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Noise Assessment Report for 125 Wellington Street Batley WF17 5TH

Report Ref:	227Batley
Client:	Sophia Janjua
Site Location:	125 Wellington Street Batley WF17 5TH
Date of Issue:	23rd April 2018
Date of Assessment:	Thursday 19th – Saturday 21st April 2018 (Day and Night measurement)

Picture 1: 125 Wellington Street Batley WF17 5TH

Executive Summary

The proposed development is within a mixed commercial and residential noise environment. The site is subject to road traffic noise that has a dominant noise impact on the environment.

LAeq (16 hour) was 65dB during the day and 60dB during the night at the front facing Wellington Street (ML1). LAFmax reached 87dB by Wellington Street during the night.

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LAeq (16 hour) was 54dB during the day and 48dB during the night at the back of the building adjacent to Dark Lane (ML2). LAFmax reached 76dB during the night.

In relation to BS8233:2014 and WHO (2009) these levels are too high and have to be actively reduced in order to ensure that internal noise levels for the dwelling do meet the guidelines. However reduction of the external noise to acceptable levels internally is achievable. This can be done by using external walling, windows, doors and ventilation that has the $R_{,w}$ (C;Ctr) specified herein for the respective rooms.

Reduction of the External noise level at the front with Wellington Street is not reasonable due to the close proximity to the road and the height that a barrier would need to achieve to be effective.

The WHO (2009) recommendation for L_{AFmax} of 60dB has not been achieved. LAFmx reached 87dB during the night at Wellington Street and 76dB at the back of the building adjacent to Dark Lane. This has been accommodated by relying on closed window ventilation to achieve internal guideline levels.

Application of the sound reduction recommendations in this report will meet the standards for internal noise levels required by the national planning policy framework guidelines. If users of the property keep external windows and doors closed, they will be at a low risk of adverse noise impact.

Objective

The proposed site is a former public house building that is no longer functioning as a public house. It is proposed to convert the existing building into nine self contained apartments. The building is located on the corner of B6123 Wellington Street and Dark Lane.

The purpose of this noise assessment is to measure the ambient noise levels and assess whether sound reduction from external walls, windows, doors and ventilation is required to satisfy the guidelines in BS8233:2014 and WHO(2009).

Source under Assessment

There is 1 dominant source of noise that impacts the area.

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- Road traffic noise from Wellington Street and Dark Lane.
- There are commercial buildings nearby however commercial noise was not significant

The site is in a mixed use built up environment characterized by commercial and predominantly residential dwellings. The dominant noise is characterized by road traffic noise from the B6123 Wellington Street.

Picture 2: Measurements obtained from the front facing Wellington Street as well as the rear of the building.

Methodology

Measurements were unattended and conducted over a 48 hour period during suitable weather conditions. The sound level meter was calibrated and placed at the front of the building outside the first floor window facing Wellington Street. After measurements from the front elevation were obtained, the meter was calibrated and placed at the rear of the building outside through the first floor window. These measurement locations are marked as ML1 and ML2 on the site location plan.

The same Casella Cel-490 class 1 sound level meter was calibrated and used to measure noise levels at the front with Wellington Street and the rear adjacent to Dark Lane.

Measurements were conducted from Thursday 19th – Saturday 21st of April 2018.

The meters were calibrated before and after the measurements successfully.

