

**LAND ADJACENT CRUD YR AWEL,
CLAWDDNEWYDD**

**INTERIM ODOUR
ASSESSMENT**

**For: Tŷ Architecture /
Gareth Williams**

Ref: 12/2017/0015

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Interim Odour Assessment

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1 Introduction

- 1.1 Tŷ Architecture, acting on behalf of Gareth Williams, has submitted an outline planning application to Denbighshire County Council (DCC) for the construction of 9 dwellings and a new access on land to the north of Clawddnewydd (planning reference: 12/2017/0015).
- 1.2 The site lies immediately to the northeast of the Clawddnewydd waste water treatment works (WwTW) which is operated by Dŵr Cymru Welsh Water. In response to planning consultation Welsh Water has commented as follows¹:

The site is located in close proximity to the Clawdd Newydd Waste Water Treatment Works and an odour assessment will need to be undertaken to ascertain what impact this might have on the occupiers of this development. This study should be carried out during periods of warmer weather. Once an odour assessment has been completed the findings should be submitted to the Local Authority's Pollution Control Officer and Welsh Water for consideration.

Having reviewed the submitted details, no information relating to odour has been presented. Further information will be required before Welsh Water can advise on the suitability of the development.

- 1.3 Tŷ Architecture accordingly instructed Smith Grant LLP (SGP) to undertake an odour assessment of the Site to determine the potential for odours generated by the WwTW to impact the proposed development.
- 1.4 The Site details are:

Table 1.1: Site Details

Address	Land adjacent Crud yr Awel, Clawddnewydd
National Grid Reference	308250, 352650
Local Authority	Denbighshire County Council (DCC)
Nature of Current Site	Open agricultural field
Site Area	0.49ha
Proposed Development	Residential development of 9 dwellings and construction of new access
Planning Reference	12/2017/0015

- 1.5 The Site location is provided below in Figure 1.1 and in Drawing D01. The Site boundary has been taken as that provided in the plan provided with the planning application.

¹ Dwr Cymru Welsh Water, comments provided in response to planning consultation 12/2017/0015, ref: PLA0026286, dated 07.03.17

- 1.6 The following assessment considers the potential for any odours generated by the WwTW to impact the Site and whether such odour could be considered a constraint to the future residential development of the Site. The report details the methodology and background information used to inform the assessment and the results and conclusions. The study to date comprised a review of the WwTW operations, a review of complaints data and preliminary assessment of potential odour impacts. The assessment has been undertaken in accordance with guidance provided by IAQM with regards to odour assessment for planning purposes². Further work is currently being undertaken of potential odour impacts using a recognised atmospheric dispersion model, ADMS 5.
- 1.7 SGP is an environmental consultancy specialising in air quality assessments. The report reviewer, Katrina Hawkins, Partner, is a Member of the Institute of Air Quality Management (IAQM) with over 20 years' experience in environmental assessment.

Figure 1.1: Site Location



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² Bull *et al* (2014). *IAQM Guidance on the Assessment of Odour for Planning*, Institute of Air Quality Management, London.

2 Technical and Legislative Context

2.1 Planning Policy

2.1.1 An odour is the organoleptic attribute perceptible by the olfactory organ on sniffing certain volatile substances. Odours may be perceived as pleasant or unpleasant, and the key concern with odour is its ability to cause a response in an individual that is considered to be objectionable or offensive. There is a wide variation between individuals as to what is deemed unacceptable and as to what can affect an individual's quality of life. As it may cause offense to human senses odour is defined as a pollutant.

Planning Policy Wales, 2016³

2.1.2 Planning Policy Wales (PPW) sets out the Welsh Government's land use planning policies and how these are expected to be applied.

2.1.3 Chapter 13 of PPW deals with minimising and managing environmental risks and pollution, including air quality issues. Section 13.1 of PPW states that:

'Planning and environmental management are separate but complementary. By controlling where development can take place and what operations may be carried out, the planning system has an important role in avoiding or minimising the adverse effects of any environmental risks on present or future land use.'

2.1.4 The Framework provides guidance to local authorities on taking air pollution (and hence odour as a pollutant) into account in planning policies and decisions. Paragraph 13.10.1 states:

'The planning system should determine whether a development is an acceptable use of land and should control other development in proximity to potential sources of pollution rather than seeking to control the processes or substances used in any particular development.'

