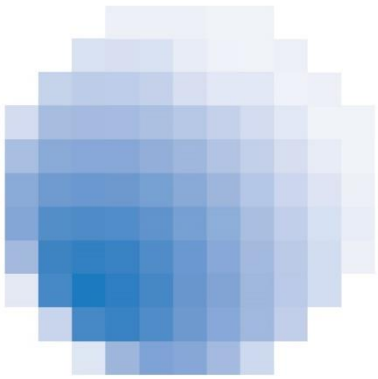

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WKE (MIDDLESBROUGH) LTD,

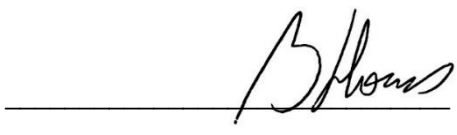
A.V. Dawson, Riverside Park Road,

Middlesbrough

Environmental Noise Impact Assessment

P1837-REP01-BDH

24 September 2020

PROJECT:	WKE (MIDDLESBROUGH) LTD, A.V. Dawson Riverside Park Road, Middlesbrough Environmental Noise Impact Assessment
CLIENT:	Sol Environment Ltd 7 Greenway Farm Bath Road, Wick Bristol BS30 5RL
DOCUMENT REFERENCE:	P1837-REP01-BDH
SIGNED:	 BRIAN HORNER
CHECKED:	 SIMON FERENCZI
DATE:	24 September 2020

CONTENTS

1 EXECUTIVE SUMMARY

Sol Acoustics Ltd ('Sol') have been appointed by Sol Environment Ltd on behalf of A.V. Dawson to provide an environmental noise impact assessment for the proposed WKE (Middlesbrough) Ltd development, which is to be located off Riverside Park Road, Middlesbrough, TS2 1UT (the "Facility").

This acoustic assessment report considers the environmental noise impact as arising from the anticipated operation of key plant and processes associated with the Facility at the nearest Noise Sensitive Receptors (NSRs).

The environmental noise emissions from the Facility have been quantified, modelled and assessed using proprietary 'CadnaA' 3D acoustic software.

The pre-existing environmental noise climate at the identified nearby NSRs, as occurring during the proposed hours of operation for the site has been measured by Sol between c.19:30 hours on Thursday 7 March and c.10:15 hours on Monday 11 March 2019.

It is the conclusion of this environmental noise assessment that the total, aggregate environmental noise impact as arising from the proposed operation of the Facility, with duly implemented Noise Mitigation Plan (NMP), results in a 'low impact' at the worst affected NSR, during both daytime and night time periods, all as assessed in accordance with British Standard BS4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound'.

This acoustic assessment quantifies an outline, provisional, itemised Noise Mitigation Plan (NMP), partly as based on adopting Best Available Techniques (BAT) in terms of noise control. The noise mitigation measures presented within this report are provided in outline terms only and have not yet been approved by the Operator. These would necessarily be subject to further design coordination and development. The actual, detailed and finalised noise mitigation strategy to be implemented is to be developed, reviewed, refined and agreed during the detailed project design stage. All such noise mitigation measures will need to be reviewed and approved by the Acoustic Consultant as details develop.

Please refer to the main report and appendices for further information.

2 INTRODUCTION

Sol Acoustics Ltd ('Sol') have been appointed by Sol Environment Ltd on behalf of A.V. Dawson to provide an environmental noise impact assessment for the proposed WKE (Middlesbrough) Ltd development, which is to be located off Riverside Park Road, Middlesbrough, TS2 1UT (the "Facility"). The purpose of this acoustic assessment is as follows:

- To identify the nearest pre-existing noise sensitive housing to the site (NSRs), which are most likely to be affected by environmental noise arising from plant and/or processes associated with the Facility.
- To determine the prevailing, pre-existing daytime and night time background noise climate at the NSRs, through direct, environmental noise measurement.
- To identify all existing and significant discrete noise sources at the site, such as specific, fixed items of processing plant and machinery, as well as noise generated from HGV and other mobile plant movements.
- To obtain suitable source noise level data for the various acoustically significant plant items identified, as well as for other plant to be deployed at the Facility.
- To calculate the resultant environmental noise contribution and impact at the NSRs, as during daytime and night time periods, and taking factors into account such as distance to receptors, acoustic screening and other environmental features.
- To carry out an environmental noise impact assessment of the proposed Facility in accordance with the methodology prescribed in relevant Standards and guidance, in order to determine the significance of the potential noise impact likely to be generated and likely required corresponding noise mitigation measures, in outline terms.
- To specify, in outline terms, the requirements for any noise mitigation to be implemented within the development proposals for the Facility.

This acoustic report is structured as follows:

- Section 3 provides a basic description of the Facility and key surrounding NSRs.
- Section 4 provides summary details of the benchmark environmental noise survey undertaken in order to determine the pre-existing environmental noise climate at the identified NSRs.
- Section 5 confirms the results of the benchmark environmental noise survey.
- Section 6 provides a summary of the pertinent acoustic Standard, namely BS4142, for the assessment of the potential noise impact.

- Section 7 provides a summary of the proprietary 3D acoustic models constructed and acoustic calculations undertaken.

- Section 8 provides a BS4142 acoustic assessment, and a summary description of the environmental noise mitigation measures which will be required.

- Section 9 provides a conclusion statement.

3 DESCRIPTION OF SITE

3.1 General Overview and Noise Sensitive Receptors (NSRs)

The site is situated within the Riverside Park Industrial estate in Middleborough, in a predominantly industrial and commercial area.

The nearest existing residential noise sensitive premises (NSRs) to the Facility are those within the residential estate off the A1046 Port Clarence Road (on Beach Terrace, Sycamore Terrace, Cambridge Terrace etc.) located c.420m to the north east of the Facility.

Figure 1 indicates the location of the Facility in relation to the nearest existing noise sensitive receptors (NSRs), and also the location of the noise monitoring positions used in order to inform the assessment (these are discussed in Section 4 of this report).

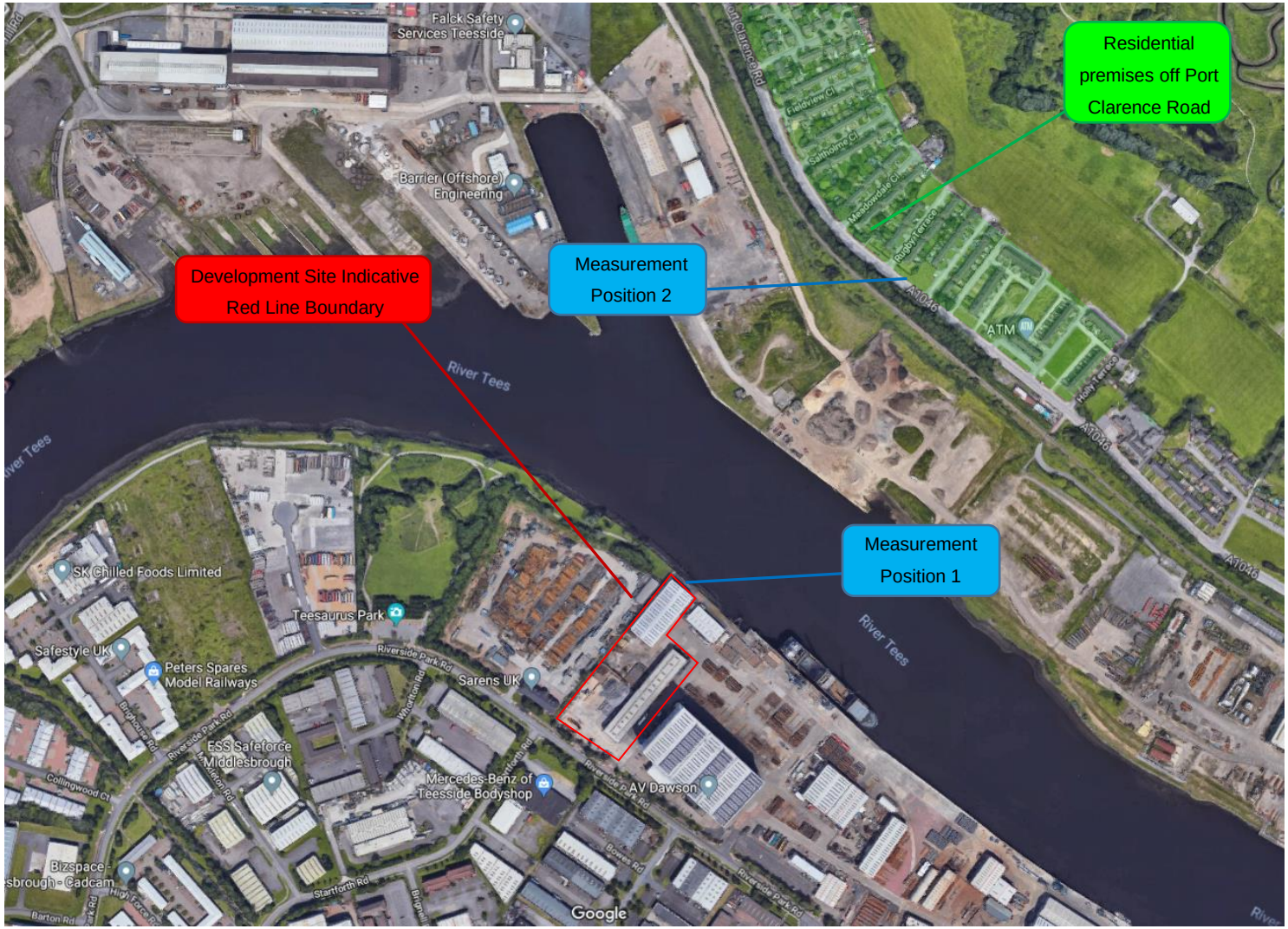


Figure 1: Aerial photography showing noise sensitive receptors and monitoring locations in relation to the Facility

3.2 Characteristics of the Facility

3.2.1 Overview

The Facility comprises a materials processing line to produce a pelletised fuel from selected Solid Recovered Fuel (SRF) materials derived from commercial and industrial waste. The Facility is expected to operate 24 hours a day, seven days a week.

The proposed installation will comprise:

- Reception Building which shall accept and store commercial and industrial waste
- The Main Processing Building (MPB) which will house the majority of the processing plant, to include three “Nawrocki” Pelleting Lines, each comprising:
    - Metal Separation (overband magnets and eddy current separators)
    - Screening Equipment
    - Air Blade Separators
    - Vibrating Sifters
    - Cyclones
    - Two low temperature Belt Driers and associated 25 metre high stacks
    - Six Pellet Mills and associated 19 metre high exhaust stacks; and
    - Three Counterflow Coolers and associated 18 metre high stacks.

3.2.2 Mobile Plant

The following mobile plant is expected to operate within the Reception Building:

- 2 off Loading Shovels
- 1 off Excavator

3.2.3 Site Deliveries and Collections

The Operator has confirmed that up to 39 deliveries/collections could be expected to site per 24 hour period. Of these, up to 26 deliveries/collections are typically expected to occur during daytime periods (i.e. 07:00 to 23:00 hours) and up to 13 deliveries/collections during the night (23:00 to 07:00 hours). HGVs shall all arrive and depart from Riverside Park Road.

Figure 2 indicates the proposed layout of the Facility.

Figure 3 provides an isometric view of the internal plant layout.

Figure 4 shows the location of key noise sources associated with the development as advised by the Client. The corresponding noise data as provided by the Client is listed in Appendix G.

Figure 5 provides the proposed building plan and elevations.

Appendix E provides an inventory of all identified acoustically significant plant and processes which have the potential to create an environmental noise impact at nearby NSRs.

