Retford Circular Economy Project Environmental Statement Addendum

Volume 1: Chapter 12: Noise

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The business of sustainability

12. CHAPTER 12: NOISE

12.1 Introduction

This Chapter of the ESA considers the potential noise implications of the amendments to the operational phases of the Amended Proposed Development within Area A at the location of residential receptors. This Chapter also identifies the results of an additional noise measurement study which was undertaken in order to supplement the previous noise measurement study, as presented in the ES. Furthermore, it seeks to address various comments relating to noise that were raised by Nottingham County Council (NCC), Natural England (NE) and Nottinghamshire Wildlife Trust (NWT).

Chapter 12 of the ES and associated appendices provided an assessment of the noise and vibration effects arising from the Proposed Development. It was concluded in the ES that the likely noise effects due to the Proposed Development would be of minor significance. However, since the submission of the previous ES, the noise impact assessment has been revised due to amendments to the Proposed Development working scheme, i.e. the Amended Proposed Development. It should be noted that both the ES and ESA operational noise impact assessments consider the 'reasonable worst-case' noise levels that are likely to occur at the nearest Noise Sensitive Receptors (NSRs), during the main PFA extraction phases (i.e. 'normal' operations as defined in Planning Practice Guidance[1]). This scenario for the 'reasonable worst-case' has not changed significantly from the ES.

In addition to the assessment of the operational PFA extraction phases, assessments of the likely noise levels due to the short-term initial dig-down, soil stripping, and embankment removal phases have been included within this chapter. The inclusion of these additional assessments provides further context as the likely maximum noise levels experienced at NSRs are from these short-term activities. The PFA extraction phases are likely to continue for approximately 20 years and so would be long term (albeit temporary) and have been assessed against long term operational noise assessment criteria. However, initial dig-down, soil stripping, and embankment removal phases are considered to be temporary in nature due to their short-term duration and following the ES methodology they have been assessed against appropriate noise criteria for short-term activities that by their nature have the potential to be noisier (see Planning Practice Guidance, paragraph 022, reference 27-022-20140306[2]).

The noise impact assessment considers each of the listed activities in isolation as there are no anticipated overlaps of activities during phases of the Amended Proposed Development unless stated otherwise.

There are slight amendments to Area C as part of the Amended Proposed Development, however these amendments are considered to be minor with respect to the likely noise effects at nearby noise sensitive receptors. These amendments are discussed in a qualitative manner in Section 12.8.2. A description of these is provided in Volume 1, Chapter 5 of this ESA.

This Chapter includes the following elements:

- Consultation responses received since the planning application and ES was submitted;
- Additional baseline noise survey results;
- Assessment of operational noise due to;
    - Soil stripping;
    - Initial dig-down;
    - Extraction phases;

[1] https://www.gov.uk/guidance/minerals#Noise-emissions

[2] https://www.gov.uk/guidance/minerals#Noise-emissions

  - Restoration (embankment removal);
- Assessment of effects;
- Noise predictions at NSRs within the SSSI;
- Statement of significance;
- Additional considerations;
  - Conveyor belt sirens; and
  - HGV and associated road traffic movements on the local road network.

12.2 Consultation Responses

Following submission of the planning application in March 2023, as discussed above, a number of comments were received from NCC, NE and NWT. These comments are considered in Table 12.1.

Table 12.1: Consultee Responses with Respect to Noise

Consultee	Date	Summary of Consultation Response	Response to Consultee	Action/clarification
NWT	15th May 2023	NWT queried the noise threshold criterion of 55 dB(A) used to inform the assessment of noise impacts at sensitive ecological receptor locations. NWT considered that a lower threshold criterion of 45dB(A) would be more appropriate.	The baseline noise measurements presented in the ES show that the typical background noise levels across the SSSI exceed 45 dB(A). Therefore, a noise threshold criterion of 45 dB(A) is considered to be inappropriate.	An additional background noise measurement survey has been undertaken to provide further context to the typical noise levels throughout the Sutton and Lound Gravel Pits Site of Special Scientific Interest (SSSI). Further information is provided in Volume 3, Technical Appendix (TA) 12.2.
		NWT stated that it is '*unclear from the Noise chapter whether shredding and screening have been factored into the noise assessments'*	The ES Volume 3, TA 12.1 identified the full list of plant utilised within the noise assessment. Screening was included within the operation phases. Volume 1, Chapter 12, Section 12.6.1.2 of the ES sets out the noise modelling procedure which includes noise from mobile screens.	Screening activities were previously included within the ES noise calculations. Shredding activities have also been included in the updated reporting in this Chapter at section 12.9.
		NWT stated that '*there appears to be no assessment of the effects of conveyor sirens*'	No assessment of conveyor sirens was included within the Noise chapter within the ES.	As reported in the ES, Volume 1, Chapter 5, the use of sirens would be restricted to exceptional circumstances such as a warning mechanism rather than in habitual use. It was therefore discounted from the assessment.
NE	28th April 2023	NE stated that '*The features of the SSSI*	The Applicant has made significant	

		could potentially be affected by increased noise levels from the construction, operation and restoration works undertaken as part of this proposal. However, most of the construction works in close proximity to the SSSI will be associated with the main processing plant and this will be far away from the main water bodies, which support the bird interest of the SSSI and these areas are also screened by vegetation. There will also be the construction of the subsidiary processing areas, the access road, conveyor, settling lagoons and soakaway. These will be undertaken as part of the various phases of the development and their localised nature as well as the existing screening by vegetation and the sandstone bunds is likely to mean no significant impact upon the notified features of the SSSI. However, the applicant has recognised that precise details regarding noise screening was not provided and that these details could be secured by a suitable planning condition in consultation with relevant parties. Natural England fully supports these screening measures should they be required as these would further ameliorate any potential negative effects up the SSSI'.	changes to the working scheme in order to further manage and reduce potential noise impacts during operation, as set out in section 12.5 of this Chapter. This includes moving infrastructure further into the Site and away from the SSSI and the removal of Temporary Processing Areas 1-3 from the scheme entirely. The restoration activities with the potential to generate most noise is the proposed embankment removal following extraction in each phase; however, this is a very short-term activity. Importantly, it should also be noted that the revised working scheme retains the significant lagoon embankment that is closest to and overlaps the SSSI, thereby further reducing noise and providing a permanent barrier along the southern boundary of the Site in this location. Please refer to sections 12.8 and 12.10 of this Chapter for more detail on embankment removal. The Applicant would seek to reduce noise impacts as far as practicable during construction by utilising local screening and other mitigation measures that would be developed in a Construction Noise Management Plan (CNMP), to be secured by a suitable planning condition. It should be noted that the assessment of construction noise effects presented in the ES Volume 1 Chapter 12 provides a worst-case assessment of the	

