



WHATLEY MANOR HOTEL

ASHPS PLANNING NOISE REPORT

Acoustics Report A2440 R02a

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Report for:	Whatley Manor Hotel
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1 Introduction

Ion Acoustics is appointed by Whatley Manor Hotel to assist them and the design team in respect of a planning application for proposed changes to their current plant. As part of a decarbonisation scheme, it is proposed to replace existing gas boilers and out of date cooling plant with new Air Source Heat Pumps (ASHPs). This report sets out the findings of a noise impact assessment for the new ASHP plant and details:

- A baseline noise survey.
- Planning noise criteria for plant including a discussion of local authority requirements.
- Derivation of plant noise limits.
- An assessment of the noise of the proposed new ASHP Plant and demonstration of compliance with proposed noise criteria.

On this basis, the report indicates that the proposed change of plant is acceptable for planning purposes in respect of noise emissions.

2 Scheme Details

Whatley Manor Hotel is a high end hotel with extensive grounds near Malmesbury in Wiltshire. It is proposed to replace existing gas boilers and other cooling plant with new ASHPs. Specifically, this will comprise the following systems.

- System 2: Spa Heating.
- System 3 + 4: Hotel Heating (3) and Hotel Cooling (4) with five units comprising three reversible units for cooling and heating and two units for heating only
- System 5: Pool Water heating

The location and details are discussed later. The plant being removed as part of this work includes the existing large chiller plant located adjacent to the bothy and various boiler plant located closer to the hotel and spa.

The site context is shown in Figure 1, which indicates the location of the plant and existing third-party housing to the east of the scheme, beyond the hotel car park. This also shows the measurement positions used for measuring the existing plant noise. The car park has a stone wall to the perimeter, with the nearest housing generally to the east beyond this. This housing comprises two storey properties with noise-sensitive residential accommodation on ground and first floor. The ground floor is essentially shielded from hotel car park and operations, but the first floor has line of sight to the car park.



Figure 1: Location plan showing the measurement positions and existing plant locations.

3 Guidance on Planning Noise for Plant

3.1 National Planning Policy Framework (NPPF)

In 2012 the National Planning Policy Framework (NPPF) replaced a number of Planning Policy Statements with a single document which is intended to promote sustainable development. The NPPF was revised in August 2026¹, certain aspects of the guidance changed.

The NPPF sets out the Government's planning policies for England. The document is generally not prescriptive and does not provide noise criteria. Instead, it places the onus on local authorities to develop their own local plans and policies. Sections of the NPPF relating to noise are stated below:

'P1: Planning for clean and safe places

1. To support efforts to avoid and mitigate risks from natural and man-made hazards, minimise levels of pollution and create clean, liveable and safe places for people to live, work and visit, development plans should:

1.b. Consider any wider opportunities to reduce air, water, soil, noise or other forms of pollution, and contribute to compliance with national and local environmental targets and objectives, through the spatial strategy and policies for specific parts of the plan area (such as by identifying opportunities for strategic nature-based solutions);

¹ <https://www.gov.uk/government/publications/national-planning-policy-framework--2>

P3: Living conditions and pollution

1. Development proposals should be appropriate for their location, taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, whether these effects are on or off-site; and whether this is as a result of the development itself or the product of preexisting conditions in its vicinity. In assessing the potential effects of pollution, consideration should be given to the potential sensitivity of the site, and its intended occupiers and users, as well as that of the environment and population in the surrounding area (including where certain groups could be particularly vulnerable to its effects, such as children and older people).

2.a. Provide healthy living conditions for occupiers and users in terms of adequate access to light and avoiding exposure to levels of air, noise, artificial light or other sources of pollution which could have an unacceptable adverse effect on health and the quality of life. Where necessary suitable mitigation measures should be incorporated to secure acceptable living conditions;

2.b. Not give rise to, or contribute to, an unacceptable level of access to daylight and sunlight for neighbouring residents and occupiers, or unacceptable levels of air, noise, artificial light, water, soil or other forms of pollution on or beyond the site. Adverse impacts of this nature should be avoided where possible, or else mitigated to an acceptable degree. Where possible, opportunities should be taken to reduce pollution affecting the wider area (such as through traffic and travel management or improved external lighting);

2.d. Mitigate and reduce to a minimum potential adverse impacts resulting from noise, not result in levels of noise exposure which would have a significant observed adverse effect, and maintain the character of tranquil areas (those areas that have remained relatively undisturbed by noise from human sources and are prized for their recreational and amenity value for this reason);

P4: Impact of development on existing activities

1. Existing businesses, community facilities, public services and defence and security activities should not have unreasonable restrictions placed on their current or permitted operation as a result of development being approved after they were established. This means that development proposals should be capable of being integrated effectively with existing business, community and public service activities and infrastructure in their vicinity (including, but not limited to, uses such as pubs, music venues, places of worship, sports clubs, blue light services, defence, electricity network infrastructure and industrial and waste sites).

2. Where the operation of an existing activity could have a significant adverse effect on a proposed new development in its vicinity, development proposals should:

a. Identify the nature of the potential impacts, informed where necessary by early discussions between the applicant (i.e. the 'agent of change') and those existing uses which could be affected by the proposal to inform the scope for mitigation; and 81

b. Be able to demonstrate that suitable mitigation can be provided before first occupation of the development, if it is to be acceptable. Planning conditions or obligations should be used to secure agreed mitigation measures.

3. This policy applies to new development involving changes of use of land and property, as well as to new construction, and includes situations where new development may interfere with the operation of electronic communications networks. Both lawful current and permitted levels of operation of existing activities should be taken into account when applying this"

3.2 Noise Policy Statement for England (NPSE)

The Noise Policy Statement for England (NPSE)² sets out the 'Government's policy on environmental, neighbourhood and neighbour noise for England. The policy has three aims:

- *"avoid significant adverse impacts on health and quality of life;*
- *mitigate and minimise adverse impacts on health and quality of life, and*
- *where possible, contribute to the improvement of health and quality of life.*

The NPSE introduces the following terms, which are also used in the NPPF:

"NOEL – No Observed Effect Level

This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.