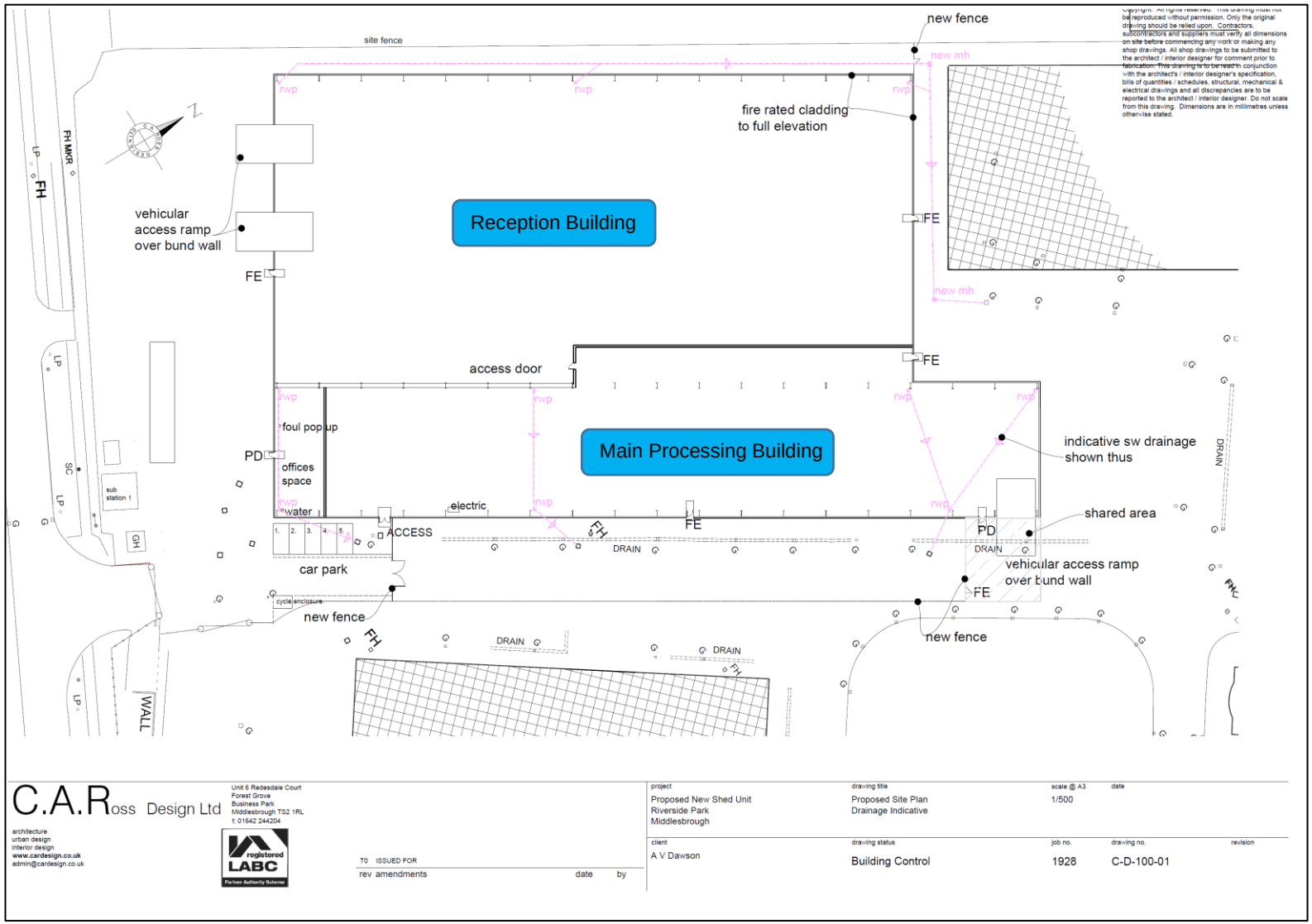


Figure 2: Proposed site layout

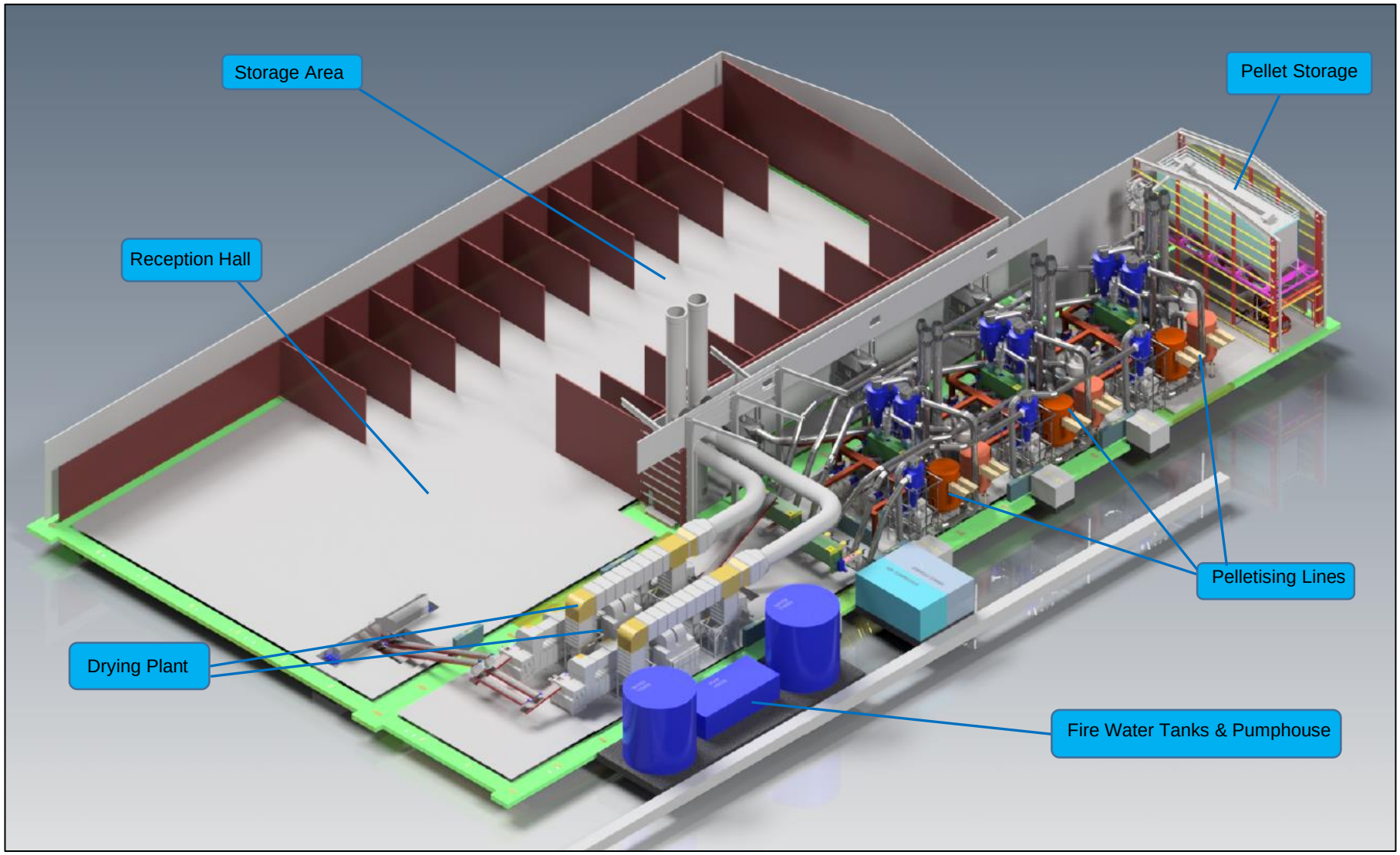


Figure 3: Internal plant layout, isometric view

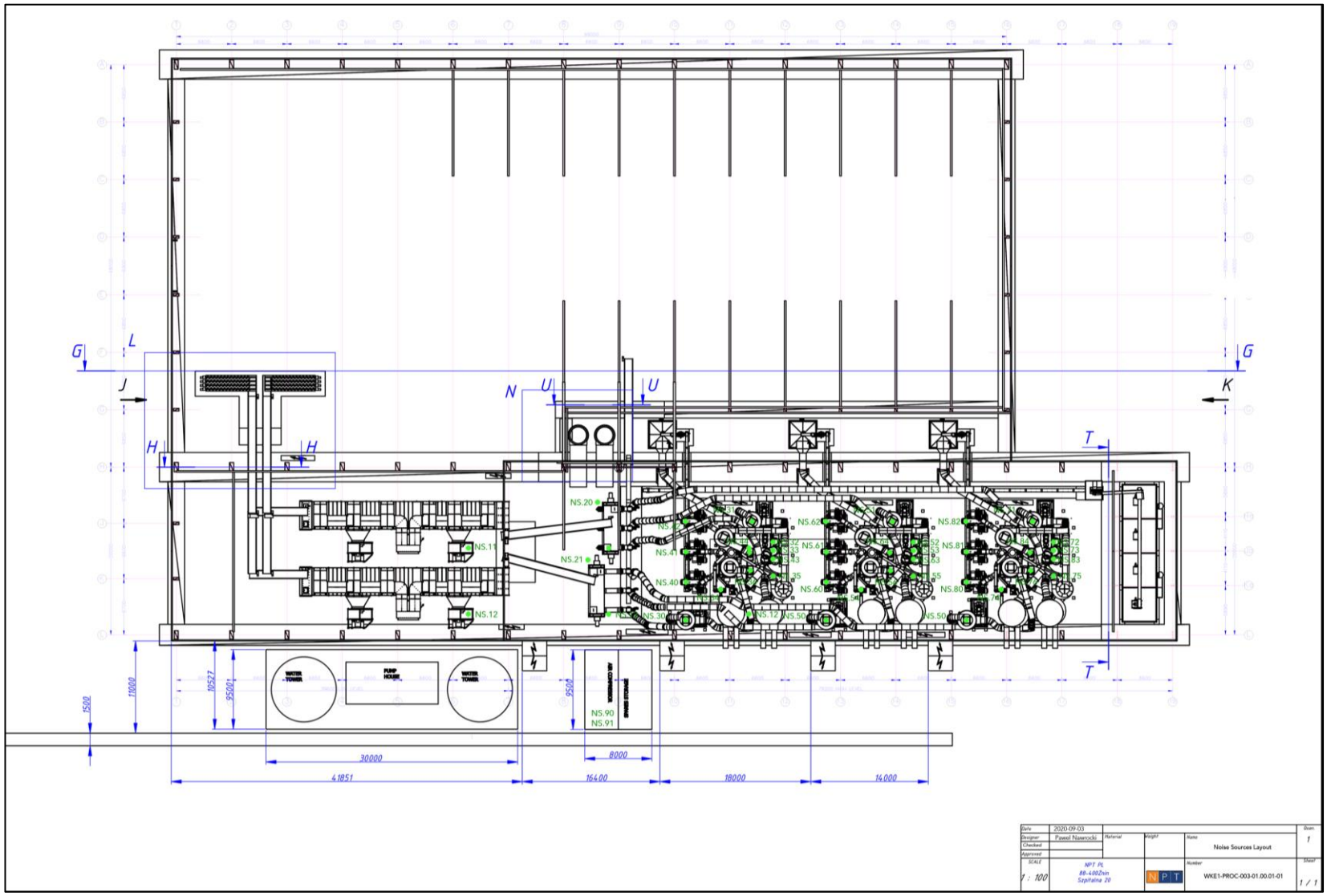


Figure 4: Site layout indicating the location of key noise sources as identified by the Client

