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TOYNBEE ROAD, EASTLEIGH
NOISE ASSESSMENT

Technical Report: R10184-2-2 Rev 0

Date: 22nd August 2023

For: Foreman Homes
Station Industrial Park
Duncan Road, Park Gate
Hampshire
SO31 1BX

24 Acoustics Document Control Sheet**Project Title:** Toynbee Road, Eastleigh – Noise Assessment**Report Ref:** R10184-2-2 Rev 0**Date:** 22nd August 2023

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For and on behalf of 24 Acoustics Ltd				

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1.0 INTRODUCTION

- 1.1 24 Acoustics Ltd has been appointed by Foreman Homes to undertake an assessment of noise at the proposed development at Toynbee Road, Eastleigh. This assessment has been requested to discharge a planning condition set out by Eastleigh Borough Council (planning reference F/21/91686).
- 1.2 This report presents the results of the assessment, following site visits and an environmental noise survey undertaken at the site from 2nd to 7th August 2023.
- 1.3 All sound pressure levels quoted in this report are in dB relative to 20 µPa. A glossary of the acoustic terminology used in this report is provided in Appendix A.

2.0 SITE DESCRIPTION

- 2.1 The site is located at Toynbee Road, Eastleigh, and falls under the jurisdiction of Eastleigh Borough Council. The land for the proposed development is currently vacant, but formerly comprised industrial units, including a builders' merchants, vehicle repair yard, and self-storage units.
- 2.2 The area surrounding the site is primarily residential, with a number of properties to the east and south. There is a rail line to the north of the site, running between Chandlers Ford and Eastleigh. A site overview is shown in Figure 1.
- 2.3 It is proposed to develop the land for residential use. The site masterplan is shown in Figure 2, in which 105 residential units are proposed.

3.0 CRITERIA AND PLANNING HISTORY

Planning History

- 3.1 Planning approval was granted for this development (planning reference F/21/91686) in October 2022. The consent is subject to a number of conditions. Condition 10 relates to noise and states:

No development above Damp Proof Course level shall take place until details of noise mitigation measures, including MVHR systems if required, as recommended within the supporting Noise Impact Assessment by Sound Advice Acoustics Ltd., Ref: SA – 6595/Rev 4 dated September 2021, have been submitted to and approved in writing by the Local Planning Authority. These agreed measures must be implemented in full prior to the occupation of each dwelling unit.

- 3.2 The Sound Advice Ltd report referenced in Condition 10 advocates that internal noise levels in proposed dwellings be assessed in line with guidance from BS 8233:2014, and WHO Guidelines for Community Noise, which is typical for a development such as this..

BS 8233:2014 and WHO Guidelines

- 3.3 BS 8233:2014 [Reference 1] provides design guidance for dwelling houses, flats and rooms in residential use and recommends that internal noise levels in dwellings do not exceed 35 dB $L_{Aeq,16hr}$ in living rooms and bedrooms during the day, 40 dB $L_{Aeq,16hr}$ in dining rooms during the day and 30 dB $L_{Aeq,8hr}$ in bedrooms at night.
- 3.4 The standard states that the above limits apply to steady external noise sources without specific character, and also states the following:

"Noise has a specific character if it contains features such as a distinguishable, discrete and continuous tone, is irregular enough to attract attention, or has strong low-frequency content, in which case lower noise limits might be appropriate."

- 3.5 BS 8233:2014 also notes that "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 $L_{Amax,f}$, depending on the character and number of events per night."
- 3.6 Although the guidelines have no formal standing, the World Health Organisation (WHO) provides guidance on desirable internal noise levels to minimise the risk of sleep disturbance. The WHO 2000 guidelines [Reference 2] suggest internal night-time noise levels not exceeding 30 dB $L_{Aeq,8hr}$ or regularly (10 to 15 times per night) exceeding 45 dB $L_{Amax,f}$ for 'a good night's sleep'.

