



Contractor



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Project **FORTH REPLACEMENT CROSSING**

Document title

**AIR QUALITY MONITORING REPORT
JANUARY 2016**

00	06/02/2017	First revision	SWR	DCK	DCK
Rev	Rev. Date	Purpose of revision	Made	Checked	Reviewed

Document status

FOR REVIEW

Made by Steven Westwater	Checked By: David Clark
Initials: SWR	Initials: David Clark

Document number	Rev
REP-00310	00

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1. INTRODUCTION

- 1.1.** Air quality monitoring is being undertaken by FCBC during the construction of the Forth Replacement Crossing and the associated road network. This report details the air quality monitoring that is currently being undertaken across the site and presents the monitoring results for January 2017.

- 1.2.** Air quality monitoring during this period has been undertaken in accordance with the Code of Construction Practice (CoCP) and the Dust and Air Quality Management Plan (DAQMP) contained within the Environmental Management Plan (EMP).



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2. MONITORING EQUIPMENT AND LOCATIONS

2.1. Air quality is being monitored on site using both automatic light scatter dust meters and Frisbee gauge dust deposition monitoring. Twelve Frisbee gauges are currently set up at sensitive locations across the site to measure dust deposition rates (Figure 1). Seven automatic light scatter meters have also been installed at various sensitive locations to measure real time particulate matter (PM₁₀) concentrations and the Total Suspended Particle (TSP) concentrations (Figure 2). These meters are calibrated annually. Table 1 lists the air quality monitoring equipment present at each monitoring location, including the date it was installed.

2.2. Light scatter type monitoring equipment have been selected as a site monitoring tool to create a live network which assesses the levels of fugitive particulate matter, principally airborne dust. These monitors require less space, maintenance and power than other real time monitors such as a Tapered Element Oscillating Microbalance (TEOM) which is used and designed to measure particulate levels to exceedingly high standards, including measuring long-term compliance to statutory limits. Light scatter meters are more practicable to deploy. However, the meters do generally record levels higher than those measured by the TEOM. The meters can also be affected by atmospheric moisture content which further increases reported levels. Accordingly, any elevations of statutory limits should be treated as precautionary exceedances. The monitors are reliable for on-site monitoring and the establishment of action thresholds to ensure unforeseen activities generating significant dust are identified and suitably controlled. Light scatter meters are becoming the construction and waste industries norm for particulate dust monitoring.



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2.3. In association with air quality monitoring across the site, temperature and relative humidity are also continually measured by the light scatter meters at Inchgarvie Lodge and Clufflat Brae. Weather stations, located at the sound level meters at Echline, Linn Mill and Whinnyhill (these are adjacent to the light scatter meters at these monitoring locations), record weather data including; temperature, relative humidity, wind speed and wind direction.

2.4. In addition to the fixed monitoring equipment used at sensitive locations across the site, a daily dust log for both the North and South sites has been kept by the FCBC Environmental Department. This daily dust inspection is used to identify any dust occurring as a result of construction works and to determine if any actions are required. This log also provides a visual record of the weather conditions at the time of the inspection, including conditions that can affect readings, such as fog.

2.5. Frequent environmental site inspections are also undertaken by members of the FCBC Environmental Department. These inspections include a dust check to assess the following:

- dust levels on site;
- suppression/dampening down; and
- transportation of materials.



