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VIRIDOR WASTE MANAGEMENT LIMITED

PILSWORTH NORTH MEDIUM COMBUSTION PLANT

NOISE ASSESSMENT REPORT

MAY 2020

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COMBUSTION PLANT

NOISE ASSESSMENT REPORT

MAY 2020

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EXECUTIVE SUMMARY

By instruction from Viridor Waste Management Limited, a noise assessment has been carried out to identify the potential noise impacts associated with the application for seven additional gas fired engines at Pilsworth North Landfill Site. The assessment considers the noise impact from gas fired engines at existing noise sensitive receptors. A noise survey has been carried out at the existing receptor locations, in addition to acoustic modelling, to support the assessment.

The results of the assessment found that the impact would be low with when providing appropriate insulation for the gas fired exhausts.

1 INTRODUCTION

1.1.1 By email instruction from Viridor Waste Management Limited (Viridor), Wardell Armstrong LLP (WA) was commissioned to undertake a noise assessment to support an environmental permit application, for the installation of seven gas engines, operated from mains gas, located at Pilsworth North Landfill. It is understood that the engines will produce electricity to support the grid in shortages of power at peak times, typically referred to as 'peaking plants'.

1.1.2 The existing site comprises seven landfill gas engines and a former landfill site. The site is located to the north-east of Pilsworth. To the north and east the site is boarded by Moss Hill Road. Further north lies an industrial/commercial buildings, a rail line and residential dwellings. Further to the east is the industrial/commercial estate, comprising a number of B Class use buildings. To the south and west of the site is the former landfill with open land beyond.

1.1.3 This noise assessment report has been prepared to accompany the environmental permit application for the gas engines. The report details assessment of the noise impact associated with the operation of the seven gas fired engines and is supported by environmental noise monitoring.

2 ASSESSMENT METHODOLOGY

2.1 Scope of Works

2.1.1 The scope of this assessment comprises a consideration of noise at existing sensitive residential areas, specifically in terms of the potential impact of the proposed gas engines.

2.2 Noise Survey

2.2.1 As part of this assessment, Wardell Armstrong LLP has carried out an attended and unattended noise survey to assess the noise levels at the existing noise sensitive receptors. The survey is detailed in Section 3.

2.3 Noise Modelling

2.3.1 Noise modelling using SoundPLAN version 8.2 has been used to assess the potential noise impact of the gas engines at the existing receptors.

2.3.2 The noise model uses OS vector mapping and Terrain 5 topography data to create a geographical model of the study area on which to generate noise contours. SoundPLAN also uses the noise prediction methodology set out in ISO 9613-2:1996 'Attenuation of sound during propagation outdoors'.

2.4 Assessment Methodology

2.4.1 The potential noise impacts have been assessed with reference to the following policies, standards and guidance, further details are provided in **Appendix A**:

- National Planning Policy Framework, 2019 (NPPF).
- Noise Policy Statement for England, 2010 (NPSE).
- Planning Practice Guidance – Noise, 2019 (PPG).
- British Standard 4142:2014 +A1 2019 Methods for rating and assessing industrial and commercial sound (BS4142).

2.5 Existing Sensitive Receptors

2.5.1 Two Existing Sensitive Receptors (ESR(s)) have been considered for the assessment (ESR1 and ESR2). Other receptors may be affected by noise from the development; however, the noise levels will be equal to or less than at the receptors identified. Reference will be made to the ESRs throughout this report, they are detailed in Table 1 below.

Table 1 Existing Sensitive Receptors				
Receptor	**Road**	**Grid Reference**		**Bearing from Site**
		Easting	Northing	
ESR1	Moss Hall Road, Broadfield, Rochdale	382966	409900	North
ESR2	Stanbury Close, Rochdale	382969	410052	North

3 NOISE SURVEY

3.1.1 Between the 3rd and 5th of March 2020, Wardell Armstrong LLP carried out a noise survey at the ESR locations.

3.1.2 Noise measurements were made using a Class 1, integrating sound level meter with continuous audio recording. In accordance with guidance, the microphone was mounted vertically on a tripod and with the diaphragm horizontal, 1.5m above the ground and more than 3.5 metres from any other reflecting surfaces.

3.1.3 Noise measurements were carried out at 2 Monitoring Locations (ML(s)), the rational of each location is as follows:

- ML1 – Carried out to monitor background sound levels, supporting a BS4142 assessment of noise at ESR1 to the north.
- ML2 – Carried out to monitor background sound levels, supporting a BS4142 assessment of noise at ESR2 to the north.

3.1.4 A summary of the MLs is detailed in Table 2 and are shown on Drawing ST17896-001-001.

Table 2 - Summary of Noise Monitoring Locations

Monitoring Location	Description	Time Period Monitored		Notes
		Start	End	
ML1	Located to the north of the site at ESR1	03/03/2020 1600hrs	04/03/2020 1400hrs	Partially Attended
ML2	Located to the north of the site at ESR2	04/03/2020 1500hrs	05/02/2020 1500hrs	Partially Attended

3.1.5 At all locations the A-weighted[1] L_{eq}[2] overall and one-third octave noise levels were measured, in addition to the L_{90}[3] and L_{10}[4] noise levels. The maximum and minimum sound pressure levels were also measured to provide additional information. The measured noise levels are set out in full in **Appendix B**.

3.1.6 The sound level meters were calibrated to a reference level of 94dB at 1kHz both before, and on completion of, the noise survey. No significant drift in the calibration

[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_{eq} — 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.

during the survey was noted.

