Noise Management Plan

MW Surfacing Limited

Owl Barn,
Norwich Rd,
Besthorpe,
NR17 2LA

WESTBURY ENVIRONMENTAL

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Document Control Table

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V1	Original Noise Management Plan	Joe Craddock	Tracey Westbury	25 January 2024

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1. Introduction

1.1. Westbury Environmental Limited has prepared this Noise Management Plan (NMP) on behalf of MW Surfacing Limited (the Operator).

1.2. This NMP covers operations associated with the physical waste treatment facility. Waste treatment activities will include the handpicking, separation, screening, crushing, washing and blending of waste at Owl Barn, Norwich Rd, Besthorpe, Attleborough, NR17 2LA (Site).

1.3. The Site extends to an area of approximately 1.3 hectares. The location and extent of the Site is shown in the Permit Boundary Plan, Drawing No. 23/019b 001.

1.4. This NMP provides detailed information on the sources, risk and mitigation measures related to potential noise emissions from the operations proposed to be undertaken on Site.

1.5. A Noise Impact Assessment (NIA) was completed to fully assess the impact of operations on Site in relation to noise, this NMP implements the requirements of the NIA, see Appendix 1 Noise Impact Assessment.

Site description

1.6. The Site is located next to the Attleborough Bypass (A11), with agricultural land to its west, residential properties to the north and east the A11 runs parallel to the southern boundary, see Drawing No. 23/019b 001 Permit Boundary Plan and Figure 1.1 Site Boundary, below .

1.7. The Site is located at National Grid Reference TM 06636 96965, approximately 900 metres north east of Attleborough.

1.8. The Site extends to an area of approximately 1.3 hectares.

Figure 1.1: Site Boundary

Operating hours

1.9. The operational hours for the recycling facility are:

- 07:00 to 18:00 hrs Monday to Friday
- Saturday and Sunday waste deliveries only

1.10. No processing of waste will take place at weekends. Only vehicular movements and occasionally the offloading of waste will take place during weekends.

Maintenance and review of NMP

1.11. This Noise Management Plan forms part of the Environmental Management System (EMS). The EMS, including the Noise Management Plan, will be available on Site.

Responsibilities

1.12. The Site manager is responsible for implementation of the requirements of the Noise Management Plan and for ensuring that the control measures are followed.

1.13. Site staff are responsible detecting/reporting noise emissions from waste operations.

Review

1.14. The Noise Management Plan will be reviewed:

- If the Site receive persistent noise complaints.
- When a change in operations is deemed to have a potential effect on increasing noise emissions.
- If a failure in the existing mitigation measures has been identified.

Training

1.15. Procedures within the EMS require staff to be trained on the details included within the Noise Procedure. The requirements of the Noise Management Plan are included within the Noise Procedure. Staff training will be completed via toolbox talks.

1.16. It is the responsibility of the Site manager to ensure that appropriate training is carried out. A record of this training will be maintained on each staff members Training Record. Copies of the staff Training Records are kept and made available on request.

1.17. Should any noise complaint investigations conclude that a noise emission arose as a result of the requirements of the Noise Management Plan not being followed by Site staff, further training will be completed on implementation of the Noise Procedure within the EMS.

Relevant sector guidance on which this NMP is based

1.18. Non-hazardous and inert waste: appropriate measures for permitted facilities – July 2021

1.19. Best Available Techniques (BAT) Reference Document for Waste Treatment - 2018

2. Sensitive Receptors

Pathway

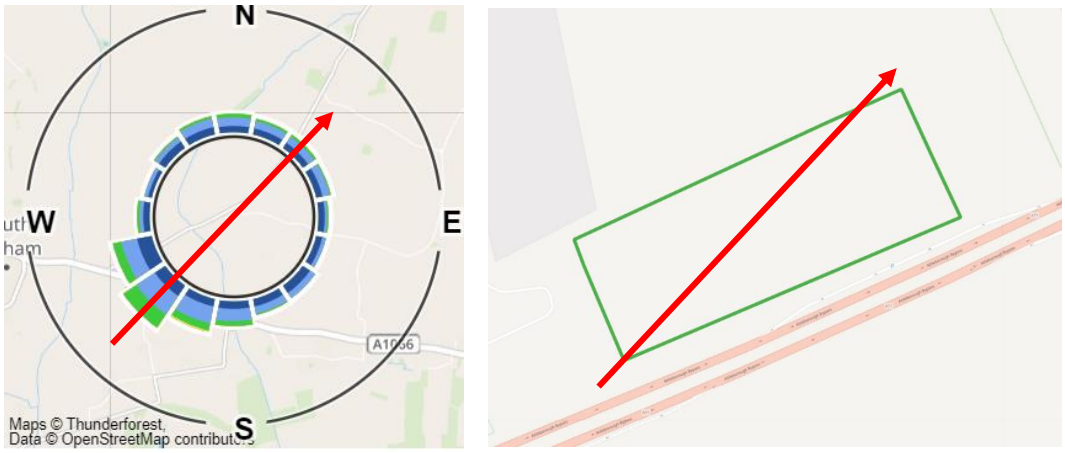
2.1. Wind direction plays a significant role in the potential impact experienced from noise. Noise will be 'carried' by the wind. It is therefore considered that noise is more likely to travel towards sensitive receptors that are 'down-wind' of the Site.

2.2. The distance from the Site boundary to the sensitive receptor plays an important role in the potential impact experienced from noise. Noise at sensitive receptors will reduce with distance from the source. Noise has the potential to cause a nuisance where sensitive receptors are closer to the Site.

2.3. Wind speed and direction data have been obtained from Hepworth weather station for the period from April 2013 to August 2023. Hepworth weather station is located approximately 20km southwest of the Site. This observing station has wind speed and direction data appropriate for characterisation of the wind climate at the Site, see **Error! Reference source not found.**. The referenced data shows that the predominant wind direction is from the south, and southwest.

Figure 2.1 Wind rose from Hepworth Weather Station

Arrow indicates predominant wind direction



Receptors

2.4. Operations on the Site have the potential to cause noise emissions. Noise emissions can create a potential nuisance in the community (residents and employees of nearby businesses) or can have an impact on local wildlife.

2.5. This Noise Management Plan identifies receptors that may be sensitive to noise emissions.

2.6. The direction and distances from the permit boundary to the closest boundary of sensitive receptors, within 1km of the Site, are provided in **Error! Reference source not found.** within 1km of the Site boundary.

Table 2.1 Sensitive Receptors within 1km of the Site boundary

Ref	Receptor	Description	Direction from Site	Approximate Distance from Site Boundary to receptor boundary (m)
1	Deciduous woodland	Woodland	North	0
2	Residential Properties (Elms Drive)	Residential	North	5
3	A11 Attleborough Bypass	Infrastructure	South	25
4	Residential Properties (Norwich Road)	Residential	North	100
5	Walnut Farm Fisheries	Commercial	South East	100
6	Residential Properties	Residential	North East	200
7	City of Cambridge Brewery	Commercial	North East	210
8	Besthorpe Plant Centre	Commercial	North	220
9	A11 services (westbound)	Commercial	East	240
10	Besthorpe Motocross Track	Recreational	South West	260
11	A11 services (eastbound)	Commercial	East	300
12	Moated site and earthworks	Scheduled Monument	South	480
13	Oakleigh Court	Residential	South West	890

2.7. The Site is located within a predominantly rural location, with residential receptors to the north/north east and agricultural land to the west and south.

2.8. The site is screened by mature trees and vegetation along its northern, eastern and southern boundary.

2.9. Due to the predominant wind direction from the south-southwest, it is considered that receptors located north-northeast of the Site are at greater risk of experiencing nuisance from noise emissions from the Site. Receptors to the north-northeast of the Site include residential and commercial properties.

2.10. A three metre high bund runs along the northern boundary of the Site will shield receptors immediately north of the Site from noise emissions.

2.11. The mitigation measures discussed in Section 4 of this Noise Management Plan will limit the likelihood of noise emissions from the Site causing an issue.

3. Noise Sources and Processes

Noise Impact Assessment conclusion

3.1. The Noise Impact Assessment concludes that the operation of the recycling facility 'may have a low impact at the nearest receptors depending on context. In context, the character of the sound is in line with the current use and will be largely marked by road traffic along the A11', see Appendix 1 Noise Impact Assessment.

3.2. Background noise for the Site has been calculated to be 62dB.

Contextual Information

3.3. The crusher is considered the dominant sound source. However, the Noise Impact Assessment clarifies that this will only be operational for a very limited period, likely two times per year.

3.4. The wash plant is proposed to be operated up to six hours per week.

3.5. The Noise Impact Assessment identifies a likely reduction in HGV/vehicle movements as a result of changes at the Site.

3.6. No processing of waste will take place at weekends, only waste deliveries will take place.

Noise sources

3.7. Table 3.1 lists the typical noise sources expected on Site and their typical sound power levels.

3.8. Operational conditions refers to the percentage of time that activities are anticipated to be carried out during a typical working day.

Table 3.1: Noise sources on Site

Noise Source	Sound Power Level (dBA)	Measurement distance (m)	Operational conditions
Excavator	75	10	100%
Wash Plant	81	10	15%
Crusher	90	10	<1%
HGV movements	108	10	4/hour

Other sources of noise

3.9. The A11 runs parallel along the southern boundary of the Site. This noise source is dominated by traffic noise.

3.10. Besthorpe Motocross track is located 260m south west of the Site. This noise source is dominated by motorbike noise.

Overview of noise processes and emissions

3.11. The layout of the Site is shown in Drawing No. 23/019b 003 Site Layout Plan.

3.12. It as anticipated that crushing operations will be the dominant noise source on the Site, however, crushing is only anticipated to account for less than 1% of the operational time.

3.13. The most significant noise emission will be from the area allocated for the wash plant and waste processing, see Site Layout Plan drawing no. 23/019b 003.

4. Control measures and process monitoring

4.1. Table 4.1 provides details of mitigation measures that will be employed at the Site.

Table 4.1 Control Measures

Potential noise source	Operational times	Contribution to overall impact	Control measures (Appropriate Measures/BAT)	Contribution to overall impact post control measures	Action taken following a noise complaint
Plant movement/ operation	07:00– 18:00 Monday to Friday Waste deliveries only Saturday and Sunday	Medium	Driver's of mobile plant will be instructed to avoid leaving engines running unnecessarily or excessive revving of engines. Non-intrusive broadband noise type reverse alarm will be used on Site. Drop heights will be minimised at all times. Maintenance of plant in accordance with manufacturer guidelines. When possible, plant will be operated at the furthest distance from nearby sensitive receptors, within the southern half of the waste storage and processing area, see Site Layout Plan drawing no. 23/019b 003. A 3m high bund is located along the northern boundary of the Site, see Site Layout Plan drawing no. 23/019b 003. This will shield nearby sensitive receptors from noise emissions on Site.	Low	Investigate complaint. Complete complaint form within the EMS and investigate the complaint. Check that operations are being carried out in accordance with the Noise Procedure within the EMS. Provide additional staff training should it be required. Plant and equipment will be checked for faults that could lead to increased noise. Repairs/maintenance carried out if necessary Temporary cessation of activities that are identified to be a source of noise emissions.

Potential noise source	Operational times	Contribution to overall impact	Control measures (Appropriate Measures/BAT)	Contribution to overall impact post control measures	Action taken following a noise complaint
Material handling	07:00– 18:00 Monday to Friday Waste deliveries only Saturday and Sunday	Medium	The speed limit for all vehicles on Site is 5mph. Speed humps will not be used on Site. No unnecessary double handling of material. Drop heights will be minimised, which will minimise noise. A 3m high bund is located along the northern boundary of the Site, see Site Layout Plan drawing no. 23/019b 003. This will shield nearby sensitive receptors from noise emissions on Site. The wash plant is to be located behind a 3m high concrete screen.	Low	Investigate complaint. Complete complaint form within the EMS and investigate the complaint. Check that operations are being carried out in accordance with the Noise Procedure within the EMS. Provide additional staff training should it be required.
HGV/ road sweeper deliveries	07:00– 18:00 Monday to Friday Waste deliveries only Saturday and Sunday	Medium	The speed limit for all vehicles on Site is 5mph. Speed humps will not be used on Site. The Site surface will be maintained to ensure the surface is kept free from potholes and ruts. Heavy Goods Vehicles (HGV's) within the control of the Operator will have non-tonal reverse type alarms fitted.	Low	Investigate complaint. Complete complaint form within the EMS and investigate the complaint. Vehicles will be checked for faults that could lead to increased noise. Repairs/maintenance carried out if necessary.

Potential noise source	Operational times	Contribution to overall impact	Control measures (Appropriate Measures/BAT)	Contribution to overall impact post control measures	Action taken following a noise complaint
			Where HGV's are sub-contractor vehicles they will be encouraged to use this type of non-tonal alarm. Driver's of HGVs will be instructed to avoid leaving engines running unnecessarily or excessive revving of engines. A 3m high bund is located along the northern boundary of the Site, see Site Layout Plan drawing no. 23/019b 003. This will shield nearby sensitive receptors from noise emissions on Site.		Check that operations are being carried out in accordance with the Noise Procedure within the EMS. Provide additional staff training should it be required.
Wash plant	07:00– 18:00 Monday to Friday Waste deliveries only Saturday and Sunday	Medium	Only trained and competent staff will operate the machinery. Machinery will be maintained in line with manufacturer guidance. Construction of 3m high concrete block screen to the north and east of the wash plant, see Site Layout Plan drawing no. 23/019b 003. The wash plant is to be located at the maxiumum distance from the nearest sensitive receptors.	Low	Investigate complaint. Complete complaint form within the EMS and investigate the complaint. Check that operations are being carried out in accordance with the Noise Procedure within the EMS. Provide additional staff training should it be required. Plant and equipment will be checked for faults that could lead to increased noise.

