Our ref: NIA/7743/18/7648 v3.0

22nd June 2018

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Dear Mr Willock

NOISE IMPACT ASSESSMENT FOR A PROPOSED PETROL FILLING STATION WITH ASSOCIATED RETAIL UNIT
LAND OFF MITCHELLS WAY/BARNSLEY ROAD, WOMBWELL

1.00 INTRODUCTION

1.01 Environmental Noise Solutions Ltd (ENS) has been commissioned by Robert Halstead Chartered Surveyors, on behalf of its client Mr Y Valli, to undertake a noise impact assessment for a proposed petrol filling station (PFS) with associated retail unit on land off Mitchells Way/Barnsley Road, Wombwell (hereafter referred to as the application site).

1.02 The objectives of the noise impact assessment were to:

- Assess the ambient and background noise climate in the vicinity of the application site during representative daytime and night time periods.
- Assess the potential impact of the proposed development with reference to the National Planning Policy Framework (NPPF) and other pertinent guidance.
- Provide recommendations for a scheme of sound attenuation works, as necessary, such that the proposed development does not give rise to any unacceptable loss of amenity at adjacent noise sensitive receptors (NSRs).

1.03 This report details the methodology and results of the assessment. It has been prepared to accompany a planning application to be submitted to the Local Planning Authority for the proposed PFS and associated retail unit at the application site.

1.04 This report has been prepared for Robert Halstead Chartered Surveyors and its client Mr Y Valli for the sole purpose described above and no extended duty of care to any third party is implied or offered. Third parties making reference to the report should consult the parties above and ENS as to the extent to which the findings may be appropriate for their use.

1.05 A glossary of acoustic terms used in the main body of the text is contained in Appendix 1.

2.00 SITE SETTING & DEVELOPMENT PROPOSALS

2.01 The application site is located in a mixed-use setting to the south of the roundabout junction of Barnsley Road and Mitchells Way. An annotated aerial image of the site area, including an overlay of the proposed development, is contained in Appendix 2.1.

2.02 The application site is bound by:

- The roundabout to the north.
- Mitchells Way to the north east, with a Lidl store beyond.
- Residential development to the south (including established residential units and a recent development).
- Barnsley Road to the west/north west, with residential development and retail units beyond (including a hot food takeaway – American Fried Chicken (AFC)).

2.03 During the course of the noise survey, road traffic was noted to be the dominant noise source. External plant associated with the takeaway was also audible.

2.04 The development proposals consist of a PFS with seven pumps, retail unit and seven customer parking spaces (including one disabled bay). A proposed layout in contained in Appendix 2.2. With reference to the layout, the retail unit and parking spaces are located on the southern boundary, with the PFS forecourt in the central/northern area of the site. Access is off Barnsley Road. **The development proposals do not include a car washing facility**.

2.05 It is understood that the operating hours sought for both the PFS and associated retail unit are 24 hours per day, 7 days per week. Typical deliveries are understood to consist of (i) two main store deliveries per week, (ii) four to five short shelf life deliveries per week (milk, bread, sandwiches etc.) by small van and (iii) one to two fuel deliveries per week, with fuel gravity fed from tankers to underground tanks. External condensers for the refrigeration units will be located on the eastern elevation of the retail unit.

3.00 BASELINE NOISE SURVEY

3.01 In order to assess the noise climate in the vicinity of the application site, a baseline noise survey was undertaken on Tuesday 2nd January 2018. Following consultation with the Local Authority Environmental Health Department, additional measurements were undertaken on Saturday 26th May into Sunday 27th May 2018.

3.02 The nearest noise sensitive receptors (NSRs) were identified as follows (see Appendix 2.1 for locations):

- NSR1 – Dwellings to the west of Barnsley Road.
- NSR2 – Established dwellings to the south of the application site.
- NSR3 – New build dwellings to the south of the application site.

3.03 For the purpose of the noise impact assessment, the following noise monitoring positions (MPs) were adopted (the approximate locations are identified on the annotated plan in Appendix 2.1):

- MP1 was located in a free field environment, at 2.0 metres above ground level (mAGL), on the western side of Barnsley Road and circa 5 metres to the kerb (considered representative of NSR1).
- MP2 was located in a free field environment, at 1.5 mAGL, to the south of the application site and circa 10 metres to the kerb of Barnsley Road (considered representative of NSR2 & NSR3).
- MP3 was located in a free field environment, at 1.5 mAGL, adjacent to the southern site boundary and circa 20 metres to the kerb of Mitchells Way (considered representative of NSR3).