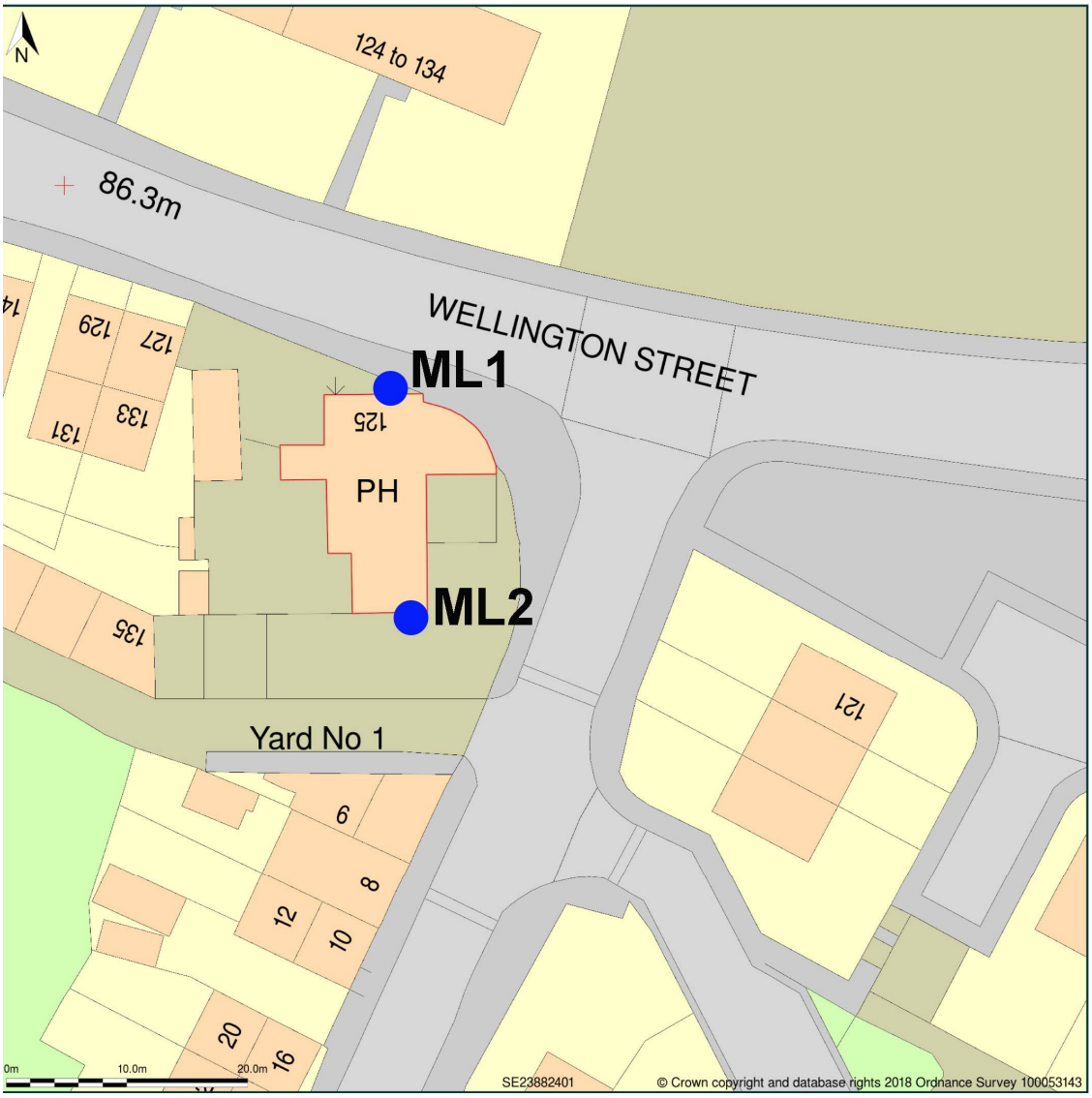
Façade Correction

Façade measurements occur when the meter is in front of a large reflective surface at a distance of less than 3.5m away from the reflective surface. In order to convert measurements to free field equivalents, a façade correction is required. This is done by reducing the measured levels by up to 3dB. At the front and rear of the building the sound level meter was 1m from the façade and a 3dB façade correction will be applied to convert the noise measurements to equivalent free field levels.

Picture 3: Measurements at the rear of the building adjacent to Dark Lane.

Picture 4: 125 Wellington Street is on a junction with Dark Lane.

Site and Measurement Locations



Site plan 1: This is a site location plan purchased and cropped for the purposes of this assessment from www.buyaplan.co.uk at 13:40 on Monday 23rd April 2018. The original uncropped version is attached at the end of this report. The blue circles indicate where the sound level meters were positioned during the measurements. ML1 indicates measurement location one and ML2 indicates the second measurement location.

