Cameron Austin-Fell

From: Sally Jones <Sally.Jones@warwickdc.gov.uk>
Sent: 11 March 2014 11:16
To: Tim Watton
Subject: SHLAA - Land at Baginton

Tim,

I'm forwarding the EH comments from Mike Jenkins.

Steve's email is stephen.hay@warwickdc.gov.uk

Regards,

Sally

From: Michael Jenkins
Sent: 13 February 2014 16:12
To: Sally Jones
Cc: Grahame Helm
Subject: RE: SHLAA - Land at Baginton

Hi Sally,

I've reviewed the odour and noise assessments for the above land and have the following general comments:

Noise
Outdoor areas are predicted to be exposed to noise levels above our acceptable criteria (50dB). Parts of the west of the site are predicted to be in the 60 to 55 dB(A) range with the rest in 50- to 55dB(A). This noise is from Stoneleigh and Coventry Road. The airport is not currently having a dominant affect because of its scaled down operation, however the proposed site is in line with the runway for the site so if air traffic movements increased or larger aircraft visited and movements took place at night, the airport could have a significant impact. Internal noise levels in proposed houses can be controlled by acoustically specified windows and acoustic trickle vents, but we would want the developer to avoid a reliance on acoustic trickle vents where possible as they aren't really adequate in warmer weather. This means the developer needs to design the internal layout of properties to position non-habitable rooms next to high noise levels facades, and keep habitable rooms in quieter areas of the house, so that residents can open their windows and not be exposed to noise.

In my view these issues aren't a reason for refusal but the developer should be required to improve the proposed layout of the housing and use mitigation (perhaps acoustically specified fencing) in the most exposed gardens to achieve the 50dB criteria. Improving the layout could involve reducing the number of proposed houses to allow for mitigation and more distance attenuation of road traffic noise. With respect to Coventry Airport, I don't see that we could object on the basis that the airport might become an issue in the future.

Odour
The assessment has predicted that odour will be detectable on site; however the prevailing wind direction is predominantly away from site, and towards existing residents who aren't currently complaining about odour. Again, whilst the proximity of the site to the sewage treatment works is a concern, on the basis of the assessment findings I don't see that we would have grounds to object but a well-structured bund could help to mitigate the odour on site so I think we could consider conditioning this for the proposed public open space area to the west of the site.

Land Contamination

The proposed site is in near to a former infilled quarry where elevated levels of landfill gas have been determined. This area has been forwarded for further investigation under Part IIA and the area is currently listed amongst the Council"s high priority sites. As a result we would require a contaminated land risk assessment to be carried out for any residential development on the site.

Best regards,

Mike Jenkins

Environmental Health Officer (Career Grade)
Environmental Sustainability
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- -
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Warwickshire, CV32 5HZ.

From: Grahame Helm
Sent: 11 February 2014 13:00
To: Michael Jenkins
Subject: SHLAA - Land at Baginton

Hi

Can we discuss this tomorrow afternoon (baby permitting!!) as I am working from home in the morning. Sally Jones came to see me this morning to drop off a new Odour Assessment and new Acoustics Report submitted by RPS. You will see from the attached letter that there is some confusion because RPS allege that this site was ok'd by environmental health back in 2009 and planning policy acted against this advice. I have advised Sally that this is now academic because given the changes to Coventry Airport and proposed Gateway project, etc, we wouldn't now have accepted reports carried out 5 years ago.

Now the good news – Sally needs our comments by early next week.

Grahame

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Land South of Baginton, Warwickshire

Odour Assessment

For Lenco Investments

Land South of Baginton, Warwickshire

Odour Assessment

For Lenco Investments

Prepared by:	Debbie Henderson PhD, BSc (Hons), MIAQM, MIEnvSc	Senior Consultant	DH.	06/01/2014
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Quality Management

Revision History				
Rev	**Date**	**Status**	**Reason for revision**	**Additional comments**
0	06/01/2014	Draft	-	-

Contents

Tables and Figures

Tables

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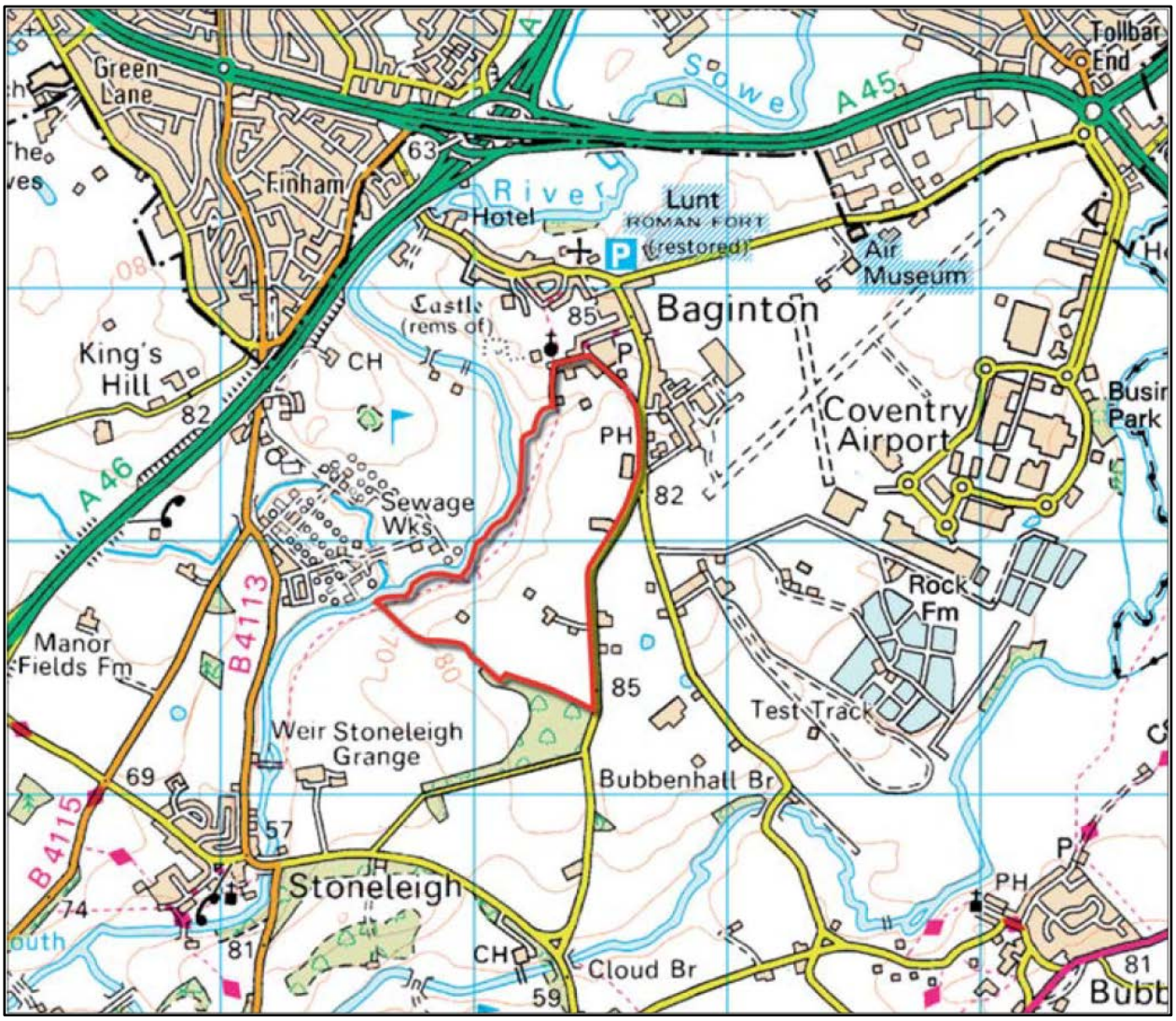
1 Introduction

1.1 RPS was commissioned by Lenco Investments to undertake an odour assessment for an area of land to the south of Baginton in Warwickshire. The land covers an area of approximately 50 hectares and is proposed to be included in the Local Plan as designated for residential use. Figure 1, reproduced from the November 2009 report promoting the site as a sustainable urban development [1], shows the location of the site.

Figure 1 Location of Site



Source: RPS Planning and Development (2009) [1]

1.2 The site is currently in agricultural use and is bordered by the village of Baginton to the north, Coventry Airport to the north-east, Coventry Golf Club to the west and agricultural land to the south and east.

1.3 The Finham Sewage Treatment Works (STW) is located to the south-west of the site, with the closest point being approximately 100 m from the area of the site that would be developed. This

odour assessment has been carried out to consider the potential for odour issues at the site due to the proximity to the STW, which may affect its suitability for residential use.

1.4 This report begins by setting out the legislative context for odour impacts. A review of publicly available data on odour concentrations around Finham STW is then presented. The methods and results for the sniff testing surveys are then described. Results of the odour complaints data analysis are presented. A conclusion has then been drawn on the suitability of the site, in odour terms, for its proposed use.

2 Legislative and Regulatory Framework

2.1 The relevant planning framework and guidance is summarised below.

National Planning Policy Framework

2.2 In March 2012, the National Planning Policy Framework (NPPF) [2] was published. The document provides a framework within which plans will be produced at a local level to reflect the individual needs and priorities of separate communities. The NPPF constitutes guidance and is a material consideration for local planning authorities and decision-takers in determining applications. At the heart of the NPPF is a presumption in favour of sustainable development. For determining planning applications, this means approving development proposals if they accord with the local development plan, unless material considerations indicate otherwise. If the development plan is absent, silent or the policies are out of date, then planning permission should be granted unless any adverse impacts would significantly outweigh the benefits, or specific policies in the NPPF indicate development should be restricted.

2.3 The NPPF states that sustainable development has economic, social and environmental dimensions. In the environmental dimension, the planning system contributes to *"protecting and enhancing our natural, built and historic environment; and, as part of this, helping to improve biodiversity, use natural resources prudently, minimise waste and pollution, and mitigate and adapt to climate change including moving to a low carbon economy."* (Paragraph 7)

2.4 Within the overarching roles, the NPPF sets out 12 core land-use planning principles. The relevant core principle in the context of this assessment is that planning should "contribute to conserving and enhancing the natural environment and reducing pollution" (Paragraph 17), as set out below.

2.5 As stated in the NPPF, pollution is *"anything that affects the quality of land, air, water or soils, which might lead to an adverse impact on human health, the natural environment or general amenity. Pollution can arise from a range of emissions, including smoke, fumes, gases, dust, steam, odour, noise and light."* The term 'pollution' can therefore be seen to include odour.

2.6 Under the heading 'Conserving and Enhancing the Natural Environment', the NPPF states:

"The planning system should contribute to and enhance the natural and local environment by:

- *…*
- *preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability…"* (Paragraph 109)

"To prevent unacceptable risks from pollution and land instability, planning policies and decisions should ensure that new development is appropriate for its location. The effects (including cumulative effects) of pollution on health, the natural environment or general amenity, and the

potential sensitivity of the area or proposed development to adverse effects from pollution, should be taken into account." (Paragraph 120)

"In doing so, local planning authorities should focus on whether the development itself is an acceptable use of the land, and the impact of the use, rather than the control of processes or emissions themselves where these are subject to approval under pollution control regimes. Local planning authorities should assume that these regimes will operate effectively. Equally, where a planning decision has been made on a particular development, the planning issues should not be revisited through the permitting regimes operated by pollution control authorities." (Paragraph 122)

Nuisance Provisions

2.7 Part III of the Environmental Protection Act 1990 defines a number of statutory nuisances and includes: *"any dust, steam, smell or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance"*. The Act places a duty on local authorities to investigate the likely occurrence of statutory nuisance and to take reasonable steps to investigate local complaints. Where a local authority is satisfied of the existence or recurrence of statutory nuisance it must generally serve an abatement notice requiring the execution of such works and other steps necessary to rectify the nuisance. If ignored, this can result in proceedings in the Magistrates Court and imposition of an order to prevent the nuisance and a fine. The Act provides a defence for the operator to demonstrate that the Best Practicable Means (BPM) have been used to control potential nuisance. For a nuisance action to succeed the offence also has to be a cause of material harm or to be persistent or likely to recur.

2.8 It is important to note that there is no numerical odour concentration limit that can indicate unequivocally whether a statutory (or other) nuisance is being caused and it is ultimately only the Court that can decide at what point it becomes "prejudicial to health or a nuisance" and whether a statutory nuisance is occurring.

Local Planning Policy

2.9 The Warwick District Council Local Plan [3] was adopted in 2007 and sets out policies for the district. A new local plan is being developed to replace the Local Plan, and this is currently being consulted on.

2.10 The policy in the Warwick District Council Local Plan relevant to this assessment is as follows:

"*DP2 Amenity*

Development will not be permitted which has an unacceptable adverse impact on the amenity of nearby uses and residents and/or does not provide acceptable standards of amenity for future users/occupiers of the development."

2.11 This indicates that, if an acceptable standard of amenity is not provided for future users, development on the site would not be permitted.

3 Odour around Finham Sewage Treatment Works

Background

3.1 Most odours are mixtures of many chemicals that interact to produce what we detect as a smell. Odour-free air contains no odorous chemicals, whilst fresh air is usually perceived as being air that contains no chemicals or contaminants that are unpleasant (i.e. air that smells 'clean'). Fresh air may contain odorous chemicals, but these odours will usually be pleasant in character, such as freshly-mown grass or sea spray. Perceptions of an odour - whether we find it acceptable, objectionable or offensive - are partly innate and hard-wired, and partly determined through life experiences and hence can be subjective to the individual.