Figure 1: Example of an Installed Frisbee Gauge Meter



Figure 2: Example of an installed Automatic Light Scatter Dust Meter

Table 1: Air Quality Monitoring Locations

Ref:	Monitoring Location	Monitoring Equipment	Installation Date	Construction Activities in January
M1	Whinny Hill	Frisbee	21/03/12	<ul style="list-style-type: none"> • Earthworks/Fill Placement • Bridge works at Ferrytoll • Main carriageway roadworks
		Automatic light scatter meter	16/02/12	
M7	Butlaw Fisheries	Frisbee	05/10/11	<ul style="list-style-type: none"> • AVS concrete works on deck • Waterproofing on deck • Wind shield installation • Scour protection • South Tower deck section lifts and stay cable installation works • Bridge deck works
M8	Barracks West	Frisbee	31/08/11	<ul style="list-style-type: none"> • AVS concrete works on deck • Waterproofing on deck • Wind shield installation • Scour protection • South Tower deck section lifts and stay cable installation works • Bridge deck works
M10	Inchgarvie Lodge	Frisbee	22/08/11	<ul style="list-style-type: none"> • Minor main carriageway works • SUDS detention basin works • AVS concrete works on deck • Waterproofing on deck • Wind shield installation • Scour protection • South Tower deck section lifts and stay cable installation works • Bridge deck works • South abutment works
		Automatic light scatter meter	17/10/11	
M11	Linn Mill	Frisbee	22/08/11	<ul style="list-style-type: none"> • Minor main carriageway works • SUDS detention basin works • AVS concrete works on deck • Waterproofing on deck • Wind shield installation • Scour protection • South Tower deck section lifts and stay cable installation works • Bridge deck works • South abutment works
		Automatic light scatter meter	06/12/11	
M12	Clufflat	Frisbee	29/08/11	<ul style="list-style-type: none"> • Minor main carriageway works • SUDS detention basin works
M13	Clufflat	Frisbee	21/09/11	

	Brae	Automatic light scatter meter	24/10/11	<ul style="list-style-type: none"> • AVS concrete works on deck • Waterproofing on deck • Wind shield installation • Scour protection • South Tower deck section lifts and stay cable installation works • Bridge deck works • South abutment works
M14	Springfield	Frisbee	15/08/11	<ul style="list-style-type: none"> • Minor main carriageway works • SUDS detention basin works • AVS concrete works on deck • Waterproofing on deck • Wind shield installation • Scour protection • South Tower deck section lifts and stay cable installation works • Bridge deck works • South abutment works
M15	Echline	Frisbee	16/08/11	<ul style="list-style-type: none"> • Minor main carriageway works
		Automatic light scatter meter	10/11/11	
M16	Scotstoun	Frisbee	07/09/11	<ul style="list-style-type: none"> • Main carriageway works • South-bound bus link
		Automatic light scatter meter	14/02/12	
M17	Dundas Home Farm	Frisbee	29/08/11	<ul style="list-style-type: none"> • Main carriageway works • South-bound bus link
		Automatic light scatter meter	23/02/12	
M18	Newton	Frisbee	22/08/11	<ul style="list-style-type: none"> • None
		TEOM	23/05/12	

3. AIR QUALITY MONITORING RESULTS

3.1. Automatic Light Scatter Dust Meter Monitoring Results

3.1.1. Light scatter results for January 2017 have been presented in a monthly chart; this can be found in Appendix A. Results show that the PM₁₀



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levels follow a similar pattern and were below threshold levels throughout the month with the exception of the 26th - 27th January, where some monitors showed an exceedance. As all monitors recorded an increase over this time period it is concluded that these exceedances were caused by regional air quality.

- 3.1.2.** The PM₁₀ results have also been compared to the daily mean results obtained from the TEOM air quality monitoring stations located in Newton, Rosyth, and Broxburn, and from the TEOM FDMS station located at Queensferry Road and St Leonards, Edinburgh (an urban background site). The TEOM at Newton was installed by West Lothian Council, facilitated by FCBC, during January 2012. The comparison between the light scatter and TEOM results demonstrates that both sets of results generally follow the same pattern throughout the month, including during the time period of the exceedances noted in 3.1.1.

3.2. Total Suspended Particles

- 3.2.1.** The TSP results for January 2017 have been presented in a monthly chart; this can be found in Appendix B. The TSP levels at monitoring locations during January were found to be low and all within the threshold. All locations across the site were found to follow a similar pattern (similar to that observed for PM₁₀ levels). As with PM₁₀ it is considered that the TSP levels across site were influenced by regional changes in TSP levels.

3.3. Frisbee Dust Deposition Results

- 3.3.1.** The Frisbee dust deposition results for January 2017 have been presented in a chart and can be found in Appendix C. Two collections were made in January; these occurred on the 12th and 25th January 2017.



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- 3.3.2.** The site action level for the dust deposition rate has been set at 250 mg/m²/day. Exceedances of this level are treated as a potential incident and a review of the works in the vicinity of the site is instigated. A lower site review level has been set at 140 mg/m²/day. Where concentrations exceed the lower review threshold the site works are reviewed to ensure good practice is implemented; it is essentially a warning that additional controls may be required.
- 3.3.3.** During January there were no exceedances of either the site review or action levels.

