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TECHNICAL REPORT

SHERINGHAM HOUSEHOLD WASTE RECYCLING CENTRE

Environmental Noise Impact Assessment

Adrian James Acoustics Document Control Sheet

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-	26 January 2023	Gary Percival MIOA	Andy Thompson MIOA	Andy Thompson MIOA

Revision History

Rev	Details

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1 INTRODUCTION

1.1 Background

We are appointed by Norfolk County Council (NCC) to assess the potential noise impact associated with the proposed construction and operation of a new household waste recycling centre at Holt Road, East Beckham, Sheringham, Norfolk NR26 8TW.

NCC are also the Local Planning Authority (LPA) and require that noise associated with the construction and operation of new noise-generating developments does not result in an unreasonable impact on residential amenity, including acoustic amenity.

The aims of this report are subsequently:

1. To establish the specific requirements of the Local Planning Authority (LPA);
2. To assess the potential noise impact of construction of the recycling centre;
3. To assess the potential noise impact of operation of the recycling centre; and
4. To identify the requirements of any mitigation necessary to control the impact.

1.2 Statement of technical competency

This report is prepared by Gary Percival. I am an associate with 13 years' experience in acoustics consultancy and am a full member of the UK Institute of Acoustics (MIOA).

My educational qualifications include a first-class BSc honours degree in audio and music technology from Anglia Ruskin University (2009), the Institute of Acoustics (IOA) Diploma in Acoustics & Noise Control (2012) and most recently a master's degree in Architectural and Environmental Acoustics from London South Bank University (2019).

I have carried out hundreds of comparable assessments over my career and have demonstrated the technical competency to carry out this assessment appropriately.

1.3 Source information

The report is based on the following design information provided by NCC.

Drawing No	Revision	Title
49868/2001/101	P03	Proposed General Arrangement and Level Design

Table 1 – Details of drawings and design information used to inform assessment

2 PLANNING POLICY

2.1 National Planning Policy Framework

The latest version of the National Planning Policy Framework (NPPF) was released in February 2019 and was last updated in July 2021

The NPPF does not set out quantitative criteria for assessing noise affecting proposed developments, but in paragraph 174 states that planning policies and decisions should actively contribute to the enhancement of the natural and local environment by:

> *"preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability."*

According to paragraph 185, planning policies and decisions should also ensure new development is appropriate for its location, particularly considering the likely effects on health and living conditions. Planning policy and decision makers should aim to:

> *"mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life".*

The *'agent of change principle'* has been part of the NPPF since the July 2018 revision. This principle means that a person or business (i.e. the agent) introducing a new land use is responsible for managing the impact of that change. Paragraph 187 states that:

> *"Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed."*

2.2 Local Planning Policy

Local planning policy for waste recycling centres is the remit of Norfolk County Council. Core Strategy Policy CS14 (Environmental Protection) of Norfolk County Council's *Core Strategy and Minerals and Waste Development Management Policies Development Plan Document 2010-2026* (adopted September 2011) refers to the noise impact of new waste management development, and states that:

> *"The protection and enhancement of Norfolk's natural and built environments is a vital consideration for future minerals extraction and associated development and waste management facilities in the county. In particular, developments must ensure that there are no unacceptable adverse impacts on, and ideally improvements to:*
>
> - *Residential amenity e.g.* ***noise****, vibration, dust, lighting, and visual intrusion."*

Development Management Policy DM12 (Amenity) refers more broadly to effects on general amenity, stating that:

> *"The protection of amenity for people in close proximity to potential minerals extraction and associated developments and waste management facilities will be a key consideration. Where appropriate, buffer zones, advanced planting and/or screening and other mitigation measures, such as restriction on hours of working and dust suppression measures, will be required.*

Development will be permitted only where it can be demonstrated that the scale, siting and design of a proposal is appropriate and that unacceptable impact to local amenity will not arise from the construction and/or operation of a facility."

No guidance is given regarding specific assessment methodology and/or criteria, but it is clear that Norfolk County Council require that new waste management facilities do not adversely and unacceptably affect local amenity.

2.3 Consultation

NCC do not have an environmental protection team and consultations for new noise-generating developments in the area are deferred to North Norfolk District Council.

Carol Bye, Senior Environmental Protection Officer at NNDC agreed that the following should be assessed:

1. Potential construction noise and vibration impact (during construction only)
2. Potential operational noise emissions from the site
3. Potential noise impact of additional vehicular traffic on the local road network

The following assessment methodologies were also agreed:

1. Construction noise – The ABC method from BS 5228-1:2009+A1:2014
2. Operational noise – BS 4142:2014+A1:2014 with reference to other guidance (e.g. BS 8233:2014/WHO) where appropriate
3. Changes in road traffic noise – IEMA Guidelines on Environmental Noise Impact Assessment

Details of these standards are provided in Section 3.

Appropriate assessment locations and noise survey methodology were also agreed. Further details are provided in Sections 4.1 and 5.2.1, respectively.

3 ASSESSMENT METHODOLOGY AND CRITERIA

3.1 BS 5228-1:2009+A1:2014

BS 5228 *'Code of practice for noise and vibration control on construction and open sites.'* (Part 1) provides guidance on predicting and assessing noise on construction sites. Part 2 addresses vibration specifically, which is not relevant in this case because the construction process for a recycling centre is unlikely to generate significant levels of vibration, particularly at any sensitive receptors which are more than 10-20m away.

BS 5228 (Part 1) sets out guidance on assessing the significance of construction noise effects and provides appropriate example methods for assessing construction noise.

Example method 1 – The ABC Method – provides values for the thresholds at which significant construction noise effects are deemed to occur at dwellings, depending on which of three categories the site falls into. The categorisation is determined by the prevailing average noise levels ($L_{Aeq,T}$) during each relevant construction period.

Table E.1 from BS 5228 (Part 1), which sets out and explains The ABC Method and the relevant threshold values, is reproduced in Figure 1. The threshold values which are appropriate for this assessment are described in Section 6.1 of this report.

Table E.1 **Example threshold of significant effect at dwellings**

Assessment category and threshold value period (L_{Aeq})	Threshold value, in decibels (dB)		
	Category A [A]	Category B [B]	Category C [C]
Night-time (23.00–07.00)	45	50	55
Evenings and weekends [D]	55	60	65
Daytime (07.00–19.00) and Saturdays (07.00–13.00)	65	70	75

NOTE 1 A significant effect has been deemed to occur if the total L_{Aeq} noise level, including construction, exceeds the threshold level for the Category appropriate to the ambient noise level.

NOTE 2 If the ambient noise level exceeds the threshold values given in the table (i.e. the ambient noise level is higher than the above values), then a significant effect is deemed to occur if the total L_{Aeq} noise level for the period increases by more than 3 dB due to construction activity.

NOTE 3 Applied to residential receptors only.

[A] Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values.

[B] Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as category A values.

[C] Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than category A values.

[D] 19.00–23.00 weekdays, 13.00–23.00 Saturdays and 07.00–23.00 Sundays.

Figure 1 – Table E.1 from BS 5228-1 detailing The ABC Method for construction noise

3.2 BS 4142:2014+A1:2019

3.2.1 Introduction

British Standard 4142:2014+A1:2019 *'Methods for rating and assessing industrial and commercial sound'* (BS 4142) describes appropriate technical methodology for the rating and assessment of sound of an industrial and/or commercial nature.

Sound of an industrial and/or commercial nature includes industrial and manufacturing processes, fixed mechanical and electrical plant installations, the unloading of goods and materials at industrial and/or commercial premises and sound from mobile plant that is an inherent part of the overall sound from industrial and/or commercial premises.

BS 4142 is applicable for the purposes of:

- Investigating complaints;
- Assessing sound from proposed, new, modified, or additional source(s) of sound from an industrial and/or commercial nature; and
- Assessing sound at proposed new dwellings or premises used for residential purposes.

BS 4142 is not intended to be applied to the rating and/or assessment of sound from recreational activities (including motorsport), music and other forms of entertainment, shooting grounds, construction/demolition, domestic animals, people, public address systems and any other sources falling within the scope of other standards/guidance.

3.2.2 Summary of BS 4142 assessment methodology

The BS 4142 assessment methodology can be summarised as follows:

5. Determine the background sound level (dB $L_{A90,T}$) at the nearest noise sensitive receptor(s) of interest.
6. Determine the specific sound level of the source under assessment (dB $L_{Aeq,T}$) (T = 1 hour for day or 15 minutes at night) at the receptor location(s).
7. Apply a rating level acoustic feature correction if the sound source has tonal, impulsive, intermittent or other characteristics which attract attention.
8. Compare the rating level (dB $L_{Ar,Tr}$) with the background sound level; typically, the greater this difference, the greater the magnitude of impact.

Differences of around +10dB are likely to be an indication of significant adverse impact, depending upon the context; a difference of +5dB is likely to be an indication of adverse impact, depending upon the context. Where the rating level (dB $L_{Ar,Tr}$) does not exceed the background sound level ($L_{A90,T}$) at the nearest receptor of interest, the indication is that the specific sound source will have a low impact, depending upon the context.

Note: Adverse impacts include but are not limited to sleep disturbance. Not all adverse impacts will lead to complaints and not all complaints are proof of an adverse impact.

3.2.3 Acoustic features

Certain acoustic features (which include tonality impulsivity and/or intermittence) can also increase the significance of impact. Where such features are present a *"character correction"* should be added to the specific sound level to obtain the rating level.

The recommended BS 4142 character corrections are presented in Table 2.

Characteristic	**Perceptibility**		
	Just Perceptible	**Clearly Perceptible**	**Highly Perceptible**
Tonality	+2 dB	+4 dB	+6 dB
Impulsivity	+3 dB	+6 dB	+9 dB
Intermittency	0	+3 dB	+3 dB
Other	0	+3 dB	+3 dB

Table 2 – Summary of BS 4142:2014 character corrections

BS4142:2014 describes suitable subjective methods for assessing character features, plus additional objective (one-third octave and reference) methods for tonality.

3.2.4 Uncertainty

The BS 4142 methodology also requires that the level of uncertainty in the technical data and/or calculations is reported. Where uncertainty could affect the conclusion, reasonable, practicable steps should be taken to reduce uncertainty. If appropriate, the level and potential effects of any identified uncertainty should also be reported.

3.3 IEMA Guidelines for Environmental Noise Impact Assessment

The *'Guidelines for Environmental Noise Impact Assessment'* were published in 2014 by the Institute of Environmental Management & Assessment and include guidance on the classification of short and long-term impacts caused by changed in sound level.

This is often used to consider the potential environmental noise impact of changes in transportation noise over a wide and/or not easily defined area, such as where a new development will instigate an increase or decrease in local road traffic.

The short and long-term impact classifications presented in the IEMA guidelines and which correspond to various changes in the sound level are shown in Table 3 below.

Long-term Impact Classification	**Short-term impact classification**	**Sound level change dB $L_{pAeq,T}$***
Negligible	Negligible	≥ 0 dB and < 1 dB
	Minor	≥ 1 dB and < 3 dB
Minor	Moderate	≥ 3 dB and < 5 dB
Moderate	Major	≥ 5 dB and < 10 dB
Major		≥ 10 dB
*T = 16hr day or 8hr night		

Table 3 – IEMA guidelines on the impact from a change in sound levels

4 DESCRIPTION OF SITE AND PROPOSALS

4.1 Site location and noise-sensitive receptors

The proposed household waste recycling centre (HWRC) would be constructed directly opposite the site of the existing HWRC on Holt Road. The locations of the existing and proposed HWRC sites are highlighted in red and blue respectively in Figure 2.

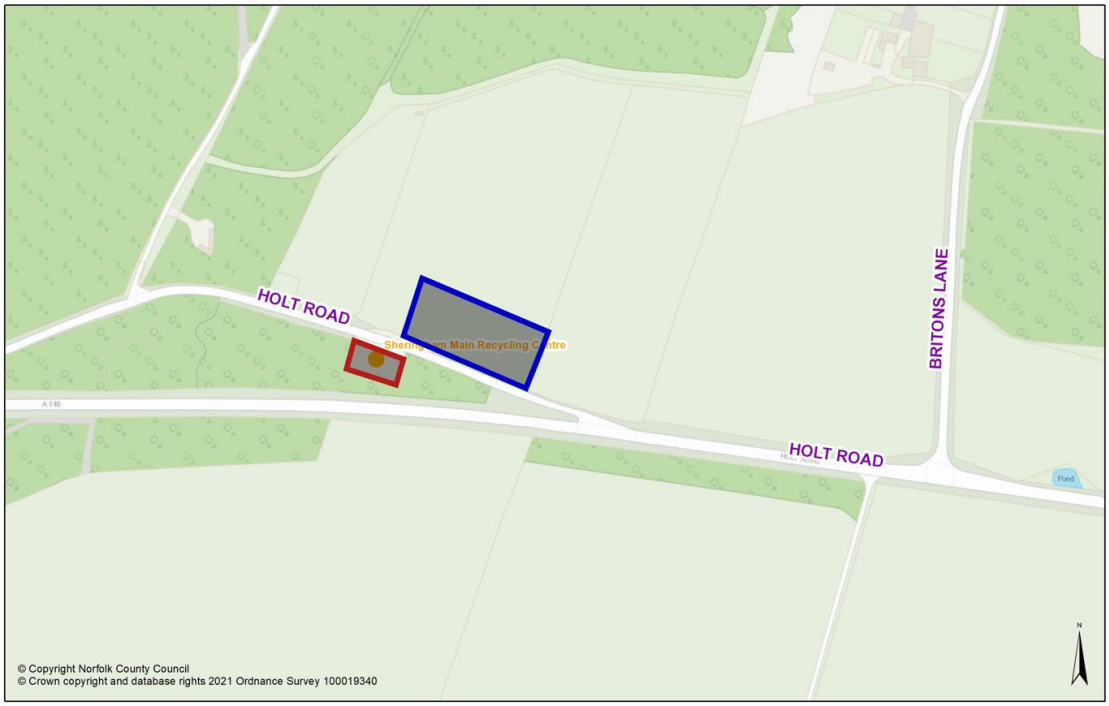

Figure 2 – Respective locations of existing and proposed HWRC sites

The proposed HWRC is situated close to the busy A148 (Holt Road), which is less than 20 m from the site at its nearest point. Other significant noise sources in the area include the Norfolk Gravel quarry, which is situated less than 400 m away to the north-east. The surrounding area is otherwise relatively rural in character.

The rural nature of the area means that the nearest noise-sensitive buildings are all at least 385 m away to the north-east/north-west:

- Residential properties – 270-435 m to the north-east
- Accommodation at Hilltop Outdoor Centre – 250-350 m to the north-west

These locations are circled in yellow in Figure 3.

There are other noise-sensitive buildings to the south/east, on the opposite side of the A148 but these are much further away:

- St. Andrew's School – 700 m to east
- Field Barn (residential) 650 m to the south

St. Andrew's School is directly adjacent to the A148 where background/ambient sound levels are likely to be relatively high.

We therefore agreed with NNDC to focus on the nearest noise-sensitive buildings to the north-west/north-east, on the basis that if an acceptable noise impact is achieved at these properties, this is also likely at other properties to the east/south which are much further away (and/or where road traffic noise is likely to be a significant factor).

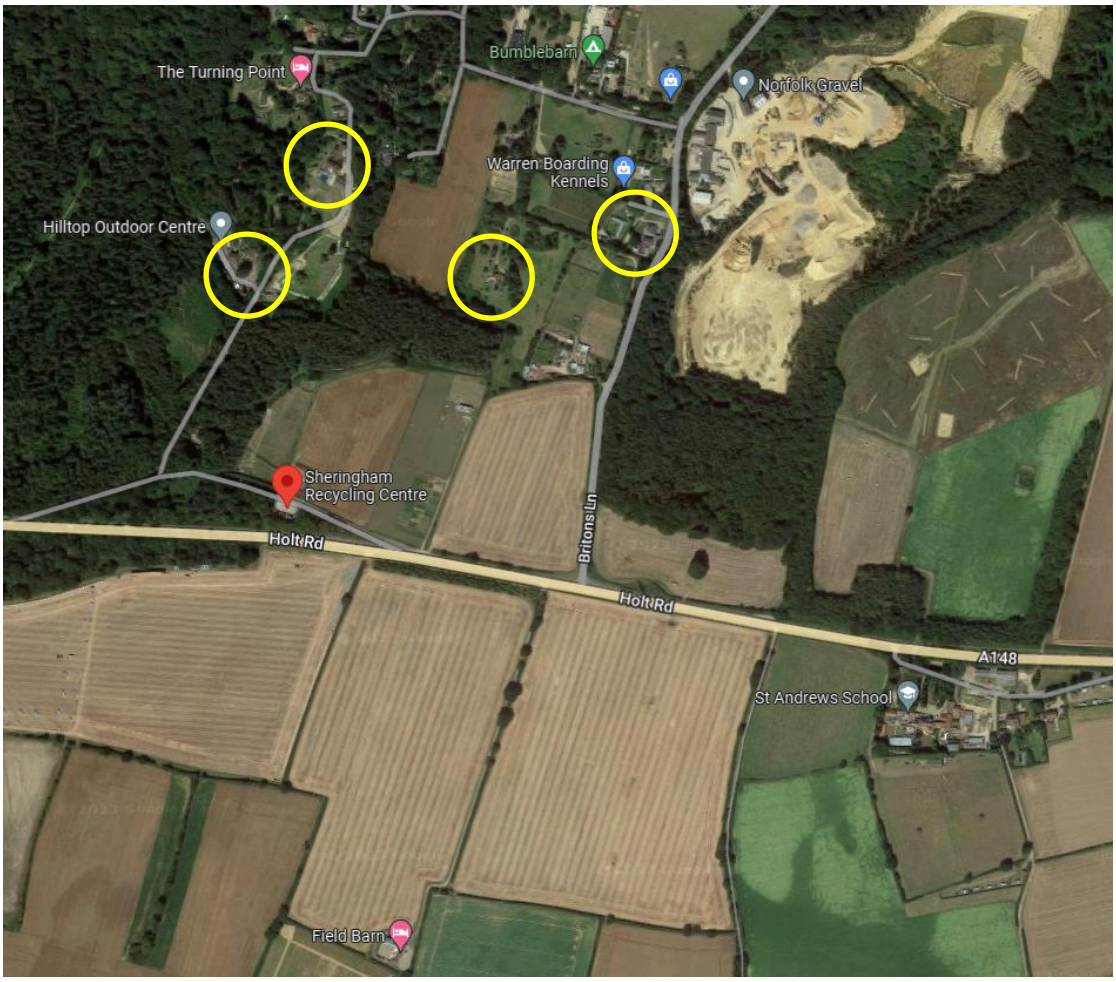

Figure 3 – Annotated aerial photograph/plan of site and surroundings (© Google 2023)

The ownership of Hilltop Outdoor Centre has stated during consultations with NCC that they are also concerned about the potential noise impact of the proposals on an area of woodland which they own approximately 200 m to the north of the proposed HWRC site and which is currently used for bushcraft activities and woodland studies.

We therefore agreed that we would include this area (which is circled in yellow in Figure 4) as a noise-sensitive receptor in our assessment.

Other outdoor areas at Hilltop Outdoor Centre (e.g. archery and games areas) are not considered particularly noise-sensitive considering their proximity to the A148 and existing HWRC. Most outdoor activities would also generate some noise themselves.

