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

Community Ambient Air Quality Monitoring Programme Report Quarter 3, 2020

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. Two PM_{10} real time monitoring stations were installed in 2014 in the vicinity of Camels Head junction and Moor Lane. These will be monitored by MVV until October 2020, when they will be handed over and adopted by Plymouth City Council for continued monitoring by the Public Protection Service.

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 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_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

2020 Quarter 3

This quarterly update presents the results of monitoring carried out during July, August, and September 2020.

1. Operational or Other Activity

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

It is evident this period that there has been a marginal increase in vehicular movements in the local vicinity possibly due to the easing of national lockdown restrictions imposed in March.

2. NO_2 Diffusion Tubes

Jul:10 tubes deployed 09/07/2020, 10 recovered 05/08/2020, results received 29/09/2020.
Aug:10 tubes deployed 05/08/2020, 10 recovered 03/09/2020, results received 29/09/2020.
Sept:10 tubes deployed 03/09/2020, 10 recovered 12/10/2020, results received 14/10/2020.

**(minor disruptions to issue of tubes, deploying, recovery and analysis during lockdown period)*

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

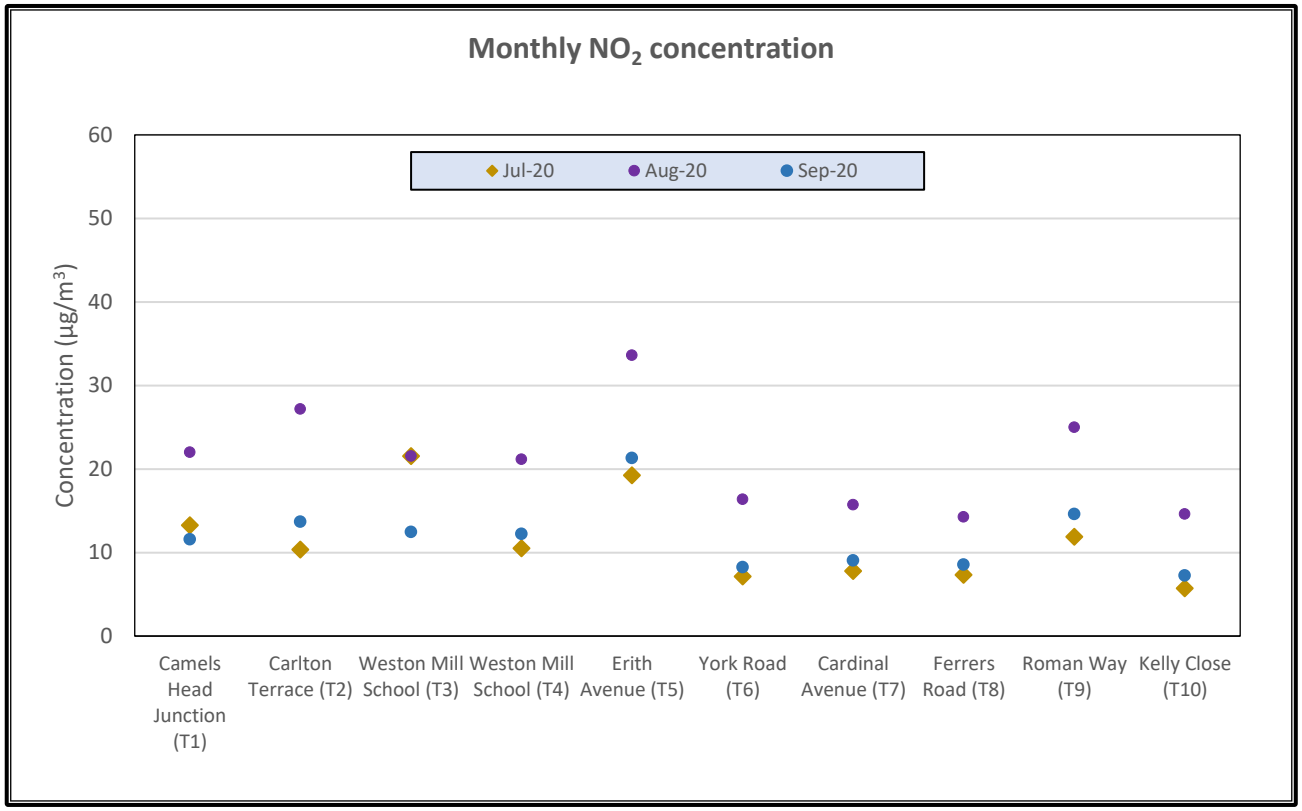
Monitors operational and serviced throughout quarter. Liaison with Plymouth City Council established to plan formal hand over of monitoring units.