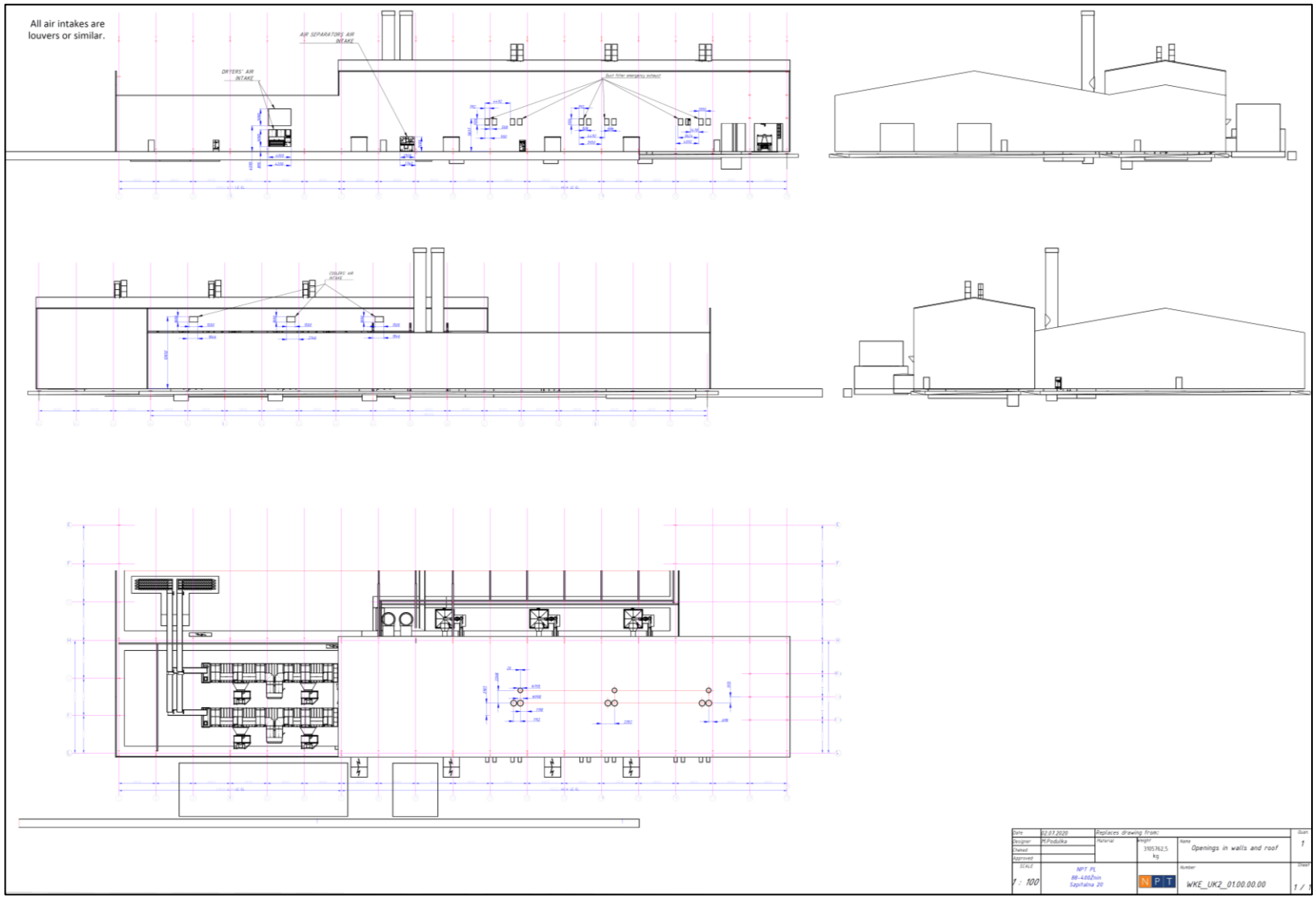


Figure 5: Proposed building plan and elevations

4 DETAILS OF INVESTIGATION

4.1 Pre-Existing Environmental Noise Climate

In order to inform the assessment, an environmental noise survey have been conducted by Sol between c.19:30 hours on Thursday 7 March and c.10:15 hours on Monday 11 March 2019. The purpose of these measurements was to determine the prevailing pre-existing background noise levels expected at the nearest noise sensitive premises to the Facility, for environmental noise benchmarking and subsequent acoustic impact assessment purposes.

The environmental noise survey consisted of an unmanned and manned environmental noise measurement positions as follows:

- **Noise Monitoring Position 1**: Unattended, mast mounted microphone and weather station at c.2.0 metres height above local ground level on the north east boundary of the Facility site, c.420m south west of the existing residential properties off A1046 Port Clarence Road. Environmental noise levels were recorded at this position between c.19:30 hours on Thursday 7 March and c.10:15 hours on Monday 11 March 2019.

- **Noise Monitoring Position 2**: Attended, tripod mounted microphone at c.1.4 metres height above local ground level outside the existing residential properties off A1046 Port Clarence Road. Environmental noise levels were recorded at this position between c.15:00 and c.19:00 hours on Sunday 10 March 2019, and again between c.23:00 and c.00:45 hours between Sunday 10 March and Monday 11 March 2019, respectively. The noise climate at this measurement positions was dominated by road traffic noise from the A1046.

The locations of the noise monitoring positions are shown in Figure 1; the full results are as presented in Appendix B.

The noise survey was carried out using Type 1 Precision Grade noise monitoring equipment, and the complete measuring systems were field calibrated immediately prior to, and following the noise survey period. (Full details of the noise monitoring systems are retained on file by Sol, including traceable calibration records; these are available for review if needed).

Meteorological data was recorded at Noise Monitoring Position 1 for the duration of the noise survey, as using a professional grade Vaisala “WXT520” weather station. A summary of the recorded meteorological data is presented in Appendix B.

The prevailing weather conditions remained favourable for the majority of the survey period for the purposes of environmental noise assessment, with none or very light (0.8mm/h or less) precipitation and mean wind speeds below 5m/s for the duration of the survey, with the exclusion of the following periods, where precipitation was greater than 1.0mm/h:

- Saturday 9 March 2019, 06:45 – 07:15 hours
- Sunday 10 March 2019, 11:45 – 12:15 hours

These periods have been excluded from the noise data set forming the basis of this report and all findings. Notwithstanding the weather conditions recorded, the microphone systems were entirely weatherproofed and fitted with all-weather environmental windshields, each with bird spike.

5 ENVIRONMENTAL NOISE SURVEY RESULTS

5.1 Pre-existing Environmental Noise Climate

Appendix B provides a detailed time history for the background noise levels as recorded at each of the measurement positions for the duration of the environmental noise survey and provides confirmation of the equipment used.

Table 1 and Table 2 provide a basic summary of the typical overall, A-weighted noise levels measured at Measurement Position 1 and Measurement Position 2, respectively, in $L_{Aeq,T}$ and $L_{A90,T}$ terms:

Date	Daytime (07:00 Hours - 23:00 Hours)		Night Time (23:00 Hours – 07:00 Hours)	
	dB $L_{Aeq,16hour}$	dB $L_{A90,15min}$ (Typical)	dB $L_{Aeq,8hour}$	dB $L_{A90,15min}$ (Typical)
Thursday 7 March 2019	51[1]	48[1]	51	48
Friday 8 March 2019	54	51	56	47
Saturday 9 March 2019	54[2]	51	47	44
Sunday10 March 2019	50	48	53	48
Monday 11 March 2019	56[1]	53[1]	-	-
[1] Measurement not conducted for the full 16-hour daytime assessment period				

Table 1: Summary of typical, measured broadband environmental noise levels, Measurement Position 1

Date	Daytime (07:00 Hours - 23:00 Hours)		Night Time (23:00 Hours – 07:00 Hours)	
	dB $L_{Aeq,16hour}$	dB $L_{A90,15min}$ (Typical)	dB $L_{Aeq,8hour}$	dB $L_{A90,15min}$ (Typical)
Sunday 10 March 2019	63[1]	50[1]	53[1]	44[1]
[1] Measurement not conducted for the full 16-hour daytime and 8-hour night-time assessment period respectively				

Table 2: Summary of typical, measured broadband environmental noise levels, Measurement Position 2

6 ENVIRONMENTAL NOISE PERFORMANCE SPECIFICATION REQUIREMENTS

6.1 BS4142: 2014+A1:2019 '*Method for rating and assessing industrial and commercial sound'*

British Standard BS4142: 2014+A1:2019: '*Method for rating and assessing industrial and commercial sound'* (BS4142) is intended to be used to assess environmental noise of an industrial nature, which includes sound from fixed installations, which comprise mechanical and electrical plant and equipment.

The procedure contained in BS4142 for assessing the impact is to compare the measured or predicted noise level from the source in question, the 'Specific Sound Level' immediately outside the noise sensitive premises, with the 'Background Sound Level'. Where the noise contains attention attracting characteristics (i.e. acoustic features) such as tonal, impulsive, intermittent elements, it may be appropriate to apply a correction to the Specific Sound Level to obtain the 'Rating Level'.

BS4142 states that 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 greater the magnitude of the impact.
- 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.

For the daytime, the assessment is carried out over a one-hour period, and over a 15-minute period at night. The daytime and night time periods are typically defined as occurring between 07:00 hours to 23:00 hours, and 23:00 hours to 07:00 hours respectively. Table 3 presents a summary of the as measured daytime and night time typical Background Sound Level at the identified noise sensitive receptors:

Noise Sensitive Receptors	**Typical Background Sound Level, dB $L_{A90,15min}$**	
	Daytime (07:00 hours – 23:00 hours)	**Night Time (23:00 hours – 07:00 hours)**
Residential Dwellings off A1046 Port Clarence Road	48	44

Table 3: Summary of typical time Background Sound Levels applicable at each NSR

7 ENVIRONMENTAL NOISE MODEL

7.1 Methodology and Basis of 3D Environmental Noise Models

In order to predict the likely noise levels impinging on the surrounding noise sensitive receptors, proprietary 3D computer noise models were created using the DataKustik 'CadnaA' Noise Mapping software. The following assumptions have been made when building all the noise models:

(a) The noise model was set up to apply the noise prediction methodology set out in ISO 9613-2: *Acoustics – Attenuation of Sound propagation outdoors – Part 2: General Method of Calculation*.

(b) The model was set to include second order reflected noise from solid structures.

(c) Ground absorption, as defined in ISO 9613-2, has been taken into consideration in the construction of the model. The base ground absorption for the model has been set to G=0.0 (hard ground). Large areas of soft ground have been set to G=1.0.

(d) The existing land topography of the plant and surrounding area up to and including the nearest NSR has been taken into consideration in the assessment. Third party topographical information has been obtained from emapsite.com.

(e) The noise impact as expected at the worst affected NSRs during both the daytime and night time has been determined at a receptor grid height of 4 metres above local ground level to approximate first floor (bedroom) height.

(f) The Client has confirmed that the Reception Building and MPB shall be of a steel frame construction with Kingspan KS1000 RW cladding to the walls and roof. Construction details of other building elements have not been confirmed. In the absence of confirmed details, the assessment has assumed the octave band sound insulation performance of a basic doorset and acoustic rated roller shutter and acoustic rated ventilation louvres as summarised in Table 4 (these stated acoustic performances form part of the required Noise Management Plan).

