



## **Test Report: Dust Fallout Monitoring – December 2023**

Prepared for

**Saldanha Bay Municipality**

**AQ344**

**Test dates: 13<sup>th</sup> November – 14<sup>th</sup> December 2023**

---

## EXECUTIVE SUMMARY

Dust fallout sampling was conducted at seven (7) sites in the Saldanha Bay Municipal area, commencing Feb 2015 and samplers are exchanged and collected on a monthly basis.

There was valid data for seven (7) of the seven (7) samples collected, resulting in 100% data capture for the period under review. This report covers the period the 13<sup>th</sup> of November to the 14<sup>th</sup> of December 2023.

There was one (1) exceedances of the South African National Dust Control Regulations residential limit of 600mg/m<sup>2</sup>/day at the Curro School site (SBM - 03) during the period under review.

There was one (1) exceedances of the South African National Dust Control Regulations non-residential limit of 1200mg/m<sup>2</sup>/day at Airport Site (SBM - 01) during the month for sites classed as non-residential.

Metals results are delayed due to December laboratory closure. Results for lead are normally 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) and the “playground areas” (400ppm) were not exceeded during the review period. 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 will be update later as Net lead masses were not available at the time of reporting.

Meteorological conditions at the Saldanha site were not available due to vandalism.

## REPORT DETAILS

REFERENCE

| AQ0344/202311\_202312

REPORT TITLE	Dust Fallout Monitoring, December 2023
DATE SUBMITTED	24 January 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	

## TABLE OF CONTENTS

Description

Page

1	INTRODUCTION	6
1.1	Scope of Work	6
2	METHODOLOGY	7
2.1	Sample Location	7
2.2	Dust fallout	9
3	GUIDELINES AND AIR QUALITY STANDARDS	10
3.1	Dust fallout	10
4	RESULTS	12
4.1	Dust fallout and heavy metal results	12
4.2	Dust fallout concentration	14
4.3	Heavy metal concentration	14
4.6	Wind Roses for Saldanha Bay Municipality	16
5	CONSULTANT'S OBSERVATIONS and CONCLUSIONS	17
5.1	Dust fallout	
5.2	Heavy metal analysis	

## ABBREVIATIONS

BDL	Below Detection Limit
DEAT	Department of Environment Affairs and Tourism
EPA	See US EPA
ℓ/min	Litres per minute
m.s <sup>-1</sup>	Metres per second
m <sup>3</sup>	Cubic metres
Max	Maximum
mg/m <sup>3</sup>	milligrams per cubic metre
Min	Minimum
PM <sub>10</sub>	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

ARGOS SCIENTIFIC was contracted by Saldanha Bay Municipality to perform dust fallout monitoring and heavy metals (Iron, lead, zinc, manganese and copper) measurements at various sites in the Saldanha Bay Municipal Area

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 for 12 months.
- Monthly collection of samples for duration of 12 months.
- Monthly sample analysis as follows: Seven (7) gravimetric samples per month.
- Elemental sample analysis as follows: Iron, lead, zinc, manganese and copper.
- Monthly results to client in electronic format.
- Data interpretation and reporting will be submitted electronically.

