Calder Valley Skip Hire
Halifax, Calderdale

Environmental Noise Impact Assessment
19 June 2017
PROJECT: Calder Valley Sip Hire
Halifax, Calderdale

Environmental Noise Impact Assessment

CLIENT: Sol Environment Limited
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DATE: 19 June 2017
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1.0 INTRODUCTION

Sol Acoustics Ltd (Sol) has been commissioned by Sol Environment Ltd (SE) to conduct an environmental noise assessment to establish the forthcoming environmental noise impact likely to be occurring on the surrounding environment, as arising from the proposed new incinerator plant to be installed at the of the Calder Valley Skip Hire site on Mearclough Road, Sowerby Bridge, Halifax, Calderdale. The purpose of this assessment is as follows:

- To identify the nearest pre-existing noise sensitive housing to the site (i.e. receptors), which are most likely to be potentially affected by environmental noise arising from plant and/or processes associated with the plant during the proposed operating periods.

- To determine the prevailing daytime and night time background noise climate at the nearest receptors (weekday and weekend periods).

- To identify all potentially significant proposed noise sources and to obtain suitable source noise level data for each of the identified significant noise sources at the Development site.

- To calculate the resultant environmental noise contribution and impact arising at the nearest noise sensitive receptors to the site, taking factors such as distance to receptors and other environmental factors into consideration.

- To carry out an environmental noise assessment of the proposed development in accordance with the methodology prescribed in relevant Standards and guidance (i.e. British Standard 4142: 2014) to determine the significance of the potential noise impact generated.
2.0 DESCRIPTION OF SITE

2.1 General Overview and Noise Sensitive Receptors (NSRs)

The Development site is located at the southwest corner Mearclough Road and Fall Lane in Sowerby Bridge, Halifax, Calderdale. Whilst the site is situated in a rural setting, the Development site sits amongst other industrial premises located along Mearclough Road.

Currently on the site is the existing Calder Valley Skip Hire Ltd premises, which is used as a waste transfer station. The site is currently permitted to operate during the following hours:

- Monday – Friday: 07:30 – 18:30 hours
- Saturday: 07:30 – 18:30 hours
- Sunday: 09:00 – 16:00 hours

Currently, the site contains an existing industrial building, complete with external storage areas and a loading/unloading area. Full constructional details of the existing building are not currently available, but from inspection, it is understood that the external building fabric consists of a masonry wall and lightweight cladding. There is a roller shutter and personnel door located within the north facing façade, and roof lights within the roof construction. The building dimensions are approximately 20m x 15m x 6m.

The nearest noise sensitive premises to the Development site are as follows:

- The residential premises located approximately 120m to the north east of the Development site on Wakefield Road.

- The residential premises located approximately 215m to the west of the Development site on Holmes Road (a continuum of Mearclough Road).

- The residential premises located approximately 340m to the west south of the Development site on Sparkhouse Lane.

- The residential premises located approximately 310m to the south of the Development site on London Road.
The location of the proposed Development site in relation to the nearest noise sensitive premises is as shown in Figure 1.

**Figure 1:** Proposed Development Site and its surroundings
2.2 Development Proposals

Calder Valley Skip hire are proposing to install a Small Waste Incineration Plant (SWIP) on the existing site. It is understood that the SWIP will combust approximately 8,000 tonnes per annum of predominantly Grade A and B waste wood and selected combustible materials (RDF). The site will also accept up to 5,000 tonnes per annum of excavated soil, which will be dried before being exported off site.

The SWIP is to be installed within the existing building on site, and will be expected to operate continuously during the consented hours of operation.

Figure 2 indicates the location of the proposed incineration plant within the existing building on site.
Figure 2: Proposed Development site layout
A typical schematic of the proposed plant is provided in Figure 3:
Sol have been in discussions with the supplier of the proposed incineration plant, namely Inciner8, in order to obtain suitable noise data for the proposed unit.

