



MVV Environment, Energy from Waste Combined Heat and Power Facility,  
North Yard, Devonport

**Community Ambient Air Quality Monitoring Programme Report  
Quarter 4, 2019**





## Overview of Monitoring Programme

MVV started ambient air quality monitoring in the vicinity of the EfW CHP Facility in August 2014. Two pollutants are measured in the on-going survey, Nitrogen Dioxide (NO<sub>2</sub>) and particulate matter (as PM<sub>10</sub>). Monitoring of NO<sub>2</sub> is carried out at ten locations in the area, while a PM<sub>10</sub> real time monitoring station has been installed in the vicinity of Camels Head junction and began monitoring in October 2014.

### Nitrogen Dioxide

Oxides of nitrogen (NO<sub>x</sub>) are formed at the high temperatures and pressures found within vehicle engines and other combustion processes. Some of the nitrogen in the air and the fuel, mainly in the form of nitric oxide (NO), is oxidised to form NO<sub>2</sub> in the atmosphere. NO<sub>2</sub> is associated with adverse effects on human health and it is this pollutant for which air quality standards have been set in the UK and elsewhere within the EU.

Diffusion tubes are used to measure levels of NO<sub>2</sub> within an area. These are small plastic tubes containing a chemical absorbent which reacts with NO<sub>2</sub> present in the air. The tubes are changed each month and then sent away to a laboratory for analysis. The results give a NO<sub>2</sub> level for each calendar month and these are used to derive an annual average which can be compared against the National Standards annual average air quality objective.

### Particulate Matter

Particulates, alternatively referred to as particulate matter (PM), are tiny solid particles or liquid droplets suspended in a gas. Sources of particulate matter can be man-made or natural. Concentrations of particulate matter within the air can be expressed in terms of their size, for example PM<sub>10</sub> represents particles of 10 µm diameter or less. PM<sub>10</sub> occurs naturally, originating from volcanoes, dust storms, forest and grassland fires, living vegetation and sea spray. Human activities also generate PM<sub>10</sub>, from sources such as road transport, power plants, agriculture, various industrial processes and local domestic heating.

A specialised air quality monitoring unit measures small particulate matter as they are drawn into the machine. The dust particles pass through a light from a long-life LED source, and as they do so generate a scattered light impulse. Measuring the deflection and intensity of this light impulse allows the size and number of particles to be detected. Measurement is continuous, and a result is generated every five minutes. These results allow a daily average to be generated from which an annual average can be determined; both figures can then be compared to the National Standards.

### Locations

The NO<sub>2</sub> monitoring sites have been divided between the area around the Camels Head junction (which could potentially be affected by emissions from site-related road traffic) and other locations representative of the urban background in St Budeaux and King's Tamerton. The PM<sub>10</sub> real time monitor is in the vicinity of Camels Head junction.



## National Standards

The national air quality objective values, against which the monitoring results are compared, are shown in the Table below:

AIR QUALITY OBJECTIVES SET IN UK REGULATIONS			
Pollutant	Averaging Period	Objective Value ( $\mu\text{g}/\text{m}^3$ )	Maximum Permitted Exceedances
Nitrogen dioxide ( $\text{NO}_2$ )	Annual average	40	None
	Hourly average	200	18 hours per year
Particulate matter ( $\text{PM}_{10}$ )	Annual average	40	None
	Daily average	50	35 days per year

## 2019 Quarter 4

This quarterly update presents the results of monitoring carried out during October, November and December 2019.

### 1. Operational or Other Activity

During this time the EfW CHP facility was operating normally with scheduled periods of upkeep, maintenance and repair.

During this period there have been minimal observed disruptions or re-routing of traffic vehicle movements in the vicinity of the site. Periodically and dependent on security state, traffic will back up from the HMNB Camels Head entrance due to enhanced security inspections and checks.

### 2. NO<sub>2</sub> Diffusion Tubes

Oct: 10 tubes deployed 02/10/2019, 9 recovered 02/11/2019, results received 08/08/2019.

