

Appendix 1

Briefing Note for Members Regarding Air Quality Monitoring in Maidstone: - the Current Situation and Options Going Forward

Background

Maidstone Borough Council has continuously monitored air quality in two locations for many years. The site at Detling is a rural background site and provides useful information for air quality modelling purposes and provides a reference which we use, for example, when processing diffusion tube data. However, the site does measure very low levels of pollution.

The site also hosts other instruments from other research organisations for which we receive funding to cover the costs of MBC officers checking and servicing these instruments, usually during the necessary visits to our own equipment.

Figure 1: The Detling Air Quality Station



The other monitoring site was established in Fairmeadow in the town centre until June 2016. EH officers were beginning to feel that the usefulness of this site was limited. The site measured PM₁₀ and NO₂, and

since 2008: has recorded exceedances of the objective for NO₂ but no exceedances of either the annual mean or the 24 hour mean objectives for PM₁₀. Diffusion tube monitoring was indicating that the highest levels of pollution in Maidstone were to be found in Upper Stone Street.

Furthermore, our primary duty in terms of the Local Air Quality Management (LAQM) regime is to monitor where people live. We are not aware of any sensitive receptors within at least 50m of the Fairmeadow Roundabout. The station was therefore not in the best location for monitoring for human receptors.

When the new road scheme was proposed for Fairmeadow, KCC's original proposal was simply to move the station a few feet away. Owing to the highly localised nature of NO₂ pollution, this would have meant that data captured after the move would not have been directly comparable with the many years of historic data which had been measured from the site. Environmental Protection Officers were keen to take the opportunity to have the station relocated at no cost to MBC.

Figure 2: The Fairmeadow Air Quality Station



In addition to the two continuous monitoring stations, MBC also has a large network of diffusion tubes to monitor NO₂. There are currently about 60 active sites, but in total we have used them in well over 100 locations. Diffusion tubes can only be used to give the average NO₂ level

over a period of exposure, usually a month. They cannot be used to measure an instantaneous NO₂ level.

Finding a New Site

A site for an air quality station needs to meet a number of requirements.

First and foremost, of course, there should be a reason for measuring in that location, i.e. a potential or anticipated air quality problem.

Secondly it has to be physically big enough to accommodate the cabin. It is possible to use much smaller cabins (roadside cabins) where space is limited. These have two main disadvantages; firstly that officers doing routine maintenance, calibrations, dealing with breakdowns and repairs and servicing cannot physically enter the cabin, which means they need to work outside exposing them to poor weather conditions and the public for up to an hour at time. This has health and safety implications for officers. Also depending on their type, some of the roadside cabins cannot accommodate calibration gas cylinders. We currently use 40 litre cylinders which are as tall as a person. These cannot be used at all with a roadside cabin. An alternative, albeit a costly one, is to use 10 litre cylinders. Some roadside cabins can accommodate these and others can't, meaning that they need to be stored somewhere else – safe and secure storage would need to be identified – and officers would then need to bring them to site each time they need to calibrate the equipment (usually fortnightly) and manhandle them.

Thirdly, there needs to be a suitable electricity supply nearby. The analysers themselves require approximately 2 kilowatts, but they also require heating and cooling systems – potentially another 4 or 5 kilowatts.

Lastly, the site should ideally be reasonably easy to access with a vehicle, so that officers and engineers can park relatively close in order not to have to carry tools and equipment too far.

The picture above shows the Fairmeadow Air Quality Station. The footprint of the cabin was approximately 2m x 2.5m. The height of the cabin was about 2.0m with an additional 0.5 metres for the airconditioning system and cages etc. Our first preference was to retain this cabin, however, finding a site big enough to accommodate it was a challenge.

A suitable site was identified in terms of size, electricity supply, reasonably easy access (walking distance for officers based at MBC) and which would provide information on the area of Maidstone of most interest

to us, namely Upper Stone Street. Furthermore, the landlord of the site was amenable to leasing the land to us. At this point, KCC having agreed to fund a new, smaller 'walk in' cabin for us, the original cabin from the Fairmeadow site was disposed of. Unfortunately, for a number of reasons, this lease agreement took a very long time to complete, and just as it was finalised, the landlord decided to sell the property and has withdrawn from the process.