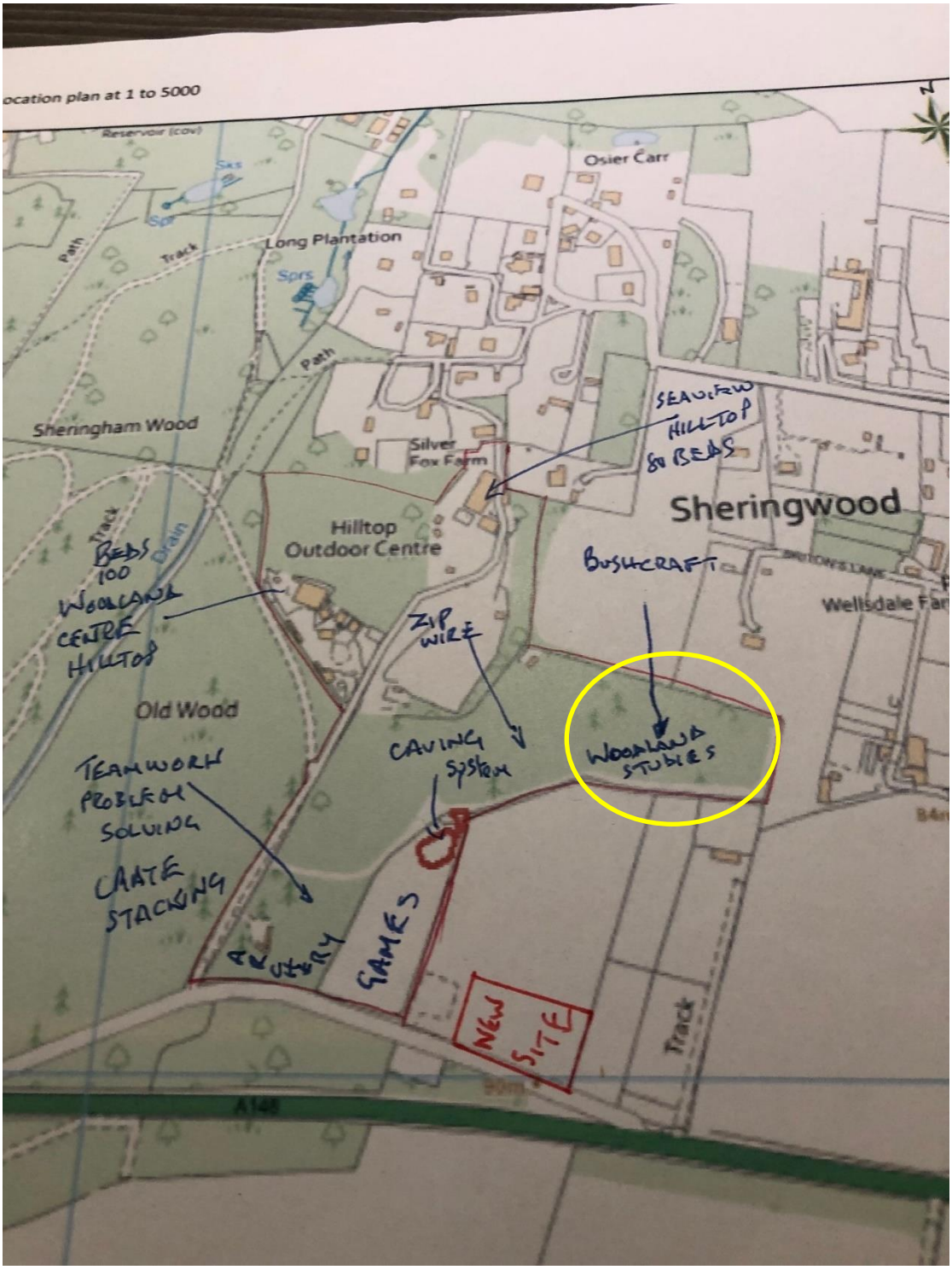

Figure 4 – Annotated site plan showing current usage of Hilltop Outdoor Centre land

4.2 Description of development proposals

4.2.1 Summary of development proposals

The proposed development involves the construction of a new HWRC on the opposite side of Holt Road. The HWRC will comprise a service area surrounded on two sides by container bins and deposit areas designated for different types of household waste. The new HWRC facility will replace the old one, which will cease to operate on opening.

An access road and visitor parking will surround the service yard and there will be staff parking and a (probably prefabricated) site office and welfare building.

There would be a drainage ditch between the access road and the north and east site boundaries, and the site would be surrounded by security fencing.

In addition to the security fence, it is also proposed to install a 2.5m high acoustic fence along the entire north site boundary to reduce noise emissions from the site. Current discussions indicate that this would be a *'living fence'* (Cheviot Trees Acoustic Green Barrier, or similar) but any fence can be used provided that it is continuous, imperforate (with no holes or gaps) and has a minimum surface mass density of at least 10 kg/m^2.

The layout of the site is shown in Figure 5.

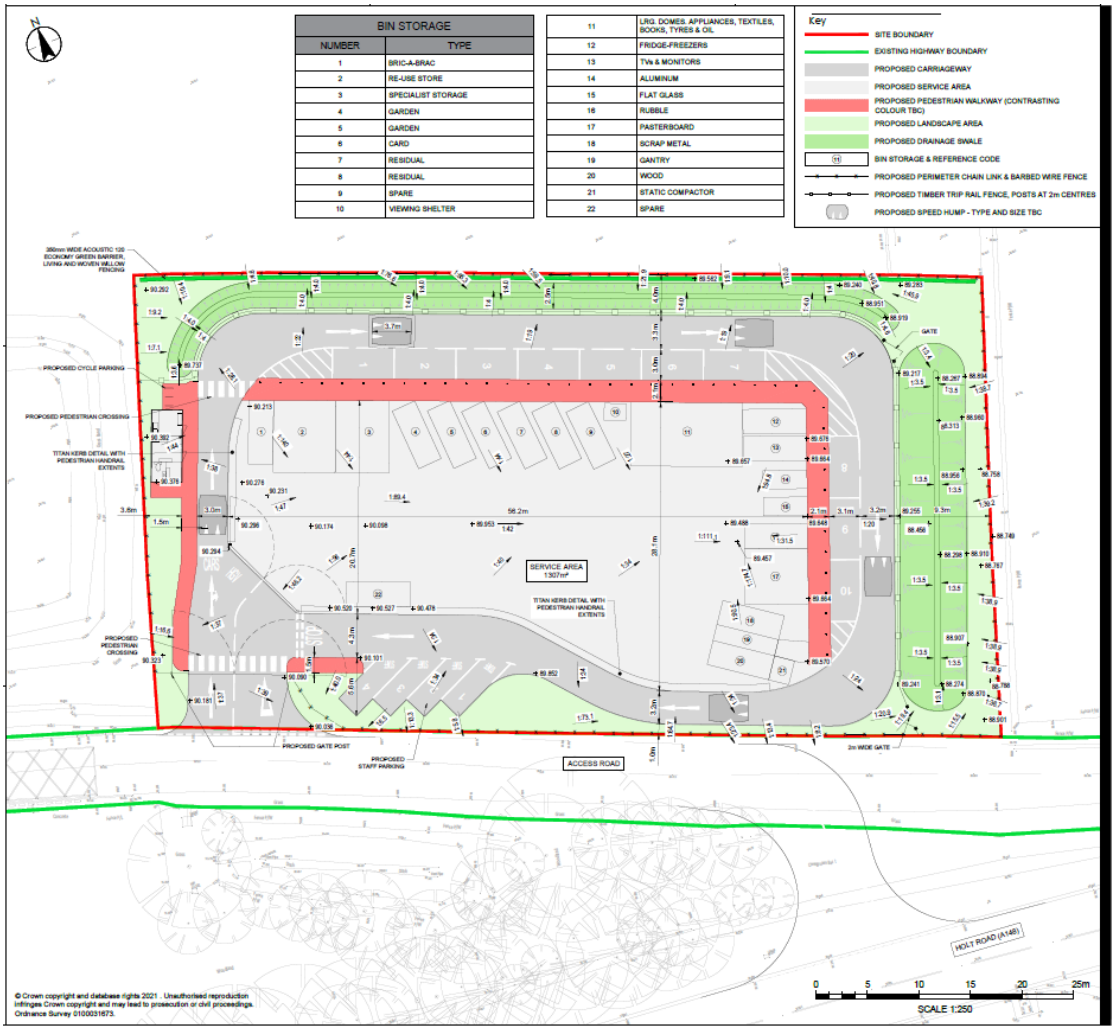

Figure 5 – Extract from site layout plan

4.2.2 Construction of the proposed development

We understand that construction would generally be undertaken during daytime hours:

- 0700-1900hrs Monday to Friday
- 0700-1300hrs on Saturdays

Construction would take approximately 33 weeks and would include site clearance and excavation, drainage and other utilities works, hard paving and building construction.

Details of the noise-generating activities associated with these processes have been provided by NCC, together with an indication of the equipment most likely to be used and the estimated on-time (during a typical day) for each item of plant or equipment.

This information is presented in Table 4 and was used to inform the construction noise assessment in Section 5.

Phase	Noise Generating Activity	Assumed Plant	% On-Time	Weeks
Preliminaries	Establish Site Compound	Wheeled backhoe loader	50	1-2
		Lorry pulling up	50	
Site Clearance and Excavation	General site clearance	Wheeled backhoe loader	50	2-3
	Excavation	Tracked excavator	50	4-11
	Muck Away	Lorry	50	
Drainage and Utilities	Excavate service diversion trenches	Mini tracker excavator	25	12-15
	Drainage works	Mini tracker excavator	25	12-19
	Backfill service diversion	Dump truck tipping fill	25	16-19
Pavement construction	Lay sub-base	Dump truck tipping fill	25	
	Concrete paved areas	Cement mixer truck discharging	25	20-24
	Asphalt surfacing of circulation lanes	Asphalt paver and tipper lorry	25	24-30
	Finishing concrete bays	Power float	25	
Buildings	Delivery and positioning of units	Hiab	25	31-33

Table 4 – Details of construction programme, activities and plant provided by NCC

4.2.3 Operation of the proposed development

The new HWRC would operate in much the same way as the existing site, albeit with more bins/waste storage. Visitor numbers are expected to remain similar to currently. Visitors would arrive by vehicle, deposit waste in the designated bins/areas, and leave.

Some of the bins at the existing site have built in compactor units; these are one of the main noise sources at the existing HWRC and will also be used at the new HWRC. When full, bins are collected by heavy goods vehicle (HGV) – again, this is understood to be one of the main noise sources and this will remain the case at the new HWRC.

The only other significant fixed/mobile plant at the proposed HWRC is a Bergmann Static Roll Packer (RP7700), a machine used for compacting wood/timber waste. (https://www.bergmanndirect.co.uk/static-roll-packer-rp7700). This is shown below.

The static roll packer will be used relatively infrequently (typically for up to 5 minutes a time and no more than 5-6 times a day, sometimes more/less on busier/quieter days).

Figure 6 – Image of Bergmann Static Roll Packer RP7700 (© Bergmann)

Other sources of noise would include waste being dropped into waste bins (particularly metals and glass) and the noise associated with visitor vehicles attending the site.

It was therefore agreed with NNDC that the main sources of noise associated with the proposed HWRC (to be included in the assessment) are integrated waste compactors, service vehicles, waste being deposited, visitor vehicles, and the static roll packer.

Proposed public operating hours for the HWRC are the same as for the existing site:

- 0900-1600hrs during winter
- 0900-1700hrs during summer

However, site management and servicing could start from 07:00 hrs. The intention is for most servicing vehicles (HGVs collecting bins) to attend between 07:00 – 09:00 hrs.

The above details form the basis of the operational noise assessment in Section 7.

4.2.4 Road traffic generated by the proposed development

The proposed development would generate vehicle movements both on and off-site.

NCC provided current (baseline) and projected (future baseline + with development) annual average weekday traffic (AAWT) flows for the proposed development, which we understand are based on observed traffic flows at similar sites within Norfolk.

The provided 18-hour (06:00 – 00:00 hrs) AAWT flows are presented in Table 5.

Period	Parameter	Holt Road east of HWRC	Holt Road west of HWRC
2022 Observed	Total Vehicles	321	272
	HGVs	32	25
	% HGVs	10%	9%
2024 Future Baseline	Total Vehicles	326	277
	HGVs	33	25
	% HGVs	10%	9%
2024 Future Baseline + Development	Total Vehicles	388	215
	HGVs	34	23
	% HGVs	9%	11%
2029 Future Baseline	Total Vehicles	342	289
	HGVs	33	25
	% HGVs	10%	9%
2029 Future Baseline + Development	Total Vehicles	408	222
	HGVs	35	23
	% HGVs	9%	11%

Table 5 – Current/projected 18-hour AAWT flows associated with the proposed HWRC

This information was used to inform the operational noise assessment in Section 7.

5 ENVIRONMENTAL NOISE SURVEY

5.1 Introduction

We carried out an environmental noise survey at various times between 25 October and 2 December 2022. The main aims of the survey were:

1. To measure typical noise levels from integrated waste compactors, servicing vehicles (HGVs) and general visitor activity at the existing HWRC; and
2. To quantify typical background sound and ambient noise levels at nearby noise sensitive receptors (the locations described in Section 4.1 of this report).

The methodology and results of the measurements corresponding to each of these aims are set out in Sections 5.2 and 5.3, respectively.

5.2 Survey of activity noise at the existing HWRC

5.2.1 Survey methodology

The survey of activity noise at the existing HWRC comprised attended measurements of specific sources and unattended monitoring at a single location on the site boundary.

Attended measurements were generally taken in the free field (clear of reflecting surfaces) with the sound level meter installed on a tripod approximately 1 m above ground height.

Unattended measurements were taken between 25 October and 1 November 2022 at a location adjacent to the east boundary of the existing HWRC, with the measurement microphone on a pole approximately 1.8 m above ground height and at least 1 m from reflective surfaces. The microphone had a clear line of sight across most of the HWRC.

The location of the unattended monitor is indicated in Figure 7.

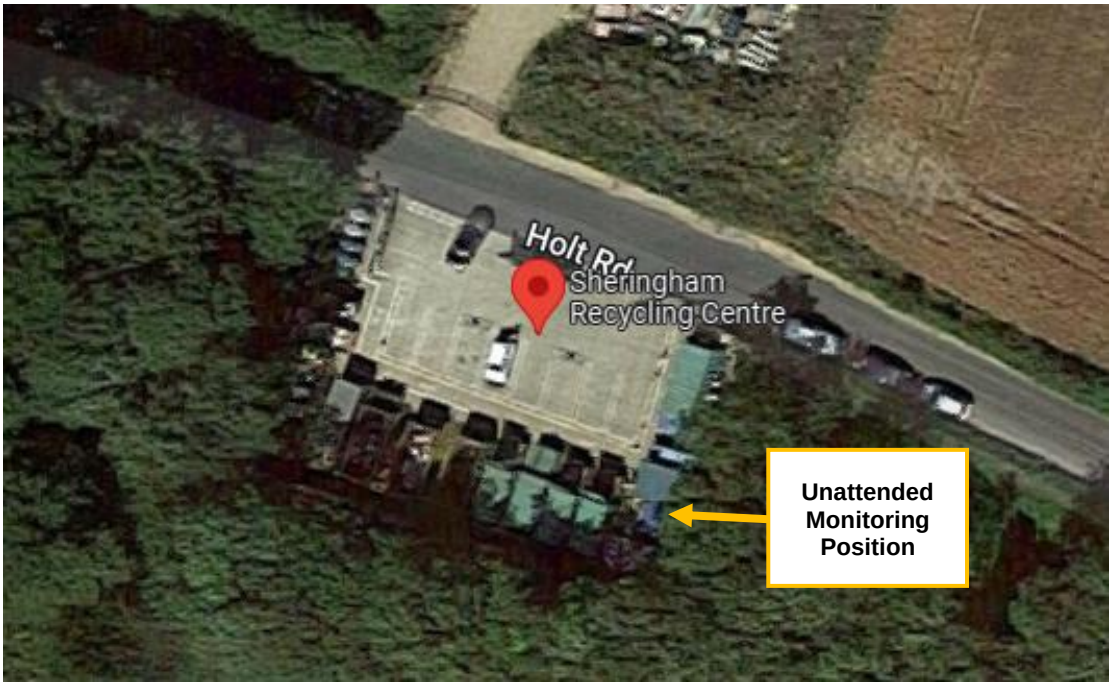

Figure 7 – Location of unattended noise monitor at existing HWRC (© Google 2023)

5.2.2 Meteorological conditions

Meteorological information for the survey period was taken from published weather data for the local area (https://www.timeanddate.com/weather/@2638019/historic).

Weather conditions were generally considered suitable for acoustic measurement with average temperatures typically ranging between 9°C and 20°C and minimal rainfall (other than light showers on the mornings of Saturday 29 and Sunday 30 October).

Average wind speeds did not exceed 5 m/s during most of the survey. There were a few periods where average wind speeds may have marginally exceeded this threshold, but we do not expect this to have a significant effect on the survey data, considering that the main noise sources are the A148 and the HWRC, which are both very nearby.

5.2.3 Measurement equipment

Details of the sound measurement and calibration equipment used are presented in Appendix B. The sound level meter used for these measurements was calibrated before and after use, with no significant calibration drift detected (less than +/- 0.5 dB).

5.2.4 Survey results

The ambient noise environment at the site is generally dominated by road traffic on the A148, although activity noise associated with the HWRC also contributes significantly.

Noise associated with the A148 is relatively consistent, but noise associated with the HWRC is more intermittent and impulsive, and therefore more distinctive than traffic.

The unattended noise monitoring results are summarised in Table 6. Average noise levels were generally dictated by road traffic; maximum noise levels by HWRC activity.

Date	07:00 – 09:00 hrs		09:00 – 16:00 hrs	
	Average noise level, dB $L_{Aeq, 2h}$	**Maximum noise level, dB L_{AFmax}**	**Average noise level, dB $L_{Aeq, 2h}$**	**Maximum noise level, dB L_{AFmax}**
26/10/2022	58.2	83.0	62.8	92.1
27/10/2022	58.1	78.7	60.7	87.9
28/10/2022	60.2	83.6	60.2	89.5
29/10/2022	57.5	78.2	61.0	96.3
30/10/2022	57.7	79.0	62.2	90.0
01/11/2022	62.4	84.4	Incomplete	Incomplete
Average	**59.4**	**81.2**	**61.5**	**91.2**
Highest	**62.4**	**84.4**	**62.8**	**96.3**

Table 6 – Summary of $L_{Aeq,T}$ and L_{AFmax} noise levels during HWRC operating hours

By analysing the statistical and audio data recorded by the unattended noise monitor, we were also able to derive noise levels during specific HWRC operational processes (particularly from servicing vehicles/HGVs and the integrated waste compactor bins).

Other sources of HWRC activity noise were noticeable on the unattended audio data, but it was often difficult to distinguish exactly where the noise was coming from and/or to quantify the specific sound level due to noise from other sources (particularly traffic).

The measurements of servicing vehicles/HGVs and integrated waste compactor bins derived from the unattended noise monitoring data are summarised in Table 7 below.

The full unattended noise data from the HWRC are provided in Appendix C.

Activity	Start Date/Time (dd/mm/yyyy hh:mm)	Duration (hh:mm:ss)	Average noise level, dB $L_{Aeq, T}$	Maximum noise level, dB L_{AFmax}
Servicing vehicles (HGV collecting full waste bin)	27/10/2022 09:36	0:13:30	65.0	87.9
	27/10/2022 10:50	0:09:45	65.9	87.9
	28/10/2022 12:40	0:21:00	63.0	83.4
	29/10/2022 09:11	0:10:50	65.8	84.0
	30/10/2022 07:26	0:25:20	59.4	84.2
	31/10/2022 13:24	0:03:35	67.0	88.5
	01/11/2022 07:55	0:17:59	65.0	84.4
		Total Time 1:41:59	**Average 64.1**	**Highest 88.5**
Integrated waste compactor	25/10/2022 14:26	0:13:20	62.3	89.7
	26/10/2022 15:16	0:03:21	67.7	92.1
	30/10/2022 10:07	0:01:49	61.7	79
		Total Time 1:41:59	**Average 64.1**	**Highest 88.5**

Table 7 – HWRC activity noise levels derived from the unattended monitoring data

We also took attended spot measurements at various locations around the HWRC to quantify typical noise levels from various operational activities. The activities that we were able to measure were limited by those which occurred during the survey.

Source/Activity	Start Time (hh:mm:ss)	End Time (hh:mm:ss)	Average noise level, dB $L_{Aeq, T}$	Maximum noise level, dB L_{AFmax}
Card compactor bin at 3 m	10:07:40	10:10:09	63.3	80.6
Timber dropped into wood bin	10:13:48	10:14:18	74.2	88.7
Metal dropped into metal bin	10:16:02	10:16:23	84.6	104.2

Table 8 – Attended measurements of operational/activity noise at the existing HWRC

The results of the attended and unattended monitoring were used, alongside previous measurement data from other similar HWRC sites that we have worked on, to inform the operational noise prediction model and assessment described in Section 7.

5.3 Survey of baseline background sound and ambient noise levels

The survey of baseline background sound and ambient noise levels at nearby noise-sensitive receptors comprised a combination of attended and unattended monitoring.

Attended measurements were carried out at the following locations:

- **A1** – Next to Warren Boarding Kennels (representing the group of residential properties approximately 435 m to the north-east on Britons Lane).
- **A2** – In the Woodland Centre accommodation area at Hilltop Outdoor Centre (the nearest of the two accommodation areas used by Hilltop Outdoor Centre).
- **A3** – A position approximately 90 m north-west of the Woodland Centre which was used in the early morning when there was no access to the Hilltop site.

Attended measurements were taken at intervals during the proposed operating hours (07:00 – 17:00 hrs) on Monday 24 October and Monday 28 November 2022. Attended measurements were taken in the free field approximately 1 m above ground height.

Unattended monitoring was carried out within the area of woodland currently used by Hilltop Outdoor Centre for bushcraft activities and woodland studies. This area is also relatively close to another residential property approximately 80 m to the north to which we were not able to gain access, so the unattended data was used for both receptors.

Unattended measurements were taken with the measurement microphone on a stand approximately 1 m above local ground height. The local topography in the area is undulating and the area of woodland currently used for bushcraft and woodland studies is in a crater between 5-10 m lower than the surrounding ground level. As such this location is more acoustically screened than other noise-sensitive receptors in the area.

Figure 8 – Background sound/ambient noise monitoring (© Google 2023)

5.3.1 Meteorological conditions

Meteorological information for the survey period was taken from published weather data for the local area (https://www.timeanddate.com/weather/@2638019/historic).

