LFAcoustics
consulting engineers

NOISE ASSESSMENT

PROPOSED OIL STORAGE DEPOT, HORNTON GROUNDS QUARRY

CERTAS ENERGY UK LTD

JUNE 2020

LF Acoustics Ltd
Pond Farm
7 High Street
Pulloxhill
Bedfordshire
MK45 5HA

t: 01525 888046
e: mail@lfacoustics.co.uk

Registered in England
Company Reg: 8434608

NOISE ASSESSMENT

PROPOSED OIL STORAGE DEPOT, HORNTON GROUNDS QUARRY

CERTAS ENERGY UK LTD

JUNE 2020

Revision	Prepared By	Date
1.0	L Jephson BEng (Hons) MIOA	8/6/20

CONTENTS

1. Introduction

LF Acoustics Ltd have been appointed to undertake a noise assessment in support of a planning application for an oil storage depot to be located within Hornton Grounds Quarry.

Certas presently have an oil storage depot at Tramway Road, Banbury. The site is due to be redeveloped and Certas need to relocate, with a suitable alternative site identified within the quarry.

The depot would be sited within the eastern part of the quarry and set at the base of the quarry, which is effectively screened by the quarry sides.

There are relatively few residential properties surrounding the site, with those potentially affected by the proposed operation located to the south.

The following section of this report summarises the applicable standards and guidance applicable to this development, with a description of the site and its surroundings provided within Section 3. Section 4 describes the baseline noise conditions upon which the assessment has been based. Section 5 calculates the noise levels attributable to the operation of the site and assesses the calculated noise levels against the relevant criteria. Finally, Section 6 provides a summary of the report.

2. Applicable Standards and Guidance

2.1. A description of the noise units referred to in this report is provided in Appendix A.

2.2. National Planning Policy Framework

The National Planning Policy Framework (NPPF), revised in February 2019 [1], sets out the Government's planning policies for England and how these should be applied. It provides a framework upon which locally-prepared plans for housing and other development can be produced.

The purpose of the planning system is to contribute to the achievement of sustainable development and at the heart of the Framework is a presumption in favour of sustainable development.

With regards noise, paragraph 180 of the NPPF advises that local planning policies and decisions should contribute to and enhance the natural and local environment by:

- preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels noise pollution.
- mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development (including cumulative effects) – and avoid noise giving rise to significant adverse impacts on health and the quality of life;
- identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

Reference is made within the NPPF to the Noise Policy Statement for England [2] (NPSE), which sets out the long term vision of the Government noise policy. Further information has been provided on the assessment of noise within recent Planning Practice Guidance, published in March 2014 and available on the Government planning web site. Whilst this guidance does not provide any objective criteria upon which to base noise assessments, the guidance provides a description of the relevant Effects Levels identified within the NPPF and NPSE and this is reproduced in Table 2.1.

Perception	Examples of Outcomes	Increasing Effect Level	Action
Not noticeable	No Effect	No Observed Effect (NOEL)	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 (LOAEL)	
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 (SOAEL)	
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

Table 2.1 Significance Criteria

2.3. British Standard BS 4142

BS 4142 [3] is the British Standard for rating and assessing noise of a commercial or industrial nature and is relevant to the noise associated with the operation of the site.

BS 4142 is a comparative standard in which the estimated noise levels from the proposed development are compared to the representative / typical background noise level from existing uses.

BS 4142 relates the likelihood of complaint to the difference between the Rating Level of the noise being assessed and the background noise level.

The background noise level is the L_{A90} noise level, usually measured in the absence of noise from the source being assessed, but may include other existing industrial or commercial sounds. The background noise levels should generally be obtained from a series of measurements each of not less than 15 minute duration.

The Rating Level of the noise being assessed is defined as its L_{Aeq} noise level (the 'specific noise level'), with the addition of appropriate corrections should the noise exhibit a marked impulsive and/or tonal component, or should the noise be irregular enough in character to attract attention. The extent of the correction is dependent upon the degree of tonality or character in the noise and is determined either by professional judgement, where the plant is not operational at present, or by measurement.

During the daytime, the specified noise levels are determined over a reference time interval of 1 hour, with a 15 minute assessment period adopted at night.

If the Rating Level of the noise being assessed exceeds the background level by 10 dB or more BS 4142 advises that there is likely to be an indication of a significant adverse impact, depending upon context. A difference between background level and Rating Level of around 5 dB is likely to be an indication of an adverse impact, depending upon context. The lower the Rating Level is, relative to the background noise level, the less likely the specific source will have an adverse or significant adverse impact. Where the Rating Level does not exceed the background noise level is an indication of a low impact, depending upon context.

Where the initial assessment of impact needs to be modified due to the context, all pertinent factors should be taken into account, including:

- The absolute level of sound; and
- 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.

2.4. British Standard BS 8233

BS 8233 [4] recommends design aims for noise levels to be achieved in buildings.

For residential properties, the guidance recommends the following internal design aims for the daytime (07:00 – 23:00) periods:

- 35 dB $L_{Aeq,T}$ within living rooms and bedrooms during the daytime (07:00 – 23:00);
- 40 dB $L_{Aeq,T}$ within dining areas / rooms during the daytime (07:00 – 23:00);
- 30 dB $L_{Aeq,T}$ within bedrooms during the night-time (23:00 – 07:00) and
- 50 – 55 dB $L_{Aeq,T}$ within gardens and patios.

