Pebbles,
Old School Lane,
Stoke Hammond,
BUCKS
MK17 9BW

E:mail projects@moirhands.co.uk

MoirHands
CONSULTANTS IN ACOUSTICS
NOISE AND VIBRATION

Tel: 01525 270212

REPORT FOR
GOLDCREST LAND plc

PROPOSED 9 UNIT RESIDENTIAL SCHEME
Malden Road,
CAMDEN

NOISE ASSESSMENT

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REPORT NO. 3229/07/16

STEPHEN MOORE
22nd March, 2016

1.0 INTRODUCTION

1.1. Goldcrest Land propose to redevelop the vacant site adjoining the Fiddler's Elbow on Malden Road, Camden for student accommodation.

1.2. The site is located between the Fiddler's Elbow public house which is also a live music entertainment venue and existing flats on Malden Road. There is a play area directly behind the site comprising an gated and fenced basketball enclosure and a children's play area.

1.3. The proposal is to construct a 5-storey residential development comprising 9 flats with the top floor set back slightly from the Malden Road frontage.

1.4. The site is in reasonably close proximity to Malden Road and Prince of Wales Road, the noise emissions from which influence the prevailing ambient noise climate on the site.

1.5. The study provides information on the noise levels affecting the site, on the objectives of acoustic mitigation in relation to the pertinent available advice, and the measures needed to control noise ingress to the levels suggested.

1.6. The analysis is based on the available drawings for the scheme, on the survey data collected by day and at night and on the various Standards whose objectives are to ensure satisfactory internal acoustic comfort conditions for rest and sleep, in the built environment, and acceptable acoustic conditions in garden/amenity areas.

1.7. The study shows that noise ingress can be controlled to those levels now generally required for developments of this nature in this type of location.

1.8. Moirhands have been in practice as acoustical consultants for over 30 years. The organisation is a recognised authority on noise control and acoustic design and is called upon to advise on the acoustic aspects of retail units, theatres, concert halls, office blocks, power stations, factories, leisure facilities, housing developments and the like.

1.9. In recent years, the dominant part of our work has been the measurement and prediction of noise in the environment and in particular, the effects on existing dwellings and proposed new residential properties, and advising on measures to mitigate such noise.

2.0 THE SITE AND ITS SURROUNDINGS

2.1. The site for the proposed residential scheme is on vacant land between The Fiddler's Elbow on the corner of Malden Road and Prince of Wales Road and 'Leysdown' which is a 6 storey development which has commercial uses on the ground floor and residential on all floors above.

2.2. To the rear of the site, there is a play area which includes a basketball court and a separate young children's play area.

2.3. The site adjoins Malden Road which is a busy thoroughfare throughout the entire day.

2.4. Shipton House which is an established 6-storey block of flats is situated on Prince of Wales Road immediately next to The Fiddler's Elbow and screens the site from activity on that thoroughfare. To the rear and beyond the play areas, there are some conventional maisonette-style dwellings.

2.5. On the opposite side of Malden Road, there are various commercial outlets including newsagents and restaurants which all appear to have residential accommodation above.

2.6. To the east of the site there is a multi-road intersection which is traffic light controlled and beyond that, the Denton Estate.

2.7. To the north, there are other commercial concerns and residential buildings.

2.8. The location of the site is illustrated in Figure 1.

3.0 NOISE PRINCIPLES, STANDARDS AND PROCEDURES

3.1 Noise in the environment is a constantly varying phenomenon and it is therefore inevitable that statistical measures of the noise are used to quantify the noise environment.

3.2 Over the years, many statistical indices have been postulated and some of the more common ones are given in the Glossary of Terms in the Attachments. Ambient noise levels are usually measured using the L_{eq} parameter. The L_{eq}, or continuous equivalent noise level is the *energy* average of the noise over a given time period. The energy average has the effect of weighting the measured level towards the peaks in the noise and is therefore higher than the arithmetic average of the noise over the same time period. The L_{eq} is generally accepted as being the index which most closely correlates to our subjective reaction to noise.

3.3 In planning policy terms relating to noise, the Department for Communities and Local Government published the National Planning Policy Framework (NPPF) 2012. Following its publication, the majority of planning policy statements and guidance notes were rescinded including Planning Policy Guidance 24 'Planning and Noise'.

3.4 The NPPF outlines four aims in relation to noise. These are:

- *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."*

3.6 There are two footnotes to the NPPF guidance. The first refers to the Explanatory Note of the Noise Policy Statement for England, which gives definitions for both "*significant adverse impacts on health and quality of life*" and "*adverse impacts on health and quality of life*" as given in the first two bullet points.