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 July to the end of September 2020 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) 2020												
Location	Description	Jan-20	Feb-20	Mar-20	Apr-20	May-20	Jun-20	Jul-20	Aug-20	Sep-20	Oct-20	Nov-20	Dec-20	2020 Average	Average of all results to date
T1	Camels Head Junction	29.14	23.96	16.39	18.08	14.28	17.3	13.29	22.02	11.58				18.45	25.95
T2	Junction of Weston Mill Drive & Carlton Terrace	22.91	31.25	28.03	19.38	17.70	12.86	10.36	27.18	13.71				20.38	21.30
T3	Weston Mill School	23.07	30.68	20.92	15	13.43	0.63	21.57	21.57	12.49				17.71	19.89
T4	Weston Mill School	21.07	23.33	20.24	14.05	13.22	12.51	10.53	21.17	12.23				16.48	20.45
T5	Erith Avenue	29.3	33.84	27.64	21.54	22.43	19.43	19.24	33.61	21.31				25.37	30.98
T6	York Road	18.65	17.97	22.79	11.79	9.84	9.36	7.16	16.39	8.26				13.58	14.82
T7	Cardinal Avenue	18.24	15.78	14.27	12.99	10.17	7.15	7.79	15.72	9.07				12.35	15.68
T8	Ferrers Road, St Budeaux	19.21	0.55	26.15	12.69	10.02	7.53	7.35	14.29	8.58				11.82	15.02
T9	Roman Way, adjacent Plaistow Hill Infant & Nursery Sch.	24.75	22.12	21.92	20.7	19.64	15.48	11.89	24.99	14.60				19.57	27.81
T10	Kelly Close, Barne Barton	11.53	9.77	10.26	12.09	9.06	7.47	5.73	14.61	7.25				9.75	13.75

Key
Air quality standard not exceeded
Air quality standard exceeded

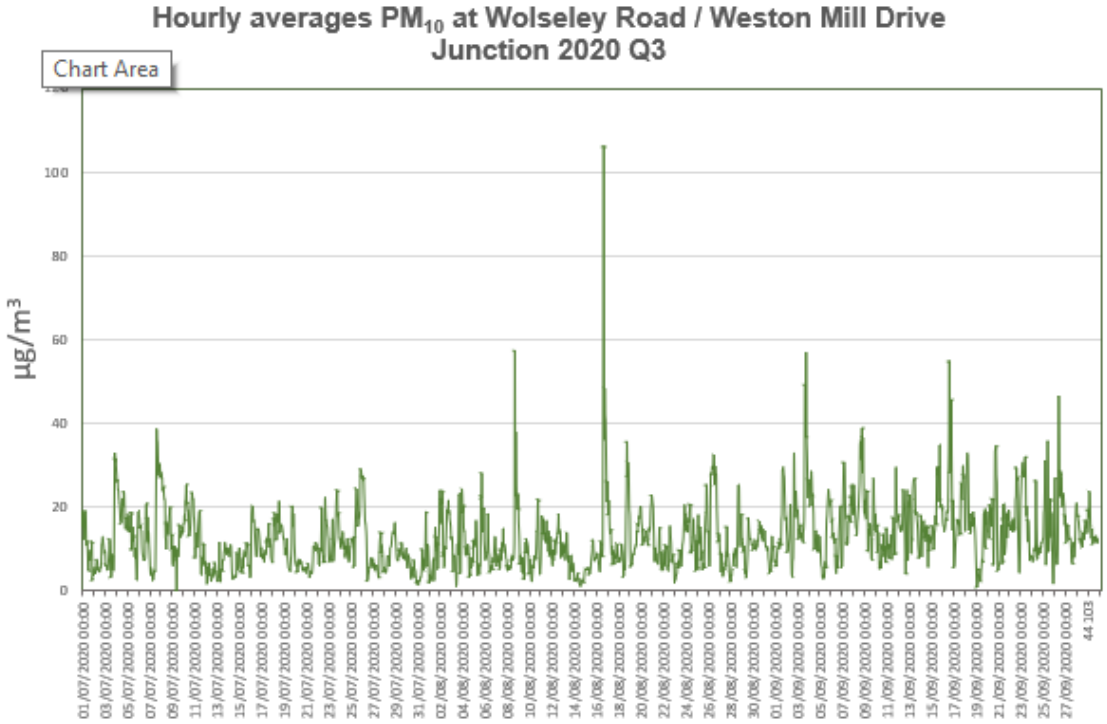
		NO_2 MONITORING												
		12-month rolling average NO_2 Concentration (µg/m^3)												
Location	Description	Jan-20	Feb-20	Mar-20	Apr-20	May-20	Jun-20	Jul-20	Aug-20	Sep-20	Oct-20	Nov-20	Dec-20	Mean
T1	Camels Head Junction	21.22	19.83	23.16	21.89	20.37	19.86	18.92	19.31	18.45				20.33
T2	Junction of Weston Mill Drive & Carlton Terrace	16.18	15.55	27.40	25.39	23.85	22.02	20.36	21.21	20.38				21.37
T3	Weston Mill School	19.18	19.13	24.89	22.42	20.62	17.29	17.90	18.36	17.71				19.72
T4	Weston Mill School	12.93	11.69	21.55	19.67	18.38	17.40	16.42	17.02	16.48				16.84
T5	Erith Avenue	27.55	27.12	30.26	28.08	26.95	25.70	24.77	25.88	25.37				26.85
T6	York Road	13.77	12.83	19.80	17.80	16.21	15.07	13.94	14.24	13.58				15.25
T7	Cardinal Avenue	13.77	12.77	16.10	15.32	14.29	13.10	12.34	12.76	12.35				13.65
T8	Ferrers Road, St Budeaux	14.38	12.04	15.30	14.65	13.72	12.69	11.93	12.22	11.82				13.20
T9	Roman Way, adjacent Plaistow Hill Infant & Nursery Sch.	25.06	23.34	22.93	22.37	21.83	20.77	19.50	20.19	19.57				21.73
T10	Kelly Close, Barne Barton	11.82	10.54	10.52	10.91	10.54	10.03	9.42	10.06	9.75				10.40

