

REF: L1662.3 V1

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22nd August 2024

**RE: SEVEN SISTERS INDUSTRIAL UNITS, NEATH PORT TALBOT
OPERATIONAL NOISE IMPACT ASSESSMENT**

Dear Mr Crimp,

Following our recent correspondence, we are writing to you with respect to the above project, to provide our outline assessment of operational noise impact from sources that may typically be used in the proposed industrial units.

We understand that the future occupiers are unknown at this stage and therefore details of equipment that may be used at the site is also unknown, although we understand that planning permission is sought for Use Class B2.

Noise data for the specific tools is not therefore known and we are therefore required to make some assumptions about the intended use of the units and the types of machinery to be used within. This approach has been agreed with the Local Authority in a telephone conversation on the 15th August 2024.

For assessment of noise impact, we have followed the methodology set out in British Standard 4142:2014 *Method for Rating and Assessing Industrial and Commercial Sound*. This is considered to be the most relevant piece of guidance for the situation and our assessment is described in the following sections.

1.0 DESIGN CRITERIA...

1.1 British Standard 4142:2014

BS4142 presents a method for determining the likelihood of complaints arising from noise levels associated with fixed sources. The procedure set out in the standard involves the comparison of two noise levels at a noise sensitive location, these are,

Rating Noise Level: The level of noise produced by the plant equipment when it has been corrected for tonal and temporal components.

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Background Noise Level: The background noise measured as an L_{A90} (the noise exceeded for 90% of the time) when the plant equipment is not operating.

If the plant noise has any distinguishing characteristics such as tonal (e.g. whine, hiss, hum etc) or impulsive components (e.g. bangs, clicks, thumps etc), or if the noise is irregular enough to attract attention, then a penalty is applied depending on the severity of the characteristic.

Acoustically Distinguishing Characteristic	Size of Penalty	Assessment Methodologies
Tonality	0 dB to +6 dB	Subjective Method 1/3 Octave Method Reference Method
Impulsivity	Up to +9 dB	Subjective Method Reference Method
Other sound characteristics	3 dB	Subjective Method
Intermittency	3 dB	Subjective Method

TABLE 1: SUMMARY OF BS4142 ACOUSTIC CHARACTERISTIC PENALTIES

To assess the likelihood of complaints, the difference between the *Rating Level* and the *Background Sound Level* is calculated. A simple comparison of these levels provides the outcome of the assessment as shown in Table 2.

Level Difference (Rating – Background) dB(A)	Assessment Conclusion
Around +10 or more	Likely to be an indication of a significant adverse impact, depending on the context
Around +5	Likely to be an indication of an adverse impact, depending on the context
Zero or less	Indication of the specific sound source having a low impact, depending on the context

TABLE 2: SUMMARY OF BS4142:2014 ASSESSMENT METHOD

The assessment conclusions are all subject to taking into consideration the context of the ambient sound at the site, the character of the specific sound and the sensitivity of the receptors.

Where the assessment takes place prior to the specific source of noise being installed, it is permitted to predict the noise level at the noise sensitive location.

2.0 OTHER DESIGN CRITERIA...

Planning Policy Wales (PPW)

The document entitled Planning Policy Wales (PPW) sets out the Welsh Assembly's planning policies for Wales and how these are expected to be applied.

PPW is supplemented by a series of Technical Advice Notes (TANs).

PPW does not contain quantitative acoustic criteria but summarises national planning policy advice and articulates the Assembly's vision of sustainable development. It provides a framework within which councils can provide their own local plans, which reflect the needs and priorities of their communities.

In respect of noise and vibration, PPW states that planning policies and decisions should aim to:

- *“ensure, as far as is practicable, that noise-sensitive developments, such as hospitals, schools and housing, that need to be located close to existing transportation infrastructure to facilitate access, are designed in such a way as to limit noise levels within and around those developments;*
- *ensure, as far as possible, that potentially noisy developments are located in areas where noise will not be such an important consideration or where its impact can be minimised;*
- *adopt policies to prevent potentially noisy developments in areas which have remained relatively undisturbed by noise;*
- *have regard to any relevant Noise Action Plan, including the need to protect urban ‘quiet areas’ against an increase in noise.*

With regards to ‘adverse effects’ and ‘significant adverse effects’, PPW refers to the Technical Advice Note 11 (TAN 11).

Technical Advice Note 11 (TAN 11)

TAN 11 seeks to clarify the underlying principles and aims in existing policy documents, legislation and guidance that relate to noise. The advice note applies to all forms of noise, including environmental noise, neighbour noise and neighbourhood noise.

The statement sets out the long-term vision of the Welsh Assembly’s noise policies and outlines some of the main considerations which local planning authorities should take into account when determining planning applications for development which will either generate noise or be exposed to existing noise sources.

This long-term vision is divided into three key sections:

- *Noise generating development*
- *Noise sensitive development*
- *Measures to mitigate the impact of noise*

The long-term policy vision and aims are designed to enable decisions to be made regarding what is an acceptable noise burden to place on society.

Noise and Soundscape Plan for Wales 2023-2028

This document sets out a vision to create better places to work and live and makes reference to TAN 11, ISO 12913, and the Well-being of Future Generations (Wales) Act 2015. The document assesses noise on a general decision-making framework scale of ‘increasing noise risk’ from ‘No noise or soundscape action required’ to a ‘quality sound environment through noise control’.

Neath Port Talbot County Borough Council Local Development Plan (2011 – 2026) – Policy EN8

This policy seeks to prevent development that would cause or result in unacceptable impact in terms of pollution and land stability due to pollutants such as noise. It does not, however, stipulate design targets in which to achieve with regard to new noise sources, but provides general discussion on proposals surrounding the issue of noise, further expanded in Section 4 – Noise Pollution, with cross reference to TAN 11.

Other Guidance

In addition, we have also considered BS8233:2014 and the World Health Organisation guidance for noise levels which offer good external amenity. A good standard of external amenity is considered to be 55 dB(A) L_{Aeq} and below.

Furthermore, we would expect neighbouring dwellings to maintain reasonable internal noise levels with windows open for ventilation. The BS8233 guidance for reasonable internal noise during the day within a dwelling is 35 dB(A) L_{Aeq} . We would normally expect 10-15 dB(A) reduction through an open window and hence we would not expect the noise level from new plant equipment to exceed 45 dB(A) L_{Aeq} measured 1 m from the external building façade where there is an opening window. At night a target 5 dB quieter can be derived in the same manner.

The most onerous of the above design criteria is expected to apply.

3.0 EXISTING BACKGROUND SOUND LEVELS...

There are no restrictions on the minimum duration of measurement of the *Background Sound Level* in BS4142, albeit to say they should represent the “Typical” background level when the new equipment will be in operation.

A survey of the pre-development noise environment was undertaken in a location chosen to best represent pre-development *Background Sound Levels* at the nearest neighbouring properties in free-field conditions, in light of the available secure positions in which to attach our equipment.

In this instance, we secured our equipment approximately 140 m further South than the proposed building and neighbouring dwellings. This location presented similar characteristics in terms of traffic noise, plant noise and industrial noise to the proposed site. However, due to the siting of the proposed building, to the rear of the dwellings to the West, we are of the opinion that this location would be more sheltered from traffic noise due to the houses, and that the rear elevations of the houses facing the proposed site are also less exposed to traffic noise. We have therefore taken this into account and adjusted our measured data accordingly to accommodate the reduction in noise levels of 5 dB as a result of the dwellings providing line-of-sight screening from traffic noise. This is considered to represent a worst-case scenario and offers a more onerous outcome i.e more protection for the occupiers at receiver No 1.