Building Element	Construction	Sound Reduction Index (SRI, dB) @ Octave Band Centre Frequency (Hz)							dB R_w
		63	125	250	500	1k	2k	4k	
Cladding and roof	Kingspan KS1000 Rw	20	18	20	24	20	29	39	25
Rooflights	Kingspan KS1000 DLTR	13	9	12	17	22	24	19	21
Roller shutter	Ascot Doors Roller Shutter	14	14	17	18	15	19	19	18
Personnel doors	Booths 29H 45mm Metal Door	18	24	25	28	30	29	34	30
Ventilation louvres	Allaway Acoustics AL1515 single banked acoustic louvre or similar	4	4	5	8	12	16	15	12

Table 4: External building fabric sound insulation performance

(g) The composite sound insulation performance for each façade and roof has been calculated as based on the sound insulation performance presented in Table 4 and proposed building elevations as presented in Figure 5.

(h) Ventilation louvres have been modelled separately as area sources mounted on the façades of the building where required.

(i) The noise contribution from the identified plant proposed to be installed within the building has been predicted from the stated sound power level of each identified new noise source (refer to Appendix E). This data has been used to determine the resultant reverberant sound pressure level within the building. Specifically, a reverberation time of 2.5 seconds have been assumed.

(j) Noise breakout from internal plant have been modelled by determining the level of noise radiated from the external building fabric of the building based upon the assessment methodology provided within British Standard *BS12354-4:2000: 'Building Acoustics – Estimation of acoustic performance of buildings from the performance of elements – Part 4: Transmission of indoor sound to the outside'*. The sound power level per unit area for each external building element has been determined from the predicted resultant reverberant sound pressure level calculations for each room by applying a "diffusivity term", as defined in BS12354-4 and subtracting the calculated composite sound insulation performance of each building face. Specifically, a diffusivity term of -5dB have been assumed.

(a) The noise model assumes that on average up to three HGVs could arrive at and depart from the Facility during a typical 1-hour daytime assessment period. Up to one HGV could arrive at and depart the Facility during a typical 15-minute night-time assessment period.

Figure 6 provide three-dimensional visualisations of the noise model used to inform the noise impact assessment.

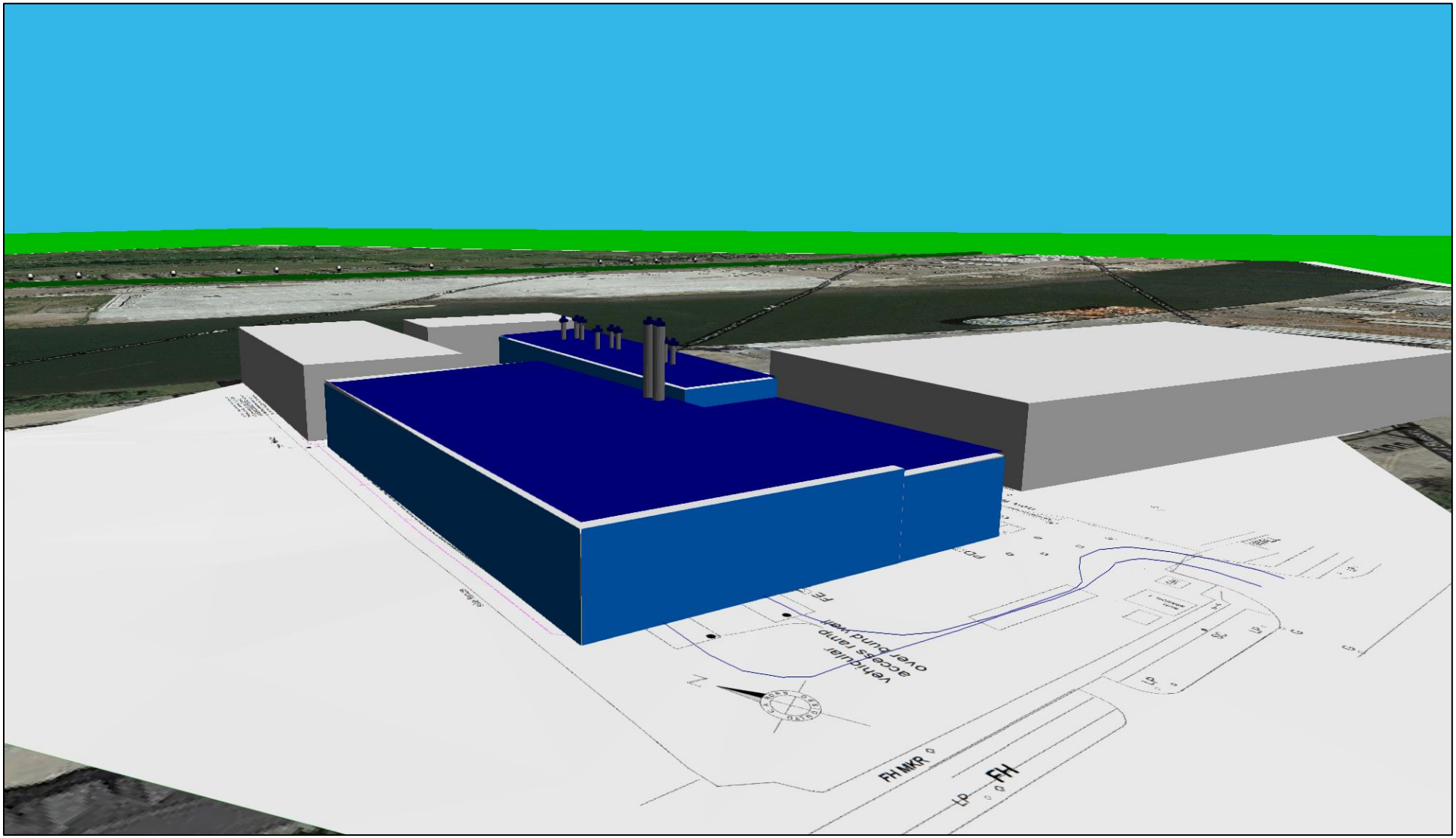


Figure 6: 3D view of the noise model of the plant

8 ENVIRONMENTAL NOISE IMPACT ASSESSMENT

8.1 BS4142 Assessment

Table 5 presents the predicted overall A-weighted, BS4142-defined 'Rating Level' at the identified noise sensitive receptor with the Noise Management Plan as presented in Section 8.2 duly and fully implemented. The at-receptor Specific Sound Levels have been predicted at 1.5m above local ground level. Appendix D provides full details of CadnaA noise maps which present the daytime and night-time Specific Sound Levels expected.

It shall be noted from the at-receptor noise level tables presented within Appendix D that the noise contribution from all individual noise sources are below the existing Background Sound Level. As a result, any acoustic character associated with individual noise sources is not expected to be clearly discernible at the nearest noise sensitive receptor above the existing environmental noise climate.

Furthermore, whilst individual noise sources associated with the Facility are likely to generate noise with a particular acoustic character (i.e. such as tonal, impulsive, intermittent features), it is considered that such features would not be as prominent when observed when the remainder of the plant is running. For example, the tonal character of any individual noise source is likely to be less prominent when observed whilst other noise sources of similar magnitude, each with its own distinctive acoustic features, are running.

On this basis, and in accordance with BS4142, a conservative correction of +3dB has been applied to the calculated Specific Sound Level, as arising at the noise sensitive receptors from the Facility in order to allow for any residual "readily distinctive" acoustic features, in order to determine the BS4142 defined 'Rating Level' for acoustic assessment purposes:

Noise Sensitive Receptor	Assessment Period	Predicted Specific Level, dB $L_{Aeq,T}$	Predicted Rating Level, dB $L_{Ar,Tr}$	Typical Background Sound Level, dB L_{A90}	Rating Level sub. Background, ±dB*
Residential Dwellings off A1046 Port Clarence Road	Daytime (07:00hrs - 23:00hrs) T = 1 hour	40	43	48	**-5**
	Night Time (23:00hrs – 07:00hrs) T = 15 minutes	40	40	44	**-1**

Table 5: BS4142 summary assessment (NMP fully implemented)

Thus, the calculated and assessed Rating Level does not exceed the existing typical Background Sound Level during both daytime and night time periods and this is therefore an indication of a '*…low impact, depending on the context*…' as defined by BS4142.

In this case, the context of the site is not expected to affect the magnitude of the identified impact. Thus, in accordance with BS4142, and with the specified NMP duly and satisfactorily implemented, the Facility is expected to have a 'low impact' on the worst affected noise sensitive receptor, with NMP duly implemented.

8.2 Draft Outline Noise Management Plan (NMP)

Appendix E provides an outline, provisional itemised list of additional noise mitigation measures which form the basis of our calculations and acoustic modelling. The finalised, actual noise mitigation strategy to be implemented must be reviewed, further developed and refined and approved by the Acoustic Consultant. The provisional, outline noise mitigation measures that are assumed and required by this acoustic assessment report are summarised below:

(a) **Client confirmed plant noise levels**: Any noise mitigation inherent in the noise level data as confirmed by the Client in Appendix G must be duly implemented such that the specified noise levels are not exceeded in any instance (including for any required mode of plant operation).

(b) **Mobile plant**: All HGVs and mobile plant under the direct control of the Operator shall only use non-intrusive broadband noise type vehicle reversing alarms and/or reversing cameras. There shall be no use of pulsed and/or tonal reversing alarms (e.g. reversing bleepers).

(c) **External Building Fabric**: The construction of the external building fabric to achieve the minimum sound insulation performance as set out in Table 6 (the requirement for acoustic louvres should be particularly noted):

Building Element	Typical Construction	Sound Reduction Index (SRI, dB) @ Octave Band Centre Frequency (Hz)							dB R_w
		63	125	250	500	1k	2k	4k	
Cladding and roof	Kingspan KS1000 Rw	20	18	20	24	20	29	39	25
Rooflights	Kingspan KS1000 DLTR	13	9	12	17	22	24	19	21
Roller shutter	Ascot Doors Roller Shutter	14	14	17	18	15	19	19	18
Personnel doors	Booths 29H 45mm Metal Door	18	24	25	28	30	29	34	30
Ventilation louvres	Allaway Acoustics AL1515 single banked acoustic louvre or similar	4	4	5	8	12	16	15	12

Table 6: Minimum required sound insulation performance to be achieved by external building fabric

(d) **Roller shutter and personnel doors**: Roller shutters and personnel doors must always be kept closed when not in use for immediate, momentary vehicle ingress/egress. They must not be used for ventilation or heat dissipation purposes etc. Induction loop automatic open/close operation is recommended.

(e) **Material conveyors:** Noise data for material conveyors have not been provided by the Client. Noise from any material conveyor shall not exceed 85dB(A) at 1 metre from any surface, for any operating state or speed. Depending upon the actual noise levels generated, provisions should be included for noise mitigation to be fitted to the conveying line and drives.

(f) **External stack outlets**: Noise from all chimney stack outlets (including the belt dryers, dust filter, pellet mills and counterflow coolers) outlet shall not exceed 80dB $L_{Aeq,T}$ at 1 metre from stack outlet edge, 90º off longitudinal axis of the stack at any speed. Make provisions for a duct attenuator to be fitted to the discharge side of the fan (including allowance for attenuator pressure loss and physical dimensions). These attenuators will be necessary in each case, albeit their exact required specifications will be dependent on the noise output (in duct sound power level) and required volume flowrate of each fan/system.

(g) **Façade mounted Mill Air intake louvres**: Noise from all façade mounted Mill Air intake louvres, and any other mechanically ducted ventilation louvres, shall not exceed 80dB $L_{Aeq,T}$ at 1 metre (maximum, when on full load and as measured on-axis). Make provisions for attenuators and/or acoustic louvres fitted to the mail air intake (again, exact specification TBC, pending further details).

