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GLADMAN DEVELOPMENTS LTD

LAND EAST OF DOVER ROAD, DEAL

NOISE ASSESSMENT

APRIL 2017

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GLADMAN DEVELOPMENTS LTD

Land East of Dover Road, Deal

Noise Assessment

April 2017

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CONTENTS

APPENDICES

DRAWINGS

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1 INTRODUCTION

1.1.1 By instruction dated 14th December 2016 from Mr Phil Gallagher of Gladman Developments Limited, Wardell Armstrong LLP was commissioned to undertake a noise impact assessment for a proposed residential development at Land east of Dover Road, Deal, Kent.

1.1.2 The proposed development site is located on Dover Road to the south of Deal. The site currently comprises open fields and woodland. To the north the site is bordered by residential properties. To the east the site is bordered by trees with open fields beyond. To the south the site is bordered by the Walmer Court Farm, which includes the premises of The Kingsdown Water Company, that produces bottled water. To the west is Dover Road, with residential properties and open farm land beyond.

1.1.3 The proposed development is residential in nature and is approximately 4.06h in area. It will comprise of up to 85 dwellings and associated infrastructure. The location of the site is shown on drawing number LE13821-001

1.1.4 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 METHODOLODGY

2.1 Consultation and Scope of Works

2.1.1 At the time of writing there has been no consultation with the environmental health officer at Dover District Council to discuss the noise assessment methodology.

2.1.2 However, the methodology adopted is based upon our experience of other similar developments and includes consideration of noise at the sensitive areas of the proposed development, i.e. proposed residential areas, specifically in terms of the potential impact of road traffic noise and noise from the Kingsdown Water Company and the Walmer Court farm shop.

2.1.3 The noise assessment takes into account current guidance including the following:

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

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

- Noise from road traffic on Dover Road and the surrounding road network; and,
- Industrial noise from The Kingsdown Water Company and the Walmer Court farm shop to the south of the development site.

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 ambient and background noise levels at proposed receptor locations. The noise survey is discussed in greater detail in Chapter 3 of this report.

2.3 Guidance

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 With regard to 'adverse impacts' the NPPF refers to the 'Noise 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 The first aim of the NPSE states that significant adverse effects on health and quality of life should be avoided. The second aim refers to the situation where the impact lies somewhere between LOAEL and SOAEL, and it requires that all reasonable steps are taken to mitigate and minimise the adverse effects of noise. However, this does not mean that such adverse effects cannot occur.

2.3.4 The Planning Practice Guidance (PPG) provides further detail about how the effect levels can be recognised. Above the NOEL noise becomes noticeable, however it has no adverse effect as it does not cause any change in behaviour or attitude. Once noise crosses the LOAEL threshold it begins to have an adverse effect and consideration needs to be given to mitigating and minimising those effects, taking account of the economic and social benefits being derived from the activity causing the noise. Increasing noise exposure further might cause the SOAEL threshold to be crossed. If the exposure is above this level the planning process should be used to avoid the effect occurring by use of appropriate mitigation such as by altering the design and layout. Such decisions must be made taking account of the economic and social benefit of the activity causing the noise, but it is undesirable for such exposure to be caused. At the highest extreme the situation should be prevented from occurring regardless of the benefits which might arise. Table 1 summarises the noise exposure hierarchy.

Table 1 National Planning Practice Guidance noise exposure hierarchy

Perception	Examples of Outcomes	Increasing Effect Level	Action
Not noticeable	No Effect	No Observed Effect	No specific measures required
Noticeable and not intrusive	Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required

Table 1 National Planning Practice Guidance noise exposure hierarchy (continued)			
Perception	**Perception**	**Perception**	**Perception**
		Lowest Observed Adverse Effect Level	
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
		Significant Observed Adverse Effect Level	
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

2.3.5 The Noise Policy Statement for England refers to the World Health Organisation (WHO) when discussing noise impacts. The WHO Guidelines for Community Noise 1999 suggest guideline values for internal noise exposure which take into consideration the identified health effects and are set, based on the lowest effect levels for general populations. Guideline values for annoyance which relate to external noise exposure are set at 50 or 55 dB(A), representing day time levels below which a majority of the adult population will be protected from becoming moderately or seriously annoyed respectively. The following guideline values are suggested by WHO:

- 35 dB $L_{Aeq\ (16\ hour)}$ during the day time in noise sensitive rooms
- 30 dB $L_{Aeq\ (8\ hour)}$ during the night time in bedrooms
- 45 dB $L_{Af,Max}$ during the night time in bedrooms
- 50 dB $L_{Aeq\ (16\ hour)}$ to protect majority of population from becoming moderately annoyed
- 55 dB$L_{Aeq\ (16\ hour)}$ to protect majority of population from becoming seriously annoyed

2.3.6 British Standard 8233 "Guidance on sound insulation and noise reduction for buildings" 2014 bases its advice on the WHO Guidelines. In addition, for internal noise levels it states;

"Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved."

2.3.7 Furthermore, with regard to external noise, the Standard states;

"For traditional external areas that are used for amenity space such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB $L_{Aeq.\ T}$ with an upper guidance value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognised that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to

ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited".

