



LANGSTONE ROAD, HAYLING ISLAND

Assessment - BS 8233: 2014

MH Architects



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1.0 INTRODUCTION

MACH Residential have been appointed by MH Architects to carry out an environmental noise survey and subsequent assessment for the proposed residential development at Langstone Road, Hayling Island.

The purpose of the assessment is to determine any appropriate noise control measures to protect the future occupants against noise ingress from the local environment. To undertake this assessment, an environmental noise survey was carried out on-site between 14/06/2018 and 15/06/2018.

A review of the requirements of the proposed building façades have been provided in order to enable compliance with guidance given within BS8233: 2014 'Guidance on sound insulation and noise reduction for buildings'.

This report describes the noise survey and its results, with a graphical representation of the noise measurements taken on site presented within the results section, and a subsequent assessment in accordance with guidelines set out in BS8233.

2.0 SITE DESCRIPTION

The proposed plans are for a new residential development on the site located at Langstone Road, Hayling Island. The proposed development is situated in close proximity to a business park and the A27, hence appropriate noise control measures will be required in order to protect the future occupants from excessive noise levels. The site in relation to its surroundings is shown in the map and aerial photograph below (residential site boundary indicative).



Figure 2.1: Aerial Photograph and Site Map

The noise sources on site are primarily A27, with Langstone Road contributing to a lesser extent. Ambient noise levels over the whole day time period are moderate, with a reduction in levels to the night. MACH has employed a combination of short and long-term noise monitoring to establish environmental noise levels due to these sources – as outlined in the following sections.

3.0 NOISE SURVEY

3.1 Methodology

In order to establish environmental noise levels on site, continuous 5-minute samples of the acoustic parameters $L_{Aeq,T}$, $L_{A90,T}$, and $L_{Amax,T}$ were measured between 13:00 on 14/06/2018 and 13:00 on 15/06/2018, at a fixed microphone position, F1, on site. Data has been gathered over an approximate 24-hour period, in order to provide L_{Aeq} and L_{Amax} levels for both day and night.

As stated in Section 2.0, A27 form the primary contribution to ambient noise levels. Figure 3.1 below provides the location of fixed measurement position F. The microphone was placed within the grounds of the property in the garden, in free field conditions, approximately 3.5m above ground. The long-term meter was set to measure consecutive 'A' weighted 5-minute time samples.