2.5. World Health Organisation Guidelines

The WHO Guidelines for Community Noise [5] provide guidance on acceptable noise levels within residential properties to minimise adverse noise impacts.

During the daytime periods, the guidance recommends protecting the majority of people from moderate annoyance, that noise levels should remain below 50 dB $L_{Aeq,\ 16\ hour}$. Assuming an open windows provides a minimum a typical reduction of between 10 - 15 dB(A) reduction in noise levels, this would equate to a level internally of between 35 - 40 dB $L_{Aeq,\ 16\ hour}$ internally.

The WHO more recently published guidance on acceptable noise levels at night [6].

The guidance advises at external noise levels below 30 dB $L_{Aeq,\ 8\ hour}$ there are no observed effects, and this may be considered the NOEL. When external noise levels increase to 40 dB $L_{Aeq,\ 8\ hour}$ adverse effects are observed.

3. Site Description and Development Proposals

3.1. Site Description

The Proposed Development would be located within the eastern half of Hornton Grounds Quarry, as indicated on Figure 1. The depot would be sited at the base of the quarry and thus effectively screened by the quarry sides. Vehicles would access the depot along the existing quarry access from the A422 to the south.

The site would principally house the fuel storage facilities and parking for tankers and employees' cars. The proposed layout is indicated on Figure 2.

The site would operate the same as the existing facility at Banbury.

Typically, employees would arrive from around 05:30 hours. One or two vehicles would be started up to enable the drivers to carry out the daily checks. Once completed, the vehicles would be moved to the two loading gantries and the engines switched off. These vehicles would then be filled with the fuels to be delivered. The fuels would be pumped into the vehicles utilising electric pumps located at ground level adjacent to the storage tanks. The tankers would typically take around 15 minutes to be filled. Once filled, the tankers would depart from the site and the next vehicles moved onto the loading gantries.

At present, 7 vehicles are based at the existing depot, which would transfer to the new site. Not all vehicles would be used each day, as this is due to demand and orders.

Once the vehicles depart for their deliveries, there would be very little activity on the site.

Depending upon deliveries, one or two vehicles would return during the day to be refilled, with further deliveries undertaken during the afternoon.

The vehicles would return to the depot during the afternoon and would either be parked up or any spare fuel unloaded back into the storage tanks. This would also be carried out using ground level electric pumps.

There would be typically two to three bulk deliveries of fuel each day. These deliveries would normally be made overnight, although this is dependent upon demand. Deliveries would be made by an articulated vehicle, which would drive into the site and park alongside the offloading headers. The vehicle engine would then be switched off whilst the vehicle was parked. The fuels would be pumped into the storage tanks using two ground level electric pumps located alongside the tanks, with a delivery typically taking around 45 minutes to complete. Once complete, the tanker would depart from the site.

3.2. Noise Sensitive Receptors

There are no residential receptors within close proximity to the proposed storage depot.

The closest property is Hornton Grounds, located approximately 300 metres to the south east of the quarry, as indicated on Figure 1.

The other potentially affected property is The Dairy Cottage, located to the south west and approximately 500 metres from the quarry and 200 metres from the access road.

Dwellings within Hornton village to the east are over 1 km from the quarry and given the large distance would not be adversely impacted by the operation of the proposed depot.

4. Baseline Noise Assessment

Due to the ongoing pandemic, it has not been considered appropriate to carry out baseline noise monitoring to establish the current background noise levels upon which to base the assessment, as monitoring at the current time would not be representative of typical conditions.

Alternative methods to derive the noise levels within the site have therefore been utilised, in accordance with the current Institute of Acoustics guidance [7]. The proposed methodology was discussed with Environmental Health Officers at Cherwell District Council, who accepted the following approach as reasonable.

The quarry has operated during the daytime periods for many years. Planning conditions attached to the minerals operations specify a limit of 45 dB $L_{Aeq,\ 1\ hour}$ during the daytime operating periods, with a limit of 5 dB(A) above background noise levels applicable to the stone cutting operations.

The depot would be most active during the early morning period, as the tankers load for the day's deliveries and overnight, associated with the deliveries of fuel. No noise monitoring or planning condition limits have previously been specified for night-time periods, and thus appropriate limits have been derived from absolute noise standards and guidance.

BS 4142 advises that where background and rating levels are likely to be low, it is often as if not more important to consider absolute noise standards, rather than the difference between the two, which is especially true at night.

Consideration has therefore been given to information contained within BS 8233 and by the WHO, which provides guidance on absolute noise levels to ensure potential adverse impacts are minimised.

BS 8233 advises that it is desirable that the internal ambient noise level does not exceed a level of 35 dB $L_{Aeq,16\ hour}$ during the daytime period within living rooms and bedrooms and 30 dB $L_{Aeq,\ 8\ hour}$ within bedrooms at night. On the basis of an open window typically providing a sound reduction of between 10 – 15 dB(A), equivalent external levels below 45 dB $L_{Aeq,\ 16\ hour}$ daytime and 40 dB $L_{Aeq,\ 8\ hour}$ night-time, would seek to ensure an acceptable noise environment was maintained within the properties.

Additionally, for steady state noise, the WHO night-noise guidance advises that a level of 40 dB $L_{Aeq,\ 8\ hour}$ represents the Lowest Observed Adverse Effect Level (LOAEL) overnight, which is equivalent to the BS 8233 guidance for night noise, assuming an open window.

