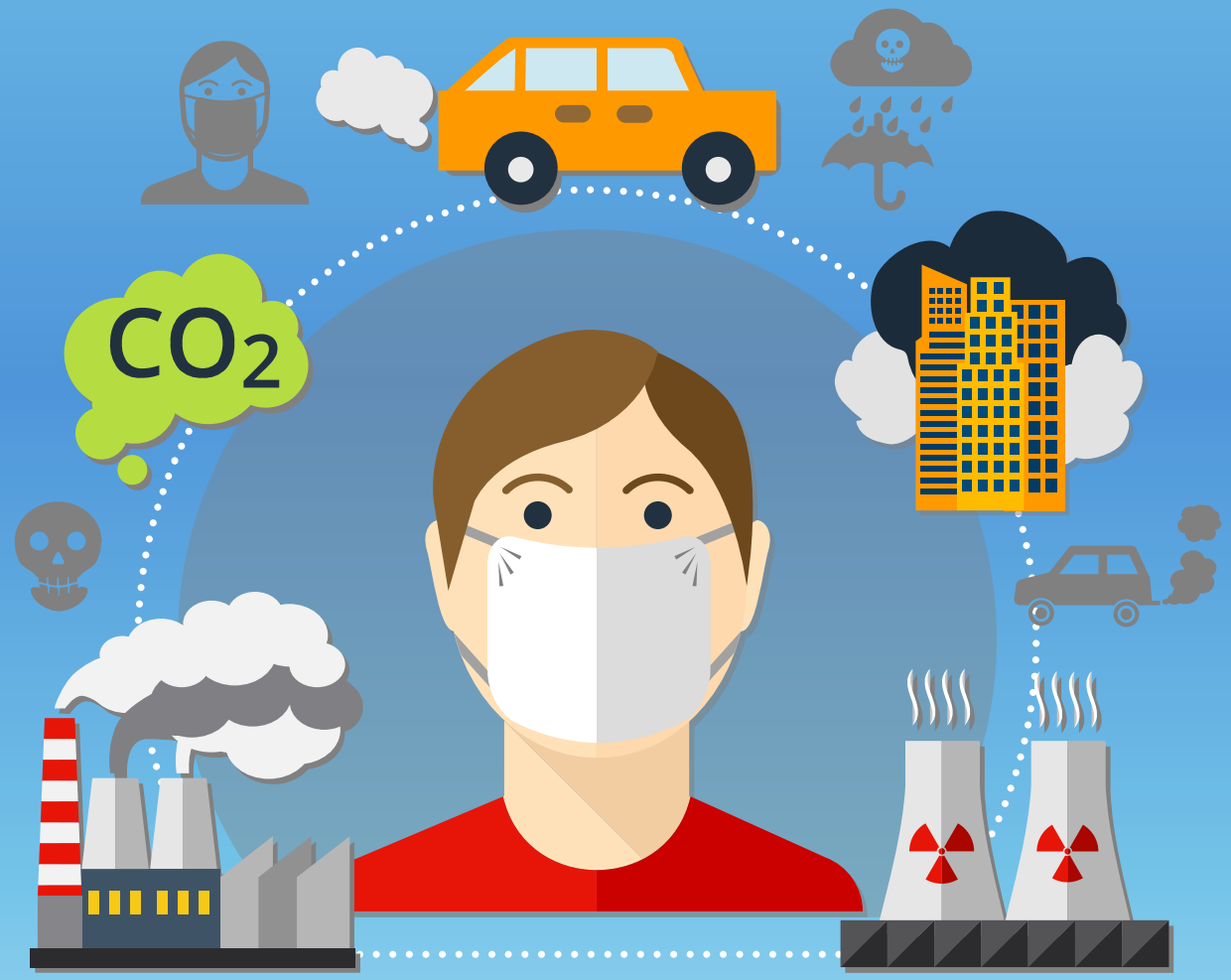
Air Quality Analysis Bradford (Winter 2024/2025)



Period

1st November 2024 to 16th January 2025

Bradford Air Quality Team

Uk Air Quality Network (PM10,PM2.5)

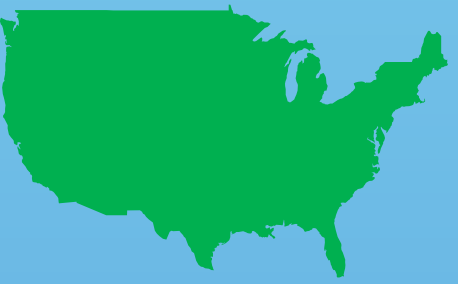
Monitoring Station

Keighley, Tong Street, Treadwell Mills

Monitoring Station.