3.2 Measured Noise Levels

3.2.1 The measured noise levels which are relevant to the assessment of industrial noise at the existing receptors are the ambient sound level and the background sound level. These have been split into daytime and night-time categories and are set out in Table 3.

Table 3: Measured Daytime and Night-time Noise Levels (Figures in L_{Aeq} and L_{A90})

Monitoring Location	Time	Measured Noise Levels	
		Ambient dB L_{Aeq}	Background dB L_{A90}
ML1	0700-2300	59	47
	2300-0700	55	41
ML2	0700-2300	50	41
	2300-0700	44	37

3.3 Site Survey Observations

3.3.1 On 3rd March 2020, the weather conditions were noted as follows:

- Wind speeds ranging between 2 to 4m/s.
- Temperature approximately 10 ˚C.
- 60% cloud cover.

3.3.2 On 4th March 2020, the weather conditions were noted as follows:

- Wind speeds ranging between 1 to 3m/s.
- Temperature approximately 8˚C.
- 50% cloud cover.

3.3.3 On 5th March 2020, the weather conditions were noted as follows:

- Wind speeds ranging between 2 to 4m/s with intermittent gusts up to 6m/s.
- Temperature approximately 3˚C.
- Partial cloud cover.

3.3.4 Therefore, the weather conditions for the duration of the survey were considered to be appropriate.

3.3.5 Attended noise monitoring and playback of audio recordings allow 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: Road traffic noise was the dominant noise at both ML1 and ML2.

Industrial Noise: Industrial noise was audible at ML1. No Industrial noise was audible at ML2.

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

4 INDUSTRIAL NOISE ASSESSMENT

4.1 Introduction

4.1.1 The application is understood to comprise seven natural gas fired engines at the landfill site. Five of the engines will be new and two are to be converted from landfill gas.

4.1.2 The site will operate as a peaking plant and will therefore operate when the load on the electricity grid is high, which is most commonly during the morning and evening periods.

4.1.3 However, the engines could operate during the daytime and night-period. Therefore, an assessment of the noise from the gas fired engines has been carried out for these periods, at both of the ESRs identified in Table 1.

4.1.4 Noise modelling has been carried out to support the assessment. Details of the assumptions within the model are set out in Section 4.5 of this report.

4.2 Identification of Specific Sound Level

4.2.1 The five new gas fired engines are to be provided by General Electric: Cogeneration Unit-Container (model no. J(G)MC 320 GS-L.L).

4.2.2 The technical sheet provided shows one-third octave sound pressure level information for the aggregate and for the exhaust gas, together with the surface area to determine the sound power levels. The sound power level for each of the aggregate and exhaust is provided in Table 4.

Table 4: Specific Sound Level of Sources of Sound

Noise Source	Specific Sound Power Level
Aggregate	117 dB Lw_A
Exhaust Gas	130 dB Lw_A

4.2.3 The specification sheet shows that the engine (aggregate) will be located within an enclosure. It states that the sound pressure level located at 10m away from the enclosure will be 65dB_A. In order to achieve this specification, it states that the enclosure must comprise 100mm of rock wool covered with a 0.75mm galvanised steel sheet.

4.2.4 The one-third octave spectrum of the aggregate sound power has been placed within the dimensions of the enclosure, together with the insulation, in the noise model. A test calculation has shown that the sound pressure level at 10m from the enclosure would be 65dB$_A$ and therefore the model is considered to be accurate.

4.2.5 It is generally considered that the attenuation of sound in a duct line is negligible without mitigation, and therefore the level of sound at the outlet of the exhaust, which will be located outside of the enclosure, is 130dB$_A$ L$_W$.

4.2.6 The insulation for the exhaust gas silencer is not included within General Electric's scope and this must therefore be sourced elsewhere. To determine the performance of the exhaust silencer, we have considered one used on a previous similar scheme. The one-third sound reduction indices for the silencer are provided in Appendix C. A summary is shown in Table 5.

Table 5: Summary of the Attenuation Provided by a Silencer on the Outlet of the Exhaust

Description	Sound Level, dB
Exhaust Gas	130dB L$_{WA}$
Silencer Sound Reduction Index	51dB R
Corrected Level	79dB L$_{WA}$

4.2.7 The corrected level at the outlet has been integrated into the model as a point source, using one for each gas engine.

4.2.8 For the purpose of the assessment, the level of noise from the two converted landfill gas engines is assumed to be the same as the level of noise from the newly proposed natural gas engines.

On-time

4.2.9 In accordance with BS4142, the level of the specific sound sources should be corrected to reflect the on-time of the noise over the respective reference interval (T_r), 1-hour daytime (0700-2300) and 15-minute night-time (2300-0700) period.

4.2.10 For the purpose of this assessment it has been assumed that the gas engines may occur for at least 1 hour during the daytime and 15 minutes during the night-time, therefore, no on-time correction needs to be applied.

Identification of the Background Sound

4.2.11 The background sound levels have been established by the mean measured L_{A90} at ML1 and ML2. The background sound level during the daytime and night-time at each receptor is detailed in Table 6.

Table 6: Background Sound Levels During the Daytime and Night-time at ESR1 and ESR2.