4.0 ENVIRONMENTAL NOISE MEASUREMENTS

- 4.1 Environmental noise measurements were undertaken at the site between 2nd and 7th August 2023, to determine the prevailing noise levels at the site. Measurements were undertaken using the following equipment:

- 2 No. Rion precision sound level meters Type NL-52
- Brüel & Kjær acoustic calibrator Type 4231

- 4.2 Noise measurements were undertaken in samples of 1 minute in terms of the free-field A-weighted L_{eq} , L_{90} and $L_{max,f}$ parameters. Measurements were made in accordance with BS 7445:1991 "Description and measurement of environmental noise Part 2 - Acquisition of data pertinent to land use" [Reference 3].

- 4.3 All instrumentation was fitted with environmental weather shields during the surveys. Weather conditions were mixed during the measurement period, with short periods of rain recorded. All noise data adversely affected by weather conditions has been removed prior to analysis.
- 4.4 The noise monitoring equipment was located in two locations, shown in Figure 1 and described as follows:
- Measurement Location 1: northern area of site, approximately 30m from the centre of the rail line, and 2m above ground level
 - Measurement Location 2: western area of site, partially screened from rail line by adjacent buildings. Approximately 75m from the centre of the rail line, and 2m above ground level
- 4.5 Noise from train movements were found by correlating peak $L_{Amax, f}$ measurements with train timetable data.
- 4.6 The noise levels measured on site are described as follows:

Measurement Location	Daytime 07:00 – 23:00 hours dB $L_{Aeq, 16hr}$	Night-time 23:00 – 07:00 hours	
		dB $L_{Aeq, 8hr}$	Typical dB $L_{Amax, f}$
Location 1 (northern)	54	53	72
Location 2 (western)	53	50	66

Table 1 - Summary of measured noise levels

- 4.7 The environmental noise measurements in Table 1 describe the prevailing noise conditions on site, and have been used to undertake calculations to determine the necessary acoustic performance of ventilation and glazing elements.

5.0 INTERNAL NOISE LEVELS

- 5.1 Calculations have been undertaken to determine the acoustic requirements for windows/glazing and ventilation to the proposed residential units, which will ensure that the internal noise levels achieve the recommended criteria described in Section 3. The calculations are based on the floorplans provided by Foreman Homes, dated June 2023.
- 5.2 It has been assumed that all external walls will be constructed from masonry, and therefore will achieve a minimum sound insulation performance of 52 dB R_w .

- 5.3 Glazing and ventilation zones have been defined for all habitable rooms at the development, based on measured external noise levels. Glazing and ventilation types have been recommended for each zone, with zones defined in Table 2 and shown in Figure 2.

Zone	Room Type	Glazing Type	Ventilation Type
A	Bedroom	G1	MVHR
	Living Room	G3	V1
B	Bedroom	G2	MVHR
	Living Room	G3	V1
C	Bedroom	G3	V1
	Living Room		

Table 2 - Glazing and ventilation per room type

Glazing

- 5.4 The recommended glazing specifications are summarised in Table 3 below:

Glazing Type	Minimum SRI (dB) per Octave Band Centre Frequency (Hz)					
	125	250	500	1k	2k	4k
G1	29	29	38	43	49	56
G2	20	21	33	40	36	48
G3	21	17	25	35	37	31

Table 3 - Recommended glazing sound insulation

- 5.5 In making a comparison with the values in Table 3, it is important that the glazing figures used are the result of tests in accordance with ISO 10140, Part 2: 2010. The quoted minimum sound reduction specifications must be achieved by the entire glazing system as a whole, including frames, seals, any insulated panels and not just the glass. The requirements also apply to external doors and rooflights.
- 5.6 For guidance and costing purposes only, the following glazing configurations would be capable of achieving the required sound reduction performances in Table 3, if installed properly (i.e. with appropriate frames and seals, etc.):

- G1 – 10mm glass – 12-16mm cavity – 8.8mm Stadip Silence glass (minimum 41 dB R_w)
- G2 – 8mm glass – 6-16mm cavity – 6mm glass (minimum 34 dB R_w)
- G3 – 4mm glass – 6-16mm cavity – 4mm glass (minimum 29 dB R_w)

Ventilation

- 5.7 Trickle vents/wall vents should not be used in bedrooms in Zones A and B. Therefore, it is assumed MVHR will be provided to these space. The required sound insulation performances for ventilation to other habitable rooms are described in Table 4.

