MVV Environment
Devonport Ltd

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

Community Ambient Air Quality Monitoring Programme Report Quarter 1, 2017

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_2) and particulate matter (as PM_{10}). Monitoring of NO_2 is carried out at ten locations in the area, while a PM_{10} 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 NO_2 in the atmosphere. NO_2 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_2 within an area. These are small plastic tubes containing a chemical absorbent which reacts with NO_2 present in the air. The tubes are changed each month and then sent away to a laboratory for analysis. The results give a NO_2 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_{10} represents particles of 10 µm diameter or less. PM_{10} occurs naturally, originating from volcanoes, dust storms, forest and grassland fires, living vegetation and sea spray. Human activities also generate PM_{10}, 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 NO_2 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 NO_2 from the main chimney of the EfW CHP Facility). The PM_{10} 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 ($\mu g/m^3$)	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

2017 Quarter 1

This quarterly update presents the results of monitoring carried out during January, February and March 2017.

1. Operational or Other Activity

During this time, the EfW CHP facility was fully operational.

2. NO_2 Diffusion Tubes

Jan: 10 tubes deployed 30/12/2016, 10 recovered 03/02/2017, results received 20/02/2017
Feb: 10 tubes deployed 03/02/2017, 10 recovered 02/03/2017, results received 28/03/2017
Mar: 10 tubes deployed 02/03/2017, 10 recovered 30/03/2017, results received 19/04/2017

3. PM_{10} Monitor maintenance, service or down time

Monitor provided no output between 4th and 10th March.

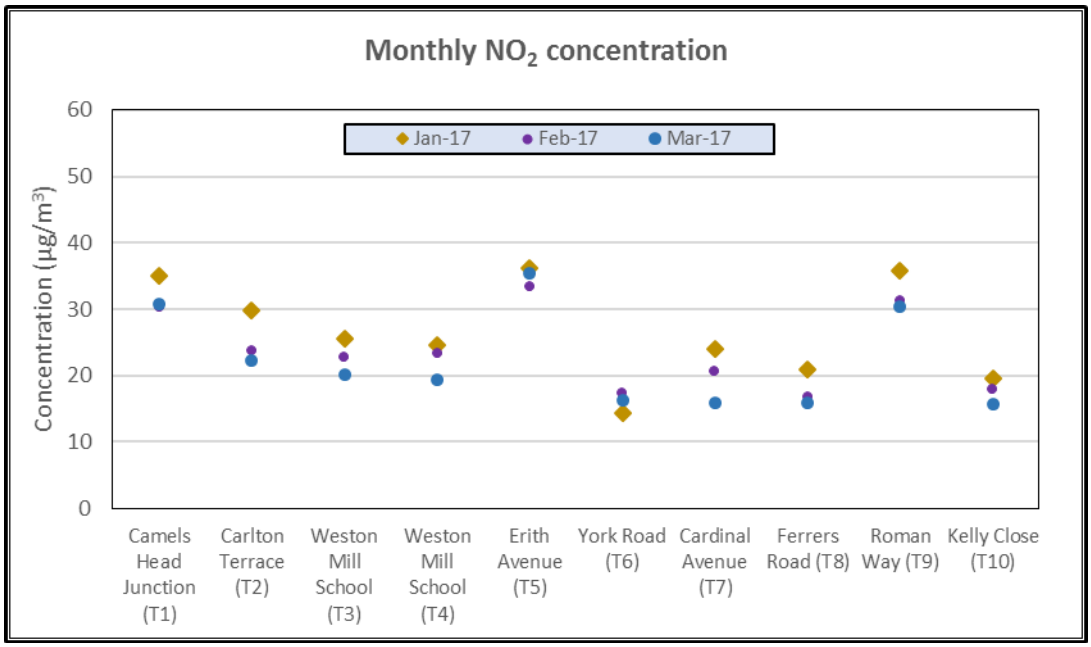
Service carried out on 31st March 2017. Report shows that the weather station had stopped responding and the data disk was full. Both issues addressed during the service and monitor was demonstrated to be working correctly from that point on.

