Contractor

FCBC
Queensferry Crossing

DRAGADOS | AMERICAN BRIDGE INTERNATIONAL
HOCHTIEF | MORRISON CONSTRUCTION

Project

FORTH REPLACEMENT CROSSING

Document title

AIR QUALITY MONITORING REPORT MAY 2017

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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 May 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).

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_{10}) 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.

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 May
M1	Whinny Hill	Frisbee	21/03/12	• Earthworks/Fill Placement • Bridge works at Ferrytoll • Main carriageway roadworks
		Automatic light scatter meter	16/02/12	
M7	Butlaw Fisheries	Frisbee	05/10/11	• AVS concrete works • Waterproofing on deck • Wind shield installation • Scour protection • Bridge deck works
M8	Barracks West	Frisbee	31/08/11	• AVS concrete works • Waterproofing on deck • Wind shield installation • Scour protection • Bridge deck works
M10	Inchgarvie Lodge	Frisbee	22/08/11	• Minor main carriageway works • SUDS detention basin works • AVS concrete works on deck • Waterproofing on deck • Wind shield installation • Scour protection • Bridge deck works • South abutment works • Cycle Track
		Automatic light scatter meter	17/10/11	
M11	Linn Mill	Frisbee	22/08/11	• Minor main carriageway works • SUDS detention basin works • AVS concrete works on deck • Waterproofing on deck • Wind shield installation • Scour protection • Surfacing access track at Linn Mill • Bridge deck works • South abutment works
		Automatic light scatter meter	06/12/11	
M12	Clufflat	Frisbee	29/08/11	• Minor main carriageway works • SUDS detention basin works • AVS concrete works on deck • Waterproofing on deck • Wind shield installation • Scour protection • Bridge deck works • South abutment works • Cycle Track
M13	Clufflat Brae	Frisbee	21/09/11	
		Automatic light scatter meter	24/10/11	

M14	Springfield	Frisbee	15/08/11	• Cycle Track
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 results for May 2017 have been presented in a monthly chart; this can be found in Appendix A. Results show that the PM_{10} levels generally follow a similar pattern throughout the month with the exception of Linn Mill where a higher result is recorded for 6th May, in addition to an exceedance for the 11th and 12thMay. This exceedance is likely to be caused by the laying of type 1 material in preparation for surfacing the access road from the south side office down to the South Abutment. Due to the access road being closed to carry out the works the bowser was unable to gain access to this area to suppress dust emissions.

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 of results generally follow the same pattern throughout the month, with the exception of the elevated result at Linn Mill noted in 3.1.1 where PM_{10} levels were higher than the TEOM levels.

3.2. Total Suspended Particles

3.2.1. The TSP results for May 2017 have been presented in a monthly chart; this can be found in Appendix B. The TSP levels at monitoring locations during May were found to be generally low and all within the threshold. All locations across the site were found to follow a similar pattern to that observed for PM_{10} levels, with the most notable increase occurring at Linn Mill on the 11th and 12th June as described in 3.1.1.

3.3. Frisbee Dust Deposition Results

3.3.1. The Frisbee dust deposition results for May 2017 have been presented in a chart and can be found in Appendix C. Two collections were made in May; these occurred on the 3rd and 24th May 2017.

3.3.2. The site action level for the dust deposition rate has been set at 250 $mg/m^2/day$. 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 $mg/m^2/day$. 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 May there were no exceedances of either the site review or action levels.