Incinerate have confirmed that other than noise from the incinerator, the main noise sources associated with the plant are from the various fans associated with the plant. Table 1 provide the noise levels expected from the proposed plant, as confirmed by Inciner8:

<table>
<thead>
<tr>
<th>Unit</th>
<th>Number of units</th>
<th>Sound Pressure Level at 1 m, dB(A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incinerator</td>
<td>1</td>
<td>76</td>
</tr>
<tr>
<td>Burner fans</td>
<td>7</td>
<td>70</td>
</tr>
<tr>
<td>Cooling fan</td>
<td>1</td>
<td>85</td>
</tr>
<tr>
<td>ID fan</td>
<td>4</td>
<td>85</td>
</tr>
</tbody>
</table>

Table 1: Manufacturer confirmed noise level data associated with the incineration plant

The ID fan is proposed to be ducted to the roof of the existing building on site. The location of the ID stack outlet is shown in Figure 1. At present, there is no noise data available for the sound power level expected from the top of the ID stack. For the purposes of this assessment, it is assumed that the noise level impact from the ID stack outlet will be limited to 75 dB(A) at 1m. This will require the use of an atmospheric side, duct mounted stack attenuator, installed between the fan outlet and the stack termination. The attenuator design is to be determined by others, upon the availability of confirmed noise level emissions (in duct sound power levels) from the ID fan, in conjunction with the above-stated acoustic performance specification.

The hopper is proposed to be loaded by the existing fork lift truck, which is currently already in operation on the site, and as such the potential noise impact from this operation has not been assessed. It is assumed for the purposes of the assessment that the roller shutter doors will remain open whilst the plant is in use to allow for easy access to, and from the incinerator (i.e. worst case condition).
3.0 DETAILS OF INVESTIGATION

In order to inform the assessment, an environmental weekend and weekday period noise survey have been conducted by Sol from 1 June until 6 June 2017. The purpose of these measurements was to determine the prevailing background noise levels prevailing at the nearest noise sensitive premises to the Development site.

Two environmental noise measurement positions were selected to inform the survey:

- **Noise Monitoring Position 1**: The microphone was positioned on the northern boundary of the development site towards Mearclough Road, approximately 215m to the west of the residential premises on Holmes Road (a continuation of Mearclough Road) and at a height of approximately 3m above location ground level. The background noise levels measured at this position are considered to be representative of those expected at the residential premises on Holmes Road and further afield to the north on Wakefield Road.

- **Noise Monitoring Position 2**: The microphone was positioned approximately 240m to the south of the Development Site boundary, towards the residential premises on Spark House Lane and London Road, and at a height of approximately 1.5m above location ground level. The background noise levels measured at this position are considered to be representative of those expected at the boundary of the residential premises on Spark House Lane and London Road.

The noise monitoring equipment was Type 1 Precision Grade, 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).

During all environmental noise measurements, the prevailing weather conditions generally remained favourable for the purposes of environmental noise assessment throughout the entire survey period. Mean wind speeds were generally lower than 5 m/s. Prolonged periods of rain were observed on the 5th June and 6th June. Further details of the identified weather conditions are provided in Appendix A. Notwithstanding the weather conditions recorded, the microphone systems were entirely weatherproofed and fitted with all-weather environmental windshields, each with bird spike.

*Appendix A provides further information.*
4.0 NOISE SURVEY RESULTS SUMMARY

4.1 Background Noise Climate

Table 2 provides a basic summary of the typical overall, A-weighted noise levels measured at the various noise monitoring locations, in $L_{Aeq}$ and $L_{A90}$ terms, during daytime and night time periods, weekdays and weekends. The specific, measured noise levels pertinent to the BS4142 environmental noise assessment are highlighted in bold, italic text. The key observations are provided below.

*Appendix A provides further information, including detailed noise time-history graphs for all the measured receptor daytime, night time, weekday and weekend background noise survey data.*

<table>
<thead>
<tr>
<th>Measurement Position</th>
<th>Date</th>
<th>Daytime (07:00 - 23:00)</th>
<th>Night Time (23:00 – 07:00)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>$dB \ L_{Aeq,16\text{hour}}$</td>
<td>$dB \ L_{A90,15\text{min}}$ (Typical)</td>
</tr>
<tr>
<td>1</td>
<td>Thursday 1 June 2017</td>
<td>67*</td>
<td>41</td>
</tr>
<tr>
<td></td>
<td>Friday 2 June 2017</td>
<td>70</td>
<td>47</td>
</tr>
<tr>
<td></td>
<td>Saturday 3 June 2017</td>
<td>65</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td>Sunday 4 June 2017</td>
<td>65</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td>Monday 5 June 2017</td>
<td>69</td>
<td>47</td>
</tr>
<tr>
<td></td>
<td>Tuesday 6 June 2017</td>
<td>71*</td>
<td>53</td>
</tr>
<tr>
<td>2</td>
<td>Thursday 1 June 2017</td>
<td>56*</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>Friday 2 June 2017</td>
<td>57</td>
<td>44</td>
</tr>
<tr>
<td></td>
<td>Saturday 3 June 2017</td>
<td>55</td>
<td>43</td>
</tr>
<tr>
<td></td>
<td>Sunday 4 June 2017</td>
<td>55</td>
<td>42</td>
</tr>
<tr>
<td></td>
<td>Monday 5 June 2017</td>
<td>61</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td>Tuesday 6 June 2017</td>
<td>67</td>
<td>52</td>
</tr>
</tbody>
</table>