			predicted likely noise levels at receptors. In practice, the noise levels at noise sensitive receptors are likely to be lower when appropriate mitigation measures are implemented via the CNMP. In order to demonstrate the likely effects on noise levels, screening of extraction activities is included within the noise modelling procedure as embedded mitigation, see section 12.6.5 of this ESA Volume 1 Chapter 12	
NCC	2nd November 2023	NCC issued a Supplementary Information Request under Regulation 25 which raised four specific points for clarification: 1) A plan showing where initial dig-down areas will be located, including the predicted noise levels at nearby receptors should be included. 2) Whether shredding had been factored into the noise calculations. 3) Whether consideration had been given to noise from dewatering pumps during the night-time. 4) Whether noise impacts due to operational HGV movements had been considered in the noise impact assessment	1) Initial dig-down activities were not included in the ES due to their temporary nature. 2) Shredding activities were not considered separately within the ES. They were included under screening. 3) Dewatering of the extraction void has been removed from the Amended Proposed Development. 4) Noise impacts due to HGV movements were briefly discussed in Section 12.7 of the ES Volume 1 Chapter 12.	Points of clarification: 1) A plan identifying the location of the initial dig-down has been provided in ESA Volume 2 Chapter 12 Figure 12.43. The predicted noise levels have also been included later in this Chapter at section 12.7.5. 2) The source noise levels utilised within the ESA noise modelling procedure for extraction include a shredder. The source noise details are identified in ESA Volume 3 Appendix 12.1. 3) Dewatering pumps have been discussed in Section 12.11 of the ESA Noise Chapter. Dewatering of the extraction void has been removed from the Amended Proposed Development, therefore nigh-time operation is not necessary. 4) HGV movements have been discussed in Section 12.9.2 of this Chapter.

12.3 Legislation, Policy and Guidance

The assessment legislation, policy, guidance and methodology remain the same as previously set out in Chapter 12 of the ES. Where applicable, references to sections of the previous ES have been made within this ESA Noise Chapter.

12.4 Assessment Methodology and Significant Criteria

The assessment methodology and significance criteria remain the same as previously set out in Chapter 12 of the ES. The full description of the methodology for the assessment of effects is set out in ES Volume 1 Chapter 12 – Section 12.3.5.

As set out in Section 12.1 of this ESA Chapter, the assessment of operational noise considers four activities; soil stripping, initial dig-down, PFA extraction and restoration (embankment removal). Three of these activities; soil stripping, dig-down and embankment removal are considered to be temporary works due to their relatively short duration. These activities are required in order to facilitate essential site preparation, restoration works and construction of acoustic bunds. The predicted noise levels from these three activities would be assessed against the increased temporary daytime noise criterion of 70 dB $L_{Aeq, 1hr}$ as set out in Planning Practice Guidance.[3]

The PFA extraction operations would be undertaken over the lifetime of the Amended Proposed Development, therefore the predicted noise levels would be assessed against the noise criteria as set out in the PPG guidance for mineral extraction where noise from the operations should not exceed 55 dB $L_{Aeq,1hr}$.

This ESA Chapter assessment of effects primarily considers residential noise sensitive receptors. However, noise prediction results are also identified for a number of ecological receptors located within the nearby SSSI. The assessment of effects at the location of the ecological receptors is set out in ESA Volume 1, Chapter 8.

12.4.1 Noise Sensitive Receptors

The residential noise sensitive receptors (NSRs) considered within this ESA Chapter are the same as those considered within the ES. However, five additional ecology NSRs have been included in this ESA Chapter in order to facilitate an assessment of the likely noise impacts at the boundary of the Site and adjacent to the SSSI. The location of these additional NSRs is identified in ESA Volume 2 Figure 12.17. Throughout this ESA Chapter there are references to ecology NSRs 5-8 and the additional NSRs 11-15. The assessment of effects at the location of these receptors can be found in ESA Volume 1, Chapter 8.

12.5 Amended Proposed Development – Proposed Changes

The Amended Proposed Development incorporates changes to the working scheme which have been considered within the noise impact assessment. The main changes to the working scheme which result in noise reductions when compared to the ES are identified below. ESA Volume 1, Chapter 5 provides a full description of the Amended Proposed Development.

12.5.1 Micro-phasing

The Amended Proposed Development would adopt the principle of micro-phasing, whereby each of the larger extraction phases (HR P1-P6 and LR P1-P5) would be split into small ‘micro-phases’. The example in Image 5.1 in ESA Volume 1, Chapter 5 shows HR P4 split into micro-phases.

Importantly, extraction would only take place in a single micro-phase at any given time, working progressively through the micro-phases until extraction is complete within the whole phase before

[3] https://www.gov.uk/guidance/minerals#Noise-emissions

moving onto the next phase. Each micro-phase would be no larger than 1.0 hectare in area, and therefore less than 1% of Area A would be worked at any given time.

The micro-phasing approach means that extraction would be focussed in a much smaller area at any given time, therefore potential noise impacts would be of a lower magnitude (due to the smaller area of influence) and easier to manage through management and mitigation measures.

12.5.2 Soil Stripping

Soil stripping is considered a necessary activity required to facilitate essential site preparation. Soil stripping by its nature needs to take place at surface level, and therefore has the potential to result in noise impacts more than other operations. To limit this, soil stripping would be undertaken as detailed below.

