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GLADMAN DEVELOPMENTS LTD (GLADMAN)

LAND OFF ST MARY'S ROAD, HAYLING ISLAND

NOISE ASSESSMENT REPORT

DECEMBER 2016

your earth our world



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GLADMAN DEVELOPMENTS LTD (GLADMAN

Land off St Mary's Road, Hayling Island

Noise Assessment Report

December 2016

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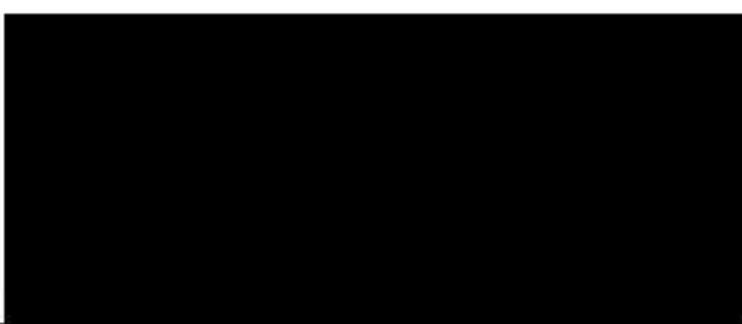
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Appendix A Noise Monitoring Results

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LE13606 – Noise Monitoring Locations Plan

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1 INTRODUCTION

- 1.1.1 Wardell Armstrong LLP was commissioned by Gladman Developments Ltd to undertake a noise assessment to support an outline planning application. The application is for a proposed residential development on land off St Mary's Road, Hayling Island. The proposed location for the site is shown on the location plan submitted to support this document.
- 1.1.2 The proposed development site is located to the west of St Mary's Road, Hayling Island; grid reference SZ719998; and currently comprises open land. To the north of the site lies open land beyond which lies Hayling Island Holiday Park. Adjacent to the north east corner lies an electrical substation and Smith & Austin Engineering Products Ltd beyond which lies Church Road. To the east and south of the site lies housing, beyond which lies St Mary's Road. To the west of the site lies further open land.
- 1.1.3 The report comprises an assessment of potential noise impacts upon the proposed residential dwellings including noise from St Mary's Road, the electrical substation, Smith and Austin Engineering Products Ltd and Hayling Island Holiday Park. The report assesses the results of a noise survey carried out in accordance with current guidance and includes recommendations for noise mitigation as appropriate.

2 ASSESSMENT METHODOLOGY

2.1 Consultation and Scope of Works

2.1.1 Wardell Armstrong LLP was commissioned to undertake a noise assessment in support of an outline planning application for a proposed residential development on land off St Mary's Road, Hayling Island.

2.1.2 Details of the noise survey and assessment methodology adopted for this assessment have been sent to the Environmental Health Department of Havant Borough Council on the 9th September 2016. No response has been received at the time of writing this report.

2.2 Noise Survey

2.2.1 As part of this assessment, Wardell Armstrong LLP has carried out an attended noise survey to assess the current noise levels at proposed receptor locations across the development site. Details of the noise survey are provided within Section 3 of this report.

2.3 Assessment Methodology

2.3.1 Potential noise issues that are addressed as part of this assessment are as follows:

- Noise from St Mary's Road and the surrounding local road network;
- Noise from electrical substation adjacent to the north eastern boundary of the development site;
- Noise from Smith and Austin Engineering Products adjacent to the north eastern corner of the site;
- Noise from Hayling Island Holiday Park located to the north of the site.

2.3.2 This noise assessment considers the suitability of the site for the proposed uses, and takes into account current guidance including:

- National Planning Policy Framework, 2012; (NPPF);
- Planning Practice Guidance (Noise), 2014;
- Noise Policy Statement for England 2010; (NPSE);
- The World Health Organisation Guidelines for Community Noise, 1999 (WHO);
- British Standard 8233: 2014 Guidance on sound insulation and noise reduction for buildings (BS8233);
- British Standard 4142: 2014 Methods for rating and assessing industrial and commercial sound (BS4142).

- Department of Transport's Memorandum: Calculation of Road Traffic Noise, 1988 (CRTN)

National Planning Policy Framework

2.3.1 In March 2012 the 'National Planning Policy Framework' (NPPF) was introduced as the current planning policy guidance within England. Paragraph 123 of 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;
- 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.'

2.3.2 In terms of 'adverse effects' the NPPF refers to the 'National Policy Statement for England' (NPSE), which defines three categories, as follows:

'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.

SOAEL – Significant Observed Adverse Effect Level

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

2.3.3 However, whilst the above terms are provided in NPSE, paragraph 2.22 acknowledges that these terms require further research in order to establish what is meant in terms of 'adverse impact'.

'2.22 It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available.'

2.3.4 The Noise Policy Statement for England refers to the WHO when discussing health and quality of life; therefore the standards set out in the WHO guidance document have been used for setting appropriate noise limits.

2.3.5 The National Planning Practice Guidance states that noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment. When preparing local or neighbourhood plans, or taking decisions about new development, there may also be opportunities to consider improvements to the acoustic environment.