ESR	Background Noise Level (Figures in dB(A) L_{90})	
	Daytime	Night-time
ESR1	47	41
ESR2	41	37

Application of a Rating Penalty

4.2.12 It can be considered that character of the gas engines at the receptor locations may be tonal, or readily distinctive against the existing acoustic environment. Therefore, in accordance with BS4142, a +3dB correction feature has been applied to the specific noise level at the receptor location.

4.3 Comparison of Background and Rating Level

4.3.1 In accordance with BS4142, the rating level of the proposed and converted gas engines, in the vicinity of the existing dwellings, has been compared with the corresponding background sound levels, as shown in Table 7.

Table 7: BS4142 Assessment of the Rating Levels at Existing Receptors During the Daytime and Night-time Period

Description	Assessment Period			
	Daytime		Night-time	
	ESR1	ESR2	ESR1	ESR2
Specific sound level (including on-time correction), dB_A	44	40	44	40
Application of rating penalty	+3	+3	+3	+3
Noise rating level	47	43	47	43
Background sound level, L_{A90}	47	41	41	37
Excess of noise rating over background level	**0**	**+2**	**+6**	**+6**

4.3.2 The BS4142 guidance states that the initial degree of impact can be estimated by comparing the noise rating level against the measured background sound level.

4.3.3 The noise rating level during the daytime period is between 0 and 2dB above the existing background noise level, indicating the impact would be '**Low**', subject to context.

4.3.4 The noise impact during the daytime period, at ESR1 and ESR2, is illustrated on drawing ST17896-002 and ST17896-003.

4.3.5 The noise rating during the night-time period is 6dB above the existing background noise level, indicating an impact of around '**Adverse**', subject to context. However, in reality, the gas engines are less likely to operate during the night-time.

4.3.6 The noise impact during the night-time period, at ESR1 and ESR2, is illustrated on drawing ST17896-004 and ST17896-005.

4.4 BS4124 Context Assessment

4.4.1 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".

4.4.2 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

4.4.3 When considering the absolute level of sound BS4142 states:

'Where background sound levels and rating levels are low, absolute levels might be as, or more relevant than the margin by which the rating level exceeds the background. This is especially true at night.'

'Where residual sound levels are very high, the residual sound might itself result in adverse impacts of significant adverse impacts, and the margin by which the rating level exceeds the background might simply be an indication of the extent to which the specific sound source is likely to make those impact worse.'

4.4.4 During the daytime the background sound level is between 47 and 41dB, with the rating levels being between 43 and 47dB. During the night-time the background sound level is between 41 and 37dB, with the rating levels being between 43 and 47dB. These levels are relatively low during both periods and therefore the absolute noise level may be more relevant than the margin by which the rating exceeds the background. This is especially true for during the night-time period.

4.4.5 When considering the context, the absolute level of sound is low and the initial impact as set out in Table 7 may be reduced.

4.4.6 Furthermore, the gas engines are peaking engines, and are therefore unlikely to operate during the night-time.

4.4.7 ***Character and Level of Residual Sound Compared with the Specific Sound***

4.4.8 The general ambient noise at the site comprises road traffic noise. The level of the road traffic noise is moderate, and therefore this would help to mask the level of industrial noise across the site.

4.4.9 The character of the road traffic noise comprises low to mid-frequency sound. This is likely to be similar when compared to the noise of the gas engines at the site.

4.4.10 When considering the context of the character and level of the noise associated with the residual and specific sound, the initial impact as set out in Table 7 could be reduced due to the similarities in character and level of sound.

Sensitivity of Receptor

4.4.11 The proposed receptors will have moderate to high sensitivity given their residential nature. However, BS4142 suggests that the sensitivity of the receptor, should consider whether the development will incorporate design measure that secure good internal and /or outdoor acoustic conditions, such as:

i) Façade insulation treatment;

ii) Ventilation and/or cooling that will reduce the need to have windows open so as to provide rapid or purge ventilation; and,

iii) Acoustic screening.

4.4.12 During the daytime the assessment should be considered externally, and therefore the impact remains unadjusted. During the night-time, however, it is likely that

occupants of the dwellings will be inside noise sensitive rooms and so the impact should be considered internally.

4.4.13 The existing dwellings are not likely to inhabit any specific façade insulation treatment and are likely to only comprise standard thermal double glazing. It should also be assumed the dwellings rely on opening windows to achieve the ventilation requirements. The attenuation provided by an open window on a façade is considered to be 13dB in accordance with BS8233. Once this correction is applied to the level of noise at the façade the actual internal level of industrial noise is likely to be negligible.

4.4.14 When considering the context of the sensitivity of the receptor, during the night-time period, the initial impact as set out in Table 7 may be reduced.

4.5 Uncertainty and Assumptions

4.5.1 To reduce assessment uncertainty the following steps have been taken:

- The background noise measurement locations were selected to be representative of the background noise level at the closest point of the receptors to the noise sources and calculated in the absence of industrial noise, where possible.
- The background noise measurements were undertaken during appropriate weather conditions.
- The background noise measurements were taken using a constant logging meter which enables data to be split into the required periods of 1-hour daytime and 15-minute night-time;
- The results of each measurement period were reported to the nearest 0.1dB;
- Noise measurements were made using a Class 1, integrating sound level meter.
- The noise model was ran with OS mapping and geographical data and was ran with a reflection order of 3.
- Outlet height is 3.5m above ground floor level.
- The converted landfill gas engines will operate with a similar sound power to the new natural gas fired engines.

4.6 Summary of Assessment

4.6.1 An assessment has been carried in accordance with BS4142 to determine the noise impact from the gas fired engines.

4.6.2 The results of the assessment show that, when the impact is considered within the context of the situation, the actual impact at the receptors can be considered to be '**Low**'.