Urban Background, Roadside

Data Overview and Initial Challenge



PM10 97%

PM2.5 97.5%

Keighley

- PM10 -ve → 1.67%
- PM2.5 -ve → 4.5%
- PM10 Missing → 2.97%
- PM2.5 Missing → 2.4%

PM10 79.3%

PM2.5 77.8%

Tong Street

- PM10 -ve → 2.8%
- PM2.5 -ve → 11.8%
- PM10 Missing → 20.67 %
- PM2.5 Missing → 22.18 %

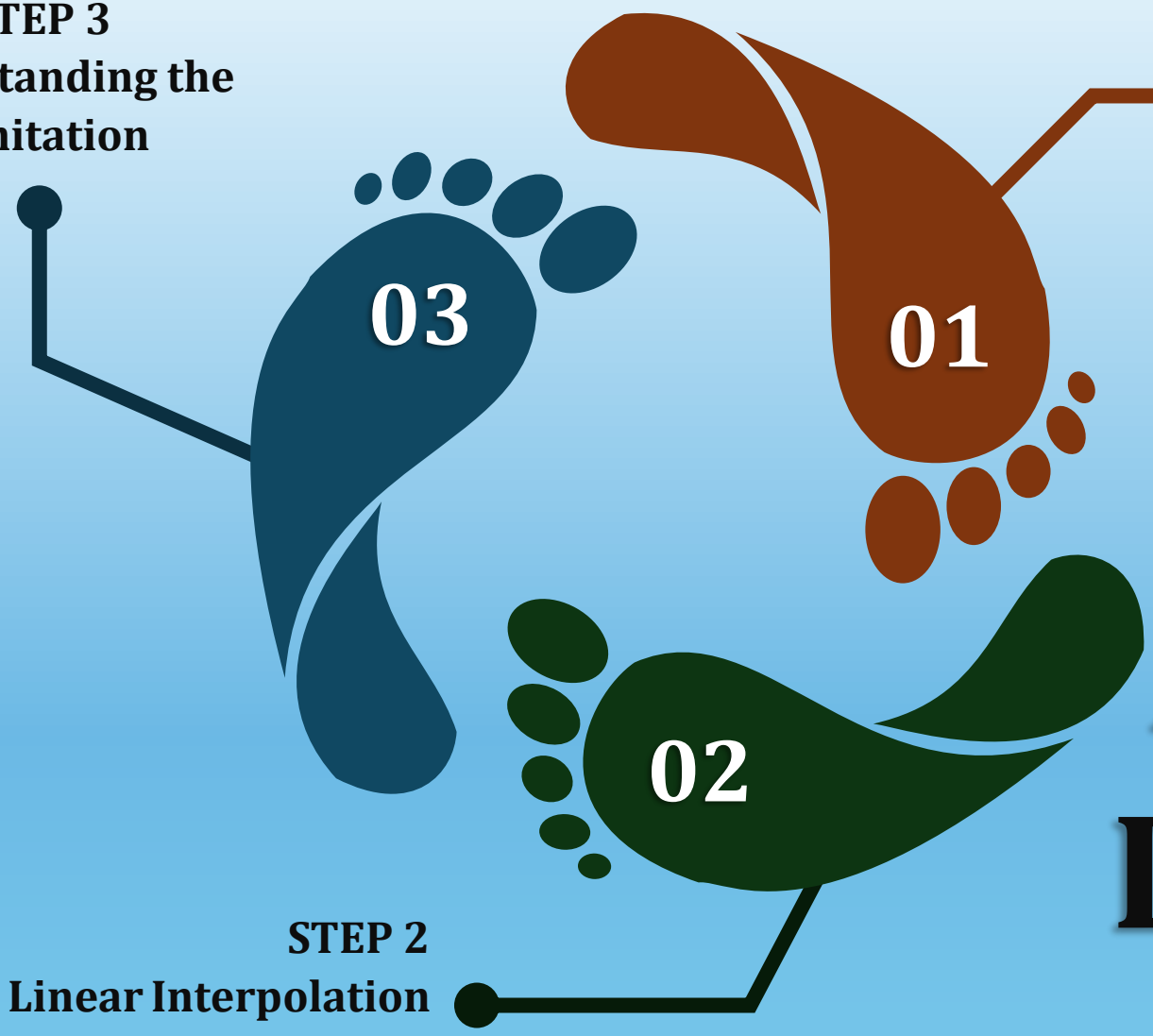
PM10 35%

PM2.5 35%

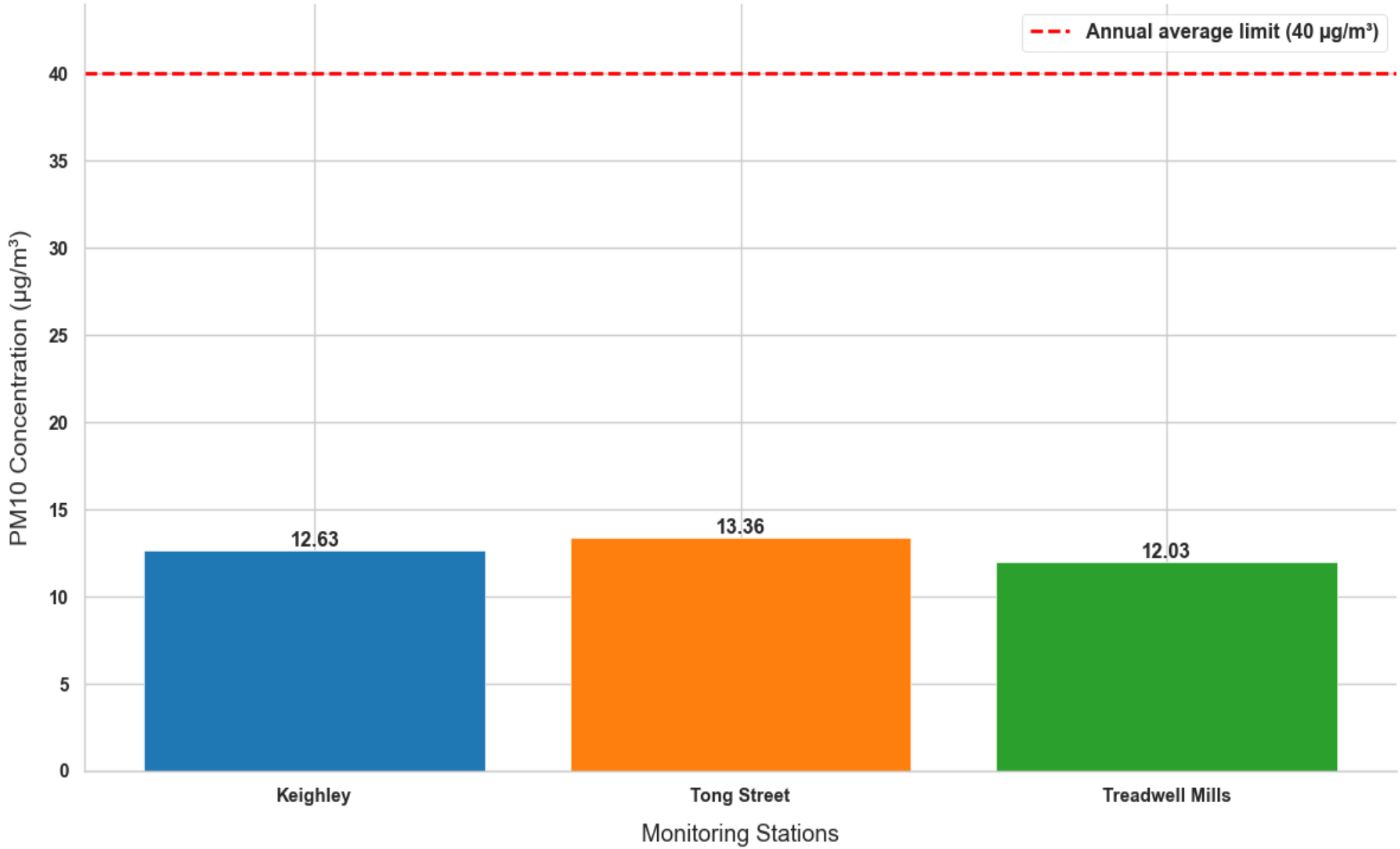
Treadwell Mills

- PM10 -ve → 0%
- PM2.5 -ve → 0%
- PM10 Missing → 64.93 %
- PM2.5 Missing → 64.93 %

