AIMS

Report

Monthly AirGradient Monitoring

September 2026

Submitted to: Candice Webb / Sandy Camminga

Richards Bay Clean Air Association (RBCAA)

Suite 18, Calypso Centre, 2 Kruger Rand Grove, Richards Bay, KwaZulu-Natal, 3900

PO Box 10299, Meerensee, 3901

Submitted by: Lance Coetzee

Air Impact Measurement Specialists

Suite 18, Calypso Centre, 2 Kruger Rand Grove, Richards Bay, KwaZulu-Natal, 3900

PO Box 10491, Meerensee, KwaZulu-Natal, 3901

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Document Approval

Action	Designation	Name	Date
Prepared	Senior Consultant	Lance Coetzee	2026-10-10
Prepared	Assistant Consultant	Alicia Garnica	2026-10-15
Reviewed	Senior Consultant	Lance Coetzee	2026-10-23



Signer ID: ABS1DHBUH7...

Lance Coetzee
Director

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Note

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

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1. INTRODUCTION

This monthly air quality report, prepared for the Richards Bay Clean Air Association (RBCAA), summarises AirGradient monitoring data for September 2026. It assesses particulate matter (PM), total volatile organic compound (TVOC) index values, nitrogen oxides (NO_x) index values and carbon dioxide (CO_2) concentrations measured by the RBCAA AirGradient screening network. The report highlights notable incidents, elevated short-term events and data-quality issues observed during the month. These monthly summaries support the identification of spatial and temporal patterns and help prioritise follow-up investigation where warranted.

RBCAA also publishes annual air quality reports summarising findings and longer-term trends over a complete calendar year. The annual reports provide stakeholders with an integrated view of regional air quality performance and support informed decision-making, policy development and environmental management: consistent monitoring and reporting support transparency, ongoing environmental assessment and community awareness.

The RBCAA monitoring network comprises eleven (11) primary monitoring stations (Figure 1.1 and Table 1.1). Airport and Felixton Met are meteorological stations, and Meerensee is a rain-gauge site; none of the three operates continuous air-quality analysers. The network also includes a secondary screening network comprising eleven (11) AirGradient monitors (Table 1.2). September 2026 is the first full calendar month for the eleventh monitor, commissioned at Scorpio on 18 August 2026.



Figure 1.1: RBCAA monitoring network.

Table 1.1: Primary monitoring network station coordinates.

Station	Latitude (°)	Longitude (°)	Elevation (m)
Airport	-28.738161	32.093332	33.99
Arboretum	-28.752377	32.062791	25.20
Brackenham	-28.731325	32.039059	56.28
CBD	-28.744693	32.054851	32.26
eSikhaleni	-28.865278	31.911679	14.54
Felixton	-28.829255	31.893636	56.59
Meerensee	-28.772104	32.101308	14.89
Felixton Met	-28.836487	31.892513	27.87
Harbour West	-28.787297	32.027133	7.36
Richardia	-28.762769	32.066068	19.96
Scorpio	-28.769694	32.034282	29.39

Table 1.2: Secondary screening network coordinates (AirGradient monitors).

Station	Latitude (°)	Longitude (°)	Elevation (m)
Airport	-28.738161	32.093332	33.99
Brackenham	-28.731325	32.039059	56.28
CBD	-28.744693	32.054851	32.26
Empangeni	-28.734970	31.896245	109.85
eSikhaleni	-28.865278	31.911679	14.54
Felixton	-28.829255	31.893636	56.59
Harbour West	-28.787297	32.027133	7.36
Meerensee	-28.772104	32.101308	14.89
Mtunzini	-28.959335	31.743905	84.00
Richardia	-28.762769	32.066068	19.96
Scorpio	-28.769694	32.034282	29.39

2. AIRGRADIENT MONITORING NETWORK

The AirGradient network was established in late 2023 as a co-location study to evaluate the comparability of particulate measurements against the primary monitoring network. It was subsequently expanded in support of an RBCAA objective to screen additional air-quality parameters. Initially, the network comprised two sites, Harbour West and Richardia, and monitored only particulates (PM_{10}, $PM_{2.5}$ and PM_1). In July 2024, the network was expanded to include Brackenham, CBD, eSikhaleni and Felixton, and all monitors were upgraded to measure total volatile organic compound (TVOC) index, nitrogen oxides (NO_x) index and carbon dioxide (CO_2). A further expansion initiated in August 2025 added Airport, Empangeni, Meerensee and Mtunzini progressively: Meerensee and Mtunzini produced data during 2025, while Airport and Empangeni commenced reporting in 2026. A further monitor was commissioned at Scorpio on 18 August 2026, following co-location at Richardia from 6 to 18 August 2026. The network now comprises eleven (11) monitors across multiple sites.

AirGradient monitors are designed as accessible, lower-cost air-quality screening instruments. Their data are useful for identifying spatial patterns, short-term events and locations that may warrant follow-up. However, they are not equivalent to reference-grade or regulatory-equivalent analysers and should be evaluated against a documented monitoring objective, performance basis and QA/QC process (Clements et al., 2022).

- Accuracy and precision: Regulatory reference or equivalent analysers are subject to method approval, routine calibration and quality-assurance requirements for specific pollutants. AirGradient monitors use compact sensors, including optical particle counters for PM and non-dispersive infrared sensors for CO_2. These sensors are useful for indicative screening but are more sensitive to siting, environmental conditions, sensor drift and calibration uncertainty than reference instruments.
- Calibration and certification: Product certifications such as CE, FCC, RoHS and REACH relate primarily to product conformity and market access; they should not be interpreted as certification of equivalence to regulatory reference methods. Where AirGradient data are used for technical assessment, co-location, calibration checks and documented QA/QC procedures are required to define their uncertainty and fitness for use.
- Data application: The AirGradient network is therefore treated as a secondary screening network. The TVOC and NO_x outputs are reported as dimensionless index values (Sensirion, 2022a; Sensirion, 2022b) and are interpreted as relative indicators of short-term changes rather than pollutant-specific regulatory concentrations.
- Cost and accessibility: Because the monitors are lower-cost and easier to deploy than reference analysers, they can improve spatial coverage and help identify potential localised events, provided the limitations above are clearly recognised.

In summary, AirGradient monitors provide useful indicative information for non-regulatory screening. Nevertheless, the data should not be used as a substitute for approved reference or equivalent-method analyser data when assessing statutory compliance.

Station abbreviations used in figures and tables are Air = Airport, Brk = Brackenham, CBD = CBD, Emp = Empangeni, eSk = eSikhaleni, Flx = Felixton, HW = Harbour West, MS = Meerensee, Mtz = Mtunzini, Rch = Richardia and Scr = Scorpio.

Comparison basis: The comments below compare the AirGradient screening results with the September 2026 Monthly Air Quality report (Project 2026001 Report 026) for the RBCAA primary monitoring network, and AirGradient data availability agrees with the September 2026 Operations report (Project 2026001 Report 025, Table 2.7) and the September 2026 Missing Data report. The comparison is qualitative and event/station-based, not a formal method comparison, because instruments, parameters and co-location coverage differ, and the AirGradient TVOC and NO_x outputs are dimensionless indices. The 3σ and 5σ screening thresholds are fixed from pooled valid hourly observations across operational AirGradient stations for calendar year 2025, calculated as the pooled mean plus three or five population standard deviations (TVOC 3σ = 355.6, 5σ = 511.2; NO_x 3σ = 45.1, 5σ = 73.4; CO_2 3σ = 605.2 ppm, 5σ = 706.5 ppm). Calculations

use unrounded thresholds; figures display rounded values. These are statistical screening thresholds, not regulatory or health limits. Re-deriving the thresholds from the 2025 hourly data as restated in October 2026 moves the TVOC and CO_2 values by less than 0.1 (TVOC 3σ = 355.7, 5σ = 511.3; CO_2 3σ = 605.1 ppm, 5σ = 706.4 ppm) and changes no September 2026 event count; the published thresholds are retained so that event counts remain comparable between months. All September 2026 statistics in this report were calculated from the September 2026 AirGradient workbooks (2026-09_Sep_AirGradient-PM10 / -PM2.5 / -TVOC / -NOX / -CO2.xlsx, 18 October 2026 issue), which apply the data invalidations recorded in the AirGradient invalidation register. Unless otherwise stated, data completeness is calculated as the number of valid 10-minute records divided by the number of scheduled 10-minute records for the reporting month (4 320 for September 2026); invalidated records are counted as lost. Exactly-zero 10-minute PM_{10} and $PM_{2.5}$ readings are retained in all concentration and completeness statistics. They occur when ambient particulate concentrations fall to the resolution floor of the optical particle counter: in September 2026, the PM_{10} reading at Richardia, the only monitor that recorded essentially no zero readings, had a median of 3.1 µg/m³ at the times any other monitor read zero, against 20.3 µg/m³ at all other times. Zero readings are therefore treated as left-censored measurements rather than as instrument faults (Helsel, 2012). Excluding them would remove only the lowest observations and bias the monthly means upward, by up to 5.9 µg/m³ at Mtunzini, 4.7 µg/m³ at Empangeni and 3.6 µg/m³ at Airport. Concentration statistics, completeness and the plotted series are accordingly on a single common basis.

Aggregation and validity: a clock-hour value is formed only when at least four of its six 10-minute records are valid for PM_{10}, $PM_{2.5}$ and TVOC, and at least five of six for NO_x and CO_2; a calendar-day value requires at least 116 of 144 valid records (80%); and a monthly value requires at least 80% of the scheduled records. Daily and monthly values are arithmetic means of the valid 10-minute records. In the monthly comparison figures, station-months below 80% capture are plotted with horizontal stripes and are not used in the text.

Diurnal profiles: the hour-of-day profiles in Sections 3.3, 4.3, 5.3 and 6.3 are unweighted means of station means over the reporting month. All eleven monitors contribute to the particulate and TVOC profiles; CBD is excluded from the NO_x profile and Harbour West from the CO_2 profile because those channels were invalidated for September 2026. Times quoted in the text are hour-beginning (20:00 denotes 20:00–21:00); the figure axes are labelled hour-ending (01 denotes 00:00–01:00).

Screening-threshold tables: in Tables 4.2, 5.2 and 6.2, the 5σ count is a subset of the 3σ count and not an additional set of observations, because an observation above 5σ is necessarily also above 3σ. Invalidated records generate no event counts: CBD NO_x (2 to 30 September 2026) and Harbour West CO_2 (the whole month) are shown as “–” in Tables 5.2 and 6.2.

Index parameters: the TVOC and NO_x outputs are Sensirion index values referenced to an adaptive baseline learned from each sensor's own recent history, so an index value expresses a deviation from that monitor's recent local conditions rather than an absolute burden (Sensirion, 2022a; Sensirion, 2022b). Monthly mean index values are therefore centred near 100 by construction, and the station comparisons in Sections 4 and 5 are indicative of the relative frequency and size of local excursions only. They are not comparisons of ambient VOC or NO_x concentration, and the station ranking by monthly mean index must not be read as a ranking of pollutant burden.

Carbon dioxide: the CO_2 sensors are non-dispersive infrared units. Where automatic baseline correction (ABC) is enabled, such sensors periodically re-anchor the lowest concentration observed over a rolling window to an assumed clean-air value, so the monthly mean is referenced to that assumed value rather than to an independent calibration.

Restatement of earlier months: the January to August 2026 rows of Tables 3.1, 4.1, 5.1 and 6.1 have been recalculated from the September 2026 workbooks. They reflect the invalidations entered in the AirGradient invalidation register in October 2026 — principally the co-location verification periods of each monitor at Richardia, the Harbour West CO_2 sensor fault from 24 July 2026 and the CBD TVOC/NO_x sensor faults — and therefore differ in places from the values published in earlier monthly reports. Those reports are not re-issued; the restated values will be carried into the 2026 annual report.

3. PARTICULATE MONITORING

3.1. Data Completeness

The September 2026 particulate data completeness results are summarised in Table 3.1.

Table 3.1: Particulate data completeness (%) based on valid 10-minute records.

Month	Air	Brk	CBD	Emp	eSk	Flx	HW	MS	Mtz	Rch	Scr
Jan 2026	-	98.7	84.7	-	96.6	100.0	100.0	99.9	90.4	100.0	-
Feb 2026	84.8	93.1	84.9	***65.1***	96.3	98.3	100.0	99.8	98.4	98.7	-
Mar 2026	96.4	96.8	98.5	90.1	94.2	***74.6***	***30.5***	98.4	90.9	98.8	-
Apr 2026	99.7	***67.8***	***42.3***	96.1	87.6	96.6	100.0	99.8	***53.6***	100.0	-
May 2026	***68.8***	99.3	87.2	84.4	***75.9***	99.5	99.6	***60.8***	99.4	99.6	-
Jun 2026	99.4	97.3	99.6	87.4	95.1	99.7	99.9	100.0	98.0	99.4	-
Jul 2026	100.0	98.4	88.5	94.0	91.3	99.7	100.0	100.0	99.0	100.0	-
Aug 2026	98.9	97.8	98.7	95.4	93.7	98.6	98.7	100.0	97.5	99.4	***43.0***
Sep 2026	100.0	98.0	94.5	98.5	96.2	98.6	98.4	98.3	99.2	100.0	100.0
Oct 2026	-	-	-	-	-	-	-	-	-	-	-
Nov 2026	-	-	-	-	-	-	-	-	-	-	-
Dec 2026	-	-	-	-	-	-	-	-	-	-	-

Missing Data (Particulates)

- *Particulate data completeness ranged from 94.5% to 100% in September 2026, the first month in which all eleven monitors operated for the full calendar month. Airport, Richardia and Scorpio recorded 100%, and Mtunzini (99.2%), Felixton (98.6%), Empangeni (98.5%), Harbour West (98.4%), Meerensee (98.3%), Brackenham (98.0%) and eSikhaleni (96.2%) met the RBCAA 95% operational target. CBD (94.5%) met the 90% minimum data capture specified in SANS 1929:2011 (Annex C, Table C.1) but not the 95% target: all CBD channels lost records on 1 September (00:00 to 08:40 and 17:00 to 20:20) and from 3 September 09:00 to 4 September 11:40, cause not established (Report 025, section 2.2). Brackenham PM_{10} and $PM_{2.5}$ records were invalidated on 4 September from 05:00 to 12:50 (48 records), when fog wetted the optical sensor, a period that includes the replacement of the $PM_{2.5}$ sensor. Brackenham, Empangeni, Felixton and Harbour West also lost records on 1 September at the tail of the multi-station interruption that began on 31 August; eSikhaleni was without power until 21:20 on 1 September; and Meerensee (27–28 September, municipal power failure) and Mtunzini (27 September) recorded short overnight outages. No monthly particulate value is withheld.*

3.2. Monthly Concentrations

PM_{10} and $PM_{2.5}$ monthly average concentrations are shown in Figures 3.1 and 3.2. Comparisons to previous months are provided in Figures 3.3 and 3.4.