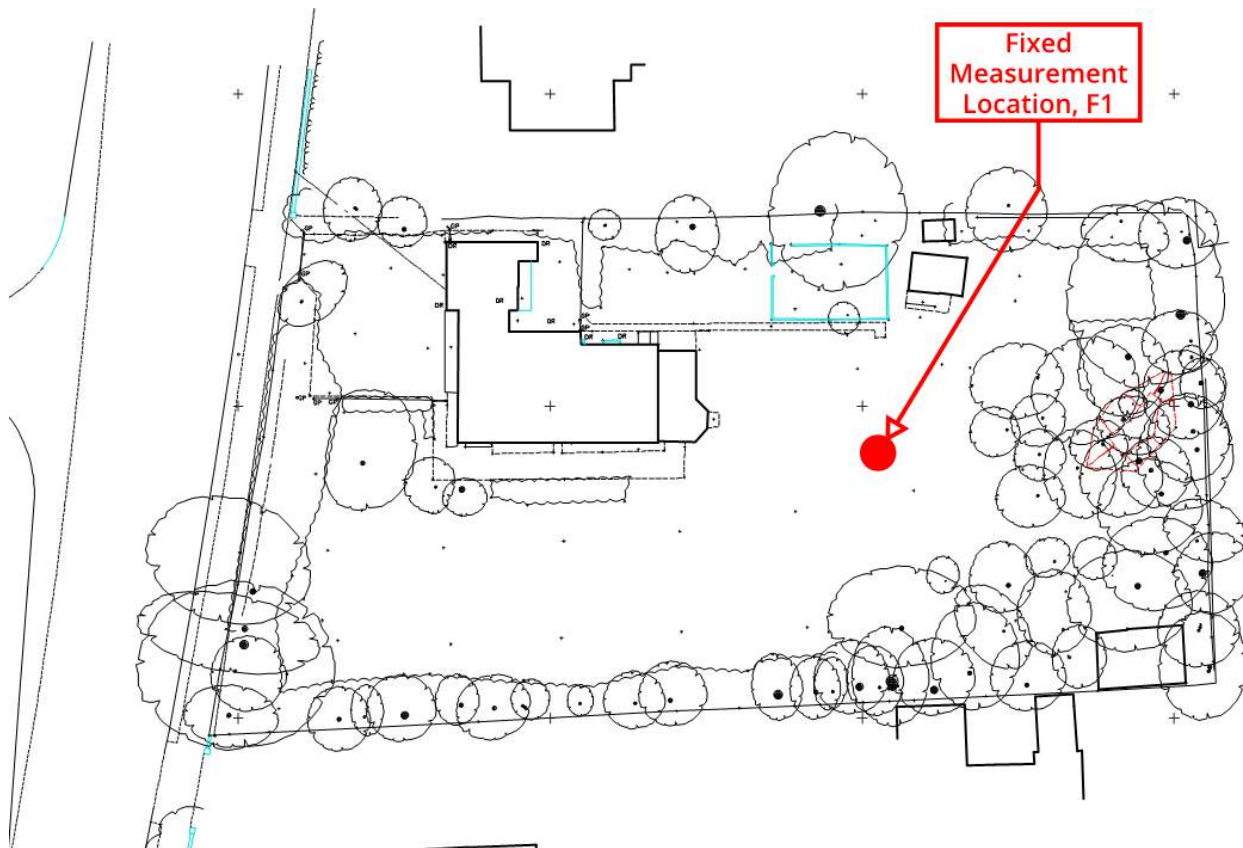


Figure 3.1: Measurement Location Map

3.2 Measurement Equipment

The measurement equipment illustrated in Table 3.1 was used during the survey, all equipment complies with BS EN 60942:2003 i.e. a class 1 device.

Name	Serial Number	Last Calibrated	Certificate number	Calibration Due
Norsonic Precision Sound Analyser Type 131	1313109	Mar-18	15588	Mar-20
Norsonic Type 1207 Pre-amplifier	12303	Mar-18	15588	Mar-20
Norsonic Type 1227 Microphone	170603	Mar-18	15587	Mar-20
Svantek Acoustic Calibrator SV33A	64138	Nov-17	manufacturer calibration	Nov-18

Table 3.1: Noise Measurement Equipment

3.3 Weather Conditions

The following climate conditions were recorded for the site:

Wind: Less than 5 m/s.

Humidity: 68%

Temperature: 13 °C - 20°C.

The above weather conditions are suitable for the measurement of environmental noise in accordance with BS7445 Description and Measurement of Environmental Noise.

4.0 NOISE SURVEY RESULTS

4.1 Fixed Measurement Results

The following graph and table show the measured noise levels at fixed measurement location F1. All measurements are shown in dB(A). The complete set of measurement data is available on request. The graph in Figure 4.1 below provides the L_{Amax} , L_{Aeq} and L_{A90} levels measured during the noise survey.

