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

Community Ambient Air Quality Monitoring Programme Report Quarter 2, 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_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 particulate 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 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 The PM_{10} 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 ($\mu g/m^3$)	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

2019 Quarter 2

This quarterly update presents the results of monitoring carried out during April, May and June 2019.

1. Operational or Other Activity

During this time the EfW CHP facility was operating normally to include a scheduled period of shutdown from the 4th -12th June 2019 for maintenance.

During end of May and all of June there were increased traffic volumes at Camels Head junction due to a series of detours from HMNB Albert gate. Periodic closures were in place as a result of the demolition work to the high-rise office block. Road works we also underway at the Camels Head HMNB entrance using heavy mobile plant in the vicinity of the monitoring devices.

2. NO_2 Diffusion Tubes

Apr: 10 tubes deployed 02/04/2019, 10 recovered 03/5/2019, results received 09/05/2019.
May: 10 tubes deployed 03/05/2019, 10 recovered 06/06/2019, results received 10/06/2019.
Jun: 10 tubes deployed 06/06/2019, 9 recovered 02/07/2019, results received 03/07/2019.

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

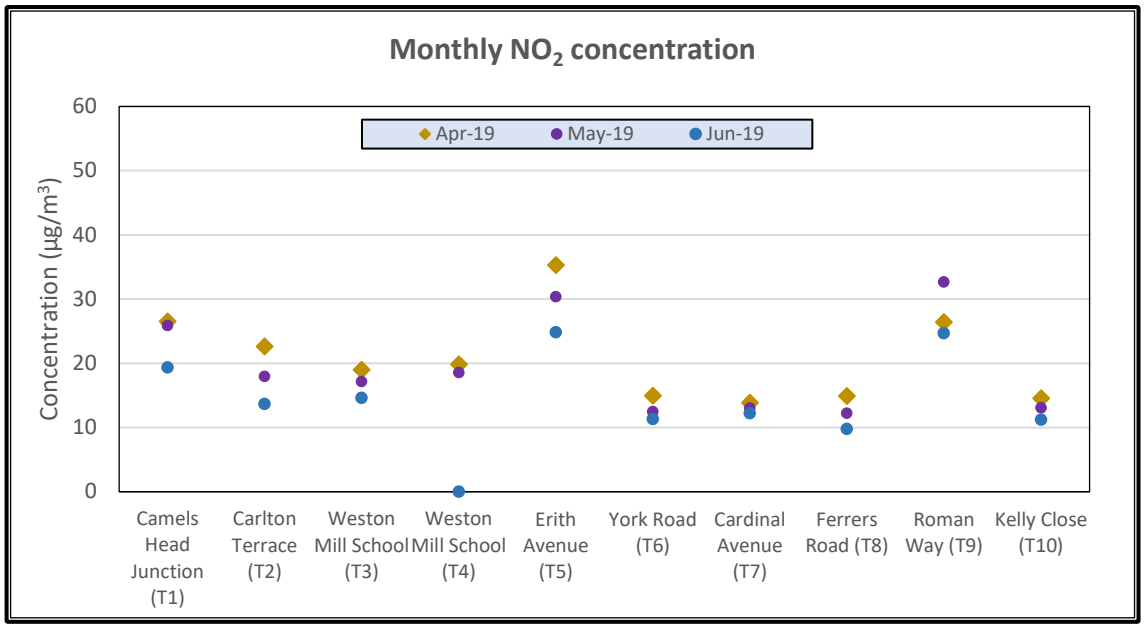
Monitor fully operational throughout quarter.

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 the end of June 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 µg/m^3 at all the monitoring sites.