Regulatory/health-limit interpretation: for PM_{10} and $PM_{2.5}$, the RSA ambient standards are the applicable regulatory reference values, while the WHO air quality guidelines are used as health-based contextual benchmarks. Because these AirGradient measurements are screening-network data, the comparisons identify potential concern and follow-up priorities only; they do not constitute reference-method compliance findings.

- Monthly PM_{10} averages (8.2–17.7 µg/m³) were below the RSA annual standard value of 40 µg/m³ at all eleven stations. The WHO annual guideline value of 15 µg/m³ was exceeded at six stations — eSikhaleni (17.7 µg/m³), Harbour West (16.7 µg/m³), Felixton (16.4 µg/m³), Richardia (16.1 µg/m³), Scorpio (15.5 µg/m³) and, marginally, Brackenham (15.0 µg/m³) — and not at Meerensee (12.4 µg/m³), Empangeni (11.5 µg/m³), Mtunzini (11.5 µg/m³),

Airport (10.6 µg/m³) or CBD (8.2 µg/m³, the lowest in the network). Annual compliance cannot be assessed from a single monthly average, and AirGradient data remain screening data rather than regulatory-equivalent measurements.

- Monthly $PM_{2.5}$ averages (8.2–13.6 µg/m³) were below the RSA annual standard value of 20 µg/m³ at all eleven stations. All eleven stations were above the WHO annual guideline value of 5 µg/m³, shown for context. This is a contextual comparison of screening data only and is not a formal annual exceedance or compliance assessment.
- Station-specific monthly benchmark status: no station exceeded the RSA PM_{10} or $PM_{2.5}$ annual standard value in the September 2026 screening comparison. The WHO annual guideline comparison, used as a health-based contextual benchmark only, was exceeded for PM_{10} at six of the eleven stations and for $PM_{2.5}$ at all eleven. September 2026 is the first full calendar month for Scorpio (100% capture), which is included in every monthly comparison in this report.

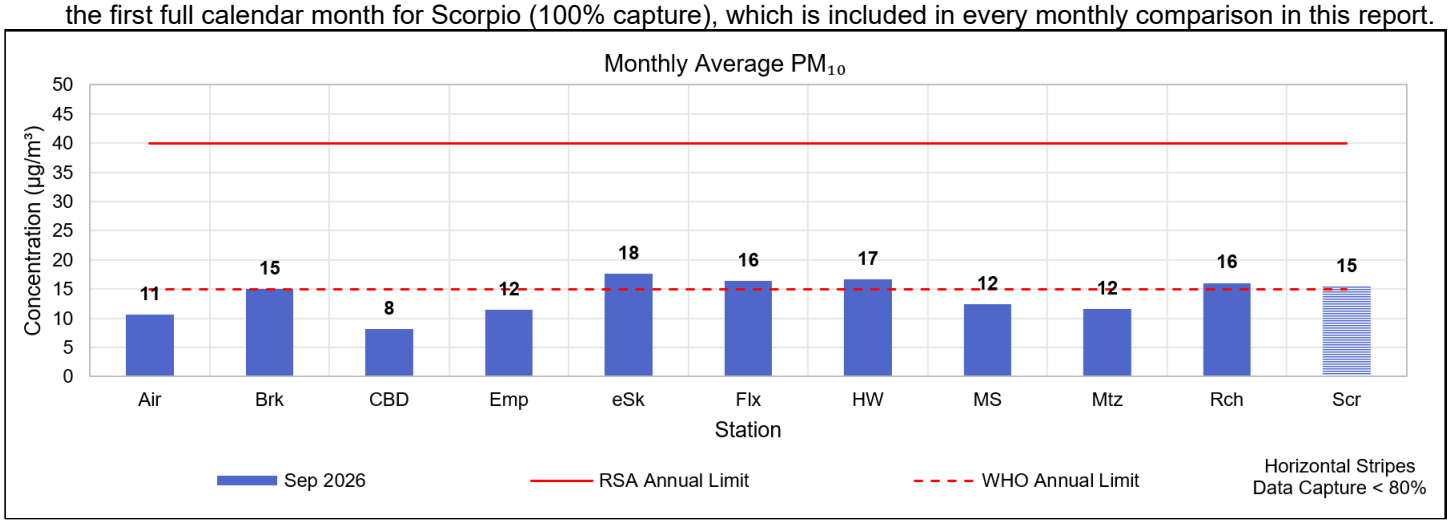


Figure 3.1: PM_{10} monthly concentration.

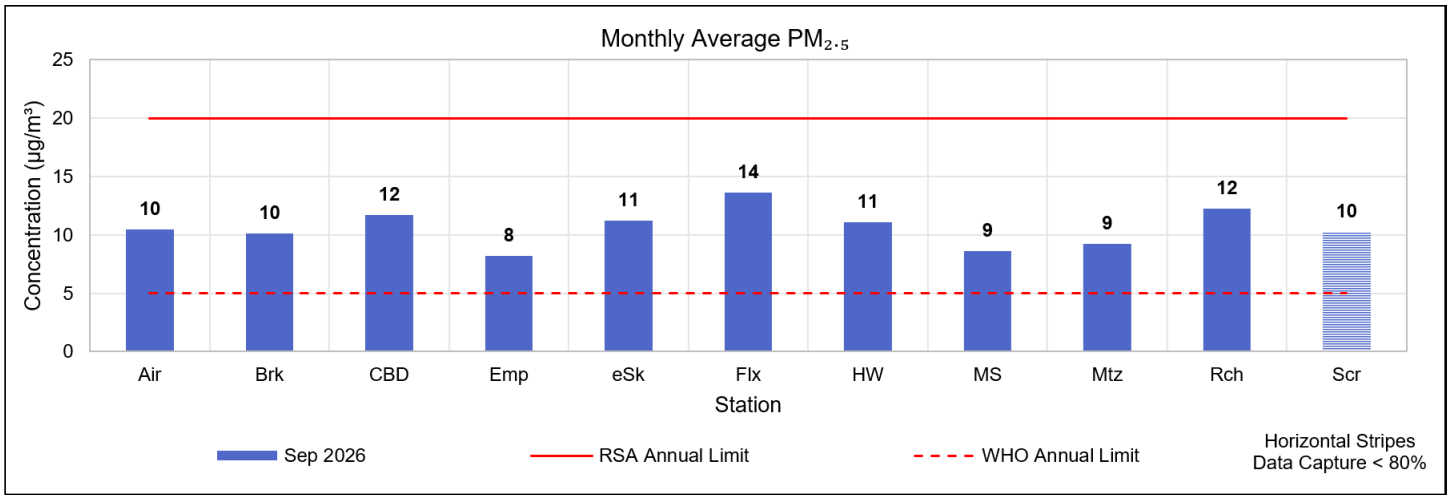


Figure 3.2: $PM_{2.5}$ monthly concentration.

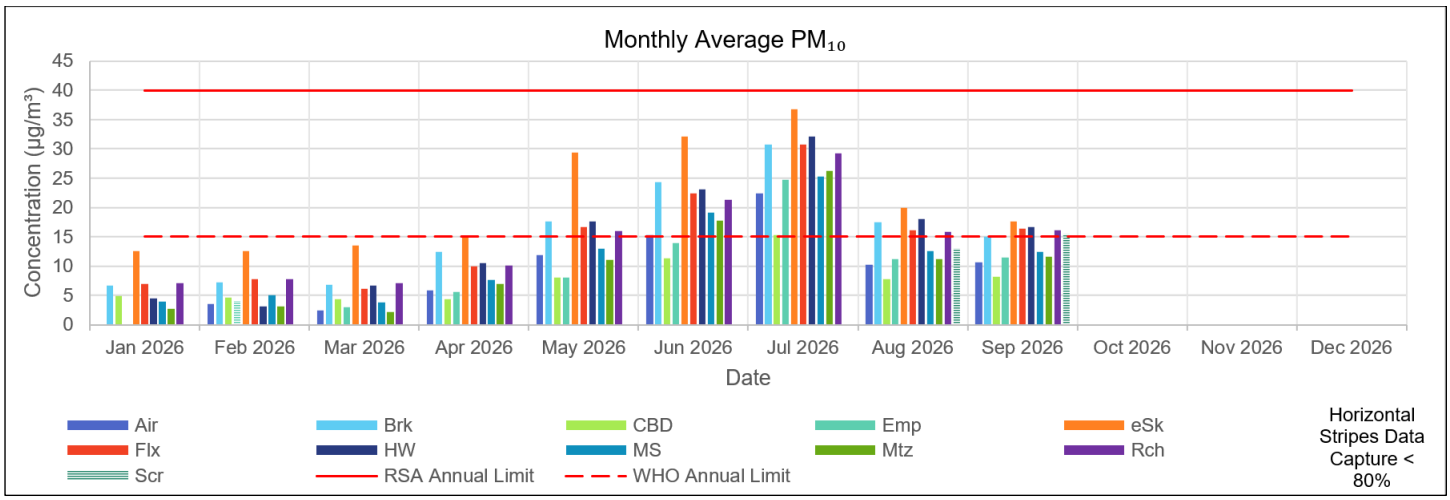


Figure 3.3: PM_{10} monthly comparison.

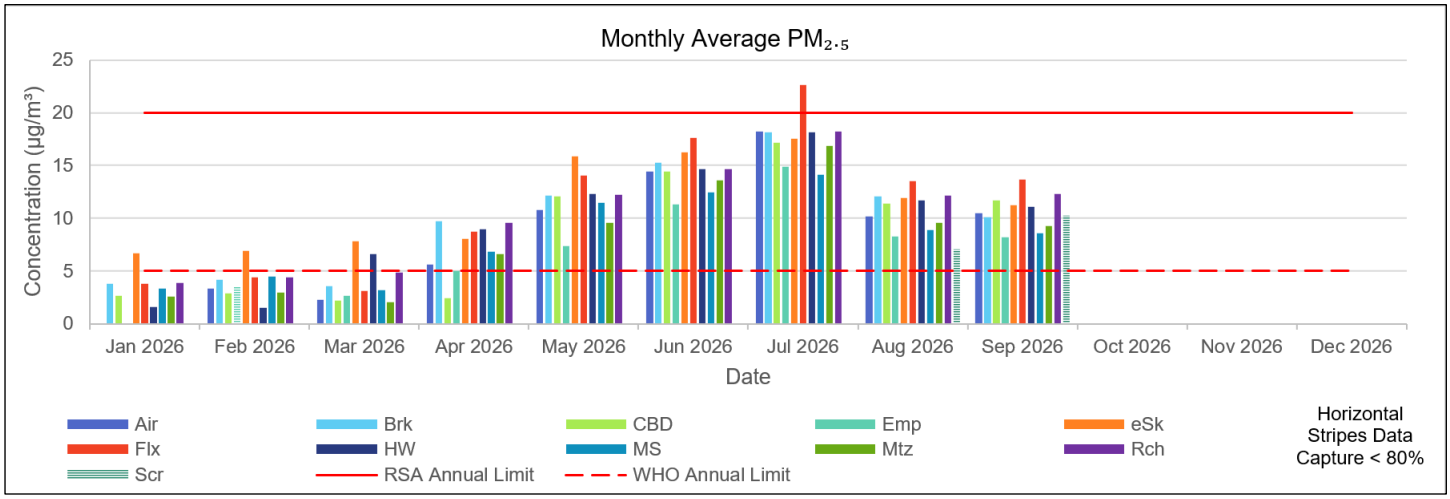


Figure 3.4: $PM_{2.5}$ monthly comparison.

3.3. Diurnal Concentrations

PM diurnal concentrations are shown in Figures 3.5 and 3.6.

- Diurnal PM_{10} and $PM_{2.5}$ averages are presented for temporal-pattern screening only. The September 2026 network-mean diurnal profile peaks at 20:00 (PM_{10} 17.4 µg/m³; $PM_{2.5}$ 12.5 µg/m³), declines overnight with a minor rise at 04:00–05:00, and is lowest at 09:00 (PM_{10} 11.3 µg/m³; $PM_{2.5}$ 9.4 µg/m³), a pattern consistent with evening domestic combustion under a contracting nocturnal boundary layer rather than with a single continuous industrial source.
- The RSA and WHO particulate criteria used in this report are calendar-day (24-hour) values and should not be applied to hour-of-day averages.
- Benchmark interpretation is therefore based on the calendar-day results in Section 3.4.