3.2 Before annoyance or nuisance can occur, there must be odour exposure. For odour exposure to occur all three links in the source-pathway-receptor chain must be present.

a) An emission **source** – a means for the odour to get into the atmosphere.

b) A **pathway** – for the odour to travel through the air to locations off site, noting that:

i. anything that increases dilution and dispersion of an odorous pollutant plume as it travels from source to receptor will reduce the concentration at the receptor, and hence reduce exposure.

ii. dilution and dispersion increase as the length of the pathway increases.

iii. increasing the length of the pathway (e.g. by releasing the emissions from a high stack) will – all other things being equal – increase the dilution and dispersion.

c) The presence of **receptors** (people) that could experience an adverse effect, noting that different people vary in their sensitivities to odour.

3.3 By convention, we restrict the term odour impact to 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 annoyance, nuisance and possibly complaints.

3.4 Both, or either, annoyance and nuisance can lead to complaint action. However, a lack of complaints does not necessarily prove there is no annoyance or nuisance. On the other hand, there needs to be an underlying level of annoyance before complaints are generated. The responses of annoyance and nuisance can change over time.

Sources, Pathways and Receptors at the Proposed Site

3.5 The closest area of the site that would be developed lies approximately 100 m from the closest point of the Finham STW. The Finham STW site covers a large area, measuring approximately 650 m north to south and 750 m east to west. The site proposed for inclusion in the Local Plan

measures approximately 1.3 km north to south and 900 m east to west. Therefore, parts of the site are located a considerable distance from the STW.

3.6 There are plans to upgrade the sludge handling operations at Finham STW. As part of the planning application for these works, an odour assessment was carried out to determine what impact there would be on odour concentrations around the STW as a result of the proposed works. This section of the report considers the findings of the odour assessment for the STW [4] to determine the likely odour levels at the proposed site.

3.7 The proposed works at the STW was granted planning permission [5] and the works are due to take place over the next two years (from March 2013) [6].

Finham STW Odour Assessment

3.8 An odour assessment was carried out in 2012 that included monitoring of odour releases and modelling of the dispersion of odour from Finham STW [4]. The report concluded that odour levels may increase slightly as a result of the proposed works to upgrade the sludge handling operations. Figure 2, reproduced from the odour assessment for the STW [4], shows the contour plots of the 98th percentile of hourly mean odour concentrations around Finham STW. The contours represent the 5 $ou_E.m^{-3}$ and 1.5 $ou_E.m^{-3}$ odour concentration contours for the existing situation (yellow and green shading with solid contour lines) and for the future situation with the proposed works completed (grey shading with dashed contour lines).

3.9 During a Public Inquiry into a planning application by Northumbrian Water for the upgrading of Newbiggin-by-the-Sea STW, an odour criterion of 5 ou/m^3, as a 98th percentile of hourly means over a calendar year was proposed by the applicant and accepted by the Inquiry Inspector [7]: "*There are no guidelines against which to assess odour emissions. However, the technique (olfactometry) defines a "faint odour" as one lying within the range of 5 – 10 ou m^{-3}. While a particularly sensitive person could detect an emission level as low as 2 ou m^{-3}, it seems to me that adoption of a level of 5 ou m^{-3} for the appeal site proposals is both reasonable and cautious*".

3.10 In 2007, Defra published its Code of Practice on odour from STWs [8], which provides both general and specific advice to local authorities and STW operators for the avoidance of odour nuisance. It does not, however, provide any guidance as to what are acceptable odour annoyance criteria, in terms of odour concentrations.

3.11 The Chartered Institution of Water and Environmental Management (CIWEM) produced guidance for application to wastewater treatment sites [9]. CIWEM's position on odour impact criteria is summarised in the document as follows: "*CIWEM considers that the following framework is the most reliable that can be defined on the basis of the limited research undertaken in the UK at the time of writing:*

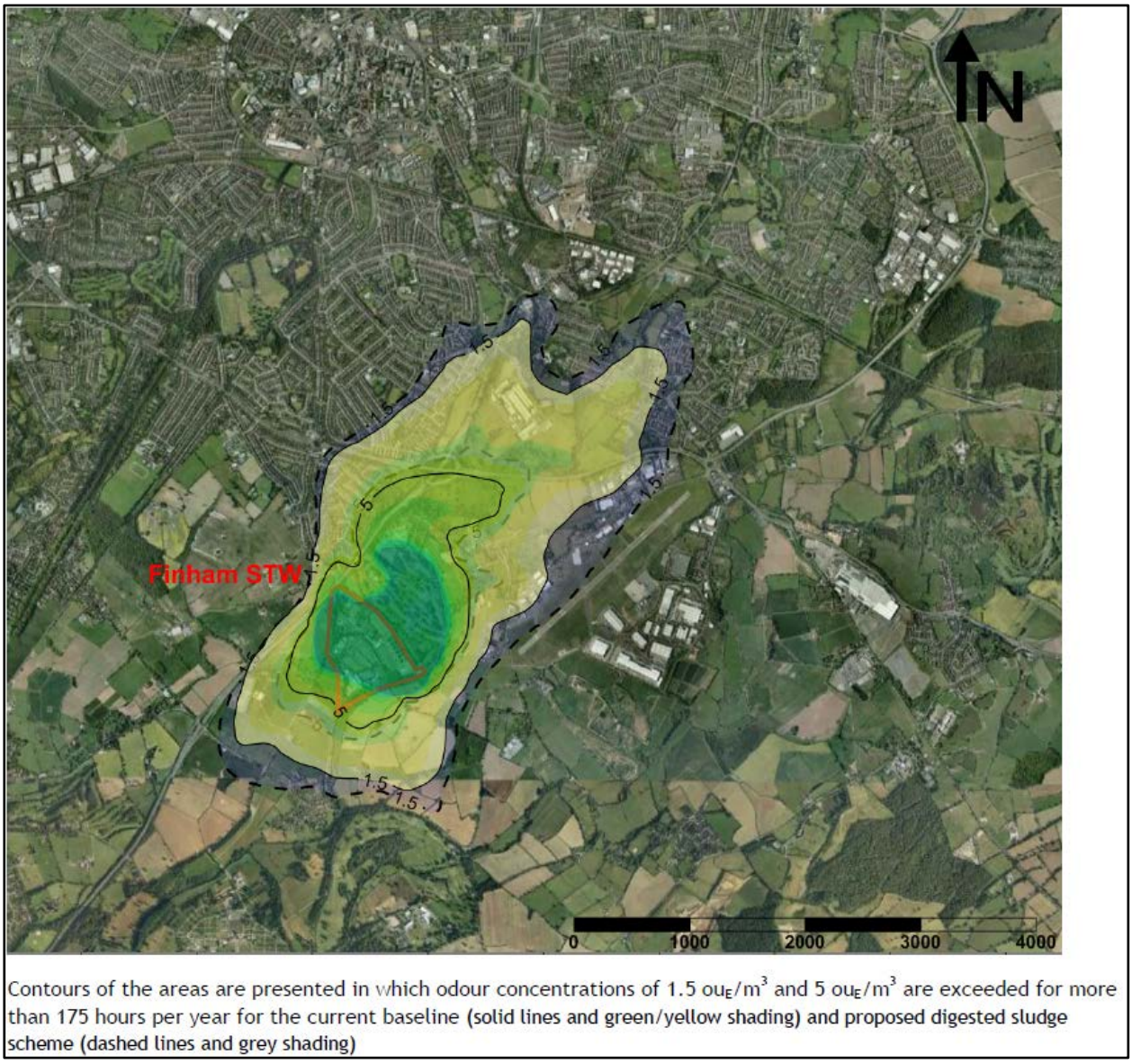
- *C_{98}, 1-hour >10 ou_E/m^3 - complaints are highly likely and odour exposure at these levels represents an actionable nuisance;*
- *C_{98}, 1-hour >5 ou_E/m^3 - complaints may occur and depending on the sensitivity of the locality and nature of the odour this level may constitute a nuisance; and*

- *C_{98}, 1-hour <3 ou_E/m^3 - 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 the odour highly unpleasant in nature."*

3.12 Odours arising from the wastewater treatment sector have been studied over the last 20 years in the UK and have been the subject of public inquiries and a notable High Court case. Accordingly, it may be considered that the criteria proposed in the CIWEM position policy statement are underpinned by a substantial body of practical experience and evidence.

3.13 Based on these criteria, it is unlikely that there would be a significant odour issue where the 98th percentile of hourly mean odour levels were below 5 $ou_E.m^{-3}$.

Figure 2 Odour Contour Plots for Finham STW



Contours of the areas are presented in which odour concentrations of 1.5 ou_E/m^3 and 5 ou_E/m^3 are exceeded for more than 175 hours per year for the current baseline (solid lines and green/yellow shading) and proposed digested sludge scheme (dashed lines and grey shading)

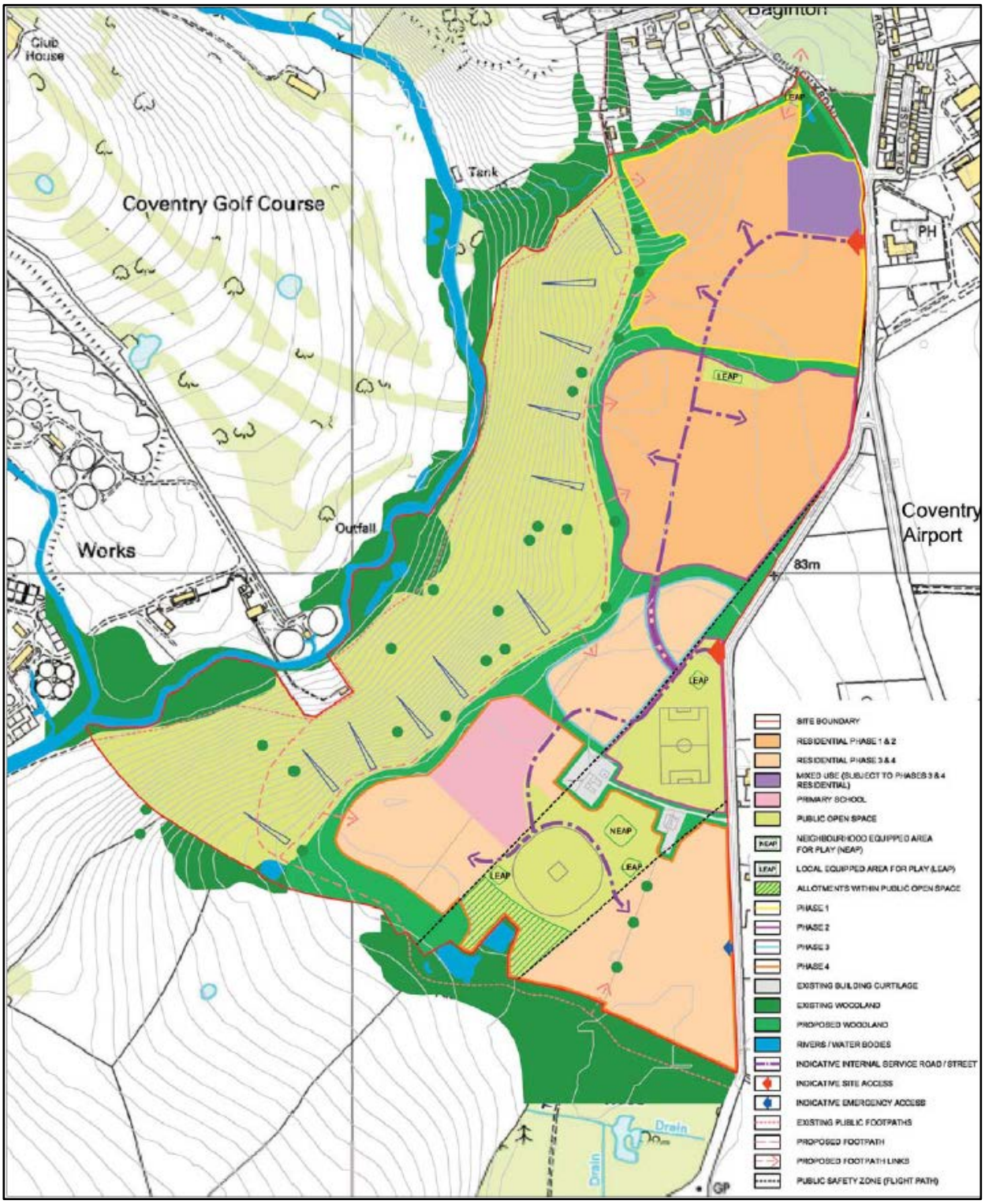
Source: Odournet (2012) [4]

3.14 The contour plots show that odour is more likely to be experienced by receptors to the north of the STW, rather than to the east, where the site proposed for inclusion in the Local Plan for

residential use is located. This is consistent with the wind rose in the Finham STW odour assessment report [4], which shows the prevailing wind direction in the area is south-westerly, approximately parallel with the orientation of the proposed site.

3.15 The side of the proposed site that is closest to the STW slopes down noticeably towards the works, and is not proposed for residential use due to this terrain feature. The current outline of proposed land uses from the illustrative concept masterplan for the site is shown in Figure 3. The orange areas on the map represent proposed residential areas (darker orange for Phase 1, lighter orange for Phase 2), the purple area represents a mixed-use area, the pink area represents a primary school and the light green areas represent public open space.