Addressing Data Quality

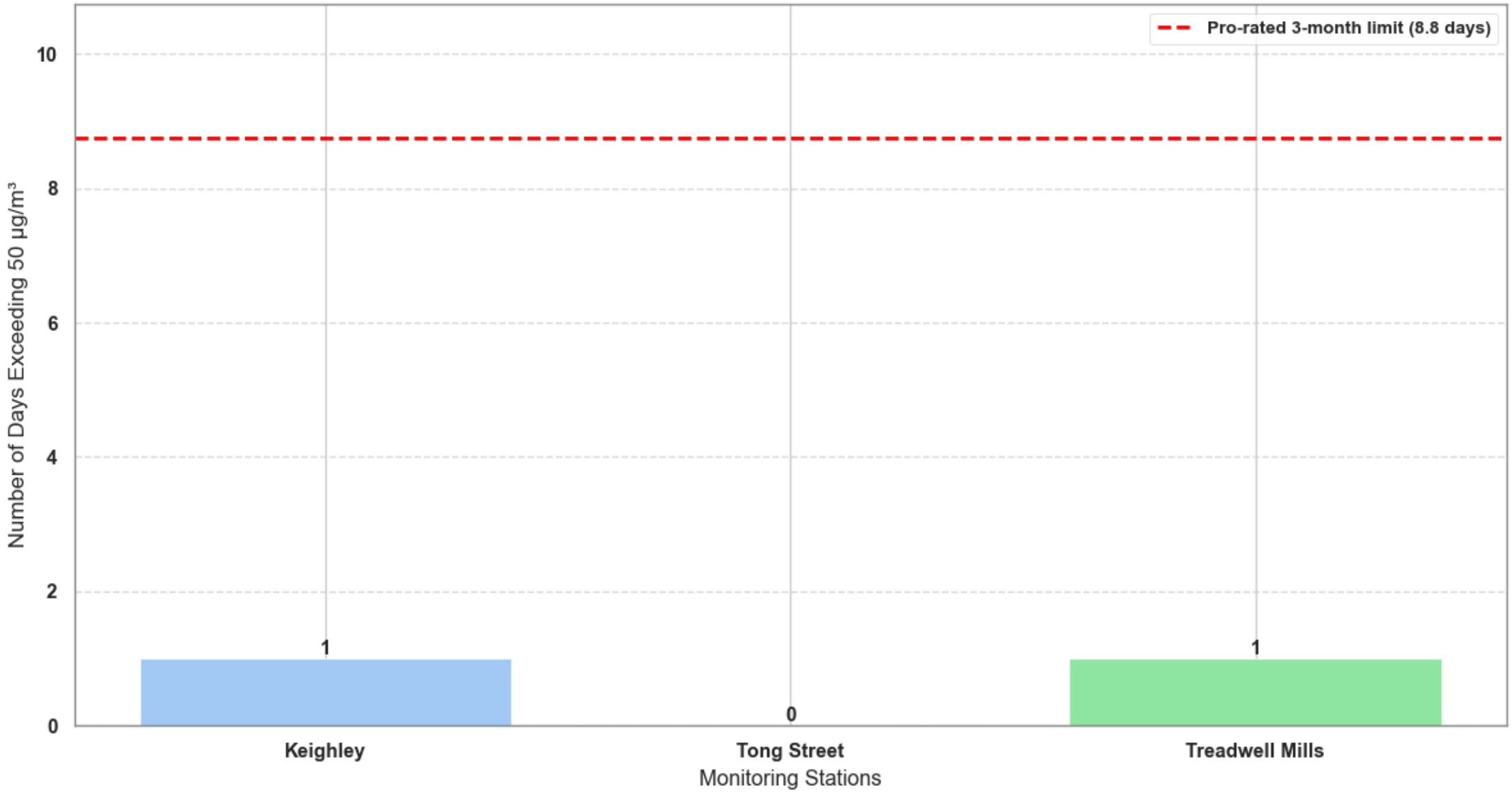


Average PM10 Concentrations Compared to Annual Limit (November 2024 - January 2025)