(h) **Additional noise sources**: The noise impact from any plant which not listed in Appendix E must be duly assessed. (Sol to be advised by Client if this list is not fully exhaustive and inclusive please).

8.3 Uncertainty

Section 10 of BS4142: 2014 states the following with regards to uncertainty:

> '… *Consider the level of uncertainty in the data and associated calculations. Where the level of uncertainty could affect the conclusion, take reasonably practicable steps to reduce the level of uncertainty. Report the level and potential effects of uncertainty*…'

In accordance with the requirements of BS4142, Sol have undertaken the following steps to limit the level of uncertainty in the acoustic assessment:

1. All noise measurements have been carried out using Type 1 Precision Grade noise mounting equipment. All noise measuring instruments have traceable laboratory calibration certification.

2. All noise measurements were accompanied by continuous meteorological measurements as conducted at, or close to, the measurement position in order to ensure that the measurement data was not adversely affected by unfavourable weather conditions. Periods of adverse weather conditions have been excluded from the assessment.

3. Calculations have been conducted in line with appropriate and nationally recognised acoustic standards (ISO 9613-2, BS12354: 2000), and using proprietary 3D noise modelling software, CadnaA.

4. The assessment assumes downwind propagation in all cases as this represents the worst case.

Once the Noise Management Plan has been agreed, implemented and installed on site, Sol advises that comprehensive, post-completion acoustic testing be carried out to ensure that the noise impact has been suitably controlled.

9 CONCLUSION

Sol Acoustics Ltd ('Sol') have been appointed by Sol Environment Ltd on behalf of A.V. Dawson to provide an environmental noise impact assessment for the proposed Waste Knot Energy Ltd development, to be located off Riverside Park Road in Middlesbrough, TS2 1UT (the "Facility").

This acoustic assessment report considers the environmental noise impact occurring at the nearest noise sensitive receptors (NSRs), as arising from the operation of all plant and processes associated with the Facility.

The environmental noise emissions from the installation, as arising from all associated duty plant and processes (excluding emergency-only plant), has been assessed herein, as modelled using proprietary 'CadnaA' 3D environmental noise modelling software.

The pre-existing environmental noise climate has been measured during unmanned and manned environmental noise surveys, conducted by Sol as occurring between c.19:30 hours on Thursday 7 March and c.10:15 hours on Monday 11 March 2019.

It is the conclusion of this environmental noise assessment that the total, aggregate environmental noise impact arising from the proposed operation of the Facility, with duly and fully implemented Noise Mitigation Plan (NMP), results in a 'low' noise impact at the worst affected NSRs during the proposed hours of operation, all as assessed in accordance with British Standard BS4142.

This acoustic assessment quantifies an outline, provisional, itemised Noise Mitigation Plan (NMP), as partly based on adopting Best Available Techniques (BAT). The noise mitigation measures presented within this report are provided in outline terms only and are subject to Client approval.

APPENDIX A
GLOSSARY OF ACOUSTIC TERMS

Term	Abbreviation	Description
Sound Pressure Level	L_{pA}	A measure of the (usually instantaneous) A-weighted sound pressure level. Typically expressed in dB(A) referenced to 2 x 10^{-5} Pascals.
Equivalent Continuous Sound Level	$L_{Aeq,T}$	The steady level of sound over a prescribed time period (*T*) which would contain the same total sound energy as the actual fluctuating noise under consideration as during the same time period (time-averaged noise level).
Statistical Sound Levels	L_{A10} and L_{A90}	The A-weighted sound pressure level that is statistically exceeded for a percentage of the time period being sampled, either 10% or 90% respectively.
Background Sound Level	$L_{A90,T}$	The A-weighted sound pressure level of the residual noise at an assessment position (e.g. receptor) that is statistically exceeded for 90% of a given time period (*T*).
Maximum Sound Level	L_{Amax}	The maximum sound or noise level recorded during a defined measurement time interval, with sound measuring instrumentation set to either a fast time weighting, L_{AFmax}, or a slow time weighting, L_{ASmax}.
Sound Power Level	L_{wA}	A measure of the total A-weighted sound energy radiated from a source (e.g. item of plant). Like sound pressure levels this is also expressed in dB(A), albeit referenced to 1 x 10^{-12} W.
Broadband		Noise data comprising of a wide frequency range (e.g. $L_{Aeq,T}$), as opposed to octave, one-third octave or narrow frequency band noise data.
Narrow-band		Acoustic Energy over a restricted range of frequencies. Used to identify the frequency of audible tones, and to assist in identifying sources of noise in a complex sound environment (e.g. via prominent, tell-tale narrow frequency spectrum).
Ambient Sound		Totally encompassing sound in a given situation at a given time, usually composed of sound from many sources, near and far.
Specific Sound Level	$L_{eq,Tr}$	The Equivalent Continuous A-Weighted Sound Level at an assessment position produced by a specific sound over a given referred time interval, *Tr*
Rating Level	$L_{Ar,Tr}$	The Specific Sound Level plus any adjustment for the acoustic characteristic features of the noise (e.g. intermittency, tones etc.)
Residual Noise	$L_{Aeq,T}$	The ambient sound remaining at given position in a given situation when the specific sound source is suppressed to a degree such that it no longer contributes to the ambient sound.
Sound Reduction Index	*SRI*	The reduction in sound energy when transmitted through a panel or similar planar element, used typically in relation to single octave or one-third octave frequency band values.
Weighted Sound Reduction Index	R_w	The Sound Reduction Index expressed as a single figure.
Dynamic Insertion Loss	*DIL*	Reduction in acoustic energy resulting from the insertion of a noise control element (e.g. an attenuator).

APPENDIX B

NOISE SURVEY DETAILS AND SUMMARY RESULTS

LOCATION

Port Clarence, Middlesbrough

DATES, TIMES AND WEATHER CONDITIONS

Date	Daytime (07:00 hours – 23:00 Hours)				Night Time (23:00 hours – 07:00 hours)			
	Temp, °C	Rain, mm/h	Wind Direction	Average Wind Speed, m/s	Temp, °C	Rain, mm/h	Wind Direction	Average Wind Speed, m/s
07/03/2019	6	0.0	N	3.0	3	0.0	W	2.1
08/03/2019	6	0.0	N	2.1	6	0.2	W	3.6
09/03/2019	3	0.1	NW	2.9	3	0.0	N	0.5
10/03/2019	5	0.1	W	2.8	4	0.0	W	4.2
11/03/2019	5	0.0	NW	4.5	-	-	-	-

PERSONNEL

Ciaron Murphy – Sol Acoustics
Juan Noriega – Sol Acoustics

INSTRUMENTATION

01dB Cube Sound level meter (serial no. 11117)
01dB Pre22 Microphone preamplifier (serial no. 1610404)
GRAS 40CD Microphone capsule (serial no. 260827)
Vaisala WXT520 Weather Station (serial no. M3640013)

01dB Cube Sound level meter (serial no. 11114)
01dB Pre22 Microphone preamplifier (serial no. 1610399)
GRAS 40CD Microphone capsule (serial no. 260807)

Norsonic 1251 Acoustic Calibrator (serial no. 29917)

METHODOLOGY

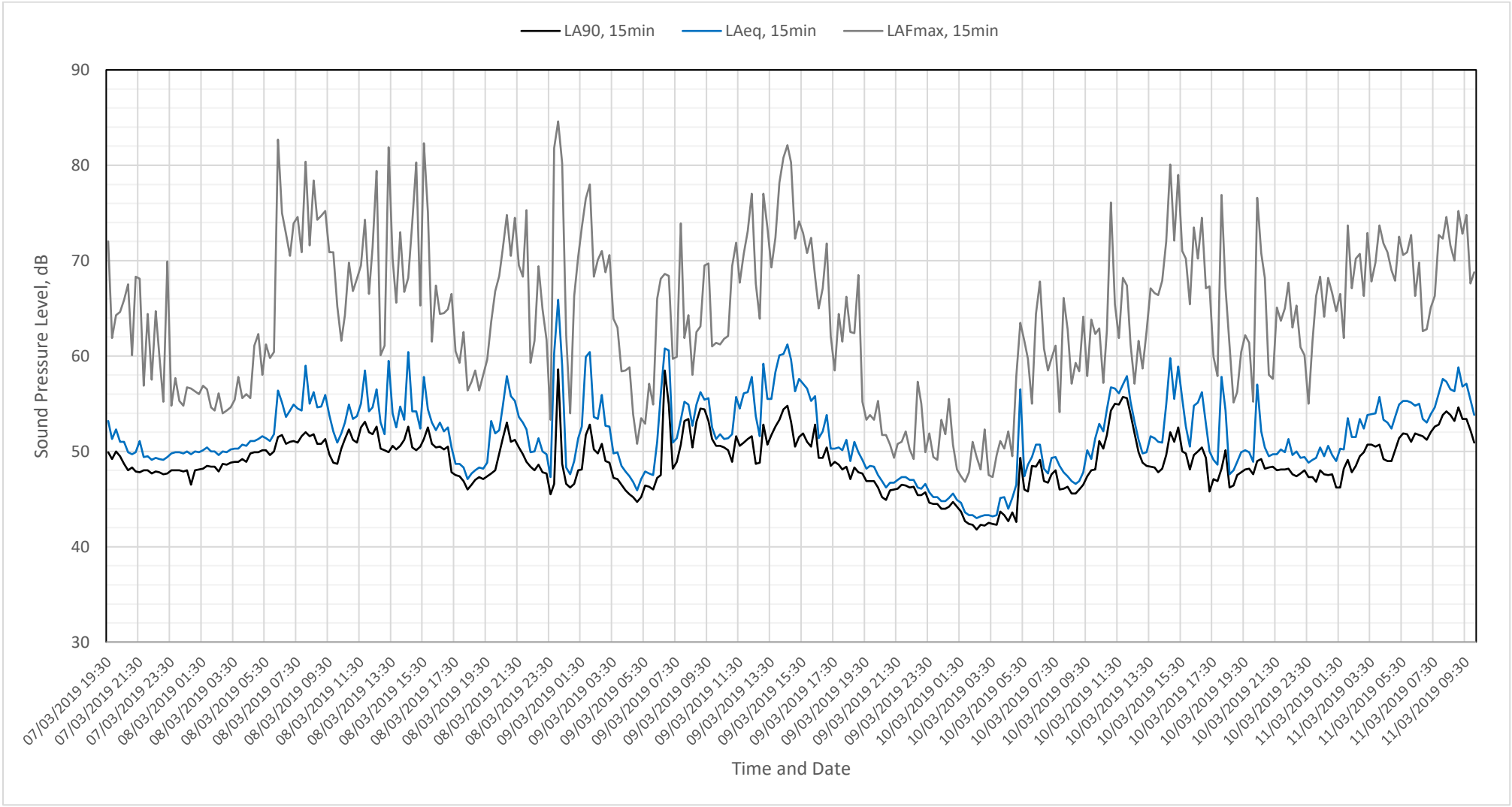
Before and after the measurements the noise monitoring equipment was calibrated to an accuracy of ±0.3dB using the Cal 21 Calibrator. The calibrator produces a sound pressure level of 94dB re 2 x 10^{-5} Pa @ 1kHz.