3.4. Daily Dust Log and Environmental Inspections

- 3.4.1.** A summary of the daily dust log for January can be found in Appendix D.
- 3.4.2.** During this period, except during the Christmas shut-down, full environmental inspections were also undertaken across the site and covered areas where works were being carried out.



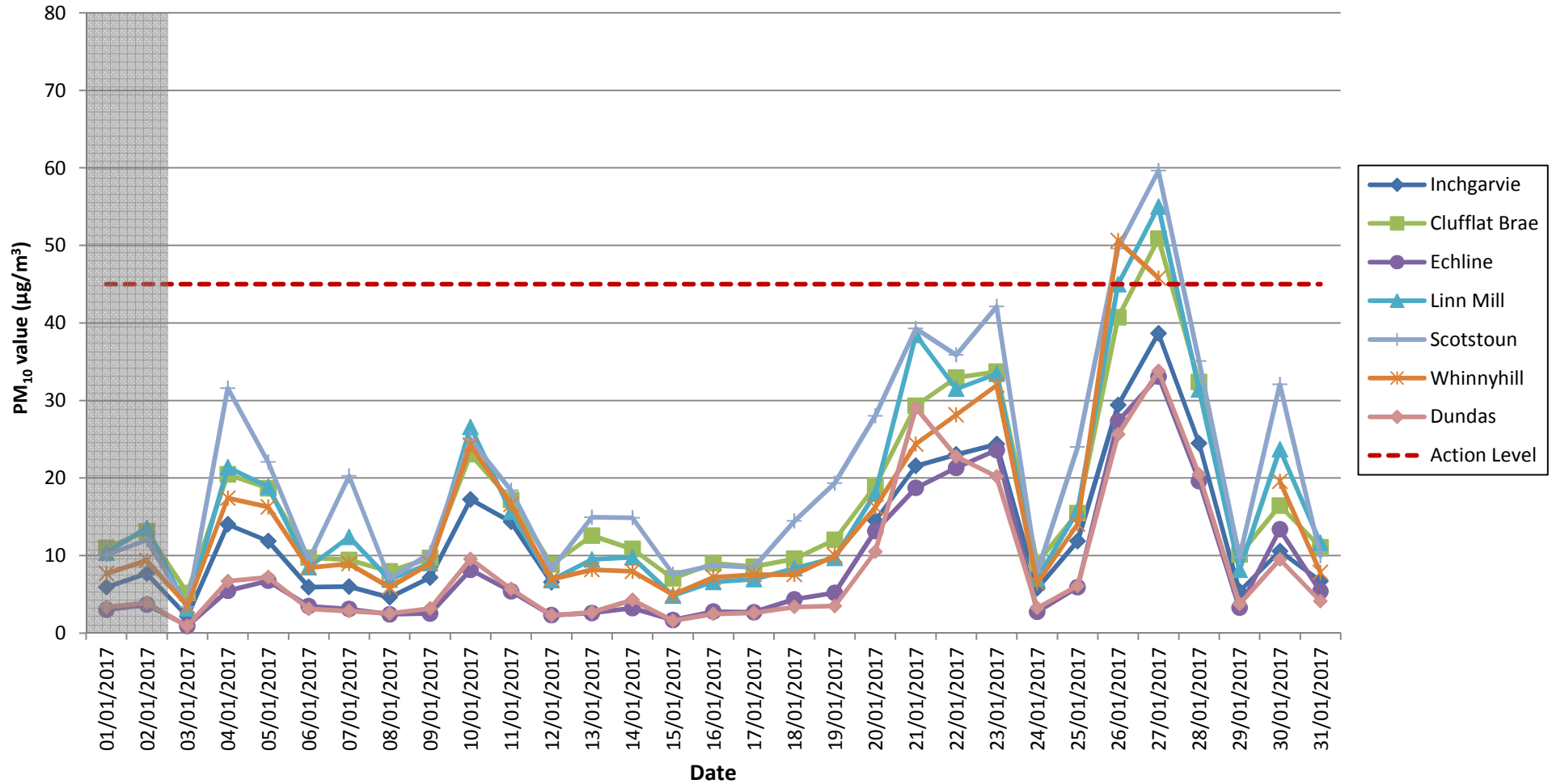
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APPENDIX A: LIGHT SCATTER METER RESULTS