4. NO_2 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 January to March 2017 are shown in the graph below.



Summary of Results

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

Monthly concentration

NO_2 MONITORING																
		Monthly NO2 Concentration (µg/m3) 2017														
Locatio	Description	Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17	Jul-17	Aug-17	Sep-17	Oct-17	Nov-17	Dec-17	2017 Average	Average to date	12 month rolling average
T1	Camels Head Junction	35.01	30.35	30.68										32.01	26.46	27.52
T2	Junction of Weston Mill Drive & Carlton Terrace	29.85	23.63	22.27										25.25	20.58	21.55
T3	Weston Mill School	25.53	22.76	20.13										22.81	19.71	20.12
T4	Weston Mill School	24.62	23.34	19.37										22.44	19.98	20.24
T5	Erith Avenue	36.28	33.4	35.37										35.02	31.08	31.85
T6	York Road	14.39	17.42	16.34										16.05	14.23	15.04
T7	Cardinal Avenue	24.09	20.53	15.79										20.14	15.27	16.37
T8	Ferrers Road, St Budeaux	20.88	16.79	15.9										17.86	14.59	15.78
T9	Roman Way, adjacent to Plaistow Hill Infant and Nursery School	35.74	31.22	30.4										32.45	26.99	30.33
T10	Kelly Close, Barne Barton	19.63	17.9	15.76										17.76	13.06	15.46

Key
Air quality standard not exceeded
Air quality standard exceeded

12-month rolling average concentration

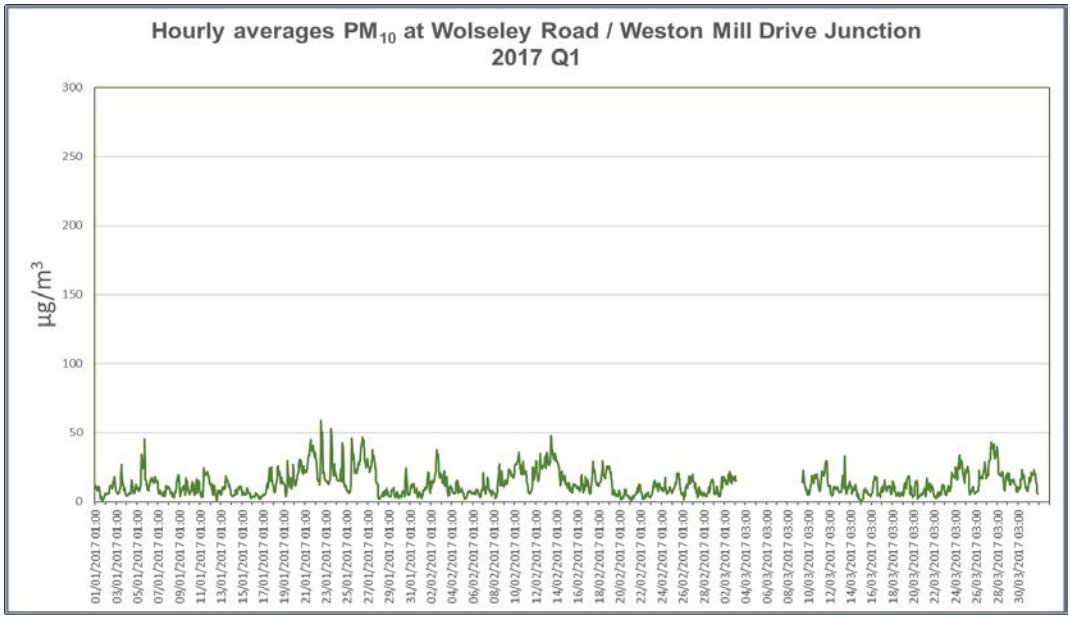
	NO_2 MONITORING												
	12-month rolling average NO_2 Concentration (µg/m3)												
Locatio	Description	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16	Jan-17	Feb-17	Mar-17
T1	Camels Head Junction	25.09589	24.78506	24.99	24.87	24.55	24.43917	24.4	24.34	24.50	25.48083	26.57833	27.10833	27.52
T2	Junction of Weston Mill Drive & Carlton Terrace	19.07151	19.01318	19.29833	19.015	18.82	18.72417	18.50083	18.65	19.50	20.61333	21.22667	21.4275	21.55
T3	Weston Mill School	18.37198	18.40198	18.6575	18.5725	18.35	18.12583	18.08583	18.13	18.85	19.68667	20.04417	20.08833	20.12
T4	Weston Mill School	18.57345	18.42799	18.59545	18.63091	18.48	18.35273	18.38364	18.29	18.84	19.88909	20.28333	20.33083	20.24
T5	Erith Avenue	29.20096	29.26262	29.55917	29.58917	29.22	29.0925	28.77917	29.04	29.43	30.6575	31.4275	31.50083	31.85
T6	York Road	13.30348	13.13515	13.30417	13.195	13.29	13.1925	13.26333	13.39	14.03	15.03917	14.88	14.885	15.04
T7	Cardinal Avenue	13.78946	13.67613	13.94083	13.75167	13.69	13.64167	13.7675	13.81	14.55	15.6025	16.1425	16.30417	16.37
T8	Ferrers Road, St Budeaux	13.2642	13.08254	13.48667	13.34583	13.39	13.27833	13.34167	13.66	14.41	15.16167	15.56333	15.65917	15.78
T9	Roman Way, adjacent to Plaistow Hill Infant and Nursery School	25.17519	24.84769	25.8225	25.75833	25.88	25.795	25.71917	26.21	27.56	29.11667	29.91583	29.96083	30.33
T10	Kelly Close, Barne Barton	11.7822	11.7347	12.12667	11.97917	11.84	11.99636	12.23818	12.32	13.36	14.38273	14.83909	15.30273	15.46