Continued from page 2

3.04 Noise measurements were undertaken using a Bruel & Kjaer 2250 Type 1 integrating sound level meter. Measurements consisted of A–weighted broadband parameters, together with linear octave band/third octave band L_{eq} levels with a logging interval of 5 seconds.

3.05 The measurement system calibration was verified immediately before the commencement of the measurement sessions and again at the end, using a Bruel & Kjaer Type 4231 calibrator. No drift in calibration level was noted. Weather conditions throughout the surveys were appropriate for monitoring. A windshield was fitted for all measurements.

3.06 The following tables contain a summary of the measurement data for each measurement session, at each measurement position, rounded to the nearest decibel.

Table 3.1 – Summary of noise measurement data, 2nd January 2018

Measurement Position	Date	Time	$L_{Aeq,T}$ (dB)	$L_{A90,T}$ (dB)	$L_{A10,T}$ (dB)	$L_{A1,T}$ (dB)	L_{AFMax} (dB)	Comments
MP1	2/1/18	10:14-10:30	68	55	72	76	84	Dominated by road traffic noise. Typical L_{AFmax} associated with vehicle pass ≤75 dB.
MP1	2/1/18	11:40-11:55	72	62	75	78	89	Dominated by road traffic noise and takeaway plant.
MP1	2/1/18	13:26-13:42	71	62	74	77	81	Dominated by road traffic noise and takeaway plant.
MP2	2/1/18	10:32-10:47	64	53	68	72	74	Dominated by road traffic noise.
MP2	2/1/18	11:22-11:37	67	56	71	75	86	Dominated by road traffic noise.
MP2	2/1/18	13:10-13:25	67	57	71	75	77	Dominated by road traffic noise.
MP3	2/1/18	10:49-11:05	63	60	65	67	69	Dominated by road traffic noise.
MP3	2/1/18	11:05-11:20	63	60	65	67	70	Dominated by road traffic noise.
MP3	2/1/18	12:53-13:08	63	60	65	67	74	Dominated by road traffic noise.

Table 3.2 – Summary of noise measurement data, 26th May 2018

Measurement Position	Date	Time	$L_{Aeq,T}$ (dB)	$L_{A90,T}$ (dB)	$L_{A10,T}$ (dB)	$L_{A1,T}$ (dB)	L_{AFMax} (dB)	Comments
MP1	26/5/18	04:55-05:16	57	41	58	71	76	Birdsong, distant and local traffic (circa 12 vehicles per hour on Barnsley Road). AFC refrigeration unit intermittently operating.
MP1	26/5/18	06:03-06:23	60	46	64	71	75	Birdsong, distant and local traffic (circa 75 vehicles per hour on Barnsley Road).
MP1	26/5/18	21:45-22:05	62	49	67	71	79	Distant and local traffic.
MP1	26/5/18	22:51-23:11	61	46	66	72	81	Distant and local traffic.
MP1	26/5/18	23:59-00:19	62	46	65	71	77	Distant and local traffic (circa 130 vehicles per hour on Barnsley Road). AFC extraction unit intermittently operating. $L_{90,T}$ with extraction unit off = 44 dB.
MP1	27/5/18	01:06-01:26	59	36	62	70	77	Distant and local traffic. Local retail units closed. AFC refrigeration unit intermittently operating.