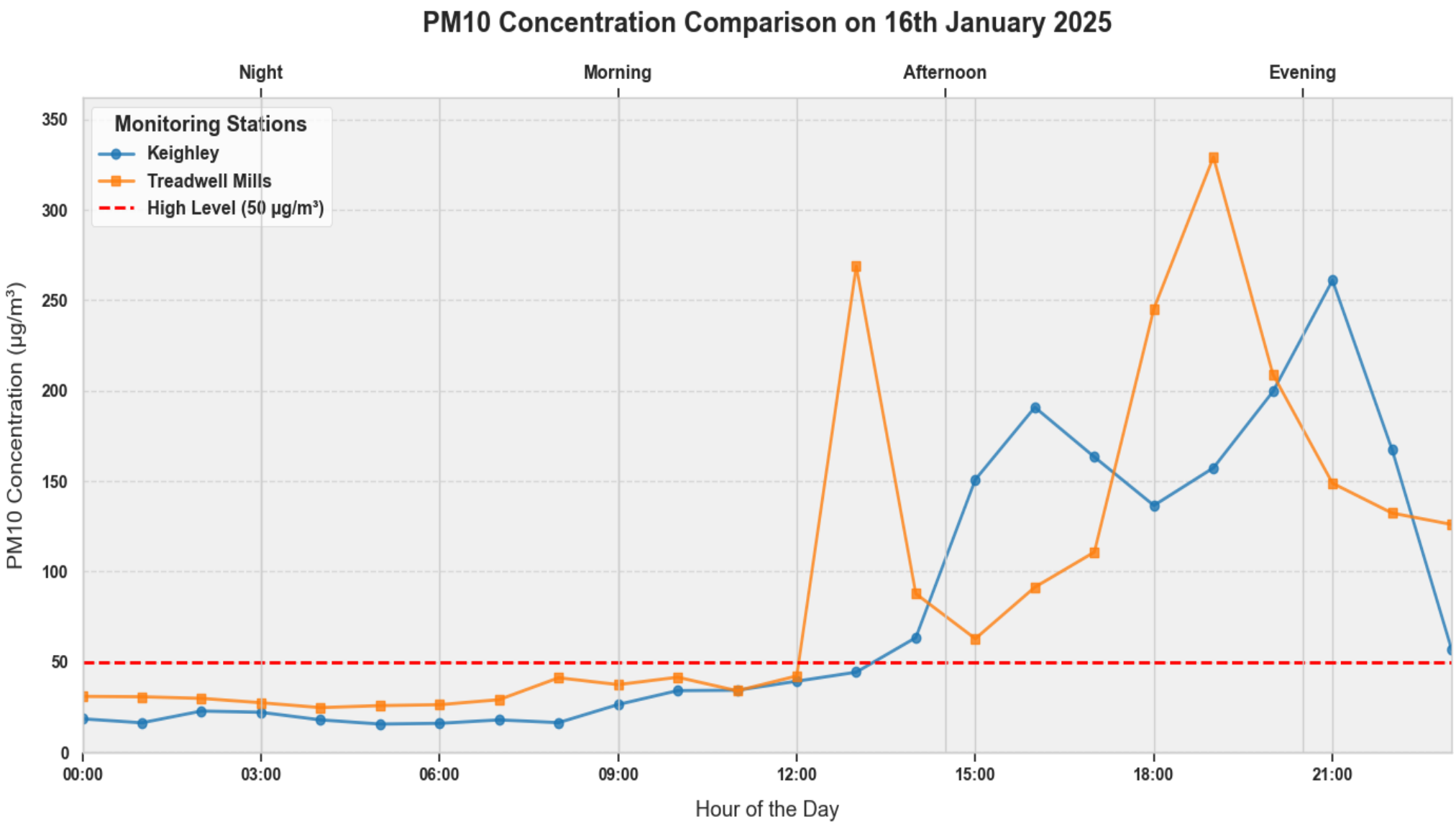


Note: The red dashed line represents the annual average limit of 40 µg/m³ as per the Air Quality Standards Regulations (2010).

PM10 Exceedance Days by Location
(November 2024 - January 2025)