Taking account of the low background noise levels within the area, particularly during the early morning period, to ensure any potential adverse impacts are minimised, an external limit of 35 dB $L_{Aeq,\ T}$ has been proposed for the operation of the proposed plant at the surrounding properties, specified as a Rating Level.

Adopting this limit for the overnight operations would ensure that the noise levels within the properties, particularly during the most sensitive early morning and evening periods remained at least 5 dB(A) below a level which would represent the lowest adverse observed effects level and thus ensure that any potentially adverse effects were minimised.

5. Calculation and Assessment of Noise Levels

5.1. Calculated Noise Levels

A noise model for the proposed storage depot has been prepared within the SoundPlan computer modelling package. The model utilises the calculation methodology from ISO 9613-2 and takes account of the intervening ground conditions between the quarry and neighbouring properties. Ground heights for the site and surrounding area have been taken from LiDAR digital terrain model data.

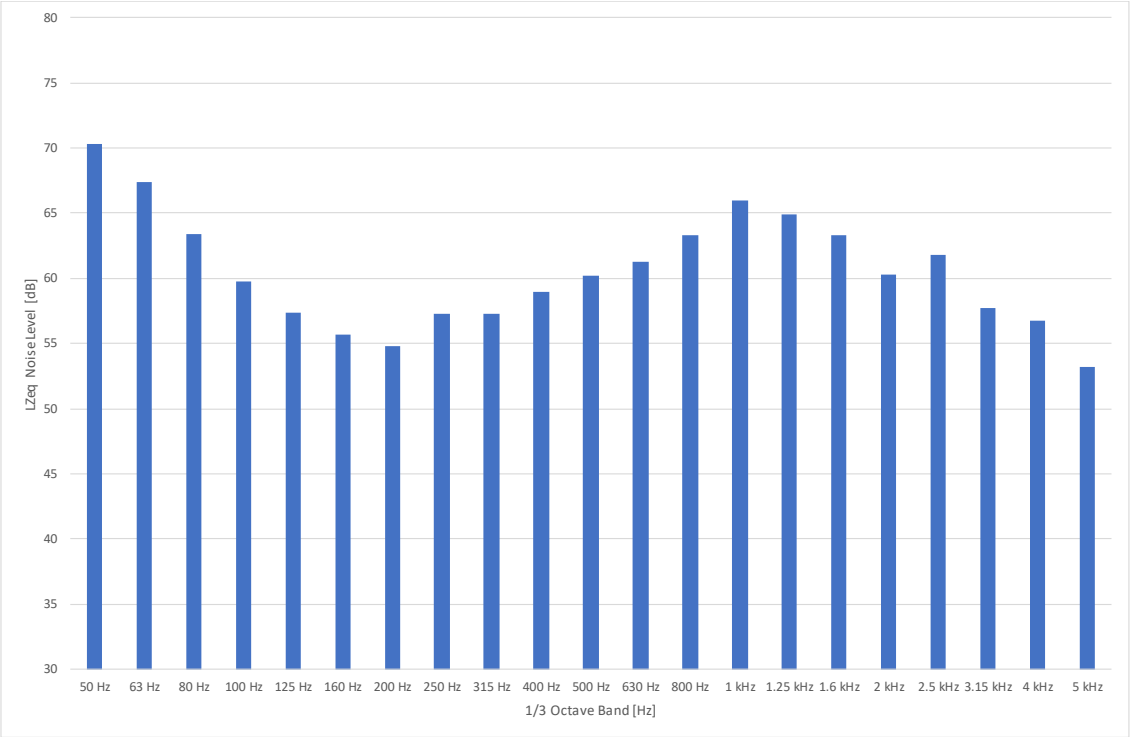
As discussed previously, noise levels attributable to the operation of the storage depot would be principally influenced by a mix of vehicle movements and the use of the electric pumps to either fill or drain the delivery vehicles.

The peak operational period would normally be from around 05:30 hours, when the drivers would arrive, start the vehicles, and load them ready for the day's deliveries. As discussed, the facility would allow two vehicles to be filled at once, with each taking around 15 minutes to complete. On this basis and to provide a likely worst case condition, the calculations have assumed the use of two vehicles manoeuvring within the depot, filling, using four pumps and departing over a 15 minute period. Calculations have also been prepared for an overnight delivery, which would typically include one vehicle movement and two pumps running over a 15 minute assessment period.

As indicated previously, during daytime hours, once the vehicles have left, there would be very little activity within the depot, until they returned and potentially off loaded before parking up. The daytime activities would therefore result in lower noise levels compared to the early morning periods, as BS 4142 specifies a 1 hour period for daytime noise and the noise level from an occasional vehicle movement would be lower than assessed for the night-time period, taken over an assessment period of 15 minutes.

Source term noise data for the electric pumps has been obtained from a measurement taken adjacent to one of the existing pumps within the Banbury Depot. The pumps proposed would be equivalent and thus the measurement was considered representative for the purposes of this assessment. The noise measurement, taken at a distance of 1 metre from the pump operating indicated a level of 73.0 dB L_{Aeq}.

A 1/3 octave band measurement was obtained to evaluate the tonality of the noise associated with the operation of the pump, as indicated below.



The noise was not considered tonal from a subjective assessment. An objective assessment has been made in accordance with the methodology contained within BS 4142, which confirms that the noise was not tonal in nature, as can be seen from the frequency analysis above.

Vehicles travelling along the access would need to maintain the current speed limits and would normally travel along the access at a relatively constant speed using low engine revs, which would seek to minimise noise levels. The calculations, however, have been based upon a vehicle travelling normally at speeds of between 20 – 30 mph and thus represent likely worst case conditions.