Ventilator Type	No. Vents assumed per habitable room	Minimum SRI (dB) per Octave Band Centre Frequency (Hz)					
		125	250	500	1k	2k	4k
V1	2	23	26	29	30	33	33

Table 4 - Recommended ventilator sound insulation specification

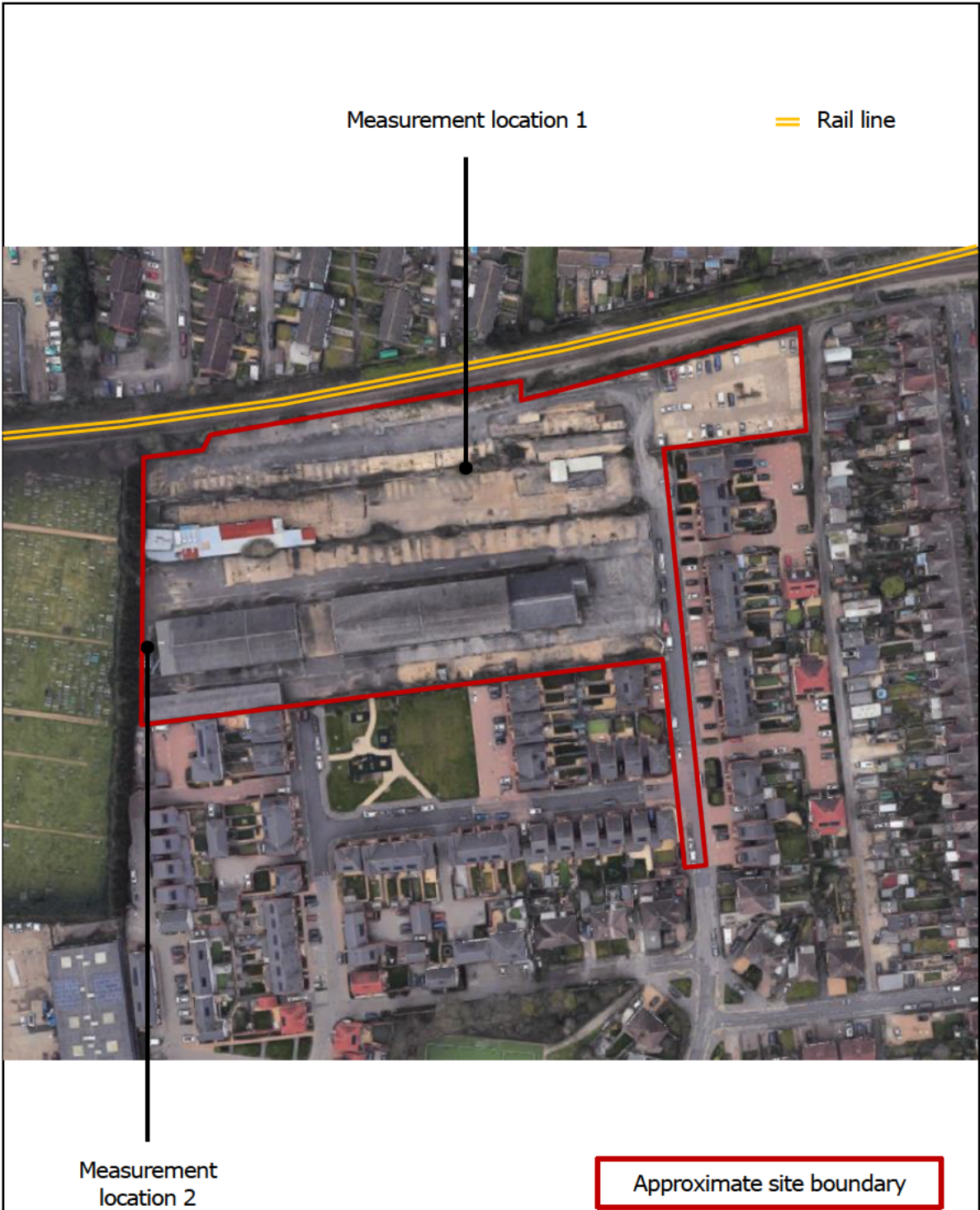
- 5.8 In making a comparison with the specifications in Table 4, it is important that the figures used are the result of laboratory tests. Note that the stated minimum performance value for each ventilation unit is for the open vent and assumes two ventilators per habitable room.
- 5.9 Ventilator V1 presents the minimum performance requirement, and hence, MVHR would be an acceptable alternative to Ventilator V1.
- 5.10 For guidance, the performance of Ventilator V1 can typically be achieved using a standard trickle ventilator (minimum 31 dB $D_{n,e,w}$ per vent).
- 5.11 Ventilation systems should allow for adequate ventilation to meet background ventilation requirements as per Part F of the Building Regulations [Reference 4].