World Health Organisation Guidelines for Community Noise (WHO)

2.3.6 In accordance with the requirements of WHO the following internal daytime and night-time noise limits, for noise from external sources, will need to be met within noise sensitive rooms of the residential dwellings:

- 35dB L_{Aeq} (16 hour) during the daytime in noise sensitive rooms other than bedrooms.
- 30dB L_{Aeq} (8 hour) during the night-time in bedroom areas.
- 45dB $L_{A_{f,max}}$ should not be exceeded during the night-time in bedroom areas.

2.3.7 WHO also identifies that the attenuation provided by a window open for ventilation purposes is up to 15dB. Relating this information to the above internal noise levels equates to allowable external noise levels of 50dB L_{Aeq} (16 hour) during the daytime and 45dB L_{Aeq} (8 hour) at night, with maximum noise levels of 60dB $L_{A_{f,max}}$.

2.3.8 WHO also proposes an external noise limit of 55dB L_{Aeq} (16 hour) during the daytime in outdoor living areas.

British Standard 4142:2014, Methods for rating and assessing industrial and commercial sound (BS4142):

2.3.9 BS4142 is used to rate and assess sound of an industrial and/or commercial nature including:

- sound from industrial and manufacturing processes;
- sound from fixed installations which comprise mechanical and electrical plant and equipment;
- sound from the loading and unloading of goods and materials at industrial and/or commercial premises; and
- sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes, such as that from forklift trucks, or that from train or ship movements on or around an industrial and/or commercial site.

2.3.10 The standard is applicable to the determination of the following levels at outdoor locations:

- rating levels for sources of sound of an industrial and/or commercial nature; and
- ambient, background and residual sound levels, for the purposes of:
 - 1) Investigating complaints;
 - 2) Assessing sound from proposed, new, modified or additional source(s) of sound of an industrial and/or commercial nature; and
 - 3) Assessing sound at proposed new dwellings or premises used for residential purposes.

2.3.11 The purpose of the BS4142 assessment procedure is to assess the significance of sound of an industrial and/or commercial nature.

2.3.12 BS4142 refers to noise from the industrial source as the 'specific noise' and this is the term used in this report to refer to noise which is predicted to occur due to activities associated with the electrical substation and Smith and Austin Engineering Products Ltd. The 'specific noise' levels, of the existing industrial premises that have been measured are detailed in Section 3 of this report.

2.3.13 BS4142 assesses the significance of impacts by comparing the specific noise level to the background noise level (L_{A90}). Section 3 of this report provides details of the background noise survey undertaken.

2.3.14 Certain acoustic features can increase the significance of impacts over that expected from a simple comparison between the specific noise level and the background noise level. In particular BS4142 identifies that the absolute level of sound, the character, and the residual sound and the sensitivity of receptor should all be taken into consideration. BS4142 includes allowances for a rating penalty to be added if it is found that the specific noise source contains a tone, impulse and/or other characteristic, or is expected to be present. The specific noise level along with any applicable correction is referred to as the 'rating level'.

2.3.15 The greater the increase between the rating level over the background noise level, the greater the magnitude of the impact. The assessment criteria given by BS4142 are as follows:

- A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context.
- The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

2.3.16 During the daytime, BS4142 requires that noise levels are assessed over 1-hour periods. However, during the night-time, noise levels are required to be assessed over 15-minute periods.

2.3.17 Where the initial estimate of the impact needs to be modified due to context, BS4142 states that all pertinent factors should be taken into consideration, including:

- The absolute level of sound;
- The character and level of the residual sound compared to the character and level of the specific sound; and
- The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions.

Department of Transports Memorandum Calculation of Road Traffic Noise

2.3.18 Road traffic is the dominant source of noise in the eastern and southern part of the site i.e. immediately adjacent to St Mary's Road. To quantify this, traffic noise measurements were carried out at monitoring location 5, in accordance with the shortened measurement procedure in CRTN. This requires that traffic noise is measured over 3 consecutive hours between 1000 and 1700 hours. Measurements were taken over 1 hour periods, over 3 consecutive hours. The $L_{10(18\text{hour})}$ is then calculated from the $L_{10(3\text{hour})}$ by subtracting 1dB(A). The L_{A10} is then converted to L_{Aeq} by subtracting 2dB(A).

3 NOISE SURVEY

3.1.1 On 13th and 14th September 2016 Wardell Armstrong LLP carried out a noise survey to assess the ambient noise levels across the development site.

3.1.2 Attended noise measurements were taken at five monitoring locations, which are considered to be representative of proposed residential receptors. The monitoring locations are as follows, and are shown on Drawing Number LE13606-001:

- Monitoring Location 1: Adjacent to north western corner of site boundary nearest to Hayling Island Holiday Park;
- Monitoring Location 2: Adjacent to southern site boundary closest to St Mary's Road;
- Monitoring Location 3: Adjacent to the north eastern site boundary, adjacent to electrical substation and Smith and Austin Engineering Products Ltd;
- Monitoring Location 4: Adjacent to western site boundary, distant from main noise sources;
- Monitoring Location 5: Adjacent to eastern site boundary approximately 10m from St Mary's Road.

3.1.3 Attended noise monitoring was carried out at location 1 between 0737hrs and 0953hrs on 14th September 2016. Monitoring was carried out at location 1 for this duration to capture any potential noise from Hayling Island Holiday Park.