## 2 METHODOLOGY

### 2.1 Sample Location

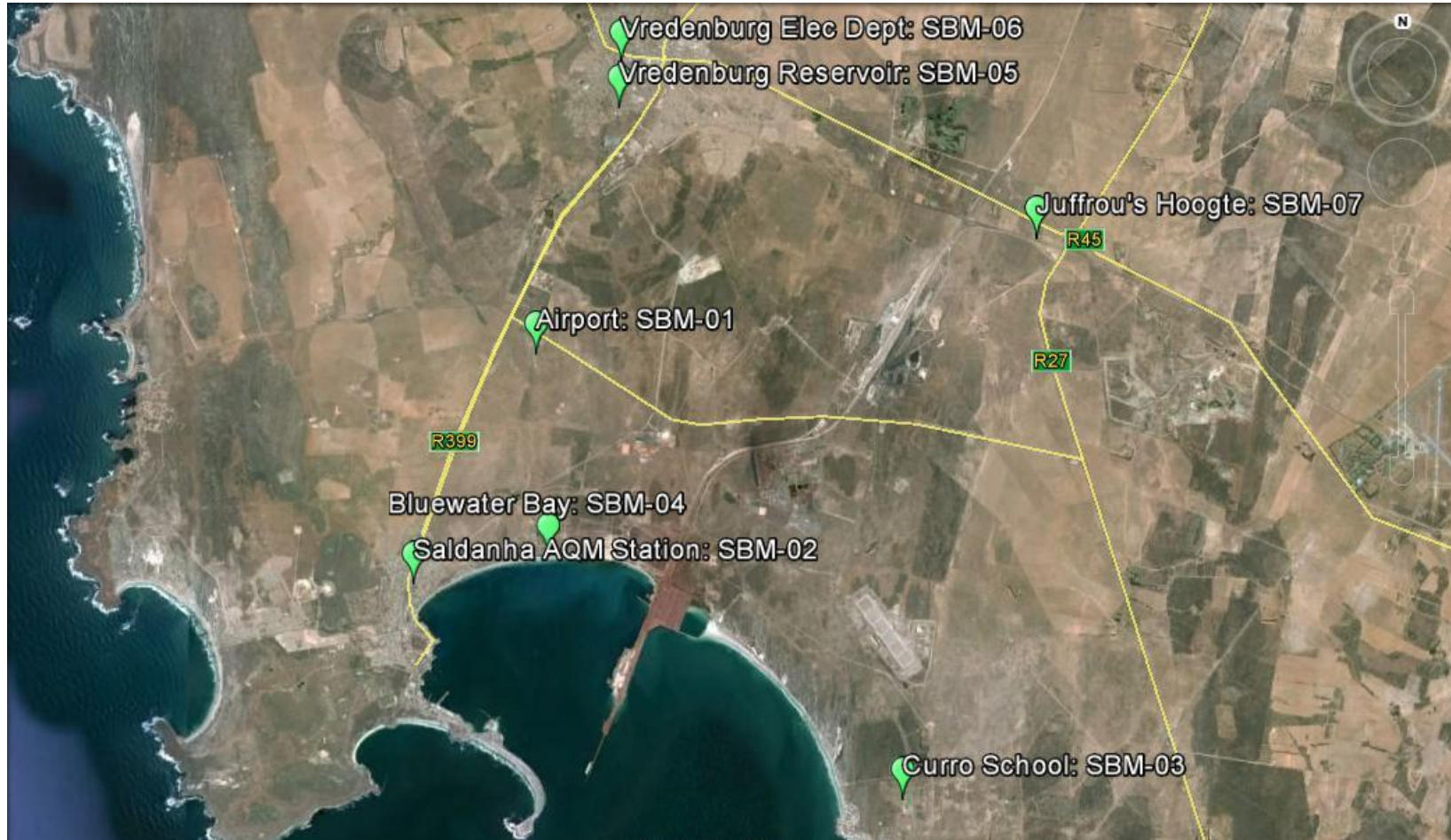
Dust fallout sampling was conducted the following seven sites:

<b>Vredenburg Electricity Dept.: SBM-06</b>	<b>32° 54' 27.2" S</b>	<b>17° 59' 13.7" E</b>
<b>Vredenburg Reservoir: SBM-05</b>	<b>32° 54' 56.1" S</b>	<b>17° 59' 12.9" E</b>
<b>Juffroushoogte: SBM-07</b>	<b>32° 56' 13.8" S</b>	<b>18° 04' 33.6" E</b>
<b>Airport: SBM-01</b>	<b>32° 57' 34.5" S</b>	<b>17° 58' 12.5" E</b>
<b>Saldanha AQM Station: SBM-02</b>	<b>33° 00' 41.0" S</b>	<b>17° 56' 18.5" E</b>
<b>Blue Water Bay: SBM-04</b>	<b>32° 59' 43.8" S</b>	<b>17° 58' 24.7" E</b>
<b>Curro School: SBM-03</b>	<b>33° 02' 16.2" S</b>	<b>18° 02' 59.9" E</b>

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 2.1.1: Location of dust fallout samplers for Saldanha Bay Municipality





## **2.2 Dust fallout**

Dust fallout samplers were deployed in November 2015 and samples are collected on a monthly basis. Distilled water was added to minimise sample loss, particularly during high wind speed episodes. Each series of samples were analysed at a SANS 17025 accredited facility.

Total insoluble dust fallout was determined in accordance with ASTM D 1739: 1970 or demonstrable equivalent, a requirement in terms of the SA National Standards (SANS 1929:2005 - Edition 1.1).

### 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 <sup>2</sup> /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/m<sup>2</sup>/day “are permissible”. For residential regions, monthly average dust fallout concentrations not exceeding 600mg/m<sup>2</sup>/day “are permissible”.