6.0 CONCLUSIONS

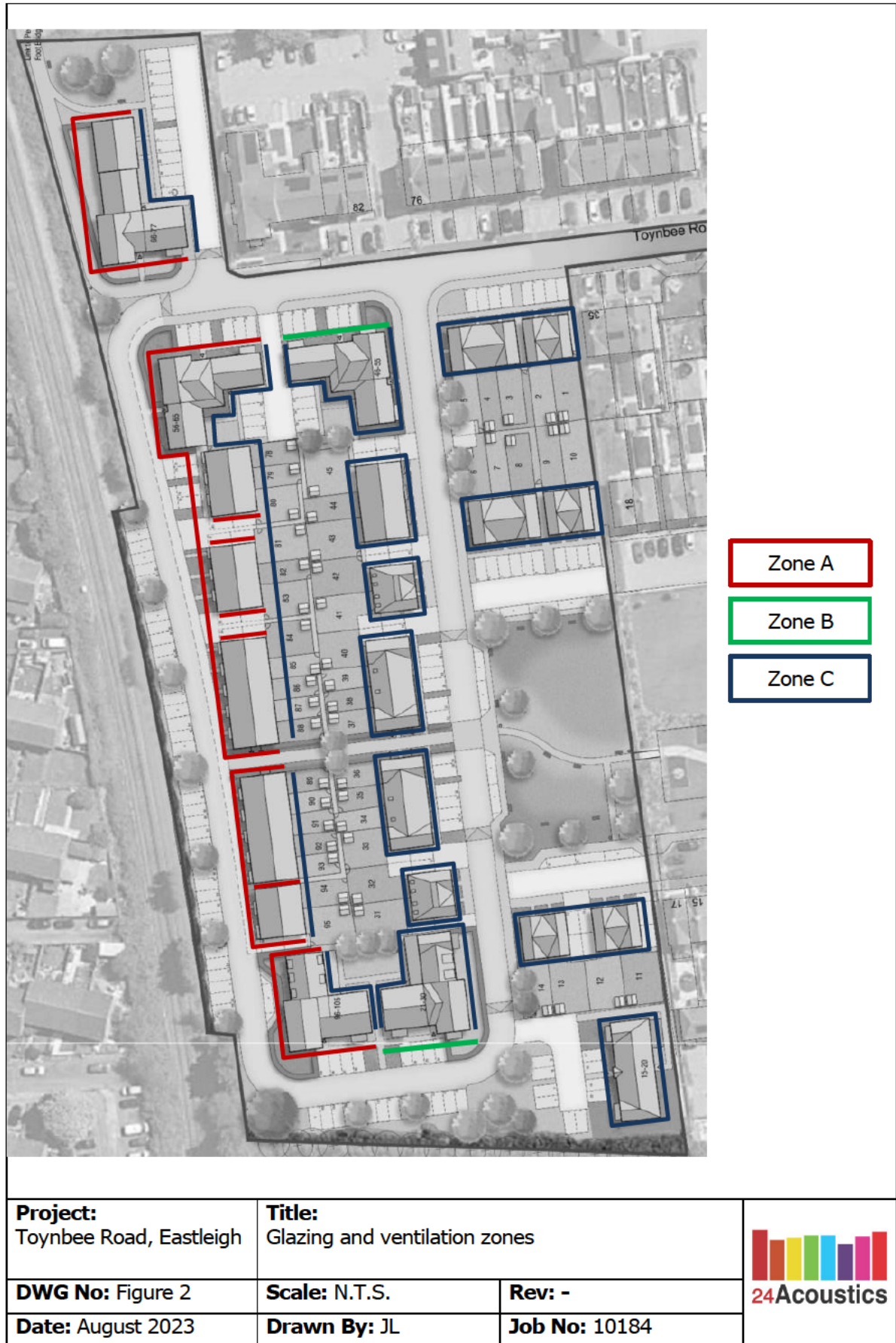
- 6.1 24 Acoustics Ltd has been appointed by Foreman Homes to undertake an assessment of noise affecting the proposed development at Toynbee Road, Eastleigh. The assessment is required to discharge Condition 10 of the planning consent (planning reference F/21/91686).
- 6.2 Environmental noise measurements have been undertaken at the site to determine existing noise levels during daytime and night-time periods.
- 6.3 Calculations have been undertaken to determine acoustic requirements for glazing and ventilation to the proposed properties, to ensure suitable internal noise levels are achieved, and hence, to discharge Condition 10 of the planning consent.