The results of the calculations are provided graphically on Figures 3 and 4, with the calculation details provided in Appendix B. A summary of the calculated façade noise levels at the upper floors of the properties are provided in the tables below.

Property	**Calculated Façade Noise Levels [dB $L_{Aeq, T}$]**			
	On Site Vehicle Checks / Movements	**Pumping Operations**	**Vehicle Movements on Access**	**Overall**
Hornton Grounds	28.0	18.7	24.8	30.0
The Dairy Cottage	25.2	23.5	30.7	32.4

Table 5.1 Calculated Noise Levels Attributable to Early Morning Vehicle Departures

Property	Calculated Façade Noise Levels [dB $L_{Aeq, T}$]			
	On Site Vehicle Checks / Movements	Pumping Operations	Vehicle Movements on Access	Overall
Hornton Grounds	26.9	<10	19.8	27.7
The Dairy Cottage	23.2	<10	25.7	27.7

Table 5.2 Calculated Noise Levels Attributable to Overnight Bulk Deliveries

5.2. Assessment

An assessment of the calculated noise levels has been made against the requirements of BS 4142 to ensure that the operation of the proposed facility would not result in significant adverse noise impacts and thus meet the requirements of the NPPF.

The noise monitoring adjacent to the pumping operations indicated that it was not tonal or characteristic in nature.

Noise associated with vehicle movements is not unusual for the quarry, although unlike the current operations, there would be occasional vehicle movements overnight and during the early morning periods.

On this basis, no penalties are considered necessary when determining the Rating Level of noise from the site operations.

Assessment of Noise Levels at Hornton Grounds

The highest noise levels associated with the operation of the depot would occur after 05:30 hours, when the delivery drivers start to make their daily checks and load the vehicles. Noise levels calculated at this property during this period were 30 dB $L_{Aeq, 15\ minute}$.

Assessing the calculated noise level against the requirements of BS 4142 on the basis of noise levels not exceeding a rating level of 35 dB $L_{Aeq, 15\ minute}$ would indicate that the noise levels would be 5dB(A) below this limit and thus indicate a low potential for an adverse noise impact associated with the loading operations at this property. It is noted that the highest noise levels associated with the loading operations would be associated with the vehicle movements within the depot.

Noise levels associated with the overnight deliveries would be lower, with a calculated noise level of 28 dB $L_{Aeq, 15\ minute}$. This level of noise would be 7 dB(A) below the proposed noise limit and thus seek to ensure that the deliveries did not result in any adverse noise impacts.

On the basis of the above, the operation of the facility would not result in any adverse noise impacts upon the occupants of this property.

Assessment of Noise Levels at The Dairy Cottage

Noise levels attributable to the operation of the oil storage depot would be at a maximum during the early morning period, as the delivery vehicles are checked and loaded for the day's deliveries. Noise levels calculated during this period are anticipated to be up to 33 dB $L_{Aeq,15\ minute}$ at this property. Assessing the calculated noise level against the proposed limit of 35 dB $L_{Aeq, 15\ minute}$, indicates that the operations would have the potential to result in a low impact and thus be acceptable.

Noise levels associated with the overnight deliveries would be lower and calculated to be 28 dB $L_{Aeq,T}$ at the dwelling. This level of noise would be 7dB(A) below the proposed night-time limit and again assessing the level against the requirements of BS 4142 would advise the low potential for an adverse noise impact and thus considered acceptable.

The noise levels at the dwelling assessed above, would be principally attributable to the vehicle movements along the quarry access. As discussed previously, the drivers would be required to maintain the existing speed limit whilst driving along the access, which would seek to minimise noise associated with the vehicle movements.

The operation of the oil depot would therefore not result in any adverse noise impacts at this property.

6. Summary

LF Acoustics Ltd were appointed to undertake a noise assessment in support of a planning application for an oil storage depot to be located within Hornton Grounds Quarry.

Certas presently have an oil storage depot located at Tramway Road, Banbury. The site is due to be redeveloped and Certas need to relocate. A suitable alternative site has been identified within the quarry.

The depot would be sited within the eastern part of the quarry and accessed using the existing quarry access from the A422 to the south.

There are relatively few residential properties surrounding the site, with those potentially affected located to the south of the quarry.

Calculations of the noise levels attributable to the operation of the depot have been made, based upon the noise levels associated with the worst case period, which is normally during the early morning, as the vehicles are readied for the days deliveries and associated with overnight deliveries of fuel to the depot.

An assessment of the calculated noise levels during the overnight period has been made, which indicated that the operation of the deport would have a low potential to give rise to adverse noise impact at surrounding properties. The operation of the site is therefore considered to be acceptable from a noise perspective and would not result in any significant adverse impact, thus complying with the requirements of the NPPF.

References

1. Ministry of Housing, Communities and Local Government. National Planning Policy Framework. February 2019.

2. Department for Communities and Local Government. Noise Policy Statement for England. 2010.

3. British Standards Institute. Methods for Rating and Assessing Industrial and Commercial Sound. BS 4142:2014 +A1:2019.

4. British Standards Institute. Guidance on Sound Insulation and Noise Reduction for Buildings. BS 8233. 2014.

5. World Health Organisation. Guidelines for Community Noise. Geneva. 1999.

6. World Health Organisation. Night Noise Guidelines for Europe. Geneva. 2009.

7. Association of Noise Consultants / Institute of Acoustics. Joint Guidance on the Impact of COVID-19 on the Practicality and reliability of Baseline Sound Level Surveying and the Provision of Sound & Noise Impact Assessments. Version 4. 21st April 2020.