Date and Time of Measurements

Thursday 19th – Saturday 21st April 2018 (Day and Night measurement)

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Measuring Equipment & Calibration

The sound level meters used at ML1 and ML2 is a Casella Cel-490, a class 1 meter laboratory calibrated by Casella in November 2016 traceable to UKAS standards serial number 230643. The meter was field calibrated on the day using a Cel 110/1 class 1 calibrator last calibrated by Pennine Instrument Services August 2017.

Noise Levels

At the front by Wellington Street Measurements at ML1

This was characterized by road traffic noise from the main B6123Wellington Street

Noise Levels include 3dB façade correction

Daytime: LAeq (16 hours) 65dB

Night: LAeq (8 hour) 60dB LAFmx 87dB

Noise Levels measurements at the rear of the building adjacent to Dark Lane (ML2)

Measurements were conducted both day and night time. Noise Levels include 3dB façade correction

Daytime: LAeq(16hour) 54dB

Night: LAeq(8hour) 48dB LAFmax 76dB

No significant noise was noticeable from any commercial or industrial noise. The measurement data is supplied in Appendix A.

The noise levels exceed the BS8233:2014 guidelines and require mitigation.

BS8233:2014 Criteria

Table 1 below is taken from BS8233:2014. It shows the guide lines for internal ambient noise levels. The guidelines in BS8233:2014 are also advised by WHO (2009).

Activity	Location	Day (07:00 -23:00)	Night (23:00 – 07:00)
Resting	**Living Room**	**35** $_{LAeq\ (16\ hour)}$	**-**
Dining	**Dining room/area**	**40** $_{LAeq\ (16\ hour)}$	**-**
Sleeping(daytime resting)	**Bedroom**	**35** $_{LAeq\ (16\ hour)}$	**30** $_{LAeq\ (8\ hour)}$

Table 1: BS8233:2014 noise level for internal habitable rooms.

In addition the WHO (2009) has guidance for outdoor living areas such as gardens for day time noise of 50 – 55dB $L_{Aeq\ (16\ hour)}$. It has a L_{AFmax} of 45dB inside bedrooms and a L_{AFmax} of 60dB outside bedrooms, (see table 2 below).

Specific Environment	LAeq dB	Time base (hours)	LAFmax dB
Outdoor living area (day)	55	16	
Outdoor living area (evening)	50	16	
Inside bedrooms (sleeping)	30	8	45
Outside bedrooms	45	8	60

Table 2: WHO (2009) guidelines

Recommendations for dwellings where Wellington Street is visible from inside an opening.

- Bed rooms should have windows, external doors, external walling and ventilation with a sound reduction of R_w(c;ctr) 47dB. The sound reduction is set to account for WHO (2009) recommendations of LAeq (8 hour) night of 30dB inside bedrooms, LAFmax of 45dB or less and to allow for uncertainty of ±5dB.

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- Living rooms should have windows, external doors, external walling and ventilation with a sound reduction of R_w(c;ctr) 35dB. The sound reduction is set to account for uncertainty ±5dB (see uncertainty section below).

- Dining rooms should have windows, external doors, external walling and ventilation with a sound reduction of R_w(c;ctr) 30dB. The sound reduction is set to account for uncertainty ±5dB (see uncertainty section below).

Recommendations for dwellings at the rear of the building where Wellington street is not visible from inside an opening.

- Bed rooms should have windows, external doors, external walling and ventilation with a sound reduction of R_w(c;ctr) 36dB. The sound reduction is set to account for WHO (2009) recommendations of LAeq (8 hour) night of 30dB inside bedrooms, LAFmax of 45dB or less and to allow for uncertainty of ±5dB.

- Living rooms should have windows, external doors, external walling and ventilation with a sound reduction of R_w(c;ctr) 24dB. The sound reduction is set to account for uncertainty ±5dB (see uncertainty section below).

- Dining rooms should have windows, external doors, external walling and ventilation with a sound reduction of R_w(c;ctr) 19dB. The sound reduction is set to account for uncertainty ±5dB (see uncertainty section below).