LOAEL – Lowest Observed Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected.

SOAEL – Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur".

However, neither the NPSE nor the NPPF Planning Practice Guidance defines numeric bounds for NOEL, LOAEL or SOAEL. The boundary of each effect level should be defined for each situation.

3.3 Online Planning Practice Guidance

Further Government planning advice is available online³. The online noise section *"advises on how planning can manage potential noise impacts in new development"* and refers to the adverse effect levels set out in the NPSE. It states:

"Plan-making and decision making need to take account of the acoustic environment and in doing so consider:

- *whether or not a significant adverse effect is occurring or likely to occur;*
- *whether or not an adverse effect is occurring or likely to occur; and*
- *whether or not a good standard of amenity can be achieved.*

...this would include identifying whether the overall effect of the noise exposure (including the impact during the construction phase wherever applicable) is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation."

The guidance also presents a noise exposure hierarchy table to provide further information on the boundaries between the NOEL, LOAEL and SOAEL. The hierarchy table is shown below in Table 1.

² Noise Policy Statement for England:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69533/pb13750-noise-policy.pdf

³ See <https://www.gov.uk/guidance/noise--2>

Table 1: Noise Exposure Hierarchy Table

Perception	Examples of Outcomes	Increasing Effect Level	Action
No Observed Effect Level			
Not noticeable	No Effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level			
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude, or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g., avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

3.4 Wiltshire Council Guidance

Wiltshire council has published a document "Planning Consultation Guidance Note: Noise and Vibration" dated 31/10/23 which sets out their standard requirements for plant noise emissions assessments.

This states that for most industrial and commercial noise sources and assessment of noise according to BS 4142 should be carried out. It further says that new developments should, where possible, prevent noise creep and that the standard design objective to prevent creep should be:

"The development should be designed so as to achieve a rating level of 5dB (L_{Aeq}) below the typical background (L_{A90}) level at the nearest noise sensitive location."

The context here is that existing plant is being replaced and some currently noisy plant is being removed. So, the issue of creep is not relevant to this scheme. So, in principle limiting the rating level of the plant to not exceed the typical background level would meet Wiltshire's requirements, and that of BS 4142 for a low impact. We presume that the intent is that the rating level would be the L_{Ar} , as set out in BS 4142:2014, rather than the L_{Aeq} as stated in their guidance.

3.5 BS 4142:2014

A BS 4142 assessment is typically made by calculating the difference between the noise under consideration and the background sound level as represented by the L_{A90} parameter, determined in the absence of the new commercial noise. (Existing commercial noise would normally be considered to part of the background sound level). The L_{A90} parameter is defined as the level exceeded for 90% of the measurement time, representing the underlying noise in the absence of short duration noise events such as dog barks or individual cars passing.

The noise under consideration is assessed in terms of the ambient noise level, L_{Aeq} , but a character correction penalty can be applied where the noise exhibits acoustic characteristics such as distinguishable tones, impulsiveness, intermittency or other acoustically significant characteristics. The ambient noise level, L_{Aeq} is defined as the steady-state noise level with the same energy as the actual fluctuating sound over the same time period. It is effectively the average noise level during the period. The new commercial noise level (L_{Aeq}) with the character correction (if necessary) is known as rating level, L_{Ar} , and the difference between the background noise and the rating level is determined to make the BS 4142 assessment.

The standard states:

- *"Typically, the greater the difference, the greater the magnitude of the impact."*
- *A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context."*
- *A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context."*
- *The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context."*

BS 4142 also stresses the importance of considering the context in which a sound occurs. Factors including the absolute sound level, the character of the sound, the sensitivity of the receptor and the character of the area should be considered when assessing the noise impact.

The standard states that the objective of a noise survey *"is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular time periods"*. A typical background sound level is usually derived by means of statistical analysis as

opposed to, for example, simply selecting a mean average or the lowest. This is typically achieved by creating a frequency distribution histogram of the background sound levels measured, rounded to the nearest whole number.

The absolute sound level is of particular importance where the measured background sound levels are low, which is typically taken as around L_{A90} 30dB or below. In regard to low sound levels, the standard states:

"Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night."

Therefore, amenity can be protected with a absolute fixed limit at low levels especially at night.

3.6 Absolute Noise Criteria

British Standard BS 8233: 2014⁴ and the World Health Organisation (WHO) also provide external noise criteria as absolute noise limits to protect residential amenities. These are detailed in Table 2 below.

Table 2: WHO / BS 8233: 2014 Guideline Noise Levels

Location	Critical Health Effect	07:00 to 23:00	23:00 to 07:00
Outside Bedroom Windows	Sleep Disturbance (Windows Open)	--	45dB $L_{Aeq, 8\text{hours}}$ ⁽¹⁾
Amenity Spaces (Gardens / Patios)	Moderate Annoyance Serious Annoyance	50dB $L_{Aeq, 16\text{ hours}}$ ⁽²⁾ 55dB $L_{Aeq, 16\text{ hours}}$ ⁽²⁾	--
Notes: (1) From WHO Community Noise Guidelines (1999) (2) BS 8233: 2014 and WHO Community Noise Guidelines			

The WHO guideline of 45 dB $L_{Aeq, 8\text{hr}}$ represents an 8-hour L_{Aeq} outside noise-sensitive rooms to prevent sleep disturbance. The WHO limit is a level of 1m from the façade. Therefore, the equivalent free field level would be approximately 3dB lower, 42 dB L_{Aeq} .

Where background and rating noise levels are low, BS4142 advises that assessment in line with absolute noise limits might be as, or more, appropriate than a relative assessment. In this instance, for third party receptors, the external WHO sleep disturbance threshold has been applied and a noise target of 32dB derived. This level being 10dB below the (free field) level at which sleep disturbance would occur, ensuring no cumulative "creep" in ambient noise levels could exceed the WHO criteria. Adherence to the noise limits would ensure noise from the proposed plant would not result in any adverse noise impacts.