Figures

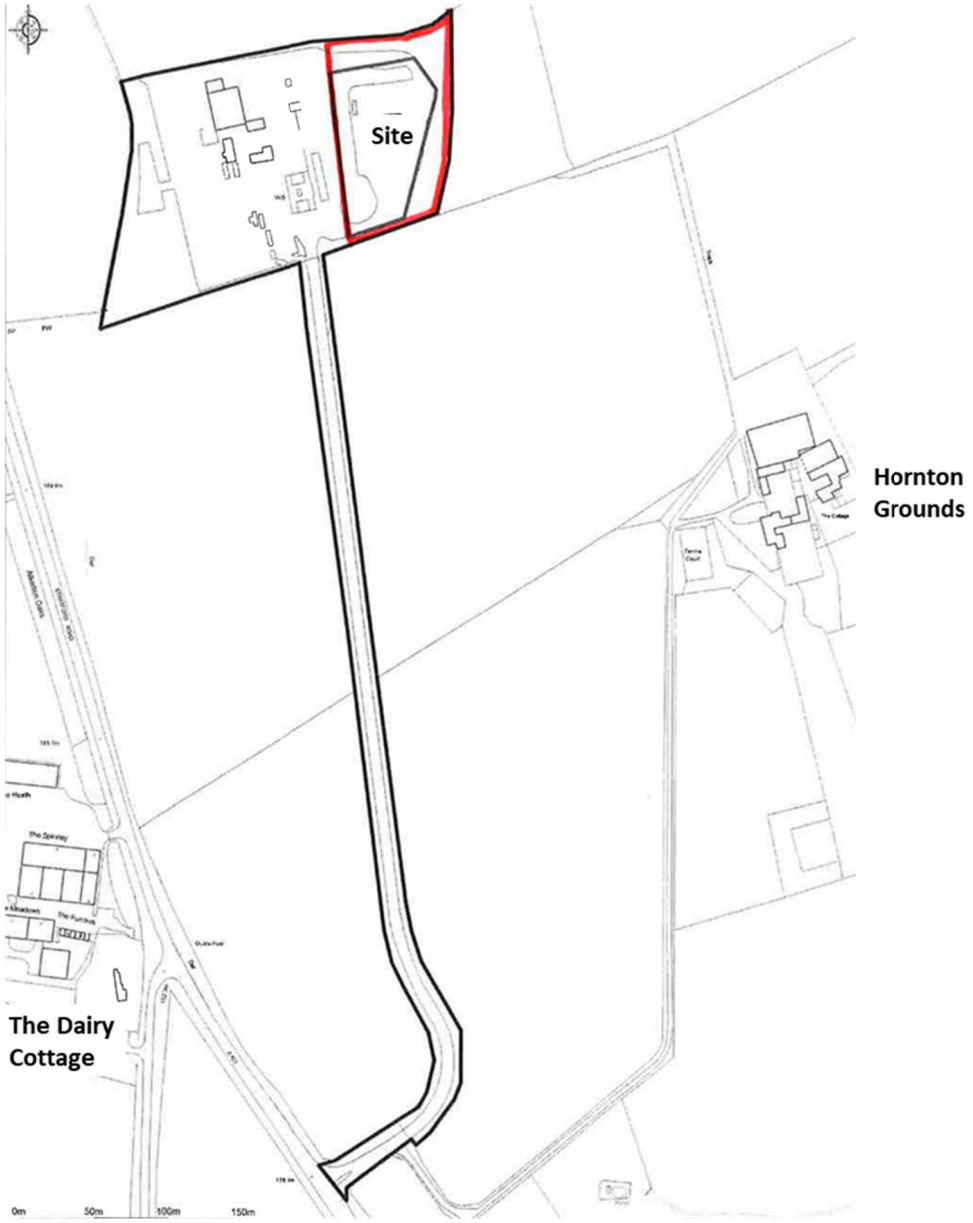
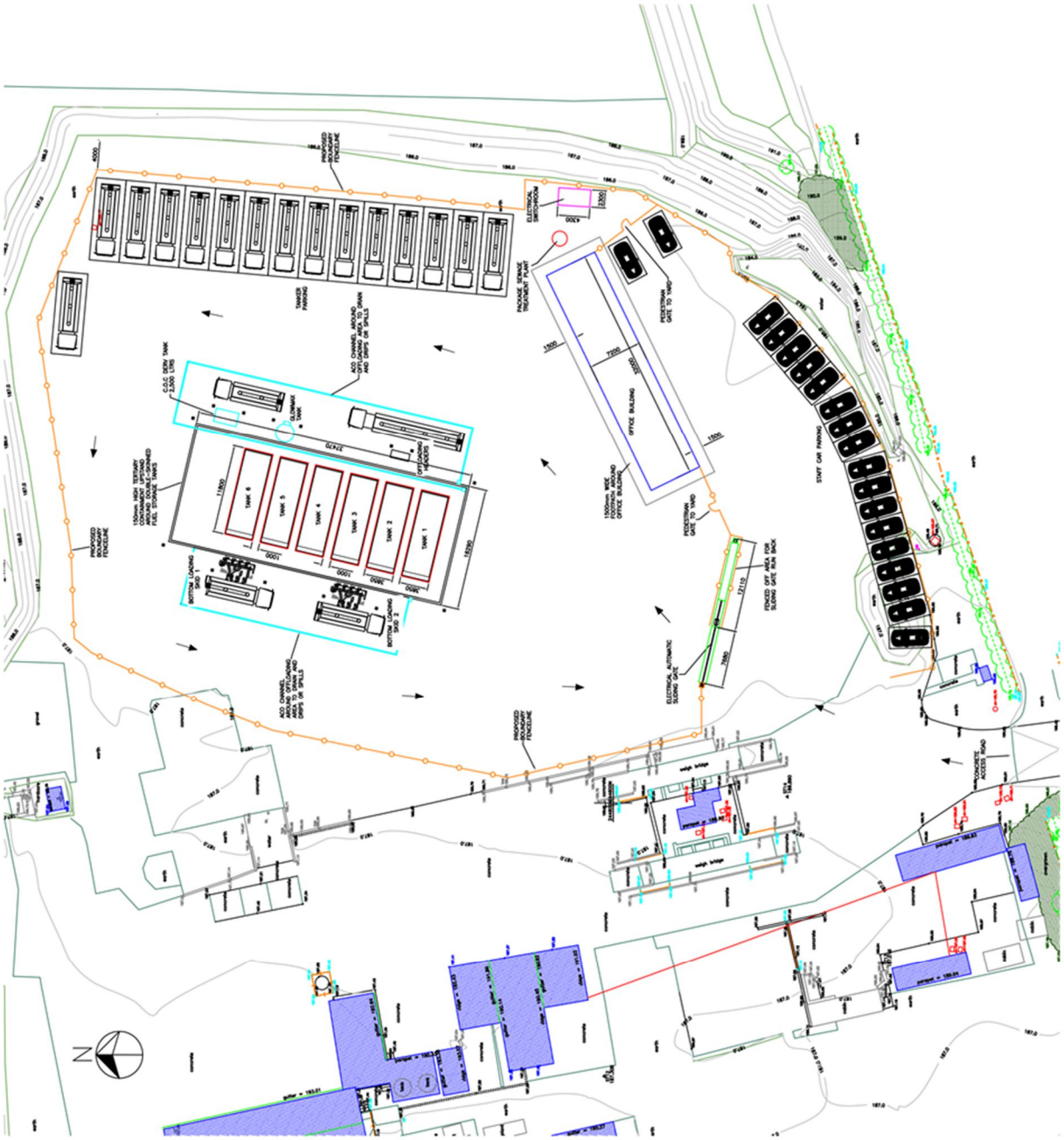