Weather conditions were generally considered suitable for acoustic measurement.

During the attended measurements, average temperatures ranged between 6°C and 17°C with negligible rainfall. Average wind speeds did not exceed 5 m/s, although there were intermittent strong gusts during the early morning of Monday 24 October.

During the unattended measurements, average temperatures ranged between 4°C and 10°C and there was no rain. Average wind speeds did not exceed 5 m/s.

5.3.2 Measurement equipment

Details of the sound measurement and calibration equipment used are presented in Appendix B. The sound level meter used for these measurements was calibrated before and after use, with no significant calibration drift detected (less than +/- 0.5 dB).

5.3.3 Survey results

Observed ambient noise sources during the attended measurements were as follows:

- **A1** – Predominantly distant A148, birdsong, intermittent barking from dogs and traffic on Britons Lane, occasional rustling of trees.
- **A2** – Predominantly distant A148. Also sound from staff getting ready for start of activities, so some chatter, noise from equipment etc.
- **A3** – Predominantly distant A148, no breeze so few other sounds audible. Military aircraft flyover during afternoon measurements on 28 November.

The ambient noise environment at the unattended monitoring location in the woodland was mainly characterised by distant traffic on the A148, though this was at a relatively low level considering the distance, due to the screening provided by the topography.

Based on analysis of the unattended audio data, there were periods where woodland activities were clearly audible/measurable (highlighted in orange below). There were also periods where some type of industrial noise was clearly audible/measurable (highlighted in pink below) which is likely to be from an area which we understand is currently used for concrete crushing and other activities.

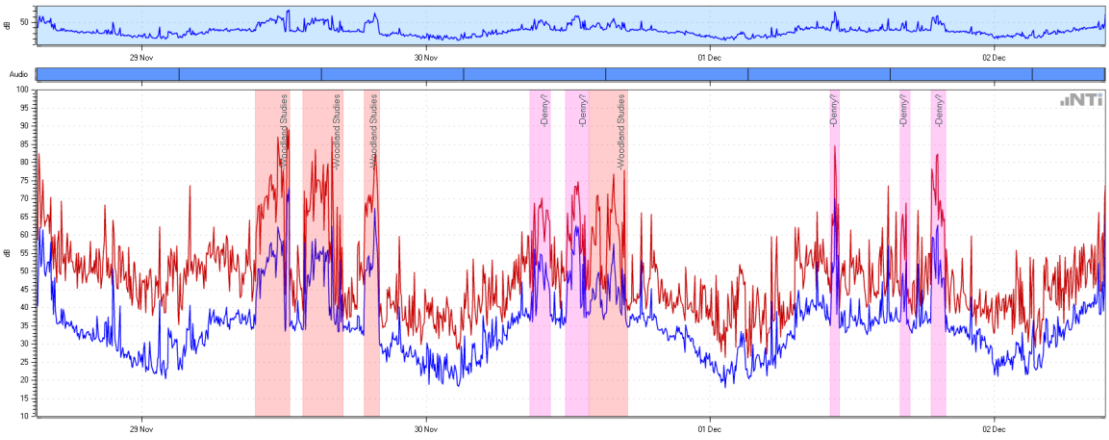

Figure 9 – Time trace of unattended monitoring data showing extraneous noise events

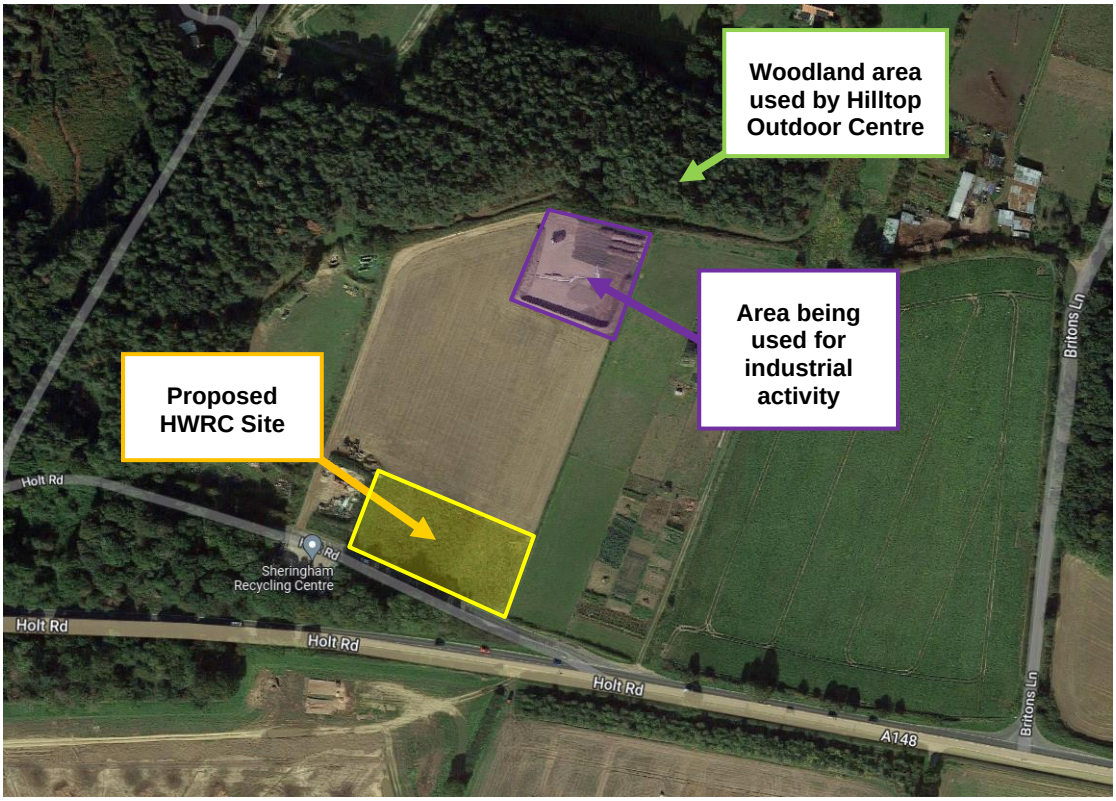

Figure 10 – Annotated aerial photo of area around proposed HWRC (© Google 2023)

The results of the 15-minute attended measurements are summarised in Table 9. This demonstrates the typical range of noise levels at each measurement position.

Position	Date (dd/mm/yyyy)	Start Time (hh:mm:ss)	Measured free-field sound pressure levels				
			dB L_{AFmax}	dB L_{AFmin}	dB $L_{Aeq,15mins}$	dB $L_{A10,15mins}$	dB $L_{A90,15mins}$
A1	25/10/2022	07:12:32	79.8	39.5	59.5	56.7	42.7
	25/10/2022	07:27:32	84.8	40.6	64.8	63.2	43.8
	25/10/2022	07:42:32	57.6	47.9	51.9	54.6	49.1
	28/11/2022	16:21:16	89.9	40.3	63.9	66.2	52.6
	28/11/2022	16:36:16	97.3	32.5	62.4	61.8	43.2
	28/11/2022	16:51:16	58.9	48.9	53.2	56.2	50.0
A2	25/10/2022	08:58:34	67.8	40.1	49.8	52.6	42.9
	25/10/2022	09:13:34	87.6	41.1	67.7	65.8	44.4
	25/10/2022	09:28:34	54.5	46.6	50.3	52.5	47
A3	25/10/2022	07:58:36	59.8	37.6	43.2	44.7	40.1
	25/10/2022	08:13:36	54.1	37.4	42.5	44.2	40.3
	25/10/2022	08:28:36	61.1	41.3	45.0	46.5	42.4

Table 9 – Results of attended background sound/ambient noise measurements

The full unattended noise data from the woodland area are provided in Appendix C.

The unattended survey results from the woodland are also shown graphically below.

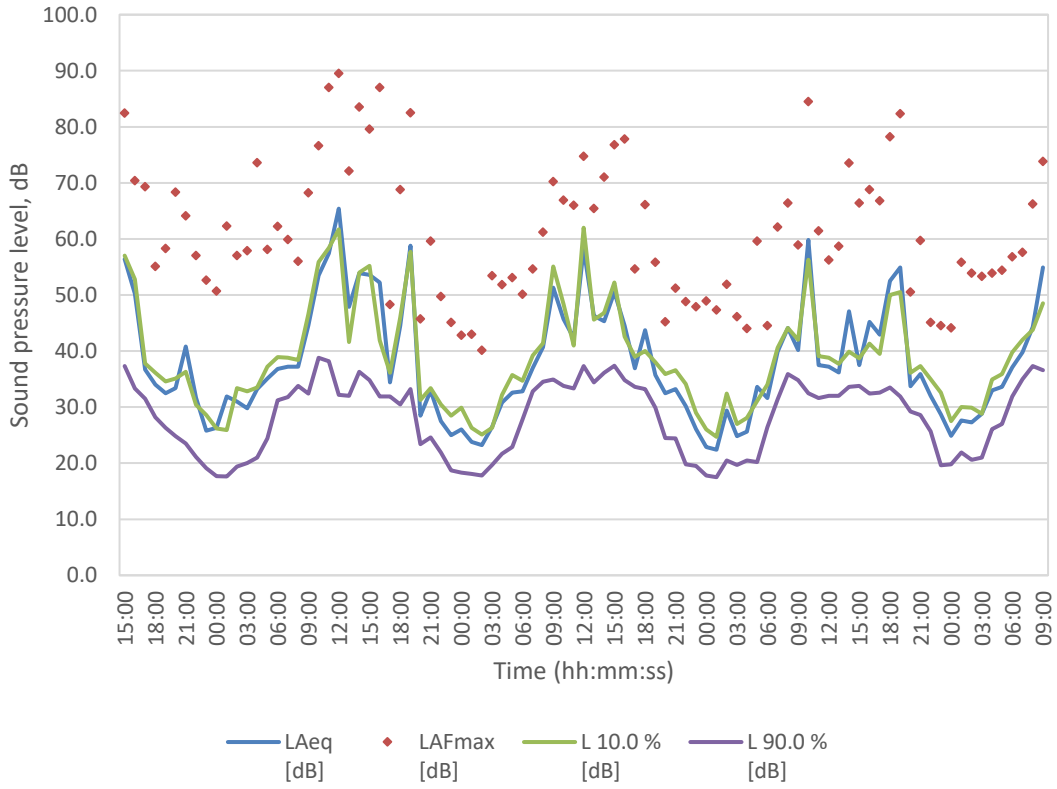

Figure 11 – Graph showing unattended noise data from the woodland area

Further analysis of the unattended noise data from the woodland area has been carried out to inform assessments of construction and operational noise from the proposed development. This analysis is discussed further in Sections 6.1 and 7.3.1 respectively.

6 CONSTRUCTION NOISE ASSESSMENT

6.1 Significance thresholds

As per Section 3.1 of this report, The ABC Method from BS 5228 provides values for the thresholds at which significant construction noise effects are deemed to occur.

The applicable thresholds depend on the prevailing ambient noise levels at relevant noise-sensitive receptors during proposed construction hours, which in this case are:

- 07:00 – 19:00 hrs Monday to Friday
- 07:00 – 13:00 hrs on Saturdays

Based on the attended measurement results in Table 9 (which indicate that typical ambient noise levels between 07:00-17:00 hrs on weekdays are below 65 dB $L_{Aeq,15mins}$) we believe that locations A1, A2 and A3 should be in ABC assessment category A.

Similarly, ambient noise levels at the unattended monitoring position did not exceed 65 dB $L_{Aeq,1hour}$ at any time. It is therefore reasonable to conclude that all the nearest (worst-case) noise-sensitive receptors would be in ABC assessment category A.

The daytime construction noise threshold value for Category A is 65 dB $L_{Aeq,0700-1900hrs}$ (between 07:00-19:00 hrs on weekdays and 07:00-13:00 hrs on Saturdays). Should construction noise exceed this threshold at any noise-sensitive receptor then a significant effect *"has been deemed to occur"* in accordance with The ABC Method.

6.2 Total noise level

6.2.1 Construction noise prediction methodology

Construction noise emissions were predicted based on the information in Table 4.

1/1 octave-band noise data for all relevant construction plant and equipment was taken from the noise source data provided in BS 5228-1. Where BS 5228 presents multiple options for source data, the worst-case (highest) potential noise levels were adopted.

Cumulative noise emissions during each phase of construction were calculated at the nearest noise-sensitive receptor (the Hilltop Outdoor Centre woodland area) based on and including all relevant equipment and associated on-times during each phase.

Most construction activities and associated noise sources will be transient and would not remain in one location for the duration of each phase. Our calculations assume that all noise sources are working at the nearest possible location to each receptor. This is a theoretical worst-case and in practice is likely to overestimate noise impact.

No screening was included in the calculations which represents a worst-case because local topography means that many receptors would benefit from acoustic screening.

6.2.2 Construction noise prediction results

Calculated cumulative average construction noise levels at the worst-case (nearest) noise-sensitive receptor are shown in Table 10.

Full details of the construction noise calculations are provided in Appendix D.

Construction Phase	**Overall average noise levels, dB $L_{Aeq,T}$**
1 - Preliminaries	40
2 - Site Clearance and Excavation	54
3 - Drainage and Utilities	47
4 - Pavement construction	47
5 - Buildings	45

Table 10 – Predicted construction noise levels at nearest noise-sensitive receptors

6.3 Assessment of impacts

Based on the construction noise predictions presented in Table 10, construction noise at the nearest (worst-case) receptor location would not exceed the relevant BS 5228 Category A threshold value of 65 dB $L_{Aeq,0700\text{-}1900hrs}$ during any phase of construction.

This is based on several worst-case assumptions. Significant construction noise effects at this or any other receptor are therefore very unlikely according to BS 5228.

7 OPERATIONAL NOISE ASSESSMENT

7.1 Introduction

The impact of operational noise associated with the proposed waste recycling centre should generally be assessed in terms of:

1. Noise generated by off-site traffic; and
2. Noise generated by on-site operational activity.

These are addressed in turn below.

7.2 Assessment of operational off-site road traffic noise

The impact of noise from off-site traffic generated by a development of this nature can generally be assessed by looking at potential increases/decreased in road traffic flows (and therefore road traffic noise) on the surrounding road network.

The most significant changes in road traffic flows due to the development would occur to the east and west of the HWRC access on Holt Road, which is the only vehicular route to and from the site. If the noise impact associated with development traffic on Holt Road is acceptable, this is also likely to be true for the wider road network.

We calculated the 18-hour L_{10} traffic noise level at 2.5 m from the carriageway edge in accordance with the methodology in Calculation of Road Traffic Noise (CRTN), based on the AAWT traffic flow data presented in Table 5. The results of these calculations (along with the predicted increase/decrease in noise level) are presented in Table 11.

Period	Calculated 18-hour CRTN level, dB $L_{A10,18h}$	
	Holt Road east of HWRC	Holt Road west of HWRC
2024 Future Baseline	62.0	61.0
2024 Future Baseline + Development	62.5	61.4
Increase/decrease (+/- dB)	0.5	0.4
2029 Future Baseline	62.2	61.2
2029 Future Baseline + Development	62.7	60.5
Increase/decrease (+/- dB)	0.5	-0.7

Table 11 – Results of CRTN calculations for off-site road traffic noise

In summary, additional road traffic generated by the proposed development would be unlikely to result in significant noise emissions and any impact would be *"negligible"* according to the IEMA *'Guidelines for Environmental Noise Impact Assessment'*.

On this basis no significant off-site traffic noise impact is expected.

7.3 Assessment of on-site operational activity

7.3.1 Background sound level

BS 4142 states that the background sound level used for a noise impact assessment should be *"representative"* but should not necessarily be the minimum or modal value.

For the attended measurement positions, we used the lowest measured background sound level as the basis for assessment. This is clearly a relatively onerous approach but is considered appropriate where there is a necessarily limited data set to work from.

For the unattended monitoring position, we post-processed the measurement data to exclude all periods where there was any extraneous noise from Hilltop Outdoor Centre bushcraft and/or woodland studies, and from industrial activity in the nearby field.

We then produced histograms to analyse the frequency of occurrence of the measured background sound levels at 1-hour intervals (in accordance with BS 4142) during each relevant assessment period (between 07:00-09:00 hrs and between 09:00-17:00 hrs).

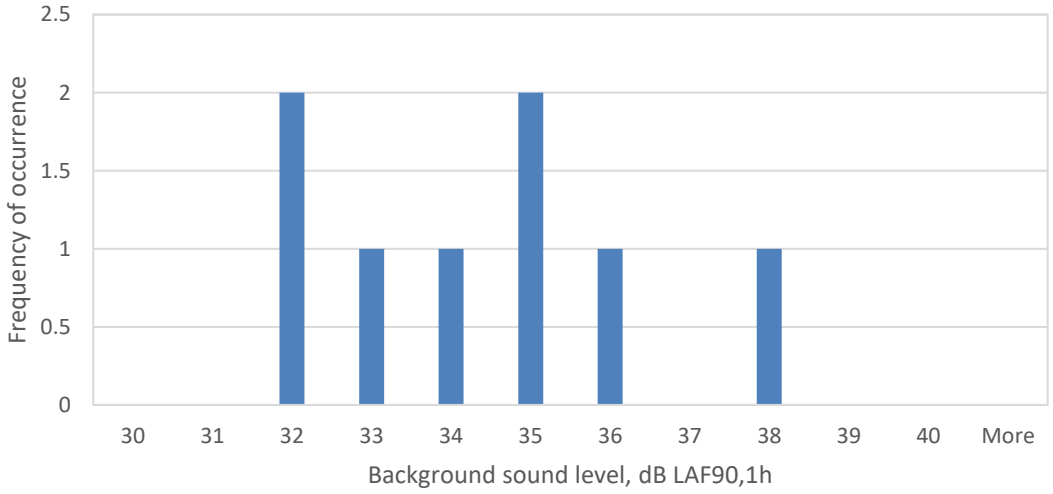

Figure 12 – Histogram of background sound levels at U1 between 07:00-09:00 hrs

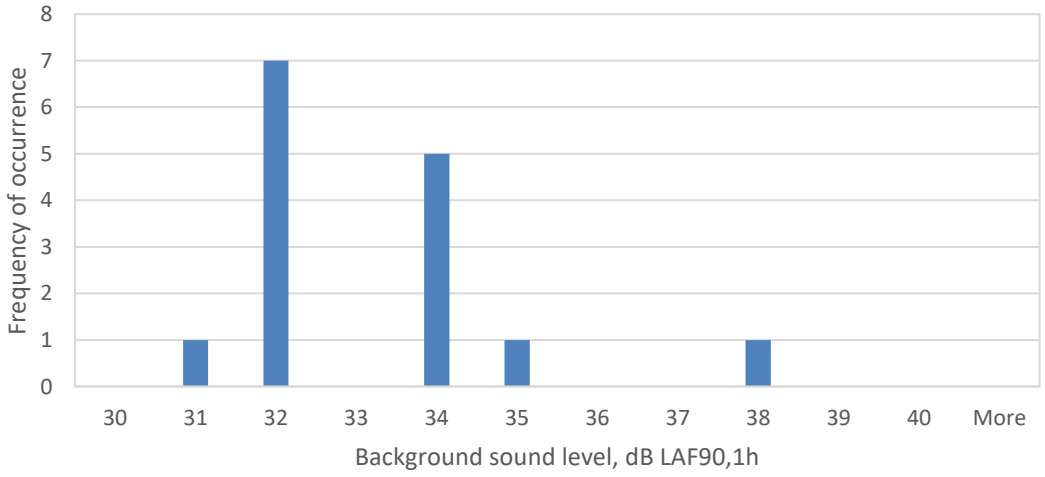

Figure 13 – Histogram of background sound levels at U1 between 09:00-17:00 hrs

Based on the histograms in Figure 12 and Figure 13, a representative background sound level of 32 dB $L_{AF90,1h}$ was identified. This is not only the modal value in both cases but only once was a lower background level measured during the entire survey.

In summary, the representative background sound levels for each receptor are:

Receptor	Representative background sound level, dB $L_{AF90,1h}$	
	07:00 – 09:00 hrs	09:00 – 17:00 hrs
R1 (Hilltop Outdoor Centre woodland area)	32	32
R2 (Hilltop Outdoor Centre accommodation)	40	43
R3 (residential property north of the woodland)	32	32
R4 (residential properties on Britons Lane)	43	43

Table 12 – Summary of representative background sound levels for assessment

Figure 14 – Aerial view of nearest (worst-case) receptor locations (© Google 2023)

7.3.2 Specific sound level

The specific sound level in this case would be the cumulative noise level generated by all site operations during a 1-hour reference time interval, in accordance with BS 4142.

Noise generated by on-site operational activity will mostly comprise:

A. General recycling activities (visitors depositing waste into the various bins)

B. Collection of full bin containers and deposit of empty bins (by HGV with a winch)

C. Waste compaction (compression of waste using the integrated compactors)

D. Timber compaction (compression of timber using the static roll packer)

There will be some noise from visitor vehicles within the site, but these will be moving at low speed and are expected to be relatively insignificant compared to other sources (including the operational activities described above and road traffic on the A148).