* Measurement not conducted for the full 16-hour assessment period

Table 2: Summary of typical, measured environmental noise levels, in broadband terms

*Appendix A provides further information, including detailed noise time-history graphs for all the measured receptor daytime, night time, weekday and weekend background noise survey data.*
It should be noted that the night time background noise levels are presented for completeness but do not form part of the assessment since the Development is only expected to operate during daytime hours.

Based upon the results of the environmental noise survey, Table 3 presents the typical weekday daytime and weekend daytime background noise levels which shall be used to form the benchmark for the environmental noise assessment:

<table>
<thead>
<tr>
<th>Measurement Position</th>
<th>Associated Residential Premises</th>
<th>Assessment Period</th>
<th>dB $\text{L}_{A90,15\text{min}}$ (Typical)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Holmes Road and Wakefield Road</td>
<td>Weekday Daytime (07:00 - 23:00)</td>
<td>47</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Weekend Daytime (07:00 - 23:00)</td>
<td>45</td>
</tr>
<tr>
<td>2</td>
<td>Spark House Lane and London Road</td>
<td>Weekday Daytime (07:00 - 23:00)</td>
<td>44</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Weekend Daytime (07:00 - 23:00)</td>
<td>42</td>
</tr>
</tbody>
</table>

**Table 3:** Benchmark Background Noise Levels
5.0 ASSESSMENT CRITERIA

5.1 BS4142 Assessment Methodology and Adopted Environmental Noise Targets

In terms of appropriate environmental noise impact, whilst not absolutely definitive, BS4142: 2014 ‘Methods for Rating and Assessing Industrial and Commercial Sound’ (BS4142) provides guidance in terms of the avoidance of likelihood of complaint due to environmental noise as arising from industrial and mechanical plant noise sources of the types discussed herein.

BS4142 considers that the potential impact is dependent on the difference occurring between the environmental noise ‘rating level’ specifically arising from, and relating to a particular plant or process (the entire Calder Valley Skip Hire processing plant and its operation in this case, during daytime and night-time periods), and typically measured background noise level.

The procedure contained in BS 4142 for assessing the likelihood of complaints is to compare the measured or predicted noise level from the source in question, the ‘Specific Noise Level’ immediately outside the noise sensitive premises, with the background noise level. Where the noise contains attention attracting characteristics such as tonal, impulsive, intermittent elements, it may be appropriate to apply a correction to the specific noise level to obtain the ‘Rating Level’.

For the daytime, this assessment is carried out over a one-hour period, and over a fifteen minute period at night. The daytime and night-time periods are defined as 07:00 to 23:00 hours and 23:00 to 07:00 hours respectively.

BS 4142 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 resulting environmental noise 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.

Thus, in BS4142 assessment terms, it is considered appropriate to limit the combined Rating Level from the Development Site to not exceed the typical measured weekday and weekend daytime background noise levels.

On this basis, and based upon the results of the environmental noise survey, the following daytime maximum permissible Rating Level limits apply at the nearest noise sensitive premises:

<table>
<thead>
<tr>
<th>Residential Premises</th>
<th>Assessment Period</th>
<th>dB $L_{A90,15min}$ (Typical)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Holmes Road and Wakefield Road</td>
<td>Weekday Daytime (07:00 - 23:00)</td>
<td>47</td>
</tr>
<tr>
<td></td>
<td>Weekend Daytime (07:00 - 23:00)</td>
<td>45</td>
</tr>
<tr>
<td>Spark House Lane and London Road</td>
<td>Weekday Daytime (07:00 - 23:00)</td>
<td>44</td>
</tr>
<tr>
<td></td>
<td>Weekend Daytime (07:00 - 23:00)</td>
<td>42</td>
</tr>
</tbody>
</table>

**Table 4:** Maximum Permissible Noise Rating Level Limit
6.0 ENVIRONMENTAL NOISE MODEL

6.1 Methodology and Basis of 3D Environmental Models

In order to predict the likely resultant environmental noise levels impinging noise sensitive receptors, proprietary 3D computer noise models were created using the DataKustik ‘CadnaA’ Noise Mapping software. The following assumptions have been made in the generation of the noise models:

- 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.