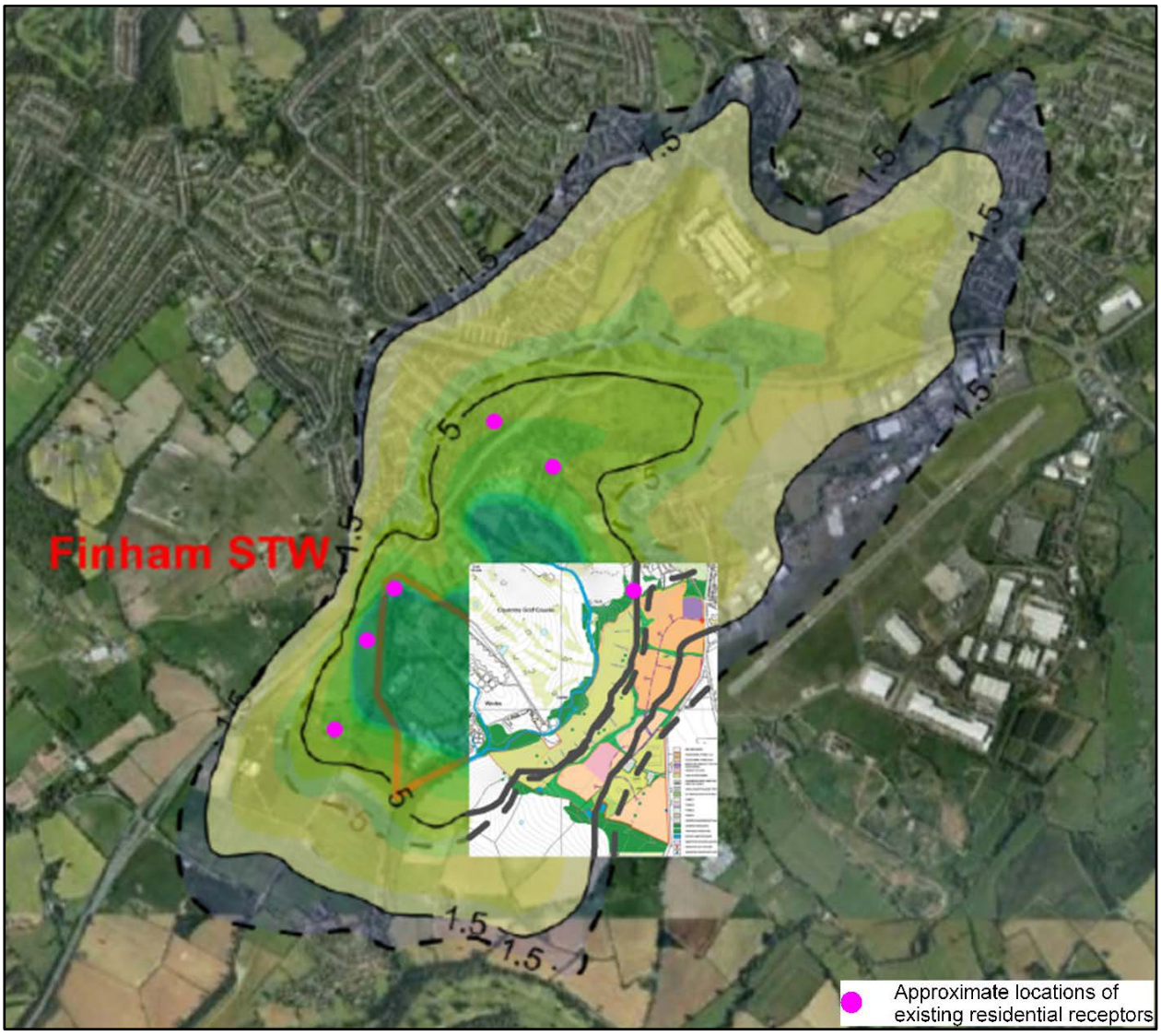
Figure 3 Illustrative Concept Masterplan for the Site



Source: RPS Planning and Development (2009) [1]

3.16 The illustrative concept masterplan has been superimposed on the figure with the odour contours to indicate the likely odour concentrations at the site. This is shown in Figure 4.

Figure 4 Odour Contours with Illustrative Concept Masterplan for the Site



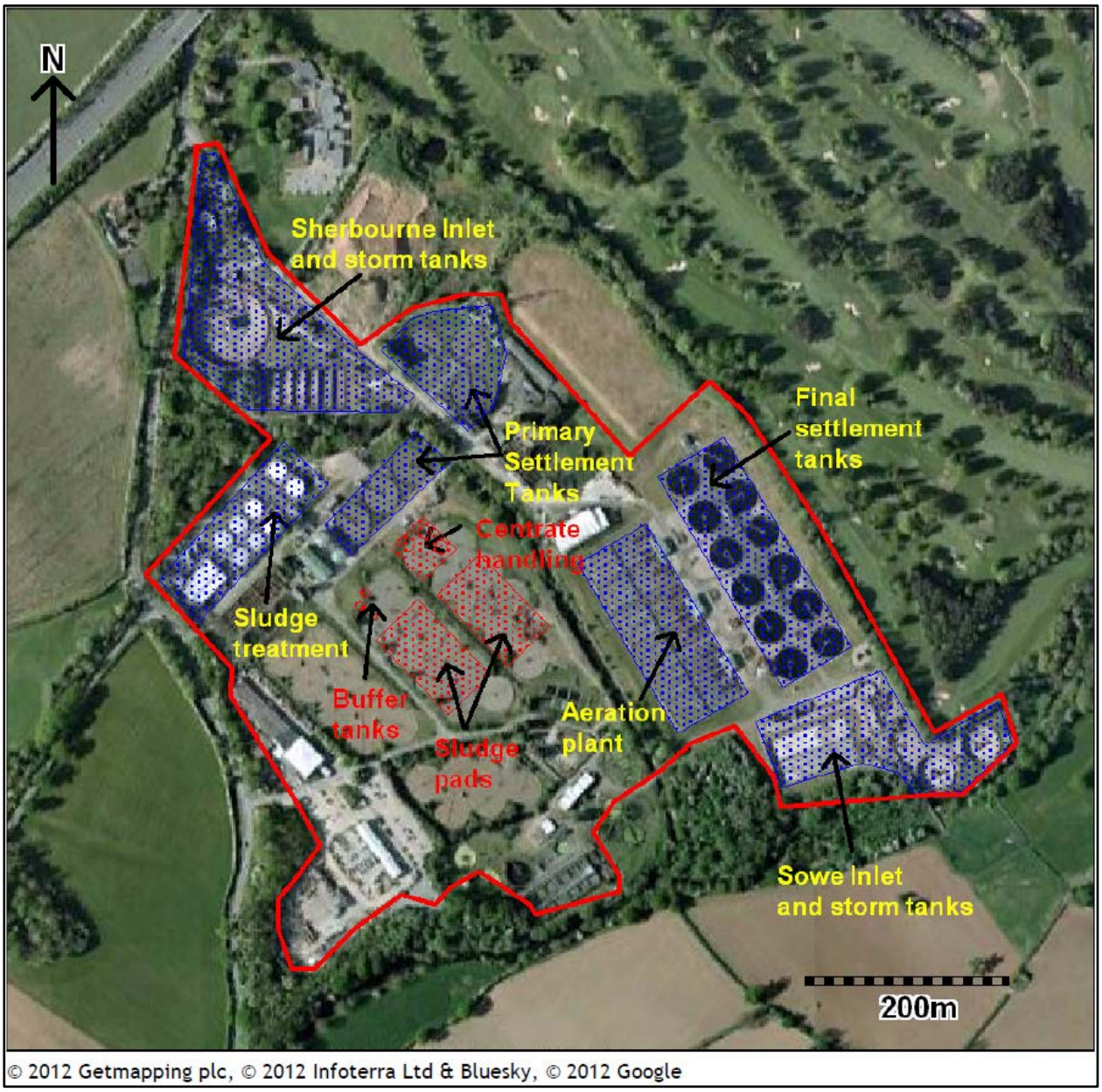
Sources: RPS Planning and Development (2009) [1]; Odournet (2012) [4]

3.17 Figure 4 shows that, of the developed, residential areas proposed for the site in the illustrative concept masterplan, only a very small area in the north-west would fall within the 5 $ou_E.m^{-3}$ odour contour. The residential area in the south-east of the site would fall outside of even the 1.5 $ou_E.m^{-3}$ contour.

3.18 Figure 4 has also been annotated with the locations of some existing residential receptors around Finham STW. Many of these lie well within the 5 $ou_E.m^{-3}$ contour, in particular the residential settlements on Mill Hill and Coventry Road and in Finham to the north of the STW, and individual properties on the B4113 St. Martin's Road to the west of the STW. The areas of the site proposed for inclusion in the Local Plan for residential use are predicted to experience lower odour concentrations than at these existing residential areas.

3.19 The Finham STW odour assessment provided a layout plan of the STW with the proposed upgrade to the sludge handling operations in place; reproduced in Figure 5.

Figure 5 Proposed Site Layout for Finham STW

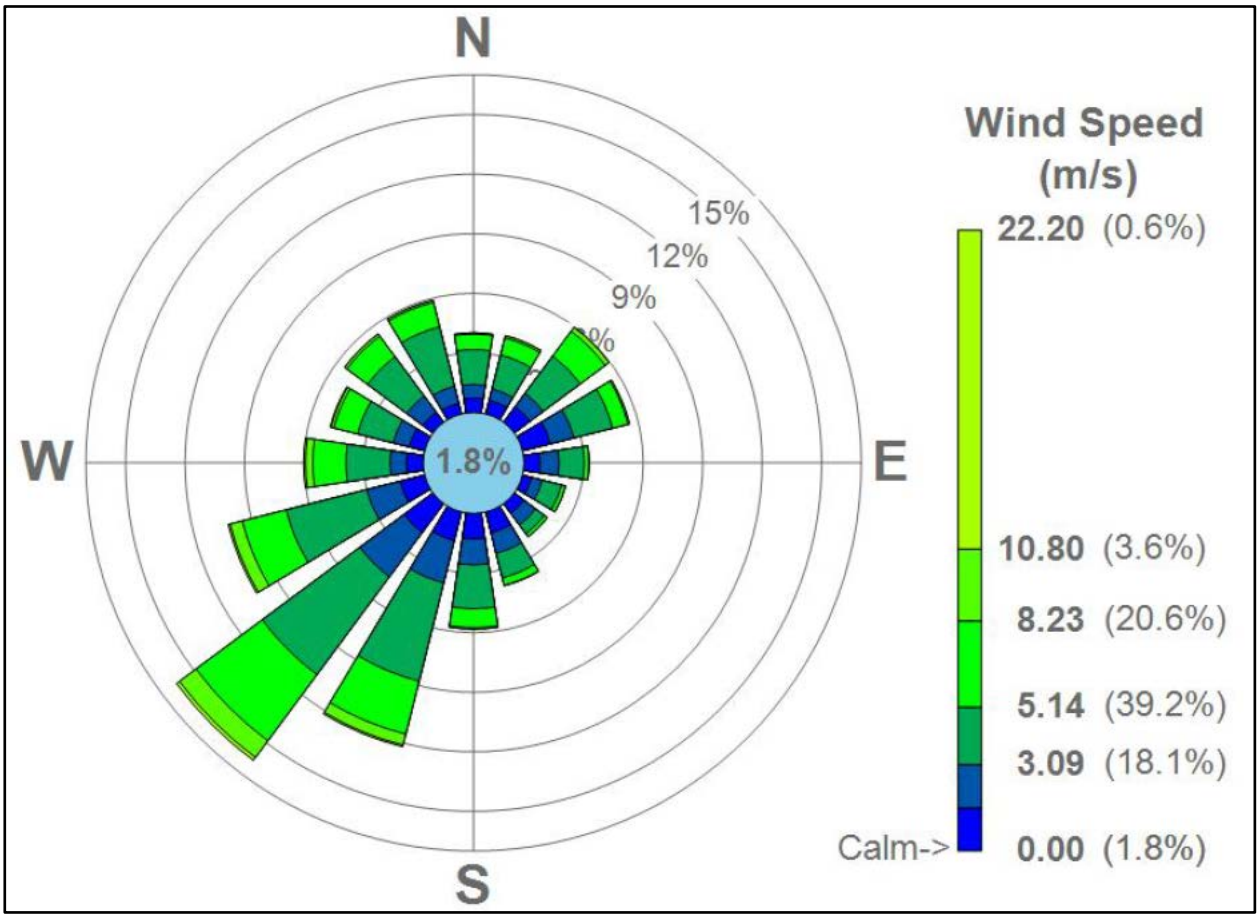


Source: Odournet (2012) [4]

3.20 Table 5 in the Finham STW odour assessment report [4] indicates that around 15% of odour emitted from the STW would originate from the plant at the eastern side of the STW site (the final settlement tanks, aeration plant and Sowe inlet and storm tanks), closest to the site proposed for inclusion in the Local Plan for residential use. Around 85% of odour emitted from the STW would originate from the plant and equipment to the west of the STW facility, farther from the site. The biggest emitters of odour from the STW are the primary settlement tanks, which are located around 700-800 m from the areas on the site proposed for residential use in the illustrative concept masterplan.

3.21 The wind rose from the Finham STW odour assessment report is reproduced in Figure 6.

Figure 6 Wind Rose for Coventry Airport Meteorological Station, 2005-2007



Source: Odournet (2012) [4]

3.22 Figure 4 shows that the site would be downwind of the STW when the wind is westerly or north-westerly. As can be seen in Figure 6, westerly, west-north-westerly and north-westerly winds occur relatively infrequently, typically for 6% of the time or less for each direction. Therefore, the site would likely be downwind of the STW less than 18% of the time. Most of the time, with the prevailing wind direction from the south-west, odours from the STW would be expected to be carried to the north-east, parallel to the site (as evidenced in the odour contour plots in Figure 2 and Figure 4).