Soil stripping as a result of the micro-phasing approach would be limited to a small number of days in any given year, as detailed in Table 5.3 of ESA Volume 1, Chapter 5. This is because each phase would be stripped progressively (i.e. one micro-phase at a time), rather than stripping the entire phase as a single activity. Any potential impacts would therefore be temporary and focussed over a short timeframe. For example, the stripping of soil from HR P1 would require 12 days in total; however, this would be split over approximately 3 years, meaning only around 4 days of soil stripping per year carried out progressively over a number of micro-phases.

The number of days where soil stripping would be required close to NSRs is further limited as many of the micro-phases would not be close to them, as they are concentrated along the southern and northern boundaries of Area A. In order to minimise potential impacts further, soil stripping works would be designed taking into account key seasons for sensitive ecological species, e.g. turtle doves.

Stripped soils would be stored in a designated area within each phase for later replacement or stored in a longer-term soil store adjacent to LR P5, if necessary. The use of the longer-term soil store would only be used when necessary, in order to reduce the need for longer haulage distances to transport soil and associated noise impacts.

12.5.3 PFA Extraction

The phasing order has been revised to work from west to east through the Site. This has a number of distinct advantages from a noise impact and management perspective when compared to the Proposed Development as described in the ES, including:

- Enabling the maintenance / haul road and the conveyor to be extended progressively at a lower level through the created void behind the lagoon embankments as extraction progresses easterly through Area A;
- The removal of the semi-fixed Processing Areas 1-3 and the positioning of mobile processing equipment (shredder, screen and conveyor hopper) close to the extraction face moving with each micro-phase, thereby reducing overall haulage distances and minimising the zone of influence from extraction, thereby reducing the potential for noise and dust impacts;
- The repositioning of the main conveyor further away from the SSSI and Bellmoor Farm properties, and the addition of an adjustable spur conveyor to move the reception hopper as close as possible to the extraction face within the void at a lower level and behind the lagoon embankments, rather than being more remote. This minimises the zone of influence from extraction, utilises the lagoon embankments as screening, and increases the distance between NSRs and the main conveyor, and therefore reduces the impact of any noise effects; and
- The permanent retention of a large section of the lagoon embankment along the southern boundary of Area A, including where the Site overlaps with the SSSI, to avoid any direct impacts on the SSSI and to ensure a permanent noise buffer is retained. There would also be

additional noise screening provided in the Low-Rise during extraction, and close to NSRs adjacent to the High-Rise where necessary.

Importantly, the combined effect of these changes would further reduce potential impacts on the SSSI bordering the southern boundary, and residential properties including at Bellmoor Farm, by removing the need for the elevated maintenance / haul road and conveyor close to the boundary of the Site.

As noted above, this new working arrangement would also significantly reduce the distances between the extraction face, screen, and conveyor hopper in comparison to the working practices described for Area A in the ES (in excess of 300 m to reach the Low-Rise phases) and would confine open-air extraction operations to a singular, small micro-phase (less than 1% of Area A at any given time).

As stated previously, ESA Volume 1, Chapter 5 provides a full description of the Amended Proposed Development.

12.6 Noise Measurement Study

An additional noise measurement study was undertaken to supplement the previous ES noise measurement study with further noise measurement data. The noise measurements were undertaken within the boundary of the Site and located adjacent to the SSSI, to address comments from ecological consultees. These additional noise measurements have been used to inform the prevailing acoustic conditions at those locations and to facilitate the assessment of likely noise impacts due to the Amended Proposed Development at receptors located within the SSSI.

A discussion of the dominant and typical noise sources observed during the study is provided, which includes analysis of the L_{AFmax}[4] noise levels. These data has been used to inform the assessment in ESA Volume 1, Chapter 8 which assesses the potential effects on the nearby SSSI.

The additional noise measurement locations are identified in ESA Volume 2 Figure 12.16. This figure supplements the ES Volume 1 Chapter 12 and ES Volume 2 Figures 12.1 and 12.2.

The noise measurement study comprised of four semi-permanent unattended, and three attended short-term, noise monitoring positions. The unattended noise monitoring equipment was installed on the 8th September 2023 and continuous noise monitoring was undertaken until the morning of the 12th September 2023. The short-term noise monitoring was undertaken during the daytime on the 8th September 2023 and again on the 11th September 2023 with repeat measurements being undertaken at each noise monitoring location across those two days.

12.6.1 Weather Conditions

The weather conditions on the following dates; 8th, 9th and during the daytime on the 10th of September were considered to be suitable for noise monitoring. However, the weather conditions deteriorated on the 11th and 12th of September towards the end of the noise measurement survey as heavy rainfall was observed and average wind speeds increased. Heavy rainfall was recorded between the late evening of the 10th and all day on the 11th September.

Although rainfall was observed it is considered that the noise measurement study obtained sufficient noise data during the first three days in order to inform the typical ambient noise level conditions at the boundary of the Site and within the SSSI. Also, conditions were dry during the daytime core working hours which are the subject of this assessment and so rain influenced measurements at night are not utilised in this assessment.

For measurements at residential receptors noise measurements would generally be taken in wind speeds below 5 m/s following the appropriate standards. However, since the purpose of these measurements was to quantify the baseline noise in the SSSI rather than at human receptors, noise levels measured during periods where wind speed gusts were recorded just above 5 m/s (with average speeds still lower than 5 m/s) have been included in this Chapter in order to identify the

[4] The L_{AFmax} is the instantaneous maximum sound pressure level measured with a fast time weighting.

changeable weather and noise conditions that are typical of rural/countryside areas, including the SSSI.

Table 12.2 identifies the meteorological conditions throughout the duration of the noise measurement survey. All weather data were obtained from wunderground.com[5], based on a weather station located in Retford.

