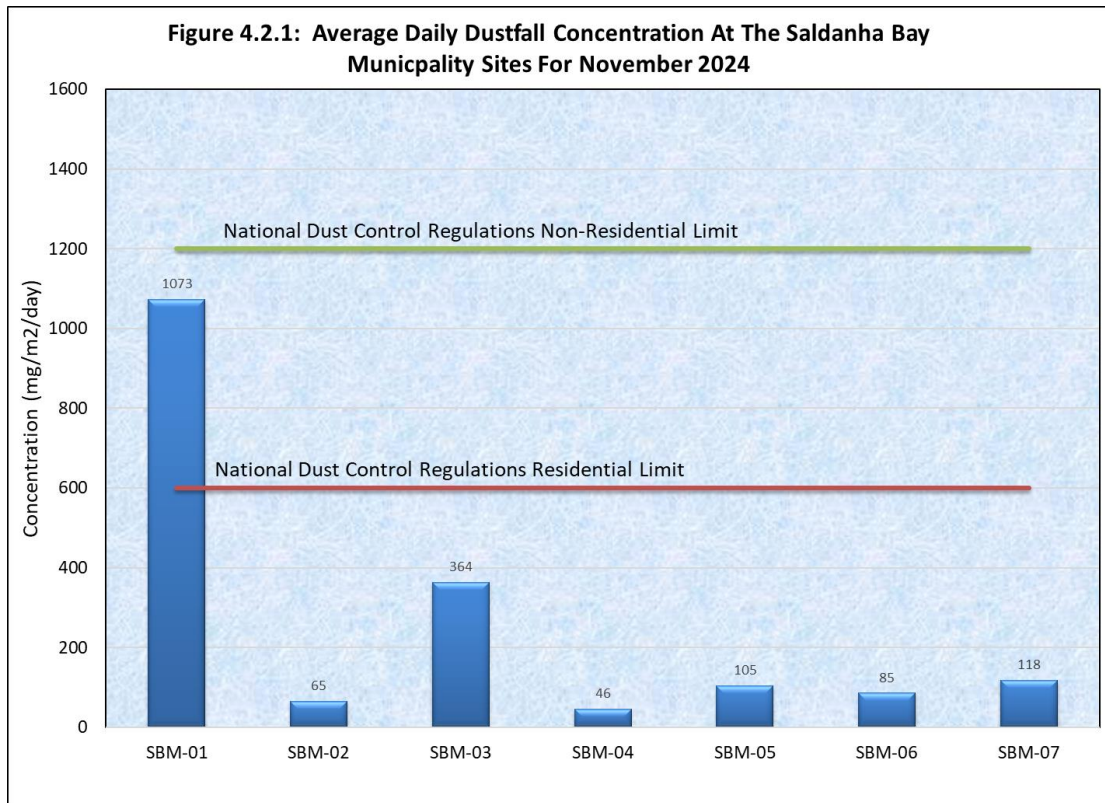
Sampling Site	Sampling Start Date	Sampling End Date	Net Mass (g)	No. of Days	Dust Fall rate (mg/m ² /day)	Lead (ppm)	Copper (ppm)	Zinc (ppm)	Iron (ppm)	Manganese (ppm)
SBM-01	11-Oct-24	11-Nov-24	0.755	31	1073	9	87	265	3046	199
SBM-02	11-Oct-24	11-Nov-24	0.046	31	65	416	525	3501	203501	8096
SBM-03	11-Oct-24	11-Nov-24	0.256	31	364	20	148	297	10150	285
SBM-04	11-Oct-24	11-Nov-24	0.032	31	46	31	371	958	58702	1637
SBM-05	11-Oct-24	11-Nov-24	0.074	31	105	176	271	1765	27149	1765
SBM-06	11-Oct-24	11-Nov-24	0.060	31	85	250	216	2163	46589	2496
SBM-07	11-Oct-24	11-Nov-24	0.083	31	118	36	97	374	27744	11098