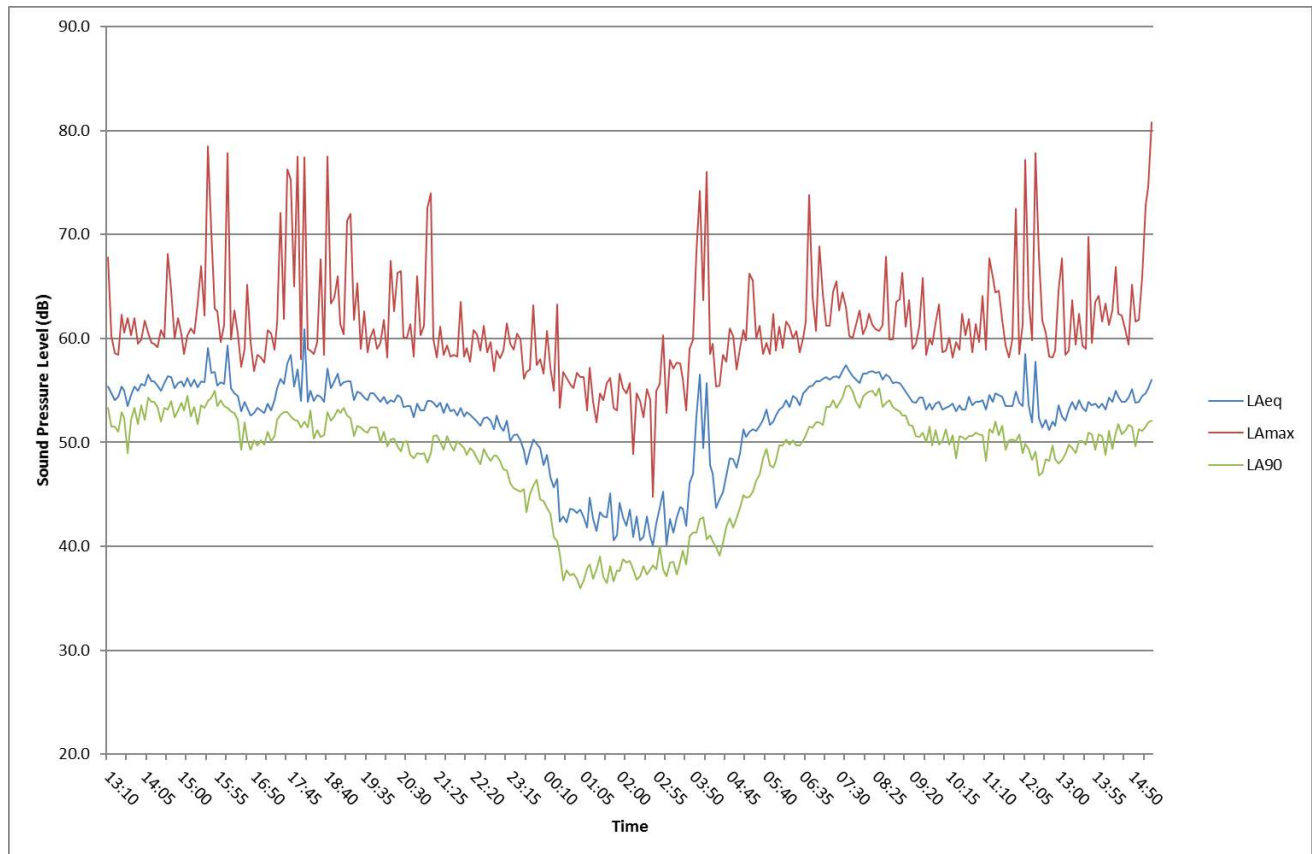


Figure 4.1: Graph of on-site environmental noise measurements (F1)

4.2 Assessment Noise Levels

Based on the results of the environmental noise survey, the following assessment noise levels have been derived from fixed measurement location F1.

Period	Sound Pressure Level, dB (Octave Band Centre Frequency, Hz)							dB(A)
	63	125	250	500	1000	2000	4000	
$L_{Aeq,16\text{hour}}$ (day)	70	62	61	61	63	56	46	65
$L_{Aeq,8\text{hour}}$ (night)	61	55	55	55	57	52	44	60
L_{Amax} (highest value)	81	71	63	64	64	84	81	87

Table 4.1: Assessment Noise Levels

5.0 FAÇADE ASSESSMENT

To determine internal noise levels within the proposed dwellings, an indicative façade noise break-in assessment has been undertaken in accordance with the guidance given within BS8233. The calculations are shown within Appendix A and have been based on the noise levels presented in Section 4.2.