- Noise source input data (L_{Aeq} levels at 10m and appropriate on-times) for A was taken from previous measurements of similar activities at a similar recycling centre.
- Noise source input data for B and C were derived from the unattended measurements of servicing vehicles and integrated waste compactor bins summarised in Table 7.
- Noise source input data for D was taken from published noise data for the Bergmann RP7700 (68 dBA at 5 m distance). We understand from speaking to Bergmann that this was measured in the free field at approximately 1.5m above local ground height, during compaction of various types of timber with no other contributory noise sources.

The input data (measured at/corrected to 10 m distance) are summarised in Table 13, together with appropriate on-times and details of the number of sources included in the assessment (based on information provided by NCC and other previous assessments).

The assumptions regarding the amount of HGV and waste compaction activity during a typical 1-hour reference time interval are likely to be conservative, and so the assessment is likely to represent a worst-case in terms of typical operational activity.

Activity	**Quantity**	**L_{Aeq} at 10m**	**On-Time (min/hour)**
Moving full bin on/off lorry	3	75	15
Integrated waster compactor	3	52	5
Static roll packer	1	62	5
Filling household waste bin	2	57	45
Filling garden waste bin	2	53	30
Filling cardboard/paper bin	1	57	30
Filling aluminium waste bin	1	72	20
Filling scrap metal bin	1	72	20
Filling wood bin	1	76	20
Filling mixed appliances	1	72	15
Filling glass bin	1	68	15
Filling rubble bin	1	57	5
Filling plasterboard bin	1	76	5

Table 13 – Assumed input data for on-site operational activity noise

As discussed in Section 4.2.3, the intention is that most servicing vehicles (HGVs collecting bins) will attend between 07:00 – 09:00 hrs and not during the public hours. However, based on our analysis of the unattended monitoring data from the existing HWRC, it is possible that servicing vehicles may still be on site during the public hours.

In addition, it is possible that integrated waste compactors and the static roll packer will operate during the same 1-hour time interval (alongside other operational activities) but it is also possible that there will be periods when there is no compaction at all.

We have therefore predicted specific sound levels for the following scenarios:

- All sources during the same 1-hour time interval during public opening hours
- Waste deposits only during a 1-hour time interval during public opening hours
- Service vehicles only during a 1-hour time interval between 07:00-09:00 hrs

To predict average cumulative operational activity noise levels during each scenario, we created a 3D noise model using CadnaA software. The calculation methodology from ISO 9613-2 *'Attenuation of sound during propagation outdoors'* was adopted.

ISO 9613-2 provides a method for calculating downwind sound propagation outdoors and accounts for distance between the source and receiver, as well as atmospheric and ground absorption, acoustic screening, reflections, and meteorological conditions.

Table 14 below sets out the main configuration settings from our CadnaA model which define the correction factors applied according to the ISO 9613-2 calculation method.

Atmospheric absorption	Ambient temperature	10 °C
	Relative humidity	70 %
Ground effect	Default ground absorption	1.00 (soft ground)
	Areas of hardstanding	0.00 (hard ground)
Surface reflection and absorption	Freestanding barriers	Absorption coefficient: 0.05
	Buildings	Absorption coefficient: 0.00
	Number of reflections calculated	5

Table 14 – ISO 9613-2 correction configurations applied in the CadnaA model

ISO 9613-2 has a calculation tolerance of +/- 3 dB.

The predicted specific sound levels for each scenario/receptor are shown in Table 15.

Receptor	Predicted specific sound level during each scenario, dB $L_{Aeq,1h}$		
	1 - All Sources	2 - Deposits Only	3 - Service Vehicles
R1	30.6	28.4	26.7
R2	19.0	17.3	14.1
R3	26.7	24.6	22.6
R4	28.5	27.2	22.7

Table 15 – Summary of predicted specific sound levels for each assessment scenario

2D CadnaA noise prediction maps for each assessment scenario are presented below.

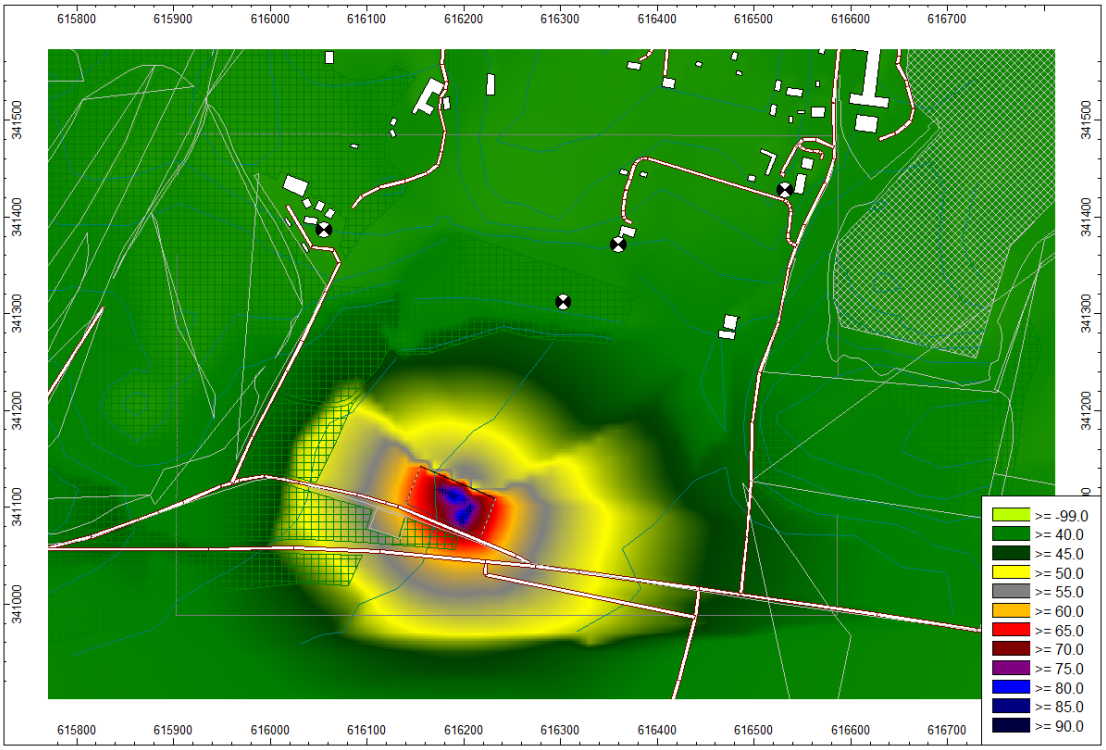

Figure 15 – 2D CadnaA noise prediction map for Scenario 1 (all sources)

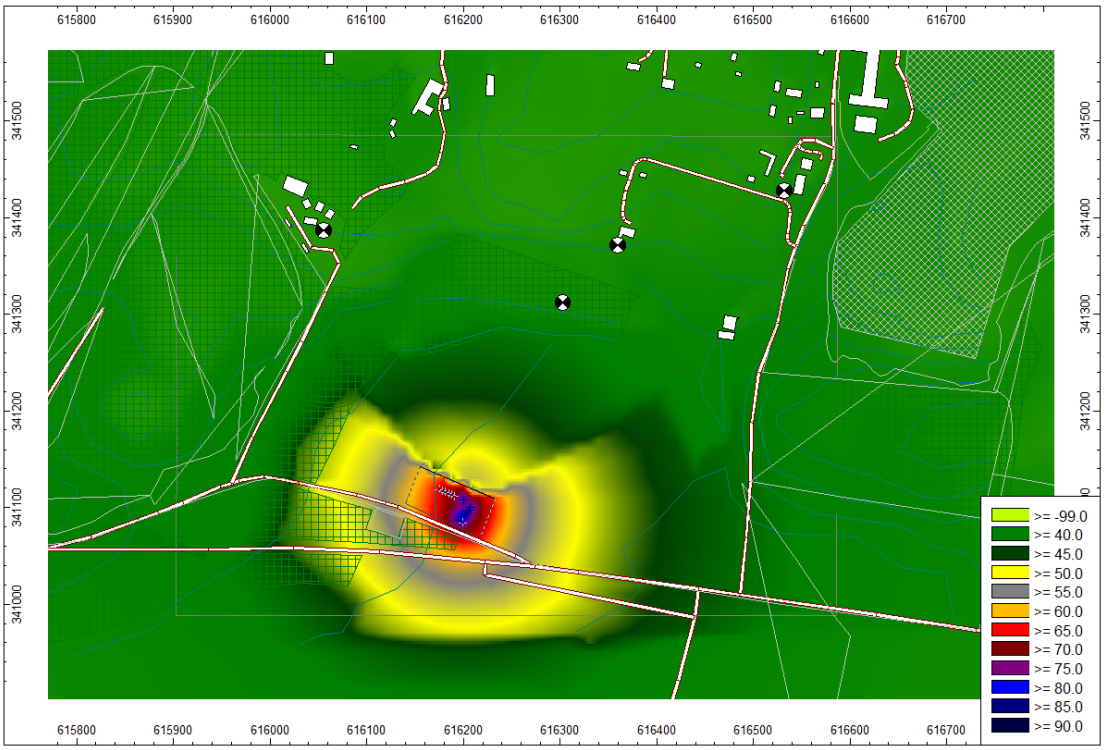

Figure 16 – 2D CadnaA noise prediction map for Scenario 2 (deposits only)

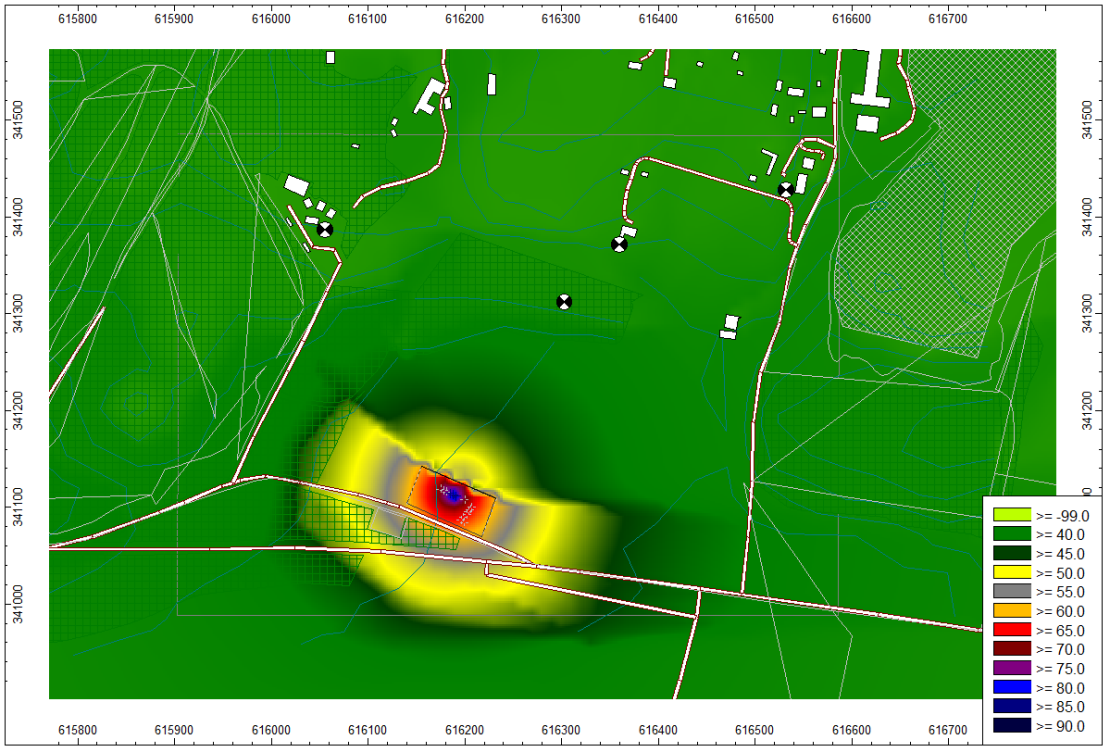

Figure 17 – 2D CadnaA noise prediction map for Scenario 3 (service vehicles only)

7.3.3 Rating level

Where potentially distinctive acoustic features are present a *"character correction"* should be added to the specific sound level to obtain the rating level. The correction depends on the extent to which the characteristics are audible at a given receptor.

Sound from operational activity at the HWRC exhibits tonal, impulsive, and intermittent characteristics (tonality would only be present when service vehicles are on the site).

However, the distinctiveness of these characteristics would normally be dictated by the extent to which they are audible. In this case predicted cumulative operational noise levels would not typically exceed the lowest background sound level at any receptor.

In our experience this makes it unlikely that any characteristics would be more than *"just perceptible"* as defined in BS 4142 and the following corrections therefore apply:

- *"Just perceptible"* tonality + 2 dB
- *"Just perceptible"* impulsivity + 3 dB
- *"Just perceptible"* intermittence + 0 dB (not a correction but shown for clarity)

7.3.4 Assessment of impacts

The impact of the specific sound can be estimated by subtracting the representative sound level from the rating level. Typically, the greater this difference, the greater the magnitude of impact (depending on context). The results of the BS 4142 assessment for the three operating scenarios are presented on this basis in the tables below.

Receptor	All sources (0900-17:00 hrs)			
	Specific sound level, dB $L_{Aeq,1h}$	Rating Level, dB $L_{Ar,1h}$	Background sound level, dB $L_{AF90,1h}$	Difference, +/- dB
R1	30.6	35.6*	32	3.6
R2	19.0	24.0*	43	-19.0
R3	26.7	31.7*	32	-0.3
R4	28.5	33.5*	43	-9.5

*includes +5 dB correction for just perceptible impulsivity and tonality

Table 16 – Summary of BS 4142 assessment results

Receptor	Waste deposits only (0900-17:00 hrs)			
	Specific sound level, dB $L_{Aeq,1h}$	Rating Level, dB $L_{Ar,1h}$	Background sound level, dB $L_{AF90,1h}$	Difference, +/- dB
R1	28.4	31.4*	32	-0.6
R2	17.3	20.3*	43	-22.7
R3	24.6	27.6*	32	-4.4
R4	27.2	30.2*	43	-12.8

*includes +3 dB correction for just perceptible impulsivity

Table 17 – Summary of BS 4142 assessment results

Receptor	Service vehicles (0900-17:00 hrs)			
	Specific sound level, dB $L_{Aeq,1h}$	Rating Level, dB $L_{Ar,1h}$	Background sound level, dB $L_{AF90,1h}$	Difference, +/- dB
R1	26.7	31.7*	32	-0.3
R2	14.1	19.1*	40	-20.9
R3	22.6	27.6*	32	-4.4
R4	22.7	27.7*	43	-15.3

*includes +5 dB correction for just perceptible impulsivity and tonality

Table 18 – Summary of BS 4142 assessment results

In accordance with BS 4142, the above indicates that a low impact is likely in but one case (because the predicted rating levels do not exceed the background sound level).

The only exception to this is during the worst-case *'all sources'* scenario at Receptor 1 (the Hilltop Outdoor Centre woodland area) where the predicted rating level exceeds the representative background sound level by 3.6 dB. However, this is still below the threshold above which BS 4142 states that adverse impacts may occur (+ 5 dB above background), and on this basis we would not expect an adverse impact to occur.

The above assessment is based on several conservative assumptions regarding the amount of HGV and waste deposit/compaction activity during a typical hour, so the assessment represents a likely worst-case in terms of typical operational activity. For most of the time noise emissions (and the resulting impact) are very likely to be lower.

Based on the above we expect the impact of on-site operational noise to be acceptable.

7.3.5 Mitigation

The BS 4142 assessment set out in Section 7.3.4 indicates that a low impact is likely.

On this basis, we do not believe that any additional mitigation is required to reduce or control the operational noise impact, beyond the measures which are already included:

- The site will not operate outside 07:00-17:00 hrs (16:00 hrs in the winter)
- The site will not be open to the public before 09:00 hrs or after 17:00 hrs.
- Servicing vehicles will, wherever possible, only attend between 07:00 hrs and 09:00 hrs. This will limit the potential impact of cumulative noise from the site.
- A 2.5 m high acoustic barrier fence will be installed along the entire north site boundary. This is a very effective form of mitigation and is the result of a design review process (our modelling indicates that extending the fence round to the other boundaries or increasing the height to 3 m would have a negligible effect).

Provided all these controls are implemented, we see no need for further mitigation.

The above can also be controlled using planning conditions, if considered necessary.

7.3.6 Uncertainty

BS 4142 recommends that any significant uncertainties are reported, potential effects highlighted and, where practicable, reasonable steps taken to reduce the effects.

The main area of potential uncertainty in relation to the measurements relates to the limited sample times of the attended background sound measurements. It is possible that background sound levels at other times could be higher/lower, but we believe that the sample times used provide a reasonable representation of typical sound levels.

The main area of potential uncertainty in relation to the calculations relates to the noise source input data derived from previous measurements of a similar waste recycling centre. However, there is no obvious reason that we are aware of why noise levels generated by comparable activities would be different from those previously measured.

8 CONCLUSIONS

- The prevailing noise environment in the vicinity of a proposed household waste recycling centre at Holt Road, East Beckham, Sheringham is predominantly characterised by road traffic noise (mainly from the A148 to the south). Other sources of ambient noise include noise from the existing HWRC on Holt Road, natural sounds (e.g. birdsong), sounds associated with Hilltop Outdoor Centre, and industrial noise on a field to the north of the site (unrelated to the HWRC).
- Construction noise associated with the proposed development was predicted and assessed in accordance with BS 5228-1, with no significant effects likely.
- Operational noise from associated off-site traffic was predicted and assessed in accordance with IEMA guidance, indicating a negligible impact.
- Operational noise from on-site operational activity was predicted and assessed in accordance with BS 4142, with the results generally indicating a low impact.
- Mitigation has been included in the proposals in the form of operational controls (operating hours and timing of servicing vehicles) and a 2.5 m acoustic fence. These mitigation measures are considered sufficient to ensure an acceptable impact and they can be controlled using suitable planning conditions, if needed.
- Considering the above, it is our view that the proposed development would comply with the requirements of NCC Policy DM 15 and therefore that there is no valid reason to withhold planning permission on the grounds of noise.

APPENDIX A RELEVANT TECHNICAL TERMS AND UNITS

Acoustic environment - Sound from all sources as modified by the environment

Ambient sound level, LA = $L_{Aeq,T}$ - Totally encompassing sound, usually composed of many sources. Comprises the residual sound and specific sound when present.

Background sound level, $L_{A90,T}$ - A weighted SPL exceeded by the residual sound for 90% of the a given time interval, T and rounded to the nearest whole dB.

Measurement time interval, T_m - Total time over which measurements are taken. May be the sum of multiple non-contiguous, short-term intervals

Rating level, $L_{Ar,Tr}$ - Specific sound level plus adjustment for characteristic features

Reference time interval, T_r - Specified interval over which the specific sound level is determined, i.e. 1h during the day (0700-2300) and 15mins at night (2300-0700).

Residual sound level, $L_r = L_{Aeq,T}$ - Ambient sound remaining when specific sound source does not contribute

Specific sound level, $L_s = L_{Aeq,Tr}$ - Level produced by specific sound source over reference time interval, Tr. Can also be calculated and/or predicted.

Sound Pressure Level (L_p or SPL) - This is a function of the source and its surroundings and is a measure in decibels of the total instantaneous sound pressure at a point in space. The SPL can vary both in time and in frequency. Different measurement parameters are therefore required to describe the time variation and frequency content of a given sound. These are described below.

Frequency - This refers to the number of complete pressure fluctuations or cycles that occur in one second. Frequency is measured in Hertz (Hz). The rumble of thunder has a low frequency, while a whistle has a high frequency. The sensitivity of the ear varies over the frequency range and is most sensitive between 1KHz and 5KHz.

Octave and One-Third Octave Bands - The human ear is sensitive to sound over a frequency range of approximately 20 Hz to 20,000 Hz and is more sensitive to medium and high frequencies than to low frequencies. To define the frequency content of a sound, the spectrum is divided into frequency bands, the most common of which are octave bands. Each band is referred to by its centre frequency, and the centre frequency of each band is twice that of the band below it. Where it is necessary for a more detailed analysis octave bands may be divided into one-third octave bands.

'**A' Weighting** - The sensitivity of the human ear varies with frequency, some frequencies sound louder than others. The 'A'-weighting curve represents the non-linear frequency response of the human ear and is incorporated in an electronic filter used in sound level meters. Measurements using an 'A'-weighting filter makes the meter more sensitive to the middle range of frequencies, which approximates to the response of the ear and the subjective loudness of the sound. Sound level measurements using 'A'-weighting will include the subscript A, e.g. dB(A).

Statistical Analysis - These figures are normally expressed as LN, where L is the sound pressure level in dB and N is the percentage of the measurement period. The LN figure represents the sound level that is exceeded for that percentage of the measurement period. L_{90} is commonly used to give an indication of the background level or the lowest level during the measurement period.