3.7 The second footnote indicates that the third bullet point is "subject to the provisions of the Environmental Protection Act 1990 and other relevant law".

3.8 The NPPF suggests that planning decisions should be made in accordance with the Local Development Plan. There is no additional quantitative guidance accompanying the NPPF which is of assistance in satisfying the objectives of this document.

3.9 Instead, guidance and advice on how to examine the effect of various sources of noise is drawn from existing established Standards and technical notes. This includes the advice in BS8233.

3.10 BS 4142 has recently been revised. It is a well established Standard used to assess the impact of sound from industrial and commercial sources of noise on the amenity of sensitive receptors.

3.11 The noise impact of different types of activity some not covered by any other guidance, can also be considered in relation to the semantic scale suggested by the Institute of Acoustics/Institute of Environmental Assessment. This is reproduced below:

Noise Change (dB)	**Category**
0	No Impact
0.1 to 2.9	Slight Impact
3.0 to 4.9	Moderate Impact
5 to 9.9	Substantial Impact
10 or more	Severe Impact

3.12 There have been no substantive studies conducted in the U.K. which allude to acceptable levels of ambient noise in the environment, arising from transport activities.

3.13 The information available and which is contained in BS 8233 suggests that:

> "As well as protection for the building, barriers or bunds should be considered to protect the gardens. In gardens and balconies etc. it is desirable that the steady noise level does not exceed 50 $L_{Aeq,T}$ dB and 55 $L_{Aeq,T}$ dB should be regarded as the upper limit."

3.14 It is not always possible, practically, to reduce high noise levels down to the limits suggested in the literature, but every attempt should be made to approach the limits called for.

3.15 Although PPG 24 has been rescinded, it made specific reference to allowable levels of noise at the outside of dwellings and other noise sensitive uses. These recommended limits were broadly in line with the *World Health Organization Guidance (1999)*. The table below summarises the recommended noise limits outdoors:

PPG 24 "Planning and Noise" 1994	Day (07.00–23.00)	L_{eq}	<55dBA	"Noise exposure category A" – where noise is not a determining factor for residential development
	Night (23.00–07.00)	L_{eq}	<45dBA	

WHO "Guidelines for Community	Day (07.00–23.00)	L_{eq}	55dBA	Few People seriously annoyed by noise.
			50dBA	Few People moderately annoyed by noise.

Noise" 1999		L_{eq}	40dBA	Suggested limit for continuous noise.
	Night	L_{eq}	45dBA	Disturbance to sleep affects few people.
	(23.00-07.00)	L_{max}	60dBA	

3.16 Finally, just because a noise is occasionally audible does not make it a nuisance; what matters is how loud it is and how often it occurs.

PROCEDURES

In this case, the relevant Standard as far as external noise is concerned is ISO 9613–2 "Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation".

4.0 THE PREVAILING NOISE ENVIRONMENT

4.1. Measurements and observations were made in the vicinity of the site covering the following period:

between 07:00 and 17:00 hours on the 27th April, between 17:00 and 23:00hrs on the 28th April, between 23:00 and 07:00 hours on the 29th/30th April and between 23:00 and 02:00 hours on the 9th/10th May, 2015.

4.2. The measurement positions are shown in Figure 1. The measurements were made over periods of 15 minutes during the day and in the evening and 1 hour periods overnight. Measurements in the evening and overnight were made at position 1 only.

4.3. The salient results that are contained in Table 1 show that the site is affected by moderately high levels of noise mainly due to road traffic.

4.4. The instrumentation utilized for the survey included:

- Norsonic 118 Precision Integrating Sound Level meter
- Matching hand-held Acoustic Calibrator

4.5. The microphone was stationed at a height of 1.5m above ground.

4.6. Before and after each measurement, the entire system was calibrated using the hand-held acoustic calibrator. No electronic drift was observed.

4.7. The weather conditions for the duration of the surveys were fine and dry with wind speeds below 1m/s. These conditions are conducive to obtaining representative measurements of the noise climate prevailing at the site.

4.8. This site is subjected to noise mainly arising from local road traffic. Noise from the live music venue adjoining the site is relatively minor in relation to that from traffic, even at 2am. Noise break-out from The Fiddler's Elbow is not significant and although audible close to the venue, dissipates rapidly and is not likely to create a disturbance to occupants of the proposed scheme.