Air Quality Monitoring

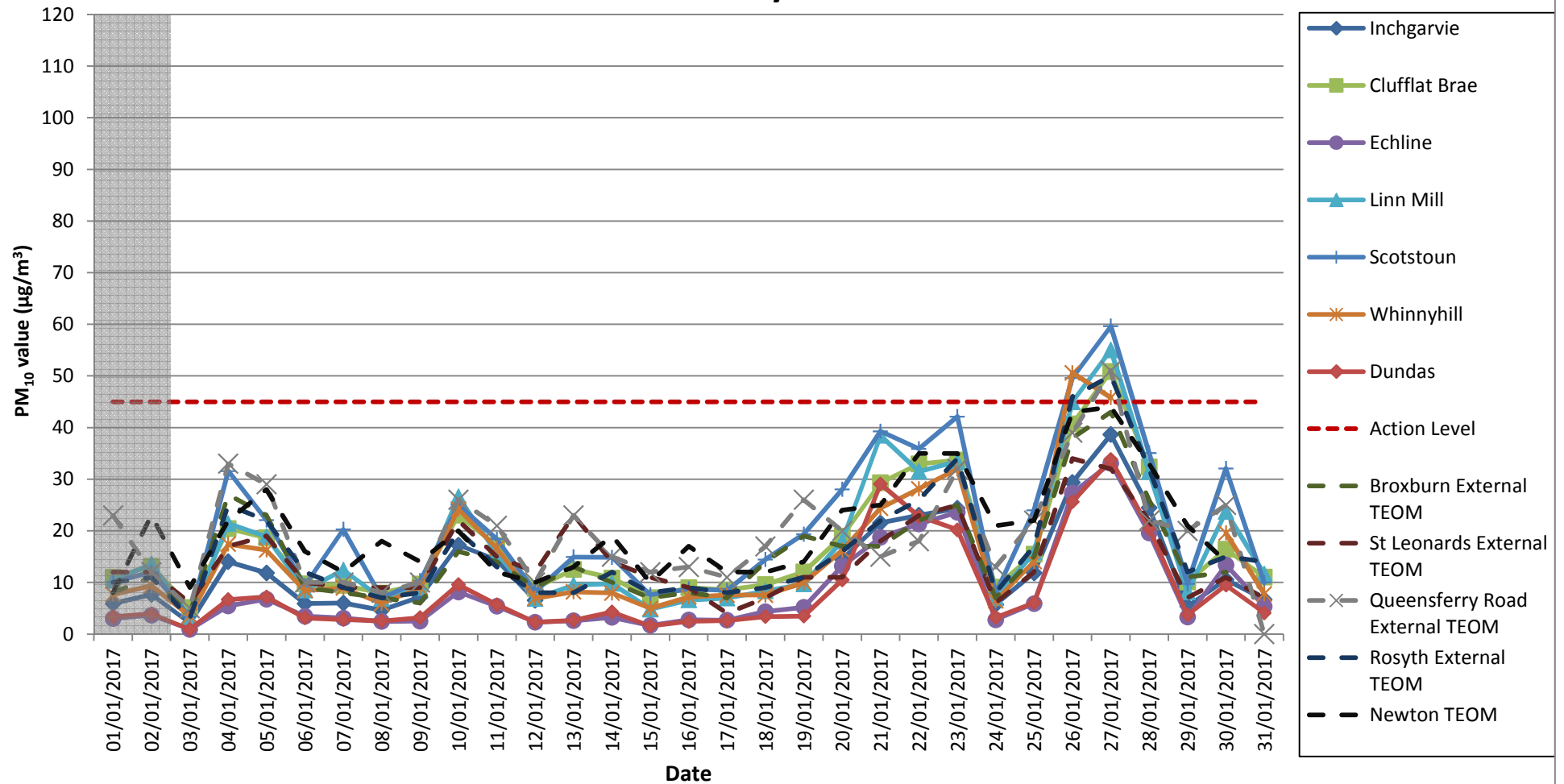
Particulate Matter (PM10) Results for all Monitoring Locations

January 2017



Note: Data missing from Inchgarvie between 13th-19th January and from Whinnyhill on the 28th and 29th January due to electrical faults.