APPENDIX B MEASUREMENT SYSTEMS AND CALIBRATION

Job reference and title: 13497 – Sheringham Recycling Centre

Measurement location: See Section 5 of this report

Measurement date(s): Various dates between 25 October and 2 December 2022

Measuring equipment used:

Equipment description / serial number	Type number	Manufacturer	Date of calibration expiration	Calibration certificate number
Kit 1				
Precision sound level meter serial no. A2A-04410-D2	XL2	NTi Audio	08/10/2023	38894
Microphone serial no. A16324	MC230	NTi Audio	08/10/2023	38893
Microphone pre-amplifier serial no. 5309	MA220	Neutrik	08/10/2023	38894
Microphone calibrator serial no. 042951	GA607	Castle Group	08/10/2023	38892
Kit 3				
Precision sound level meter serial no. A2A-04410-D2	XL2	NTi Audio	08/10/2023	38894
Microphone serial no. A16324	MC230	NTi Audio	08/10/2023	38893
Microphone pre-amplifier serial no. 5309	MA220	Neutrik	08/10/2023	38894
Microphone calibrator serial no. 042951	GA607	Castle Group	08/10/2023	38892
Kit 7				
Precision sound level meter serial no. A2A-09025-E0	XL2-TA	NTi Audio	06/05/2023	37840
Microphone serial no. 8123	MC230	NTi Audio	06/05/2023	37839
Microphone pre-amplifier serial no. 5139	MA220	Neutrik	06/05/2023	37840
Microphone calibrator serial no. 2342835	4231	B&K	06/05/2023	37838

Calibration levels: Kit 1 - 93.7 dB @ 1 kHz

Kit 2 - 113.9 dB @ 1 kHz

Kit 3 - 114.0 dB @ 1 kHz

People in charge of measurements:	George Moore AMIOA
	Julez Redding AMIOA
Measurement parameters	1/3 Octave band and A-weighted $L_{eq,T}$
	1/3 Octave band and A-weighted L_{Fmax}
	1/3 Octave band and A-weighted $L_{F10,T}$
	1/3 Octave band and A-weighted $L_{F90,T}$

APPENDIX C UNATTENDED SOUND MONITORING DATA

Existing HWRC Unattended Monitoring Data

Date	Start Time	End Time	L_{AFmax}	L_{AFmin}	$L_{Aeq,T}$	L_{AF10}	L_{AF90}
dd:mm:yyyy	hh:mm:ss	hh:mm:ss	dB]	dB	dB	dB	dB
25/10/2022	11:04:56	11:15:00	74.8	44.6	57	59.6	49.7
25/10/2022	11:15:00	11:30:00	78.9	44.1	58.3	60.1	50.3
25/10/2022	11:30:00	11:45:00	81.1	41.2	58.1	59.9	50.6
25/10/2022	11:45:00	12:00:00	76.1	43.8	58.8	60.8	51.4
25/10/2022	12:00:00	12:15:00	79.2	42.8	58.4	60.3	48.8
25/10/2022	12:15:00	12:30:00	87	46.4	60.2	60.2	51.4
25/10/2022	12:30:00	12:45:00	81.1	44.6	58.6	60.2	51.3
25/10/2022	12:45:00	13:00:00	79	45.9	57.3	59.7	50.4
25/10/2022	13:00:00	13:15:00	70.1	44.4	57.3	60	49.6
25/10/2022	13:15:00	13:30:00	79.9	44.3	57.1	59.5	49.7
25/10/2022	13:30:00	13:45:00	81.5	41.5	58.5	60.5	50.2
25/10/2022	13:45:00	14:00:00	79.4	44	58	60	50.5
25/10/2022	14:00:00	14:15:00	78.5	42.1	58.7	60.6	50
25/10/2022	14:15:00	14:30:00	77.1	44.2	59	61.8	51.5
25/10/2022	14:30:00	14:45:00	89.7	47.3	61.5	62.4	54.6
25/10/2022	14:45:00	15:00:00	78.9	43	57.6	59.8	50.2
25/10/2022	15:00:00	15:15:00	74.9	46.4	58	60.2	52.4
25/10/2022	15:15:00	15:30:00	79.6	42	58.7	60.4	50.4
25/10/2022	15:30:00	15:45:00	75.1	44.8	59.8	62.2	52
25/10/2022	15:45:00	16:00:00	79.2	46.8	58.6	60.5	52.2
25/10/2022	16:00:00	16:15:00	73.1	47.1	58.3	60.6	53.7
25/10/2022	16:15:00	16:30:00	64.4	45.8	57.9	60.2	52.8
25/10/2022	16:30:00	16:45:00	63	48.4	57.8	60.3	53.1
25/10/2022	16:45:00	17:00:00	65.4	49.2	58	60.4	53.5
25/10/2022	17:00:00	17:15:00	74.7	51.5	59.4	61.1	54.6
25/10/2022	17:15:00	17:30:00	76.4	48.7	59.4	61.2	54.7
25/10/2022	17:30:00	17:45:00	69.2	46.5	58.7	61	53.6
25/10/2022	17:45:00	18:00:00	73.3	48.2	58	60.5	53.1
25/10/2022	18:00:00	18:15:00	65.8	40.8	56.8	59.7	50.7
25/10/2022	18:15:00	18:30:00	76.5	38.2	56.7	59.2	47.3
25/10/2022	18:30:00	18:45:00	64	40.4	55.5	58.7	47.5
25/10/2022	18:45:00	19:00:00	63.8	40.3	55.4	58.9	47.7
25/10/2022	19:00:00	19:15:00	66.5	33.9	55.7	59.4	43.8
25/10/2022	19:15:00	19:30:00	62.3	37.1	54.5	58.4	45.3
25/10/2022	19:30:00	19:45:00	63.9	34.8	53.9	57.9	42.8
25/10/2022	19:45:00	20:00:00	66.2	35.7	54.5	58.3	43.3
25/10/2022	20:00:00	20:15:00	68.7	34.1	53.7	57.6	40.7
25/10/2022	20:15:00	20:30:00	63.4	31.2	52.8	57.3	36.8

Date	Start Time	End Time	L_{AFmax}	L_{AFmin}	$L_{Aeq,T}$	L_{AF10}	L_{AF90}
25/10/2022	20:30:00	20:45:00	62	35.3	52.8	57.1	41.5
25/10/2022	20:45:00	21:00:00	66.2	34.8	52.9	57.2	39.3
25/10/2022	21:00:00	21:15:00	75.6	35.5	56.6	58.3	40.9
25/10/2022	21:15:00	21:30:00	64.9	33.5	53.9	58.1	38.7
25/10/2022	21:30:00	21:45:00	63.4	35	53	57.3	41.2
25/10/2022	21:45:00	22:00:00	66.3	33.5	53.9	58.1	37.2
25/10/2022	22:00:00	22:15:00	66.4	35.1	52.3	56.8	36.9
25/10/2022	22:15:00	22:30:00	65.3	35.8	53.8	58.1	40.8
25/10/2022	22:30:00	22:45:00	64.3	37.7	52.6	57.2	39.7
25/10/2022	22:45:00	23:00:00	61.8	35.9	50.4	55.4	38
25/10/2022	23:00:00	23:15:00	62.9	31.6	47.7	51.5	33.8
25/10/2022	23:15:00	23:30:00	61.8	35.2	48.1	51.9	37.4
25/10/2022	23:30:00	23:45:00	64.2	37.5	49.4	53.7	39.1
25/10/2022	23:45:00	00:00:00	59.1	35.1	43.8	46.7	36.5
26/10/2022	00:00:00	00:15:00	67.1	35.1	47.2	49.9	36.4
26/10/2022	00:15:00	00:30:00	63.3	35.5	46.3	48.7	37.1
26/10/2022	00:30:00	00:45:00	61.1	35	42.7	43.6	36
26/10/2022	00:45:00	01:00:00	58.9	36.3	42.7	42.4	37.6
26/10/2022	01:00:00	01:15:00	57.2	36.1	41.3	41.8	37.9
26/10/2022	01:15:00	01:30:00	59.4	36.3	43	42.4	37.9
26/10/2022	01:30:00	01:45:00	59.4	37.7	43.5	44.3	39.5
26/10/2022	01:45:00	02:00:00	64.7	35	44.4	46.2	36.6
26/10/2022	02:00:00	02:15:00	60.8	33.8	42.4	40.8	35.1
26/10/2022	02:15:00	02:30:00	46.5	33.7	36.5	37.8	34.7
26/10/2022	02:30:00	02:45:00	58.7	33.6	42.2	40.7	35.1
26/10/2022	02:45:00	03:00:00	51.4	35.2	39.3	40.8	36.7
26/10/2022	03:00:00	03:15:00	64.9	35.7	44.7	42	37.3
26/10/2022	03:15:00	03:30:00	64.9	36.8	44	44.7	38.8
26/10/2022	03:30:00	03:45:00	60.9	37.9	44.7	46	40.4
26/10/2022	03:45:00	04:00:00	59	40.4	45.3	46.8	42.1
26/10/2022	04:00:00	04:15:00	64.2	40.7	48.1	49.9	42.5
26/10/2022	04:15:00	04:30:00	65	40	49	51.8	42.2
26/10/2022	04:30:00	04:45:00	62.4	39	46	47.4	40.7
26/10/2022	04:45:00	05:00:00	66.8	37.9	51.3	55.9	40.6
26/10/2022	05:00:00	05:15:00	67.4	39.7	50.2	53.3	42.5
26/10/2022	05:15:00	05:30:00	69.8	40.2	50.9	54.2	43.3
26/10/2022	05:30:00	05:45:00	71.7	40.4	51	54.9	43.1
26/10/2022	05:45:00	06:00:00	64.9	41.1	53.6	57.9	43.9
26/10/2022	06:00:00	06:15:00	68.1	40.1	54.1	58.2	43.1
26/10/2022	06:15:00	06:30:00	66	40.4	54.4	58.9	43.3
26/10/2022	06:30:00	06:45:00	67.8	40.7	55.9	59.8	45
26/10/2022	06:45:00	07:00:00	68.3	42.6	56.8	60.2	48
26/10/2022	07:00:00	07:15:00	65.6	44.4	56.2	59.7	49

Date	Start Time	End Time	L_{AFmax}	L_{AFmin}	$L_{Aeq,T}$	L_{AF10}	L_{AF90}
26/10/2022	07:15:00	07:30:00	72.9	45.5	57.8	60.5	49.9
26/10/2022	07:30:00	07:45:00	79.8	47.3	59.4	61.2	52.7
26/10/2022	07:45:00	08:00:00	70.6	46.5	57.9	60.8	50.3
26/10/2022	08:00:00	08:15:00	66.4	46.9	57.7	60.8	51.2
26/10/2022	08:15:00	08:30:00	71.8	49.1	58.9	61.5	53.9
26/10/2022	08:30:00	08:45:00	73.2	47.1	58.6	61.4	51.7
26/10/2022	08:45:00	09:00:00	83	46	58.5	61	51.9
26/10/2022	09:00:00	09:15:00	87.3	47.6	59.9	61.2	52.5
26/10/2022	09:15:00	09:30:00	85.8	45.8	59	60.8	51.7
26/10/2022	09:30:00	09:45:00	87.8	46.9	65.6	64.8	53.1
26/10/2022	09:45:00	10:00:00	81.6	47.1	59.6	61.3	52.7
26/10/2022	10:00:00	10:15:00	77.9	47.3	58.3	60.6	52.3
26/10/2022	10:15:00	10:30:00	75.2	48.9	58.8	61	53.9
26/10/2022	10:30:00	10:45:00	74.1	49.6	59.3	61.3	54.8
26/10/2022	10:45:00	11:00:00	79.7	50.4	59.9	61.5	55.6
26/10/2022	11:00:00	11:15:00	77.1	51	59.7	61.7	55.4
26/10/2022	11:15:00	11:30:00	90	54.3	71.1	72	58.6
26/10/2022	11:30:00	11:45:00	75	50.4	59.5	61.7	55.4
26/10/2022	11:45:00	12:00:00	75.7	51	59.7	61.5	55.3
26/10/2022	12:00:00	12:15:00	75.1	49.1	58.9	60.8	52.6
26/10/2022	12:15:00	12:30:00	74.2	50.4	59.7	61.9	55.5
26/10/2022	12:30:00	12:45:00	79	51.7	60.7	62.7	55.8
26/10/2022	12:45:00	13:00:00	79.1	48.6	62.5	65.4	55.1
26/10/2022	13:00:00	13:15:00	76.5	50.4	59.1	61.4	54.5
26/10/2022	13:15:00	13:30:00	76.8	49.5	59.4	61.6	54.3
26/10/2022	13:30:00	13:45:00	75.4	48.5	59.3	61.3	53.9
26/10/2022	13:45:00	14:00:00	80.3	48.5	58.7	60.9	52.5
26/10/2022	14:00:00	14:15:00	78.7	52.9	61.4	63.7	56.4
26/10/2022	14:15:00	14:30:00	73.5	49.3	59.7	62.4	54
26/10/2022	14:30:00	14:45:00	74.9	48.8	58.9	61.1	53.7
26/10/2022	14:45:00	15:00:00	81.8	49.7	59.8	61.2	54.3
26/10/2022	15:00:00	15:15:00	81.8	49.7	59	60.8	53.7
26/10/2022	15:15:00	15:30:00	92.1	50.9	62.7	61.1	54.5
26/10/2022	15:30:00	15:45:00	75.8	48.1	57.7	60.1	52.3
26/10/2022	15:45:00	16:00:00	83.8	49.4	62.1	61.3	54.2
26/10/2022	16:00:00	16:15:00	70.4	49.3	58.3	60.8	53.3
26/10/2022	16:15:00	16:30:00	68.4	46.7	58.1	60.3	53.1
26/10/2022	16:30:00	16:45:00	77.8	46.7	58.9	60.6	52.1
26/10/2022	16:45:00	17:00:00	82.6	47.2	59.7	60.3	52.8
26/10/2022	17:00:00	17:15:00	65.8	45.3	57.1	59.9	51.6
26/10/2022	17:15:00	17:30:00	69.3	44	57.9	60.5	51.6
26/10/2022	17:30:00	17:45:00	74.7	47.1	57.1	59.5	51
26/10/2022	17:45:00	18:00:00	67.1	43.7	57.1	60	50.5

Date	Start Time	End Time	L_{AFmax}	L_{AFmin}	$L_{Aeq,T}$	L_{AF10}	L_{AF90}
26/10/2022	18:00:00	18:15:00	67	44	55.7	59.1	47.4
26/10/2022	18:15:00	18:30:00	65.2	45.4	55.8	59.2	48.9
26/10/2022	18:30:00	18:45:00	69.1	43.6	55.7	58.9	48
26/10/2022	18:45:00	19:00:00	64.2	39.6	54.2	58	44.1
26/10/2022	19:00:00	19:15:00	64.9	41.5	54.3	58	44.9
26/10/2022	19:15:00	19:30:00	67.2	40.4	53.8	58	44
26/10/2022	19:30:00	19:45:00	65.4	38.3	52.8	57	43.9
26/10/2022	19:45:00	20:00:00	65.9	39	51.7	56.2	42.1
26/10/2022	20:00:00	20:15:00	64.4	41.3	53.1	57.3	44.1
26/10/2022	20:15:00	20:30:00	67.1	41.6	52.9	57.1	45.3
26/10/2022	20:30:00	20:45:00	70.7	39.9	52.1	56.3	43.1
26/10/2022	20:45:00	21:00:00	67.2	40.8	52.9	57.2	43.3
26/10/2022	21:00:00	21:15:00	63.1	40.8	52.5	56.6	44.1
26/10/2022	21:15:00	21:30:00	61	41	50.6	54.5	43.3
26/10/2022	21:30:00	21:45:00	64.5	41	52.4	56.5	43.8
26/10/2022	21:45:00	22:00:00	61.7	42	51.2	55.3	44.9
26/10/2022	22:00:00	22:15:00	63.4	42.3	51.8	55.6	44.8
26/10/2022	22:15:00	22:30:00	64.3	41.9	51.7	55.7	44
26/10/2022	22:30:00	22:45:00	67.2	40	49.5	52	41.8
26/10/2022	22:45:00	23:00:00	68.4	39.5	51	54.2	41.4
26/10/2022	23:00:00	23:15:00	67	37.1	49.7	52.7	39.7
26/10/2022	23:15:00	23:30:00	67.4	35.6	48.7	51.4	38.5
26/10/2022	23:30:00	23:45:00	64.3	37	48.4	51.9	38.6
26/10/2022	23:45:00	00:00:00	66.6	32.5	49	51.9	35.1
27/10/2022	00:00:00	00:15:00	58.5	30	37.8	34.7	31.5
27/10/2022	00:15:00	00:30:00	60.4	31.9	44.3	47.3	34.1
27/10/2022	00:30:00	00:45:00	61.2	33.1	43	45.6	34.2
27/10/2022	00:45:00	01:00:00	57.4	32.4	40.1	39.4	33.7
27/10/2022	01:00:00	01:15:00	61.2	30.9	42.2	42.6	32.6
27/10/2022	01:15:00	01:30:00	58.8	31.3	40.9	39.6	32.8
27/10/2022	01:30:00	01:45:00	56.6	31.1	37.5	36.6	32.9
27/10/2022	01:45:00	02:00:00	63.6	29.4	42.4	39.3	30.4
27/10/2022	02:00:00	02:15:00	64.4	29.1	42.9	38.5	30
27/10/2022	02:15:00	02:30:00	61.9	31	40	34.7	31.9
27/10/2022	02:30:00	02:45:00	62.9	29	42.8	42.7	30.1
27/10/2022	02:45:00	03:00:00	61.3	29.4	42	42.2	30
27/10/2022	03:00:00	03:15:00	61.7	28.8	36.8	31	29.4
27/10/2022	03:15:00	03:30:00	60.3	29.1	38.3	32.4	29.9
27/10/2022	03:30:00	03:45:00	55.4	29.5	38.5	40.3	30.3
27/10/2022	03:45:00	04:00:00	61.8	31.8	43.2	44.5	32.9
27/10/2022	04:00:00	04:15:00	62.4	31.7	46.9	50.5	32.6
27/10/2022	04:15:00	04:30:00	64.6	29.1	46.3	49.3	30
27/10/2022	04:30:00	04:45:00	65.4	29.7	45.7	47.4	30.4

Date	Start Time	End Time	L_{AFmax}	L_{AFmin}	$L_{Aeq,T}$	L_{AF10}	L_{AF90}
27/10/2022	04:45:00	05:00:00	64.5	32.7	48.8	53.2	33.7
27/10/2022	05:00:00	05:15:00	66.5	32	48.1	51.9	33.8
27/10/2022	05:15:00	05:30:00	68.5	32.8	51.8	55.8	34.7
27/10/2022	05:30:00	05:45:00	62.4	33.2	48.8	53.1	35.1
27/10/2022	05:45:00	06:00:00	63.9	33.9	51.3	55.6	37.7
27/10/2022	06:00:00	06:15:00	63.2	33	51.5	55.6	37.9
27/10/2022	06:15:00	06:30:00	67	33.4	54.1	58.5	36.3
27/10/2022	06:30:00	06:45:00	65.7	40.8	55.8	59.6	46.4
27/10/2022	06:45:00	07:00:00	69.1	39.1	55.8	59.5	47
27/10/2022	07:00:00	07:15:00	65.6	42.6	55.8	59	48.1
27/10/2022	07:15:00	07:30:00	67.8	42.6	56.7	59.9	50
27/10/2022	07:30:00	07:45:00	78.7	42.6	58.3	60.5	50.9
27/10/2022	07:45:00	08:00:00	67.1	45.7	57.6	60.5	51.2
27/10/2022	08:00:00	08:15:00	77	47.1	57.4	60.2	51.1
27/10/2022	08:15:00	08:30:00	76	48.7	59.5	61.8	53.5
27/10/2022	08:30:00	08:45:00	68.3	48.2	59.1	61.7	54.6
27/10/2022	08:45:00	09:00:00	73.1	47.6	59.2	61.5	54.5
27/10/2022	09:00:00	09:15:00	74.7	49	59.8	62.1	55.2
27/10/2022	09:15:00	09:30:00	71.6	45.4	59.2	62.2	53
27/10/2022	09:30:00	09:45:00	87.9	52.7	64	66.7	57.2
27/10/2022	09:45:00	10:00:00	78.6	49.8	61.3	63.4	55.5
27/10/2022	10:00:00	10:15:00	75.9	48.5	59.5	61.6	54.6
27/10/2022	10:15:00	10:30:00	72.6	50.6	59.9	62.2	55.5
27/10/2022	10:30:00	10:45:00	82.5	50.4	60.4	62.1	55.8
27/10/2022	10:45:00	11:00:00	87.9	57.3	65.3	67.8	61
27/10/2022	11:00:00	11:15:00	76.7	53.4	61.5	63.4	57.7
27/10/2022	11:15:00	11:30:00	70.8	45.5	60.2	62.5	54.7
27/10/2022	11:30:00	11:45:00	82	49.4	61.2	62.9	55.6
27/10/2022	11:45:00	12:00:00	84.9	51.7	62.2	63.8	57.7
27/10/2022	12:00:00	12:15:00	77.2	49.9	61.4	63.5	56.9
27/10/2022	12:15:00	12:30:00	77	50.4	61.2	63.4	56.5
27/10/2022	12:30:00	12:45:00	87.9	50.3	62	63.3	55.4
27/10/2022	12:45:00	13:00:00	82.4	47.5	60.5	62.3	54
27/10/2022	13:00:00	13:15:00	75.2	49	59	61.6	53.9
27/10/2022	13:15:00	13:30:00	72.5	47.7	58.4	61.2	51.9
27/10/2022	13:30:00	13:45:00	78.2	48.8	59.1	61	54.2
27/10/2022	13:45:00	14:00:00	82.5	48.5	59.1	61	52.7
27/10/2022	14:00:00	14:15:00	79.4	48.8	59.2	61.1	53.3
27/10/2022	14:15:00	14:30:00	72.9	50	58.6	61	53.5
27/10/2022	14:30:00	14:45:00	86.7	46.6	61	61.5	54.6
27/10/2022	14:45:00	15:00:00	73.1	49.1	58.4	60.8	53
27/10/2022	15:00:00	15:15:00	73.8	47.4	57.6	60.2	52.3
27/10/2022	15:15:00	15:30:00	83.2	47	58.4	60.6	52.1

