



Odour Assessment

Jacques Yard Wrexham

July, 2022

Castlemead Group Ltd



Document Control Sheet

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1 Introduction

1.1 Overview

Castlemead Group Limited (CGL) has recently secured Planning Approval for a residential development comprising 25 units on land at Jacques Yard, Mold Road, Wrexham LL11 2BY, with the following Condition from Wrexham County Borough Council (WCBC) (Condition 11):

“No dwelling shall be occupied until a scheme of odour mitigation in respect of the Pumping Station identified on drawing no. JWA/PD/00 Revision 1 has been implemented in full in strict accordance with details that shall have first been submitted to and approved in writing by the Local Planning Authority”

The pumping station is owned and operated by Welsh Water and lies adjacent to a proposed house. It is understood that the pumping station currently serves the nearby Premier Inn, with the intention being to also use it to serve the Foul Drainage from the proposed development. The station is at ground level. Welsh Water requested that a 15 m cordon sanitaire be maintained (free from development) around the pumping station, and it appears that the odour condition is as a result of this request. A pumping station of this type should not give rise to odour nuisance in normal operation, and that odour nuisance will typically arise as a consequence of abnormal or operational failures on the part of the sewerage undertaker.

According to Google Earth dated aerial photography imagery, the hotel and pumping station were constructed between 2012 and 2018.

At the initial stage it was not considered that odour sampling or modelling is necessary, and a proposal was made to visit the site to conduct a sniff test survey to establish the odour situation in normal operation, and to establish access arrangements, should odour sampling/other methods be needed at a later date.

The local authority who will discharge the planning condition is Wrexham Borough Council (WCBC).

DustScanAQ (DS) have been instructed by CGL to provide an odour assessment to support the discharge of the condition.

1.2 Objective

The objective of this work is to provide an odour assessment report which addresses the potential concerns of the local planning authority, Welsh Water and the potentially impacted properties.

1.3 Proposed Development

The proposed development involves the construction of new dwellings adjacent to a pumping station. The site location is shown in Figure 1-1.