The background and ambient sound at site are dominated by existing industrial noise, other fixed plant in the area, passing pedestrians and vehicular traffic.

A brief summary of the overall sound levels measured is provided in Table 3. We understand the units are not to be operational prior to 07:00 but we have included the measured data prior to the period for completeness.

Location	Period	Parameter dB(A)	
		L_{Aeq}	L_{A90}
1	Day Time $L_{Aeq,1hr}$ (07:00 – 23:00)	57	50
	Night-Time $L_{Aeq,15min}$ (23:00 – 07:00)	54	41

TABLE 3: SUMMARY OF MEASURED NOISE LEVELS (FREE FIELD) (MOST COMMONLY OCCURRING L_{A90})

Taking into consideration the measured levels, tolerances and corrections, the *Background Sound Level* used in our assessment is 48 dB(A) $L_{A90,1hr}$ during the daytime period at façade level at the nearest affected receiver and 39 dB(A) $L_{A90,15mins}$ during the night-time period. This calculation includes a 3 dB correction to convert our measured free-field L_{A90} to a façade level measurement in accordance with BS4142, and the screening correction between the survey site and the proposed site.

4.0 PROPOSED EQUIPMENT...

4.1 Equipment Schedule

We understand that the 6 No units are to be built speculatively i.e. there are no known end users at this stage. Consequently, it is not known what equipment is to be used in each unit also and we are therefore required to make some assumptions on the noise levels of potential equipment that may in used in the units.

On the basis that the units are to operate within Use Class B2, it is likely that the building is to operate with activities that include noisy equipment such as power tools. In the absence of specific noise data, we have acquired data for a number of power tools for use in our modelling. It should be noted that it is not possible to cover all anticipated activities within the proposed units and that the data used should be regarded with caution. However, our assessment is carried out on the basis that each unit is to deploy noisy equipment such as power tools, and would likely be all operational in a worst-case scenario.

The noise data used in our assessment has been taken from the research paper *Relevant test methods for establishing sound power levels of powered hand tools* (Hayden & Zechmann, 2009), the levels of which are summarised below.

Table 1—Comparison of tool types with loaded and unloaded mean L_{WA} for the particular family of tool types and Standard Deviations (STD) (A-weighted dB) between the tool types.

Tool Type (# of tools tested)	Loaded	Unloaded
	Mean L_{WA} (STD) (A-weighted dB)	Mean L_{WA} (STD) (A-weighted dB)
Circular Saw (28)	108.5 (2.8)	100.9 (3.6)
Drill (14)	91.9 (1.8)	91.9 (2.4)
Grinder (18)	99.8 (2.6)	97.5 (3.1)
Hammer Drill (12)	105.0 (3.9)	92.9 (2.7)
Jig Saw (5)	99.2 (1.9)	96.0 (2.5)
Miter Saw (6)	107.2 (4.5)	100.8 (1.0)
Orbital Sander (17)	84.7 (5.6)	88.8 (6.1)
Reciprocating Saw (14)	106.7 (2.9)	99.4 (2.6)
Screw Driver (4)	88.1 (2.6)	91.7 (1.3)

FIGURE 1: A-WEIGHTED SOUND LEVELS USED IN ASSESSMENT

It is noted that such equipment primarily relates to working with timber. However, in our experience, the noise levels of the above equipment are comparable to that of other types of power tools and the noise levels stated are considered a good representation of other types of power tools.

We have applied generic spectrum data assumed for each noise source. The sound output data for the proposed equipment is summarised in Table 4.

Source	No Off	Sound Power Level (dB re 1 pW) 1/1 Octave Band Centre Frequencies (Hz)								A
		63	125	250	500	1k	2k	4k	8k	
Circular Saw ¹	1	65	78	92	99	105	103	99	94	108
Drill ¹	1	48	61	75	82	88	86	82	77	92
Grinder ²	1	72	82	88	93	97	85	92	86	100
Hammer Drill ¹	1	61	74	88	95	101	99	95	90	105
Jig Saw ¹	1	56	69	83	90	96	94	90	85	99
Mitre Saw ¹	1	64	77	91	98	104	102	98	93	107
Orbital Sander ¹	1	41	54	68	75	81	79	75	70	85
Reciprocating Saw ¹	1	63	76	90	97	103	101	97	92	107
Screwdriver ³	1	73	79	84	88	76	83	77	37	88
Hammer ⁴	1	81	91	97	102	106	94	101	95	108

TABLE 4: DERIVED SOUND POWER DATA OF PROPOSED EQUIPMENT

- ¹ Spectrum based on the generic shape of a timber plant.
² Spectrum based on the generic shape of a grinding process.
³ Spectrum based on the generic shape of a metal construction process.
⁴ Spectrum based on the generic shape of a hammer process.

4.2 On-Time Correction

In accordance with BS4142 clause 7.3.14 when the specific sound level is cyclic, we have corrected the measured value of *Specific Sound Level* to account for the “on-time” when it is generating sound.

The exact usage time of each item of equipment is not known. We have therefore based the on-time corrections on a set of assumptions described in Table 5.

It should be noted that the reference period for the assessment method is 1 hour.

Source	Operation Time (Mins Per Hour)	On-Time Correction (dB)
Circular Saw	10	-7.8
Drill	10	-7.8
Grinder	10	-7.8
Hammer Drill	10	-7.8
Jig Saw	10	-7.8
Mitre Saw	10	-7.8
Orbital Sander	10	-7.8
Reciprocating Saw	10	-7.8
Screwdriver	5	-10.8
Hammer	0.5	-20.8

TABLE 5: SUMMARY OF ON-TIME CORRECTIONS TO SPECIFIC SOUND LEVELS

The above corrections are based on typical operational behaviours which, in our experience, would be observed in such facilities, with a power tools being switched off when not in use, therefore only generating noise when functioning for its intended use.

4.3 Assessment of Penalties

Following the procedures set out in clause 9.2, Annex D and Annex E of BS4142 we have undertaken an assessment of the penalties to be applied to the measured *Specific Sound Levels* to adjust for tonality, impulsivity, and other sound characteristics to obtain the *Rating Level*.

We have applied penalties to the calculated *Specific Sound Levels* to obtain the *Rating Level* as summarised in Table 6.

Source	Penalty for Tonal Components (dB) {Note 1}	Penalty for Impulsivity (dB) {Note 2}	Penalty for Intermittency (dB) {Note 3}	Total Penalty applied to Obtain <i>Rating Level</i> (dB)	Comments
Circular Saw	0	0	+3	+3	Subjective Method
Drill	0	0	+3	+3	
Grinder	+4	+6	0	+10	
Hammer Drill	0	0	+3	+3	
Jig Saw	0	0	+3	+3	
Mitre Saw	0	0	+3	+3	
Orbital Sander	0	0	+3	+3	
Reciprocating Saw	0	0	+3	+3	
Screwdriver	0	0	+3	+3	
Hammer	0	+6	0	+6	

TABLE 6: SUMMARY OF BS4142 PENALTIES TO SPECIFIC SOUND LEVELS

Should it transpire that the equipment has more undesirable acoustic characteristics, further penalties to that already included would be applied as described in BS4142 dependent on the prominence of the features.