Table 4.2 Lead content (net mass, mg) in dust fallout, past 18 months: Mar/Apr 2023 – Oct/Nov 2024

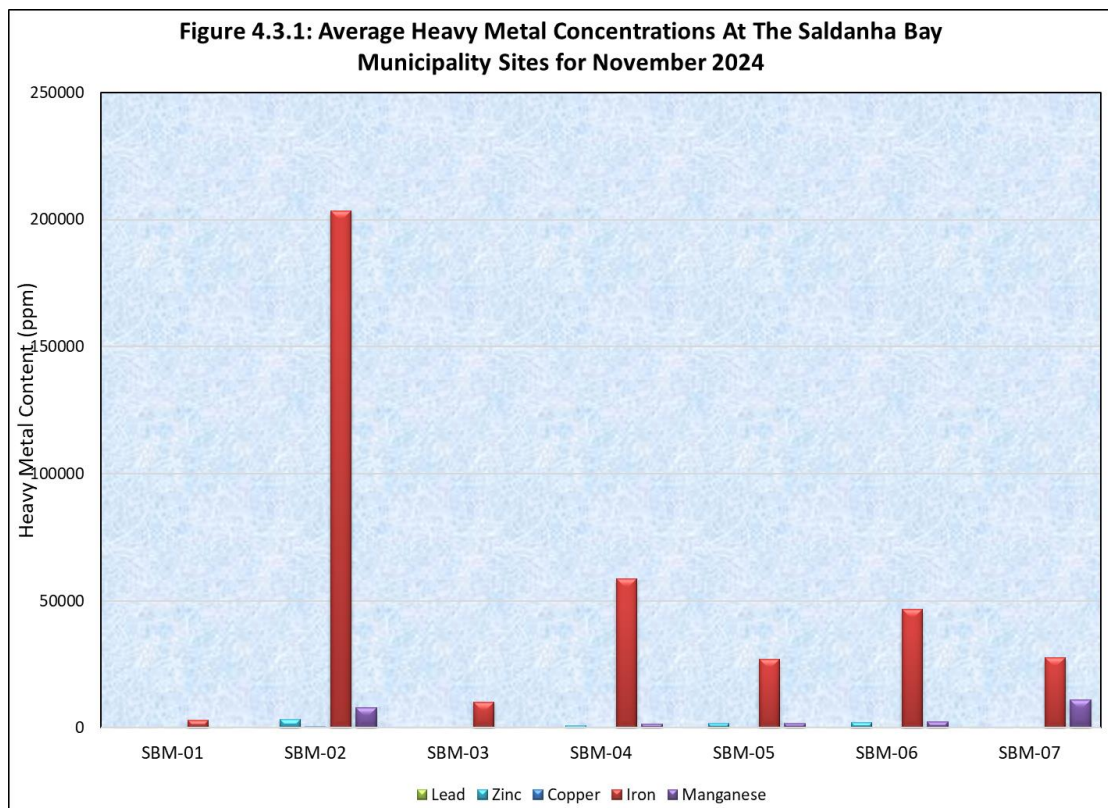
Site/Period	Mar - Apr 23	Apr - May 23	May - Jun 23	Jun - Jul 23	Jul - Aug 23	Aug - Sep 23	Sep - Oct 23	Oct - Nov 23	Nov - Dec 23	Dec - Jan 24	Jan - Feb 24	Feb - Mar 24	Mar - Apr 24	Apr - May 24	May - Jun 23	Jun - Sep 24	Sep - Oct 24	Oct - Nov 24
SBM-01	0.006	0.005	0.004	0.002	0.008	0.011	0.007	0.012	0.009	0.001	0.005	0.004	0.006	0.002	0.004	0.016	0.006	0.007
SBM-02	0.010	0.002	0.003	0.001	0.001	0.003	0.003	0.006	0.017	0.005	0.004	0.005	N/A	N/A	0.027	0.082	0.025	0.019
SBM-03	0.006	0.002	0.002	0.011	0.002	0.003	0.003	0.004	0.007	0.004	0.017	0.004	0.004	0.002	0.004	0.009	0.004	0.005
SBM-04	N/A	N/A	N/A	N/A	0.005	0.015	0.003	0.003	0.009	0.003	0.003	0.003	0.003	0.003	0.008	0.009	0.016	0.001
SBM-05	N/A	N/A	N/A	0.010	0.004	0.003	0.013	0.014	0.016	0.021	0.017	0.007	0.013	0.002	0.005	0.011	0.005	0.013
SBM-06	0.014	0.005	0.012	0.004	0.006	0.005	0.014	0.018	0.006	0.030	0.027	0.015	0.026	0.004	0.008	0.015	0.011	0.015
SBM-07	0.025	0.002	0.006	0.001	0.005	0.006	0.003	0.006	0.005	0.003	0.005	0.005	0.003	0.002	0.002	0.005	0.002	0.003

