

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

**Community Ambient Air Quality Monitoring Programme Report
Quarter 4, 2016**



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 (NO₂) and particulate matter (as PM₁₀). Monitoring of NO₂ is carried out at ten locations in the area, while a PM₁₀ 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_x) 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 NO₂ in the atmosphere. NO₂ 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 NO₂ within an area. These are small plastic tubes containing a chemical absorbent which reacts with NO₂ present in the air. The tubes are changed each month and then sent away to a laboratory for analysis. The results give a NO₂ 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 PM₁₀ represents particles of 10 µm diameter or less. PM₁₀ occurs naturally, originating from volcanoes, dust storms, forest and grassland fires, living vegetation and sea spray. Human activities also generate PM₁₀, from sources such as road transport, power plants, agriculture, various industrial processes and local domestic heating.

A specialised air quality monitoring unit measures small particles of matter as they as 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 of these figures can then be compared to the National Standards.

Locations

The NO₂ 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 (which could be affected by emissions of NO₂ from the main chimney of the EfW CHP Facility). The PM₁₀ real time monitor is located 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 (µg/m ³)	Maximum Permitted Exceedances
Nitrogen dioxide(NO ₂)	Annual average	40	None
	Hourly average	200	18 hours per year
Particulate matter(PM ₁₀)	Annual average	40	None
	Daily average	50	35 days per year



2016 Quarter 4

This quarterly update presents the results of monitoring carried out during October, November and December 2016.

1. Operational or Other Activity

During this time, the EfW CHP facility was operational.

2. NO₂ Diffusion Tubes

Oct: 10 tubes deployed 04/10/2016, 10 recovered 02/11/2016 date of report 07/11/2016
Nov: 10 tubes deployed 02/11/2016, 10 recovered 06/12/2016 date of report 08/12/2016
Dec: 10 tubes deployed 06/12/2016, 10 recovered 30/12/2016 date of report 09/01/2017

3. PM₁₀ Monitor maintenance, service or down time

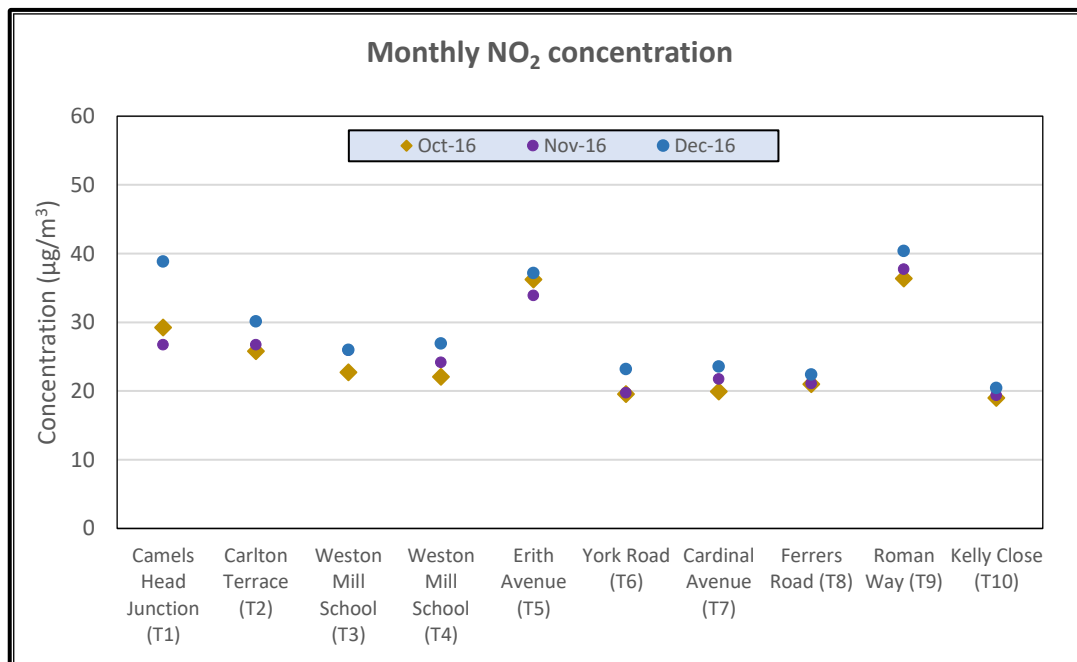
Monitor was taken off line for servicing from 17th November 2016 and brought back into service on the 23rd November 2016.

4. NO₂ 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 December 2016 are shown in the graph below.



Summary of Results

A summary of results to date are shown in the Table below where the rolling 12-month average can be directly compared with the Annual Air Quality mean objective. The mean concentrations of all results, except one, to date are seen to be within the air quality objective of 40 µg/m³ at all the monitoring sites. One result in December was marginally above the air quality objective of 40 µg/m³ at 40.39 µg/m³.