4.6.3 In order to achieve this noise impact, appropriate insulation should be sourced for the exhausts of the gas fired engines. This can be achieved with the use of a silencer with sound reduction levels equal to or greater than those set out in Appendix C.

5 CONCLUSIONS

5.1.1 Wardell Armstrong LLP has carried out a noise assessment to support an environmental permit application, relating to the installation of seven natural gas fired engines at Pilsworth North Landfill.

5.1.2 To determine the noise impact association with the application, an assessment has been carried out in accordance with BS4142 at the receptor locations. The assessment has been supported by noise monitoring carried out at the receptors, and with the use of noise modelling software SoundPLAN V8.2.

5.1.3 The results of the assessment found that, when considered in context, and with the use of appropriate exhaust silencers, the actual noise impact at the receptors can be considered to be '**Low**'.

5.1.4 When these impacts are compared to the criteria set out in Table 1 in Appendix A, the noise impact would be considered to be the 'Lowest Observed Effect Level' (LOAEL) and therefore the application is considered to be acceptable.

APPENDICES

Appendix A

Policy, Standards and Guidance

National Planning Policy Framework

In February 2019 the 'National Planning Policy Framework' (NPPF) was introduced as the current planning policy guidance within England.

Paragraph 180 of the NPPF states:

'Planning policies and decisions should also ensure that new development is appropriate for its location taking in account the likely effects (including cumulative effects) of pollution on heath, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impact that could arise from the development. In doing so they should:

a. Mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development - and avoid noise giving rise to significant adverse impact on health and the quality of life;

b. Identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason'…

Paragraph 182 of the NPPF states:

'Planning policies and decisions should ensure that new development can be integrated with existing business and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed.'

Noise Policy Statement for England

With regard to 'significant adverse impacts on health and the quality of life' the NPPF refers to the 'Noise Policy Statement for England' (NPSE).

The Noise Policy Statement for England refers to the World Health Organisation when discussing noise impacts and introduces observed effect levels which are based on

established concepts from toxicology that are applied to noise impacts by WHO.

Three levels are defined 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'.

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.

Planning Practice Guidance – Noise

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
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 non-awakening 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

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 +A1 2019 Methods for rating and assessing industrial and commercial sound (BS4142):

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.

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.

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

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 industrial noise. The 'specific noise' sources, of the existing industrial premises that have been observed are detailed in Section 3 of this report.

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.

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'.

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.

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.

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.

Appendix B
Noise Monitoring Results

Monitoring Location 1– Background Noise Levels in the vicinity of Brook Cottage off Moss Hall Rd						
Time	**L_{Aeq} (dB)**	**$L_{A\ min}$ (dB)**	**$L_{A\ max}$ (dB)**	**L_{A90} (dB)**	**L_{A10} (dB)**	**Comments**
03/03/20 – Daytime						
1600-1700	60.1	49.6	77.2	52.8	63.8	Road traffic noise from Moss Hall Road dominant. Occasional noise from vehicle movements at Viridor site and Quest Park Industrial estate also audible.
1700-1800	60.8	48.4	76.2	53.3	64.2	
1800-1900	59.6	48.9	74.9	51.7	63.1	
1900-2000	56.7	44.4	73.4	48.2	60.8	
2000-2100	55.3	44.0	73.9	45.7	59.5	
2100-2200	54.5	44.7	71.9	46.3	58.2	
2200-2300	54.3	43.1	73.3	44.5	57.8	
03/03/20 – 04/03/20 – Night-time						
2300-2315	51.8	42.7	68.3	43.7	54.7	Unattended
2315-2330	51.9	42.0	70.9	43.0	54.8	
2330-2345	47.7	41.1	67.2	42.1	48.4	
2345-0000	48.2	41.0	68.5	41.5	48.5	
0000-0015	50.2	41.4	71.1	42.1	52.2	
0015-0030	47.0	40.4	68.5	41.6	46.5	
0030-0045	49.1	40.9	67.2	41.6	50.5	
0045-0100	48.9	40.8	68.0	41.5	49.5	
0100-0115	49.6	39.8	70.8	40.3	51.5	
0115-0130	44.5	39.8	67.2	40.2	45.4	
0130-0145	50.7	39.9	73.3	40.4	53.4	
0145-0200	47.5	40.2	68.1	40.7	48.4	
0200-0215	51.7	39.7	68.7	40.5	54.0	
0215-0230	46.5	39.4	67.9	40.1	46.6	
0230-0245	49.2	40.5	67.4	41.1	52.8	
0245-0300	45.5	39.9	65.7	40.6	47.3	
0300-0315	45.7	39.6	67.9	40.3	46.2	
0315-0330	50.1	39.9	65.4	40.6	56.1	
0330-0345	50.5	39.5	71.5	41.0	53.5	
0345-0400	50.5	39.4	67.9	40.2	54.9	
0400-0415	46.9	39.9	65.5	41.6	47.6	
0415-0430	51.3	41.0	68.0	42.4	56.1	
0430-0445	52.9	41.6	69.4	43.6	57.7	
0445-0500	53.4	41.2	69.0	43.8	57.4	
0500-0515	52.7	43.0	69.2	44.9	55.8	
0515-0530	53.9	43.0	69.2	44.5	58.0	
0530-0545	57.5	43.4	73.9	46.0	61.1	
0545-0600	57.7	45.1	71.3	49.6	61.1	
0600-0615	61.0	47.4	77.2	52.1	64.0	
0615-0630	63.2	49.4	74.1	52.3	67.5	
0630-0645	59.4	50.6	71.0	53.2	62.9	
0645-0700	59.8	49.4	76.0	51.0	63.7	
Overall	54.5	39.4	77.2	40.9	58.2	