**Table 3.2: Acceptable Dust Fall Rates**

Restriction Areas	Dust fallout rate (D) mg/m <sup>2</sup> /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/m<sup>2</sup>/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/m<sup>2</sup>/day and for industrial regions 1200mg/m<sup>2</sup>/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 <sup>2</sup> /day)	Lead (ppm)	Copper (ppm)	Zinc (ppm)	Iron (ppm)	Manganese (ppm)
SBM-01	13-Nov-23	14-Dec-23	1.136	31	1614	-*	-*	-*	-*	-*
SBM-02	13-Nov-23	14-Dec-23	0.084	31	119	-*	-*	-*	-*	-*
SBM-03	13-Nov-23	14-Dec-23	0.625	31	888	-*	-*	-*	-*	-*
SBM-04	13-Nov-23	14-Dec-23	0.056	31	80	-*	-*	-*	-*	-*
SBM-05	13-Nov-23	14-Dec-23	0.121	31	172	-*	-*	-*	-*	-*
SBM-06	13-Nov-23	14-Dec-23	0.079	31	113	-*	-*	-*	-*	-*
SBM-07	13-Nov-23	14-Dec-23	0.050	31	71	-*	-*	-*	-*	-*

-\* | Metals not available at time of reporting.

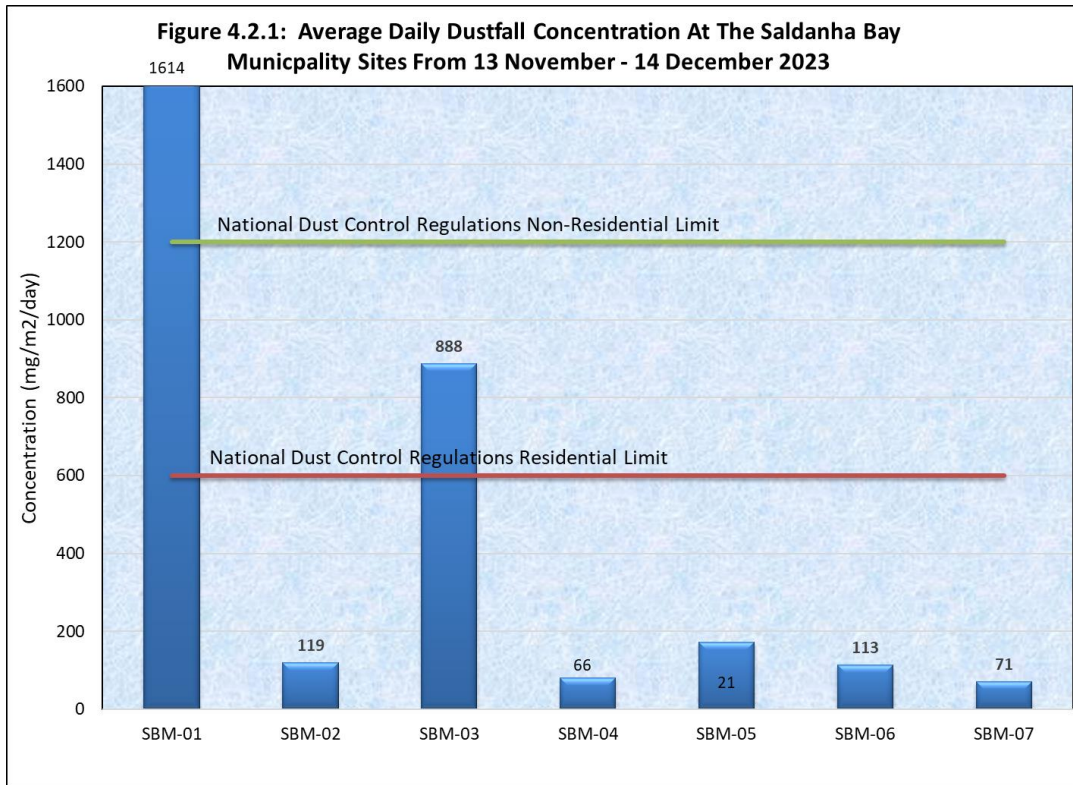
**Table 4.2 Lead content (net mass, mg) in dust fallout, past 18 months: May 2022 – December 2023**