3.1.4 Monitoring was undertaken at location 2 between 0514 and 0917 on 14th September 2016 to capture any fluctuations in road noise, including busy periods during the night and daytime, within the development site.

3.1.5 Monitoring was undertaken at location 3 between 0451 and 0620, and between 1000 and 1200 on 14th September 2016 to capture noise associated with the electrical substation and Smith and Austin Engineering Products Ltd adjacent to the site. Two references measurements were also taken at Location 3 in order to identify the specific noise from the electrical substation and the external plant at Smith and Austin Products Engineering Ltd.

3.1.6 At location 4 monitoring was undertaken from 1422 until 1522, and 2200 until 0000 on 13th September 2016 to capture the background noise during the quieter part of the day, away from the main noise sources at the development site.

- 3.1.7 At location 5 monitoring was undertaken from 0814 until 0845 and 1202 until 1502 in order to capture any fluctuations in road noise, including busy periods during and daytime, within the development site where the site entrance is likely to be.
- 3.1.8 The noise measurements were made using a Type 1, integrating sound level meter. The sound level meter was mounted vertically on a tripod 1.5m above the ground and more than 3.5 metres from any other reflecting surfaces.
- 3.1.9 All noise monitoring took place during dry and calm weather conditions. The sound level meter was calibrated to a reference level of 94dB at 1kHz both before, and on completion of, the noise survey. No drift in calibration was noted during the survey.
- 3.1.10 For the purpose of this assessment daytime hours are taken to be 0700 to 2300 hours and night-time hours to be 2300 to 0700 hours.
- 3.1.11 A-weighted¹ L_{eq} ² noise levels were measured to comply with the requirements of WHO. A-weighted L_{90} ³ and L_{10} ⁴ noise levels, together with the maximum and minimum sound pressure levels, were also measured to provide additional information and for use in the BS4142 assessment. The measured noise levels are set out in full in Appendix A.
- 3.1.12 Attended noise monitoring allows observations and detailed notes to be made of the significant noise sources which contribute to each of the measured levels. The observations identified the following:

Road Traffic Noise: Noise from road traffic on St Mary's Road and the surrounding road network was audible throughout the site.

Electrical substation: Noise from the electrical substation located in close proximity to the north eastern corner of the site was audible throughout the monitoring at location 3.

Smith & Austin Engineering Products Ltd: Noise from the external plant at Smith and Austin Engineering Products which is located in close proximity to the north eastern

¹ A' Weighting An electronic filter in a sound level meter which mimics the human ear's response to sounds at different frequencies under defined conditions

² L_{eqs} Equivalent continuous noise level; the steady sound pressure which contains an equivalent quantity of sound energy as the time-varying sound pressure levels.

³ L_{90} The noise level which is exceeded for 90% of the measurement period.

⁴ L_{10} The noise level which is exceeded for 10% of the measurement period.

corner of the site was audible during the daytime monitoring at location 3. The plant is located on the rear of the premises approximately 2m off the ground.

Birdsong: Birdsong was audible during the daytime and night-time periods.

Other: Occasional aircraft noise was audible throughout the site. Some construction noise was also audible to the west of the site during the monitoring. No noise was audible from Hayling Island Holiday Park.

4 NOISE IMPACT ASSESSMENT

4.1 Existing Noise Levels

4.1.1 The measured noise levels for the monitoring locations have been divided into daytime (0700-2300 hours) and night-time (2300-0700 hours) categories. The individual levels have been arithmetically averaged and then rounded to give a single daytime and night-time level for each monitoring location.

4.1.2 In accordance with the shortened CRTN measurement procedures specified in CRTN, the measured daytime noise level at monitoring location 5 i.e. in the immediate vicinity of St Mary's Road, has been adjusted to predict the daytime level of road traffic noise at this location.

4.1.3 The results for the monitoring locations are presented in Table 1.

Table 1: Average Daytime and Night-time Noise Levels (Figures in dB)				
Time	Monitoring Location	Average Measured Noise Level L _{Aeq}		Lowest Measured Background Noise L _{A90}
0700-2300	1	46.0		39.9
2300-0700		-		-
0700-2300	2	46.7		39.0
2300-0700		41.6		31.1
0700-2300	3	48.0		42.8
2300-0700		45.2		36.7
0700-2300	4	44.1		35.2
2300-0700		40.6		35.3
0700-2300	5	CRTN	Measured	42.7
		50.1	52.8	
2300-0700		-		-

4.1.4 Based on the results obtained, a robust assessment can be made of the noise levels at the site and of the mitigation measures necessary to achieve the required internal daytime and night time noise levels, and external daytime noise levels at the development.

4.1.5 The maximum noise levels measured during the night-time period of the survey, at the monitoring locations, are shown in Table 2.

Table 2: Summary of the Maximum Night-time Noise Levels (Figures in dB L _{Amax})	
Monitoring Location	Maximum Measured Noise Level
2	59.7
3	69.4
4	63.4

4.2 WHO Assessment of Daytime Noise Levels in Outdoor Living Areas

4.2.1 Table 1 shows that during the daytime, noise levels affecting the development site would be between 44.1dB and 52.8dB L_{Aeq}. The WHO guidance level of 55dB L_{Aeq} will not be exceeded in outdoor living areas anywhere on the site, including the part of the site closest to St Mary's Road.