NO_2 MONITORING															
		Monthly NO2 Concentration (µg/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	28.02	33.88	26.00	25.67	16.59	16.45							24.44	26.48
T2	Junction of Weston Mill Drive & Carlton Terrace	24.60	30.53	21.10	21.88	13.64	18.41							21.69	21.00
T3	Weston Mill School	24.23	26.28	22.97	17.55	15.50	16.6							20.52	20.07
T4	Weston Mill School	25.22	26.05	30.96	17.98	15.07	0							19.22	20.42
T5	Erith Avenue	30.65	36.00	31.74	29.22	27.13	26.59							30.22	31.39
T6	York Road	21.14	22.05	13.94	13.67	10.23	10.78							15.30	14.57
T7	Cardinal Avenue	20.76	20.84	16.12	14.07	10.45	11.46							15.62	15.62
T8	Ferrers Road, St Budeaux	21.25	22.01	13.06	14.63	10.23	0.66							13.64	15.07
T9	Roman Way, adjacent Plaistow Hill Infant & Nursery Sch.	29.98	37.95	25.75	27.87	21.60	23.83							27.83	27.86
T10	Kelly Close, Barne Barton	16.59	20.47	10.11	11.87	9.75	10.05							13.14	13.77

Key
Air quality standard not exceeded
Air quality standard exceeded

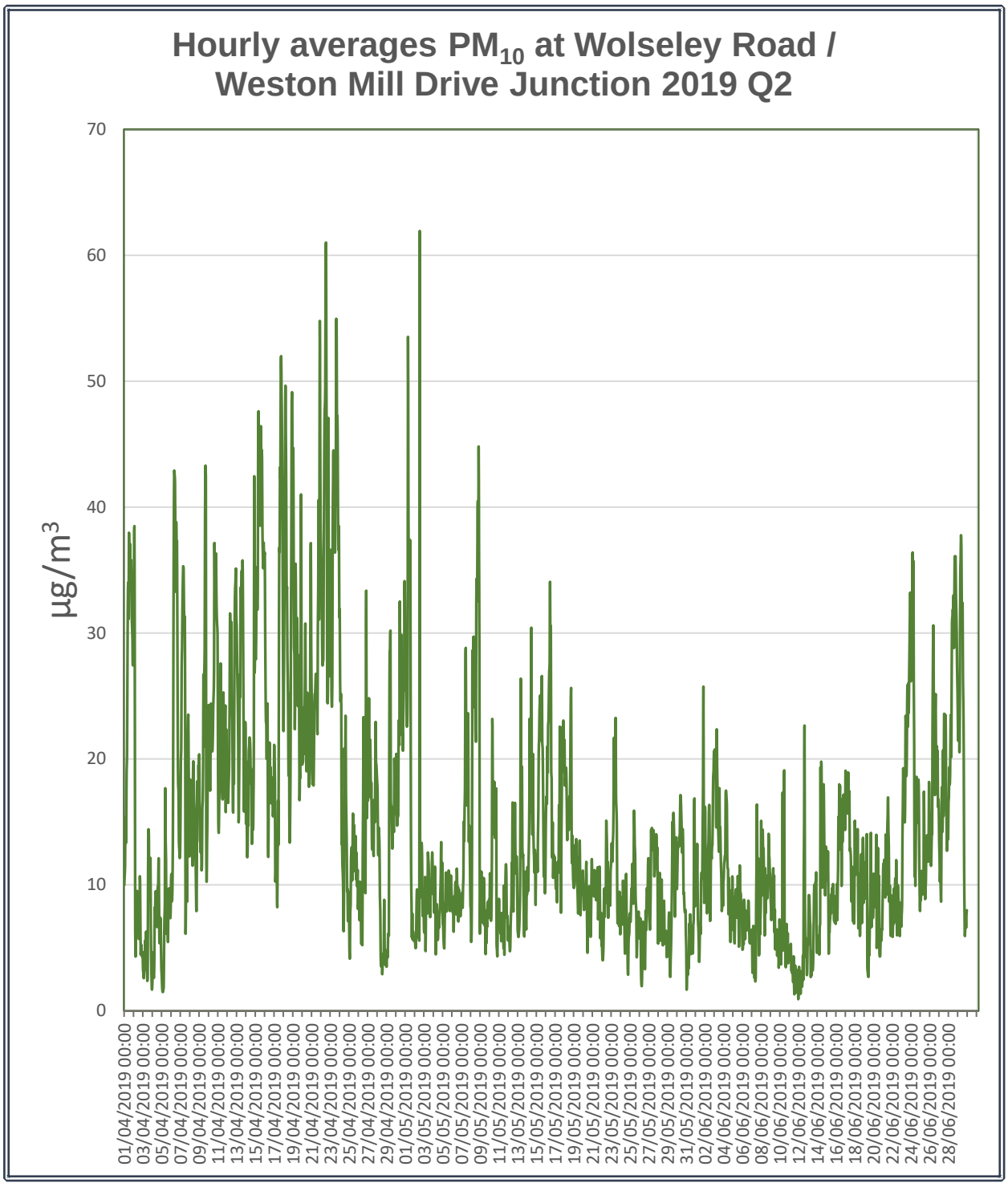
		NO_2 MONITORING												
		12-month rolling average NO_2 Concentration (µg/m^3)												