Table 12.2: Noise Measurement Survey - Meteorological Conditions

Date	Period	Wind Speed			Temperature (°C)			Precipitation
		Avg. Speed (m/s)	Max Speed (m/s)	Modal Direction	Min	Avg.	Max	
08/09/2023	Day	1.2	3.1	ENE	22	25	31	Between 1600 hrs and 1700 hrs
	Night	1.8	3.1	ENE	17	19	22	None
09/09/2023	Day	1.2	3.1	WNW	17	28	34	None
	Night	1.1	2.2	NW	17	19	21	None
10/09/2023	Day	2.9	4.0	ENE	18	24	31	Between 1600 hrs and 1700 hrs
	Night	4.4	5.8	SE	17	19	22	None
11/09/2023	Day	4.6	6.7	NW	18	22	26	Throughout the day
	Night	1.3	3.1	NW	15	16	18	Between 1900 hrs and 2000 hrs

12.6.2 Noise Measurement Locations

Table 12.3 below provides a short description of the additional noise measurement locations and of the current noise climate, at each location.

Table 12.3: Noise Measurement Locations

Noise Measurement Location	Location Description/Sensitive Species
LT1	Sound Level Meter (SLM) was located at the eastern edge of the Low-Rise within Area A, approximately 800 m southeast of the Oranmore Precast concrete works. Typical noise sources observed were activity from the concrete supplier, passing lorries and sheep bleating.
LT2	SLM was located in the corner of a field towards the centre of the Site (in the High-Rise area), approximately 1 km due east from Sutton cum Lound. Typical noise sources observed were sheep bleating, bird song and distant road traffic.
LT3	SLM was located along the southern edge of a field in the western part of the Site to the south of Bellmoor Farm and approximately 1 km due east

[5] https://www.wunderground.com/dashboard/pws/IRETFO6/graph/2023-09-10/2023-09-10/daily

	from the nearest trainline. Typical noise sources observed included occasional trains, birdsong and leaves rustling.
LT4	SLM was located by the Main Processing Site access road in the south western section the Site, close to the existing Breedon concrete batching plant at the Bellmoor Industrial Estate. Typical noise sources observed were industrial in nature, such as lorries, forklift trucks, and reversing alarms.
ST1	This location was chosen due to the original position being inaccessible from within the Site when the ES was produced. Noise measurements in this location were of a longer duration in order to obtain sufficient noise data. SLM was located on the Riverside Trail alongside the River Idle. Typical noise sources included walkers and model aircraft noise from the flying club within the Site boundary.
ST2	SLM was located on a footpath along the Site boundary edge towards the northeast of the Site. Typical noise sources included walkers and model aircraft noise from the flying club within the Site boundary.
ST3	SLM was located on the edge of a field approximately 300 m from the Oranmore Precast pre-cast concrete works to the north of the Site. Typical noise sources included industrial noise from the concrete supplier.

The noise climate within the Site and within the SSSI located to the south and southeast comprised of the following noise sources:

- Industrial sounds from the Oranmore pre-cast concrete works ;
- Industrial sounds from the Breedon concrete batching plant and potentially other uses on the Bellmoor Industrial Estate located to the south and currently adjacent to the SSSI;
- Agricultural vehicles such as tractors, small vans, pick-up trucks, forklifts and lorries accessing farm property, fields and land adjacent to the Site;
- Noise from farm animals such as sheep bleating and horses;
- Noise from lightweight model aircraft being flown within the Site;
- Human activity within the SSSI such as families talking and children playing/shouting;
- Trees rustling in light winds; and
- Birdsong.

It was observed during the noise measurement study that the dominant source of noise at all noise measurement locations was agricultural noise such as tractors and impulsive, intermittent noisy events such as loud bangs and crashes (sources unknown). Distant road traffic noise from the A638 was audible throughout the noise measurement survey.

The noise climate at noise measurement positions LT3, LT4 and ST1 located towards the middle and to the south of the Site were dominated by sounds from the nearby Breedon Retford concrete batching plant and potentially other uses on the Bellmoor Industrial Estate and anthropological sources from within the SSSI. Throughout the noise measurement study HGVs were observed entering and exiting the Breedon Retford concrete supplier (from the nearby A638) which resulted in the loudest recorded maximum noise levels (L_{AFmax}). Anthropological activity such as adults talking and children playing/shouting were also observed at noise measurement positions LT3, LT4 and ST1.

The noise climate at noise measurement positions LT1, LT2, ST2 and ST3 located at the centre, north and north east of the Site was dominated by agricultural sounds and wildlife such as bird song and trees rustling. Industrial noise such as intermittent bangs and crashes from the Oranmore pre-cast concrete works and potentially other industrial/agricultural uses to the north of the Site were observed whilst attended noise monitoring was undertaken at ST3. Additional sounds observed at ST3 were tractors and occasional road traffic and HGVs accessing the nearby Sutton Grange Farm.

The prevailing noise climate in and around the Site and within the SSSI is comprised mainly of distant continuous road traffic noise from the nearby A638. Localised noise sources such as wildlife within the SSSI, human activity and agricultural activity contribute to the typical 55 – 60 dB L_{AFmax} noise levels and are considered to be variously impulsive and intermittent in nature.

12.6.3 Noise Measurement Results

The summary results of the long-term noise monitoring survey are identified in Tables 12.4, 12.5, 12.6, and 12.7. The results of the short-term noise monitoring surveys are provided in Table 12.8. The summary tables present the $L_{Aeq,T}$, the maximum measured L_{AFmax} and the modal $L_{A90, 1hr}$ for the day and night-time periods.

It should be noted that this section includes the noise measurement results for the night-time period in response to NWT and NCC comments. The data facilitates a comparison of the measured day and night-time noise levels which identifies an expected uplift in the results during the daytime. This would indicate an influence from road traffic noise sources (such as the A638) and local sources such as agricultural/industrial activities and other human activities.