4.4 Reverberant Sound Pressure Levels

To account for noise breakout via the façade and various other façade elements, we have calculated an approximate reverberant sound pressure level within each unit. Our assessment is on the basis that all 6 units are to be operational simultaneously.

Each of the six units are identical in size. We have used a reverberation time of 1.5 seconds, calculated in our acoustic design review dated 2nd July 2024 (ref: L1662.2 V2) which includes the recommended additional absorption specified in that assessment.

We have assessed the reverberant sound pressure level of multiple use cases ('Totals'), which are summarised in Table 7. This has been based on the geometry and reverberation times described above, in addition to all corrections and penalties described in the subsequent sections.

Use Case	Reverberant Sound Pressure Level (dB re 20 µPa) 1/1 Octave Band Centre Frequencies (Hz)								A
	63	125	250	500	1k	2k	4k	8k	
Total 1 ¹	64	74	83	89	94	91	88	83	98
Total 2 ²	53	66	80	87	93	91	87	82	97
Circular Saw	48	61	75	82	88	86	82	77	92
Drill	32	45	59	66	72	70	66	61	75
Grinder	63	73	79	84	88	76	83	77	90
Hammer Drill	45	58	72	79	85	83	79	74	88
Jig Saw	39	52	66	73	79	77	73	68	83
Mitre Saw	47	60	74	81	87	85	81	76	91
Orbital Sander	24	37	51	58	64	62	58	53	68
Reciprocating Saw	46	59	73	80	86	84	80	75	90
Screwdriver	53	59	64	68	56	63	57	17	69
Hammer	54	64	70	75	79	67	74	68	81

TABLE 7: ESTIMATED REVERBERANT SOUND PRESSURE LEVELS USED IN ASSESSMENT

¹ Total of all tools running concurrently, minus the hammer.

² Total of circular saw, mitre saw, reciprocating saw and hammer drill.

A diffuse field correction of -5 dB has been applied within the acoustic modelling. This is based on the corrections set out in BS 12354 Part 4 Annex B for an “average industrial building”.

4.5 The Building Envelope

The building envelope is understood to be formed profiled powder coated insulated wall cladding at upper levels (Euroclad Roackspan) and block cavity walls at lower levels, with the roof consisting of profiled powder coated insulated roofing sheets with translucent roof lights (Euroclad Elite 2), and Zenon Pro Triple Skin (Outer Zenon Pro 18m Liner Zenon Pro 30, 10 mm Polycarbonate).

The manufacture of the rooflights has confirmed that the proposed rooflights have not been tested and therefore the exact performance is unknown at this stage. However, we have been provided with the test result for a similar system (Zenon Pro 24 Outer, Pro 18 Liner triple skin GRP), stated to have an R_w value of 24 dB. We have therefore used the spectra for a typical glazing unit and matched this to reflect the stated single figure performance.

We have been provided with the predicted and lab tested data for the Rockspan wall and Elite roof systems respectively from the manufacture and have used their stated performance in our assessment.

The exact roller shutter system is unknown at this stage. We have used the performance specification for an insulated roller shutter for the purposes of this assessment.

We have based the assessment on the information and sound insulation performance data summarised in Table 8.

Element	Description	Sound Reduction Index (dB R) 1/1 Octave Band Centre Frequencies (Hz)								R_w
		63	125	250	500	1k	2k	4k	8k	
Walls	Euroclad Rockspan profiled insulated panels (upper wall) Block cavity (lower wall)	20	24	28	30	26	44	49	--	33
Roof	Euroclad Elite 2 insulated panel	18	27	38	46	48	49	56	59	47
Roller Shutters	Data based on Bolton Gate Insulated roller shutter (or equivalent)	10	14	15	15	20	22	22	22	19
Entrance / Exit Doors	Door set to achieve minimum performance of 30 dB R_w	19	23	28	32	36	35	43	43	30
Roof Glazing	Zenon Pro 24 Outer, Pro 18 Liner triple skin GRP	2	18	12	20	34	39	33	33	24

TABLE 8: SOUND REDUCTION PERFORMANCES USED IN ASSESSMENT

5.0 SPECIFIC SOUND LEVEL & RATING LEVEL...

We have modelled the propagation of sound from the plant equipment using the method described in ISO 9613-2.

We have used architectural drawings and on-line mapping tools to estimate the distance between the assessment locations and the proposed building.

We have used 1 No assessment location as follows:

1. Receiver No 1. Most exposed residential property to the West of the proposed development. The address is understood to be No 98 Dulais Road, Seven Sisters, SA10 9ES.

The proposed units are understood to each include an office and a WC on the ground floor. The office is understood to include glazing in the façade. We recommend that the entrance doors to the workshops and offices are fitted with a self-closing mechanism and that they provide a sound reduction index of no less than 35 dB R_w . This is discussed in more depth in L1662.2 V2. Under this assumption, noise breakout via the office windows is considered to be negligible when compared with noise breakout via the façade, permitting the use of standard double-glazing units.

The assessment location is indicated on a mark-up in the appendix.

The calculated *Rating Level* of the proposed equipment at the assessment location, and comparison of this sound level against the target values for daytime period only (i.e. 07:00 to 23:00), and the resulting conclusions are summarised in Table 9.

For brevity, we have included only the results for the use-cases with the highest total reverberant sound pressure level i.e. Total 2 and the circular saw. We have not included Total 1 due to the unlikelihood of all tools being used concurrently. The results include all 6 No units being operated with the same machinery items simultaneously.

Receiver Location	Period	Background Sound Level dB(A) $L_{A90,T}$	Predicted Rating Level dB(A) $L_{Ar,Tr}$	Difference Rating - BG dB(A)	BS4142 Conclusion
1 Roller Shutters Closed	Day 07:00-23:00	48 (Façade)	40 (Façade)	-8	Indication of a low impact
1 Roller Shutters Open	Day 07:00-23:00	48 (Façade)	53 (Façade)	+5	Indication of an adverse impact

TABLE 9: SUMMARY OF PREDICTED RATING LEVELS FOR CIRCULAR SAW ONLY (LOUDEST SINGLE ITEM)

Receiver Location	Period	Background Sound Level dB(A) $L_{A90,T}$	Predicted Rating Level dB(A) $L_{Ar,Tr}$	Difference Rating - BG dB(A)	BS4142 Conclusion
1 Roller Shutters Closed	Day 07:00-23:00	48 (Façade)	45 (Façade)	-3	Indication of a low impact
1 Roller Shutters Open	Day 07:00-23:00	48 (Façade)	58 (Façade)	+10	Indication of a significant adverse impact

TABLE 10: SUMMARY OF PREDICTED RATING LEVELS FOR TOTAL 2

When comparing the assessment results against BS4142 with inclusion of the recommended mitigation of the absorption as detailed in L1662.2 V2 and the insulated roller shutters remaining closed during all operational activities, the noise levels from the proposed building when all 6 No units are operational simultaneously is expected to be an indication of a low impact, depending on the context, in the worst-case scenario and is also expected to satisfy local authority target levels.