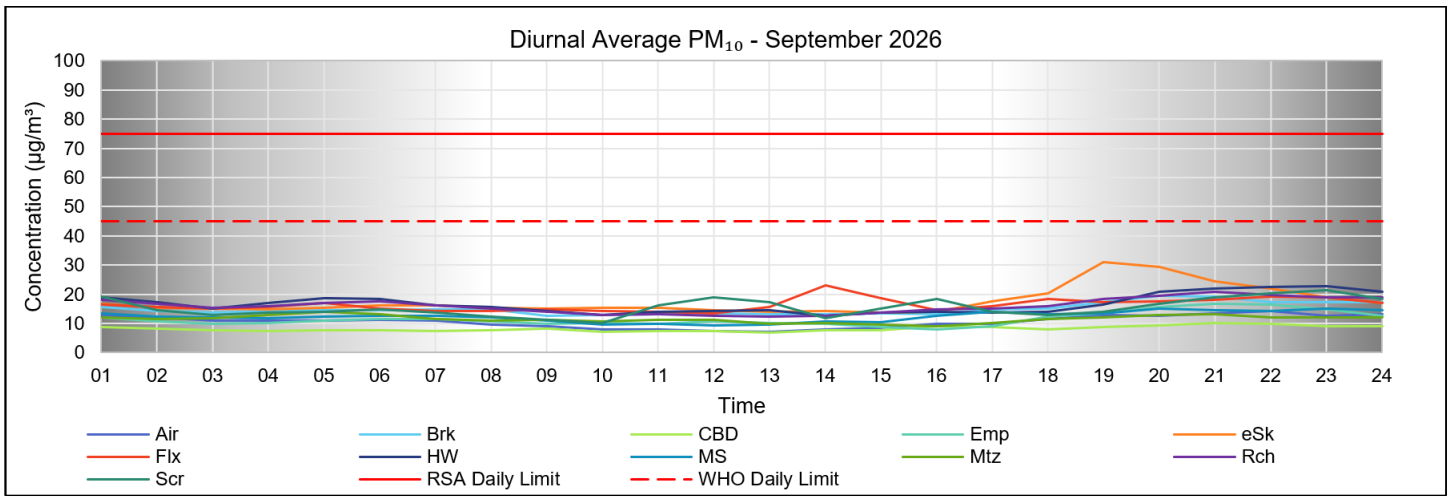


Figure 3.5: PM_{10} diurnal concentrations.

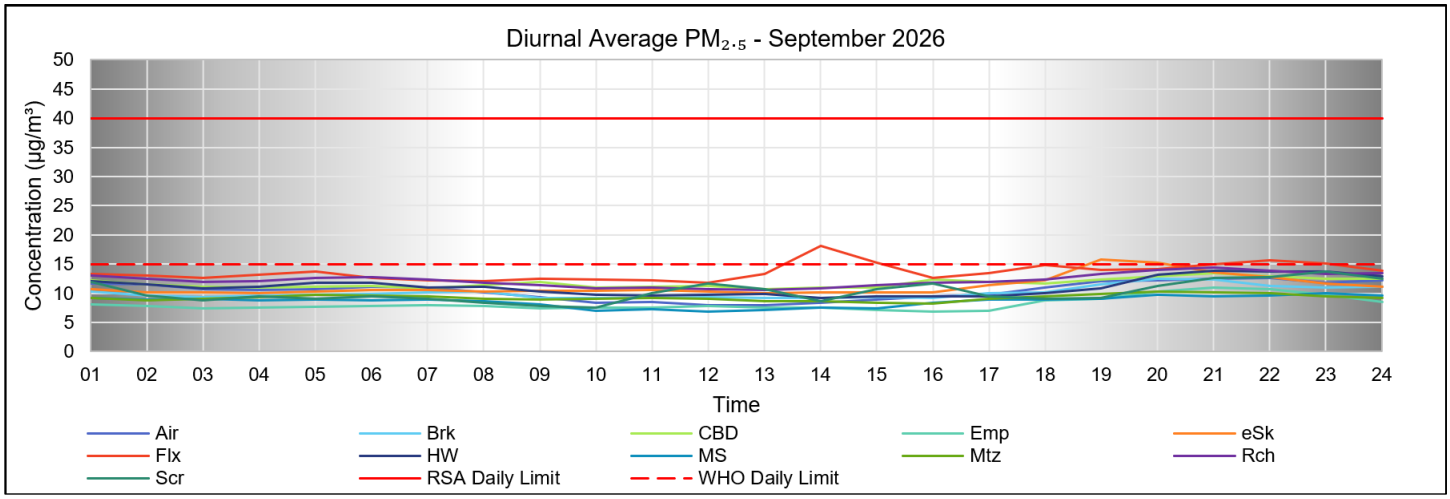


Figure 3.6: $PM_{2.5}$ diurnal concentrations.

3.4. 24-hour Concentrations

PM daily concentrations are shown in Figures 3.7 and 3.8.

- No daily average PM_{10} value exceeded the RSA 24-hour standard value of 75 µg/m³ at any station in September 2026; the highest daily value in the network was 67.6 µg/m³ at Scorpio on 3 September. The WHO 24-hour guideline value of 45 µg/m³, shown for context, was exceeded on 16 station-days, all on 2 and 3 September: on 3 September at all ten stations with a valid daily value — Scorpio (67.6 µg/m³), eSikhaleni (64.8 µg/m³), Harbour West (59.9 µg/m³), Brackenham (57.6 µg/m³), Felixton (56.8 µg/m³), Empangeni (55.0 µg/m³), Richardia (52.2 µg/m³), Meerensee (51.5 µg/m³), Mtunzini (50.5 µg/m³) and Airport (48.5 µg/m³) — and on 2 September at eSikhaleni (50.5 µg/m³), Harbour West (50.5 µg/m³), Brackenham (49.2 µg/m³), Richardia (46.3 µg/m³), Scorpio (46.1 µg/m³) and Felixton (46.0 µg/m³). CBD had no valid daily value on 3 September (station outage); its highest daily value was 26.9 µg/m³ on 2 September.

- One daily average $PM_{2.5}$ value exceeded the RSA 24-hour standard value of 40 µg/m³: Scorpio on 3 September 2026 (47.1 µg/m³). The highest daily value at any other station was 37.9 µg/m³ at Felixton on the same day.
- The WHO 24-hour guideline value of 15 µg/m³ for $PM_{2.5}$ was exceeded at all eleven stations, on 78 station-days in total and on 4 to 11 days per station, with the highest count at Felixton (11 days), followed by Airport and Richardia (9 each), and the lowest at Empangeni (4). The exceedances cluster on 1–3, 11–16 and 22–25 September, indicating regional episodes rather than localised sources.
- These are screening-network results and should not be interpreted as reference-method compliance findings.
- Station-specific daily benchmark status: on a screening basis, the 2026 year-to-date RSA 24-hour exceedance counts are PM_{10}: eSikhaleni 2, Felixton 1 and Mtunzini 1; $PM_{2.5}$: Felixton 3, Airport 2 and Scorpio 1. No AirGradient station has reached the four exceedances per calendar year permitted by the RSA 24-hour standards. Felixton remains at three of the four permitted $PM_{2.5}$ exceedances, with three months of the calendar year outstanding, and should be treated as a watch item. This is not a compliance determination. The AirGradient counts carry the station-specific bias discussed in Section 3.5, and, because most co-located units underread their reference analysers, they are a lower bound: in September 2026 the reference analysers recorded eight RSA 24-hour $PM_{2.5}$ exceedances (Brackenham 2, Felixton 2, Scorpio 4; Report 026), against one in the co-located AirGradient record (Scorpio, 3 September). The AirGradient year-to-date counts must therefore not be used as a proxy for regulatory exceedance status at any station, and the Felixton watch item is a screening observation only.

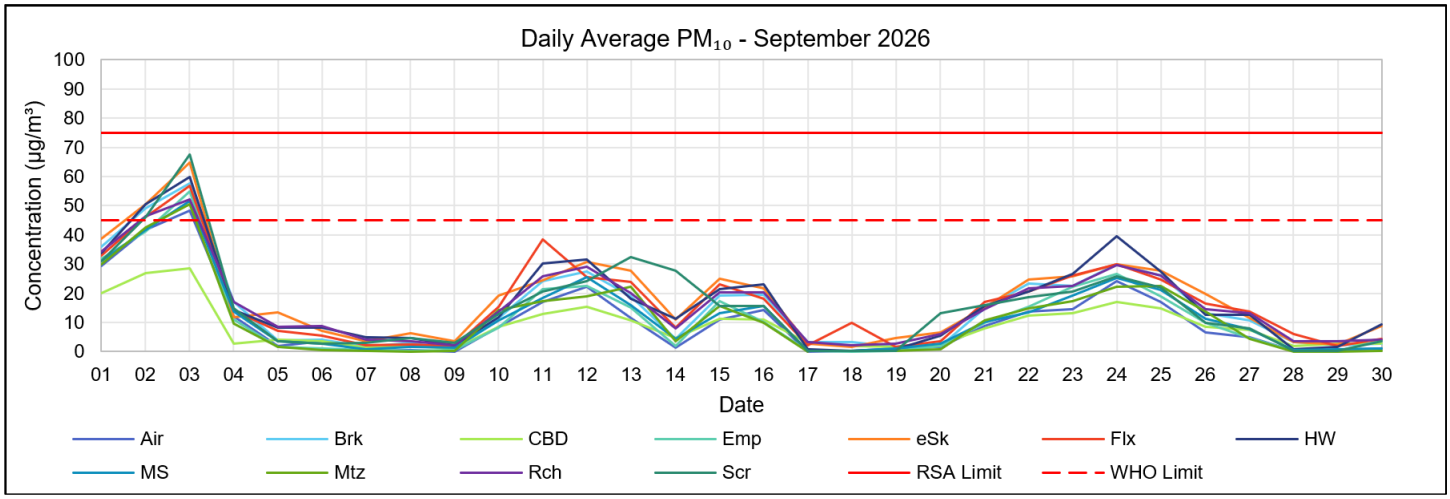


Figure 3.7: PM_{10} daily concentrations.

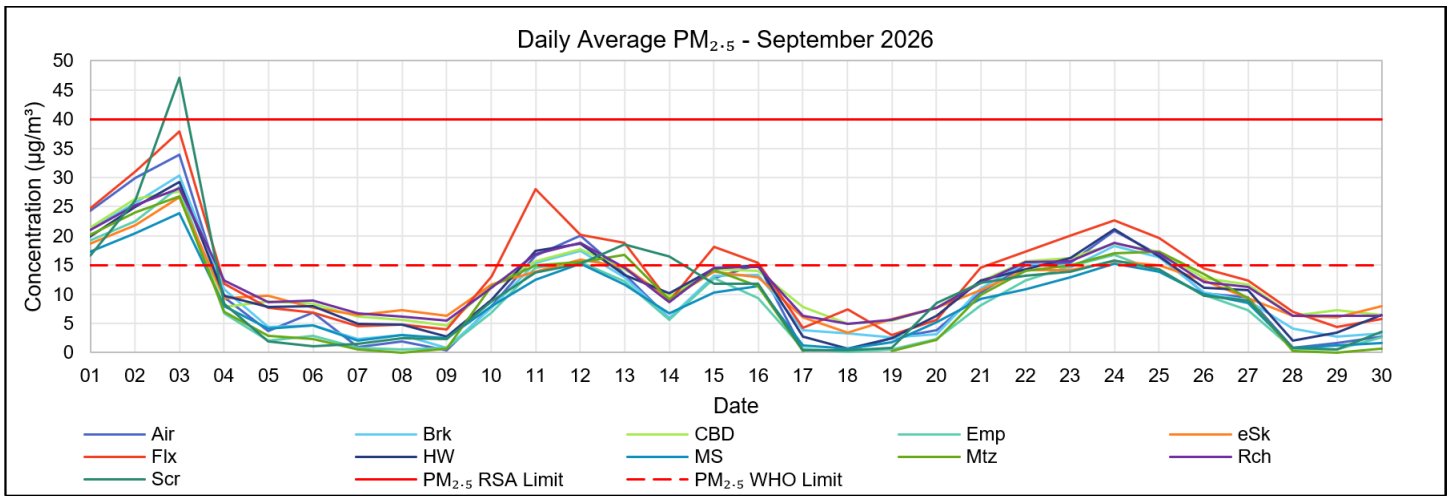


Figure 3.8: $PM_{2.5}$ daily concentrations.

3.5. Conclusion

Particulate concentrations across the AirGradient network were broadly unchanged between August and September 2026 (Figures 3.3 and 3.4): of the ten stations with an August value, monthly PM_{10} rose slightly at six and fell at four, and $PM_{2.5}$ rose at four and fell at six. Concentrations were low to moderate in absolute terms for most of the month. Even so, a regional episode on 2–3 September, allocated in Report 026 to wildfires, accounted for all sixteen WHO PM_{10} 24-hour exceedance-days and for the only RSA $PM_{2.5}$ 24-hour exceedance in the AirGradient record (Scorpio, 3 September).

