

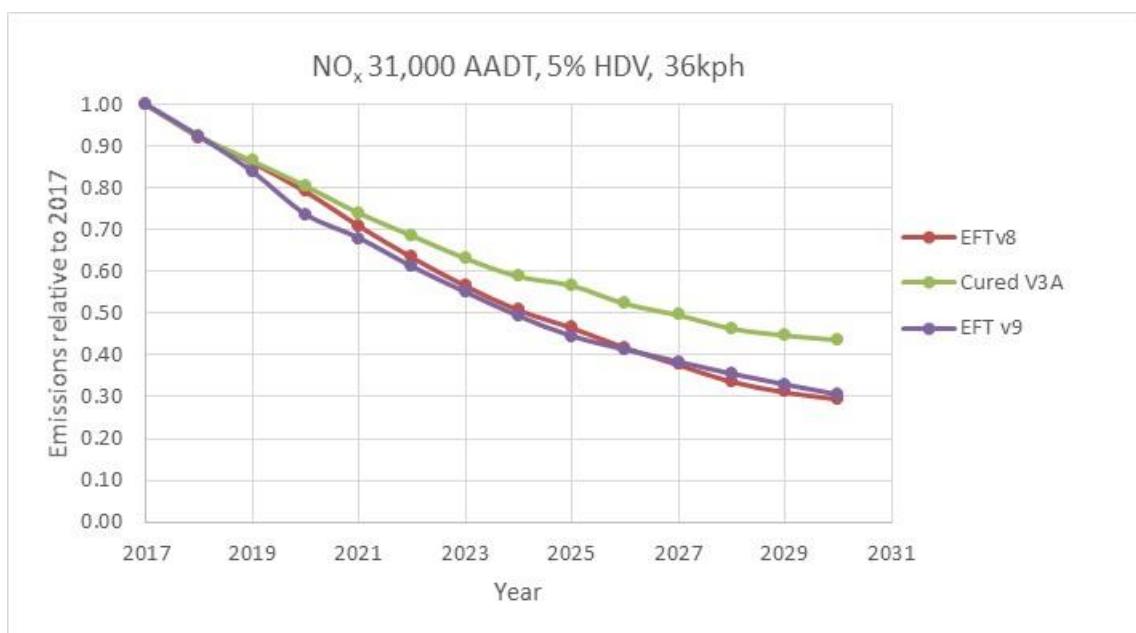
Response to Comments on Air Quality by Stuart Steed, Medway Council – MC/19/1566 Land off Pump Lane, Rainham

Air Quality

An air quality assessment has been undertaken as part of the Environmental Statement. The assessment has used a relatively conservative approach, for example the use of 2022 emissions factors for the opening year. There is still some uncertainty around future emissions, with the Emissions Factor Toolkit and its accompanying guidance being recently revised in May 2019 (version 9.0), and a new NOx/NO2 convertor (VERSIONS 7.1) released in April 2019.

The use of emission factors for the assessment was agreed with Stuart prior to undertaking the modelling assessment (see attached email). As indicated in the correspondence, rather than undertake sensitivity tests, which can give confusion and uncertainty to the results, we prefer to use an alternative approach which for this assessment used 2021 emission factors to assess the future year scenario in 2022. The use of 2021 emission factors for the 2022 assessment is based on comparison of the EFT emissions data with the CURED emissions data, using the EFT data which is equivalent to the more conservative CURED data for the assessment year. Details of the approach used is set out in detail in Appendix 12.3 of the ES. Furthermore, the assessment has used 2029 traffic data for the 2022 scenario, therefore the assessment has used a conservative prediction of potential impacts on 2022 in conjunction with a conservative selection of both emissions data and background concentrations.

In relation to the revised emissions data published in May 2019, this was published after the assessment was completed, therefore the assessment was based on the most up to date available at the time. Furthermore, since EFT9.0 has been published, analysis of the data shows very little difference between the EFT8.0 and EFT 9.0, as indicated in the figure below. Therefore, the emissions data used in the assessment is considered appropriate and represents a conservative approach to the prediction of air quality.