4.3 WHO Assessment of Daytime Noise Levels in Living Rooms

4.3.1 The measured daytime noise levels, as detailed in Table 1, have been used to determine the noise levels likely at the façades of properties in the vicinity of the monitoring locations during the daytime period.

4.3.2 Before internal noise levels can be calculated 3dB(A) must be added to the freefield measured levels to allow for the reflection of noise from the proposed housing façades when the buildings are in place.

4.3.3 The calculated noise levels at the facades of the properties, together with the level of attenuation required to achieve 35dB L_{Aeq} in the living room areas, are summarised in Table 3.

Table 3: Facade Noise Level at Properties in the Vicinity of the Monitoring Locations and Level of Attenuation Required to Achieve the Internal Daytime Noise Guideline Level (Figures in dB(A))		
Residential Properties	Noise Level at the Façade of the Property	Level of Attenuation Needed To Achieve Noise Guideline Level in Living Room Areas
Proposed dwellings in the northern part of the site, nearest to Hayling Island Holiday Park (monitoring location 1)	49.0	14.0

Proposed dwellings in the eastern and southern part of the site, nearest to St Mary's Road (monitoring location 2)	49.7	14.7
Proposed dwellings in the north eastern part of the site, nearest to the electrical substation & Smith and Austin Engineering products (monitoring location 3)	51.0	16.0

4.4 The facades of the buildings further into the site will be protected by the buildings themselves and/or screened by other buildings. It is considered that the noise levels at these facades, and therefore the level of attenuation the facades would need to provide, to achieve noise guidance levels in accordance with BS8233, will be less than those detailed in Table 3.

4.5 Assessment of Night-time Noise Levels in Bedrooms

4.5.1 The measured night-time noise levels, as detailed in Tables 1 and 2, have been used to determine the noise levels likely at the façades of properties in the vicinity of the monitoring locations, during the night-time period.

4.5.2 To be robust, the noise levels at these facades are based on the highest maximum noise levels measured during the night-time survey. Before internal noise levels can be calculated 3dB(A) must be added to the freefield measured levels to allow for the reflection of noise from the proposed housing facades when the buildings are in place.

4.5.3 The calculated noise levels at the façades of properties, together with the level of attenuation required to achieve 30dB L_{Aeq} and 45dB $L_{A_{f,max}}$ in the bedrooms, are summarised in Table 4.

Table 4: Facade Noise Level at Properties in the Vicinity of the Monitoring Locations and Level of Attenuation Required to Achieve the Internal Night-time Noise Guideline Levels (Figures in dB(A))			
Residential Properties	Noise Level at the Façade of the Property (L_{Aeq})	Maximum Noise Level at the Façade of the Property ($L_{A_{max}}$)	Level of Attenuation Needed To Achieve the Noise Guideline Levels in Bedrooms
Proposed dwellings in the eastern and southern part of the site, nearest to St Mary's Road (monitoring location 2)	44.6	62.7	17.7

Proposed dwellings in the north eastern part of the site, nearest to the electrical substation & Smith and Austin Engineering products (monitoring location 3)	48.2	72.4	27.4
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4.5.4 The facades of the buildings further into the site will be protected by the buildings themselves and/or screened by other buildings. It is considered that the noise levels at these facades, and therefore the level of attenuation the facades would need to provide, to achieve noise guidance levels in accordance with BS8233, will be less than those detailed in Table 4.

4.6 **BS4142 Assessment of Electrical Substation and Smith & Austin Engineering Products Ltd**

4.6.1 Observations made during the noise survey indicate that noise from the electrical substation and the external plant at Smith & Austin Engineering Products Ltd may affect proposed residential dwellings in the north eastern parts of the site closest to them.

Electrical Substation

4.6.2 The substation appeared to be active throughout the day and night. It was audible at the site boundary throughout the monitoring during the day and night. The sound level produced by the substation was constant.

4.6.3 BS4142 includes a section on identifying acoustic features which can increase the significance of impact over that expected from the basic comparison of the specific sound level and the background sound level. No acoustic features were identified for the substation and therefore no penalties have been added to the specific sound level.

4.6.4 The following measured noise from the substation has been used for the specific noise level in the BS4142 assessment. Due to the constant nature of the noise produced by the substation, the lowest level recorded at location 3 has been used to best represent the noise produced solely by the substation.

4.6.5 Monitoring Location 3: The measured noise level over the period 0457 and 0458 hours (14/09/2016) is considered representative of the noise from the substation. For the purpose of the assessment the daytime and night-time noise level (L_{Aeq}), of 36.8dB, has been used and is shown in Table 5.

- 4.6.6 The noise levels measured during the following periods are considered to be representative of the background noise level in the western part of the site, (i.e. in the absence of any noise from the substation):
- 4.6.7 Daytime Period: Over the period 2200 to 2300 hours (13/09/2016) at Monitoring Location 4. For the purpose of the assessment the daytime background noise level (L_{A90}), of 35.2dB, has been used. This is considered representative of the daytime background noise level at location 3 without noise from the substation.
- 4.6.8 Night-time period: Over the period 2345 to 0000 hours (13/09/2016) at Monitoring Location 4. For the purpose of the assessment the night time background noise level (L_{A90}), of 35.3dB, has been used. This is considered representative of the night time background noise level at location 3 without noise from the substation.
- 4.6.9 In accordance with BS4142 the specific noise level in the vicinity of the proposed dwellings within the site has been compared with the corresponding measured background noise level, as shown in Table 5.