3.4. Daily Dust Log and Environmental Inspections

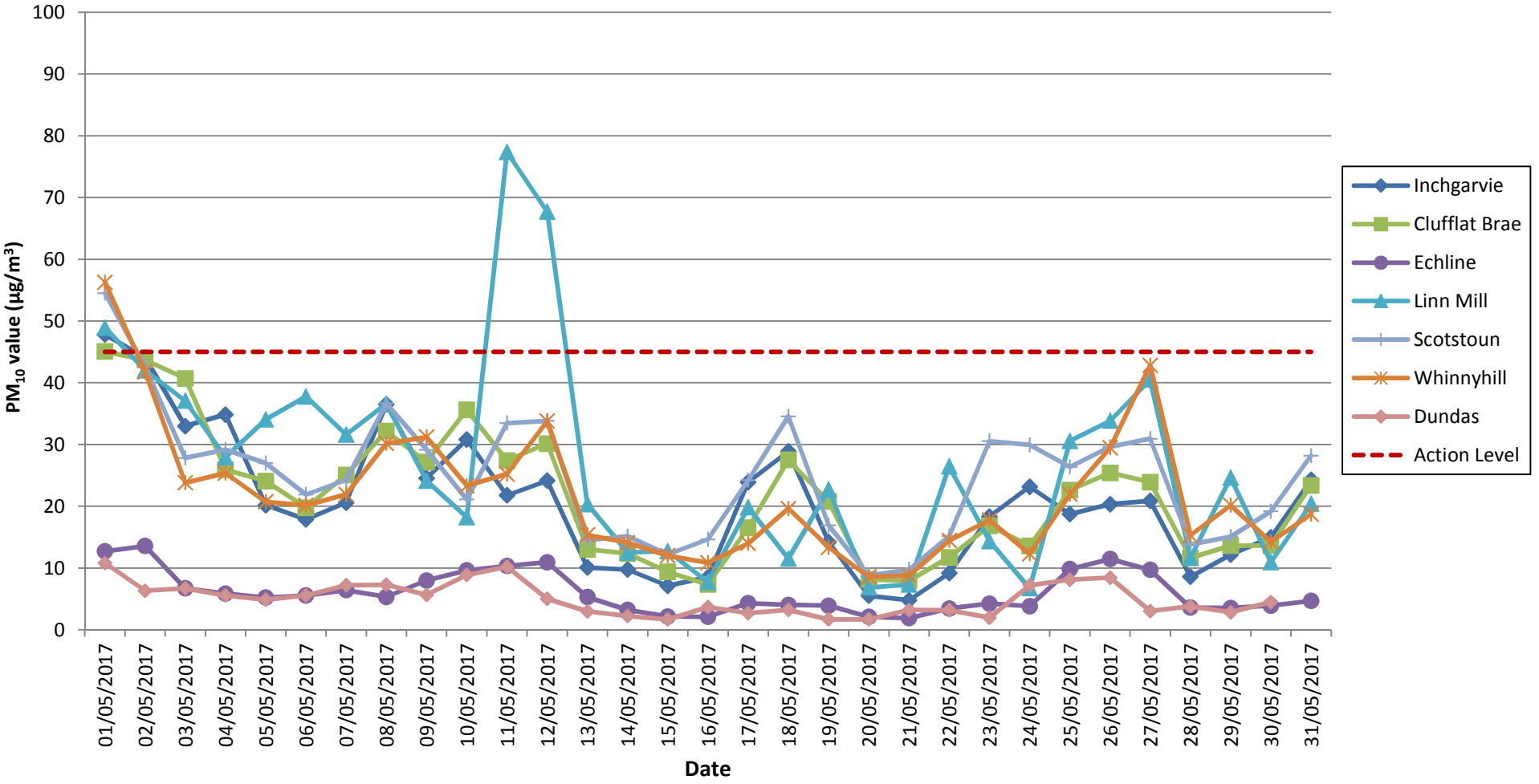
3.4.1. A summary of the daily dust log for May can be found in Appendix D.

3.4.2. During this period, full environmental inspections were also undertaken across the site and covered areas where works were being carried out.

