AIMS

Report

Monthly Air Quality

Richards Bay January 2025

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Document Approval

Action	Designation	Name	Date
Prepared	Assistant Consultant	Alicia Garnica	2025-02-06
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Revision	Comments	Author	Date
0	Draft	Lance Coetzee	2025-02-20
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Note

This report has been finalised with the available information at the time of its compilation.

Table of Contents

Appendices

List of Tables

List of Figures

1. INTRODUCTION

This monthly air quality report provided by the Richards Bay Clean Air Association (RBCAA) offers a comprehensive overview of air quality monitoring data for the specific month under review. It aims to provide a detailed analysis of meteorology, sulphur dioxide (SO_2), total reduced sulphur (TRS), and particulate matter (PM) levels measured by the RBCAAs monitoring network. Each monthly report focuses on a single calendar month, highlighting any notable incidents or exceedances of the applicable ambient air quality standards during that period. By analysing the monthly data, trends and patterns in air quality can be identified, helping to assess potential environmental impacts and mitigate any adverse effects.

In addition to the monthly reports, RBCAA publishes annual air quality reports summarising the key findings and trends observed over a complete calendar year. These annual reports offer a broader perspective on the region's overall air quality performance and long-term patterns. They provide stakeholders with a comprehensive understanding of the air quality and serve as a valuable tool for decision-making, policy development, and environmental management. By consistently monitoring and reporting air quality data, the RBCAA aims to promote transparency, facilitate ongoing environmental assessments, and ensure the well-being of the local community and surrounding environment.

The RBCAA monitoring network comprises ten (10) stations (Figure 1-1 and Table 1-1).

Figure 1-1: RBCAA monitoring network.

Table 1-1: Station coordinates.

Station	Latitude	Longitude	Elevation (m)
Airport	-28.738138	32.093333	34
Arboretum	-28.752385	32.062738	30
Brackenham	-28.731301	32.039016	51
CBD	-28.744719	32.054805	32
eSikhaleni	-28.865244	31.911679	13
Felixton	-28.829229	31.893536	51
Felixton Met	-28.836487	31.892513	30
Harbour West	-28.787286	32.027065	6
Richardia	-28.762776	32.066072	20
Scorpio	-28.769692	32.034228	31

2. METEOROLOGY

2.1. Data Availability

The percentage of valid data received from the meteorological network for January 2025 is shown in Table 2-1.

Table 2-1: Meteorological data capture.

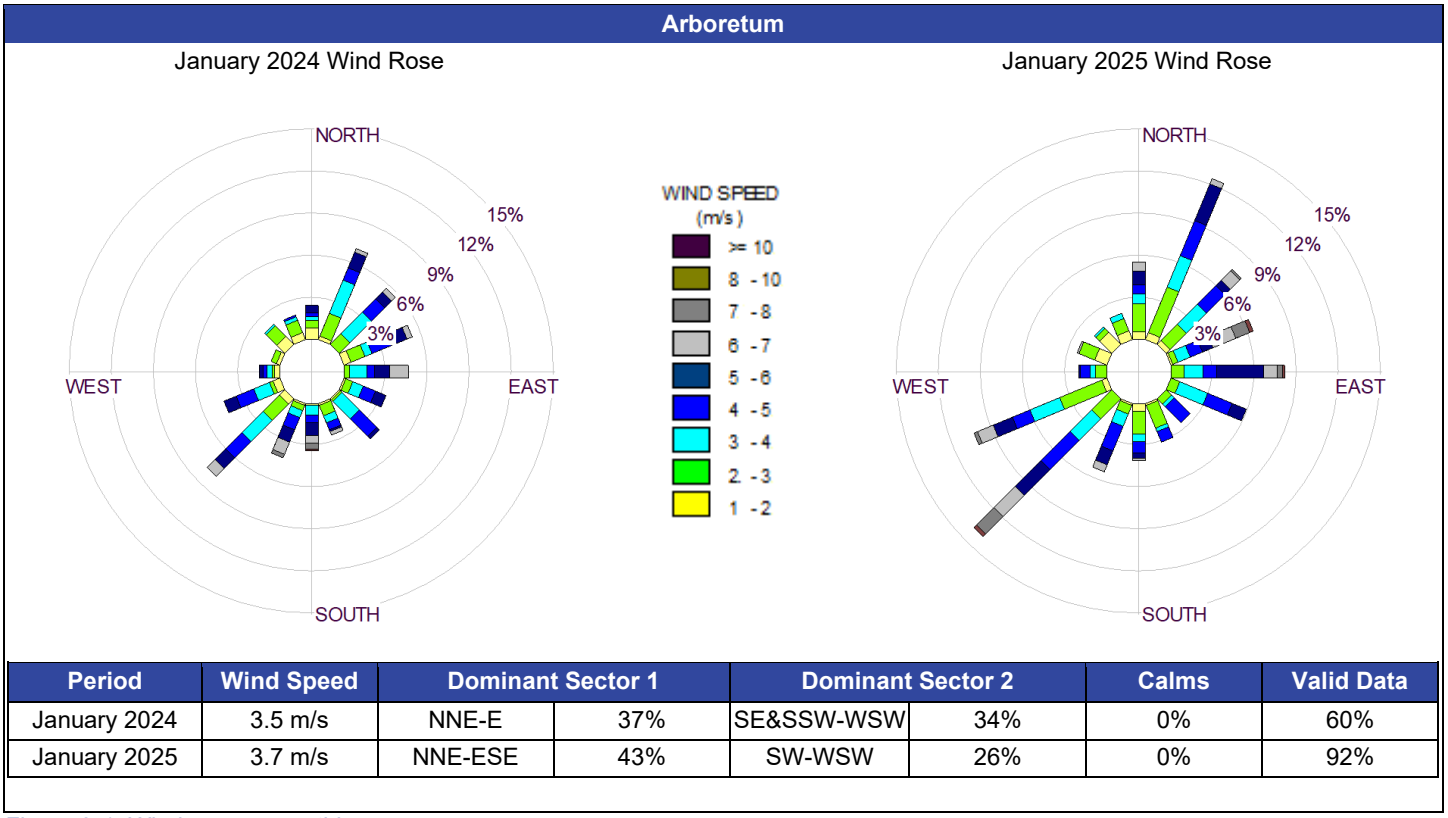
Station	Availability (%)	Wind (%)	Temperature (%)	Relative Humidity (%)	Pressure (%)	Solar Radiation (%)	Rain (%)
Airport	98	98	98	98	98	98	-
Arboretum	100	98	100	-	-	-	-
Brackenham	100	100	**40**	-	-	-	-
CBD	99	**92**	99	-	99	-	-
CBD Rain	99	-	-	-	-	-	99
eSikhaleni	99	99	99	-	99	-	-
Felixton Met	100	100	100	-	100	-	-
Harbour West	100	100	100	-	-	-	-

Notes:
1. *Red - Not acceptable for statistical purposes (<80%),*
2. *Orange – Does not meet SANAS data capture requirements (<90%),*
3. *Yellow – RBCAA reporting requirement (<=95%)*

Missing Data (Station and meteorology):
- *Airport – power outages (1 day with <80% data capture 5 January 2025).*
- *Brackenham ES2 – not commissioned yet (31 days with <80% data capture 1-31 January 2025).*
- *eSikhaleni – power outages (1 day with <80% data capture 31 January 2025).*
- *Richardia – power outages (1 day with <80% data capture 12 January 2025).*

2.2. Wind Roses

Monthly wind roses for January 2024 and 2025 for Arboretum are presented in Figure 2-1. They indicate that the wind blew predominantly along the NE and SW axis. NE wind is generally associated with fair weather, while SW wind is usually associated with the passage of coastal lows, cold fronts, and inclement weather.



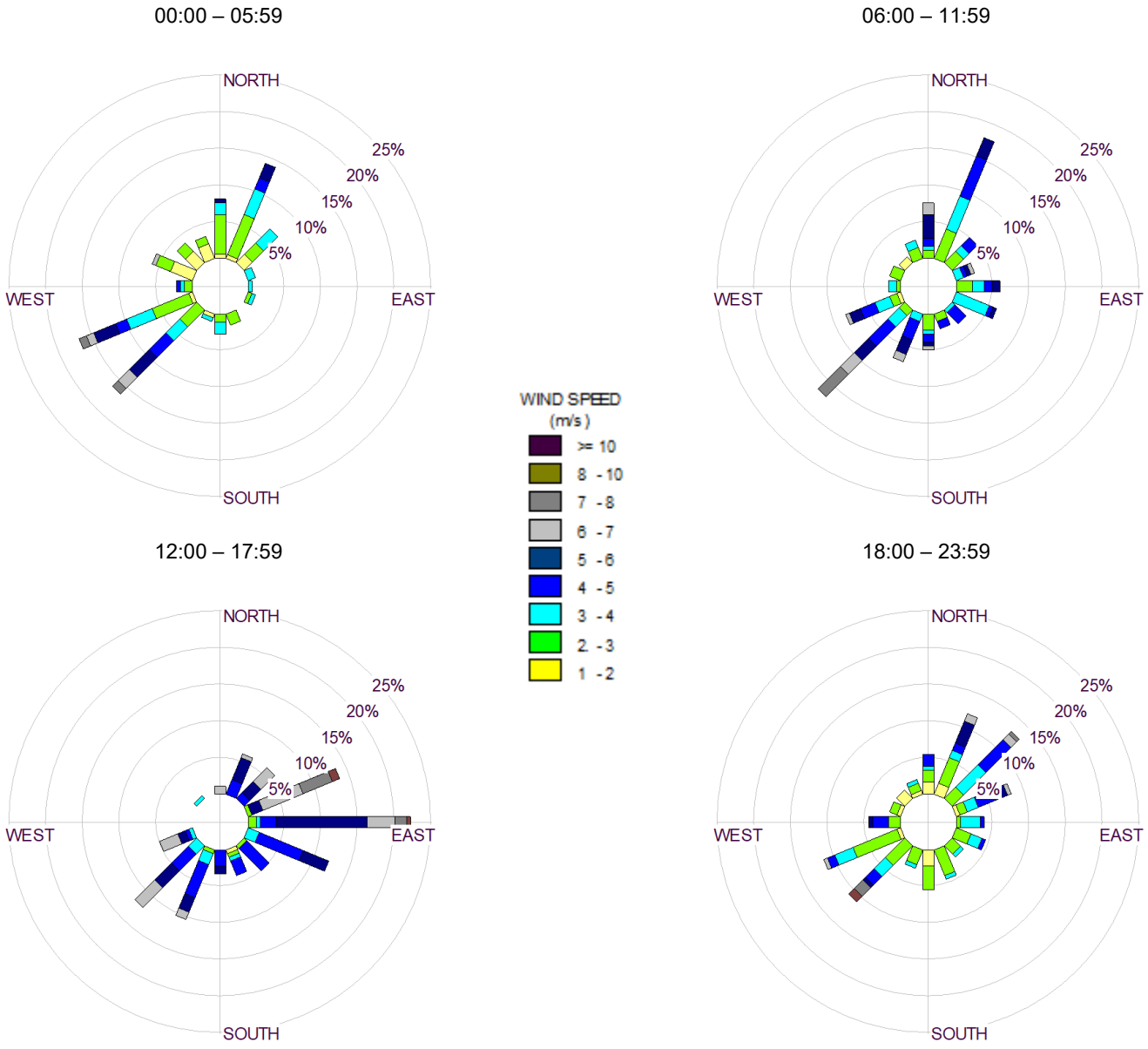
Period	Wind Speed	Dominant Sector 1		Dominant Sector 2		Calms	Valid Data
January 2024	3.5 m/s	NNE-E	37%	SE&SSW-WSW	34%	0%	60%
January 2025	3.7 m/s	NNE-ESE	43%	SW-WSW	26%	0%	92%

Figure 2-1: Wind roses - monthly.

Typically, there is an increase in light (1 to 3 m/s) to moderate (3 to 6 m/s) wind from the NNW during periods that include autumn and winter conditions and the seasonal increase in fresh (6 to 8 m/s) to strong (> 8 m/s) N to NE wind during periods that include spring and early summer. Strong southerly to SSW wind occurs throughout the year and is typically associated with the arrival of coastal lows and cold fronts. Coastal lows are more frequent during the summer, hence the slightly higher proportion of these winds).

Diurnal wind roses for January 2025 are shown in Figure 2-2. ESE to SSE wind primarily consists of sea breezes during the day and early evening, particularly during the warmer spring and summer months. In contrast, WNW to NNW wind is mainly in the form of land breezes at night and early morning, particularly during the colder and more stable autumn and winter months.

Arboretum – January 2025



Period	Wind Speed	Dominant Sector 1		Dominant Sector 2		Calms	Valid Data
00:00-05:59	2.9 m/s	N-NE	34%	SSW-WSW & WNW	46%	0%	84%
06:00-11:59	3.8 m/s	N-NNE&E-ESE	40%	SSW-WSW	34%	0%	93%
12:00-17:59	4.8 m/s	ENE-ESE	48%	SSW-SW	22%	0%	99%
18:00-23:59	3.0 m/s	NNE-ENE	35%	SW-WSW	24%	0%	92%

Figure 2-2: Wind roses - diurnal.

2.3. Rainfall

Rainfall measured at various locations is presented in Figure 2-3, Figure 2-4, Figure 2-5 and Figure 2-6 (See APPENDIX F for tables). Note: South32 has had issues with its rain gauge during 2024.

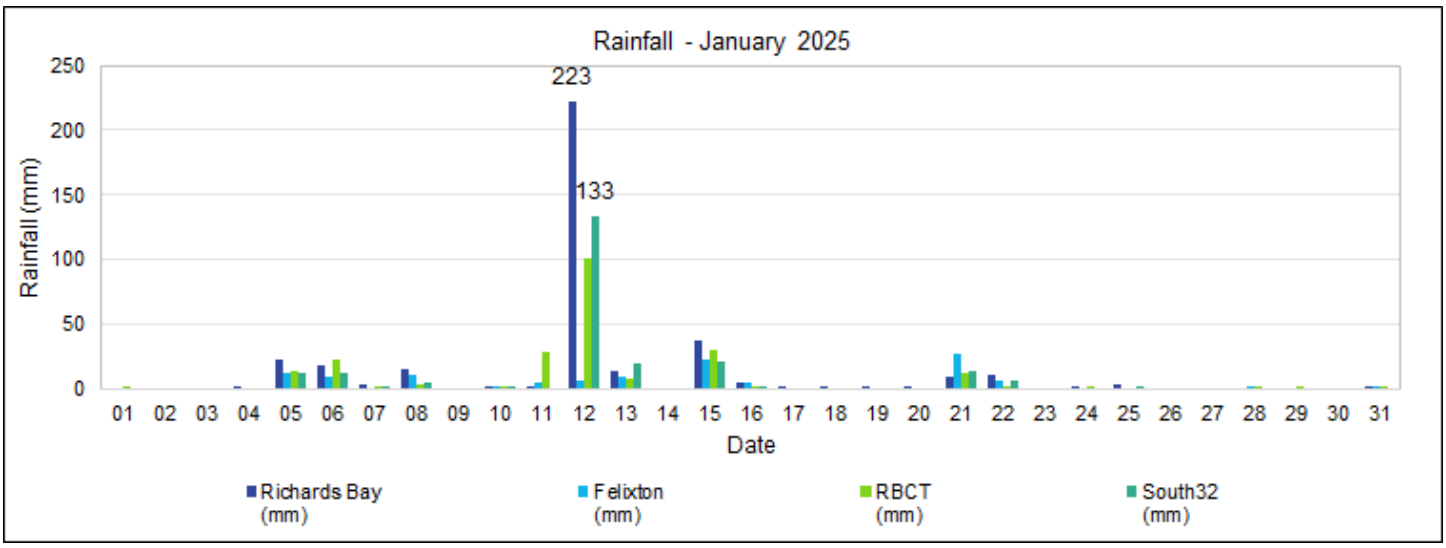


Figure 2-3: Rainfall.

Table 2-2: Rainfall -monthly averages.

Month	Richards Bay (mm)	Felixton (mm)	RBCT (mm)	South 32 (mm)
January 2025	371	117	229	232

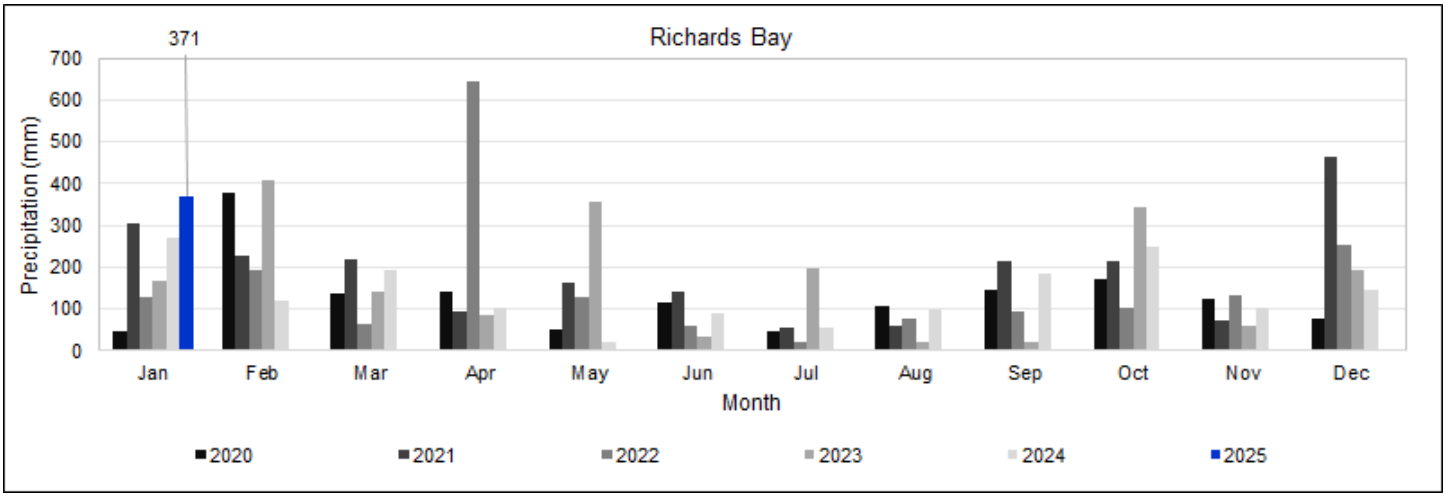


Figure 2-4: Rainfall –Richards Bay.

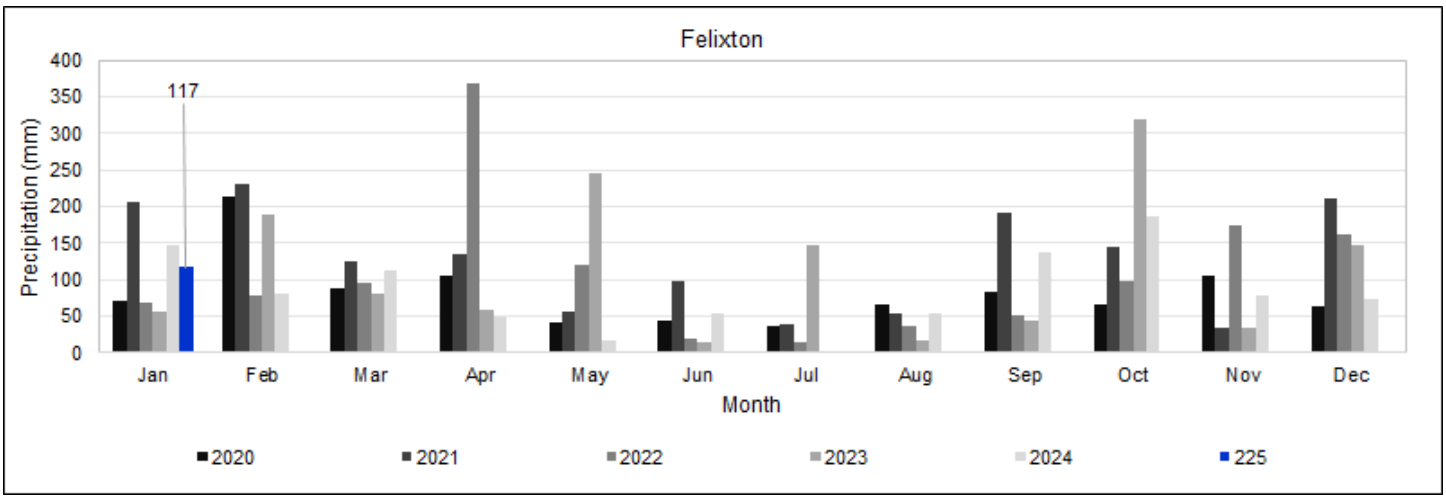


Figure 2-5: Rainfall – Felixton.

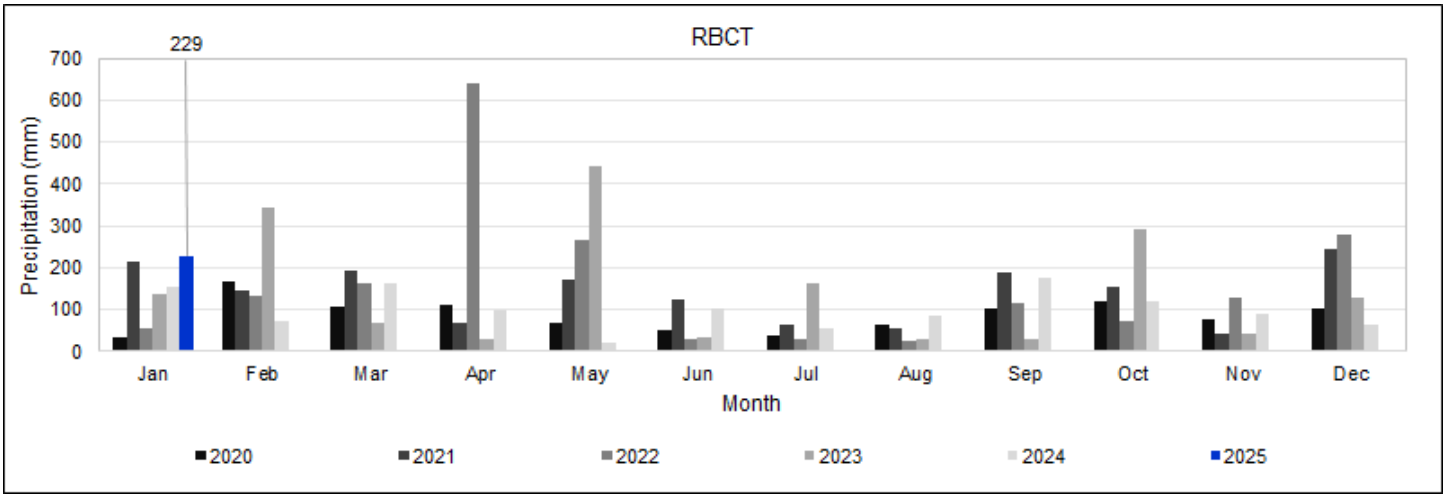


Figure 2-6: Rainfall – RBCT.

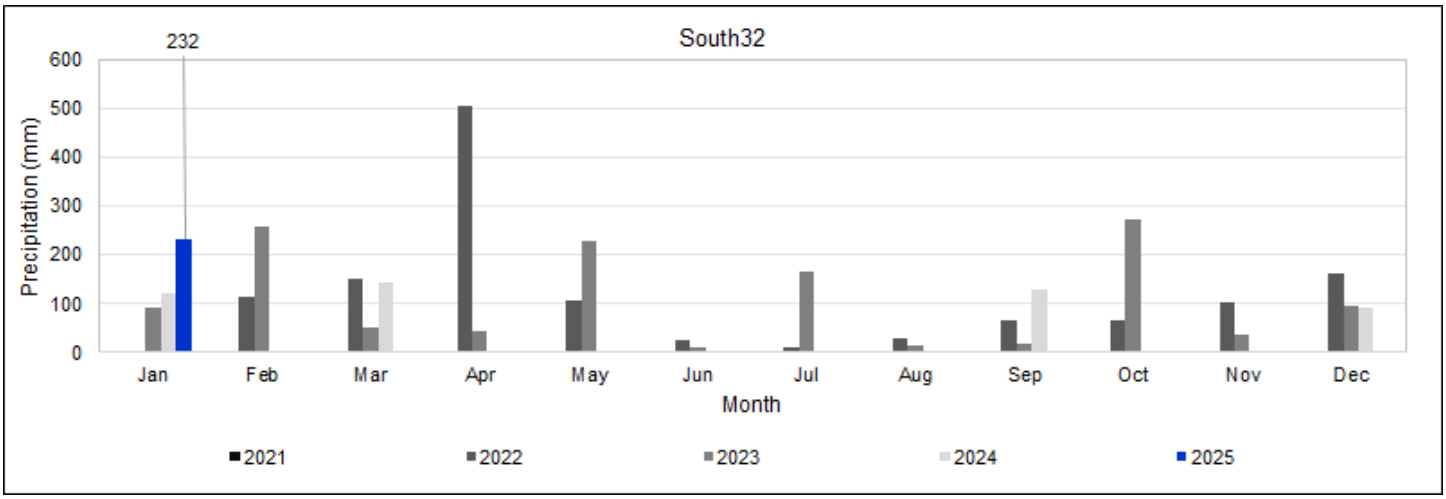


Figure 2-7: Rainfall - South32.
Note: South32 has had issues with its rain gauge during 2024.

3. AIR QUALITY COMPLAINTS

Detailed complaint records are maintained, updated, and distributed weekly to the RBCAA's complaints mailing list. The following sections summarise and analyse the complaints received during January 2025. Please see APPENDIX F for the Complaints Log.

3.1. Field Observations

Eight (8) air quality complaints were received during January 2025; Three (3) were logged in January 2024. The daily complaints and a monthly historical count are reflected below (Figure 3-1 and Figure 3-2).

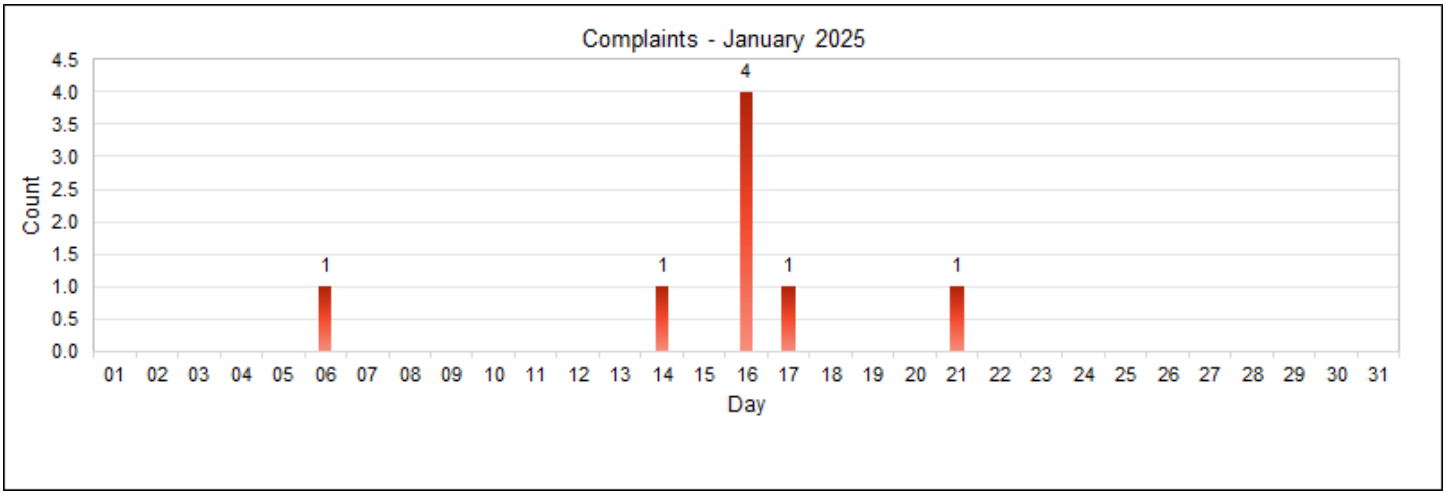


Figure 3-1: Complaints – daily.

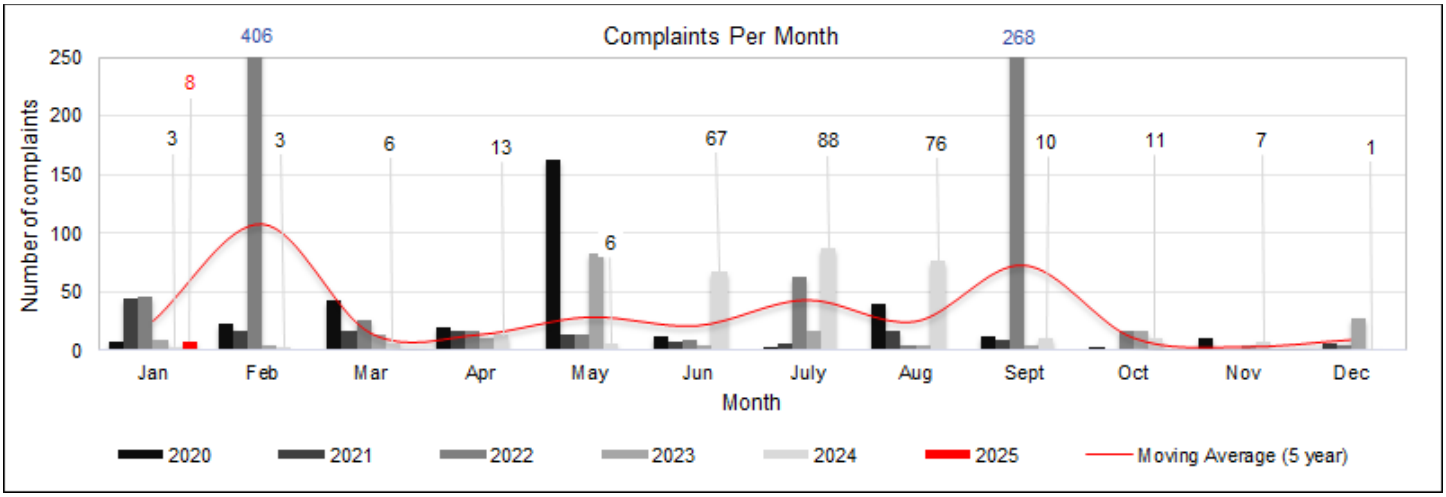


Figure 3-2: Complaints - historical monthly comparison.