Potential noise source	Operational times	Contribution to overall impact	Control measures (Appropriate Measures/BAT)	Contribution to overall impact post control measures	Action taken following a noise complaint
			A 3m high bund is located along the northern boundary of the Site, see Site Layout Plan drawing no. 23/019b 003. This will shield nearby sensitive receptors from noise emissions on Site.		Repairs/maintenance carried out if necessary. Temporary cessation of activities that are identified to be a source of noise emissions if relevant.
Crushing and screening	07:00– 18:00 Monday to Friday Waste deliveries only Saturday and Sunday	High	Only trained and competent staff will operate the machinery. Machinery will be maintained in line with manufacturer guidance. A 3m high bund is located along the northern boundary of the Site, see Site Layout Plan drawing no. 23/019b 003. This will shield nearby sensitive receptors from noise emissions on Site. The crusher is to be located at the maxiumum distance from nearby sensitive receptors when possible, within the southern half of the waste storage and processing area, see Site Layout Plan drawing no. 23/019b 003.	Medium	Investigate complaint. Complete complaint form within the EMS and investigate the complaint. Check that operations are being carried out in accordance with the Noise Procedure within the EMS. Provide additional staff training should it be required. Plant and equipment will be checked for faults that could lead to increased noise. Repairs/maintenance carried out if necessary. Temporary cessation of activities that are identified to be a source of noise emissions if relevant.

Noise Monitoring

4.2. All staff must report unusual or abnormal noise to Site Management, in accordance with their noise training. Noise will be routinely monitored using noise monitoring equipment at the Site, see Appendix 2 Noise Control and Noise Monitoring.

4.3. Monitoring will be carried out by a competent person. The data collected during this monitoring will be recorded to help identify changes in sound levels from the Site over time, see Appendix 4 Noise Monitoring Form. This will help to inform whether changes to operations are needed or additional control measures need to be implemented to control noise generated from operations.

4.4. The location of monitoring points are shown on Proposed Site Layout Plan Drawing No. 23/019b 003.

Table 4.2 Description of sound monitoring requirements

Measurement Location	Frequency of measurement	Minimum measurement duration	Operational Conditions	Operating conditions on Site	Typical Background Noise
MP1	Once a month	5 mins	Within operational hours (07:00 – 18:00 Monday to Friday) when waste processing is undertaken.	Waste acceptance and processing.	62 dB or below
MP2	Once a month	5 mins	Within operational hours (07:00 – 18:00 Monday to Friday) when waste processing is undertaken.	Waste acceptance and processing.	62 dB or below
MP3	Once a month	5 mins	Within operational hours (07:00 – 18:00 Monday to Friday) when waste processing is undertaken.	Waste acceptance and processing.	62 dB or below

4.5. Noise monitoring will be completed in accordance with the Noise Control and Monitoring Procedure, see Appendix 2 Noise Control And Monitoring.

Onsite procedures for managing noise

4.6. Table 4.3 below sets out the procedures in place to manage noise emissions from the Site.

Table 4.3 Description of onsite processes which will ensure emissions do not increase on Site.

Description of procedure	Procedure	When this will be carried out?	Corrective action
Replacing old / faulty equipment	Procurement of new equipment	When equipment requires replacing	Replace equipment that have sound levels which are equivalent or lower sound levels compared to existing equipment

EMS procedures	Planned Preventative Maintenance and Inspections checklist	Annually, monthly, weekly	Routine inspections will be undertaken to ensure that the Site is maintained to ensure noise is minimised. Inspections will cover site surfacing, plant etc.
Staff Training	Staff Training	All staff will receive training on control measures for noise when they start working at the Site.	Refresher training shall be provided should a need be identified i.e. staff not following Noise Management Plan.

5. Complaints reporting

5.1. In the case of any incidents that cause significant noise emissions, staff will report the incident to the Site Manager.

5.2. The Site Manager will record the incident and any steps taken to resolve the issue e.g., pausing operation or repairing failing machinery. Procedures and forms relating to the recording of incidents are included within the EMS.

5.3. If the incident was raised because of a complaint, a Complaint Form will be completed. All complaints are acknowledged and recorded.

5.4. The Complaint Form will record the incident that led to the complaint and any remedial action taken. A copy of the Complaint Form is provided in Appendix 3 Complaint Form.

5.5. It is the responsibility of the Site Manager or their delegate to complete the Complaints Form.

5.6. Staff will investigate all complaints to identify the source of the problem. All incidents/ complaints will be investigated on the same day, where possible. The investigation will include.

- Travel to the site from which the complaint is reported to originate to make checks on noise levels.
- Ensuring the inspections of plant /equipment have been complete.
- Ensuring this Noise Management Plan is being followed accordingly.
- Monitoring of noise emissions from the area from which the noise originated, see Appendix 2 Noise Control and Noise Monitoring.
- If noise is detectable, identification of where on Site the noise may be originating.

5.7. If the source is not from the Site and is attributable to another source, the complainant will be notified, and the source recorded. If the source of the noise is found to be from the Site the complainant will be notified as part of the response to the complaint.

5.8. The Operator will then go about identifying the reason for the noise emission e.g., breach of procedure, training, mitigation or increase in noise at the source.

5.9. Records of any monitoring carried out as part of the complaint investigation process will be kept with the completed complaint form.

5.10. A complaint is considered to be resolved when the source of the noise is identified, and remedial action is taken (if required) and relevant persons notified. Feedback will be requested from the complainant to check they are satisfied with the outcome.

5.11. Should the investigation identify the need for additional mitigation or other remedial action, the appropriate mitigation/ action will be implemented as soon as practicable.

Drawings

Permit Boundary Plan	Drawing No.	23/019b 001
Sensitive Receptors Plan	Drawing No.	23/019d 002
Site Layout Plan	Drawing No.	23/019b 003

MW Surfacing Limited

Permit Boundary Plan

Reference: 23/019b 001

Owl Barn
Norwich Road
Besthorpe
Attleborough
NR17 2LA

Scale: 1:2000

07/11/2023

Created by: JC
Checked by: TW

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MW Surfacing Ltd

Sensitive Receptors Plan

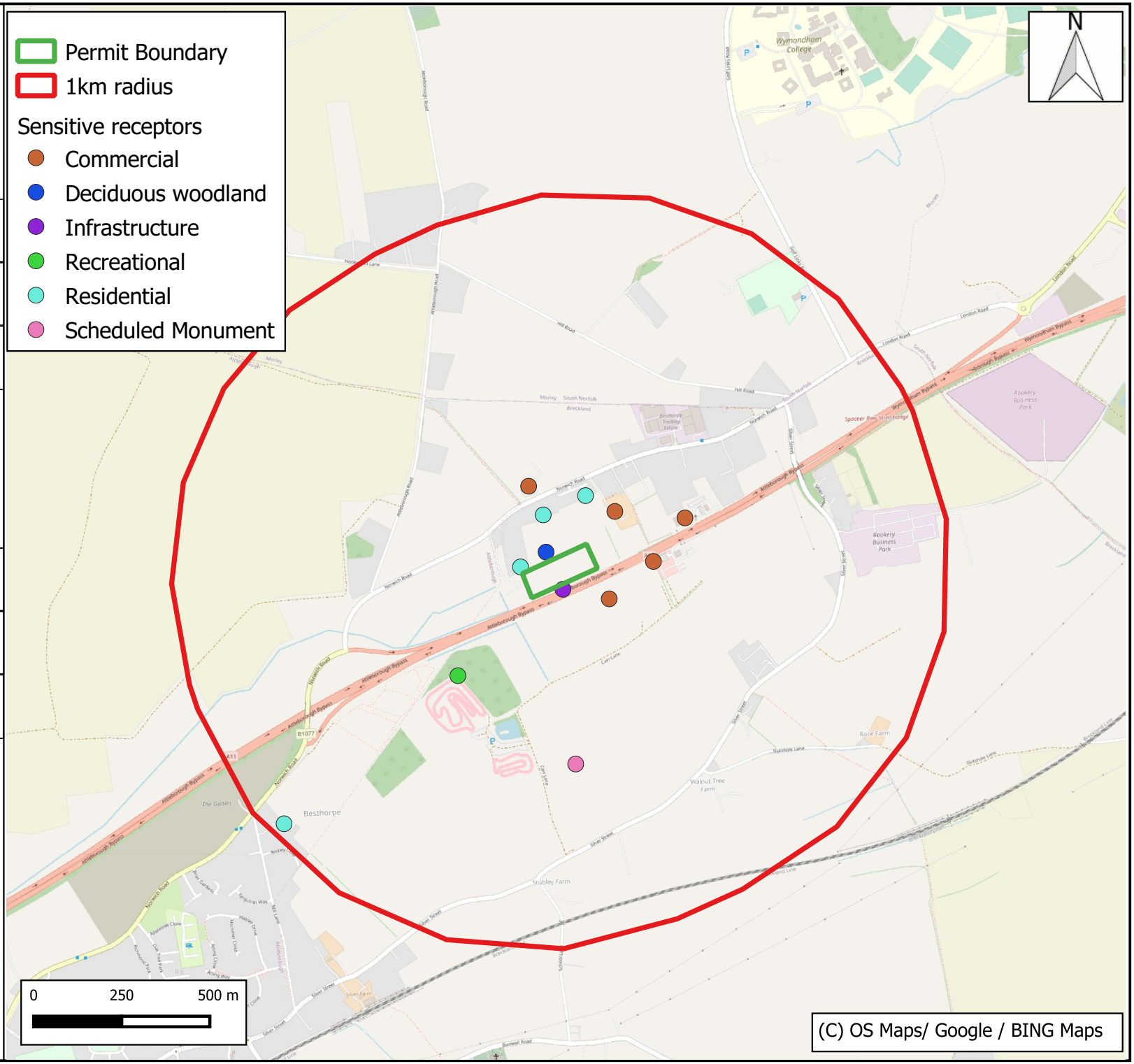
Reference: 23/019d 002

Owl Barn
Norwich Rd
Besthorpe
Attleborough
NR17 2LA

Scale: 1:15,000

06/10/2023

Created by: JC
Checked by: TW



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MW Surfacing Limited

Site Layout Plan

Reference: 23/019b 003

Owl Barn
Norwich Road
Besthorpe
Attleborough
NR17 2LA

Scale: Not to scale

25/01/2024

Created by: JC
Checked by: TW

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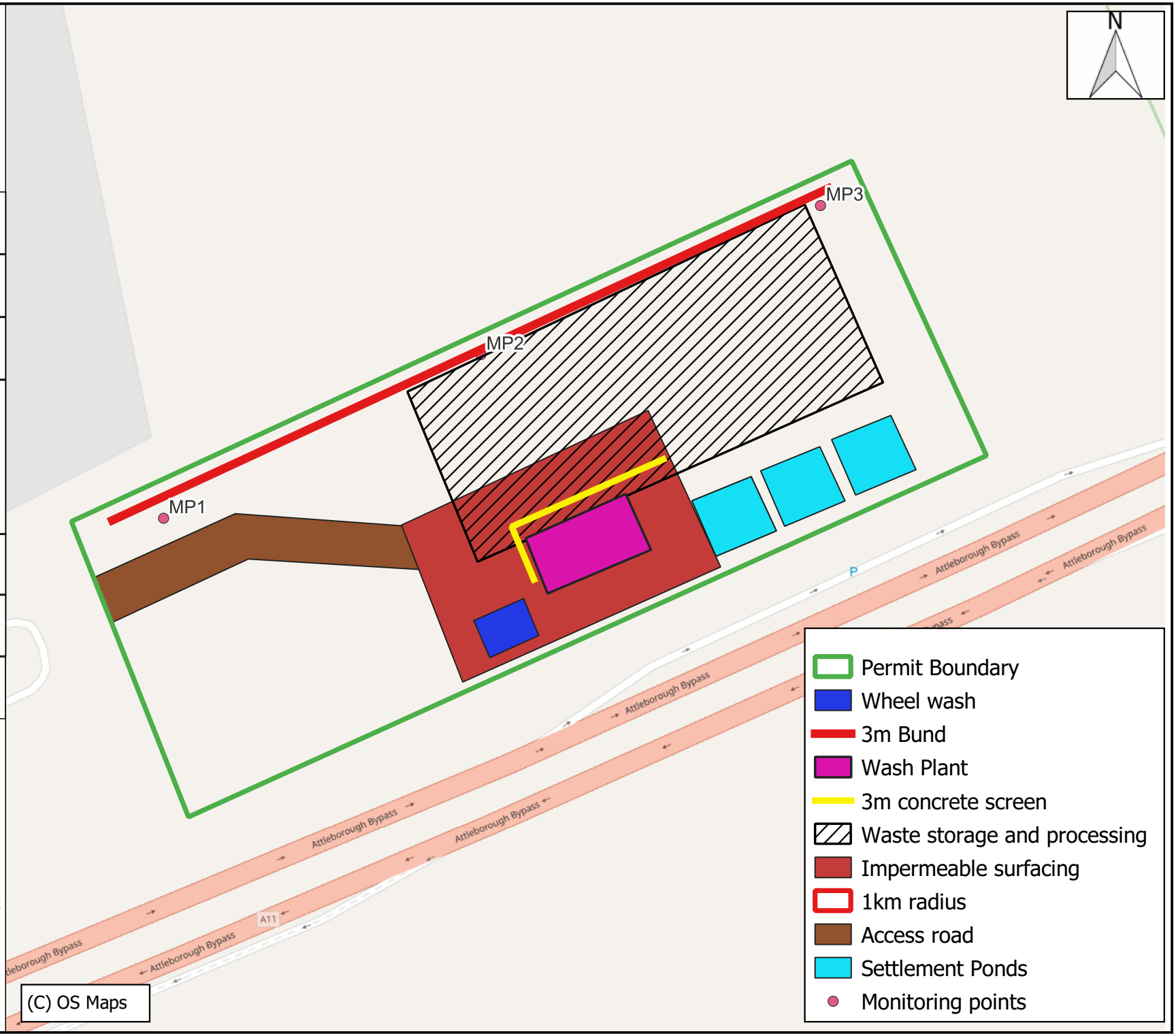

Appendix 1

Noise Impact Assessment

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PREPARED: Friday, 03 November 2023

MW SURFACING, BESTHORPE

OPERATIONAL SOUND IMPACT ASSESSMENT

CONTENTS

LIST OF ATTACHMENTS

Project Ref:	AS13261	**Title:**	MW Surfacing, Besthorpe
Report Ref:	AS13261.231015.R1.3	**Title:**	Operational Sound Impact Assessment
Client Name:	MW Surfacing		
Project Manager:	Ben Dymock		
Report Author:	Alec Korchev		
Clarke Saunders Acoustics Winchester SO22 5BE		This report has been prepared in response to the instructions of our client. It is not intended for and should not be relied upon by any other party or for any other purpose.	