Monthly PM_{10} averages ranged from 8.2 to 17.7 µg/m³, with the highest value at eSikhaleni (17.7 µg/m³), followed by Harbour West (16.7 µg/m³) and Felixton (16.4 µg/m³), and the lowest at CBD (8.2 µg/m³); the network mean was 13.8 µg/m³ in September against 14.0 µg/m³ in August (13.6 µg/m³ excluding Scorpio, on the same ten-station basis as August). Monthly $PM_{2.5}$ averages ranged from 8.2 to 13.6 µg/m³, with the highest value at Felixton (13.6 µg/m³), followed by Richardia (12.3 µg/m³) and CBD (11.7 µg/m³), and the lowest at Empangeni (8.2 µg/m³); the network mean was 10.6 µg/m³, against 11.0 µg/m³ in August. Monthly PM_{10} averages were below the RSA annual standard value at all stations; the WHO annual guideline value, shown for context, was exceeded at six of the eleven.

Monthly $PM_{2.5}$ averages were below the RSA annual standard value at all stations, and all were above the WHO annual guideline value shown for context. These are contextual comparisons of screening data only; annual compliance cannot be concluded from one month of screening data. No daily average PM_{10} value exceeded the RSA 24-hour standard value, and one daily average $PM_{2.5}$ value did (Scorpio, 47.1 µg/m³, 3 September). The WHO 24-hour guideline value was exceeded for PM_{10} on sixteen station-days, all on 2 and 3 September, at every station except CBD, and for $PM_{2.5}$ at all eleven stations on 78 station-days in total.

Regulatory-limit comment: no AirGradient PM_{10} daily average exceeded the RSA 24-hour standard value during September 2026, and one $PM_{2.5}$ daily average did, at Scorpio on 3 September, a day on which the co-located Scorpio reference analyser also recorded an RSA $PM_{2.5}$ exceedance (Report 026). This is a screening indication only; annual regulatory status cannot be concluded from a single month of screening data. Health-limit comment: the WHO guideline comparisons are more conservative and continue to indicate health-relevant particulate levels across the network, particularly for $PM_{2.5}$, which exceeded the WHO 24-hour guideline value at every station on between four and eleven days.

Station-specific conclusion: the September 2026 AirGradient particulate results indicate one RSA daily standard exceedance for $PM_{2.5}$ at Scorpio on 3 September. The health-based WHO daily guideline comparison identified PM_{10} exceedances at ten of the eleven stations, all on 2 and 3 September, and $PM_{2.5}$ exceedances at all eleven stations.

These are screening-network results and should not be interpreted as reference-method compliance findings. September particulate data completeness ranged from 94.5% to 100%: ten of the eleven monitors met the RBCAA 95% operational target, and all eleven met both the 90% minimum data capture specified in SANS 1929:2011 (Annex C, Table C.1) and the 80% statistical-robustness threshold. CBD (94.5%) fell below the 95% target owing to station outages on 1 and 3–4 September (cause not established). The eSikhaleni night-time data loss recorded in August did not recur in September (Report 025, Table 4.1, item 19, closed).

Correlation with the September 2026 technical report: temporal agreement between the two networks remains strong, and magnitude agreement remains station-specific. Across the paired calendar days of September 2026, the Pearson correlation between the AirGradient daily average and the co-located reference analyser is 0.83 to 0.96 at every co-located pair. Means quoted in this paragraph are over the paired days only and therefore differ slightly from the calendar-month means in Section 3.2. The mean daily bias ranges from −12.4 µg/m³ (CBD, PM_{10}, n = 27) and −11.9 µg/m³ (Brackenham, $PM_{2.5}$, n = 28) to +1.8 µg/m³ (eSikhaleni, PM_{10}, n = 28), while Harbour West (+0.3 µg/m³, $PM_{2.5}$), Richardia (+0.9 µg/m³, $PM_{2.5}$) and Felixton (−2.4 µg/m³, PM_{10}; −2.0 µg/m³, $PM_{2.5}$) agree to within about 2.5 µg/m³. Scorpio, in its first full month, underread its reference PM_{10} analyser by 4.4 µg/m³ (r = 0.91, n = 30); its $PM_{2.5}$ comparison (−13.5 µg/m³, r = 0.91) is not interpreted, because the Scorpio reference $PM_{2.5}$ record is itself qualified, having exceeded the co-located reference PM_{10} on 24 of 30 days (Report 026, section 4.2). The sign of the bias at each station is unchanged from August 2026, consistent with a stable uncorrected sensor offset rather than random error. The practical consequences follow directly. At Brackenham, the reference analyser recorded two RSA 24-hour $PM_{2.5}$ exceedances (2 and 3 September) and a monthly mean of 22.8 µg/m³. In contrast, the co-located AirGradient unit returned a monthly mean of 10.1 µg/m³, a daily maximum of 30.3 µg/m³ and no exceedance — an underread by a little over a factor of two, as in July and August. At CBD, the reference analyser recorded a PM_{10} monthly mean of 22.6 µg/m³ and two WHO PM_{10} exceedance-days, against the AirGradient unit's 8.2 µg/m³ and none. At eSikhaleni, the AirGradient unit again overread PM_{10} on the paired days (18.0 against 16.2 µg/m³) and recorded two WHO PM_{10} exceedance-days on which the reference analyser did not exceed (reference maximum 31 µg/m³). Because the correlation is high and the bias is stable and station-specific, the divergences remain consistent with uncorrected sensor bias rather than random error, and are in principle correctable by site-specific calibration factors derived from co-location. Until such factors are applied and documented in this report, AirGradient exceedance counts must not be reported as, or compared directly with, reference-method results.

4. TOTAL VOLATILE ORGANIC COMPOUNDS MONITORING

Volatile organic compounds (VOCs) are organic chemicals that can evaporate at ambient temperatures. Outdoor VOCs may originate from industrial activities, combustion sources, vehicle exhaust and the use or storage of solvents and other chemical products. Health and environmental relevance depend strongly on the individual compound, concentration and exposure duration; therefore, a total VOC index should not be interpreted as a compound-specific health-risk metric. The AirGradient TVOC sensor does not identify individual compounds and reports a relative, dimensionless index rather than an absolute concentration (Sensirion, 2022b). In this report, TVOC index data are used only as screening information to identify temporal changes and potential short-term events requiring follow-up.

4.1. Data Completeness

The September 2026 TVOC data completeness results are summarised in Table 4.1.

Table 4.1: TVOC data completeness (%) based on valid 10-minute records.

Month	Air	Brk	CBD	Emp	eSk	Flx	HW	MS	Mtz	Rch	Scr
Jan 2026	-	98.7	***48.2***	-	96.6	100.0	100.0	99.9	90.4	100.0	-
Feb 2026	84.8	93.1	***52.0***	***65.1***	96.3	98.3	100.0	99.8	98.4	98.7	-
Mar 2026	96.4	96.8	98.5	90.1	94.2	***67.9***	***73.1***	98.4	90.9	98.8	-
Apr 2026	99.7	***67.8***	***70.3***	96.1	87.6	96.6	100.0	99.8	***53.6***	100.0	-
May 2026	***68.8***	99.3	99.3	84.4	***75.9***	99.5	99.6	***60.8***	99.4	99.6	-
Jun 2026	99.4	97.3	99.6	87.4	***75.9***	99.7	99.9	100.0	98.0	99.4	-
Jul 2026	100.0	98.4	***8.7***	94.0	91.3	***69.1***	98.7	100.0	99.0	100.0	-
Aug 2026	98.9	97.8	***10.2***	95.4	93.7	98.6	98.7	100.0	97.5	99.4	***43.0***
Sep 2026	100.0	99.1	91.2	98.5	96.2	95.5	98.4	98.3	99.2	100.0	100.0
Oct 2026	-	-	-	-	-	-	-	-	-	-	-
Nov 2026	-	-	-	-	-	-	-	-	-	-	-
Dec 2026	-	-	-	-	-	-	-	-	-	-	-

Missing Data (TVOC)

- *CBD (91.2%) – in addition to the station outages of 1 and 3–4 September 2026, the TVOC/NO_x channel recorded no data from 18 September 12:00 to 19 September 12:00 (145 records), with PM and CO_2 unaffected. Felixton (95.5%) – the TVOC/NO_x channel recorded no data from 18 September 15:30 to 19 September 13:40 (134 records), and the sensor was replaced on 19 September 2026. Both losses, and a loss of 34 records at eSikhaleni on 18 September, coincide with the heaviest rainfall of the month (106.7 mm at CBD and 115 mm at Felixton-THS on 18 September; Report 025, section 2.2); the association is noted, but the cause has not been established. All remaining monitors were at or above 96.2%. No monthly TVOC value is withheld.*

4.2. Monthly Index Values

TVOC monthly average index values are shown in Figure 4.1. Comparisons to previous months are also provided in Figure 4.2.

Regulatory/health-limit applicability: No South African ambient regulatory limit or generally applicable health-based limit is applied to the AirGradient TVOC index because it is a dimensionless relative index rather than a compound-specific concentration. Elevated TVOC index values are therefore evaluated only as screening indicators using temporal patterns and the 3σ/5σ event flags in Table 4.2.

Station-specific limit/standard status: No AirGradient TVOC station is recorded as exceeding a regulatory or health-based limit or standard in September 2026. Ten of the eleven monitors recorded one or more 3σ screening flags; Richardia (37), Felixton (22), eSikhaleni (19) and Empangeni (18) recorded the most, and CBD (2) and Airport (3) the fewest, while Harbour West recorded none. No station recorded a 5σ flag. These are screening-event flags only.

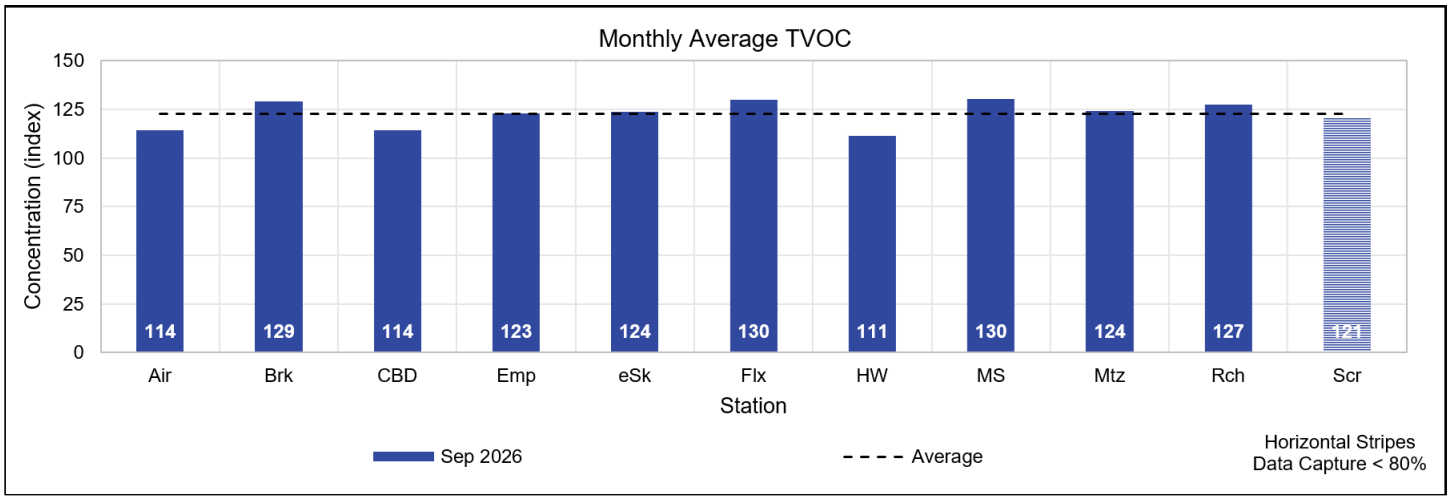


Figure 4.1: TVOC monthly index values.

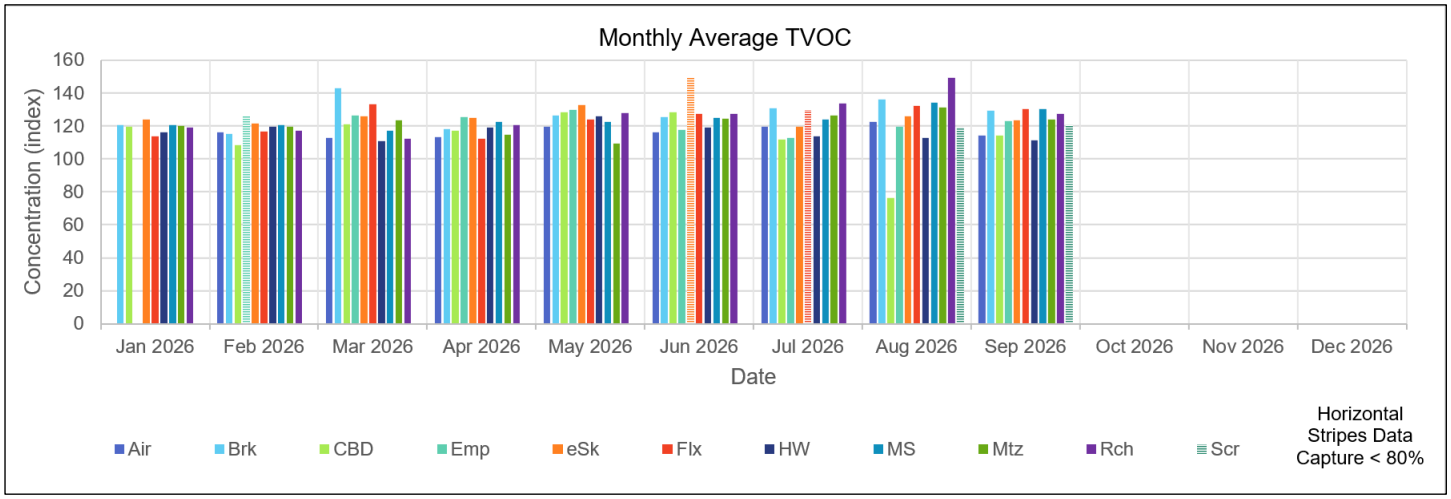


Figure 4.2: TVOC monthly index comparison.