Table 5: BS4142 Assessment of the Electrical Substation at Proposed Dwellings in the north eastern Part of the Site– (Figures in dB(A))		
	Daytime	Night-time
Specific Noise i.e. noise level of the operational activities (including distance)	36.8	36.8
Acoustic Feature Correction	0	0
Rating Level	36.8	36.8
Background Noise Level	35.2	35.3
Excess of rating over background level	+1.6	+1.5

- 4.6.10 The result of the BS4142 assessment in Table 5 suggests that with no mitigation in-place, an adverse impact due to noise from the substation station is unlikely.

4.6.11 No mitigation has therefore been recommended to attenuate noise from the electrical substation.

Smith & Austin Engineering Products Ltd

4.6.12 The only noise audible from Smith and Austin Engineering Products during the survey was the external plant located at the back of the premises. The plant appeared to be active throughout the opening hours of the premises. It was audible at the site boundary throughout the monitoring during the premises' opening hours. As the plant was only active during daytime hours, the noise impact of the plant during the night-time will not be considered. The sound level produced by the plant was constant.

4.6.13 BS4142 includes a section on identifying acoustic features which can increase the significance of impact over that expected from the basic comparison of the specific sound level and the background sound level. No acoustic features were identified for the plant and therefore no penalties have been added to the specific sound level.

4.6.14 The following measured noise from the plant has been used for the specific noise level in the BS4142 assessment.

4.6.15 Monitoring Location 3: The measured noise level over the period 1200 and 1201 hours (14/09/2016) is considered representative of the noise from the plant. For the purpose of the assessment the daytime noise level (L_{Aeq}), of 51.2dB, has been used and is shown in Table 6.

4.6.16 The noise levels measured during the following periods are considered to be representative of the background noise levels during the opening hours of the premises in the north eastern part of the site, in the absence of any noise from the plant:

4.6.17 Daytime Period: Over the period 0846 to 0917 hours (14/09/2016) at Monitoring Location 2. For the purpose of the assessment the daytime background noise level (L_{A90}), of 39.0dB, has been used. This is considered representative of the background noise levels during the opening hours of the premises at location 3 without noise from the plant.

4.6.18 In accordance with BS4142 the specific noise level in the vicinity of the proposed dwellings within the site has been compared with the corresponding measured background noise level, as shown in Table 6.

Table 6: BS4142 Assessment of the Extraction fan at Proposed Dwellings in the north eastern Part of the Site– (Figures in dB(A))	
	Daytime
Specific Noise i.e. noise level of the operational activities (including distance)	51.2
Acoustic Feature Correction	0
Rating Level	51.2
Background Noise Level	39.0
Excess of rating over background level	+12.2

4.6.19 The result of the BS4142 assessment in Table 6 suggests that with no mitigation in-place, a significant adverse impact due to noise from the plant may be likely during the daytime.

4.6.20 Mitigation measures should be implemented to reduce noise from the plant at Smith & Austin Engineering Products Ltd by at least 12.2dB at proposed dwellings in the north eastern part of the site nearest to the premises. These measures are discussed in section 5 of this report.

5 NOISE ATTENUATION SCHEME

5.1 Introduction

5.1.1 The results of the noise assessment, for the proposed residential areas of the development, indicate that noise mitigation measures are required to reduce the noise impact from St Mary's Road and the external plant at Smith & Austin Engineering Products Ltd to an acceptable level at the proposed dwellings in the parts of the site closest to them.

5.1.2 No mitigation is considered necessary to attenuate noise from the electrical substation and Hayling Island Holiday Park.

5.2 Daytime Noise Levels in Outdoor Living Areas

5.2.1 The measured noise levels, as detailed in Table 1 of the report indicate that outdoor living areas throughout the site will achieve outdoor daytime noise guidance levels of less than 55dB L_{Aeq} . However, the BS4142 assessment has also shown that a significant adverse impact is likely in parts of the site closest to the external plant at Smith & Austin Engineering products Ltd without mitigation in place.

5.2.2 To further mitigate noise levels in outdoor living areas located closest to, and with a direct line of sight of the plant at Smith & Austin Engineering products Ltd, gardens can be located on the screened sides of dwellings, i.e. not located with a direct line of sight to the plant. Alternatively if gardens are positioned facing the plant the required noise levels could be achieved with close boarded fencing (or fence and bund combinations) of approximately the following heights:

- North eastern part of the site adjacent to Smith & Austin Engineering products Ltd – 1.8m.

5.2.3 The final height of the required fence would depend on the final location of the outdoor living areas the location of the barrier relative to the plant and proposed receptors.

5.2.4 Properties further into the site will be screened by the proposed residential buildings themselves and would therefore be likely to achieve the required daytime noise levels without further mitigation.

5.3 Glazing Requirements of Proposed Development

5.3.1 In the absence of design details for the building facades, it has been assumed that the glazing to noise sensitive rooms would comprise about 25% of the facade area. To

calculate the overall attenuation provided by this percentage of glazing in a brick or block facade, a non-uniform partition calculation can be used.