1.0 INTRODUCTION

1.1 The existing MW Surfacing facility in Besthorpe (the Site) is applying for a permit to operate a washer / screener and periodic operation of a mobile crusher, limited to circa twice per year. Clarke Saunders Acoustics (CSA) has been commissioned by MW Surfacing to undertake an operational sound impact assessment of the facility, including the proposed plant and mobile plant and HGV movements associated with their use.

1.2 This report provides an assessment of cumulative noise impacts associated with the proposed works and presents a processes and communication management protocol that should be maintained throughout the works.

1.3 The author is a Specialist Consultant at CSA and is a corporate member of the Institute of Acoustics [IOA]. The author also holds a Master of Science degree in Environmental and Architectural Acoustics from London South Bank University [LSBU] and is currently pursuing a Ph. D at LSBU. CSA is a member of the Association of Noise Consultants [ANC].

2.0 SITE DESCRIPTION

2.1 The application site is bounded to the south by the A11 (Attleborough Bypass), rural land to the east and west, and residential premises to the north. The nearest noise sensitive receptors have been identified as the residential dwellings at the end of Elm Drive, circa 95m northwest of the proposed plant location. Further receptors are located at along Norwich Road, gardens and facades of which are in excess of 90 and 170m north of the proposed fixed plant[1] location, respectively.

2.2 The plant items are expected to improve operations by increasing the amount of material that can be processed onsite, reducing the number of vehicle movements in and out of the Site.

2.3 The washer / screener has been conservatively estimated to operate over 6 hours once per week (Friday) during the wintertime, reducing to 6 hours once per month during the summertime. In-situ, there is a likelihood that actual operational time would be lower. The plant will only operate between the hours of 07:00 and 18:00. The tracked excavator may operate more regularly and has been considered accordingly.

2.4 The crusher is proposed to operate only circa two times per year. The crusher will not be permanently installed and will be moved to a position near the washer / screener when required.

3.0 ASSESSMENT METHODOLOGY

3.1 BRITISH STANDARD BS4142:2014+A1:2019

3.1.1 British Standard BS4142:2014+A.1:2019[2] describes a method for rating and assessing sound of an industrial and/or commercial nature and as such is appropriate for the assessment of the washer / screener and tracked excavator. A summary of the BS4142 methodology is presented in Appendix B.

[1] Referring to the washer / screener location as shown in the attached AS13261/SP1
[2] British Standard BS4142:2014 + A.1:2019 *Methods for rating and assessing industrial and commercial sound*

3.1.2 Supplemental guidance on the application of BS4142 is provided by the Environmental Agency is presented in the Method Implementation Document (MID), published 27 March 2023.[3]

3.1.3 The Environmental Agency Guidance on Noise and vibration management: environmental permits (January 2022)[4] states:

"You must use 'BS 4142: Methods for rating and assessing industrial and commercial sound' to quantify the level of environmental noise impact from industrial processes."

3.1.4 A summary of the BS4142 methodology is presented in Appendix B.

4.0 SOUND SURVEY AND RESULTS

4.1 A survey of existing baseline sound levels was undertaken at approximately 1.5m height, at the site / receptor garden boundaries as depicted on the attached indicative site plan AS13261/SP1. Measurements of consecutive 5-minute L_{Aeq}, L_{Amax}, L_{A10} and L_{A90} sound pressure levels were taken between Wednesday 4th and Saturday 7th October 2023.

4.2 The following integrating-averaging class 1 sound level meters, conforming to the specifications of BS EN 61672-1:2013 '*Electroacoustics. Sound level meters. Specifications*', was used during the course of the survey:

- 2 no. NTi data logging sound level meter type XL2; and
- 1 no. Rion sound level calibrator type NC74.

4.3 The calibration of the sound level meters was verified before and after use. No calibration drift was detected. All equipment has current certified traceable laboratory calibration which is appended to this report.

4.4 The weather during the survey was generally dry with light winds, which made the conditions suitable for the measurement of environmental sound. Some periods of increased wind speed were observed, and the data considered carefully. The periods are shown in grey in the attached time histories AS13261/TH.

4.5 Although the MW Surfacing site was operational during the survey, it is understood that operations were limited to vehicular movements and intermittent, short term material sorting, which are not considered to have influenced the background L_{A90} levels, which, are driven by the constant traffic flow on the A11.

4.6 Measurements were made following procedures in BS 7445:1991[6] (ISO1996-2:1987) and BS4142:2014 + A.1:2019, as required.

4.7 Figures AS13261/TH show the L_{Aeq}, L_{Amax}, L_{A10} and L_{A90} sound pressure levels as time histories at the measurement positions.

4.8 Table 1 provides a summary of the measured typical background and average sound levels at the monitoring location during the survey. The background sound level was determined by traffic sound from the local road, specifically form the A11, a busy A-road. The typical

[3] https://www.gov.uk/government/publications/method-implementation-document-mid-for-bs-4142/method-implementation-document-mid-for-bs-4142
[4] https://www.gov.uk/government/publications/noise-and-vibration-management-environmental-permits/noise-and-vibration-management-environmental-permits
[6] British Standard BS 7445:1991 *Description and measurement of environmental noise* Part 2 *Acquisition of data pertinent to land use*

background sound pressure level is derived as the lowest 10th percentile of the measured $L_{A90,5min}$ data.

4.9 Data is presented for daytime, night-time and the intended operating period of the plant.

MONITORING LOCATION	MONITORING PERIOD	TYPICAL $L_{A90,5MINS}$	AVERAGE $L_{Aeq,T}$
Position LT1	07:00 to 23:00 hours	56 dB	66 dB
	23:00 to 07:00 hours	42 dB	60 dB
	07:00 to 18:00 hours	62 dB	67 dB
Position LT2	07:00 to 23:00 hours	55 dB	66 dB
	23:00 to 07:00 hours	40 dB	59 dB
	07:00 to 18:00 hours	62 dB	67 dB

Table 1: Summary of measured typical background and average sound levels [dB ref. 20µPa]

5.0 TYPICAL OPERATIONAL NOISE EMISSIONS

5.1 SOURCE SOUND EMISSIONS

5.1.1 The washing / screening plant is proposed to operate up to 6 hours once per week (Fridays) between 07:00 and 18:00hrs during the summertime, reducing to 6 hours once per month during the wintertime. In-situ, there is a likelihood that actual operational time may be lower. Operation of the tracked excavator is likely to be more regular, however also likely to be used in shorter durations.

5.1.2 The crusher is proposed to operate only circa two times per year between 07:00 and 18:00hrs. The crusher will not be permanently installed and will be moved to a position near the washer / screener when required. Due to the limited operational periods, the BS4142 assessment considers operational scenarios with and without the crusher.

5.1.3 The proposed plant is not yet on site, therefore, manufacturer and library data for similar items have been referenced.

5.1.4 Sound levels for the exact model of the washer / screener are unknown though it is understood to have an approximate power rating of 22.5kW.

5.1.5 In-lieu of clear sound level data from the specific plant item proposed, this assessment has used data from the equipment schedule presented in BS 5228-1:2009+A1:2014,[7] with reference, as required, to CSA library data. Based on CSA library data, washer / screeners with power ratings between 50kW and 60kW can typically generate sound pressure levels between L_{Aeq} 78 dB and L_{Aeq} 84 dB at 10 metres, respectively.

5.1.6 Sound levels of L_{Aeq} 81 dB for a 56kW unit have been used in this assessment, however in-situ levels are expected to be considerably lower with the proposed unit, owing to the significantly lower power rating. This is, therefore, considered to represent a particularly robust assessment.

[7] British Standard BS 5228-1:2009+A1:2019 *Code of practice for noise and vibration control on construction and open sites* Part 1 *Noise*

5.1.7 The sound pressure data presented in Table **2** have been adopted for this assessment.

PLANT ITEM	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	**dB(A)**
Screen stockpiler	93	86	79	78	75	71	69	62	**81**
	(BS5228-1 ref. Table C.10 no 14)								
Tracked Excavator	82	84	75	69	69	67	62	57	**75**
	(BS5228-1 ref. Table C.6 no. 11)								
Tracked Semi-mobile crusher	91	91	88	87	85	83	78	68	**90**
	(BS5228-1 ref. Table C.9 no. 14)								

Table 2: Source sound levels at 10 metres

5.2 SITE LAYOUT

5.2.1 The site is bounded to the south by the A11, and to the north by residential receptors. The A11 is elevated over the Site; without any obstruction, sound from the A11 dominates the sound climate across the site at the nearest residential premises.

5.2.2 The positioning of the washer / screener also represents a maximum practicable distance from the surrounding receptors. To further minimise the impact on the neighbouring residences, the proposals also include provision for a 3m high concrete block screen built at the proposed plant position as indicated on attached site plan.

5.2.3 The Site also features a 3m high bund along the northern boundary. Owing to the relative elevation of the roadway, the bund is not expected to significantly reduce road traffic noise levels at the receptors.

5.2.4 The excavator will move around the Site as required, meaning propagation and screening losses will vary depending on its given location at a time. Two operational scenarios have therefore been calculated to demonstrate the cumulative levels associated with the operational extents of the Site. With reference to the calculations presented in Appendix C, these are defined as follows:

- Scenario A: Excavator located at its closest position to the northern bund / receptors.
- Scenario B: Excavator located at its furthest position from the northern bund / receptors.

5.2.5 When required, the crusher will also be brought to generally the same location as the washer / screener. During these periods it is not expected that the washer / screener will be operational, and the excavator is likely to be primarily located behind the same screen that encloses the plant area.

5.2.6 A third calculation scenario, Scenario C has therefore been included in the calculations for this operational requirement.

5.3 BS4142 ASSESSMENT

5.3.1 The type and character of the plant is unlikely to give rise to any perceived tonality at receptor locations, however it may be intermittent and impulsive, depending on the actual sound levels of the proposed unit.

5.3.2 For all scenarios, an impulsivity correction of +3 dB has been applied on the basis that impulsive features can be 'just perceptible' at the respective receptors. For scenario C an additional correction of +3 dB has been applied on the basis that intermittent features could be 'readily distinctive' against the acoustic environment. No other feature corrections have been applied.

5.3.3 The numerical assessment is presented in Table 3.

STEP	ELM DRIVE			NORWICH ROAD		
	A	B	C	A	B	C
Specific Sound Level at Receptor	54 dB	53 dB	59 dB	54 dB	53 dB	60 dB
Acoustic Feature Correction	+3 dB	+3 dB	+6 dB	+3 dB	+3 dB	+6 dB
Rating Level	57 dB	56 dB	65 dB	57 dB	56 dB	66 dB
Background Sound Level (L_{A90})	62 dB	62 dB	62 dB	62 dB	62 dB	62 dB
Assessment Level	-5 dB	-6 dB	+3 dB	-5 dB	-6 dB	+4 dB

Table 3: BS4142 Sound assessment

5.4 The assessment shows that the proposals may result in levels below background sound levels at the most affected receptors for Scenarios A and B, whilst Scenario C may result in levels of up to 4 dB over background sound levels at the most affected receptors. Under the BS4142 methodology, this would indicate that the operation of this plant is expected to result in a 'low impact' and potential 'adverse impact,' respectively, depending on context.

5.5 CONTEXT

5.5.1 BS4142 is primarily a context-based assessment method, which recognises the importance of the environment and circumstances in which the specific sound occurs.

5.5.2 The above summary assessment could indicate a low to adverse impact from the proposed work, depending on the context.

5.5.3 The context of the Site can be described as being dominated by existing road traffic noise along the A11, as well as some contributions from the operations at the existing MW Surfacing site.

