Review of Permit Air Quality Assessment: Beddington Energy Recovery Facility, Sutton

December 2022

Experts in air quality management & assessment

Document Control

Client	London Borough of Sutton	**Principal Contact**	David Kingstone

Job Number	J10/14171A/10

Report Prepared By:	Martin Peirce & Dr Kate Wilkins

Document Status and Review Schedule

Report No.	Date	Status	Reviewed by
J10/14171A/10/2/F1	19 December 2022	Final	Dr Ben Marner (Director – Air Quality Modelling & Assessment)

Air Quality Consultants Ltd
23 Coldharbour Road, Bristol BS6 7JT Tel: 0117 974 1086
24 Greville Street, Farringdon, London, EC1N 8SS Tel: 020 3873 4780
aqc@aqconsultants.co.uk

Registered Office: 23 Coldharbour Road, Bristol BS6 7JT
Companies House Registration No: 2814570

1 Introduction

1.1 Viridor operates the Beddington Energy Recovery Facility (ERF) and Waste Transfer Station (WTS) on Beddington Lane, Croydon, in the London Borough of Sutton. The facility is regulated by the Environment Agency (EA) under the environmental permitting regime. Viridor have submitted an application to the EA to vary the ERF's existing permit to (among other things) increase its processing capacity 382,286 tonnes of waste per annum[1].

1.2 The permit variation application was accompanied by an air quality assessment (AQA) (Gair Consulting Ltd, 2022) along with a human health risk assessment (HHRA) (Gair Consulting Ltd, 2021), an assessment of the air quality impact arising from the mobile shredder emissions (Barrowcliffe, 2022), and an assessment of abnormal emissions (Fichtner, 2021).

1.3 The AQA presents modelled concentrations of pollutants emitted by the ERF during normal operations, and compares them against air quality objectives or environmental assessment levels. The health effects of dioxins and furans (polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans, PCCD/Fs) are more complicated to assess than other air pollutants since ingestion is a significant pathway, so the health effects of these pollutants are addressed in the HHRA[2].

1.4 This report presents a review and appraisal of the AQA and other air quality reports. The review is based on the information presented within the application reports, along with the professional experience of the reviewers. It considers the methodology used, the reasonableness of the predictions, and the conclusions of the assessment. The review has not included re-working or checking individual calculations or the raw model files; these details will be checked by the EA. The review was carried out by Air Quality Consultants Ltd (AQC) on behalf of the London Borough of Sutton.

2 Assessment Context

2.1 The application is to vary the permit issued by the EA. It is understood that the development does not require a new planning application. With respect to air quality assessment, the planning regime serves a role which is quite distinct from that of environmental permitting. The principal role of air quality assessments for planning is to determine whether proposals are an acceptable, effective, and efficient use of land, and while air quality may be a material consideration, it is only part of the planning balance. The principal focus of environmental permitting is to ensure that plant are

[1] The original permit was for 302,500 tonnes per annum but a variation was granted on 9 December 2020 to allow for the processing of up to 347,422 tonnes per annum.

[2] HHRAs follow a method prescribed by the United States Environmental Protection Agency and focus on bioaccumulation in the food chain of specific pollutants. This scope is much narrower than that of a Health Impact Assessment (HIA).

designed, equipped, and maintained appropriately. This focus for permitting can result in a relatively narrow assessment since it does not take account of the potential for other developments to also add to local concentrations in the future. By contrast, guidance from the Institute of Air Quality Management (IAQM) on 'Land-Use Planning & Development Control: Planning for Air Quality' (IAQM/EPUK, 2017) sets out an assessment approach which considers potential effects from incremental changes below the relevant standards, thus acknowledging that the planning system cannot ignore the competing needs and effects of other surrounding land uses. As explained by the IAQM within that guidance: "*The EA's risk assessment methodology has not been designed for conducting an assessment to accompany a planning application, especially one undertaken for the EIA Regulations*".

2.2 Permitting also only focuses on the control of impacts from specified regulated activities, which significantly constrains the scope of impacts which are considered. For example, permitting is not required to consider impacts from development-generated traffic and so often will not consider the entire air quality effects of a development.