The assessment methodology appears to deviate from what was agreed in the attached email trail. Specifically the number of model verification sites has been dramatically reduced. I note that only 4 sites have been used for model verification and adjustment. This of concern as the modelled network is large, and has based purely on a restricted number of monitoring sites. With such a large study area a zonal approach to model verification and adjustment is probably more appropriate. For example, it is probably more appropriate to adjust predicted concentrations in Pier Road based on the Pier Road monitoring tubes, and likewise for High Street Rainham. For other areas of the modelled network it may be more appropriate to appropriate to use a factor determined from a wider range of monitoring sites. A recent zonal approach to model verification was used for the Rochester Riverside development. LAQM TG(16), paragraph 7.524 makes reference to a more zonal approach. Excluding certain monitoring sites for use on model verification disguises the fact that there may be significantly different adjustment factors for different areas (for example Pier Road).

No explanation has been provided as to why tubes identified and agreed previously for model verification have been excluded. A number of existing monitoring sites are absent from Figure 12.1.

At the time of undertaking consultation with MC to agree the scope of the assessment no traffic data had been provided by the transport consultants. The monitoring sites selected were based on assumptions on where we expected to have traffic data for and the presence of monitoring sites. In effect it was a wish list. However, Monitoring sites DT25, DT26 and DT27 are located on Pier Road, west of Church Street. We were not provided with traffic data for this section of Pier Road. It is assumed that this is because the change in trips associated with the operational development would fall below the EPUK/IAQM criteria on this link and therefore further detailed assessment has been scoped out. As we do not have traffic data for this section of Pier Road these monitoring sites could not be included within the model verification.

A review of monitoring site DT01 shows it located quite close to a junction and opposite a parking area, therefore it is not considered representative of conditions along the rest of the High Street when compared to monitoring sites ST16 and DT16. The use of this monitoring site was therefore excluded from the model verification as it would not be possible to adequately take account of emissions from the adjacent parking area within the modelling.

In terms of other monitoring sites, monitoring site DT17 is located at the junction of A2 and A231. No traffic data was included within the data set for the A231 therefore this location couldn't be fully represented. Furthermore, model verification should be carried out against monitoring at typical roadside locations. This is not a typical roadside location given its proximity to the junction.

Monitoring sites DT08, DT10, DT11 and DT18 were not included in the model verification as they were not located adjacent to the road network considered within the assessment.

No other monitoring sites are located within the assessment area covered by the road links provided which therefore determines the model verification area.

It would be possible to undertake a more zonal approach to the model verification. Based on the traffic data considered within the assessment this would include a separate model verification for the Rainham AQMA using monitoring sites DT15 and DT16 and a model verification for the wider area

based on sites DT09 and the Chatham AURN, however, it is considered unlikely that this would make a significant difference to the outcome of the assessment.

Obviously, this zonal approach could not be applied to PM10 as this is only monitored at the Chatham AURN.

I note that a number of monitoring sites are missing from Figure 12.1 but this does not affect the assessment.

In terms of committed developments, I note that some key developments have been included, but importantly this does not include the proposed SEN School located just of the roundabout junction of Yokosuka Way and Ito Way. The schools will also be a sensitive receptor that should be modelled.

The committed developments included within the traffic data was determined by the Transport Consultants. Details of these are discussed in the TA and Transport ES Chapter. I was not aware of the SEN School as a proposed development.

In terms of including trips generated by this development as part of the committed development trips, we can not say that this has explicitly been included. However, the assessment has used a TEMPRO factor to factor forward the base flows to the future year scenarios which increases trips in general terms by approximately 1500 on each link. The TA completed for the SEN School forecasts a total of 362 vehicles trips across an average weekday, which equates to approximately 260 AADT. The SEN School TA assumes that 22% travel north on Yokosuka Way (57 vehicles) and 63% south on Ito Way (164 vehicles). These equate to 0.18% and 0.63% of the 2029 base flows used within the AQ modelling assessment. This number of additional trips is not considered to be significant in air quality terms. Furthermore, the Sen School TA has based this trip generation on the assumption that all pupils arrive by car every day. In reality this would not be the case as part of the school is residential. Therefore, in real terms the additional trips generated by the school would be less than indicated above. As the AQ modelling assessment has used a cautious approach to the assessment by using the 2029 base year in combination with 2021 emission factors, the future base scenario is considered to be adequately robust that the addition of the small number of trips associated with the Sen School would not make any noticeable change to the future baseline concentrations.