2.1.5 Of note, the different roles of a planning authority and a pollution control authority are addressed by PPW in section 13.10.2:

'Planning authorities should operate on the basis that the relevant pollutant control regimes will be properly applied and enforced by other agencies. They should not seek to control through planning measures, matters that are the proper concern of the pollution control authority. These regimes are set out in the Environment Act 1995, the Environmental Protection Act 1990, the Water Resources Act 1991 and the regulatory regimes introduced by the Pollution Prevention and Control Act 1999. Each of these may have a bearing on the environmental controls imposed

³ Welsh Government, Planning Policy Wales, Edition 9, November 2016

on the development in respect of environmental and health concerns and planning authorities will need to ensure that planning conditions do not duplicate or contradict measures more appropriately controlled under these regimes.

2.1.6 PPW sets out the position for development management in relation to air (and water) quality in section 13.12.1 as follows:

The potential for pollution affecting the use of land will be a material consideration in deciding whether to grant planning permission. Material considerations in determining applications for potentially polluting development are likely to include:

- *location, taking into account such considerations as the reasons for selecting the chosen site itself;*
- *impact on health and amenity;*
- *the risk and impact of potential pollution from the development, insofar as this might have an effect on the use of other land and the surrounding environment (the environmental regulatory regime may well have an interest in these issues, particularly if the development would impact on an Air Quality Management Area or a SAC);*
- *prevention of nuisance;*
- *impact on the road and other transport networks, and in particular on traffic generation; and*
- *the need, where relevant, and feasibility of restoring the land (and water resources) to standards sufficient for an appropriate after use. (Powers under the Pollution Prevention and Control Act 1999 require an operator to return a site to a satisfactory state on surrender of an Integrated Pollution Prevention and Control Permit).*

2.2 National Best Practice and Guidance

*IAQM: Guidance on the Assessment of Odour for Planning*⁴

2.2.1 The IAQM document provides non-statutory guidance applicable to the assessment of odours specifically for planning purposes. The guidance outlines an approach for carrying out odour assessments and details information that should be contained in such an assessment report.

*Defra: Odour Guidance for Local Authorities*⁵

2.2.2 Guidance provided by Defra to Local Authorities regarding odour states *'Equally, careful consideration needs to be given to the location of new odour sensitive developments such as residential developments, schools and hospitals near to existing odour sources. Encroachment of odour sensitive development around such sites may lead to problems with the site becoming*

⁴ Bull *et al* (2014). *IAQM Guidance on the Assessment of Odour for Planning*, Institute of Air Quality Management, London.

⁵ DEFRA, *Odour Guidance for Local Authorities*, March 2010

the subject of complaint, essentially creating a problem where there was not one before.'
'Where odour is likely to be an issue, it is important that planning officers consult at an early stage with their EHP colleagues regarding the adequacy of any information provided by the applicant in connection with anticipated odour impacts and the odour mitigation measures being proposed.' Further guidance is provided within the document on measuring and assessing potential odour impacts.

*Defra: Code of Practice on Odour from Sewage Treatment Works*⁶.

2.2.3 The Defra Code of Practice (CoP) on odour nuisance from sewage treatment works provides a high level framework for minimising the likelihood and impact of nuisance from odours from WwTWs. The guidance notes that the achievement of zero odours around sewage treatment works may not be possible in all circumstances and makes the following comments with regards to the issue of proposed or actual development close to such works (often termed encroachment):

'encroachment of odour-sensitive development can lead to significant problems, with existing sewage treatment works becoming subject to complaints, perhaps for the first time'

'The occupiers of any new development are likely to expect and demand high amenity standards and this could result in complaints. Differing circumstances between individual works makes a standard distance 'cordon sanitaire' difficult. However, individual buffer zones can offer a practical means of preventing the exacerbation of existing problems and the occurrence of new ones. The operational and complaints history of a sewage treatment works and other potential odour issues should be carefully considered by Planning Authorities before permitting new development in the immediate vicinity.'

*CIWEM Policy Position Statement on the Control of Odour*⁷.

2.2.4 In 2012 CIWEM issued a policy position statement on the control of odour. The Statement makes the following comments with regards to encroachment:

'With regard to the issue of encroachment between WwTW and residential areas, CIWEM considers that it is not possible to implement a blanket control over these issues; each case must be evaluated on its own merits. Recent experience with the adoption of 'consultation zones' has indicated that such an approach ensures that all parties can work together from an early stage to ensure the opportunities for compatible land uses are maximised.'