3.2. Complaints Distribution

The distribution of complaints in January 2025 by region, source and type is presented in Figure 3-3, Figure 3-4, and Figure 3-5.

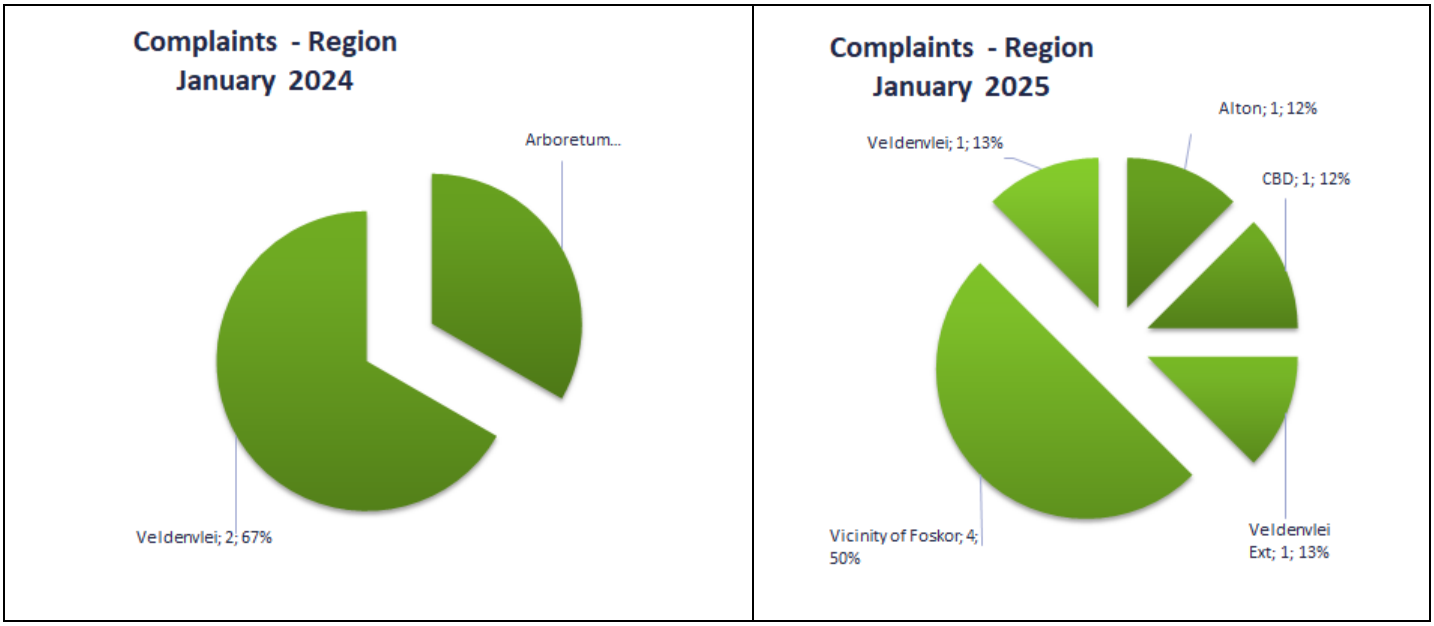


Figure 3-3: Complaints - region.

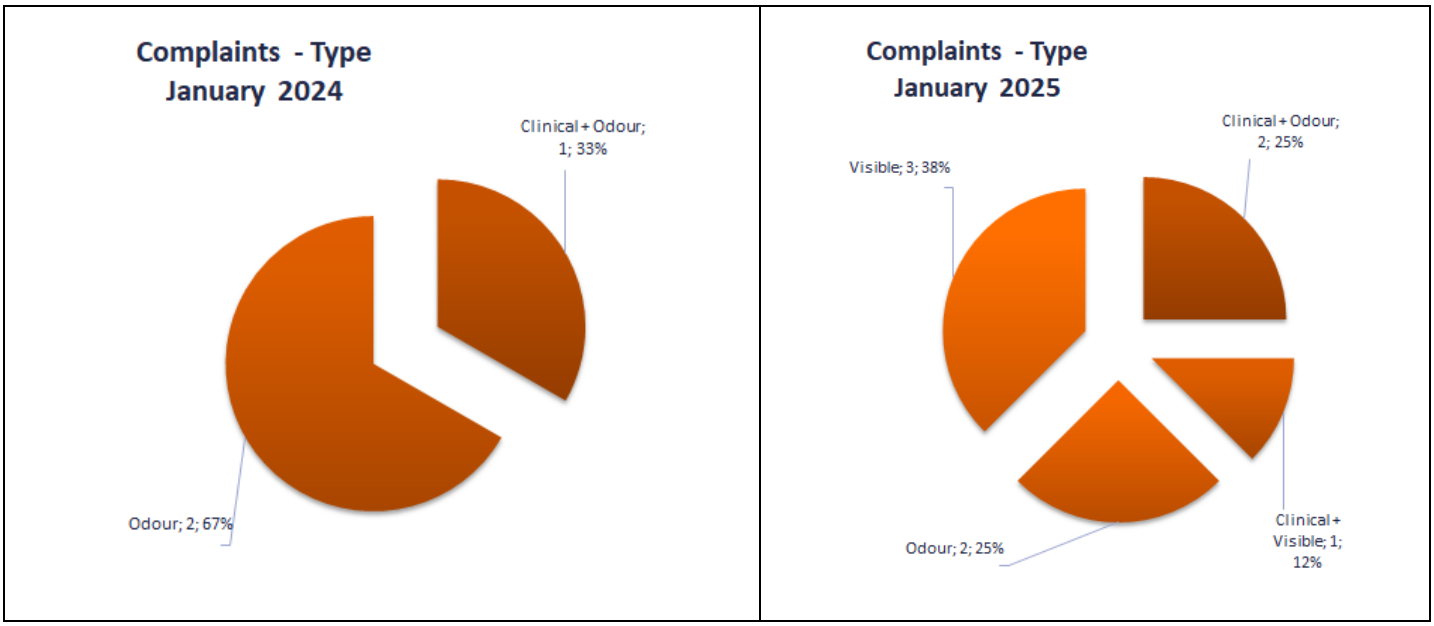


Figure 3-4: Complaints - type.

The complaints received were allocated as follows: Foskor (5, 63%), Mondi (2, 25%) and CoU(1, 12%).

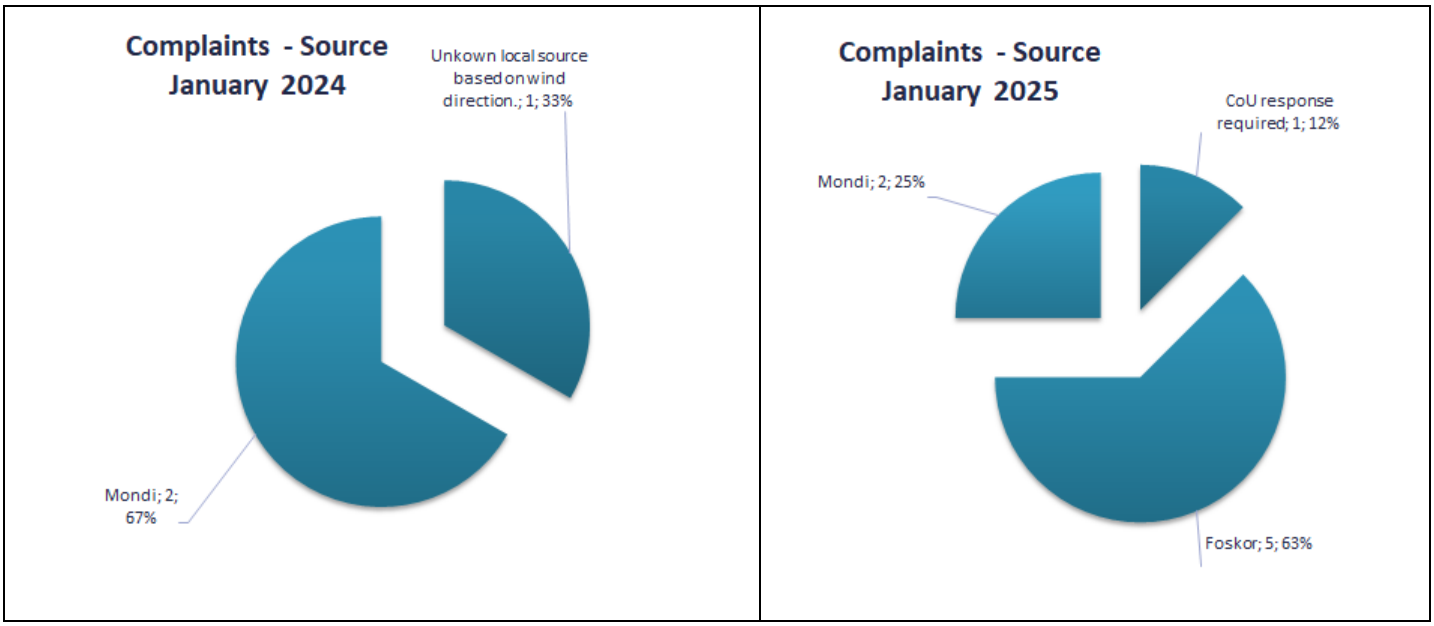


Figure 3-5: Complaints - source.

Table 3-1: Complaint allocation and region.

Complaint allocation and region	8
CoU response required	**1**
Alton	1
Foskor	**5**
CBD	1
Vicinity of Foskor	4
Mondi	**2**
Veldenvlei	1
Veldenvlei Ext	1

Table 3-2: Complaint allocation and type

Complaint allocation and type	8
CoU response required	**1**
Clinical + Odour	1
Foskor	**5**
Visible	3
Clinical + Visible	1
Odour	1
Mondi	**2**
Odour	1
Clinical + Odour	1

4. FINE PARTICULATE MONITORING

Particulate Matter (PM) refers to the atmosphere's solid particles and liquid droplets. Many anthropogenic and natural sources emit PM directly or other pollutants into the atmosphere to form PM. These solid and liquid particles can vary in size. For example, particles less than 10 micrometres (µm) in diameter are classified as PM_{10} and particles less than 2.5 micrometres (µm) in diameter as $PM_{2.5}$.

Fine particulates can be inhaled and accumulate deep within the respiratory system. Therefore, exposure to sustained high concentrations may result in the following:

- Reduced lung development in children
- Allergy-related inflammatory reactions of the airway
- Asthma, nasal congestion, and sinus problems
- Increase in symptoms associated with the lower respiratory tract.
- In severe cases, a reduction in life expectancy

Particulate matter (PM) monitoring at eSikhaleni and Richardia utilises Tapered Element Oscillating Microbalance (TEOM) devices, which are U.S. EPA-approved for continuous PM measurement. These instruments determine particle mass by detecting frequency changes in a vibrating element as particles accumulate. In contrast, Brackenham, CBD, Felixton, Scorpio, and Harbour West employ E-Samplers, which combine real-time light scattering with filter-based sampling to measure particulate concentrations. The E-Sampler is certified under the UK's Monitoring Certification Scheme (MCERTS) for indicative ambient particulate monitoring.

4.1. Ambient Air Quality Standards

Ambient air quality standards for particulates are listed below (Table 4-1).

Table 4-1: Particulate ambient air quality limits.

Organisation	Limit	PM_{10} Daily Average (µg/m³)	PM_{10} Annual Average (µg/m³)	$PM_{2.5}$ Daily Average (µg/m³)	$PM_{2.5}$ Annual Average (µg/m³)
RSA [a, d]	Standard	75 [b]	40 [c]	40 [b]	20 [c]
WHO [e]	Guideline	45 [c]	15 [c]	15 [c]	5 [c]

Notes:

a) Government Gazette 32816 (24 December 2009) in terms of the National Environmental Management: Air Quality Act No. 39 of 2004, effective from 2015 (RSA-NEMAQA, 2009)
b) Not to be exceeded more than four (4) times in one year
c) Not to be exceeded
d) Government Gazette 35463 (29 June 2009) in terms of the National Environmental Management: Air Quality Act No. 39 of 2004, effective from 2015 (RSA-NEMAQA, 2012)
e) World Health Organisation (WHO, 2021)

4.2. Data Availability

The percentage of valid data received from the PM analysers for January 2025 is shown in Table 4-2.

Table 4-2: PM data capture.

Station	Availability (%)	PM_{10} (%)	$PM_{2.5}$ (%)
Brackenham ES2	0	-	0
CBD ES1	99	99	-
eSikhaleni	99	98	-
Felixton ES1	100	100	-
Felixton ES2	99	-	99
Harbour West ES2	100	-	100
Richardia	98	98	-
Scorpio ES1	100	100	-
Scorpio ES2	100	-	100

Missing Data (PM_{10}):

- *eSikhaleni – power outages, data invalidation (1 day with <80% data capture 31 January 2025).*
- *Richardia – power outages, data invalidation (1 day with <80% data capture 12 January 2025).*

Missing Data ($PM_{2.5}$):

- *Brackenham ES2 – not commissioned yet (31 days with <80% data capture 1-31 January 2025).*

4.3. Monthly

PM_{10} monthly average concentrations did not exceed the RSA Annual Limit; the WHO Annual Limit was exceeded at eSikhaleni, Richardia and Scorpio (Figure 4-1). Comparisons to previous months are also provided (Figure 4-2).

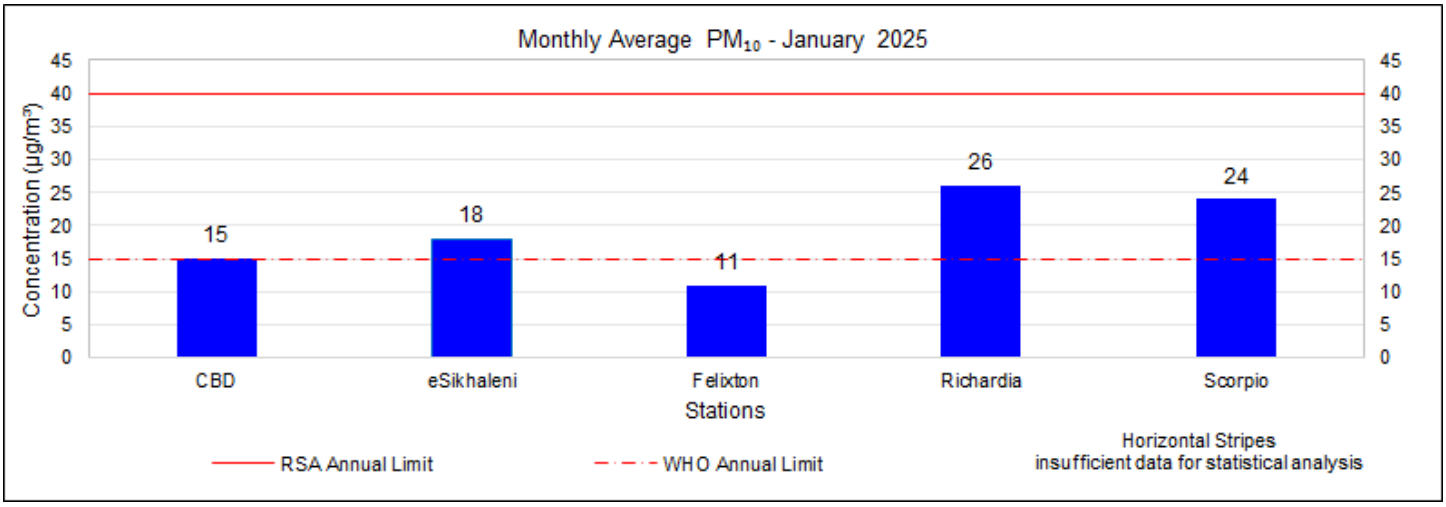


Figure 4-1: PM_{10} monthly concentrations.

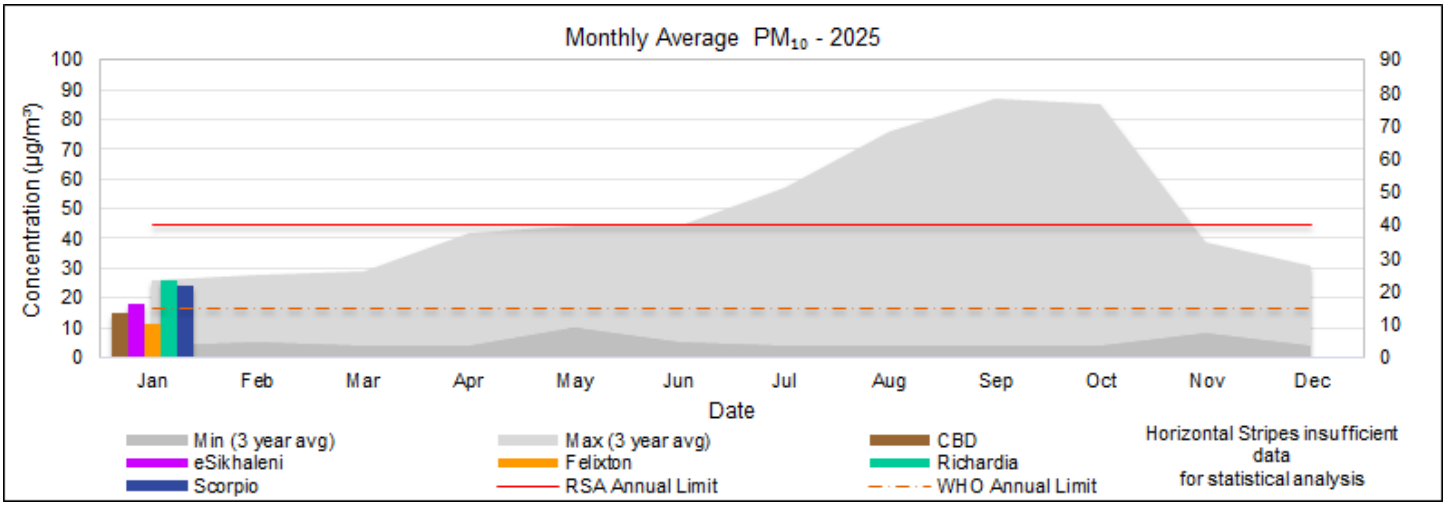


Figure 4-2: PM_{10} monthly comparison.

$PM_{2.5}$ monthly average concentrations did not exceed the RSA Annual Limit; the WHO Annual Limit was exceeded at Felixton, Harbour West and Scorpio (Figure 4-3). Comparisons to previous months are also provided (Figure 4-4).

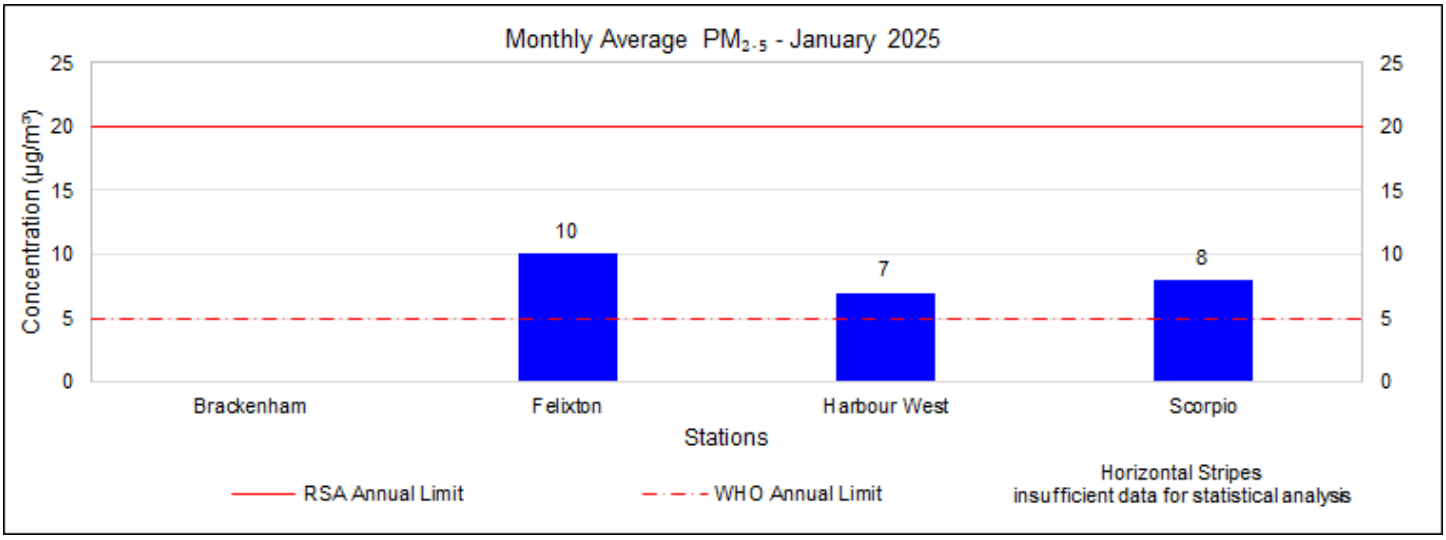


Figure 4-3: $PM_{2.5}$ monthly concentrations.
Note: Brackenham ES2 – not commissioned yet (31 days with <80% data capture 1-31 January 2025).

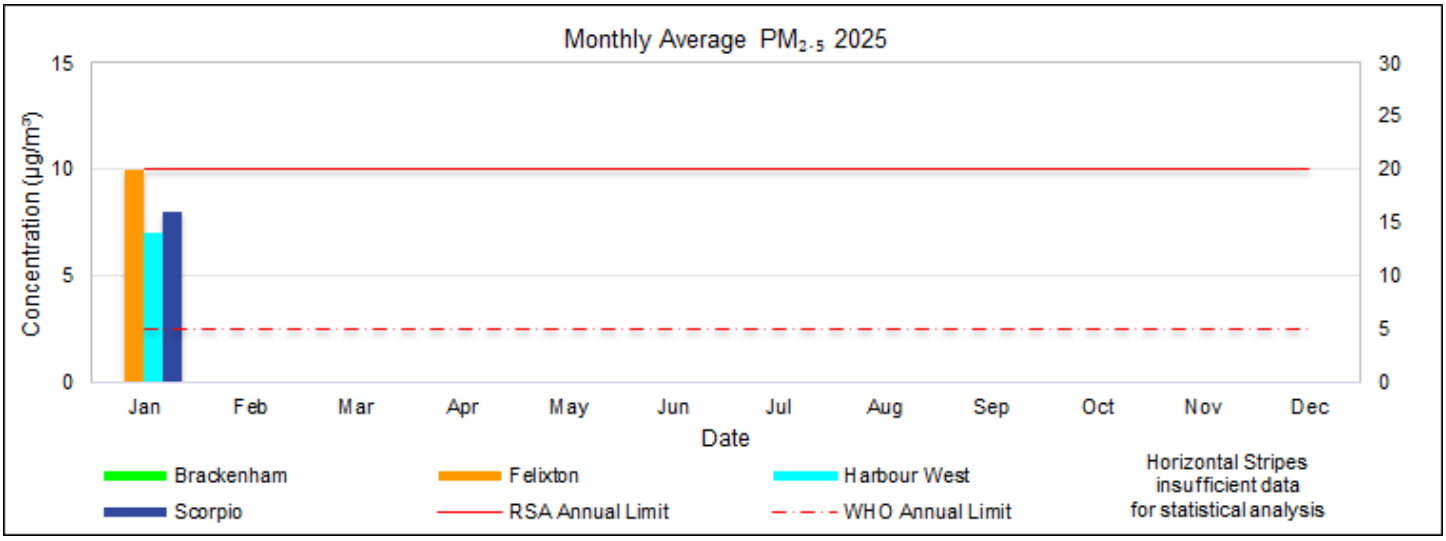


Figure 4-4: $PM_{2.5}$ monthly comparison.
Note: Brackenham ES2 – not commissioned yet (31 days with <80% data capture 1-31 January 2025).

4.4. Diurnal

PM diurnal concentrations are shown below (Figure 4-5 and Figure 4-6). Diurnal concentrations of PM_{10} did not exceed the RSA Daily Limit (75 µg/m³) nor the WHO Daily Limit (45 µg/m³). Diurnal concentrations of $PM_{2.5}$ did not exceed the RSA Daily Limit (40 µg/m³); the WHO Daily Limit (15 µg/m³) was exceeded at Felixton.

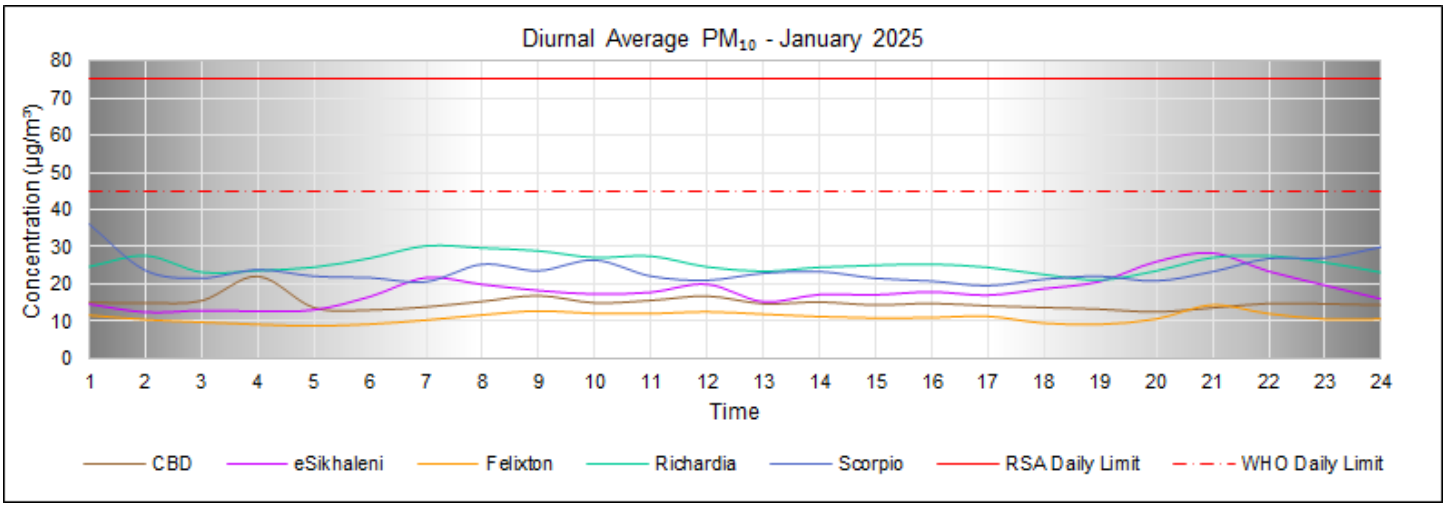


Figure 4-5: PM_{10} diurnal concentrations.
Note:

- *eSikhaleni – power outages, data invalidation (1 day with <80% data capture 31 January 2025).*
- *Richardia – power outages, data invalidation (1 day with <80% data capture 12 January 2025).*

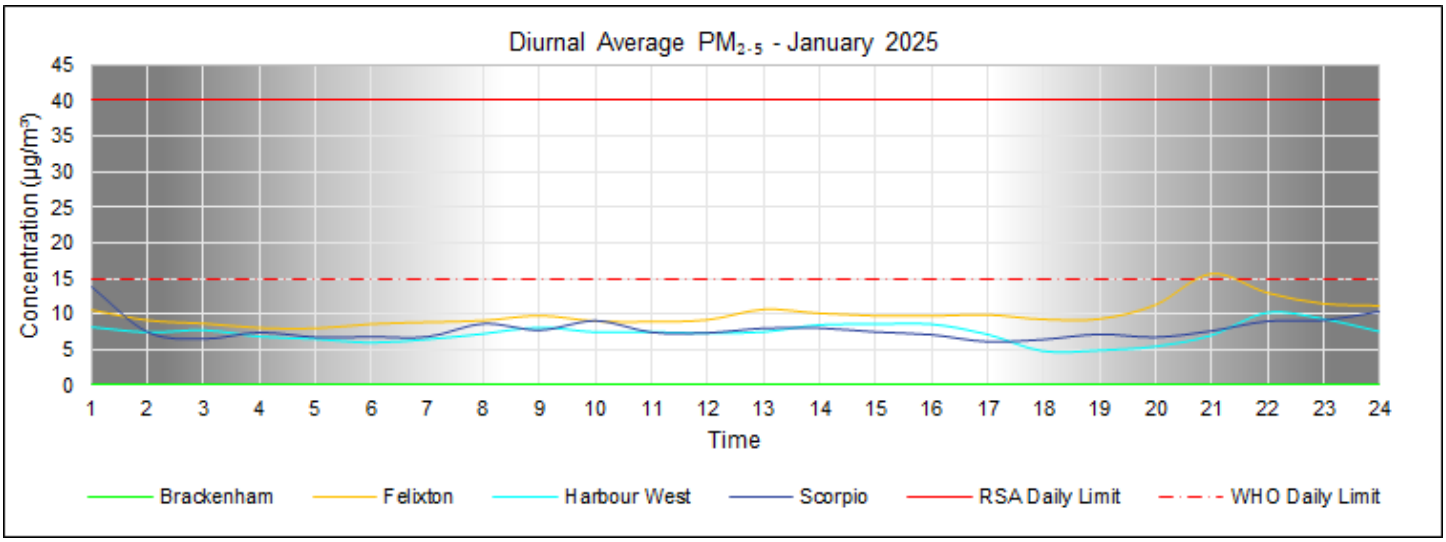


Figure 4-6: $PM_{2.5}$ diurnal concentrations.
Note: Brackenham – instrument failure, retired, will be replaced with an e-sampler (30 days with <80% data capture 1-31 January 2025).

4.5. Daily

PM_{10} daily concentrations are shown in Figure 4-7, and exceedances are in Table 4-3. There were:

- No (0) measured exceedance of the RSA Limit (75 µg/m³); and,
- One (1) measured exceedance of the WHO Limit (45 µg/m³).

Table 4-3: PM_{10} 24-hour exceedances (WHO).