Date	Start Time	End Time	L_{AFmax}	L_{AFmin}	$L_{Aeq,T}$	L_{AF10}	L_{AF90}
27/10/2022	15:30:00	15:45:00	83.3	47.8	58.6	60.4	53.1
27/10/2022	15:45:00	16:00:00	83.3	44.7	61	62.2	52
27/10/2022	16:00:00	16:15:00	80	48.6	58.8	60.9	54.2
27/10/2022	16:15:00	16:30:00	75.2	46	58.2	60.5	52.5
27/10/2022	16:30:00	16:45:00	69.6	45.7	57.4	60.3	51.3
27/10/2022	16:45:00	17:00:00	71.2	46.3	57.9	60.5	52
27/10/2022	17:00:00	17:15:00	66.1	46.3	57.9	60.5	52.2
27/10/2022	17:15:00	17:30:00	64.8	47.4	58.2	60.7	53.4
27/10/2022	17:30:00	17:45:00	63.9	44.5	57.6	60.5	51.3
27/10/2022	17:45:00	18:00:00	70.6	42.3	57.8	60.5	51
27/10/2022	18:00:00	18:15:00	65	42.9	56.5	59.6	49.8
27/10/2022	18:15:00	18:30:00	65.4	41.7	55.6	59.2	47.8
27/10/2022	18:30:00	18:45:00	66.4	39.2	56.3	59.3	49.3
27/10/2022	18:45:00	19:00:00	63.1	42.7	55.6	59.1	48.9
27/10/2022	19:00:00	19:15:00	64.2	38.7	55	58.6	45.4
27/10/2022	19:15:00	19:30:00	66.5	37.5	55.1	58.4	46.4
27/10/2022	19:30:00	19:45:00	66.2	33.6	52.8	57.1	38
27/10/2022	19:45:00	20:00:00	62.5	35.6	52.6	56.9	42.7
27/10/2022	20:00:00	20:15:00	72.4	36	54.7	58.2	41.4
27/10/2022	20:15:00	20:30:00	65	36.6	53	57.5	39.9
27/10/2022	20:30:00	20:45:00	74.8	38.6	54.7	57.8	41.3
27/10/2022	20:45:00	21:00:00	62.3	36.9	50.5	55.1	38.7
27/10/2022	21:00:00	21:15:00	62.8	37.7	51.6	56.3	40.5
27/10/2022	21:15:00	21:30:00	64.4	38	52	56.4	40.5
27/10/2022	21:30:00	21:45:00	64.6	34.6	53	57.5	38.8
27/10/2022	21:45:00	22:00:00	63.8	35.7	51.8	56.2	39.2
27/10/2022	22:00:00	22:15:00	62.3	33.8	50.9	55.4	36.7
27/10/2022	22:15:00	22:30:00	64.7	34.8	50.9	55.5	37
27/10/2022	22:30:00	22:45:00	64.6	33.7	50.6	55	35.8
27/10/2022	22:45:00	23:00:00	61.8	33.1	49.7	54.3	34.8
27/10/2022	23:00:00	23:15:00	66.3	32.3	47.9	52.4	33.7
27/10/2022	23:15:00	23:30:00	62.3	32.1	48.7	53	33.2
27/10/2022	23:30:00	23:45:00	61.5	31.4	46.8	51.3	32.1
27/10/2022	23:45:00	00:00:00	67.2	32.2	47.6	51.5	33.1
28/10/2022	00:00:00	00:15:00	70.9	32.5	52.7	55.5	33.3
28/10/2022	00:15:00	00:30:00	72.1	33.5	49.3	52	34.5
28/10/2022	00:30:00	00:45:00	63.3	33.3	45.8	50	34.3
28/10/2022	00:45:00	01:00:00	70.7	32.9	48.7	48.4	33.8
28/10/2022	01:00:00	01:15:00	58.5	32.1	40.7	39.5	32.7
28/10/2022	01:15:00	01:30:00	61.7	32.5	41.3	38.3	33.3
28/10/2022	01:30:00	01:45:00	45.4	32.2	34	34.7	33
28/10/2022	01:45:00	02:00:00	63.6	32.5	41.3	35	33.4
28/10/2022	02:00:00	02:15:00	60.2	31.9	40.9	39.2	32.6

Date	Start Time	End Time	L_{AFmax}	L_{AFmin}	$L_{Aeq,T}$	L_{AF10}	L_{AF90}
28/10/2022	02:15:00	02:30:00	43.9	32	33.4	33.9	32.6
28/10/2022	02:30:00	02:45:00	41.6	31.7	33.2	34	32.5
28/10/2022	02:45:00	03:00:00	63.8	32.1	45.5	45.1	33
28/10/2022	03:00:00	03:15:00	61.3	31.6	41	41.2	32.6
28/10/2022	03:15:00	03:30:00	49.1	30.9	32.4	32.5	31.6
28/10/2022	03:30:00	03:45:00	62.5	31.7	42	37.7	32.3
28/10/2022	03:45:00	04:00:00	61.5	32	42.4	42.9	33.1
28/10/2022	04:00:00	04:15:00	64.5	31.8	46.4	49.3	32.7
28/10/2022	04:15:00	04:30:00	60	31.1	41	42.1	31.7
28/10/2022	04:30:00	04:45:00	62.8	31.6	44.7	46.9	32.7
28/10/2022	04:45:00	05:00:00	66.7	33.4	50.1	54.1	34.8
28/10/2022	05:00:00	05:15:00	64.6	33.9	48.2	52.4	35.2
28/10/2022	05:15:00	05:30:00	68.3	33.9	51.3	55.4	35.3
28/10/2022	05:30:00	05:45:00	68.9	33	50.6	54.6	34.5
28/10/2022	05:45:00	06:00:00	70.6	34.1	54	57.9	38.4
28/10/2022	06:00:00	06:15:00	63.7	33.2	51.8	56.5	34.6
28/10/2022	06:15:00	06:30:00	68	35.1	54.4	58.3	41.2
28/10/2022	06:30:00	06:45:00	72.6	40.6	56.4	59.9	46.5
28/10/2022	06:45:00	07:00:00	65	40.3	56.9	60.4	47.7
28/10/2022	07:00:00	07:15:00	66.8	42.5	56.3	59.7	48.2
28/10/2022	07:15:00	07:30:00	67.7	44.7	57.4	60.4	51.1
28/10/2022	07:30:00	07:45:00	77.9	43.7	59	61.7	49.5
28/10/2022	07:45:00	08:00:00	79.7	45.9	58.7	61.4	51.2
28/10/2022	08:00:00	08:15:00	83.3	42.1	60.7	61.8	50.6
28/10/2022	08:15:00	08:30:00	69	45.2	59	61.7	53.4
28/10/2022	08:30:00	08:45:00	68.4	44.2	59.1	61.7	53.4
28/10/2022	08:45:00	09:00:00	83.6	48.3	64.9	66.6	55.7
28/10/2022	09:00:00	09:15:00	69.4	48.7	58.8	61.3	53.9
28/10/2022	09:15:00	09:30:00	79.7	50.9	60.9	62.8	56.4
28/10/2022	09:30:00	09:45:00	84.4	50.2	61.8	63.3	56.8
28/10/2022	09:45:00	10:00:00	79.2	46.8	61.1	63.1	55.2
28/10/2022	10:00:00	10:15:00	77.9	53.1	62.8	65.1	57.8
28/10/2022	10:15:00	10:30:00	83.6	51.5	63.8	64.5	55.8
28/10/2022	10:30:00	10:45:00	79.4	47.7	60.3	62.2	54.9
28/10/2022	10:45:00	11:00:00	87.7	48.7	62.4	62.6	54.4
28/10/2022	11:00:00	11:15:00	74.7	47.3	58.7	61.2	52.4
28/10/2022	11:15:00	11:30:00	72.9	47.6	58.6	60.9	53.4
28/10/2022	11:30:00	11:45:00	89.5	48.1	60.2	61	53.7
28/10/2022	11:45:00	12:00:00	86.1	48.7	59.3	60.4	53.1
28/10/2022	12:00:00	12:15:00	77.6	50.4	59.4	61.1	54.3
28/10/2022	12:15:00	12:30:00	81.7	48.7	59.3	60.6	53.7
28/10/2022	12:30:00	12:45:00	83.4	48.3	61.5	65.9	54.8
28/10/2022	12:45:00	13:00:00	81.4	51.6	62.7	66.5	56.3

Date	Start Time	End Time	L_{AFmax}	L_{AFmin}	$L_{Aeq,T}$	L_{AF10}	L_{AF90}
28/10/2022	13:00:00	13:15:00	73	46.6	57.6	59.9	51.3
28/10/2022	13:15:00	13:30:00	66.2	48.3	57.6	59.9	52.9
28/10/2022	13:30:00	13:45:00	83.8	45.1	62	60.2	51.1
28/10/2022	13:45:00	14:00:00	76.9	48.7	58.4	60.5	53.7
28/10/2022	14:00:00	14:15:00	72.4	46.1	57.9	60.3	52.4
28/10/2022	14:15:00	14:30:00	74.9	47	58.4	60.7	53.4
28/10/2022	14:30:00	14:45:00	89.3	48.6	59.2	60.1	52.6
28/10/2022	14:45:00	15:00:00	77.1	46.2	58.6	60.6	52.3
28/10/2022	15:00:00	15:15:00	78	45	57.7	60.1	51.7
28/10/2022	15:15:00	15:30:00	87.7	46	59.7	60.1	52.3
28/10/2022	15:30:00	15:45:00	79.5	45.2	58	60.2	52.4
28/10/2022	15:45:00	16:00:00	77.2	41.5	58.7	60.6	52.4
28/10/2022	16:00:00	16:15:00	75.8	46.9	58.6	60.5	52.7
28/10/2022	16:15:00	16:30:00	63.8	39.7	56.9	59.6	49.6
28/10/2022	16:30:00	16:45:00	63.2	43.5	57.3	59.7	51.7
28/10/2022	16:45:00	17:00:00	67.3	41.4	56.9	59.9	49.4
28/10/2022	17:00:00	17:15:00	74.1	41.6	57.9	60.4	48.9
28/10/2022	17:15:00	17:30:00	68.4	40.1	57.7	60.5	50.9
28/10/2022	17:30:00	17:45:00	72.7	46.8	57.5	60.5	51.2
28/10/2022	17:45:00	18:00:00	67.6	43.7	57.2	59.9	50.9
28/10/2022	18:00:00	18:15:00	63.4	39.5	56.2	59.5	47.7
28/10/2022	18:15:00	18:30:00	62.6	40.5	55.5	58.8	47.5
28/10/2022	18:30:00	18:45:00	64.9	39.7	55.5	59.1	47.3
28/10/2022	18:45:00	19:00:00	64.7	42	55.6	59.1	47.6
28/10/2022	19:00:00	19:15:00	65.8	36	54	58.2	42
28/10/2022	19:15:00	19:30:00	63.9	36.4	54.1	58	42.4
28/10/2022	19:30:00	19:45:00	63.3	36.3	53.9	58.4	41.6
28/10/2022	19:45:00	20:00:00	63.5	32.5	52.3	57.1	37.8
28/10/2022	20:00:00	20:15:00	63.6	33.7	51.7	56.3	38
28/10/2022	20:15:00	20:30:00	62.9	36.3	52.5	56.8	41.6
28/10/2022	20:30:00	20:45:00	62.3	35.2	51.6	56.5	39
28/10/2022	20:45:00	21:00:00	66.6	32.7	51.5	56.1	36.3
28/10/2022	21:00:00	21:15:00	61.3	34.4	50.8	55.8	37.6
28/10/2022	21:15:00	21:30:00	62.1	34.3	50.4	55.4	37.8
28/10/2022	21:30:00	21:45:00	60.8	33.7	50.7	55.9	37
28/10/2022	21:45:00	22:00:00	66.3	33.3	51.2	56.1	36.7
28/10/2022	22:00:00	22:15:00	66.7	32	51	55.8	35.5
28/10/2022	22:15:00	22:30:00	65.2	32.1	51.4	55.9	36.2
28/10/2022	22:30:00	22:45:00	66.8	31.8	51.3	56.1	34.8
28/10/2022	22:45:00	23:00:00	65.1	32.9	50.4	55.4	36.3
28/10/2022	23:00:00	23:15:00	65.6	31	48.9	53	33
28/10/2022	23:15:00	23:30:00	62	31.5	49.1	53.9	35.4
28/10/2022	23:30:00	23:45:00	63.9	31.6	48.4	53.2	32.5

Date	Start Time	End Time	L_{AFmax}	L_{AFmin}	$L_{Aeq,T}$	L_{AF10}	L_{AF90}
28/10/2022	23:45:00	00:00:00	65.5	31.4	49.3	54.1	32.7
29/10/2022	00:00:00	00:15:00	61.6	31.2	47.3	50.8	32.1
29/10/2022	00:15:00	00:30:00	61.7	31.2	45.9	49.2	32.4
29/10/2022	00:30:00	00:45:00	64.7	31.1	42.9	45.6	31.8
29/10/2022	00:45:00	01:00:00	63.2	31.1	43.6	45	31.6
29/10/2022	01:00:00	01:15:00	65.2	31	45.6	47.6	31.7
29/10/2022	01:15:00	01:30:00	67.4	31.1	44.1	43.9	31.6
29/10/2022	01:30:00	01:45:00	61.6	31	42.1	43.1	31.5
29/10/2022	01:45:00	02:00:00	62.5	30.7	39.3	36.5	31.5
29/10/2022	02:00:00	02:15:00	60.4	30.9	39	34.5	31.3
29/10/2022	02:15:00	02:30:00	63.8	30.9	45.2	47.7	31.5
29/10/2022	02:30:00	02:45:00	62.3	30.9	40.2	37.4	31.4
29/10/2022	02:45:00	03:00:00	44.9	30.8	32	32.6	31.3
29/10/2022	03:00:00	03:15:00	63	31	44.4	47.5	31.5
29/10/2022	03:15:00	03:30:00	57.2	31	37.5	36.8	31.6
29/10/2022	03:30:00	03:45:00	56	31.1	38.5	40	31.5
29/10/2022	03:45:00	04:00:00	59.7	31.1	43.7	47.4	31.6
29/10/2022	04:00:00	04:15:00	61.9	30.9	44.6	48	31.5
29/10/2022	04:15:00	04:30:00	62.5	31.2	45.3	49.4	31.7
29/10/2022	04:30:00	04:45:00	64.2	31.3	43.9	45.7	31.8
29/10/2022	04:45:00	05:00:00	63.9	31	47.5	52	31.8
29/10/2022	05:00:00	05:15:00	62.8	31.2	47.7	52.1	32.3
29/10/2022	05:15:00	05:30:00	65.3	31.8	48	52.3	32.5
29/10/2022	05:30:00	05:45:00	63.9	31.5	48.8	52.9	32.3
29/10/2022	05:45:00	06:00:00	62.1	31.3	47.9	51.4	33.5
29/10/2022	06:00:00	06:15:00	63.8	32.5	50.4	54.5	36.5
29/10/2022	06:15:00	06:30:00	62	32.5	49.8	54.2	34.2
29/10/2022	06:30:00	06:45:00	64.8	33	51.7	55.8	38.3
29/10/2022	06:45:00	07:00:00	62.8	34.5	53.2	57.3	41.6
29/10/2022	07:00:00	07:15:00	64.6	37.2	53	57.1	43.1
29/10/2022	07:15:00	07:30:00	65.6	35.8	53.6	57.3	43.6
29/10/2022	07:30:00	07:45:00	68.3	45.2	57.2	60.4	50.4
29/10/2022	07:45:00	08:00:00	74	48.6	59.8	62.7	53.4
29/10/2022	08:00:00	08:15:00	67.1	40.2	56.2	59.9	46.9
29/10/2022	08:15:00	08:30:00	66.3	39.4	57.4	61.1	49.4
29/10/2022	08:30:00	08:45:00	78.2	43.3	59.5	62	51.4
29/10/2022	08:45:00	09:00:00	66.3	43.7	58.9	61.6	52.9
29/10/2022	09:00:00	09:15:00	84	45.9	62	66.8	53.8
29/10/2022	09:15:00	09:30:00	79.6	50.6	63.6	67.5	57.1
29/10/2022	09:30:00	09:45:00	86.6	51.3	61.4	62.7	56.7
29/10/2022	09:45:00	10:00:00	84.8	51.5	62.6	64.3	57.4
29/10/2022	10:00:00	10:15:00	85.4	50.4	61.6	63.3	57
29/10/2022	10:15:00	10:30:00	81.7	51.8	60.8	62.7	56

Date	Start Time	End Time	L_{AFmax}	L_{AFmin}	$L_{Aeq,T}$	L_{AF10}	L_{AF90}
29/10/2022	10:30:00	10:45:00	77	52.2	60.4	62.4	56.3
29/10/2022	10:45:00	11:00:00	80.8	52.9	62.4	63.7	58.3
29/10/2022	11:00:00	11:15:00	84.3	50.5	62.9	63.2	55.6
29/10/2022	11:15:00	11:30:00	82.6	50.7	61.1	62.8	57
29/10/2022	11:30:00	11:45:00	75.1	51.6	60.5	62.5	56.2
29/10/2022	11:45:00	12:00:00	77.2	52.4	60.1	62.1	56.2
29/10/2022	12:00:00	12:15:00	81.5	51.2	60.5	62.5	55.4
29/10/2022	12:15:00	12:30:00	79.3	50.6	60.3	62.4	56.2
29/10/2022	12:30:00	12:45:00	90.6	52.2	63.2	62.8	56.9
29/10/2022	12:45:00	13:00:00	76.8	49.3	60.5	62.3	55.4
29/10/2022	13:00:00	13:15:00	74.6	47.9	58.7	61	52.9
29/10/2022	13:15:00	13:30:00	84	46.5	60.1	61.2	53.7
29/10/2022	13:30:00	13:45:00	84.6	44	59.2	60.9	52.5
29/10/2022	13:45:00	14:00:00	96.9	50.2	62.8	61.1	55.3
29/10/2022	14:00:00	14:15:00	84.3	50.8	61	61.8	55
29/10/2022	14:15:00	14:30:00	79	47.8	59.4	61.3	55.2
29/10/2022	14:30:00	14:45:00	82.3	49.3	59.6	61.4	54.8
29/10/2022	14:45:00	15:00:00	87.9	49.8	60.4	61.4	54.7
29/10/2022	15:00:00	15:15:00	88.8	50.2	60.7	61.5	55.1
29/10/2022	15:15:00	15:30:00	85.6	50.5	61.4	62	55.8
29/10/2022	15:30:00	15:45:00	79.1	47.6	59.1	61.2	54.6
29/10/2022	15:45:00	16:00:00	79.3	47.9	59.2	61.2	54.3
29/10/2022	16:00:00	16:15:00	68	47.5	58.3	60.8	53.3
29/10/2022	16:15:00	16:30:00	64.4	46.5	58.2	60.8	53.1
29/10/2022	16:30:00	16:45:00	74.2	46	59.2	61.3	52.5
29/10/2022	16:45:00	17:00:00	72.3	49.7	58.7	60.7	54.1
29/10/2022	17:00:00	17:15:00	75.6	48.1	60.2	62.9	52.6
29/10/2022	17:15:00	17:30:00	75.8	46.4	58.8	60.7	52.2
29/10/2022	17:30:00	17:45:00	75	40	58.9	61.1	52.4
29/10/2022	17:45:00	18:00:00	66.8	41.7	56.6	59.8	48.1
29/10/2022	18:00:00	18:15:00	65.4	44.8	57.2	60.2	50.8
29/10/2022	18:15:00	18:30:00	69.7	43.9	56.8	59.8	49.8
29/10/2022	18:30:00	18:45:00	65.9	38.3	55.8	59.3	44.1
29/10/2022	18:45:00	19:00:00	63.9	39.1	54.8	58.7	44.8
29/10/2022	19:00:00	19:15:00	65.9	36.5	55.2	58.8	43.4
29/10/2022	19:15:00	19:30:00	64.5	36.6	55.3	59	46.2
29/10/2022	19:30:00	19:45:00	66.1	39	54	57.7	43.6
29/10/2022	19:45:00	20:00:00	66.9	38.3	54.4	58	46
29/10/2022	20:00:00	20:15:00	69.7	35	54	57.7	40.2
29/10/2022	20:15:00	20:30:00	64.2	33.9	51.8	56.7	35.7
29/10/2022	20:30:00	20:45:00	66.2	32.5	52.1	56.8	36.3
29/10/2022	20:45:00	21:00:00	64.7	36.9	53	57.2	42.2
29/10/2022	21:00:00	21:15:00	66.4	36.9	52.4	57	41