⁶ DEFRA, Code of Practice on Odour Nuisance from Sewage Treatment Works, 2006

⁷ The Chartered Institution of Water and Environmental Management (CIWEM), Policy Position Statement, Control of Odour, September 2012

2.3 Odour Standards and Impact

2.3.1 The concentration at which an odour is just detectable to a typical human nose is referred to as the 'threshold concentration'. An odour concentration of 1 odour unit (ou_E/m^3) equates to the level at which 50% of a trained olfactometry panel can detect a faint odour, and is the point of detection. Typical odour concentrations can be described as:

- 1 ou_E/m^3 : odour threshold,
- 3 ou_E/m^3 : the point at which a smell is recognisable,
- 5 ou_E/m^3 : noticeable, but faint, and
- 10 ou_E/m^3 : a distinct smell.

2.3.2 The odour concentrations for normal background odours such as from traffic, grass cutting, plants etc can typically range from 5 ou_E/m^3 to 40 ou_E/m^3 .

2.3.3 The odour quality, hedonic tone (pleasantness or unpleasantness) and concentration can influence the potential for annoyance and perception leading to complaint. Hedonic tones may vary from +4 for very pleasant odours (e.g. bakeries) to -4 for foul ones (e.g. rotting flesh). However, even relatively pleasant odours may become objectionable, if not offensive, by virtue of persistence and intensity.

2.3.4 There are no mandatory numerical standards in the UK for assessing odour levels, although some guideline values can be used for assessing potential odour impacts. Although odours can be due to a single chemical, they are typically due to a complex mixture of compounds making reliable 'chemical' analysis or measurement at source difficult. As such, there is no single method for reliably measuring or assessing odour pollution, and the potential for an odour nuisance, and any conclusion, is best based on a number of pieces of evidence.

2.3.5 The potential for an odour impact will be dependent on a number of factors including:

- likely magnitude of odour emissions (source strength)
- likely meteorological conditions at a site
- sensitivity of the receptors;
- frequency: how often a receptor / individual is exposed to odour
- offensiveness: type of odour; some odours are generally regarded as more unpleasant than others

2.3.6 In establishing benchmark criteria for dispersion modelling it is standard accepted practice to refer to odour concentrations as a 98th percentile of hourly means over a calendar year, referred to as C_{98} . This represents the concentration that will not be exceeded for more than 2% of the time, or 175 hours per annum.

2.3.7 Guidance on odour management and assessment is provided by Natural Resources Wales (NRW)⁸ to operators of industrial, waste and agricultural installations requiring an Environment Permit to operate under the Environmental Permitting (England and Wales) Regulations 2007, and subsequent amendments (referred to as the NRW H4 guidance). The NRW H4 guidance provides benchmark criteria of between 1.5 to 6 ou_E/m³ (as a 98th percentile), depending on the offensiveness of the odour, that may be used to predict the impacts of new proposals where exposure levels are being modelled and that indicate the likelihood of unacceptable odour pollution. The guidance advises however that other assessment methods and site-specific influences should also be taken into account.

2.3.8 The NRW H4 guidance however relates specifically to EPR permitted installations; with regards to WwTW this only covers the large major works and those handling significant quantities of sewage sludge. The CIWEM policy position statement⁷ states that these and other odour impact criteria should be regarded as indicative guidelines and provides the following framework on odour impact criteria:

- >10 ou_E/m³ (C_{98, 1 hour}) – complaints are highly likely and odour exposure at these levels represents an actionable nuisance;
- >5 ou_E/m³ (C_{98, 1 hour}) – complaints may occur and depending on the sensitivity of the locality and nature of the odour at this level may constitute a nuisance;
- <3 ou_E/m³ (C_{98, 1 hour}) – complaints are unlikely to occur and exposure below this level are unlikely to constitute significant pollution or significant detriment to amenity unless the locality is highly sensitive or odour highly unpleasant in nature.

2.3.9 The IAQM guidance states that in any specific case an appropriate criterion may lie somewhere in the range of 1 to 10 ou_E/m³, as a 98th percentile. 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.

3 Methodology

3.1 Scope of the Assessment

3.1.1 The odour assessment has focused on the potential for the WwTW to generate odours and to impact future receptors to be introduced as part of the proposed residential development.

