



Odour Assessment Review
Land at Ford Airfield, Ford,
West Sussex
November 2021

Review of Odour Assessment

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Document Control:

Project no.	Project
8693C	Odour Assessment Review: Land at Ford Airfield, Ford, West Sussex

Client	
Arun District Council (ADC)	

Report No.	Version	Prepared by	Checked by	Authorised by	Date of issue
11050	V0	H. Parfitt	P. Beckett	P. Beckett	19/11/2021

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1. Introduction

- 1.1 Phlorum Ltd has been commissioned by Arun District Council (ADC) to review the odour assessment associated with the planning application F/4/20/OUT.
- 1.2 The proposal is for an:

“Outline planning application (with all matters reserved except for access) for the development of up to 1,500 dwellings (Use Class C3), 60-bed care home (Use Class C2), up to 9,000 sqm of employment floorspace (Use Classes B1), local centre of up to 2,350 sqm including up to 900 sqm retail / commercial (Use Classes A1-A5) and 1,450 sqm community / leisure floorspace (Use Classes D1-D2), land for a two-form entry primary school (Use Class D1), public open space, allotments, new sports pitches and associated facilities, drainage, parking and associated access, infrastructure, landscape, ancillary and site preparation works, including demolition of existing buildings and part removal of existing runway hardstanding”
- 1.3 An odour assessment was required due to the proposed development’s proximity to Ford wastewater treatment works (WwTW).
- 1.4 This review analyses the following documents:
 -  **Quantitative Odour Assessment** (‘the report’) carried out by Hoare Lea (report reference: **REP-1010502-5A-20211019-Ford Airfield Odour-R7**); and
 -  the report’s associated appendices, including the **Monitoring Report** produced by Olfasense (report reference: **REWA21A_06**).
- 1.5 Phlorum Ltd has extensive experience of carrying out odour assessments on behalf of developers and utility companies across the UK. Phlorum Ltd’s air quality team includes staff who are full members of the Institute of Air Quality Management (IAQM) and who have had their olfactory senses tested in a UKAS certified odour laboratory.
- 1.6 Odour assessments are, in the words of IAQM guidance, *“partly subjective”* and it is recognised that there is no single tool that can provide an unequivocal answer, or delineation, between significant and insignificant effects. Odour assessments should, therefore, provide a *“weight of evidence”* to support any conclusions by culminating the results of numerous tools.

2. Review of Quantitative Odour Assessment

- 2.1 This review follows the broad structure of the report.

Introduction

- 2.2 The introduction includes appropriate information setting out the development's description, the reason for the report, the scope, and objectives of the study.
- 2.3 The objectives are appropriate and are as follows:

👁️ *"To predict odour impacts from the Ford WwTW on future receptors sited within the Ford Airfield development; and*

👁️ *To assess the extent of these predicted impacts to inform the site masterplan"*

Regulatory Standards and Guidance

- 2.4 The report provides an important discussion on how odour impact criteria are based on guidance documents, and not statutory standards.

The National Planning Policy Framework (NPPF)

- 2.5 The NPPF was last updated in July 2021 and not February 2019 as stated. The wording of the referenced paragraphs has not changed; however, the paragraph numbers have. Otherwise, appropriate, and relevant sections of the NPPF have been extracted.

IAQM Odour Guidance

- 2.6 The Institute of Air Quality Management's (IAQM) *Guidance on The Assessment of Odour for Planning*¹ is an appropriate guidance document for this type of assessment as it draws on best practice from other guidance documents in the UK and abroad.
- 2.7 The report outlines the importance of carrying out a *"multi-tool odour assessment"* and importantly discusses the strengths and weaknesses of each tool. This is appropriate.
- 2.8 The report highlights that wastewater treatment works are generally considered moderately offensive when operating normally, thereby suggesting that odours in exceedance of 30uE would constitute a moderate and, therefore, significant adverse effect on residential receptors. This is appropriate.

¹ IAQM (2018) Guidance on the assessment of odour for planning.

CIWEM Criteria

- 2.9 The report references the Chartered Institution of Water and Environmental Management (CIWEM) published Policy Position Statement relating to the control of odour. This is considered an appropriate reference and it agrees with the IAQM's assertion that when WwTW are operating normally, odours in exceedance of 3ou_E would constitute a significant adverse effect.

UK Planning Appeals

- 2.10 The report references planning appeals where the 3ou_E criterion was deemed to be appropriate. Case law is useful in the absence of statutory standards.

Southern Water

- 2.11 The report sets out that Southern Water's position as being more conservative than other utility companies and lower than the IAQM's and CIWEM's criteria. Southern Water's position is, in most cases, conservative for WwTWs.

