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Project:

Waitrose Rustington

Title:

Plant Noise Assessment

quietly moving forward



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Client	Underwood Carpenter		
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1 INTRODUCTION

- 1.01 Environmental Equipment Corporation Limited has been commissioned by Underwood Carpenter to undertake a noise survey at the site of the proposed Waitrose retail store in Rustington, with a view to assessing the noise impact of proposed plant.
- 1.02 This assessment includes the prediction of noise impacts at the worst affected noise sensitive receptors based on the proposed items of plant and their location.
- 1.03 This report is prepared solely for Underwood Carpenter. Environmental Equipment Corporation Limited accepts no responsibility for its use by any third party.
- 1.04 Whilst every effort has been made to ensure that this report is easy to understand, it is necessarily technical in nature. To assist the reader, an explanation of the terminology used in this report is contained in Appendix A.

2 SITE

- 2.01 Waitrose are to fit out and occupy an existing retail building on the east side of Broadmark Lane in Rustington. The site is served by a shared local car park at the rear (east) of the store and is located in a mixed commercial and residential area. An aerial view of the existing site arrangement is shown in Appendix B. The store is a mixture of two storey and single storey blocks and the existing plant (decommissioned) is located on the first floor flat roof of the west single storey section.
- 2.02 The proposed plant includes three flatbed condensers to be located on the west flat roof as shown on the roof plan drawing in Appendix B. The nearest noise sensitive properties to this plant location are those dwellings above the commercial properties on Broadmark Lane to the north west of the site. As shown in the following photograph:



Photo 1 : Rear of residential dwellings above shops on Broadmark Lane

- 2.03 The closest of these dwellings is 18m from the proposed flatbed plant extent. Each condenser has a peak operating duty noise output of 32dB(A) at 10m. The peak noise level is typical of

maximum ambient daytime summer temperatures and noise emissions at night will be less. The rooftop plant will also include a single air handling unit and this will be designed and constructed so as not to adversely affect the site noise emissions as reported in this document.

- 2.04 The store will also be served by an emergency generator to be located on the north east corner of the building. The closest noise sensitive windows to the generator are those at first floor on the rear façade of dwellings on The Bramblings, 56m away. The generator will only operate in the event of a significant power cut and occasionally, during the daytime for regulatory and mandatory testing.
- 2.05 It is recognised that the previous and proposed use of the site and buildings are for retail purposes and as such the character and levels of noise associated with operational activities is well established in the context of the local area and existing amenity. This includes the operation of plant, its associated noise and the exposure of residents to it. In this case the proposed plant is to replace decommissioned plant in an identical location.
- 2.06 All other noise sensitive receptors are at a greater distance from the proposed location of the units, or are protected by more screening by the intervening structures, and as such will be subject to lower levels of noise.

3 GUIDANCE

- 3.01 National Planning Policy is presented in Appendix C of this document.
- 3.02 Informal consultations have also been undertaken with Fiona Fitzgerald, an Environmental Health Officer at Arun District Council (ADC) to establish and agree appropriate assessment methods and criteria. The Council adopt ideal standards for new plant noise that aim to avoid any adverse impact. In this context, where feasible, the plant noise should be designed and operated such that its rating noise level is at least 10dB less than the background noise at all times in accordance with 'BS4142:2014: 'Methods for rating and assessing industrial and commercial sound''. However, ADC recognise that where the background noise levels are already very low, achieving such a criterion will not be feasible nor necessary and that alternative standards may be acceptable. In this context, it is proposed to set absolute noise limits for plant of 30dB(A) outside residential windows, given that this will ensure that noise within dwellings as a result of such external noise levels, will be less than 20dB(A) and unlikely to cause any adverse impact.
- 3.03 The World Health Organisation Night Noise Guidance for Europe 2009 summarises pertinent research and knowledge for noise affecting humans at night. Based on studies of sleep disturbance an L_{night} level below 30 dB(A) outside a residential window is said to equate to the No Observed Effect Level, NOEL, for occupants.

4 MEASUREMENTS

- 4.01 Environmental noise measurements were carried out over a weekday period, between 1630 hours on Wednesday 11th February 2015 and concluded 1625 hours the following day, to establish the existing noise levels at the site. The survey methodology and results are set out below.
- 4.02 Noise measurements have been carried out at the following location, as shown in Appendix B and described as:

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- 4.02 Noise measurements have been carried out at the following location, as shown in Appendix B and described as:

- Position 1: located at a height of approximately 1.5 metres above store 1st floor roof level in the vicinity of the rear facades of Broadmark Lane residential dwellings. The measurement was located within 3.5 metres of any reflecting surfaces and a façade correction would be applicable to these values. .

4.03 This location is considered to be representative of the current background noise levels that prevail at the rear facades of Broadmark Lane.