Nov: 9 tubes deployed 02/11/2019, 9 recovered 02/12/2019, results received 12/09/2019.

Dec: 10 tubes deployed 02/12/2019, 9 recovered 02/10/2020, results received 15/01/2020.

*Note: One tube missing at (T4) Weston Mill Primary School. It was removed whilst still attached to a drainpipe during construction / roof work, and access prohibited to redeploy new tubes. November's tubes returned as void due to a lab error in issuing a rogue batch.*



### 3. PM10 Monitor maintenance, service or down time

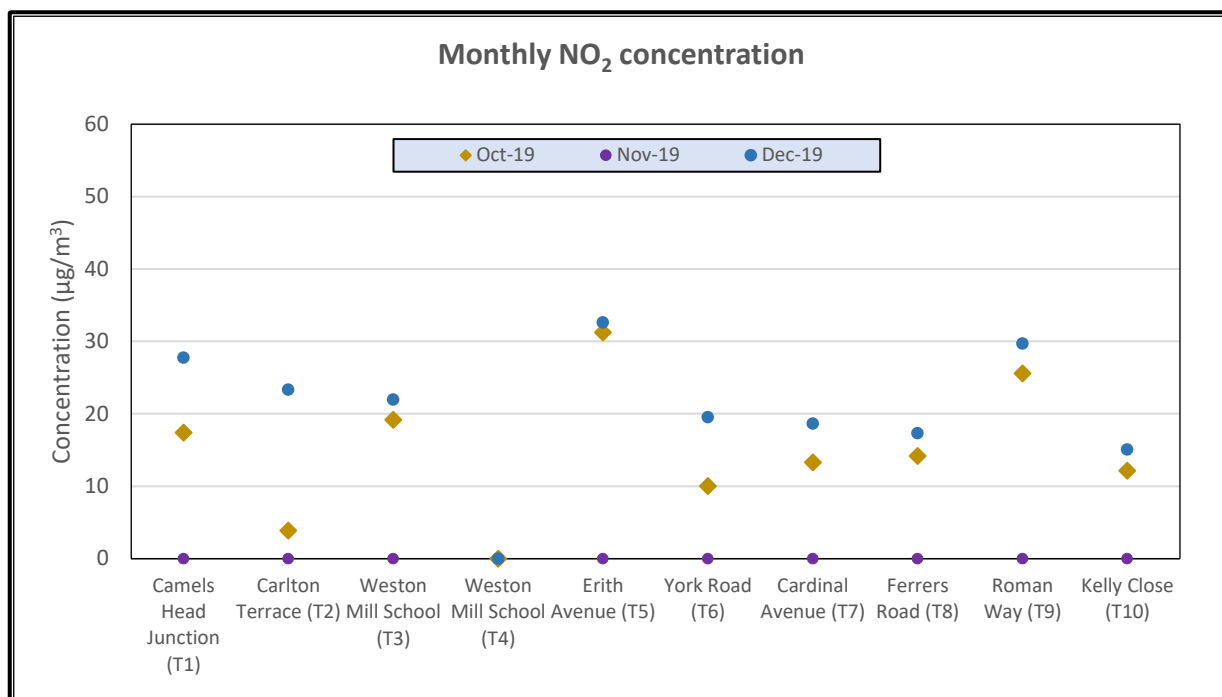
Monitor operational throughout quarter, defect identified 9<sup>th</sup> December on the Wolsely Rd monitor. Service call out to rectify.

### 4. NO<sub>2</sub> Diffusion Tube Monitoring

Note: Results shown include an adjustment for laboratory blank but are provisional until bias adjustment has taken place.

#### Three Monthly Monitoring.

The results of the monitoring for the three-month period October to the end of December 2019 are shown in the graph below.





## Summary of Results

A summary of results to date are shown in the Tables below where the rolling 12-month average can be directly compared with the Annual Air Quality mean objective. The mean concentrations to date are seen to be within the air quality objective of 40  $\mu\text{g}/\text{m}^3$  at all the monitoring sites.