5.5.4 The proposals are also likely to reduce the number of HGVs currently coming into and out of the Site. Though the exact influence on vehicular movements is unquantifiable at this stage (and falls out of the scope of BS4142), it is expected to improve conditions at the residences situated along the access road leading to the MW Surfacing Site.

5.5.5 For Scenarios A and B, impact is further contextualised by considering the on-time of the excavation plant. For the purposes of this robust assessment, the predictions assume that all plant will be operating continuously over the 1-hour period for all other hours in the assessment period. A sensitivity check, where excavation plant only operates for circa 50% of the time, would further reduce the Specific Sound Level for Scenarios A and B by 1-2 dB.

5.5.6 The crusher associated with Scenario C is also only proposed to operate circa two times per year, reducing the potential for 'adverse impact' significantly.

5.5.7 Finally, due to the limited nature of its use, the operation of the proposed crusher operation in Scenario C may not entirely fall within scope of BS4142. The plant is not permanent and, therefore, any perceived impact would be temporary and non-continuous. Guidance provided in PPG Minerals[8] applies to temporary developments that may generate noise of an industrial nature, and though not fully applicable, may be relevant to this assessment.

5.5.8 With reference to PPG Minerals, predicted noise levels fall comfortably within the limit of 10dB above the measured background sound pressure level, L_{A90}.

5.6 UNCERTAINTY

5.6.1 As per the requirements of BS 4142:2014, the uncertainty in the assessment is considered and reported. This is not an indication of error but an acknowledgment of possible variability of the factors contributing to the assessment.

5.6.2 Use of a calibrated type 1 sound level meter is considered to reduce measurement instrument error to insignificant levels as compared with environmental variations.

5.6.3 Measurements were taken at an acoustically equivalent location to the assessment position. This therefore represents a robust assessment of the background sound climate.

5.6.4 The meteorological conditions during the baseline sound survey were generally dry with light winds, which made the conditions suitable for representative environmental sound data capture. This reduces the uncertainty in the typical impact scenarios when compared with background sound levels which have captured in periods of unfavourable conditions and may show a more favourable outcome.

5.6.5 The baseline sound level is based on measurements captured using a 5-minute sampling time. This higher degree of resolution offers a more robust appraisal of the 'typical' background sound level over 15-minute and 1-hour time periods used in the BS 4142 assessment.

5.6.6 Exact source sound pressure / sound power levels are currently unknown. In-lieu of more appropriate data, sound levels for larger (and typically louder) units has been used for this assessment.

[8] https://www.gov.uk/guidance/minerals

6.0 CONCLUSIONS

6.1 Clarke Saunders Acoustics has been commissioned by MW Surfacing to undertake an operational sound impact assessment of the MW Surfacing facility in Besthorpe.

6.2 CSA library data as well as data from British Standard BS 5228-1:2009+A1:2019 for the various equipment items proposed has been used in this assessment to predict the noise levels at the nearest noise-sensitive receptors in line with the procedures in BS 4142:2014+A1:2019.

6.3 The BS4142 assessment shows that the work may have a 'low impact' at the nearest receptors depending on context. In context, the character of the sound is in line with the current use and will be largely masked by road traffic along the A11.

6.4 The change to road traffic noise levels from the local road network as a result of the reduced HGVs associated with this development is also expected to benefit some of the neighbouring residences.

A Korchev

Alec Korchev MIOA
CLARKE SAUNDERS ACOUSTICS

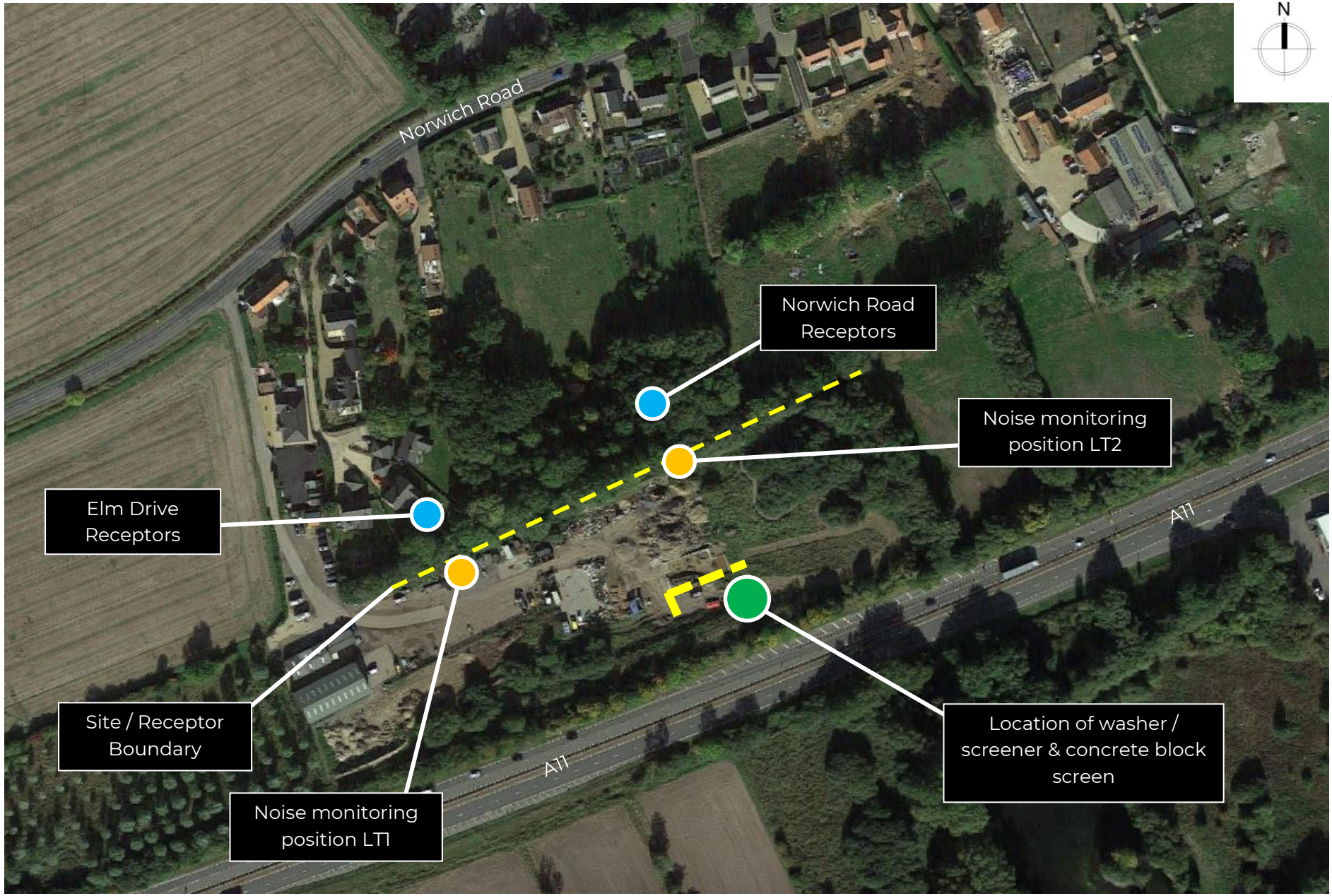

Figure AS13261/SP1

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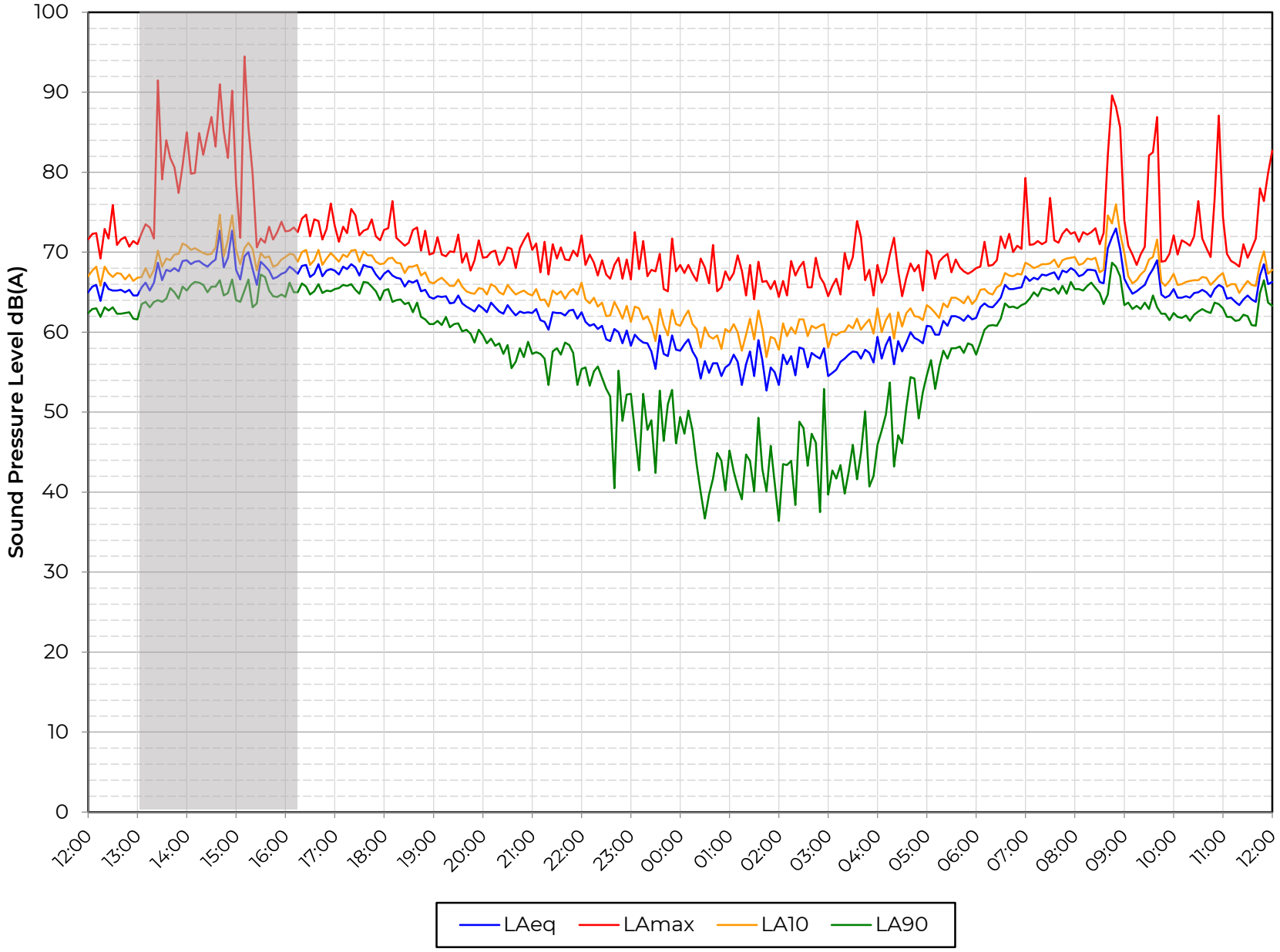
MW Surfacing, Besthorpe

Position 1



Wed 04 Oct to Thu 05 Oct

Figure AS13261/TH1

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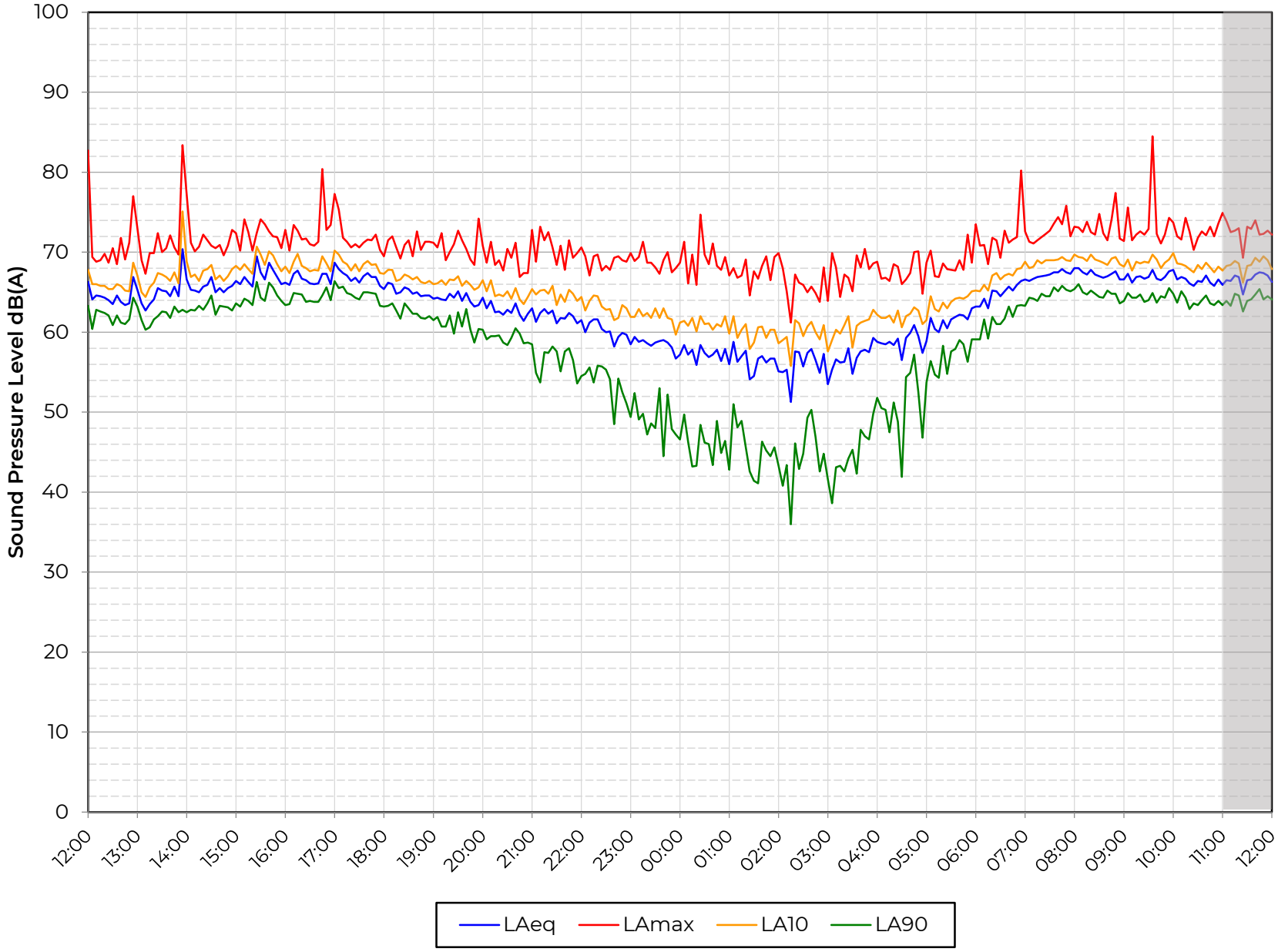
Position 1