⁸ Natural Resources Wales (NRW): EPR - H4, Odour Management, October 2014

3.1.2 An initial screening assessment has been undertaken to assess the potential for odour to impact the development Site.

3.1.3 In undertaking the odour assessment, SGP has undertaken the following activities:

- site visit to view the proposed site and current situation,
- walkover of the surrounding area to confirm the current site setting and local topography,
- visit to Clawddnewydd WwTW,
- review of baseline air quality and weather conditions, including windspeed and direction data for the meteorological stations at Bala and Rhyl No. 2,
- review of sewerage network plans,
- liaison with DDC regarding local complaints history,
- liaison with Welsh Water regarding the nature of the WwTW, any historical or planned improvements, and any other relevant information,
- three 'sniff surveys' at the site,
- assessment of odours from the WwTW,
- provision of advice on development layout and potential stand-off distances.

3.1.4 In undertaking the odour assessment reference has been made to the guidance provided by IAQM² and Defra³. The IAQM guidance recommends a multi-tool approach to odour assessment. The assessment approach has incorporated consideration of a number of factors such as odour source strength, pathway (distance, local meteorological conditions, natural screening) and initial site surveys with empirical observations. It is considered that this is an appropriate methodology to inform the preliminary assessment.

3.1.5 Site visits incorporating detailed odour 'sniff surveys' were undertaken by K. Hawkins, Partner, SGP, on the 1st of June 2017; by K. Hawkins and F. Hartley, Consultant, on 9th June 2017; and by F Hartley on 20th June 2017. The visit on 9th June 2107 included a visit to the WwTW accompanied by Greg Windsor, the Site Operator.

3.1.6 Additional limited site visits were undertaken by K Hawkins on 25th June, 5th July and 25th July 2017. Photographs of salient features are provided in Appendix A. Full details of the 'sniff survey' methodology and observations are provided in Section 5.

3.2 Sources of Information

3.2.1 In undertaking the assessment reference was made to the following background information:

Table 3.1: Information Sources

date and reference	author and source	purpose and information content
background and topographical information		
Promap, accessed May/June 2017	Ordnance Survey (OS), including 1:10,000 scale mapping	general mapping information including topography, ground features, rights of way, communications etc
Google Earth (imagery date 2015)	aerial photography	site setting
www.magic.gov.uk ; accessed June 2017	multi-agency	interactive web-based map containing general information about site setting
www.environment – agency.gov.uk; June 2017	Environment Agency	general information on industrial pollution sources, environmental permits

3.3 Consultations

3.3.1 Consultations have been held with Sean Awbury, Environmental Health Officer, DCC with regards to the site and proposed scope of work and to review odour complaints in the locality. Information obtained is included within Section 4.

3.3.2 Consultations have been held with Dŵr Cymru Welsh Water regarding the nature of operations at the WwTW. Public sewerage maps were obtained for the site locality. Information obtained is included within Section 4.

4 **Baseline Conditions**

4.1 General Site Setting

4.2 The Site is located on the northern outskirts of the village of Clawddnewydd. The Site comprises an open agricultural field bound by Crud yr Awel to the east; much of the surroundings to the north and wider west and east are agricultural. A builders' yard (C W Turner & Sons) is located to the west, adjacent to the site boundary.

4.3 Clawddnewydd wastewater treatment works (WwTW) is located to the immediate southwest of the Site, less than 10m away at the closest point to the site boundary. The furthest point of the Site is located about 105m from the WwTW.

4.3.1 Site boundaries and immediate environs of the site are:

Table 4.1: Site Boundaries and Environs

	boundary	neighbouring land
north	no defined boundary	Agricultural field, access to builders' yard
east	hedgerow and fencing	road (Crud yr Awel)
south	no defined boundary	access track to WwTW
southwest	security fencing to WwTW	WwTW, enclosed area (likely for livestock)
west	barbed wire fencing	trees, builders' yard and access to yard

4.4 Access to the WwTW is gained from Crud yr Awel to the east of the Site; the edge of the access track forms the southern boundary of the Site.

4.5 The closest existing residential properties to the WwTW are a number of properties on Crud yr Awel 40m to the south and 54m southeast. Cae-wgan is located 158m to the north. In addition, two properties 30m to the east on the opposite side of Crud yr Awel are currently undergoing construction and will form the closest residential development to the WwTW.