NO <sub>2</sub> MONITORING															
		Monthly NO <sub>2</sub> Concentration ( $\mu\text{g}/\text{m}^3$ ) 2019													
Locatio	Description	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	2019 Average	Average of all results to date
T1	Camels Head Junction	27.99	33.78	25.92	26.54	25.90	19.35	17.44	5.27	19.28	17.42	0	27.77	20.56	24.86
T2	Junction of Weston Mill Drive & Carlton Terrace	24.57	30.43	21.02	22.64	17.94	13.68	0	15.18	14.81	3.87	0	23.32	15.62	20.26
T3	Weston Mill School	24.3	26.18	22.89	19.02	17.18	14.64	30.70	15.26	14.94	19.16	0	21.98	18.85	19.71
T4	Weston Mill School	25.19	25.95	30.88	19.86	18.56	0	8.94	17.59	0	0	0	0	12.25	18.67
T5	Erith Avenue	30.62	35.9	31.66	35.29	30.36	24.84	23.86	25.47	27.00	31.25	0	32.62	27.41	30.27
T6	York Road	21.11	21.95	13.86	14.94	12.46	11.32	11.26	13.48	10.51	10.01	0	19.52	13.37	14.47
T7	Cardinal Avenue	20.73	20.74	16.04	13.86	13.02	12.23	12.69	10.15	9.31	13.31	0	18.64	13.39	15.15
T8	Ferrers Road, St Budeaux	21.22	21.91	12.98	14.9	12.24	9.76	22.54	10.69	10.03	14.19	0	17.33	13.98	14.52
T9	Roman Way, adjacent Plaistow Hill Infant & Nursery Sch.	29.95	37.85	25.67	26.43	32.67	24.67	24.73	20.62	23.12	25.57	0	29.71	25.08	27.03
T10	Kelly Close, Barne Barton	16.56	20.37	10.03	14.59	13.09	11.21	11.41	9.67	8.03	12.13	0	15.06	11.85	13.20

Key  
 Air quality standard not exceeded  
 Air quality standard exceeded

NO <sub>2</sub> MONITORING														
		12-month rolling average NO <sub>2</sub> Concentration ( $\mu\text{g}/\text{m}^3$ )												
Locatio	Description	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	Mean
T1	Camels Head Junction	23.82	24.57	24.47	24.47	24.47	24.47	24.53	23.76	23.38	22.89	20.58	20.56	23.50
T2	Junction of Weston Mill Drive & Carlton Terrace	21.53	22.20	22.19	22.19	22.19	21.33	19.56	19.25	18.80	17.23	15.42	15.62	19.79
T3	Weston Mill School	18.48	19.05	19.25	19.25	19.25	19.33	20.53	20.49	20.25	20.15	18.61	18.85	19.46
T4	Weston Mill School	19.17	19.70	20.61	20.61	20.61	19.28	18.56	18.65	16.88	15.08	13.83	12.25	17.94
T5	Erith Avenue	28.93	29.67	29.83	29.83	29.83	29.83	29.44	29.40	29.17	29.57	27.10	27.41	29.17
T6	York Road	15.06	15.46	15.35	15.35	15.35	15.35	15.24	15.52	15.19	14.63	13.09	13.37	14.91
T7	Cardinal Avenue	15.37	15.56	15.59	15.59	15.59	15.59	15.63	15.61	15.04	14.66	13.19	13.39	15.07
T8	Ferrers Road, St Budeaux	14.42	14.80	14.82	14.82	14.82	14.82	15.62	15.66	15.22	15.13	13.86	13.98	14.83
T9	Roman Way, adjacent Plaistow Hill Infant & Nursery Sch.	27.29	28.13	27.63	27.63	27.63	27.63	27.33	27.16	26.76	26.84	24.74	25.08	26.99
T10	Kelly Close, Barne Barton	13.55	13.93	13.67	13.67	13.67	13.67	13.60	13.51	13.21	12.97	11.49	11.85	13.23