However, when the roller shutters are open, the noise levels from the proposed building when all 6 No units are operational simultaneously is expected to be an indication of an adverse to significant adverse impact, depending on the context, in the worst-case scenario.

We have also made an assessment at the elevation of the nearest non-residential building i.e. the Pharmacy under the Total 2 scenario with roller shutters closed and have determined the predicted rating level to be 46 dB at 1 m from the Northern façade i.e. 2 dB below the background level, and include this for completeness.

It should be noted that the assessment has been based on daytime hours only. Use of the workshop during the night-time period would likely yield conclusions that differ from those summarised above.

6.0 CONCLUSIONS IN CONTEXT...

The context of the site is that of a semi-rural area with some other industrial units nearby and agricultural activities in the wider area. There are also pedestrians and vehicles frequently moving around with an additional presence of existing plant noise from neighbouring doctors' surgery and industrial units.

We therefore believe that the introduction of this new facility would be in keeping with this context, subject to suitable control of noise levels.

In our opinion, in context, targeting a *Rating Level* that is no greater than *Background Sound Level* in this environment is considered acceptable and not likely to cause adverse impact to nearby noise sensitive receivers.

7.0 EFFECTS OF UNCERTAINTY...

Where available we have considered uncertainty.

We have assessed the uncertainty associated with the measurement of the background sound level based on the measurement tolerance of a Class 1 sound level meter which conforms with IEC61672-1:2002. The typical uncertainty based on the frequency spectrum of road traffic noise on the measured background level is ± 1 dB(A).

There are other sources of uncertainty in our assessment, such as, tolerances to be applied to manufacturers data, the variation in *Background Sound Level* on a different day, and the calculation tolerances for the propagation model.

The survey of the *Background Sound Level* has been undertaken in full accordance with BS7445 and ANC Green Book Guidance using laboratory calibrated measurement equipment. These precautions will minimise sources of uncertainty in the survey data. The current site conditions exhibit a low variability in the ambient and background sound levels and our data is considered to be a good representation of the site.

We do not expect the effects of uncertainty to have a significant effect on the outcome of our assessment and would not be of a magnitude to alter the assessment of noise impact.

8.0 ASSESSMENT CONCLUSION...

We have undertaken an assessment of the proposed new industrial units against the methodology set out in BS4142:2014 during daytime hours.

We have estimated the likely noise levels at the nearest residential building based on information provided to us and using standard noise propagation and mapping tools.

We have made assumptions regarding power tool noise levels, in addition to the intended operation durations.

Our assessment has concluded that, **subject to our recommendations of additional absorption and the roller shutters remaining closed during all operational activities**, a low impact is expected to be achieved.

If an undesirable tonal or temporal component not accounted for in this assessment were evident in the noise output of the equipment, then a penalty would be applied to the *Specific Noise Level* as described previously. The conclusions reached may therefore be altered as a result.

I trust you find this assessment provides suitable information for consideration by the local authority. Please don't hesitate to contact me if you require anything further.

Yours sincerely,
For Red Twin Limited



Dr Ashley Punter BEng EngD MSc MRTPI MIOA
Acoustic Consultant

APPENDIX A – SURVEY DETAILS...

Address: Seven Sisters Industrial Units, Neath Port Talbot, SA10 9EY

Date: 11th – 12th April 2024

Measurement Location

Location 1 The monitoring equipment was set up 140 m to the South of the proposed site at a location considered representative of the proposed building location and nearest noise sensitive receivers. The microphone was pole mounted at 2 m above local ground level and in free-field conditions as indicated in Figure 2.

Equipment (Blue)

Brüel & Kjær 2250 hand held analyser, serial No 265348, with a Brüel & Kjær Type 4189 Microphone, serial No 2676519. The microphone was fitted with a UA-1650 windshield. The hand-held analyser and microphone were laboratory calibrated on 16th June 2022 (Certificate No. U41288) and the calibrator was laboratory calibrated on 16th June 2022 (Certificate No. U41287). The hand-held analyser sensitivity was checked before and after the measurements using the calibrator and a drift of 0.03 dB was observed, which is not significant and no adjustments to the measurements have been made to the data.

Personnel

The survey was set up and managed by Dr Ashley Punter of Red Twin Limited.

Weather

The weather was suitable for noise measurement with overcast conditions. There was precipitation at the start of the survey period but remained dry for the majority of the survey and the wet conditions are excluded accordingly. Wind speeds were moderately low c. 5 m s⁻¹ and were suitable for noise surveying.

Conditions were acceptable for noise measurement work and in full accordance with BS7445.

Survey Comments

The background and ambient sound at site are dominated by existing industrial noise, other fixed plant in the area, passing pedestrians and vehicular traffic.

Location	Start Time	Duration	Parameter dB(A)		
			LAeq	LA1	LA90
Day 1					
1	14:15:14	00:44:36	56	65	48
	15:00:00	01:00:00	54	62	46
	16:00:00	01:00:00	53	62	47
	17:00:00	01:00:00	52	61	47
	18:00:00	01:00:00	52	61	45
	19:00:00	01:00:00	48	57	43
	20:00:00	01:00:00	46	56	43
	21:00:00	01:00:00	45	53	43
	22:00:00	01:00:00	45	53	43
Day 2					
1	07:00:00	01:00:00	57	65	50
	08:00:00	01:00:00	55	63	50
	09:00:00	01:00:00	53	60	49
	10:00:00	01:00:00	54	63	49

	11:00:00	01:00:00	53	61	50
	12:00:00	00:30:00	52	61	50

TABLE 11: MEASURED NOISE DATA – LOCATION 1 (FREE-FIELD) DAY TIME

The data in red has been excluded from the assessment on the basis that the local weather conditions were unsuitable for survey inclusion.

Location	Start Time	Duration	Parameter dB(A)		
			LAeq	LA1	LA90
1	23:00:00	00:15:00	45	52	43
	23:15:00	00:15:00	47	56	43
	23:30:00	00:15:00	47	57	43
	23:45:00	00:15:00	47	56	43
	00:00:00	00:15:00	45	54	43
	00:15:00	00:15:00	43	48	42
	00:30:00	00:15:00	43	47	42
	00:45:00	00:15:00	44	50	42
	01:00:00	00:15:00	45	54	42
	01:15:00	00:15:00	45	53	42
	01:30:00	00:15:00	45	55	42
	01:45:00	00:15:00	50	62	41
	02:00:00	00:15:00	54	67	41
	02:15:00	00:15:00	50	63	41
	02:30:00	00:15:00	52	67	41
	02:45:00	00:15:00	50	63	41
	03:00:00	00:15:00	47	59	41
	03:15:00	00:15:00	50	63	41
	03:30:00	00:15:00	49	61	41
	03:45:00	00:15:00	46	55	41
	04:00:00	00:15:00	46	56	41
	04:15:00	00:15:00	48	57	42
	04:30:00	00:15:00	53	66	43
	04:45:00	00:15:00	51	58	46
	05:00:00	00:15:00	50	58	44
	05:15:00	00:15:00	47	55	43
	05:30:00	00:15:00	48	56	44
	05:45:00	00:15:00	52	57	48
	06:00:00	00:15:00	53	60	48
	06:15:00	00:15:00	52	61	48
	06:30:00	00:15:00	53	64	48
	06:45:00	00:15:00	53	59	50

TABLE 12: MEASURED NOISE DATA – LOCATION 1 (FREE-FIELD) NIGHT-TIME



FIGURE 2: PHOTOGRAPH OF SURVEY MEASUREMENT LOCATION NO 1

APPENDIX B – SITE LOCATION PLAN...