Assessment Methodology

Consultation

- 2.12 The appropriate bodies (Arun District Council and Southern Water) were contacted, and an appropriate methodology was agreed.

Site Visits

- 2.13 It is beneficial that Hoare Lea/ Isopleth Ltd visited the site with members of Southern Water to best understand the WwTW and identify its key emission sources.

Sniff Test

- 2.14 IAQM guidance states that at least three sniff tests should be carried out in the vicinity of the WwTW as sniff tests only provide a snapshot of the odour environment at a particular time, on a particular day. As such, the six surveys Hoare Lea/ Isopleth Ltd conducted constitute good practice.
- 2.15 It should, however, be noted that three of the surveys were conducted on consecutive days, when the operation of the WwTW and meteorological conditions would likely be similar, thereby somewhat limiting the variation that might have been found by carrying out the surveys on non-consecutive days.
- 2.16 Furthermore, as the sensitivity to odour differs from person to person, it would have been helpful if the sensitivity of the assessor's sense of smell, in accordance with BS EN 13725, was provided. It is not reported whether the assessors, Matt Stooling of Isopleth Ltd or Charlotte Smith of Hoare Lea, have an odour sensitivity in the normal range. Whilst having an either too sensitive or not sensitive enough nose wouldn't necessarily preclude the assessor from carrying out sniff tests, it is important information to contextualise the survey results knowing this.

- 2.17 The sniff tests were largely carried out in a field to the north-east of the WwTW, and outside the boundaries of the application site. The use of a proxy locations is, in principle, supported as it is important to sample downwind of an odour source. However, five of the six surveys were undertaken at this proxy location, and it would have been better practice to have planned surveys when winds were blowing in other directions. As the wind rose in Figure 5.1 demonstrates, winds from the north are common in the region and the large parts of the application site (including sensitive residential land use) are found to the south of the WwTW.
- 2.18 IAQM guidance states that for existing activities “*empirical observations*” such as the results of sensory sniff tests should be given “*considerable weight*” and, therefore, the lack of sampling across the application site is a concern.

Odour Sampling and Analysis

- 2.19 An appropriate air dispersion model (AERMOD) has been used.
- 2.20 Emission factors for the model were derived from sampling carried in late spring (May 18th), which is considered just reasonable as emissions from WwTW generally peak in summer and are lowest during winter. Therefore, without carrying out multiple measurements of the WwTW over a year, spring likely provides a sensible emission profile to predict impact over the year. Nevertheless, It would have been better to have waited for the peak of summer to carry out this monitoring, as they would likely have been more conservative.
- 2.21 It should also be noted that monitoring the WwTW still only provides a snapshot of the odour emissions on a particular day. As such, the emission factors derived from monitoring, should still be treated with caution when being used to predict impacts across the year.
- 2.22 The layout and eventually chosen emission factors were derived following discussions with Southern Water and their odour experts, Atkins.
- 2.23 Odour sampling was carried out by Olfasense using UKAS accredited procedures (UKAS Testing Laboratory No. 2430), meaning that the emission factors should be robust and suitable for an assessment of this type.
- 2.24 No seasonal variability has been applied to the emission factors and as the sampling was carried out in late spring; this is considered to be a reasonable assumption.
- 2.25 The modelled emission rate from the sludge reception odour control unit was roughly five times that monitored, as agreed with Southern Water. This is considered a conservative assumption. It is not clear why this was agreed.
- 2.26 The report recognises the inherent uncertainties in modelling and the input parameters by carrying out extensive sensitivity testing, including the use of an additional 5 years of meteorological data from Thorney Island. This is excellent practice.
- 2.27 The appropriateness of the 30U_E contour, referencing the hedonic tone, of the effluent is a reasonable method. Furthermore, it is explained well, referencing the specific pieces of equipment/ process why odours would not be septic.

- 2.28 Table 5.5. appears to mix emissions from the main works OCU and Sludge Import OCU. It would be helpful if the applicant could confirm that the model itself hasn't incorporated this error.

Grundon Waste Transfer

- 2.29 The survey-based methodology of assessing Grundon Waste Transfer station is considered reasonable and appropriate.