5 EQUIPMENT

5.01 Equipment for the survey was as follows:-

- Brüel & Kjær type 2250 Light Integrating Sound Level Meter conforming to Class 1 BS EN 61672, Type 1 BS EN 60804 & BS EN 60651: 1994.
- Brüel & Kjær Condenser Microphone type 4950;
- Brüel & Kjær Outdoor Microphone, type 4952/UA1679;
- Tripod.

5.02 The equipment holds current UKAS or equivalent accreditation and serial numbers as follows:

Sound Level Meter B&K2250L	Serial No.	2766725
	Calibration Date	25 th June 2013
	Cal Certificate No.	01356/3
½" Condenser Mic. B&K 4950	Serial No.	2742570
	Calibration Date	25 th June 2013
	Cal Certificate No.	01356/3
Calibrator B&K4231	Serial No.	2389051
	Calibration Date	27 th August 2014
	Cal. Certificate No.	01968/1

N.B. Copies of calibration certificates are available upon request.

Sound Level Meter B&K2250L	Serial No.	2766725
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	Cal Certificate No.	01356/4
Outdoor ½" Condenser Mic. B&K 4952	Serial No.	2742570
	Calibration Date	25 th June 2013
	Cal Certificate No.	01356/4
Calibrator B&K4231	Serial No.	2389051
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N.B. Copies of calibration certificates are available upon request.

5.03 The equipment was calibrated both before and after the survey with no difference noted in the levels.

6 RESULTS

- 6.01 The weather during the survey was suitable for noise measurement, it being dry with little wind for the duration of the survey.
- 6.02 Noise sources at the site include local and distant road traffic, there were no other significant sources of noise during the survey.
- 6.03 A list of the levels measured is included in Appendix D and represented graphically in Appendix E.
- 6.04 A summary of the time averaged ambient levels and lowest measured background levels over the measurement periods are shown in Table 6.1. The minimum L_{A90} is the lowest 5 minute measurement in the specified period.

Location	Period	Average $L_{Aeq,T}$ – dB	Minimum L_{A90} – dB
Position 1	Day time (0700-1900 hrs)	49	38
	Evening (1900-2300 hrs)	42	28
	Night-time (2300-0700 hrs)	41	22

Table 6.1: Free-Field Measured Ambient and Lowest Background Noise Levels

7 PLANT ASSESSMENT

- 7.01 This application includes the installation of three flatbed condensers to be located on the west flat roof of the existing store. Each condenser has a peak operating duty noise output of 32dB(A) at 10m. The peak noise level is typical of maximum ambient daytime summer temperatures and noise emissions during the evenings and at night, when the temperatures are much lower, will be less. For the purposes of this assessment a minimal 3dB reduction in noise output is assumed for the evening and night time periods.
- 7.02 In accordance with the design criteria discussed above and giving consideration for the very low existing background noise levels, an absolute noise limit of 30dB(A) is proposed outside noise sensitive residential windows.
- 7.03 Predicted noise levels have been calculated at the closest noise sensitive windows, which are those to the North West approximately 22m from the centre of the condenser location. An assessment has then been made in line with current British Standards and World Health Organisation guidance.
- 7.04 Other residential receptors located further from the site will be subject to lower noise levels than those predicted at the above locations.
- 7.05 Table 7.1 presents the results of worst-case plant noise predictions at the worst-case locations.

Item	Noise Level		Notes
	Day	Eve/Night	
3 No. Flatbed condensers	37 dB(A)	34 dB(A)	Cumulative sound pressure level at 10m
Conformal area Losses over 22 metres	6 dB	6 dB	Distance to closest window from centre of plant location
Reflections	0 dB	0 dB	No Additional reflections, open roof area
Total Noise Level	31 dB(A)	29 dB(A)	Rear of Broadmark Lane 1 st floor windows

Table 7.2: Plant Noise Calculation to Broadmark Lane dwellings

Property	Period	Proposed Noise Limit L _{Ar}	Predicted L _{Aeq,T}	Exceedance of noise limit
Broadmark Lane 1 st Floor residential	Daytime	30 dB	31 dB	+ 1 dB
	Evening	30 dB	29 dB	- 1 dB
	Night-time	30 dB	29 dB	- 1 dB

Table 7.3: Assessment of Predicted Noise Levels Based on Proposed Noise Limit, Free-field dB(A)