Site/Period	Jun - Jul 22	Jul - Aug 22	Aug - Sep 22	Sep - Oct 22	Oct - Nov 22	Nov - Dec 22	Dec - Jan 23	Jan - Feb 23	Feb - Mar 23	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
SBM-01	0.002	0.005	0.006	0.004	0.002	0.002	0.002	0.002	0.004	0.006	0.005	0.004	0.002	0.008	0.011	0.007	0.012	-*
SBM-02	0.003	0.001	0.004	0.003	0.003	0.003	0.003	N/A	0.007	0.010	0.002	0.003	0.001	0.001	0.003	0.003	0.006	-*
SBM-03	0.003	0.002	0.004	0.005	0.002	0.004	0.009	0.002	0.005	0.006	0.002	0.002	0.011	0.002	0.003	0.003	0.004	-*
SBM-04	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.005	0.015	0.003	0.003	-*
SBM-05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.010	0.004	0.003	0.013	0.014	-*
SBM-06	0.004	0.003	0.006	0.009	0.009	0.013	0.016	0.017	0.026	0.014	0.005	0.012	0.004	0.006	0.005	0.014	0.018	-*
SBM-07	0.002	0.005	0.002	0.006	0.004	0.006	0.004	0.005	0.010	0.025	0.002	0.006	0.001	0.005	0.006	0.003	0.006	-*

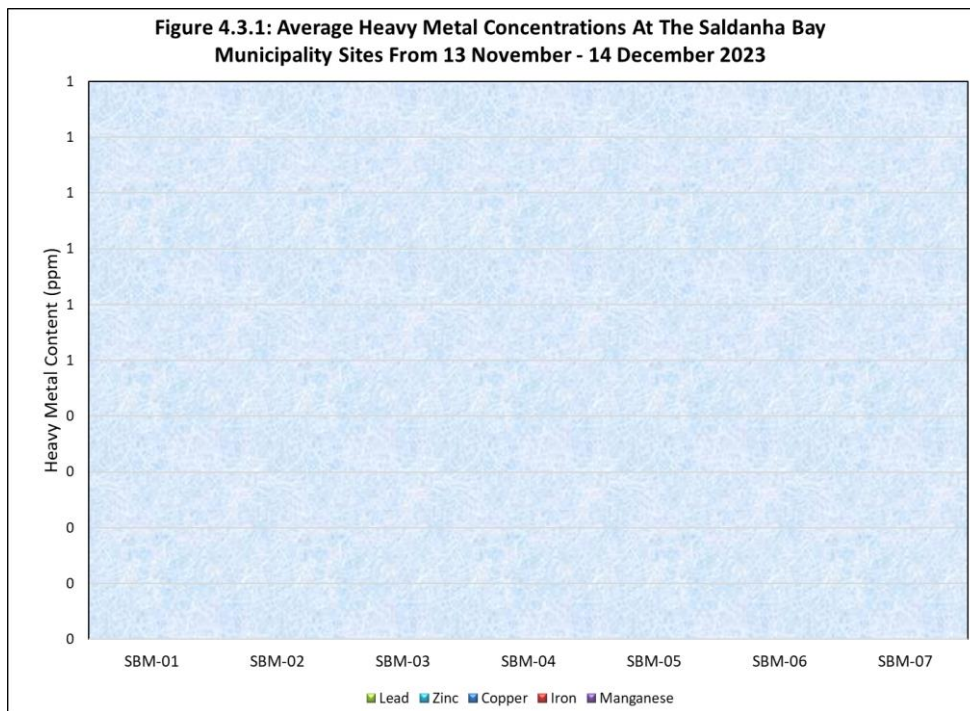
*-\* | Lead not available at time of reporting.*