Continued from page 3

Table 3.2 cont…… – Summary of noise measurement data, 26th May 2018

Measurement Position	Date	Time	$L_{Aeq,T}$ (dB)	$L_{A90,T}$ (dB)	$L_{A10,T}$ (dB)	$L_{A1,T}$ (dB)	L_{AFMax} (dB)	Comments
MP2	26/5/18	05:18-05:38	54	44	56	65	73	Birdsong, distant and local traffic.
MP2	26/5/18	06:24-06:44	57	44	60	68	78	Birdsong, distant and local traffic.
MP2	26/5/18	21:24-21:44	59	47	62	68	82	Distant and local traffic.
MP2	26/5/18	22:29-22:49	56	43	60	67	74	Distant and local traffic.
MP2	26/5/18	23:38-23:58	55	45	59	66	71	Distant and local traffic. AFC extraction unit operating throughout measurement.
MP2	27/5/18	00:45-01:05	54	34	57	65	73	Distant and local traffic. Local retail units closed.
MP3	26/5/18	05:42-06:02	57	46	60	65	70	Birdsong, distant and local traffic (circa 180 vehicles per hour on Mitchells Way).
MP3	26/5/18	06:46-07:06	59	51	63	67	72	Birdsong, distant and local traffic (circa 250 vehicles per hour on Mitchells Way).
MP3	26/5/18	21:02-21:22	59	51	62	67	78	Distant and local traffic (circa 300 vehicles per hour on Mitchells Way). AFC extraction unit operating throughout measurement.
MP3	26/5/18	22:07-22:27	59	49	62	67	73	Distant and local traffic.
MP3	26/5/18	23:14-23:34	56	44	60	64	70	Distant and local traffic (circa 200 vehicles per hour on Mitchells Way). AFC refrigeration unit intermittently operating (no difference in background noise level with and without extraction unit operating).
MP3	27/5/18	00:22-00:42	55	39	59	64	70	Distant and local traffic. Local retail units closed.

3.07 Based on the measurement data, the representative background noise levels during the quietest periods of the week are taken as follows:

- 46 dB $L_{A90,T}$ during the daytime period (07:00 to 23:00 hours) and 36 dB $L_{A90,T}$ during the night time period (23:00 to 07:00 hours) at MP1
- 43 dB $L_{A90,T}$ during the daytime period (07:00 to 23:00 hours) and 34 dB $L_{A90,T}$ during the night time period (23:00 to 07:00 hours) at MP2.
- 49 dB $L_{A90,T}$ during the daytime period (07:00 to 23:00 hours) and 39 dB $L_{A90,T}$ during the night time period (23:00 to 07:00 hours) at MP3.

Continued from page 4

4.00 NOISE IMPACT ASSESSMENT CRITERIA

National Planning Policy Framework

4.01 The National Planning Policy Framework (NPPF) is a material consideration in planning decisions. At the heart of the NPPF is a presumption in favour of sustainable development, and the policies in Paragraphs 18 to 219 of the NPPF, taken as a whole, constitute the Government's view on what sustainable development in England means in practice for the planning system.

4.02 The NPPF states that there are three dimensions to sustainable development, which include an economic role (contributing to building a strong, responsive and competitive economy), a social role (providing the supply of housing required to meet the needs of present and future generations) and an environmental role (which includes minimising waste and pollution).

4.03 The main policy statement in relation to noise is Paragraph 123 of the NPPF, which 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.*

4.04 In relation to 'adverse impacts', the NPPF refers to the Explanatory Note to the Noise Policy Statement for England (NPSE) for guidance.

4.05 The Noise Policy Statement for England (NPSE) and associated Explanatory Note were published by DEFRA in 2010 and set out the Government's noise management strategy to enable noise management decisions to be made within the wider context (i.e. guiding principles of sustainable development), in a cost-effective manner and in a timely fashion.

4.06 Fundamental to this approach is '*there is a need to integrate consideration of the economic and social benefit of the activity or policy under examination with proper consideration of the adverse environmental effects, including the impact of noise on health and quality of life. This should avoid noise being treated in isolation in any particular situation, i.e. not focussing solely on the noise impact without taking into account other related factors'*.

4.07 The noise policy aims of NPSE are to (i) avoid significant adverse impact on health and quality of life, (ii) mitigate and minimise adverse impacts on health and quality of life, and (iii) where possible, contribute to the improvement of health and quality of life. The policy aims are always to be considered within the context of the Government's policy on sustainable development.

4.08 In relation to the mitigation and minimisation of adverse impacts, NPSE considers that '*in reality, although not always stated, the aim has tended to be to minimise noise 'as far as is reasonably practical'*. This is reinforced in Paragraph 2.24 of the Explanatory Note, which requires that '*all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development. This does not mean that such adverse effects cannot occur'*.

4.09 In relation to explaining the 'significant adverse' and 'adverse' effects quoted in the NPPF, NPSE uses the two established concepts from toxicology that are currently being applied to noise impacts, for example by the World Health Organisation (WHO), these are:

- 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 noise.