Air Quality Monitoring: Particulate Matter (PM10) Results for all Monitoring Locations, including TEOM data January 2017



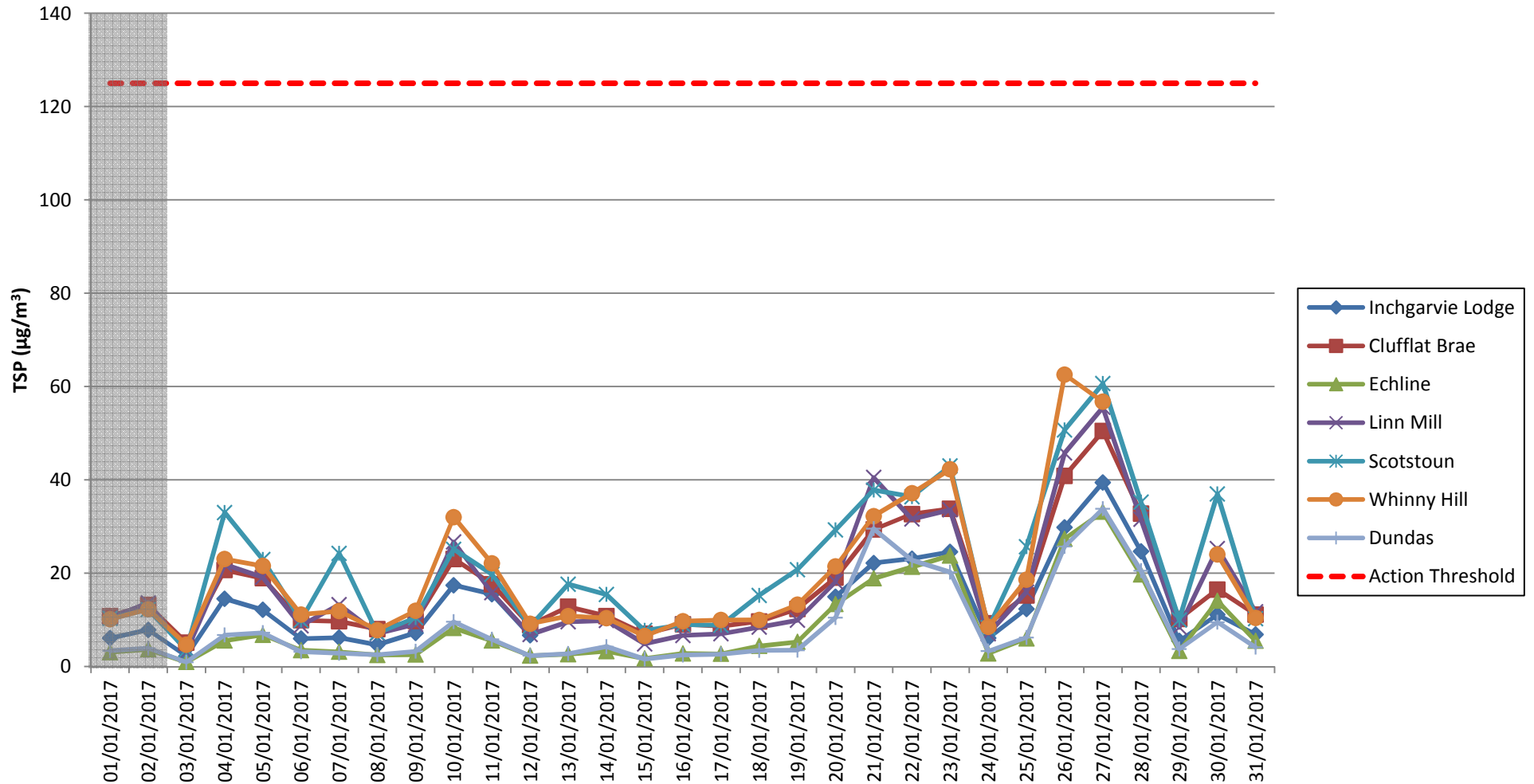
Note: Data missing from Inchgarvie between 13th-19th January and from Whinnyhill on the 28th and 29th January due to electrical faults.