- 7.06 It can be seen from the above tables the peak daytime plant noise will be at least 7dB less than the minimum recorded background noise levels and only 1dB higher than the external noise limits defined by WHO as resulting in No Observable Effect (NOEL) for occupants. Such levels will be of no consequence particularly since the NOEL criterion is for night time sleep disturbance.
- 7.07 During the night time the resultant noise levels are expected to be below 30 dB(A) outside the residential windows and the plant noise will not lead to any observed effects based on the World Health Organisation Guidelines for Night time noise in Europe 2009.
- 7.08 The generator will be operated only in the event of a significant power failure and is required to provide power to preserve critical food standards and safety systems in the store. It will be tested monthly during weekday daytime periods and operates at a maximum noise level of 75dB(A) at 1m. The closest residential dwellings with a line of sight to the generator are those on The Bramblings to the east, the top floor windows of which are approximately 58m away. Propagating the generator noise to this location results in a noise level of 50dB(A). This will be comparable to the daytime ambient noise levels at this location so is not likely to cause any adverse impact during its short periods of daytime testing. Noise reaching the inside of these dwellings will be 35dB(A), assuming a 15dB loss for open windows in accordance with BS8233:2014, 'Guidance on sound insulation and noise reduction for buildings'. This standard also outlines a level of 35dB(A) as being an acceptable internal ambient noise level for resting in bedrooms during daytime periods. In the event of the rare operation of the generator at night in an emergency, it would be reasonable to expect residents to close their windows affording a further reduction due to the glazing and ensuring adequate and acceptable conditions within bedrooms.

8 CONCLUSIONS

- 8.01 Underwood Carpenter has appointed Environmental Equipment Corporation Limited to undertake a noise assessment at the site of the proposed Waitrose Rustington retail store.
- 8.02 The assessment has been carried out in accordance with national planning guidance and current British Standards and World Health Organisation Guidelines using noise data for the proposed plant and the results of an environmental noise survey conducted at the site over a mid-week period.
- 8.03 The assessment has shown that the noise impact from the proposed new plant will be below the no observed adverse effect level (NOEL) at all times and during the night time will be well below the level at which adverse effects occur, the LOAEL for occupants of the nearest residential properties to the store.
- 8.04 Noise from the proposed air handling unit will be designed and controlled such that it has no adverse effect on the assessment outlined here.
- 8.05 Noise from the proposed emergency generator will meet appropriate internal noise criteria within dwellings.
- 8.06 On the basis of this assessment it is considered that noise does not pose a material constraint to the operation of the proposed external plant.

APPENDIX A

GLOSSARY OF TECHNICAL TERMS

TECHNICAL TERMS AND UNITS

Decibel (dB) - This is the unit used to measure sound. The human ear has an approximately logarithmic response to sound over a very large dynamic range (typically 20 micro-Pascals to 100 Pascals). We therefore use a logarithmic scale to describe sound pressure levels, intensities and power levels. The logarithms used are to base 10; hence, an increase of 10 dB in sound pressure level corresponds to a doubling in perceived loudness of the sound.

Sound Power Level (SWL) - This is a function of the noise source alone and is independent of its surroundings. It is a measure of the amount of sound power output measured in decibels.

Sound Pressure Level (SPL) - This is a function of the source and its surroundings and is a measure of the sound pressure at a point in space. For example, a sound pressure level measured at 1 metre from a sound source of certain sound power in reverberant room will not be the same as the sound pressure level at 1 metre from the sound source measured in open space.

Octave and One-Third Octave Bands - The human ear is sensitive to sound over a range of approximately 20 Hz to 20 KHz and is generally more sensitive to medium and high frequencies than to low frequencies. In order to define the frequency content of a noise, the spectrum is divided into frequency bands and the sound pressure level is measured in each band. The most commonly used frequency bands are octave bands, in which the mid frequency of each band is twice that of the band below it. For finer analysis, each octave band may be split into one-third octave bands.

"A" Weighting - A number of frequency weightings have been developed to imitate the ear's varying sensitivity to sound of different frequencies. The most commonly used weighting is the "A" weighting. The "A" weighted SPL can be measured directly or derived from octave or one-third octave band SPLs. The result is a single figure index which gives some idea of the subjective loudness of the sound, but which contains no information as to its frequency content.

Noise Rating (NR) Curves - The "A" weighted sound pressure level cannot be used to define a spectrum or to compare sounds of different frequencies. NR curves convey frequency information in a single-figure index. This is done by defining the maximum permissible sound pressure level at each frequency for each curve. To measure the noise rating of a given environment, the SPL is measured in octave or one-third octave bands and the noise rating is then the highest NR curve touched by the measured levels.

Intermittency and Time-Weighting - The degree of annoyance caused by a noise also depends on its duration and intermittency of a noise. Intermittent, impulsive or repetitive noises tend to be more annoying than continuous noises. Various time-weightings have been derived to measure sounds of differing intermittences and these can be measured directly on modern equipment. The most common time-weightings in use are as follows:-

L_{90} This is the sound pressure level exceeded for 90% of the measurement period. It is widely used to measure background noise levels.