Options for the future

Having been without town centre monitoring for almost 18 months, and with the ongoing difficulties in securing the new site, this is an appropriate time to review monitoring requirements in Maidstone.

The Environment Act 1995 places a duty on local authorities to review, and assess, the key pollutants in their area against air quality standards and objectives laid down in the Air Quality (England) Regulations 2000. Although MBC is not currently continuously monitoring pollution in the town centre, it still does a great deal of monitoring by diffusion tube, and operates a continuous monitoring station out of town at Detling. It would therefore be hard to argue that MBC is failing in its duty under the Environment Act. Indeed the 2017 Annual Status Report which reports all monitoring data obtained during 2016 was recently approved by DEFRA. However, the results obtained from our diffusion tubes in Upper Stone Street indicate that further monitoring is needed there to establish if the hourly mean for NO₂ is being breached; something about which DEFRA is aware.

The only pollutants relevant to Maidstone and the vast majority of other Local Authorities are PM₁₀ and NO₂

NO₂ pollution is highly localised, and levels in one location may be very different to levels just a few metres away. This is one of the reasons for using diffusion tubes, because they are cost effective to be used in many locations.

PM₁₀ levels tend to be similar over larger areas, and in general monitoring is done near very busy roads, on the basis that these will be representative of worst case. The Fairmeadow roundabout seemed a likely choice for worst case as it's effectively the junction of a number of different major roads. However, based upon the results of our NO₂ monitoring, it would seem that the situation in Upper Stone is likely to be worse.

When deciding the future of town centre monitoring, the most fundamental question is whether or not to continue with it. It could be argued that MBC has fulfilled its obligations to review and assess the air quality in its area, it has recognised an exceedance of the NO₂ objective and declared an AQMA, and prepared an associated Action Plan, as it is required to do.

The view of Environmental Health, however, is that this is not enough because there are still two key questions to be answered regarding Upper Stone Street. Firstly, although we did not measure an exceedance of the PM₁₀ objectives at the Fairmeadow site going back at least as far as 2008, there are compelling grounds for believing that levels in Upper Stone Street may be even higher than those in Fairmeadow, and there may be an exceedance of the PM₁₀ objective there, which we wouldn't know without monitoring in that location.

Secondly, with our diffusion tubes we routinely measure annual mean NO₂ concentrations in excess of 80µgm⁻³. The annual mean is the objective which is applicable at residential receptors, (i.e. long term exposure) however, there is also a hourly mean objective of 200µgm⁻³ which is applicable in areas where people are passing through, e.g. shoppers (i.e. short term exposure).

Annual means of over 60µgm⁻³ are indicative of exceedances of the hourly mean, so it is quite likely that the hourly mean for NO₂ is exceeded in Upper Stone Street. We can only establish this by measuring with a continuous analyser. This has been pointed out by DEFRA in response to the last two annual status reports.

The view of EH is that these two questions should be addressed and we need to find the best way of doing so.

As part of a review of monitoring in Maidstone, it is appropriate to consider whether we should be measuring PM_{2.5}. MBC does not have a statutory duty to measure PM_{2.5} however, it is probably the pollutant of most concern in as much as it is the one most often linked to poor health. PM_{2.5} is particulate matter less than 2.5 microns, ie smaller than PM₁₀ which is particulate matter less than 10 microns. We measure PM₁₀ using an instrument called a TEOM which is about 15 years old, and which has been out of production for at least 5 years. A new model would cost about £30,000, but for £40,000 a 'dual channel' version could be purchased which could measure both PM₁₀ and PM_{2.5}. There is another instrument available (the FIDAS) also costing about £30,000 which measures both PM₁₀ and PM_{2.5} and has certain other advantages over the

TEOM, namely, it requires no heating, no air conditioning, no officer 'LSO' duties (there are no filters to change) it is smaller and its electricity consumption is about 150W as opposed to 1500W for the TEOM (plus heating and air con) If the decision is made to continue monitoring in Upper Stone Street on a long term basis, Members may wish to consider whether now is a good time to replace our elderly equipment, and if so, whether to add the capability to measure PM_{2.5}. Assuming that we wish to continue monitoring both NO₂ and PM₁₀ the problem of finding a suitable site based on the criteria mentioned above still needs to be addressed.