4.6 Topography

4.6.1 Ground falls towards the north and northwest of the Site, where the mapped contour lines are marked as 250m aod. Northern areas of the Site are therefore somewhat sheltered from the prevailing wind direction, while the central and southern areas of the Site are located at a similar elevation to the WwTW. A stream (Nant y Cefn) flows 20m to the west of the Site boundary.

4.7 Wind Speed and Direction

4.7.1 The most important meteorological parameters governing the atmospheric dispersion of pollutants are:

- wind direction: determines the broad direction of transport of the emission
- wind speed: affects ground level emissions by determining the initial dilution of pollutants emitted;
- atmospheric stability: a measure of atmospheric turbulence and hence dispersion of pollutants.

4.8 The two closest meteorological stations to the Site are located at Bala (NGR: 293549, 335636) which lies about 22.2 km to the southwest of the Site, and Rhyl No 2 (NGR: 299448, 374652) which lies 23.5km to the northwest.

4.9 The annual windroses for Bala and Rhyl for the years 2006-2015 and 2007-2016, provided by the Met Office, are provided in Appendix C. These depict average wind speeds and directions over a 10-year period. The data is summarised in Table 4.2 below.

Table 4.2: Annual Wind Frequencies – Bala and Rhyl No 2

Sector	Bala	Rhyl No 2
	2007-2016	2006-2015
	All winds (%)	All winds (%)
0°	3.0	2.8
30°	5.1	2.1
60°	14.8	2.5
90°	9.3	2.3
120°	3.2	3.4
150°	2.5	13.6
180°	2.8	9.3
210°	6.9	18.9
240°	38.5	14.5
270°	9.2	11.9
300°	2.8	9.8
330°	2.9	6.0

4.10 The Rhyl No 2 windrose shows the prevailing wind direction to be from sectors 150° through to 300° (broadly south-easterly to north-westerly), with winds from these directions occurring 77.9% of the time. This is broadly similar to typical UK conditions with a prevailing southwesterly wind direction.

4.11 The Bala windrose is very different with a very prominent southwesterly wind direction, with winds originating from sector 240° 38.5% of the time. The Bala windrose is atypical for the UK and it is likely the wind direction at Bala is heavily influenced by the valley of Llyn Tegrid / Bala Lake to the southwest.

4.12 The altitude at Bala station is 163m aod and at Rhyl No 2 the altitude is 77m aod. The altitude at the site is therefore more similar to that at Bala than Rhyl No 2. However, based on the Site setting and topography, and the very strong unusual southwest influence at Bala, the data for Rhyl No2 is considered more likely to be more representative of conditions at the Site than that for Bala.

4.13 Industrial Activities and Other Odour Sources

4.13.1 The adjoining WWTW and potential emissions are discussed further in Section 6.

4.13.2 No other industrial facilities have been identified in the locality which may result in potential odorous emissions. Local agricultural activities may give rise to odour in the area, however there are no farm buildings in the immediate vicinity. Activities at the adjacent builders' yard may also give rise to occasional odours but these are unlikely to be significant.

4.14 Complaints History

4.14.1 DCC advised SGP that no complaints have been received by the Council regarding potential odours associated with the WwTW in the last 5 years.

5 Proposed Development

5.1 Full details on the proposed development are provided in the planning application and supporting documentation. Only those aspects of relevance to the odour assessment are detailed below.

5.2 Proposals are for the development of the site to 9 residential units with associated infrastructure. Proposals are for construction of a new site access to be constructed off Crud yr Awel to the north of the existing WwTW access. Plots 1 – 3 are to be proposed between the new access road and the existing WwTW access track, with Plot 3 lying closest to the WwTW. Plots 4 to 9 extend to the north away from the WwTW across the centre of the existing field.

6 Odour Screening Assessment

6.1 Sources of Odour

6.1.1 The adjoining WwTW has the potential to produce odours due to a wide range of chemical species such as hydrogen sulphide, ammonia, organic sulphides and organic nitrogen based compounds during both normal and abnormal operations. Principal sources of odour from a WwTW include the raw influent, screening processes, sedimentation tanks, and sludge storage and handling. The degree of odours that may arise will depend on a number of factors including general management, design and operation of the plant and odour abatement. For example, rising mains are more likely to produce septicity in sewage rather than gravity sewers due to anaerobic conditions, resulting in a greater potential for odours at the inlet point.

