



Contractor



**FCBC**  
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Project **FORTH REPLACEMENT CROSSING**

Document title

**AIR QUALITY MONITORING REPORT  
AUGUST 2017**

00	08/09/2017	First revision	SWR	DCK	DCK
<b>Rev</b>	<b>Rev. Date</b>	<b>Purpose of revision</b>	<b>Made</b>	<b>Checked</b>	<b>Reviewed</b>

Document status

**FOR REVIEW**

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

Document number	Rev
<b>REP-00342</b>	<b>00</b>

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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 August 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 (PM<sub>10</sub>) 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 August
M1	Whinny Hill	Frisbee	21/03/12	<ul style="list-style-type: none"> <li>• Earthworks/Fill Placement</li> <li>• Ferrytoll gyratory slip road works</li> </ul>
		Automatic light scatter meter	16/02/12	
M7	Butlaw Fisheries	Frisbee	05/10/11	<ul style="list-style-type: none"> <li>• Waterproofing and road surfacing on deck</li> <li>• Wind shield installation</li> <li>• Bridge deck works</li> </ul>
M8	Barracks West	Frisbee	31/08/11	<ul style="list-style-type: none"> <li>• Waterproofing and road surfacing on deck</li> <li>• Wind shield installation</li> <li>• Bridge deck works</li> </ul>
M10	Inchgarvie Lodge	Frisbee	22/08/11	<ul style="list-style-type: none"> <li>• Waterproofing and road surfacing on deck</li> <li>• Wind shield installation</li> <li>• Bridge deck works</li> <li>• South abutment works</li> <li>• Drainage works</li> <li>• Cycle Track</li> </ul>
		Automatic light scatter meter	17/10/11	
M11	Linn Mill	Frisbee	22/08/11	<ul style="list-style-type: none"> <li>• Waterproofing and road surfacing on deck</li> <li>• Wind shield installation</li> <li>• Surfacing access track at Linn Mill</li> <li>• Bridge deck works</li> <li>• Drainage works</li> <li>• South abutment works</li> </ul>
		Automatic light scatter meter	06/12/11	
M12	Clufflat	Frisbee	29/08/11	<ul style="list-style-type: none"> <li>• Waterproofing and road surfacing on deck</li> <li>• Wind shield installation</li> <li>• Bridge deck works</li> <li>• South abutment works</li> <li>• Drainage works</li> <li>• Cycle Track</li> </ul>
M13	Clufflat Brae	Frisbee	21/09/11	
		Automatic light scatter meter	24/10/11	
M14	Springfield	Frisbee	15/08/11	<ul style="list-style-type: none"> <li>• Cycle Track</li> </ul>





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M15	Echline	Frisbee	16/08/11	• Cycle Track
		Automatic light scatter meter	10/11/11	
M16	Scotstoun	Frisbee	07/09/11	• Tidying / reinstatement works
		Automatic light scatter meter	14/02/12	
M17	Dundas Home Farm	Frisbee	29/08/11	• Tidying / reinstatement works
		Automatic light scatter meter	23/02/12	
M18	Newton	Frisbee	22/08/11	• None
		TEOM	23/05/12	

### 3. AIR QUALITY MONITORING RESULTS

#### 3.1. Automatic Light Scatter Dust Meter Monitoring Results

**3.1.1.** Light scatter meter results for August 2017 have been presented in a monthly chart; this can be found in Appendix A. Results for the month are generally low and all are below the action level.  $PM_{10}$  levels generally follow a similar pattern throughout the month with the exception of higher results recorded at Scotstoun on the 10<sup>th</sup>, 29<sup>th</sup> and 31<sup>st</sup> August. At the time of these higher results there were no project related activities being undertaken which would give rise to dust as FCBC construction works were complete in this area.

**3.1.2.** The  $PM_{10}$  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



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of results generally follow the same pattern throughout the month, with the exception of the result recorded at Scotstoun on 10<sup>th</sup> August.

### **3.2. Total Suspended Particles**

**3.2.1.** The TSP results for August 2017 have been presented in a monthly chart; this can be found in Appendix B. The TSP levels at monitoring locations during August were found to be generally low and all within the threshold level. All locations across the site were found to follow a similar pattern to that observed for PM<sub>10</sub> levels, as described in 3.1.1.