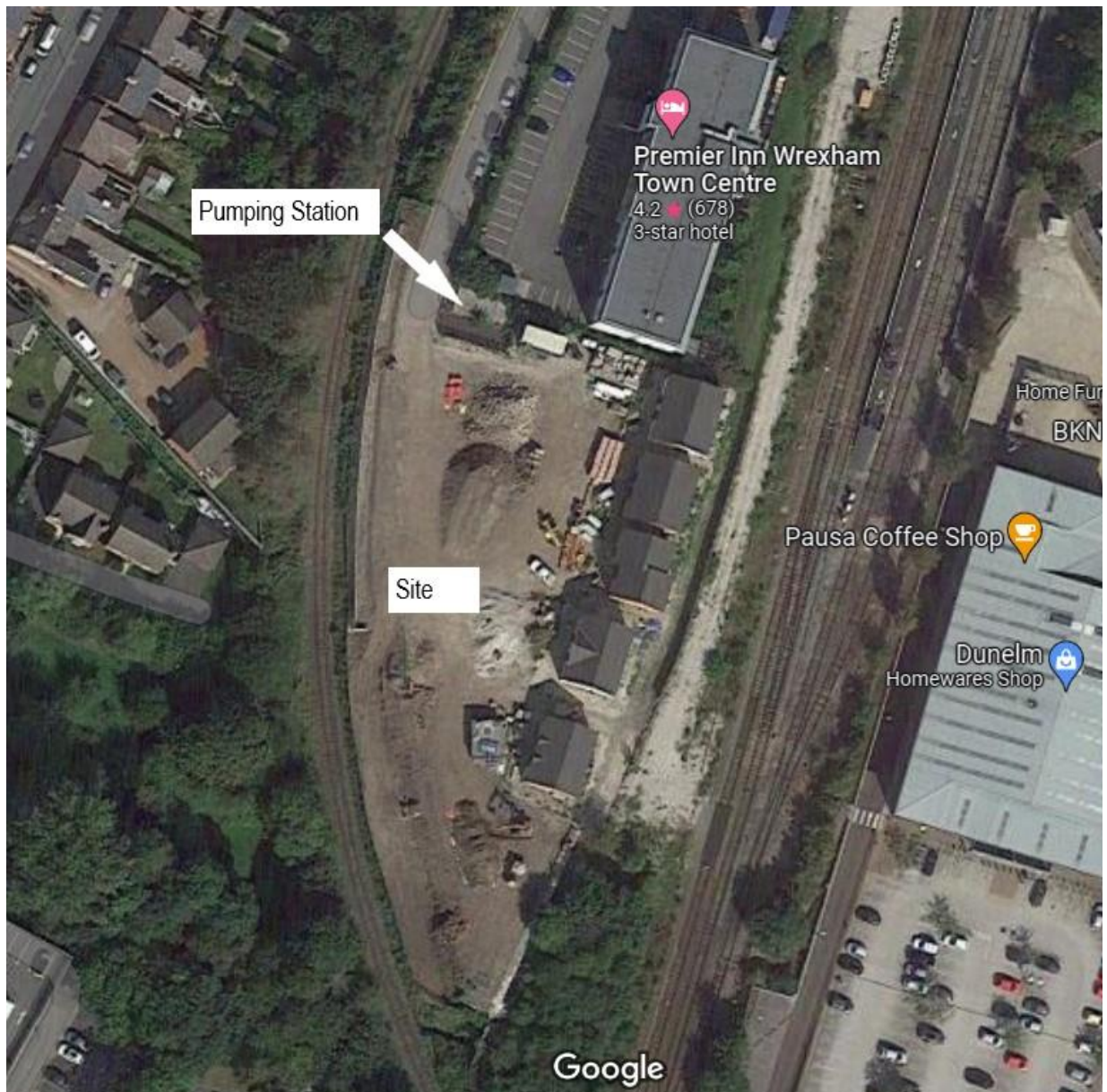


Figure 1-1 Site Location (from Google Maps) – image date September 2021

At the time of the site visit on 26/05/2022, the houses were further built out than shown in the image in Figure 1-1. The aerial photography image shows the first five houses completed to roof level. The nearest house to the pumping station was nearing completion and within 15 m of the pumping station (shown marked on the map on the northern boundary of the site).