The previously measured background noise data was presented in ES Chapter 12 Section 12.4, and Tables 12.11 and 12.12. The differences in the weather conditions and noise measurement locations between the ES and ESA do not facilitate a direct comparison of the results. Therefore, the data identified in Tables 12.4, 12.5, 12.6, and 12.7 should be considered as supplementary to the ES noise measurement data**.**

Table 12.4: Summary of Long-term Noise Measurement Survey (LT1)

Noise Measurement Location	Date	Measurement Period	L_{Aeq} (dB)	L_{AFmax} (dB)	Modal $L_{A90, 1hr}$ (dB)
LT1	08/09/2023	0700 - 2300 (daytime)	44	85	31
		2300 - 0700 (night-time)	43	65	29
	09/09/2023	0700 - 2300 (daytime)	46	85	32
		2300 - 0700 (night-time)	36	63	29
	10/09/2023	0700 - 2300 (daytime)	44	82	31
		2300 - 0700 (night-time)	35	60	27
	11/09/2023	0700 - 2300 (daytime)	47	74	37
		2300 - 0700 (night-time)	47	71	38

Table 12.5: Summary of Long-term Noise Measurement Survey (LT2)

Noise Measurement Location	Date	Measurement Period	L_{Aeq} (dB)	L_{AFmax} (dB)	Modal $L_{A90, 1hr}$ (dB)
LT2	08/09/2023	0700 - 2300 (daytime)	50	80	31
		2300 - 0700 (night-time)	46	78	27
	09/09/2023	0700 - 2300 (daytime)	54	83	33
		2300 - 0700 (night-time)	43	75	29
	10/09/2023	0700 - 2300 (daytime)	50	88	32
		2300 - 0700 (night-time)	38	78	28
	11/09/2023	0700 - 2300 (daytime)	46	86	37
		2300 - 0700 (night-time)	46	67	35

Table 12.6: Summary of Long-term Noise Measurement Survey (LT3)

Noise Measurement Location	Date	Measurement Period	L_{Aeq} (dB)	L_{AFmax} (dB)	Modal $L_{A90, 1hr}$ (dB)
LT3	08/09/2023	0700 - 2300 (daytime)	38	67	29
		2300 - 0700 (night-time)	37	65	25
	09/09/2023	0700 - 2300 (daytime)	39	70	29
		2300 - 0700 (night-time)	34	69	24
	10/09/2023	0700 - 2300 (daytime)	40	70	30
		2300 - 0700 (night-time)	38	70	27
	11/09/2023	0700 - 2300 (daytime)	47	73	37
		2300 - 0700 (night-time)	49	77	35

Table 12.7: Summary of Long-term Noise Measurement Survey (LT4)

Noise Measurement Location	Date	Measurement Period	L_{Aeq} (dB)	L_{AFmax} (dB)	Modal $L_{A90, 1hr}$ (dB)
LT4	08/09/2023	0700 - 2300 (daytime)	52	87	37
		2300 - 0700 (night-time)	42	67	29
	09/09/2023	0700 - 2300 (daytime)	51	93	34
		2300 - 0700 (night-time)	39	77	27
	10/09/2023	0700 - 2300 (daytime)	46	83	36
		2300 - 0700 (night-time)	47	82	31
	11/09/2023	0700 - 2300 (daytime)	53	95	43
		2300 - 0700 (night-time)	44	70	34

Table 12.8: Summary of Short-term Noise Measurement Survey

Noise Measurement Location	Date	Start Time	Duration (mins)	L_{Aeq} (dB)	L_{AFmax} (dB)	$L_{A90, T}$ (dB)
ST1	08/09/2023	13:45	60	39	60	31
	11/09/2023	11:05	60	40	61	36
	11/09/2023	14:44	60	38	61	34
ST2	08/09/2023	12:59	30	34	49	30
	08/09/2023	14:58	30	37	56	29
	11/09/2023	10:21	30	45	66	39
	11/09/2023	12:18	30	41	64	37
	11/09/2023	14:02	30	42	66	38
	11/09/2023	15:57	15	45	61	39
ST3	08/09/2023	12:08	30	45	62	39
	08/09/2023	15:46	60	43	58	39
	11/09/2023	09:18	30	41	62	38
	11/09/2023	13:12	30	41	60	39

12.6.4 Noise Measurement Results - L_{AFmax}

In order to provide additional context regarding the current acoustic climate within the SSSI and the Site, further analysis of the L_{AFmax} noise levels has been undertaken. The sound level meters used during the noise measurement survey were configured to record audio data when the trigger level exceeded L_{AFmax} 70 dB. Table 12.9 identifies various L_{AFmax} noise levels and their sources.

Audio data files were not recorded at noise measurement position LT1 due to an equipment malfunction of the audio trigger. However, the typical sources of L_{AFmax} noise levels at LT1 are assumed to be similar to LT3, as the magnitude of the L_{AFmax} results are similar.

The audio recordings at LT2 identify birdsong and model aircraft as the typical sources of L_{AFmax} during the noise survey. It is understood that the model aircraft are flown by members of the North Notts Model Flying Club who meet at a current location central to the Site. The model aircraft are piloted regularly throughout all seasons, weather permitting.

The audio recordings at LT3 identify birdsong and aircraft during the daytime and rain fall during the night-time.

The audio recordings at LT4 identify HGVs passing by and entering the Breedon concrete batching plant and other uses at the Bellmoor Industrial Estate. The L_{AFmax} due to HGVs at night were recorded in the early hours of the day at 05:55 hrs.

Table 12.9 below identifies the measured L_{AFmax} values and the noise source.

Table 12.9: L_{AFmax} – Noise Sources

Noise Measurement Location	Period	L_{AFmax} – Noise Sources			
		Max Level	2nd Highest	3rd Highest	10th Highest
LT1	Day	85	85	82	79
	Night	71	70	65	63
LT2	Day	88 (Birdsong)	86 (Model Aircraft & Birdsong)	86 (Birdsong)	80 (Model Aircraft)
	Night	78 (Birdsong)	78 (Birdsong)	75 (Birdsong)	71 (Birdsong)
LT3	Day	73 (Aircraft)	73 (Birdsong)	72 (Birdsong)	69 (Aircraft)
	Night	77 (Rain*)	75 (Rain)	75 (Rain)	73 (Rain)
LT4	Day	95 (HGV)	93 (HGV)	89 (HGV)	83 (HGV)
	Night	82 (HGV)	77 (HGV)	77 (Birds)	71 (Birds)

*Results influenced by rain are not utilised within the assessment

Table 12.10 below identifies the various statistical L_{AFmax} parameters in addition to the typically presented maximum L_{AFmax} values. The presentation of additional L_{AFmax} data facilitates a comparison of the 'typical' and maximum measured noise levels throughout the noise survey. The maximum, 10th highest, mean, median and mode values of the L_{AFmax} are identified in Table 12.10. The results are presented for the daytime and night-time periods which are usually considered to be 0700 -2300 hrs (Daytime) and 2300 to 0700 hrs (Night-time). Although the daytime core working hours are from 0700-1900 hrs the maximum noise levels measured during those core hours would be of a similar magnitude to those identified for the daytime period 0700-2300 hrs i.e. the measured maximum L_{AFmax} noise levels would also occur during the proposed core working hours.