Thu 05 Oct to Fri 06 Oct

Figure AS13261/TH2

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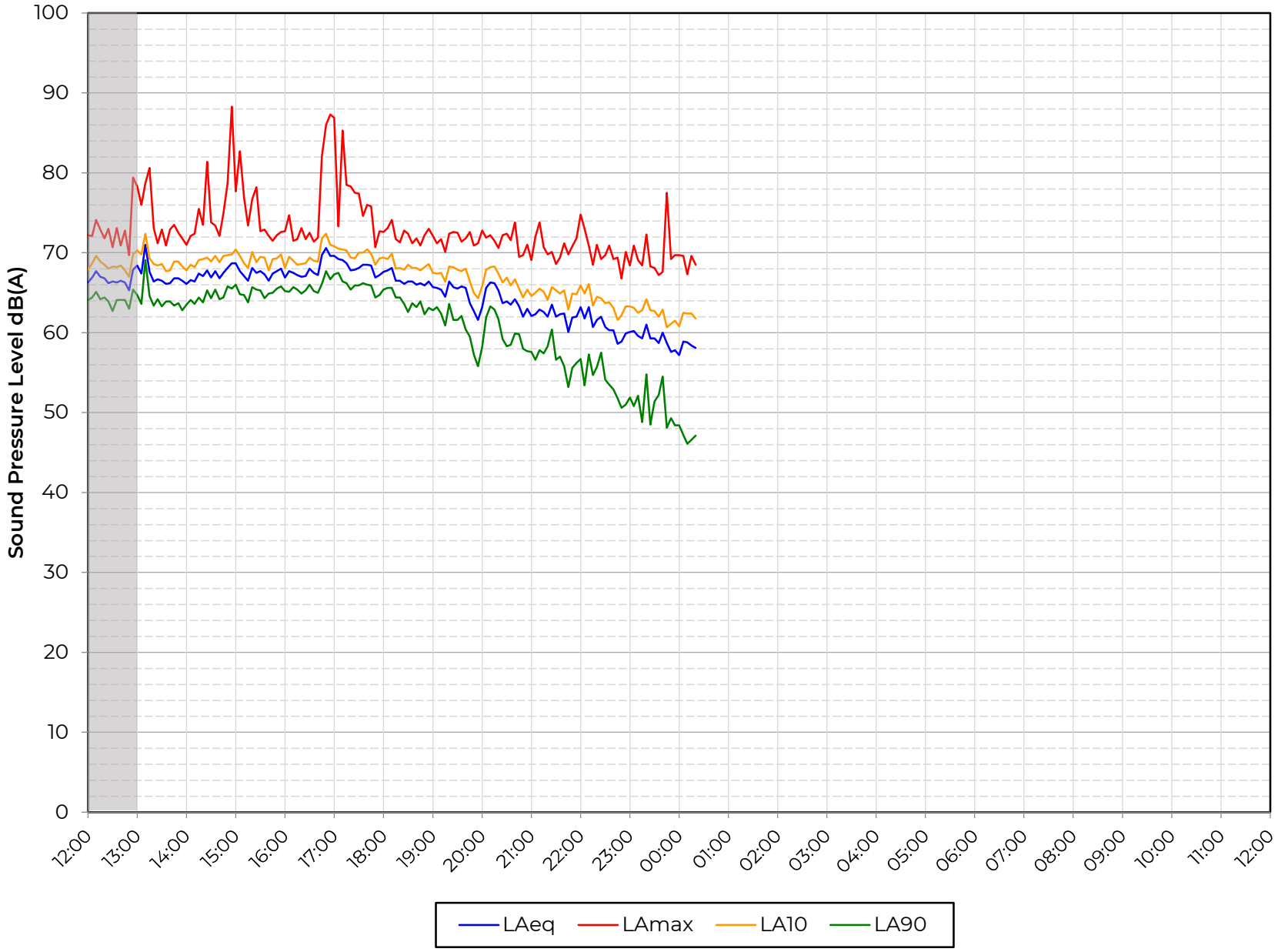
MW Surfacing, Besthorpe

Position 1



Fri 06 Oct to Sat 07 Oct

Figure AS13261/TH3

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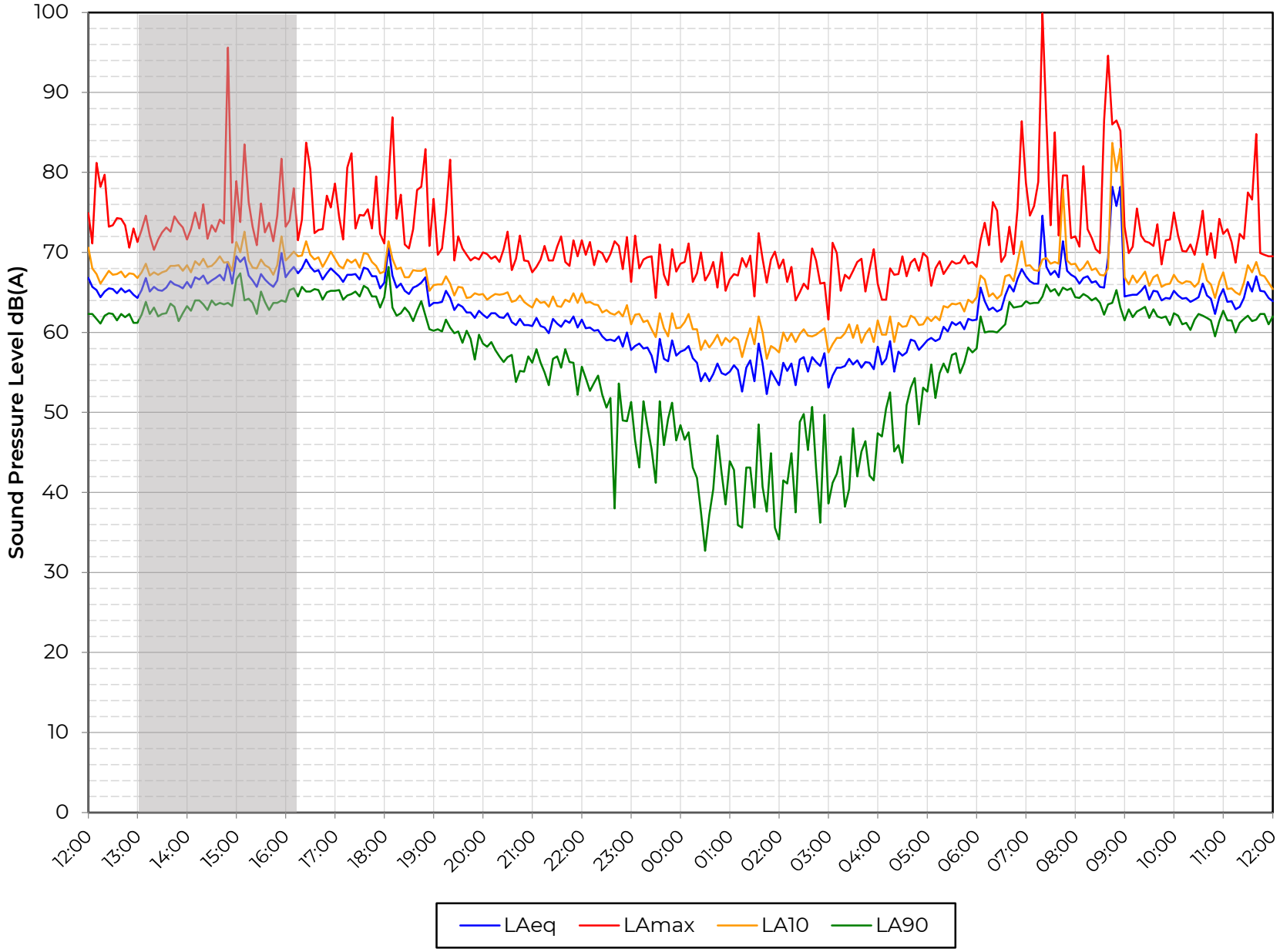
MW Surfacing, Besthorpe

Position 2



Wed 04 Oct to Thu 05 Oct

Figure AS13261/TH1

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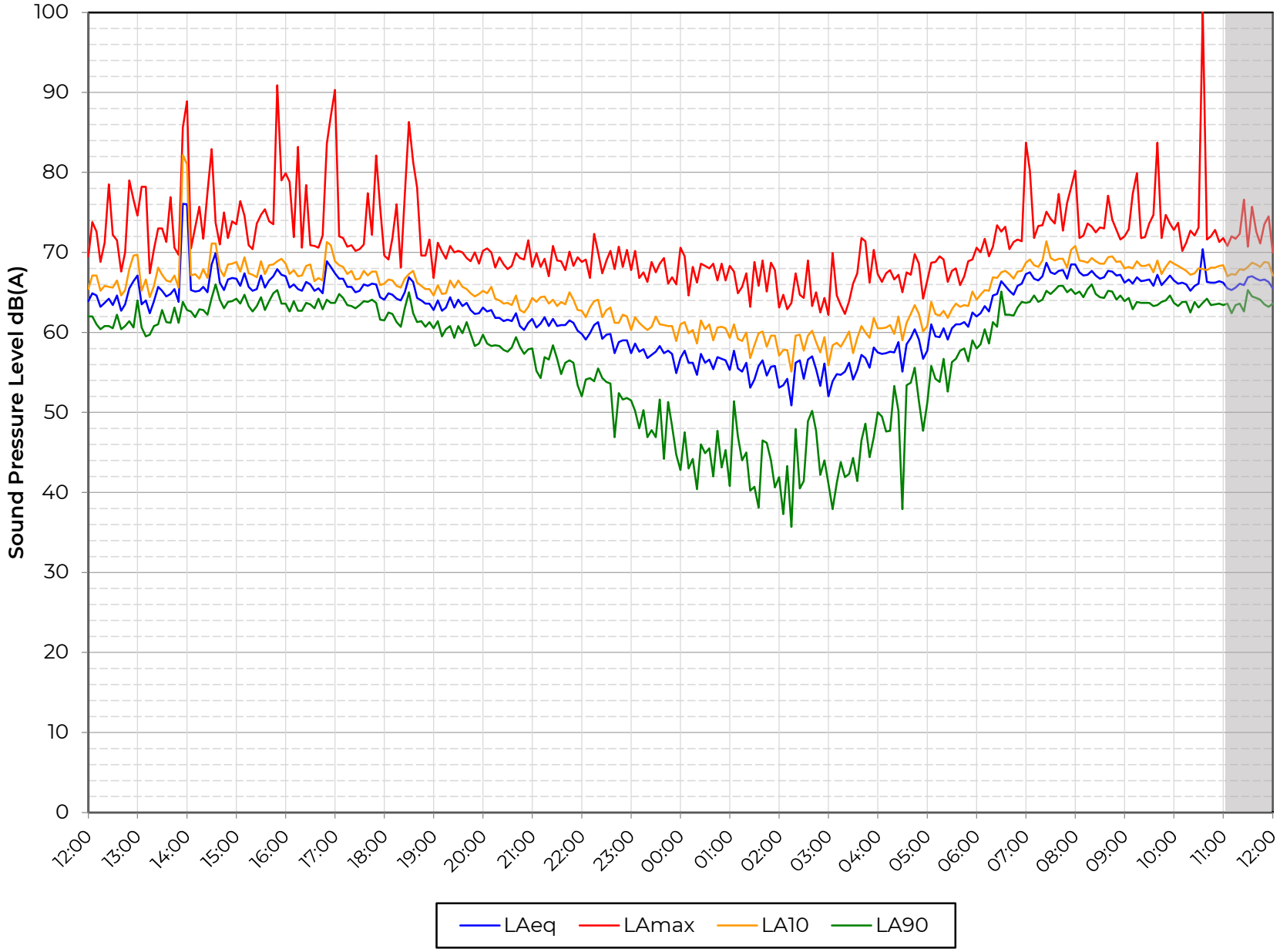
MW Surfacing, Besthorpe