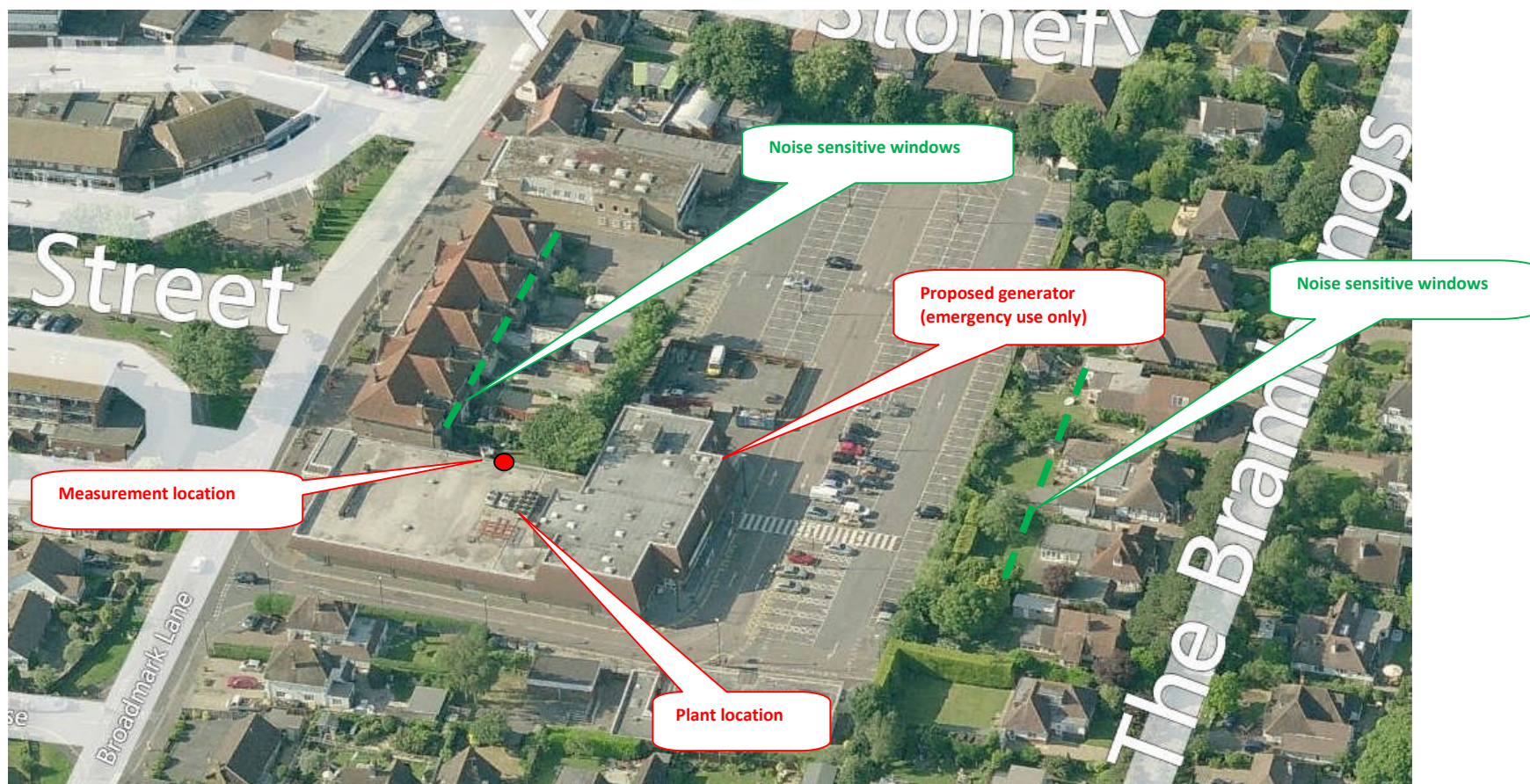
L_{10} This is the sound pressure level exceeded for 10% of the measurement period. It is widely used to measure traffic noise. For a given measurement period, the L_{10} level is by definition greater than or equal to the L_{90} level.

L_{eq} The equivalent continuous noise level is often used to measure intermittent noise. It is defined as the notional steady noise level that would contain the same acoustic energy as the varying noise. Because the averaging process used is logarithmic, the L_{eq} level tends to be dominated by the higher noise levels measured.