PM_{10} Daily WHO Limit (45 µg/m³)	1
Scorpio	**1**
No response required	1

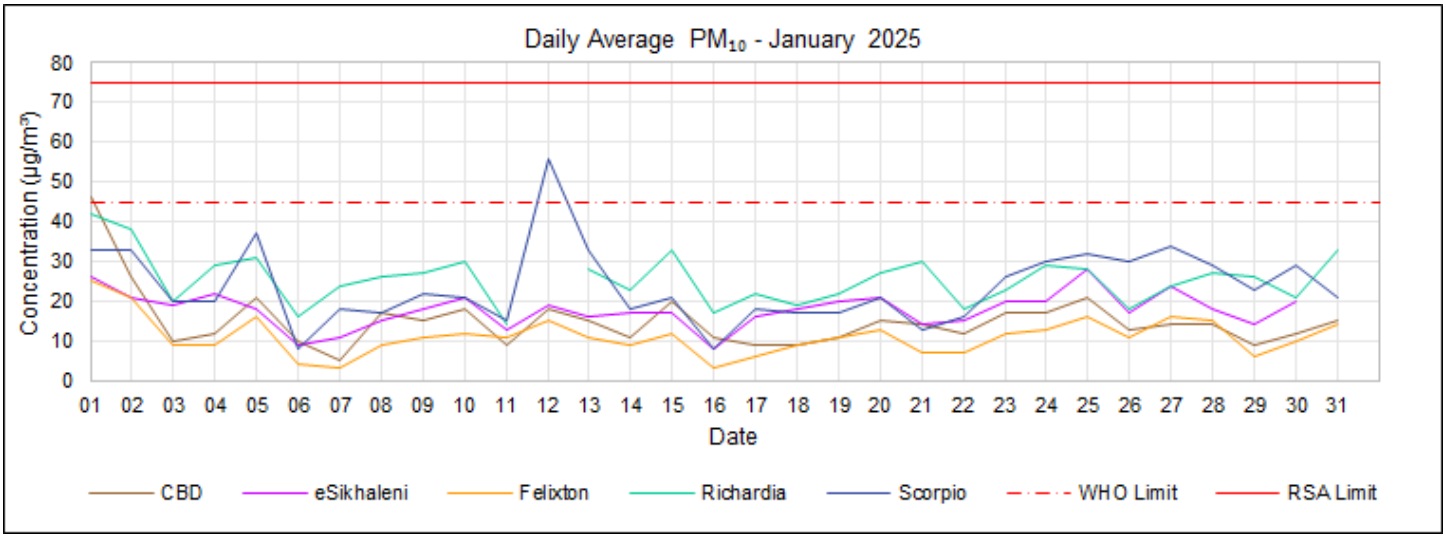


Figure 4-7: PM_{10} 24-hour average concentrations.
Missing Data (PM_{10})

- *eSikhaleni – power outages, data invalidation (1 day with <80% data capture 31 January 2025).*
- *Richardia – power outages, data invalidation (1 day with <80% data capture 12 January 2025).*

$PM_{2.5}$ daily concentrations are shown in Figure 4-8, and exceedances are in Table 4-4. There were:

- No (0) measured exceedances of the RSA Limit (40 µg/m³); and,
- Four (4) measured exceedances of the WHO Limit (15 µg/m³).

Table 4-4: $PM_{2.5}$ 24-hour exceedances (WHO)

$PM_{2.5}$ Daily WHO Limit (15 µg/m³)	4
Felixton	**2**
No response required	2
Scorpio	**1**
No response required	1
Harbour West	**1**
No response required	1

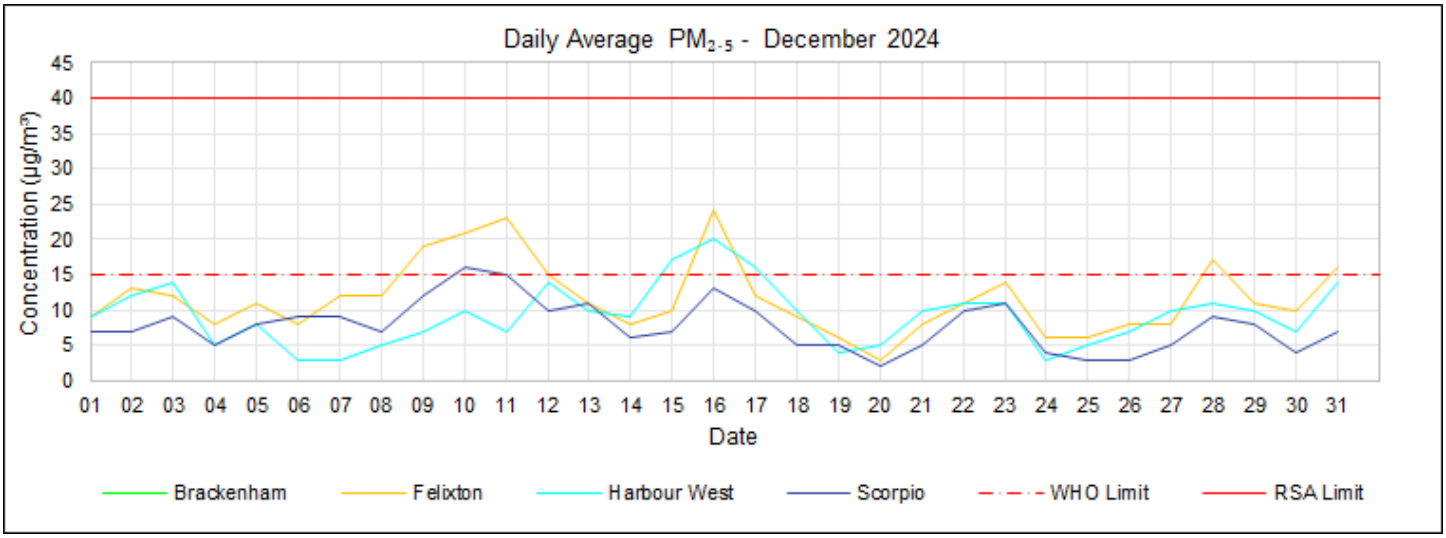


Figure 4-8: $PM_{2.5}$ daily average concentrations.
Missing Data ($PM_{2.5}$):

- *Brackenham – instrument failure, retired, will be replaced with an e-sampler (30 days with <80% data capture 1-31 January 2025).*

4.6. Exceedances

The number of days on which exceedances occurred, plus comparisons to previous months, are shown in Figure 4-9 and Figure 4-10, and a summary of PM exceedances broken down per station is presented in Table 4-5 and Table 4-6. According to the relevant Air Quality Index (AQI), the areas where no exceedances were measured may be considered good air quality concerning PM.

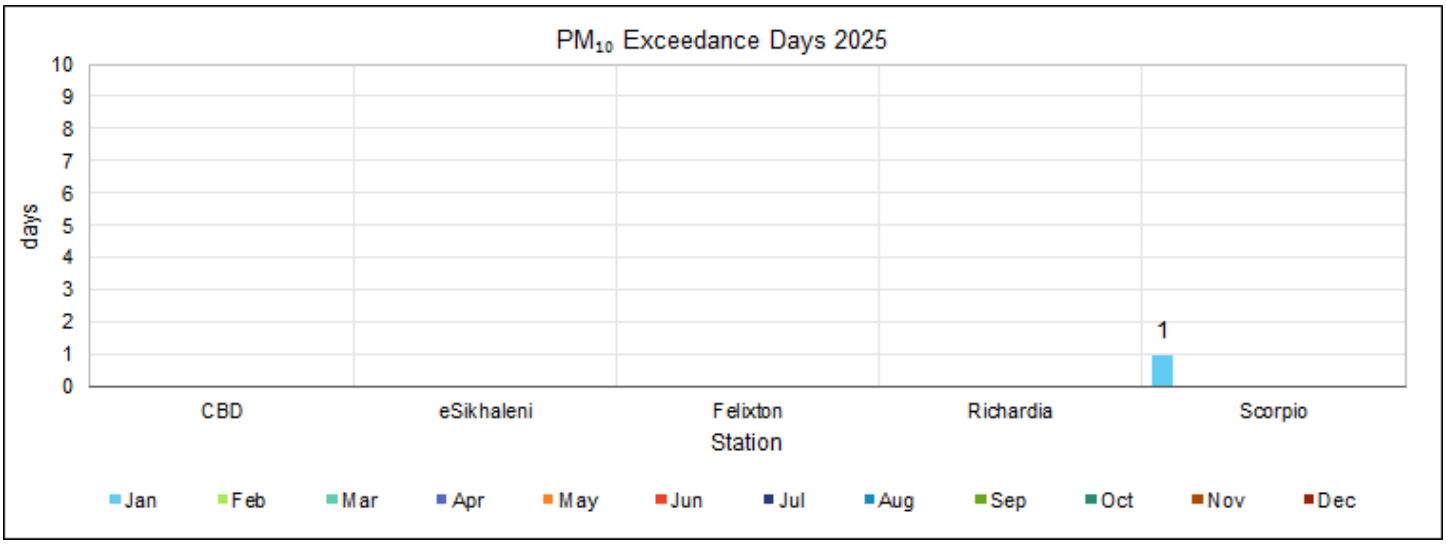


Figure 4-9: PM_{10} exceedance days.

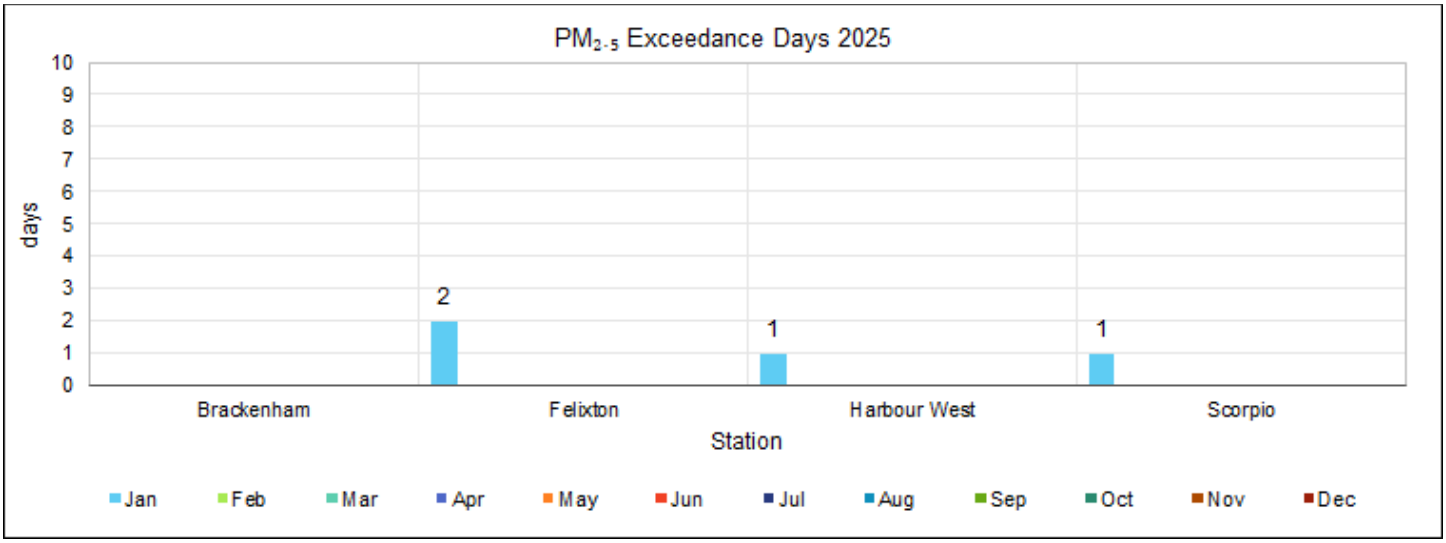


Figure 4-10: $PM_{2.5}$ exceedance days.

Table 4-5: PM_{10} exceedance summary.

2025	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
PM_{10} Daily RSA Limit (75 µg/m³)													
Brackenham	-	-	-	-	-	-	-	-	-	-	-	-	0
CBD	-	-	-	-	-	-	-	-	-	-	-	-	0
eSikhaleni	-	-	-	-	-	-	-	-	-	-	-	-	0
Felixton	-	-	-	-	-	-	-	-	-	-	-	-	0
Richardia	-	-	-	-	-	-	-	-	-	-	-	-	0
Scorpio	-	-	-	-	-	-	-	-	-	-	-	-	0
PM_{10} Daily WHO Limit (45 µg/m³)													
Brackenham	-	-	-	-	-	-	-	-	-	-	-	-	0
CBD	-	-	-	-	-	-	-	-	-	-	-	-	0
eSikhaleni	-	-	-	-	-	-	-	-	-	-	-	-	0
Felixton	-	-	-	-	-	-	-	-	-	-	-	-	0
Richardia	-	-	-	-	-	-	-	-	-	-	-	-	0
Scorpio	1	-	-	-	-	-	-	-	-	-	-	-	**1**

Table 4-6: $PM_{2.5}$ exceedance summary.

2025	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
$PM_{2.5}$ Daily RSA Limit (40 µg/m³)													
Brackenham	-	-	-	-	-	-	-	-	-	-	-	-	-
Felixton	-	-	-	-	-	-	-	-	-	-	-	-	-
Harbour West	-	-	-	-	-	-	-	-	-	-	-	-	-
Scorpio	-	-	-	-	-	-	-	-	-	-	-	-	-
$PM_{2.5}$ Daily WHO Limit (15 µg/m³)													
Brackenham	-	-	-	-	-	-	-	-	-	-	-	-	0
Felixton	2	-	-	-	-	-	-	-	-	-	-	-	**2**
Harbour West	1	-	-	-	-	-	-	-	-	-	-	-	**1**
Scorpio	1	-	-	-	-	-	-	-	-	-	-	-	**1**

5. SULPHUR DIOXIDE MONITORING

Sulphur dioxide (SO_2) is one gas of highly reactive gasses known as "oxides of sulphur." Anthropogenic sources include fossil fuel combustion (particularly coal-burning power plants), industrial processes such as wood pulping, paper manufacture, petroleum and metal refining, and metal smelting (particularly from sulphide-containing ores, e.g., lead, silver, and zinc ores) and vehicle tailpipe emissions. Natural sources of SO_2 emissions include geothermal activity (including hot springs and volcanic activity) and the natural decay of vegetation on land in wetlands and oceans.

SO_2 is linked with several adverse effects on the respiratory system as it is highly soluble and thus readily absorbed by the mucous membranes of the nose and upper respiratory tract. Exposure to high concentrations may result in the following:

- Reduction in lung function (especially in asthmatics and children)
- Wheezing and coughing
- In severe cases, a decrease in life expectancy

5.1. Ambient Air Quality Standards

South African ambient air quality standards for SO_2 are listed below (Table 5-1).

Table 5-1: SO_2 ambient air quality limits.

Organisation	Limit	10-min Average	Hourly Average	Daily Average	Annual Average
RSA [a]	SO_2 Standard	500 µg/m³ [b]	350 µg/m³ [c]	125 µg/m³ [d]	50 µg/m³ [e]
		191ppb [b]	134 ppb [c]	48 ppb [d]	19 ppb [e]
WHO [f]	SO_2 Guideline	500 µg/m³	-	40 µg/m³	-
		191ppb	-	15 ppb	-

Notes:

a) SA Government Gazette 32816 (published 24 December 2009) in terms of the National Environmental Management: Air Quality Act 39 of 2004 (RSA-NEMAQA, 2009)
b) Not to be exceeded more than five hundred and twenty-six (526) times in one year.
c) Not to be exceeded more than eighty-eight (88) times in one year
d) Not to be exceeded more than four (4) times in one year
e) Not to be exceeded
f) World Health Organisation (WHO, 2021)

5.2. Data Availability

The percentage of valid data received from the SO_2 analysers for January 2025 is shown in Table 5-2.

Table 5-2: SO_2 data capture.

Station	Availability (%)	SO_2 (%)
Arboretum	100	99
Brackenham	100	100
CBD	99	99
eSikhaleni	99	98
Felixton	100	100
Harbour West	100	100
Richardia	98	***94***
Scorpio	99	99

Notes:
1. *Red - Not acceptable for statistical purposes (<80%)*
2. *Orange – Does not meet SANAS data capture requirements (<90%)*
3. *Yellow – RBCAA reporting requirement (<=95%)*

Missing Data (SO_2):
- *eSikhaleni – power outages, data invalidation (1 day with <80% data capture 31 January 2025).*
- *Richardia – analyser failure – replaced, power outages, data invalidation (1 day with <80% data capture 12, 17-18 January 2025).*

5.3. Monthly

Monthly average SO_2 concentrations did not exceed the RSA Annual Limit nor the WHO Annual Limit (Figure 5-1). Comparisons to previous months are also provided (Figure 5-2).

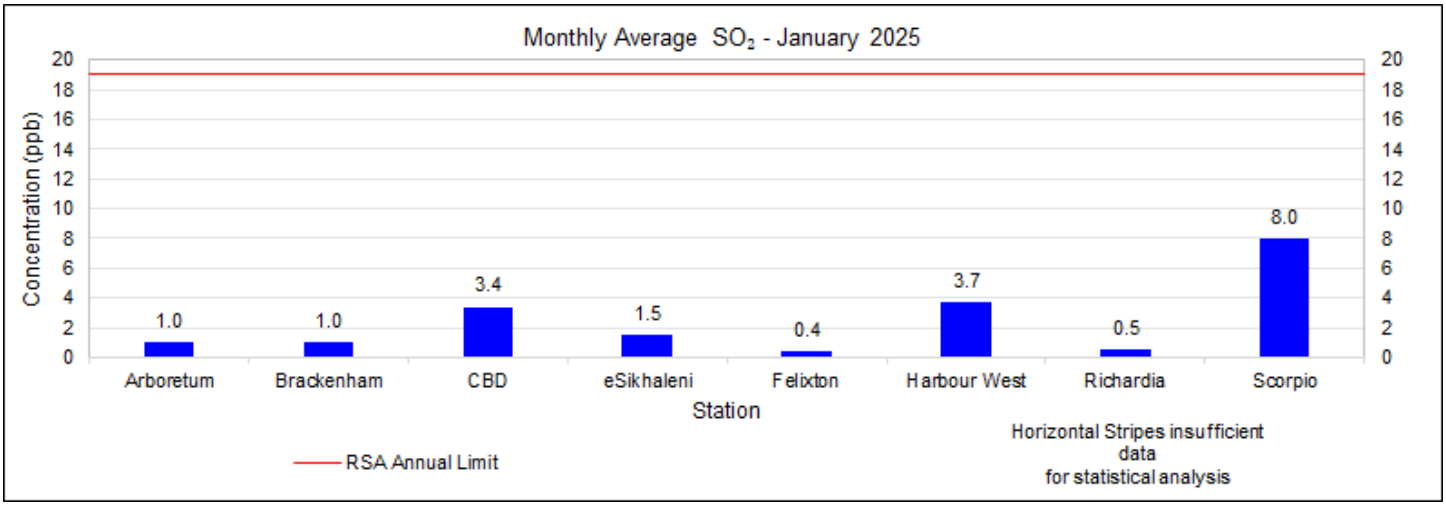


Figure 5-1: SO_2 monthly concentrations.

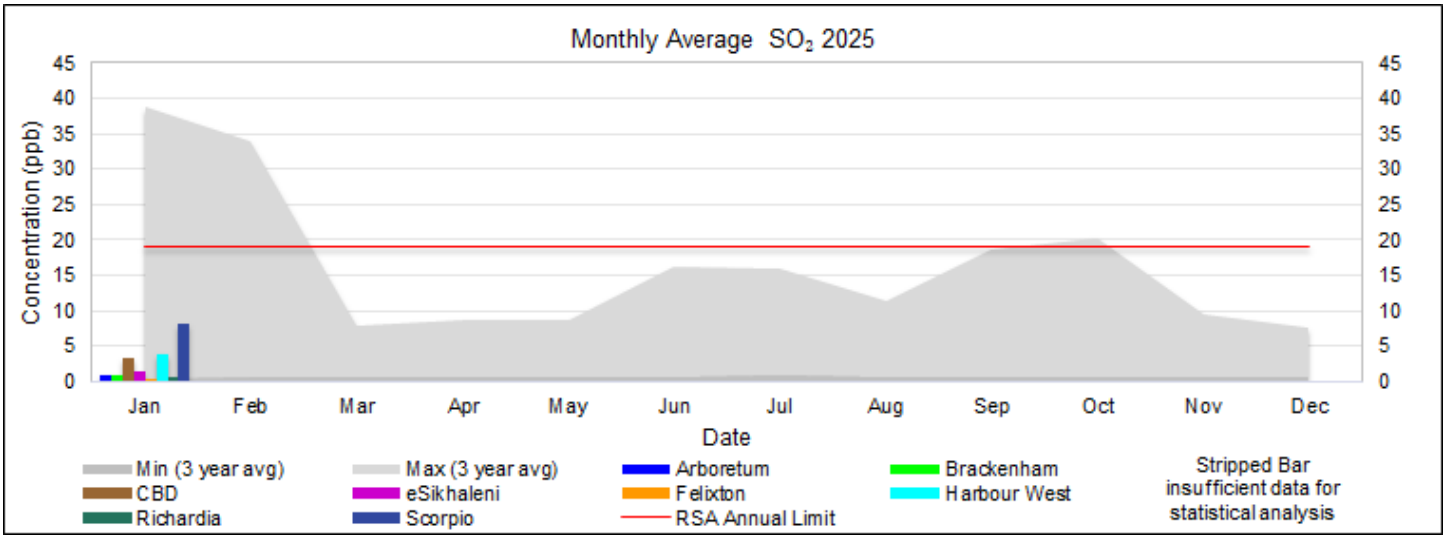


Figure 5-2: SO_2 monthly comparison.

5.4. Diurnal

Diurnal SO_2 concentrations are shown below (Figure 5-3). Diurnal concentrations of SO_2 did not exceed the RSA Daily Limit (48 ppb) or the WHO Daily Limit (15 ppb).

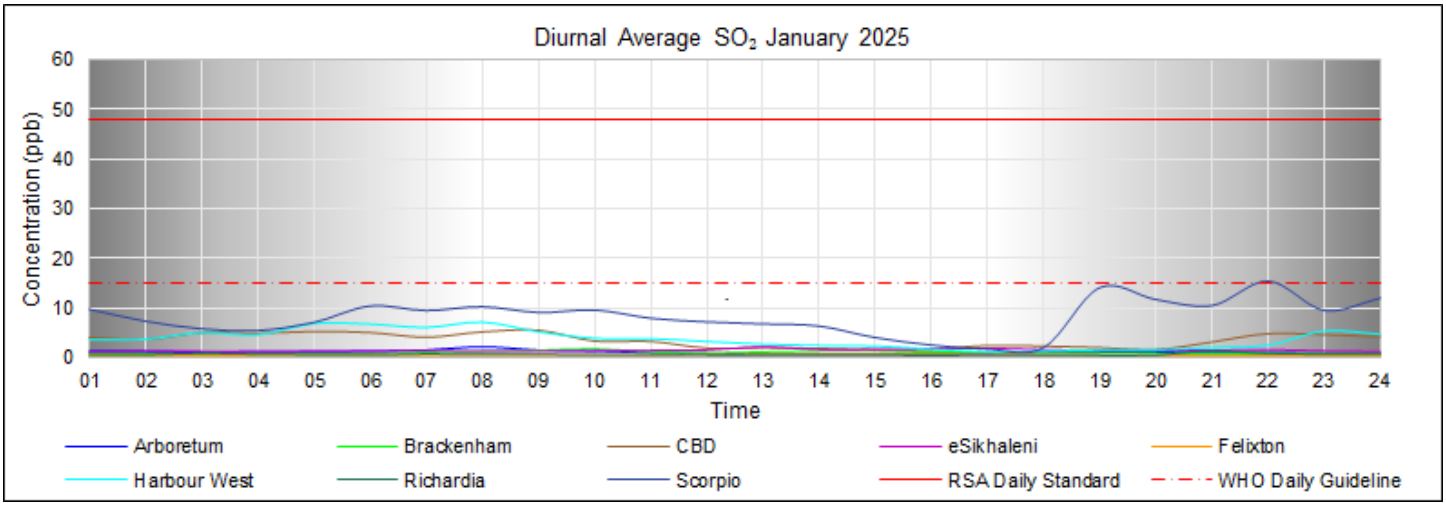


Figure 5-3: SO_2 diurnal concentrations.

5.5. Daily

SO_2 daily average concentrations are shown in Figure 5-4 and exceedances in Table 5-3 and Table 5-4: There were:

- One (1) measured exceedance of the RSA Limit (48 ppb); and,
- Four (4) measured exceedances of the WHO Limit (15 ppb).

Table 5-3: SO_2 24-hour average exceedance (RSA).

SO_2 Daily RSA Limit (48 ppb)	1
Scorpio	**1**
Foskor	1

Table 5-4: SO_2 24-hour average exceedance (WHO).

SO_2 Daily WHO Limit (15 ppb)	4
CBD	**1**
No response required	1
Scorpio	**3**
No response required	3

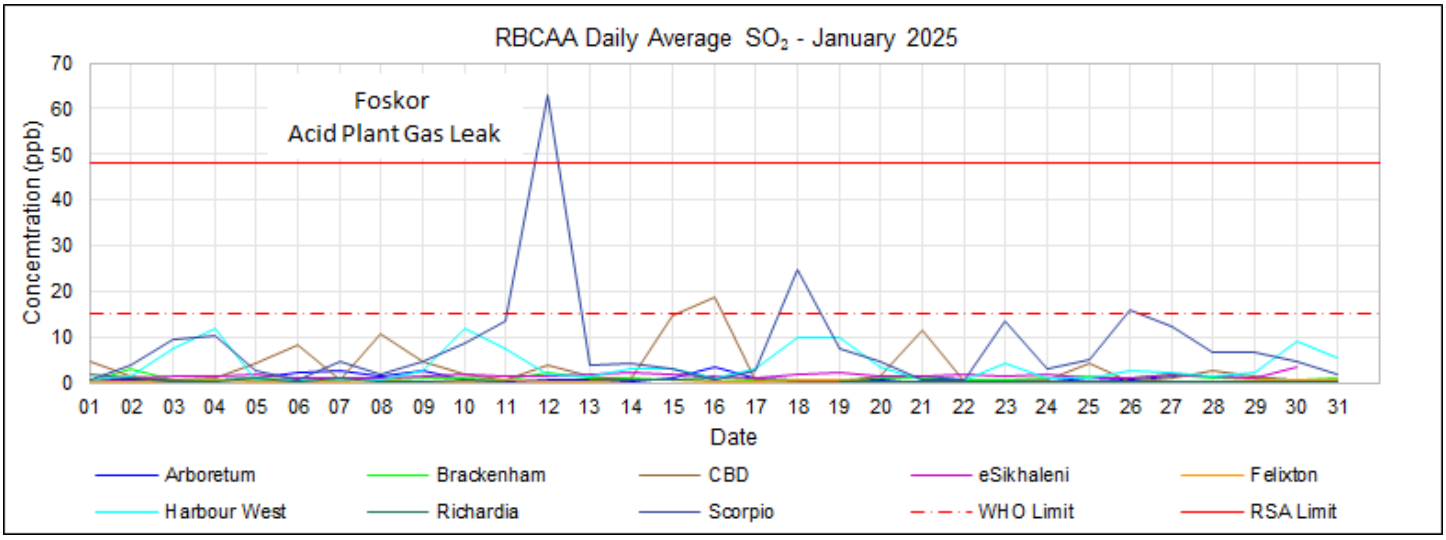


Figure 5-4: SO_2 24-hour average concentrations.
Missing Data (SO_2):

- *eSikhaleni – power outages, data invalidation (1 day with <80% data capture 31 January 2025).*
- *Richardia – analyser failure – replaced, power outages, data invalidation (1 day with <80% data capture 12, 17-18 January 2025).*

5.6. Hourly

SO_2 hourly average concentrations are shown in Figure 5-5 and exceedances in Table 5-5. There were four (4) measured exceedances of the RSA Limit (134 ppb).

Table 5-5: SO_2 1-hour average exceedance (RSA).

SO_2 Hourly RSA Limit (134 ppb)	4
Scorpio	**4**
Foskor	4

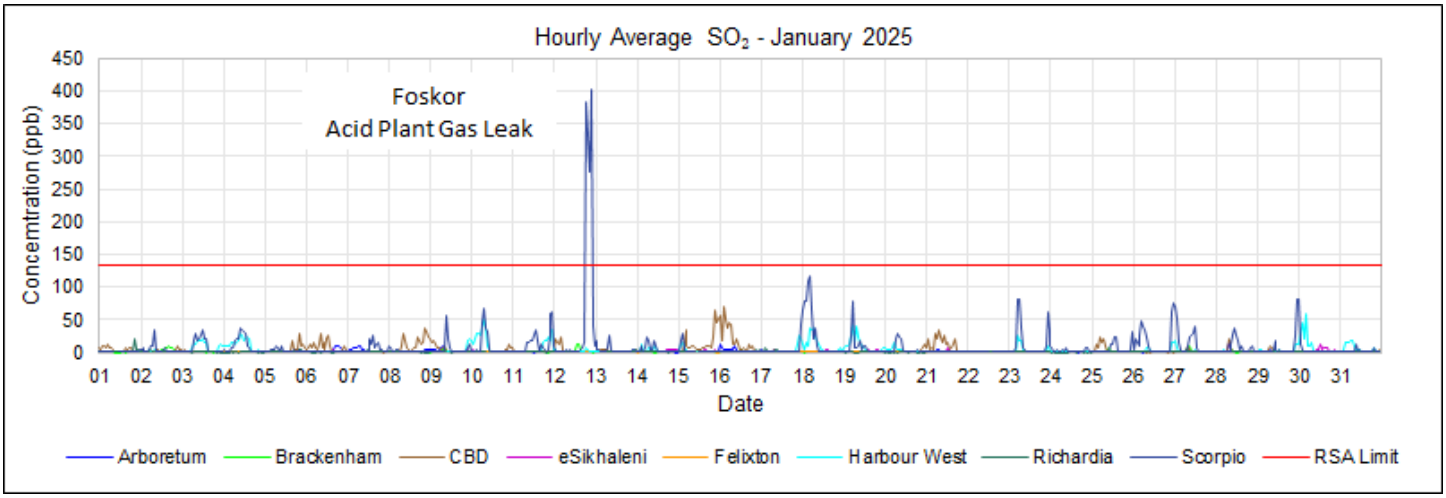


Figure 5-5: SO_2 1-hour average concentrations.

5.7. 10-minute

SO_2 10-minute average concentrations are shown in Figure 5-6 and exceedances in Table 5-6. There were eighteen (18) measured exceedances of the RSA and WHO Limit (191 ppb).

Table 5-6: SO_2 10-minute average exceedance (RSA & WHO).