MEASUREMENT RESULTS

Tables B1 at Attended Noise Measurements Position 2. Graph B1 summarises the broadband A-weighted results obtained at Monitoring Positions 1:

Date and Time	Daytime (07:00 - 23:00)			Night Time (23:00 – 07:00)		
	dB $L_{Aeq,15min}$	dB $L_{A90,15min}$	dB $L_{AF(max),15min}$	dB $L_{Aeq,15min}$	dB $L_{A90,15min}$	dB $L_{AF(max),15min}$
10/03/2019 15:00	62	52	74	-	-	-
10/03/2019 15:15	63	53	74	-	-	-
10/03/2019 15:30	63	52	73	-	-	-
10/03/2019 15:45	65	50	88	-	-	-
10/03/2019 16:00	61	49	74	-	-	-
10/03/2019 16:15	63	52	75	-	-	-
10/03/2019 16:30	62	51	78	-	-	-
10/03/2019 16:45	61	51	77	-	-	-
10/03/2019 17:00	62	50	73	-	-	-
10/03/2019 17:15	65	50	88	-	-	-
10/03/2019 17:30	62	49	73	-	-	-
10/03/2019 17:45	62	50	73	-	-	-
10/03/2019 18:00	63	52	76	-	-	-
10/03/2019 18:15	64	51	81	-	-	-
10/03/2019 18:30	63	48	74	-	-	-
10/03/2019 18:45	62	48	83	-	-	-
10/03/2019 23:00	-	-	-	55	44	71
10/03/2019 23:15	-	-	-	55	44	72
10/03/2019 23:30	-	-	-	55	44	73
10/03/2019 23:45	-	-	-	54	44	70
11/03/2019 00:00	-	-	-	50	43	71
11/03/2019 00:15	-	-	-	50	45	69
11/03/2019 00:30	-	-	-	49	44	69

Table B1: Results at Noise Measurement Position 2



Graph B4: A-weighted environmental noise levels at Measurement Position 1, 7 to 11 March 2019, T = 15minutes

APPENDIX C

SITE PLAN INDICATING LOCATION OF NOISE SOURCES

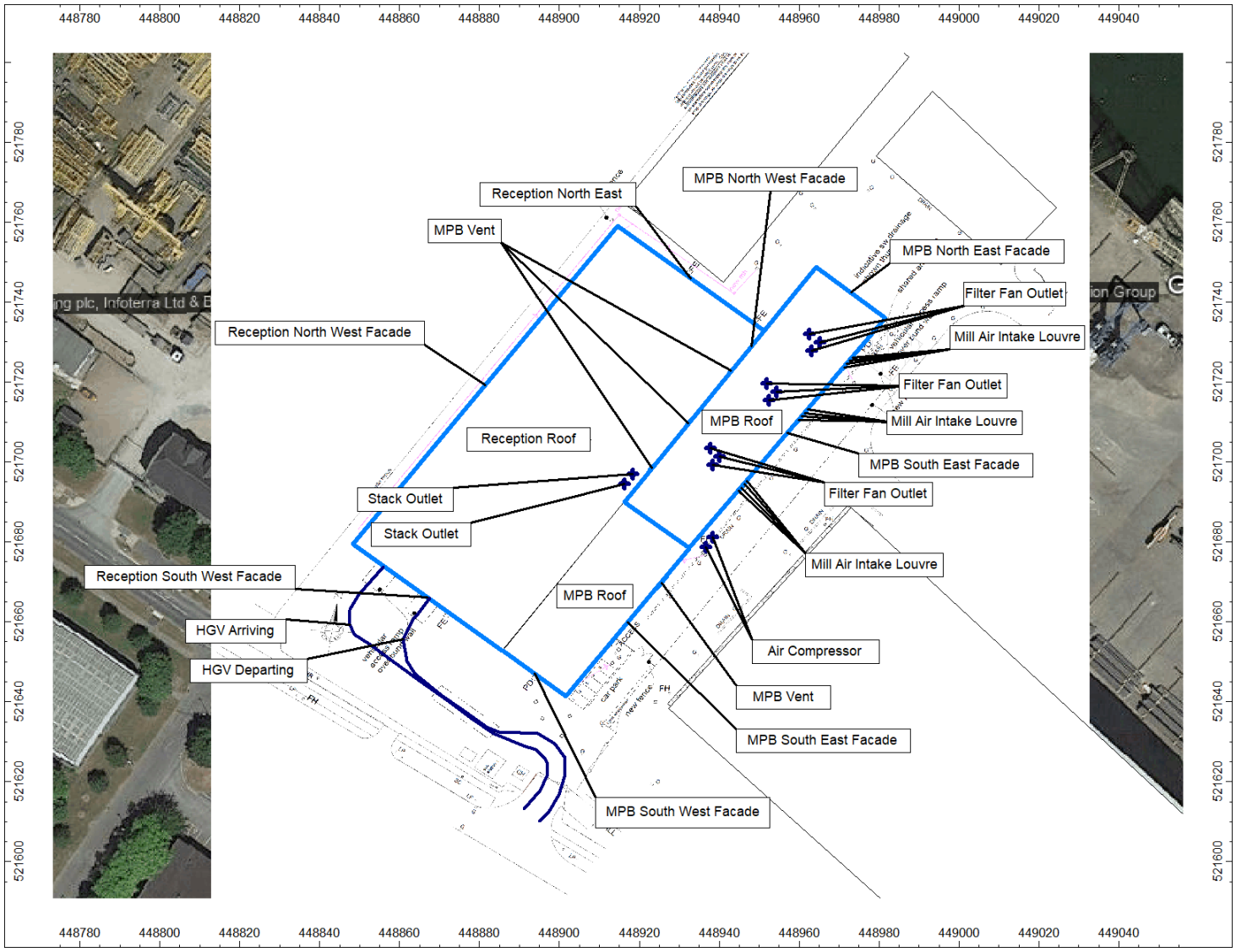


Figure C1: Site plan indicating grid coordinate references x, y coordinates for all external noise sources (duty)

APPENDIX D

ENVIRONMENTAL NOISE MODELLING RESULTS

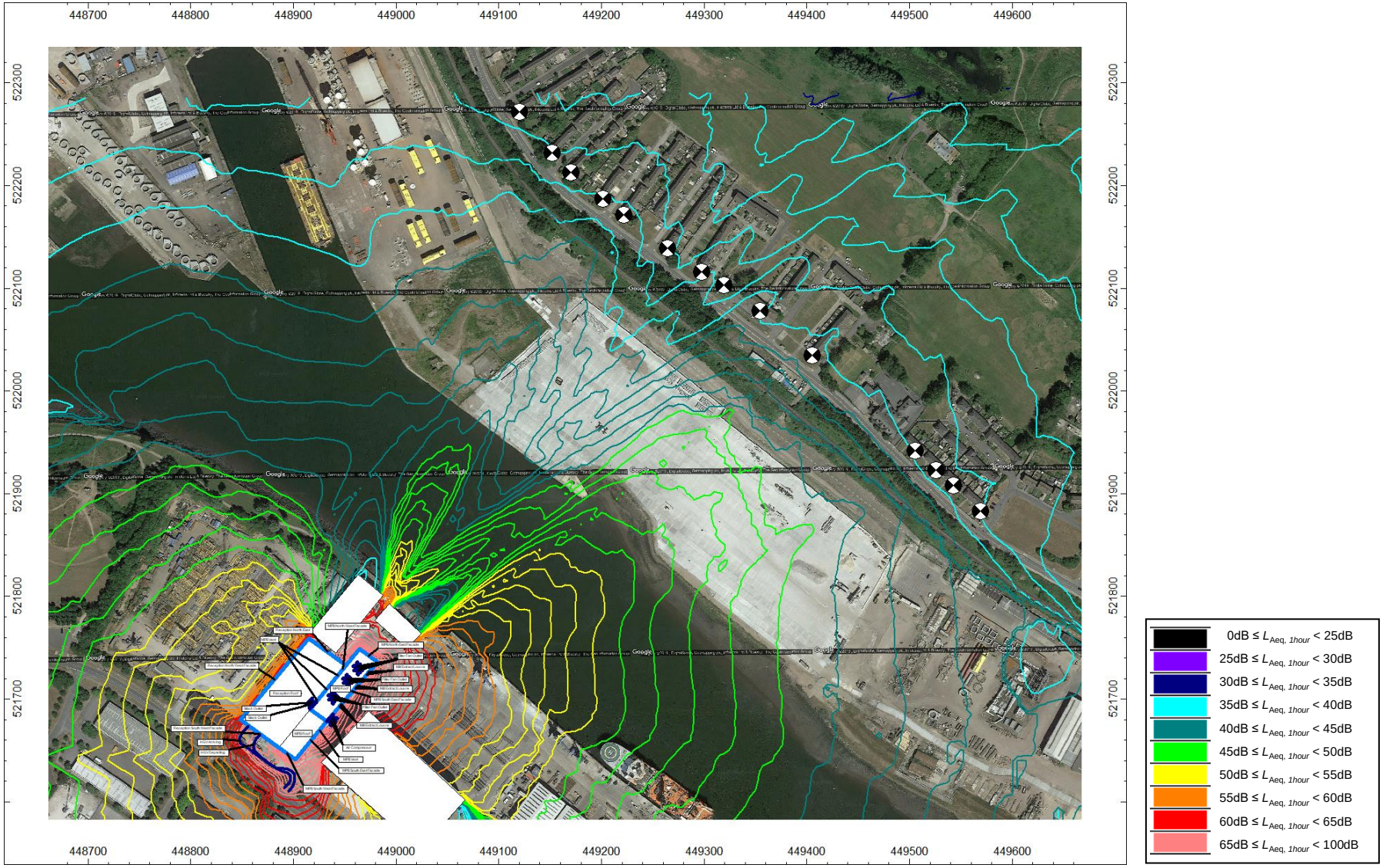


Figure D1: Predicted daytime $L_{Aeq,1hour}$ Specific Sound Level from the installation, at 4 metres height