Locatio	Description	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19	Mean
T1	Camels Head Junction	16.67	14.85	23.94	23.26	27.78	4.00	28.02	33.88	26.00	25.67	16.59	16.45	21.43
T2	Junction of Weston Mill Drive & Carlton Terrace	45.33	19.12	20.22	22.72	21.85	20.88	24.60	30.53	21.10	21.88	13.64	18.41	23.36
T3	Weston Mill School	16.31	16.04	17.88	20.34	18.50	19.13	24.23	26.28	22.97	17.55	15.50	16.60	19.28
T4	Weston Mill School	16.78	16.90	19.53	19.77	0.00	19.00	25.22	26.05	30.96	17.98	15.07	0.00	17.27
T5	Erith Avenue	28.55	26.28	29.76	26.51	29.68	28.66	30.65	36.00	31.74	29.22	27.13	26.59	29.23
T6	York Road	12.65	10.30	14.57	16.79	18.42	16.26	21.14	22.05	13.94	13.67	10.23	10.78	15.07
T7	Cardinal Avenue	12.31	10.61	16.18	17.92	17.64	16.25	20.76	20.84	16.12	14.07	10.45	11.46	15.38
T8	Ferrers Road, St Budeaux	13.04	10.41	15.43	15.28	15.18	15.94	21.25	22.01	13.06	14.63	10.23	0.66	13.93
T9	Roman Way, adjacent Plaistow Hill Infant & Nursery Sch.	28.24	22.95	27.98	24.68	25.17	25.65	29.98	37.95	25.75	27.87	21.60	23.83	26.80
T10	Kelly Close, Barne Barton	12.25	10.92	11.71	15.06	17.77	10.85	16.95	20.47	10.11	11.87	9.75	10.05	13.15