SO_2 10-minute RSA & WHO Limit (191 ppb)	18
Scorpio	**18**
Foskor	18

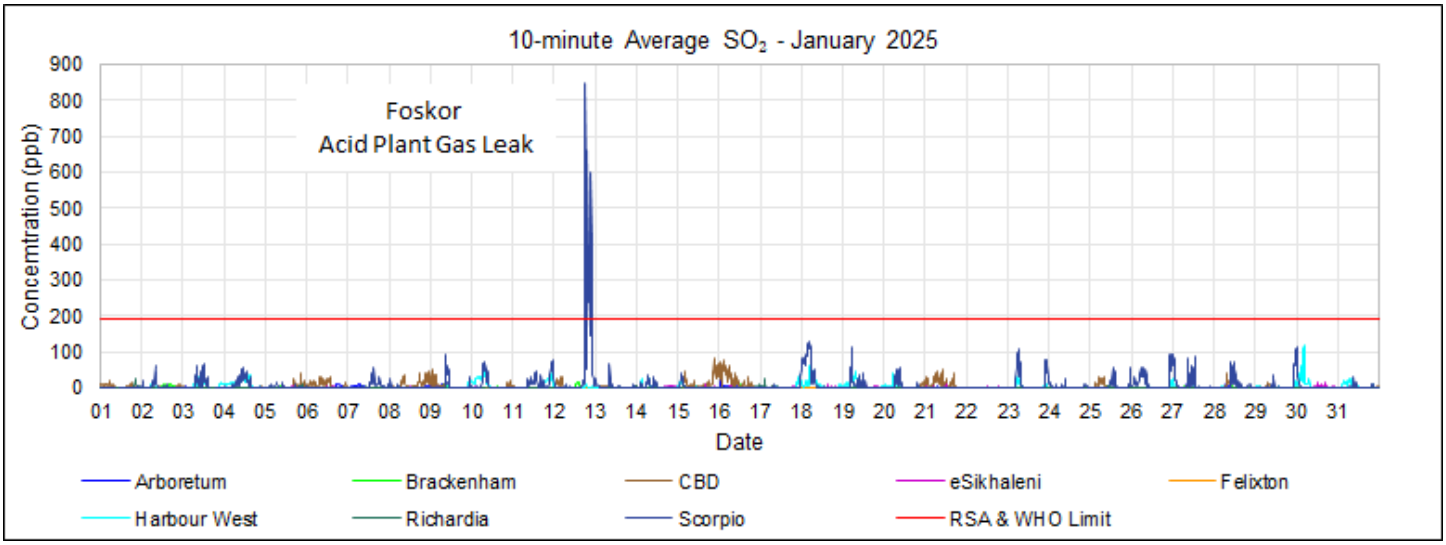


Figure 5-6: SO_2 10-minute average concentrations.

5.8. Exceedances

The number of days on which exceedances occurred, plus comparisons to previous months, are shown in Figure 5-7, and a summary of the SO_2 exceedances broken down per station is presented in Table 5-7. SO_2 exceedances can be associated with emissions because of process upsets (i.e., planned maintenance, plant shutdowns or start-up), leaks in equipment, pipelines, seals, valves (fugitive emissions) or an event (e.g., fires or emergency shutdowns). According to the relevant Air Quality Index (AQI), the areas where no exceedances were measured may be considered good air quality concerning SO_2.

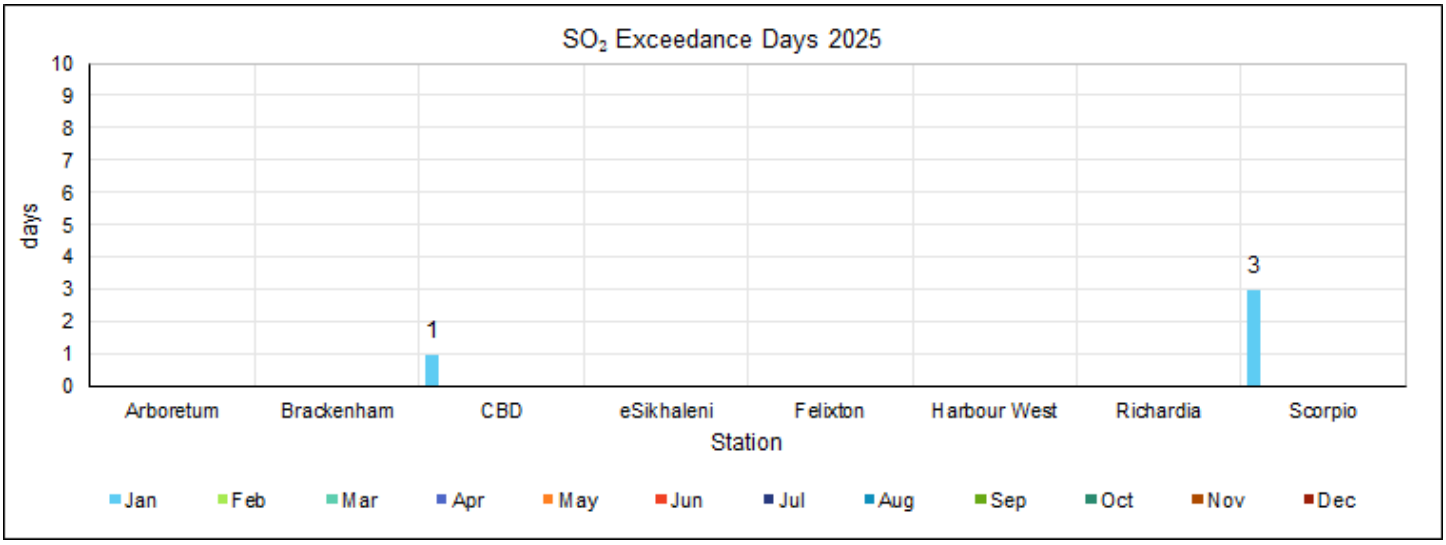


Figure 5-7: SO_2 exceedance days.

Table 5-7: SO_2 exceedance summary.

2025	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
SO_2 Daily WHO Limit (15 ppb)													
CBD	1	-	-	-	-	-	-	-	-	-	-	-	**1**
eSikhaleni	-	-	-	-	-	-	-	-	-	-	-	-	0
Harbour West	-	-	-	-	-	-	-	-	-	-	-	-	0
Richardia	-	-	-	-	-	-	-	-	-	-	-	-	0
Scorpio	3	-	-	-	-	-	-	-	-	-	-	-	**3**
SO_2 Hourly RSA Limit (134 ppb)													
CBD	-	-	-	-	-	-	-	-	-	-	-	-	0
eSikhaleni	-	-	-	-	-	-	-	-	-	-	-	-	0
Harbour West	-	-	-	-	-	-	-	-	-	-	-	-	0
Richardia	-	-	-	-	-	-	-	-	-	-	-	-	0
Scorpio	4	-	-	-	-	-	-	-	-	-	-	-	4
SO_2 10-minute RSA & WHO Limit (191 ppb)													
CBD	-	-	-	-	-	-	-	-	-	-	-	-	0
eSikhaleni	-	-	-	-	-	-	-	-	-	-	-	-	0
Harbour West	-	-	-	-	-	-	-	-	-	-	-	-	0
Richardia	-	-	-	-	-	-	-	-	-	-	-	-	0
Scorpio	18	-	-	-	-	-	-	-	-	-	-	-	18

6. TOTAL REDUCED SULPHUR MONITORING

Total reduced sulphur compounds (TRS), often associated with rotten egg or cooked cabbage odour, refer to a gaseous mixture of compounds consisting mainly of hydrogen sulphide (H_2S), methyl mercaptan (CH_3S-H), dimethyl sulphide (CH_3-S-CH_3) and dimethyl disulphide (CH_3-S-S-CH_3). While there are other ambient TRS compounds, these four are the most common, abundant, and generally referred to in TRS discussions. Once released into the atmosphere, oxidation products of TRS compounds, such as sulphuric acid, contribute to the environment's acidity. The most often reported health concerns related to TRS substances are nausea and headaches, although each component has its characteristics and effects.

6.1. Ambient Air Quality Standards

There are no South African standards for TRS; however, the World Health Organization (WHO) and the Ontario Ministry for the Environment (OME) have derived guidelines.

Table 6-1: TRS ambient air quality limits.

Organisation	Limit	10-min Average	30-minute Average	24-hour Average	Annual Average
WHO	Guideline	-	7 µg/m³ [a]	-	-
		-	5 ppb [a]	-	-
OME	Standard (pulp and paper)	13 µg/m³ [b]	10 µg/m³ [b]	14 µg/m³ [c]	-
		9.3 ppb [b]	7.2 ppb [b]	10.1 ppb [c]	-
OME	Standard (other industries)	13 µg/m³ [b]	10 µg/m³ [b]	7 µg/m³ [b]	-
		9.3 ppb [b]	7.2 ppb [b]	5.0 ppb [b]	-

Notes:

a) *World Health Organization recommendation to avoid substantial complaints about odour annoyance among the exposed population* (WHO, 2000).
b) *Based on odour effects* (OME, 1999).
c) *Based on the odour and health effects* (OME, 1999).
d) *Based on the adverse effects on the respiratory system (nasal lesions)* (OME, 1999).

The RBCAA has decided to implement the following:

- 30-minute WHO H_2S Guideline; and the
- Daily and 10-minute OME standards for the Pulp and Paper sector.

6.2. Data Availability

The percentage of valid data received from the TRS analysers for January 2025 is shown in Table 6-2.

Table 6-2: TRS data capture.

Station	Availability (%)	TRS (%)
CBD	99	99
eSikhaleni	99	98
Felixton	100	100
Richardia	98	97

Notes:
1. *Red - Not acceptable for statistical purposes (<80%)*
2. *Orange – Does not meet SANAS data capture requirements (<90%)*
3. *Yellow – RBCAA reporting requirement (<=95%)*

Missing Data (TRS):
- *eSikhaleni – power outages, data invalidation (1 day with <80% data capture 31 January 2025).*
- *Richardia – power outages, data invalidation (1 day with <80% data capture 12 January 2025).*

6.3. Monthly

Monthly average TRS concentrations are shown in Figure 6-1. Comparisons to previous months are also provided (Figure 6-2).

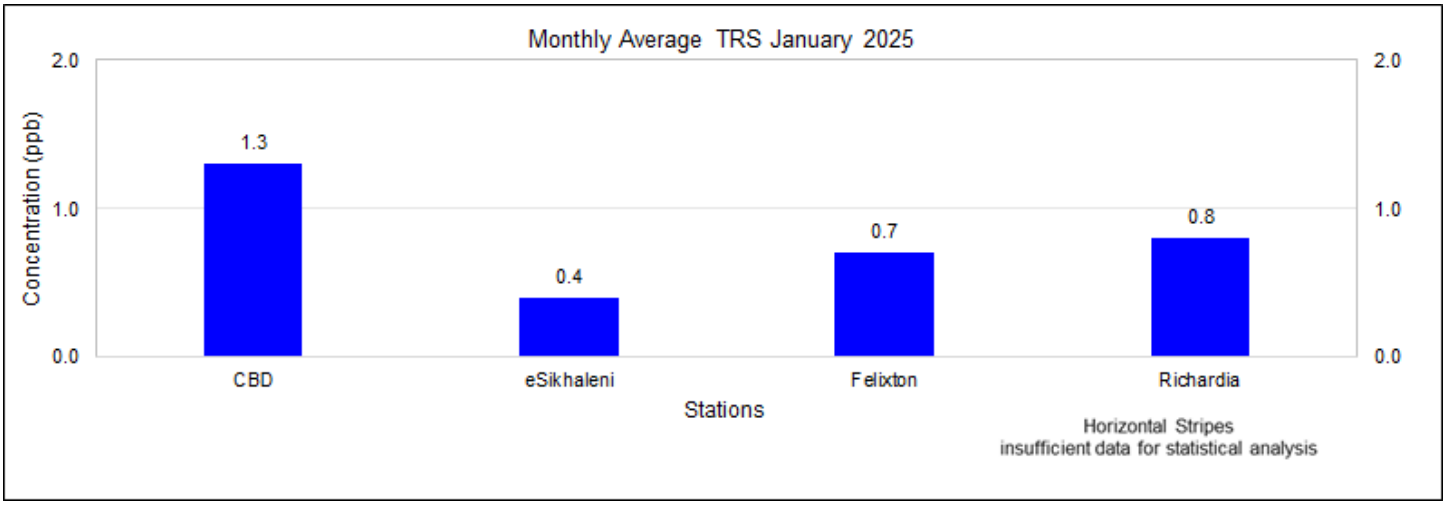


Figure 6-1: TRS monthly concentrations.

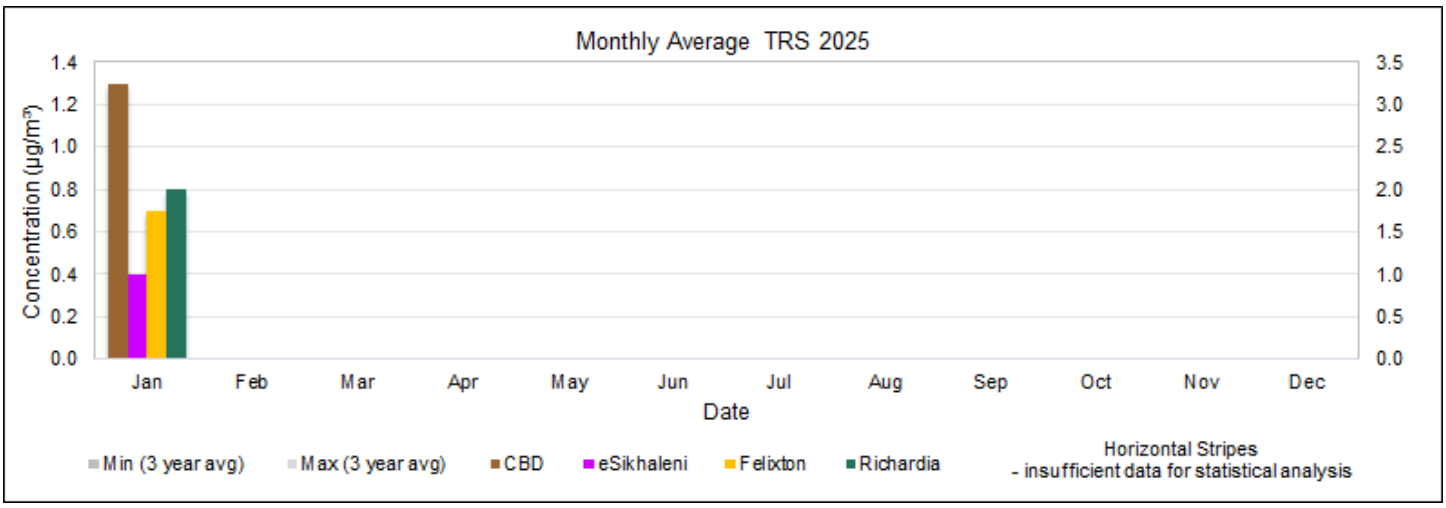


Figure 6-2: TRS monthly comparison.

6.4. Diurnal

The diurnal TRS concentrations are shown below (Figure 6-3). Diurnal concentrations of TRS did not exceed the OME Daily Limit (10.1 ppb).

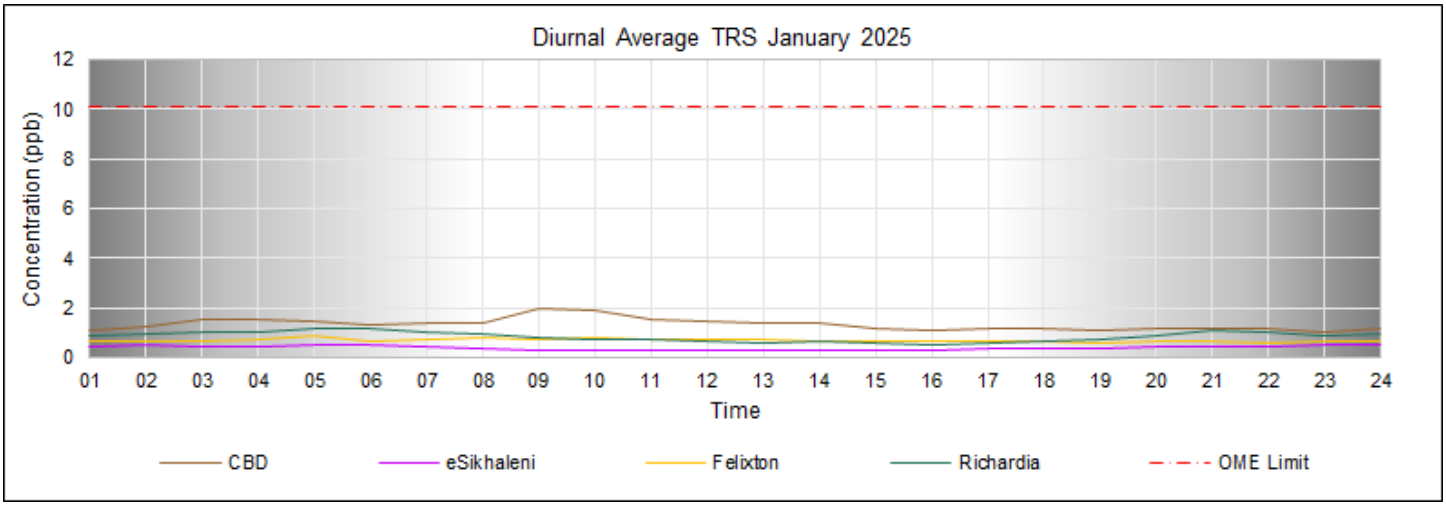


Figure 6-3: TRS diurnal concentrations.

6.5. Daily

The daily average concentrations of TRS are shown in Figure 6-4 and exceedances in Table 6-3. One (1) exceedance of the OME Limit (10.1 ppb) was measured at CBD.

Table 6-3: TRS 24-hour average exceedance (OME)

TRS 24-hr-OME Limit (10.1 ppb)	1
CBD	1
Mondi	1

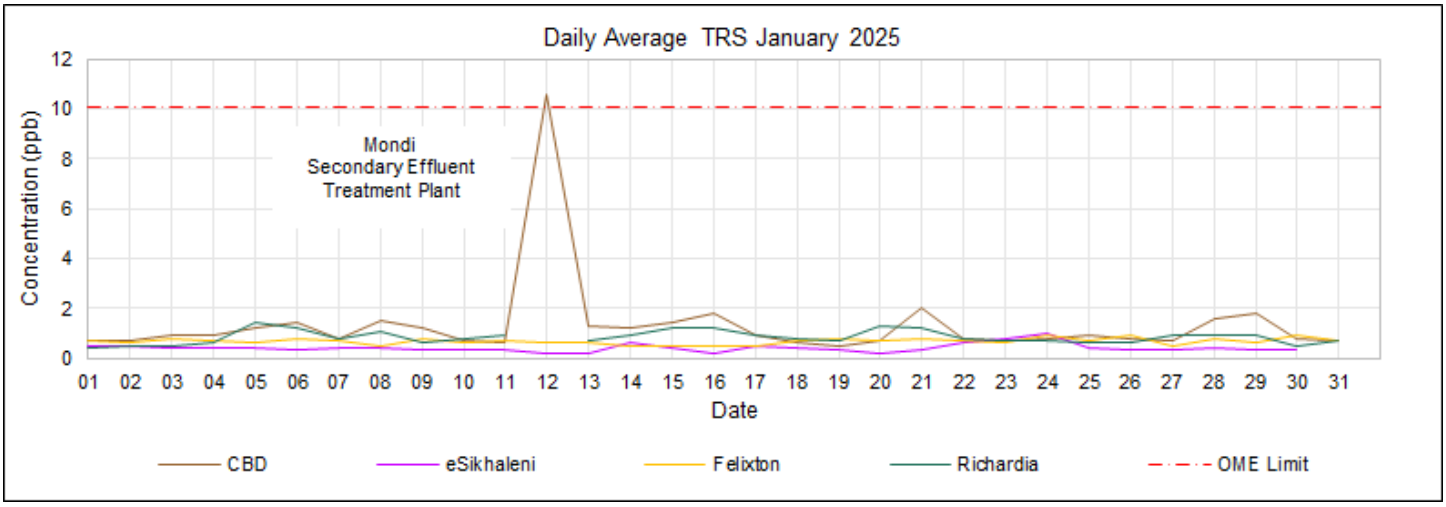


Figure 6-4: TRS daily average concentration.
Missing Data (TRS):

- *eSikhaleni – power outages, data invalidation (1 day with <80% data capture 31 January 2025).*
- *Richardia – power outages, data invalidation (1 day with <80% data capture 12 January 2025).*

6.6. 30-minute

TRS 30-minute average concentrations are shown in Figure 6-5, and exceedances in Table 6-4. Fourty (40) exceedances of the WHO Limit (5.0 ppb) were measured.

Table 6-4: TRS 30-minute average exceedances (WHO).

TRS 30-minute WHO H_2S Limit (5.0 ppb)	40
CBD	**34**
Mondi	34
Felixton	**1**
THS - meteorology	1
Richardia	**5**
Mondi	5

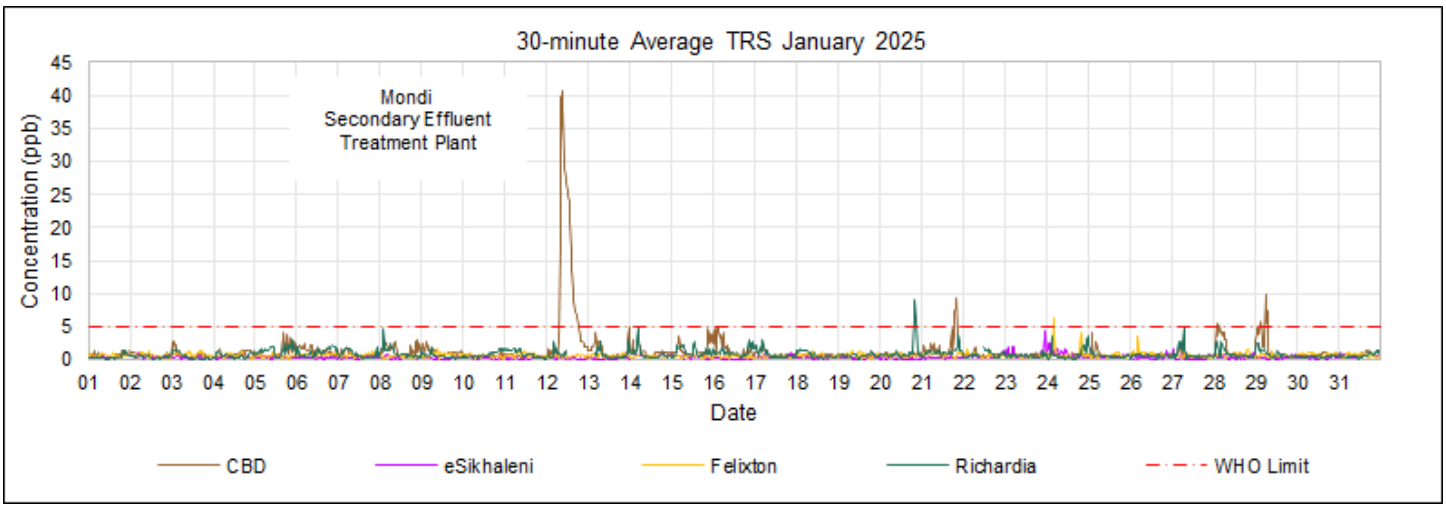


Figure 6-5: TRS 30-minute average concentration.

6.7. 10-minute

TRS 10-minute average concentrations are shown in Figure 6-6 and exceedances in Table 6-5. Fifty-eight (58) exceedances of the OME Limit (9.3 ppb) were measured.

Table 6-5: TRS 10-minute average exceedances (OME).

TRS 10-minute OME Limit (9.3 ppb)	58
CBD	**53**
Mondi	53
Felixton	**2**
THS - meteorology	2
Richardia	**3**
Mondi	3

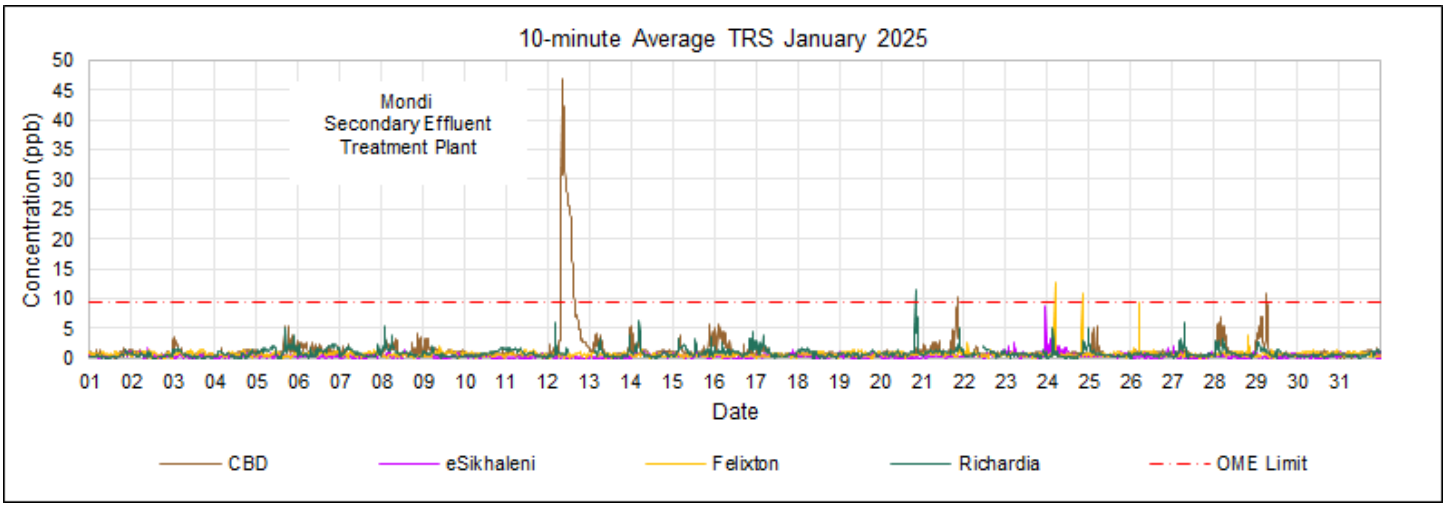


Figure 6-6: TRS 10-minute average concentrations.

6.8. Exceedances

The number of days on which exceedances occurred, plus comparisons to previous months, are shown in Figure 6-7, and a summary of the TRS exceedances broken down per station is presented in Table 6-6. TRS exceedances can be associated with emissions because of process upsets (i.e., planned maintenance, plant shutdowns or start-up), leaks in equipment, pipelines, seals, valves (fugitive emissions) or an event (e.g., fires or emergency shutdowns). According to the relevant Air Quality Index (AQI), the areas where no exceedances were measured may be considered good air quality.

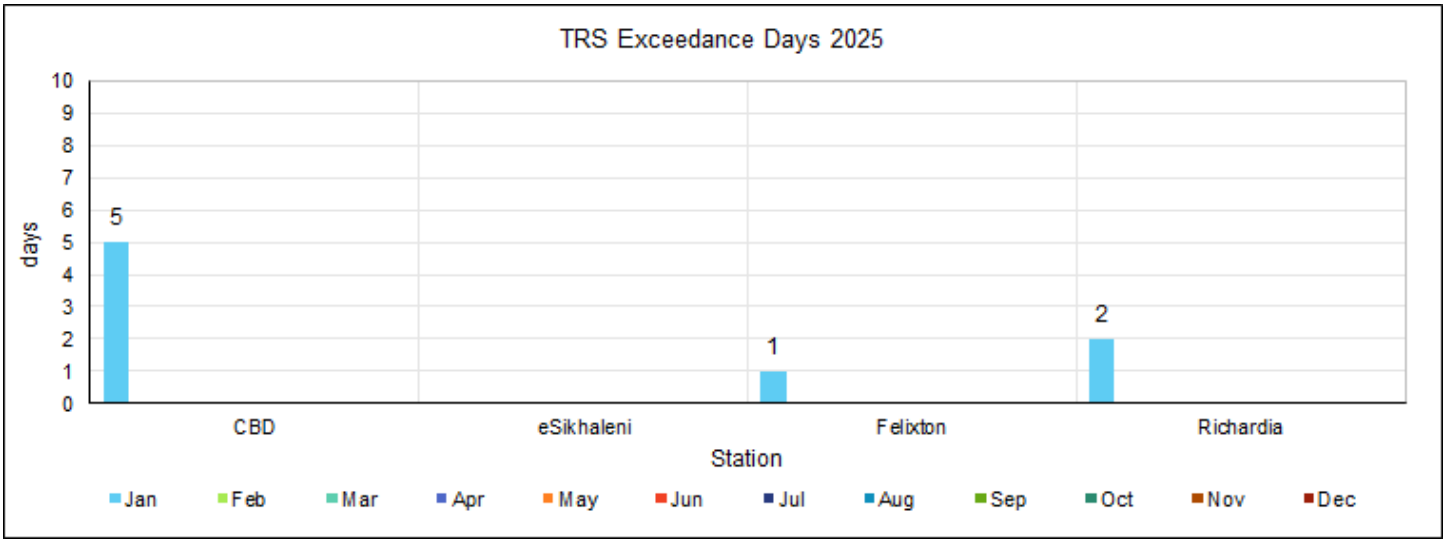


Figure 6-7: TRS exceedance days.

Table 6-6: TRS exceedance summary.

2025	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
TRS 24-hr-OME Limit (10.1 ppb)													
CBD	1	-	-	-	-	-	-	-	-	-	-	-	**1**
eSikhaleni	-	-	-	-	-	-	-	-	-	-	-	-	0
Felixton	-	-	-	-	-	-	-	-	-	-	-	-	0
Richardia	-	-	-	-	-	-	-	-	-	-	-	-	0
TRS 30-minute WHO H_2S Limit (5.0 ppb)													
CBD	34	1	-	-	-	-	-	-	-	-	-	-	**35**
eSikhaleni	-	-	-	-	-	-	-	-	-	-	-	-	0
Felixton	1	-	-	-	-	-	-	-	-	-	-	-	**1**
Richardia	5	-	-	-	-	-	-	-	-	-	-	-	**5**
TRS 10-minute OME Limit (9.3 ppb)													
CBD	53	-	-	-	-	-	-	-	-	-	-	-	**53**
eSikhaleni	-	-	-	-	-	-	-	-	-	-	-	-	0
Felixton	2	-	-	-	-	-	-	-	-	-	-	-	**2**
Richardia	3	-	-	-	-	-	-	-	-	-	-	-	**3**

7. MONTHLY AIR QUALITY

Where possible, the RBCAA assesses data collected by its network against National Standards, International Guidelines, and Local Targets. The WHO air quality guidelines (AQGs) are intended for worldwide use and have been developed to support actions to achieve air quality that protects public health in different contexts. On the other hand, air quality standards and local targets are set by each country or region to protect the public health of their citizens and, as such, are an essential component of national risk management and environmental policies. National standards and local targets vary according to the approach adopted for balancing health risks, technological feasibility, economic considerations, and other political and social factors. These factors, in turn, depend on, among other things, the level of development and national capability in air quality management (WHO, 2005).