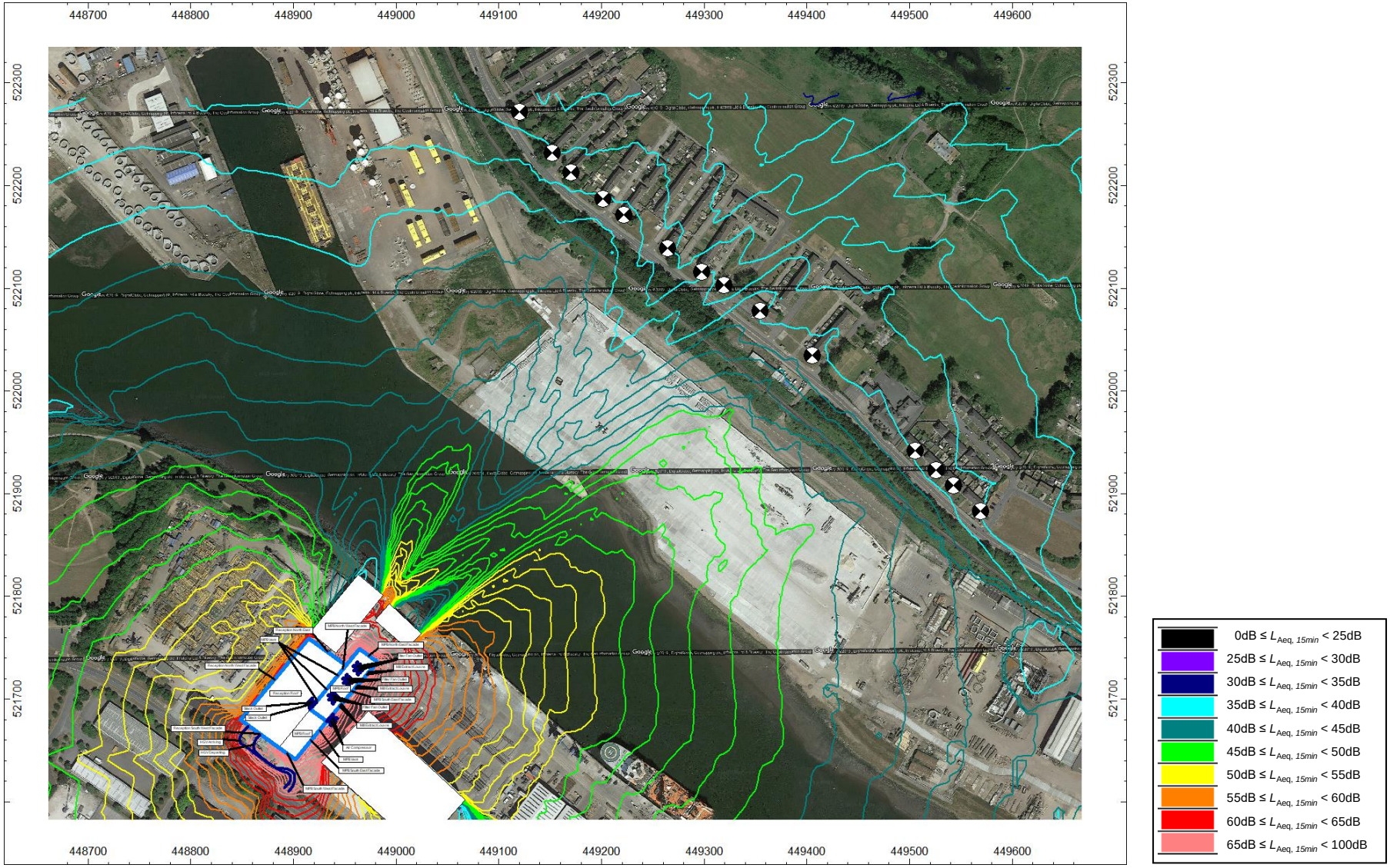


Figure D2: Predicted night time $L_{Aeq,15min}$ Specific Sound Level from the installation, at 4 metres height

Port Clarence Road NMP Predicted Specific Sound Levels Daytime (07:00 – 23:00 Hours)	
Source Description	**Specific Sound Level, dB $L_{Aeq,T}$**
MPB Vent	33.7
MPB South East Facade	30.1
MPB South East Facade	29.2
MPB Roof	28.9
MPB North West Facade	26.2
Filter Fan Outlet	25.7
Filter Fan Outlet	25.6
Stack Outlet	25.1
Filter Fan Outlet	25.0
Filter Fan Outlet	24.9
MPB Roof	23.7
Filter Fan Outlet	23.0
Filter Fan Outlet	22.9
Filter Fan Outlet	22.9
Filter Fan Outlet	22.9
Filter Fan Outlet	22.6
Stack Outlet	22.5
Reception Roof	21.3
MPB North East Facade	20.3
MPB Vent	16.5
MPB Vent	15.7
MPB Vent	15.4
HGV Departing	14.8
HGV Arriving	13.9
Air Compressor	13.3
Air Compressor	13.2
Reception North East	11.8
Mill Air Intake Louvre	11.2
Mill Air Intake Louvre	11.1
Mill Air Intake Louvre	10.9
Mill Air Intake Louvre	10.8
MPB South West Facade	10.3
Reception North West Facade	9.1
Mill Air Intake Louvre	8.6
Mill Air Intake Louvre	8.5
Mill Air Intake Louvre	8.4
…	..
Total	**39.6**

Table D1: NMP Specific Sound Levels, daytime

Port Clarence Road NMP Predicted Specific Sound Levels Night time (23:00 – 07:00 Hours)	
Source Description	**Specific Sound Level, dB $L_{Aeq,T}$**
MPB Vent	33.7
MPB South East Facade	30.1
MPB South East Facade	29.2
MPB Roof	28.9
MPB North West Facade	26.2
Filter Fan Outlet	25.7
Filter Fan Outlet	25.6
Stack Outlet	25.1
Filter Fan Outlet	25
Filter Fan Outlet	24.9
MPB Roof	23.7
Filter Fan Outlet	23
Filter Fan Outlet	22.9
Filter Fan Outlet	22.9
Filter Fan Outlet	22.9
Filter Fan Outlet	22.6
Stack Outlet	22.5
Reception Roof	21.3
MPB North East Facade	20.3
MPB Vent	16.5
HGV Departing	16
MPB Vent	15.7
MPB Vent	15.4
HGV Arriving	13.9
Air Compressor	13.3
Air Compressor	13.2
Reception North East	11.8
Mill Air Intake Louvre	11.2
Mill Air Intake Louvre	11.1
Mill Air Intake Louvre	10.9
Mill Air Intake Louvre	10.8
MPB South West Facade	10.3
Reception North West Facade	9.1
Mill Air Intake Louvre	8.6
Mill Air Intake Louvre	8.5
Mill Air Intake Louvre	8.4
…	..
Total	**39.6**

Table D2: NMP Specific Sound Levels, night time

APPENDIX E

NOISE SOURCE SCHEDULE AND OUTLINE REQUIRED BAT NOISE CONTROL MEASURES

Equipment Name	Data Source / Specification	Number of Sources	Average Sound Pressure Level, dB, at Octave Band Centre Frequency Hz								Average Sound Pressure Level on Measurement Surface, L_{pA}	Measurement Distance, m	Measurement Surface Area at Measurement Position, m²	Overall Sound Power Level, dB L_{wA}	Source: Area (A) Line (L) Point (P) or internal (I)	Outline Noise Mitigation Design
			63	125	250	500	1k	2k	4k	8k						
Reception Building																Refer to Table 6 for required minimum sound insulation performance to be achieved by the external building fabric.
Loading Shovel	Noise spectrum taken from BS5228 Table C.10 reference 5 ("Wheeled loader": 232kW 39t).	2	84	88	81	74	74	71	66	65	80	10	628	108	I	Mobile plant under the direct control of the Operator shall only use non-intrusive broadband vehicle reversing alarms and/or reversing cameras. No use of pulsed and/or tonal reversing alarms (e.g. reversing bleepers)
Excavator	Noise spectrum taken from BS5228 Table C.2 reference 14 ("Tracked Excavator": 226kW 40t).	1	85	78	77	77	73	71	68	63	79	10	628	107	I	Mobile plant under the direct control of the Operator shall only use non-intrusive broadband vehicle reversing alarms and/or reversing cameras. No use of pulsed and/or tonal reversing alarms (e.g. reversing bleepers)
MPB																Refer to Table 6 for required minimum sound insulation performance to be achieved by the external building fabric.
Drying Line																
Belt Dryer	Client confirmed broadband A-weighted sound pressure noise level confirmed. Typical octave band spectrum assumed.	2	82	83	82	80	73	68	63	58	80	1	224	104	I	
Material Conveyor	No data provided. Typical noise data assumed.	4	84	83	82	78	81	78	72	55	85	1	144	107	I	Noise from any material conveyor shall not exceed 85dB $L_{Aeq,T}$ at a distance of 1 metre from any surface, for any operating state or speed. Depending upon the actual noise levels generated, provisions should be included for noise mitigation to be fitted to the conveying line and drives.
Dry Feedstock Buffering Line																
Filter fan	Client confirmed broadband A-weighted sound pressure noise level confirmed. Typical octave band spectrum assumed.	2	87	86	84	81	80	77	72	67	85	1	6	93	I	
Milling Module 1-3																
Hammer Mill	Client confirmed broadband A-weighted sound pressure noise level confirmed. Typical octave band spectrum assumed.	6	93	94	88	84	86	82	92	78	95	1	104	115	I	
Transport fan	Client confirmed broadband A-weighted sound pressure noise level confirmed. Typical octave band spectrum assumed.	6	92	91	89	86	85	82	77	72	90	1	6	98	I	
Filter Fan	Client confirmed broadband A-weighted sound pressure noise level confirmed. Typical octave band spectrum assumed.	6	92	91	89	86	85	82	77	72	90	1	6	98	I	
Supporting fan	Client confirmed broadband A-weighted sound pressure noise level confirmed. Typical octave band spectrum assumed.	3	87	86	84	81	80	77	72	67	85	1	6	93	I	
Pelleting Module 1-3																
Pellet Mill	Client confirmed broadband A-weighted sound pressure noise level confirmed. Typical octave band spectrum assumed.	9	94	95	89	85	87	83	93	79	96	1	91	116	I	
Fan for counterflow cooler	Client confirmed broadband A-weighted sound pressure noise level confirmed. Typical octave band spectrum assumed.	3	106	105	103	100	99	96	91	86	104	1	6	112	I	
Dust from vibrating screen fan	Client confirmed broadband A-weighted sound pressure noise level confirmed. Typical octave band spectrum assumed.	3	95	94	92	89	88	85	80	75	93	1	6	101	I	
Fork Lift Truck	No noise data provided. Noise data taken from similar project based upon manufacturer noise data.	1	79	79	69	71	64	64	55	48	72	10	628	100	I	Mobile plant under the direct control of the Operator shall only use non-intrusive broadband vehicle reversing alarms and/or reversing cameras. No use of pulsed and/or tonal reversing alarms (e.g. reversing bleepers)
External																
Belt Dryer Stack outlet	No noise data provided. Noise data taken from similar project based upon manufacturer noise data.	2	84	82	79	77	75	72	69	66	80	1	28	95	P	Noise from belt dryer stack outlet shall not exceed 80dB $L_{Aeq,T}$ at 1 metre from stack outlet edge, 90º off longitudinal axis of the stack at any speed. Make provisions for duct attenuators to be fitted to the discharge side of each fan, which will very likely be necessary.

Equipment Name	Data Source / Specification	Number of Sources	Average Sound Pressure Level, dB, at Octave Band Centre Frequency Hz								Average Sound Pressure Level on Measurement Surface, L_{pA}	Measurement Distance, m	Measurement Surface Area at Measurement Position, m²	Overall Sound Power Level, dB L_{wA}	Source: Area (A) Line (L) Point (P) or internal (I)	Outline Noise Mitigation Design
			63	125	250	500	1k	2k	4k	8k						
Dust Filter Stack Outlets	No noise data provided. Noise data taken from similar project based upon manufacturer noise data.	9	84	82	79	77	75	72	69	66	80	1	28	95	P	Noise from the Dust Filter Extract Fan stack outlet shall not exceed 80dB $L_{Aeq,T}$ at 1 metre from stack outlet edge, 90º off longitudinal axis of the stack at any speed. Make provisions for duct attenuators fitted to the discharge side of each fan, which will very likely be necessary.
Mill Air intake louvres	No noise data provided. Noise data taken from similar project based upon manufacturer noise data.	12	83	79	74	75	78	70	57	45	80	1	1	80	A	Noise from all façade mounted Mill Air intake louvres, and any other mechanically ducted ventilation louvres, shall not exceed 80dB $L_{Aeq,T}$ at 1m (maximum, when on full load and as measured on-axis). Make provisions for attenuators / acoustic louvres.
Air compressor	Client confirmed broadband A-weighted sound pressure noise level confirmed. Typical octave band spectrum assumed.	2	70	72	69	69	71	66	61	52	74	1	6	82	P	
HGV	Noise spectrum taken from BS5228 Table C.2 reference 34 ("Lorry": 4-axle wagon).	39 per day	73	78	78	78	74	73	68	66	80	10	628	108	Moving P	Mobile plant under the direct control of the Operator shall only use non-intrusive broadband vehicle reversing alarms and/or reversing cameras. No use of pulsed and/or tonal reversing alarms (e.g. reversing bleepers)