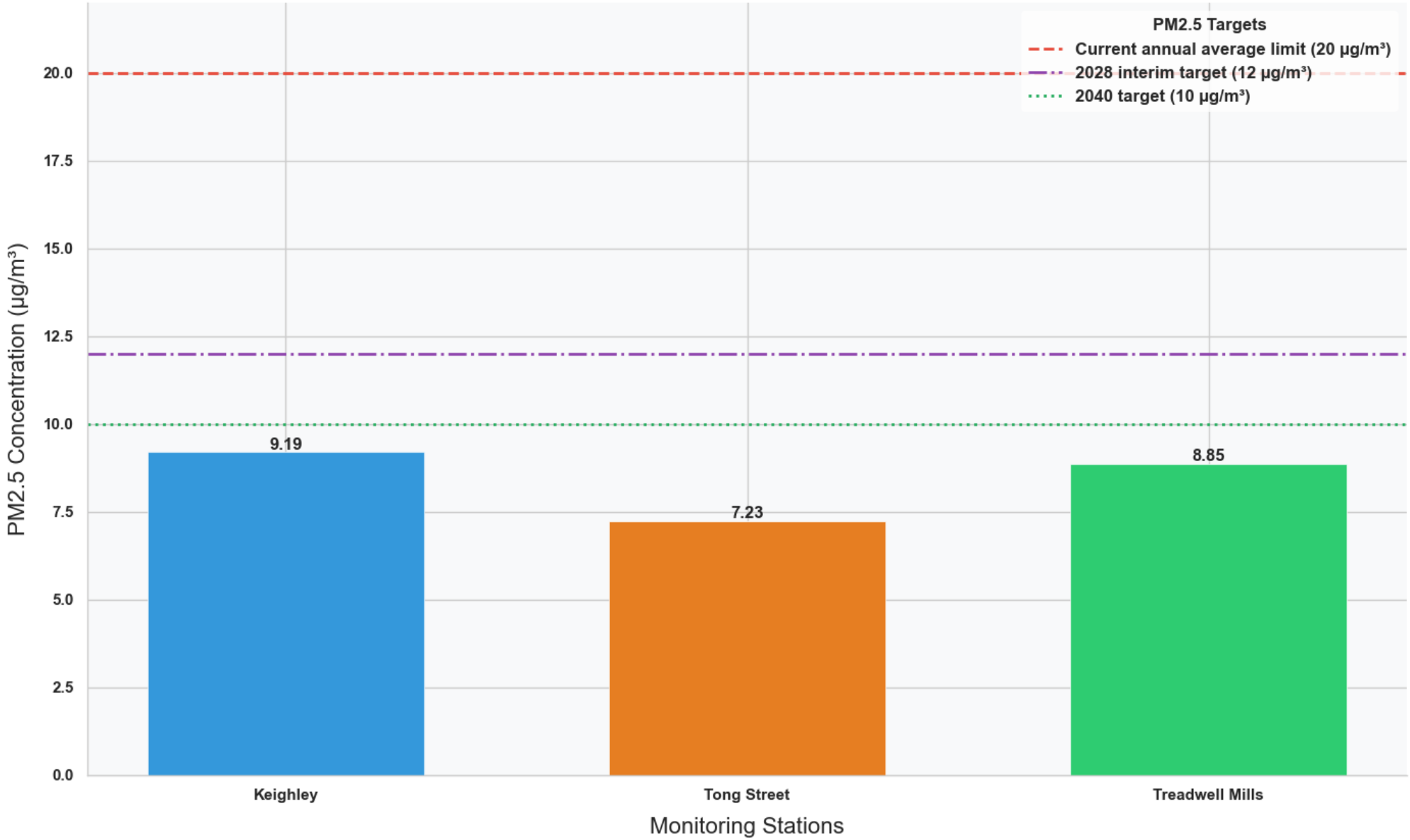


Note: Annual limit is 35 days. Data shown for 3 months (Nov 2024 - Jan 2025).



Note: Data points represent hourly PM10 concentrations. The red dashed line indicates the high level threshold of 50 µg/m³.

Average PM2.5 Levels Compared to Current and Future Targets (November 2024 - January 2025)