Date	Start Time	End Time	L_{AFmax}	L_{AFmin}	$L_{Aeq,T}$	L_{AF10}	L_{AF90}
29/10/2022	21:15:00	21:30:00	61.7	32.9	49.4	53.8	34.7
29/10/2022	21:30:00	21:45:00	68.1	30.9	50.4	55.2	34.9
29/10/2022	21:45:00	22:00:00	62.5	35.2	51.7	56.6	39.7
29/10/2022	22:00:00	22:15:00	67.3	32.4	50.2	54.3	36.9
29/10/2022	22:15:00	22:30:00	65.4	32.4	49.9	54.2	35.6
29/10/2022	22:30:00	22:45:00	64.5	32.3	51	55.7	34.9
29/10/2022	22:45:00	23:00:00	61	32.4	49.2	54	35.6
29/10/2022	23:00:00	23:15:00	69.2	29.8	50.4	54.2	31.6
29/10/2022	23:15:00	23:30:00	64.3	32.9	50.3	54.7	36.3
29/10/2022	23:30:00	23:45:00	62.7	31.9	48.7	53	35.3
29/10/2022	23:45:00	00:00:00	61.5	33.4	48.6	52.9	36.1
30/10/2022	00:00:00	00:15:00	62.9	34.7	49.2	53.3	37.2
30/10/2022	00:15:00	00:30:00	62.3	33.8	45.5	48.2	35.3
30/10/2022	00:30:00	00:45:00	64.8	33.7	48.9	52.5	36.8
30/10/2022	00:45:00	01:00:00	63.4	32.7	45.6	46.3	34.8
30/10/2022	01:00:00	01:15:00	72.4	30.7	43.2	42.1	32.4
30/10/2022	01:15:00	01:30:00	64.3	31.9	45.7	46.3	33.3
30/10/2022	01:30:00	01:45:00	61.4	33	45.2	47.5	34.9
30/10/2022	01:45:00	02:00:00	63.7	31.6	43.9	44.4	33.1
30/10/2022	02:00:00	02:15:00	60.3	29.8	39.9	36.6	31.3
30/10/2022	02:15:00	02:30:00	54.9	31.4	37.2	38.6	32.9
30/10/2022	02:30:00	02:45:00	52.2	31.1	35.5	36.8	32.2
30/10/2022	02:45:00	03:00:00	54.9	30.5	34.5	34.3	31.8
30/10/2022	03:00:00	03:15:00	61.2	29.8	41.4	39.5	31.7
30/10/2022	03:15:00	03:30:00	58.4	29.9	36.3	35	30.9
30/10/2022	03:30:00	03:45:00	63.6	33.3	41.2	38.7	34.5
30/10/2022	03:45:00	04:00:00	59.8	31.3	41.4	42.3	32.3
30/10/2022	04:00:00	04:15:00	68.5	31.8	45	45.6	33.2
30/10/2022	04:15:00	04:30:00	57.4	31.5	39.8	39.8	32.7
30/10/2022	04:30:00	04:45:00	56.8	31.7	37.6	37.1	33.8
30/10/2022	04:45:00	05:00:00	65.2	30.4	42.1	38.9	32.1
30/10/2022	05:00:00	05:15:00	59.7	30.4	39.8	38	31.7
30/10/2022	05:15:00	05:30:00	60.1	32.5	40.1	37	33.8
30/10/2022	05:30:00	05:45:00	59.8	32.1	41.8	41.5	33.3
30/10/2022	05:45:00	06:00:00	58.4	31.6	40.4	40.6	32.8
30/10/2022	06:00:00	06:15:00	62.1	32.4	44	45.1	33.5
30/10/2022	06:15:00	06:30:00	65.1	31.4	43.2	38.7	32.7
30/10/2022	06:30:00	06:45:00	68.4	32.5	49.6	52.6	34.8
30/10/2022	06:45:00	07:00:00	62.6	31.6	46.6	50	33.3
30/10/2022	07:00:00	07:15:00	68.8	31.5	50.8	54	34.8
30/10/2022	07:15:00	07:30:00	73.5	32.3	52.4	55.6	37
30/10/2022	07:30:00	07:45:00	84.2	47.7	60.8	63.6	53.3
30/10/2022	07:45:00	08:00:00	73.6	32.2	54.6	57.6	38.4

Date	Start Time	End Time	L_{AFmax}	L_{AFmin}	$L_{Aeq,T}$	L_{AF10}	L_{AF90}
30/10/2022	08:00:00	08:15:00	67.2	32.1	53.1	57.5	36.3
30/10/2022	08:15:00	08:30:00	66	32.7	51.2	55.8	36.1
30/10/2022	08:30:00	08:45:00	78.8	36	57.6	59.1	42.7
30/10/2022	08:45:00	09:00:00	66.5	39.1	53.9	58	45.2
30/10/2022	09:00:00	09:15:00	71.4	39.6	55.4	59	44.8
30/10/2022	09:15:00	09:30:00	66.1	36.3	53.9	58.1	43.7
30/10/2022	09:30:00	09:45:00	68.1	35.2	53.4	57.5	41
30/10/2022	09:45:00	10:00:00	65	42.1	55.1	58.8	47.7
30/10/2022	10:00:00	10:15:00	84.7	47.2	59.3	61.4	52.5
30/10/2022	10:15:00	10:30:00	74.9	45.8	58.5	61.4	51.9
30/10/2022	10:30:00	10:45:00	79.2	47.1	59.1	62	52.6
30/10/2022	10:45:00	11:00:00	79.5	47.4	59.8	61.9	55.3
30/10/2022	11:00:00	11:15:00	74.3	49.6	60.1	62.4	55.3
30/10/2022	11:15:00	11:30:00	75.3	49.9	60.2	62.4	56
30/10/2022	11:30:00	11:45:00	73.1	50.4	60	62.6	54.8
30/10/2022	11:45:00	12:00:00	81.7	48.3	59.9	62	53.9
30/10/2022	12:00:00	12:15:00	78.1	47.4	60.2	62.5	55.8
30/10/2022	12:15:00	12:30:00	73.9	50.5	60.4	62.5	56
30/10/2022	12:30:00	12:45:00	87.9	51.4	61.1	63.1	55.8
30/10/2022	12:45:00	13:00:00	87	49	60.4	62.4	53.9
30/10/2022	13:00:00	13:15:00	87.9	44.6	60.5	62.3	53.2
30/10/2022	13:15:00	13:30:00	77.4	49.5	59.7	62.2	53.9
30/10/2022	13:30:00	13:45:00	83.4	48.4	60.8	62.6	55.3
30/10/2022	13:45:00	14:00:00	71.6	45.6	59.2	62.2	51.9
30/10/2022	14:00:00	14:15:00	76.2	49.7	59.6	62.1	54.5
30/10/2022	14:15:00	14:30:00	79.6	45.7	59.4	62	53.9
30/10/2022	14:30:00	14:45:00	79.4	49.8	60.1	62.2	55.3
30/10/2022	14:45:00	15:00:00	72.4	48.9	59.5	61.9	54.3
30/10/2022	15:00:00	15:15:00	90.1	49.7	62.1	62.3	54.3
30/10/2022	15:15:00	15:30:00	81.1	49	60.1	62.3	55.1
30/10/2022	15:30:00	15:45:00	87.7	49.5	59.9	61.4	53.6
30/10/2022	15:45:00	16:00:00	78.3	49	60.4	62.5	53.8
30/10/2022	16:00:00	16:15:00	66.1	46.6	57.5	60.5	52.1
30/10/2022	16:15:00	16:30:00	84.7	47.3	62.6	61.6	53.8
30/10/2022	16:30:00	16:45:00	76.8	46.5	58.6	61.2	53.1
30/10/2022	16:45:00	17:00:00	87.6	44.8	61.5	62.4	53.6
30/10/2022	17:00:00	17:15:00	78.9	47.4	60.3	62.1	53
30/10/2022	17:15:00	17:30:00	68.6	44.4	57.8	61.1	50.6
30/10/2022	17:30:00	17:45:00	68.2	45.6	57.6	60.8	50
30/10/2022	17:45:00	18:00:00	65.4	44.1	57.6	60.6	49.9
30/10/2022	18:00:00	18:15:00	65.5	42.7	56.6	59.9	49.1
30/10/2022	18:15:00	18:30:00	65.3	42.7	56.4	59.8	49
30/10/2022	18:30:00	18:45:00	63.7	39.7	55.8	59.7	46

Date	Start Time	End Time	L_{AFmax}	L_{AFmin}	$L_{Aeq,T}$	L_{AF10}	L_{AF90}
30/10/2022	18:45:00	19:00:00	67.6	41.5	55.3	58.9	46.4
30/10/2022	19:00:00	19:15:00	62.9	41.1	53.4	57.3	44.8
30/10/2022	19:15:00	19:30:00	63.9	40.9	54.9	58.9	45.8
30/10/2022	19:30:00	19:45:00	67.3	39.4	54.7	59	43.1
30/10/2022	19:45:00	20:00:00	66.3	39	54.1	58.1	43.9
30/10/2022	20:00:00	20:15:00	66.7	39.8	55.3	59.4	44.5
30/10/2022	20:15:00	20:30:00	66	38.6	53.2	57.2	41.2
30/10/2022	20:30:00	20:45:00	66.9	37.6	54.1	58.3	42.9
30/10/2022	20:45:00	21:00:00	63.8	39	51.9	56.3	42
30/10/2022	21:00:00	21:15:00	63.1	40.1	53.1	57.4	43.9
30/10/2022	21:15:00	21:30:00	63.5	39.1	51.5	55.8	42.1
30/10/2022	21:30:00	21:45:00	68.9	39.4	51.7	55.9	42.1
30/10/2022	21:45:00	22:00:00	66.3	39.1	51.4	55.6	41.7
30/10/2022	22:00:00	22:15:00	63.9	38.8	51.8	55.9	42.5
30/10/2022	22:15:00	22:30:00	64.6	39.9	53.4	57.6	44.3
30/10/2022	22:30:00	22:45:00	66.1	41.7	52.6	56.6	43.6
30/10/2022	22:45:00	23:00:00	65.6	40.4	51.1	55.1	42.8
30/10/2022	23:00:00	23:15:00	64.7	39.8	52.2	56.3	42.5
30/10/2022	23:15:00	23:30:00	64.4	40.3	51.2	55.3	42.8
30/10/2022	23:30:00	23:45:00	71.5	39.6	52.2	55.9	41.8
30/10/2022	23:45:00	00:00:00	73.2	40.5	52.6	56.3	42.6
31/10/2022	00:00:00	00:15:00	64.1	36.3	47.9	50.8	38.8
31/10/2022	00:15:00	00:30:00	65.6	34.5	48.8	52.9	35.9
31/10/2022	00:30:00	00:45:00	62	35	48.8	53.4	36.6
31/10/2022	00:45:00	01:00:00	64.5	34.6	46.8	50	36.1
31/10/2022	01:00:00	01:15:00	65.7	34.1	46.4	47.5	35.3
31/10/2022	01:15:00	01:30:00	64.2	34.3	46.4	49.7	35.6
31/10/2022	01:30:00	01:45:00	58.5	33.5	40.7	39.8	35.1
31/10/2022	01:45:00	02:00:00	65.5	34.1	44	39.6	35.4
31/10/2022	02:00:00	02:15:00	60.7	33.6	41.6	40	35
31/10/2022	02:15:00	02:30:00	60.3	33.3	40.9	39.8	34.6
31/10/2022	02:30:00	02:45:00	62.6	33.1	44.2	42.8	34
31/10/2022	02:45:00	03:00:00	63	32.9	35.3	35.7	33.7
31/10/2022	03:00:00	03:15:00	60.4	32.1	39.7	35.8	33.2
31/10/2022	03:15:00	03:30:00	61.2	34.5	43.2	44.1	35.7
31/10/2022	03:30:00	03:45:00	64.9	35.3	43.7	41	36.7
31/10/2022	03:45:00	04:00:00	56.6	34.5	39.7	39.5	35.8
31/10/2022	04:00:00	04:15:00	61.8	34.1	41.6	39.1	35.2
31/10/2022	04:15:00	04:30:00	60.4	34.6	39.7	38.6	35.7
31/10/2022	04:30:00	04:45:00	61.7	33.4	43.5	44.2	34.9
31/10/2022	04:45:00	05:00:00	61.9	31.8	44.3	47.2	33.3
31/10/2022	05:00:00	05:15:00	61.8	34	41.9	42.5	34.8
31/10/2022	05:15:00	05:30:00	64.4	33.8	45.7	45.9	35

Date	Start Time	End Time	L_{AFmax}	L_{AFmin}	$L_{Aeq,T}$	L_{AF10}	L_{AF90}
31/10/2022	05:30:00	05:45:00	67.2	33	48.1	52.1	33.9
31/10/2022	05:45:00	06:00:00	67.1	31.9	46.9	48.9	32.8
31/10/2022	06:00:00	06:15:00	63.2	32.4	48.9	53	33.5
31/10/2022	06:15:00	06:30:00	69	34	51.4	55	36.4
31/10/2022	06:30:00	06:45:00	67.7	34.6	51.9	56.1	35.9
31/10/2022	06:45:00	07:00:00	73.1	33.6	54.2	57.7	38
31/10/2022	07:00:00	07:15:00	63.6	34.7	51.3	55.6	37.2
31/10/2022	07:15:00	07:30:00	67.3	35.6	53.9	57.8	43.6
31/10/2022	07:30:00	07:45:00	74	42.7	57.4	60.8	49.1
31/10/2022	07:45:00	08:00:00	77.2	41	58.5	61.2	50.1
31/10/2022	08:00:00	08:15:00	68.8	41.6	57.2	60.6	49
31/10/2022	08:15:00	08:30:00	68.8	43.9	58.4	61.5	51.3
31/10/2022	08:30:00	08:45:00	79	46.1	59.7	62.1	52.1
31/10/2022	08:45:00	09:00:00	67	49	59.9	62.5	55.5
31/10/2022	09:00:00	09:15:00	69	47.5	59.7	62.4	52.5
31/10/2022	09:15:00	09:30:00	69.2	43.6	59.6	62	54.6
31/10/2022	09:30:00	09:45:00	73.9	44.4	59.4	62	52.9
31/10/2022	09:45:00	10:00:00	69.9	47	59.9	62.4	53.9
31/10/2022	10:00:00	10:15:00	75.3	49.6	59.7	62.2	54.3
31/10/2022	10:15:00	10:30:00	78.3	49.1	59.2	61.5	54.2
31/10/2022	10:30:00	10:45:00	82.2	48.9	59.9	61.8	53.9
31/10/2022	10:45:00	11:00:00	82.5	48.2	63.4	62.6	55
31/10/2022	11:00:00	11:15:00	82.4	49.9	64.9	65.8	55.1
31/10/2022	11:15:00	11:30:00	83.5	49.5	65.3	67.4	54.4
31/10/2022	11:30:00	11:45:00	89.1	51	70.3	72.1	56.1
31/10/2022	11:45:00	12:00:00	85.3	48.5	60.2	62.2	54.3
31/10/2022	12:00:00	12:15:00	74.4	48.3	59.6	61.7	54.5
31/10/2022	12:15:00	12:30:00	88.9	48.3	60.6	62	55
31/10/2022	12:30:00	12:45:00	79.1	50.3	60.8	62.5	55.6
31/10/2022	12:45:00	13:00:00	82.8	46.6	60.1	62.4	53.9
31/10/2022	13:00:00	13:15:00	75.9	49.7	59.1	61.3	53.9
31/10/2022	13:15:00	13:30:00	88.5	48.7	62.8	65.4	54.4
31/10/2022	13:30:00	13:45:00	83.7	50.2	60.3	62.1	55.3
31/10/2022	13:45:00	14:00:00	67.4	49.2	58.8	61.3	53.8
31/10/2022	14:00:00	14:15:00	84	48	59.7	61.5	53.6
31/10/2022	14:15:00	14:30:00	90	47.1	63.1	64.9	54.7
31/10/2022	14:30:00	14:45:00	87.6	47.9	62	63.6	55.1
31/10/2022	14:45:00	15:00:00	80.4	51	61.4	63.4	55.2
31/10/2022	15:00:00	15:15:00	73.4	48.8	59.1	61.4	54.1
31/10/2022	15:15:00	15:30:00	83.3	46.3	61.4	61.8	54.2
31/10/2022	15:30:00	15:45:00	70	48	59.2	61.7	54.2
31/10/2022	15:45:00	16:00:00	86	47.3	61.5	61.2	53.8
31/10/2022	16:00:00	16:15:00	81	50	60.1	62	55.6

Date	Start Time	End Time	L_{AFmax}	L_{AFmin}	$L_{Aeq,T}$	L_{AF10}	L_{AF90}
31/10/2022	16:15:00	16:30:00	72.8	49.7	60	61.8	55.6
31/10/2022	16:30:00	16:45:00	76.9	46.8	59.9	62.1	55.3
31/10/2022	16:45:00	17:00:00	81.7	51.5	60.9	62.7	55.6
31/10/2022	17:00:00	17:15:00	78.8	51.6	59.4	61.4	55.4
31/10/2022	17:15:00	17:30:00	65.1	48.5	58.2	60.5	54
31/10/2022	17:30:00	17:45:00	72.8	48	58.1	60.3	53.1
31/10/2022	17:45:00	18:00:00	70.1	47	59	61.3	53.1
31/10/2022	18:00:00	18:15:00	75.3	49.1	59.5	61.4	54.4
31/10/2022	18:15:00	18:30:00	68.8	43.8	57.9	60.7	51.9
31/10/2022	18:30:00	18:45:00	70.5	44.5	58	60.4	51.2
31/10/2022	18:45:00	19:00:00	63.8	43.9	57	59.8	50.9
31/10/2022	19:00:00	19:15:00	66.4	44.1	58	60.8	52.1
31/10/2022	19:15:00	19:30:00	64.9	43.8	56.2	59.4	49.6
31/10/2022	19:30:00	19:45:00	67.4	45.4	56.2	59.2	48.8
31/10/2022	19:45:00	20:00:00	69.5	45.5	56.5	59.9	49.2
31/10/2022	20:00:00	20:15:00	90.4	44.6	64.4	62.6	49.3
31/10/2022	20:15:00	20:30:00	73.4	43.8	56	59.5	47.1
31/10/2022	20:30:00	20:45:00	65	44.1	55	58.5	47.9
31/10/2022	20:45:00	21:00:00	67.4	42.1	54.9	58.9	45.7
31/10/2022	21:00:00	21:15:00	68.1	42.1	54.8	58.7	45.3
31/10/2022	21:15:00	21:30:00	63.2	42.7	53.3	57.1	45.5
31/10/2022	21:30:00	21:45:00	64.2	41.4	53.1	57.3	44.2
31/10/2022	21:45:00	22:00:00	67.6	41	53.5	57.2	45.9
31/10/2022	22:00:00	22:15:00	66.6	41.8	53.4	57	45.6
31/10/2022	22:15:00	22:30:00	68.1	41.4	53.8	57.5	45.3
31/10/2022	22:30:00	22:45:00	63.8	40.4	52.4	56.3	44.9
31/10/2022	22:45:00	23:00:00	69.3	42.4	54	57.9	45.5
31/10/2022	23:00:00	23:15:00	68	36.6	52.4	56.7	40.1
31/10/2022	23:15:00	23:30:00	65.9	36.3	51	55.5	39.1
31/10/2022	23:30:00	23:45:00	65.6	37.8	51.5	55.9	40.3
31/10/2022	23:45:00	00:00:00	70.6	36.9	51.5	54.6	39.2
01/11/2022	00:00:00	00:15:00	62.3	36.3	48.7	53	38.8
01/11/2022	00:15:00	00:30:00	69.2	37.9	52.7	57.6	41.3
01/11/2022	00:30:00	00:45:00	63.2	36.8	47.3	50.1	39.7
01/11/2022	00:45:00	01:00:00	62.5	37.1	48	51.1	40.1
01/11/2022	01:00:00	01:15:00	71.9	41.3	49.2	50.7	43.8
01/11/2022	01:15:00	01:30:00	70.2	41.1	50.9	53.7	44.6
01/11/2022	01:30:00	01:45:00	68.6	43.3	51.6	53.4	47
01/11/2022	01:45:00	02:00:00	75.3	43.2	51.7	54.1	46.7
01/11/2022	02:00:00	02:15:00	69.9	46.2	55.5	58.6	48.8
01/11/2022	02:15:00	02:30:00	69.2	42.3	49.5	52.1	45.3
01/11/2022	02:30:00	02:45:00	59.9	46.3	52.6	55.1	48.8
01/11/2022	02:45:00	03:00:00	61.3	46.8	53.1	56.1	49