3.23 In summary, while some odour from Finham STW may be detectable in parts of the site, only a small portion of the residential areas of the site is predicted to experience 98th percentile of hourly mean odours exceeding 5 $ou_E.m^{-3}$ and the odour levels on the site are predicted to be lower than those experienced at existing residential receptors in the area. In addition, the most odorous parts of the STW are located on the far side of the STW facility from the site and, under the prevailing wind direction, odours would not be expected to be carried towards the site from the STW.

4 Sniff Testing Methodology and Results

Methodology for Odour Monitoring by Sensory Testing

4.1 Sensory testing of odours ('sniff testing') was carried out on three separate occasions, to sample existing odour levels at the site. This section describes the sniff testing methodology and results.

4.2 Odour assessment in the field using subjective, sensory testing is a tool whereby a trained odour assessor records the attributes of the odour that determine its impact, namely the Frequency, Intensity, Duration, Offensiveness and Location (the so-called FIDOL factors). This procedure describes how these attributes of the odour can be measured in ambient air so that the impact of the odour can be assessed for a given location.

4.3 The assessment is "sensory" in that the human nose is used as the detector – a sound approach considering that (currently at least) no analytical instrument can give a unified measure of a complex mixture of compounds that quantifies it as a whole in the same way that a human experiences odour.

Measurement Method

4.4 Sensory testing was carried out by trained and qualified odour assessors, using RPS' documented procedure, which is a development of the Environment Agency's H4 Sniff Test Protocol [10] and the German national VDI standard [11], allowing the odour impact to be estimated from the FIDOL factors in a semi-quantitative manner (negligible, slight, moderate, substantial or very substantial adverse), using well established risk-ranking principles. The sniff tests allow the character of the odour to be assessed, which is essential where there may be a number of alternative odour sources.

4.5 The main principles of the sensory assessment are:

- Step 1 – The 'sniff-test' technique is used to gather information on odour intensity (refer to Table 4.1), character, unpleasantness, frequency and duration at different test locations upwind and downwind of the odour source. Box 1 summarises the procedure.
- Step 2 – The Odour Exposure at each test location at the time of sampling is estimated, taking into account the average odour intensity over the sniff testing period (I_{mean}) and the percentage of the time where the odour intensity level was greater than or equal to 4 ($t_{I\geq4}$) (refer to Table 4.2). The Odour Exposure experienced at each location will be dependent on the frequency, intensity, duration and unpleasantness of the odour and different combinations of the FIDOL factors can result in different exposures: for example, odours may occur frequently in short bursts ('acute' exposures), or for longer periods ('chronic' exposures).
- Step 3 – The Odour Effect is assessed based on the Odour Exposure combined with the Receptor Sensitivity of the location (refer to Table 4.3). As the site is proposed for residential use, Receptor Sensitivity has been assumed to be 'high'.

4.6 The sniff testing technique can measure odour exposure at a particular place and time, but the frequency of odour occurrence at that place is also important. If many sniff testing samples are taken that represent a wide range of weather conditions and source variations, the results of the sniff testing can be considered to represent the overall odour exposure at a particular receptor location. However, if fewer tests are carried out, professional judgement would be required to conclude how the snapshot(s) relate to the overall odour exposure at a receptor location. The Overall Odour Exposure and Receptor Sensitivity determine the overall Odour Effect (Table 4.3).

Box 1 Sniff Test Sampling Procedure

The sensory test is carried out at each test location over a standard observation time, typically 5 minutes. Testing should start from locations affected by the least-intense odours, to avoid olfactory fatigue. For each test location, the start time of the observation period and the attributes of the odour over the observation period are recorded as follows:

i) The assessor breathes normally, inhaling ambient air samples through the nose at regular intervals (say, every 10 seconds, to give 30 samples over typically a 5 minute observation period). However, where the odour levels are either constant or intense then the odour assessor should avoid olfactory fatigue/desensitisation by alternating each sample sniff of ambient air with a sniff of odour-free air from an ori-nasal face mask fitted with carbon filters.

ii) For each sample, the odour intensity (VDI scale, 0-6) is recorded.

iii) At the end of the observation period at the test location, the odour unpleasantness is noted down by classifying it as unpleasant, neutral (neither pleasant nor unpleasant) or pleasant. This assumes that at least some of the 30 samples were of intensity 3 or more (i.e. the odour is at least barely recognisable).

iv) The odour descriptor should also be noted: odours can be objectively described using standardised categories and reference vocabulary. It is useful to provide odour assessors with standard descriptor terms, which are organised with similar terms in categories and groups either as a list or as an “odour wheel”.

v) Next the pervasiveness/extent of the odour at this test location is assessed. This can be calculated as the percentage odour time, $t_{I \geq 4}$, which is the number of samples where odour was recognisable divided by the total number of samples (i.e. 30). Note that “recognisable odour” is where the odour strength exceeds the recognition threshold and is definitely recognisable by the assessor, i.e. the assessor is capable of definitely identifying its quality/character, which corresponds to VDI intensity of 4 or more.

vi) The average odour intensity, I_{mean}, over the test period is calculated and the maximum intensity observed is noted.

The above procedure is then repeated at the next test location, remembering that the character of an odour mixture can change over distance, as the particular components may become diluted below their individual detection thresholds at different distances.

A record should be kept of the meteorological conditions at the time of testing (including wind strength and direction, atmospheric stability category, barometric pressure, rainfall, temperature and humidity), together with information relating to the operations and activities being undertaken on site and in the surrounding area.

Table 4.1 Odour Intensity Categories

Odour Strength	Intensity Level	Comments
No odour/not perceptible	0	No odour when compared to the clean site
The Odour Detection Threshold (ODT) of 1 $ou_E.m^{-3}$ is somewhere between 0 and 1		
Slight/very weak	1	There is probably some doubt as to whether the odour is actually present
Slight/weak	2	The odour is present but cannot be described using precise words or terms
Distinct	3	The odour character is barely recognisable
VDI 3940 says that the recognition threshold intensity is generally 3-10 times higher than the ODT (i.e. 3-10 $ou_E.m^{-3}$)		
Strong	4	The odour character is easily recognisable
Very strong	5	The odour is offensive. Exposure to this level would be considered undesirable
Extremely strong	6	The odour is offensive. An instinctive reaction would be to mitigate against further exposure

Table 4.2 RPS Matrix to Assess the Odour Exposure (neutral and unpleasant odours) at Time and Place of Sampling

Average Intensity (I_{mean})						
	6	*Large*	*Very Large*	*Very Large*	*Very Large*	*Very Large*
	5	*Medium*	*Large*	*Large*	*Very Large*	*Very Large*
	4	*Small*	*Medium*	*Medium*	*Large*	*Large*
	3	*Small*	*Medium*	*Medium*	*Medium*	*Medium*
	2	*Small*	*Small*	*Medium*	*Medium*	*Medium*
	1	*Small*	*Small*	*Small*	*N/A*	*N/A*
		≤10%	**11 – 20%**	**21 – 30%**	**31 – 40%**	**≥41%**
		Percent odour time ($t_{I\geq4}$) during the test				

I_{mean} should be rounded to the nearest whole number
Note - the following overriding considerations affect the scoring of the odour annoyance impact:
if I_{mean} = 0, then the odour effect can for practical purposes be considered negligible; and
if I_{mean} = 1 but $t_{I\geq4}$ = 0%, then the odour effect can for practical purposes be considered negligible.

Table 4.3 RPS Matrix to Assess the Odour Effect at Individual Receptors

		Receptor Sensitivity		
		Low	**Medium**	**High**
Overall Odour Exposure	**Very Large**	*Substantial adverse*	*Substantial adverse*	*Very substantial adverse*
	Large	*Moderate adverse*	*Moderate adverse*	*Substantial adverse*
	Medium	*Slight adverse*	*Slight adverse*	*Moderate adverse*
	Small	*Negligible*	*Negligible*	*Slight adverse*

4.7 Although a snapshot might be good enough to confirm an adverse impact, numerous repeat surveys will usually be required to show with a reasonable degree of certainty that there is an absence of adverse impact. In general, the greater the number of surveys carried out, the higher the confidence in the conclusion drawn.

4.8 Sniff testing was undertaken on three separate occasions for this assessment, which would allow reasonably good confidence in the conclusions drawn.

QA/QC

4.9 In order to provide confidence in the quality of the results, the sensory tests were carried out by suitably qualified and trained odour assessors. The assessors' olfactory sensitivity has been certified using the American Society for Testing and Materials (ASTM) method.

4.10 The work undertaken has been designed and managed by RPS, which has ISO9001 and ISO14001 certifications for its Quality Management System and Environmental Management System, respectively.

Results of Sensory Field Assessments

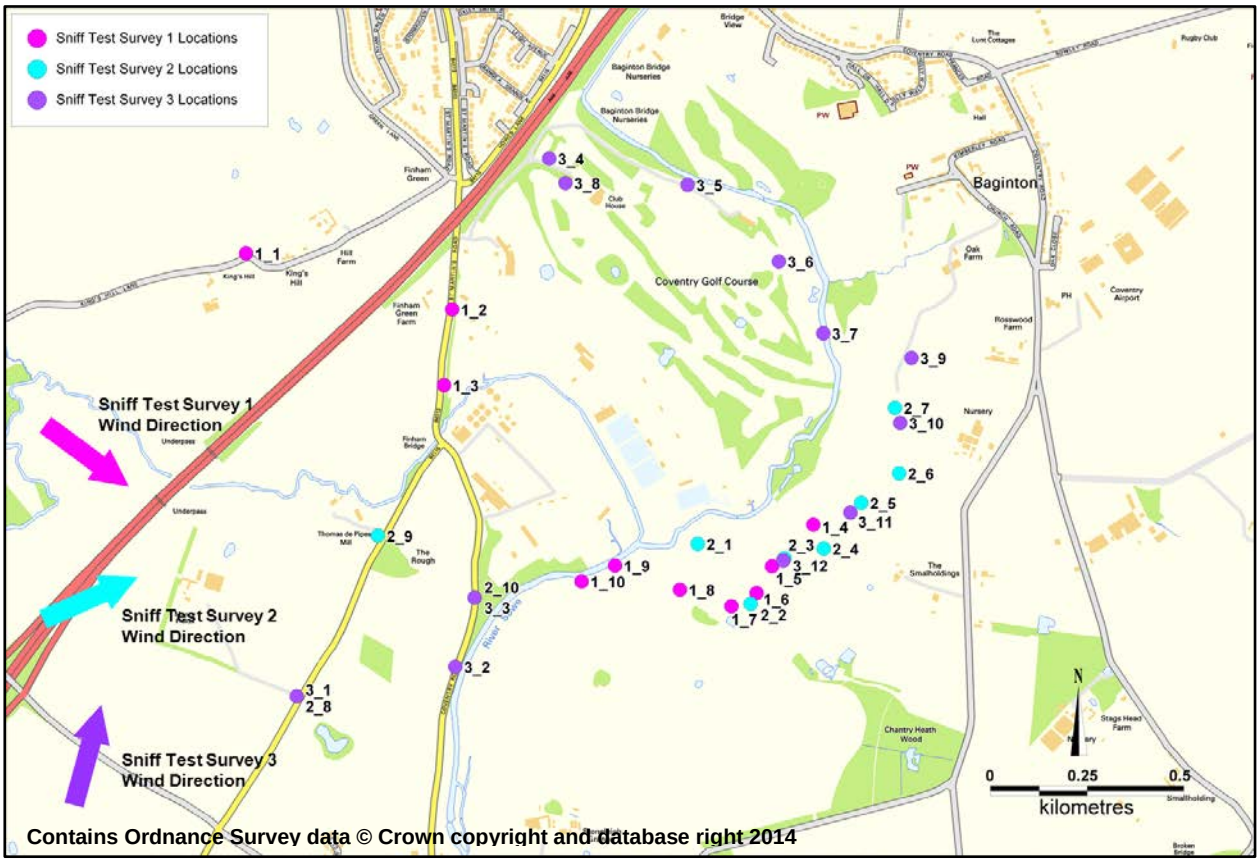
4.11 Visits were made to the proposed development site and local area on the 29th of November and on the 9th and 10th of December 2013. During the site visits, sensory field assessments (sniff tests) were conducted at upwind and downwind of Finham STW and at on-site locations. The locations of the sensory tests are given in Table 4.4 and shown in Figure 7.

4.12 The on-site sniff test survey locations focussed on the area marked as being for residential use in the illustrative concept masterplan (Figure 3), with survey locations mainly selected on the edge of the proposed residential area closest to the STW.

Table 4.4 Sniff Test Locations

Sniff Test Location		Grid Reference	
ID	**Location relative to STW and if on-site**	**X**	**Y**
Sniff Test Survey 1 (29th November 2013)			
1_1	Upwind	432639	274561
1_2	Upwind	433172	274416
1_3	Downwind, on-site	433151	274220
1_4	Downwind, on-site	434106	273859
1_5	Downwind, on-site	433999	273751
1_6	Downwind, on-site	433959	273682
1_7	Downwind, on-site	433894	273648
1_8	Downwind	433761	273691
1_9	Downwind	433593	273753
1_10	Downwind	433507	273712
Sniff Test Survey 2 (9th December 2013)			
2_1	Downwind	433807	273809
2_2	On-site	433944	273654
2_3	On-site	434031	273772
2_4	On-site	434133	273797
2_5	Downwind, on-site	434230	273915
2_6	Downwind, on-site	434328	273992
2_7	Downwind, on-site	434317	274161
2_8	Upwind	432770	273415
2_9	Upwind	432980	273830
2_10	Upwind	433230	273670
Sniff Test Survey 3 (10th December 2013)			
3_1	Upwind	432770	273415
3_2	Upwind	433180	273491
3_3	Upwind	433230	273670
3_4	Downwind	433423	274806
3_5	Downwind	433781	274738
3_6	Downwind	434017	274540
3_7	Downwind	434132	274354
3_8	Downwind	433465	274743
3_9	On-site	434360	274290
3_10	On-site	434331	274122
3_11	On-site	434202	273890
3_12	On-site	434028	273766

Figure 7 Sniff Test Survey Locations



4.13 The meteorological conditions were noted on the site survey occasions and are summarised in Table 4.5. Conditions were generally dry and cloudy. The wind was breezy on the first sniff test survey day, but wind speeds during the second and third visits were lower. Wind direction was westerly on the first visit, south-westerly on the second visit and southerly on the third visit.