N/A = Corroded / Broken or contaminated

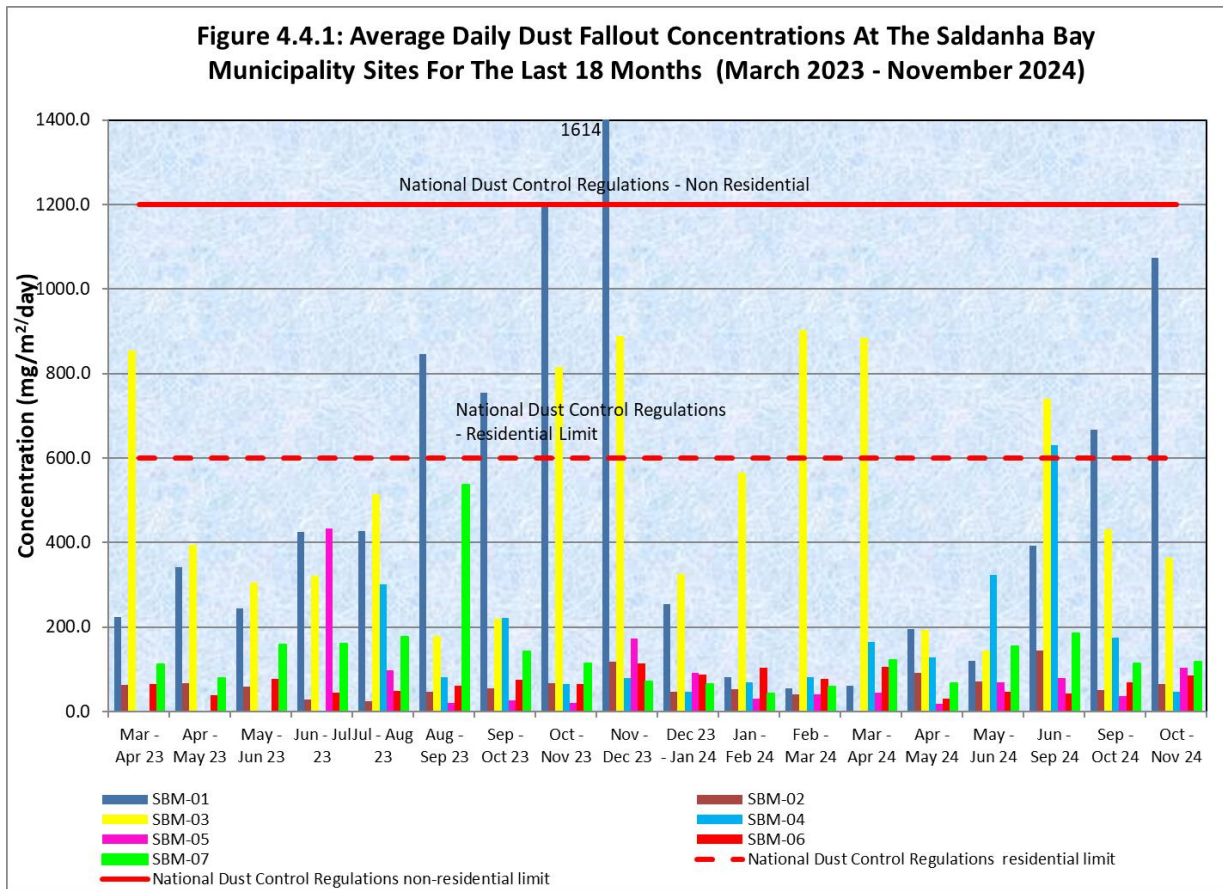
4.2 Dust fallout concentration:



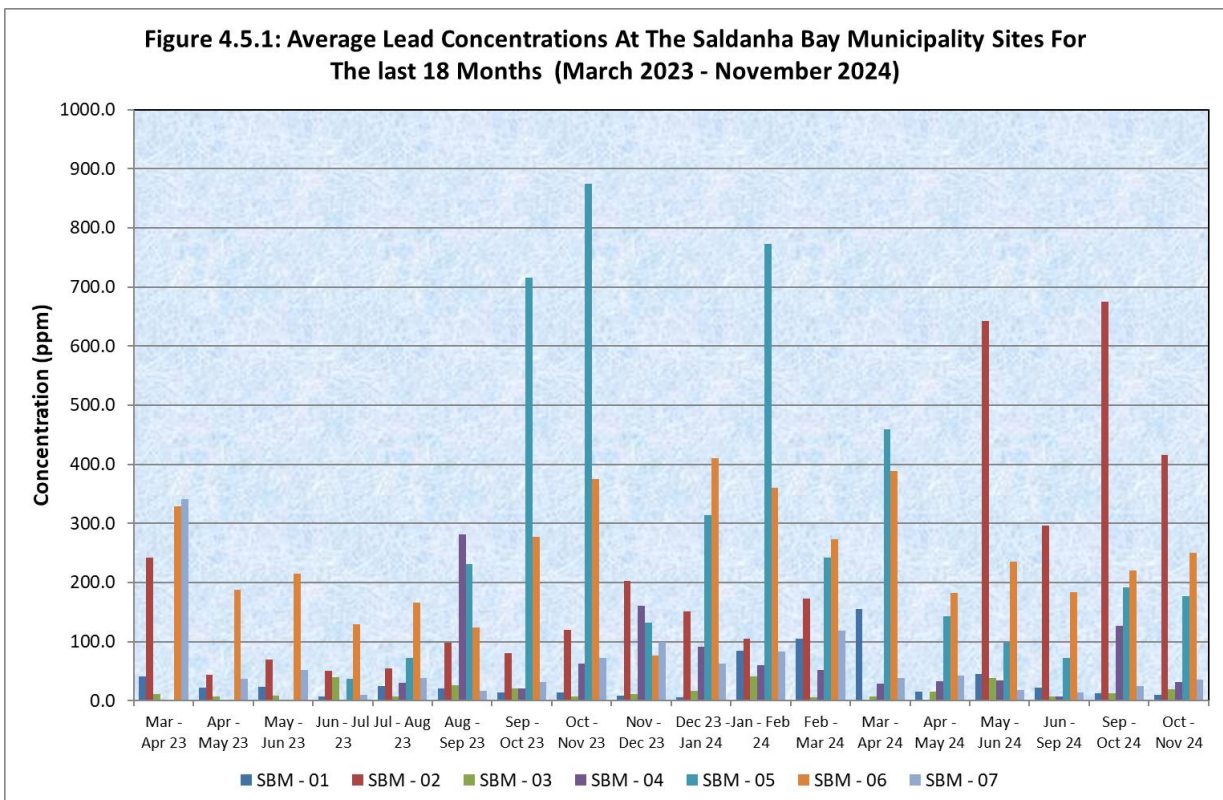
4.3 Heavy metal concentration



4.4: Average Historical Daily Dust fallout concentrations



4.5: Average Historical Lead fallout concentrations



4.6 Wind Roses for Saldanha Bay Municipality

No data available at the time of reporting.