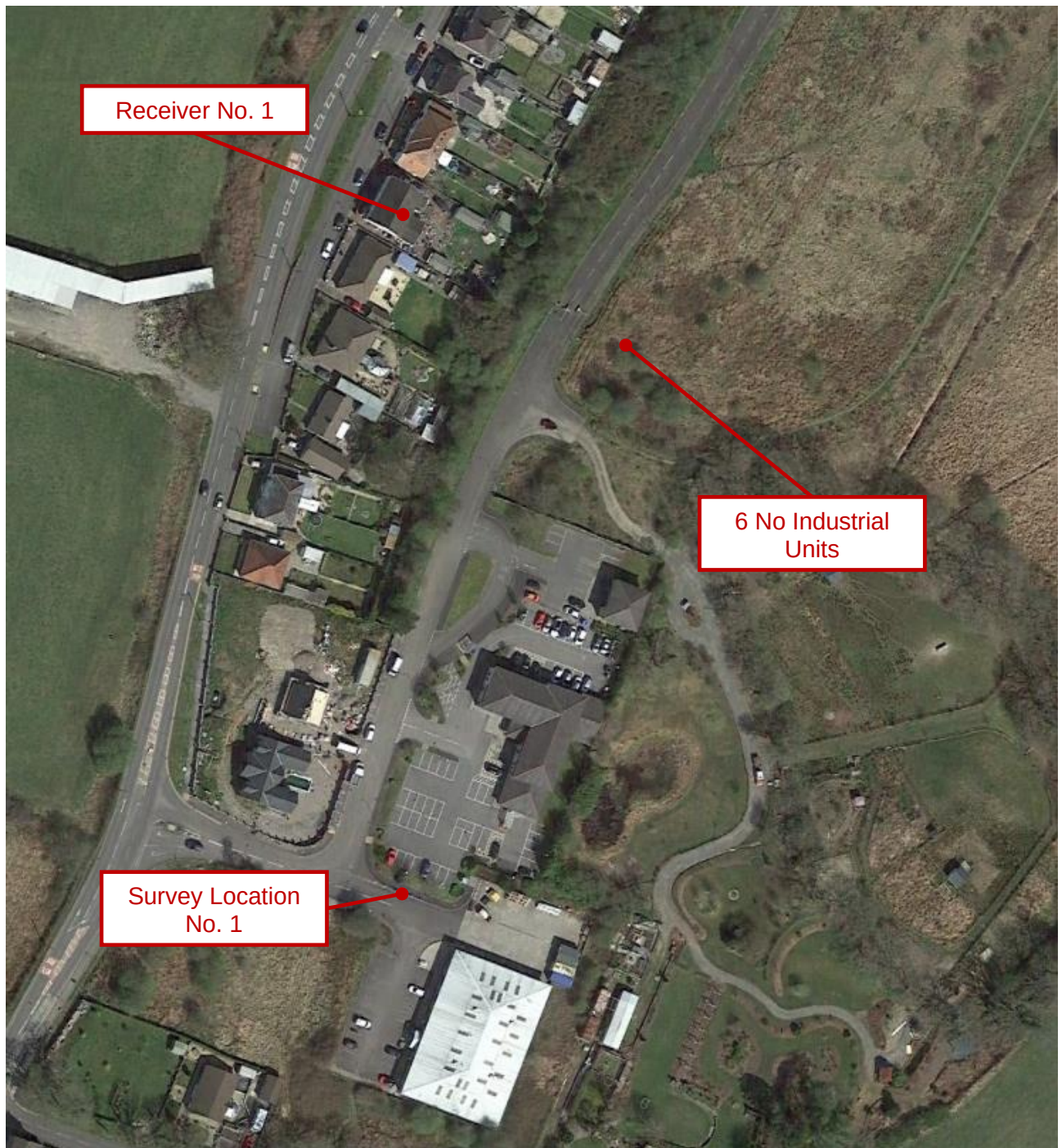


FIGURE 3: AERIAL VIEW OF THE SITE SHOWING KEY LOCATIONS (NOT TO SCALE)



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APPENDIX C – CALCULATION OF RATING LEVEL...

Noise Modelling Methodology

We have undertaken prediction of the noise exposure of the receiver locations based on the method described in ISO 9613-2 *Acoustics – Attenuation of Sound During Propagation Outdoors – Part 2: General Method of Calculation*.

The ISO propagation model calculates the sound pressure level from a source sound power level in each 1/1 octave band and subtracts various attenuation factors as follows,

$$L_{ft}(DW) = L_w + D_c - (A_{div} + A_{atm} + A_{gr} + A_{bar} + A_{misc})$$

Where

$L_{ft}(DW)$ is the equivalent continuous downwind octave-band sound pressure level (dB)

L_w is the octave band sound power level (dB)

D_c is a directivity correction that describes the extent by which the $L_{ft}(DW)$ deviates in a specified direction from the level of an omni-directional sound source (dB)

A_{div} is the attenuation due to geometrical divergence (dB)

A_{atm} is the attenuation due to atmospheric absorption (dB)

A_{gr} is the attenuation due to the ground effects (dB)

A_{bar} is the attenuation due to a barrier (dB)

A_{misc} is the attenuation due to miscellaneous other effects such as foliage, industrial sites and housing (dB).

The A-weighted total level is obtained by combining the octave band levels with the appropriate weighting and summing the contributions from each source.