APPENDIX B

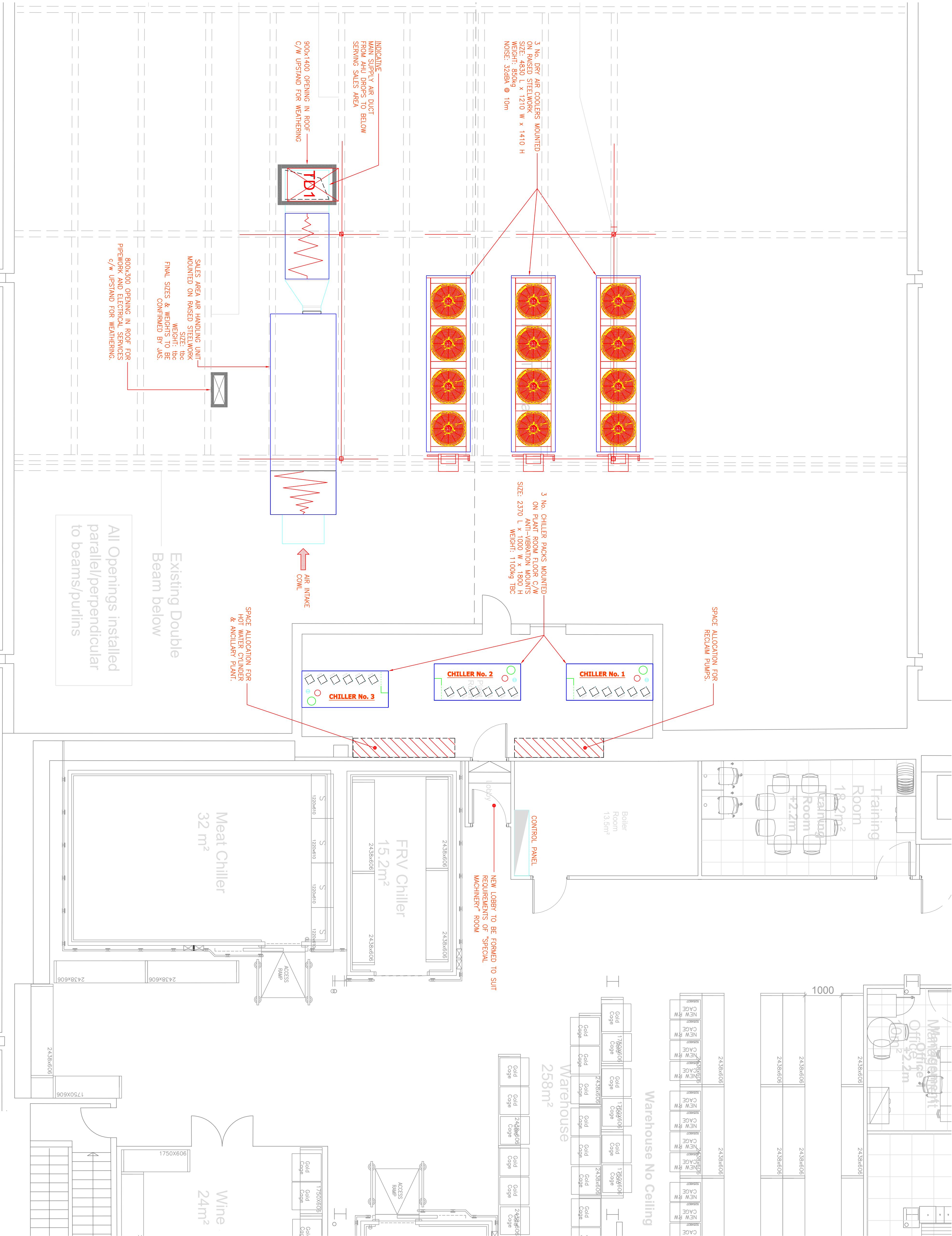
SITE PLAN/MEASUREMENT LOCATION
&
PLANT LAYOUT DRAWING

quietly moving forward



View north (Bing Maps)

NOTES



BASED UPON ARCHITECTS DRG No: 174-74-AG-101

DATE		SCALE		DRAWN		CHECKED		APPROVED	
FEB.2015		1:50@A1		LFJ		IAF			
PROJECT No		DRAWING No		REVISION					
4682		HV-R01		B					

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DRAWING TITLE		MAIN ROOF PLANT LAYOUT	

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PROJECT TITLE		WAITROSE RUSTINGTON	
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APPENDIX C

**PLANNING POLICY
AND GUIDANCE**

quietly moving forward

PLANNING POLICY AND GUIDANCE

National Planning Policy Framework and the Noise Policy Statement for England

The Department for Communities and Local Government published the National Planning Policy Framework (NPPF) on 27th March 2012 and upon its publication, the majority of planning policy statements and guidance notes were withdrawn, including Planning Policy Guidance 24 Planning and Noise, which previously presented the government's overarching planning policy on noise.

The NPPF contains four aims, which are set out at paragraph 123 in Section 11 of the document, titled *Conserving and enhancing the natural environment*:

"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."