- The model was set to include up to second order reflected noise from solid structures.

- The existing land topography of the development site and surrounding area up to and including the nearest noise sensitive premises has been taken into consideration in the assessment. 3rd party topographical information has been obtained from emapsite.com.

- Where full octave band noise data is not available, the noise level contribution for a source has been determined based upon the broadband A-weighted value. The noise level has been entered into the acoustic model as an A-weighted sound power level at 250 Hz.

- The potential noise level impact from proposed equipment to be located within the existing building has 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 12354-4:2000: Building Acoustics – Estimation of acoustic performance of buildings from the performance of elements – Part 4: Transmission of indoor sound to the outside. The total reverberant sound pressure level expected within the building has been determined based on the confirmed sound power level for the proposed equipment, the industrial building’s room dimensions and assuming a reverberation time within the existing warehouse (with the existing roller shutters open) of up to 1 seconds.
The sound power level for the individual fans have been determined based assuming point source sound propagation over a reflective surface. The incinerator has been modelled as a 5-sided 3D noise radiating object, based upon the dimensions stated for the unit, assuming uniform noise propagation from each surface.

For the purposes of the assessment, it is assumed that the existing external building fabric is constructed from Kingspan KS1000 with no internal lining, or similar; this being a conservative estimate. The assumed octave band sound reduction index of the existing external building fabric is provided below. Note that a 30% reduction in on-site performance has been applied to the sound reduction indices stated below to allow for the reduction in performance due to the existing personnel doors and rooflights:

<table>
<thead>
<tr>
<th>Construction</th>
<th>Minimum Building Envelope Wall Cladding Acoustic Performance Sound Reduction Index (SRI, dB) @ Octave Band Centre Frequency (Hz)</th>
<th>$R_w$ (dB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kingspan KS1000 RW</td>
<td>20</td>
<td>18</td>
</tr>
</tbody>
</table>

Table 5: Assumed acoustic performance of the external building envelope
6.2 Predicted Daytime and Night Time Environmental Noise Levels at Receptors

Table 5 provides a basic summary of the typical overall, A-weighted noise levels predicted at the identified worst affected noise sensitive receptors. In all cases, the noise levels have been predicted at 1.5m above local ground level. The corresponding noise map information is provided in Appendix B.

Note that a correction of +3 dB has been applied to the specific noise level to determine the Rating Level, in order to account for the attracting acoustic character that could be expected from the proposed plant:

<table>
<thead>
<tr>
<th>Residential Dwellings</th>
<th>Assessment Period</th>
<th>Predicted Rating Level, dB $L_{A,n}$</th>
<th>Typical Background Noise level, dB $L_{A90}$</th>
<th>Difference, dB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Holmes Road (west of Development Site)</td>
<td>Weekday Daytime (07:00 - 23:00)</td>
<td>32 (+3)</td>
<td>47</td>
<td>-12</td>
</tr>
<tr>
<td></td>
<td>Weekend Daytime (07:00 - 23:00)</td>
<td>32 (+3)</td>
<td>45</td>
<td>-10</td>
</tr>
<tr>
<td>Wakefield Road (north of Development Site)</td>
<td>Weekday Daytime (07:00 - 23:00)</td>
<td>37 (+3)</td>
<td>47</td>
<td>-7</td>
</tr>
<tr>
<td></td>
<td>Weekend Daytime (07:00 - 23:00)</td>
<td>37 (+3)</td>
<td>45</td>
<td>-5</td>
</tr>
<tr>
<td>Spark House Lane (south west of Development Site)</td>
<td>Weekday Daytime (07:00 - 23:00)</td>
<td>26 (+3)</td>
<td>44</td>
<td>-15</td>
</tr>
<tr>
<td></td>
<td>Weekend Daytime (07:00 - 23:00)</td>
<td>26 (+3)</td>
<td>42</td>
<td>-13</td>
</tr>
<tr>
<td>London Road (south east of Development Site)</td>
<td>Weekday Daytime (07:00 - 23:00)</td>
<td>29 (+3)</td>
<td>44</td>
<td>-12</td>
</tr>
<tr>
<td></td>
<td>Weekend Daytime (07:00 - 23:00)</td>
<td>29 (+3)</td>
<td>42</td>
<td>-10</td>
</tr>
</tbody>
</table>

* Noise levels are presented as Specific Sound Levels. The correction to be applied for acoustic character is provided in the parenthesis which is be added to the Specific Sound Level to determine the Rating Level.