Table 4.5 Meteorological Conditions

Meteorological Parameter	Sniff Test Survey 1 29/11/2013	Sniff Test Survey 2 09/12/2013	Sniff Test Survey 3 10/12/2013
Temperature (ºC)	10	10	7
Bar. Pressure (mbar)	1009	1027	1029
Precipitation	Light rain	None	None
Ground Condition	Damp	Damp	Damp
Relative Humidity (%)	79	87	87
Cloud Cover	Overcast	Mostly cloudy	Mostly cloudy
General Air Stability Category	Neutral	Neutral	Neutral
Average Wind speed and direction	12 – 31 mph, westerly	1 – 4 mph, south-westerly	1 – 4 mph, southerly

4.14 Meteorological conditions on each day correlated most closely with Atmospheric Stability Category D (Neutral), which is the most prevalent category (45-60% of the time in a year) and leads to moderate dispersion of contaminants.

4.15 As stated in the methodology, a snapshot might be good enough to confirm an adverse impact, but numerous repeat surveys will usually be required to show with a reasonable degree of certainty that there is an absence of adverse impact. In general, the greater the number of surveys carried out, the higher the confidence in the conclusion drawn.

Table 4.6 Summary of Sensory Field Assessments

Location	Average Intensity (VDI Scale 0-6)	Maximum Intensity (VDI Scale 0-6)	% Time Odour Intensity Level ≥4 ($t_{I\geq4}$) during test	Odour Descriptor*	Unpleasant-ness*	Odour Exposure	Receptor Sensitivity	Odour Effect
Sniff Test Survey 1 (29th November 2013)								
1_1, Upwind	3	3	0	Fresh/damp earth	Pleasant	N/A	High	-
1_2, Upwind	2	3	0	Rotting Leaves	Neutral	Small		Slight Adverse
1_3, Downwind, on-site	2	3	0	Damp	Neutral	Small		Slight Adverse
1_4, Downwind, on-site	2	2	0	-	-	-		-
1_5, Downwind, on-site	1	3	0	Slight sewage smell	Unpleasant	Small		Negligible
1_6, Downwind, on-site	1	4	7	Sewage	Unpleasant	Small		Slight Adverse
1_7, Downwind, on-site	1	3	0	Slight sewage smell	Unpleasant	Small		Negligible
1_8, Downwind	2	3	0	Slight sewage smell	Unpleasant	Small		Slight Adverse
1_9, Downwind	2	3	0	Very slight sewage smell	Unpleasant	Small		Slight Adverse
1_10, Downwind	2	2	0	-	-	-		-
Sniff Test Survey 2 (9th December 2013)								
2_1, Downwind	1	2	0	-	-	-	High	-
2_2, On-site	1	2	0	-	-	-		-
2_3, On-site	3	3	0	Sewage	Unpleasant	Small		Slight Adverse
2_4, On-site	2	3	0	Sewage	Unpleasant	Small		Slight Adverse
2_5, Downwind, on-site	2	3	0	Sewage	Unpleasant	Small		Slight Adverse
2_6, Downwind, on-site	2	3	0	Sewage	Unpleasant	Small		Slight Adverse
2_7, Downwind, on-site	1	2	0	-	-	-		-
2_8, Upwind	0	1	0	-	-	-		-
2_9, Upwind	1	1	0	-	-	-		-
2_10, Upwind	0	1	0	-	-	-		-

Location	Average Intensity (VDI Scale 0-6)	Maximum Intensity (VDI Scale 0-6)	% Time Odour Intensity Level ≥4 ($t_{I\geq4}$) during test	Odour Descriptor*	Unpleasant-ness*	Odour Exposure	Receptor Sensitivity	Odour Effect
Sniff Test Survey 3 (10th December 2013)								
3_1, Upwind	0	1	0	-	-	-	High	-
3_2, Upwind	2	3	0	Sewage, dirt	Unpleasant	Small		Slight Adverse
3_3, Upwind	2	3	0	Sewage	Unpleasant	Small		Slight Adverse
3_4, Downwind	3	4	17	Sewage	Unpleasant	Medium		Moderate Adverse
3_5, Downwind	2	3	0	Grass, sewage	Neutral	Small		Slight Adverse
3_6, Downwind	2	3	0	Sewage, dirt	Neutral	Small		Slight Adverse
3_7, Downwind	2	3	0	Sewage, grass	Neutral	Small		Slight Adverse
3_8, Downwind	3	4	27	Waste, sewage	Unpleasant	Medium		Moderate Adverse
3_9, On-site	3	4	3	Sewage	Unpleasant	Small		Slight Adverse
3_10, On-site	2	3	0	Sewage	Unpleasant	Small		Slight Adverse
3_11, On-site	2	3	0	Sewage	Neutral	Small		Slight Adverse
3_12, On-site	3	4	37	Sewage	Unpleasant	Medium		Moderate Adverse

* The odour descriptor and relative unpleasantness can only be reported when at least some of the sniff test samples in the run were of intensity 3 or more.

4.16 The strongest odours occurring for the longest periods during the sniff testing were detectable at receptors 3_4, 3_8 and 3_12, downwind of Finham STW on the golf course and at one point on the site.

4.17 The Odour Intensity Level exceeded 3 (the level at which odour character is barely recognisable; Table 4.1) at only 5 of the 32 sniff test locations; at two of these locations, the level exceeded 3 for less than 10% of the sampling period.

4.18 Twelve of the 32 sampling locations had no or negligible odour effect, over half of which were downwind of the STW and/or on-site. Seventeen of the 32 sampling locations had a 'slight adverse' odour effect; three of these were upwind of the STW.

4.19 Based on the results of the sniff testing surveys, there is likely to be an overall 'slight adverse' odour effect at the site. The most recent draft version of the Institute of Air Quality Management (IAQM) odour guidance, due to be released for consultation in early 2014 [12], notes that, where the overall effect is greater than slight adverse, the effect is likely to be significant. The corollary is that slight adverse or lower effects are unlikely to be significant.

5 Odour Complaints Data Analysis

5.1 Warwick District Council stated that there has been only one complaint relating to Finham STW within the last five years [13]. This complaint was made on the 15th of July 2013 by a resident on St. Martin's Road in Stoneleigh. Weather records indicate that the temperature was around 26°C on that day; the hot weather possibly being the reason for the odour issue [14].

5.2 Information was requested from the EA with regards to the odour complaints history for Finham STW. The EA's response dated 27h December 2013 [15] indicated that there have been no odour complaints relating to the Finham STW in the last five years.

5.3 The results of the complaints analysis indicate that the Finham STW is currently not causing odour issues, with only one complaint relating to the STW in the last five years.

6 Conclusions

6.1 RPS was commissioned by Lenco Investments to undertake an odour assessment for an area of land to the south of Baginton in Warwickshire. The land covers an area of approximately 50 hectares and is proposed to be included in the Local Plan to be designated for residential use.

6.2 The Finham Sewage Treatment Works (STW) is located to the south-west of the site, with the closest point being approximately 100 m from the area of the site that would be developed. This odour assessment has been carried out to address concerns over the potential for odour issues at the site due to the proximity to the STW, which may affect its suitability for residential use.

6.3 In order to assess what the odour levels at the site would be, information on odour concentrations around Finham STW was reviewed, sniff testing surveys were undertaken and odour complaints data were analysed.

6.4 A review was carried out of the odour assessment accompanying the planning application for the proposed upgrade to the sludge handling operations at Finham STW. The most odorous parts of the STW are located at the far side of the STW facility from the site, and the results of atmospheric dispersion modelling indicated that new residential receptors on the site would experience lower odour levels than existing residential areas. Furthermore, the modelling study indicated that while some odour from Finham STW may be detectable on parts of the site, only a small portion of the proposed residential areas of the site is predicted to experience 98th percentile of hourly mean odours exceeding 5 $ou_E.m^{-3}$. As discussed in Section 3, it is considered unlikely for significant odour issues to occur at odour levels below this benchmark.

6.5 The dispersion modelling results show how odour levels vary over the course of a full year. The modelling was complemented by a subjective odour monitoring survey, to corroborate (or otherwise) the predictions. Sniff tests were carried out to obtain snapshots of the of the actual odour levels prevailing at the site on three days (29th November and 9th and 10th December 2013). Odours from the STW were detectable, but most were at an Odour Intensity Level of 3 or lower (level 3 being the level at which odour character is barely recognisable). At many of the sniff testing survey locations, there was no measureable odour effect. Using the draft IAQM classification scheme, the overall Odour Effect as measured on the survey dates was 'slight adverse', which is consistent with the modelling results.

6.6 An analysis of historical complaints levels was undertaken. Warwick District Council was consulted and confirmed that there had been only one odour complaint relating to Finham STW within the last five years. Information on the odour complaints history of Finham STW was also requested from the Environment Agency; the records indicated that there were no complaints relating to Finham STW in the last five years. It would therefore appear that the STW is not causing a significant odour problem to existing residential receptors in the area.

6.7 The local planning policy (Warwick District Council Local Plan) indicates that the site would be suitable for use if it provides future users with an acceptable level of amenity. Complaints

analysis indicated that the STW is not currently causing any significant odour issues at existing sensitive residential receptors, whilst dispersion modelling predictions and sniff test surveys indicated that odour from the STW is unlikely to cause a significant adverse effect at the locations of proposed residential properties on the development site. It is therefore concluded that the site is suitable for residential use from an odour perspective.

References

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2 Communities and Local Government (2012) National Planning Policy Framework.

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PROPOSED RESIDENTIAL DEVELOPMENT, BAGINTON, WARWICKSHIRE

ACOUSTICS REPORT ON ENVIRONMENTAL NOISE FOR A PROPOSED RESIDENTIAL DEVELOPMENT

Date: **13th December 2013**
Our Ref: **B7350/ENV/P1**
Client: **RPS Planning & Development.**

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Date:	**13th December 2013**
Document Reference:	**B7350/ENV/P1**

CONTENTS

1 INTRODUCTION

1.1 RPS (Acoustics) has been commissioned by RPS (Planning & Development) to carry out an assessment of noise levels affecting the site of a proposed residential development in Baginton, Warwickshire.

1.2 It is understood that the Local Planning Authority have raised significant concerns over the suitability of the site due to its proximity to Coventry Airport. These concerns were first raised in 2009 at which point a full assessment of baseline noise levels had not been carried out.

1.3 The purpose of this assessment is to therefore evaluate the existing noise impact at the site and, if required, provide recommendations for mitigation measures in order to achieve a comfortable internal and external acoustic environment, in line with the relevant British Standards and Local and National Planning Policy.

1.4 The scope of the assessment has been discussed and agreed with Michael Jenkins, Environmental Health Officer at Warwick District Council, on Thursday 5th December 2013, and is based on good practice techniques and extensive previous experience of similar projects.

2 DESIGN CRITERIA

2.1 This report is to be primarily based on the following standards:

- The National Planning Policy Framework (2012)
- The Noise Policy Statement for England (2010)
- BS 8233:1999, 'Sound Insulation and Noise Reduction for Buildings – Code of Practice'

a) <u>English Planning Policy on Noise Impact – The NPPF and NPSE</u>

2.2 The NPPF is the over-arching planning policy document that applies to all new developments in England. The guidance and assessment criteria given (or referred to) in this document can therefore be applied to all other standards in terms of assessing the suitability of granting Planning permission with respect to noise impact.

2.3 The NPPF states that Planning policies and decisions should aim to:

- avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;
- mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;
- recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established; and
- identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

2.4 With specific reference to noise impact, the NPPF document refers to the Noise Policy Statement for England (NPSE)[1]. The NPSE provides guidance which enables decisions to be made regarding the acceptable noise burden to place on society, using three key phrases – the No Observed Effect Level (NOEL), the Lowest Observed Adverse Effect Level (LOAEL) and the Significant Observed Adverse Effect Level (SOAEL).

2.5 In order to provide a consistent frame of reference (and to allow a view to be taken on the suitability of the application with reference to the relevant Planning guidance), the levels or criteria given in other relevant documents used in assessment will be re-framed in terms of the following:

No Observed Effect Level (NOEL)

2.6 The NOEL is the level of noise impact below which no effect can be detected, and there would be no discernible negative effect on health or quality of life.

[1] Ref. Section 123, page 29

Lowest Observed Adverse Effect Level (LOAEL)

2.7 The LOAEL is the lowest level of noise impact above which adverse effects on health or quality of life can be detected.

2.8 Designing noise impacts to be equal-to-or-less-than the LOAEL should see that any adverse effects on health or quality of life are negligible.