- LOAEL – Lowest Observed Adverse Effect Level. This is the level above which adverse effects on health and quality of life can be detected.

4.10 The NPSE then extends these concepts to lead to a SOAEL – Significant Observed Adverse Effect Level. This is the level above which significant adverse effects on health and quality of life occur.

4.11 No specific criteria are presented in the NPSE, to provide the necessary policy flexibility until further evidence and suitable guidance is available. In lieu of specific criteria, for this assessment, ENS makes reference to existing guideline documents, which are summarised in the following paragraph(s).

Planning Practice Guidance on Noise

4.12 Planning Practice Guidance specifically dealing with noise was uploaded to the Government's Planning Portal in March 2014 as an accompaniment to the National Planning Policy Framework.

4.13 In order to determine noise impact, local planning authorities' plan-making and decision taking should take account of the acoustic environment and in doing so consider:

- Whether or not a significant adverse effect is occurring or likely to occur;
- Whether or not an adverse effect is occurring or likely to occur; and
- Whether or not a good standard of amenity can be achieved.

4.14 At the lowest extreme, when noise is not noticeable, there is by definition no effect. As the noise exposure increases, it will cross the no observed effect level as it becomes noticeable. However, the noise has no adverse effect so long as the exposure is such that it does not cause any change in behaviour or attitude. The noise can slightly affect the acoustic character of an area but not to the extent there is a perceived change in quality of life. If the noise exposure is at this level no specific measures are required to manage the acoustic environment.

4.15 As the exposure increases further, it crosses the lowest observed adverse effect level boundary above which the noise starts to cause small changes in behaviour and attitude, for example, having to turn up the volume on the television or needing to speak more loudly to be heard. The noise therefore starts 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).

4.16 Increasing noise exposure will at some point cause the significant observed adverse effect level boundary to be crossed. Above this level the noise causes a material change in behaviour such as keeping windows closed for most of the time or avoiding certain activities during periods when the noise is present. If the exposure is above this level the planning process should be used to avoid this 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.

4.17 At the highest extreme, noise exposure would cause extensive and sustained changes in behaviour without an ability to mitigate the effect of noise. The impacts on health and quality of life are such that regardless of the benefits of the activity causing the noise, this situation should be prevented from occurring.

4.18 The following table summarises the noise exposure hierarchy, based on the likely average response.

Continued from page 6

Table 4.1 – 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 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

4.19 The subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any particular situation. These factors include:

- The source and absolute level of the noise together with the time of day it occurs.
- For non-continuous sources of noise, the number of noise events, and the frequency and pattern of occurrence of the noise.
- The spectral content of the noise (i.e. whether or not the noise contains particular high or low frequency content) and the general character of the noise (i.e. whether or not the noise contains particular tonal characteristics or other particular features).
- The local acoustic character of the area.

BS4142:2014

4.20 The methods described in British Standard BS 4142:2014 'Methods for Rating and Assessing Industrial and Commercial Sound' (BS 4142) use outdoor sound levels to assess the likely effects of sound on people for the purposes of (i) investigating complaints, (ii) assessing sound from proposed, new, modified or additional source(s) of sound of an industrial and/or commercial nature, and (iii) assessing sound at proposed new dwellings or premises used for residential purposes. BS 4142 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 source exceeds the background sound level and the context in which the sound occurs. Typically, the greater this difference, the greater the magnitude of the impact. For example:

- *A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context*
- *A difference of around +5 dB 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*

Adverse impacts include, but are not limited to, annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact.

Where the initial estimate of the impact needs to be modified due to the context, take all pertinent factors into consideration, including the absolute level of sound.

4.21 The reference time interval of the specific sound is 1 hour during the day and 15 minutes at night.

4.22 The rating level is described as the specific sound level (the equivalent continuous A-weighted sound pressure level at the assessment position (NSR) produced by the specific sound source over the given reference time interval) plus any adjustment for the characteristic features of the sound. The character correction relates to whether and to what degree the specific sound is assessed to have an element of tonality, impulsivity and/or characteristics that are readily distinctive against the residual acoustic environment.

4.23 The background sound level is the A-weighted sound pressure level of the residual sound at the assessment position that is exceeded for 90 percent of a given time interval, T, measured using time weighting 'F' and quoted to the nearest whole number of decibels. The residual sound is described as the ambient sound remaining in a given position in a given situation when the specific sound source is suppressed to a degree such that it does not contribute to the ambient sound.