Results

Sniff Tests

- 2.30 During walkover/sniff test 1, strong odours could be detected transiently but regularly up to 120m from the WwTW boundary, and at least 300m from the most odorous part of the WwTW, i.e., the main works odour control unit. The three locations where strong odours could be detected were not the three closest, as is suggested in the report, suggesting that a plume from the OCU might be grounding there.
- 2.31 Nevertheless, there is consistency in the results of the sniff tests (i.e., that the area within 100m of the WwTW to the NW is regularly exposed to strong odours that could be *"regarded as 'substantial adverse' for a residential receptor and 'moderate adverse' at a commercial receptor"*. This area is at least 300m from the most odorous part of the WwTW, i.e., the main works OCU.
- 2.32 During sniff test 3, strong odours could regularly be detected along the WwTW southern boundary (locations 5 to 14); however, strong odours quickly dissipated when sampling at locations 22-29, which were circa 70m to the south. The sniff test did not sample at greater distances to the south. It is, therefore, unknown whether odours could be detected at 300m distance from the main OCU, as they could be to the north-east of the WwTW. This is a possibility given the height and design of the OCUs, which would allow odorous air to ground at greater distances from the facility.

Modelling results

- 2.33 It is highly unexpected that the contours presented in the report would extend further to the south than northeast, given the predominance of south westerly winds at Shoreham (See Figure 1 and 2 below). This merits further explanation from Hoare Lea.

Figure 1: Scenario 6 Average (from the Report)

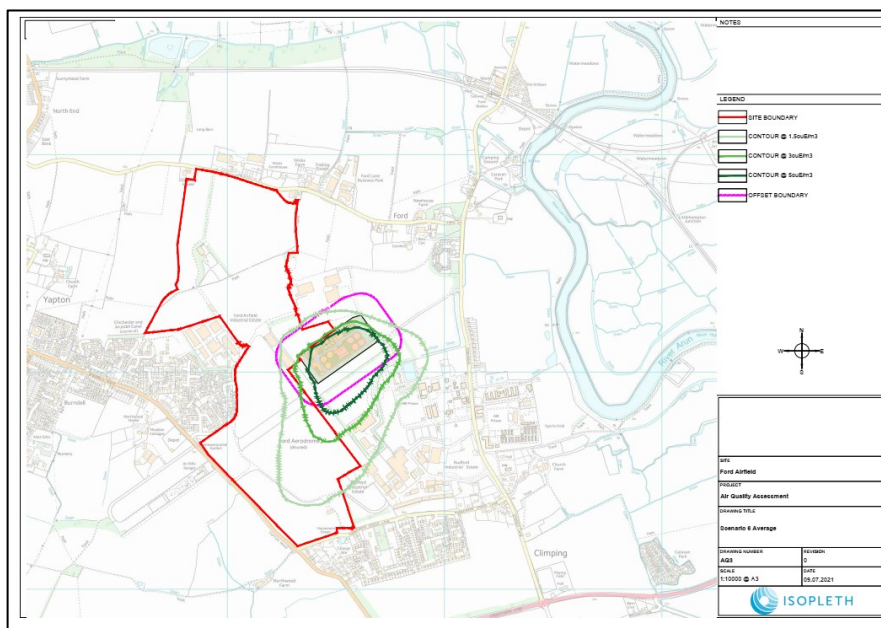


Figure 2 Wind Rose 2013-2017

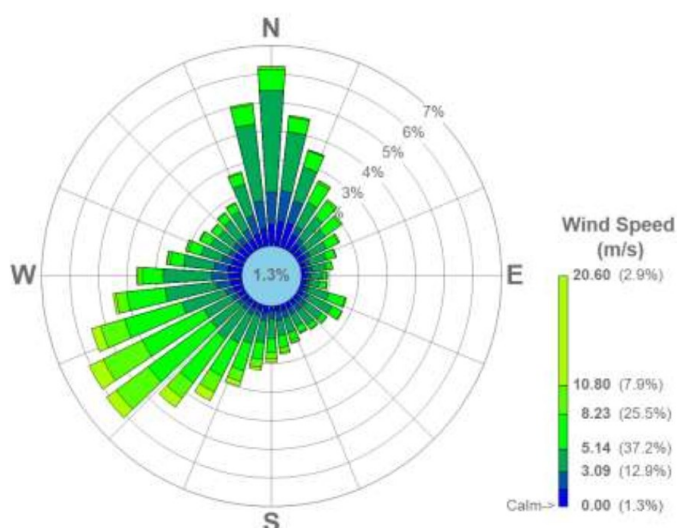


Figure 5-1 Shoreham Data: Windrose 2013-2017

- 2.34 Nonetheless, the 3ou_E contour extends a similar distance (from the main OCU) to the south as to where strong odours could be detected during the sniff tests, to the northeast. This is encouraging as there is some agreement between the sniff tests and modelling as to the *distance* where significantly adverse odours could be detected. Conversely, there is not agreement as to the *direction* in which strong odours occur.