Table 12.10: Noise Measurement Results - L_{AFmax}

Noise Measurement Location	Date	Period	L_{AFmax} (dB)				
			Maximum	10th Highest	Mean	Median	Mode
LT1	08/09/2023	0700 – 2300 (daytime)	85	68	56	56	60
		2300 - 0700 (night-time)	65	56	45	43	37
	09/09/2023	0700 - 2300 (daytime)	85	78	59	57	53
		2300 - 0700 (night-time)	63	54	46	45	42
	10/09/2023	0700 - 2300 (daytime)	82	72	56	56	57
		2300 - 0700 (night-time)	60	52	44	43	41
	11/09/2023	0700 - 2300 (daytime)	74	67	57	58	58
		2300 - 0700 (night-time)	71	62	53	56	61
LT2	08/09/2023	0700 - 2300 (daytime)	80	71	58	59	64
		2300 - 0700 (night-time)	78	66	52	48	43
	09/09/2023	0700 - 2300 (daytime)	83	77	64	66	66
		2300 - 0700 (night-time)	75	68	48	46	39
	10/09/2023	0700 - 2300 (daytime)	88	72	59	59	55
		2300 - 0700 (night-time)	78	60	44	43	47
	11/09/2023	0700 - 2300 (daytime)	86	68	55	54	52
		2300 - 0700 (night-time)	67	63	51	53	60
LT3	08/09/2023	0700 - 2300 (daytime)	67	57	48	47	46
		2300 - 0700 (night-time)	65	57	45	42	39
	09/09/2023	0700 - 2300 (daytime)	70	60	50	50	50
		2300 - 0700 (night-time)	69	54	42	40	37
	10/09/2023	0700 - 2300 (daytime)	70	65	51	51	50
		2300 - 0700 (night-time)	70	55	44	42	42
	11/09/2023	0700 - 2300 (daytime)	73	66	55	54	54
		2300 - 0700 (night-time)	77	73	58	67	71

Noise Measurement Location	Date	Period	L_{AFmax} (dB)				
			Maximum	10th Highest	Mean	Median	Mode
LT4	08/09/2023	0700 - 2300 (daytime)	87	78	61	60	53
		2300 - 0700 (night-time)	67	60	50	50	48
	09/09/2023	0700 - 2300 (daytime)	93	71	57	55	55
		2300 - 0700 (night-time)	77	61	49	47	47
	10/09/2023	0700 - 2300 (daytime)	83	73	60	59	59
		2300 - 0700 (night-time)	82	69	52	49	48
	11/09/2023	0700 - 2300 (daytime)	95	77	63	62	58
		2300 - 0700 (night-time)	70	62	50	50	46

12.7 Noise Predictions – Residential Receptors

The operational noise predictions have been updated due to the amendments to the PFA extraction processes (i.e. the amended working scheme). The key activities that are considered to be potential sources of noise are soil stripping, digging down (to establish the extraction base), general extraction, and restoration (embankment removal) phases.

12.7.1 Noise Model Assumptions - Soil Stripping

Noise modelling has been undertaken to predict the likely reasonable worst-case noise levels at each noise sensitive receptor (NSR) due to soil stripping activities.

To calculate the likely worst-case noise levels the noise modelling takes into account the following:

- Soil stripping would occur at the closest location in each phase to NSRs;
- Soil stripping would occur at surface level, within each PFA lagoon prior to extraction; and
- Soil stripping would be continuous throughout the working day.

The plant list for soil stripping activities is provided in, Appendix 12.1, Volume 3 of this ESA.

12.7.2 Noise Modelling Results – Soil Stripping

Table 12.11 identifies the results of the noise modelling for residential and ecological receptors respectively. Table 12.11 also identifies the approximate distance between each NSR considered within the noise impact assessment and the closest soil stripping area, the duration of soil stripping and the minimum distance to soil stripping activities.

The noise contours for soil stripping are provided in ESA Volume 2 Figures 12.18 to 12.28. The calculation area of the noise contours is within the 500 m buffer around the Site. The noise contours identify the location of the noise sources and the resulting noise propagation, are calculated at a 1.5 m height, and include the existing site topography. The existing embankments are included within the noise modelling and provide a degree of acoustic screening of soil stripping activities. It should be noted that soil stripping would occur at one location at a time, owing to the micro-phasing approach, and there would be no temporal overlap between activities at different areas. However, in order to

predict reasonable worst case noise levels at the NSRs, which are located at both sides of the Site, predictions have been carried out with the soil stripping plant teams located at the closest likely point to the receptors on both sides of the Site (i.e. in phases HR P1 and HR P3). This approach results in an overprediction of noise levels, but, as the nearest activity is likely to dominate noise at the receptors, the effects of this are small. NSRs 5, 7 and 10 which are considered within ESA Volume 1 Chapter 8 are excluded from the figures due the separation distance from the noise sources.