2.3 The requirements and scope for an air quality assessment are thus slightly different in the planning and permitting regimes. For new developments which require both planning permission and an environmental permit, these issues are addressed since both regimes can sensibly assume that the other operates effectively. In the current case, the only air quality assessment has been prepared in the context of permitting. It does not, therefore, fully consider all the issues which would be captured through planning.

2.4 The principal omissions which are caused by this disparity are:

a) that the impacts of additional road traffic generated by the development have not been assessed; and

b) that the effective screening criteria provided by EPUK/IAQM in the context of planning have not been considered.

2.5 In order to address these issues, AQC has carried out an assessment of road traffic, reported separately (AQC, 2022), which includes the contribution from the stack emissions as reported in the AQA and uses EPUK/IAQM criteria to evaluate the significance of the impacts of the facility. This finds that the emissions from the additional traffic generated by the proposed changes, and the EfW itself, will have a Negligible impact on air quality conditions at all receptors along the local road network, when assessed against the UK air quality objectives, and that the overall operational air quality effects of the proposed changes are judged to be 'not significant'

3 Comments and Observations

3.1 From the information available in the AQA and HHRA reports, the assessments are judged to have been undertaken correctly and the conclusion that there will be no significant effects on air quality is considered to be robust. Some issues have been identified and are discussed below, but they do not undermine this overall conclusion.

3.2 Where it is necessary to make assumptions or approximations, for the most part, these assumptions are considered to be appropriate and follow usual good practice for such assessments. For example, assumptions are normally worst-case, conservative or realistic rather than best-case or optimistic.

3.3 Where issues are identified below indicating that the assessment may be less robust, they are appraised to determine if they are likely to affect the overall conclusions.

Conservatism

3.4 The assessment makes consistently worst-case assumptions for modelling parameters that may vary over time, for example with regard to the year of meteorological data used, emission rates, and operating duration. For modelling parameters which are fixed but hard to quantify, the assessment makes assumptions which are generally realistic or conservative; sensitivity tests reported in the AQA show that alternative assumptions are unlikely to change the conclusions of the assessment.

Pollutants

3.5 The assessment has addressed all the pollutants normally considered in an assessment of this type of facility.

Background Concentrations

3.6 The background concentrations of nitrogen dioxide (NO_2) and fine Particulate Matter (PM_{10} and $PM_{2.5}$) have been taken from roadside monitoring locations, providing a worst-case assessment given that receptors are set back from roads. Monitoring data for 2019 from the ST5 Beddington Lane North and ST8 Beddington Lane monitoring sites have been included, which are located 430 m northeast and 600 m southeast of the ERF stacks, and are likely to be influenced by emissions from the facility, so there is a small amount of double-counting of the contribution from the ERF; this is unlikely to be substantial and is conservative. Monitoring data for 2020 and 2021 have not been used; concentrations were generally lower in these years due to the changes in traffic flows brought about by the Covid-19 pandemic, so again this is a conservative assumption. For other pollutants, which are likely to have background concentrations well below the relevant assessment levels, reasonable choices have been made for estimating the background concentrations.

3.7 The method for estimating the 24-hour mean background concentrations is unusual and is based on what appears to be a misinterpretation of the EA guidance. The factor of 0.59 to convert from an

hourly mean to a 24-hour mean is intended for contributions from individual installations rather than from backgrounds which are due to diverse and diffuse sources. The EA guidance states that short-term backgrounds should be estimated as twice the annual mean concentration and elsewhere the AQA treats 24-hour mean concentrations as short-term impacts. An alternative approach for this assessment, since the background concentrations were taken from continuous monitoring data, would have been to extract the actual monitored 24-hour mean data, although this can require consideration of when the maximum 24-hour impacts occur. Using double the annual mean concentration would substantially reduce the headroom below the air quality objective for 24-hour mean PM_{10}, but the contribution from the proposed operation of the facility is sufficiently small that there would be no exceedance of the objective, especially given the conservatism of other assumptions in the assessment.

Emission Rates

3.8 The emission rate of PCCD/Fs quoted in Table 3.4 of the AQA report appears to be incorrect: an emission concentration of 0.1 ng/Nm^3 corresponds to an emission rate of 6.1×10^{-9} g/s, not 6.1×10^{-10} g/s. However modelled concentrations appear consistent with the higher emission rate, so this is likely to be a reporting error, which does not affect the conclusions.