5 CONSULTANT'S OBSERVATIONS AND CONCLUSIONS

- There was valid data for all seven (7) Metal results collected, resulting in 100% data capture for the period under review. This report covers the period 11 of October to 11 November 2024.
- There was one (1) exceedance of the South African National Dust Control Regulations residential limit of 600mg/m²/day, at SBM-01 (Airport) during the period under review.
- There were no exceedances of the South African National Dust Control Regulations non-residential limit of 1200mg/m²/day during the month for sites classed as non-residential.
- Results for lead are evaluated against US EPA Federal Register (40 CFR Part 745: Lead; identification of dangerous levels of lead; Final Rule). This regulation establishes: *“hazard standards for residential dust and soil lead. As stated in Unit II.F.3. Today’s rule establishes two hazard standards for bare residential soil; 400ppm for playgrounds and an average of 1200ppm for the rest of the yard.”*
- This represents a cautionary approach in estimating worst-case scenarios for exposure to the general public. Lead levels for the “rest of the yard” (1200ppm) were not exceeded during the review period while the 400ppm limit was exceeded at SBM-02 and SBM-06. Care must be taken in evaluating “concentrations” figures when **dust fallout mass is low**. A table of “net lead (Pb) mass in mg”, Table 4.2, has been added for information purposes.
- Net lead masses were low and ranged between 1µg and 19µg during the review period. These are possibly a better measure than concentration when assessing “heavy metal” levels in dust fallout.
- Meteorological conditions at the Saldanha site were not available at the time of reporting.

5.1 SANAS Accredited Certificates of Analysis for Dust Fallout & Metals

TEST REPORT

Client Details		Laboratory Details	
Client	Argos Scientific	Laboratory	SKYSIDE SA
Contact	Grant Ravenscroft	Contact	Quentin Hurt
Address	Section St Paarden Eiland Cape Town 8001	Address	Unit 8 Section Street Paarden Eiland Cape Town 8001
Project	SBM	Telephone	021 300 8705
Customer ref	AS1138	Report Number	CT111
Number of samples	7	Date Received	19 Nov 2024
		Date Started	19 Nov 2024
		Date of Report	26 Nov 2024

Disclaimers:

1. This test report may not be reproduced except in full.
2. SKYSIDE is accredited for compliance with ISO/IEC 17025:2017.
3. Skyside Cape Town has applied for an ISO 17025 audit in terms of the Skyside Group quality assurance system but this area of the facility and system has not been assessed.
4. Results marked "Not ISO 17025 Accredited" or otherwise marked with # in this report are not included in the ISO 17025 Schedule of Accreditation for SKYSIDE.
5. Opinions and interpretations expressed herein are outside the scope of SANAS accreditation.
6. The samples were supplied by the customer.
7. Results marked "Subcontracted Test" or otherwise marked with \$ in this report are not included in the SANAS Schedule of Accreditation for SKYSIDE.

Report authorised by: Quentin Hurt

Designation: Technical Signatory

Signature: 

Sampling data (provided by Argos)

Start date	11 October 2024
End date	11 November 2024
Exposure period	31 days

Sample recovery and weighing according to ASTM D1739 (Insoluble fraction only)

Sample identifier	Dust fall# (mg/m²/d)	Mass of sample (mg)	Laboratory UoM (mg/m²/d)
SBM1	1 073	755	59
SBM2	65	46	4
SBM3	364	256	20
SBM4	46	32	3
SBM5	105	74	6
SBM6	85	60	5
SBM7	118	83	7

Internal Method Summary

Pre-sampling filters: Filters (in an open Petridish) are pre-conditioned by drying at 130°C for at least one hour, followed by cooling down to ambient temperature for at least four hours in a temperature- and humidity-controlled environment. Three mass readings are taken, and the average deemed to be the pre-mass.