It should be noted that the dwellings rely on windows being closed to achieve internal noise level guidelines because LAFmax night is above 60dB outside bedrooms. As a result acoustic ventilation must be provided that does not require windows to be open. Acoustic ventilation in bedrooms, dining rooms and living rooms must achieve the minimum sound reduction stated for that room.

WHO (2009) has an external LAFmx night of 60dB outside bedrooms. This has not been achieved at ML1 LAFmx night is 87dB and at ML2 it was 76dB.

A data sheet from Pilkington glass has been attached showing glazing that achieves the sound reductions index levels recommended in this report.

Pilkington provides glazing. Huet provides acoustic doors that achieve the required $R_{,w}$(c;ctr) Greenwoods acoustic ventilation provides ventilation that would be suitable. Data sheets have been attached as part of this report to assist the Client in achieving the required sound insulation. The client does not have to source these products from the suppliers mentioned in this report. The suppliers mentioned herein are for example purposes only.

No special acoustic measures are required for hallways, bathrooms and kitchens unless they form part of a Dining room, Living room or bedroom.

The day time noise levels are not within the recommended LAeq (16 hour) 50 – 55dB for outside living space such as patios and garden areas at the front but are within the guidelines at the rear of the building. LAeq (16hour) was 685B at ML1 and 54dB at ML2.

Achieving the sound reduction as stated in this report will meet the standards for day and night time levels inside the specified rooms.

Context of the Noise Environment

$L_{Aeq(8\ Hour)}$ Night of 45dBA Outside Bedrooms

WHO (2009) provides guidance of night time $L_{Aeq\ (8\ hour)}$ of 45dB outside bedrooms. Adverse health effects arise from sleep disturbance when the window to the bedroom is left open. This means that persons sleeping with the window open are likely to have disturbed sleep if outside noise levels are greater than night time $L_{Aeq\ (8\ hour)}$ 45dB. For this reason the WHO (2009) guidelines recommend noise levels outside bedrooms to be $L_{Aeq\ (8\ hour)}$ 45dB or lower. This requirement has not been met.

LAFmx Night 45dB Inside Bedrooms

The SRI of the external walling, windows, doors and ventilation has been calculated to reduce internal LAFmx to 45dB and to also achieve the day time $L_{Aeq\ (16hour)}$ of 35dB and the night time $L_{Aeq(8hour)}$ of 30dB.

LAFmx Night 60dB Outside Bedrooms

WHO(2009) recommends that LAFmx outside bedrooms be 60dBA or less. This has not been achieved. LAFmx Night reached 87dB at ML1 and 76dB at ML2.

National Planning Policy Framework (NPPF)

The national policy framework states at paragraph 109 new and existing developments should be prevented;

"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.."

At paragraph 123 the NPPF states;

"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.."

The proposed development is within a mixed commercial and residential noise environment where LAFmax reached 87dB during the night at ML1 and LAFmx 76dB at ML2. The daytime level of $L_{Aeq\ (16\ hour)}$ 54dB at ML2 and 65dB at ML1 with a night time level of 60dB at ML1 and 48dB at ML2.

Achieving the weighted sound reduction index for walls, windows, doors and ventilation as specified in this report will satisfy the main standards for internal habitable rooms and should fulfill the internal requirements of the national planning policy framework.

It should be noted that users of the proposed dwellings are at risk of adverse noise impact when external doors and windows are left open.

BS8233:2014 accepts that external noise level guidelines may not be attainable but in certain circumstances development is acceptable, see section 7.7.2 and 7.7.3.2 of BS8233:2014 reproduced below.

Section 7.7.2 Internal Ambient Noise Levels for Dwellings of BS8233:2014 states

Note 4: Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or L_{AFMAX} depending on the character and number of events per night. Sporadic noise events could require separate values.

Note 5: If relying on closed windows to meet the guide values, there needs to be an appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level.

Note 7: Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved.