The Noise Policy Statement for England does not provide guidance on internal noise levels within residential buildings. As a result, the advised levels within BS8233: 2014 'Guidance on sound insulation and noise reduction for buildings' have been adopted. BS8233 states that to achieve adequate sleeping and living conditions, background noise levels should be 30 dB L_{Aeq} or less within bedrooms at night, and 35 dB L_{Aeq} or less within Living rooms during the day. The advised levels are tabulated below.

Activity	Location	0700 - 2300	2300 - 0700
Resting	Living Room	35 dB L_{Aeq} , 16 Hour	-
Dining	Dining Room	40 dB L_{Aeq} , 16 Hour	-
Sleeping	Bedroom	35 dB L_{Aeq} , 16 Hour	30 dB L_{Aeq} , 8 Hour

Table 5.1: BS8233 Internal Noise Levels

BS 8233: 2014 provides no definitive methodology for assessment of L_{Amax} levels. The standard simply states that a guideline value for the internal level may be set depending on the character of the noise source and number of events occurring. Due to the proximity of the proposed site to sources of road traffic noise, assessment of L_{Amax} is critical to ensuring that disturbance is avoided.

In order to provide an assessment of L_{Amax} levels, the recommendations of the World Health Organisation have been employed. The WHO state that in order to avoid sleep disturbance within bedrooms during the night, the internal sound pressure level should not exceed 45 dB L_{Amax} .

5.1 Façade Construction

In order that the requirements of glazing and ventilation elements can be specified, MACH Residential have calculated the performance of the façade construction.

Calculations have been based on an indicative façade construction, which is assumed to be cavity construction with masonry inner leaf.

Element	125	250	500	1000	2000	4000
External Wall	41	45	45	54	58	58

Table 5.2: Façade, Sound Reduction Indices

5.2 Glazing and Ventilation Specification

Based on achieving the criteria set out in Table 5.1 above, calculations were carried out to determine the levels of attenuation required by the glazing and ventilation elements. Calculations show that to achieve an acceptable internal acoustic environment in habitable rooms, the building envelope constructions should meet the sound insulation performance values presented in the following sub section(s). Appendix A contains graphic representations of the spreadsheets used in the facade calculations.

Calculations based on providing background ventilation in the form of trickle vents. Acoustic requirements under purge ventilation have not been specified. BS8233 states that open windows may be relied upon for purge ventilation, and places no acoustic restriction on this statement.

Façade	Element	Units	125	250	500	1000	2000	4000
All Facades	Glazing	Rw	22	22	26	37	46	47
	Trickle Vents	Dne	33	39	44	49	50	53

Table 5.3: Minimum sound reduction indices (SRI) for façade elements

Note that the specifications are for guidance only. Similar systems to the ones used in calculations may achieve the same desired internal noise levels. All systems should be verified by the supplier against the sound reduction indices below.

Façade	Element	Construction Description
All Facades	Glazing	Double - 4/6-16/4
	Trickle Vents	Renson AK40 Open

Table 5.4: Suggested façade elements.

6.0 OUTDOOR AMENITY

With regards to outdoor amenity areas, BS8233 states a lower exposure value of 50 dBA and a higher exposure value of 55 dBA (which would be acceptable in noisier environments).

These values are specified as $L_{Aeq, T}$, where T refers to the activity period of the outdoor space. For this development, assessment is based on gardens during day time hours. Although L_{Amax} levels will exceed the upper value of 55 dBA, assessment must be based on an $L_{Aeq, 16 \text{ Hour}}$ value.

MACH Residential have created a CadnaA noise map (see Figure D.1 in Appendix D) in order to predict the noise level in the gardens. The predicted levels, without any mitigation, are over the WHO guidelines for noise levels in outdoor amenity areas. Therefore, a number of acoustic fences should be installed. With these in place the noise levels in the outdoor amenity areas will be in line with the WHO guidelines.