4.3. Diurnal Index Values

TVOC diurnal index values are shown below (Figure 4.3).

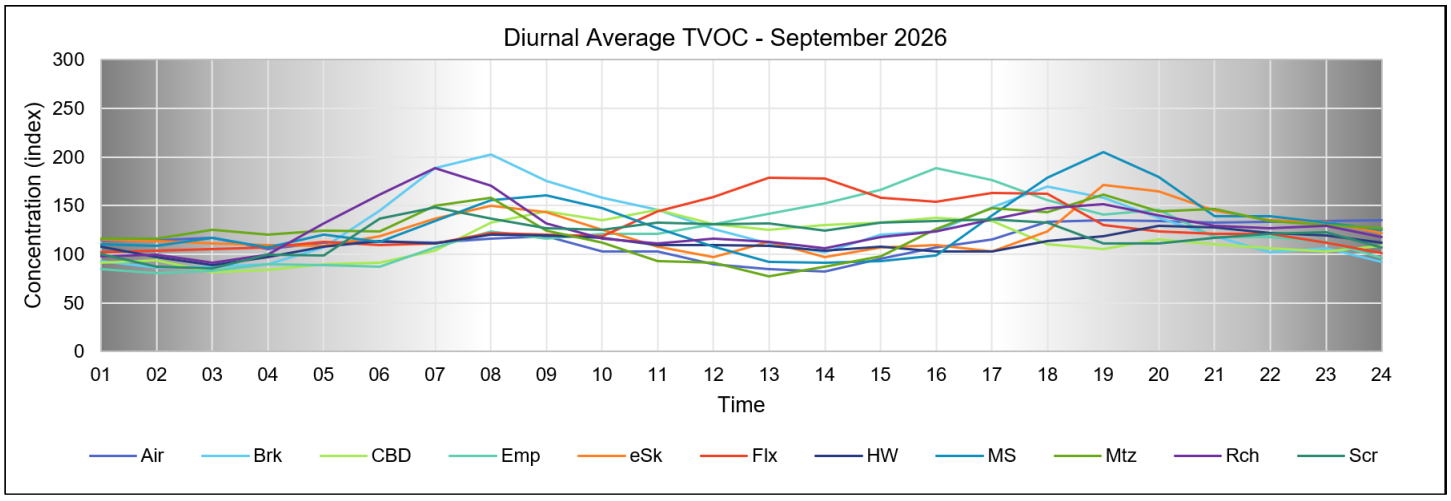


Figure 4.3: TVOC diurnal index values.

4.4. 24-hour Index Values

TVOC daily index values are shown below (Figure 4.4).

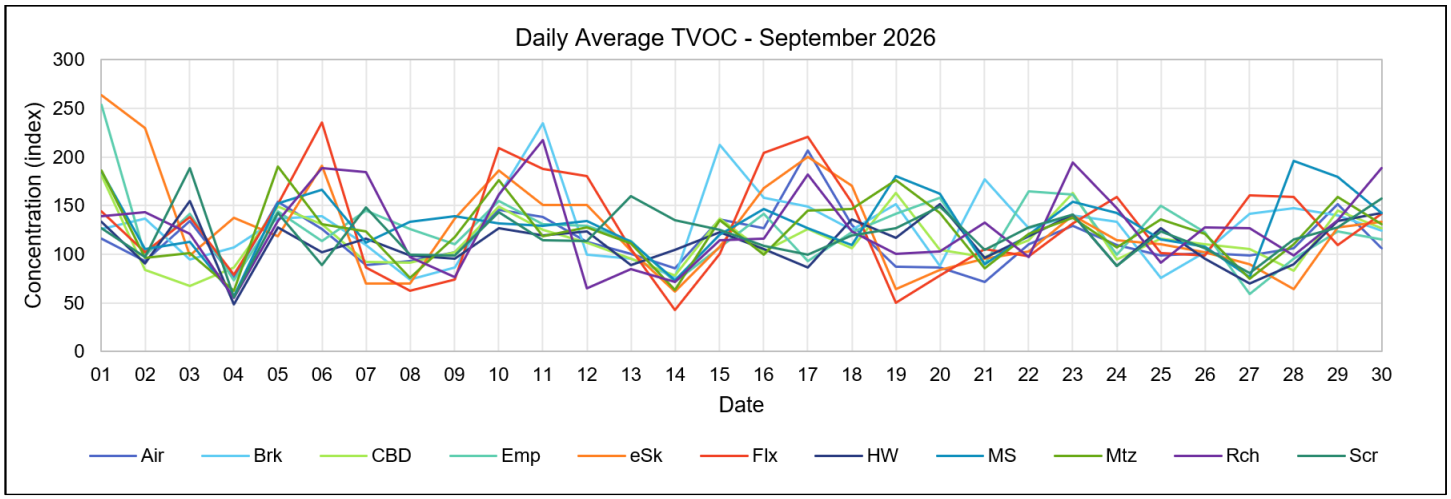


Figure 4.4: TVOC daily index values.

4.5. 1-hour Index Values

TVOC hourly index values are shown below (Figure 4.5).

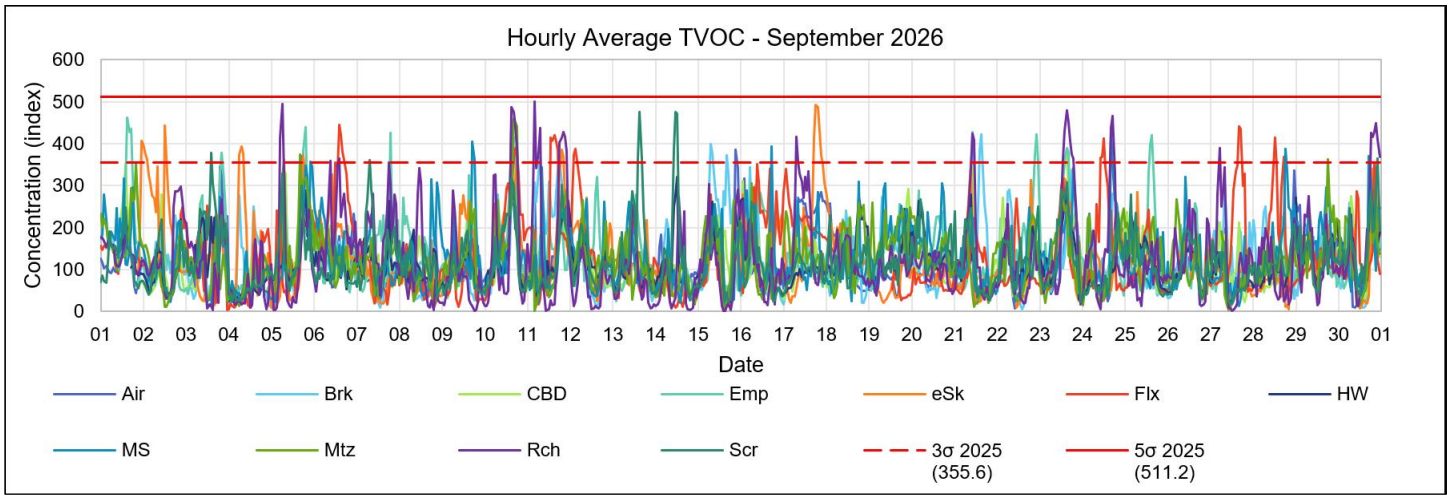


Figure 4.5: TVOC hourly index values.

TVOC hourly observations above the 3σ and 5σ screening thresholds are summarised in Table 4.2.

Table 4.2: TVOC hourly observations above the 3σ and 5σ screening thresholds.

Limit	Air	Brk	CBD	Emp	eSk	Flx	HW	MS	Mtz	Rch	Scr	Total
3σ	3	8	2	18	19	22	0	7	6	37	9	131
5σ	0	0	0	0	0	0	0	0	0	0	0	0

4.6. Conclusion

September 2026 TVOC monthly average index values ranged from 111.4 to 130.2 across the eleven monitors. Meerensee and Felixton recorded the highest monthly average index values (both 130.2), followed by Brackenham (129.0) and Richardia (127.4); Harbour West recorded the lowest (111.4). The network mean was 122.6, against 129.3 in August on the restated basis. Because each index is referenced to its own sensor's adaptive baseline (Section 2), these differences are not differences in VOC burden. Diurnal and hourly data indicate intermittent short-term elevated index events rather than persistently elevated conditions; the network diurnal profile has two maxima, at 07:00 (144.5) and 18:00 (144.6), and a minimum at 02:00 (99.5). Using the exact unrounded hourly thresholds (3σ = 355.6; 5σ = 511.2), 131 hourly observations were above 3σ, and none were above 5σ (August 2026, restated: 142 and none). Richardia (37), Felixton (22), eSikhaleni (19) and Empangeni (18) recorded the most 3σ flags in absolute terms. The ranking is unchanged when expressed as a rate of valid hours: Richardia recorded the highest event frequency of the network (37 flags in 720 valid hours, 5.1%), ahead of Felixton (22 in 686 hours, 3.2%), eSikhaleni (19 in 692 hours, 2.7%) and Empangeni (18 in 709 hours, 2.5%). Richardia recorded eight 10-minute values at 500 index units, the top of the sensor's reporting range, and an hourly maximum of 499.8; values at that ceiling should be treated as right-censored rather than as measurements, so the Richardia monthly mean and 3σ count are lower bounds. This is the treatment applied to the exactly-zero particulate readings in Section 2, applied at the opposite end of the sensor range. Overall, the results indicate a relatively consistent baseline with isolated short-term events that warrant local-source follow-up only where they coincide with odour observations, complaints or relevant meteorological conditions. Ten of the eleven monitors met the RBCAA 95% operational target for TVOC capture; CBD (91.2%) did not.

Regulatory and health-limit conclusion: The TVOC findings cannot be assessed against an ambient compliance limit or a health-based concentration threshold in this report. The reported events should be treated as screening triggers for source-pattern review, targeted field observations or compound-specific monitoring where persistent or recurrent elevations are observed.

Station-specific conclusion: No TVOC station exceeded an applicable regulatory or health limit or standard; all named TVOC stations with 3σ flags should therefore be described as screening-event locations rather than exceedance locations.

Correlation with the September 2026 technical report: There is no direct TVOC comparator, and the only overlap is contextual. Three air quality complaints were logged in September 2026 (September 2025: 39): the RBCAA complaints register records two odour complaints allocated to Mondi and one particulate complaint allocated to Grindrod (Report 026). That is the allocation recorded when each complaint was logged; it is not a verified source attribution and is reproduced here only as context. Over the same month, the reference network recorded TRS exceedances of the WHO 30-minute H_2S guideline at eSikhaleni (12), Felixton (11), CBD (2) and Brackenham (1), and of the OME 10-minute criterion at eSikhaleni (14), Felixton (9) and CBD (1). TVOC 3σ flags were recorded at ten of the eleven monitors, with the highest counts at Richardia, Felixton, eSikhaleni and Empangeni. The co-occurrence at Felixton and eSikhaleni is a follow-up trigger only, not attribution; the TVOC index responds to a broad and unspecified range of compounds and cannot be equated with reduced sulphur species. Richardia, which recorded the most TVOC flags in the network, recorded no TRS exceedance, which further cautions against reading the index as a sulphur indicator.

5. NITROGEN OXIDES MONITORING

Nitrogen oxides (NO_x) are a group of reactive gases that primarily include nitric oxide (NO) and nitrogen dioxide (NO_2), generated mainly by high-temperature combustion from vehicles, power generation and industrial activities. NO_x contributes to the formation of ozone and secondary particulate matter and can affect respiratory health, particularly in susceptible populations. The AirGradient NO_x sensor reports a relative, dimensionless index rather than pollutant-specific NO or NO_2 concentrations (Sensirion, 2022a). In this report, NO_x index data are used as screening information to identify short-term changes and potential events, not to assess compliance with ambient NO_2 standards.

5.1. Data Completeness

The September 2026 NO_x data completeness results are summarised in Table 5.1.

Table 5.1: NO_x data completeness (%) based on valid 10-minute records.

Month	Air	Brk	CBD	Emp	eSk	Flx	HW	MS	Mtz	Rch	Scr
Jan 2026	-	98.7	***48.2***	-	96.6	100.0	100.0	99.9	90.4	100.0	-
Feb 2026	84.8	93.1	***52.0***	***65.1***	96.3	98.3	100.0	99.8	98.4	98.7	-
Mar 2026	96.4	96.8	98.5	90.1	94.2	***67.9***	***73.1***	98.4	90.9	98.8	-
Apr 2026	99.7	***67.8***	***70.3***	96.1	87.6	96.6	100.0	99.8	***53.6***	100.0	-
May 2026	***68.8***	99.3	99.3	84.4	***75.9***	99.5	99.6	***60.8***	99.4	99.6	-
Jun 2026	99.4	97.3	99.6	87.4	***75.9***	99.7	99.9	100.0	98.0	99.4	-
Jul 2026	100.0	98.4	***8.7***	94.0	91.3	***69.1***	98.7	100.0	99.0	100.0	-
Aug 2026	98.9	97.8	***10.2***	95.4	93.7	98.6	98.7	100.0	97.5	99.4	***43.0***
Sep 2026	100.0	99.1	***1.6***	98.5	96.2	95.5	98.4	98.3	99.2	100.0	100.0
Oct 2026	-	-	-	-	-	-	-	-	-	-	-
Nov 2026	-	-	-	-	-	-	-	-	-	-	-
Dec 2026	-	-	-	-	-	-	-	-	-	-	-

Missing Data (NO_x)

- *CBD (1.6%) – NO_x data were invalidated from 2 to 30 September 2026, after 1 September was lost to the station outage: the index from the TVOC/NO_x sensor installed on 28 August 2026 repeatedly ran to 374–500 while every other station remained at 1–3, and the CBD PM and CO_2 channels showed no counterpart, indicating a sensor fault rather than ambient NO_x (Report 025, section 2.2 and Table 4.1, item 23). The CBD monthly NO_x value is therefore withheld. Felixton (95.5%) lost 134 records on 18–19 September 2026, and its sensor was replaced on 19 September. All remaining monitors were at or above 96.2%.*

5.2. Monthly Index Values

NO_x monthly average index values are shown in Figure 5.1; comparisons to previous months are also provided in Figure 5.2.

