MVV Environment
Devonport Ltd

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

Community Ambient Air Quality Monitoring Programme Report Quarter 2, 2015

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

2015 Quarter 2

This quarterly update presents the results of monitoring carried out during April, May and June 2015.

1. Operational or Other Activity

During this time, the EfW CHP facility was still in the construction / commissioning phase.

2. NO_2 Diffusion Tubes

Apr: 10 tubes deployed 09/04/2015, 10 recovered 07/05/2015, results received 26/05/2015.
May: 10 tubes deployed 07/05/2015, 10 recovered 08/06/2015, results received 24/06/2015
Jun: 10 tubes deployed 08/06/2015, 10 recovered 08/07/2015, results received 27/07/2015

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

Monitor fully operational, except during service.

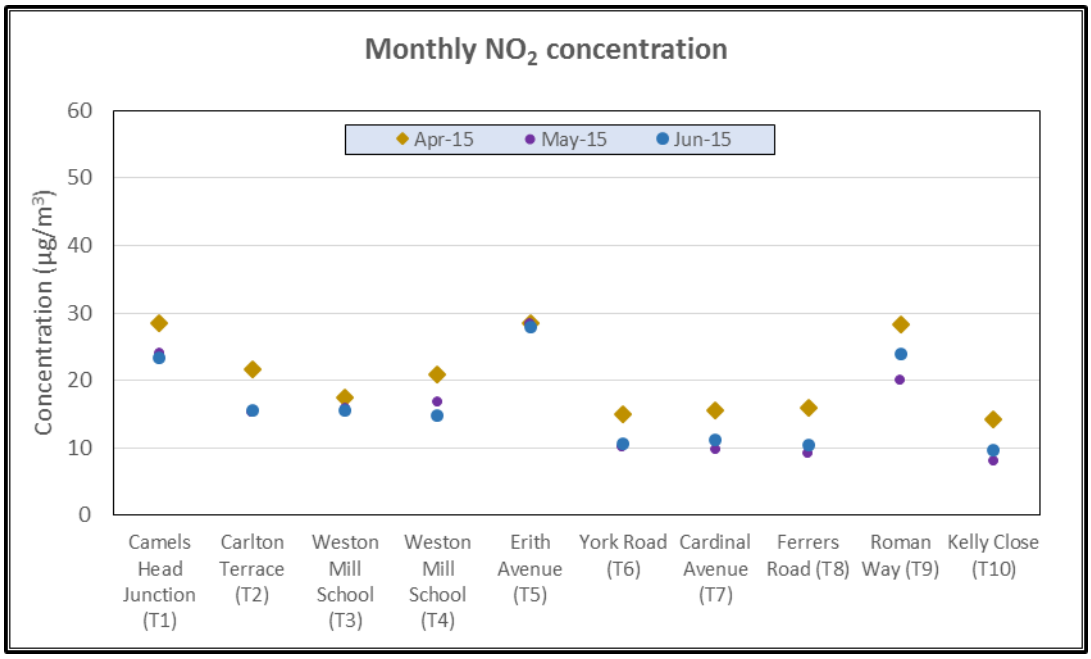
Service carried out on 14th May 2015.

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 April to June 2015 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 (not yet available) 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.

MVV Environment Devonport Ltd

NO_2 MONITORING

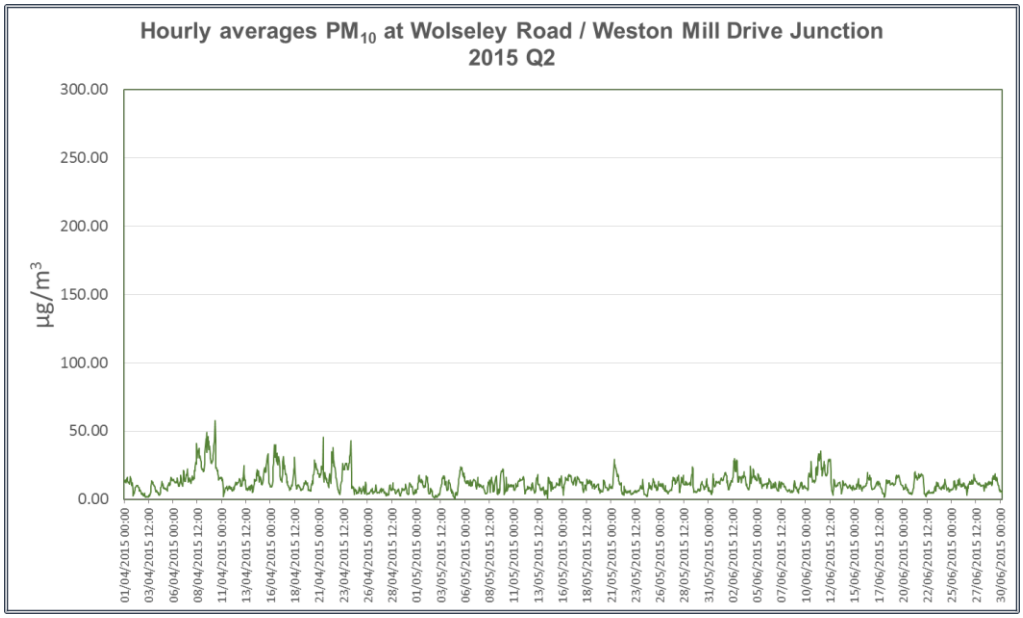
		Monthly NO_2 Concentration (µg/m^3) 2015														
Location	Description	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Jul-15	Aug-15	Sep-15	Oct-15	Nov-15	Dec-15	2015 Average	Average to date	12 month rolling average
T1	Camels Head Junction	30.03	29.93	27.57	28.5	23.97	23.32							27.22	27.96	
T2	Junction of Weston Mill Drive & Carlton Terrace	21.88	-	22.49	21.73	15.24	15.52							19.37	21.71	
T3	Weston Mill School	24.40	24.23	20.04	17.5	15.87	15.5							19.59	20.64	
T4	Weston Mill School	24.38	24.44	22.37	20.86	16.85	14.74							20.61	21.10	
T5	Erith Avenue	37.30	38.07	29.73	28.54	28.43	27.88							31.66	32.61	
T6	York Road	16.62	15.93	14.25	15.06	10.18	10.52							13.76	14.23	
T7	Cardinal Avenue	16.97	20.09	17.52	15.63	9.74	11.11							15.18	16.17	
T8	Ferrers Road, St Budeaux	16.28	17.28	15.46	16	9.16	10.44							14.10	14.89	
T9	Roman Way, adjacent to Plaistow Hill Infant and Nursery School	28.14	28.42	28.17	28.29	20.02	23.91							26.16	25.92	
T10	Kelly Close, Barne Barton	12.27	15.6	-	14.23	7.98	9.64							11.94	12.63	