### **3.3. Frisbee Dust Deposition Results**

**3.3.1.** The Frisbee dust deposition results for August 2017 have been presented in a chart and can be found in Appendix C. Two collections were made in August; these occurred on the 9<sup>th</sup> and 23<sup>rd</sup> August 2017.

**3.3.2.** The site action level for the dust deposition rate has been set at 250 mg/m<sup>2</sup>/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/m<sup>2</sup>/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 August there were exceedances of the site review level at Scotstoun Park for both monitoring periods. With regards to these exceedances, the temporary Frisbee at Scotstoun Arups, which is located closer to the FCBC works area, indicates a significantly lower result than for the permanent Frisbee during this period. In addition, there were no project related activities being undertaken in this area during August which would give rise to dust. This suggests that the higher results obtained at the permanent monitoring location are not due to FCBC activities.



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### **3.4. Daily Dust Log and Environmental Inspections**

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



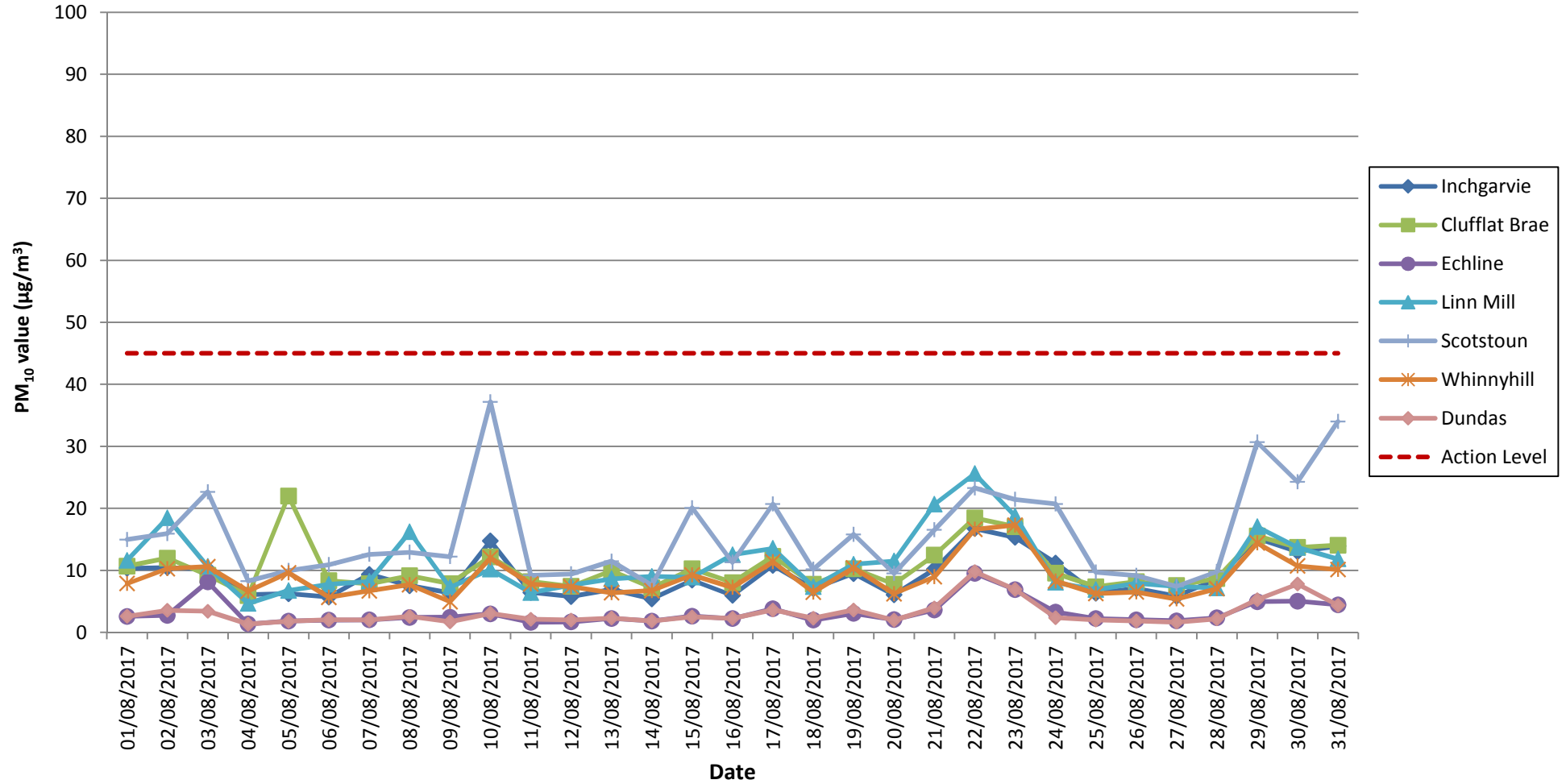
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## **APPENDIX A: LIGHT SCATTER METER RESULTS**