Monitoring Location 1– Background Noise Levels in the vicinity of Brook Cottage off Moss Hall Rd						
Time	**L_{Aeq} (dB)**	**$L_{A\ min}$ (dB)**	**$L_{A\ max}$ (dB)**	**L_{A90} (dB)**	**L_{A10} (dB)**	**Comments**
04/03/20 – Daytime						
0700-0800	60.9	48.8	75.4	53.1	64.4	Road traffic noise from Moss Hall Road dominant. Occasional noise from vehicle movements at Viridor site and Quest Park Industrial estate also audible.
0800-0900	60.6	45.7	73.1	52.6	64.0	
0900-1000	58.2	44.7	72.8	49.7	62.0	
1000-1100	56.7	40.6	73.2	45.0	60.9	
1100-1200	57.1	40.1	72.1	45.4	61.1	
1200-1300	56.7	40.0	71.2	44.6	61.0	
1300-1400	57.9	41.1	76.7	49.3	61.5	

Monitoring Location 2– Background Noise Levels in the vicinity of 3 Stanbury Close						
Time	**L_{Aeq} (dB)**	**$L_{A\ min}$ (dB)**	**$L_{A\ max}$ (dB)**	**L_{A90} (dB)**	**L_{A10} (dB)**	**Comments**
04/03/2020 – Daytime						
1500-1600	48.4	37.0	70.1	41.3	51.5	Road traffic noise from Moss Hall Road dominant. Distant noise from vehicle movements Quest Park Industrial estate also audible. Bird song and distant aircraft also audible. Noise from trains passing on adjacent track also audible.
1600-1700	49.3	35.9	77.7	41.8	51.9	
1700-1800	48.8	38.5	67.0	42.6	51.2	
1800-1900	48.9	41.4	78.0	43.3	50.9	
1900-2000	46.4	38.2	62.3	40.6	49.7	
2000-2100	43.4	36.4	59.7	38.5	47.1	
2100-2200	43.4	34.1	56.0	36.8	46.8	
2200-2300	44.6	36.3	60.3	40.0	47.5	
04/03/2020 – 05/03/2020 – Night-time						
2300-2315	45.3	37.6	58.1	40.4	47.9	Unattended
2315-2330	43.6	35.8	56.7	38.9	45.6	
2330-2345	42.9	35.2	59.6	37.3	45.7	
2345-0000	40.3	35.3	53.3	36.7	42.2	
0000-0015	41.4	35.5	58.7	36.5	43.2	
0015-0030	39.6	35.8	52.2	36.5	41.0	
0030-0045	39.7	36.7	51.7	37.4	40.4	
0045-0100	40.4	37.2	51.0	38.2	41.6	
0100-0115	40.1	36.7	52.2	37.5	41.6	
0115-0130	41.2	36.2	59.5	37.1	42.0	
0130-0145	41.4	36.0	57.4	37.2	42.4	
0145-0200	39.2	35.9	50.4	36.7	40.6	
0200-0215	37.9	34.6	50.3	35.6	39.3	
0215-0230	38.1	34.9	48.6	35.8	39.6	
0230-0245	40.6	35.9	57.2	36.9	41.3	
0245-0300	39.1	36.0	51.6	36.7	40.6	
0300-0315	38.3	35.4	45.7	36.7	39.6	
0315-0330	39.3	36.0	52.8	36.9	40.6	
0330-0345	41.3	36.7	60.5	37.9	42.3	
0345-0400	40.8	37.7	53.0	38.6	42.0	
0400-0415	40.7	37.5	52.5	38.6	41.6	
0415-0430	42.6	38.0	55.9	39.2	45.1	
0430-0445	42.3	38.6	53.5	40.0	43.6	
0445-0500	43.7	38.8	57.6	40.6	45.3	

Monitoring Location 2– Background Noise Levels in the vicinity of 3 Stanbury Close						
Time	**L_{Aeq} (dB)**	**$L_{A\ min}$ (dB)**	**$L_{A\ max}$ (dB)**	**L_{A90} (dB)**	**L_{A10} (dB)**	**Comments**
04/03/2020 – 05/03/2020 – Night-time						
0500-0515	44.9	39.7	54.3	41.4	46.6	Unattended
0515-0530	46.5	40.9	53.9	43.7	48.4	
0530-0545	48.0	43.1	57.0	45.2	50.0	
0545-0600	49.2	42.3	72.1	44.2	50.3	
0600-0615	48.7	42.6	63.7	45.3	51.0	
0615-0630	48.4	42.6	70.1	45.1	50.7	
0630-0645	48.3	44.9	55.7	45.9	50.4	
0645-0700	51.4	45.3	65.8	46.6	52.5	
Overall	44.4	34.6	72.1	37.1	47.9	
05/03/20 – Daytime						
0700-0800	49.4	43.4	68.6	45.6	51.6	Road traffic noise from Moss Hall Road dominant. Distant noise from vehicle movements Quest Park Industrial estate also audible. Bird song and distant aircraft also audible. Noise from trains passing on adjacent track also audible
0800-0900	51.8	41.0	65.2	45.0	54.7	
0900-1000	52.6	38.5	66.2	42.0	57.1	
1000-1100	46.6	38.6	63.8	40.8	49.6	
1100-1200	45.7	37.3	61.4	39.9	48.8	
1200-1300	47.6	37.6	73.1	42.2	49.5	
1300-1400	54.4	38.9	81.4	42.5	54.6	