Significant Observed Adverse Effect Level (SOAEL)

2.9 The SOAEL is the level above which significant adverse effects on health and quality of life occur.

2.10 Designs should always seek to avoid a noise impact which would be categorised as a SOAEL.

b) Noise Levels within Residential Buildings and External Amenity Areas – BS 8233 / W.H.O

2.11 Table 2.1 shows recommended internal noise levels, as prescribed in BS 8233:1999:

Table 2.1 : BS 8233:1999 Internal Noise Levels

Area	BS 8233: 1999 level
Living Rooms	30 – 40 dB(A)
Bedrooms	30 – 35 dB(A)

2.12 It is recommended that in order to provide a comfortable environment within habitable rooms, specifically bedrooms, the external building fabric be designed to achieve the lower internal night-time noise level of 30 dB(A) and daytime level of 35 dB(A).

2.13 The figures given above would be considered the LOAEL, and levels below the figures above would be considered the NOEL. Levels significantly greater than the figures given above would be considered the SOAEL, and should be avoided.

2.14 For a reasonable standard in bedrooms, BS 8233:1999 also recommends that individual noise events should not normally exceed L_{AFmax} 45 dB(A) at night (ref. Footnote 'a', Table 5, p 19).

2.15 BS 8233 does not define the term 'normally' in relation to the number of exceedances per night. However, the World Health Organisation's 'Guidelines for Community Noise' references a study by Vallet & Vernet, 1991, which concluded that "For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 dB L_{Amax} more that 10-15 times per night."

2.16 For the purposes of assessment, less than 10 exceedances per night would be considered the NOEL, with 15 exceedences considered the LOAEL. Numbers significantly in excess of this would be considered the SOAEL.

2.17 BS 8233 also states that it is desirable that the steady noise level in external amenity areas (such as gardens or outdoor living areas) should "not exceed 50 dB(A) $L_{Aeq,T}$ and 55 dB(A) $L_{Aeq,T}$ should be regarded as the upper limit." This is in line with recommendations given in the WHO Guidelines for community noise.

2.18 For the purposes of assessment, levels lower than 50 dB(A) will be considered the NOEL, with a level of 55 dB(A) considered the LOAEL. Levels significantly greater than this would be considered the SOAEL.

c) Local Authority Noise Policy

2.19 Michael Jenkins of Warwick District Council confirmed that the following design criteria should be adhered to for new residential planning applications:

- *Internal noise levels within bedrooms shall not exceed the BS 8233 'good' internal target noise level of 30dB $L_{Aeq,8hr}$, with the maximum instantaneous noise level not normally exceeding 45dB $L_{Amax,fast}$.*
- *Internal noise levels within living rooms shall not exceed the BS 8233 'good' internal target noise level of 30dB $L_{Aeq,16hr}$.*
- *Daytime external noise levels in amenity areas shall not exceed 50dB $L_{Aeq,T}$ with reference to World Health Organisation Guidelines.*

2.20 The targets listed above will be used to form the basis of recommendations made within this report. Where targets are not considered achievable, reference will be made to NPSE definitions and guidance.

3 SITE

3.1 The proposed development site is split into a southern and northern section. The southern section is located to the west of Stoneleigh Road and the northern section sits to the west of Coventry Road. At present, both sections of the site comprise of disused open land.

3.2 Both the Coventry and Stoneleigh Roads are considered to be the dominant noise sources affecting the eastern part of both sections of the site. Both roads are moderately busy single-lane carriageways which provide access to the major road network (A45, A46, A444) and Coventry City Centre to the north.

3.3 Other land adjacent to the sites are moderately benign from a noise perspective. To the immediate west is a farm and nursery, further to the west lie a sewage works and the Coventry Golf Club, and to the south lies farmland.

3.4 An existing site plan is given in Appendix 1.

a) Coventry Airport

3.5 Coventry Airport sits to the north east of both sections of the site. The runway alignment is such that incoming and outgoing flights travel directly above both sections of the site, although specific flight paths are dictated by wind direction. Witnessed take-off and landing paths are shown on a plan in Appendix 1.

3.6 It is understood that movements in and out of the airport have significantly reduced since initial noise concerns were raised by the Local Authority in 2009. Current movements in and out of the airport are largely made up of commercial teaching flights in small propeller based aircraft. It is understood from discussions with Michael Jenkins of WDC that night-time flights are restricted to two per night.

3.7 Whilst there is the possibility that the airport will expand in the future, there is currently very little information available to quantify any increase in noise associated with this. This report therefore considers noise associated with existing airport operations.

b) Coventry and Warwickshire Gateway

3.8 The Coventry and Warwickshire Gateway development is a large industrial development which, if permitted, will sit directly adjacent to Coventry Airport. The following description has been taken directly from the Design and Access Statement which accompanied the planning application:

'The proposals include for the comprehensive redevelopment of land to the north and south of the A45 between the Stonebridge and Tollbar Island junctions of the A45 and A46 and land to the north, west and south of Coventry Airport comprising demolition of existing structures and the erection of new buildings to accommodate offices, research and development facilities and light industrial uses (Use Class B1), general industrial uses (Use Class B2), storage and distribution (Use Class B8), hotel accommodation (Use Class C1), car showroom accommodation, replacement airport buildings, small scale retail and catering establishments (Use Classes A1, A3, A4 and/or A5), new countryside park, ground modelling works including the construction of landscaped mounding, construction of new roads/footpaths/cycle routes, remodelling of junctions on the existing highway network, associated parking, servicing and landscaping.'

3.9 It is worth noting that the planning application had not been approved at the time of writing this report, and permission will ultimately be decided by the Secretary of State in 2015. However, it is considered unlikely that the operation of the Gateway, if permitted, would increase noise levels affecting the proposed residential site at Baginton. From perusal of the submitted Masterplan it can be seen that existing residential properties lie directly adjacent to the western boundary of the Gateway site. Buffer zones and acoustic bunds and barriers are proposed to limit operational noise affecting nearby existing properties. These mitigation measures would also protect proposed residences at Baginton, if both schemes were permitted and built.

3.10 Furthermore, current Gateway proposals include for improved road links to the eastern end of Coventry Airport. It Is understood from discussions with Michael Jenkins of WDC that this will reduce road traffic flows past the proposed Baginton residential sites.

4 ENVIRONMENTAL NOISE

4.1 Measurements were taken to assess the levels of environmental noise affecting the site in accordance with agreements made with the Local Authority. Table 4.1 gives details of the duration of the noise surveys carried out:

Table 4.1 : Survey Periods

Date	Time	Monitoring Positions Surveyed
22nd Nov – 2nd Dec 2013	11 Days	1 (Position 1)
25th Nov- 2nd Dec 2013	8 Days	2 (Position 2 +3)

4.2 Three measurement positions were selected for the surveys as described in Table 4.2. The equipment was set up at the positions so as to be representative of the most exposed facades of proposed residential dwellings to the existing dominant noise sources.

Table 4.2 : Measurement Locations

Measurement Position	Location Description
Position 1	Indicative of noise levels to the south of the site.
Position 2	Indicative of noise levels to the north-west of the site.
Position 3	Indicative of noise levels to the north of the site.

4.3 A site plan showing the approximate location of the measurement positions can be found in Appendix 1.

4.4 Table 4.3 below details weather conditions observed during the survey:

Table 4.3 : Survey Weather Conditions

Date	Highest Temperature	Lowest Temperature	Wind speed	Conditions	Cloud Coverage
22nd November	5°C	-1°C	< 5.2ms^{-1}	Dry	0-75%
23rd November	5°C	5°C	< 5.8ms^{-1}	Dry	0-50%
24th November	8°C	5°C	< 5.8ms^{-1}	Dry	0-50%
25th November	7°C	0°C	< 4.4ms^{-1}	Dry	0-50%
26th November	4°C	-5°C	< 3.0ms^{-1}	Dry	0-75%
27th November	11°C	4°C	< 6.7ms^{-1}	Dry	0-75%
28th November	9°C	5°C	< 3.1ms^{-1}	Dry	0-75%
29th November	10°C	7°C	< 8.1ms^{-1}	Light Showers	0-75%
30th November	11°C	4°C	< 3.9ms^{-1}	Dry	0-50%

Date	Highest Temperature	Lowest Temperature	Wind speed	Conditions	Cloud Coverage
1st December	11°C	3°C	< 3.9ms^{-1}	Dry	0-50%
2nd December	8°C	6°C	< 2.2ms^{-1}	Dry	0-75%

4.5 Noise measurements were made using three Rion NL 31 sound level meters (serial numbers: Position 1 – 00203726, Position 2 – 00203727, Position 3 – 01141927), generally in accordance with BS EN 60651:1994 and BS 7445:1993. The meters were calibrated before and after use with a 01dB Cal 21 calibrator (serial number 7491). No significant drift was witnessed. Calibration certificates for all equipment are available upon request.

4.6 Subjective notes taken by the engineer while on site describe the noise environment as being generally moderate. Audible noise sources included local road traffic noise and from Stoneleigh Road and occasional air traffic.

4.7 A summary of the average daytime and night-time ambient noise levels recorded are detailed within Tables 4.4 – 4.9 below. The values are the logarithmically averaged $L_{Aeq,T}$, the lowest $L_{A90,T}$ results and the highest $L_{AF,max}$ dB(A) values measured. A graphical representation of the full noise data set is provided in Appendix 2. All values are in dB(A)

Table 4.4 : Summary of Noise Monitoring Results - Position 1 - Daytime

Date	$L_{Aeq,T}$	$L_{AF,max}$	$L_{A90,T}$	Direction of Aircraft
22-Nov	65.0	93.4	40.9	Landing
23-Nov	64.0	89.4	39.1	Landing
24-Nov	62.8	97.1	39.0	Landing
25-Nov	64.8	90.5	42.0	Landing
26-Nov	59.1	85.9	36.6	Take off
27-Nov	65.1	87.2	40.4	Landing
28-Nov	65.0	91.9	35.9	Take off
29-Nov	65.1	91.6	44.9	Mixed
30-Nov	63.9	90.4	42.6	Landing
01-Dec	63.4	86.0	34.9	Landing
02-Dec	66.8	88.6	35.4	Take off

Table 4.5 : Summary of Noise Monitoring Results - Position 2 - Daytime

Date	$L_{Aeq,T}$	$L_{AF,max}$	$L_{A90,T}$	Direction of Aircraft
25-Nov	52.1	77.8	45.0	Landing
26-Nov	52.4	77.9	43.4	Take off

Date	$L_{Aeq,T}$	$L_{AF,max}$	$L_{A90,T}$	Direction of Aircraft
27-Nov	51.0	77.6	41.4	Landing
28-Nov	50.0	77.2	39.8	Take off
29-Nov	52.2	76.1	44.5	Mixed
30-Nov	50.1	79.6	43.8	Landing
01-Dec	51.0	74.1	41.0	Landing
02-Dec	52.3	79.6	38.1	Take off

Table 4.6 : Summary of Noise Monitoring Results - Position 3 - Daytime

Date	$L_{Aeq,T}$	$L_{AF,max}$	$L_{A90,T}$	Direction of Aircraft
25-Nov	56.0	83.8	47.3	Landing
26-Nov	57.2	91.3	47.1	Take off
27-Nov	53.1	80.2	44.6	Landing
28-Nov	52.5	72.3	40.3	Take off
29-Nov	53.4	76.0	47.7	Mixed
30-Nov	53.3	85.7	46.5	Landing
01-Dec	55.1	82.0	43.6	Landing
02-Dec	54.9	80.6	40.4	Take off

Table 4.7 : Summary of Noise Monitoring Results - Position 1 – Night-time

Date	$L_{Aeq,T}$	$L_{AF,max}$	$L_{A90,T}$
22-Nov	55.4	84.5	36.2
23-Nov	54.3	85.0	33.4
24-Nov	56.8	85.0	33.4
25-Nov	57.7	87.8	39.3
26-Nov	56.7	84.3	36.6
27-Nov	57.4	88.7	33.9
28-Nov	56.8	84.9	35.4
29-Nov	55.6	86.3	38.6
30-Nov	53.0	84.2	32.9
01-Dec	56.3	86.0	31.1

Table 4.8 : Summary of Noise Monitoring Results - Position 2 – Night-time

Date	$L_{Aeq,T}$	$L_{AF,max}$	$L_{A90,T}$
25-Nov	51.3	80.9	40.1
26-Nov	46.4	71.4	38.5
27-Nov	46.2	76.5	35.8
28-Nov	44.5	74.7	37.2
29-Nov	45.4	73.8	39.0
30-Nov	42.2	62.1	34.1
01-Dec	43.6	62.8	35.2

Table 4.9 : Summary of Noise Monitoring Results - Position 3 – Night-time

Date	$L_{Aeq,T}$	$L_{AF,max}$	$L_{A90,T}$
25-Nov	54.2	83.6	42.0
26-Nov	49.5	73.4	39.9
27-Nov	49.0	74.1	37.5
28-Nov	47.5	75.4	38.8
29-Nov	47.6	76.1	40.8
30-Nov	46.1	62.4	35.8
01-Dec	46.5	60.1	37.7

4.8 It can be seen from the results in the tables above that noise levels throughout the daytime and night-time periods are moderate to low, with the highest noise levels monitored at Position 1. From attended monitoring carried out on site, it was noted that these elevated noise levels were dictated by noise from Stoneleigh Road, and not from air traffic movements in and out of Coventry Airport.

4.9 Noise levels affecting residential properties to the east of both sections of the proposed site will be elevated and will require a specific scheme of glazing and ventilation mitigation measures in order to achieve Local Authority internal noise criteria.

5 GLAZING AND VENTILATION

a) Residential Dwellings

5.1 Based on guidance provided by Michael Jenkins of WDC, it is proposed that the external building fabric for residential dwellings be designed such that a maximum internal daytime and night-time noise level of 30 dB(A) can be achieved.

5.2 For a reasonable standard in bedrooms, WDC also recommends that individual noise events should not normally exceed $L_{AF,max}$ 45 dB(A) at night, based upon guidance given in BS 8233:1999.