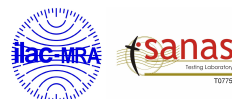
Sample recovery Water is added to the bucket to clean the sides and the bottom before being decanted through a 90 mm filter in a Buchner funnel attached to a 5L flask under partial vacuum. Once filtered the filter is placed in the Petridish for processing.

Post-sampling filters: Filters are pre-conditioned by drying at 105°C for at least one hour, followed by cooling down to ambient temperature for at least four hours in a temperature- and humidity-controlled environment. Three mass readings are taken, and the average deemed to be the post-mass.

TEST REPORT

Contact	Quentin Hurt	Project Number	AS1138
Client	Skyside (South Africa) Cape Town	Lab Reference	JBX24-022124
Email	qh@skyside.co.za	Report Number	LIM24/3152
Address		Date Received	22-Nov-2024
Order Number		Dates Started	22-Nov-2024
Samples	7	Date Reported	26-Nov-2024
Sample Matrix	Air		

The document is issued in accordance with SANAS's accreditation requirements. Accredited for compliance with ISO/IEC 17025. SANAS accredited laboratory T0775. Results marked "Subcontracted Test" in this report are not included in the SANAS Scope of Accreditation for this laboratory.



Sample No.	Sample ID	Sample Comment	JBX24-022124-01	JBX24-022124-02	JBX24-022124-03	JBX24-022124-04
Analysis	Unit	LOR	Result	Result	Result	Result
Multi Element Determination of Metals by ICP OES (ME-AN-027) - LAB-QLT-MET-027						
Copper (Cu)	mg/filter	0.002	0.066	0.024	0.038	0.012
Iron (Fe)	mg/filter	0.005	2.3	9.3	2.6	1.9
Lead (Pb)	mg/filter	0.001	0.007	0.019	0.005	<0.001
Manganese (Mn)	mg/filter	0.001	0.15	0.37	0.073	0.053
Zinc (Zn)	mg/filter	0.001	0.20	0.16	0.076	0.031

Sample No.	Sample ID	Sample Comment	JBX24-022124-05	JBX24-022124-06	JBX24-022124-07
Analysis	Unit	LOR	Result	Result	Result
Multi Element Determination of Metals by ICP OES (ME-AN-027) - LAB-QLT-MET-027					
Copper (Cu)	mg/filter	0.002	0.020	0.013	0.008
Iron (Fe)	mg/filter	0.005	2.0	2.8	2.3
Lead (Pb)	mg/filter	0.001	0.013	0.015	0.003
Manganese (Mn)	mg/filter	0.001	0.13	0.15	0.92
Zinc (Zn)	mg/filter	0.001	0.13	0.13	0.031

Warwick Slater
 Senior Chemist/Technical Signatory

Method	Method Summary
Multi Element Determination of Metals by ICP OES (ME-AN-027)	Dissolved metals are determined on a filtered and acidified portion of aqueous sample by inductively coupled plasma optical emission spectrometry (ICP-OES). The method is based on US EPA 200.7 and Standard Methods for the Examination of Water and Wastewater Method 3120. Total metals are determined on a nitric acid digested portion of well-shaken aqueous sample by inductively coupled plasma optical emission spectrometry (ICP-OES). The method is based on US EPA 200.2 and 200.7. Recoverable metals are determined on an acid digested portion of sample by inductively coupled plasma optical emission spectrometry (ICP-OES). The method is based on US EPA 200.2, 3050B and 200.7. Silicon is not recovered. Metals are determined on acid digestions of filters by inductively coupled plasma optical emission spectrometry (ICP-OES). The method is based on NIOSH 7300 and 7301.

IS	Insufficient sample for analysis	NA	Not analysed
LNR	Sample listed but not received	-	Not applicable
LOR	Limit of reporting	UTD	Unable to determine
*	Not SANAS accredited. This result is not included in the SANAS scope of accreditation for this laboratory	NR	Not Requested

Samples analysed as received. Solid samples expressed on a dry weight basis.

Unless otherwise indicated, samples were received in containers fit for purpose at ambient temperature.

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