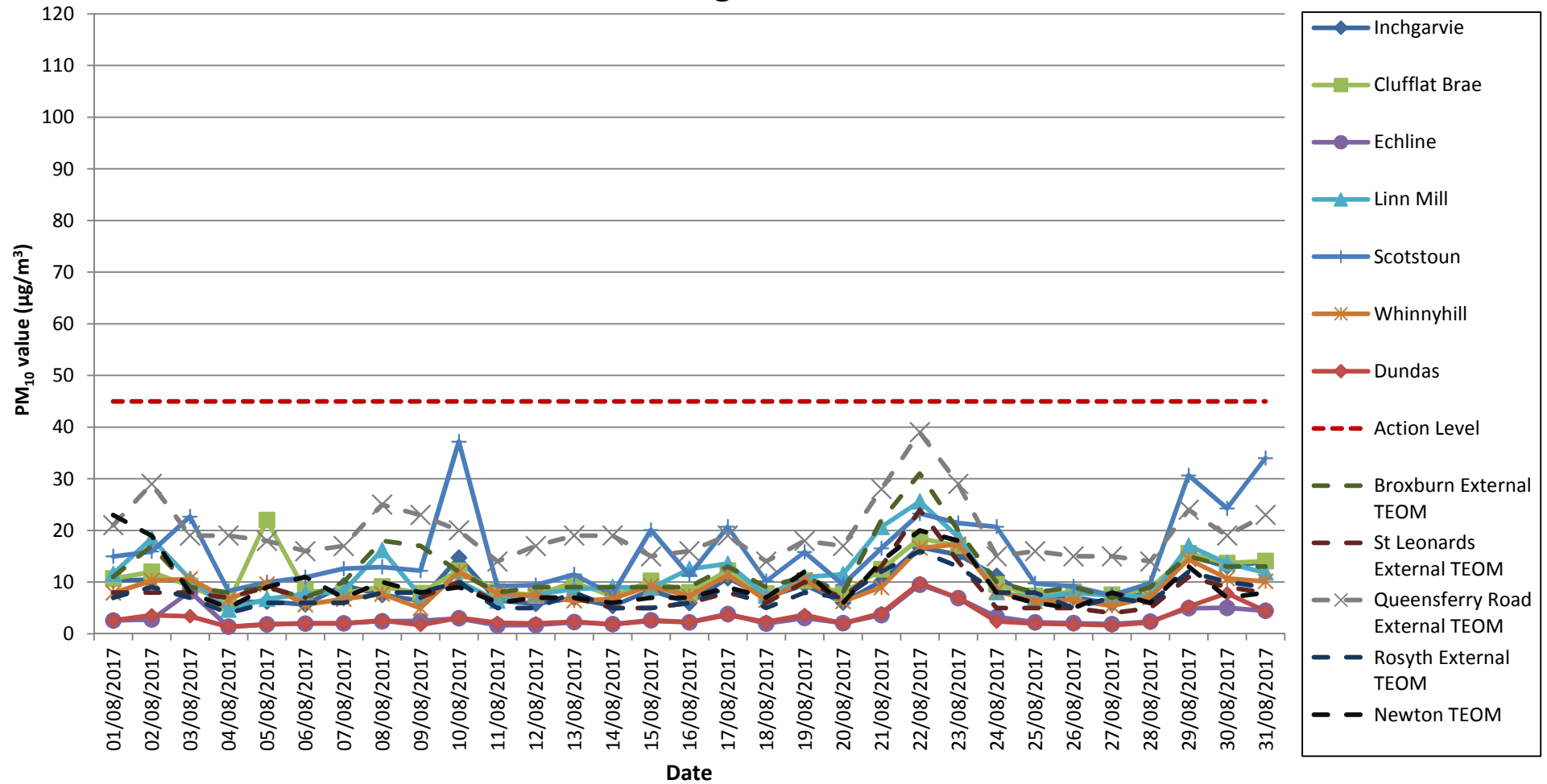
# Air Quality Monitoring

## Particulate Matter (PM10) Results for all Monitoring Locations

### August 2017