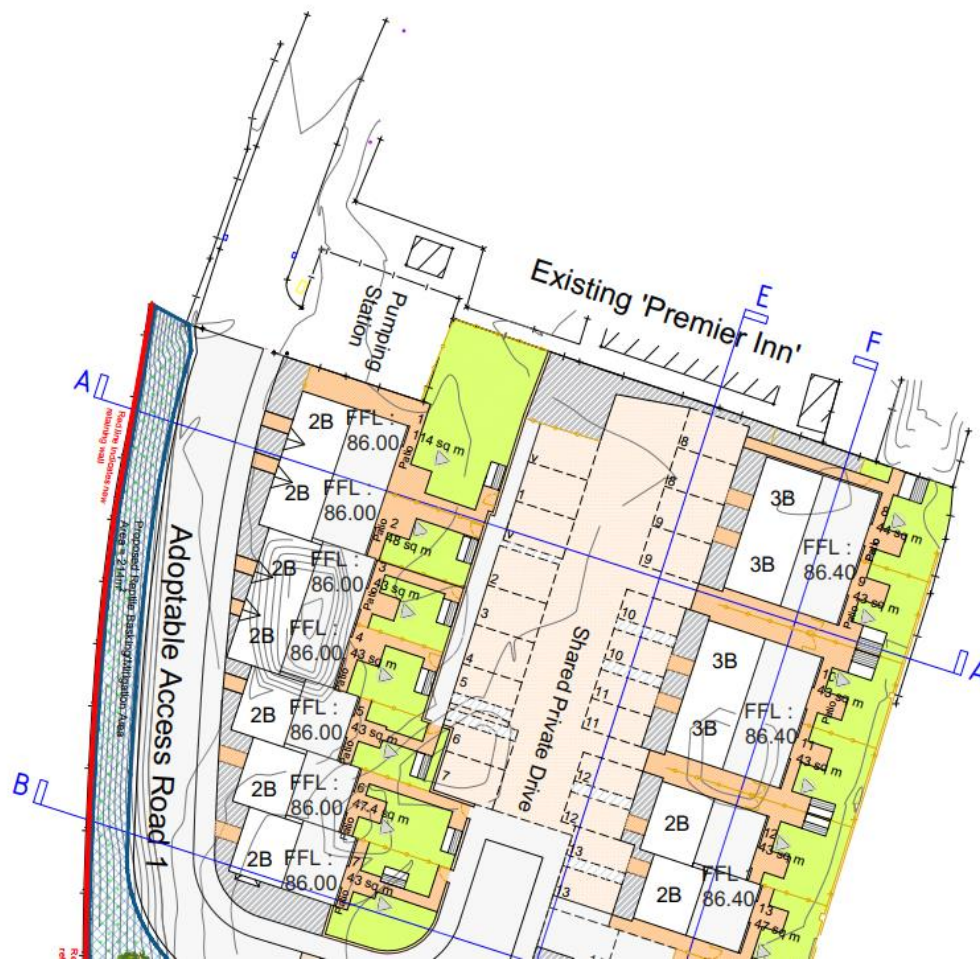


Figure 1-2 Extract from design drawing JWA/PD/00

2 Legislation, Policy and Guidance

2.1 Overview

This section summarises all legislation, policy, statutory and non-statutory guidelines relevant to the proposed development. Furthermore, the latest regional and local planning policy guidance specifically applicable to the proposed development has been reviewed.

2.2 National (Wales) Legislation

2.2.1 Statutory Nuisance

It is recognised that the planning system presents a way of protecting amenity. However, in cases where planning conditions are not applicable to a development/installation, the requirements of the Environmental Protection Act 1990 still apply. Under Part III of the Environmental Protection Act 1990, local authorities have a statutory duty to investigate any complaints of:

- *“any premises in such a state as to be prejudicial to health or a nuisance;*
- *smoke emitted from premises so as to be prejudicial to health or a nuisance;*
- *fumes or gases emitted from premises so as to be prejudicial to health or a nuisance;*
- *any dust, steam, smell or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance;*
- *any accumulation or deposit which is prejudicial to health or a nuisance.”*

Where the local authority establishes that any one of these issues constitutes a statutory nuisance and believes it to be unreasonably interfering with the use or enjoyment of someone’s premises and/or is prejudicial to health, an abatement notice will be served on the person responsible for the offence or the owner/occupier. Failure to comply with the notice could lead to a prosecution. It is however considered as a defence if the best practicable means to prevent or to counteract the effects of the nuisance are employed.

It is a general principle in land use planning to try to avoid conflict between types of land uses. Local planning authorities should try to control developments in a way that prevents or minimises the potential to create statutory nuisances.

2.3 Planning Policy

2.3.1 Planning Policy Wales

The Planning Policy Wales document¹ of February 2021 says that:

“Development plan strategies, policies and development proposals should be formulated to look to the long term protection and enhancement of the special characteristics and intrinsic qualities of places, be these of natural, historic or built environments, ensuring their longevity in the face of change. This means both protecting and enhancing landscapes, habitats, biodiversity, geodiversity and the historic environment in their own right as well as other components of the natural world, such as water resources or air quality. Problems should be prevented from occurring or getting worse. Biodiversity loss should be reversed, pollution reduced, environmental risks addressed and overall resilience of ecosystems improved. When appropriate development is proposed, it must be taken forward in an integrated way to ensure common issues are considered and accommodated in the early stages of plan-making or individual proposal and multiple benefits, such as green infrastructure are secured.”

It may be interpreted that odour is an aspect of air quality, and therefore that ‘*problems should be prevented from occurring*’ includes locations where new development may occur in areas of poor air quality.

There is a further policy relevant in this context, which is that the principle of the ‘agent of change’ is recognised, whereby the developer takes on the responsibility of mitigation when developing in an environment which is potentially affected by a neighbour’s activities. The situation cited is for noise² and the principle may be taken to be relevant to odour.

2.4 IAQM Odour Guidance (2018)

IAQM odour guidance (2018) assesses the effect of odour on amenity and not on human health. It gives guidance on the assessment of odour for planning purposes i.e. predictive assessments.

The relevant Planning Authority must consider whether a proposed development (an odour source itself or nearby new receptors such as residential dwellings) will be a suitable use of the land. The planning system has the task of guiding development to the most appropriate locations: ideally, significant sources of odour should be separated from odour-sensitive users of the surrounding land (sensitive receptors).