4.24 Based on BS 4142 and in the context of the NPPF, a rating level of <10 dB above the background noise level is not considered to represent a significant adverse impact (the prevention of which is the 1st aim of Para 123 of the NPPF), whilst a rating level not exceeding the background noise level is considered to be in keeping with the 2nd aim of Para 123 of the NPPF, i.e. to mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development.

Internal Ambient Noise Levels

4.25 In addition to the comparative level criteria advocated in BS 4142, consideration has also been given to absolute level criteria.

4.26 BS 8233:2014 'Guidance on sound insulation and noise reduction for buildings' (BS 8233) sets guideline indoor ambient noise levels for dwellings which it is desirable are not exceeded. These levels are based on guidelines issued by the World Health Organisation (WHO). For the daytime period (07:00 to 23:00 hours), in living rooms and bedrooms, the target criterion is 35 dB $L_{Aeq,T}$. For the night time period (23:00 to 07:00 hours), in bedrooms, the target criterion is 30 dB $L_{Aeq,T}$. The WHO Guidelines on Community Noise (1999) considers that if negative effects on sleep are to be avoided, noise events exceeding 45 dB L_{Amax} should be limited.

4.27 Based on the WHO Guidelines approximation of 15 dB reduction from outside to inside for a partially open window, an internal daytime target criterion of 35 dB $L_{Aeq,T}$ equates to an external free field level of 50 dB $L_{Aeq,T}$ with windows partially open, an internal night time target criterion of 30 dB $L_{Aeq,T}$ equates to an external free field level of 45 dB $L_{Aeq,T}$ with windows partially open and a discrete event maxima of 45 dB L_{AFmax} internally during the night time equates to an external free field level of 60 dB L_{AFmax} with windows partially open.

Continued from page 8

5.00 NOISE IMPACT ASSESSMENT

5.01 The principal noise sources potentially associated with the proposed development are considered to be:

- Noise associated with fixed external plant.
- Noise associated with customer parking provision.
- Noise associated with deliveries (goods to store).
- Noise associated with deliveries (fuel).
- Noise associated with the use of the petrol filling station.

5.02 The following section assesses the potential noise impact of the noise sources associated with the proposed PFS and retail unit.

Plant Noise

5.03 Details of external plant are not currently available, therefore an accurate assessment cannot be made at this time. It is understood, however, that external plant will primarily consist of condenser units serving internal refrigeration units.

5.04 Notwithstanding the above, it is considered that the control of noise emissions associated with external plant is amenable to a planning condition with the following criteria (based on the noise data detailed in Section 3):

- The cumulative rating level of external plant operating during the daytime period should not exceed 43 dB $L_{Ar,T}$ at the nearest noise sensitive receptor.
- The cumulative rating level of external plant operating during the night time period should not exceed 34 dB $L_{Ar,T}$ at the nearest noise sensitive receptor.

5.05 It is considered that the above criteria may be achieved using judicious selection and location/orientation of plant, together with localised screening as required.

Noise Associated with the Customer Parking Provision

5.06 Seven customer parking spaces (including one disabled bay) are located adjacent to the south eastern boundary of the application site. With reference to the proposed application site layout and a planning layout for the recently constructed dwellings to the south, the parking bays are (i) circa 50 metres from the dwellings to the west off Barnsley Road (NSR1), (ii) circa 35 metres from the established dwellings to the south (NSR2) and screened by the proposed retail unit, and (iii) circa 30 metre from the new build dwellings to the south (NSR3).

5.07 Previous measurements undertaken by ENS in close proximity to car parking spaces in regular use at a supermarket have been measured at no greater than 48 dB $L_{Aeq,T}$ at a distance of 5 metres from source. The noise level from a car door slam, engine starting and driving away has been measured as being circa 65 dB L_{AFMax} at a distance of 5 metres from source.