2.3.8 The PPG summarises the approach to be taken when assessing noise. It accepts that noise can override other planning concerns, but states:

"Neither the Noise Policy Statement for England nor the National Planning Policy Framework (which reflects the Noise Policy Statement) expects noise to be considered in isolation, separate from the economic, social and other environmental dimensions of proposed development".

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 Kingsdown Water Company premises. 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.

3 NOISE SURVEY

3.1.1 On the 25th and 26th January 2017, Wardell Armstrong LLP carried out a survey to assess existing ambient and background noise levels across the development site.

3.1.2 Noise measurements were taken at three monitoring locations; considered to be representative of proposed sensitive receptors. The monitoring locations are as follows; and are shown on drawing LE13821-001:

- Monitoring Location 1: In the north western part of the site approximately 10m from Dover Road. This location was selected to be representative of proposed dwellings across the northern and western part of the site, closest to and with a direct line of sight of Dover Road.
- Monitoring Location 2: In the southern part of the site 50m from the Kingsdown Water Company boundary; this location was selected to be representative of proposed dwellings closest to The Kingsdown Water Company.
- Monitoring Location 3: In the eastern part of the site, 5 metres from the wooded area and approximately 50 metres from the eastern boundary. This location was selected to be representative of the proposed residential dwellings in the eastern part of the site, and the background sound level at proposed receptors.

3.1.3 Attended noise monitoring was carried out between 0500 and 1435 hours, on the 25th January 2017. Both daytime and night-time measurements were taken at ML1 and ML2 since these are the proposed receptors that will be the closest to the sources of noise. Measurements were taken at ML3 to obtain background noise levels where the industrial noise was not present. These measurements will be used to assess industrial noise.

3.1.4 The noise measurements were made using a Type 1, integrating sound level meter. The meter was mounted on a tripod 1.5m above the ground and more than 3.5 metres from any other reflecting surfaces. 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 greater than 0.5dB in the calibration during the survey was noted.

3.1.5 On the 25th January 2017 the weather conditions were as follows;

- 1 ˚C;
- Fog
- Cloudy

- Winds approximately 1m/s

3.1.6 On the 26th January 2017 the weather conditions were as follows;

- -2 ˚C
- Winds ranging 3-3.5m/s
- Clear sky

3.1.7 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.

3.1.8 A-weighted[1] L_{eqs}[2] were measured in accordance with the requirements of BS8233. The maximum and minimum sound pressure levels, A-weighted L_{90s}[3] and A-weighted L_{10s}[4] were also measured to provide additional information. The measured noise levels are set out in full in Appendix A.

3.1.9 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 significant noise sources at the site to be as follows:

Road Traffic: Noise from road traffic along Dover Road and the surrounding local road network was audible at all locations throughout the survey. An increase in the level of road traffic noise was noted during the day-time period.

Industrial Noise: Various industrial noise sources from The Kingsdown Water Company were intermittently audible at monitoring location 2, including;

- Customer vehicles; and,
- fork lift truck; and,
- Handing of bottles.

Birdsong: Birdsong was occasionally audible at all locations during the daytime and night-time period.

Other sources: Low level noise was occasionally audible from aircraft passing overhead. Additional noise was also audible from horses and pedestrians.

[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.

4 NOISE IMPACT ASSESSMENT

4.1 Existing Noise Levels

4.1.1 The measured noise levels at all monitoring locations have been divided into daytime (0700-2300 hours), and where applicable, night-time (2300-0700 hours) have been arithmetically averaged to give a single level for each location.

4.1.2 Noise monitoring was carried out at location 3, away from significant noise sources to provide indication of the noise levels in the eastern part of the site, and to establish a robust background noise level against which assessment of the industrial noise from the water company has been made.

4.1.3 The results for each of the monitoring locations are presented in Table 2.

Table 2: Average Daytime and Night-time Noise Levels (Figures in dB L_{Aeq})

Time	Monitoring Location	Average Measured Noise Level
2300-0700	1	62
0700-2300		68
2300-0700	2	47
0700-2300		50
0700-2300	3	40

4.1.4 The maximum noise level measured during the night-time period of the survey, at monitoring locations 1 and 2, is detailed in Table 3.

Table 3: Summary of the Maximum Night-time Noise Levels (Figures in dB L_{Amax})

Monitoring Location	Maximum Measured Noise Levels
1	85
2	61

4.2 WHO Assessment of Daytime Noise Levels in Outdoor Living Areas

4.2.1 Table 2 shows that during the daytime, noise levels affecting the development site at monitoring locations 2 and 3 in the southern and eastern parts of the site are between 40dB L_{Aeq} and 50dBL_{Aeq}, which are below the guidance noise levels in WHO for outdoor living areas. The noise level measured at monitoring location 1, in the western part of the site closest to Dover Road is 68dB L_{Aeq} during the daytime, which exceeds the upper guidance noise level in WHO of 55dB L_{Aeq} for outdoor living areas.

4.2.2 Mitigation measures will therefore be required to ensure that guidance noise levels in gardens of proposed dwellings are met in the western part of the site closest to and in direct sight of Dover Road.

4.3 Assessment of Daytime Noise Levels in Living Rooms and Bedrooms

4.3.1 The daytime noise levels in noise sensitive rooms of the proposed dwellings have been assessed in accordance with WHO and BS8233 guideline noise levels for living room and bedroom areas. The guideline daytime noise level within living rooms and bedrooms is 35 dB $L_{Aeq\ (16hr)}$.