The costs of running the monitoring station are in the region of £5000 per year, which includes equipment maintenance and servicing, data capture, management and ratification, electricity, plus officer time – in the region of a day per month in calibrations, maintenance and attending breakdowns. Any equipment to be used in LAQM monitoring has to be approved by DEFRA, which only happens after its reliability and accuracy have been established. It is not possible to use the 'cheap and cheerful' analysers based on, for example, electrochemical cells.

Another possibility which could be considered, if MBC wishes want to continue monitoring and to have a new monitoring station set up and running in the shortest possible time, is to use a contractor. This is expensive, but may be the best solution if Members decide they want to continue monitoring on a short term basis, with the least delay.

A contractor would help us to identify a suitable location – they have lots of experience in identifying places where they can fit their equipment and are used to finding suitable sites in areas where space is at a premium – they routinely use roadside cabinets, such as the one shown below.

Figure 3: A Typical Roadside Cabin



Recently MBC officers visited Upper Stone Street with a suitable contractor and identified a site outside the Jubilee Church. The site is opposite the highest reading diffusion tube in Maidstone, so would potentially yield very important air quality information. The site is owned by KCC, as was the old Fairmeadow site, and is large enough to accommodate a walk in cabin.

MBC officers have been trying to get permission to use the site, and to establish what arrangements would necessary in terms of a lease agreement. Hopefully a simple amendment to the lease for the Fairmeadow site would be sufficient.

Under the original agreement with KCC at the Miller Heights site, KCC were to supply a new walk in cabin, and their contractors would build a suitable base for the cabin. The cabins ideally need to be situated on a solid level base, which is likely to be a significant undertaking on the proposed site where there is a quite pronounced slope,

It is now the view of EH Officers that whilst the site outside Jubilee Church is a very promising site for long term monitoring, if required, it cannot be established very quickly. We do not know how long it will take for KCC to give permission to use the site, what arrangements they will require in respect of a lease, or how long this might take to negotiate. Furthermore, even once they place an order for a new walk in cabin, it is likely to take several weeks to commission and complete the installation. Therefore we would still recommend that we engage a contractor to try to establish a temporary monitoring station as soon as possible, using a small footprint roadside cabinet. In the meantime, we will continue to work towards having a long term station established at the Jubilee Church.

The contractor could choose to use our existing analysers, but would supply any additional equipment required, including an additional analyser to measure PM_{2.5}. They would also supply all the consumables, complete the installation, undertake all routine maintenance, and deal with repairs and break downs etc: in short they would do everything, and dismantle and remove the station at the end of the required period. MBC staff would have no involvement with the station, once it is installed; they would just be supplied with the data. Data ratification would be undertaken by our current data management contractor. In the event of a major equipment failure, the contractor will supply a replacement instrument until the end of the contract. This would be the quickest and least burdensome option for MBC. The cost of this option is in the region of £16,000 for PM₁₀, PM_{2.5} and NO₂ for a period of one year, however, we would be able to make some savings from not having to meet the costs of running in house equipment. There is an additional cost of approximately £1800 for data management, applies whether monitoring is done externally or in house.

Comparison of Running costs of Monitoring Station in House or with Contractor

	In House	External Contractor (approx. £16,000)
ESU (includes servicing, maintenance, breakdown cover and consumables)	£ 3,300 (from external contractor)	Included in price
Calibrations	52 hours (MBC Officer) £975	Included in price
Data management	£1,075	£1,075
Lease	Unknown	Unknown
Audit	£700	£700
Monitoring of PM _{2.5}	Not included	Included in price
Total	£6,050	£17,775

After 12 months, there would be a number of options open to us, which would depend on the results obtained. If some air quality issues have been identified then we may wish to consider extending the contract for another year. If the air quality issues are such that we envisage longer term ongoing monitoring at the location, we can negotiate with the contractor to purchase the equipment. If no air quality issue has been found, we may decide that the monitoring can be discontinued, in which case, the contractor would decommission the station and remove the equipment. It should be noted that the contractor would only use equipment approved by DEFRA for this exercise.