The Department for Environment Food and Rural Affairs published the Noise Policy Statement for England (NPSE) in March 2010. The explanatory note of NPSE defines the following terms 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.

2.21 *Extending these concepts for the purpose of this NPSE leads to the concept of a significant observed adverse effect level.*

SOAEL – Significant Observed Adverse Effect Level

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

The NPSE does not define any of the above effect levels numerically.

The NPSE presents the Noise Policy Aims as:

"Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy and sustainable development:

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."

It can be seen that the first two bullet points are similar to Section 11 of the NPPF, with a third aim that seeks to improve health and quality of life. The NPSE later expands on the Noise Policy Aims, stating:

2.23 The first aim of the NPSE states that significant adverse effects on health and quality of life should be avoided while also taking into account the guiding principles of sustainable development (paragraph 1.8).

2.24 The second aim of the NPSE refers to the situation where the impact lies somewhere between LOAEL and SOAEL. It requires that all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development (paragraph 1.8). This does not mean that such adverse effects cannot occur.

2.25 This aim (the third aim), seeks where possible, positively to improve health and quality of life through the pro-active management of noise while also taking into account the guiding principles of sustainable development (paragraph 1.8), recognising that there will be opportunities for such measures to be taken and that they will deliver potential benefits to society. The protection of quiet places and quiet times as well as the enhancement of the acoustic environment will assist with delivering this aim."

It is clear that noise described in the NPSE as SOAEL that would lead to significant adverse effects should be avoided, although there is no definition as to what constitutes a significant adverse effect. Similarly, noise should be mitigated where it is high enough to lead to adverse effects, termed the LOAEL, but not so high that it leads to significant adverse effects.

British Standard 4142

British Standard (BS) 4142: 1997 *Method for rating industrial noise affecting mixed residential and industrial areas* is intended to be used to assess whether noise from factories, industrial premises or fixed installations and sources of an industrial nature in commercial premises is likely to give rise to complaints from people residing in nearby dwellings.

The procedure contained in BS4142 for assessing the likelihood of complaints is to compare the "specific noise level", which is the measured or predicted noise level from the source in question immediately outside the dwelling, with the background noise level. Where the noise contains a "distinguishable discrete continuous note (whine, hiss, screech, hum etc.) or if there are distinct impulses in the noise (bangs, clicks, clatters or thumps), or if the noise is irregular enough to attract attention" then a correction of +5dB is added to the specific noise level to obtain the "rating level" or L_{Ar} .

The likelihood of noise provoking complaints is assessed by subtracting the background noise level from the rating noise level. BS4142 states:

"A difference of around 10dB or higher indicates that complaints are likely. A difference of around 5dB is of marginal significance. A difference of -10dB is a positive indication that complaints are unlikely."

The standard also notes that:

"The greater this difference the greater the likelihood of complaints."

In the context of the NPPF, it is considered that a situation where BS4142 suggests complaints are unlikely would equate to the No Observed Effect Level (NOEL). The situation where BS4142

suggests complaints are likely would equate to the Significant Observed Adverse Effect Level (SOAEL).

The Lowest Observed Adverse Effect Level (LOAEL) has been equated to the situation that BS4142 describes as “marginal” as this is the only intermediate threshold identified in BS4142.

Setting plant noise limits in accordance with the requirements of WCC will result in noise levels either below the NOEL or between the LOAEL and the NOEL depending on the measured ambient noise level.

This assessment is carried out over a one hour period for the daytime and a five minute period for the night-time. Day or night are not defined in the standard but it states that night should cover the times when the general adult population are preparing for sleep or are actually sleeping. For the purposes of this assessment, it is assumed that daytime and night-time are 07:00 to 23:00 hours and 23:00 to 07:00 hours respectively.

BS4142 has been referenced in setting noise limits for any fixed plant proposed as part of the proposed development.

APPENDIX D

SURVEY RESULTS
(TABULAR)