5.08 The distance from the closest parking bay to a residential receptor (NSR3) is circa 30 metres. Based on point source distance attenuation to NSR3 ($20*\log_{10}$ [5/30]) the following noise levels associated with the use of the car parking bays have been calculated (note: no screening assumed albeit a hit and miss timber fence is located on the boundary):

- 32 dB $L_{Aeq,T}$
- 49 dB L_{AFMax}

5.09 Based on the above, a BS 4142 assessment for the potential impact of night time car parking activity at NSR3 is contained in Table 5.1. Note: although car parking activity is transport related, robustly due to the nature of night time car park use, a character penalty has been applied in the table based on the BS 4142 premise that '*where the specific sound features characteristics that are neither tonal nor impulsive, though otherwise readily distinctive against the residual acoustic environment, a penalty of 3 decibels can be applied*'.

Table 5.1 – BS 4142 Assessment of Night Time Car Parking Activity at NSR3

Noise Parameter	Value	Comments
(A) Specific noise level	32 dB $L_{Aeq, T}$	Calculated noise level at NSR3 (see Para. 5.08).
(B) Acoustic feature correction	+3 dB	Character penalty for subjective assessment of noise sources (see Para. 5.09).
(C = A+B) Rating level	35 dB $L_{Ar, T}$	
(D) Background noise level	34 dB $L_{A90, T}$	Baseline noise monitoring at MP2 (see Table 3.2).
Excess of rating over background noise level (C – D)	+1 dB(A)	Indication that car parking activity will not have an adverse impact at NSR3.

5.10 The BS 4142 assessment indicates that car parking activity will not have an adverse impact at NSR3. Note: This is considered a robust assessment as the source noise level used for the assessment was for a busy period during the daytime, whilst during the night time period, the use of the car parking provision is anticipated to be limited.

5.11 In addition to the BS 4142 assessment, consideration has been given to absolute noise levels, with external levels of up to 32 dB $L_{Aeq,T}$ and 49 dB L_{AFmax} associated with car parking activity predicted at NSR3.

5.12 As detailed in Section 4, based on the WHO Guidelines approximation of 15 dB reduction from outside to inside for a partially open window, an internal daytime target criterion of 35 dB $L_{Aeq,T}$ equates to an external free field level of 50 dB $L_{Aeq,T}$ with windows partially open, an internal night time target criterion of 30 dB $L_{Aeq,T}$ equates to an external free field level of 45 dB $L_{Aeq,T}$ with windows partially open and a discrete event maxima of 45 dB L_{AFmax} internally during the night time equates to an external free field level of 60 dB L_{AFmax} with windows partially open.

5.13 The predicted car parking activity noise levels at NSR3 are significantly below the WHO Guideline levels and should not give rise to annoyance during the daytime or sleep disturbance during the night time, even with partially open windows.

5.14 On the basis of the above, in terms of the NPPF, 24 hour car parking activity represents a No Observed Adverse Effect Level (NOAEL) in that such noise is noticeable and not intrusive i.e. noise can be heard, but does not cause any change in behaviour or attitude and such noise can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life. The noise impact is therefore considered to be negligible.

Delivery Noise (Goods to Store)

5.15 It is understood that deliveries will take place via the retail unit access door. As such, deliveries will be screened from the dwellings to the south (NSR2 & NSR3) by the retail unit. Deliveries will be circa 40 metres from NSR1, which is located on the opposite side of Barnsley Road to the development site and subject to noise levels of ≥ 60 dB $L_{Aeq,T}$ during the daytime period associated with road traffic.

5.16 The anticipated number of deliveries is limited, typically consisting of two main store deliveries per week and four to five short shelf life deliveries per week (milk, bread, sandwiches etc.) by small van.

5.17 Given the limited number of deliveries and the daytime ambient noise levels at NSR1, it is considered that the control of delivery noise is amenable to a planning condition restricting deliveries to daytime hours only. Further, it is not considered that a small van delivery prior to 07:00 hours (if required to provide fresh stock) would have a significant impact.

Delivery Noise (Fuel)

5.18 It is understood that 1 to 2 no. deliveries of fuel are to be made per week, where the fuel is gravity fed into underground tanks. Noise associated with the delivery process is not considered to be significant due to the lack of a mechanical process for the delivery of fuel.

5.19 The fuel tanker parking location is adjacent to the northern boundary of the site (i.e. adjacent to Barnsley Road and Mitchells Way). As such, deliveries will be screened from the dwellings to the south by the retail unit (NSR2) and a significant separation distance from NSR3. NSR1 is located on the opposite side of Barnsley Road to the development site and subject to noise levels of ≥ 60 dB $L_{Aeq,T}$ during the daytime period associated with road traffic.