4.3.2 The measured daytime noise levels have been used to determine the noise levels likely at the facades of the properties in the vicinity of the proposed noise sensitive parts of the development, during the daytime period.

4.3.3 Before internal noise levels can be calculated 3dB(A) must be added to the free-field measured levels to allow for the reflection of noise from the proposed housing facades when the buildings are in place.

4.3.4 The calculated noise levels at the façades of the proposed dwellings, together with the level of attenuation required to achieve 35dB $L_{Aeq\ (16hr)}$ in living rooms and bedrooms is summarised in Table 4.

Table 4: Façade Noise Level at Properties in the Vicinity of the Monitoring Locations and Level of Attenuation Required to Achieve the Internal Daytime Guidance Noise Level (Figures in dB(A))

Properties	Noise Level at the Façade of the Property dB(L_{Aeq})	Level of Attenuation Needed to Achieve Guidance Noise Level in Living Rooms and Bedrooms dB(A)
Proposed dwellings in the northern and western part of the site, nearest to Dover Road (Monitoring Location 1).	71	36
Proposed dwellings in the southern part of the site closest to Kingsdown Water Company (Monitoring Location 2).	53	18

4.3.5 The facades of the buildings further into the site will be protected by the buildings themselves and/or be 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 attenuate, to achieve recommended guideline noise values, will be less than those detailed in Table 4.

4.4 Assessment of Night-time Noise Levels in Bedrooms

4.4.1 The guideline noise level within bedroom areas is 30 dB $L_{Aeq\ (8hr)}$. In addition, individual noise events should not normally exceed 45dB L_{Afmax}.

4.4.2 The measured night time noise levels have been used to determine the noise levels likely at the facades of the properties in the vicinity of the proposed noise sensitive parts of the development, during the night time period.

4.4.3 Before internal noise levels can be calculated, 3dB(A) must be added to the free-field measured levels to allow for the reflection of noise from the proposed housing facades when the buildings are in place.

4.4.4 The calculated noise levels at the façades of the dwellings, together with the level of attenuation required to achieve 30dB L_{Aeq} and 45dB L_{Amax} in the bedrooms, are summarised in Table 5.

Table 5: Façade Noise Level at Properties in the Vicinity of the Monitoring Locations and Level of Attenuation Required to Achieve the Internal Night-time Guidance Noise Level (Figures in dB(A))

Property	Noise Level at the Façade of the Property (dB L_{Aeq})	Maximum Noise Level at the Façade of the Property (dB L_{Amax})	Level of Attenuation Needed to Achieve the Noise Limits in Bedrooms (dB(A))
Proposed dwellings in the northern and western part of the site, nearest to Dover Road (Monitoring Location 1).	65	88	43
Proposed dwelling in the south part of the site, nearest and closest to The Kingsdown Water Company (Monitoring Location 2).	53	64	23

4.4.5 The facades of dwellings facing into the site will be protected by the building itself and/or be 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 the 30dB L_{Aeq} and 45dB L_{Amax} in the bedrooms will be less than those detailed in Table 5.

4.5 Industrial Noise Assessment

4.5.1 Industrial noise was found to be audible in the southern part of the site nearest to the Kingsdown Water Company during the day time.

4.5.2 Therefore, an industrial noise assessment has been carried out in accordance with BS4142 to assess the impact of noise from The Kingsdown Water Company on proposed sensitive receptors. The main source of noise was observed to be the unloading or handling of stock, in this case, glass bottles. There was also additional noise from forklift truck movements.

4.5.3 Furthermore, no noise of a similar industrial nature was identified from the source premises during the site monitoring prior to 0700 hours i.e during the night time period.

4.5.4 Consultation with The Kingsdown Water Company revealed that the operation hours are between 0700-1700 hours. The Company also stated that there were three HGV deliveries per week and approximately three LGV deliveries per day.

4.5.5 These details are a clear indication that the Kingsdown Water Company premises operates solely during the daytime period and this assumption has been adopted for the purposes of this assessment. Therefore, a night-time BS4142 assessment has not been carried out.

Identification of the Specific Noise

4.5.6 An assessment of the noise level at monitoring location 2, measured between 0700 and 1300 hours has been carried out. It was found that, when activity was taking place, noise from the handling of bottles was dominant. A forklift was noted to be audible at the monitoring location intermittently throughout the day, therefore noise from this has also been assessed. Using computer software, it has been possible to extract the relevant specific noise levels from the operations at The Kingsdown Water Company from other, ambient noise sources.

4.5.7 The specific noise levels identified have been used in the BS4142 assessment and are as follows:

- Handling of bottles 47dB(A)
- Forklift Operation (beeps) 47dB(A)

On-time correction

4.5.8 Observations made during the noise monitoring showed that the noise from the handling of glass bottles occurred only for short periods of time. It is therefore reasonable to estimate that the noise typically occurs for approximately 20 seconds in any one-hour period during the daytime. To account for this, 23dB(A) has been subtracted from the specific noise level to allow for the limited period during which the noise occurs.

4.5.9 Observations made during the noise monitoring showed that the noise of the forklift truck occurred approximately for half of the time throughout the day. It is reasonable to estimate that the noise of the forklift typically occurs for 30 minutes in any one hour during the day time. Therefore, 3dB(A) has been subtracted from the specific noise to allow for the intermittent forklift activity.