Regulatory/health-limit applicability: the AirGradient NO_x output is reported as a dimensionless index and is not equivalent to an NO_2 or NO_x concentration in µg/m³. South African NO_2 ambient standards and WHO NO_2 health-based guidelines are therefore not applied to these index data; interpretation is limited to relative screening and 3σ/5σ event identification.

Station-specific limit/standard status: no AirGradient NO_x station is recorded as exceeding a regulatory or health-based limit or standard in September 2026, because the NO_x output is an index and not an NO_2 concentration. No hourly observation at any reporting monitor exceeded the 3σ screening threshold; the highest hourly index values were 30.3 at Harbour West and Richardia. CBD is excluded because its NO_x record is invalidated.

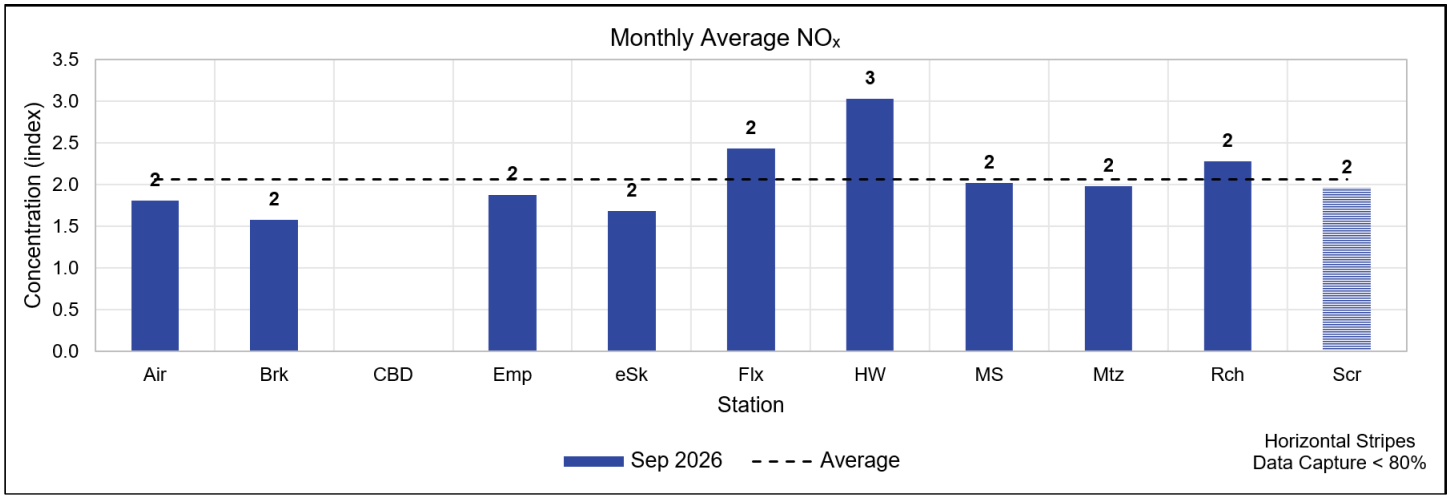


Figure 5.1: NO_x monthly index values.

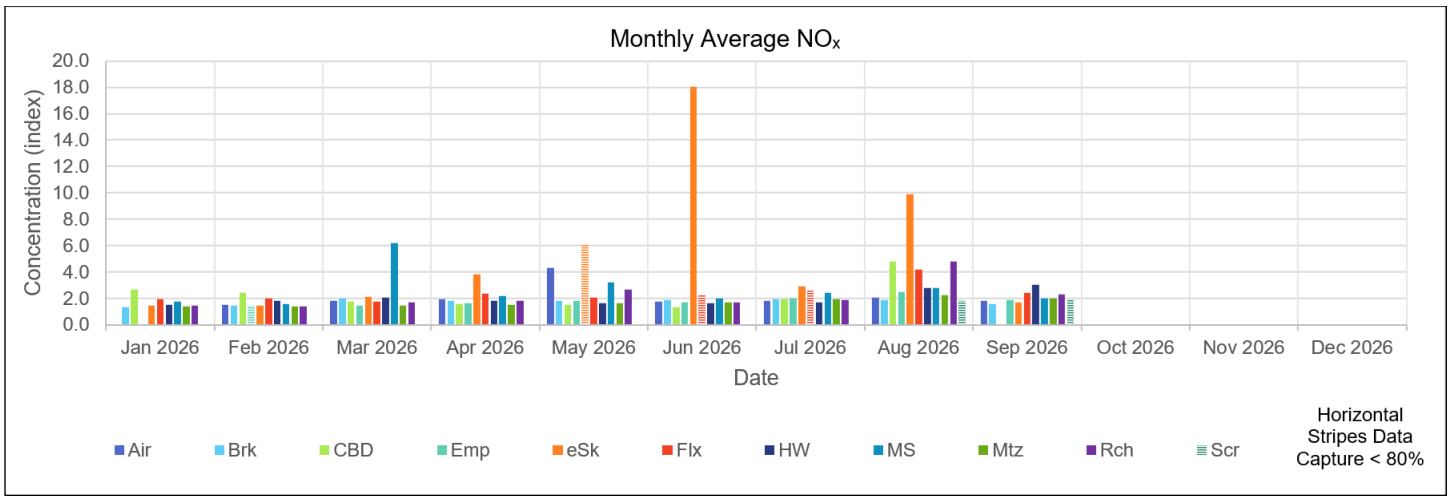


Figure 5.2: NO_x monthly comparison.

5.3. Diurnal Index Values

NO_x diurnal index values are shown below (Figure 5.3).

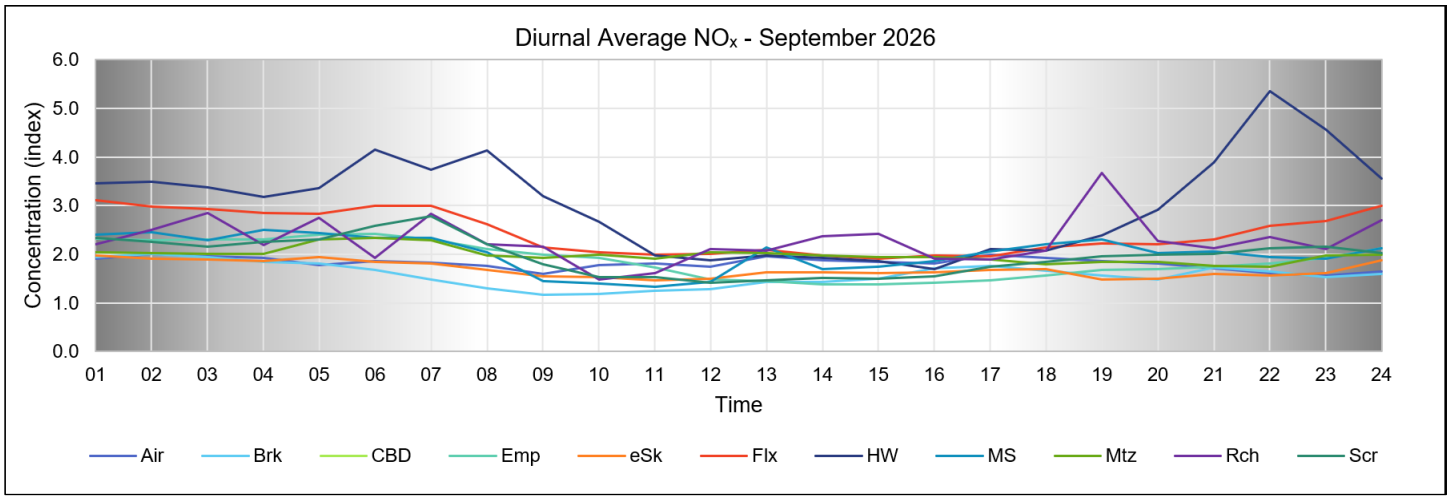


Figure 5.3: NO_x diurnal index values.

5.4. 24-hour Index Values

NO_x daily index values are shown below (Figure 5.4).

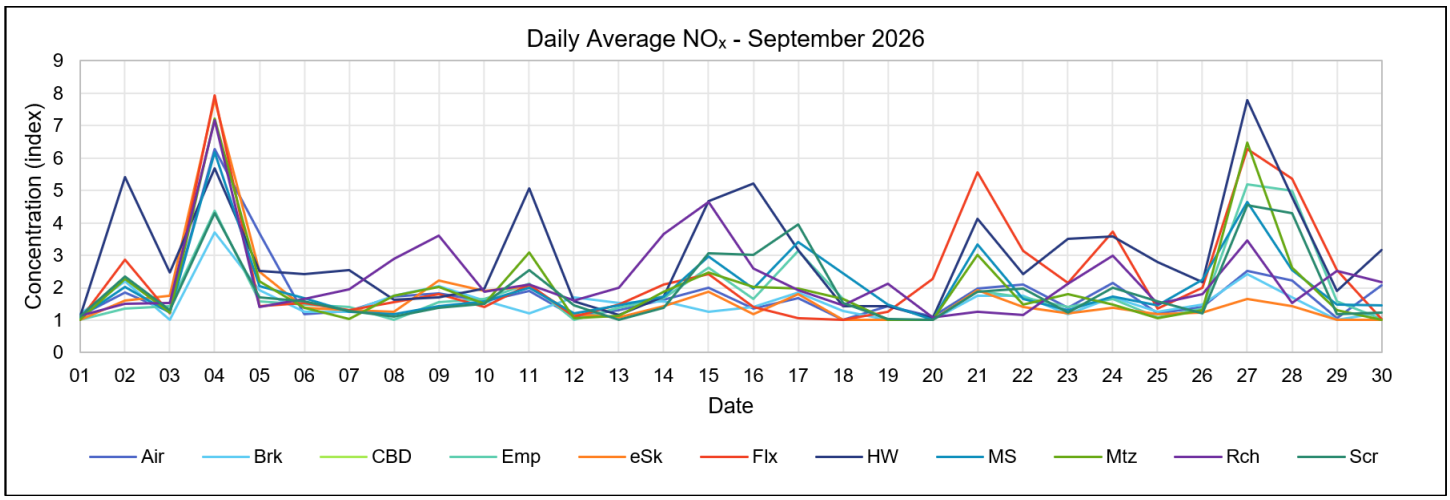


Figure 5.4: NO_x daily index values.

5.5. 1-hour Index Values

NO_x hourly index values are shown below (Figure 5.5).

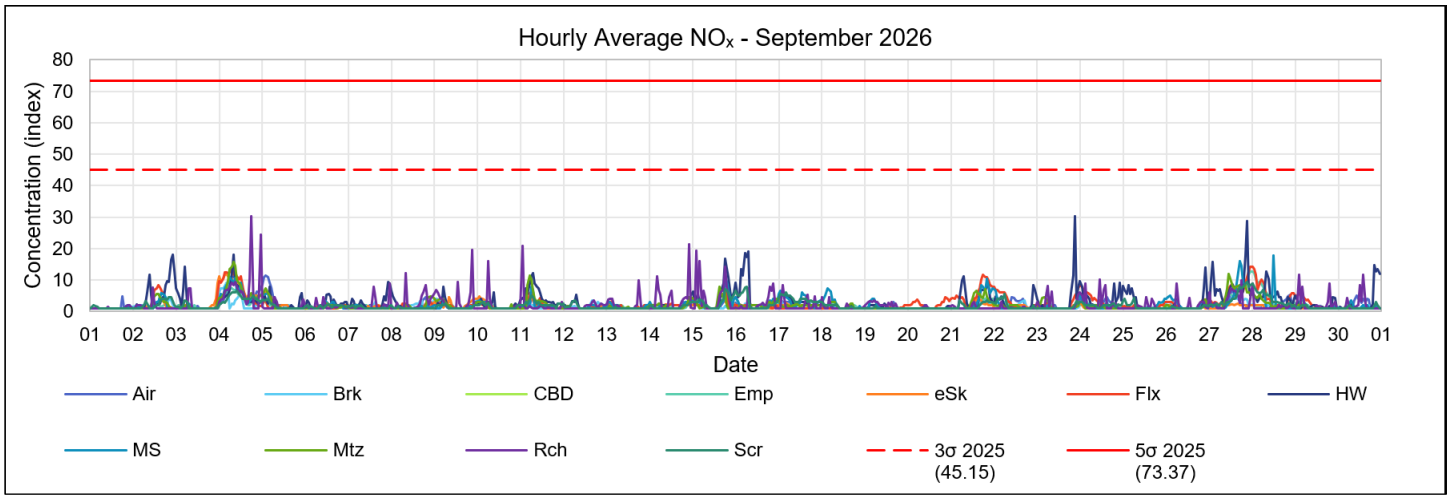


Figure 5.5: NO_x hourly index values.