Position 2



Thu 05 Oct to Fri 06 Oct

Figure AS13261/TH2

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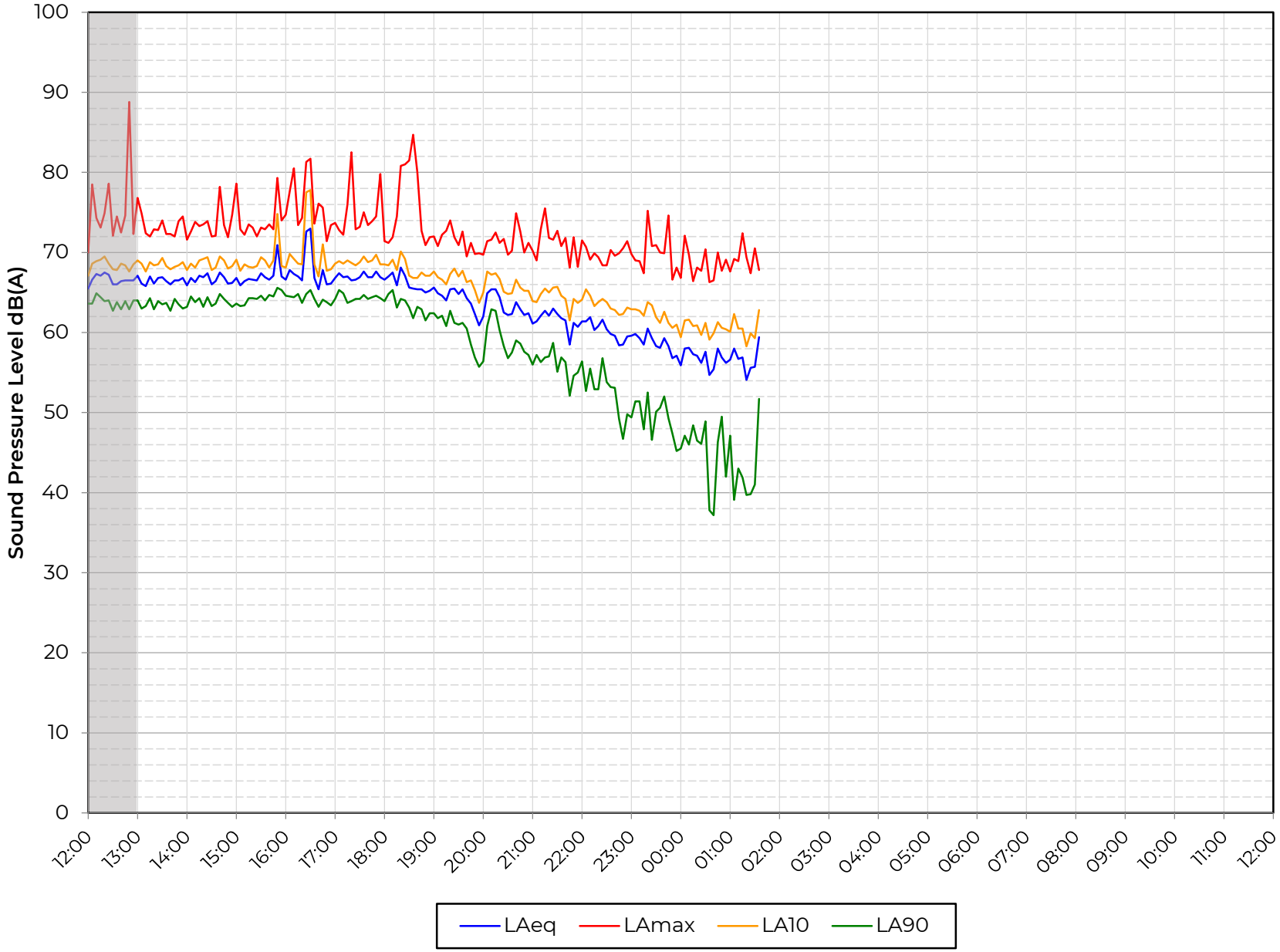
Position 2



Fri 06 Oct to Sat 07 Oct

Figure AS13261/TH3

APPENDIX A

Acoustic Terminology

The human impact of sounds is dependent upon many complex interrelated factors such as 'loudness', its frequency (or pitch) and variation in level. In order to have some objective measure of the annoyance, scales have been derived to allow for these subjective factors.

Sound Vibrations propagating through a medium (air, water, etc.) that are detectable by the auditory system.

Noise Sound that is unwanted by or disturbing to the perceiver.

Frequency The rate per second of vibration constituting a wave, measured in Hertz (Hz), where 1Hz = 1 vibration cycle per second. The human hearing can generally detect sound having frequencies in the range 20Hz to 20kHz. Frequency corresponds to the perception of 'pitch', with low frequencies producing low 'notes' and higher frequencies producing high 'notes'.

dB(A): Human hearing is more susceptible to mid-frequency sounds than those at high and low frequencies. To take account of this in measurements and predictions, the 'A' weighting scale is used so that the level of sound corresponds roughly to the level as it is typically discerned by humans. The measured or calculated 'A' weighted sound level is designated as dB(A) or L_A.

L_{eq}: A notional steady sound level which, over a stated period of time, would contain the same amount of acoustical energy as the actual, fluctuating sound measured over that period (e.g. 8 hour, 1 hour, etc).

The concept of L_{eq} (equivalent continuous sound level) has primarily been used in assessing noise from industry, although its use is becoming more widespread in defining many other types of sounds, such as from amplified music and environmental sources such as aircraft and construction.

Because L_{eq} is effectively a summation of a number of events, it does not in itself limit the magnitude of any individual event, and this is frequently used in conjunction with an absolute sound limit.

L_{10} & L_{90}: Statistical L_n indices are used to describe the level and the degree of fluctuation of non-steady sound. The term refers to the level exceeded for n% of the time. Hence, L_{10} is the level exceeded for 10% of the time and as such can be regarded as a typical maximum level. Similarly, L_{90} is the typical minimum level and is often used to describe background noise.

It is common practice to use the L_{10} index to describe noise from traffic as, being a high average, it takes into account the increased annoyance that results from the non-steady nature of traffic flow.

L_{max}: The maximum sound pressure level recorded over a given period. L_{max} is sometimes used in assessing environmental noise, where occasional loud events occur which might not be adequately represented by a time-averaged L_{eq} value.

Octave Band Frequencies

In order to determine the way in which the energy of sound is distributed across the frequency range, the International Standards Organisation has agreed on "preferred" bands of frequency for sound measurement and analysis. The widest and most commonly used band for frequency measurement and analysis is the Octave Band.

In these bands, the upper frequency limit is twice the lower frequency limit, with the band being described by its "centre frequency" which is the average (geometric mean) of the upper and lower limits, e.g. 250 Hz octave band extends from 176 Hz to 353 Hz. The most commonly used octave bands are:

Octave Band Centre Frequency Hz	63	125	250	500	1000	2000	4000	8000

Human Perception of Broadband Noise

Because of the logarithmic nature of the decibel scale, it should be borne in mind that sound levels in dB(A) do not have a simple linear relationship. For example, 100dB(A) sound level is not twice as loud as 50dB(A). It has been found experimentally that changes in the average level of fluctuating sound, such as from traffic, need to be of the order of 3dB before becoming definitely perceptible to the human ear. Data from other experiments have indicated that a change in sound level of 10dB is perceived by the average listener as a doubling or halving of loudness. Using this information, a guide to the subjective interpretation of changes in environmental sound level can be given.

INTERPRETATION

Change in Sound Level dB	Subjective Impression	Human Response
0 to 2	Imperceptible change in loudness	Marginal
3 to 5	Perceptible change in loudness	Noticeable
6 to 10	Up to a doubling or halving of loudness	Significant
11 to 15	More than a doubling or halving of loudness	Substantial
16 to 20	Up to a quadrupling or quartering of loudness	Substantial
21 or more	More than a quadrupling or quartering of loudness	Very Substantial

Earth Bunds and Barriers - Effective Screen Height

When considering the reduction in sound level of a source provided by a barrier, it is necessary to establish the "effective screen height". For example if a tall barrier exists between a sound source and a listener, with the barrier close to the listener, the listener will perceive the sound as being louder if he climbs up a ladder (and is closer to the top of the barrier) than if he were standing at ground level. Equally if he sat on the ground the sound would seem quieter than if he were standing. This is explained by the fact that the "effective screen height" is changing with the three cases above. In general, the greater the effective screen height, the greater the perceived reduction in sound level.

Similarly, the attenuation provided by a barrier will be greater where it is aligned close to either the source or the listener than where the barrier is midway between the two.

BS4142 is designed to allow contextual assessment of impact from commercial, or industrial sound on sensitive receptors. Examples covered by the Standard include:

- Sound from industrial and manufacturing processes;
- Sound from fixed installations which comprise mechanical and electrical plant and equipment.
- Sound from the loading and unloading of goods and materials at industrial and/or commercial premises, and
- Sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes.

In brief, the assessment procedure involves establishing sound levels from the items or processes of interest, (the specific sound source(s)), corrected for any acoustic features to derive the Rating Level, ($L_{Ar,Tr}$), at the relevant assessment position(s). The Rating Level is compared against the existing Background Sound Level, ($L_{A90,T}$), to provide an initial estimate of impact. The Standard offers the following guidance with regard to the significance of estimated impact:

a) *Typically, the greater this difference, the greater the magnitude of the impact;*

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

c) *A difference of around +5dB could be an indication of an adverse impact, depending on the context;*

d) *Where the rating level does not exceed the background sound level, this is an indication of the specific sound having a low impact, depending on the context. The lower the rating level is relative to the background sound level, the less likely it is that the specific sound source will have an adverse impact.*

Where relevant, the initial estimate should then be modified by accounting for contextual aspects of the operation of the specific sound source and / or the context of the character of the area.

Other Assessment Parameters and Guidance on Character Corrections

The Specific Sound Level (L_s) is expressed in terms of an L_{Aeq} for a reference time interval, (T_r) of one-hour during the daytime (07:00 – 23:00 hours) and a fifteen-minute period during the night-time (23:00 – 07:00 hours). The Rating Level is also expressed in terms of the reference time interval, T_r.

The Specific Sound Level can be determined by various means, which can include prediction based on manufacturer's data and accompanying propagation calculations to the assessment position(s). This method could be used, for instance, where the specific sound source is not yet in-situ, or is in-situ but not yet operational.

Where the specific sound source is already operational and in-situ, measurements of the sound climate resulting from both the specific sound source and all other contributing sources, (knows as the Ambient Sound Level, L_a = $L_{Aeq,T}$) should be measured over a representative time period, ideally at the assessment position(s).

Depending on the relative contribution of other sources not related to the specific sound, (known as the residual sound), the Specific Sound Level can be derived by logarithmically subtracting the Residual Sound Level, $L_r = L_{Aeq,T}$, from the Ambient Sound Level.

With justification, representative proxy locations can be used for the measurement of the ambient and/or residual sound climate. Where these measurement locations are not fully representative of the assessment position(s), measurement can be supplemented with calculation.

The Background Sound Level should ideally also be measured at the assessment position(s) but can be measured at representative proxy locations where suitable reasons can be provided. The Background Sound Level should be measured over a period which is suitable to characterise the background sound climate during the period of interest and should normally be at least 15 minutes.

When deriving the Rating Level from the Specific Sound Level, consideration is given to the character of the sound. The Standard provides several methods for deriving appropriate character corrections, offering the following advice for subjective assessment:

Tonality

For sound ranging from not tonal to prominently tonal, the Joint Nordic Method gives a correction of between 0 dB and +6 dB for tonality. Subjectively, this can be allocated as a penalty of 2 dB for a tone which is just perceptible at the sound receptor, 4 dB where it is clearly perceptible and 6 dB where it is highly perceptible.

Impulsivity

A correction of up to +9dB can be applied for sound that is highly impulsive considering both the rapidity of the change in sound level and the overall change in sound level. Subjectively, this can be allocated as a penalty of 3dB for impulsivity which is just perceptible at the receiver, 6dB where it is clearly perceptible and 9dB where it is highly perceptible.

Other sound characteristics

Where the specific sound contains characteristics that are neither tonal nor impulsive, but are otherwise startling, disturbing or incongruous with the residual acoustic environment, a penalty of +3dB can be applied.

Intermittency

When the specific sound has identifiable on/off conditions, if the intermittency is readily distinctive against the residual acoustic environment, a penalty of +3dB can be applied.