Application of a Rating Penalty

4.5.10 The specific noise of the glass bottles and forklift is considered to be intermittent in a manner which is readily distinctive against the residual acoustic environment. Therefore, in accordance with BS4142 a 3dB penalty has been added to the noise levels for assessment purposes.

4.5.11 The specific noise of the glass bottles is considered to be impulsive considering both the rapidity of the change in sound and the overall change in sound level. Therefore, in accordance BS4142 a 6dB penalty has been added to the noise level of bottle handling for assessment purposes.

Identification of the Background Noise

4.5.12 For the purpose of the assessment the daytime background noise level, measured at monitoring location 3, will be used. The background noise level was found to be 37dB L_{A90} measured over the period 1315 to 1415 hours. This measurement excludes any period when industrial noise was present. This is considered to be representative of the $L_{A90,1hour}$ background noise level during the day time in the eastern part of the site.

4.5.13 In accordance with BS4142, the noise rating level from activities at the Kingsdown Water Company, in the vicinity of the closest proposed dwellings in the southern part of the site, has been compared with the corresponding measured background noise level. A summary of the assessment is shown in Table 6.

Table 6: BS4142 Assessment of Industrial Operations at Proposed Dwellings in the Southern Part of the Site During the Daytime– (Figures in dB(A))

Description	Glass Bottles	Forklift
Specific Noise i.e. noise level of the operational activities (on-time correction), dB L_{Aeq}	24	44
Intermittency Correction, dB	+3	+3
Impulsive Correction dB	+6	0
Rating Level, dB	33	47
Background Noise Level (dB L_{A90})	37	37
Excess of rating over background level, dB	-4	+10

4.5.14 The result of the BS4142 assessment indicates that glass bottle handling noise is 4dB below the rating level. The forklift noise is 10 dB above the rating level.

4.5.15 In accordance with BS4142, the noise associated with the handling of glass bottles at proposed sensitive receptors was found to have a '**Low Impa**ct' and, the noise associated from the forklift at proposed sensitive receptors was found to have a '**Significant Adverse'** impact. However, this depends on the context.

4.6 BS4142 Context Assessment

4.6.1 BS4142:2014 States; *"The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound sources exceeds the background sound level and the context in which the sound occurs"*.

4.6.2 The first requirement of this statement has been determined within the noise impact assessment section above. To determine the context in which the proposed industrial sound will reside, three factors must be considered, these are;

- The absolute level of sound;
- The character and level of the residual sound compared to the character and level of the specific sounds and,
- The sensitivity of the receptor.

Absolute level of Sound

4.6.3 The impact of a given difference between rating level and background noise level will depend upon whether the residual sound level is low or high.

4.6.4 In order to assess the Industrial noise in the context of its environment and that of each of the existing sensitive receptors the sound levels from the industrial noise have been compared to the existing ambient level.

4.6.5 The results for each existing receptor location for daytime are detailed within Table 7.

Table 7: Context Assessment at Existing Sensitive Receptors –The Kingsdown Water Company- Daytime Operation Between 0700 and 1700 hours Figures in dB L_{Aeq}

Receptor	Glass Bottles	Forklift
Specific Noise levels	47	47
Residual Noise Level	50	50
Total absolute level of sound i.e. Existing sound level plus industrial noise	52	52
Difference between existing ambient sound levels and specific sound levels	+2	+2

4.6.6 The noise likely to be generated by glass bottle handling and the forklift movements during the daytime is, -3dB below the existing ambient noise levels at the nearby sensitive receptors. Therefore, the total absolute level would be 2dB above the existing ambient level at the receptor location.

Character and Level of Residual Sound Compared with the Specific Sound

4.6.7 The existing sensitive receptors are near to Dover road and so it is dominated by road traffic noise containing a lot of low-mid frequencies. There is also additional low frequency noise from aircraft.

4.6.8 In contrast, the noise associated with the forklift is high in frequency. And, the noise associated with the bottles is also high and broad in frequency. Therefore, both glass bottle and forklift truck noise is likely to be distinguishable in the overall ambient level at the proposed receptor and could have more impact.

Sensitivity of Receptor and Existing Acoustic Conditions

4.6.9 Residential receptors are generally considered are sensitive in nature however, the installation of appropriate glazing and ventilation should ensure that internal levels are within the guideline values recommended by WHO and BS8233 for noise sensitive rooms. Outdoor living areas are expected to be below the WHO upper guidance value in the south of the site away from Dover Road.

Summary of the Site Context

When considering the site context, and in accordance with BS4142, the absolute noise level from the glass bottles and forklift will be up to 2dB above the ambient noise level. The noise associated with The Kingsdown Water Company would therefore have a **'Low'** to **'Adverse Impact'** on nearby sensitive receptors and so mitigation is recommended.

5 NOISE ATTENUATION SCHEME

5.1 Outdoor Living Areas

5.1.1 The measured noise levels, as detailed in Table 3, indicate that properties situated on the western boundary of the site will fail to achieve the guideline noise levels during daytime. Therefore, some form of mitigation will be required to reduce noise levels in outdoor living areas located closest to, and with a direct line of sight of Dover Road.