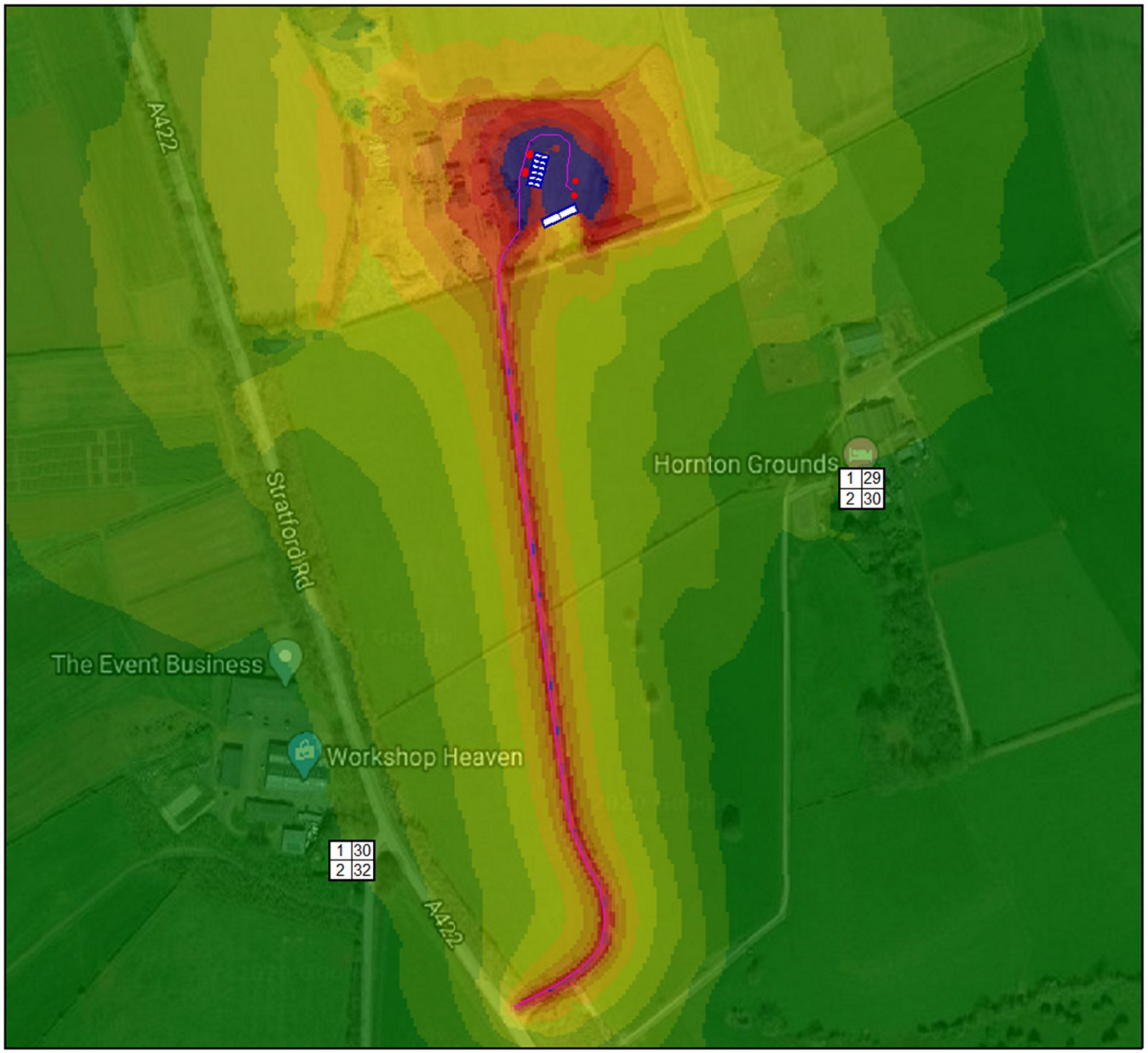
Figure 1:
Site Location

LFAcoustics
consulting engineers

LFAcoustics
consulting engineers

Figure 2:
Site Layout





Noise Level LAeq,T
in dB(A)

	< 30
30	- 33
33	- 36
36	- 39
39	- 42
42	- 45
45	- 48
48	- 51
51	- 54
54	- 57
57	- 60
>=	60

1	32
2	33

Floor
Facade $L_{Aeq,T}$

Figure 3:
Calculated Noise Levels
Early Morning Period

LFAcoustics
consulting engineers

LFAcoustics
consulting engineers

Noise Level LAeq,T
in dB(A)

	< 30
	30 - 33
	33 - 36
	36 - 39
	39 - 42
	42 - 45
	45 - 48
	48 - 51
	51 - 54
	54 - 57
	57 - 60
	>= 60

1	32
2	33

Floor
Facade $L_{Aeq,T}$

Figure 4:
Calculated Noise Levels
Overnight Delivery

LFAcoustics
consulting engineers

LFAcoustics
consulting engineers

Appendix A
Noise Units

Decibels (dB)

Noise can be defined as unwanted sound. Sound in air can be considered as the propagation of energy through the air in the form of oscillatory changes in pressure. The size of the pressure changes in acoustic waves is quantified on a logarithmic decibel (dB) scale firstly because the range of audible sound pressures is very great, and secondly because the loudness function of the human auditory system is approximately logarithmic.

The dynamic range of the auditory system is generally taken to be 0 dB to 140 dB. Generally, the addition of noise from two sources producing the same sound pressure level, will lead to an increase in sound pressure level of 3 dB. A 3 dB noise change is generally considered to be just noticeable, a 5 dB change is generally considered to be clearly discernible and a 10 dB change is generally accepted as leading to the subjective impression of a doubling or halving of loudness.

A-Weighting

The bandwidth of the frequency response of the ear is usually taken to be from about 18 Hz to 18,000 Hz. The auditory system is not equally sensitive throughout this frequency range. This is taken into account when making acoustic measurements by the use of A-weighting, a filter circuit which has a frequency response similar to the human auditory system. All the measurement results referred to in this report are A-weighted.