Appendix C
Noise Attenuation Requirements for Exhaust Silencer

One-Third Octaves	25Hz	31.5Hz	40Hz	50Hz	63Hz	80Hz	100Hz	125Hz	160Hz	200Hz	250Hz	315Hz	400Hz	500Hz	630Hz	800Hz	1000Hz	1250Hz	1600Hz	2000Hz	2500Hz	3150Hz	4000Hz	5000Hz
Sound Reduction	7dB	7dB	12dB	20dB	27dB	34dB	38dB	44dB	38dB	44dB	45dB	46dB	50dB	51dB	49dB	53dB	52dB	54dB	54dB	55dB	53dB	59dB	60dB	58dB

DRAWINGS



KEY

Site Boundary

Noise Monitoring Locations

Notes:

Boundaries are indicative.

Aerial imagery shown for context purposes only.

REVISION	DETAILS	DATE	DRAWN	CHK'D	APP'D

CLIENT

VIRIDOR WASTE MANAGEMENT LIMITED

PROJECT

PILSWORTH GAS PEAKING STATION

DRAWING TITLE

NOISE MONITORING LOCATION PLAN

PRELIMINARY

DRG No.	REV
ST17896/001	P01

DRG SIZE	SCALE	DATE
A3	1:2,500	14/04/2020

DRAWN BY	CHECKED BY	APPROVED BY
SW	RC	--

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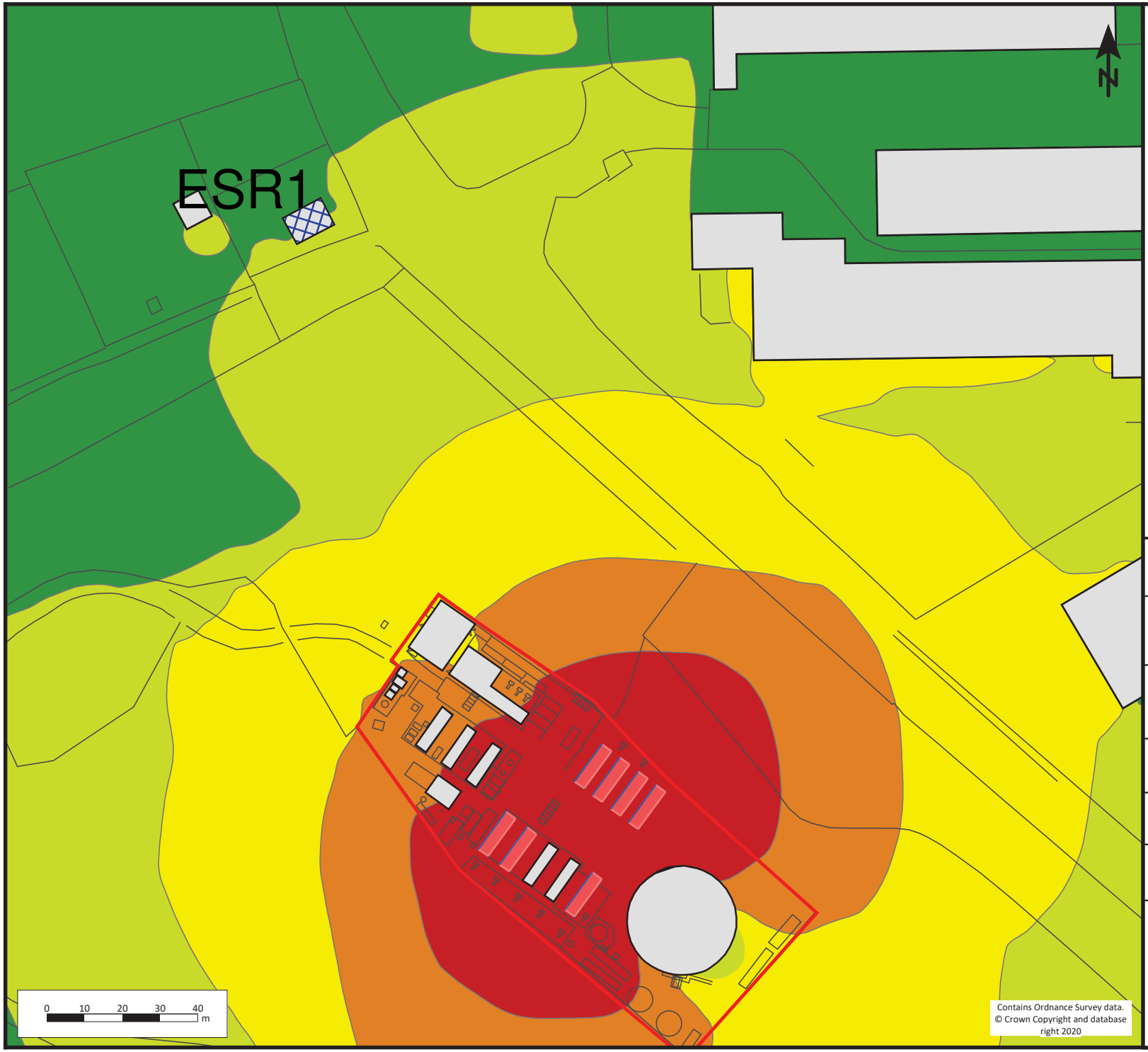