5.1.2 To mitigate noise levels in gardens of proposed dwellings near the western boundary of the site, outdoor living areas can be located on the screened sides of dwellings, i.e. not located with a direct line of sight of Dover Road, in order to achieve the guidance noise level of 55dB L_{Aeq}.

5.1.3 Alternatively, if gardens were to be located between Dover Road and the dwellings, a barrier would be needed of 3.5m in height. This could comprise of close boarded fencing of 2m in height in combination with a 1.5m earth bund to achieve guideline recommendations.

5.1.4 Mitigation requirements can be confirmed on a plot by plot basis, once a detailed design layout is available.

5.1.5 Properties elsewhere on the site will be screened from road noise by other properties and will achieve the guideline recommended values for daytime noise levels in outdoor living areas without any specific mitigation.

5.2 Glazing Requirements for Daytime Living Rooms and Bedrooms

5.2.1 When assessing daytime noise levels in noise sensitive rooms the noise attenuation provided by the overall building facade should be considered. To mitigate noise levels, the composition of the building facade can be designed to provide the level of attenuation required. Glazing is generally the building element that attenuates noise the least, so the proportion of glazing in a building facade is an important consideration when assessing overall noise attenuation.

5.2.2 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.

5.2.3 The calculation combines the different degrees of attenuation of the wall element and the window element. A facade element comprising a standard modern solid brick or block work construction, will typically 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).

5.2.4 The noise attenuation requirements for proposed noise sensitive living rooms nearest to existing noise sources are summarised in Table 4. The requirements indicate that enhanced acoustic glazing would ensure that recommended internal noise levels are met within living room and bedroom areas closest to and with a direct line of sight of Dover Road.

5.2.5 However, with windows open, the attenuation provided by the façade will be approximately 15dB(A). This would potentially allow the recommended internal noise guideline levels to be exceeded in some living rooms and bedrooms in the western and southern parts of the site nearest to and in direct sight of Dover Road.

5.2.6 On occasion, this may be acceptable to a resident, but when quiet conditions are required, the resident should be able to close the windows whilst maintaining adequate ventilation. Some form of alternative ventilation would therefore need to be installed in some of the living rooms and bedrooms.

5.2.7 Alternatively, to meet the required noise levels, living rooms and bedrooms could be located on the screened side of the proposed buildings, away from the main sources of noise.

5.2.8 Proposed dwellings further into the site will be protected by the buildings themselves and/or screened by intervening buildings. These dwellings are likely to achieve 35dB L_{Aeq} in living rooms and bedrooms which can be provided by standard thermal double glazing, even with windows open.

5.2.9 Glazing and ventilation requirements can be confirmed, on a plot by plot basis, at the reserved matters stage.

5.3 Glazing Requirements for Night-time Bedrooms

5.3.1 The noise attenuation requirements for proposed noise sensitive living rooms nearest to existing noise sources are summarised in Table 5.

5.3.2 The requirements indicate that enhanced acoustic glazing should ensure that recommended internal noise levels are met within bedrooms of dwellings at the western edge of the site and with windows closed during the night-time.

5.3.3 However, with windows open the attenuation provided by the facade will be approximately 15dB(A). This would allow the recommended internal guideline noise levels to be exceeded in a number of bedroom areas in the western and southern parts of the site. Some form of acoustic ventilation would therefore need to be installed in some bedrooms.

5.3.4 Alternatively, to meet the required noise levels, bedrooms could be located on the screened side of the proposed buildings, away from Dover Road.

5.3.5 The facades of the dwellings 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 the required noise limits, will be less than those detailed in Table 5.

5.3.6 It should be noted that the noise attenuation requirements for bedrooms during the night-time is greater than is required during the daytime. Therefore, the higher glazing and ventilation specification to attenuate noise at night should be used for bedrooms.

5.3.7 Glazing requirements can be confirmed, on a plot by plot basis, at the reserved matters stage.

5.4 Industrial Noise

5.4.1 Receptors in the south of the site with direct line of sight of The Kingsdown Water Company will meet the internal recommended noise levels with standard glazing.

5.4.2 However, with windows open, the attenuation provided by the façade will be approximately 15dB(A). This would potentially allow the recommended internal noise guideline levels to be exceeded in some living rooms and bedrooms in the western and southern parts of the site nearest to and in direct sight of The Kingsdown Water Company.

5.4.3 On occasion, this may be acceptable to a resident, but when quiet conditions are required, the resident should be able to close the windows whilst maintaining adequate ventilation. Some form of alternative ventilation would therefore need to be installed in some of the living rooms and bedrooms.

5.4.4 Alternatively, to meet the required noise levels, living rooms and bedrooms could be located on the screened side of the proposed buildings, away from the main sources of noise.

5.4.5 To reduce the noise impact at the proposed receptors in the south of the site, it is recommended that a close boarded fencing be used of 1.8 metres in height to mitigate the noise impact.

5.4.6 Table 8 presents the results of the BS4142 noise assessment including the discussed mitigation;

Table 8: BS4142 Assessment of Industrial Operations at Proposed Dwellings in the Southern Part of the Site During the Daytime– (Figures in dB(A))

Description	Glass Bottles	Forklift
Specific Noise i.e. noise level of the operational activities (on-time correction), dB L_{Aeq}	24	44
Intermittent Correction, dB	+3	+3
Impulsive Correction dB	+6	0
Close Boarded Fencing	-8	-8
Rating Level, dB	25	39
Background Noise Level (dB L_{A90})	37	37
Excess of rating over background level, dB	-12	+2

5.4.7 The results of the BS4142 assessment indicate that the noise associated with The Kingsdown Water Company will have a **'Adverse Impact'**, which would not be considered significant, at existing sensitive receptors during the daytime with the inclusion of acoustic mitigation.