REFERENCES

1. British Standards Institution. British Standard 8233: Guidance on sound insulation and noise reduction for buildings, 2014.
2. World Health Organisation, Guidelines for Community Noise, 2000.
3. British Standards Institution. British Standard 7445: 1991 Description and measurement of environmental noise Part 2 - Acquisition of data pertinent to land use.
4. Approved Document F – Ventilation, 2021.



Project: Toynbee Road, Eastleigh		Title: Site overview		 24Acoustics
DWG No: Figure 1	Scale: N.T.S.	Rev: -		
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APPENDIX A – ACOUSTIC TERMINOLOGY

Noise is defined as unwanted sound. The range of audible sound is from 0 to 140 dB. The frequency response of the ear is usually taken to be around 18 Hz (number of oscillations per second) to 18000 Hz. The ear does not respond equally to different frequencies at the same level. It is more sensitive in the mid-frequency range than the lower and higher frequencies and because of this, the low and high frequency components of a sound are reduced in importance by applying a weighting (filtering) circuit to the noise measuring instrument. The weighting which is most widely used and which correlates best with subjective response to noise is the dBA weighting. This is an internationally accepted standard for noise measurements.

For variable sources, such as traffic, a difference of 3 dB is just distinguishable. In addition, a doubling of traffic flow will increase the overall noise by 3 dB. The 'loudness' of a noise is a purely subjective parameter, but it is generally accepted that an increase/ decrease of 10 dB corresponds to a doubling/ halving in perceived loudness.

External noise levels are rarely steady, but rise and fall according to activities within an area. In attempt to produce a figure that relates this variable noise level to subjective response, a number of noise indices have been developed. These include:

i) The L_{Amax} noise level

This is the maximum noise level recorded over the measurement period.

ii) The L_{Aeq} noise level

This is "equivalent continuous A-weighted sound pressure level, in decibels" and is defined in British Standard BS 7445 as the "value of the A-weighted sound pressure level of a continuous, steady sound that, within a specified time interval, T , has the same mean square sound pressure as a sound under consideration whose level varies with time".

It is a unit commonly used to describe construction noise and noise from industrial premises and is the most suitable unit for the description of other forms of environmental noise. In more straightforward terms, it is a measure of energy within the varying noise.

iii) The L_{A10} noise level

This is the noise level that is exceeded for 10% of the measurement period and gives an indication of the noisier levels. It is a unit that has been used over many years for the measurement and assessment of road traffic noise.

iv) The L_{A90} noise level

This is the noise level that is exceeded for 90% of the measurement period and gives an indication of the noise level during the quieter periods. It is often referred to as the background noise level and is used in the assessment of disturbance from industrial noise.

APPENDIX B: ENVIRONMENTAL NOISE MEASUREMENTS