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APPENDIX B: TOTAL SUSPENDED PARTICLES

Total Suspended Particles (TSP) Results January 2017



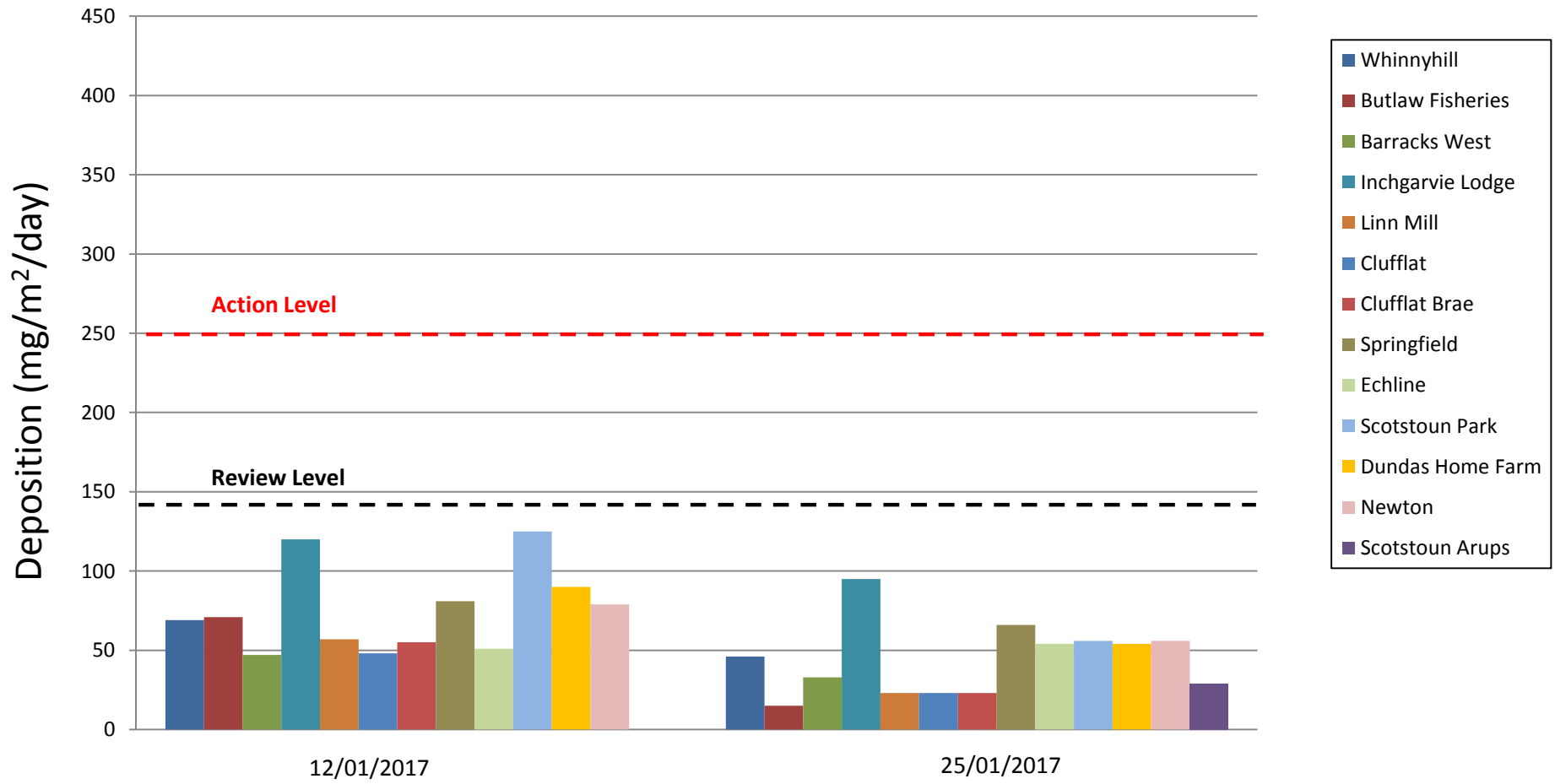
Note: Data missing from Inchgarvie between 13th-19th January and from Whinnyhill on the 28th and 29th January due to electrical faults.