Units Used to Describe Time-Varying Noise Sources (L_{Aeq}, L_{A90} and L_{Amax})

Instantaneous A-weighted sound pressure level is not generally considered as an adequate indicator of subjective response to noise because levels of noise usually vary with time.

For many types of noise the Equivalent Continuous A-Weighted Sound Pressure Level ($L_{Aeq,T}$) is used as the basis of determining community response. The $L_{Aeq,T}$ is defined as the A-weighted sound pressure level of the steady sound which contains the same acoustic energy as the noise being assessed over a specific time period, T.

The L_{A90} is the noise level exceeded for 90% of the measurement period. It is generally used to quantify the background noise level, the underlying level of noise which is present even during the quietest part of the measurement period.

The L_{Amax} is the maximum value that the A-weighted sound pressure level reaches during a measurement period. $L_{Amax,F}$, or Fast, is averaged over 0.125 of a second.

Appendix B
Calculation Details

Hornton Grounds Oil Depot
Mean propagation Leq - Early Morning Loading

Legend

Source		Source name
Source type		Type of source (point, line, area)
Time slice		Name of time slice
L'w	dB(A)	Sound power level per m, m²
Lw	dB(A)	Sound power level per unit
l or A	m,m²	Size of source (length or area)
S	m	Distance source - receiver
Adiv	dB	Mean attenuation due to geometrical spreading
Agr	dB	Mean attenuation due to ground effect
Abar	dB	Mean attenuation due to screening
Aatm	dB	Mean attenuation due to air absorption
dLrefl	dB	Level increase due to reflections
Ls	dB(A)	Unassessed sound pressure level at receiver
Ls=Lw+Ko+ADI+Adiv+Agr+Abar+Aatm+Afol_site_house+Awind+dLrefl		
dLw	dB	Correction due to source operation time
Lr	dB(A)	Assessed level of time slice