NO_x hourly observations above the 3σ and 5σ screening thresholds are summarised in Table 5.2.

Table 5.2: NO_x hourly observations above the 3σ and 5σ screening thresholds.

Limit	Air	Brk	CBD	Emp	eSk	Flx	HW	MS	Mtz	Rch	Scr	Total
3σ	0	0	–	0	0	0	0	0	0	0	0	0
5σ	0	0	–	0	0	0	0	0	0	0	0	0

5.6. Conclusion

September 2026 NO_x monthly average index values were low and uniform, ranging from 1.6 to 3.0 at the ten reporting monitors. Harbour West recorded the highest monthly average index value (3.0), followed by Felixton (2.4) and Richardia (2.3); Brackenham recorded the lowest (1.6). The CBD monthly value is withheld because its NO_x record was invalidated (sensor fault). Using the exact unrounded hourly thresholds (3σ = 45.1; 5σ = 73.4), no hourly observation was above either threshold, against 52 above 3σ and 36 above 5σ in August 2026, when eSikhaleni (21 and 19), Felixton (16 and 13), Richardia (12 and 4) and Meerensee (3 and none) recorded flags; the eSikhaleni monthly mean fell from 9.9 in August to 1.7. The network diurnal profile is nearly flat, at about 2.4 from 00:00 to 06:00 and lowest at 10:00–11:00 (1.7), consistent with overnight accumulation under stable conditions rather than with a specific source. Because the AirGradient NO_x output is a dimensionless index rather than a pollutant-specific NO or NO_2 concentration, the results are screening indicators only and do not demonstrate compliance or non-compliance with ambient NO_2 standards.

Regulatory and health-limit conclusion: no regulatory or health-limit exceedance is concluded from the NO_x index results. Recurrent elevated index events should be treated as screening evidence requiring corroboration with reference/equivalent NO_2 or NO_x measurements before any compliance or health-risk interpretation is made.

Station-specific conclusion: no NO_x station exceeded an applicable regulatory or health limit or standard, and no reporting monitor recorded a 3σ or 5σ screening flag in September 2026. The August 2026 pattern at eSikhaleni, Felixton and Richardia did not recur; eSikhaleni, which recorded elevated-index episodes in June and August 2026, should remain under review.

Correlation with the September 2026 technical report: there is no direct NO_2 or NO_x comparator, because the RBCAA primary network measures PM_{10}, $PM_{2.5}$, SO_2 and TRS only. No AirGradient NO_x screening flag was recorded in September 2026, whereas the reference network recorded TRS exceedances at eSikhaleni (12 above the WHO 30-minute H_2S guideline and 14 above the OME 10-minute criterion) and Felixton (11 and 9). The absence of NO_x index flags at the stations with TRS exceedances is consistent with the two parameters responding to different sources. It cannot, however, establish pollutant equivalence, compliance status or source attribution without reference or equivalent NO_2/NO_x measurements.

6. CARBON DIOXIDE MONITORING

Carbon dioxide (CO_2) is reported in parts per million (ppm). In this report, CO_2 data are used as indicative local concentration measurements to identify relative build-up events and spatial differences across the AirGradient network. Because outdoor CO_2 varies with local sources, vegetation, atmospheric mixing, and sensor accuracy, small differences around the background reference line should not be over-interpreted.

6.1. Data Completeness

The September 2026 CO_2 data completeness results are summarised in Table 6.1.

Table 6.1: CO_2 data completeness (%) based on valid 10-minute records.

Month	Air	Brk	CBD	Emp	eSk	Flx	HW	MS	Mtz	Rch	Scr
Jan 2026	-	98.7	84.7	-	96.6	100.0	***0.0***	99.9	90.4	100.0	-
Feb 2026	84.8	93.1	84.9	***64.5***	96.3	98.3	***48.2***	99.8	98.4	98.7	-
Mar 2026	96.4	96.8	98.5	90.1	94.2	***74.6***	***60.5***	98.4	90.9	98.8	-
Apr 2026	99.7	***67.8***	***73.4***	96.1	87.6	96.6	100.0	99.8	***53.6***	100.0	-
May 2026	***68.8***	99.3	99.6	84.4	***75.9***	99.5	99.6	***60.8***	99.4	99.6	-
Jun 2026	99.4	97.3	99.6	87.4	95.1	99.7	99.9	100.0	98.0	99.4	-
Jul 2026	100.0	98.4	88.5	94.0	91.3	99.7	***74.2***	100.0	99.0	100.0	-
Aug 2026	98.9	97.8	98.7	95.4	93.7	98.6	***0.0***	100.0	97.5	99.4	***43.0***
Sep 2026	100.0	99.1	94.5	98.5	96.2	98.6	***0.0***	98.3	99.2	100.0	100.0
Oct 2026	-	-	-	-	-	-	-	-	-	-	-
Nov 2026	-	-	-	-	-	-	-	-	-	-	-
Dec 2026	-	-	-	-	-	-	-	-	-	-	-

Missing Data (CO_2)

- *CO_2 data completeness ranged from 94.5% (CBD) to 100% (Airport, Richardia and Scorpio) at the ten reporting monitors in September 2026. CBD (94.5%) fell below the RBCAA 95% operational target but met the 90% minimum data capture specified in SANS 1929:2011 (Annex C, Table C.1). Harbour West CO_2 (0.0%) was invalidated for the whole month as part of the invalidation from 24 July to 30 September 2026: the sensor offset against the network lower quartile rose from the usual +15 to +30 ppm to +110 to +660 ppm from 28 July 2026, with baseline steps that had no network counterpart, and the fault was still present on 30 September (Report 025, Table 2.7, note b, and Table 4.1, item 10). No Harbour West CO_2 statistics are reported. The low Harbour West CO_2 completeness in January (0.0%), February (48.2%) and March 2026 (60.5%) (Table 6.1) was also due to a sensor fault. Remaining gaps were intermittent and short.*

6.2. Monthly Concentrations

CO_2 monthly average concentrations are shown in Figure 6.1; comparisons to previous months are also provided (Figure 6.2).

Regulatory/health-limit applicability: no South African ambient regulatory limit or WHO ambient health-based guideline is applied to outdoor CO_2 in this report. Occupational exposure limits and indoor ventilation thresholds are not appropriate ambient-air compliance criteria; CO_2 is used here only as an indicative tracer for local accumulation, mixing and possible combustion or respiration influences.

Station-specific limit/standard status: no AirGradient CO_2 station is recorded as exceeding an ambient regulatory or health-based limit or standard in September 2026. Three monitors recorded 3σ screening flags: Felixton (230), eSikhaleni (134) and CBD (70); of these, Felixton (142), CBD (47) and eSikhaleni (44) also recorded 5σ flags. No other station recorded a flag. These are local accumulation indicators only.

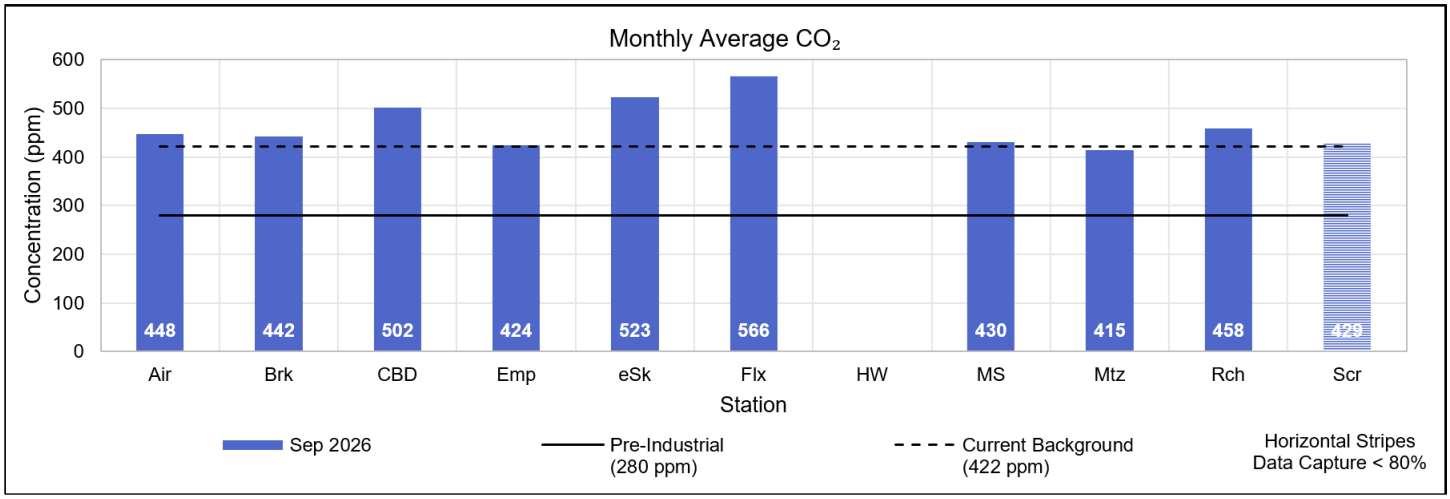


Figure 6.1: CO_2 monthly concentration.

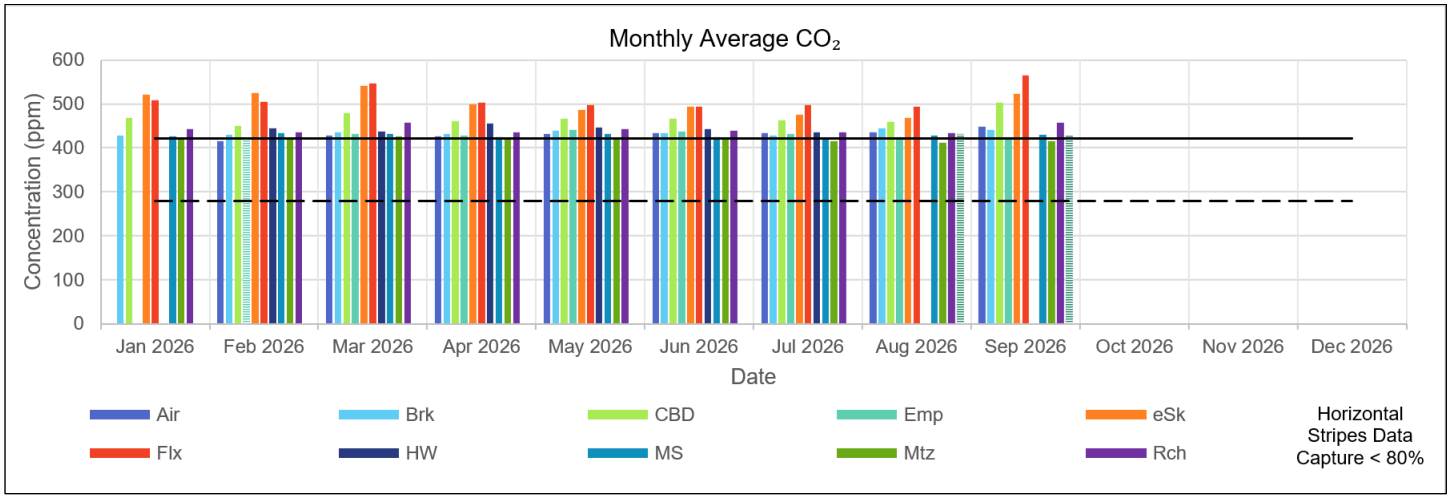


Figure 6.2: CO_2 monthly comparison.

6.3. Diurnal Concentrations

CO_2 diurnal concentrations are shown below (Figure 6.3).

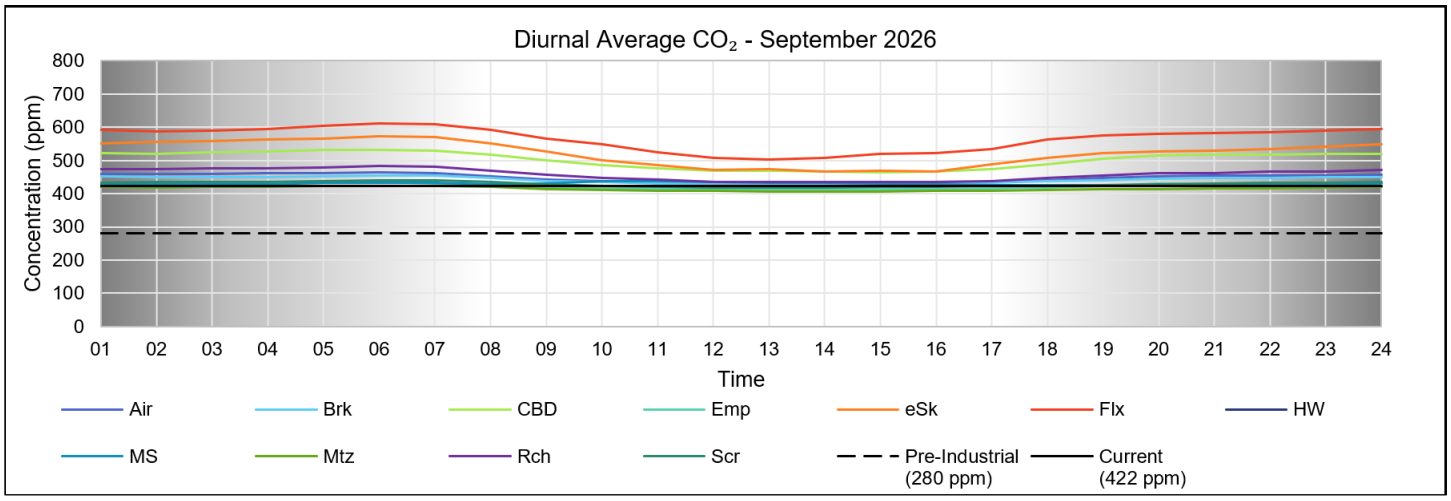


Figure 6.3: CO_2 diurnal concentrations.