Key
Air quality standard not exceeded
Air quality standard exceeded

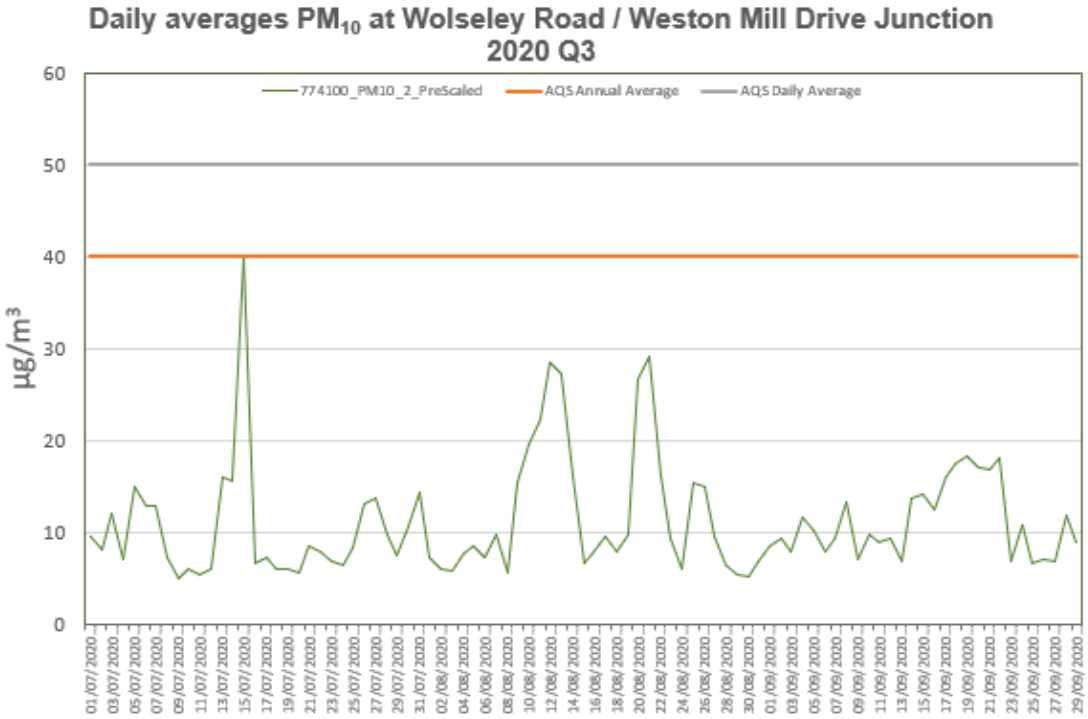
5. PM10 Monitoring

Note 1: *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 is seen to be within the AQS annual air quality mean objective of 40 µg/m^3.
The highest daily individual value recorded in 2020 was 39.8 µg/m^3 on 15th July, possibly attributable to building works immediately adjacent to the monitor. The AQS 24-hour average of 50 µg/m^3 was not exceeded during this period.
Data capture for Jul, Aug and Sept was 100%.

PM_{10} MONITORING AT THE CAMELS HEAD JUNCTION			
Results July- Sept 2020			
Minimum recorded value		(µg/m^3)	5.118
Maximum recorded value		(µg/m^3)	39.879
Average		(µg/m^3)	11.28
Standard Deviation		(µg/m^3)	2.3
Data Capture		(%)	100
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/m^3)		0
2015	Average (to date)		12.56
	Number of 24-hour periods with average >50 (mg/m^3)		0
2016	Average		10.49
	Number of 24-hour periods with average >50 (mg/m^3)		0
2017	Average		6.51
	Number of 24-hour periods with average >50 (mg/m^3)		0
2018	Average		5.14
	Number of 24-hour periods with average >50 (mg/m^3)		0
2019	Average		14.93
	Number of 24-hour periods with average >50 (mg/m^3)		1
2020	Average		11.33
	Number of 24-hour periods with average >50 (mg/m^3)		0

KEY:
Air quality standard not exceeded
Air quality standard exceeded

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