6.1.2 Details on the specific Clawddnewydd WwTW operations have been provided by Welsh Water and obtained through the site visit. The facility is a Oxigest ASP package plant with open-topped activated sludge aeration chambers and final settlement. The plant serves a population equivalent (PE) of 208. Other than the sludge holding tank all parts of the process are open. The WwTW discharges into Nant y Cefn as shown on Welsh Water plans provide in Appendix C. Photographs are provided in Appendix A.

6.1.3 Key points regarding the facility are summarised below:

Table 6.1: Summary of Key Activities

Activity	Comment
Influent	enters the site via gravity flow in the south; all influent is domestic with no local industrial sources, although may receive some agricultural influent; locality does not experience significant variations in population across the year (i.e. as may be experienced through summer visitors); WW advised facility does not typically suffer from septicity
Screening	inlet screw screen discharges sewage debris in small open skip awaiting off-site disposal
Activated Sludge Treatment	open-topped aeration ditch and final settlement tank
Storm water	former storm water tank now used as a balancing tank
Sludge holding tanks	single sludge holding tank; sludge production ~4 kg DS/d; tankered off-site ~1-2 times a month as and when required; enclosed above ground tank other than small vent; advised sludge transfer lasts ½ hr
Discharge	discharges into Nant y Cefn to the north

6.1.4 The works is a very small compact rural works with all areas open other than the sludge storage tank. At the time of the site visit to the works highly intermittent and rare weak to distinct odours were noted at the inlet. Intermittent weak to distinct 'drain' odour was close to the aeration ditch and intermittent and very localised distinct to strong odour was noted immediately adjoining balancing tank. Background pervasive odours were not noted across the works; all odours being very localised.

6.1.5 Key sources of odour are likely to be the inlet, balancing tank and open aeration / final settlement tanks. The sludge tankering operation may also give rise to short-lived increased odour emissions although this is relatively infrequent and for only a short period of time. No sludge handling or tanker collection operations were observed to be occurring at the WwTW during the surveys.

6.2 Odour Management

6.2.1 Recommendations for the management of odours from WwTWs are provided in the Defra CoP. The CoP includes a number of basic means of odour control that would be expected at all WwTW including good housekeeping and raw material handling practices, avoiding anaerobic conditions and minimising septicity. However, even with the adoption of best practice it is recognised that the achievement of zero odour around a WwTW may not be possible in all circumstances.

6.2.2 The facility does not require an installation Environmental Permit and as such the overall site operations are not regulated by either Natural Resources Wales (NRW) or Local Authority. The facility is not therefore required to operate an Odour Management Plan.

6.3 Baseline Conditions

Site and Area Observations

- 6.3.1 To assist in the assessment, and to provide background data on the current site conditions, SGP personnel have undertaken three detailed odour ‘sniff’ surveys. Full details of the surveys and observations are provided in Appendix D; a summary is provided below.
- 6.3.2 Each survey comprised several ‘sniff test’ circuits undertaken during the course of the day. The ‘sniff testing’ was carried out over a period of several minutes at a number of locations across the site in accordance with the IAQM guidance. An additional three short site visits were undertaken where formal surveys were not carried out but a quick assessment of odours made at the site.
- 6.3.3 All the surveys were undertaken by surveyors who have been screened to determine their sensitivity to n-butanol, the reference material specified in the British Standard EN13725:2003 which details the determination of odour concentration by dynamic olfactometry. The criteria for being selected as an odour panellist are a mean detection threshold between 20 and 80ppb and a standard deviation of less than 2.3. Both surveyors were within the range of acceptability for an odour panel.
- 6.3.4 During the ‘sniff survey’, time, wind direction and wind strength was recorded at each location. Weather conditions were also noted. Any odours detected were qualitatively assessed against intensity (average and maximum), unpleasantness, and pervasiveness/extent as detailed below.

Table 6.1: Odour assessment criteria (as defined in IAQM guidance)

Intensity (VD)	
0	No odour / odour not perceptible
1	Slight / very weak – probably some doubt as to whether odour is present
2	Slight/weak – odour is present but cannot be described using precise words or terms
3	Distinct – the odour character is barely recognisable
4	Strong – the odour character is easily recognisable
5	Very strong – the odour is offensive. Exposure to this level would be considered undesirable
6	Extremely strong – the odour is offensive. Instinctive reaction would be to mitigate against further exposure
Unpleasantness	
1	Pleasant
2	Neutral

3	Unpleasant
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6.3.5 During two of the surveys the wind direction was predominantly southwesterly across the WwTW towards the site. The weather was warm with a typically gentle to fresh breeze. A third survey was undertaken at the end of June following a prolonged period of warm dry weather; on this occasion however the wind direction was generally away from the WwTW.