*N/A = Corroded / Broken or contaminated*

## 4.2 Dust fallout concentration

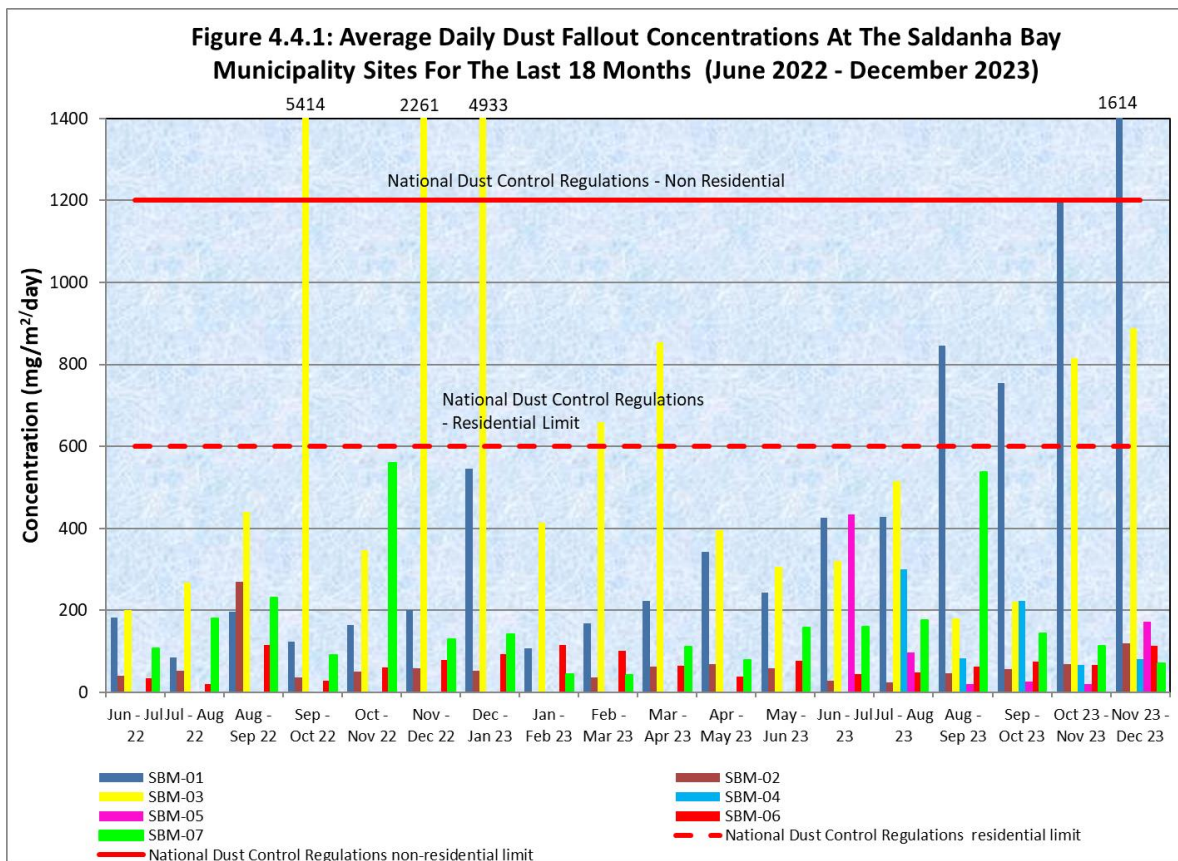


## 4.3 Heavy metal concentration (Not available at time of reporting)

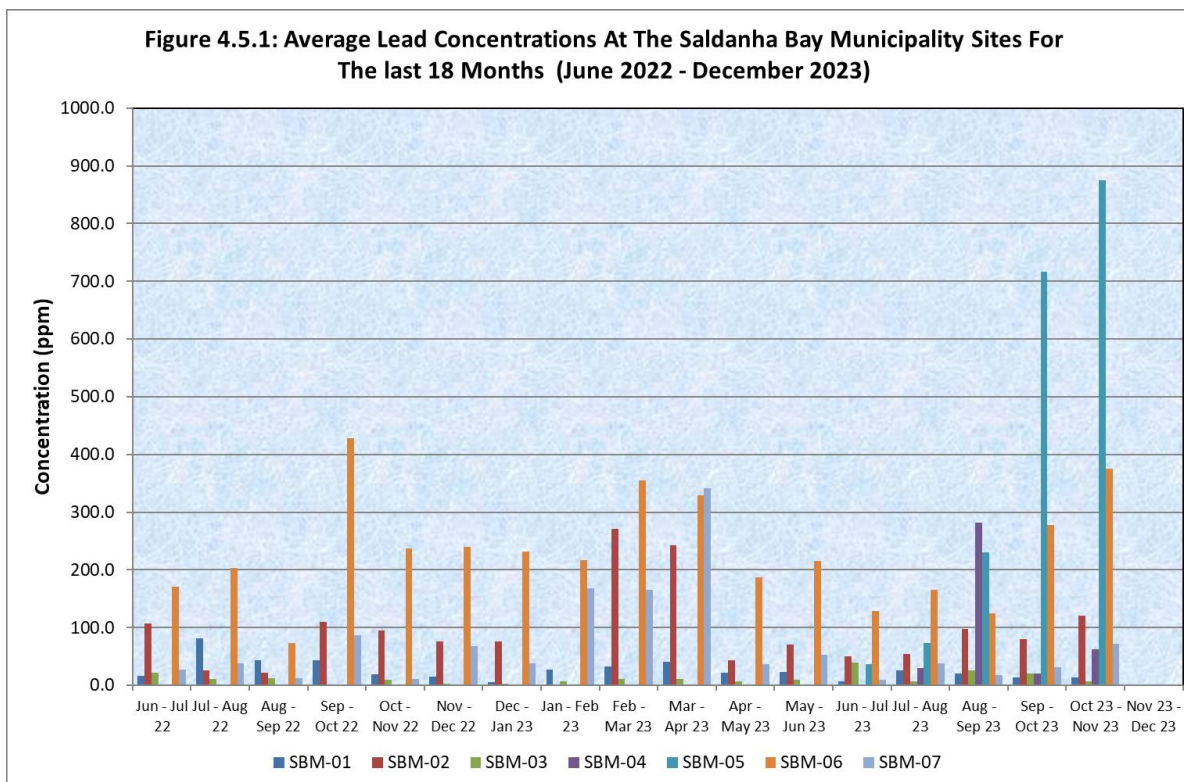


*\* Metals not available during time of reporting.*

#### 4.4: Average Historical Daily Dust fallout concentrations



#### 4.5: Average Historical Lead fallout concentrations (December Results Pending)



**\* Lead not available during time of reporting.**

#### **4.6 Wind Roses for Saldanha Bay Municipality**

No data available due to vandalism.




## 5 CONSULTANT'S OBSERVATIONS AND CONCLUSIONS

- There was valid data for seven (7) of the seven (7) samples collected, resulting in 100% data capture for the period under review. This report covers the period 13<sup>th</sup> of November to the 14<sup>th</sup> of December 2023.
- There was one (1) exceedances of the South African National Dust Control Regulations residential limit of 600mg/m<sup>2</sup>/day at the Curro School site (SBM - 03) during the period under review.
- There was one (1) exceedances of the South African National Dust Control Regulations non-residential limit of 1200mg/m<sup>2</sup>/day at Airport Site (SBM - 01) during the month for sites classed as non-residential.
- Metals results are delayed due to December laboratory closure and will be available soon. Results for lead are normally 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) and the “playground areas” (400ppm) were not exceeded during the review period. 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 not available at the time of reporting and will be updated later.