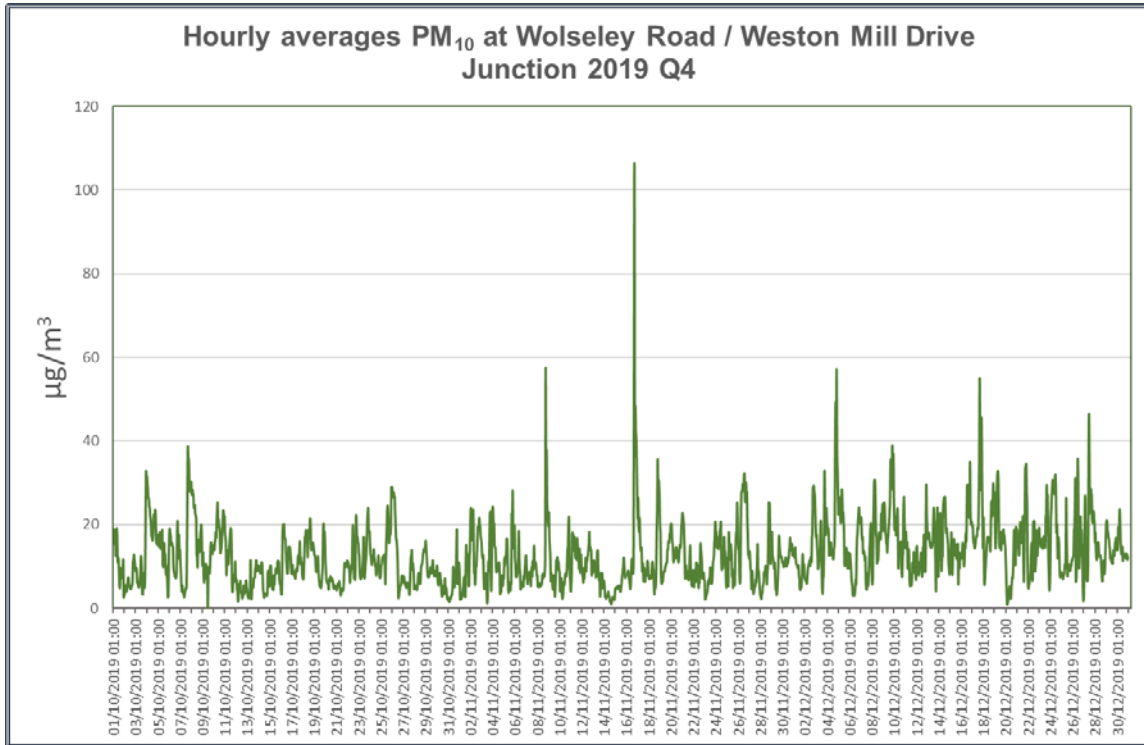
Key  
 Air quality standard not exceeded  
 Air quality standard exceeded