The fences should be installed as shown in Figure 6-1 below by the red lines. The fence should be at least 2.2 m high, have a surface mass of at least 15 kg/m² and they should be continuous, i.e have no holes. With these fences installed the noise levels will be within the recommended level of 55 dBA or lower.



Figure 6-1: Shows the required location of acoustic barriers in blue.

7.0 SUMMARY

MACH Residential have been appointed by MH Architects to carry out an environmental noise survey and subsequent assessment for the proposed residential development at Langstone Road, Hayling Island.

To determine internal noise levels within the proposed dwellings, an indicative façade noise break-in assessment has been undertaken in accordance with the method given within BS8233 for both day and night time noise levels.

Section 5.0 above indicates that to provide an acceptable acoustic environment within habitable spaces, façade elements should comply with the minimum sound reduction indices specified in this report.

Once the fences in Figure 6-1 are installed the noise levels within outdoor amenity are seen to be in line with the WHO guidelines.

APPENDIX A – FAÇADE BREAK-IN CALCULATIONS

1+2+3+4+5+6 All Elements including vents and open	BS8233 Façade Noise Break In Calculations								LAeq,16hour (day)								LAeq,8hour (night)								LAmax (10th highest)												
									63	125	250	500	1000	2000	4000	dB(A)	63	125	250	500	1000	2000	4000	dB(A)	63	125	250	500	1000	2000	4000	dB(A)					
	Calculation Safety		Noise Level at Façade: 3 dB Façade level type: J - R.N.H.V.B.T N%eq(SMA) (Free field level)						68	60	59	59	61	54	44	63	59	53	53	53	55	50	42	58	79	69	61	62	62	82	79	85					
									0.5	0.5	0.5	0.5	0.5	0.5	0.5		0.5	0.5	0.5	0.5	0.5	0.5	0.5		0.5	0.5	0.5	0.5	0.5	0.5	0.5		0.5	0.5	0.5	0.5	
	Façade level type:								40.6	40.6	40.6	40.6	40.6	40.6	40.6		40.6	3.7	3.7	3.7	3.7	3.7	3.7		3.7	3.7	3.7	3.7	3.7	3.7	3.7		3.7	3.7	3.7	3.7	3.7
	Lff								1.6	1.6	1.6	1.6	1.6	1.6	1.6		1.6	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4		-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4		-0.4	-0.4	-0.4	-0.4	-0.4
	(Free field level)																																				
	Wall-Ext		External Wall		SRA						0	41	45	45	54	58	58		0	41	45	45	54	58	58		0	41	45	45	54	58	58				
	Wall-Ext 13 - Rw 52 - Brick/b		Brick/black cavity wall		NLAeq((SRAstat)N%(-R/N))						0	-42	-46	-46	-55	-59	-59		0	-43	-47	-47	-56	-60	-60		0	-43	-47	-47	-56	-60	-60				
	External Wall		Predicted noise levels building						-39.0	22.4	17.2	16.3	9.8	-0.7	-10.7	16.6	-39.0	12.3	8.7	8.7	1.5	-7.5	-15.7	8.2	-39.0	28.7	16.3	17.3	8.6	24.6	21.3	27.8					
		Assessment						-125	6	9	14	10	0	-10		-125	-4	0	5	1	-6	-15		-125	13	8	14	9	26	22							
Glaz-Dbl		Glazing		SRA						0	22	22	26	37	46	47		0	22	22	26	37	46	47		0	22	22	26	37	46	47					
Glaz-Dbl 8 - Rw 32 - Double		Double - 4.4/12/4 - SGG		NLAeq((SRAstat)N%(-R/N))						0	-29	-29	-33	-44	-53	-54		0	-26	-26	-30	-41	-50	-51		0	-26	-26	-30	-41	-50	-51					
Glazing		Stdap Silence						-39.0	36.0	34.8	30.5	21.4	5.9	-5.1	30.8	-39.0	29.3	29.7	25.7	16.5	2.5	-6.7	25.7	-39.0	45.7	37.3	34.3	23.6	34.6	30.3	39.2						
		Assessment						-125	20	26	27	21	7	-4		-125	13	21	22	16	4	-6		-125	30	29	21	24	36	31							
TrVnt-Aco		Trickle Vents		Dno~NLAeq(n)						0	32.8	39.1	44.3	48.8	50	53		0	32.8	39.1	44.3	48.8	50	53		0	32.8	39.1	44.3	48.8	50	53					
TrVnt-Aco 10 - Rw 38 - Rona		Titan Variquase 500 mm Op		Aa30						-8	-41	-47	-52	-57	-58	-61		1	-32	-39	-44	-48	-49	-52		1	-32	-39	-44	-48	-49	-52					
Trickle Vent		Predicted noise level through trickle vent						-39.0	24.2	16.7	11.2	8.6	0.9	-12.1	14.5	-39.0	23.1	17.2	12.0	3.3	3.1	-8.1	15.0	-39.0	39.5	24.8	20.6	16.4	35.2	28.9	37.6						
		Assessment						-125	8	8	8	9	2	-11		-125	7	9	9	9	9	4	-7		-125	23	16	17	16	36	30						
								63	125	250	500	1000	2000	4000	dB(A)	63	125	250	500	1000	2000	4000	dB(A)	63	125	250	500	1000	2000	4000	dB(A)						
		Combined Noise Levels (including ventilation elements)						0	38	36	32	27	15	6	33	0	30	30	26	17	7	1	26	0	47	38	35	25	38	33	42						
		Target						35							35	30							30								45						
		NR Difference						-56	-7	-1	2	1	-8	-15	Pass	-51	-9	-1	2	-3	-10	-13	Pass	-65	-7	-9	-6	-13	4	1	Pass						