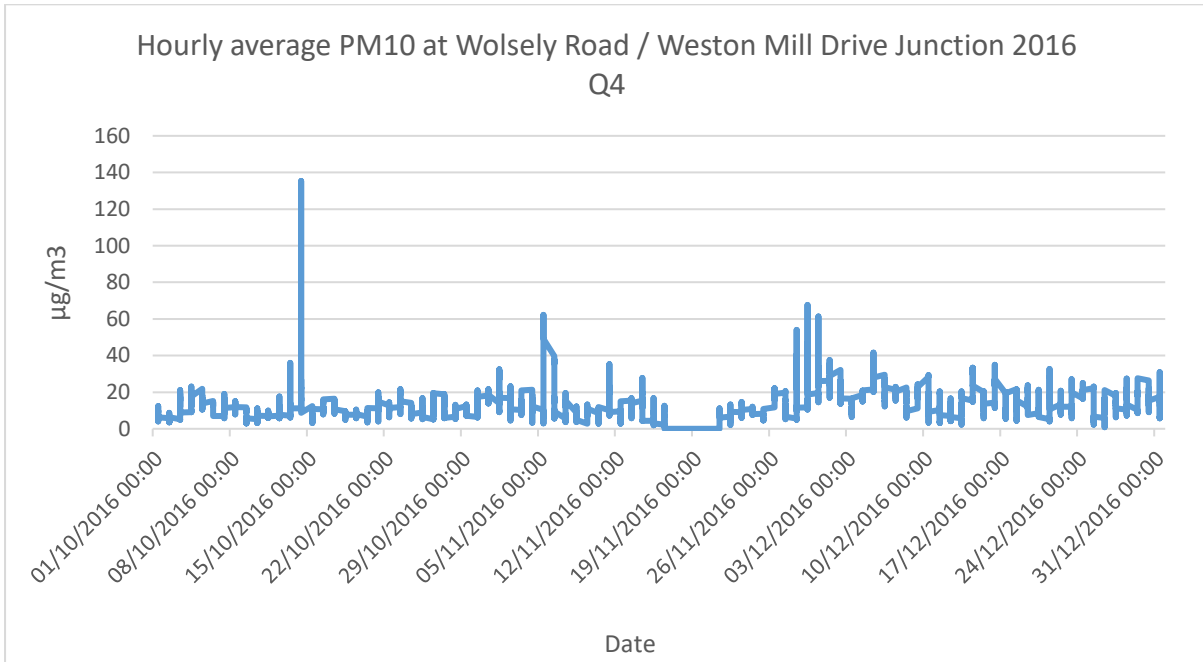
NO ₂ MONITORING														
Monthly NO ₂ Concentration (µg/m ³) 2016														
Locatic	Description	Jan-16	Feb-16	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16	2016 Average
T1	Camels Head Junction	21.84	23.99	25.69	24.77	26.43	21.88	21.13	20.58	24.63	29.26	26.73	38.84	25.48
T2	Junction of Weston Mill Drive & Carlton Terrace	22.49	21.22	20.81	21.03	18.66	12.12	13.89	14.49	19.99	25.81	26.73	30.12	20.61
T3	Weston Mill School	21.24	22.23	19.74	17.86	18.94	14.48	14.83	13.85	18.46	22.7	25.92	25.99	19.69
T4	Weston Mill School		22.77	20.42	19.26	18.69	15.13	15.38	13.94	20.05	22.07	24.18	26.89	19.89
T5	Erith Avenue	27.04	32.52	31.19	29.28	31.99	28.24	23.94	25.88	30.50	36.24	33.91	37.16	30.66
T6	York Road	16.3	17.36	14.52	13.04	12.21	9.21	10.45	9.74	15.21	19.53	19.73	23.17	15.04
T7	Cardinal Avenue	17.61	18.59	15.06	14.27	12.92	8.84	10.04	9.65	15.02	19.91	21.74	23.58	15.60
T8	Ferrers Road, St Budeaux	16.06	15.64	14.48	13.82	14.01	8.75	9.47	9.68	15.57	21	21.07	22.39	15.16
T9	Roman Way, adjacent to Plaistow Hill Infant and Nursery Sch	26.15	30.68	25.93	24.36	31.72	23.14	23.17	22.38	27.41	36.36	37.71	40.39	29.12
T10	Kelly Close, Barne Barton	14.61	12.8	14.02	13.66	12.68	7.87	8.49	-	15.27	19	19.37	20.44	14.38
Key														
Air quality standard not exceeded														
Air quality standard exceeded														