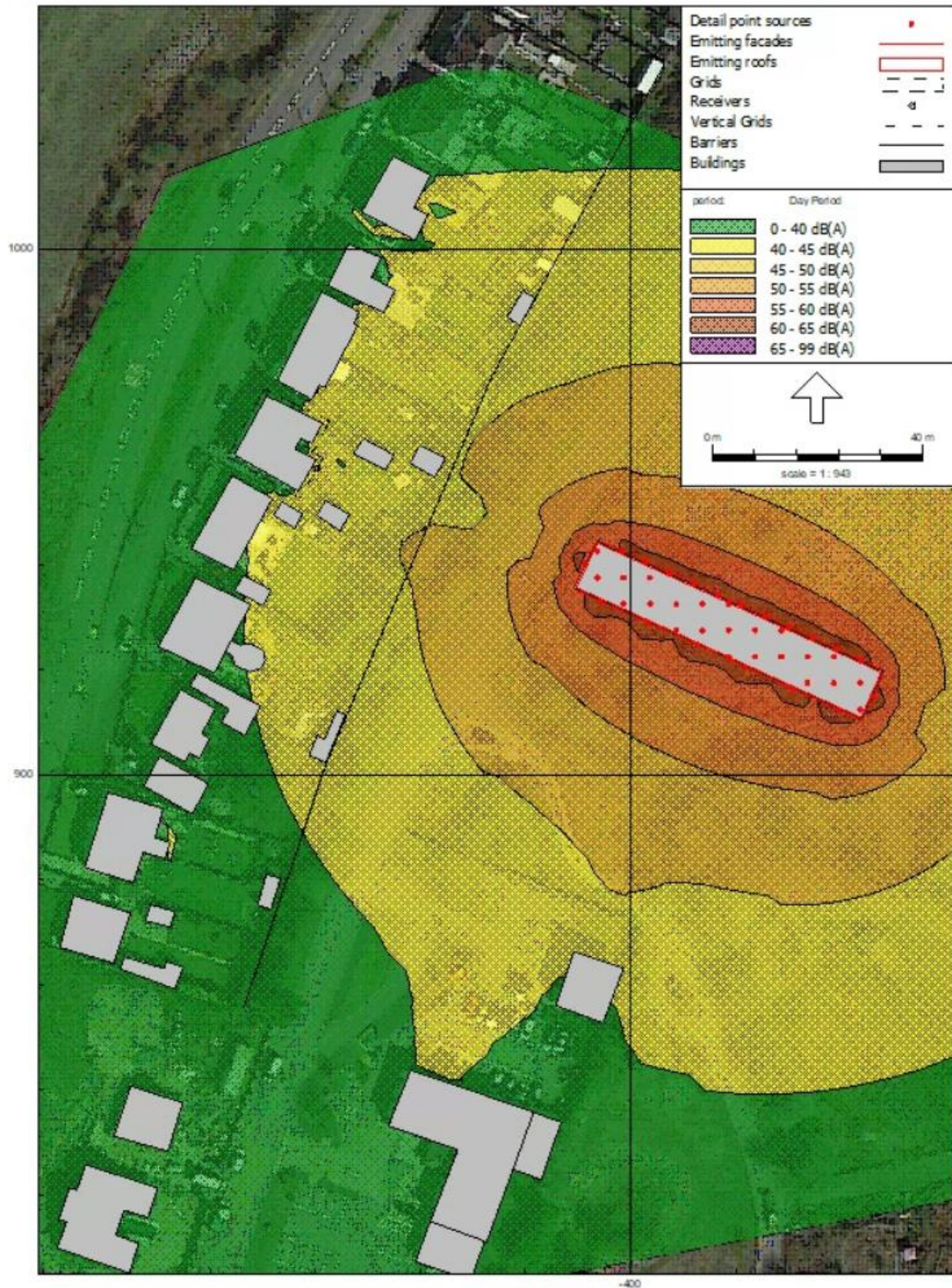
Our calculations are performed using a proprietary software package, Predictor V2023 available through Softnoise in the UK, and it should be noted that the model is an approximation of the real situation. The calculated values are based on geometry information included in the model, some of which is approximate.

The model has assumed a 'hard' ground surface and has included the effects of air absorption at 273 K at 101 kPa and 60% humidity.

initial model Single loudest item

RedTwin, UK

19 Aug 2024, 14:27



ISO 9613, [version of Area - initial model Single loudest item], Predictor V2023 rev 1 Licensed to RedTwin, UK

FIGURE 5: NOISE CONTOURS ACROSS THE SITE FOR LOUDEST SINGLE ITEM AT 2M HEIGHT (ROLLER SHUTTERS CLOSED)

initial model Single loudest item Roller Open

RedTwin, UK

19 Aug 2024, 14:46

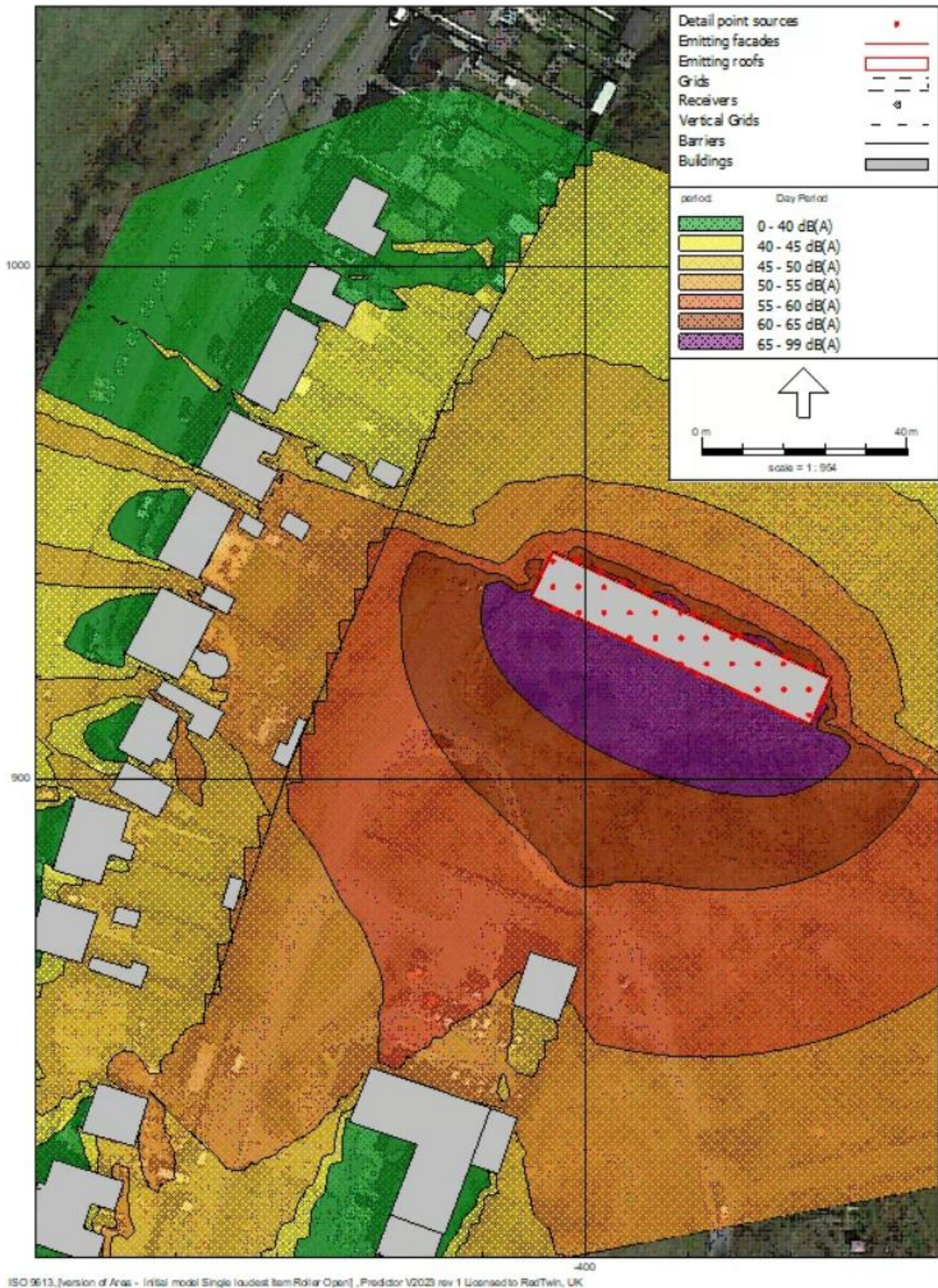


FIGURE 6: NOISE CONTOURS ACROSS THE SITE FOR LOUDEST SINGLE ITEM AT 2M HEIGHT (ROLLER SHUTTERS OPEN)