- Meteorological conditions at the Saldanha site were not available due to vandalism.

### 5.1 SANAS Accredited Certificates of Analysis for Dust Fallout

Provision Dust Fallout Results below

Provisional results: SBM Dust Fallout Nov- Dec 2023

 Quentin Hurt <qh@skyside.co.za>  
To Grant Ravenscroft  
You replied to this message on 2024/01/24 10:18 AM.

Project Code/Name																			
SBM CT031																			
Start	Start	End	End	No.	Site	Site	Mass Before			Average	Mass after			Average	Filter	Nett mass	Period	Dust Fallout	Uncertainty of measurement
Date	Time	Date	Time	Days	Description	No.	before (g)				after (g)				(mg)	(days)	(mg/m <sup>2</sup> /d)	Laboratory only: (mg/m <sup>2</sup> /d)	
2023-11-13	10:30	2023-12-14	12:00	31,00	SBM1	SBM1	0,6356	0,6352	0,6354	0,6354	1,7709	1,7713	1,7714	1,7712	S1	1136	31	1614	90
2023-11-13	10:50	2023-12-14	12:00	31,00	SBM2	SBM2	0,6358	0,6358	0,6358	0,6358	0,719	0,7197	0,7197	0,71947	S2	84	31	119	7
2023-11-13	11:10	2023-12-14	12:00	31,00	SBM3	SBM3	0,6534	0,6538	0,6541	0,6537667	1,2794	1,2785	1,279	1,27897	S3	625	31	888	48
2023-11-13	11:30	2023-12-14	12:00	31,00	SBM4	SBM4	0,6245	0,6244	0,6245	0,6244667	0,681	0,681	0,6806	0,68087	S4	56	31	90	4
2023-11-13	12:00	2023-12-14	12:00	31,00	SBM5	SBM5	0,6497	0,6498	0,6498	0,6497667	0,7705	0,7706	0,7703	0,77047	S5	121	31	172	10
2023-11-13	12:30	2023-12-14	12:00	31,00	SBM6	SBM6	0,6352	0,6355	0,6354	0,6353667	0,7148	0,715	0,7144	0,71473	S6	79	31	113	6
2023-11-13	13:00	2023-12-14	12:00	31,00	SBM7	SBM7	0,6277	0,6277	0,6277	0,6277	0,6777	0,6782	0,678	0,67797	S7	50	31	71	4
					BLANK					0,6375				0,9448		307	31	437	