7.1. Conclusion

Determining air quality concerning pollutants measured and impacts simulated is based on comparison to and exceedances of short-term (10-minute, 30-minute, 1-hour and 24-hour averages) and long-term (monthly and annual averages) targets, guidelines, and standards.

AIMS concludes that during January 2025, based on the following:

- Measured long-term average concentrations (chronic exposure) and WHO health guidelines of concern are:
  - PM_{10} at eSikhaleni, Richardia and Scorpio;
  - $PM_{2.5}$ at Felixton, Harbour West and Scorpio.

- Measured short-term average concentrations (acute exposure) and WHO health guidelines ambient air quality was compromised by:
  - PM_{10} at Scorpio;
  - $PM_{2.5}$ at Felixton, Harbour West and Scorpio; and
  - TRS at CBD, Felixton and Richardia.

8. AIRGRADIENT MONITORING NETWORK

The AirGradient network was established towards the end of 2023 as a co-location study to verify the accuracy of its particulate measurements. It was later expanded in response to an RBCAA objective, adding monitoring capabilities for additional pollutants. Initially, there were only two sites, Harbour West and Richardia and only particulates (PM_{10}, $PM_{2.5}$ and PM_1) were monitored. The network was expanded to Brackenham, CBD, eSikhaleni and Felixton in July 2024, and all the monitors were upgraded to measure volatile organic compounds (TVOC), nitrogen oxides (NO_x), and carbon dioxide (CO_2).

AirGradient monitors are designed to provide accessible and cost-effective air quality monitoring solutions. While they offer valuable insights into environmental conditions, there are notable differences when compared to analysers approved by organisations such as the U.S. Environmental Protection Agency (EPA):

- Accuracy and Precision: Approved analysers are subjected to rigorous testing to ensure high accuracy and precision in measuring specific pollutants. AirGradient monitors utilise sensors like the Plantower PMS5003 for particulate matter and the SenseAir S8 for CO_2, which are reliable but may not match the stringent accuracy levels of certified equipment. For instance, the SenseAir S8 has an accuracy of ±30 ppm ±3% of the reading, which is suitable for general monitoring but may not meet standards for regulatory compliance.
- Calibration and Certification: Approved devices undergo regular calibration and certification processes to maintain compliance with federal standards. AirGradient monitors, particularly the DIY kits, may not come with such certifications, and their accuracy can be influenced by factors like sensor placement and environmental conditions. However, AirGradient offers fully assembled monitors certified for CE, FCC, RoHS, and REACH, providing a higher level of assurance in their performance.
- Data Application: AirGradient monitors are well-suited for educational purposes, personal use, and preliminary air quality assessments. They are beneficial for raising awareness and guiding indoor air quality management decisions. In contrast, Approved analysers are employed for regulatory monitoring, research, and enforcement of air quality standards, where data accuracy and reliability are paramount.
- Cost and Accessibility: AirGradient monitors are more affordable and accessible, making them ideal for widespread use in homes, schools, and communities. Approved analysers are significantly more expensive and are typically used by governmental agencies and research institutions.

In summary, while AirGradient monitors provide valuable air quality data for non-regulatory applications, they do not replace the precision and certification of approved analysers required for compliance and enforcement purposes.

The RBCAA AirGradient monitoring network comprises six (6) stations (Figure 8-1).

Figure 8-1: RBCAA monitoring network.

8.1. Data Availability

The percentage of valid data received from the AirGradient network for 2025 is shown in Table 8-1.

Table 8-1: AirGradient network data availability.

Date	Brackenham	CBD	eSikhaleni	Felixton	Harbour West	Richardia
Jan 2024	-	-	-	-	**94**	97
Feb 2024	-	-	-	-	**75**	**90**
Mar 2024	-	-	-	-	97	**85**
Apr 2024	-	-	-	-	**93**	97
May 2024	-	-	-	-	**94**	98
Jun 2024	-	-	-	-	**92**	**94**
Jul 2024	**41**	**42**	**38**	**33**	**95**	**94**
Aug 2024	99	100	**95**	97	99	96
Sep 2024	96	**94**	**95**	**90**	96	96
Oct 2024	97	100	99	**92**	99	98
Nov 2024	97	**91**	96	96	96	95
Dec 2024	98	96	98	**93**	98	**74**
Jan 2025	99	98	97	97	98	97

Notes:
1. Red - Not acceptable for statistical purposes (<80%),
2. Orange – Does not meet SANAS data capture requirements (<90%),
3. Yellow – RBCAA reporting requirement (<=95%)

Missing Data:

- *Brackenham*
  - *July – instrument commissioned.*
- *CBD*
  - *July – instrument commissioned.*
  - *September – power outages.*
  - *November - power outages.*
- *eSikhaleni*
  - *July – instrument commissioned.*
  - *August - power outages.*
  - *September – power outages.*
- *Felixton*
  - *July – instrument commissioned.*
  - *September – power outages.*
  - *October - solar system failure.*
  - *December - communication failures.*
- *Harbour West*
  - *January to June – There were issues with MTN router data contracts; since July, when new Wi-Fi routers were installed, the instruments were connected to the station APN.*
- *Richardia*
  - *January to June – There were issues with MTN router data contracts; since July, when new Wi-Fi routers were installed, the instruments were connected to the station APN.*
  - *December - power outages.*

8.2. Particulate Monitoring

8.2.1. Monthly

PM_{10}, $PM_{2.5}$ and PM_1 monthly average concentrations are shown in Figure 8-2, Figure 8-3, and Figure 8-4, comparisons to previous months are also provided (Figure 8-5, Figure 8-6, and Figure 8-7). There are similar seasonal trends, with elevated concentrations during winter.

- PM_{10} monthly average concentrations did not exceed the RSA Annual Limit or the WHO Annual Limit.
- $PM_{2.5}$ monthly average concentrations did not exceed the RSA Annual Limit; the WHO Annual Limit was exceeded at all points monitored.

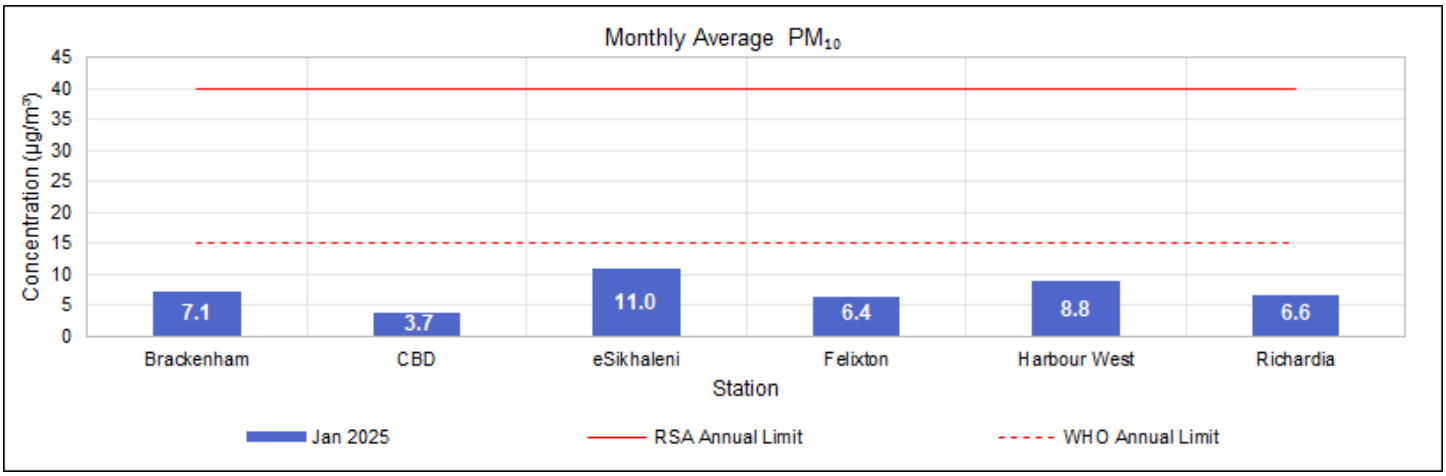


Figure 8-2: PM_{10} monthly concentration.

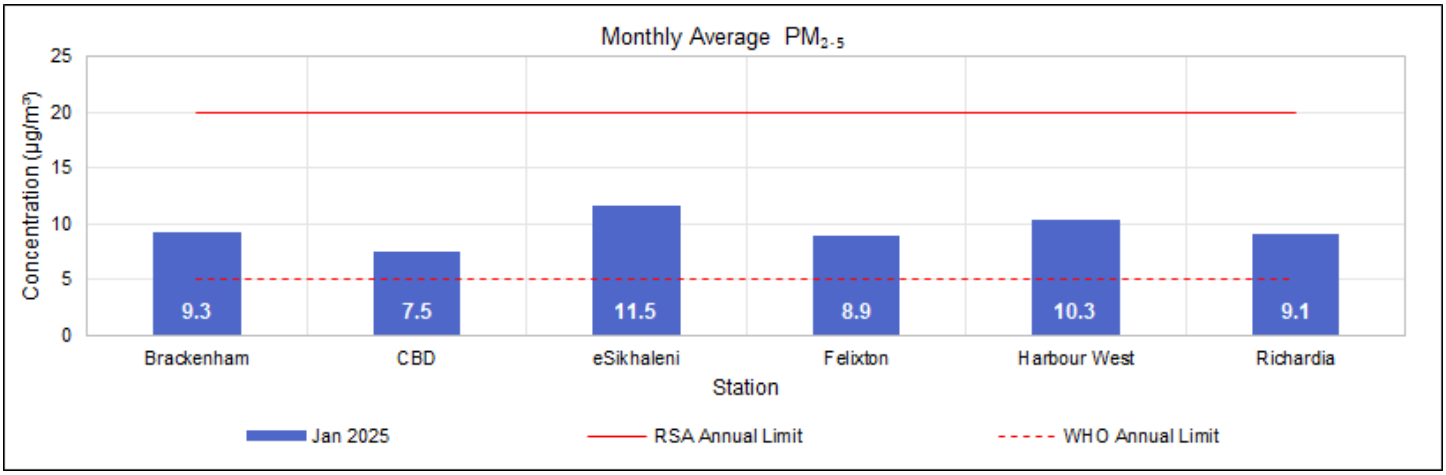


Figure 8-3: $PM_{2.5}$ monthly concentration.

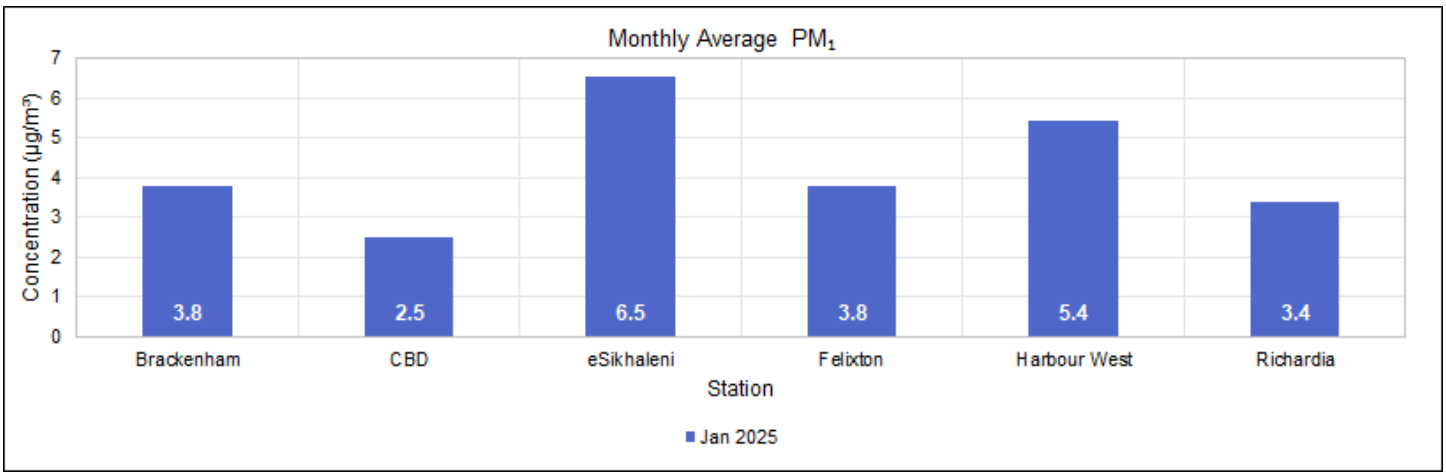


Figure 8-4: PM_{10} monthly concentration.

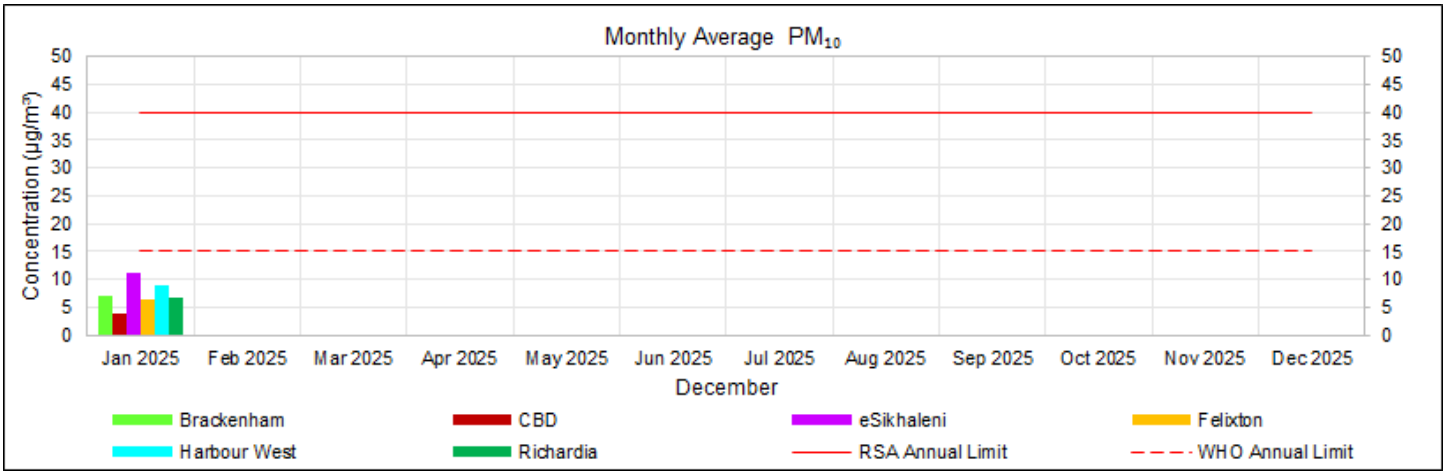


Figure 8-5: PM_{10} monthly comparison.

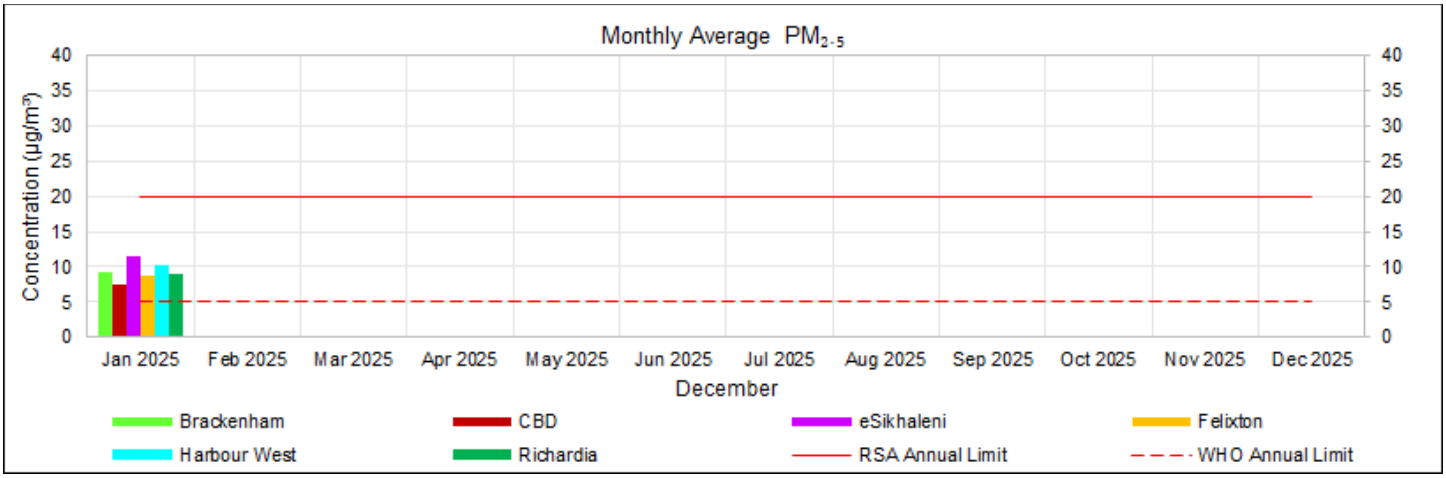


Figure 8-6: $PM_{2.5}$ monthly comparison.

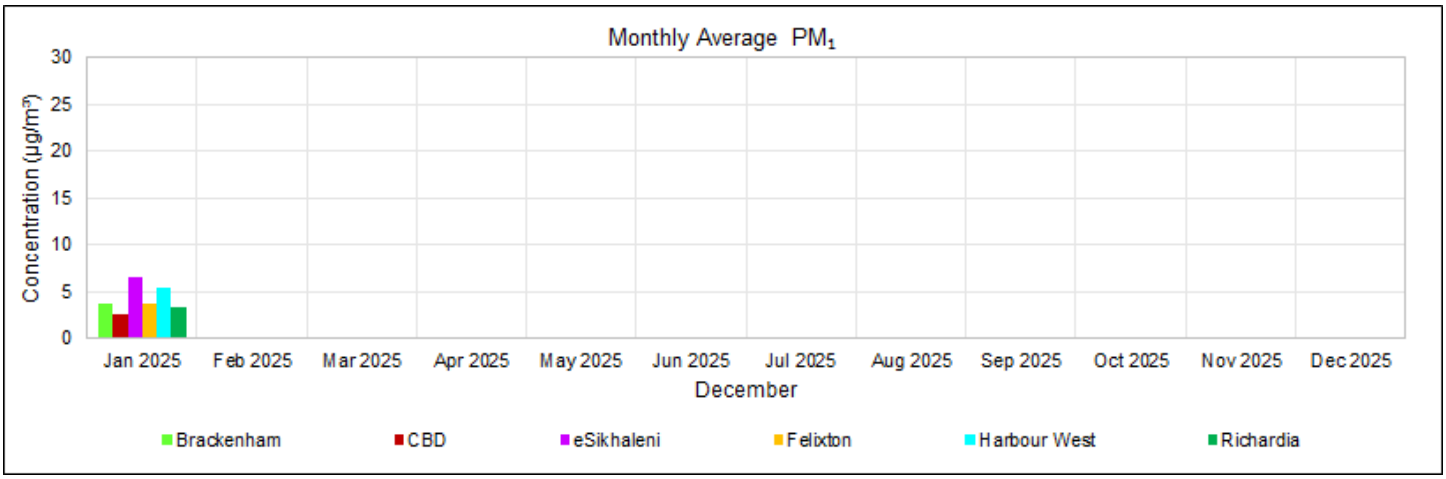


Figure 8-7: PM_1 monthly comparison.

8.2.2. Diurnal

PM diurnal concentrations are shown below (Figure 8-8, Figure 8-9, and Figure 8-10).

- RSA daily limits for PM_{10} and $PM_{2.5}$ were not exceeded, and,
- WHO daily limits for $PM_{2.5}$ were exceeded at eSikhaleni.

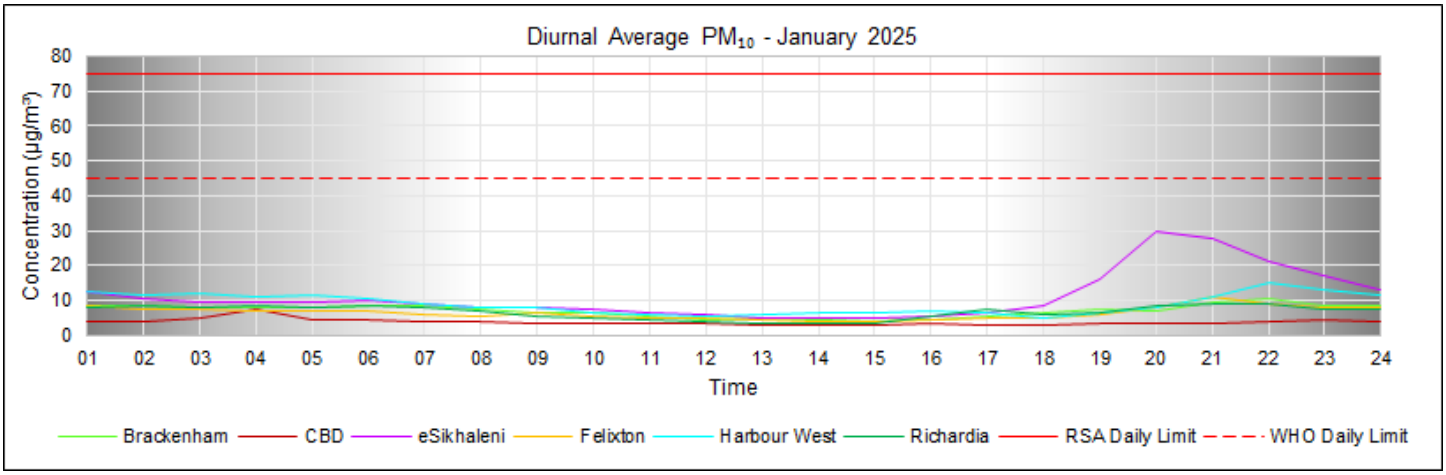


Figure 8-8: PM_{10} diurnal concentrations.

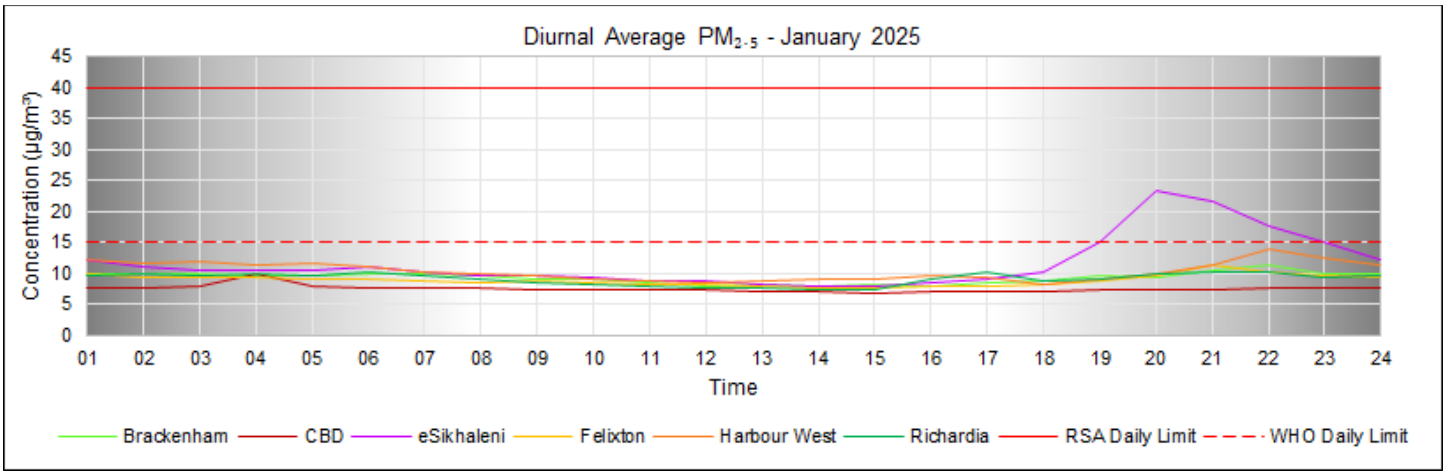


Figure 8-9: $PM_{2.5}$ diurnal concentrations.

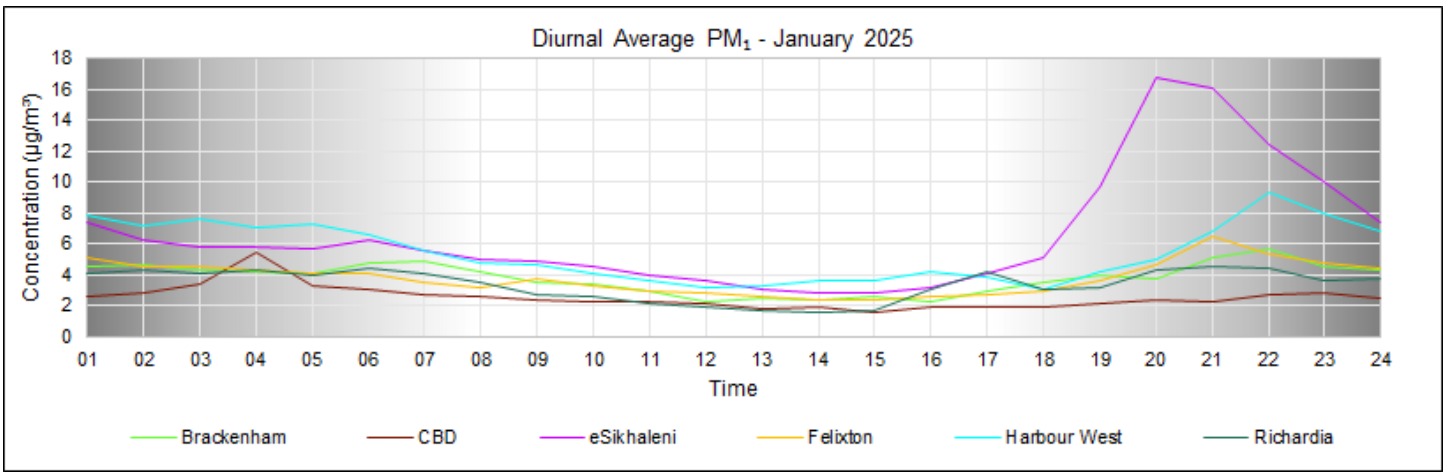


Figure 8-10: PM_1 diurnal concentrations.

8.2.3. Daily

PM daily concentrations are shown below (Figure 8-11, Figure 8-12, and Figure 8-13).

- The RSA daily limits for PM_{10} and $PM_{2.5}$ were not exceeded;
- The WHO daily limit for PM_{10} was not exceeded; the $PM_{2.5}$ limit was exceeded at Harbour West and eSikhaleni.

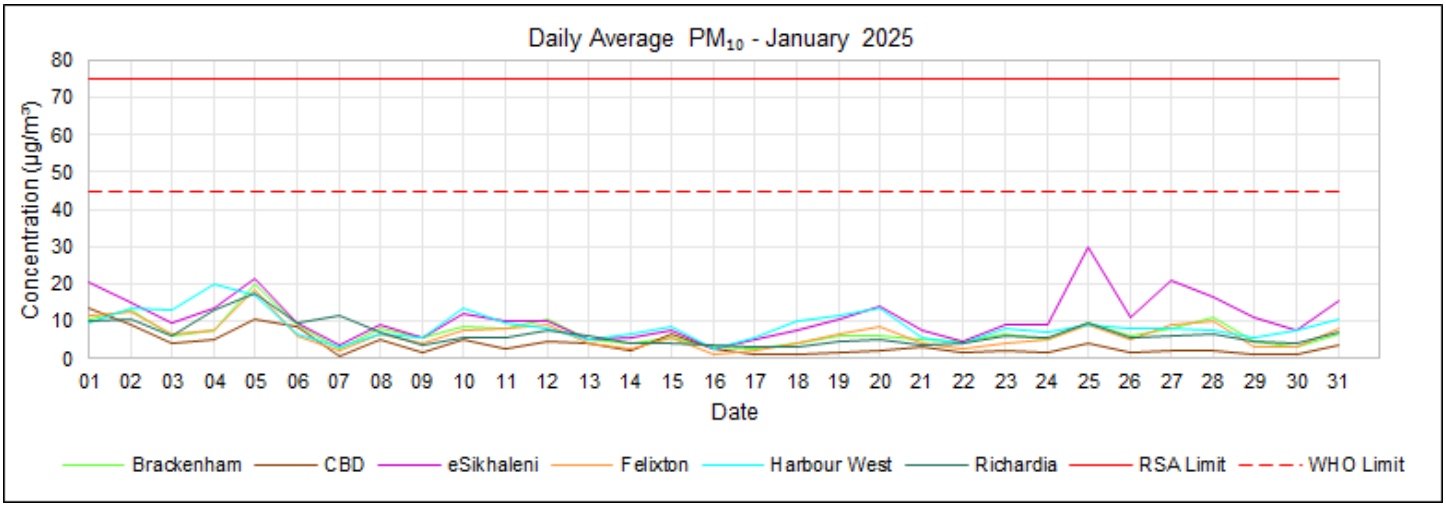


Figure 8-11: PM_{10} daily concentrations.