Odour is subjective to individuals. Perceptions of an odour – whether it is found to be acceptable, objectionable, or offensive – are partly innate and hard-wired, and partly determined through life experiences are therefore subjective to individuals. The population has a spectrum of sensitivities to odour. The guidance and practice are based on typical responses to odour, and up-to-date science and case law.

¹ https://gov.wales/sites/default/files/publications/2021-02/planning-policy-wales-edition-11_0.pdf

² <https://gov.wales/planning-noise-live-music-venues>

The odour effect which is assessed is the negative appraisal by a human receptor of the odour exposure. This appraisal, occurring over a matter of seconds or minutes, involves many complex psychological and socio-economic factors. Once exposure to odour has occurred, the process can lead to adverse effects such as disamenity, annoyance, nuisance and possibly complaints.

For exposure to odour to occur, there must be an emission source to the atmosphere, a pathway for the odour to travel along and a receptor that has the potential to experience adverse effects. Therefore, the IAQM guidance is based upon Defra's Green Leaves III guidance³ which describes the Source-Pathway-Receptor (S-P-R) concept. The S-P-R concept presents the hypothetical relationship between the source (S) of the odour, the pathway (P) by which exposure might occur, and the receptor (R) that could be adversely affected.

In addition, the scale of exposure is determined by the FIDOL factors:

- **Frequency:** how often an individual is exposed to odour;
- **Intensity:** the individual's perception of the strength of the odour;
- **Duration:** the overall duration that individuals are exposed to an odour over time;
- **Odour unpleasantness:** the 'hedonic tone' of the odour (pleasant, neutral or unpleasant, expressed on a nine-point scale); and
- **Location:** the type of land use and nature of human activities in the vicinity of an odour source. This can be considered to encompass the receptor characteristics, receptor sensitivity and socio-economic factors.

The guidance offers predictive methods to assess planned scenarios, including qualitative, semi-quantitative and quantitative (modelling). Observational assessments can also be used including field 'sniff' tests and odour complaints record analysis.

Research into the correlation of public complaints about pig farm odours and the measurement and dispersion of odours from farms in the Netherlands is used as a quantitative basis to predict the future response of the public to odour exposure in future planned scenarios, using odour concentrations.

The type of odour assessment required has not been specified through any planning consultation. A semi-quantitative assessment is presented here, involving a qualitative assessment of the source-pathway-receptor model, and an on-site sniff test.

2.4.1 Odour Concentrations as Guidelines

Practical experience of UK installations has shown that exposures of up to 5 ou_E/m³, expressed as the 98th percentile of one hourly-average odour concentrations do not

³ Department for Environment, Food and Rural Affairs, (2011): 'Guidelines for Environmental Risk Assessment and Management (Green Leaves III)

generally cause odour nuisance. However, the Environment Agency H4 Odour Guidance sets benchmark levels as follows:

- 1.5 odour units for most offensive odours;
- 3 odour units for moderately offensive odours; and
- 6 odour units for less offensive odours.

Odours categorised as most offensive include processes involving decaying animal or fish remains, septic effluent or sewage, and biological landfill odours.

Moderately offensive odours arise from a number of processes including sewage treatment in normal conditions, intensive livestock rearing, sugar beet processing, fat frying and well aerated green waste composting.

Based on the guidance, the odours from the sewage pumping station are likely to be 'moderately offensive'.

2.4.2 Uncertainties, Limitations and Assumptions

The practice of odour impact assessments is a developing area of environmental consultancy work, and IAQM (2018) recognises the need for professional judgement in carrying out such assessments.

The IAQM Guidance says that:

"It is incumbent on the responsible practitioner to exercise good professional judgement in selecting an appropriate odour assessment criterion for any particular case and providing justification for that selection. Practitioners are also recommended to exercise such judgement in appreciating other factors which govern human responses to odour. It is not simply the presence of odours that govern the responses of individual population members to malodour, but many other socio-psychological factors including the existence of health conditions, beliefs regarding the alleged harmfulness of the odorants, individual coping behaviours and other demographic and social factors, and the variation in the sensitivity of sense of smell in the general population.