5.20 On the basis of the above and given their infrequent nature, deliveries should cause no adverse impact at the NSRs.

Use of Petrol Filling Station

5.21 It is understood that the proposed PFS may dispense fuel on a 24/7 basis. With reference to the proposed application site layout and a planning layout for the recently constructed dwellings to the south, the closest pumps are (i) circa 30 metres from the dwellings to the west off Barnsley Road (NSR1), (ii) circa 35 metres from the established dwellings to the south (NSR2) and screened by the proposed retail unit, and (iii) circa 40 metres from the new build dwellings to the south (NSR3).

5.22 In order to assess the impact at the NSRs, a noise survey was undertaken by ENS at a distance of 10 metres from an existing 'pay at pump' PFS outside Doncaster. It is noted that the measurements made by ENS included other noise sources such as distant road traffic (notably from the M18 motorway, resulting in high background noise levels), and the actual impact of the PFS may be lower.

5.23 It was concluded from the survey that L_{AFMax} noise levels associated with the use of the petrol station were (i) cars using PFS - 59 dB L_{AFmax} at 10m, and (ii) HGVs using PFS - 68 dB L_{AFmax} at 10m. The measured $L_{Aeq,T}$ over a 15 minute period of regular use of the pumps was 44 dB at 10 metres from source. The survey engineer commented that the noise levels were not significant and were influenced by background traffic levels, with the pump noise emissions being inaudible at circa 20 metres from source.

5.24 The Transport Statement for the development considers that most, if not all, the vehicle movements to and from the PFS would be from opportunistic pass-by movements from the traffic already using the A633 and Barnsley Road (i.e. the same traffic related noise would be present whether the PFS was there or not).

5.25 Based on the above and treating the PFS activity as a point source (i.e. $20*\log_{10}$ (10/30) at NSR1) the predicted façade incident noise levels for the use of the proposed PFS are as follows:

- General use of the PFS – 34 dB $L_{Aeq,T}$ at NSR1.
- Car using PFS - 49 dB L_{AFMax} at NSR1.
- HGV using PFS – 58 dB L_{AFMax} at NSR1.

5.26 Based on the above, a BS 4142 assessment for the potential impact of night time PFS usage at NSR1 is contained in Table 5.2. Note: due to the nature of night time PFS use, a character penalty has been applied in the table based on the BS 4142 premise that 'w*here the specific sound features characteristics that are neither tonal nor impulsive, though otherwise readily distinctive against the residual acoustic environment, a penalty of 3 decibels can be applied'*.

Continued from page 11

Table 5.1 – BS 4142 Assessment of Night Time PFS Use at NSR1

Noise Parameter	Value	Comments
(A) Specific noise level	34 dB $L_{Aeq, T}$	Calculated noise level at NSR1 (see Para. 5.25).
(B) Acoustic feature correction	+3 dB	Character penalty for subjective assessment of noise sources (see Para. 5.26).
(C = A+B) Rating level	37 dB $L_{Ar, T}$	
(D) Background noise level	36 dB $L_{A90, T}$	Baseline noise monitoring at MP1 (see Table 3.2).
Excess of rating over background noise level (C – D)	+1 dB(A)	Indication that PFS use will not have an adverse impact at NSR1.

5.27 The BS 4142 assessment indicates that PFS use will not have an adverse impact at NSR1. Note: This is considered a robust assessment as the source noise levels used for the assessment were based on daytime usage of the reference PFS.

5.28 In addition to the BS 4142 assessment, consideration has been given to absolute noise levels, with external levels of up to 34 dB $L_{Aeq,T}$ and 49 dB L_{AFmax} (cars) / 58 dB L_{AFmax} (HGVs) associated with PFS use predicted at NSR1.

5.29 As detailed in Section 4, based on the WHO Guidelines approximation of 15 dB reduction from outside to inside for a partially open window, an internal daytime target criterion of 35 dB $L_{Aeq,T}$ equates to an external free field level of 50 dB $L_{Aeq,T}$ with windows partially open, an internal night time target criterion of 30 dB $L_{Aeq,T}$ equates to an external free field level of 45 dB $L_{Aeq,T}$ with windows partially open and a discrete event maxima of 45 dB L_{AFmax} internally during the night time equates to an external free field level of 60 dB L_{AFmax} with windows partially open.