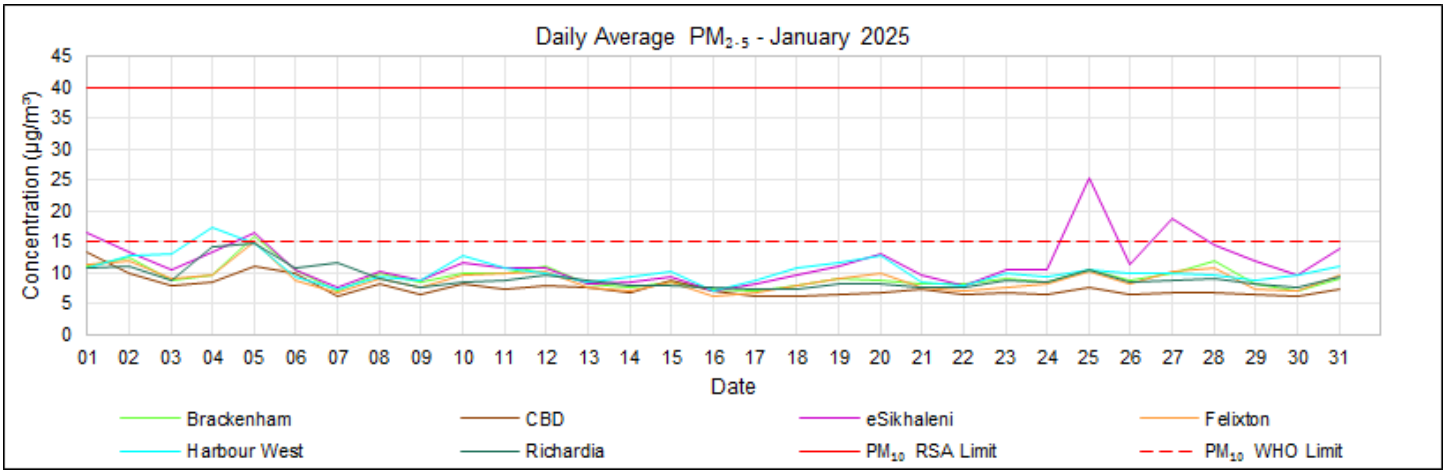


Figure 8-12: $PM_{2.5}$ daily concentrations.

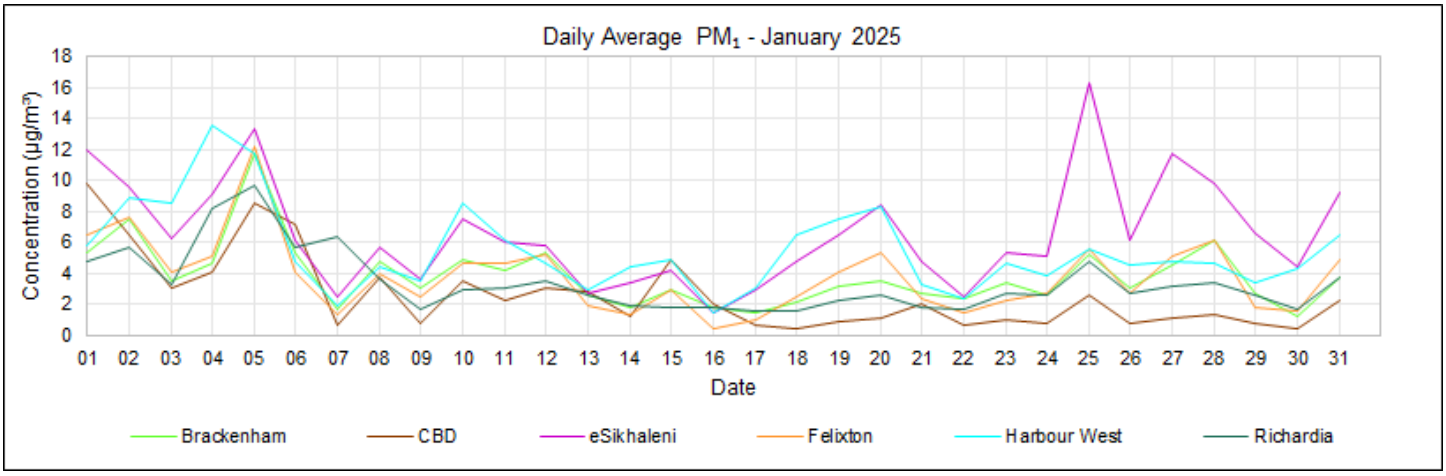


Figure 8-13: PM_1 daily concentrations.

8.3. Total Volatile Organic Compounds Monitoring

Total Volatile Organic Compounds (VOCs) refer to organic chemicals that easily evaporate at ambient temperatures. They are commonly present in outdoor air due to sources like industrial emissions, vehicle exhaust, and the use of chemical products. These compounds can significantly contribute to air pollution and negatively impact human health and the environment. Exposure to high concentrations of TVOCs can cause short-term symptoms such as irritation of the eyes, nose, and throat, as well as headaches and dizziness. Prolonged exposure may lead to more severe health issues, including damage to the liver, kidneys, and central nervous system. The AirGradient TVOC sensors cannot distinguish between harmful and harmless substances and don't measure absolute levels but changes in the concentration (index); this can help identify (and avoid) emission events such as rush hours.

8.3.1. Monthly

TVOC monthly average concentrations are shown in Figure 8-14. Comparisons to previous months are also provided (Figure 8-15).

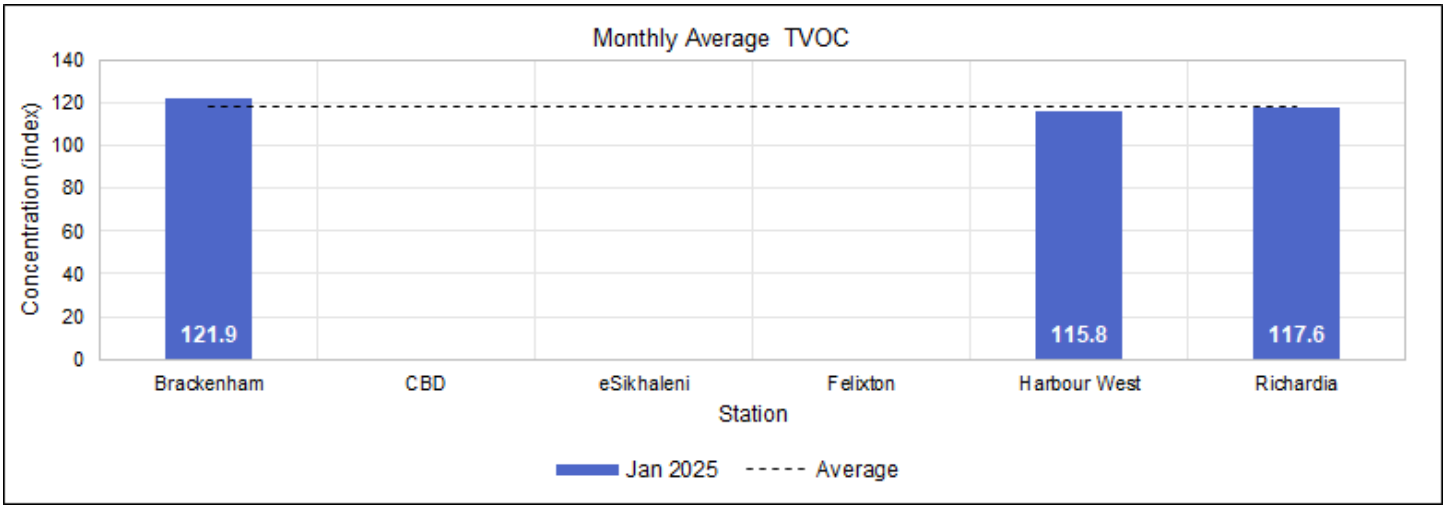


Figure 8-14: TVOC monthly concentration.
CBD - sensor failure
eSikhaleni - sensor failure
Felixton - sensor failure

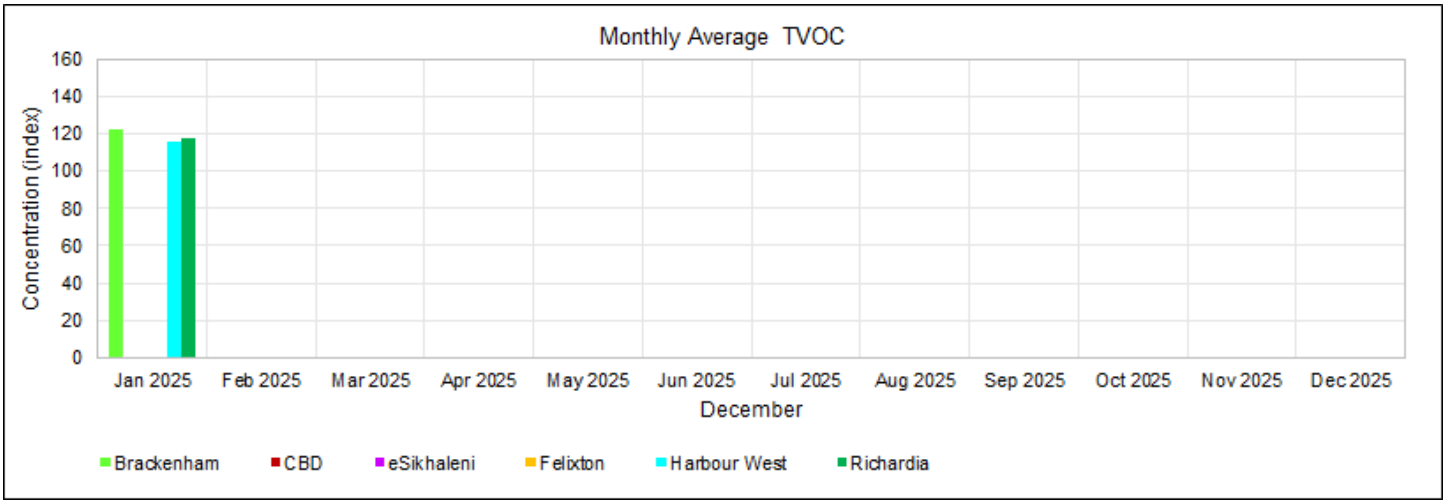


Figure 8-15: TVOC monthly comparison.
CBD - sensor failure
eSikhaleni - sensor failure
Felixton - sensor failure

8.3.2. Diurnal

TVOC diurnal concentrations are shown below (Figure 8-8, Figure 8-9, and Figure 8-10).

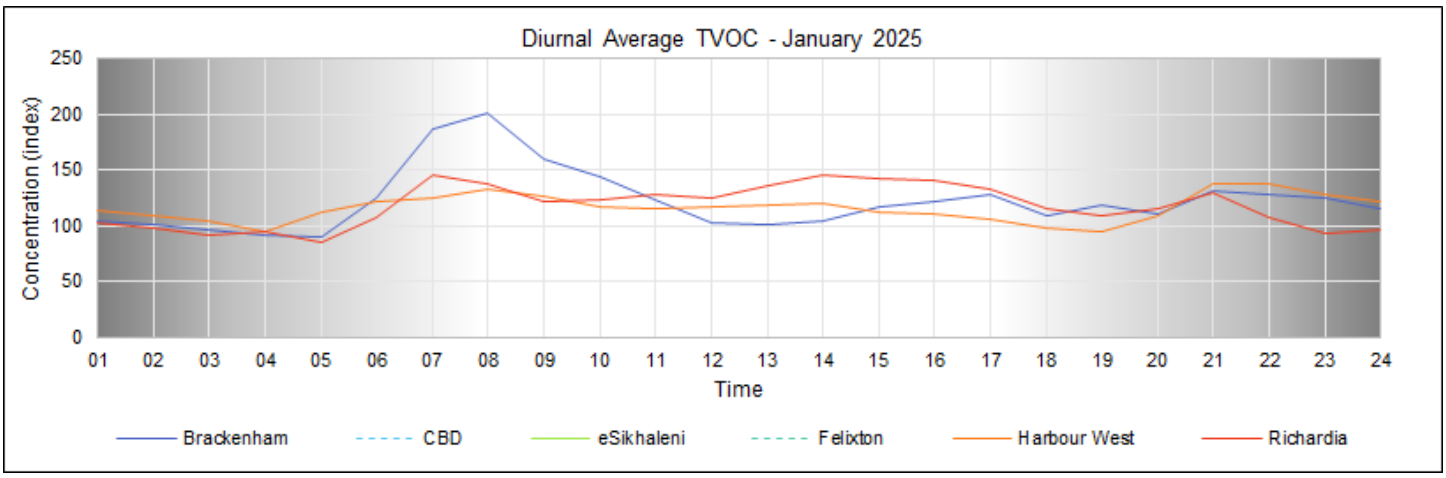


Figure 8-16: TVOC diurnal concentrations.
CBD - sensor failure
Felixton - sensor failure

8.3.3. Daily

TVOC daily concentrations are shown below (Figure 8-17).

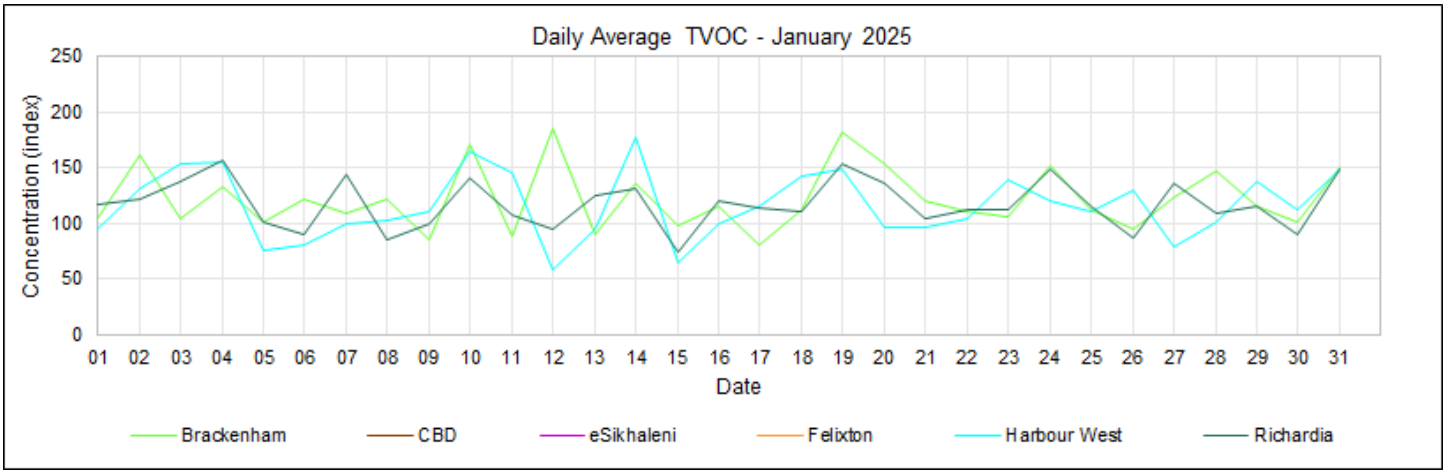


Figure 8-17: TVOC daily concentrations.
CBD - sensor failure
eSikhaleni - sensor failure
Felixton - sensor failure

8.3.4. Hourly

TVOC hourly concentrations are shown below (Figure 8-18).

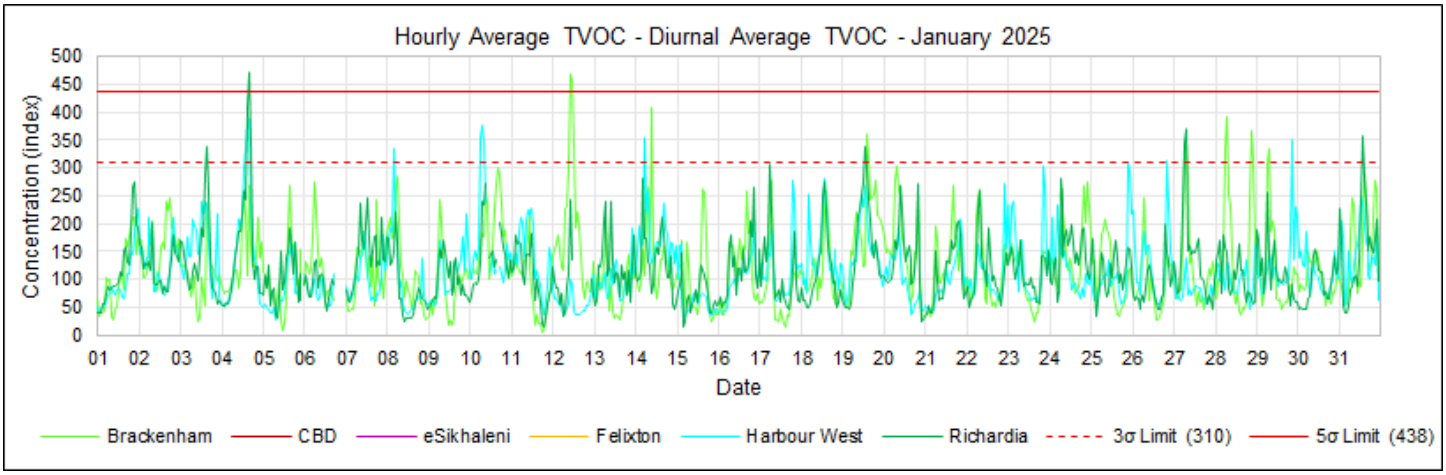


Figure 8-18: TVOC hourly concentrations.
CBD - sensor failure
eSikhaleni - sensor failure
Felixton - sensor failure

8.4. Nitrogen Oxides Monitoring

Nitrogen oxides (NO_x) refer to a group of highly reactive gases that are primarily composed of nitrogen dioxide (NO_2) and nitric oxide (NO). These gases are produced through the combustion of fossil fuels in vehicles, power plants, and industrial facilities. NO_x emissions significantly contribute to air pollution, playing a key role in forming ground-level ozone and particulate matter, both harmful to human health and the environment. Exposure to elevated levels of NO_x can lead to respiratory problems, particularly in vulnerable populations such as children, the elderly, and those with pre-existing conditions like asthma. Additionally, NO_x contributes to the formation of acid rain, which can damage ecosystems and infrastructure. Regulatory standards for NO_x vary globally, but efforts to reduce these emissions are critical for improving air quality and mitigating environmental impacts. The AirGradient NO_x sensors don't measure absolute levels but changes in the concentration (index); this can help identify (and avoid) emission events such as rush hours.

8.4.1. Monthly

NO_x monthly average concentrations are shown in Figure 8-19; comparisons to previous months are also provided (Figure 8-20).

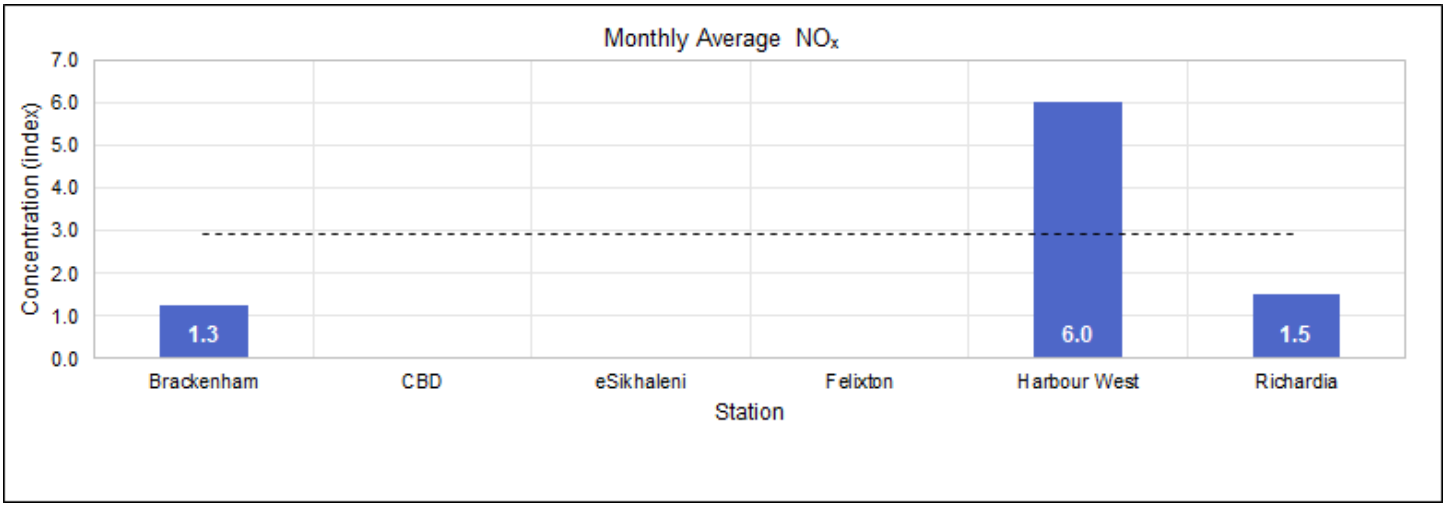


Figure 8-19: NO_x monthly concentration.
CBD - sensor failure
eSikhaleni - sensor failure
Felixton - sensor failure

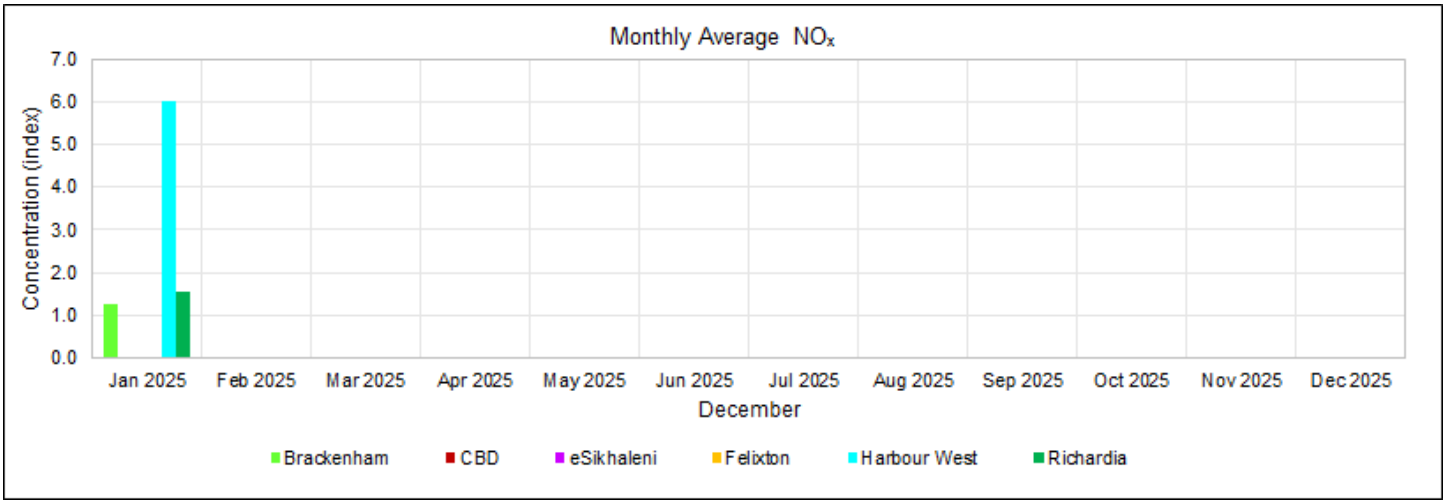


Figure 8-20: NO_x monthly comparison.
CBD - sensor failure
Felixton - sensor failure

8.4.2. Diurnal

NO_x diurnal concentrations are shown below (Figure 8-21).

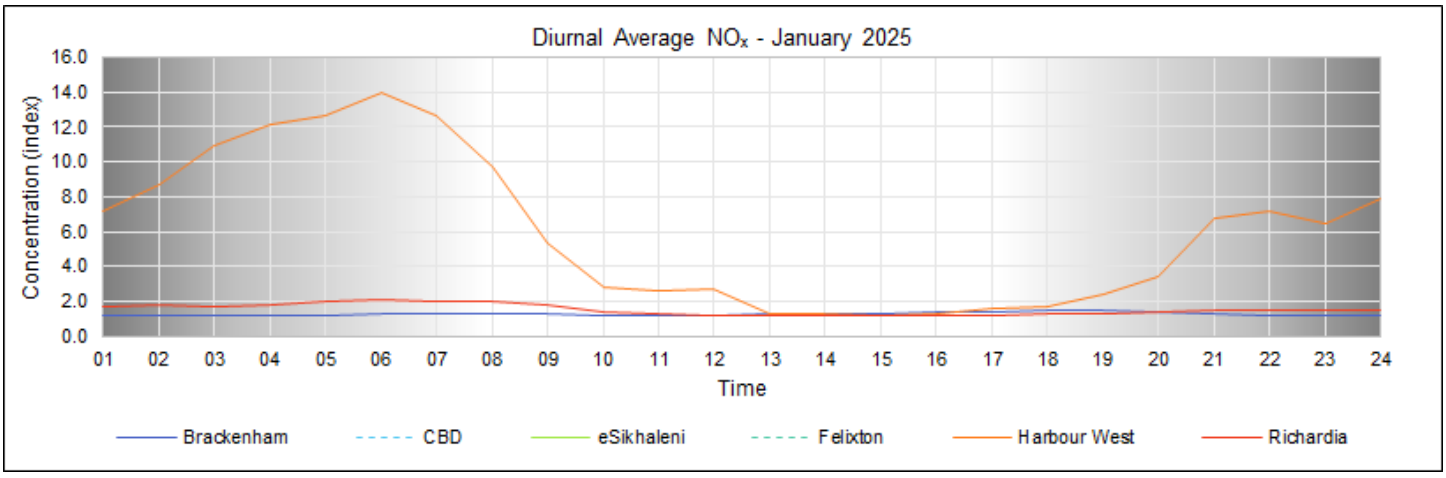


Figure 8-21: NO_x diurnal concentrations.
CBD - sensor failure
Felixton - sensor failure

8.4.3. Daily

NO_x daily concentrations are shown below (Figure 8-22).

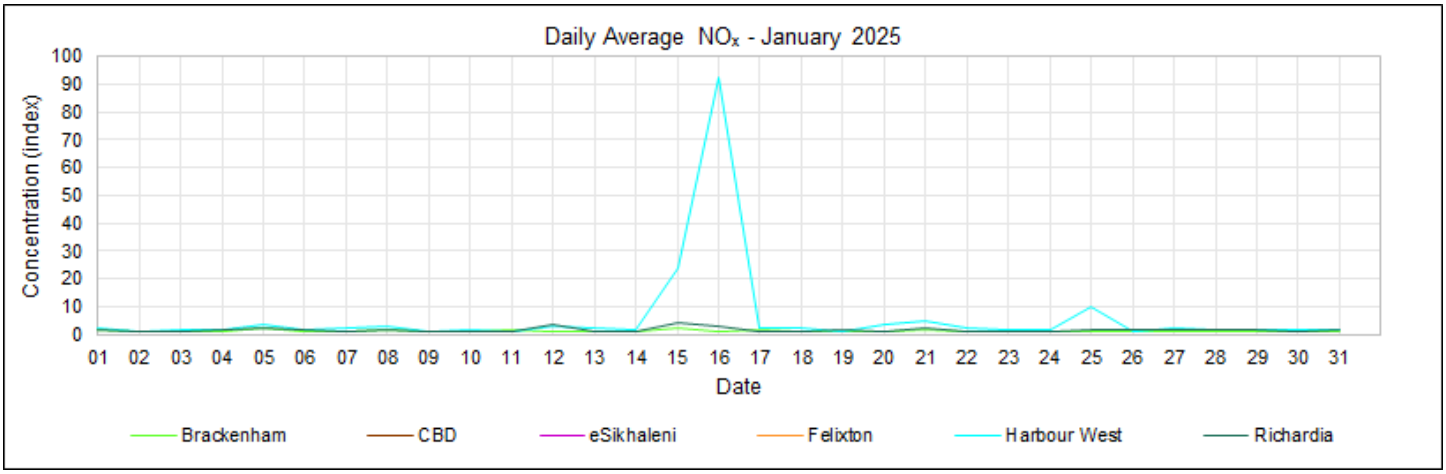


Figure 8-22: NO_x daily concentrations.
CBD - sensor failure
Felixton - sensor failure

8.4.4. Hourly

NO_x hourly concentrations are shown below (Figure 8-23).

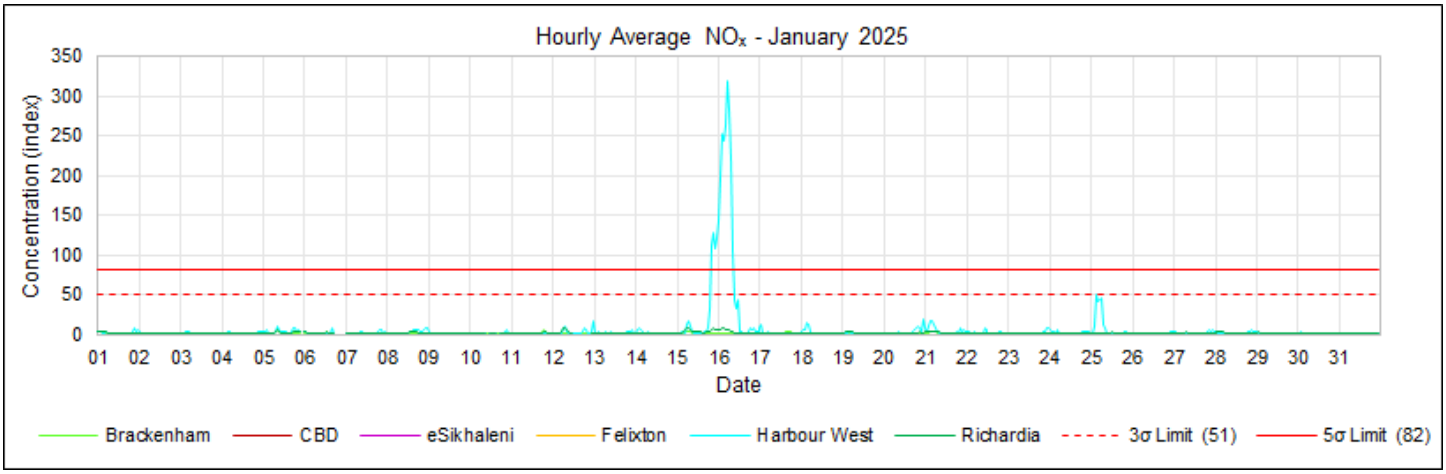


Figure 8-23: NO_x hourly concentrations.
CBD - sensor failure
Felixton - sensor failure

8.5. Carbon Dioxide Monitoring

In the year 2000, the global background concentration of carbon dioxide (CO_2) was approximately 370 ppm; this marked a significant increase from the pre-industrial level of around 280 ppm and reflected the continued growth in CO_2 emissions from fossil fuel combustion, deforestation, and other human activities during the 20th century. The rate of increase in atmospheric CO_2 had accelerated during the latter half of the century, with an average rise of about 1.5 to 2 ppm per year by the early 2000s.

8.5.1. Monthly

CO_2 monthly average concentrations are shown in Figure 8-24; comparisons to previous months are also provided (Figure 8-25).