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APPENDIX C
AS13261 MW Surfacing, Besthorpe
PLANT SOUND CALCULATIONS

Scenario A

Plant sound to Elm Drive receptors		63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	dB(A)
Screen stockpiler 56kW	Lp @ 10m	93	86	79	78	75	71	69	62	81
Screening Loss	3m high screen	-6	-7	-8	-10	-12	-15	-17	-18	
Distance Loss	95m	-20	-20	-20	-20	-20	-20	-20	-20	
Specific Sound level	$L_{eq\ 1hr}$	**68**	**60**	**51**	**49**	**43**	**37**	**32**	**24**	**51**
Tracked excavator (19t)	Lp @ 10m	82	84	75	69	69	67	62	57	75
Screening Loss	3m high bund (near)	-6	-6	-7	-9	-11	-13	-16	-18	
Distance Loss	60m	-16	-16	-16	-16	-16	-16	-16	-16	
Specific Sound level	$L_{eq\ 1hr}$	**61**	**62**	**52**	**45**	**43**	**38**	**30**	**23**	**50**
Total Specific Sound Level	$L_{eq\ 1hr}$	**68**	**64**	**55**	**50**	**46**	**41**	**34**	**27**	**54**
Tonality correction										**0**
Intermittency correction										**0**
Impulsivity correction		***Impulsive features could be 'just perceptible'***								**3**
Other										**0**
Rating Sound Level										**57**
Background Sound Level										**62**
Assessment Level										**-5**

Plant sound to Norwich Road receptors		63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	dB(A)
Screen stockpiler 56kW	Lp @ 10m	93	86	79	78	75	71	69	62	81
Screening Loss	3m high screen	-6	-7	-8	-10	-12	-15	-17	-18	
Distance Loss	90m	-19	-19	-19	-19	-19	-19	-19	-19	
Specific Sound level	$L_{eq\ 1hr}$	**68**	**60**	**52**	**49**	**44**	**37**	**33**	**25**	**51**
Tracked excavator (19t)	Lp @ 10m	82	84	75	69	69	67	62	57	75
Screening Loss	3m high bund (near)	-6	-6	-7	-9	-11	-13	-16	-18	
Distance Loss	60m	-16	-16	-16	-16	-16	-16	-16	-16	
Specific Sound level	$L_{eq\ 1hr}$	**61**	**62**	**52**	**45**	**43**	**38**	**30**	**23**	**50**
Total Specific Sound Level	$L_{eq\ 1hr}$	**69**	**64**	**55**	**50**	**46**	**41**	**35**	**27**	**54**
Tonality correction										**0**
Intermittency correction										**0**
Impulsivity correction		***Impulsive features could be 'just perceptible'***								**3**
Other										**0**
Rating Sound Level										**57**
Background Sound Level										**62**
Assessment Level										**-5**

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Scenario B

Plant sound to Elm Drive receptors		63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	dB(A)
Screen stockpiler 56kW	Lp @ 10m	93	86	79	78	75	71	69	62	81
Screening Loss	3m high screen	-6	-7	-8	-10	-12	-15	-17	-18	
Distance Loss	95m	-20	-20	-20	-20	-20	-20	-20	-20	
Specific Sound level	$L_{eq\ 1hr}$	**68**	**60**	**51**	**49**	**43**	**37**	**32**	**24**	**51**
Tracked excavator (19t)	Lp @ 10m	82	84	75	69	69	67	62	57	75
Screening Loss	3m high bund (far)	-5	-6	-6	-7	-9	-11	-13	-16	
Distance Loss	90m	-19	-19	-19	-19	-19	-19	-19	-19	
Specific Sound level	$L_{eq\ 1hr}$	**58**	**59**	**50**	**43**	**41**	**37**	**30**	**22**	**48**
Total Specific Sound Level	$L_{eq\ 1hr}$	**68**	**63**	**54**	**50**	**45**	**40**	**34**	**26**	**53**
Tonality correction										**0**
Intermittency correction										**0**
Impulsivity correction		***Impulsive features could be 'just perceptible'***								**3**
Other										**0**
Rating Sound Level										**56**
Background Sound Level										**62**
Assessment Level										**-6**

Plant sound to Norwich Road receptors		63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	dB(A)
Screen stockpiler 56kW	Lp @ 10m	93	86	79	78	75	71	69	62	81
Screening Loss	3m high screen	-6	-7	-8	-10	-12	-15	-17	-18	
Distance Loss	90m	-19	-19	-19	-19	-19	-19	-19	-19	
Specific Sound level	$L_{eq\ 1hr}$	**68**	**60**	**52**	**49**	**44**	**37**	**33**	**25**	**51**
Tracked excavator (19t)	Lp @ 10m	82	84	75	69	69	67	62	57	75
Screening Loss	3m high bund (far)	-5	-6	-6	-7	-9	-11	-13	-16	
Distance Loss	90m	-19	-19	-19	-19	-19	-19	-19	-19	
Specific Sound level	$L_{eq\ 1hr}$	**58**	**59**	**50**	**43**	**41**	**37**	**30**	**22**	**48**
Total Specific Sound Level	$L_{eq\ 1hr}$	**68**	**63**	**54**	**50**	**46**	**40**	**34**	**27**	**53**
Tonality correction										**0**
Intermittency correction										**0**
Impulsivity correction		***Impulsive features could be 'just perceptible'***								**3**
Other										**0**
Rating Sound Level										**56**
Background Sound Level										**62**
Assessment Level										**-6**

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Scenario C

Plant sound to Elm Drive receptors		63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	dB(A)
Tracked semi-mobile crus	Lp @ 10m	91	91	88	87	85	83	78	68	90
Screening Loss	3m high screen	-6	-7	-8	-10	-12	-15	-17	-18	
Distance Loss	95m	-20	-20	-20	-20	-20	-20	-20	-20	
Specific Sound level	$L_{eq\ 1hr}$	**66**	**65**	**60**	**58**	**53**	**49**	**41**	**30**	**59**
Tracked excavator (19t)	Lp @ 10m	82	84	75	69	69	67	62	57	75
Screening Loss	3m high screen	-6	-7	-8	-10	-12	-15	-17	-18	
Distance Loss	95m	-20	-20	-20	-20	-20	-20	-20	-20	
Specific Sound level	$L_{eq\ 1hr}$	**57**	**58**	**47**	**40**	**37**	**33**	**25**	**19**	**46**
Total Specific Sound Level	$L_{eq\ 1hr}$	**66**	**66**	**61**	**58**	**54**	**49**	**41**	**31**	**59**
Tonality correction										**0**
Intermittency correction		***Intermittent features could be 'readily distinctive'***								**3**
Impulsivity correction		***Impulsive features could be 'just perceptible'***								**3**
Other										**0**
Rating Sound Level										**65**
Background Sound Level										**62**
Assessment Level										**3**

Plant sound to Norwich Road receptors		63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	dB(A)
Tracked semi-mobile crus	Lp @ 10m	91	91	88	87	85	83	78	68	90
Screening Loss	3m high screen	-6	-7	-8	-10	-12	-15	-17	-18	
Distance Loss	90m	-19	-19	-19	-19	-19	-19	-19	-19	
Specific Sound level	$L_{eq\ 1hr}$	**66**	**65**	**61**	**58**	**54**	**49**	**42**	**31**	**60**
Tracked excavator (19t)	Lp @ 10m	82	84	75	69	69	67	62	57	75
Screening Loss	3m high bund (far)	-5	-6	-6	-7	-9	-11	-13	-16	
Distance Loss	90m	-19	-19	-19	-19	-19	-19	-19	-19	
Specific Sound level	$L_{eq\ 1hr}$	**58**	**59**	**50**	**43**	**41**	**37**	**30**	**22**	**48**
Total Specific Sound Level	$L_{eq\ 1hr}$	**67**	**66**	**61**	**58**	**54**	**50**	**42**	**31**	**60**
Tonality correction										**0**
Intermittency correction		***Intermittent features could be 'readily distinctive'***								**3**
Impulsivity correction		***Impulsive features could be 'just perceptible'***								**3**
Other										**0**
Rating Sound Level										**66**
Background Sound Level										**62**
Assessment Level										**4**

Manufacturer Calibration Certificate

The following instrument has been tested and calibrated to the manufacturer specifications.
The calibration is traceable in accordance with ISO/IEC 17025 covering all instrument functions.

- Device Type: **M2230 Measurement Microphone**
  consisting of
  MA220 Serial Number: **5342**
  Capsule Serial Number: **A19413**

- Date of Calibration: **20 January 2021**
- Certificate Number: **44216-5342-M2230**
- Results: **PASSED**
  (for detailed report see next page)

Tested by: D.Young

Signature: 

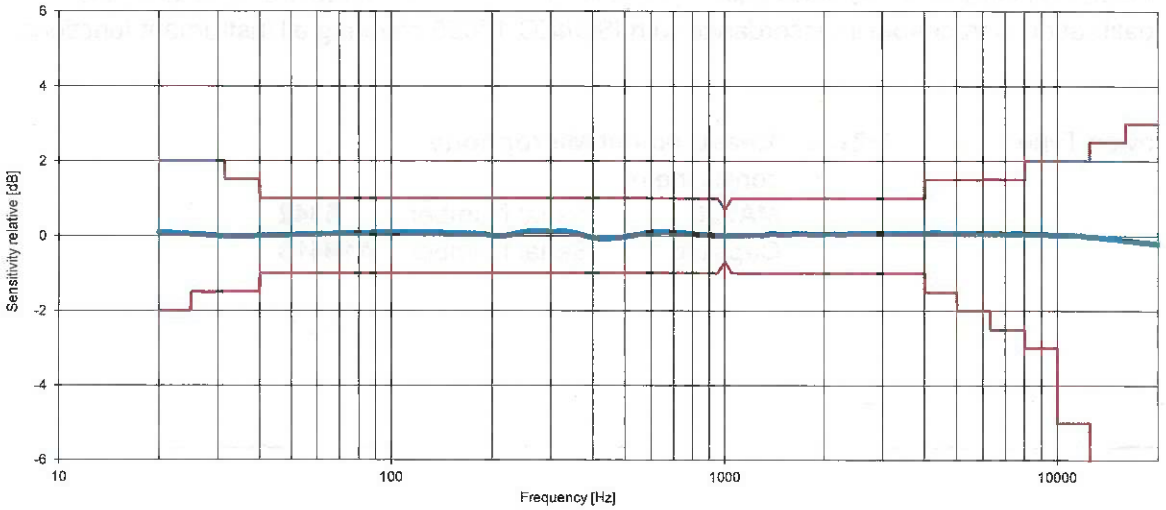
Date: 20 January 2021
Calibration of: M2230 consisting of
MA220 Serial Number: 5342
Capsule Serial Number: A19413

- Measurement Data on Receipt: **in tolerance**

- Detailed Calibration Test Results:

	actual	tolerance	calibration uncertainty[1]
Sensitivity @ 1 kHz, 114 dBSPL	**43.8 mV/Pa**	34-53 mV/Pa	±2.85%

Frequency response Class 1 acc. IEC 61672



- Test Conditions:

Temperature:	**20.6**	±0.5 °C
Relative Humidity:	**46.5%**	±2%
Air Pressure:	**976.3**	±0.25 kPa

- Calibration Equipment Used:

  - Norsonic Sound Calibrator, Type 1255 S/No.125525354
    Last Calibration: 05/01/2021
    Next Calibration: 05/01/2022
    Calibrated by Campbell Associates

  - NTi Audio FX100, S/No. 11095
    Last Calibration: 27/10/2020
    Next Calibration: 27/10/2021
    Calibrated by NTi Audio meeting product specifications

  - M2230 S/N #9565, Mic Capsule MC230A S/No. #A19844
    Last Calibration: 08/01/2021
    Next Calibration: 08/01/2022
    Calibrated by NTi Audio meeting product specifications

[1] The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with the regulations of the GUM.

Manufacturer Calibration Certificate

The sound level meter submitted for testing successfully completed the periodic tests of IEC 61672-3. All tests are traceable in accordance with ISO/IEC 17025.

This model of sound level meter submitted for periodic testing successfully completed the applicable pattern-evaluation tests given in IEC 61672-2. The pattern approval certificate is available at www.nti-audio.com/XL2.

Sound Level Meter

Manufacturer	NTi Audio		
Type	XL2-TA	S/N	A2A-20477-E0
Firmware	V4.21		
Reference Level Range	mid		
Microphone Model	M2230		
Preamplifier	MA220	S/N	10974
Microphone Capsule	MC230A	S/N	A23430
Performance class	Class 1		
Customer Inventory Nr.			

Customer

Clarke Saunders
The Ministry
79-81 Borough Road
London
SE1 1DN

Date 30 June 2022

Certificate UK-22-052

Results **PASSED**
(for detailed report see next pages)

Operator 
David Young

NTi AUDIO

1. Indication at the calibration check frequency

The indication of the sound level meter at the calibration check frequency is checked by application of the sound calibrator and adjusted, if necessary, to indicate the required sound level for the environmental conditions under which the tests are performed. All levels in [dB].

Sensitivity before calibration	Sensitivity after calibration	Meas level	Limit -	Limit +	Uncert.	Status
46.7 mV/Pa	46.7 mV/Pa	114.2	113.21	115.21	0.2	Passed

2. Self-generated noise

2.1 Microphone cartridge installed

The self-generated noise is measured in the most-sensitive level range as a time-averaged sound pressure level with frequency-weighting A and an averaging time of 30 seconds. All levels in [dB].

Weighting	Meas level	Limit +	Uncert.	Status
A	16.1	18.0	0.1	Passed

2.2 Microphone cartridge replaced by the capsule replacement NTI-K65-15

The self-generated noise is measured in the most-sensitive level range as a time-averaged sound pressure level for all frequency-weightings and an averaging time of 30 seconds. All levels in [dB] referenced to S = 42 mV/Pa.

Weighting	Meas level	Limit +	Uncert.	Status
A	8.6	13.0	0.1	Passed
C	12.1	16.0	0.1	Passed
Z	18.5	24.0	0.1	Passed

3. Acoustic signal tests of a frequency weighting

The frequency weighting is tested for frequency-weighting A, using an acoustic test facility. The sound level meter is set to a fast time-weighted sound level in the reference level range. All levels in [dB].