Therefore, implementing a limit of 32dB externally provides a good level of protection and it is not necessary to impose a lower value in order to protect amenity, regardless of the background noise level. This limit has been commonly implemented for such planning schemes where background levels are low.

⁴ British Standards Institution (2014) BS 8233:2014: Guidance on sound insulation and noise reduction for buildings

4 Noise Survey

A noise survey was carried out at the site to determine the baseline background noise levels in line with BS 4142 and also to assess existing baseline noise levels from the current plant.

A logging survey was undertaken to determine the background sound levels at a position representing the nearest housing. This would represent both sets of housing to the west of the hotel site boundary.

4.1 Logging Noise Survey

A baseline logging noise survey was carried out between Tuesday 31st March – Wednesday 1st April 2026 using a Rion NL52 sound level meter with a Type WS15 wind shield as shown at position MP1, as shown in Figure 1, and a photo in Figure 2. The microphone and windshield were mounted on a tripod and placed in a free field location close to the perimeter of the site adjacent to the housing to the east. This position is representative of the baseline noise level affecting the closest third party housing.



Figure 2: MP1 in the SE corner of the car park facing east with residential windows behind

The meter was successfully calibrated with a Brüel & Kjær Type 4231 calibrator at the start and end of the survey. No significant drift in calibration was noted on collection. The meter was set up to log various noise indices (L_{Aeq} , $L_{Amax,F}$, L_{A90} , L_{A01} , L_{A10}) in consecutive 15-minute periods.

Weather conditions on set up were dry and slightly overcast at a temperature of 12°C and low winds, with conditions clearing to be sunny during the day. There was a gentle breeze from the south-west, with some small amount of branch movement, but no noise from leaves was audible.

On collection, the weather conditions were again dry with clear skies at a temperature of 9°C with light winds. The forecast throughout the survey suggested the weather conditions were suitable for monitoring.

During the survey, the AHUs were also running continuously, and are assumed to have run at night, so were included in the logging measurements, but they were not audible at the northern boundary nor at MP1. And intentionally MP1 was chosen to ensure it was distant from the AHUs and other fixed plant and fully shielded by the bothy building so it was not affected by AHU noise and allowed an appropriate baseline background level to be measured.

4.2 Attended Measurements

Various attended measurements were carried out to assess the noise of existing plant currently operating on the site. This included noise from the existing AHUs, the standby generator and the chiller. The various measurement positions are shown in Figure 1.

With respect to this ASHP assessment the key data is noise from the existing chiller, which is being replaced, and from the standby generator.

To determine noise from the chiller and the generator, these were set running artificially as they were not specifically required for duty during the survey

5 Noise Survey Results

5.1 Logging Noise Levels Measured

Noise levels measured at MP1 are shown graphically in Figure 3 for the period recorded between set up on the morning of Tuesday 31st March and the following morning of Wednesday 1st April in terms of the 15-minute L_{Aeq} , L_{AFmax} and L_{A90} noise levels. The data from the full survey period is tabulated in Appendix A.

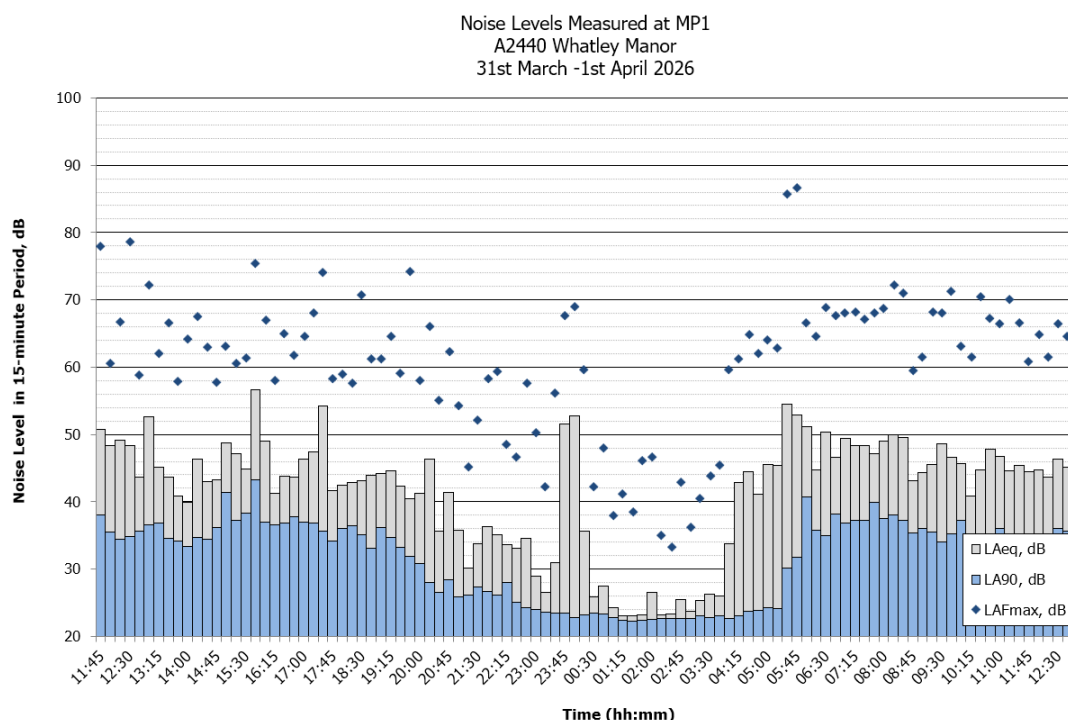


Figure 3: Time History Graph for MP1

Noise levels are varied throughout the survey with the L_{A90} ranging from 22-43 dB. Noise levels started to drop at 19:00 hrs on the 31st March before starting to gradually increase at 05:30 hrs on the 1st April. The increase is from a combination of road traffic flows to the north starting to increase and the dawn chorus. There is a high peak which is from activity either nearby in the car park or potentially outside the house. In general, the daytime background levels are fairly consistent, at around L_{A90} 33-34dB. The typical night value is 23dB. The L_{Aeq} is more variable and is increased by activity nearby from time to time.