Figure A1: Day/Night time façade noise break-in.

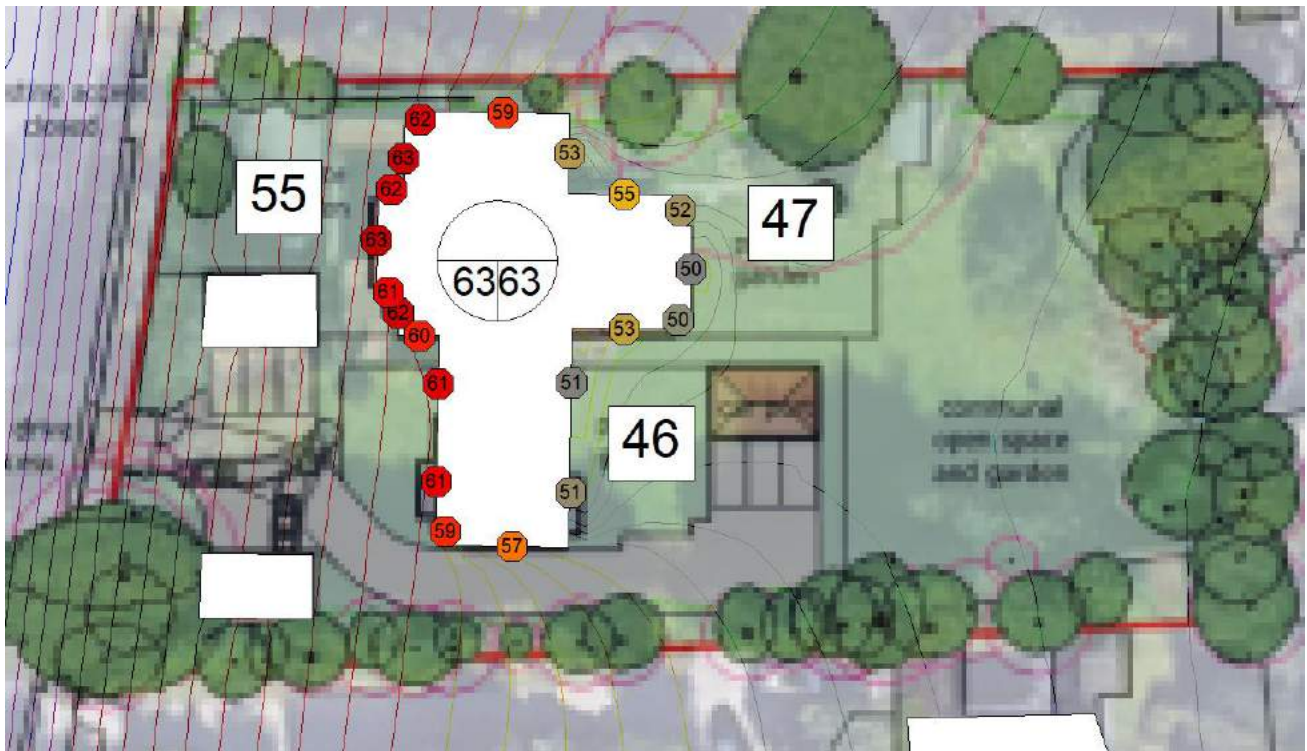


Figure A.3: Shows the outdoor amenity noise levels, day time LAeq levels.