5.3 It is generally accepted that glazing and ventilation openings within external façades will be the weakest elements acoustically.

5.4 It is considered that suitable glazing and ventilation attenuation can be provided to habitable rooms, such that internal average noise levels would be within acceptable limits, as per WDC and BS 8233 guidance.

5.5 Calculations below are based upon the averaged $L_{Aeq,T}$ values. It is anticipated that if the recommended glazing and ventilation specification are installed as set out herein, internal average noise levels would be within acceptable limits.

b) Building Envelope Requirements

5.6 The glass rating $R_w + C_{tr}$ is generally used to define attenuation against road traffic noise, based upon typical road traffic spectra. Calculation procedures are as follows:

$$R_w + C_{tr} = External\ dB(A) - Internal\ dB(A)$$

5.7 In order to see that any provision for ventilation does not compromise the attenuating performance of the glazing, it is necessary that any ventilators (when considered in the fully open position), have a sound insulation performance at least equal to that of the windows, expressed as a weighted, normalised element level difference, $D_{ne,w}+ C_{tr}$.

5.8 Based on the varying noise impact, it is suggested that three ‘conditions’ are specified, with a corresponding level of building envelope attenuation.

i. Condition 1

5.9 Condition 1 applies to living rooms and bedrooms fronting onto Stoneleigh and Coventry Road.

ii. Condition 2

5.10 Condition 2 applies to living rooms in the northern section of the site with a direct line of site to Coventry Road.

iii. Condition 3

5.11 Condition 3 applies to all other habitable rooms not specified within ‘Conditions 1 & 2’.

5.12 A marked-up plan showing ‘Condition’ locations is given in Appendix 3

5.13 Table 5.1 below shows the logarithmically averaged $L_{Aeq,T}$ levels affecting the site, the recommended internal noise levels, and the corresponding required attenuation of glazing and ventilation.

Table 5.1 – Attenuation Requirements

Location	Period	Maximum Noise Impact dB	Recommended Internal Noise Criteria dB	Glazing Attenuation Requirement $R_w + C_{tr}$ dB	Ventilation Attenuation Requirement $D_{ne,w} + C_{tr}$ dB
1	Daytime	$L_{Aeq,T}$ 65.1*	$L_{Aeq,T}$ 30	35	35
	Night-time	$L_{Aeq,T}$ 57.7	$L_{Aeq,T}$ 30	28	28
2	Daytime	$L_{Aeq,T}$ 52.4	$L_{Aeq,T}$ 30	23	23
	Night-time	$L_{Aeq,T}$ 51.3	$L_{Aeq,T}$ 30	22	22
3	Daytime	$L_{Aeq,T}$ 57.2	$L_{Aeq,T}$ 30	27	27
	Night-time	$L_{Aeq,T}$ 54.2	$L_{Aeq,T}$ 30	24	24

*Note – this is the highest daytime $L_{Aeq,16hour}$ measurement recorded at Position 1. An increased measurement of $L_{Aeq,T}$ 66.8dB was recorded on 2nd December 2013, however this was averaged between the busy hours of 0700 and 1100.

c) Glazing and Ventilation to Residential – Condition 1

5.14 Calculations show that the maximum required level of attenuation on Condition 1 façades is $R_w + C_{tr}$ 35 dB. This level of attenuation could be achieved by using the following double glazing specification:

- 8 mm pane
- 12 mm air gap
- 8.8 mm SCC Stadip Silence laminated pane

5.15 This construction is rated by Saint Gobain at $R_w + C_{tr}$ 35 dB.

5.16 It is necessary for the ventilation attenuation performance to match or exceed that of the glazing. An appropriate product would be an acoustic trickle or through wall vent, rated by the manufacturer at ≥ $D_{ne,w} + C_{tr}$ 35 dB.

5.17 An example of a suitable product capable of providing this level of sound attenuation would be the Titon Acoustic Airliner TAL4CWL. Such vents should be capable of providing the background ventilation rates given in Part F of the Building Regulations.

5.18 Opening windows should not be necessary in order to provide ventilation – the vents must provide sufficient airflow in order to meet the minimum requirements under Parts F & L of the Building Regulations.

5.19 The ventilation opening and free area of the unit should therefore be checked by a mechanical services engineer before installation. Should the equivalent open area be insufficient to meet the minimum requirements of either Part F or L, it may be necessary to provide more than one unit per habitable room. Alternatively, a mechanical supply / extract system could be provided to façades in Condition 1.

d) Glazing and Ventilation to Residential - Condition 2

5.20 Calculations show that the maximum required level of attenuation on Condition 2 façades is R_w + C_{tr} 27 dB. This level of attenuation could be achieved by using the following double glazing specification:

- 6 mm pane
- 12 mm air gap
- 6.4 mm laminated pane

This construction is rated by Pilkington at R_w + C_{tr} 27 dB.

5.21 It is necessary for the ventilation attenuation performance to match or exceed that of the glazing. An appropriate product would be an acoustic trickle or through wall vent, rated by the manufacturer at ≥ $D_{ne,w}$ + C_{tr} 27 dB.

5.22 An example of a suitable product capable of providing this level of sound attenuation would be the Titon Trimvent Select Xtra S16 4600 vent & XHD16 grille. Such trickle vents should be capable of providing the background ventilation rates given in Part F of the Building Regulations.

5.23 Opening windows should not be necessary in order to provide ventilation – the trickle vents must provide sufficient airflow in order to meet the minimum requirements under Parts F & L of the Building Regulations.

5.24 The ventilation opening and free area of the unit should therefore be checked by a mechanical services engineer before installation. Should the equivalent open area be insufficient to meet the minimum requirements of either Part F or L, it may be necessary to provide more than one unit per habitable room.

e) Glazing and Ventilation to Residential - Condition 3

5.25 Calculations show that the maximum required level of attenuation on Condition 3 façades is R_w + C_{tr} 25 dB. This level of attenuation could be achieved by using the following 'standard thermal' double glazing specification:

- 4 mm pane
- 16 mm air gap
- 4 mm pane

This construction is rated by Pilkington at R_w + C_{tr} 25 dB.

5.26 The above specification would also be suitable for non-habitable rooms on any façade.

5.27 Ventilation on Condition 3 façades could be met by means of non-acoustic trickle vents set within window heads.

d) Night-Time $L_{AF,max}$ Exposure

5.28 As stated above, for a reasonable standard in bedrooms, BS 8233: 1999 also recommends that individual noise events should not normally exceed $L_{AF,max}$ 45 dB at night. World Health Organisation Community Noise Guidelines 1999 interprets this as no more than 10 - 15 times.

5.29 It can be seen from the results in Table 4.7 that the highest night-time $L_{AF,max}$ recorded to the east of the site was 88.7 dB(A). On the assumption that any proposed residential façades will be situated at least 10m from the edge of either Coventry or Stoneleigh Road, and based upon the Condition 1 glazing specification recommended above, it is considered that the internal night-time $L_{AF,max}$ 45dB criteria will not be exceeded more than 15 times during the night-time period.

c) General glazing notes

5.30 All windows should be well sealed when closed. It is imperative that the frame does not compromise the performance of the glazing. It is therefore recommended that the frames be of uPVC, hardwood or aluminium constructions and be well sealed into the apertures.

5.31 Softwood windows could also be used, providing guarantees are given by the manufacturer that acoustic properties will be maintained for the life of the windows.

5.32 No gaps should be visible around the frame from the exterior.

5.33 All glazing should meet with minimum requirements under Part L of Building Regulations

6 OUTDOOR AMENITY SPACES

6.1 Guidance given in BS 8233 and the WHO Guidelines for Community Noise states that it is desirable for the steady noise level in external amenity areas (such as gardens or outdoor living areas) to be less than 50 dB $L_{Aeq,T}$ with 55 dB $L_{Aeq,T}$ regarded as an upper limit.

6.2 Whilst average existing daytime levels of around 65dB(A) have been recorded on the most exposed part of site, it is anticipated that the construction of site buildings and the inclusion of 1.8m high close-boarded garden fences will significantly reduce noise levels in outdoor amenity spaces.

6.3 It is therefore anticipated that noise levels within gardens closest to Stoneleigh and Coventry Road will be between 55-60 dB(A) when averaged over the daytime period. This would be considered to fall somewhere between the LOAEL and SOAEL with reference to the NPSE.

6.4 Noise levels in gardens further into the site are likely to be 50-55 dB(A) which would be considered to fall somewhere between the NOEL and LOAEL with reference to the NPSE.

7 CONCLUSIONS

a) Assessment

7.1 Prevailing noise levels at a proposed residential development site have been measured, and an assessment of the site has been made. Measurements have been made at the most exposed proposed residential locations i.e. at locations considered to represent the worst case noise climate on site.

7.2 Survey measurements and witnessed conditions have indicated that the dominant noise source affecting both parts of the site are the adjacent Stoneleigh and Coventry Road. Whilst noise from the nearby Coventry Airport is audible on site, flights are currently infrequent and generally restricted to the daytime period.

7.3 The level of noise affecting the site is elevated to the east. Residential plots situated directly adjacent to the road network will require acoustic mitigation, in the form of suitably selected glazing and ventilation, in order to meet Local Authority criteria. However, noise levels affecting the site are not deemed to restrict the suitability of the site for residential purposes.

b) Proposed Residential Dwellings

7.4 By providing the appropriate glazing and ventilation constructions to the proposed façades, calculations indicate that internal ambient noise levels within proposed dwellings would be less than 30 dB(A) for daytime and night-time.

7.5 The in-situ noise levels would therefore be considered the NOEL, and noise due to environmental sources should have no perceptible adverse effect on health or quality of life providing that the design guidance given in this report is followed.

c) Outdoor Amenity Space

7.6 An assessment of expected noise levels within outdoor amenity spaces (such as gardens) has concluded that the level of noise impact in the most exposed outdoor amenity spaces would generally be considered to fall somewhere between the LOAEL and SOAEL with reference to the NPSE.

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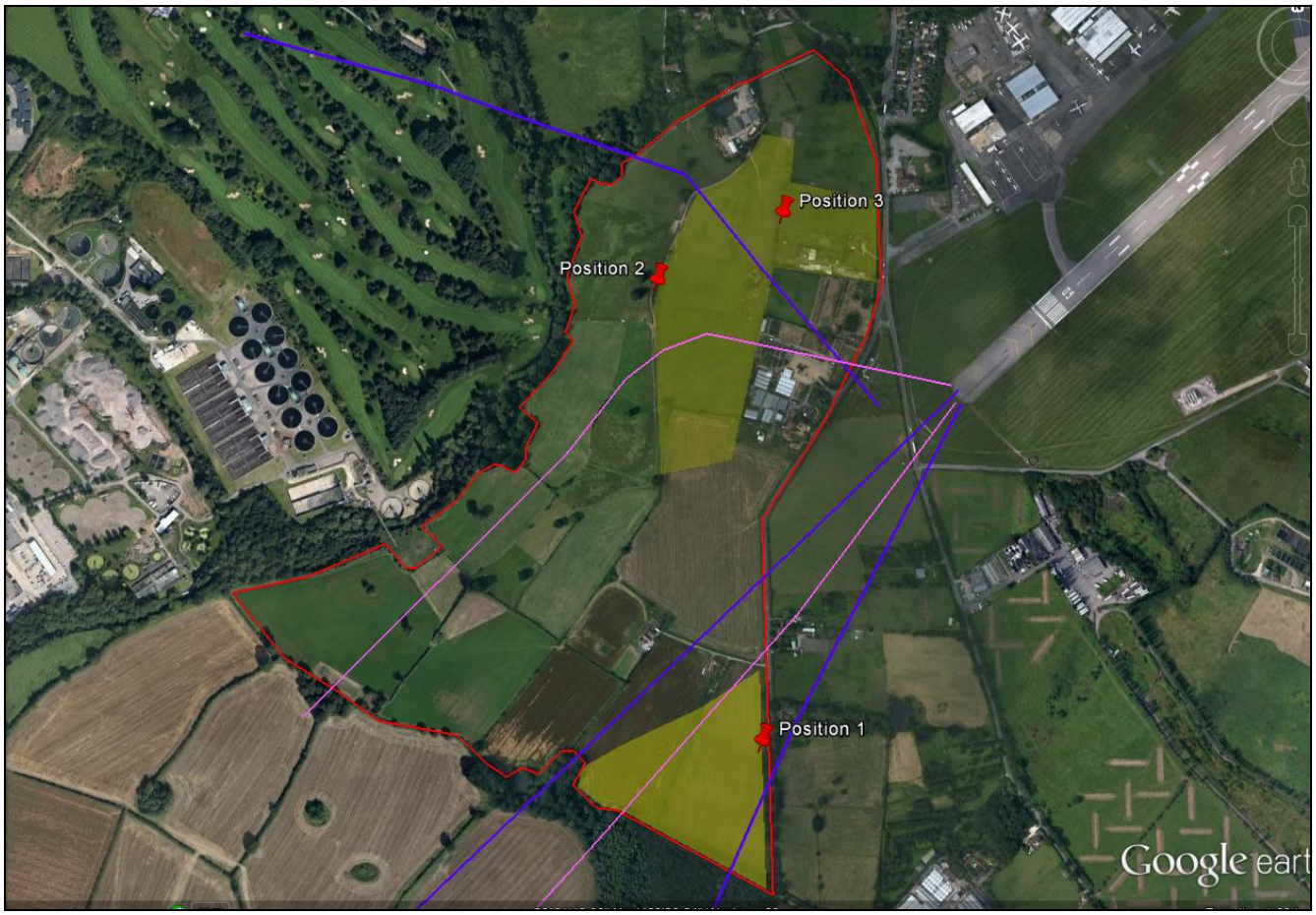
Highfield House
5 Ridgeway
Quinton Business Park
Birmingham
B32 1AF