The AQ assessment predicted concentrations at the residential flats closest to the Yokosuka Way and Ito Way roundabout on Hillyard Close (Receptor 9). This receptor is located a similar distance from the roundabout as the proposed SEN School, therefore pollutant concentrations at both locations are expected to be very similar. The assessment predicted NO₂ and PM₁₀ concentrations well below (<75%) the relevant objectives at receptor 9 in 2021 and found the impact of traffic generated by the operational development to be negligible. Pollutant concentrations at the SEN School site are therefore expected to be well below the objective and the impact of the operational development would also be negligible.

Impacts on receptors on Otterham Quay Lane should probably be considered as this is a sensitive area that is also subjected to further development, including the school that is likely to come forward.

As detailed in the AQ report the assessment considered those road links where development traffic would exceed the assessment criteria set out within the EPUK/IAQM air quality planning guidance as detailed below:

- *A change in Light Duty Vehicles (LDVs) flows of more than 100 AADT within or adjacent to an AQMA or more than 500 AADT elsewhere;*
- *A change in Heavy Duty Vehicles (HDVs) flow of more than 25 AADT within or adjacent to an AQMA or more than 100 AADT elsewhere*

The traffic data presented in Appendix 13.2 shows an increase in flows of 92 per day on Lower Rainham Road to the east of the proposed development. Given anticipated traffic distribution this would result in less than 92 additional vehicles per day on Otterham Quay Lane as a result of the operational development, below the above thresholds. Air quality impacts along Otterham Quay Lane where therefore scoped out for further assessment as impacts are not considered to be significant.

Speeds used in the model have not been provided.

Traffic speeds used in the assessment are provided in Appendix 12.2

An emissions mitigation assessment has been carried out. This does not strictly follow the simplified method in our planning guidance, however the approach to uplifting costs is acceptable. The damage costs have been carried out using the year 2022 EFT 8.0 (See above comments on EFT). These calculations should perhaps be revised based upon EFT 9.0. The damage costs used are now out of date, as Defra issued new guidance in this area in January 2019. The Road Transport Urban Large damage costs are most appropriate. If it assists then I would be happy to accept use of the Defra toolkit for the emissions mitigation assessment.

Please see comments above on EFT. The original damage cost calculations were undertaken in January 2019 prior to the revised damage cost guidance being published by DEFRA, hence the use of the previous damage costs. However, we have undertaken a revised damage cost calculation using the EFT9.0 and revised 2019 damage costs for Urban Large using the DEFRA damage cost spreadsheet. This has resulted in a total damage cost of £1,245,294.

As you will see from Table 12.7, monitoring at the Chatham Roadside site does not show any substantial changes in pollutant concentrations. There is, therefore, insufficient evidence that air pollution concentrations are declining. This pattern is repeated at a significant number of diffusion tube sites at locations closest to the development site, as can be seen in Table 12.8. At these tubes sites, concentrations are either stable, or have increased over the past 4 years. So despite the predicted improvements that are presented in the assessment for the future without development scenario, there is insufficient evidence in our monitoring trends that support this prediction. I pick out receptor R23 to illustrate the point as this receptor is near to the Chatham Roadside continuous monitoring station. The without development scenario is predicting a 5 microgramme improvement in NO₂ concentrations to occur, however data from Chatham Roadside has shown no improvement in NO₂ as presented in 12.7. P

Although the data is provisional the annual mean recorded at Chatham AURN for 2018 is 23.4 µg/m³, showing a decline in concentrations between 2017 and 2018. 2018 diffusion tube data has also been obtained and bias adjusted using the National Bias Adjustment Factor for Socotec (Formerly known as ESG) Didcot of 0.77, as obtained from the DEFRA national bias adjustment spreadsheet. The updated data is set out below and shows a decline in concentrations between 2017 and 2018 and all monitoring locations presented except DT26, which shows no change in concentrations.