5.0 BASIS OF ANALYSIS

5.1. The analysis is based on the following information:

- JPA drg no.: 1601_P_120 entitled: 'Proposed Block/ Ground Floor Plan' dated March 2016
- JPA drg no.:1601_P_121 entitled 'Proposed Block/ First Floor Plan' dated March 2016
- JPA drg no.:1601_P_401 entitled 'Proposed East and West Elevations' dated March 2016
- Noise survey data collected on and around the site
- Achieving the 'good' standard for intrusive noise, as defined in both the WHO guidance and BS8233 in relation to habitable rooms
- Standard acoustical calculations, procedures and practices
- Construction comprising brick-cavity-medium density blockwork or one capable of providing the same level of sound insulation($D_{nT,w}$ + C_{tr} greater than 54dB)

5.2. The glazing design for the flats is based on controlling the transient maximum noise level in line with the suggestions given by the World Health Organisation.

5.3. In addition, the WHO guidance calls for a limit to the internal L_{eq} due to noise ingress of 30dBA. The glazing performance was determined by whichever was the most onerous.

6.0 DISCUSSION OF RESULTS

6.1. The noise environment along the Malden Road frontage is controlled mainly by traffic noise from that road. There are contributions from Prince of Wales Road and from commercial and pedestrian activity but neither of these are significant contributors.

6.2. For the scheme under consideration, the daytime and night-time L_{eq} values and the night-time L_{max} values at the Malden Road facade are given in the table below:

Facade	Day (L_{eq})	Night (L_{eq})	Night (L_{max})
Malden Road	68	60	85.6

6.3. For planning purposes, it is acceptable to use a single figure index to specify the acoustic performance of the glazing. This is the approach adopted here.

6.4. The following table identifies the preliminary glazing requirements for windows to habitable rooms. The glazing requirements are based on the most likely worst-case exposure at ground floor level and the current drawings:

	$R_W + C_{tr}$(dB)	Typical glazing form*
Malden Road	41	6/150/4
Fiddler's Elbow/Shipton House	38	10/12/6.8

*Not to be used for tender purposes

6.5. In addition, all habitable rooms facing towards either Malden Road or The Fiddler's Elbow would require an alternative means of ventilation having a rated performance ($D_{n,e,w}$) of no less than 45dB. Elsewhere, acoustic trickle vents having a rated performance ($D_{n,e,w}$) of no less than 41dB can be used.

6.6. There is no firm, authoritative guidance as to the upper limit for noise in garden areas. Although the WHO recommendation is that a level of 55dBA or lower 'is desirable', this level is not an upper limit and is not part of any national policy documentation. There are very many developments in use for residential purposes, where garden/open space/balcony noise levels exceed the suggested level of 55dBA without any harm being caused.

6.7. Noise levels on residents' terraces facing Malden Road would be in the range 65-68dBA on a 16hr Leq basis. On those at higher levels and to the rear of the development, the noise levels would be lower, by around 5-7dBA.

7.0 CONCLUSIONS

7.1. Goldcrest Land plc propose to redevelop the vacant site adjoining The Fiddler's Elbow public house on Malden Road, Camden, to create a residential scheme comprising 9 flats.

7.2. The site is subjected to moderately high levels of noise arising from traffic on Malden Road and the neighbouring road network. Noise break-out from the neighbouring live music venue is not significant.

7.3. Using measured data and predictions, the noise levels at the windows of the habitable rooms have been predicted, to enable the glazing requirements to be computed.

7.4. The analysis indicates that on some facades, higher than normal specification glazing will be needed to achieve the internal acoustic comfort standards required.

7.5. Some dwellings would require to be fitted with an alternative means of ventilation. All others would need to be fitted with acoustic trickle vents.

7.6. It will be the responsibility of the supplier of the glazing to demonstrate using test results from a reputable test laboratory, that their system, including frame, meets the R_w+C_{tr} values stipulated.

7.7. Noise levels on the terraces will be above 55dBA. This level is not a specific design objective, nor is it a requirement in the literature.

7.8. Provided the measures suggested above are implemented, the internal comfort conditions will be perfectly satisfactory and in accordance with the available guidelines and advice on noise in the living environment.

ATTACHMENTS

GLOSSARY OF ACOUSTIC TERMS

The following definitions explain the technical terms used in the preceding text. They are a guide only and are intended to provide a qualitative understanding of the concepts involved in characterising and summarising acoustic information.

Audible Range: *the human hearing system is capable of detecting sound pressures from around 20 uPa up to approximately 20 Pa - a range of 1,000,000. Higher pressures can be detected but damage becomes increasingly likely.*

dB Scale: *condenses this unmanageable range of sound pressures by taking the logarithm of the ratio of the actual sound pressure to the threshold of hearing pressure (20 uPa). The ear also behaves roughly logarithmically. To determine the sound pressure level in dB terms, the following formula is used:*

SPL = 20 Log (rms pressure/20 uPa)

In dB terms, the threshold of hearing would be 0dB, the threshold of feeling, 120dB and somewhere between 130 and 140dB is generally recognised as being the threshold of pain.