6 CONCLUSIONS

6.1.1 Wardell Armstrong has carried out a noise assessment for the proposed residential development located on Dover Road, Deal. The dominant noise source, which will potentially affect the residents of the proposed residential development, is road traffic on Dover Road and the industrial operations at The Kingsdown Water Company.

6.1.2 In policy terms there is no presumption against development in places with high noise levels, provided that the noise can be adequately mitigated taking into account the economic and social benefits of the proposed scheme.

6.1.3 Traffic noise levels can be assessed against the guideline values suggested by the World Health Organisation and BS8233. It should be noted that the internal guideline values in WHO are health-based and are relatively inflexible, however adequate noise mitigation is relatively straightforward to implement. The external guideline values are based on amenity and allow noise to be balanced against any benefits of the location of the proposed scheme.

6.1.4 The results of the noise survey and assessment indicate that to achieve the guideline level of 55dB$L_{Aeq\ (16\ Hour)}$ in outdoor living areas, mitigation measures would be required for those properties located nearest to and in direct sight of Dover Road.

6.1.5 To achieve recommended levels, gardens could be placed on the screened site of the dwellings. Alternatively, if outdoor living areas were to be located between Dover Road and the dwellings, an acoustic screen of a total 3.5m in height would be required.

6.1.6 The requirements indicate that enhanced acoustic glazing should ensure that internal noise guideline levels are met in living rooms and bedroom areas for proposed dwellings located closest to and with a direct line of sight of Dover Road, during the daytime and night-time periods, with windows closed.

6.1.7 However, with the windows open the attenuation provided by the façade would allow the internal noise guideline levels to be exceeded in living room and bedroom areas located in the western and southern parts of the development site.

6.1.8 Acoustic ventilation would therefore need to be installed in some of the living rooms and bedrooms located nearest to, and with a direct line of sight, of Dover Road. Alternatively, to meet the required noise levels, living rooms and bedrooms could be located on the screened side of the proposed buildings, away from the main sources of noise.

6.1.9 Details of mitigation can be confirmed at the reserved matters stage.

6.2 Industrial noise

The results indicate that only standard glazing is necessary to achieve the internal guideline levels for dwellings located in the southern parts of the site. However, the results of the BS4142 assessment provides an indication that noise from Kingsdown Water Company will have a 'Significant Adverse Impact', at the nearest proposed residential dwellings during the daytime

6.2.1 It is recommended therefore that mitigation measures be installed to reduce the noise impact at the nearest proposed receptors in the south of the site. A close boarded fence of 1.8m in height will provide sufficient mitigation to reduce the impact to a '**Adverse Impact'** which would not be considered significant.

6.2.2 The details of mitigation of industrial noise can be confirmed, at the reserved matters stage.

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Appendix A

Noise Monitoring Results

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Appendix A

Noise Monitoring Results

Monitoring Location 1 – North-west of the site, approximately 10 meters away from Dover Road.						
Time	**L_{Aeq} (dB)**	**$L_{A\ min}$ (dB)**	**$L_{A\ max}$ (dB)**	**L_{A90} (dB)**	**L_{A10} (dB)**	**Comments**
25/01/17 – Night time						
0100-0115	54.2	19.4	75.5	21.1	52.7	Unattended monitoring. Road traffic noise from Dover Road.
0115-0130	57.8	21.6	80.3	23.0	55.5	
0130-0145	51.5	20.3	73.8	21.4	45.4	
0145-0200	50.7	20.8	73.5	22.3	38.7	
0200-0215	51.4	20.8	72.5	23.1	46.5	
0215-0230	52.2	21.8	76.4	24.1	44.8	
0230-0245	42.5	20.1	68.7	21.7	29.8	
0245-0300	53.4	21.0	76.4	22.4	47.8	
0300-0315	54.5	20.9	78.5	22.3	49.1	
0315-0330	55.6	21.5	79.3	23.5	51.0	
0330-0345	57.3	21.6	78.5	23.7	53.7	
0345-0400	57.4	20.7	80.4	21.4	54.0	
0400-0415	56.9	21.5	82.5	22.9	50.1	
0415-0430	58.5	22.3	80.3	26.6	56.1	
0430-0445	58.2	23.2	80.2	26.0	56.1	
0445-0500	61.3	20.9	82.2	30.9	61.8	
0500-0515	62.2	22.0	80.5	35.3	64.3	
0515-0530	62.3	27.8	81.6	34.8	64.8	
0530-0545	65.1	35.2	81.2	43.4	70.3	
0545-0600	64.1	27.1	84.3	39.8	69.0	
0600-0615	66.4	24.1	83.0	42.6	71.3	
0615-0630	66.5	39.9	81.4	48.7	71.4	
0630-0645	67.6	42.3	84.5	48.6	72.4	
0645-0700	67.4	38.9	81.6	45.6	72.3	
Overall	61.7	19.4	84.5	22.9	63.7	
25/01/17 – Day time						
0700-0800	69.8	49.0	81.3	56.8	73.5	Unattended monitoring. Road traffic noise from Dover Road.
0800-0900	69.9	44.5	81.1	58.5	73.6	
0900-1000	68.7	41.4	82.9	54.4	72.9	
1000-1100	68.6	37.3	82.7	53.4	72.8	
1100-1200	68.7	39.8	81.7	53.2	72.6	
1200-1300	68.5	37.7	81.5	53.8	72.6	
1300-1400	68.6	38.4	85.0	54.2	72.5	
1400-1500	68.4	36.7	83.0	52.6	72.4	
1500-1600	68.9	42.8	82.4	56.1	72.7	
1600-1700	68.5	37.9	80.9	55.3	72.3	
1700-1800	69.6	40.9	98.5	57.6	72.3	
1800-1900	68.4	40.2	90.0	54.4	71.8	
1900-2000	66.4	33.1	80.9	46.1	70.9	
2000-2100	65.1	30.6	82.9	41.7	69.9	
2100-2200	63.8	31.3	82.4	38.9	68.8	
2200-2300	62.9	29.4	80.4	36.4	67.7	
Overall	68.2	29.4	98.5	48.7	72.3	