Key
Air quality standard not exceeded
Air quality standard exceeded

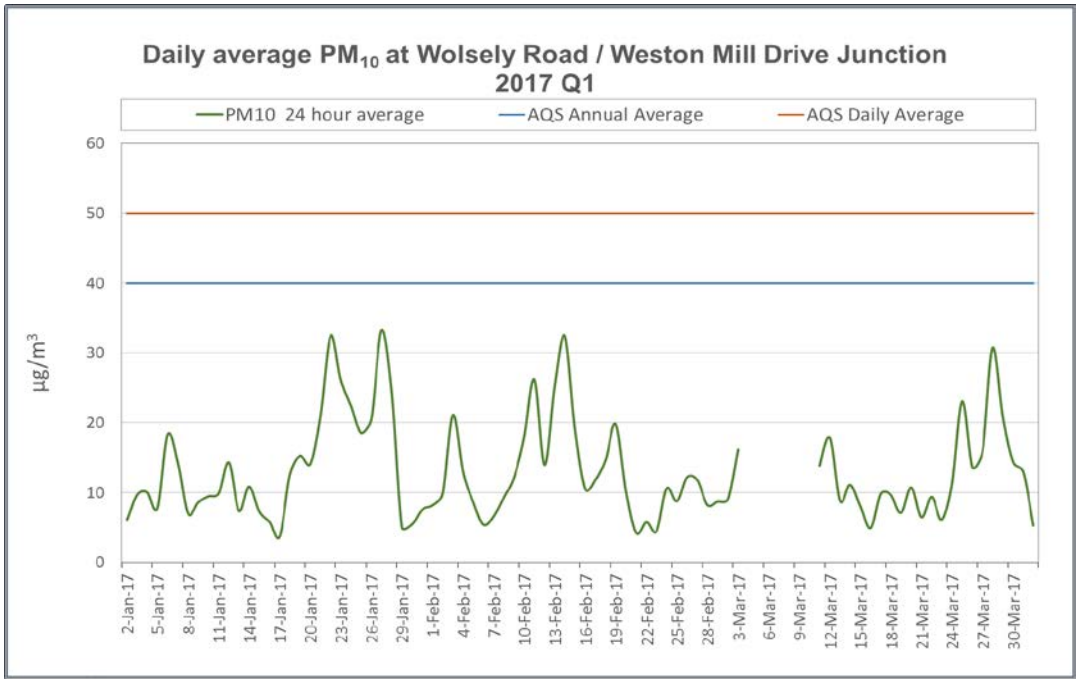
5. PM10 Monitoring

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

Hourly PM_{10} Concentrations



24-hour PM_{10} Concentrations



Summary of Results

A summary of results to date are shown in the table below. The mean concentrations for this quarter are seen to be within the AQS annual air quality mean objective of 40 μg/m^3.

The highest individual value was recorded in February. No daily average value exceeded the AQS 24-hour average of 50 μg/m^3.

Data capture for January, February and March was 93%.

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

PM_{10} MONITORING AT THE CAMELS HEAD JUNCTION			
Results January - March 2017			
Minimum recorded value		(μg/m^3)	0.4
Maximum recorded value		(μg/m^3)	67.01
Average		(μg/m^3)	13.1
Standard Deviation		(μg/m^3)	9.01
Data Capture		(%)	93.1
Number of 24-hour periods with average above 50 (mg/m^3)			0
Summary to date			
2014*	Average		15.23
	Number of 24-hour periods with average >50 (mg/m3)		0
2015	Average (to date)		12.56
	Number of 24-hour periods with average >50 (mg/m3)		0
2016	Average		10.49
	Number of 24-hour periods with average >50 (mg/m3)		0
2017	Average		13.09
	Number of 24-hour periods with average >50 (mg/m3)		0

KEY:

Air quality standard not exceeded

Air quality standard exceeded

* 14 Oct - 31 Dec 2014 only

Chimney Emission Data

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

https://www.mvv.de/en/mvv_energie_gruppe/mvv_umwelt/beteiligungen/mvv_environment_1/devonport/links_downloads/index.jsp