**Table 6:** Predicted operational rating level at receptors compared to the typical background noise level, at 1.5m height

*Appendix B provides further information, and specifically, noise contour plots for noise model. The noise contour plots also have a grid system to enable quick reference of source and receptor location coordinates.*
It can be seen from Table 6 that the predicted Rating Level expected from the Development does not exceed the existing weekday and weekend daytime background noise level at any of the nearest identified noise sensitive premises. As such, and in accordance with BS 4142: 2014, the Development proposals are not expected to have an adverse noise level impact on the identified noise sensitive receptors and no further noise mitigation is expected to be required.

However, it will need to be confirmed through design that noise from the noise from the roof mounted ID stack outlet will be controlled to not exceed a 75 dB(A) 1m. This will require the use of an acoustic attenuator installed between the fan and the ID fan air outlet.
7.0 CONCLUSION

Sol Acoustics Ltd (Sol) has been commissioned by Sol Environment Ltd (SE) to conduct an environmental noise assessment to establish the forthcoming environmental noise impact likely to be occurring on the surrounding environment, as arising from the proposed new incinerator plant proposed to be installed at the of the Calder Valley Skip Hire site on Mearclough Road, Sowerby Bridge, Halifax, Calderdale.

The assessment has shown that based upon the data available for the proposed incinerator plant, the maximum ascertained and permissible Rating Level noise limits are not expected to be exceeded at the nearest identified noise sensitive premises during the proposed hours of operation and as such no further noise mitigation is expected to be required. It should be noted that calculations have been made assuming that the roller shutter doors to the existing industrial premises located on the site, which will house the proposed incinerator plant, will remain open during use.

It will need to be confirmed through further detailed design that noise from the noise arising from the roof mounted ID stack outlet will be controlled to not exceed a 75 dB(A) 1m. This will require the use of an acoustic attenuator installed between the fan and the ID fan air outlet.
APPENDIX A
NOISE SURVEY DETAILS AND SUMMARY RESULTS

LOCATION
Sowerby Bridge, Halifax, Calderdale

<table>
<thead>
<tr>
<th>Date</th>
<th>Temp [°C]</th>
<th>Wind speed [mph]</th>
<th>Precipitation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Max</td>
<td>Mean</td>
<td>Max</td>
</tr>
<tr>
<td>Thursday 1 June 2017</td>
<td>21.0</td>
<td>18.4</td>
<td>4.2</td>
</tr>
<tr>
<td>Friday 2 June 2017</td>
<td>16.0</td>
<td>14.2</td>
<td>2.9</td>
</tr>
<tr>
<td>Saturday 3 June 2017</td>
<td>18.0</td>
<td>13.4</td>
<td>4.5</td>
</tr>
<tr>
<td>Sunday 4 June 2017</td>
<td>16.0</td>
<td>12.2</td>
<td>5.4</td>
</tr>
<tr>
<td>Monday 5 June 2017</td>
<td>15.0</td>
<td>10.8</td>
<td>6.4</td>
</tr>
<tr>
<td>Tuesday 6 June 2017</td>
<td>12.0</td>
<td>10.4</td>
<td>10.9</td>
</tr>
</tbody>
</table>

PERSONNEL PRESENT DURING MEASUREMENTS
Mark Greenhalgh – Sol Acoustics

INSTRUMENTATION
Norsonic Type 118 IEC 60651 Type 1 Integrating-Averaging Sound Level Meter (serial no. 28260)
Norsonic Type 118 Type 1 ½ inch microphone preamplifier (serial no. 30962)
Norsonic Type 1225 Type 1 ½ inch microphone (serial no. 29923)
Norsonic Type 1251 IEC 60942-1997 Class 1 Sound Calibrator (serial no. 29917)
Norsonic Type 139 IEC 60651 Type 1 Integrating-Averaging Sound Level Meter (serial no. 1392778)
Norsonic Type 1207 ½ inch microphone preamplifier (serial no. 20308)
Norsonic Type 1227 Type 1 ½ inch microphone (serial no. 170638)

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 2x10^-5 Pa @ 1kHz.

MEASUREMENT RESULTS
Graphs A1 and A2 summarise the results obtained at Monitoring Positions 1 and 2.
Graph A1: Position 1, 1st to 6th June 2017

Graph A2: Position 2, 1st to 6th June 2017
APPENDIX B
CADNAA NOISE MAPS
Figure A1: Predicted Daytime $L_{Aeq,1hour}$ Noise Level Impact from the Site at 1.5m above Local Ground Level