Key

- Site Area
- Existing Buildings
- Proposed Gas Engines
- Sensitive Receptor

Exceedance of Noise Rating Over Daytime Background, dB

<=	0.0
0.0 -	5.0
5.0 -	10.0
10.0 -	15.0
>	15.0

CLIENT: Viridor Waste Management LTD		
PROJECT: Pilsworth North Medium Combustion Plant		
TITLE: Exceedance of Noise Rating Level Over Daytime Background Noise Level at ESR1		
DRG NO: ST17896/002		REV: A
DRG SIZE: A3	SCALE: 1:1000	DATE: 15/04/2020
DRAWN BY: JS	CHECKED BY: RC	APPROVED BY: MD

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Key

- Site Area
- Existing Buildings
- Proposed Gas Engines
- Sensitive Receptor

Exceedance of Noise Rating Over Daytime Background, dB

<=	0.0
0.0 -	5.0
5.0 -	10.0
10.0 -	15.0
>	15.0

CLIENT: Viridor Waste Management LTD		
PROJECT: Pilsworth North Medium Combustion Plant		
TITLE: Exceedance of Noise Rating Level Over Daytime Background Noise Level at ESR2		
DRG NO: ST17896/003		REV: A
DRG SIZE: A3	SCALE: 1:1500	DATE: 15/04/2020
DRAWN BY: JS	CHECKED BY: RC	APPROVED BY: MD

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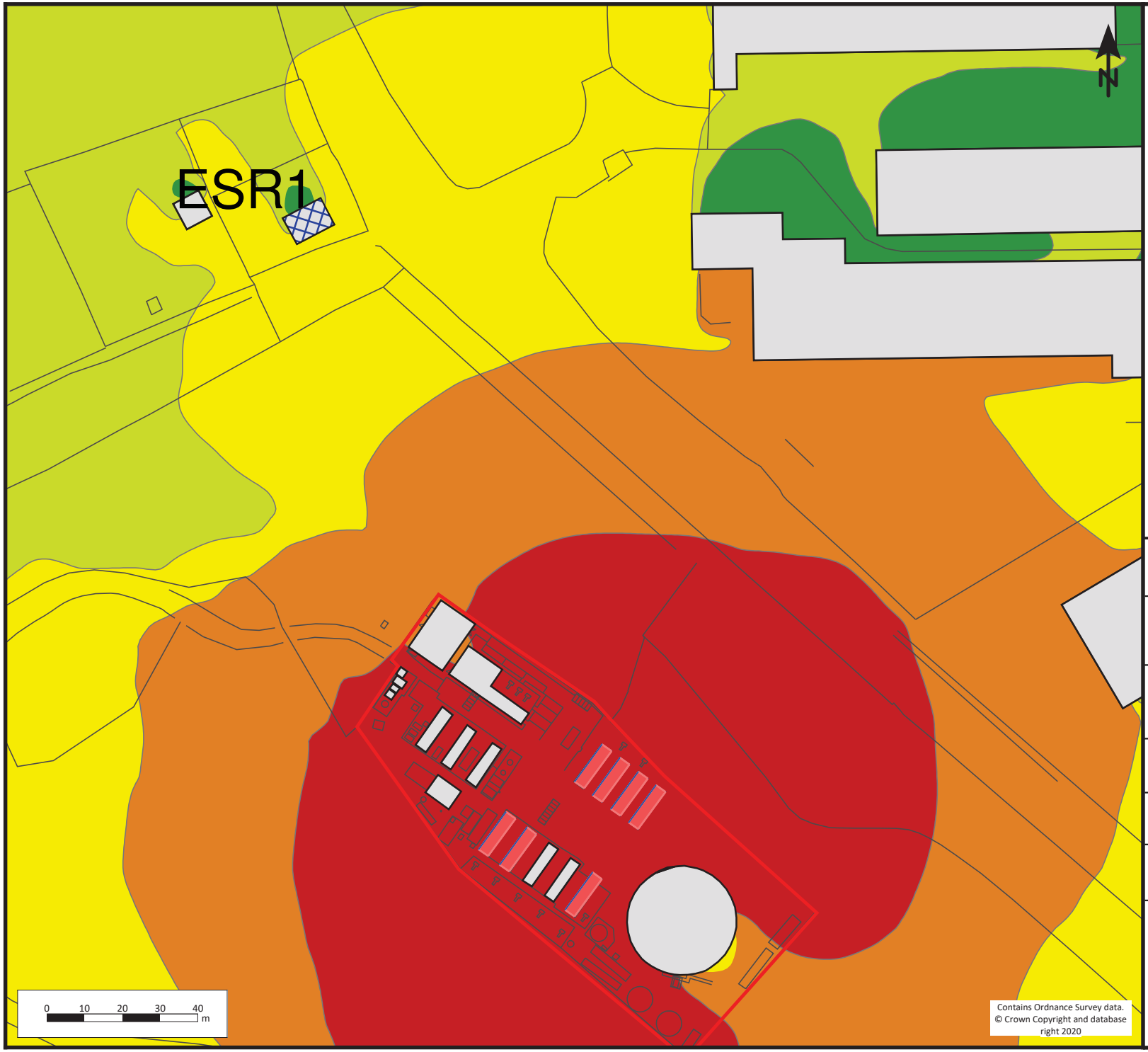