26/01/17 – Night time						
2300-2315	61.0	28.3	79.7	34.5	64.2	Unattended monitoring. Road traffic noise from Dover Road.
2315-2330	59.8	26.9	80.0	31.1	62.0	
2330-2345	59.7	24.0	81.1	26.8	58.8	
2345-0000	58.7	23.3	77.7	25.8	58.9	
0000-0015	57.5	24.8	80.4	27.6	57.3	
0015-0030	57.0	22.2	79.5	24.6	53.2	
0030-0045	56.4	24.3	77.1	25.8	54.1	
0045-0100	53.4	24.6	77.3	26.6	47.3	
0100-0115	54.0	22.3	79.7	23.1	42.2	
0115-0130	56.9	25.3	77.9	27.9	54.8	
0130-0145	54.5	24.0	76.4	25.6	51.2	
0145-0200	50.0	24.0	74.0	24.7	42.2	
0200-0215	52.2	23.9	78.1	25.1	43.1	
0215-0230	49.7	23.6	78.0	24.4	36.5	
0230-0245	52.8	23.4	79.3	25.0	39.5	
0245-0300	48.0	25.1	74.3	26.0	40.7	
0300-0315	52.6	25.5	76.7	27.3	44.4	
0315-0330	51.3	23.6	78.2	25.3	37.8	
0330-0345	48.0	25.9	71.9	27.0	39.0	
0345-0400	56.5	26.4	78.3	28.3	52.7	
0400-0415	54.9	26.3	79.2	27.6	49.9	
0415-0430	59.0	26.9	82.4	28.6	53.9	
0430-0445	60.5	29.0	80.9	33.1	59.1	
0445-0500	62.8	31.5	81.6	36.1	63.9	
0500-0515	63.3	30.2	82.7	36.9	65.8	
0515-0530	62.8	29.1	79.8	32.7	66.1	
0530-0545	64.3	33.9	81.1	41.3	68.1	
0545-0600	65.7	36.2	82.4	41.9	70.9	
0600-0615	66.1	36.0	84.9	42.0	71.5	
0615-0630	66.6	41.7	81.3	47.6	71.9	
0630-0645	67.3	45.8	81.3	49.8	72.3	
0645-0700	68.4	45.5	81.0	52.4	73.0	
Overall	61.3	22.2	84.9	26.2	62.9	
26/01/17 – Day time						
0700-0800	69.7	43.3	80.9	57.4	73.5	Unattended monitoring. Road traffic noise from Dover Road.
0800-0900	69.9	44.1	88.2	56.9	73.5	
0900-1000	69.0	45.0	81.5	56.0	73.1	
Overall	69.5	43.3	88.2	56.6	73.4	

Monitoring Location 2 – South of the site, approximately 50 metres from Industrial factory.						
Time	**L_{Aeq} (dB)**	**$L_{A\ min}$ (dB)**	**$L_{A\ max}$ (dB)**	**L_{A90} (dB)**	**L_{A10} (dB)**	**Comments**
25/01/17 – Night time						
0500-0515	44.0	20.3	54.6	31.1	48.4	Road traffic noise on Dover Road, bird noise, people arriving at Kingsdown Water factory.
0515-0530	43.6	23.8	55.4	33.4	47.9	
0530-0545	46.3	33.5	57.4	39.1	49.9	
0545-0600	46.1	32.8	60.8	38.0	49.4	
0600-0615	48.0	22.2	58.4	35.9	51.7	
0615-0630	48.2	38.0	56.3	42.7	51.0	
0630-0645	47.9	36.6	55.4	41.7	50.5	
0645-0700	48.3	36.3	54.7	41.3	51.2	
Overall	46.9	20.3	60.8	37.0	50.3	
25/01/17 – Daytime						
0700-0800	50.7	39.5	60.0	47.1	52.6	Road traffic noise on Dover Road, bird and horse noise, noise associated with Kingsdown Water factory (forklift, HGV/LGV), occasional aircraft noise. Additional noise from pedestrians.
0800-0900	50.9	36.8	64.8	46.9	52.9	
0900-1000	49.5	36.8	59.1	45.1	51.8	
1000-1100	49.2	34.8	61.4	43.8	51.5	
1100-1200	48.8	35.7	66.7	43.5	51.1	
1200-1300	48.2	35.0	60.3	42.5	50.7	
Overall	49.7	34.8	66.7	44.6	52.0	