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

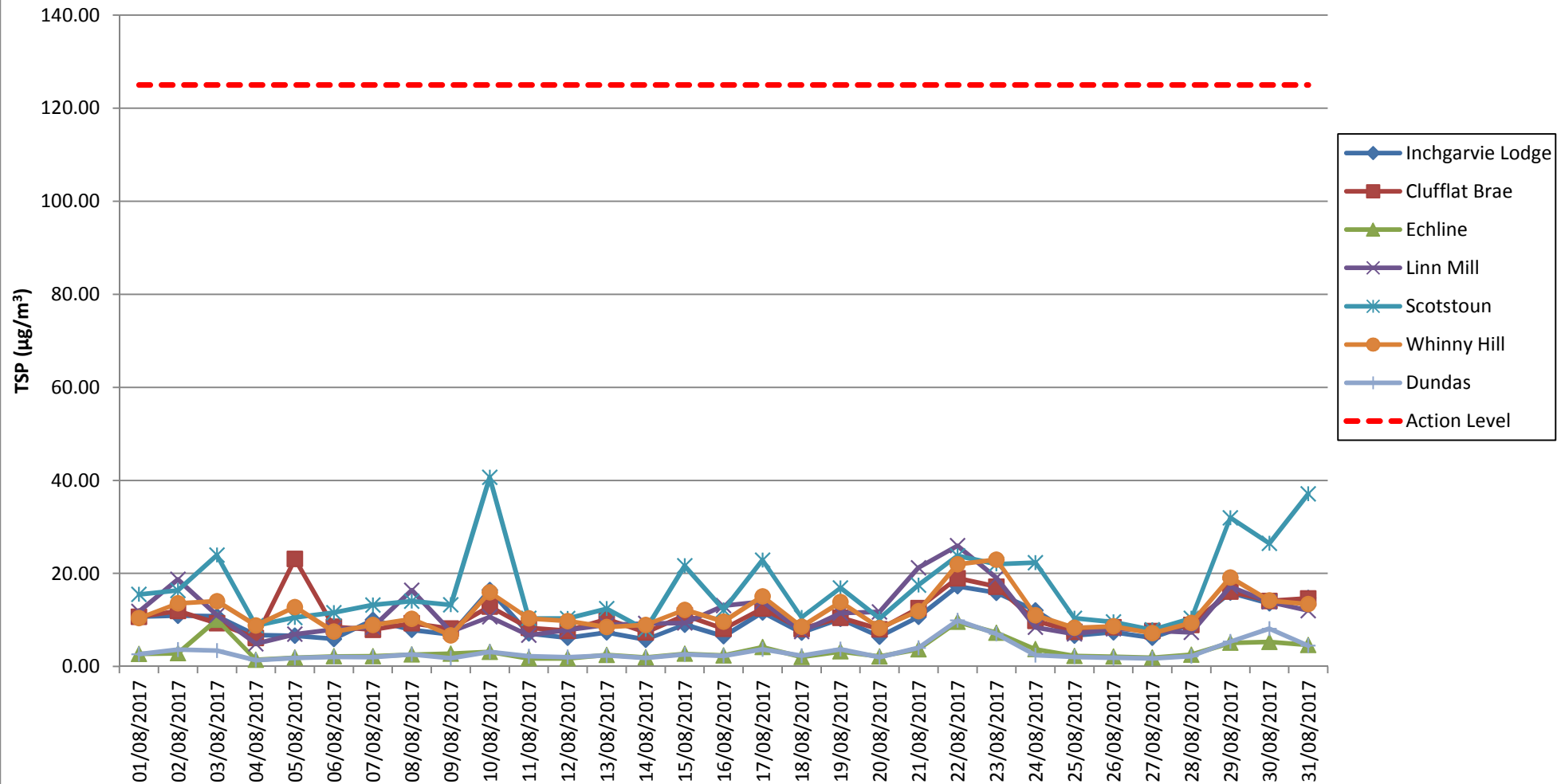




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## **APPENDIX B: TOTAL SUSPENDED PARTICLES**