Date	Start Time	End Time	L_{AFmax}	L_{AFmin}	$L_{Aeq,T}$	L_{AF10}	L_{AF90}
01/11/2022	03:00:00	03:15:00	64.9	48.9	56.4	60	51.6
01/11/2022	03:15:00	03:30:00	67.2	48.1	58.2	61.2	53
01/11/2022	03:30:00	03:45:00	70.6	49.7	61	64.4	53.1
01/11/2022	03:45:00	04:00:00	64.8	49.6	58.4	61.5	52.9
01/11/2022	04:00:00	04:15:00	68.8	51.2	59.8	63.2	54.4
01/11/2022	04:15:00	04:30:00	65.1	43.2	56.9	61.2	47.3
01/11/2022	04:30:00	04:45:00	63.2	47.6	55.3	58.2	51
01/11/2022	04:45:00	05:00:00	59	42.4	50.2	53	45
01/11/2022	05:00:00	05:15:00	60.3	41.5	48.8	50.5	45.1
01/11/2022	05:15:00	05:30:00	66.7	42.9	50.9	53.3	45.7
01/11/2022	05:30:00	05:45:00	68.3	48.1	56.2	59	51.1
01/11/2022	05:45:00	06:00:00	64.4	47.4	55.8	58.9	50.8
01/11/2022	06:00:00	06:15:00	64.8	46.4	54.7	57.1	49.2
01/11/2022	06:15:00	06:30:00	66.5	48.8	57.2	60.3	52
01/11/2022	06:30:00	06:45:00	66.6	47.6	56.4	60.1	50.5
01/11/2022	06:45:00	07:00:00	68.2	47.7	57.6	60.4	51.6
01/11/2022	07:00:00	07:15:00	70.7	51.3	61.5	64.1	55
01/11/2022	07:15:00	07:30:00	69.8	52.6	60.8	64	55.6
01/11/2022	07:30:00	07:45:00	71	52.2	61.8	65	56.5
01/11/2022	07:45:00	08:00:00	84.4	50.4	62.2	64.8	55.3
01/11/2022	08:00:00	08:15:00	82.8	53	64.9	68	57.4
01/11/2022	08:15:00	08:30:00	74.8	49.3	60.8	63.6	54.5
01/11/2022	08:30:00	08:45:00	80.2	52.6	63.3	65.7	57.1
01/11/2022	08:45:00	09:00:00	69.5	53.3	61.9	64.2	57.5
01/11/2022	09:00:00	09:15:00	69	51.4	61.4	63.8	56.7
01/11/2022	09:15:00	09:30:00	72.5	50.8	60.8	63.2	56.7
01/11/2022	09:30:00	09:45:00	69.3	52.5	60.3	62.8	55.7
01/11/2022	09:45:00	10:00:00	69.3	53.1	61	63.5	56.1
01/11/2022	10:00:00	10:15:00	91.1	51.9	63.1	64.1	56.4
01/11/2022	10:15:00	10:30:00	83.4	52.1	60.6	62.3	55.9
01/11/2022	10:30:00	10:45:00	87.9	51.2	62.7	62.7	55.4
01/11/2022	10:45:00	11:00:00	76.5	52.9	61.6	63.8	57.7
01/11/2022	11:00:00	11:15:00	79.5	52.2	62.8	65.5	56.7
01/11/2022	11:15:00	11:30:00	80.6	53.2	60.5	62.2	56.2
01/11/2022	11:30:00	11:45:00	79	51.8	59.1	61.2	54.3
01/11/2022	11:45:00	12:00:00	77.3	49.7	60.4	62.6	55.4
01/11/2022	12:00:00	12:15:00	75.5	54.6	61.1	63.3	57.3
01/11/2022	12:15:00	12:30:00	76.1	50.1	59.4	61.6	54.7
01/11/2022	12:30:00	12:45:00	81.7	52	60.4	62.2	55.8
01/11/2022	12:45:00	13:00:00	84	49.5	61.4	63.2	55.8
01/11/2022	13:00:00	13:15:00	82.7	49.9	60.4	61.9	54.4
01/11/2022	13:15:00	13:30:00	75	48	57.7	60.3	51.4
01/11/2022	13:30:00	13:45:00	77.4	50.4	59.8	61.9	55

Date	Start Time	End Time	L_{AFmax}	L_{AFmin}	$L_{Aeq,T}$	L_{AF10}	L_{AF90}
01/11/2022	13:45:00	14:00:00	87.8	49.8	65.6	67.2	55.7
01/11/2022	14:00:00	14:15:00	82.7	50.5	62.4	64.8	55.7
01/11/2022	14:15:00	14:30:00	77.2	51.2	59.6	62.1	55
01/11/2022	14:30:00	14:45:00	84.7	48.3	60.3	61.4	54.6
01/11/2022	14:45:00	14:49:31	75.6	49.5	58.8	60.9	53.2

Woodland Unattended Monitoring Data

Start Date [dd:mm:yyyy]	Start Time [hh:mm]	LAeq [dB]	LAFmax [dB]	L 10 [dB]	L 90 [dB]
28/11/2022	15:00	56.4	82.4	57	37.3
28/11/2022	16:00	50.2	70.4	52.8	33.3
28/11/2022	17:00	36.7	69.3	37.8	31.5
28/11/2022	18:00	34.0	55.1	36.1	28.2
28/11/2022	19:00	32.5	58.3	34.6	26.3
28/11/2022	20:00	33.4	68.3	35.1	24.8
28/11/2022	21:00	40.8	64.1	36.3	23.5
28/11/2022	22:00	31.7	57.0	30.4	21.1
28/11/2022	23:00	25.8	52.6	28.6	19.1
29/11/2022	00:00	26.3	50.7	26.2	17.7
29/11/2022	01:00	31.9	62.3	25.9	17.6
29/11/2022	02:00	31.0	57.0	33.4	19.4
29/11/2022	03:00	29.8	57.9	32.8	20
29/11/2022	04:00	33.2	73.6	33.5	21
29/11/2022	05:00	35.1	58.1	37.2	24.4
29/11/2022	06:00	36.8	62.2	38.9	31.2
29/11/2022	07:00	37.2	59.9	38.8	31.8
29/11/2022	08:00	37.2	56.0	38.4	33.8
29/11/2022	09:00	44.6	68.2	46.6	32.4
29/11/2022	10:00	53.5	76.6	55.9	38.8
29/11/2022	11:00	57.4	87.0	58.4	38.2
29/11/2022	12:00	65.4	89.5	61.7	32.2
29/11/2022	13:00	47.9	72.1	41.6	32
29/11/2022	14:00	53.9	83.5	54	36.3
29/11/2022	15:00	53.6	79.6	55.2	34.8
29/11/2022	16:00	52.2	87.0	41.9	31.9
29/11/2022	17:00	34.4	48.3	36.1	31.9
29/11/2022	18:00	44.5	68.8	46	30.5
29/11/2022	19:00	58.8	82.5	57.7	33.2
29/11/2022	20:00	28.5	45.7	31.3	23.4
29/11/2022	21:00	32.9	59.6	33.4	24.6
29/11/2022	22:00	27.5	49.7	30.5	21.9
29/11/2022	23:00	25.0	45.1	28.5	18.7

Start Date [dd:mm:yyyy]	Start Time [hh:mm]	LAeq [dB]	LAFmax [dB]	L 10 [dB]	L 90 [dB]
30/11/2022	00:00	26.0	42.8	29.9	18.3
30/11/2022	01:00	23.8	43.0	26.3	18.1
30/11/2022	02:00	23.2	40.1	25.1	17.8
30/11/2022	03:00	26.5	53.4	26.3	19.7
30/11/2022	04:00	30.8	51.8	32.2	21.7
30/11/2022	05:00	32.6	53.1	35.7	22.9
30/11/2022	06:00	32.8	50.1	34.7	27.8
30/11/2022	07:00	37.0	54.6	39.2	32.8
30/11/2022	08:00	40.7	61.2	41.4	34.5
30/11/2022	09:00	51.3	70.2	55.1	34.9
30/11/2022	10:00	45.7	66.9	48.4	33.8
30/11/2022	11:00	42.3	66.0	41	33.3
30/11/2022	12:00	58.2	74.7	62	37.3
30/11/2022	13:00	46.3	65.4	45.6	34.4
30/11/2022	14:00	45.3	71.0	46.8	36.1
30/11/2022	15:00	50.5	76.8	52.2	37.4
30/11/2022	16:00	44.5	77.8	42.6	34.8
30/11/2022	17:00	36.9	54.6	39	33.6
30/11/2022	18:00	43.7	66.1	40	33.2
30/11/2022	19:00	35.7	55.8	38	29.9
30/11/2022	20:00	32.5	45.2	35.9	24.5
30/11/2022	21:00	33.2	51.2	36.6	24.4
30/11/2022	22:00	30.2	48.8	34.1	19.8
30/11/2022	23:00	26.1	47.9	29	19.5
01/12/2022	00:00	22.9	48.9	26	17.8
01/12/2022	01:00	22.4	47.3	24.7	17.5
01/12/2022	02:00	29.4	51.9	32.4	20.5
01/12/2022	03:00	24.8	46.1	27	19.7
01/12/2022	04:00	25.6	44.0	28.1	20.5
01/12/2022	05:00	33.6	59.6	31.1	20.2
01/12/2022	06:00	31.6	44.5	34	26.4
01/12/2022	07:00	39.9	62.1	40.6	31.4
01/12/2022	08:00	44.1	66.4	44.1	35.9
01/12/2022	09:00	40.2	58.9	42	34.8
01/12/2022	10:00	59.8	84.5	56.3	32.5
01/12/2022	11:00	37.5	61.4	39.1	31.6
01/12/2022	12:00	37.2	56.2	38.8	32
01/12/2022	13:00	36.2	58.7	37.7	32
01/12/2022	14:00	47.1	73.5	39.9	33.6
01/12/2022	15:00	37.5	66.4	38.7	33.8
01/12/2022	16:00	45.2	68.8	41.3	32.4
01/12/2022	17:00	42.9	66.8	39.5	32.6

Start Date [dd:mm:yyyy]	Start Time [hh:mm]	LAeq [dB]	LAFmax [dB]	L 10 [dB]	L 90 [dB]
01/12/2022	18:00	52.5	78.2	50	33.5
01/12/2022	19:00	54.9	82.3	50.5	31.9
01/12/2022	20:00	33.7	50.5	36.1	29.2
01/12/2022	21:00	35.9	59.7	37.3	28.6
01/12/2022	22:00	32.0	45.1	35	25.7
01/12/2022	23:00	28.7	44.5	32.6	19.6
02/12/2022	00:00	24.9	44.1	27.5	19.8
02/12/2022	01:00	27.6	55.8	30	21.9
02/12/2022	02:00	27.3	53.9	29.9	20.6
02/12/2022	03:00	28.8	53.3	28.8	21
02/12/2022	04:00	33.0	53.9	34.9	26.1
02/12/2022	05:00	33.6	54.4	35.9	27
02/12/2022	06:00	37.1	56.8	39.8	31.9
02/12/2022	07:00	39.8	57.6	42	35
02/12/2022	08:00	44.3	66.2	43.8	37.3
02/12/2022	09:00	54.9	73.8	48.5	36.6

APPENDIX D CONSTRUCTION NOISE CALCULATION DETAILS

Source Data

Source	1/1 Octave Band LAeq,T at 10									BS 5228
	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dBA	
Wheeled backhoe loader (working)	74	66	64	64	63	60	59	50	68	Table C.2
Wheeled backhoe loader (idling)	60	53	49	52	51	48	43	33	55	Table C.2
Lorry (pulling up)	59	64	64	64	60	59	54	52	70	Table D.7
Ground excavation (tracked excavator)	85	78	77	77	73	71	68	63	79	Table C.2
Tipper lorry	88	82	74	74	74	73	70	67	79	Table C.8
Cement mixer truck (discharging)	80	69	66	70	71	69	64	58	75	Table C.4
Trenching (mini tracked excavator)	87	79	76	70	68	64	57	48	74	Table C.5
Articulated dump truck (tipping fill)	80	76	73	70	69	66	63	58	74	Table C.2
Asphalt paver + tipper lorry (paving)	72	77	74	72	71	70	67	60	77	Table C.5
Power float	No spectral data available								72	Table D.6
Lorry with lifting boom (HIAB)	81	78	76	74	72	69	64	56	77	Table C.4

Phase-by-Phase Calculations

Phase 1 - Preliminaries

Source/activity	63	125	250	500	1000	2000	4000	8000	dBA
Wheeled backhoe loader (working)	74	66	64	64	63	60	59	50	67.9
10m / 225m	47.0	39.0	37.0	37.0	36.0	33.0	32.0	23.0	40.8
A-weighting	20.8	22.9	28.4	33.8	36.0	34.2	33.0	21.9	40.5
Corrected for 50% on-time	17.7	19.8	25.3	30.7	32.9	31.1	29.9	18.8	37.5
Wheeled backhoe loader (idling)	60	53	49	52	51	48	43	33	55.2
10m / 200m	34.0	27.0	23.0	26.0	25.0	22.0	17.0	7.0	29.2
A-weighting	7.8	10.9	14.4	22.8	25.0	23.2	18.0	5.9	28.8
Corrected for 50% on-time	4.8	7.9	11.4	19.8	22.0	20.2	15.0	2.9	25.8
Lorry (pulling up)	59	64	64	64	60	59	54	52	66.1
10m / 225m	32.0	37.0	37.0	37.0	33.0	32.0	27.0	25.0	39.1
A-weighting	5.8	20.9	28.4	33.8	33.0	33.2	28.0	23.9	38.4
Corrected for 50% on-time	2.7	17.8	25.3	30.7	29.9	30.1	24.9	20.8	35.4
All sources combined (nearest NSR)	18.1	22.1	28.4	33.9	34.9	33.9	31.2	23.0	40.2

Phase 2 - Site Clearance and Excavation

Source/activity	63	125	250	500	1000	2000	4000	8000	dBA
Wheeled backhoe loader (working)	74	66	64	64	63	60	59	50	67.9
10m / 200m	48.0	40.0	38.0	38.0	37.0	34.0	33.0	24.0	41.8
A-weighting	21.8	23.9	29.4	34.8	37.0	35.2	34.0	22.9	41.5
Corrected for 50% on-time	18.8	20.9	26.4	31.8	34.0	32.2	31.0	19.9	38.5
Wheeled backhoe loader (idling)	60	53	49	52	51	48	43	33	55.2
10m / 200m	34.0	27.0	23.0	26.0	25.0	22.0	17.0	7.0	29.2
A-weighting	7.8	10.9	14.4	22.8	25.0	23.2	18.0	5.9	28.8
Corrected for 50% on-time	4.8	7.9	11.4	19.8	22.0	20.2	15.0	2.9	25.8
Ground excavation (tracked excavator)	85	78	77	77	73	71	68	63	79.0
10m / 200m	59.0	52.0	51.0	51.0	47.0	45.0	42.0	37.0	53.0
A-weighting	32.8	35.9	42.4	47.8	47.0	46.2	43.0	35.9	52.1
Corrected for 50% on-time	29.8	32.9	39.4	44.8	44.0	43.2	40.0	32.9	49.1
Tipper lorry	88	82	74	74	74	73	70	67	79.5
10m / 200m	62.0	56.0	48.0	48.0	48.0	47.0	44.0	41.0	53.5
A-weighting	35.8	39.9	39.4	44.8	48.0	48.2	45.0	39.9	53.3
Corrected for 50% on-time	32.8	36.9	36.4	41.8	45.0	45.2	42.0	36.9	50.3
Cement mixer truck (discharging)	80	69	66	70	71	69	64	58	75.1
10m / 200m	54.0	43.0	40.0	44.0	45.0	43.0	38.0	32.0	49.1
A-weighting	27.8	26.9	31.4	40.8	45.0	44.2	39.0	30.9	49.2
Corrected for 50% on-time	17.8	16.9	21.4	30.8	35.0	34.2	29.0	20.9	39.2
All sources combined (nearest NSR)	34.7	38.4	41.3	46.8	47.9	47.6	44.4	38.5	53.5

Phase 3 - Drainage and Utilities

Source/activity	63	125	250	500	1000	2000	4000	8000	dBA
Trenching (mini tracked excavator)	87	79	76	70	68	64	57	48	73.8
10m / 200m	61.0	53.0	50.0	44.0	42.0	38.0	31.0	22.0	47.7
A-weighting	34.8	36.9	41.4	40.8	42.0	39.2	32.0	20.9	45.6
Corrected for 25% on-time	28.8	30.9	35.4	34.8	36.0	33.2	26.0	14.9	39.6
Articulated dump truck (tipping fill)	80	76	73	70	69	66	63	58	74.0
10m / 200m	54.0	50.0	47.0	44.0	43.0	40.0	37.0	32.0	48.0
A-weighting	27.8	33.9	38.4	40.8	43.0	41.2	38.0	30.9	47.2
Corrected for 25% on-time	21.8	27.9	32.4	34.8	37.0	35.2	32.0	24.9	41.2
Drainage (mini tracked excavator)	87	79	76	70	68	64	57	48	73.8
10m / 200m	61.0	53.0	50.0	44.0	42.0	38.0	31.0	22.0	47.7
A-weighting	34.8	36.9	41.4	40.8	42.0	39.2	32.0	20.9	45.6
Corrected for 25% on-time	28.8	30.9	35.4	34.8	36.0	33.2	26.0	14.9	39.6
All sources combined (nearest NSR)	32.2	34.8	39.3	39.5	41.1	38.7	33.7	25.7	46.6

Phase 4 - Pavement Construction

Source/activity	63	125	250	500	1000	2000	4000	8000	dBA
Articulated dump truck (tipping fill)	80.0	76.0	73.0	70.0	69.0	66.0	63.0	58.0	74.0
10m / 200m	54.0	50.0	47.0	44.0	43.0	40.0	37.0	32.0	48.0
A-weighting	27.8	33.9	38.4	40.8	43.0	41.2	38.0	30.9	47.2
Corrected for 25% on-time	21.8	27.9	32.4	34.8	37.0	35.2	32.0	24.9	41.2
Cement mixer truck (discharging)	80	69	66	70	71	69	64	58	75
10m / 200m	54.0	43.0	40.0	44.0	45.0	43.0	38.0	32.0	58.7
A-weighting	27.8	26.9	31.4	40.8	45.0	44.2	39.0	30.9	49.1
Corrected for 25% on-time	21.8	20.9	25.4	34.8	39.0	38.2	33.0	24.9	43.1
Asphalt paver + tipper lorry (paving)	72	77	74	72	71	70	67	60	77
10m / 200m	46.0	51.0	48.0	46.0	45.0	44.0	41.0	34.0	60.7
A-weighting	19.8	34.9	39.4	42.8	45.0	45.2	42.0	32.9	50.5
Corrected for 25% on-time	13.8	28.9	33.4	36.8	39.0	39.2	36.0	26.9	44.5
Finish concrete bays (power float)	No spectral data available								72
10m / 200m									46.0
Corrected for 25% on-time									40.0
All sources combined (nearest NSR)	22.4	29.5	34.0	38.9	42.0	41.7	37.7	29.0	47.7

Phase 5 - Buildings

Source/activity	63	125	250	500	1000	2000	4000	8000	dBA
Lorry with lifting boom (HIAB)	81	78	76	74	72	69	64	56	76.9
10m / 200m	55.0	52.0	50.0	48.0	46.0	43.0	38.0	30.0	50.9
A-weighting	28.8	35.9	41.4	44.8	46.0	44.2	39.0	28.9	50.0
Corrected for 25% on-time	22.8	29.9	35.4	38.8	40.0	38.2	33.0	22.9	44.0
All sources combined (nearest NSR)	22.8	29.9	35.4	38.8	40.0	38.2	33.0	22.9	44.0

Calculation Summary

Construction Phase	1/1 Octave Band LAeq,T at 10								
	63	125	250	500	1000	2000	4000	8000	dBA
1 - Preliminaries	18.1	22.1	28.4	33.9	34.9	33.9	31.2	23.0	40.2
2 - Site Clearance and Excavation	34.7	38.4	41.3	46.8	47.9	47.6	44.4	38.5	53.5
3 - Drainage and Utilities	32.2	34.8	39.3	39.5	41.1	38.7	33.7	25.7	46.6
4 - Pavement construction	22.4	29.5	34.0	38.9	42.0	41.7	37.7	29.0	46.9
5 - Buildings	22.8	29.9	35.4	38.8	40.0	38.2	33.0	22.9	44.9