BS 4142 requires an assessment by comparing the noise emissions from operational plant against the "typical" background sound levels (L_{A90}), not the lowest value. This has been determined by plotting the frequency distribution of the integer L_{A90} values as discussed in BS 4142. The frequency distribution histogram for the measurement period are provided in Appendix A.

Based on this, the daytime typical background noise level is taken as L_{A90} 33dB; the level falls below this only 20% of the time. The levels are lower at night and typical background noise level is taken as L_{A90} 23dB; levels are below this only about 9% of the time and this is also the modal value.

Table 3 shows the summary results in terms of the 16-hour daytime and 8-hour night-time values as measured. The L_{Aeq} results have been logarithmically averaged. The background results are derived from the histograms in Appendix A.

Table 3: External Noise Levels - Summary

Position	Period	Total Duration	L_{Aeq} , dB	Typical, L_{A90} dB
MP1	Day (07:00 to 23:00)	16 hrs	46.7	33
	Night (23:00 to 07:00)	8 hrs	46.0	23

5.2 Attended Measurements

The full results of the attended measurements are given in Appendix A which also sets out the specific measurement positions.

Existing Chiller

The existing York chiller (YLAA 0515HE) could only be run for a few minutes before there was no load and it then stopped running. It is understood that the chiller was not operating at full operational duty, but we did not have a method of determining the actual duty. The levels measured, are considered conservatively low for the chiller. We were able to measure close to the unit on the south side (with line of sight) giving 61dBA at 3m. Measurements were also made close to the northern perimeter wall for a short duration giving L_{A90} 37dB, which was considered dominated by the chiller, albeit for a very short period. The chiller then stopped running and it was not possible to obtain further measurements. Predicting back to the residence from distance loss alone (20 log 38/26) gives value of 34dBA for the chiller noise incident on the dwelling (free field).

The manufacturer's data gives for the chiller gives a sound pressure level of 64dBA at 10m. A measured value of 61dBA at 3m would approximate to 48dBA at 10m, so it does appear that the chiller could be notably noisier at full duty. So we expect the existing chiller noise at the dwelling would be around 34dBA to around 40dBA depending on duty, potentially slightly higher under full duty.

Generator

The generator is located inside the ground floor of the bothy building and is vented out of the rear (north side) and the side into the chiller enclosure. There is also noise breakout through the timber garage doors facing the yard to the south. We measured:

- 64dBA at 2.5m from the doors into the yard,
- 65dBA at 2m from the inlet louvre on the side wall, although the door was the dominant source
- 67dBA at 2.5m from the vent louvre facing north into the car park.

The generator was clearly audible at the northern boundary of the car park and we measured around 53-54dBA there. It would be clearly audible at the housing also.

5.3 Proposed Plant Noise Emissions Limits

Plant noise emission limits at residential receptors have been set following BS 4142 and following the principles of Wiltshire Guidance. A limit no higher than the derived typical background noise has been set to obtain a "low impact" according to BS 4142, with a preference for 5dB below to control "creep". The noise rating level limits are set out in Table 4. For clarity, the rating level is the specific noise level (dB L_{Aeq}) with any correction for character applied when assessed according to BS 4142. This applies at the windows of residential receptors. In this case, the levels are set as a free field limit, so if measured, the levels 1m from the façade would be around 3dB higher.

As the levels are low at night, the proposed night value is given as a fixed limit in accordance with the discussion in Section 3.6 above. During the day, as there is already AHU noise and the new noise is actually lower, the issue of noise creep is not a factor and therefore the low impact

criterion from BS 4142 and the Wiltshire Guidance is taken, specifically the L_{Ar} not exceeding the background L_{A90} . Hence the proposed limits are given in the final column.

The operational period for the plant is expected to include the full 24 hours period potentially for some of the plant so will need to meet night noise limits as well as during the day.

Table 4: Noise Rating Level Limits (free field level)

Period	Typical, L_{A90} dB	Level 5dB below L_{A90}	Level at Parity with L_{A90}	Proposed limit L_{Ar} dB
Day (07:00 - 00:00)	33	28dB	33dB	33dB
Night (00:00-07:00)	23	18dB	23dB	32dB

These limits apply to third-party receptors. Note however that the development hotel and noise levels must be controlled to the guestrooms. This aspect does not need to be reported for planning but it is another key consideration of the noise control design.

6 Plant Noise Emissions Assessment

6.1 Plant, Operation and Noise Levels

The proposed plant details have been provided by E3 the mechanical engineers for the scheme. The scheme has been developed iteratively with the team to provide a scheme which will work operationally for the hotel, but also to meet the proposed noise limits at the nearby residential receptors.

The individual sets of plant are described below along with their location and operational modes. The locations are shown in Figure 4. These also show (red lines) the location of **new** noise barriers proposed as part of the works. Note that most of the shielding is provided by existing buildings and walls.