- 5.3.2 The calculation combines the different degrees of attenuation of the wall element and the window element. A facade element comprising a solid brick or blockwork, will attenuate by 45-50dB (British Standard 8233: "Sound insulation and noise reduction for buildings – Code of practice" 1999) whereas standard double glazing will attenuate road traffic noise by 26-29dB(A) (BRE Digest 379 "Double glazing for heat and sound insulation"). The overall noise attenuation provided by this combination is, therefore, between 31.9dB(A) and 34.9dB(A).

Noise Sensitive Rooms during the Daytime

- 5.3.3 The noise attenuation requirements during the daytime for proposed noise sensitive rooms nearest to existing noise sources are summarised in Table 3 and 6. The requirements indicate that standard thermal double glazing should ensure that internal noise levels are met with the windows closed.
- 5.3.4 With windows open, the attenuation provided by the façade will be approximately 15dB(A). This would potentially allow the recommended internal noise limit to be exceeded in some noise sensitive rooms during the daytime in the north eastern parts of the site nearest to the electrical substation and Smith & Austin Engineering Products Ltd.
- 5.3.5 Some form of acoustic ventilation would therefore need to be installed in some of the noise sensitive rooms. Alternatively, to meet the required noise levels, noise sensitive rooms could be located on the screened side of the proposed buildings, away from the noise source.
- 5.3.6 It is considered that proposed dwellings further into the site will be protected by the buildings themselves and/or screened by other buildings, from the main sources of noise. These façades are likely to achieve the recommended noise guidance levels, even with windows open.
- 5.3.7 Glazing and ventilation requirements can be confirmed, on a plot by plot basis, at the reserved matters stage.

Noise Sensitive Bedrooms during the Night-Time

- 5.3.8 The noise attenuation requirements during the night-time for proposed noise sensitive bedrooms nearest to existing noise sources are summarised in Table 4 and

5. The requirements indicate that standard thermal double glazing should ensure that internal noise levels are met with the windows closed.

- 5.3.9 With windows open, the attenuation provided by the façade will be approximately 15dB(A). This would potentially allow the recommended internal noise limit to be exceeded in some bedrooms during the night time in the eastern parts of the site nearest to St Mary's Road and Smith & Austin Engineering Products Ltd.
- 5.3.10 Some form of acoustic ventilation would therefore need to be installed in some of the bedrooms. Alternatively, to meet the required noise levels, bedrooms could be located on the screened side of the proposed buildings, away from the noise source.
- 5.3.11 It is considered that proposed dwellings further into the site will be protected by the buildings themselves and/or screened by other buildings, from the main sources of noise. These façades are likely to achieve the recommended noise guidance levels, even with windows open.
- 5.3.12 Glazing and ventilation requirements can be confirmed, on a plot by plot basis, at the reserved matters stage.

5.4 Acoustic Ventilation Requirements

- 5.4.1 It is recommended that the acoustic ventilation proposed at the site should, as a minimum, comply with Building Regulations 2000 Approved Document F1 Means of Ventilation and British Standard BS5925 1991: "Code of Practice for Ventilation Principles and Designing for Natural Ventilation". Acoustic ventilation is only recommended for noise sensitive rooms, which are bedrooms and living rooms.
- 5.4.2 The implementation of the recommended glazing together with appropriate acoustic ventilation should ensure that the required internal daytime and night-time noise limits are achieved.
- 5.4.3 The façades of some of the properties further into the site will be protected by the buildings themselves and/or screened by other buildings. Therefore, acoustic ventilation may not be required for these plots. The requirement for acoustic ventilation can be confirmed on a plot by plot basis, before commencement of the development.

6 CONCLUSIONS

- 6.1.1 The dominant noise sources at the proposed development is road traffic on St Mary's Road and the surrounding road network and noise from the external plant at Smith & Austin Engineering Products Ltd. Due to the very low noise levels observed from the electrical substation and Hayling Island Holiday Park, these are not considered to be a problem for the proposed development.
- 6.1.2 The noise levels have been assessed using guideline values suggested by the World Health Organisation and BS8233. It should be noted that the internal guideline values are health-based and are therefore relatively inflexible; however adequate noise mitigation is relatively straightforward to engineer.
- 6.1.3 The results of the noise survey and assessment indicate that to achieve the guideline value of 55dBLAeq (16 Hour) in outdoor living areas, acoustic mitigation will be required for those areas located nearest to, and with a direct line of sight to the external plant at Smith & Austin Engineering Products Ltd.
- 6.1.4 This mitigation could include locating gardens on the screened sides of dwellings, i.e. not located with a direct line of sight to the plant. Alternatively if gardens are positioned facing the plant, guidance noise levels could be achieved with close boarded fencing (or a bund and fence combination) of approximately the following heights:
- North eastern part of the site adjacent to the plant – 1.8m.
- 6.1.5 The final height of the required fence would depend on its chosen position relative to the noise source.
- 6.1.6 Properties further into the site will be screened by the proposed residential buildings themselves and would therefore be likely to achieve the required outdoor daytime noise levels.
- 6.1.7 In living and bedrooms rooms across the site, standard thermal double glazing should ensure that required internal noise levels are met with the windows closed.
- 6.1.8 With windows open there is potential for recommended internal noise limits to be exceeded in some living rooms in the north east of the site during the daytime and bedrooms in the eastern parts of the site due to noise from St Marys' Road and the external plant at Smith & Austin Engineering Products Ltd. Some form of acoustic ventilation would therefore need to be installed in some of the rooms. Alternatively,

to meet the required noise levels, these rooms could be located on the screened side of the proposed buildings, away from the road noise.