This could result in the application of odour exposure criteria that may appear, on the basis of the studies carried out to date, to be erroneous. Such a case has occurred recently, as reported in a Defra publication, where a concerted and comprehensive odour emission sampling and modelling campaign revealed C_{98} concentrations well below the most stringent $1.5 \text{ ou}_E/\text{m}^3$ criterion, but where up to 50 complaints about odour per day arose. Similarly, another recent study found numerical odour criteria did not predict complaints around sewage works.

The practitioner needs to take into account the uncertainty of the prediction and/or the degree to which conservative assumptions have been used."

The uncertainties associated with odour assessments are greater than with other types of air quality assessments.

3 Odour Impact Assessment

This section of the report is an assessment of the odour exposure environment arising as a result of the Proposed Development, using the assessment matrix in the IAQM guidance and the observations from a site walkover sniff test.

3.1 Site Visit and Sniff Test

A site visit was undertaken on 26th May 2022. The purpose of the site visit was to understand and inspect the sewage pumping arrangements and observe the potential for odorous emissions. An additional reason was to check for any other local odour sources on and off site, which contribute to the baseline odour situation.

No odours at all were detected which could be attributed to the sewage pumping station. The wind was blowing from the west-northwest and west-southwest during the test. Details of the walkover sniff test are appended. The site visit photographs included below show the surface details of the sewage pumping station. The inspection covers appeared to be closely fitted to be air-tight, and a 'Durgo' type one-way pressure release valve was visible, designed to admit air into the chamber when the internal pressure is lowered, but not allow odorous air out.



Figure 3-1: Sewage Pumping Station – Picture 1 – showing nearest dwelling scaffolded in the background



Figure 3-2: Sewage Pumping Station – Picture 2



Figure 3-3: Sewage Pumping Station – Picture 3



Figure 3-4: Sewage Pumping Station – Picture 4 – showing grey air admittance valve in the foreground

3.2 Local Wind Patterns - Windroses from Shawbury

Meteorological data observed at Shawbury (approximately 35 km to the southeast of the site) was considered as being acceptably representative of the long term wind conditions at the subject site.

Figure 3-5 below presents the wind roses for three years from 2014-2016 demonstrating the variation in wind speed and direction from year to year.