Table E1: Noise source schedule

APPENDIX F

PREDICTED COMPOSITE SOUND INSULATION PERFORMANCE OF THE EXTERNAL BUILDING FABRIC

Project	Waste Knott
Project Ref.	1837
Building Ref.	Main Processing Building

BUILDING DIMENSIONS

Length (m)	120	Volume (m3)	33600
Width (m)	20	Surface Area (m2)	8720
Height (m)	14	Diffusivity term Cd (BS 12354)	-5

COMPOSITE SRI CALCULATIONS

Building Façade	Total Area	Element	Area	Octave Band Frequencies								Construction
				63	125	250	500	1 k	2 k	4 k	8 k	
North west façade	280	Wall	280	20	18	20	24	20	29	39	47	Kingspan KS1000 Rw
		Roller Shutter										
		Door										
		Louvres										
		Window										
		Composite SRI		**20**	**18**	**20**	**24**	**20**	**29**	**39**	**47**	
North east façade	280	Wall	280	20	18	20	24	20	29	39	47	Kingspan KS1000 Rw
		Roller Shutter										
		Door										
		Louvres										
		Window										
		Composite SRI		**20**	**18**	**20**	**24**	**20**	**29**	**39**	**47**	
South east façade	1440	Wall	1358	20	18	20	24	20	29	39	47	Kingspan KS1000 Rw
		Roller Shutter	72	14	14	17	18	15	19	19	19	Ascot Doors Roller Shutter
		Door	11	18	24	25	28	30	29	34	34	Booths 29H 45mm Metal Door
		Louvres										
		Window										
		Composite SRI		**19**	**18**	**20**	**23**	**20**	**28**	**32**	**32**	
South west façade	220	Wall	218	20	18	20	24	20	29	39	47	Kingspan KS1000 Rw
		Roller Shutter										
		Door	2	18	24	25	28	30	29	34	34	Booths 29H 45mm Metal Door
		Louvres										
		Window										
		Composite SRI		**20**	**18**	**20**	**24**	**20**	**29**	**39**	**46**	
Roof	2400	Roof	2387	20	18	20	24	20	29	39	47	Kingspan KS1000 Rw
		Rooflights	240	13	9	12	17	22	24	19	22	Kingspan KS1000 DLTR
		Composite SRI		**18**	**16**	**18**	**22**	**20**	**28**	**28**	**32**	

Project	Waste Knott
Project Ref.	1837
Building Ref.	Reception Building

BUILDING DIMENSIONS

Length (m)	103	Volume (m3)	55620
Width (m)	45	Surface Area (m2)	12822
Height (m)	12	Diffusivity term Cd (BS 12354)	-5

COMPOSITE SRI CALCULATIONS

Building Façade	Total Area	Element	Area	Octave Band Frequencies								Construction
				63	125	250	500	1 k	2 k	4 k	8 k	
North west façade	1236	Wall	1236	20	18	20	24	20	29	39	47	Kingspan KS1000 Rw
		Roller Shutter										
		Door										
		Louvres										
		Window										
		Composite SRI		**20**	**18**	**20**	**24**	**20**	**29**	**39**	**47**	
North east façade	540	Wall	538	20	18	20	24	20	29	39	47	Kingspan KS1000 Rw
		Roller Shutter										
		Door	2	18	24	25	28	30	29	34	34	Booths 29H 45mm Metal Door
		Louvres										
		Window										
		Composite SRI		**20**	**18**	**20**	**24**	**20**	**29**	**39**	**47**	
South east façade	NA	Wall		20	18	20	24	20	29	39	47	Kingspan KS1000 Rw
		Roller Shutter		14	14	17	18	15	19	19	19	Ascot Doors Roller Shutter
		Door		18	24	25	28	30	29	34	34	Booths 29H 45mm Metal Door
		Louvres										
		Window										
		Composite SRI		**####**	**####**	**####**	**####**	**####**	**####**	**####**	**####**	
South west façade	540	Wall	502	20	18	20	24	20	29	39	47	Kingspan KS1000 Rw
		Roller Shutter	36	14	14	17	18	15	19	19	19	Ascot Doors Roller Shutter
		Door	2	18	24	25	28	30	29	34	34	Booths 29H 45mm Metal Door
		Louvres										
		Window										
		Composite SRI		**19**	**18**	**20**	**23**	**19**	**27**	**31**	**31**	
Roof	4635	Roof	4622	20	18	20	24	20	29	39	47	Kingspan KS1000 Rw
		Rooflights	464	13	9	12	17	22	24	19	22	Kingspan KS1000 DLTR
		Composite SRI		**18**	**16**	**18**	**22**	**20**	**28**	**28**	**32**	

APPENDIX G

NOISE DATA AS PROVIDED BY THE CLIENT

03/09/2020		**Noise levels for WKE Middlesbrough, UK**	WKE1-PROC-003-01					
		Measurment Distance: 1m Noise: Sound Pressure Level Dimensions: X x Y; H [meters]						
No	Diagramm No	Drying Line	Diagramm	Quantity	Dimensions	Operating Mode	Noise	Power
			[pos.]	[pcs.]			[dB(A)]	[kW]
10.	NS.10	Belt dryer with silencer 1	201	1		Continuously	80	~134
11.	NS.11	Belt dryer with silencer 2	202	1		Continuously	80	~134
No		Dry Feedstock Buffering Line	Diagramm	Quantity	Dimensions	Operating Mode	Noise	Power
			[pos.]	[pcs.]			[dB(A)]	[kW]
20.	NS.20	Filter's fan 1	304.1	1	0,5x0,5x3,0	Continuously	85	11
21.	NS.21	Filter's fan 2	304.2	1	0,5x0,5x3,0	Continuously	85	11
No		Line 4	Diagramm	Quantity	Dimensions	Operating Mode	Noise	Power
		Milling Module 1	[pos.]	[pcs.]			[dB(A)]	[kW]
30.	NS.30	Hammer Mill 1	609	1	1,8x3,3x3,6	Continuously	95	200
31.	NS.31	Hammer Mill 2	610	1	1,8x3,3x3,6	Continuously	95	200
32.	NS.32	Transport fan 1	617	1	1,9x1,9x2,1	Continuously	85-90	37
33.	NS.33	Transport fan 2	618	1	1,9x1,9x2,1	Continuously	85-90	37
34.	NS.34	Filter's fan 1	620.1	1	2,7x3,0x2,8	Continuously	90	37
35.	NS.35	Filter's fan 2	620.2	1	2,7x3,0x2,8	Continuously	90	37
36.	NS.36	Supporting fan 1	625	1	0,8x0,7x1,0	Continuously	85	11
		Pelleting Module 1			Dimensions	Operating Mode		
40.	NS.40	Pellet mill 1	704	1	3,2x3,1x2,2	Continuously	89-96	264
41.	NS.41	Pellet mill 2	708	1	3,2x3,1x2,2	Continuously	89-96	264
42.	NS.42	Pellet mill 3	712	1	3,2x3,1x2,2	Continuously	89-96	264
43.	NS.43	Fan for counterflow cooler 1	725	1	2,2x2,5x2,7	Continuously	104	45
44.	NS.44	Dust from vibrating screen fan 1	729	1	1,0x1,2x1,1	Continuously	93	5.5
No		Line 5	Diagramm	Quantity	Dimensions	Operating Mode	Noise	Power
		Milling Module 2	[pos.]	[pcs.]			[dB(A)]	[kW]
50.	NS.50	Hammer Mill 3	909	1	1,8x3,3x3,6	Continuously	95	200
51.	NS.51	Hammer Mill 4	910	1	1,8x3,3x3,6	Continuously	95	200
52.	NS.52	Transport fan 3	917	1	1,9x1,9x2,1	Continuously	85-90	37
53.	NS.53	Transport fan 4	918	1	1,9x1,9x2,1	Continuously	85-90	37
54.	NS.54	Filter's fan 3	920.1	1	2,7x3,0x2,8	Continuously	90	37
55.	NS.55	Filter's fan 4	920.2	1	2,7x3,0x2,8	Continuously	90	37
56.	NS.56	Supporting fan 2	925	1	0,8x0,7x1,0	Continuously	85	11
		Pelleting Module 2			Dimensions	Operating Mode		
60.	NS.60	Pellet mill 4	1004	1	3,2x3,1x2,2	Continuously	89-96	264
61.	NS.61	Pellet mill 5	1008	1	3,2x3,1x2,2	Continuously	89-96	264
62.	NS.62	Pellet mill 6	1012	1	3,2x3,1x2,2	Continuously	89-96	264
63.	NS.63	Fan for counterflow cooler 2	1025	1	2,2x2,5x2,7	Continuously	104	45
64.	NS.64	Dust from vibrating screen fan 2	1029	1	1,0x1,2x1,1	Continuously	93	5.5
No		Line 6	Diagramm	Quantity	Dimensions	Operating Mode	Noise	Power
		Milling Module 3	[pos.]	[pcs.]			[dB(A)]	[kW]
70.	NS.70	Hammer Mill 5	1209	1	1,8x3,3x3,6	Continuously	95	200
71.	NS.71	Hammer Mill 6	1210	1	1,8x3,3x3,6	Continuously	95	200
72.	NS.72	Transport fan 5	1217	1	1,9x1,9x2,1	Continuously	85-90	37
73.	NS.73	Transport fan 6	1218	1	1,9x1,9x2,1	Continuously	85-90	37
74.	NS.74	Filter's fan 5	1220.1	1	2,7x3,0x2,8	Continuously	90	37
75.	NS.75	Filter's fan 6	1220.2	1	2,7x3,0x2,8	Continuously	90	37
76.	NS.76	Supporting fan 3	1225	1	0,8x0,7x1,0	Continuously	85	11
		Pelleting Module 3			Dimensions	Operating Mode		
80.	NS.80	Pellet mill 7	1304	1	3,2x3,1x2,2	Continuously	89-96	264
81.	NS.81	Pellet mill 8	1308	1	3,2x3,1x2,2	Continuously	89-96	264
82.	NS.82	Pellet mill 9	1312	1	3,2x3,1x2,2	Continuously	89-96	264
83.	NS.83	Fan for counterflow cooler 3	1325	1	2,2x2,5x2,7	Continuously	104	45
84.	NS.84	Dust from vibrating screen fan 3	1329	1	1,0x1,2x1,1	Continuously	93	5.5
No			Diagramm	Quantity	Dimensions	Operating Mode	Noise	Power
		Air compressor room	[pos.]	[pcs.]			[dB(A)]	[kW]
90.	NS.90	Air compressor 1		1	2,5x1,1x1,6	Intermittently 60%	74	37
91.	NS.91	Air compressor 2		1	2,5x1,1x1,6	Intermittently 60%	74	37

Figure F1: Client confirmed noise data for all key plant

APPENDIX H

DETAILS AND PROFESSIONAL QUALIFICATIONS OF CONTRIBUTING SOL STAFF

Company Details

Name of Organisation: Sol Acoustics Limited

Status: Private Limited Company

Address: Unit 11, Brunel Court,
Gadbrook Park
CW9 7LP

Telephone Number: 01565 632535

E-Mail: info@solacoustics.co.uk

Nature of Business: Acoustic Consultancy

Directors: Simon Ferenczi

Company Registration Number: 4218702

Key Technical Personnel & Qualifications

Simon Ferenczi	Institute of Acoustics Diploma (with additional modules), MIOA
Brian Horner	BSc (Hons), MIOA
Ciaron Murphy	BEng (Hons), AMIOA
Juan Noriega	PhD, MSc, BSc

Company Accreditations

Sol Acoustics is a member of The Association of Noise Consultants (ANC) and is qualified to perform sound insulation testing under the ANC's accredited testing scheme to demonstrate compliance with the requirements of Approved Document E of the Building Regulations.