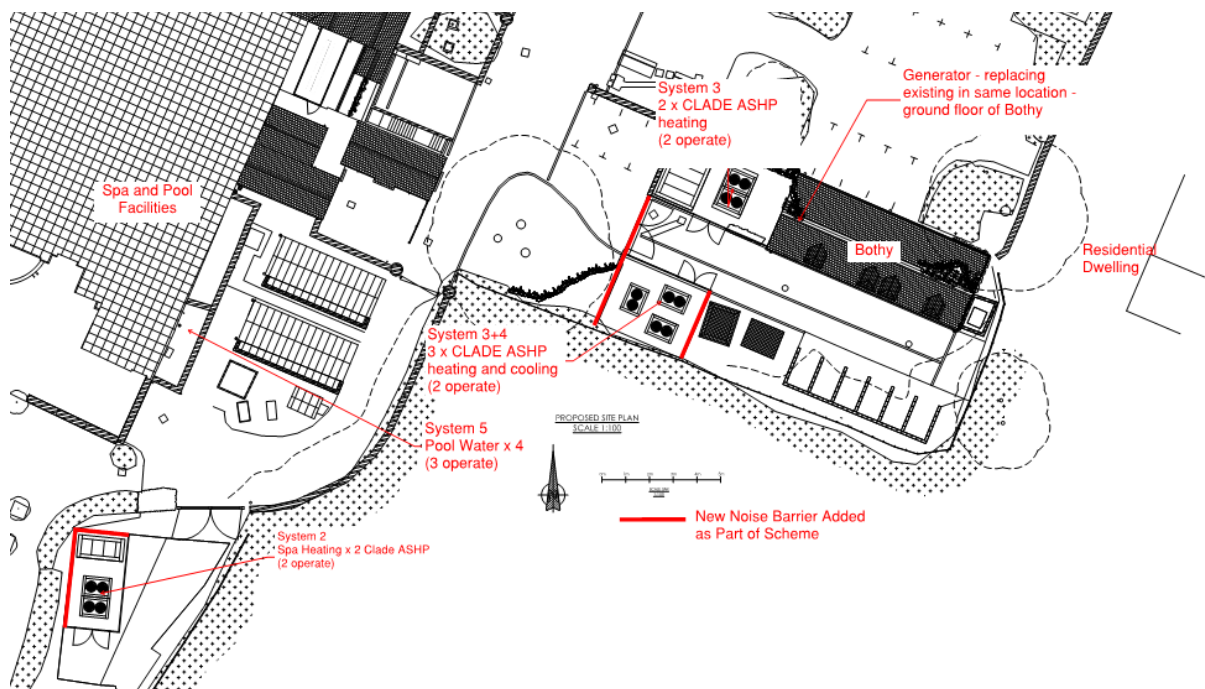


Figure 4 Location of Proposed Plant and Mitigation

System 2: Spa Heating

Two Clade Rowan 2 units are proposed, and both could operate. These are located to the south of the spa and greenhouses and are a good distance from the residential receptors. A noise barrier is proposed around the north and west sides to reduce noise to the hotel spa outdoor areas. These can operate day and night. The spectral sound data for the Clade Rowan units at the proposed operational duty is given in Table 5.

Table 5: Clade Rowan 2 Sound Power Data

	sound power level (dB) at Octave Centre Bands (Hz)						
	63	125	250	500	1000	2000	4000
Heating	79	80	67	64	60	54	50
Cooling	79	80	67	64	60	54	50

System 3: Hotel Heating

Three Clade Rowan (reversible units) are proposed for a new enclosure and two Clade Rowan (heating only) are proposed for the chiller enclosure. Four of these could operate at any time during the day. At night there is lower demand and the BMS would be configured such that only three would operate at night.

System 4: Hotel Cooling

The cooling is provided by the three reversible units in System 3. The cooling is required in daytime and evening only. There is no cooling to guest bedrooms, and the cooling will be completely off at night. It is assumed that on days when cooling is required, there is no requirement for hotel heating (but there would be for domestic hot water). So cooling and heating would not occur at the same time.

The operational assumption for System 3 and 4 is:

- Winter Day up to all five units heating
- Winter Night: up to four units heating
- Peak Summer Day: three units operating cooling
- Peak Summer night: no cooling and no heating
- Mid Season. This could be a combination of heating or cooling but would be a quieter operational condition than the options above

System 5: Pool Water

Four polytropic condensers (or equivalent) located in the "well" adjacent to the AHU vent well. Up to three could operate at one time; these could run day or night. These are quite distant from the residences and well shielded.

The sound data for these has been provided by the supplier at 28-35dBA at 10m. We have used the upper value of 35dBA in the calculations.

6.2 Plant Noise Calculations

Plant noise emissions calculations have been prepared to assess noise levels to the most affected dwellings, NSR1 (see Figure 1). The architect has inspected the site in detail and made line of sight observations from the proposed locations of each unit to identify where existing barrier shielding exists, or where additional shielding is required. Based on this, additional barriers are

being provided to the three heating/cooling clade units and to the domestic hot water units (if required once installed), as well as to the spa units, but the latter is to protect hotel guests. All the units will be provided with barrier shielding to the residential receptors and this is included in the calculations.

The full calculation is given in Appendix B. The summary BS 4142:2014 assessment is given in Tables 6 (day) and 7 (night).

Table 6: BS4142:2014 assessment – Day

Item	Description	Heating	Cooling
Specific Level (L_{Aeq})	Total level of all units	30.3	26.4dB
BS4142 character correction	No character correction applicable for fan noise	0dB	0dB
Rating Level (L_{Ar})	Specific level + Character Correction	33dB	29dB
Day Background (L_{A90})	Typical background level	33dB	33dB
Proposed Limit (L_{Ar})		33dB	33dB
Compliant		Yes	Yes

Table 7: BS4142:2014 assessment – Night

Item	Description	Heating	Cooling
Specific Level (L_{Aeq})	Total level of all units	27.4dB	20.5dB
BS4142 character correction	No character correction applicable for fan noise	0dB	0dB
Rating Level (L_{Ar})	Specific level + Character Correction	32dB	26dB
Night Background (L_{A90})	Typical background level night	22dB	22dB
Proposed Limit (L_{Ar})		32dB	32dB
Compliant		Yes	Yes

It can be seen that the proposed plant with the mitigation provided can meet the proposed noise limits.

Therefore the plant rating level is low, and below 30dBA for night conditions and the daytime cooling. Only the daytime heating is above 30dBA, and that is at 31dBA, which is still low. And that assumes all plant running at full duty, which would not be a particularly common condition we expect.

We note also that the noise of the existing chillers is assessed as giving 34-40dBA. Therefore, the noise level from the new plant would be lower than the existing chiller alone which is being replaced.

6.3 Other AHU plant

A recent assessment of new AHU plant was made which predicted very low noise levels, which were more than 10dBA below the predicted new ASHP plant, so do not contribute to a cumulative assessment impact.

6.4 Context and Uncertainty

BS 4142 requires an assessment of uncertainty and the assessment also depends on context. In this case the calculations have been carried out using data published for the plant at full duty and with all plant operating for the different scenarios, although it is not expected that the plant will

necessary always operate generally at full duty. So that provides a level of conservatism to the calculations.