- 6.1.9 The implementation of the recommended glazing together with appropriate acoustic ventilation should ensure that the required internal daytime and night-time noise limits are achieved.
- 6.1.10 Proposed dwellings further into the site will be protected by the buildings themselves and/or screened by other buildings, from the main sources of noise. It is therefore likely that standard thermal double glazing, even with windows open will be adequate for these dwellings.
- 6.1.11 Noise mitigation measures, including glazing requirements for bedroom and living room areas will be confirmed, on a plot by plot basis, at the reserved matters stage. Requirements for acoustic ventilation will also be confirmed.

APPENDICES

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Appendix A

Noise monitoring results

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Appendix A

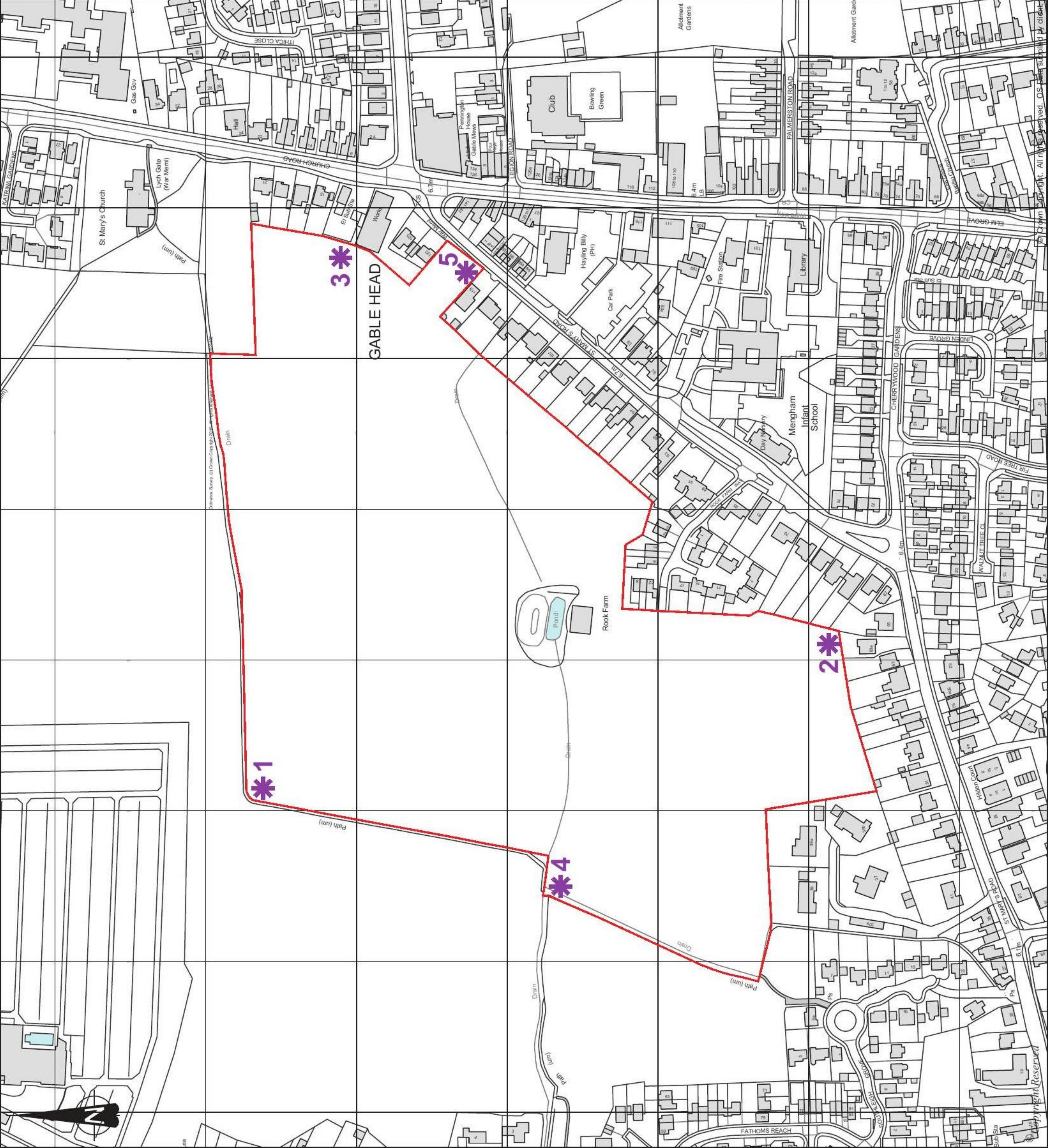
Noise Monitoring Results

Monitoring Location 1 – Adjacent to north western corner of site boundary nearest to Hayling Island Holiday Park						
Time	L _{Aeq} (dB)	L _A min (dB)	L _A max (dB)	L _{A90} (dB)	L _{A10} (dB)	Comments
14/09/2016 - Daytime						
0737-0808	43.2	38.3	58.6	39.9	44.1	Constant distant traffic noise. Occasional aircraft. Birdsong. Pedestrians and dogs passing near to meter. 0823 – motorbikes on St Mary’s Road
0922-0953	48.7	38.5	69.8	41.0	48.5	Constant distant traffic noise. Occasional aircraft. Birdsong. Pedestrians and dogs passing near to meter. 0925-0927 – dog barking near to meter 0930 onwards – Construction noise west of site
Monitoring Location 2 –Adjacent to southern site boundary nearest to St Mary’s Road						
Time	L _{Aeq} (dB)	L _A min (dB)	L _A max (dB)	L _{A90} (dB)	L _{A10} (dB)	Comments
14/09/2016 – Night-time						
0514-0529	35.8	29.0	47.4	31.1	38.3	Occasional vehicle on St Mary’s Road
0529-0544	38.1	28.1	49.0	31.8	40.8	
0630-0645	45.7	38.7	59.7	41.5	48.3	Intermittent traffic on St Mary’s Road. Occasional aircraft. Birdsong.
0645-0700	46.6	40.0	55.5	42.9	48.8	
14/09/2016 – Daytime						
0700-0730	46.9	40.7	58.8	43.6	48.6	Constant traffic noise on St Mary’s Road. Occasional aircraft. Birdsong 0914-police siren
0846-0917	46.5	35.5	62.3	39.0	49.2	
Monitoring Location 3 – Adjacent to eastern site boundary, adjacent to electrical substation and Smith and Austin Engineering Products Ltd						
Time	L _{Aeq} (dB)	L _A min (dB)	L _A max (dB)	L _{A90} (dB)	L _{A10} (dB)	Comments
14/09/2016 – Night-time						