Freq. [Hz]	Gen. level	Meas level	Dev	Limit -	Limit +	Uncert.	Status
125	69.8	69.8	0.0	-1.0	1.0	0.4	Passed
250	77.4	77.4	0.0	-1.0	1.0	0.4	Passed
500	82.8	82.7	-0.1	-1.0	1.0	0.4	Passed
1000	86.0	85.9	-0.1	-0.7	0.7	0.4	Passed
2000	87.2	87.2	0.0	-1.0	1.0	0.4	Passed
4000	87.0	87.2	0.2	-1.0	1.0	0.4	Passed
8000	84.9	85.6	0.7	-2.5	1.5	0.4	Passed

NTi AUDIO

5. Frequency and time weightings at 1kHz

While injecting a constant steady signal at the reference frequency of 1 kHz the F-time-weighted sound level, S-time-weighted sound level and time-averaged sound level are verified with frequency weighting A. Additionally the F-time-weighted sound level for frequency weightings C and Z is measured. The first measurement serves as reference and differences in the reading with respect to this first one are determined. All levels in [dB].

Level	Exp level	Meas level	Dev	Limit -	Limit +	Uncert.	Status
LAF	114.0	114.0	0.0	-0.7	0.7	0.1	Passed
LAS	114.0	113.8	-0.2	-0.7	0.7	0.1	Passed
LAeq	114.0	114.0	0.0	-0.7	0.7	0.1	Passed
LCF	114.0	114.0	0.0	-0.7	0.7	0.1	Passed
LCeq	114.0	114.0	0.0	-0.7	0.7	0.1	Passed
LZF	114.0	114.0	0.0	-0.7	0.7	0.1	Passed
LZeq	114.0	114.0	0.0	-0.7	0.7	0.1	Passed

6. Level linearity on the reference level range

The level linearity on the reference level range is determined by applying steady sinusoidal electrical signals at a frequency of 8 kHz with the sound level meter set for frequency-weighting A and fast time-weighting. All levels in [dB].

Exp abs level	Meas. level	Abs dev	Abs Limit -	Abs Limit +	Exp rel level	Rel dev	Rel Limit -	Rel Limit +	Uncert.	Status
114.0	114.0	0.0	-0.8	0.8	0.0	0.0	-0.3	0.3	0.1	Passed
119.0	119.0	0.0	-0.8	0.8	119.0	0.0	-0.3	0.3	0.1	Passed
124.0	124.0	0.0	-0.8	0.8	124.0	0.0	-0.3	0.3	0.1	Passed
114.0	114.0	0.0	-0.8	0.8	0.0	0.0	-0.3	0.3	0.1	Passed
109.0	109.0	0.0	-0.8	0.8	109.0	0.0	-0.3	0.3	0.1	Passed
104.0	104.0	0.0	-0.8	0.8	104.0	0.0	-0.3	0.3	0.1	Passed
99.0	99.0	0.0	-0.8	0.8	99.0	0.0	-0.3	0.3	0.1	Passed
94.0	94.0	0.0	-0.8	0.8	94.0	0.0	-0.3	0.3	0.1	Passed
89.0	89.0	0.0	-0.8	0.8	89.0	0.0	-0.3	0.3	0.1	Passed
84.0	84.0	0.0	-0.8	0.8	84.0	0.0	-0.3	0.3	0.1	Passed
79.0	79.0	0.0	-0.8	0.8	79.0	0.0	-0.3	0.3	0.1	Passed
74.0	74.0	0.0	-0.8	0.8	74.0	0.0	-0.3	0.3	0.1	Passed
69.0	69.0	0.0	-0.8	0.8	69.0	0.0	-0.3	0.3	0.1	Passed
64.0	64.0	0.0	-0.8	0.8	64.0	0.0	-0.3	0.3	0.1	Passed
59.0	59.0	0.0	-0.8	0.8	59.0	0.0	-0.3	0.3	0.1	Passed
54.0	54.0	0.0	-0.8	0.8	54.0	0.0	-0.3	0.3	0.1	Passed
49.0	49.0	0.0	-0.8	0.8	49.0	0.0	-0.3	0.3	0.1	Passed
44.0	44.0	0.0	-0.8	0.8	44.0	0.0	-0.3	0.3	0.1	Passed
39.0	39.0	0.0	-0.8	0.8	39.0	0.0	-0.3	0.3	0.1	Passed
34.0	34.1	0.1	-0.8	0.8	34.0	0.1	-0.3	0.3	0.1	Passed
33.0	33.1	0.1	-0.8	0.8	33.1	0.0	-0.3	0.3	0.1	Passed
32.0	32.1	0.1	-0.8	0.8	32.1	0.0	-0.3	0.3	0.1	Passed
31.0	31.2	0.2	-0.8	0.8	31.1	0.1	-0.3	0.3	0.1	Passed
30.0	30.2	0.2	-0.8	0.8	30.2	0.0	-0.3	0.3	0.1	Passed
30.0	30.3	0.3	-0.8	0.8	30.3	0.0	-0.3	0.3	0.1	Passed

9. C-weighted peak sound level

The sound level meter is tested on the least-sensitive level range with fast time weighting and C frequency weighting. The test signals are a single complete cycle of an 8 kHz sinusoid starting and stopping at zero crossings and positive and negative half cycles of a 500 Hz sinusoid that also start and stop at zero crossings. All levels in [dB].

Burst signal	Source level	Exp LCp-LCF	Meas LCp-LCF	Dev	Limit -	Limit +	Uncert.	Status
8kHz	129.0	3.4	2.6	-0.8	-2.0	2.0	0.2	Passed
500Hz +	132.0	2.4	2.2	-0.2	-1.0	1.0	0.2	Passed
500Hz -	132.0	2.4	2.2	-0.2	-1.0	1.0	0.2	Passed

10. Overload Indication

Overload indication is tested on the least-sensitive level range with the sound level meter set to A-weighted, time-averaged sound level. Positive and negative one-half-cycle sinusoidal electrical signals at a frequency of 4 kHz are used. All levels in [dB].

Start level	OV +	OV -	Dev	Limit -	Limit +	Uncert.	Status
136.1	138.2	138.3	0.1	-1.5	1.5	0.3	Passed

Appendix 2

Noise Control and Noise Monitoring

Noise Control and Monitoring Procedure

Purpose: To ensure that noise monitoring is undertaken and that noise emissions from the operations do not cause a nuisance to surrounding receptors.

		RESPONSIBLE PERSON	RECORD
	Plant / Vehicle Movements		
1.	Efforts will be made to locate plant and equipment as far as possible from the nearest sensitive receptors (residential housing north of the permit boundary).		Drawing No. 23/019b 003 Site Layout Plan
2.	Vehicle movements on site will be minimised (avoid double handling of waste etc.) and vehicles will not be left idling unnecessarily.		
3.	Plant and equipment on site will be maintained in accordance with manufacturers recommendations and regularly checked to identify any maintenance required.		
4.	Non-tonal reverse alarms will be used on vehicles and plant on Site.		
	Operation of the Wash Plant, Crushing Plant and Screening Plant		
5.	The wash plant will be located close to the southern boundary of the site behind a 3m high concrete screen. This will maximise the distance to the nearest sensitive receptors located along Elm Drive and Norwich Road.		Drawing No. 23/019b 003 Site Layout Plan
6.	Drop heights of materials being loaded into the wash plant, crusher and screener will be reduced as low as practicable to minimise noise from material being dropped.		
7.	When appropriate plant will not be turned off when not in use, to reduce the frequency and duration of noise emissions and in turn to ensure noise is not being generated unnecessarily.		
	Noise Monitoring		
8.	It is the responsibility of every member of staff to be vigilant of noise emissions arising from operations. If a significant rise in noise emission is detected, it should be reported to the Site manager and appropriate action taken to investigate / mitigate to avoid risk of causing nuisance.	Site Operative	
9.	Noise monitoring will be undertaken by a member of staff who has been trained on this procedure.	Site Manager	
10.	It is the responsibility of the site manager to ensure scheduled noise monitoring is undertaken at least once a month, for a minimum of five minutes each time. All noise monitoring is recorded on the Noise Monitoring Form.		Noise Monitoring Form
11.	Noise monitoring should be avoided during periods of heavy rain as this can affect the measurements.		
12.	The Smart phone to be used will be checked against a calibrated noise metre.	Site Manager	

		RESPONSIBLE PERSON	RECORD
13.	Noise monitoring will be undertaken on a monthly basis and monitoring captured within the Noise Monitoring Form to allow any trends or patterns to be identified.		
14.	Recorded monitoring will take place at three specific monitoring points along the northern boundary of the Site, closest to sensitive receptors.		Drawing No. 23/019b 003 Site Layout Plan
15.	Location of monitoring points: • MP1 – Northwestern corner of the permit boundary closest to residential receptors located on Elm Drive. • MP2 – Centrally along the northern boundary of the Site closest to sensitive receptors located on Norwich Road. • MP3 – Northeastern corner of the Site. The locations of the monitoring points are included on the Site Layout Plan.		Drawing No. 23/019b 003 Site Layout Plan
16.	A monitoring form will be completed to record information from the monitoring event. Completed Noise Monitoring Forms will be retained for a minimum of six months.		
	Completing the Noise Monitoring Form		
17.	One Noise Monitoring Form will be completed for each noise monitoring event.		Noise Monitoring Form
18.	The person completing the Noise Monitoring Form will include their name and the date/time the monitoring took place.		
19.	Details of the weather conditions (including wind direction and strength) will be recorded on the Noise Monitoring Form for each monitoring event. This will help indicate what receptors noise is likely to be blown toward.		Noise Monitoring Form
20.	The time that the monitoring events took place at the monitoring locations is recorded on the Noise Monitoring Form. Noise should be measured over a period of at least five minutes at each monitoring location.		
21.	Noise level will be recorded at each monitoring location using the smart phone application 'decibel meter dB sound detector' (App) available to download on any smartphone.		
22.	While recording is taking place the operative undertaking the noise monitoring will stand facing the operations with the phone microphone facing away from them and towards the operations. This will ensure accurate noise recordings are picked up and no interference from blocking of the microphone can take place.	Site Operative	
23.	The average noise levels (dB) recorded throughout the monitoring period should be recorded on the monitoring form for each location and an indication of whether the 62dB has been exceeded.	Site Operative	Noise Monitoring Form
24.	If there is any external interference when conduction the monitoring e.g., significant road noise this should be recorded on the comments section of the Monitoring Form.		Noise Monitoring Form
25.	Once monitoring is complete, the app provides a graph analysis of the noise recorded, giving an average and peak frequency for the recording period. These are saved within the app under the 'records' tab and are time and date stamped.		

	RESPONSIBLE PERSON	RECORD

Methodology

26. In line with BS 4142 Noise Assessments and Methods, average dB recorded should not exceed background noise levels (62dB).

27. If the average dB recorded exceeds background noise levels (62dB) and the source of this noise could be attributed to activities on site (or is unclear), additional monitoring will be undertaken. Should the average dB exceed background, but external sources of noise be identified as the cause (i.e. little or no site activity and significant external noise sources) then this will be noted on the monitoring form and no further action taken.

28. If further monitoring is needed to take place, due to the average recordings exceeding background levels (62dB) this will be undertaken for a minimum of 10 minutes and recorded on another Noise Monitoring Form.

29. If results from the monitoring are still exceeding background after this additional monitoring and unless an external noise source can be attributed to elevated noise levels, activities should cease, and an investigation should take place to determine what is causing the noise emissions.

Appendix 3

Complaint Form

Complaints Form **V.1, October 2023**

<table>
<tr><td rowspan="3">Who made the complaint?</td><td>Name:</td><td></td></tr>
<tr><td>Address:</td><td></td></tr>
<tr><td>Phone No.:</td><td></td></tr>
<tr><td colspan="2">Date and time they made the complaint:</td><td></td></tr>
<tr><td colspan="3">What happened? What was it about?</td></tr>
<tr><td colspan="3">Was anyone else aware of this – other neighbours or your staff? If so, who?</td></tr>
<tr><td colspan="3">Did the complaint relate to your site? If so, what happened? What went wrong?</td></tr>
<tr><td colspan="3">What have you done to make sure that it does not happen again?</td></tr>
<tr><td colspan="3">Was there any significant pollution – for example: dust, odour or noise outside the site or spillage of polluting liquids onto the ground, into a drain or a watercourse?</td></tr>
<tr><td colspan="2">If there was, then you must notify the Environment Agency on 0800 807060 and any other relevant regulators.

Have you done so? Yes ☐ No ☐</td><td>At what time did you phone?</td></tr>
<tr><td colspan="2">You must also write or send an email to confirm this to your local Environment Agency office.

Have you done so? Yes ☐ No ☐</td><td>What date did you contact?</td></tr>
<tr><td colspan="3">Please print and sign your name:</td></tr>
</table>

Appendix 4

Noise Monitoring Form

Noise Monitoring Form

Name		Date				
Wind Direction (e.g., from NE)		Wind Strength	High ☐	Gusty ☐	Slight wind ☐	No wind ☐
Weather Conditions	Sunny ☐	Raining ☐	Windy ☐	Dry ☐		

Location	Description of monitoring location	Start Time	Duration	Average dB	Maximum dB	Has background (62dB) been exceeded Yes or No
MP1	See location drawing below.		5 minutes			
MP2	See location drawing below.		5 minutes			
MP3	See location drawing below.		5 minutes			
Comments e.g., a train/car passed during monitoring:						
Further monitoring required? (Y/N)						

Location of monitoring points