Site Name	Site Type	Distance from Application Site (km)	AQMA Location	Annual Mean Concentrations (µg/m ³)				
				2014	2015	2016	2017	2018
DT01	Roadside	1.1 to the south east	Rainham	44.7	43.4	42.2	45.4	37.8
DT04	Roadside	4 to the south west	Central Medway	38.2	36.8	38.6	37.9	32.9
DT09	Roadside	3 to the south west	Central Medway	26.2	27.7	25.6	25.5	23.4
DT11	roadside	4 to the south west	Central Medway	35.2	36.3	35.6	35.7	32.5
DT15	Roadside	1.5 to the south east	Rainham	34.4	34.4	35.3	36.0	32.2
DT16	Roadside	1.6 to the south east	Rainham	26.9	25.8	28.6	28.6	24.5
DT17	Roadside	3 to the south west	Central Medway	43.7	45.0	43.5	45.3	41.2
DT18	Roadside	4 to the south west	Central Medway	45.4	45.4	46.3	48.0	40.9
DT25	Roadside	3 to the north west	Gillingham	-	37.6	36.5	42.9	38.3
DT26	Roadside	3 to the north west	Gillingham	-	25.8	33.6	28.1	28.2
DT27	Roadside	3 to the north west	Gillingham	-	37.6	33.5	39.1	36.1

Monitoring for previous years does indicate little change in concentrations and in some locations an increase in concentrations. This is at odds with the expectation that due to improvements in vehicle emissions and an increase in lower emissions vehicles within the vehicle fleet, pollution concentrations are predicted to decline over time. This discrepancy is likely to be caused by previously optimistic emissions factors and “cheat devices” factors which are now taken into account in the emissions factors used for the assessment as well as the increase in traffic. This increase in traffic can, in some locations offset the reduction in per vehicle emissions, however, this will vary over time and location depending on the proposed development and trends in car ownership. This assessment has been based on traffic data which includes an uplift to traffic data independent of this development and therefore this factor has been considered. Full details regarding the factors considered in the future traffic data are included in the transport assessment. As detailed above the

assessment has employed a number of assumptions and selected data for the modelling assessment to ensure a cautious approach to the prediction of future concentrations. The assessment of future concentrations assuming no change in future emissions is considered to be overly pessimistic and it is considered that the assessment has used an adequately cautious approach.

It is probably overly pessimistic to assume that emissions will not improve, but the extent and rate at which this takes place is uncertain, and current trends do not indicate roadside concentrations are improving. If we are to assume that baseline levels have not improved in line with predictions then there are receptors that are likely to experience concentrations close to the objectives levels in the without development scenario.

In Appendix 12, in the last paragraph on page 221 states that final modelled NO₂ lies within +/-10% of the 1:1 line, this does not appear to be correct when looking at Figure 12.43.

This is a typo error. This should read within +/- 25% of the 1:1 line. All adjusted concentrations are actually within +/- 14% of measured concentrations and therefore are considered to be within the recommended accuracy when comparing monitored and predicted concentrations.

I have also noticed a discrepancy between paragraph 12.146 and the with development NO₂ concentration presented in Table 12.7.2 for receptor R21. I don't know if there are any further discrepancies between the report text and the presented model output results.

I am not sure what discrepancy is being referred to. Paragraph 12.146 refers to the 2017 baseline scenario not the with development scenario??

Paragraph 12.137 makes reference to MET data from Luton (however the appendix contains data from Gravesend).

This is a typo and should read Gravesend.

- Further sensitivity test around application of EFT 9.0 and version 7.1 of the NOX/NO₂ convertor should be carried out. The assessment will then be based on current evidence and understanding instead of what was understood in 2017. *This is not considered necessary based on the discussion above.*
- Provide speeds used in the model, and how these have been determined *see appendix 12.2*
- Revised the emission mitigation assessment (e.g. based on EFT 9.0, the revised Defra damage costs etc.) *already provided and discussed above*
- Apply a zonal approach to model verification and adjustment, including the consideration of other monitoring sites as appropriate (e.g. Pier Road). *It is considered unlikely that this would make a significant difference to the outcome of the assessment.*

I think that is just about it for my comments so far on air quality. The points above need to be considered and addressed before I can make final comments and any recommendations.