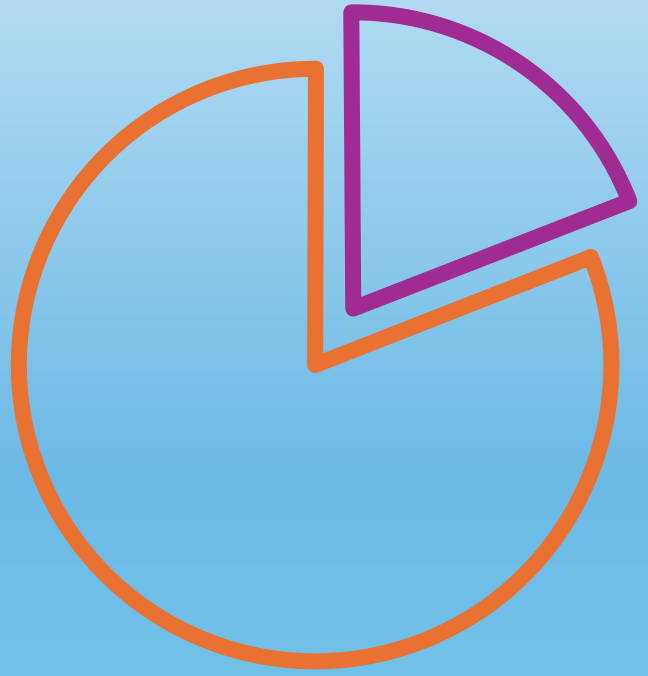


Note: The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023 set a target of 10 µg/m³ by 2040, with an interim target of 12 µg/m³ by January 2028. The current limit is 20 µg/m³.