Ambient Noise *The local noise level which comprises all noise, near and far and is normally expressed as an L_{eq}.*

A-weighting: *normal hearing covers approximately 3 decades of frequency starting from around 20Hz up to about 20kHz; sensitivity is greatest between about 2000Hz and 5000Hz. The 'A'-weighting is an electrical circuit built into a noise meter which imitates the frequency response of the ear.*

dBA: *a measurement of sound with the A-weighting filter switched in: the resultant level reflecting the subjective response of the noise under investigation.*
It is generally accepted that a change in noise level of 3dBA is the minimum that can be detected. A change of 1dBA is detectable but only under certain prescribed laboratory conditions. A 10dBA change in level corresponds to a doubling or halving of the loudness of a sound. Loudness and level are different concepts.

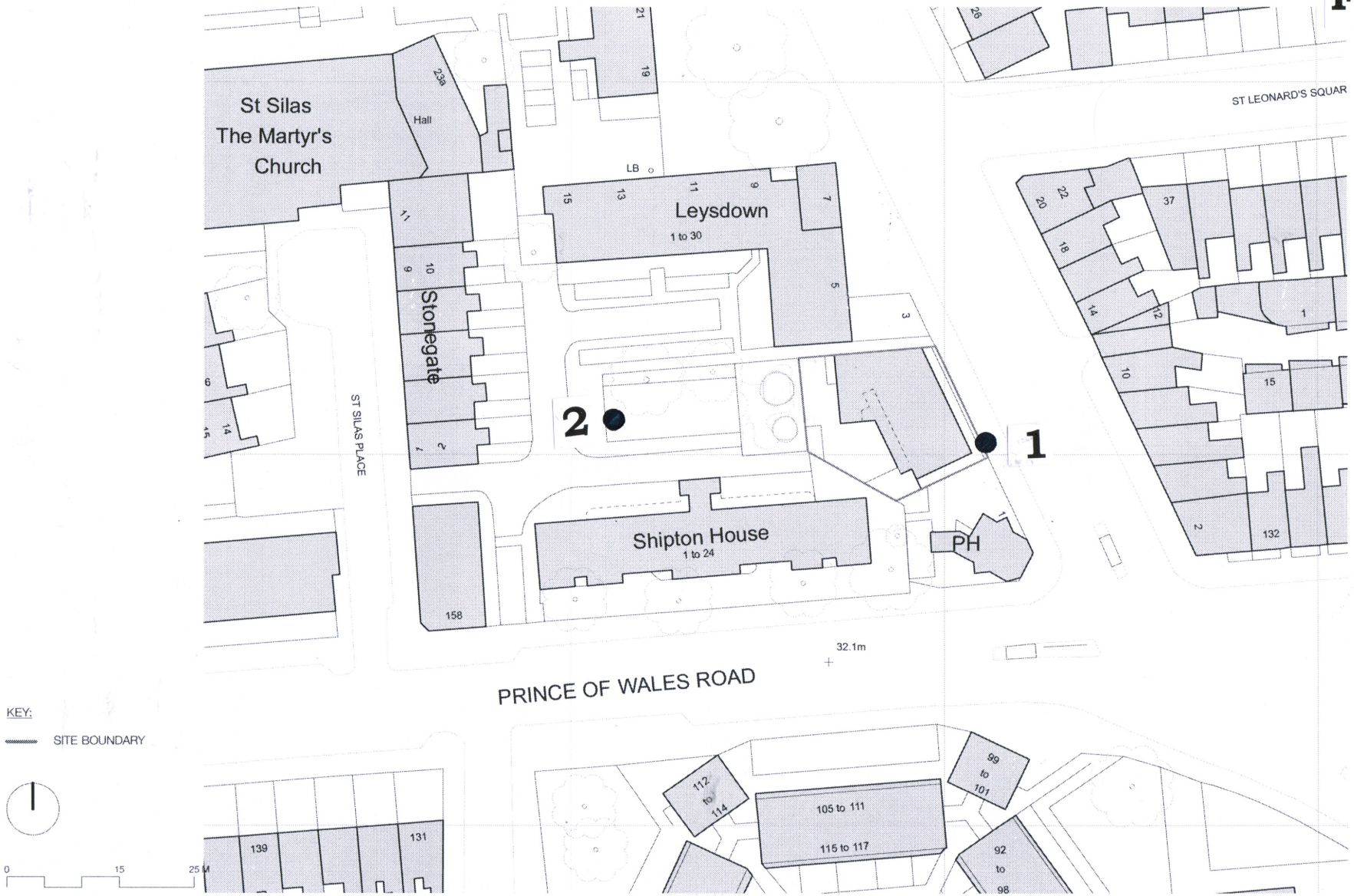
Hz: *unit of the frequency of a sound.*

FAST: *the response time of the sound level meter which is nearest to that of the human ear {time constant of 125ms}.*