6.3.6 A fourth short site visit was again undertaken following a prolonged warm period and a fifth evening visit was made at the end of a warm day. A sixth short morning visit was made during dry weather following a mixed period of weather.

6.3.7 It is considered that the surveys have been undertaken in favourable weather conditions to detect odour in the vicinity of the WwTW and are appropriate to inform the preliminary assessment.

6.3.8 On the initial two visits intermittent *weak* to *distinct* odours were noted at the WwTW boundary. These appeared to be highly localised and were not pervasive. A persistent *very weak* to *slight* odour was however noted in the area of proposed Plots 1 to 3 with a rare *distinct* odour potentially extending into the area of Plot 4. *Distinct* to *strong* odours were noted on occasion along the WwTW access track.

6.3.9 On the fourth visit a *strong* odour was noted at the track access and extended across Plots 1 – 3 and into Plot 4; this was *very strong* within 10m of the WwTW boundary. The odour on this occasion was considered to be offensive. On the fifth visit however, which was carried out in the early evening following a warm day when odours may be expected to be strong from a WwTW no odours were detected within the Site. The only odour noted on this occasion was a very short-lived *distinct* odour on the WwTW boundary. Similarly on the sixth short visit no odours were noted within the Site, although *distinct* to *strong* odours were noted on the WwTW boundary.

Complaints History

6.3.10 As noted above DCC advised it has not advised of any complaints being received due to odours associated with the WwTWs operations.

6.4 Encroachment Risk Assessment

6.4.1 To inform the assessment reference has been made to guidance issued by Anglian Water⁹ which provides a methodology for determining whether development proposals potentially pose a low, medium or high risk to the company's assets and the degree of assessment required in support of development proposals. The guidance is based on information obtained from site

⁹ Anglian Water, Asset Encroachment Risk Assessment Methodology: Guidance Document, version 1, December 2012

managers and odour modelling¹⁰. Where sites are deemed to pose a medium or high risk additional aspects that may require consideration include whether there is a history of complaints, number of properties that are a similar / same distance as the proposed development and nature of the development. Dŵr Cymru Welsh Water have not issued any similar such guidance.

6.4.2 The guidance categorises WwTWs based on the population served; the categories range from Category 1 for a population equivalent (PE) of up to 1,000 to Category 7 for >100,001. On this basis Clawddnewydd WwTW is classified as 'Category 1' (serving a PE of 0-1,000) and is effectively a small treatment works with reduced potential for generation of significant odours. With a PE of 208 the works lies at the lower end of this category.

6.4.3 Based on the Anglian Water classification, proposed development within 100m of a Category 1 WwTW may be considered to be at '*medium*' risk of amenity impacts due to odour from the WwTW, i.e. there may be a risk of odour impacts, and requires further consideration. Development beyond 100m and beyond may be considered of '*low*' risk; i.e. development unlikely to pose a risk.

6.4.4 The Site lies to the immediate east / northeast of the WwTW and all the proposed development area lies within 100m of the site boundary. This area would therefore be considered to be of *medium* risk of amenity impacts in the absence of further supporting information.

6.4.5 It is noted that the Anglian Water risk assessment is based on modelling of typical sizes of WwTW within each PE band and likely odour emission rates. The distance risk matrix that was developed took into account where the modelling predicted potential odour concentrations may be above $1.5 \text{ ou}_E/\text{m}^3$, with the provision of an additional buffer of 50m to the results.

6.5 Screening Assessment

6.5.1 Further screening assessment has therefore been undertaken with reference to the IAQM qualitative framework. This takes into account detailed information on the WwTW, location of existing sensitive receptors, local topography and weather conditions and the Site visit observations.

6.5.2 Although only a small works, the WwTW is mainly open topped and may be considered to have a *small* to *medium* source odour potential. Odours have been typically noted on the WwTW boundary during the site visits; however these have frequently been intermittent, highly localised and not pervasive.