0451-0507	41.1	36.3	56.1	36.7	43.6	Occasional vehicle on St Mary’s Road. Noise from electrical substation.
0550-0605	45.8	37.5	62.1	39.4	48.3	
0605-0620	48.7	38.5	69.4	40.5	48.9	
14/09/2016 - Daytime						
1000-1100	49.1	41.1	67.1	44.1	50.2	Intermittent traffic on St Mary’s Road. Constant noise from electrical substation. Occasional aircraft. Birdsong.
1100-1200	47.0	39.3	65.2	42.8	49.0	
Electrical substation specific noise – Approximately 1m from electrical substation boundary						
Smith and Austin Engineering Products Ltd – Approximately 2m from external plant specific noise						
1200-1201	51.2	50.7	52.5	50.7	51.4	External fan noise

Monitoring Location 4 – Adjacent to western site boundary, distant from main noise sources (background noise)						
Time	L _{Aeq} (dB)	L _A min (dB)	L _A max (dB)	L _{A90} (dB)	L _{A10} (dB)	Comments
13/09/2016 - Daytime						
1422-1522	50.4	41.2	67.3	45.2	52.1	Intermittent distant traffic noise. Occasional aircraft noise. Birdsong. 1456-dog bark
2200-2300	37.8	32.0	44.3	35.2	39.6	Occasional distant traffic noise. Occasional aircraft noise. Birdsong
13/09/2016 – Night-time						
2300-2315	45.1	34.8	63.4	36.4	44.9	Occasional distant traffic noise. Occasional aircraft noise. Birdsong 2305 - motorbikes
2315-2330	40.1	36.1	44.2	38.1	41.5	
2330-2345	39.4	35.7	42.9	37.3	40.9	
2345-0000	37.7	33.1	42.0	35.3	39.3	
Monitoring Location 5 – Adjacent to eastern site boundary, approximately 10m from St Mary’s Road						
Time	L _{Aeq} (dB)	L _A min (dB)	L _A max (dB)	L _{A90} (dB)	L _{A10} (dB)	Comments
20/07/2016 - Daytime						
0814-0845	55.2	36.7	82.3	43.3	55.6	Constant traffic noise. Occasional aircraft. Birdsong. 0818-motorbike
1202-1302	54.3	34.6	83.8	42.8	54.5	Constant traffic noise. Occasional aircraft. Birdsong. 1206-motorbike 1246-motorbike 1349-dog bark 1417-shouting 1421-motorbike
1302-1402	50.5	35.8	71.8	42.7	53.4	
1402-1502	51.2	39.0	71.8	44.4	54.0	

DRAWINGS

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DO NOT SCALE FROM THIS DRAWING

REFERENCE

Site boundary_---_

Noise monitoring location_---_*

REVISION

DETAILS

DATE

DRN

CHK'D

APP'D

CLIENT

GLADMAN DEVELOPMENTS Ltd.

PROJECT

St. MARY'S ROAD,
HAYLING ISLAND

DRAWING TITLE

NOISE MONITORING LOCATION POINTS

DRG No.

LE13606-001

REV

DRG SIZE

A3

SCALE

1:2500

DATE

15/09/16

DRAWN BY

RJH

CHECKED BY

RP

APPROVED BY

JLH

☒ CARDIFF

☐ BIRMINGHAM

☐ GLASGOW

☐ NEWCASTLE UPON TYNE

☐ CARLISLE

☐ CROYDON

☐ LEIGH

☐ SHEFFIELD

☐ EDINBURGH

☐ LONDON

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