Annual rolling averages

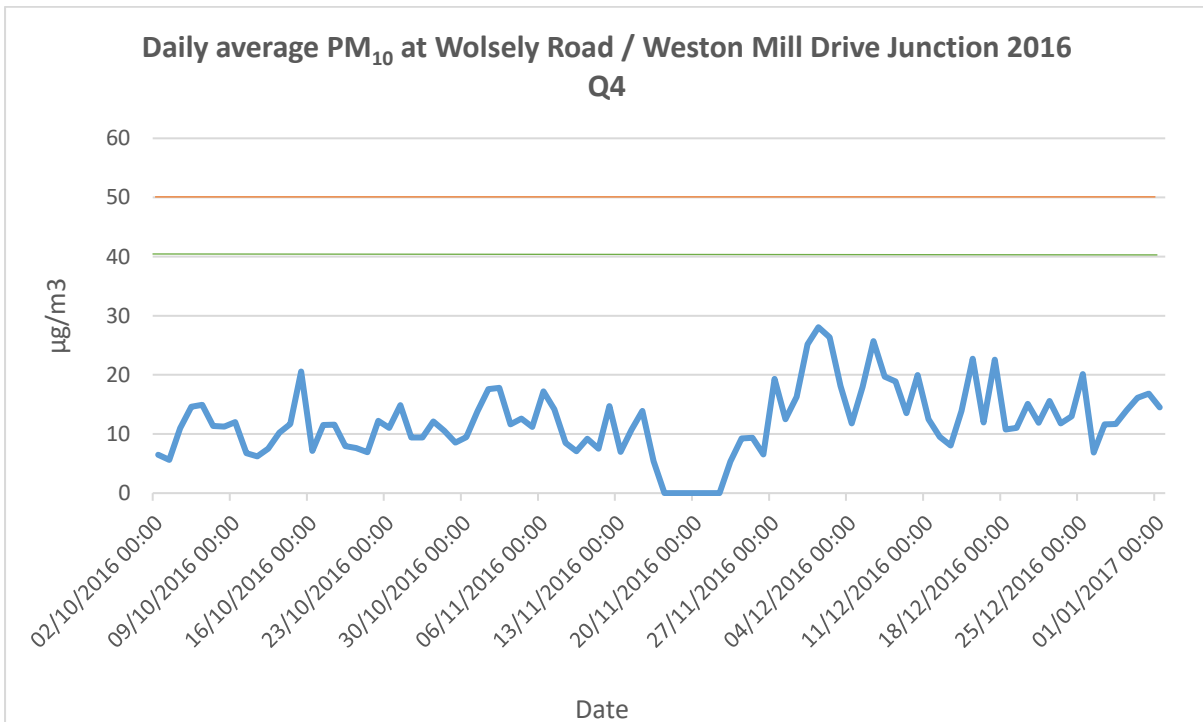
		12 month rolling average											
		Jan-16	Feb-16	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16
T1	Camels Head Junction	25.75	25.25	25.10	24.79	24.99	24.87	24.55	24.44	24.40	24.34	24.50	25.48
T2	Junction of Weston Mill Drive & Carlton Terrace	19.03	19.21	19.07	19.01	19.30	19.02	18.82	18.72	18.50	18.65	19.50	20.61
T3	Weston Mill School	18.56	18.40	18.37	18.40	18.66	18.57	18.35	18.13	18.09	18.13	18.85	19.69
T4	Weston Mill School	18.90	18.75	18.57	18.43	18.60	18.63	18.48	18.35	18.38	18.29	18.84	19.89
T5	Erith Avenue	29.54	29.08	29.20	29.26	29.56	29.59	29.22	29.09	28.78	29.04	29.43	30.66
T6	York Road	13.16	13.28	13.30	13.14	13.30	13.20	13.29	13.19	13.26	13.39	14.03	15.04
T7	Cardinal Avenue	14.12	13.99	13.79	13.68	13.94	13.75	13.69	13.64	13.77	13.81	14.55	15.60
T8	Ferrers Road, St Budeaux	13.48	13.35	13.26	13.08	13.49	13.35	13.39	13.28	13.34	13.66	14.41	15.16
T9	Roman Way, adjacent to Plaistow Hill Infant and Nurse	25.17	25.36	25.18	24.85	25.82	25.76	25.88	25.80	25.72	26.21	27.56	29.12
T10	Kelly Close, Barne Barton	11.83	11.58	11.78	11.73	12.13	11.98	11.84	12.00	12.24	12.32	13.36	14.38

5. PM10 Monitoring

Hourly PM₁₀ Concentrations



24-hour PM₁₀ Concentrations



PM₁₀ 24-hour average — AQS annual average — AQS daily average —

Summary of Results

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

The highest individual value of 135.35 $\mu\text{g}/\text{m}^3$ was recorded on 14th October 2016. However, the daily average for the 14th October was 11.68 $\mu\text{g}/\text{m}^3$.

Actual chimney emission data for our Facility is published weekly on our website:

http://www.mvv-environment.co.uk/en/swdwp_devonport/links_and_downloads/links_and_downloads.jsp

Data capture for October, November and December 2016 was 95% due to servicing of the monitoring equipment.

PM ₁₀ MONITORING AT THE CAMELS HEAD JUNCTION		
Results October - December 2016		
Minimum recorded value (during monitor operation)	($\mu\text{g}/\text{m}^3$)	0.857
Maximum recorded value (during monitor operation)	($\mu\text{g}/\text{m}^3$)	135.35
Average	($\mu\text{g}/\text{m}^3$)	12.781
Standard deviation	($\mu\text{g}/\text{m}^3$)	7.708
Data Capture	(%)	95
Number of 24-hour periods with average above 50 ($\mu\text{g}/\text{m}^3$)		0