Section 7.7.3.2 Design Criteria for External Noise of BS8233:2014 states

"For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50dB $L_{Aeq,T}$ with an upper guideline of 55dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited," (BS8233:2014).

Uncertainty

The noise levels were obtained by direct onsite measurements. The sound level meter was fitted with a wind shield and maintained on a tripod throughout the measurement period. Once readings were started, the sound level meter was free from human interference. This was done to minimize uncertainty in the readings.

In addition, the readings were taken during suitable weather conditions. Each measurement was conducted for a duration sufficient to provide a representation of $L_{Aeq,(8\ hour)}$ for night time and $L_{Aeq,\ (16\ hour)}$ for day time.

The calibration of the sound level meter at the beginning and end of the readings showed a maximum drift of 0.2 dB at the start and end of the reading. This is considered normal.

Laboratory calibration uncertainty of the sound level meter is ± 1 dB

The nature of the road traffic noise may vary from time to time depending on but not limited to the number of vehicles, type of vehicles and the speed at which they are travelling. An uncertainty factor of ±5dB has been added to account for variations that can occur day to day.

$$u = \sqrt{a^2 + b^2 + c^2 ...etc}$$

U= $\sqrt{1}$ **+5²**

U = ± 5 dB

Uncertainty in the measurement is ± 5 dB

Conclusion

The proposed development is within a mixed commercial and residential noise environment. The site is subject to road traffic noise that has a dominant noise impact on the environment.

LAeq (16 hour) was 65dB during the day and 60dB during the night at the front facing Wellington Street (ML1). LAFmax reached 87dB by Wellington Street during the night.

LAeq (16 hour) was 54dB during the day and 48dB during the night at the back of the building adjacent to Dark Lane (ML2). LAFmax reached 76dB during the night.

In relation to BS8233:2014 and WHO (2009) these levels are too high and have to be actively reduced in order to ensure that internal noise levels for the dwelling do meet the guidelines. However reduction of the external noise to acceptable levels internally is achievable. This can be done by using external walling, windows, doors and ventilation that has the $R_{,w}$ (C;Ctr) specified herein for the respective rooms.

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Reduction of the External noise level at the front with Wellington Street is not reasonable due to the close proximity to the road and the height that a barrier would need to achieve to be effective.

The WHO (2009) recommendation for L_{AFmax} of 60dB has not been achieved. LAFmx reached 87dB during the night at Wellington Street and 76dB at the back of the building adjacent to Dark Lane. This has been accommodated by relying on closed window ventilation to achieve internal guideline levels.

Application of the sound reduction recommendations in this report will meet the standards for internal noise levels required by the national planning policy framework guidelines. If users of the property keep external windows and doors closed, they will be at a low risk of adverse noise impact.

Uncertainty in the measurement is ± 5 dB

Signed:
Donald I Angir
Donald Angir AM IOA BA(Hons)
Noise Consultant
Noise Survey Ltd

BIBLIOGRAPHY

British Standards Institution (2014) BS EN 8233:2014 **Guidance on Sound Insulation and Noise Reduction for Buildings.** London. BSI

World Health Organization Europe (2009) **Night Noise Guidelines for Europe.** Copenhagen WHO

Department for Communities and Local Government (2012) **National Planning Policy Framework.** Crown London

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APPENDIX A

Measuring Equipment

Cel-490, a class 1 meter laboratory calibrated by Casella on 24th November 2016 traceable to UKAS standards serial number 230643.

Casella Cel 110/1 type 1 field acoustic calibrator serial no. 138252 laboratory calibrated by Penine Instruments on 11 August 2017 traceable to UKAS standards.

Kane May Thermostat model KM330 serial: 723858

Kaindl Electronic model: Windtronic 2 Anemometer.

Weather Conditions

Wind speeds were below 5m/s. There was no precipitation during any of the measurement period. Cloud cover ranged from 40% - 70% during the measurement duration. The temperature was as low as 10**°C** and reached 24°C at the start and 18°C at the end. All measurements were conducted during suitable weather conditions.