The site already has significant plant, including a chiller which is being replaced with the new plant which is noisier than the proposed new plant.

The background noise measurements are also subject to uncertainty. However, to allow for a conservative assessment a full 24-hour period has been undertaken and the typical values have been set conservatively at the lower end of the measured values. However, a fixed noise limit is proposed which is not affected by variations in background noise levels.

7 Standby Generator

The standby generator is also being replaced. This is currently located within a garage type enclosure at the west end of the ground floor bothy building; this generator gives rise to noise levels which are clearly audible at the boundary of the site and would be at the nearby sensitive receptors. The proposed scheme is to replace this with a new generator in the same location and having the same inlet and outlet ventilation/exhaust paths. The noise levels will be limited to no higher than the current plant noise emissions as measured and reported in this document.

The plant is for standby emergency use, so will only be operated in the case of a power failure. It will also need to be tested, no more than once a month. The testing would take place during the day and at an agreed time to reduce noise impact.

8 Summary

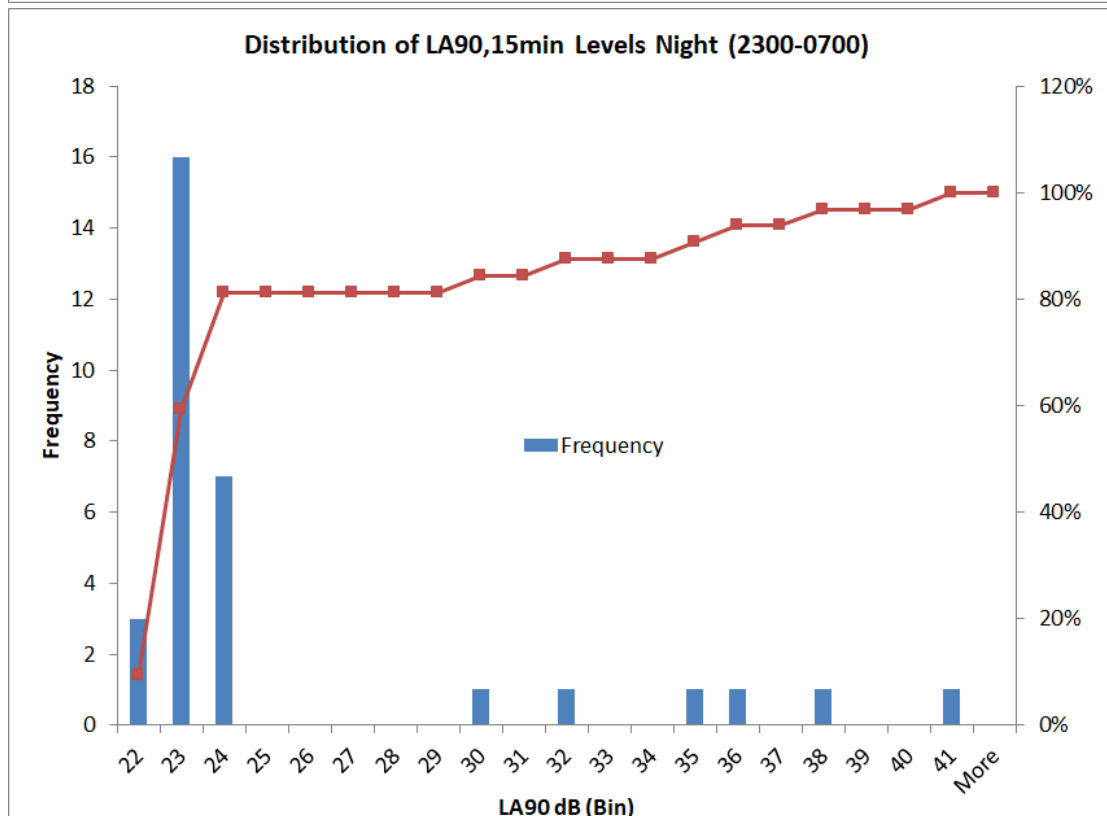
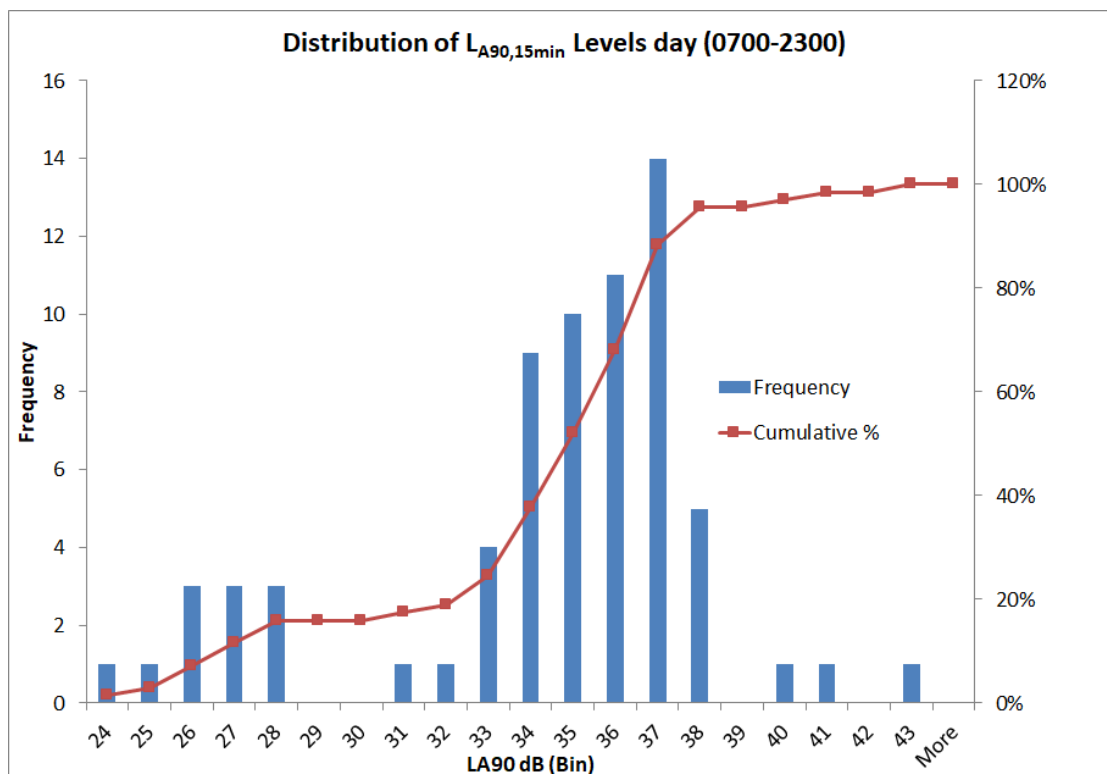
Ion Acoustics has carried out a noise assessment of the impact of proposed new ASHP heating and cooling plant being proposed as part of a decarbonisation scheme to replace existing boiler and chiller plant at Whatley Manor Hotel. A baseline noise survey was carried out to determine the existing noise levels, and in particular determine the background sound levels in terms of the L_{A90} . This is then used to determine plant noise emissions limits in line with BS414:2014 and with reference to Wiltshire Council's standard guidance. The new plant predicted noise levels are lower than that from the existing chiller plant, so this would also represent an improvement in noise levels compared to the current chiller noise.