Monitoring Location 3 – Eastern border of site, represents proposed receptors site east.						
Time	**L_{Aeq} (dB)**	**$L_{A\ min}$ (dB)**	**$L_{A\ max}$ (dB)**	**L_{A90} (dB)**	**L_{A10} (dB)**	**Comments**
25/01/17 - Daytime						
1315-1415	40.1	31.7	55.6	37.0	41.9	Road traffic noise on Dover Road, bird and horse noise, industrial noise from residential property nearby, additional noise from pedestrians and aircrafts.
Overall	40.1	31.7	55.6	37.0	41.9	

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Drawings

LE13821-001 – Noise Monitoring Locations

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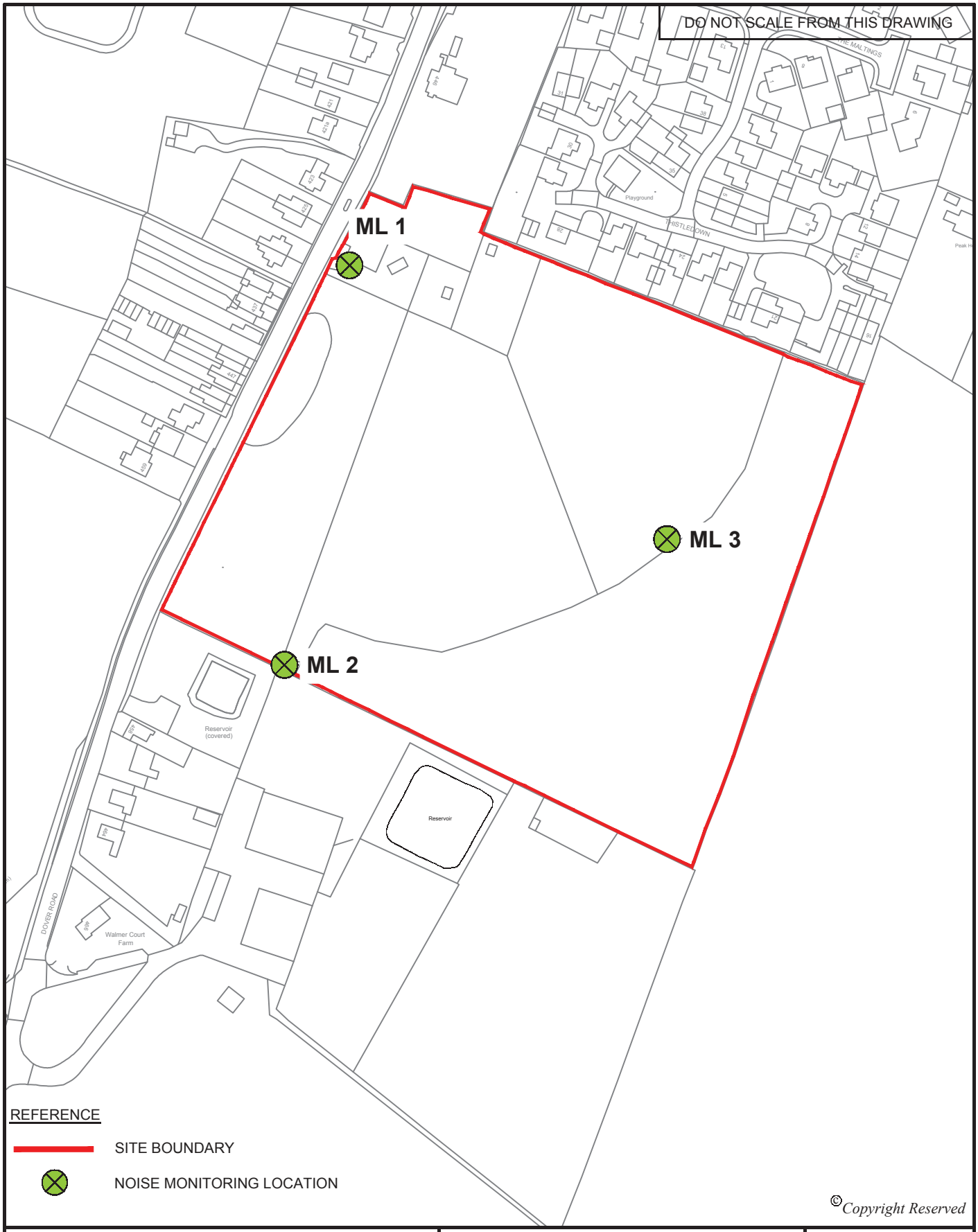

REFERENCE

SITE BOUNDARY

NOISE MONITORING LOCATION

CLIENT: Gladman Developments Limited	DRG No.: LE13821-001		REV:
PROJECT: Land at Dover Road, Deal, Kent	SIZE: A4	SCALE: 1:2000	DATE: 02/02/17
	DRAWN BY: LS	CHECKED BY:	APPROVED BY:
DRAWING TITLE: Noise Monitoring Locations	wardell armstrong — your earth our world		

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