Measurement Data

Day and Night Time Ambient Noise at The front with Wellington Street (ML1)

Date	Time	LAFmx	LAeq	LAF10.0	LAF90.0
		dB	dB	dB	dB
19/04/2018	11:01:55	92.4	71.1	75	59
19/04/2018	12:01:55	82.5	66.9	70.5	56
19/04/2018	13:01:55	95.3	68.8	70.5	57
19/04/2018	14:01:55	88.5	67.1	70.5	58.5
19/04/2018	15:01:55	86.5	67	70.5	57.5
19/04/2018	16:01:55	89.2	67.2	70.5	58.5
19/04/2018	17:01:55	90.5	67.3	71	58
19/04/2018	18:01:55	80.5	67.3	71	58.5
19/04/2018	19:01:55	89.2	67.1	71	56.5
19/04/2018	20:01:55	82.1	65.7	70	54
19/04/2018	21:01:55	90.8	66	70	51.5
19/04/2018	22:01:55	81	63.3	67.5	46.5
19/04/2018	23:01:55	78.9	61.5	65.5	40.5
20/04/2018	00:01:55	78	57.6	59	35
20/04/2018	01:01:55	87.3	56.8	52.5	34
20/04/2018	02:01:55	79.6	55.4	52	33
20/04/2018	03:01:55	80	56.8	55.5	37.5
20/04/2018	04:01:55	79.6	62.8	67	42
20/04/2018	05:01:55	82	65.8	70.5	48
20/04/2018	06:01:55	90.2	68.5	72.5	56
20/04/2018	07:01:55	86.4	68.6	72	58.5
20/04/2018	08:01:55	85.1	68.6	72.5	58.5
20/04/2018	09:01:55	90.4	67.9	71.5	57.5

20/04/2018	10:01:55	90.6	68.2	71.5	57

Table 3: Measurements at the front facing Wellington Street (ML1). The gray shaded arear indicates night time noise levels. The measurements show a daytime LAeq(16hour) of 68dB. The night time LAeq(8 hour) is 63.4dB. LAFmax reached 90.2dB at night.

Day and Night Time Noise at the rear of 125 Wellington St Adjacent to Dark Lane (ML2)

Date	Time	LAFmx	LAeq	LAF10.0	LAF90.0
		dB	dB	dB	dB
20/04/2018	11:32:31	80.7	58.5	61	50.5
20/04/2018	12:32:31	76.9	57.4	60.5	49.5
20/04/2018	13:32:31	83.4	57.2	59.5	48.5
20/04/2018	14:32:31	76.9	57	59.5	49.5
20/04/2018	15:32:31	88.1	58.6	59.5	50
20/04/2018	16:32:31	81	58	61	50
20/04/2018	17:32:31	83.7	57.9	60	50
20/04/2018	18:32:31	78.2	56.8	59.5	49.5
20/04/2018	19:32:31	82	56.4	59	47.5
20/04/2018	20:32:31	78.8	56.6	59	47.5
20/04/2018	21:32:31	76.7	54.8	58	44
20/04/2018	22:32:31	78.9	54.1	56.5	43
20/04/2018	23:32:31	70	51.7	55.5	40.5
21/04/2018	00:32:31	75	50.6	54.5	38.5
21/04/2018	01:32:31	67.2	48.6	52.5	35
21/04/2018	02:32:31	69.8	46.4	49.5	35
21/04/2018	03:32:31	69.7	49.3	53	37.5
21/04/2018	04:32:31	74.6	51.7	55	41
21/04/2018	05:32:31	70.9	52.6	56	43
21/04/2018	06:32:31	72.7	53.9	57	44
21/04/2018	07:32:31	82.2	55.4	57.5	46.5
21/04/2018	08:32:31	87.1	56.1	58	48.5
21/04/2018	09:32:31	76.4	56.6	59	49
21/04/2018	10:32:31	69.4	55.8	58	49.5
21/04/2018	11:32:31	79.8	56.5	59	50

Table 4: Measurements during the day and night at the rear of the building adjacent to Dark Lane Lane (ML2). The gray area shows measurements during the night time. Day time LAeq(16hour) 56.7dB and night time LAeq(8 hour) is 51.4dB. LAFmax reached 79dB during the night.