The noise of the proposed plant has been calculated to the sensitive receptors and found to be compliant with the noise limits with a good margin. The plant is also demonstrated to be quieter than the existing plant which is to be replaced. Therefore, there is no significant noise impact from the proposed replacement scheme.

Time	L _{Aeq} dB	L _{Amax,F} dB	L _{AF90} dB	Time	L _{Aeq} dB	L _{Amax,F} dB	L _{AF90} dB
31/03/2026 13:45	40.9	57.9	34.1	01/04/2026 01:45	23.2	46.0	22.4
31/03/2026 14:00	39.9	64.1	33.3	01/04/2026 02:00	26.6	46.6	22.5
31/03/2026 14:15	46.3	67.5	34.7	01/04/2026 02:15	23.2	35.0	22.6
31/03/2026 14:30	43.0	63.0	34.4	01/04/2026 02:30	23.3	33.2	22.7
31/03/2026 14:45	43.3	57.7	36.2	01/04/2026 02:45	25.5	42.9	22.6
31/03/2026 15:00	48.7	63.2	41.4	01/04/2026 03:00	23.7	36.2	22.7
31/03/2026 15:15	47.1	60.6	37.2	01/04/2026 03:15	25.4	40.5	23.1
31/03/2026 15:30	44.9	61.4	38.3	01/04/2026 03:30	26.3	43.9	22.8
31/03/2026 15:45	56.7	75.5	43.3	01/04/2026 03:45	26.0	45.4	23.0
31/03/2026 16:00	49.0	66.9	37.0	01/04/2026 04:00	33.8	59.7	22.7
31/03/2026 16:15	41.3	58.0	36.6	01/04/2026 04:15	42.9	61.3	23.1
31/03/2026 16:30	43.8	65.1	36.8	01/04/2026 04:30	44.5	64.9	23.7
31/03/2026 16:45	43.7	61.8	37.8	01/04/2026 04:45	41.1	62.0	23.9
31/03/2026 17:00	46.4	64.6	37.0	01/04/2026 05:00	45.6	64.0	24.2
31/03/2026 17:15	47.4	68.0	36.8	01/04/2026 05:15	45.4	62.7	24.1
31/03/2026 17:30	54.2	74.1	35.6	01/04/2026 05:30	54.5	85.8	30.2
31/03/2026 17:45	41.6	58.2	34.1	01/04/2026 05:45	52.9	86.6	31.7
31/03/2026 18:00	42.5	58.9	36.1	01/04/2026 06:00	51.2	66.6	40.7
31/03/2026 18:15	42.9	57.5	36.5	01/04/2026 06:15	44.8	64.5	35.8
31/03/2026 18:30	43.1	70.8	35.1	01/04/2026 06:30	50.4	68.9	35.0
31/03/2026 18:45	43.9	61.2	33.1	01/04/2026 06:45	46.6	67.7	38.2
31/03/2026 19:00	44.2	61.3	36.2	01/04/2026 07:00	49.4	68.0	36.8
31/03/2026 19:15	44.6	64.5	34.7	01/04/2026 07:15	48.3	68.1	37.3
31/03/2026 19:30	42.3	59.2	33.2	01/04/2026 07:30	48.3	67.1	37.2
31/03/2026 19:45	40.5	74.3	31.9	01/04/2026 07:45	47.1	68.0	39.9
31/03/2026 20:00	41.2	58.0	30.8	01/04/2026 08:00	49.0	68.7	37.5
31/03/2026 20:15	46.4	66.0	28.0	01/04/2026 08:15	49.9	72.2	38.1
31/03/2026 20:30	35.6	55.2	26.5	01/04/2026 08:30	49.6	71.0	37.3
31/03/2026 20:45	41.4	62.2	28.4	01/04/2026 08:45	43.1	59.4	35.4
31/03/2026 21:00	35.8	54.3	25.9	01/04/2026 09:00	44.4	61.5	36.1
31/03/2026 21:15	30.2	45.2	26.2	01/04/2026 09:15	45.6	68.1	35.5
31/03/2026 21:30	33.7	52.2	27.4	01/04/2026 09:30	48.6	68.0	34.0
31/03/2026 21:45	36.3	58.3	26.7	01/04/2026 09:45	46.6	71.3	35.3
31/03/2026 22:00	35.1	59.3	26.1	01/04/2026 10:00	45.7	63.1	37.2
31/03/2026 22:15	33.6	48.6	28.0	01/04/2026 10:15	40.9	61.5	33.4
31/03/2026 22:30	33.1	46.6	25.1	01/04/2026 10:30	44.7	70.5	35.3
31/03/2026 22:45	34.6	57.5	24.3	01/04/2026 10:45	47.8	67.3	33.9
31/03/2026 23:00	29.0	50.2	24.0	01/04/2026 11:00	46.7	66.4	36.1
31/03/2026 23:15	26.5	42.2	23.6	01/04/2026 11:15	44.6	70.1	34.4
31/03/2026 23:30	30.9	56.2	23.5	01/04/2026 11:30	45.4	66.6	34.1
31/03/2026 23:45	51.5	67.7	23.4	01/04/2026 11:45	44.5	60.9	34.4
01/04/2026 00:00	52.7	69.1	22.8	01/04/2026 12:00	44.8	64.8	35.1
01/04/2026 00:15	35.7	59.6	23.2	01/04/2026 12:15	43.6	61.6	34.8
01/04/2026 00:30	25.9	42.3	23.4	01/04/2026 12:30	46.4	66.4	36.1
01/04/2026 00:45	27.5	48.0	23.3	01/04/2026 12:45	45.2	64.6	35.7
01/04/2026 01:00	24.2	37.9	22.8	01/04/2026 13:00	48.4	70.2	34.9
01/04/2026 01:15	23.1	41.2	22.4	01/04/2026 13:15	0.0	0.0	0.0
01/04/2026 01:30	23.1	38.4	22.3	01/04/2026 13:30	0.0	0.0	0.0