5.30 The predicted PFS use noise levels at NSR1 are below the WHO Guideline levels and should not give rise to annoyance during the daytime or sleep disturbance during the night time, even with partially open windows.

5.31 On the basis of the above, in terms of the NPPF, 24 hour use of the PFS represents a No Observed Adverse Effect Level (NOAEL) in that such noise is noticeable and not intrusive i.e. noise can be heard, but does not cause any change in behaviour or attitude and such noise can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life. The noise impact is therefore considered to be negligible. This should also be considered in the context that the typical Barnsley Road vehicle drive by levels at NSR1 were measured at of the order of 70 dB $L_{AF1,T}$ dB.

Continued from page 12

6.00 CONCLUSIONS

6.01 A noise impact assessment has been undertaken for a proposed petrol filling station with associated retail unit on land off Mitchells Way/Barnsley Road, Wombwell.

6.02 The ambient and background noise climate in the vicinity of the application site is dominated by traffic noise on the local road network.

6.03 Based on the assessment undertaken and detailed in this report, it is concluded that the control of noise associated with any fixed external plant servicing the development is amenable to a planning condition setting limiting noise levels, which could be achieved with the judicious selection and siting of plant and/or standard noise mitigation techniques.

6.04 It is further concluded that 24 hour activities at the proposed development will not lead to an unacceptable loss of amenity at the nearest identified noise sensitive receptors. The potential impact has been assessed as 'negligible' and in terms of the National Planning Policy Framework equates to a No Observed Adverse Effect Level (NOAEL) in that '*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'*.

I trust the foregoing is sufficient for your needs. Should you have any queries regarding the above, please do not hesitate to contact me.

Yours sincerely

Richard Pennell
For Environmental Noise Solutions Limited

Appendix 1
Glossary of Acoustic Terms

Sound Pressure Level (L_p)

The basic unit of sound measurement is the sound pressure level. As the pressures to which the human ear responds can range from 20 µPa to 200 Pa, a linear measurement of sound levels would involve many orders of magnitude. Consequently, the pressures are converted to a logarithmic scale and expressed in decibels (dB) as follows:

$L_p = 20 \log_{10}(p/p_0)$

Where L_p = sound pressure level in dB; p = rms sound pressure in Pa; and p_0 = reference sound pressure (20 µPa).

A-weighting Network

A frequency filtering system in a sound level meter, which approximates under defined conditions the frequency response of the human ear. The A-weighted sound pressure level, expressed in dB(A), has been shown to correlate well with subjective response to noise.

Equivalent continuous A-weighted sound pressure level, $L_{Aeq, T}$

The value of the A-weighted sound pressure level in decibels of continuous steady sound that within a specified time interval, T, has the same mean-square sound pressure as a sound that varies with time. $L_{Aeq, 16h}$ (07:00 to 23:00 hours) and $L_{Aeq, 8h}$ (23:00 to 07:00 hours) are used to qualify daytime and night time noise levels.

$L_{A10, T}$

The A-weighted sound pressure level in decibels exceeded for 10% of the measurement period, T. $L_{A10, 18h}$ is the arithmetic mean of the 18 hourly values from 06:00 to 24:00 hours.

$L_{A90, T}$

The A-weighted sound pressure level of the residual noise in decibels exceeded 90% of a given time interval, T. L_{A90} is typically taken as representative of background noise.

$L_{AF\ max}$

The maximum A-weighted noise level recorded during the measurement period. The subscript 'F' denotes fast time weighting, slow time weighting 'S' is also used.

Sound Exposure Level (SEL or L_{AE})

The energy produced by a discrete noise event averaged over one second, no matter how long the event actually took. This allows for comparison between different noise events which occur over different lengths of time.

Weighted Sound Reduction Index (R_W)

Single number quantity which characterises the airborne sound insulation properties of a material or building element over a defined range of frequencies (R_W is used to characterise the insulation of a material or product that has been measured in a laboratory).

Weighted Airborne Sound Insulation ($D_{nT,w}$)

Single number quantity which characterises the airborne sound insulation between rooms.

Appendix 2.1: Annotated aerial image indicating the approximate noise monitoring positions (MPs) and NSRs

Appendix 2.2: Proposed Layout