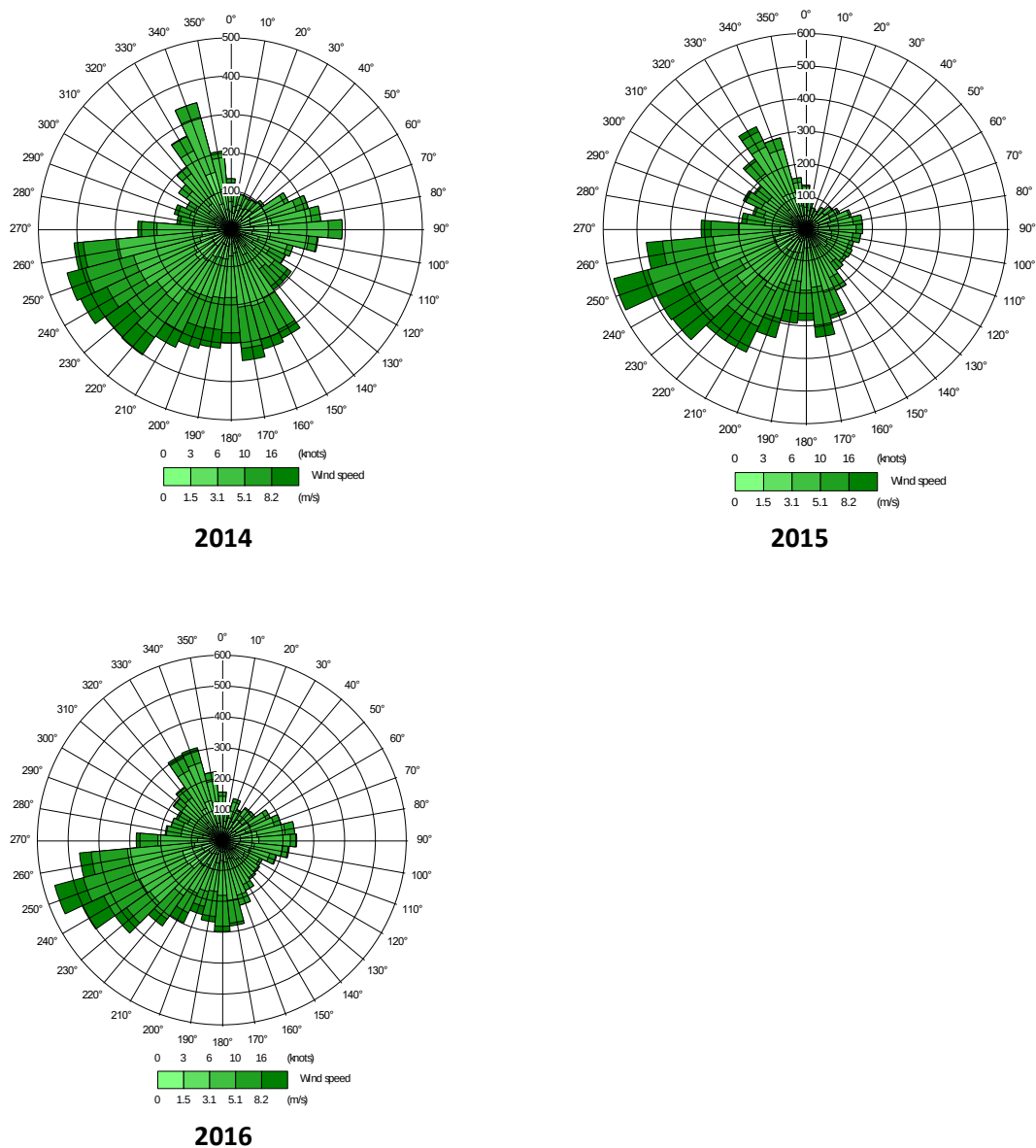


Figure 3-5: Shawbury meteorological station Windrose Plots: 2014 - 2016

The windroses (which show the number of hours per year that the wind blows from) from 2014 to 2016, show that the winds are predominantly from the southwestern quadrant (i.e. between south and west). For much of the rest of the year, the wind is from the east to southeast, with a noticeable element from the north-northwest through the 'Cheshire Gap'. These mean that for more than half of the hours of the year, the wind will blow any odours from the waste storage away from the nearest residential receptors.