6.4. 24-hour Concentrations

CO_2 daily concentrations are shown below (Figure 6.4).

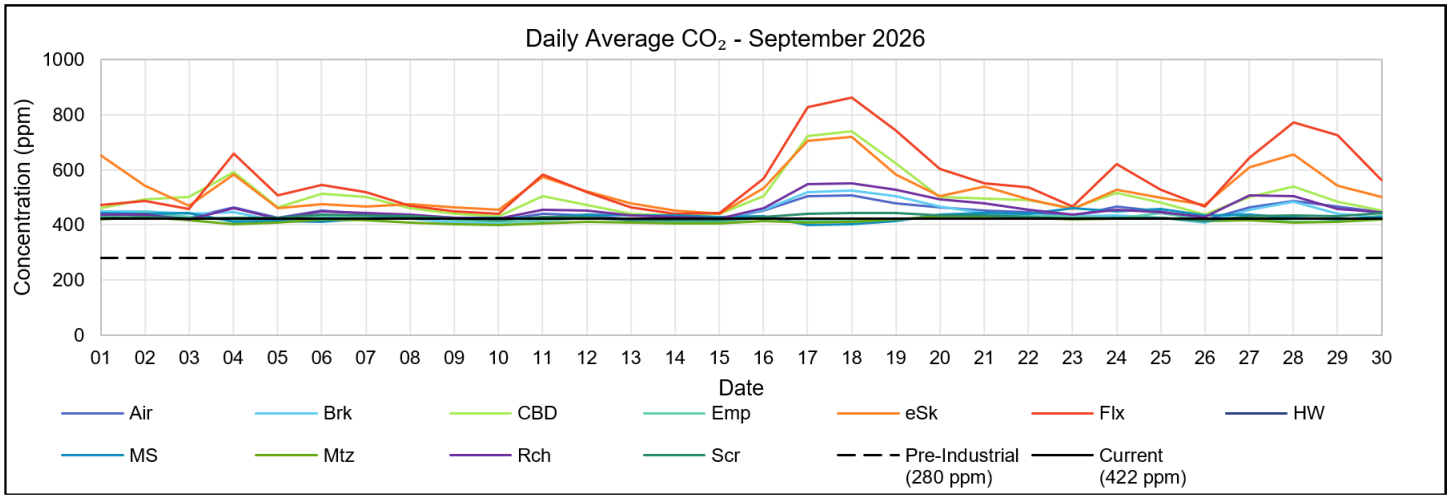


Figure 6.4: CO_2 daily concentrations.

6.5. 1-hour Concentrations

CO_2 hourly concentrations are shown below (Figure 6.5).

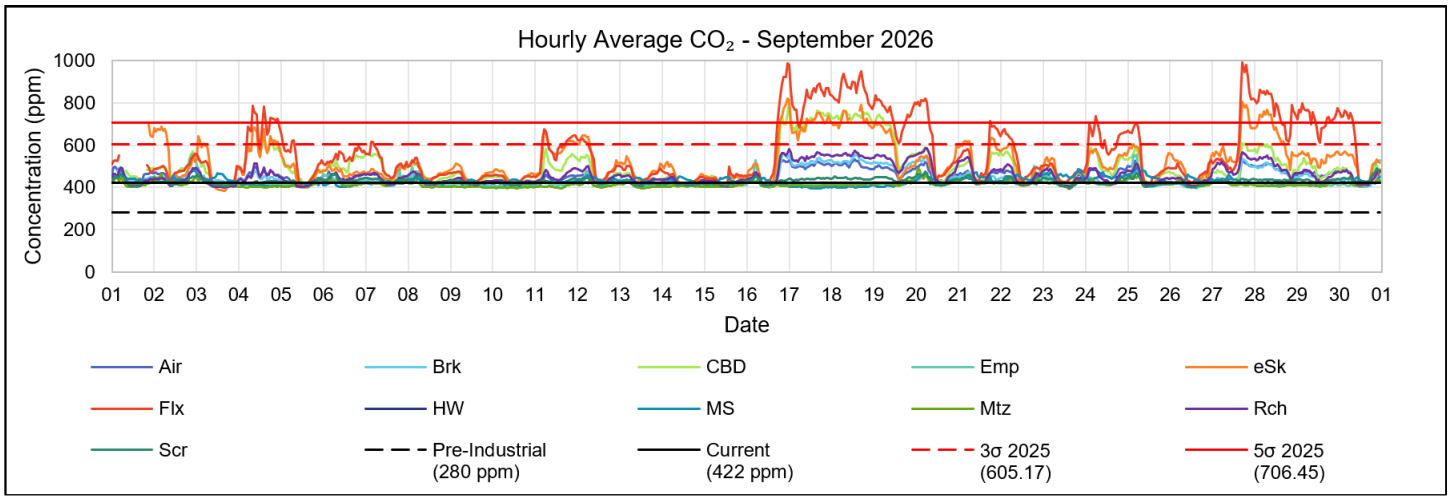


Figure 6.5: CO_2 hourly concentrations.

CO_2 hourly observations above the 3σ and 5σ screening thresholds are summarised in Table 6.2.

Table 6.2: CO_2 hourly observations above the 3σ and 5σ screening thresholds.

Limit	Air	Brk	CBD	Emp	eSk	Flx	HW	MS	Mtz	Rch	Scr	Total
3σ	0	0	70	0	134	230	–	0	0	0	0	434
5σ	0	0	47	0	44	142	–	0	0	0	0	233

Note: Harbour West CO_2 data are invalid from 24 July to 30 September 2026 (sensor fault; Report 025, Table 4.1, item 10), and no event counts are reported.

6.6. Conclusion

September 2026 CO_2 monthly average concentrations ranged from 414.8 to 565.8 ppm across the ten reporting monitors. Felixton recorded the highest monthly average (565.8 ppm), followed by eSikhaleni (523.2 ppm), CBD (502.4 ppm) and Richardia (458.2 ppm). Airport (448.0 ppm), Brackenham (441.8 ppm), Meerensee (430.4 ppm), Scorpio (428.7 ppm) and Empangeni (423.7 ppm) were closer to the 422 ppm background reference line shown in the monthly plot, with Mtunzini (414.8 ppm) below it; small differences around this line should be interpreted in the context of sensor uncertainty and of the baseline-correction behaviour described in Section 2. The network mean rose from 444.3 ppm in August to 463.7 ppm, almost entirely through Felixton (+72.4 ppm), eSikhaleni (+55.0 ppm) and CBD (+43.9 ppm). Harbour West CO_2 data are invalidated for the month (Section 6.1). Using the exact unrounded hourly thresholds (3σ = 605.2 ppm; 5σ = 706.5 ppm), 434 hourly observations were above 3σ and 233 above 5σ, against 98 and 33 in August. All September flags were at Felixton (230 and 142; 32% of its 713 valid hours above 3σ), eSikhaleni (134 and 44) and CBD (70 and 47). The events were episodic rather than continuous and occurred at the three stations simultaneously: 189 of the 434 station-hours fell on 17 to 19 September, coinciding with the heaviest rainfall of the month on 18 September, and a further 65 on 28 and 29 September, with smaller episodes on 4 and 11–12 September. The same three monitors lost TVOC/NO_x records on 18 September (Section 4.1), so a moisture effect on the sensors cannot be excluded, and the episodes are reported as measured pending review. Afternoon (12:00–16:00) median concentrations at all ten monitors were 407.1 (Mtunzini) to 450.8 ppm (Felixton), close to the August values. The network diurnal profile peaks at 05:00 (484.7 ppm) and is lowest at 13:00 (440.8 ppm), consistent with boundary-layer control rather than with a continuous local source. The

results are indicative screening information for local accumulation and mixing conditions, not a regulatory compliance metric.

Regulatory and health-limit conclusion: the CO_2 results do not represent regulatory or health-limit exceedances. The elevated short-term flags at Felixton, eSikhaleni and CBD identify accumulation episodes for follow-up but should not be interpreted as ambient health-limit breaches.

Station-specific conclusion: no CO_2 station exceeded an applicable ambient regulatory or health limit or standard. Felixton, eSikhaleni and CBD should be highlighted only as the dominant short-term CO_2 accumulation locations, not as health-standard exceedance locations, and the episodes of 17–19 and 28–29 September should be reviewed against meteorology and sensor diagnostics before they are interpreted as ambient. Harbour West is excluded from this month's ranking pending replacement and verification of its CO_2 sensor.

Correlation with the September 2026 technical report: Felixton and eSikhaleni are the principal overlaps within the reporting period. They recorded the strongest AirGradient CO_2 screening activity (Felixton 230 hours above 3σ, eSikhaleni 134) and the highest reference-network TRS exceedance counts: eSikhaleni 12 exceedances of the WHO 30-minute H_2S guideline and 14 of the OME 10-minute criterion, and Felixton 11 and 9 (Report 026). Three air quality complaints were logged across the RBCAA area in September 2026. This is a month-level co-occurrence only; it establishes neither temporal correlation nor source attribution, and CO_2 is not a marker for the reduced sulphur species that drive the TRS record.

7. CONSOLIDATED AIRGRADIENT MONITORING CONCLUSION

Overall, the September 2026 AirGradient monitoring results indicate that the secondary screening network provided useful spatial and short-term event context. Still, the data remain indicative and are not equivalent to reference or regulatory-equivalent analyser data. No AirGradient result should be interpreted as a statutory compliance finding. The only parameter for which regulatory and health-based benchmark comparisons were applied was particulate matter. Across the AirGradient particulate dataset, no PM_{10} daily average exceeded the RSA 24-hour standard value, one $PM_{2.5}$ daily average did (Scorpio, 47.1 µg/m³, 3 September), and no monthly average exceeded the applicable RSA annual standard value at any station; annual compliance cannot, in any event, be concluded from one month of screening data. The WHO health-based guideline comparisons were more conservative, flagging PM_{10} on sixteen station-days, all during the regional episode of 2–3 September, and $PM_{2.5}$ at all eleven stations on 78 station-days in total, and indicate health-relevant particulate levels for follow-up.

TVOC and NO_x outputs are dimensionless index values, and CO_2 is used as an ambient screening or tracer parameter; no applicable ambient regulatory or health-based exceedance is concluded for these parameters. TVOC recorded 131 hourly observations above 3σ and none above 5σ, at ten of the eleven monitors, with Richardia (37) and Felixton (22) the most frequent. NO_x recorded no screening flag at any reporting monitor, a marked decrease from August 2026; the CBD NO_x record was invalidated for a sensor fault. CO_2, excluding the invalidated Harbour West channel, recorded 434 observations above 3σ and 233 above 5σ, at Felixton (230 and 142), eSikhaleni (134 and 44) and CBD (70 and 47), concentrated in episodes on 17–19 and 28–29 September. These findings are local screening triggers, not compliance or health-limit breaches.

Correlation with the September 2026 technical report is event-based rather than quantitative. Both networks identify 2–3 September as the principal particulate episode of the month: the reference network recorded WHO PM_{10} exceedances at CBD, Felixton and Scorpio, and five of its eight RSA $PM_{2.5}$ exceedances (Brackenham 2, Felixton 1, Scorpio 2) on those two days, allocated in Report 026 to wildfires. Agreement is not general. The AirGradient network recorded one RSA $PM_{2.5}$ exceedance (Scorpio, 3 September) against eight at the reference analysers. Brackenham, which recorded two reference exceedances, did not exceed in the AirGradient record, because its unit underreads the co-located reference analyser by 11.9 µg/m³ on the paired-day mean. Conversely, at eSikhaleni, the AirGradient unit overreads PM_{10} and recorded two WHO PM_{10} exceedance-days on which the reference analyser did not exceed. Other overlaps at Felixton and eSikhaleni (CO_2 and TVOC screening activity alongside the network's highest reference TRS exceedance counts)

indicate follow-up priorities only. These are month-level associations; co-location, reference or equivalent measurements and meteorological and source analysis are required before concluding equivalence or attribution.

September 2026 data completeness at the reporting monitors was 94.5% to 100% for PM_{10}, $PM_{2.5}$ and CO_2, 91.2% to 100% for TVOC and 95.5% to 100% for NO_x (CBD NO_x and Harbour West CO_2 invalidated). CBD was the only monitor below the RBCAA 95% operational target for particulates and CO_2 (94.5%) and for TVOC (91.2%); all reporting monitors met the 90% minimum data capture specified in SANS 1929:2011 (Annex C, Table C.1) and the 80% statistical-robustness threshold. September 2026 was the first full calendar month for the eleventh monitor, Scorpio, which returned 100% capture on every channel. Two channels were invalidated for sensor faults and are excluded from all statistics: CBD NO_x from 2 to 30 September 2026 (TVOC/NO_x sensor installed on 28 August 2026; Report 025, Table 4.1, item 23) and Harbour West CO_2 for the whole month (invalidated from 24 July 2026; item 10). Gas-channel-only TVOC/NO_x losses have now been recorded in four consecutive months — eSikhaleni in June, Felixton in July, CBD in August, and CBD and Felixton in September 2026 — and the September losses, together with the CO_2 episode of 17–19 September at the same stations, coincided with the heaviest rainfall of the month. This points to a recurring fault mode in the gas-sensor module, possibly moisture-related, that should be raised with the supplier (Report 025, Table 4.1, item 24). The January to August 2026 completeness values have been restated for the October 2026 invalidations (Section 2).

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