# Total Suspended Particles (TSP) Results August 2017



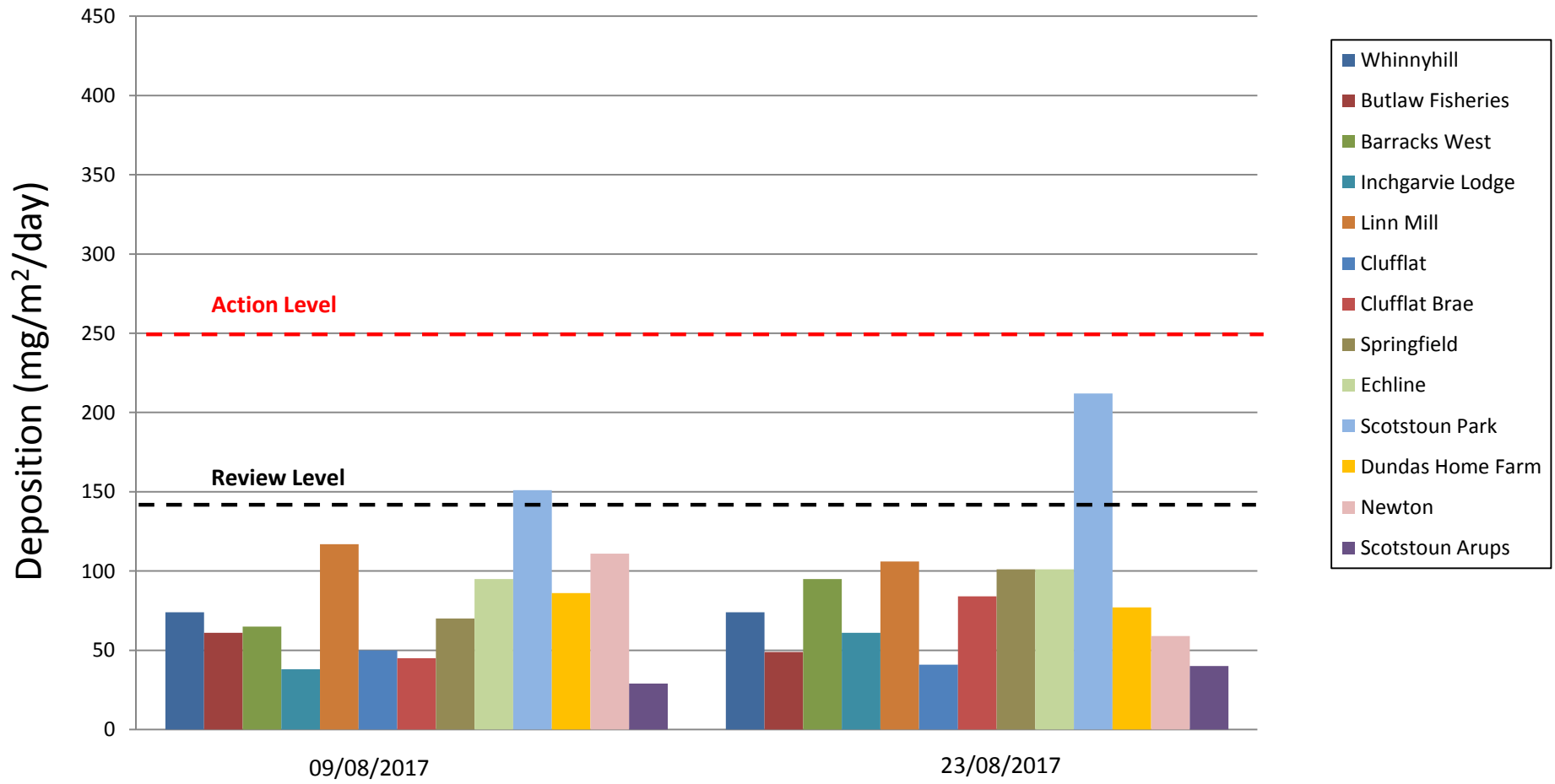




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## **APPENDIX C: FRISBEE GAUGE RESULTS**