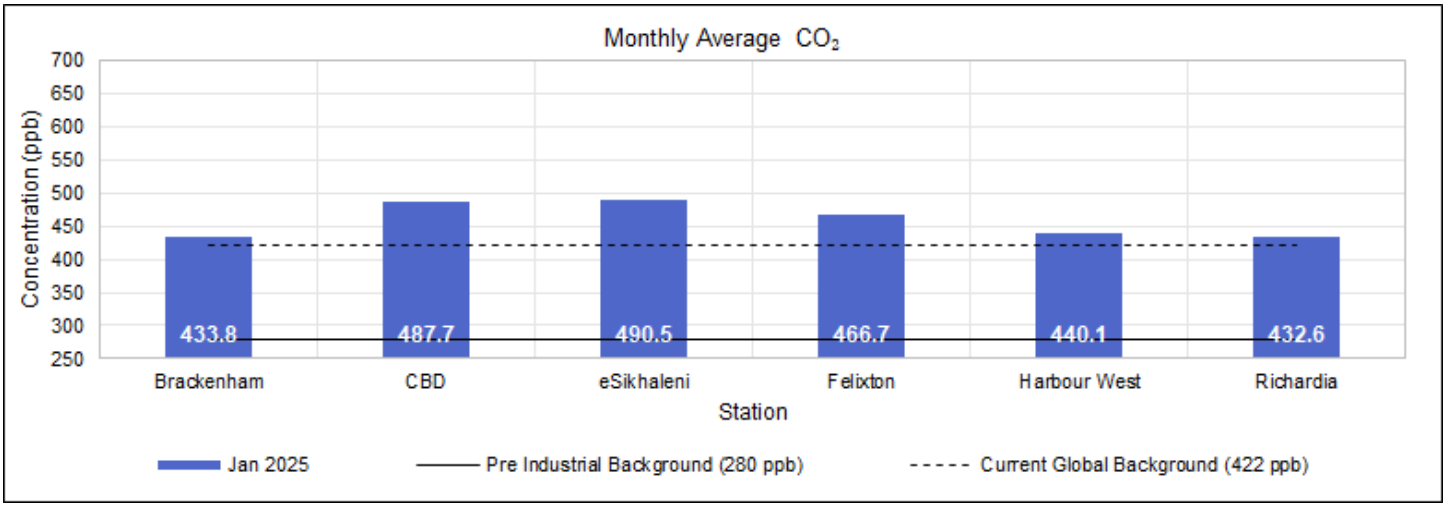


Figure 8-24: CO_2 monthly concentration.

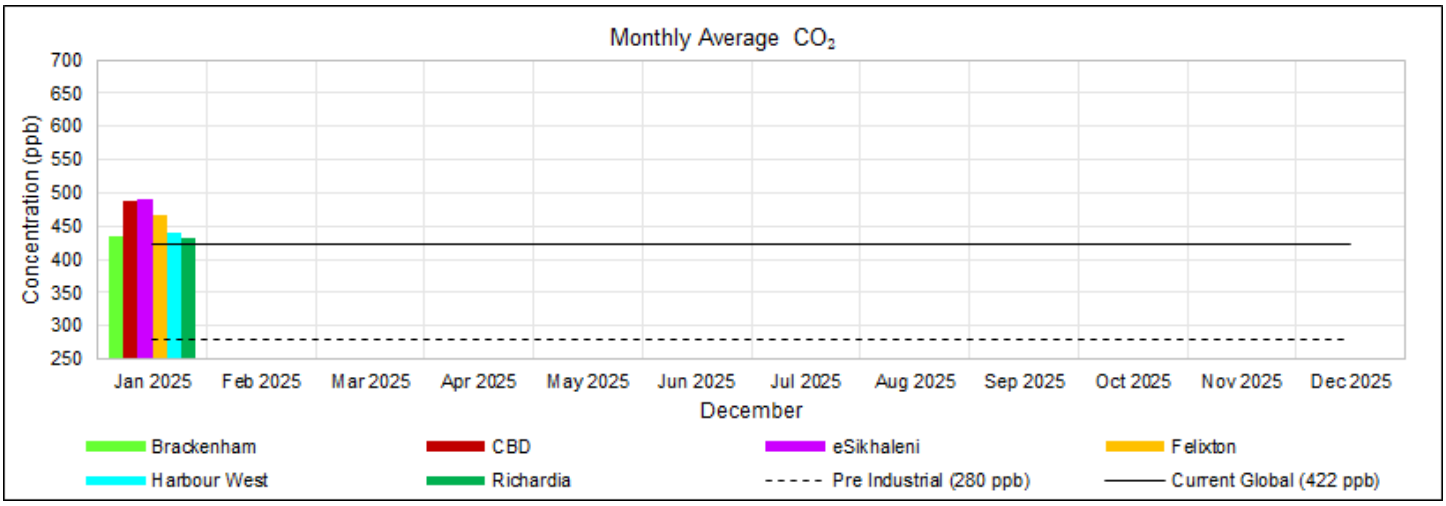


Figure 8-25: CO_2 monthly comparison.

8.5.2. Diurnal

CO_2 diurnal concentrations are shown below (Figure 8-26).

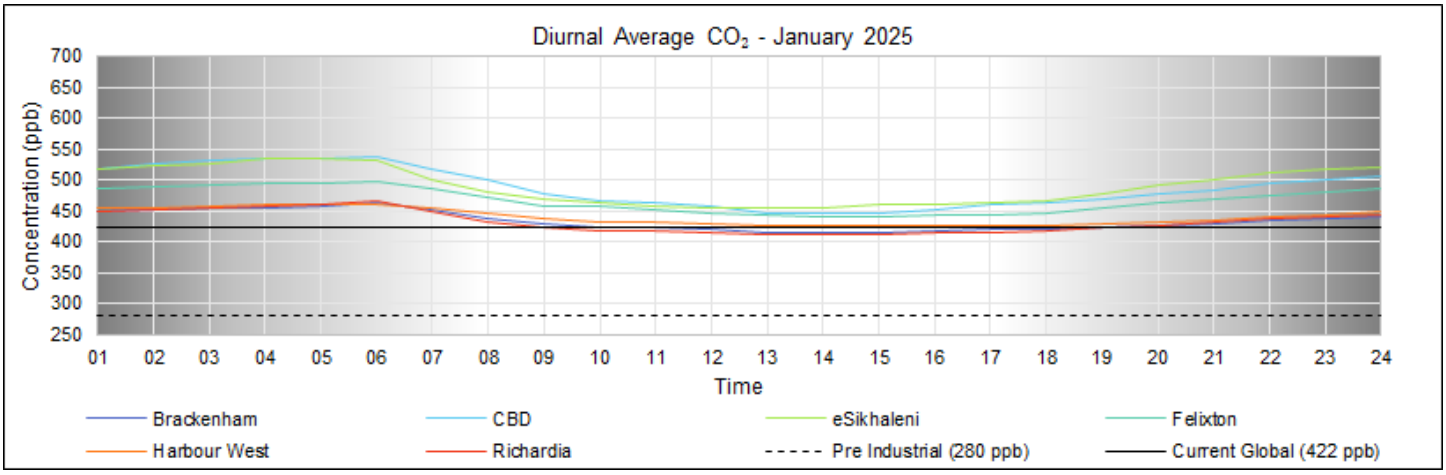


Figure 8-26: CO_2 diurnal concentrations.

8.5.3. Daily

CO_2 daily concentrations are shown below (Figure 8-27).

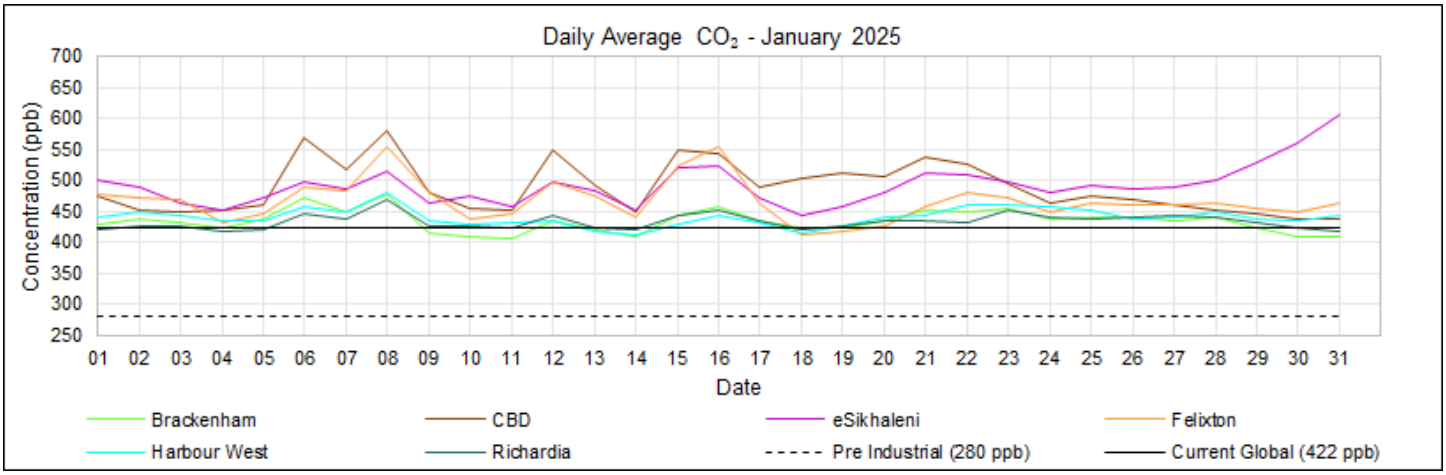


Figure 8-27: CO_2 daily concentrations.

8.5.4. Hourly

CO_2 hourly concentrations are shown below (Figure 8-28).

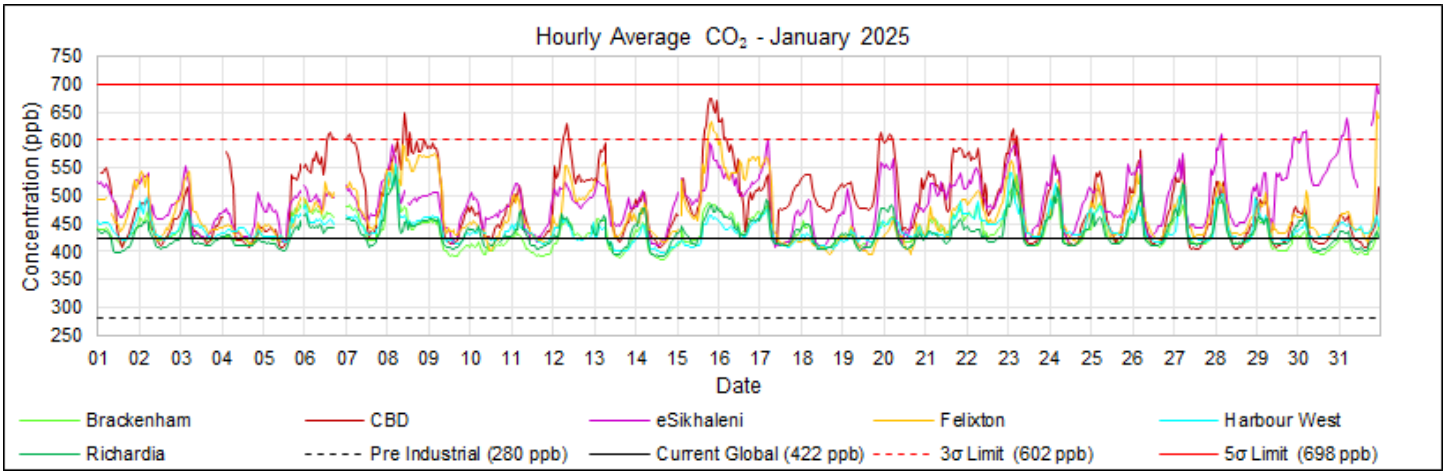


Figure 8-28: CO_2 hourly concentrations.

9. ACKNOWLEDGEMENT

Air Impact Measurement Specialists compiled this report for the Richards Bay Clean Air Association; contributors include Alicia Garnica and François Nel.

Signer ID: ABS1DHBUH7...

Lance Coetzee
Director

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APPENDIX A
ABBREVIATIONS AND TERMS

List of Abbreviations and Terms	
Chemical Formulae	
CH_3-S-CH_3	Dimethyl Sulphide
CH_3S-H	Methyl Mercaptan
CH_3-S-S-CH_3	Dimethyl Disulphide
CH_4	Methane
CO	Carbon Monoxide
CO_2	Carbon Dioxide
FPM	Fine Particulate Matter
H_2S	Hydrogen Sulphide
H_2SO_3	Sulphurous Acid
H_2SO_4	Sulphuric Acid
NO	Nitric Oxide
NO_2	Nitrogen Dioxide
NO_x	Oxides of Nitrogen
O_3	Ozone
PM_{10}	Particulates with an aerodynamic diameter of less than 10 µm
$PM_{2.5}$	Particulates with an aerodynamic diameter of less than 2.5 µm
SO_2	Sulphur Dioxide
SO_3	Sulphur Trioxide
TRS	Total Reduced Sulphur
TSP	Total Suspended Particulates
TVOCs	Total Volatile Organic Compounds

List of Abbreviations and Terms	
Countries	
EU	European Union
RSA	Republic of South Africa
UK	United Kingdom
US	United States

List of Abbreviations and Terms	
Direction	
N	North
NNE	North-North-East
NE	North-East
ENE	East-North-East
E	East
ESE	East-South-East
SE	South-East
SSE	South-South-East
S	South
SSW	South-South-West
SW	South-West
WSW	West-South-West
W	West
WNW	West-North-West
NW	North-West
NNW	North-North-West

List of Abbreviations and Terms	
Measurement	
°	Degrees
°C	Degrees Celsius
µg	Microgram
µg/m³	Micrograms per cubic meter
BMC	Best Measurement Capabilities
g/s	Grams per second
K	Kelvin
km	Kilometre
km/h	Kilometre per hour
m	Metres
m/s	Metres per second
mg	Milligrams
mg/m²/day	Milligrams per meter squared per day
mg/m³	Milligrams per cubic meter
ppb	Parts per billion
ppm	Parts per million
t/day	Tons per day
t/hr	Tons per hour
tpa	Tons per annum

List of Abbreviations and Terms	
Organisations	
AIMS	Air Impact Measurement Specialists
CASCO	Conformity Assessment Committee
DEFF	Department of Environment Forestry and Fisheries
EA-NPI	Environment Australia - National Pollutant Inventory
EC	European Commission
EU-EA	European Union - Environmental Agency
IEC	International Electrotechnical Commission
IFC	International Finance Corporation
ISO	International Standard Organisation
RBCAA	Richards Bay Clean Air Association
SANAS	South African National Accreditation System
SANS	South Africa National Standard
UK-EA	United Kingdom - Environmental Agency
US-EPA	United States - Environmental Protection Agency
WHO	World Health Organisation

List of Abbreviations and Terms	
Terms	
Analyser	A mechanical-electrical-optical device used to measure the concentration of trace gas pollutants or particulate concentrations.
Calibration	Calibration is a procedure that compares sensor responses to known standards. Deviations between the expected and known concentrations are corrected and reported.
Database	The data structures and attendant software that organise, store, and allow users access to data.
Environment	The organisation's surroundings include air, water, land, natural resources, flora, fauna, humans, and their interactions and relations.
Meteorological Station	A monitoring station capable of monitoring wind speed, direction, and temperature.
Model	The model implements dispersion modelling mathematics software that calculates ambient pollution concentrations based on emission figures and meteorological data.
Network	The network comprises hardware (sensors, data loggers, telemetry, and computers) and software (data handling, storage programs, models, and database).
Precision Check	The precision check is a procedure where a sensor is challenged with a gas of a known concentration within the operating range of the measurement.
Source	A point, line or area from which pollution would be released
Station	A station is a data capture point used for pollutant measurement, meteorological measurement, or data consolidation.
System	The system represents all network components, including the procedures for marshalling and reporting data.

APPENDIX B
QUALITY ASSURANCE

The SO_2 concentrations reported are determined by the United States Environmental Protection Agency (US EPA) equivalent method, EQSA-0193-092. SO_2 and TRS measurements allow a maximum precision error of 10% of the reported value. A tolerance around the zero-point of plus or minus 5 ppb is permitted. All effort is made to reduce the error to a minimum. The minimum threshold for statistical analyses is at least 80% valid data to maintain reliability and minimize bias; the South African National Accreditation (SANAS, 2012) requires 90%

Table 1: Quality Assurance

Test	Range	Action
Zero	Zero 0 to 2 ppb	Leave it as is.
	Zero value -2 to 0 ppb	Set to zero.
	Zero value -5 to -2 ppb and 2 to 5 ppb	Adjust the data set to re-zero all data.
	Zero value outside the above limits, invalidate and recalibrate.	Data can be adjusted if a specific reason for the deviation can be identified.
Span	Span value plus or minus a 3% deviation.	Leave it as is.
	Span value -10 to -3% and 3 to 10% deviation.	Scale the data set by the opposite, corresponding percentage.
	Span value outside the above limits, invalidate and recalibrate.	Data can be adjusted if a specific reason for the deviation can be identified.

APPENDIX C
EMISSION INVENTORY

Table 1: Emission Inventory – 2024.

Industry	Description	SO_2 Emission 2023 (t)	SO_2 Emission 2023 (t)	SO_2 Contribution (%)
Foskor	Acid Plant	2390	2401	13%
	Boiler	11		
Tongaat Hulett	Boiler	185	185	1%
Mondi	Flume 1	1417	3080	17%
	Flume 2	836		
	Power Boiler	795		
	Incinerator	8		
	Bleach Plant	24		
Mpact	Babcock	281	805	5%
	JT Boiler	524		
	Oil Burner	0		
RBM	Char Plant	468	542	3%
	Miscellaneous	34		
	MSP (Drier)	38		
	Smokers	1		
South32	FTC	1885	10561	59%
	GTC 1	1955		
	GTC 2	1680		
	GTC 3	1579		
	GTC 4	1579		
	GTC 5	1630		
	Potrooms	254		
Tronox	Tank 1	251	251	1%
Total		17825	17825	100%
Note: Tongaat Hullet shut down during the year's 1st quarter and last month.				

APPENDIX D
OPERATIONAL REPORT

Table 1: Maximum concentrations for PM_{10} and $PM_{2.5}$.

RBCAA: Monthly Report						
PM_{10} daily averages						
Station	*Concentration (µg/m³)*	*% of RSA Standard (75 µg/m³)*	*% of WHO Guideline (45 µg/m³)*	*Time*	*Wind Direction (°)*	*Wind Speed (m/s)*
CBD ES1	46.0	61%	**102%**	2025/01/01 00:00	3.1	216
eSikhaleni	28.0	37%	62%	2025/01/25 00:00	2.2	214
Felixton ES1	25.0	33%	56%	2025/01/01 00:00	2.8	253
Richardia	42.0	56%	93%	2025/01/01 00:00	3.4	221
Scorpio ES1	56.0	75%	**124%**	2025/01/12 00:00	3.0	189
$PM_{2.5}$ daily averages						
Station	*Concentration (µg/m³)*	*% of RSA Standard (40 µg/m³)*	*% of WHO Guideline (15 µg/m³)*	*Time*	*Wind Direction (°)*	*Wind Speed (m/s)*
Brackenham ES2	No Data	-	-		2.6	251
Felixton ES2	21.0	53%	**140%**	2025/01/01 00:00	2.8	253
Harbour West ES2	20.0	50%	**133%**	2025/01/04 00:00	5.3	24
Scorpio ES2	21.0	53%	**140%**	2025/01/12 00:00	3.0	189

LEGEND
Yellow: = 50% of the guideline/standard
Red: >= 100% of the guideline/standard (i.e. exceedance)
Turquoise: = 10% of the guideline/standard

NOTES
Dates used for time intervals are time beginning.
Wind speeds of < 1 m/s are considered calms; wind directions measured under these conditions cannot be used for incident investigations.
This report is an interim report in terms of AIMS' quality system classification. Final data will be published in the monthly report for the system.

STATUS
Meteorology
Airport, Arboretum, Brackenham, CBD, eSikhaleni, and Harbour West have meteorology.
Scorpio uses meteorology from Harbour West, and Felixton uses meteorology from eSikhaleni.

MISSING DATA
"Data < 80%" - data capture less than 80% (not suitable for statistical analysis)
"No Data" – no data available.

Table 2: Maximum concentrations for SO_2.

RBCAA: Monthly Report						
SO_2 10-minute averages						
Station	*Concentration (ppb)*	*% of RSA Standard & WHO Guideline (500 µg/m³ / 191 ppb)*		*Time*	*Wind Direction (°)*	*Wind Speed (m/s)*
Arboretum	24.8	13%		2025/01/16 00:50	6.6	236
Brackenham	18.4	10%		2025/01/27 09:10	0.5	282
CBD	84.8	44%		2025/01/15 21:00	-	235
eSikhaleni	14.1	7%		2025/01/30 12:00	5.2	75
Felixton	2.0	1%		2025/01/18 16:50	3.3	84
Harbour West	121.2	63%		2025/01/30 04:20	1.3	35
Richardia	28.8	15%		2025/01/01 20:30	0.1	-
Scorpio	845.7	**443%**		2025/01/12 18:20	1.8	143
SO_2 hourly averages						
Station	*Concentration (ppb)*	*% of RSA Standard (350 µg/m³ / 134 ppb)*	*No WHO Guideline*	*Time*	*Wind Direction (°)*	*Wind Speed (m/s)*
Arboretum	14.1	11%	-	2025/01/28 07:00	2.5	233
Brackenham	13.1	10%	-	2025/01/12 14:00	5.1	218
CBD	69.4	52%	-	2025/01/16 02:00	-	239
eSikhaleni	12.5	9%	-	2025/01/30 12:00	5.1	75
Felixton	1.5	1%	-	2025/01/18 15:00	3.3	88
Harbour West	59.0	44%	-	2025/01/30 04:00	1.6	35
Richardia	21.6	16%	-	2025/01/01 20:00	0.3	-
Scorpio	401.5	**300%**	-	2025/01/12 21:00	0.9	161
SO_2 daily averages						
Station	*Concentration (ppb)*	*% of RSA Standard (125 µg/m³ / 48 ppb)*	*% of WHO Guideline (40 µg/m³ / 15 ppb)*	*Time*	*Wind Direction (°)*	*Wind Speed (m/s)*
Arboretum	3.4	7%	23%	2025/01/16 00:00	4.5	237
Brackenham	2.9	6%	19%	2025/01/02 00:00	2.4	261
CBD	18.8	39%	**125%**	2025/01/16 00:00	-	242
eSikhaleni	3.6	8%	24%	2025/01/30 00:00	3.7	52
Felixton	0.8	2%	5%	2025/01/15 00:00	3.1	247
Harbour West	12.0	25%	80%	2025/01/10 00:00	2.9	234
Richardia	1.8	4%	12%	2025/01/01 00:00	3.4	221
Scorpio	62.8	**131%**	**419%**	2025/01/12 00:00	3.0	189

Table 3: Maximum concentrations for TRS.

RBCAA: Monthly Report						
TRS 10-minute averages						
Station	*Concentration (ppb)*	*No RSA Standard*	*% of OME TRS Guideline (13.0 µg/m³ / 9.3 ppb)*	*Time*	*Wind Direction (°)*	*Wind Speed (m/s)*
CBD	46.8	-	**503%**	2025/01/12 08:20	3.9	169
eSikhaleni	8.7	-	94%	2025/01/23 23:00	0.0	12
Felixton	12.8	-	**138%**	2025/01/24 04:20	0.5	21
Richardia	11.6	-	**125%**	2025/01/20 19:50	1.9	172
TRS 30-minute averages						
Station	*Concentration (ppb)*	*No RSA Standard*	*% of WHO H_2S Guideline (7.0 µg/m³ / 5.0 ppb)*	*Time*	*Wind Direction (°)*	*Wind Speed (m/s)*
CBD	40.7	-	**814%**	2025/01/12 09:00	4.0	169
eSikhaleni	4.4	-	88%	2025/01/23 23:00	0.0	356
Felixton	6.5	-	**130%**	2025/01/24 04:00	0.9	244
Richardia	9.0	-	**180%**	2025/01/20 20:00	1.6	182
TRS daily averages						
Station	*Concentration (ppb)*	*No RSA Standard*	*% of OME TRS Guideline (14.0 µg/m³ / 10.1 ppb)*	*Time*	*Wind Direction (°)*	*Wind Speed (m/s)*
CBD	10.6	-	**105%**	2025/01/12 00:00	3.2	181
eSikhaleni	1.0	-	10%	2025/01/24 00:00	1.7	75
Felixton	0.9	-	9%	2025/01/24 00:00	1.9	72
Richardia	1.4	-	14%	2025/01/05 00:00	3.0	189

APPENDIX E
RAINFALL

Table 1: Daily Rainfall

Date	Richards Bay (mm)	Felixton (mm)	RBCT (mm)	South32 (mm)
2025/01/01	0	0	0	0
2025/01/02	0	0	0	0
2025/01/03	0	0	0	0
2025/01/04	0	0	0	0
2025/01/05	23	13	14	12
2025/01/06	19	9	23	13
2025/01/07	3	0	1	1
2025/01/08	16	11	3	5
2025/01/09	0	0	0	0
2025/01/10	1	1	1	1
2025/01/11	1	5	28	0
2025/01/12	223	6	101	133
2025/01/13	14	9	8	19
2025/01/14	0	0	0	0
2025/01/15	38	23	30	22
2025/01/16	5	6	2	2
2025/01/17	0	0	0	0
2025/01/18	0	0	0	0
2025/01/19	0	0	0	0
2025/01/20	0	0	0	0
2025/01/21	10	28	12	15
2025/01/22	12	6	3	7
2025/01/23	0	0	0	0
2025/01/24	0	0	0	0
2025/01/25	4	0	0	3
2025/01/26	0	0	0	0
2025/01/27	0	0	0	0
2025/01/28	0	2	0	0

Date	Richards Bay (mm)	Felixton (mm)	RBCT (mm)	South32 (mm)
2025/01/29	0	0	1	0
2025/01/30	0	0	0	0
2025/01/31	1	1	2	0
Total	371	117	229	232

Table 2: Monthly Rainfall Richards Bay

Month	Richards Bay							
	2018	2019	2020	2021	2022	2023	2024	2025
Jan	94	182	47	305	127	167	271	371
Feb	232	195	377	229	193	410	118	
Mar	139	78	139	217	62	141	192	
Apr	261	214	141	96	647	87	101	
May	311	9	53	165	130	356	22	
Jun	70	78	114	140	60	33	89	
Jul	20	16	48	57	20	196	57	
Aug	100	160	107	59	77	20	97	
Sep	85	43	144	216	93	23	186	
Oct	213	260	171	214	101	345	250	
Nov	119	296	122	72	131	61	103	
Dec	156	320	77	464	253	195	145	
Minimum	20	9	47	57	20	20	22	
Average	150	154	128	186	158	169	136	
Maximum	311	320	377	464	647	410	271	
Total	1798	1850	1540	2234	1893	2034	1630	371

Table 3: Monthly Felixton

Month	Felixton							
	2018	2019	2020	2021	2022	2023	2024	225
Jan	43	138	71	207	68	57	146	117
Feb	129	138	214	231	78	188	82	
Mar	89	70	89	126	95	80	113	
Apr	138	143	106	135	368	58	49	
May	342	9	42	57	120	245	17	
Jun	60	53	44	98	20	14	53	
Jul	22	17	37	39	15	146	2.5	
Aug	83	39	67	55	37	18	54	
Sep	53	79	84	191	51	43	137	
Oct	201	144	67	145	98	318	187	
Nov	84	121	106	35	174	34	78	
Dec	111	311	64	212	163	146	74	
Minimum	22	9	37	35	15	14	3	
Average	113	105	82	127	107	112	83	
Maximum	342	311	214	231	368	318	187	
Total	1354	1261	987	1530	1288	1347	992	117

Table 4: RBCT

Month	RBCT							
	2018	2019	2020	2021	2022	2023	2024	2025
Jan	42	110	33	215	54	136	154	229
Feb	137	124	166	146	131	344	72	
Mar	78	172	109	194	161	69	161	
Apr	161	174	111	69	642	30	98	
May	175	14	69	171	268	442	23	
Jun	59	24	52	124	30	34	104	
Jul	21	5	39	64	30	162	56	
Aug	35	68	64	56	25	30	86	
Sep	41	59	104	187	115	30	177	
Oct	80	164	121	156	71	293	121	
Nov	70	186	77	43	129	42	89	
Dec	104	216	104	245	279	127	65	
Minimum	21	5	33	43	25	30	23	
Average	84	110	87	139	161	145	100	
Maximum	175	216	166	245	642	442	177	
Total	1005	1317	1049	1669	1934	1740	1205	229

Table 5: South32

Month	South32 (mm)							
	2018	2019	2020	2021	2022	2023	2024	2025
Jan	-	-	-	-	-	91	120	232
Feb	-	-	-	-	115	256	-	
Mar	-	-	-	-	149	51	144	
Apr	-	-	-	-	505	43	-	
May	-	-	-	-	106	230	-	
Jun	-	-	-	-	25	11	-	
Jul	-	-	-	-	12	165	-	
Aug	-	-	-	-	30	13	-	
Sep	-	-	-	-	64	18	129	
Oct	-	-	-	-	64	271	-	
Nov	-	-	-	-	101	36	-	
Dec	-	-	-	-	163	95	92	
Minimum	-	-	-	-	12	11	92	
Average	-	-	-	-	121	107	121	
Maximum	-	-	-	-	505	271	144	
Total	-	-	-	-	1336	1280	485	232

Please note that the South32 missing rain data for 2024 was due to a faulty rain gauge.

APPENDIX F
COMPLAINTS LOG

Table 1: Complaints.