Complaints

- 2.35 Complaints data have been provided by ADC and SW. No location for these complaints was provided, nor whether the complaints were lodged by the same complainant or multiple complainants
- 2.36 Given that the vast majority of the area surrounding the WwTW is not built up and therefore missing 'noses' to detect odours, complaints data are of less intrinsic value to this assessment. Regardless, it is unfortunate that no high-level data could be provided on the location of these complaints. It should be possible to obtain such data without contravening data protection laws – e.g. by providing postcodes rather than full addresses of complainants.

Conclusions

- 2.37 The report is structured without a discussion section. As such there is no drawing together of the results of each assessment tool so that interpretation of the available information can effectively be discussed and conclusions drawn.
- 2.38 The dispersion model upon which it appears the greatest weight is placed in this assessment, is understood to be somewhat conservative, considering the sensitivity tests carried out and the incorporation of elevated emission rates for the sludge OCU. However, as olfactometric sampling of the WwTW was not undertaken in summer, there is uncertainty as to whether the model is sufficiently conservative.
- 2.39 However, there is practically no discussion on the apparent discrepancy between sniff test and dispersion model results. This is particularly concerning as the IAQM states that considerable weighting should be given to ground observations (see paragraph 2.18 and Section 2.2 of the Hoare Lea Report).
- 2.40 For example, the sniff tests find that moderate & substantial adverse impacts (assuming residential uses were present) could be consistently detected to the north-west of the WwTW up to 100m from the site boundary, and over 300m from the most odorous part of the WwTW. However, the modelling suggests impacts would be, at worst, 'slight adverse' at this location. This suggests that impacts associated with normal operations of the WwTW could be under-predicted to the north-west of the facility and that the model is not performing in line with the prevailing meteorological conditions and with the ground based observations.
- 2.41 As observations from the sniff tests were almost exclusively to the northeast of the WwTW and the model is, evidently, not performing well, this brings into question whether it is appropriate to place such weight on the results of the dispersion model.
- 2.42 Such discrepancy between modelled and observed results should point to the adoption of the precautionary principle. If unacceptable odour contours are predicted to occur 300m from sludge processes, then this ought to be *considered* the radius in all wind directions where such odours could affect the application site. This would be a more robust way to inform the appropriate layout of the masterplan.

- 2.43 The assessment/prediction of nuisance episodes should not be simply based on the prevailing situation. Wind direction is often more variable in summer, and that's when complaints generally occur. This is due to a number of factors including that warm weather increases biological activity and the concentration of sewage in effluent, and that odours are more effectively transported in dry air. Furthermore, people have a heightened sense of smell in warm conditions and are more likely to be spending time outdoors/ with their windows open.

3. Conclusions

3.1 The objectives of the study were to:

-  *"To predict odour impacts from the Ford WwTW on future receptors sited within the Ford Airfield development; and*
-  *To assess the extent of these predicted impacts to inform the site masterplan"*

3.2 On face value, the report was carried in accordance with best practice IAQM guidance, using a methodology agreed with both SW and ADC.

3.3 The dispersion modelling assessment recognises the inherent uncertainty of the process and a number of conservative assumptions, as well sensitivity testing, were incorporated into the report. This is excellent practice.

3.4 However, IAQM guidance states:

"It should be emphasised that the results from a model should not be used to try to "prove" the absence of an existing adverse odour effect (e.g. nuisance) when strong empirical evidence from complaints analysis, community response data, and sensory tests (by appropriately trained persons) show otherwise. To do so would be to mistake the model for the reality of the situation, rather than a simplified version of it."

3.5 The report does not clearly bring together the results of the sensory tests and the dispersion modelling to discuss how the masterplan has been informed by both. As the only location where, robust observations have been made (i.e. to the north east of the WwTW) is also a location where the dispersion model appears to under-predict, this suggests that the model might not be a suitable tool, on it own, for developing a constraints plan. As such, the current layout *is understood* to have not been developed using an appropriate weight of evidence, relying instead on the dispersion model.

Recommendations/ Points of clarification

3.6 Hoare Lea should explain why the odour contour extends further to the south than north-east. This appears odd as south westerly winds are more common than winds from the north, which is corroborated by their ground based observations (sniff tests).

3.7 Furthermore, it is important to understand how, it at all, the sniff tests have been used to inform the masterplan/ whether the cordon sanitaire around the WwTW has been defined solely based on the results of the dispersion model. Observational data should be given considerable weight in informing the masterplan, and it appears that this data might not have been fully discussed and integrated into conclusions.

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