EC 13901 - Waitrose Rustington



Waitrose Ltd

Tabulated Results

Time	L _{Aeq}	L _{Amax}	L _{A90}
16:30	52.1	75.5	43.3
16:30	46.4	62.0	40.9
16:35	46.9	64.6	42.7
16:40	45.7	55.8	40.0
16:45	48.5	63.3	43.3
16:50	50.7	67.3	43.3
16:55	46.8	63.3	41.7
17:00	47.1	60.8	41.9
17:05	46.6	57.9	41.8
17:10	44.6	56.3	40.7
17:15	45.3	56.9	41.9
17:20	46.1	62.6	40.2
17:25	47.5	68.7	39.4
17:30	44.6	56.0	40.6
17:35	47.1	59.4	41.1
17:40	52.0	69.8	40.8
17:45	44.2	52.0	40.9
17:50	44.5	51.9	40.1
17:55	46.7	65.6	41.6
18:00	44.6	53.0	40.3
18:05	46.5	67.8	39.1
18:10	44.4	52.6	40.0
18:15	46.1	60.3	39.2
18:20	45.1	56.5	40.6
18:25	43.6	50.6	39.0
18:30	43.8	53.5	40.7
18:35	44.2	52.4	40.8
18:40	44.4	54.3	40.3
18:45	45.2	59.8	39.3
18:50	43.9	51.8	38.9
18:55	45.6	58.7	38.1
19:00	44.3	52.5	40.3
19:05	44.6	54.0	40.0
19:10	43.1	50.4	38.6
19:15	41.9	54.0	37.9
19:20	42.9	52.3	39.6
19:25	43.1	54.3	39.3
19:30	43.3	55.0	38.5
19:35	42.6	53.2	38.2
19:40	42.2	57.0	38.1
19:45	46.8	68.5	38.7
19:50	43.0	52.2	37.1
19:55	41.7	55.0	36.9
20:00	42.4	55.1	36.5
20:05	40.5	52.4	34.7
20:10	41.7	51.0	36.0
20:15	40.4	50.7	34.6
20:20	41.3	54.8	37.0

Time	L _{Aeq}	L _{Amax}	L _{A90}
20:25	40.9	50.7	36.5
20:30	40.3	51.3	35.4
20:35	40.8	52.2	35.9
20:40	39.6	52.1	34.7
20:45	40.3	48.5	37.2
20:50	40.2	50.7	36.4
20:55	41.2	52.0	35.9
21:00	44.4	55.4	36.5
21:05	39.8	50.9	35.3
21:10	43.3	60.5	37.8
21:15	39.5	50.3	35.1
21:20	42.9	64.2	35.6
21:25	42.0	58.7	32.5
21:30	40.8	54.2	33.9
21:35	40.3	53.7	32.7
21:40	41.9	55.1	33.3
21:45	39.6	48.8	32.3
21:50	38.3	47.6	30.0
21:55	39.1	51.7	31.8
22:00	38.9	48.7	31.8
22:05	39.4	50.8	34.7
22:10	37.3	51.2	30.5
22:15	37.2	49.9	29.4
22:20	36.3	48.7	27.9
22:25	37.1	51.7	29.2
22:30	42.0	61.1	29.1
22:35	45.7	62.8	30.7
22:40	37.2	53.2	28.0
22:45	36.1	49.3	29.0
22:50	37.1	46.2	30.0
22:55	34.5	43.2	28.6
23:00	35.2	50.5	26.3
23:05	36.2	55.0	27.2
23:10	38.0	53.4	30.7
23:15	33.3	52.7	28.8
23:20	36.3	48.8	30.2
23:25	37.9	51.1	29.5
23:30	39.4	59.3	30.4
23:35	38.9	57.0	32.1
23:40	36.4	52.5	30.1
23:45	37.3	51.0	28.6
23:50	56.5	83.2	28.1
23:55	36.5	50.4	28.2
00:00	34.6	47.9	30.5
00:05	35.2	50.5	27.3
00:10	37.8	54.2	26.7
00:15	32.4	43.8	26.6
00:20	30.5	39.8	25.5

quietly moving forward

EC 13901 - Waitrose Rustington



Waitrose Ltd

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Time	L _{Aeq}	L _{Amax}	L _{A90}
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00:30	32.6	42.6	25.5
00:35	29.9	40.4	25.4
00:40	28.4	41.0	23.4
00:45	25.3	32.2	23.2
00:50	33.0	46.6	24.4
00:55	27.5	35.8	23.7
01:00	31.7	49.9	25.0
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05:00	33.3	43.8	27.8
05:05	34.3	43.8	27.8
05:10	35.4	47.1	27.1
05:15	34.6	44.0	27.6
05:20	38.2	52.8	26.8
05:25	34.9	49.4	26.0
05:30	34.6	46.2	25.8
05:35	37.4	49.8	26.5
05:40	40.8	53.2	28.0
05:45	37.4	50.4	27.6
05:50	39.2	52.6	29.2
05:55	40.3	54.9	26.6
06:00	45.0	64.0	27.8
06:05	49.9	63.6	30.0
06:10	46.7	63.9	30.8
06:15	42.2	60.2	34.6
06:20	41.5	54.0	31.3
06:25	42.7	56.4	34.2
06:30	45.0	58.5	37.0
06:35	46.7	61.3	33.8
06:40	43.9	65.0	34.8
06:45	42.6	65.3	34.5
06:50	42.4	51.6	35.8
06:55	48.7	61.5	39.9
07:00	51.3	66.0	41.3
07:05	48.5	61.6	40.8
07:10	48.5	59.7	41.3
07:15	52.9	71.6	39.7
07:20	47.3	59.4	41.4
07:25	49.6	63.6	41.6
07:30	51.6	65.5	39.5
07:35	48.2	65.3	41.0
07:40	45.3	59.3	40.5
07:45	50.3	74.3	41.3
07:50	46.9	63.3	41.6
07:55	46.4	56.6	40.6
08:00	45.8	60.8	40.5
08:05	46.8	59.1	42.0
08:10	49.4	70.9	41.7
08:15	49.9	61.9	43.1
08:20	47.0	60.8	42.7