¹⁰ Jones E., Dean J, and Bull M, The development of an Odour Risk Assessment method for Anglian Water, 18th European Biosolids & Organics Resources Conference & Exhibition,

- 6.5.3 The closest existing residential properties to the WwTW are located 40m to the south; the closest downwind property is located 158m to the north. These are all further away than the proposed development. DCC advises that no complaints have been received regarding odours from the WwTW from these or other properties. Given the distance and orientation of these properties to the Works the absence of complaints does not confirm the absence of potential odour impacts closer to the WwTW. It does however indicate that the WwTW does not give rise to significant odour issues in the wider area.
- 6.5.4 The development Site lies downwind of the prevailing wind direction from the WwTW, with the cumulative frequency of winds blowing toward the north and northeast from the WwTW across the Site 55% of the time (from 180° to 270° sectors). This represents the maximum period of time when odour may be dispersed in the main direction of the Site. Given the proximity of the Site there is also the potential for odours to extend in this area during calm periods. It is considered there would be a *highly* effective pathway of odour flux to receptors in the immediate vicinity of the WwTW. The pathway may reduce to *moderate* for receptors located further away in the northern part of the Site.
- 6.5.5 With reference to Table 9 of the IAQM guidance the WwTW may result in a **negligible** to **medium** risk of odour impacts at the Site, with the risk decreasing across the Site. This results in potential **moderate**, decreasing to **slight** and **negligible**, adverse effects across the Site.
- 6.5.6 On the basis of the site observations and comments above, at this stage it is considered that areas of the Site closest to the WwTW would not be suitable for residential development due to potential loss of amenity from odours. Distinct to strong odours have been noted extending to the proposed Plot 4 on occasion. At this stage, on the basis of the information currently available, it is considered a buffer zone of about 50m should be provided to the WwTW boundary to minimise the potential for adverse amenity impacts. Further assessment is currently being undertaken incorporating atmospheric dispersion modelling to provide further information on the recommended buffer zone.
- 6.5.7 The WwTW is accessed via a track that forms the southern boundary of the Site. Odour impacts on future residential development may also therefore arise from sludge tanker movements along this track. Any such odour arising from such movements are however very short lived and highly infrequent. In addition, new properties are currently being constructed at the access point, this is not considered a significant additional constraint to the development.

7 Summary and Conclusions

- 7.1 A preliminary odour assessment has been undertaken to assess the potential impacts of odours arising from the nearby waste water treatment works to the proposed future use of the Site for residential development.
- 7.2 The assessment has comprised a review of background information, including complaints history for the locality, along with 'sniff' surveys across the Site, to determine the potential for odours to arise at the treatment works, and for any such odours to impact potential future residential use of the land.
- 7.3 The treatment works serves a small population and therefore has a reduced potential to give rise to significant odours. DCC has advised that no complaints regarding odours have been reported in the area for the last 5 years and hence the WwTW does not appear to give rise to significant odours in the wider area, and particularly to the southeast where there are existing properties.
- 7.4 The proposed development is however located immediately downwind of the WwTW and the proposals would involve the development of sensitive receptors in closer proximity to the WwTW than currently exist.
- 7.5 Intermittent weak to very strong offensive odours have been detected on occasion at the WwTW boundary. On one visit very strong odours persisted to about 10m away from the boundary, and remained strong in proposed Plots 1-3 and into Plot 4. On other occasions odours were, at most, slight on Plots 1-3 and distinct into Plot 4, and were frequently undetected away from the WwTW boundary.
- 7.6 Based on the information review and preliminary assessment it is considered that parts of the Site may be suitable for residential development. However, it is advised a buffer zone should be provided to the WwTW to provide adequate off-set to minimise the risk of loss amenity due to odour. At this stage, it is recommended this should extend to about 50m from the WwTW boundary.
- 7.7 In addition, in the absence of any existing screening, it is recommended landscaping screening is provided within any buffer area. Although such screening may not serve to disperse odours it can offer a psychological effect and minimise visual impacts which can reduce the potential for odours to cause annoyance to residents.
- 7.8 Further assessment is currently being undertaken through atmospheric dispersion modelling to inform this assessment. This report will be updated when results are available.

DRAWINGS

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APPENDIX A

Photographic Record

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APPENDIX B

'Sniff Survey' Field Observations

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APPENDIX C

Bala and Rhyl No 2 Windroses

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APPENDIX D

Dŵr Cymru Welsh Water Sewer Map