Hornton Grounds Oil Depot
Mean propagation Leq - Early Morning Loading

10

Source	Source type	Time slice	L'w	Lw	l or A	S	Adiv	Agr	Abar	Aatm	dLrefl	Ls	dLw	Lr
			dB(A)	dB(A)	m,m²	m	dB	dB	dB	dB	dB	dB(A)	dB	dB(A)
Receiver Hornton Grounds Fl F 1 Lday,lim dB(A) LAeq,T 30.0 dB(A)														
HGV on Site Access	Line	LAeq,T	55.4	83.9	711.4	338.02	-61.6	-0.7	-4.4	-1.5	0.0	15.7	9.0	24.8
Tanker Loading	Point	LAeq,T	91.2	91.2		398.77	-63.0	-0.1	-14.4	-1.2	1.6	14.1	0.0	14.1
Tanker Loading	Point	LAeq,T	91.2	91.2		389.86	-62.8	-0.1	-16.3	-1.2	0.0	10.9	0.0	10.9
Tanker Loading	Point	LAeq,T	91.2	91.2		391.03	-62.8	-0.1	-15.9	-1.2	2.6	13.8	0.0	13.8
Tanker Loading	Point	LAeq,T	91.2	91.2		397.70	-63.0	-0.1	-16.1	-1.2	0.0	10.9	0.0	10.9
Vehicle Movement on Site	Line	LAeq,T	60.7	82.5	154.3	384.14	-62.7	-0.6	-5.2	-1.4	0.1	12.7	9.0	21.8
Vehicle Start Up & Idling	Point	LAeq,T	96.4	96.4		347.46	-61.8	0.1	-10.9	-1.0	0.0	22.8	0.0	22.8
Vehicle Start Up & Idling	Point	LAeq,T	96.4	96.4		355.49	-62.0	0.1	-8.9	-1.0	0.0	24.6	0.0	24.6
Receiver Stratford Road Fl F 1 Lday,lim dB(A) LAeq,T 32.4 dB(A)														
HGV on Site Access	Line	LAeq,T	55.4	83.9	711.4	252.08	-59.0	-1.6	-0.1	-1.5	0.0	21.7	9.0	30.7
Tanker Loading	Point	LAeq,T	91.2	91.2		616.59	-66.8	-0.6	-3.5	-3.0	0.0	17.3	0.0	17.3
Tanker Loading	Point	LAeq,T	91.2	91.2		598.72	-66.5	-0.6	-3.5	-3.0	0.0	17.6	0.0	17.6
Tanker Loading	Point	LAeq,T	91.2	91.2		601.22	-66.6	-0.6	-3.5	-3.0	0.0	17.6	0.0	17.6
Tanker Loading	Point	LAeq,T	91.2	91.2		614.52	-66.8	-0.6	-3.5	-3.0	0.0	17.3	0.0	17.3
Vehicle Movement on Site	Line	LAeq,T	60.7	82.5	154.3	605.12	-66.6	-1.2	-3.2	-2.2	0.0	9.3	9.0	18.3
Vehicle Start Up & Idling	Point	LAeq,T	96.4	96.4		593.03	-66.5	-0.4	-8.9	-1.7	0.0	19.0	0.0	19.0
Vehicle Start Up & Idling	Point	LAeq,T	96.4	96.4		605.12	-66.6	-0.4	-4.4	-2.3	0.0	22.7	0.0	22.7

Hornton Grounds Oil Depot
Mean propagation Leq - Fuel Delivery (Electric Pump)

10

Source	Source type	Time slice	L'w	Lw	l or A	S	Adiv	Agr	Abar	Aatm	dLrefl	Ls	dLw	Lr
			dB(A)	dB(A)	m,m²	m	dB	dB	dB	dB	dB	dB(A)	dB	dB(A)
Receiver Hornton Grounds Fl F 1 Lday,lim dB(A) LAeq,T 27.7 dB(A)														
Delivery Vehicle Movement	Line	LAeq,T	60.7	78.2	56.3	363.72	-62.2	-0.7	-6.8	-1.3	0.0	7.2	0.0	7.2
Delivery Vehicle Pumping	Point	LAeq,T	80.9	80.9		372.34	-62.4	0.5	-15.4	-1.8	1.6	3.4	0.0	3.4
Delivery Vehicle Pumping	Point	LAeq,T	80.9	80.9		373.08	-62.4	0.5	-15.3	-1.8	2.5	4.4	0.0	4.4
HGV on Site Access	Line	LAeq,T	59.4	87.9	711.4	338.05	-61.6	-0.7	-4.4	-1.5	0.0	19.8	0.0	19.8
Vehicle Doors / Starting	Point	LAeq,T	96.4	96.4		371.99	-62.4	0.1	-5.8	-1.4	0.0	26.8	0.0	26.8
Receiver Stratford Road Fl F 1 Lday,lim dB(A) LAeq,T 27.7 dB(A)														
Delivery Vehicle Movement	Line	LAeq,T	60.7	78.2	56.3	565.44	-66.0	-1.3	-3.0	-2.2	0.3	5.9	0.0	5.9
Delivery Vehicle Pumping	Point	LAeq,T	80.9	80.9		597.53	-66.5	0.0	-4.2	-3.7	0.0	6.5	0.0	6.5
Delivery Vehicle Pumping	Point	LAeq,T	80.9	80.9		599.02	-66.5	0.0	-4.2	-3.7	0.0	6.5	0.0	6.5
HGV on Site Access	Line	LAeq,T	59.4	87.9	711.4	252.08	-59.0	-1.6	-0.1	-1.5	0.0	25.7	0.0	25.7
Vehicle Doors / Starting	Point	LAeq,T	96.4	96.4		605.11	-66.6	-0.4	-3.8	-2.5	0.0	23.1	0.0	23.1