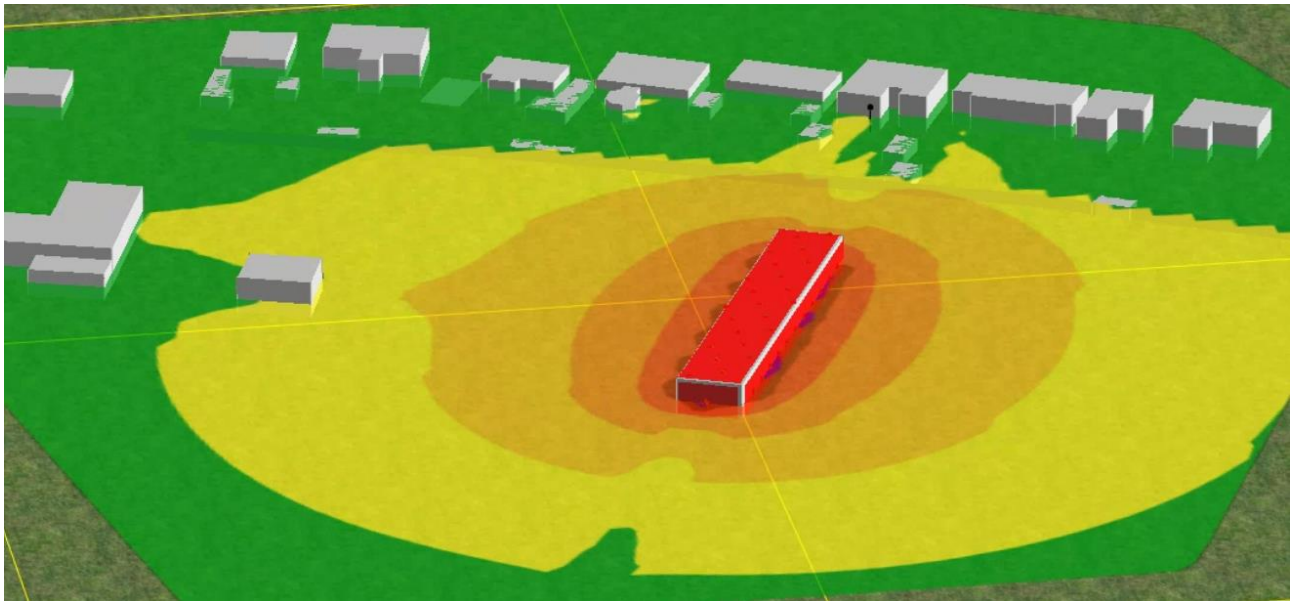
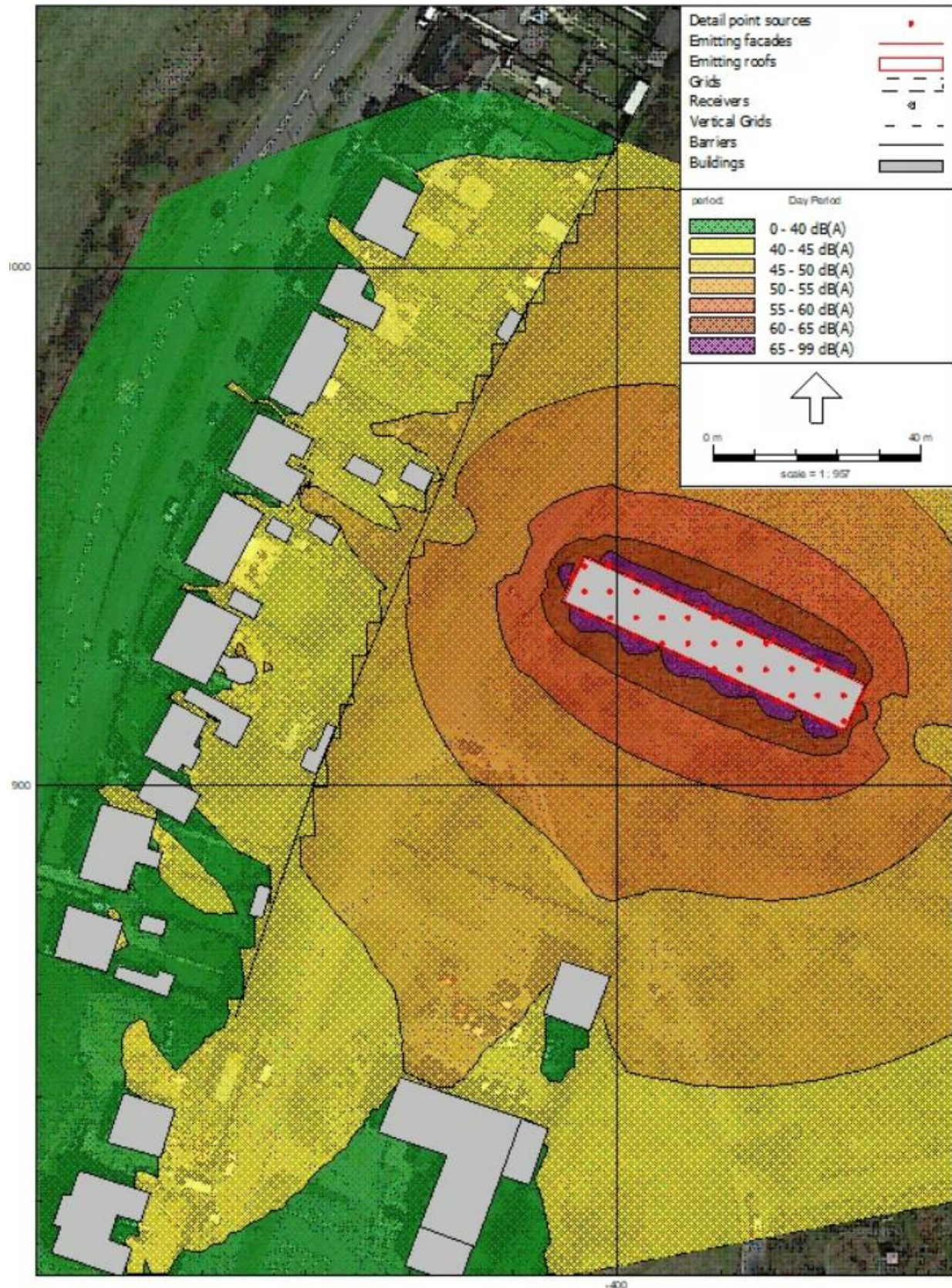