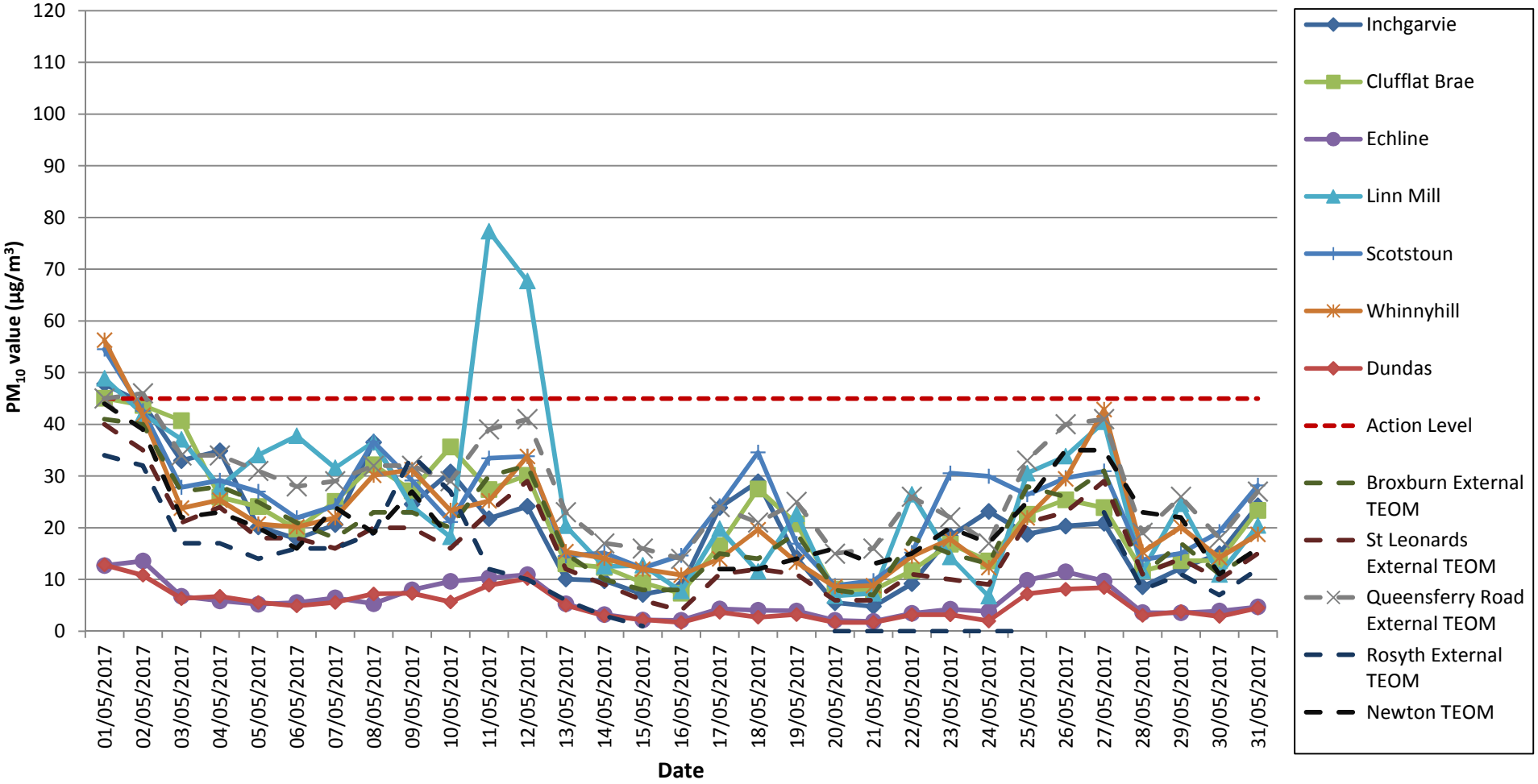
3.4.3. As noted in 3.1.1 there were exceedances registered on the 11th and 12th May at Linn Mill. These incidents were investigated by the environmental team. Due to the access track being closed to carry out the works it was not possible for a bowser to get access to this area to suppress the dust.

APPENDIX A: LIGHT SCATTER METER RESULTS

Air Quality Monitoring
Particulate Matter (PM10) Results for all Monitoring Locations
May 2017