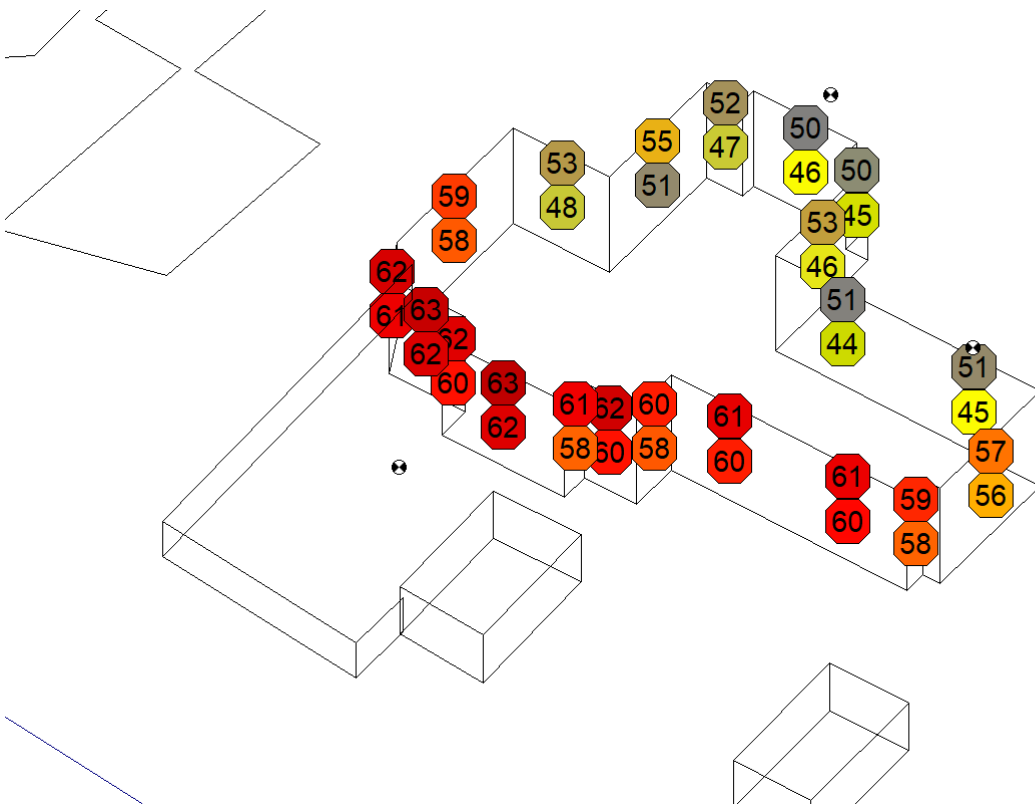


Figure A.3: Shows the predicted façade day time LAeq levels.

APPENDIX B – PHOTOGRAPHS



Figure B1: Fixed Survey Position (F1)