Other Sources of Emissions

3.9 The AQA has calculated quantified impacts from the ERF stack emissions, and an accompanying report presents a qualitative discussion of the air quality impacts of the mobile shredding machine in the WTS, which are expected to be insignificant.

3.10 As noted above, the application has not assessed the air quality impacts of road traffic generated by the facility. AQC has prepared an assessment that includes the impacts of road traffic.

3.11 The installation may have emergency diesel generators to ensure safety in the event of a loss of off-site power. These would normally be tested regularly, but may be excluded from permitting requirements. Clarification of the presence and test schedule of any diesel generators and their potential contribution to air quality impacts would be beneficial.

Complex Terrain

3.12 The dispersion modelling has used the ADMS-5 complex terrain module. However, the terrain surrounding the installation is very flat. Including complex terrain may cause ADMS to change the minimum turbulence parameter, which may not be appropriate in all circumstances. However, for elevated, buoyant releases in urban environments, it is unlikely to make a significant difference to the model outputs.

Baseline

3.13 The report includes comparisons of the impacts of the proposed increase in capacity against two baselines:

- no ERF (i.e. pollutants present at background levels); and
- with the existing permitted facility.

3.14 The first of these is the appropriate assessment approach. The second is not incorrect, and provides additional information of interest when presented in addition to the first. However, it is given a strong emphasis in the report, and this could be (mis-)interpreted as attempting to 'salami-slice' the impacts of the facility as a whole. There is no reason to suppose that this was the author's intent, but there is the risk of misinterpretation by concerned parties. It should be emphasised, therefore, that the key conclusions of the assessment are correctly based on the no-ERF baseline and are therefore robust.

Meteorological Data

3.15 The dispersion modelling has used five years of meteorological data ('met years'), as is normal practice for this type of assessment. The tables of concentrations correctly report the concentration for the worst-case met year on a receptor-by-receptor basis. However, the contour plots are only given for a single met year, and it is unclear what the basis for choosing this met year is. It would be preferable to present contour plots for the worst-case met year on a grid point-by-grid point basis. This would assist the reader as it would be consistent with the presentation in the tables, allow cross-checking with the tables, and identify the locations experiencing the greatest concentrations for all met years. However, since the tables include the greatest concentration at any grid point, regardless of whether there is relevant exposure there, and this is used as the basis for the evaluation of the impacts, the assessment is worst-case and robust with respect to met year.

4 Summary and Conclusions

4.1 This report presents a review of the AQA and HHRA that accompany the permit variation application for Beddington ERF. From the information available in the AQA and HHRA reports, the assessments are considered to have been undertaken correctly and the conclusion that there will be no significant effects on air quality is judged to be robust.

4.2 Some points where the AQA report could have been improved have been identified, but these do not undermine the overall conclusions of the assessment.

4.3 The assessments have made worst-case and conservative assumptions where necessary, and so are likely to overestimate the predicted impacts.

4.4 The AQA does not include the impact of additional road traffic generated by the proposed development. This is normal in a permit application, but means that a potentially significant impact is omitted. To fill this gap, a separate assessment of road traffic has been carried out and reported separately (AQC, 2022).

5 References

AQC (2022) *Supplementary Air Quality Assessment: Beddington Energy Recovery Facility, Croydon. Report Reference: J10/14171A/10/3/F1*.

Barrowcliffe (2022) *Assessment of the Air Quality Impact Arising from the Mobile Shredder Emissions*.

EA (2022) *Air emissions risk assessment for your environmental permit*, [Online], Available: https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit.

Fichtner (2021) *Beddington ERF Permit Variation: Abnormal Emissions Assessment*.

Gair Consulting Ltd (2021) *Beddington Energy Recovery Facility Human Health Risk Assessment. Report Reference: C71-P03-R02*.

Gair Consulting Ltd (2022) *Beddington Energy Recovery Facility Air Quality Assessment - Updated. Report Reference: C71-P03-R03*.

IAQM/EPUK (2017) *Land-Use Planning & Development Control: Planning For Air Quality.*.