Table 12.11 – Soil Stripping – Predicted Noise Levels – Residential Receptors

Noise Sensitive Receptor	Closest Soil Stripping Area	Activity Duration (days)	Approximate Minimum Distance to NSR (m)	Noise Level $L_{Aeq, 1hr}$ dB (free field)
1 - Wetlands Fisheries	HR P6	11 (over 1.9 years)	125	62
2 - Sutton-cum-Lound	HR P6	11 (over 1.9 years)	625	46
3 - Low Farm/Sutton Grange Farm	LR P5	5 (over 0.8 years)	85	61
4 - Bellmoor Farm	HR P3	11 (over 3.7 years)	180	57
9 - 45 Sutton Lane	HR P1	12 (over 3.1 years)	800	43
10 - Brooklyn House - North Road	HR P1	12 (over 3.1 years)	850	44

12.7.3 Magnitude of Impact – Soil Stripping

It should be noted that the soil stripping activities are considered temporary in nature and would occur for significantly less than 8 weeks duration in any one year of operations. Therefore, the temporary noise threshold criterion of 70 $L_{Aeq, 1hr}$ dB set out in Planning Practice Guidance[6] is applicable to noise from these activities, in the location of residential receptors.

The reasonable worst-case external free-field noise levels at the location of residential NSRs are predicted to be 47 to 63 dB $L_{Aeq,1hr}$.

The highest noise levels of 61 - 63 dB $L_{Aeq,1hr}$ are predicted at Wetland Fisheries, Low Farm and Sutton Grange Farm. The predicted noise levels are due to the close proximity of the soil stripping activities to the NSRs. The highest noise levels of 63 dB $L_{Aeq,1hr}$ are predicted whilst soil stripping activities are undertaken within HR P4, HR P5 and LR P5.

NSRs at Sutton Lane and Brooklyn House are located more than 800 m from the nearest soil stripping activities and therefore the predicted noise levels are 47 dB $L_{Aeq,1hr}$.

The noise levels at the location of Bellmoor Farm are predicted to be 57 dB $L_{Aeq,1hr}$. The highest predicted noise levels of 57 dB $L_{Aeq,1hr}$ at Bellmoor Farm would occur during soil stripping activities undertaken within HR P3.

The predicted noise levels are the result of the reasonable worst-case scenario when soil stripping activities are undertaken in close proximity to NSRs. Therefore, the typical noise levels at the location of NSRs would be lower than those predicted, as the majority of the soil stripping would occur at a greater distance than stated in Table 12.8. In practice, the NSRs would experience the maximum predicted noise levels for a short period.

[6] Guidance on the Planning for Mineral Extraction: Ministry of Housing, Communities & Local Government, October 2014

The predicted noise levels are below the temporary noise impact threshold criterion of 70 dB $L_{Aeq,1h,}$ at the location of all residential NSRs. Therefore, the magnitude of impact is considered to be negligible.

12.7.4 Noise Model Assumptions - Dig-Down

The plant list for dig-down activities is provided in Appendix 12.1, Volume 3 of this ESA. As a reasonable worst-case scenario, the noise modelling considers the dig-down activity occurring at surface level throughout the duration of these works, estimated to require a temporary period of around 3-5 days for each dig-down location. The dig-down works would commence at surface level, however as the dig-down works progress the noise generating equipment would be situated at a progressively lower level before reaching the target depth of 5m. Therefore, the NSRs would benefit from the noise screening provided by the existing embankments shortly after the dig-down commences.

The initial dig-down activity would be required to be undertaken in three locations during the RCEP lifetime. These three locations are as follows:

- Southwest corner of HR P1;
- East embankment of HR P1 to cut through into HR P2; and
- East embankment of HR P6 to cut through into the Low-Rise section of the Site.

The locations of the dig-downs considered within the noise modelling are identified on ES Volume 1 Chapter 12 Figures 12.29.

The noise modelling for the initial dig-down phase, forming part of temporary site establishment activities considers the activity taking place in the first instance at the southwest corner of HR P1, as this is where it is necessary to provide a cut into which the conveyor belt and maintenance road are to be extended. Following on from extraction activities within HR P1 it would be necessary to create another dig-down cut into HR P2. Lastly there would be another dig-down required within HR P6 following soil stripping in the first micro-phase of LR P3.

12.7.5 Noise Modelling Results - Dig-Down

Table 12.12 presents the results of the noise modelling for the dig down phase for residential receptors. The results shown do not include any additional correction for screening due to working at depth in order to facilitate reasonable worst-case noise predictions of surface level working. The reality is that as the depth increases after the first day of digging the noise levels would also decrease with it due to localised screening effects.

The noise contours for the dig-down are provided in ESA Volume 2 Figures 12.30 to 12.32. The calculation area of the noise contours is within the 500 m buffer around the Site. The noise contours are calculated at 1.5 m height and demonstrate how the sound due to dig-down activities would likely propagate across the Site and towards the noise contour. Figure 12.30 identifies that the topography of the existing embankment located at the southwest corner of HR P1 provides some degree of screening during the dig-down at this location.

Table 12.12 – Dig-Down – Predicted Noise Levels – Residential Receptors

Noise Sensitive Receptor	Dig Down at HR P1 - Noise Level $L_{Aeq, 1hr}$ dB (free field)	Dig Down at HR P2 - Noise Level $L_{Aeq, 1hr}$ dB (free field)	Dig Down at LR P3 - Noise Level $L_{Aeq, 1hr}$ dB (free field)
1- Wetlands Fisheries	27	30	37
2- Sutton-cum-Lound	27	31	43
3- Low Farm/Sutton Grange Farm	26	28	52
4- Bellmoor Farm	35	54	31

9- 45 Sutton Lane	25	23	20
10- Brooklyn House - North Road	25	23	20

12.7.6 Magnitude of Impact – Dig-Down

The initial dig-down activities are considered essential site preparation works and are required to facilitate the extension of the haul road and conveyor through the Site. The initial dig-down activities would occur in three specific locations and would be undertaken over a short period of time, such that they can be considered to be temporary in nature. The noise resulting at NSRs is likely to be lower than those presented in Table 12.12 due to exclusion of screening effects within the noise calculations. The predicted noise levels are likely to occur for a short duration whilst the dig-down commences at surface level. As the dig-down progresses to a depth of approximately 5 m in the High-Rise and at least 2-3 m in all locations the existing embankment would screen noise emissions of the dig-down activities. A conservative assumption of 2-3 m has been taken in the noise modelling.

The highest predicted noise level at Wetlands Fisheries is 37 dB $L_{Aeq,1hr}$ are likely to occur whilst dig down activities are located at LR P3 between the high rise and Low-Rise areas within the Site.