PM10 Exposure Analysis

98.50%

3931 hours



1.50%

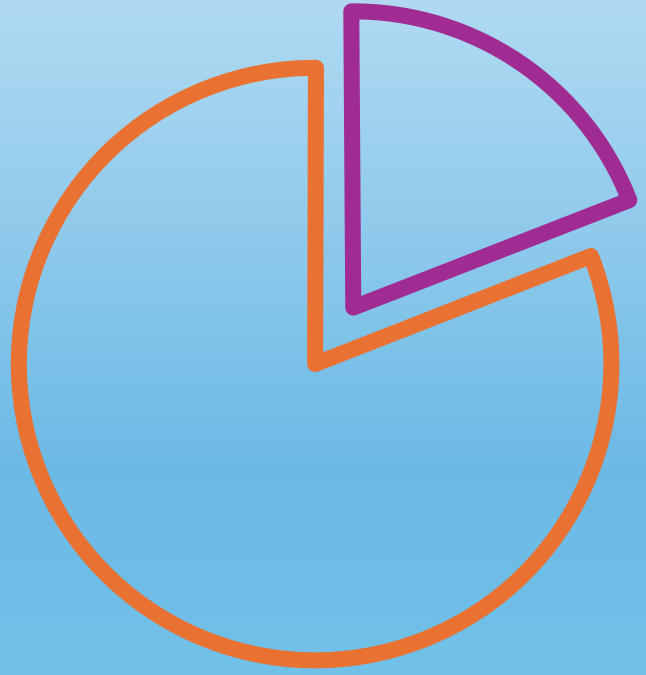
60 hours

Note : Winter Air Quality Analysis from 1st of November to 16th of January

PM2.5 Exposure Analysis

96.66%

3884 hours



3.34%

134 hours

Note : Winter Air Quality Analysis from 1st of November to 16th of January

Hours of Exposure to PM10 and PM2.5

Treadwell PM2.5

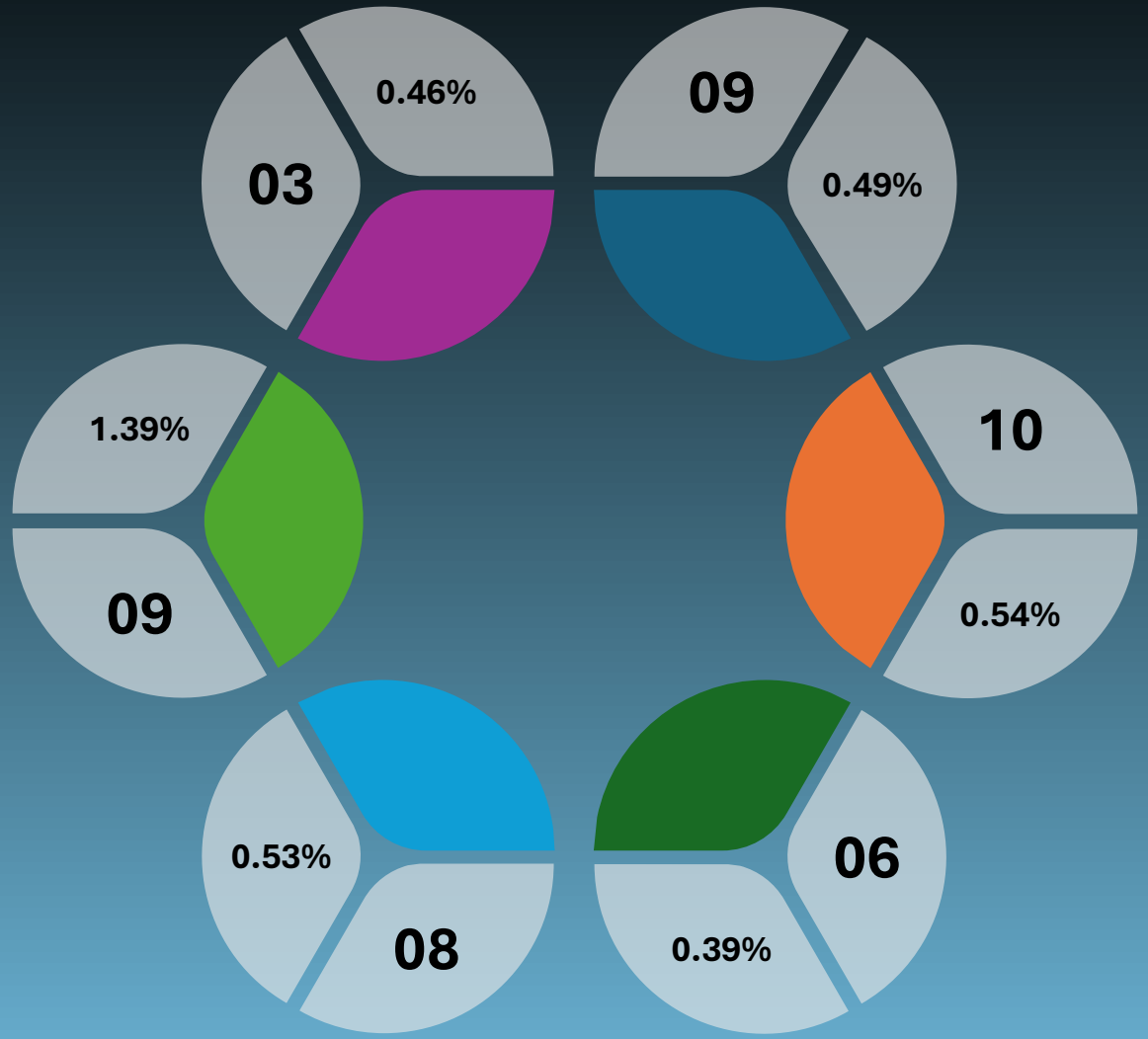
High : 3 hours (0.46%)
Moderate : 22 hours (3.40%)
Low : 623 hours (96.14%)

Treadwell PM10

High : 9 hours (1.39%)
Moderate : 12 hours (1.85%)
Low : 627 hours (96.76%)

Tong Street PM2.5

High : 8 hours (0.53%)
Moderate : 26 hours (1.71%)
Low : 1488 hours (97.77%)



Keighley PM10

High : 9 hours (0.49%)
Moderate : 27 hours (1.46%)
Low : 1812 hours (98.05%)

Keighley PM2.5

High : 10 hours (0.54%)
Moderate : 65 hours (3.25%)
Low : 1773 hours (95.94%)

Tong Street PM10

High : 6 hours (0.39%)
Moderate : 24 hours (1.58%)
Low : 1492 hours (98.03%)

Key Findings

HDRC

Data Quality Issues

Negative and Missing Values.

Regulatory Guidelines

January 16th.

Meeting the Set Targets

Meeting the Targets for 2028 and 2030.

Exposure Analysis

Predominantly Low Exposure Levels.

Members

Warrants Further Research

Investigating of Extreme Air Quality Events

Further investigation is needed to understand the causes of extreme air quality events, such as the PM10 spike observed on January 16th. This should include analysis of meteorological conditions, traffic patterns, and potential local sources to inform targeted interventions.

Enhanced Data Quality Management

A comprehensive approach to data quality management is recommended. This involves root cause analysis of data errors, exploring advanced imputation techniques, and rigorously assessing the impact of data correction methods on analytical results.

Advanced Air Quality and Environment Modelling

Advanced statistical modeling is warranted to explore relationships between air quality and environmental factors. This includes time series analysis, correlation studies, and potentially spatial modeling to understand air quality dynamics.

Refined Public Health Exposure Assessment

A refined exposure assessment is necessary to better understand health implications. This should incorporate time-activity patterns, age-specific sensitivities, and potentially health impact modeling to assess population risk.

Benchmarking and Interactive Data Platform

Benchmarking against industry best practices and developing an interactive data platform would enhance data analysis and stakeholder communication. This platform would allow for user-driven exploration of air quality data and insights.

Thank You

Q & A

HDRC