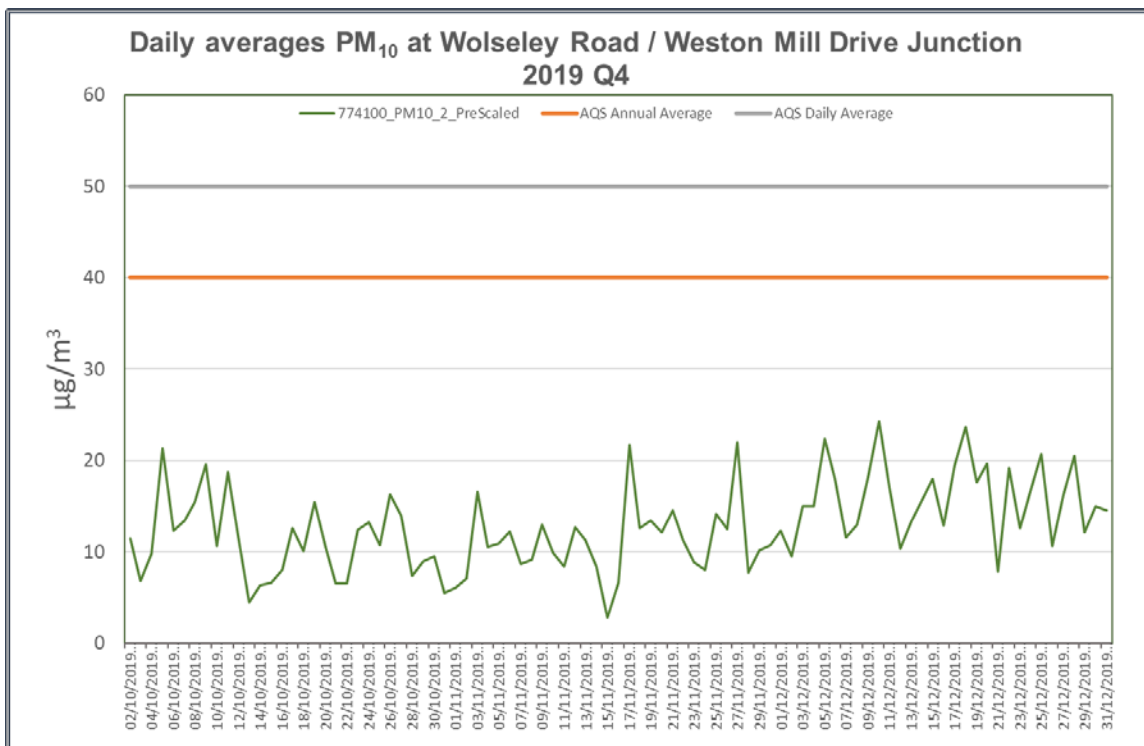
## 5. PM10 Monitoring

Note: All results shown are provisional until calibration has taken place.

### Hourly PM<sub>10</sub> Concentrations



### 24-hour PM<sub>10</sub> Concentrations





## Summary of Results

A summary of results to date are shown in the table below. The mean concentration for this quarter is seen to be within the AQS annual air quality mean objective of 40  $\mu\text{g}/\text{m}^3$ .

The highest individual value recorded was on 10<sup>th</sup> December. The AQS 24-hour average of 50  $\mu\text{g}/\text{m}^3$  was not exceeded during this period. An hourly spike on bonfire nights is evident in the hourly average graph.

Data capture for Oct, Nov and Dec was 100%.

<b>PM10 Monitoring at Camels Head Junction</b>		
<b>Results from 1st<sup>t</sup> Oct-31st<sup>h</sup> Dec 2019</b>		
Maximum recorded value		24.3 $\mu\text{g}/\text{m}^3$
Minimum recorded value		2.8 $\mu\text{g}/\text{m}^3$
Average		12.78 $\mu\text{g}/\text{m}^3$
Data Capture		100%
No of 24 hour periods exceeding 50mg/m3		0
<b>Summary to date</b>		
<b>2014</b>	Average	15.23 $\mu\text{g}/\text{m}^3$
	No of 24-hour periods exceeding 50mg/m3	0
<b>2015</b>	Average	12.56 $\mu\text{g}/\text{m}^3$
	No of 24-hour periods exceeding 50mg/m3	0
<b>2016</b>	Average	10.59 $\mu\text{g}/\text{m}^3$
	No of 24-hour periods exceeding 50mg/m3	0
<b>2017</b>	Average	6.51 $\mu\text{g}/\text{m}^3$
	No of 24-hour periods exceeding 50mg/m3	0
<b>2018</b>	Average	4.84 $\mu\text{g}/\text{m}^3$
	No of 24-hour periods exceeding 50mg/m3	0
<b>2019</b>	Average	14.93 $\mu\text{g}/\text{m}^3$
	No of 24-hour periods exceeding 50mg/m3	1

All results to date are subject to calibration of the machine.

## Chimney Emission Data

Chimney emission data for the MVV Environment Devonport EfW CHP Facility is published weekly on the MVV website

[https://www.mvv.de/en/mvv\\_energie\\_gruppe/mvv\\_umwelt/beteiligungen/mvv\\_environment\\_1/devonport/links\\_downloads/index.jsp](https://www.mvv.de/en/mvv_energie_gruppe/mvv_umwelt/beteiligungen/mvv_environment_1/devonport/links_downloads/index.jsp)