## Frisbee Dust Deposition Results: August 2017





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## **APPENDIX D: DAILY DUST LOG**

### Daily Dust Log - North - August 2017

DATE	LOCATION	WIND	WIND DIRECTION	GROUND SURFACE	VISIBLE DUST	DUST DUE TO WORKS (if applicable)	CAUSES OF DUST (if applicable)	COMMENTS AND ACTIONS
01/08/2017	N	LIGHT	E	WET	N			
02/08/2017	N	LIGHT	S	WET	N			
03/08/2017	N	LIGHT	S	WET	N			
04/08/2017	N	LIGHT	S	WET	N			
05/08/2017								
06/08/2017								
07/08/2017	N	LIGHT	SE	DRY	N			
08/08/2017	N	LIGHT	S	DRY	N			
09/08/2017	N	LIGHT	S	DRY	N			
10/08/2017	N	LIGHT	SE	DRY	N			
11/08/2017	N	LIGHT	SE	DRY	N			
12/08/2017								
13/08/2017								
14/08/2017	N	LIGHT	S	WET	N			
15/08/2017	N	LIGHT	SE	DAMP	N			
16/08/2017	N	LIGHT	E	DRY	N			
17/08/2017	N	LIGHT	E	DRY	N			
18/08/2017	N	LIGHT	SE	DAMP	N			
19/08/2017								
20/08/2017								
21/08/2017	N	LIGHT	S	DRY	N			
22/08/2017	N	LIGHT	W	DRY	N			
23/08/2017	N	LIGHT	SW	WET	N			
24/08/2017	N	LIGHT	E	DRY	N			
25/08/2017	N	LIGHT	E	WET	N			
26/08/2017								
27/08/2017								
28/08/2017	N	LIGHT	E	DAMP	N			
29/08/2017	N	LIGHT	E	DRY	N			
30/08/2017	N	LIGHT	E	DRY	N			
31/08/2017	N	LIGHT	SE	DRY	N			

### Daily Dust Log - South - August 2017

DATE	LOCATION	WIND	WIND DIRECTION	GROUND SURFACE	VISIBLE DUST	DUST DUE TO WORKS (if applicable)	CAUSES OF DUST (if applicable)	COMMENTS AND ACTIONS
01/08/2017	S	LIGHT	E	WET	N			
02/08/2017	S	LIGHT	S	WET	N			
03/08/2017	S	LIGHT	S	WET	N			
04/08/2017	S	LIGHT	S	WET	N			
05/08/2017								
06/08/2017								
07/08/2017	S	LIGHT	SE	DRY	N			
08/08/2017	S	LIGHT	S	DRY	N			
09/08/2017	S	LIGHT	SW	DRY	N			
10/08/2017	S	LIGHT	SE	DRY	N			
11/08/2017	S	LIGHT	E	DRY	N			
12/08/2017								
13/08/2017								
14/08/2017	S	LIGHT	S	WET	N			
15/08/2017	S	LIGHT	SE	DAMP	N			
16/08/2017	S	LIGHT	S	DRY	N			
17/08/2017	S	LIGHT	E	DRY	N			
18/08/2017	S	LIGHT	SE	DAMP	N			
19/08/2017								
20/08/2017								
21/08/2017	S	LIGHT	S	DRY	N			
22/08/2017	S	LIGHT	W	DRY	N			
23/08/2017	S	LIGHT	SW	WET	N			
24/08/2017	S	LIGHT	E	DRY	N			
25/08/2017	S	LIGHT	E	WET	N			
26/08/2017								
27/08/2017								
28/08/2017	S	LIGHT	E	DAMP	N			
29/08/2017	S	LIGHT	E	DRY	N			
30/08/2017	S	LIGHT	SE	DRY	N			
31/08/2017	S	LIGHT	SE	DRY	N			