Key
Air quality standard not exceeded
Air quality standard exceeded

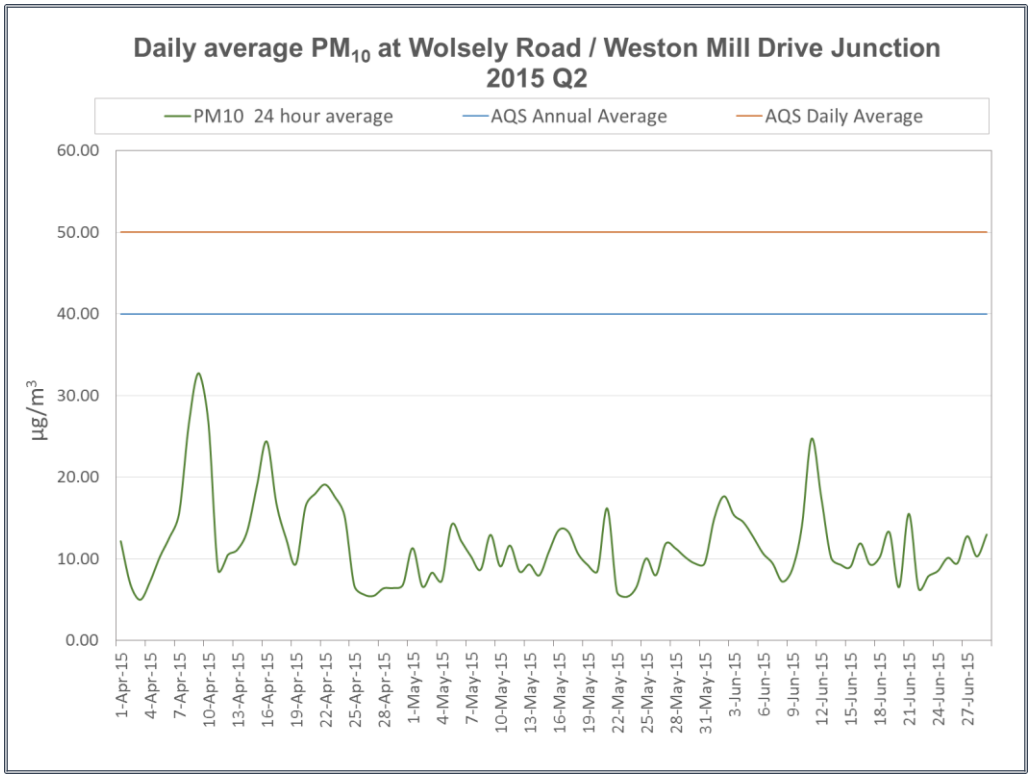
5. PM10 Monitoring

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 to date are seen to be within the AQS annual air quality mean objective of 40 μg/m^3.

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

Data capture for April, May and June was 99.9%.

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

PM_{10} MONITORING AT THE CAMELS HEAD JUNCTION			
Results April - June 2015			
Minimum recorded value		(μg/m^3)	0.43
Maximum recorded value		(μg/m^3)	89.33
Average		(μg/m^3)	11.76
Standard Deviation		(μg/m^3)	7.02
Data Capture		(%)	99.9
Number of 24-hour periods with average above 50 (mg/m^3)			0
Summary			
Rolling average (all months)		(μg/m^3)	13.89
Rolling average for last 12 months		(μg/m^3)	n/a
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		
	Number of 24-hour periods with average >50 (mg/m3)		
2017	Average		
	Number of 24-hour periods with average >50 (mg/m3)		

KEY:
Air quality standard not exceeded
Air quality standard exceeded

* 14 Oct - 31 Dec 2014 only