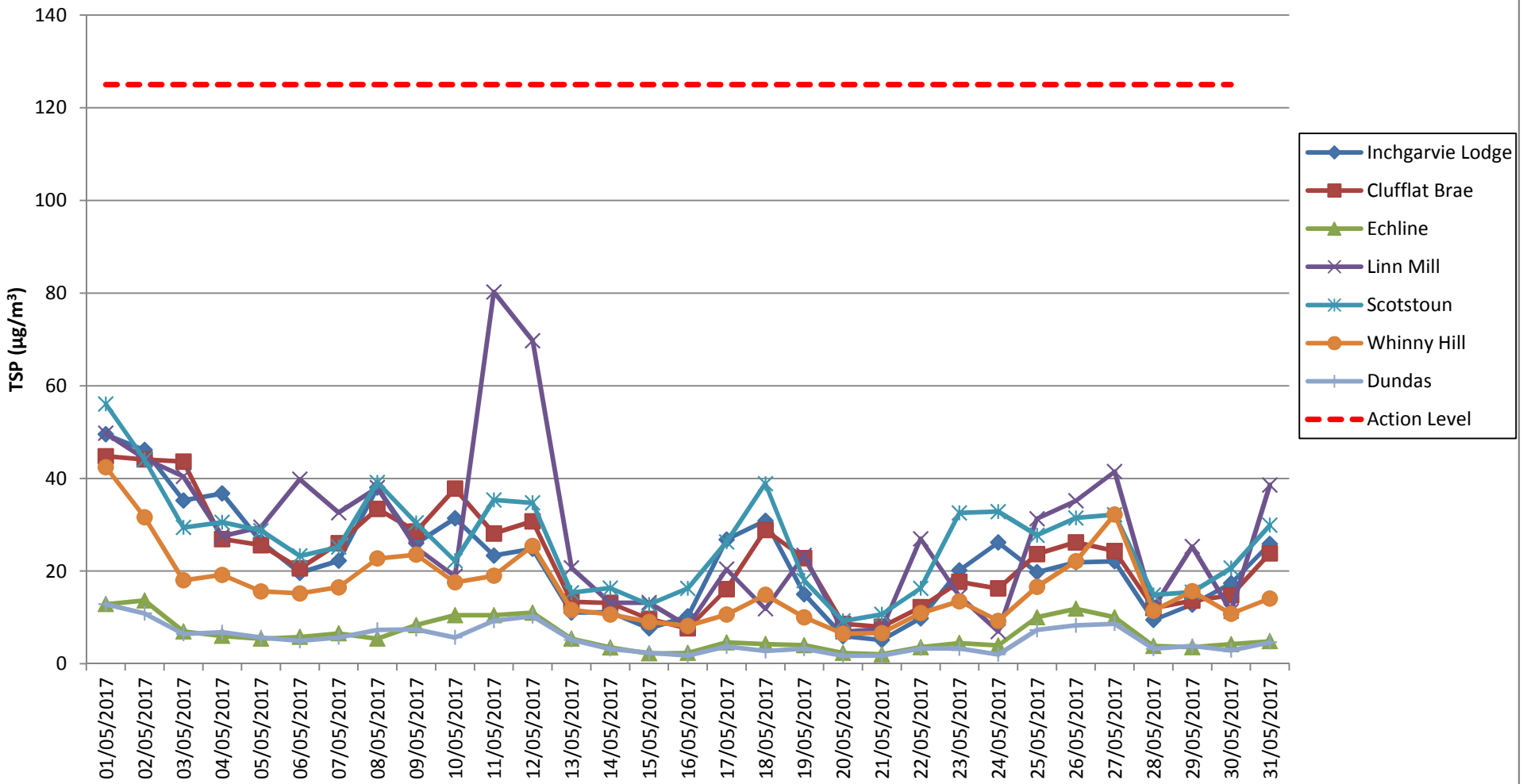
Air Quality Monitoring: Particulate Matter (PM10) Results for all Monitoring Locations, inlcuding TEOM data
May 2015



Note:

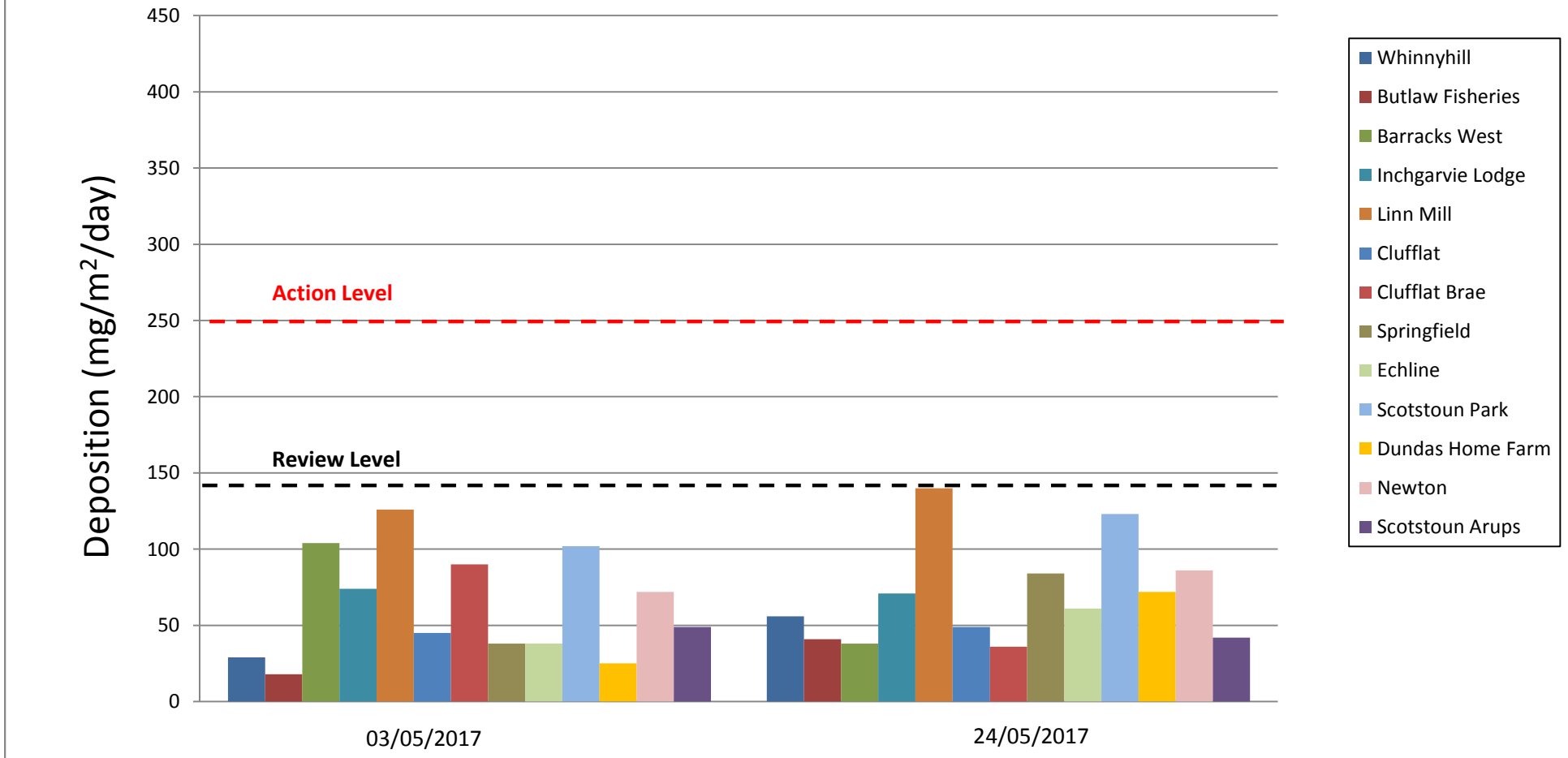
APPENDIX B: TOTAL SUSPENDED PARTICLES

Total Suspended Particles (TSP) Results
May 2017



APPENDIX C: FRISBEE GAUGE RESULTS

Frisbee Dust Deposition Results: May 2017



APPENDIX D: DAILY DUST LOG

Daily Dust Log - North - May 2017

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

Daily Dust Log - South - May 2017

DATE	LOCATION	WIND	WIND DIRECTION	GROUND SURFACE	VISIBLE DUST	DUST DUE TO WORKS (if applicable)	CAUSES OF DUST (if applicable)	COMMENTS AND ACTIONS
01/05/2017	S	LIGHT	W	DRY				
02/05/2017	S	LIGHT	W	DRY				
03/05/2017	S	LIGHT	W	DRY				
04/05/2017	S	LIGHT	S	DRY				
05/05/2017	S	LIGHT	S	DRY				
06/05/2017								
07/05/2017								
08/05/2017	S	LIGHT	NW	DRY				
09/05/2017	S	LIGHT	SE	DRY				
10/05/2017	S	LIGHT	SE	DRY				
11/05/2017	S	LIGHT	W	DRY	Y	Y	Laying of Typer 1 material on acces track	Due to restricted access to area then the bowser could not gain access to this area
12/05/2017	S	LIGHT	S	DRY	Y	Y		
13/05/2017								
14/05/2017								
15/05/2017	S	LIGHT	S	DAMP				
16/05/2017	S	LIGHT	E	WET				
17/05/2017	S	LIGHT	SE	DRY				
18/05/2017	S	LIGHT	S	DRY				
19/05/2017	S	LIGHT	S	DRY				
20/05/2017								
21/05/2017								
22/05/2017	S	LIGHT	SW	WET				
23/05/2017	S	LIGHT	SE	DRY				
24/05/2017	S	LIGHT	SE	DAMP				
25/05/2017	S	LIGHT	SW	DRY				
26/05/2017	S	LIGHT	SW	DRY				
27/05/2017								
28/05/2017								
29/05/2017	S	LIGHT	W	DAMP				
30/05/2017	S	LIGHT	E	DAMP				
31/05/2017	S	LIGHT	SW	DRY				