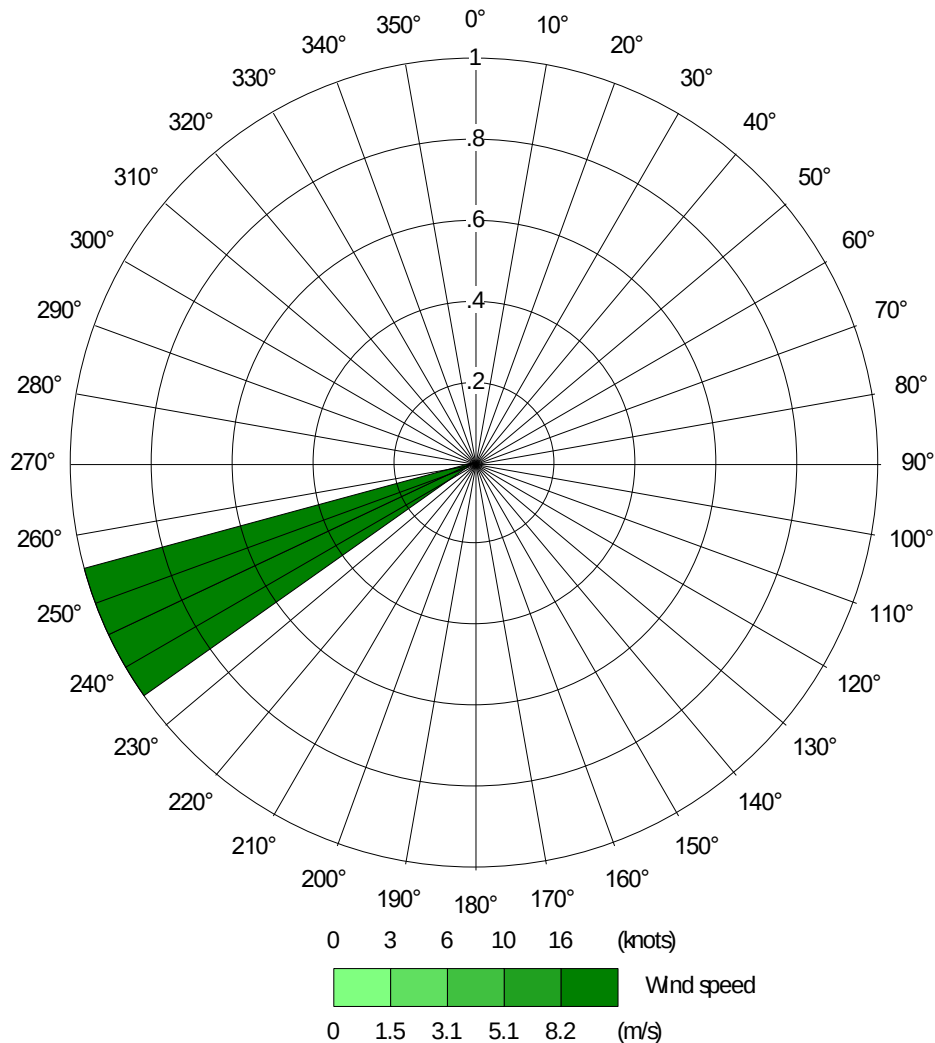


Figure 3-6 Shawbury Windrose during site visit

There were moderate wind conditions during the time of the site visit.

3.3 Odour Impact Risk Assessment

The method for assessing the likely odour effect of change from the IAQM odour guidance is applied, considering the people who will be exposed to the change. The risk assessment follows the source-pathway-receptor model in the guidance. The primary receptors are nearest dwellings, particularly the house within 15 m of the sewage pumping station boundary.

Considering the information set out above and design of the sewage pumping station, the probability of a likely odour effect is assessed in the table below. The receptor sensitivity is assigned as high, being residential. The pumping station is assigned an odour potential of negligible because of the negligible potential for odorous emissions during normal operation, since the pumping station is sealed to the atmosphere. The pathway

effectiveness is high because although the prevailing wind blows directly away from the nearest receptors, the receptors are adjacent to the potential source and the nearest house is no more than 10 m away (below the buffer distance requested by Welsh Water).

Table 3-1: Summary of the likely odour effects at proposed receptors

Receptor details	Source Odour Potential	Pathway Effectiveness	Odour Exposure	Receptor Sensitivity	Likely Odour Effect of Change
Nearest House	Negligible	Highly Effective Pathway	Low Risk	High Sensitivity	Slight/Negligible Effect

Table 3-1 above presents the likely odour effects at the proposed sensitive receptors, based on the arrangement of the sewage pumping station and the nearest house. The likely odour effect of the development is judged to be slight adverse or negligible and not significant because of the combination of factors outlined above.

The sewage pumping station covers will need to be opened for maintenance access on a limited basis. The likely frequency was reported to be twice per year (every six months). During these events, the potential for odour effects at neighbouring houses will be significant, and the situation should be managed through appropriate mitigation which should include, as far as reasonably practicable:

- notification to Jacques Yard householders of planned maintenance access to the pumping station;
- consideration of the timing of the events (time of day/day of week) and the weather conditions; and
- management of the access i.e. limiting the potential for odorous emissions by opening of the access covers for no longer than is necessary for the work to undertaken.

3.4 Summary

In our professional judgement, the development is not likely to present a significant risk of odour exposure or complaints by its residents, provided that the sewage pumping station operates normally. Appropriate mitigation measures outlined above should be adopted to mitigate the risk of odour effects during planned maintenance.

4 Conclusions

This odour assessment report takes into account the development design, and has been carried out following appropriate methods, including a source-pathway-receptor risk assessment.

This odour assessment report follows the IAQM 'Guidance on the assessment of odour for planning' which effectively summarises government (Environment Agency), national and industry (CIWEM) standards, and it is the best practice technical guidance.

This assessment finds that there is no significant risk of odour annoyance from the development arrangement during normal operation of the sewage pumping station. A scheme of mitigation measures is recommended to mitigate the risk of odour effects during planned maintenance.

The proposed development is consistent with national, regional and local planning policy.

This odour assessment report has been produced following the principles of the IAQM Guidance by Gordon Allison, one of the contributing authors of the guidance.

DustScanAQ
July 2022



Appendix A: Sniff Test Record Sheet

Project: Sewage Pumping Station

Weather: 7/8 cloud, moderate W'ly, swirling

[illegible]