quietly moving forward

EC 13901 - Waitrose Rustington



Waitrose Ltd

Tabulated Results

Time	L _{Aeq}	L _{Amax}	L _{A90}
08:25	50.7	64.7	42.4
08:30	46.4	56.6	42.4
08:35	46.4	65.1	41.4
08:40	49.1	68.9	43.3
08:45	46.4	58.9	41.0
08:50	46.4	61.2	42.3
08:55	49.7	65.9	43.4
09:00	53.4	65.9	42.0
09:05	48.1	64.9	39.5
09:10	49.1	67.0	39.5
09:15	47.7	62.1	40.8
09:20	52.1	70.7	39.9
09:25	50.2	62.6	41.7
09:30	47.3	63.4	40.3
09:35	53.2	70.2	40.5
09:40	45.4	62.0	40.6
09:45	48.4	63.6	41.6
09:50	48.1	64.2	41.7
09:55	45.5	55.9	41.1
10:00	45.2	60.5	40.4
10:05	45.4	56.7	41.2
10:10	47.2	60.1	41.0
10:15	47.9	73.5	41.8
10:20	49.0	68.4	40.7
10:25	45.1	55.0	40.8
10:30	46.8	63.4	41.0
10:35	46.7	63.3	40.5
10:40	50.2	70.5	41.6
10:45	47.1	62.5	42.9
10:50	48.7	66.8	43.9
10:55	47.8	56.9	43.0
11:00	51.8	62.1	45.4
11:05	50.0	60.8	45.8
11:10	48.6	63.3	44.2
11:15	48.9	61.6	44.6
11:20	49.4	60.7	44.3
11:25	49.9	74.8	45.2
11:30	50.8	70.4	44.0
11:35	50.5	65.7	44.6
11:40	48.1	66.7	42.9
11:45	48.6	65.1	43.0
11:50	47.5	61.3	42.8
11:55	48.2	65.2	44.1
12:00	49.4	68.2	44.6
12:05	49.0	64.3	44.4
12:10	47.6	61.3	43.9
12:15	47.0	62.8	43.2
12:20	50.5	63.1	43.1

Time	L _{Aeq}	L _{Amax}	L _{A90}
12:25	47.2	62.9	42.4
12:30	48.1	65.7	41.6
12:35	49.9	65.9	43.0
12:40	47.1	58.3	42.7
12:45	48.1	70.2	42.0
12:50	51.0	67.7	42.3
12:55	55.0	66.7	44.2
13:00	51.7	70.8	43.4
13:05	47.1	66.7	41.8
13:10	45.8	64.5	40.8
13:15	47.9	66.1	41.4
13:20	48.4	72.7	40.4
13:25	51.8	66.4	40.8
13:30	45.7	58.6	40.0
13:35	49.4	67.5	40.5
13:40	43.4	56.2	38.8
13:45	49.7	66.9	42.8
13:50	48.6	65.8	42.0
13:55	46.4	56.2	41.8
14:00	45.9	55.6	41.9
14:05	61.2	74.4	45.0
14:10	44.8	57.3	39.8
14:15	44.6	58.8	38.7
14:20	48.0	60.0	42.1
14:25	47.4	70.3	40.7
14:30	45.3	58.0	40.9
14:35	45.6	57.7	40.8
14:40	46.0	61.3	39.9
14:45	45.4	54.4	40.6
14:50	45.3	53.3	42.2
14:55	50.3	67.2	40.6
15:00	47.9	70.4	41.0
15:05	44.7	56.5	40.2
15:10	45.0	59.6	40.1
15:15	45.7	64.7	40.1
15:20	47.9	61.6	42.2
15:25	50.3	63.4	42.0
15:30	45.1	54.9	39.8
15:35	46.9	62.1	41.5
15:40	45.7	59.6	41.8
15:45	45.6	58.8	41.5
15:50	45.5	59.7	40.3
15:55	47.5	58.7	42.2
16:00	44.5	53.0	40.0
16:05	44.4	59.4	39.7
16:10	45.0	59.3	39.4
16:15	49.1	64.3	41.7
16:20	46.4	69.1	39.3

quietly moving forward

APPENDIX E
SURVEY RESULTS
(GRAPHICAL)