FIGURE 7: 3D VIEW OF NOISE PROPAGATION FOR LOUDEST SINGLE ITEM (LOOKING DUE WEST) AT 2M HEIGHT (ROLLER SHUTTERS CLOSED)

initial model Total Group

RedTwin, UK

19 Aug 2024, 14:21



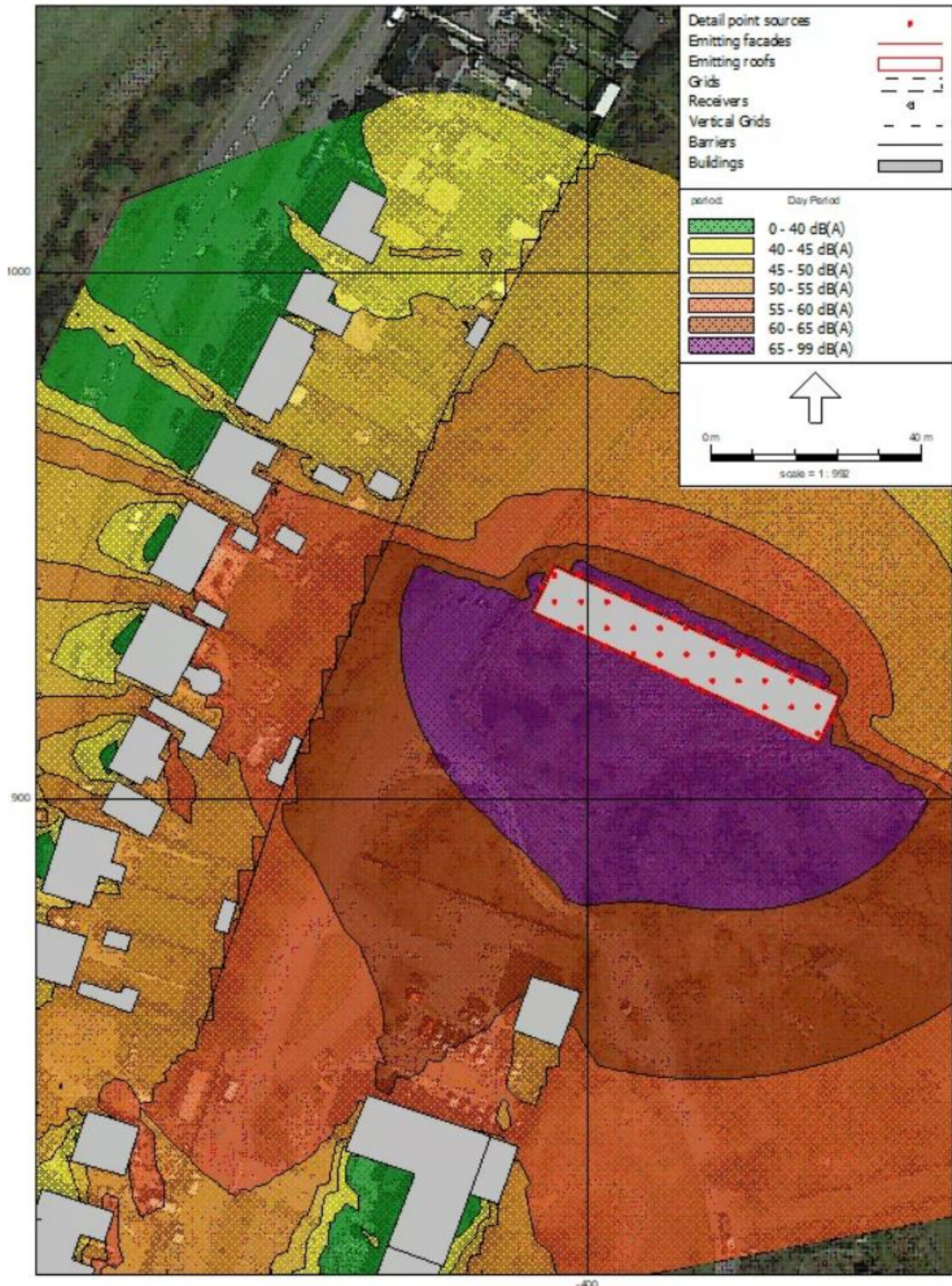
ISO 9613, (version of Area - initial model Total Group), Predictor V2023 rev 1 Licensed to RedTwin, UK

FIGURE 8: NOISE CONTOURS ACROSS THE SITE FOR TOTAL 2 SCENARIO AT 2M HEIGHT (ROLLER SHUTTERS CLOSED)

initial model Total Group Rolle Open

RedTwin, UK

19 Aug 2024, 14:47



ISO 9613, (version of Area - initial model Total Group Rolle Open), Prediction V2023 rev 1 Licensed to RedTwin, UK

FIGURE 9: NOISE CONTOURS ACROSS THE SITE FOR TOTAL 2 SCENARIO AT 2M HEIGHT (ROLLER SHUTTERS OPEN)

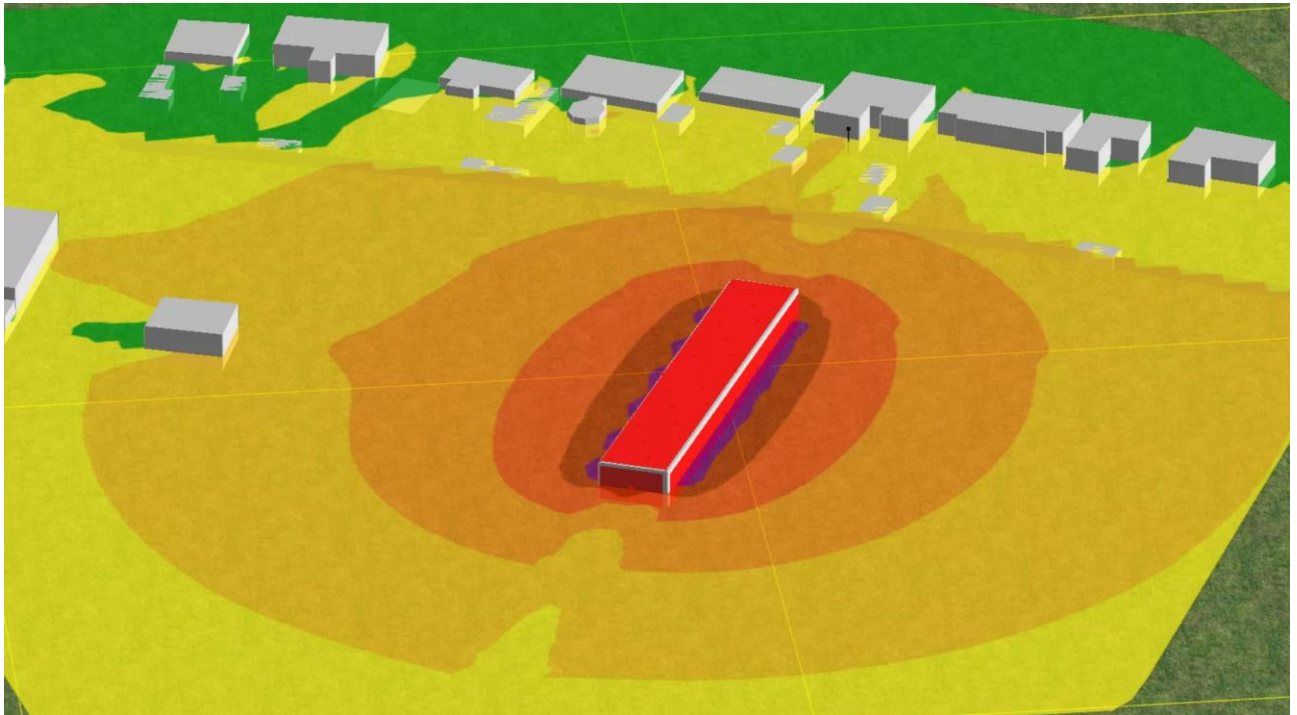


FIGURE 10: 3D VIEW OF NOISE PROPAGATION FOR TOTAL 2 SCENARIO (LOOKING DUE WEST) AT 2M HEIGHT (ROLLER SHUTTERS CLOSED)