B7350/ENV/P1

13th December 2013

APPENDIX 1 – SITE PLAN AND MEASUREMENT POSITION



Key:

Aircraft take-off path

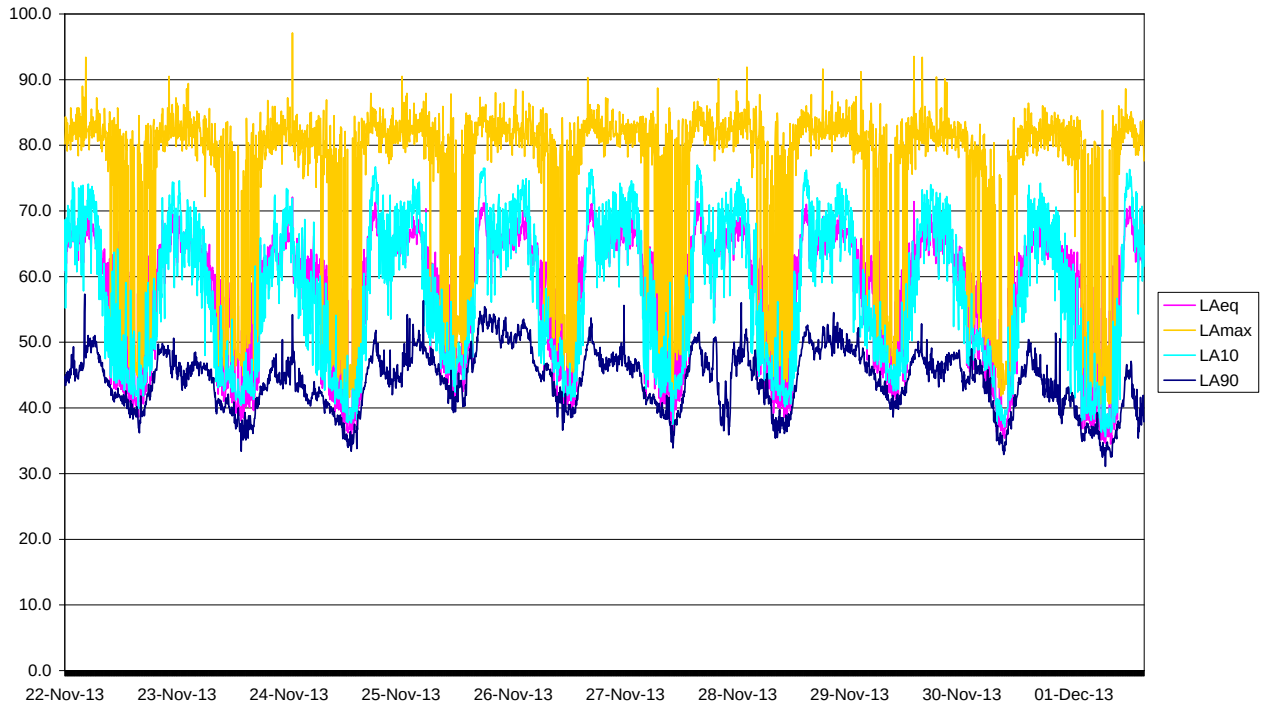
Aircraft landing path

Site Boundary

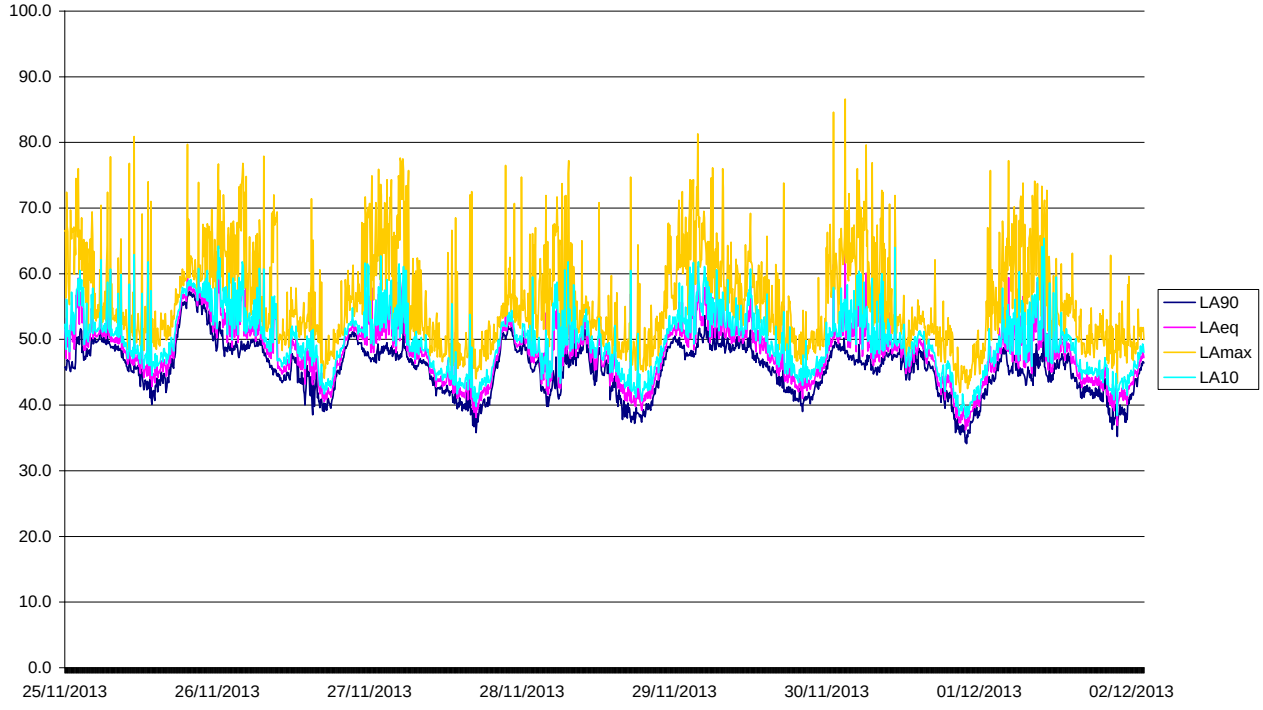
APPENDIX 2 – MEASUREMENT RESULTS

All measurements are in dB(A). The measurement period, T, was set to 5 minutes.

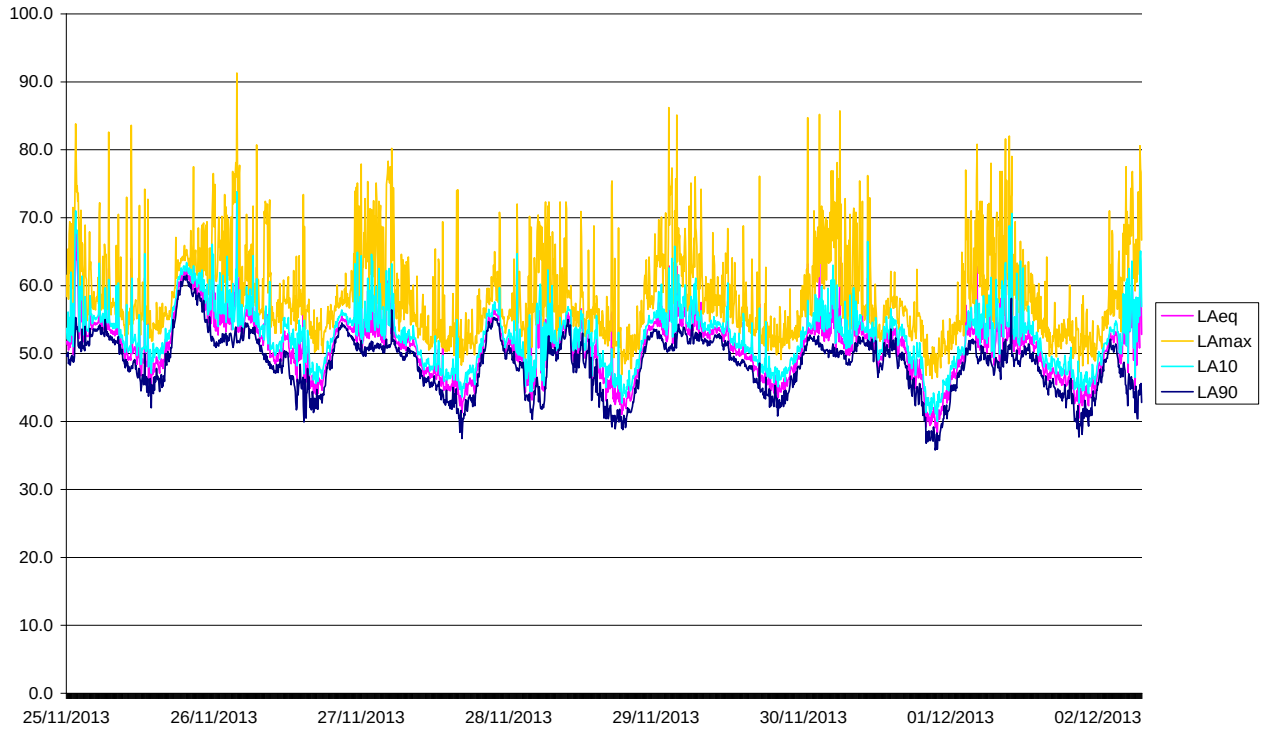
Position 1 Results 22nd November – 2nd December 2013



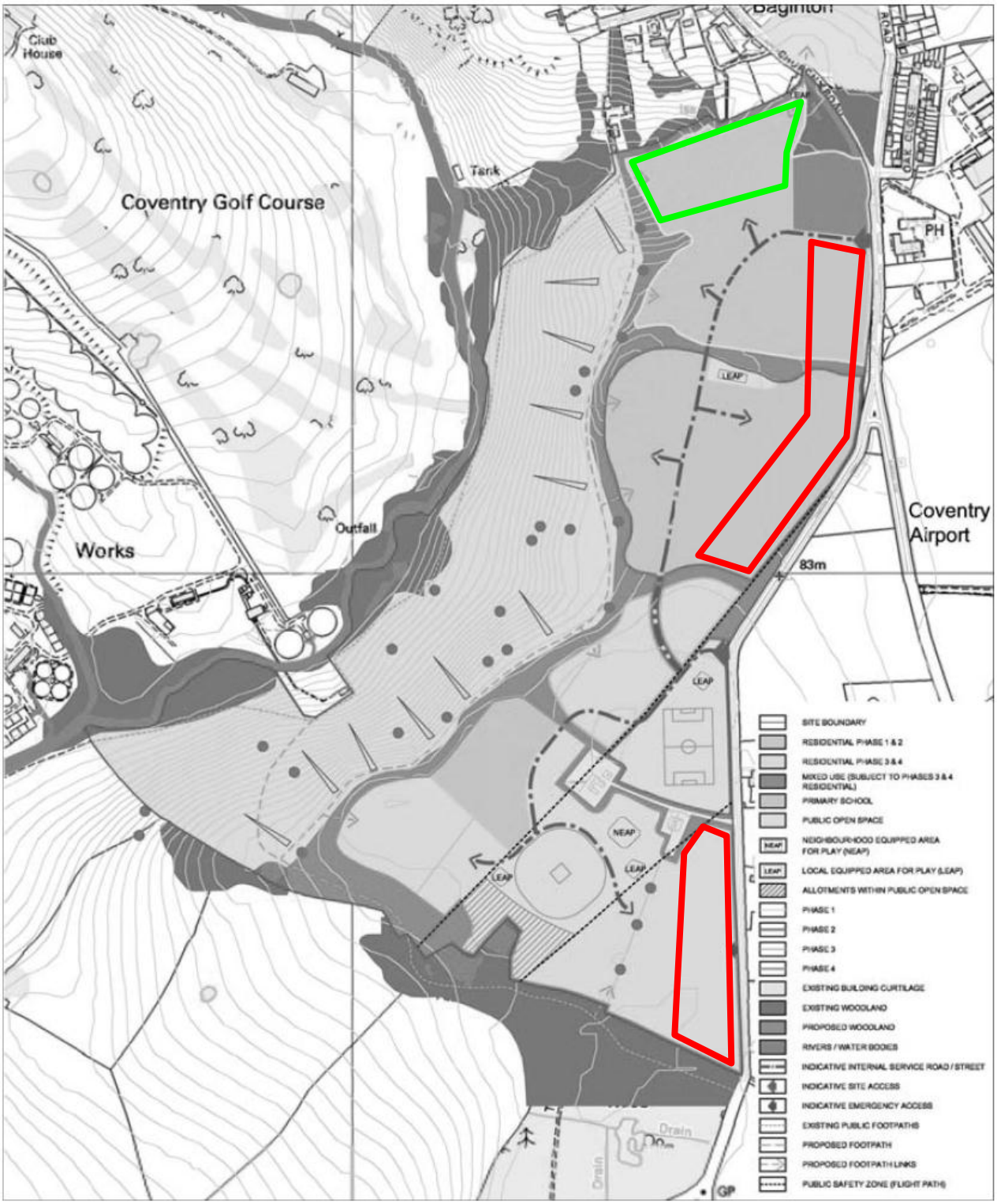
Position 2 Results 25th November – 2nd December 2013



Position 3 Results 25th November – 2nd December 2013



APPENDIX 3 – GLAZING & VENTIALTION REQUIREMENTS



Key:

Condition 1 | Condition 2 | *unmarked* Condition 3