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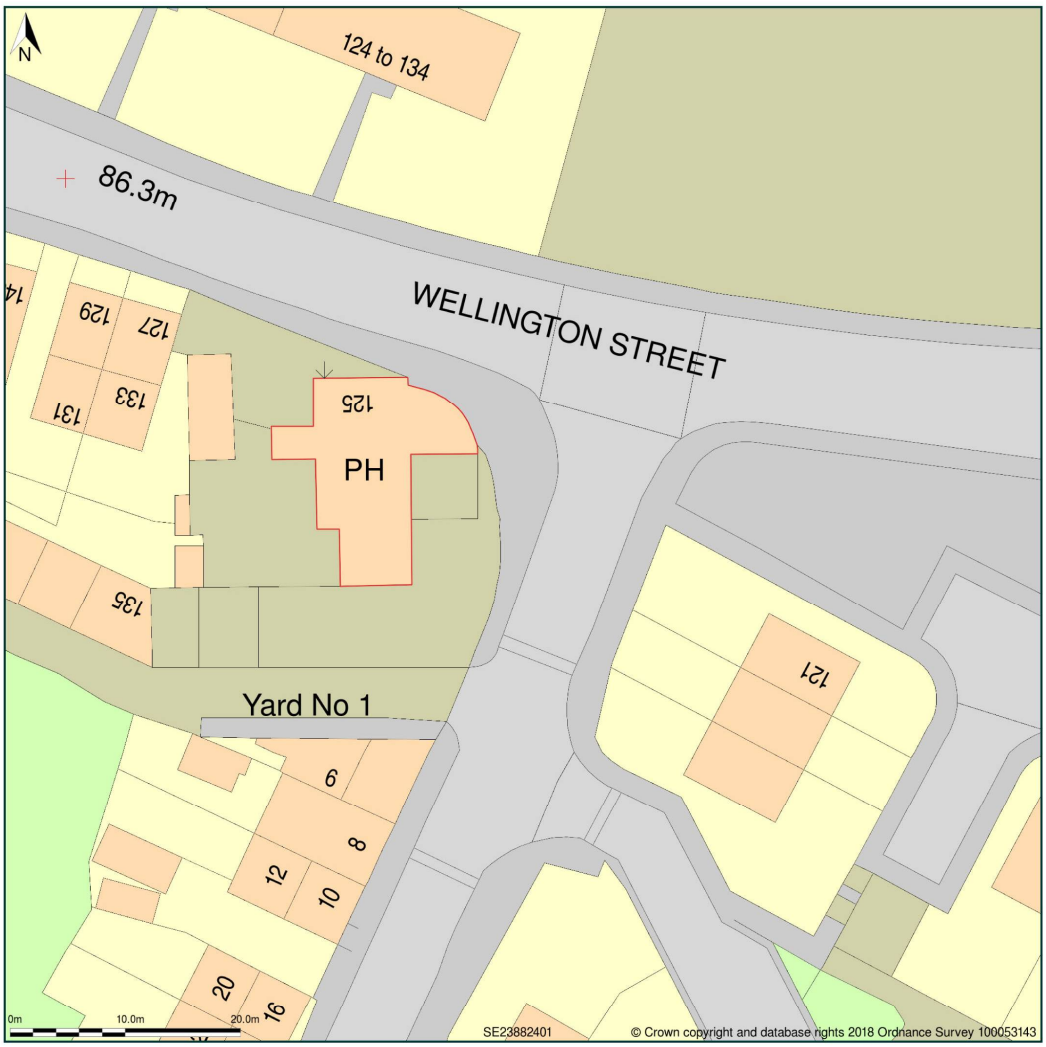

Block Plan shows area bounded by: 423835.88, 423974.74 423925.88, 424064.74 (at a scale of 1:500), OSGridRef: SE23882401. The representation of a road, track or path is no evidence of a right of way. The representation of features as lines is no evidence of a property boundary.

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