Key
Air quality standard not exceeded
Air quality standard exceeded

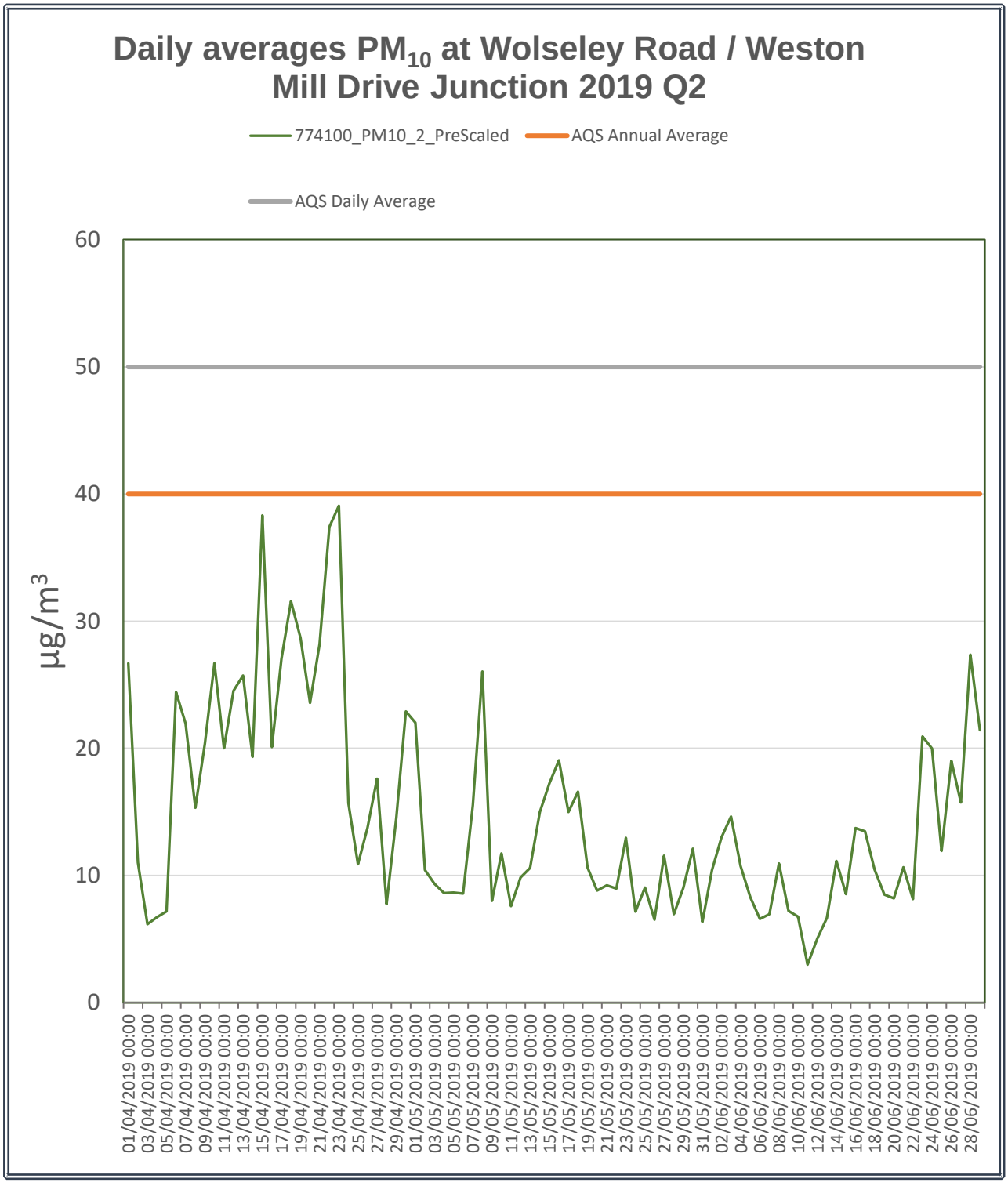
5. PM10 Monitoring

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

The highest individual value recorded was in February. The AQS 24-hour average of 50 µg/m^3 was exceeded on the 27th February

Data capture for April, May and June was 100%.

PM10 Monitoring at Camels Head Junction		
Results from 1st March -30th June 2019		
Maximum recorded value		61.93 µg/m^3
Minimum recorded value		0.91 µg/m^3
Average		14.79 µg/m^3
Data Capture		100%
No of 24 hour periods exceeding 50mg/m3		0
Summary to date		
2014	Average	15.23 µg/m^3
	No of 24-hour periods exceeding 50mg/m3	0
2015	Average	12.56 µg/m^3
	No of 24-hour periods exceeding 50mg/m3	0
2016	Average	10.59 µg/m^3
	No of 24-hour periods exceeding 50mg/m3	0
2017	Average	6.51 µg/m^3
	No of 24-hour periods exceeding 50mg/m3	0
2018	Average	4.84 µg/m^3
	No of 24-hour periods exceeding 50mg/m3	0
2019	Average	18.05 µg/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