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APPENDIX C: FRISBEE GAUGE RESULTS

Frisbee Dust Deposition Results: January 2017



Note: Data missing from Scotstoun Arups on the 12/01/2017 as frisbee had been blown over in high winds.



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APPENDIX D: DAILY DUST LOG

Daily Dust Log - North - January 2017

DATE	LOCATION	WIND	WIND DIRECTION	GROUND SURFACE	VISIBLE DUST	DUST DUE TO WORKS (if applicable)	CAUSES OF DUST (if applicable)	COMMENTS AND ACTIONS
01/01/2017								
02/01/2017								no works/ Christmas shutdown period
03/01/2017	N	LIGHT	SE	DAMP	N			
04/01/2017	N	LIGHT	S	DAMP	N			
05/01/2017	N	LIGHT	SE	DRY	N			
06/01/2017	N	LIGHT	SE	WET	N			
07/01/2017								
08/01/2017								
09/01/2017	N	LIGHT	E	WET	N			
10/01/2017	N	LIGHT	SE	WET	N			
11/01/2017	N	LIGHT	S	WET	N			
12/01/2017	N	LIGHT	SE	WET	N			
13/01/2017	N	LIGHT	SE	WET	N			
14/01/2017								
15/01/2017								
16/01/2017	N	LIGHT	SE	WET	N			
17/01/2017	N	LIGHT	SE	DAMP	N			
18/01/2017	N	LIGHT	SE	DAMP	N			
19/01/2017	N	LIGHT	SE	DRY	N			
20/01/2017	N	LIGHT	E	DAMP	N			
21/01/2017								
22/01/2017								
23/01/2017	N	LIGHT	E	DRY	N			
24/01/2017	N	LIGHT	E	DRY	N			
25/01/2017	N	LIGHT	E	DRY	N			
26/01/2017	N	LIGHT	SE	DRY	N			
27/01/2017	N	LIGHT	S	DRY	N			
28/01/2017								
29/01/2017								
30/01/2017	N	LIGHT	SW	DAMP	N			
31/01/2017	N	LIGHT	S	WET	N			

Daily Dust Log - South - January 2017

DATE	LOCATION	WIND	WIND DIRECTION	GROUND SURFACE	VISIBLE DUST	DUST DUE TO WORKS (if applicable)	CAUSES OF DUST (if applicable)	COMMENTS AND ACTIONS
01/01/2017								
02/01/2017								no works/ Christmas shutdown period
03/01/2017	S	LIGHT	SE	DAMP	N			
04/01/2017	S	LIGHT	S	DAMP	N			
05/01/2017	S	LIGHT	S	DRY	N			
06/01/2017	S	LIGHT	SE	WET	N			
07/01/2017								
08/01/2017								
09/01/2017	S	LIGHT	E	WET	N			
10/01/2017	S	LIGHT	SE	WET	N			
11/01/2017	S	LIGHT	S	WET	N			
12/01/2017	S	LIGHT	E	WET	N			
13/01/2017	S	LIGHT	E	WET	N			
14/01/2017								
15/01/2017								
16/01/2017	S	LIGHT	SE	WET	N			
17/01/2017	S	LIGHT	SE	DAMP	N			
18/01/2017	S	LIGHT	SE	DAMP	N			
19/01/2017	S	LIGHT	E	DRY	N			
20/01/2017	S	LIGHT	SE	DAMP	N			
21/01/2017								
22/01/2017								
23/01/2017	S	LIGHT	E	DRY	N			
24/01/2017	S	LIGHT	S	DRY	N			
25/01/2017	S	LIGHT	E	DRY	N			
26/01/2017	S	LIGHT	SE	DRY	N			
27/01/2017	S	LIGHT	S	DRY	N			
28/01/2017								
29/01/2017								
30/01/2017	S	LIGHT	SW	DAMP	N			
31/01/2017	S	LIGHT	S	WET	N			