No	Date	Region	Type	Source	Description	Response
1	2025/01/06 19:15	Veldenvlei Ext	Odour	Mondi	“pungent odour”.	232
2	2025/01/14 12:11	CBD	Visible	Foskor	Abnormal emissions from C-Stack.	236
3	2025/01/16 11:00	Vicinity of Foskor	Clinical + visible	Foskor	John Ross traffic light at Foskor. Complainant reported a gas cloud at the intersection emanating from Foskor. Had to close vehicle windows. Complainant alleges that they witnessed people running out of Foskor, who then informed the complainant that there was a fire and a gas leak. This complaint was received by the RBCAA today, Monday 20th January.	234
4	2025/01/16 12:11	Vicinity of Foskor	Visible	Foskor	“Big white cloud at the bridge.”	237
5	2025/01/16 12:43	Vicinity of Foskor	Odour	Foskor	“pungent odour” . Complainant reported that they had been informed that individuals onsite at Foskor were purchasing respirators.	235
6	2025/01/16 12:58	Vicinity of Foskor	Visible	Foskor	“low hanging cloud over Foskor”	235
7	2025/01/17 09:17	Alton	Clinical + Odour	CoU response required	Noxious odour and emissions emanating from the CHEMALUM facility in Alton. Causes headache and chest to close up.	1, 233
8	2025/01/21 17:03	Veldenvlei	Clinical + Odour	Mondi	“Very strong cat pee smell.” Causing sinus and headache.	238

Response	Industry Feedback
232	Mondi - Candice Webb responded (2025/01/07 08:29): Source of odour: Mondi Secondary effluent plant.
233	RBCAA - Sandy Camminga (2025/01/20 08:35): The RBCAA will refer this complaint to the relevant Authorities.
234	Foskor- Silungile Msane responded (2025/01/22 18:39): In the morning of January 16, 2025, fire was observed at Filter number 3 of the Sulphuric Acid Plant. Sulphuric Acid Plant has 3 filters namely filter no.l filter no.2 and filter no.3. These filters are used to filter molten sulphur and separate the clean sulphur from the sulphur ash. When fire occurs in the filter, the sulphur ash forms smoke which contains small amounts of SO2 gas because of the sulphur content that remains in the ash during the process of filtration. The cloud seen was as a result of the smoke resulting from the fire.
235	Foskor- Silungile Msane responded (2025/01/22 18:48):In the morning of January 16, 2025, fire was observed at Filter number 3 of the Sulphuric Acid Plant. As a result of this fire, there was smoke in the vicinity of the Sulphuric Acid Plant.
236	Foskor- Silungile Msane responded (2025/01/22 18:48): The acid strength probe was faulty.
237	Foskor- Silungile Msane responded (2025/01/22 18:48): In the morning of January 16, 2025, fire was observed at Filter number 3 of the Sulphuric Acid Plant. As a result of this fire, there was smoke observed in the Sulphuric Acid Plant.
238	Mondi - Candice Webb responded (2025/01/23 08:48): Source of odour: Secondary Effluent Treatment Plant - condensate overflow.

APPENDIX G
PM_{10} EXCEEDANCE LOG

No	Target / Guideline / Standard	Station	Date	Value (ppb)	Wind Direction (°)	Wind Speed (m/s)	Source	Comment	Response
1	PM_{10} Daily WHO Limit (45 µg/m³)	Scorpio	2025/01/12 0:00	56.0	189	3	No response required	None	2

Response	Industry Feedback
2	No response required

APPENDIX H
$PM_{2.5}$ EXCEEDANCE LOG

Table 1:PM $_{2.5}$ Exceedances

No	Target / Guideline / Standard	Station	Date	Value (ppb)	Wind Direction (°)	Wind Speed (m/s)	Source	Comment	Response
1	$PM_{2.5}$ Daily WHO Limit (15 µg/m³)	Felixton	2025/01/01 00:00	21.0	254	2.8	No response required	None	2
2	$PM_{2.5}$ Daily WHO Limit (15 µg/m³)	Felixton	2025/01/02 00:00	20.0	258	2.3	No response required	None	2
3	$PM_{2.5}$ Daily WHO Limit (15 µg/m³)	Harbour West	2025/01/04 00:00	20.0	24	5.3	No response required	None	2
4	$PM_{2.5}$ Daily WHO Limit (15 µg/m³)	Scorpio	2025/01/12 00:00	21.0	189	3.0	No response required	None	2

Response	Industry Feedback
2	No response required

APPENDIX I
SO_2 EXCEEDANCE LOG

Table 1: SO_2 Exceedances.

No	Target / Guideline / Standard	Station	Date	Value (ppb)	Wind Direction (°)	Wind Speed (m/s)	Source	Comment	Response
1	SO_2 Daily WHO Limit (15 ppb)	CBD	2025/01/16 00:00	18.8	243	34.5	No response required	None	2
2	SO_2 Daily WHO Limit (15 ppb)	Scorpio	2025/01/12 00:00	62.8	189	3	No response required	None	2
3	SO_2 Daily RSA Limit (48 ppb)	Scorpio	2025/01/12 00:00	62.8	189	3	Foskor	Acid Plant Gas Leak	130
4	SO_2 Hourly RSA Limit (134 ppb)	Scorpio	2025/01/12 18:00	384.1	140	2.2	Foskor	Acid Plant Gas Leak	130
5	SO_2 10-minute RSA & WHO Limit (191 ppb)	Scorpio	2025/01/12 18:10	555.5	149	2.4	Foskor	Acid Plant Gas Leak	130
6	SO_2 10-minute RSA & WHO Limit (191 ppb)	Scorpio	2025/01/12 18:20	845.7	143	1.8	Foskor	Acid Plant Gas Leak	130
7	SO_2 10-minute RSA & WHO Limit (191 ppb)	Scorpio	2025/01/12 18:30	548.4	139	2	Foskor	Acid Plant Gas Leak	130
8	SO_2 10-minute RSA & WHO Limit (191 ppb)	Scorpio	2025/01/12 18:40	267.6	134	2.1	Foskor	Acid Plant Gas Leak	130
9	SO_2 Hourly RSA Limit (134 ppb)	Scorpio	2025/01/12 19:00	331.7	156	1.3	Foskor	Acid Plant Gas Leak	130
10	SO_2 10-minute RSA & WHO Limit (191 ppb)	Scorpio	2025/01/12 19:10	311.9	142	1.3	Foskor	Acid Plant Gas Leak	130
11	SO_2 10-minute RSA & WHO Limit (191 ppb)	Scorpio	2025/01/12 19:20	663.2	150	1.5	Foskor	Acid Plant Gas Leak	130
12	SO_2 10-minute RSA & WHO Limit (191 ppb)	Scorpio	2025/01/12 19:30	364.9	163	1.5	Foskor	Acid Plant Gas Leak	130
13	SO_2 10-minute RSA & WHO Limit (191 ppb)	Scorpio	2025/01/12 19:40	340.4	160	1.6	Foskor	Acid Plant Gas Leak	130
14	SO_2 10-minute RSA & WHO Limit (191 ppb)	Scorpio	2025/01/12 19:50	236.8	185	0.7	Foskor	Acid Plant Gas Leak	130
15	SO_2 10-minute RSA & WHO Limit (191 ppb)	Scorpio	2025/01/12 20:00	363.1	164	1.3	Foskor	Acid Plant Gas Leak	130

No	Target / Guideline / Standard	Station	Date	Value (ppb)	Wind Direction (°)	Wind Speed (m/s)	Source	Comment	Response
16	SO_2 Hourly RSA Limit (134 ppb)	Scorpio	2025/01/12 20:00	276.3	161	1.3	Foskor	Acid Plant Gas Leak	130
17	SO_2 10-minute RSA & WHO Limit (191 ppb)	Scorpio	2025/01/12 20:10	280.2	158	1.5	Foskor	Acid Plant Gas Leak	130
18	SO_2 10-minute RSA & WHO Limit (191 ppb)	Scorpio	2025/01/12 20:20	396.9	152	1.1	Foskor	Acid Plant Gas Leak	130
19	SO_2 10-minute RSA & WHO Limit (191 ppb)	Scorpio	2025/01/12 20:30	323.0	158	1.2	Foskor	Acid Plant Gas Leak	130
20	SO_2 10-minute RSA & WHO Limit (191 ppb)	Scorpio	2025/01/12 21:00	440.8	159	1.3	Foskor	Acid Plant Gas Leak	130
21	SO_2 Hourly RSA Limit (134 ppb)	Scorpio	2025/01/12 21:00	401.5	161	0.9	Foskor	Acid Plant Gas Leak	130
22	SO_2 10-minute RSA & WHO Limit (191 ppb)	Scorpio	2025/01/12 21:10	447.8	163	1	Foskor	Acid Plant Gas Leak	130
23	SO_2 10-minute RSA & WHO Limit (191 ppb)	Scorpio	2025/01/12 21:20	351.5	169	0.8	Foskor	Acid Plant Gas Leak	130
24	SO_2 10-minute RSA & WHO Limit (191 ppb)	Scorpio	2025/01/12 21:30	602.4	151	1.2	Foskor	Acid Plant Gas Leak	130
25	SO_2 10-minute RSA & WHO Limit (191 ppb)	Scorpio	2025/01/12 21:40	406.6	143	0.7	Foskor	Acid Plant Gas Leak	130
26	SO_2 Daily WHO Limit (15 ppb)	Scorpio	2025/01/18 00:00	24.7	32	3.4	No response required	None	2
27	SO_2 Daily WHO Limit (15 ppb)	Scorpio	2025/01/26 00:00	15.8	24	1.9	No response required	None	2

Table 2: SO_2 Responses.

Response	Industry Feedback
2	No response required
130	Foskor - Kitso Masemola responded (Wed 2025/01/15 12:19, 12:25and 12:28): Gas leak on Sulphuric A-plant.

APPENDIX J
TRS EXCEEDANCE LOG

Table 1: TRS Exceedances

No	Target / Guideline / Standard	Station	Date	Value (ppb)	Wind Direction (°)	Wind Speed (m/s)	Source	Comment	Response
1	TRS 24-hr-OME Limit (10.1 ppb)	CBD	2025/01/12 00:00	10.6	181	3.2	Mondi	Secondary Effluent Treatmnet Plant	602
2	TRS 10-minute OME Limit (9.3 ppb)	CBD	2025/01/12 07:30	12.1	193	5.4	Mondi	Secondary Effluent Treatmnet Plant	602
3	TRS 30-minute WHO H_2S Limit (5.0 ppb)	CBD	2025/01/12 07:30	17.7	202	4.2	Mondi	Secondary Effluent Treatmnet Plant	602
4	TRS 10-minute OME Limit (9.3 ppb)	CBD	2025/01/12 07:40	17.8	208	3.5	Mondi	Secondary Effluent Treatmnet Plant	602
5	TRS 10-minute OME Limit (9.3 ppb)	CBD	2025/01/12 07:50	23.1	203	3.8	Mondi	Secondary Effluent Treatmnet Plant	602
6	TRS 10-minute OME Limit (9.3 ppb)	CBD	2025/01/12 08:00	30.7	178	4.9	Mondi	Secondary Effluent Treatmnet Plant	602
7	TRS 30-minute WHO H_2S Limit (5.0 ppb)	CBD	2025/01/12 08:00	39.9	176	4.5	Mondi	Secondary Effluent Treatmnet Plant	602
8	TRS 10-minute OME Limit (9.3 ppb)	CBD	2025/01/12 08:10	42.1	181	4.6	Mondi	Secondary Effluent Treatmnet Plant	602
9	TRS 10-minute OME Limit (9.3 ppb)	CBD	2025/01/12 08:20	46.8	169	3.9	Mondi	Secondary Effluent Treatmnet Plant	602
10	TRS 10-minute OME Limit (9.3 ppb)	CBD	2025/01/12 08:30	38.4	184	4.8	Mondi	Secondary Effluent Treatmnet Plant	602
11	TRS 30-minute WHO H_2S Limit (5.0 ppb)	CBD	2025/01/12 08:30	33.7	187	4.7	Mondi	Secondary Effluent Treatmnet Plant	602
12	TRS 10-minute OME Limit (9.3 ppb)	CBD	2025/01/12 08:40	30.8	189	4.8	Mondi	Secondary Effluent Treatmnet Plant	602
13	TRS 10-minute OME Limit (9.3 ppb)	CBD	2025/01/12 08:50	31.9	187	4.6	Mondi	Secondary Effluent Treatmnet Plant	602
14	TRS 10-minute OME Limit (9.3 ppb)	CBD	2025/01/12 09:00	38.1	177	3.6	Mondi	Secondary Effluent Treatmnet Plant	602
15	TRS 30-minute WHO H_2S Limit (5.0 ppb)	CBD	2025/01/12 09:00	40.7	169	4.0	Mondi	Secondary Effluent Treatmnet Plant	602
16	TRS 10-minute OME Limit (9.3 ppb)	CBD	2025/01/12 09:10	42.3	170	4.4	Mondi	Secondary Effluent Treatmnet Plant	602

No	Target / Guideline / Standard	Station	Date	Value (ppb)	Wind Direction (°)	Wind Speed (m/s)	Source	Comment	Response
17	TRS 10-minute OME Limit (9.3 ppb)	CBD	2025/01/12 09:20	41.7	160	4.1	Mondi	Secondary Effluent Treatmnet Plant	602
18	TRS 10-minute OME Limit (9.3 ppb)	CBD	2025/01/12 09:30	41.3	167	3.5	Mondi	Secondary Effluent Treatmnet Plant	602
19	TRS 30-minute WHO H_2S Limit (5.0 ppb)	CBD	2025/01/12 09:30	37.7	172	3.0	Mondi	Secondary Effluent Treatmnet Plant	602
20	TRS 10-minute OME Limit (9.3 ppb)	CBD	2025/01/12 09:40	38.0	169	2.9	Mondi	Secondary Effluent Treatmnet Plant	602
21	TRS 10-minute OME Limit (9.3 ppb)	CBD	2025/01/12 09:50	33.8	179	2.6	Mondi	Secondary Effluent Treatmnet Plant	602
22	TRS 10-minute OME Limit (9.3 ppb)	CBD	2025/01/12 10:00	31.4	181	2.4	Mondi	Secondary Effluent Treatmnet Plant	602
23	TRS 30-minute WHO H_2S Limit (5.0 ppb)	CBD	2025/01/12 10:00	30.2	169	1.8	Mondi	Secondary Effluent Treatmnet Plant	602
24	TRS 10-minute OME Limit (9.3 ppb)	CBD	2025/01/12 10:10	30.1	173	1.7	Mondi	Secondary Effluent Treatmnet Plant	602
25	TRS 10-minute OME Limit (9.3 ppb)	CBD	2025/01/12 10:20	29.0	152	1.2	Mondi	Secondary Effluent Treatmnet Plant	602
26	TRS 10-minute OME Limit (9.3 ppb)	CBD	2025/01/12 10:30	29.2	160	1.4	Mondi	Secondary Effluent Treatmnet Plant	602
27	TRS 30-minute WHO H_2S Limit (5.0 ppb)	CBD	2025/01/12 10:30	28.8	190	2.3	Mondi	Secondary Effluent Treatmnet Plant	602
28	TRS 10-minute OME Limit (9.3 ppb)	CBD	2025/01/12 10:40	28.6	204	2.5	Mondi	Secondary Effluent Treatmnet Plant	602
29	TRS 10-minute OME Limit (9.3 ppb)	CBD	2025/01/12 10:50	28.6	199	3.2	Mondi	Secondary Effluent Treatmnet Plant	602
30	TRS 10-minute OME Limit (9.3 ppb)	CBD	2025/01/12 11:00	28.1	206	3.9	Mondi	Secondary Effluent Treatmnet Plant	602
31	TRS 30-minute WHO H_2S Limit (5.0 ppb)	CBD	2025/01/12 11:00	27.6	201	3.6	Mondi	Secondary Effluent Treatmnet Plant	602
32	TRS 10-minute OME Limit (9.3 ppb)	CBD	2025/01/12 11:10	27.6	199	3.6	Mondi	Secondary Effluent Treatmnet Plant	602
33	TRS 10-minute OME Limit (9.3 ppb)	CBD	2025/01/12 11:20	27.0	198	3.1	Mondi	Secondary Effluent Treatmnet Plant	602
34	TRS 10-minute OME Limit (9.3 ppb)	CBD	2025/01/12 11:30	27.0	197	3.6	Mondi	Secondary Effluent Treatmnet Plant	602

No	Target / Guideline / Standard	Station	Date	Value (ppb)	Wind Direction (°)	Wind Speed (m/s)	Source	Comment	Response
35	TRS 30-minute WHO H_2S Limit (5.0 ppb)	CBD	2025/01/12 11:30	26.7	195	5.4	Mondi	Secondary Effluent Treatmnet Plant	602
36	TRS 10-minute OME Limit (9.3 ppb)	CBD	2025/01/12 11:40	26.8	199	4.0	Mondi	Secondary Effluent Treatmnet Plant	602
37	TRS 10-minute OME Limit (9.3 ppb)	CBD	2025/01/12 11:50	26.3	189	8.4	Mondi	Secondary Effluent Treatmnet Plant	602
38	TRS 10-minute OME Limit (9.3 ppb)	CBD	2025/01/12 12:00	25.6	192	2.7	Mondi	Secondary Effluent Treatmnet Plant	602
39	TRS 30-minute WHO H_2S Limit (5.0 ppb)	CBD	2025/01/12 12:00	25.7	188	2.9	Mondi	Secondary Effluent Treatmnet Plant	602
40	TRS 10-minute OME Limit (9.3 ppb)	CBD	2025/01/12 12:10	25.7	192	2.8	Mondi	Secondary Effluent Treatmnet Plant	602
41	TRS 10-minute OME Limit (9.3 ppb)	CBD	2025/01/12 12:20	25.7	180	3.2	Mondi	Secondary Effluent Treatmnet Plant	602
42	TRS 10-minute OME Limit (9.3 ppb)	CBD	2025/01/12 12:30	25.0	178	3.4	Mondi	Secondary Effluent Treatmnet Plant	602
43	TRS 30-minute WHO H_2S Limit (5.0 ppb)	CBD	2025/01/12 12:30	24.8	181	3.5	Mondi	Secondary Effluent Treatmnet Plant	602
44	TRS 10-minute OME Limit (9.3 ppb)	CBD	2025/01/12 12:40	24.8	180	3.2	Mondi	Secondary Effluent Treatmnet Plant	602
45	TRS 10-minute OME Limit (9.3 ppb)	CBD	2025/01/12 12:50	24.6	186	3.9	Mondi	Secondary Effluent Treatmnet Plant	602
46	TRS 10-minute OME Limit (9.3 ppb)	CBD	2025/01/12 13:00	23.9	179	3.8	Mondi	Secondary Effluent Treatmnet Plant	602
47	TRS 30-minute WHO H_2S Limit (5.0 ppb)	CBD	2025/01/12 13:00	23.9	183	3.3	Mondi	Secondary Effluent Treatmnet Plant	602
48	TRS 10-minute OME Limit (9.3 ppb)	CBD	2025/01/12 13:10	23.9	187	2.8	Mondi	Secondary Effluent Treatmnet Plant	602
49	TRS 10-minute OME Limit (9.3 ppb)	CBD	2025/01/12 13:20	23.8	184	3.2	Mondi	Secondary Effluent Treatmnet Plant	602
50	TRS 10-minute OME Limit (9.3 ppb)	CBD	2025/01/12 13:30	22.0	184	3.5	Mondi	Secondary Effluent Treatmnet Plant	602
51	TRS 30-minute WHO H_2S Limit (5.0 ppb)	CBD	2025/01/12 13:30	20.7	181	3.2	Mondi	Secondary Effluent Treatmnet Plant	602
52	TRS 10-minute OME Limit (9.3 ppb)	CBD	2025/01/12 13:40	20.5	181	3.0	Mondi	Secondary Effluent Treatmnet Plant	602

No	Target / Guideline / Standard	Station	Date	Value (ppb)	Wind Direction (°)	Wind Speed (m/s)	Source	Comment	Response
53	TRS 10-minute OME Limit (9.3 ppb)	CBD	2025/01/12 13:50	19.5	179	3.1	Mondi	Secondary Effluent Treatmnet Plant	602
54	TRS 10-minute OME Limit (9.3 ppb)	CBD	2025/01/12 14:00	17.4	181	2.7	Mondi	Secondary Effluent Treatmnet Plant	602
55	TRS 30-minute WHO H_2S Limit (5.0 ppb)	CBD	2025/01/12 14:00	16.5	180	2.8	Mondi	Secondary Effluent Treatmnet Plant	602
56	TRS 10-minute OME Limit (9.3 ppb)	CBD	2025/01/12 14:10	16.3	180	3.2	Mondi	Secondary Effluent Treatmnet Plant	602
57	TRS 10-minute OME Limit (9.3 ppb)	CBD	2025/01/12 14:20	15.9	179	2.4	Mondi	Secondary Effluent Treatmnet Plant	602
58	TRS 10-minute OME Limit (9.3 ppb)	CBD	2025/01/12 14:30	15.3	178	3.4	Mondi	Secondary Effluent Treatmnet Plant	602
59	TRS 30-minute WHO H_2S Limit (5.0 ppb)	CBD	2025/01/12 14:30	13.6	169	3.5	Mondi	Secondary Effluent Treatmnet Plant	602
60	TRS 10-minute OME Limit (9.3 ppb)	CBD	2025/01/12 14:40	13.3	168	3.8	Mondi	Secondary Effluent Treatmnet Plant	602
61	TRS 10-minute OME Limit (9.3 ppb)	CBD	2025/01/12 14:50	12.4	162	3.5	Mondi	Secondary Effluent Treatmnet Plant	602
62	TRS 10-minute OME Limit (9.3 ppb)	CBD	2025/01/12 15:00	11.5	166	3.9	Mondi	Secondary Effluent Treatmnet Plant	602
63	TRS 30-minute WHO H_2S Limit (5.0 ppb)	CBD	2025/01/12 15:00	10.5	163	3.6	Mondi	Secondary Effluent Treatmnet Plant	602
64	TRS 10-minute OME Limit (9.3 ppb)	CBD	2025/01/12 15:10	10.4	165	3.8	Mondi	Secondary Effluent Treatmnet Plant	602
65	TRS 10-minute OME Limit (9.3 ppb)	CBD	2025/01/12 15:20	9.6	158	3.1	Mondi	Secondary Effluent Treatmnet Plant	602
66	TRS 30-minute WHO H_2S Limit (5.0 ppb)	CBD	2025/01/12 15:30	8.9	166	3.5	Mondi	Secondary Effluent Treatmnet Plant	602
67	TRS 30-minute WHO H_2S Limit (5.0 ppb)	CBD	2025/01/12 16:00	7.4	165	3.2	Mondi	Secondary Effluent Treatmnet Plant	602
68	TRS 30-minute WHO H_2S Limit (5.0 ppb)	CBD	2025/01/12 16:30	7.3	163	3.2	Mondi	Secondary Effluent Treatmnet Plant	602
69	TRS 30-minute WHO H_2S Limit (5.0 ppb)	CBD	2025/01/12 17:00	7.0	156	2.9	Mondi	Secondary Effluent Treatmnet Plant	602
70	TRS 30-minute WHO H_2S Limit (5.0 ppb)	CBD	2025/01/12 17:30	6.4	148	3.0	Mondi	Secondary Effluent Treatmnet Plant	602

No	Target / Guideline / Standard	Station	Date	Value (ppb)	Wind Direction (°)	Wind Speed (m/s)	Source	Comment	Response
71	TRS 30-minute WHO H_2S Limit (5.0 ppb)	CBD	2025/01/12 18:00	5.2	147	2.5	Mondi	Secondary Effluent Treatmnet Plant	602
72	TRS 30-minute WHO H_2S Limit (5.0 ppb)	CBD	2025/01/16 02:30	5.1	238	19.9	Mondi	Secondary Effluent Treatmnet Plant	603
73	TRS 30-minute WHO H_2S Limit (5.0 ppb)	CBD	2025/01/21 19:00	7.4	258	2.7	Mondi	B Condnesate to drain	604
74	TRS 30-minute WHO H_2S Limit (5.0 ppb)	CBD	2025/01/21 19:30	7.7	274	2.3	Mondi	B Condnesate to drain	604
75	TRS 30-minute WHO H_2S Limit (5.0 ppb)	CBD	2025/01/21 20:00	9.3	269	1.8	Mondi	B Condnesate to drain	604
76	TRS 10-minute OME Limit (9.3 ppb)	CBD	2025/01/21 20:10	9.5	268	1.7	Mondi	B Condnesate to drain	604
77	TRS 10-minute OME Limit (9.3 ppb)	CBD	2025/01/21 20:20	10.4	274	2.1	Mondi	B Condnesate to drain	604
78	TRS 30-minute WHO H_2S Limit (5.0 ppb)	CBD	2025/01/28 02:00	5.5	267	1.3	Mondi	Secondary Effluent Treatmnet Plant	605
79	TRS 30-minute WHO H_2S Limit (5.0 ppb)	CBD	2025/01/28 03:30	5.4	256	1.9	Mondi	Secondary Effluent Treatmnet Plant	605
80	TRS 30-minute WHO H_2S Limit (5.0 ppb)	CBD	2025/01/29 01:30	5.1	248	1.2	Mondi	Secondary Effluent Treatmnet Plant	606
81	TRS 30-minute WHO H_2S Limit (5.0 ppb)	CBD	2025/01/29 03:00	5.8	270	2.4	Mondi	Secondary Effluent Treatmnet Plant	606
82	TRS 30-minute WHO H_2S Limit (5.0 ppb)	CBD	2025/01/29 03:30	5.8	261	1.7	Mondi	Secondary Effluent Treatmnet Plant	606
83	TRS 10-minute OME Limit (9.3 ppb)	CBD	2025/01/29 06:00	10.8	261	2.3	Mondi	Secondary Effluent Treatmnet Plant	606
84	TRS 30-minute WHO H_2S Limit (5.0 ppb)	CBD	2025/01/29 06:00	10.0	264	2.4	Mondi	Secondary Effluent Treatmnet Plant	606
85	TRS 10-minute OME Limit (9.3 ppb)	CBD	2025/01/29 06:10	9.4	264	2.4	Mondi	Secondary Effluent Treatmnet Plant	606
86	TRS 10-minute OME Limit (9.3 ppb)	CBD	2025/01/29 06:20	10.0	266	2.6	Mondi	Secondary Effluent Treatmnet Plant	606
87	TRS 30-minute WHO H_2S Limit (5.0 ppb)	CBD	2025/01/29 06:30	5.6	264	2.7	Mondi	Secondary Effluent Treatmnet Plant	606
88	TRS 30-minute WHO H_2S Limit (5.0 ppb)	CBD	2025/01/29 07:00	7.4	260	3.3	Mondi	Secondary Effluent Treatmnet Plant	606

No	Target / Guideline / Standard	Station	Date	Value (ppb)	Wind Direction (°)	Wind Speed (m/s)	Source	Comment	Response
89	TRS 30-minute WHO H_2S Limit (5.0 ppb)	Felixton	2025/01/24 04:00	6.5	244	0.9	THS - meteorology	RBCAA allocation	588, 607, 611
90	TRS 10-minute OME Limit (9.3 ppb)	Felixton	2025/01/24 04:20	12.8	21	0.5	THS - meteorology	RBCAA allocation	588, 607, 611
91	TRS 10-minute OME Limit (9.3 ppb)	Felixton	2025/01/24 20:00	11.0	183	1.2	THS - meteorology	RBCAA allocation	588, 607, 611
92	TRS 30-minute WHO H_2S Limit (5.0 ppb)	Richardia	2025/01/20 19:30	6.3	170	1.9	Mondi	Non-condensable gas system	608
93	TRS 10-minute OME Limit (9.3 ppb)	Richardia	2025/01/20 19:50	11.6	172	1.9	Mondi	Non-condensable gas system	608
94	TRS 10-minute OME Limit (9.3 ppb)	Richardia	2025/01/20 20:00	10.1	181	1.7	Mondi	Non-condensable gas system	608
95	TRS 30-minute WHO H_2S Limit (5.0 ppb)	Richardia	2025/01/20 20:00	9.0	182	1.6	Mondi	Non-condensable gas system	608
96	TRS 10-minute OME Limit (9.3 ppb)	Richardia	2025/01/20 20:10	10.1	183	1.6	Mondi	Non-condensable gas system	608
97	TRS 30-minute WHO H_2S Limit (5.0 ppb)	Richardia	2025/01/20 20:30	6.0	189	1.5	Mondi	Non-condensable gas system	608
98	TRS 30-minute WHO H_2S Limit (5.0 ppb)	Richardia	2025/01/20 21:00	5.3	206	1.6	Mondi	Non-condensable gas system	608
99	TRS 30-minute WHO H_2S Limit (5.0 ppb)	Richardia	2025/01/27 07:00	5.1	281	2.3	Mondi	Methanol	609

Table 2: TRS Responses

Response	Industry Feedback
588	Mpact - Maggie Odayar responded, (2025/01/29 10:48): The TRS exceedances for the 24th of January were investigated. There were no abnormal conditions found that could have contributed to these exceedances.
602	Mondi - Candice Webb responded, (2025/02/13 11:05): Mondi has investigated and identified the effluent treatment plant as the source of the odour. The mill was in the process of starting up the mill after a shut. Mondi is in the process of scoping a TRS improvement project associated with our effluent plant.
603	Mondi - Candice Webb responded, (2025/02/13 11:10): Mondi has investigated and identified the effluent treatment plant as the source of the odour. Mondi is in the process of scoping a TRS improvement project associated with our effluent plant.
604	Mondi - Candice Webb responded, (2025/02/13 11:14): Mondi has investigated and identified the effluent treatment plant as the source of the odour. This was due to human error resulting in B condensate disharged to drain. Mondi is in the process of scoping a TRS improvement project associated with our effluent plant.
605	Mondi - Candice Webb responded, (2025/02/13 11:21): Mondi has investigated and identified the effluent treatment plant as the source of the odour. Mondi is in the process of scoping a TRS improvement project associated with our effluent plant.
606	Mondi - Candice Webb responded, (2025/02/13 11:28): Mondi has investigated and identified the effluent treatment plant as the source of the odour. Mondi is in the process of scoping a TRS improvement project associated with our effluent plant.
607	Mondi - Candice Webb responded, (2025/02/13 11:32): Mondi has investigated based on wind direction and or low wind speed it is unlikly that Mondi is the source.
608	Mondi - Candice Webb responded, (2025/02/13 11:41): Mondi has investigated and identified the vacuum of the Non-condensable Gas system to be slightly positive pressure (0.1 kPA) where a negative pressure is required (-2kPA). Although there was no evidence of venting non-condensable gases, it is possible that during period of positive pressure odourus gases were released to atmosphere. a task team s working on addressing the problem.
609	Mondi - Candice Webb responded, (2025/02/13 11:48): Mondi has investigated and identified the vacuum of the Non-condensable Gas system to be slightly positive pressure (0.1 kPA) where a negative pressure is required (-2kPA). Although there was no evidence of venting non-condensable gases, it is possible that during period of positive pressure odourus gases were released to atmosphere. a task team s working on addressing the problem.
611	RBCAA allocation 2025-02-13


AIMS