Environmental noise, in the main, is a fluctuating phenomenon. It varies in level both spatially and temporally and because this is the case, noise is characterised by a series of statistical parameters. In general the following are used to describe any particular noise environment. The list is by no means exhaustive.

L_{eq}	*is an 'average' of the noise level over a defined time period. The average is performed on an energy basis which has the effect of weighting the sound level to the peaks in the noise. Used commonly nowadays to describe a range of noises.*
L_{90}	*the A-weighted noise level exceeded for 90% of a specified measuring period. This index generally taken to be the background noise level i.e. that noise that would remain once all local noise sources had been 'switched off'.*
L_{10}	*the A-weighted noise level exceeded for 10% of a specified measuring period. Used largely to assess the noise from road traffic.*
L_{max}	*the highest A-weighted noise level recorded during a measurement period. This is not the same as Peak or Maximum Peak.*
SEL	*Sound Exposure Level - is effectively the L_{eq} of a noise event normalised to l second. In other words if a sound level equal to the SEL is maintained constant over a 1 second period, it would have the same acoustic energy as the measured noise event.*

Figure 1



STATUS:	PLANNING	DRAWING NO:	1601_P_101
SCALE:	1:500 @ A3	TITLE:	PROPOSED BLOCK PLAN
DATE:	MARCH 2016	PROJECT:	**MALDEN ROAD, LONDON**

jpa
john pardey architects
beck farm studio . st leonards road . east end
lymington . hampshire . SO41 5SR
t 01590 626 465 mail@johnpardeyarchitects.com
f 01590 626 547 www.johnpardeyarchitects.com

Site location and noise measurement positions

TABLE 1

NOISE SURVEY DATA

27th/30th April and 9th/10th May, 2015

Position	Time	L_{eq}	L_{10}	L_{90}	L_{max}
27th April					
1	07:00	66.9	70.5	59.5	80.6
2		51.5	53.5	49.5	66.8
1	08:00	69.7	71.5	58.5	79.9
2		50.6	52.5	48.5	64.2
1	09:00	68.1	71.0	56.5	76.8
2		51.8	53.5	48.0	63.7
1	10:00	66.2	69.5	55.0	79.2
2		49.5	52.0	47.5	65.5
1	11:00	65.1	69.0	55.5	83.5
2		49.1	52.5	48.5	64.8
1	12:00	67.8	70.0	57.0	80.7
2		52.4	54.0	49.0	64.6
1	13:00	67.3	70.5	57.5	82.2
2		50.7	52.5	46.5	62.9
1	14:00	66.5	70.0	57.0	81.5
2		50.1	52.5	44.5	63.9
1	15:00	67.1	71.0	54.5	75.1
2		49.4	51.5	47.0	62.2
1	16:00	68.1	72.5	58.5	83.6
2		51.7	53.5	48.5	60.8
28th April					
1	17:00	69.6	72.5	58.0	83.4
2		51.2	54.0	49.0	66.8
1	18:00	69.1	72.0	58.5	81.5
2		50.9	53.5	49.5	72.1
1	19:00	67.2	70.0	57.0	82.4
2		49.5	52.0	48.5	67.6
1	20:00	66.3	69.0	56.0	79.5
2		49.1	52.5	49.0	63.1
1	21:00	64.9	67.0	55.5	74.1

TABLE 1

2		47.5	51.5	49.0	64.8
1	22:00	65.1	68.0	55.0	75.2
2		47.2	51.0	48.5	66.5
29th April					
1	23:00	65.2	69.0	56.5	85.6
1	00:00	63.9	67.5	55.0	80.4
1	01:00	62.7	66.0	54.5	81.2
1	02:00	61.6	64.0	47.0	79.4
1	03:00	56.9	60.5	42.0	74.6
1	04:00	57.4	61.0	44.0	70.1
1	05:00	60.8	63.5	49.0	74.8
1	06:00	64.9	68.0	55.5	83.1
10th May					
1	22:00	67.2	70.0	58.5	82.5
1	23:00	66.7	69.5	56.5	84.8
1	00:00	63.5	66.5	54.5	81.6

1	01:00	60.8	64.0	54.0	79.9