Attended Measurements of Chiller and Generator

Pos	Duration	description	LAeq	LAFmax	LA90	ve Centre Bands - Hz)						
			dB	dB	dB	63 Hz	125 Hz	250 Hz	500 Hz	1.0 kHz	2.0 kHz	4.0 kHz
P6a	30s	2.5m generator door - genny runing	64.3	68.1	63.9	80.6	69.3	62.7	61.0	54.7	56.9	54.2
P6a	30s	2.5m generator door - genny runing	64.2	64.8	63.9	80.0	69.0	63.0	61.0	55.0	56.8	53.9
P6b	30s	2m off axis to inlet louvre (but exhaust cow,+door dominant	64.7	65.7	64.2	84.3	73.7	65.2	56.1	57.1	52.5	47.6
P6c	30s	2.5m from outlet louvre by car park (outlet dominant)	66.9	67.9	66.4	80.1	76.5	72.6	60.6	54.2	51.9	55.3
P6c	30s	2.5m from outlet louvre by car park (outlet dominant)	66.9	68.3	66.3	80.0	76.6	72.5	61.0	54.1	51.8	55.0
P6d	30s	car park north perimeter, 1m from wall (generator LA90)	54.0	56.0	53.1	69.5	63.2	62.3	43.1	36.3	30.8	30.1
P6d	30s	car park north perimeter, 1m from wall (generator LA90)	54.3	55.9	53.5	69.5	63.6	62.5	44.1	37.7	31.8	30.6
P7	24s	3m from end of chiller (chiller on, fans only)	56.9	65.3	54.3	70.8	63.4	60.1	55.7	47.9	44.6	40.6
P7	30s	3m from end of chiller (chiller on, fans + compressor - duty unknown)	61.4	62.7	60.9	70.1	64.7	63.1	61.5	54.5	48.3	42.4
P6d	1min	car park north perimeter, 1m from wall (chiller LA90)	44.5	56.7	37.4	53.3	46.1	39.8	34.1	30.5	28.7	42.0



Summary

Whatley Manor Hotel - ASHP: Preliminary Noise Emissions Assessment							
RECEPTOR	NSR1 most affected third party dwelling (building with tower to east)						
27/08/2026							
system	type	condition	shielding	cooling day	heating day	cooling night	heating night
				dBA	dBA	dBA	dBA
System 5	Pool Water			17.7	17.7	17.7	17.7
System 2	Spa Heating	full load		17.2	17.2	17.2	17.2
System 3	Hotel Heating	full load			24.2	0.0	24.2
System 3+4	Hotel Heat & CHW	full load		25.1	28.4	0.0	22.40
Total level all running				26.4	30.3	20.5	27.4
background LA90 night				29.4	33.3	23.0	23.0
difference						-2.5	4.4
proposed limit night						32.0	32.0
difference						-11.5	-4.6
background LA90 day				33.0	33.0		
difference				-6.6	-2.7		
proposed limit day				33.0	33.0		
difference				-6.6	-2.7		

System 5 calculations

System 5	Pool Water	
SPL rec = SPL ref - 20 log (d/dref) + reflections - shielding		
SPL ref		35
d ref		10
d receptor		80
20 log d/dref		-18.0617997
reflections locally		6
shielding		-10
Number Units	3	4.8
Lp		17.7

System 2, 3 & 4 Calculations

27/08/26									
Octave Band Centre Frequency, Hz									
63 125 250 500 1000 2000 4000									
Heating	swl								
uncertainty									
Cooling	swl								
uncertainty									
System 2	SPA Heating								
relocated to well away to south of spa									
SPL rec = SWL ref - 20 log d - 8 + ref - shielding									
SWL									
d									
20 log d									
-8									
reflections locally									
shielding	pd	0.3							barrier from
Number Units									
Lp data									
uncertainty									
Lp + uncertainty									
System 3	Hotel Heating (3 units Heat only)								
located in the location of the existing chiller - have full shielding as shown									
SPL rec = SWL ref - 20 log d - 8 + ref - shielding									
SWL									
d									
20 log d									
-8									
reflections locally									
shielding	pd	0.3							
Number Units									
Lp									
uncertainty									
Lp + uncertainty									
System 3+4	Hotel Heating + cooling (4 units Heat/Cool)								
HEATING located to south of yard, just beside									
SPL rec = SWL ref - 20 log d - 8 + ref - shielding									
SWL									
d									
20 log d									
-8									
reflections locally									
direct	43.37	A	2.85	B	40.67				
shielding		pd	0.18						
Number Units									
Lp									
uncertainty									
Lp + uncertainty									
System 3+4	Hotel Heating + cooling (2 units Heat/Cool)								
COOLING located to south of yard, just beside									
SPL rec = SWL ref - 20 log d - 8 + ref - shielding									
SWL									
d									
20 log d									
-8									
reflections locally									
shielding		pd	0.18						
Number Units									
Lp									
uncertainty									
Lp + uncertainty									