Key

- Site Area
- Existing Buildings
- Proposed Gas Engines
- Sensitive Receptor

Exceedance of Noise Rating Over Night-time Background, dB

<=	0.0
0.0 -	5.0
5.0 -	10.0
10.0 -	15.0
>	15.0

CLIENT: Viridor Waste Management LTD		
PROJECT: Pilsworth North Medium Combustion Plant		
TITLE: Exceedance of Noise Rating Level Over Night-time Background Noise Level at ESR1		
DRG NO: ST17896/004		REV: A
DRG SIZE: A3	SCALE: 1:1000	DATE: 15/04/2020
DRAWN BY JS	CHECKED BY RC	APPROVED BY MD

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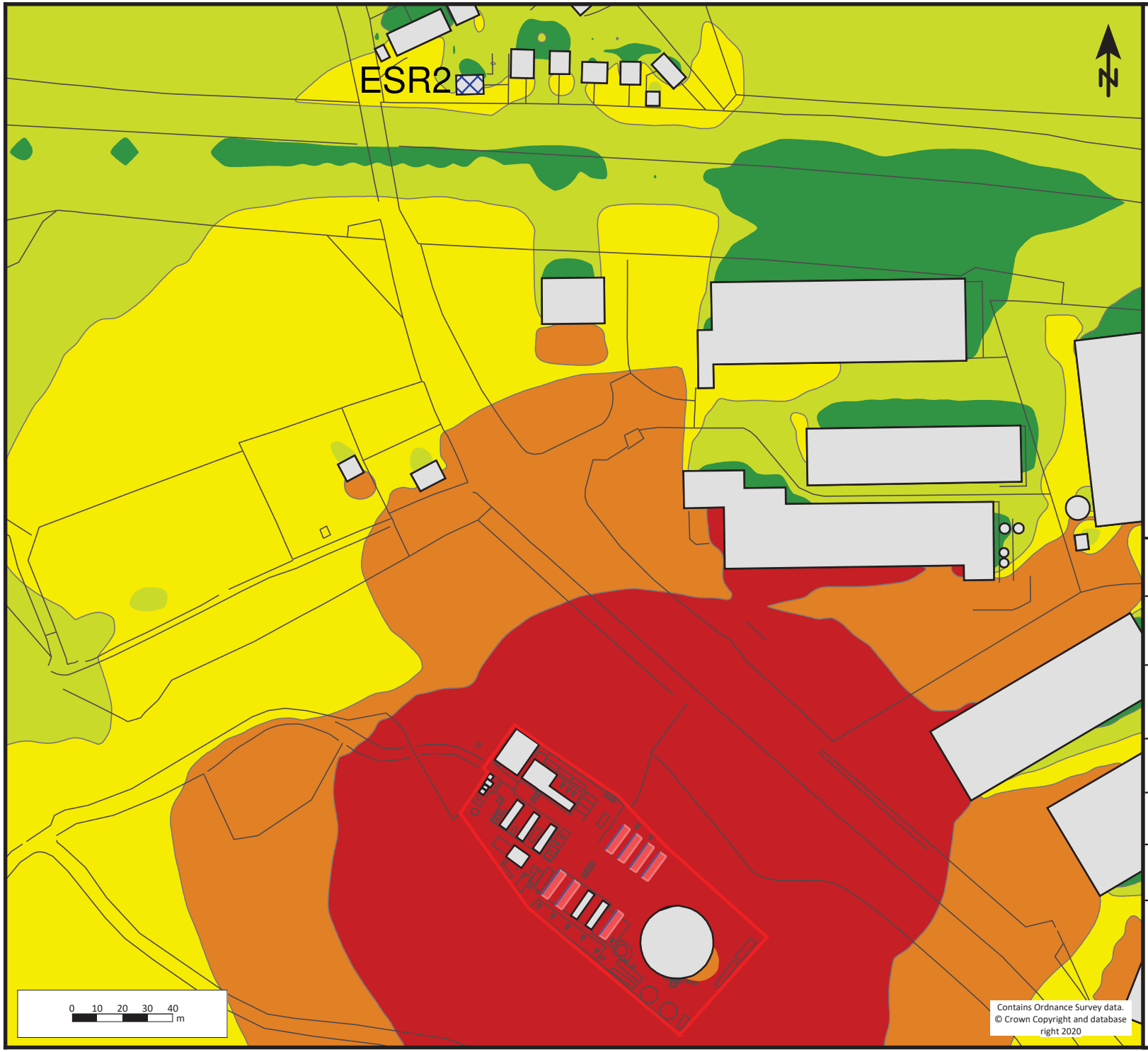

Key

- Site Area
- Existing Buildings
- Proposed Gas Engines
- Sensitive Receptor

Exceedance of Noise Rating Over Night-time Background, dB

<=	0.0
0.0 -	5.0
5.0 -	10.0
10.0 -	15.0
>	15.0

CLIENT: Viridor Waste Management LTD		
PROJECT: Pilsworth North Medium Combustion Plant		
TITLE: Exceedance of Noise Rating Level Over Night-time Background Noise Level at ESR2		
DRG NO: ST17896/005		REV: A
DRG SIZE: A3	SCALE: 1:1500	DATE: 15/04/2020
DRAWN BY: JS	CHECKED BY: RC	APPROVED BY: MD

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