The highest predicted noise level at Sutton-cum-Lound is 43 dB $L_{Aeq,1\ hr}$ during the dig down located at LR P3.

The highest predicted noise levels at the location of Bellmoor Farm is 54 dB $L_{Aeq,1hr}$. The highest noise level is likely to occur during the initial dig down of HR P2. During the dig-down at HR P1 the majority of dig-down activities would be located below the surface level. Whilst the dig down is undertaken at HR P1 the predicted noise levels are 27 – 46 dB $L_{Aeq,1hr.}$ As the works progress deeper the embankment would provide screening of noise generating equipment.

The highest predicted noise level of 54 dB $L_{Aeq,\ 1hr}$ is below the temporary threshold criterion of 70 dB $L_{Aeq,1hr}$ at the location of residential NSRs. Therefore, the magnitude of impact is considered to be negligible.

12.7.7 Noise Model Assumptions - PFA Extraction Phases (‘normal’ operations)

The methodology for calculating operational noise levels due to PFA extraction is set out in Volume 1, Section 12.6.1.2 of the ES and is used to inform the noise assessment within the ESA. The methodology remains the same for this ESA. An updated plant list is provided in Volume 3, Appendix 12.1 of this ESA.

The noise model assumes that PFA extraction activities are taking place in a location which represents the final stages of extraction within each area, i.e. at the closest location within the Site to the NSRs. In practice, the noise emissions from extraction activities would initially be lower whilst extraction commences further back within the High-Rise. The noise modelling also assumes as a reasonable worst-case scenario that PFA extraction is being undertaken at two locations concurrently within certain phases. It is understood however that this is unlikely to occur. Please refer to ESA Volume 1 Chapter 5 for phasing details of the Amended Proposed Development.

A significant change from the ES is the inclusion of additional mitigation within the noise modelling. The Low-Rise embankment which bounds the north and northeast of area LR P5 would be increased in height with additional temporary 2-3 m bund formed of soil placed on top. The additional temporary 2-3 m bund would be removed when the Site is decommissioned. For the purposes of the modelling in this document a 3 m screening feature has been included. This would raise the embankment height to approximately 5 m and increase the noise mitigation properties of the existing embankment. The bund would be formed of topsoil from soil stripping activities and/or from the soil overburden store located adjacent to LR P5. It is also proposed to place a 2-3 m high bund to the south and west of LR P2 and LR P1 in the Low-Rise where the Site borders the SSSI, in order to provide acoustic

screening of noisy activities. The location of the proposed mitigation is identified in Figure 12.15 in ESA Volume 2.

12.7.8 Noise Modelling Results – PFA Extraction

The noise modelling has been split into scenarios based on the order of the Amended Proposed Development extraction operations. The revised phasing order is detailed in Volume 1, Chapter 5 of this ESA. Each modelling scenario represents extraction operations being undertaken within the working area, as identified in Table 12.13. The updated noise predictions for PFA extraction operations within the Site are identified in Tables 12.14 and 12.15.

The updated noise contour results are provided on Figures 12.3 to 12.12 in Volume 2 of this ESA. The calculation area of the noise contours is within the 500 m buffer around the Site. The noise contours identify the locations of the noise generating equipment associated with the PFA extraction activities and also include the haul road and conveyor. As discussed earlier, the location of the PFA extraction activities have been configured to result in reasonable worst-case noise predictions when extraction activities are undertaken within approximately 150 m of NSRs.

Due to the PFA extraction taking place at a depth of approximately 4-5 m within the Site the existing embankments provide a degree of noise and visual screening of noise generating equipment at NSRs.

Table 12.13: Noise Modelling Scenarios – PFA Extraction

Scenario	Working Area	Activity Duration (years)
1	HR P1	3.1
2	HR P2	3.1
3	HR P3	3.7
4	HR P4	4.4
5	HR P5	1.9
6	HR P6	1.9
7	LR P3	0.7
8	LR P4	1.1
9	LR P5	0.8
10	LR P1 and LR P2	0.3

Table 12.14 – Operational Noise Levels – Residential Receptors

NSR	Operational Noise Level $L_{Aeq, 1hr}$ dB (free field)						
	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6	Scenario 7
1- Wetlands Fisheries	29	32	37	40	40	43	38
2- Sutton-cum-Lound	28	30	36	37	34	34	39
3- Low Farm/Sutton Grange Farm	27	29	32	35	32	34	36
4- Bellmoor Farm	40	43	43	41	41	41	40
9- 45 Sutton Lane	43	43	43	43	43	43	43
10- Brooklyn House - North Road	44	44	44	44	44	44	44

Table 12.15 – Operational Noise Levels – Residential Receptors

NSR	Operational Noise Level $L_{Aeq, 1hr}$ dB		
	Scenario 8	Scenario 9	Scenario 10
1- Wetlands Fisheries	38	41	39
2- Sutton-cum-Lound	38	36	36
3- Low Farm/Sutton Grange Farm	39	48	35
4- Bellmoor Farm	40	40	40
9- 45 Sutton Lane	43	43	43
10- Brooklyn House - North Road	44	44	44

12.7.9 Magnitude of Impact – PFA Extraction

The principal PFA extraction phases would be undertaken over the full duration of the Amended Proposed Developmentwhich is approximately 22 years. Therefore, any potential noise impacts at NSRs due to the PFA extraction are long-term, albeit temporary.

The changes to the extraction process would be the most significant in terms of noise reduction. After the initial dig-down and site preparation is completed the extraction process would progress through the Site utilising the existing lagoon embankment in each extraction phase and the PFA extraction face as a noise screen. This, in conjunction with a reduction in the working area, and the use of spur conveyors, removes the requirement for long travel distances to semi-fixed Processing Areas 1-3. This would reduce the total noise emissions from the Amended Proposed Development when compared to the ES.

Residents at Bellmoor Farm, Wetlands Fisheries and Low Farm/Sutton Grange Farm would experience reduced noise levels when compared to the ES Working Scheme. Most notably the change in location of the conveyor and maintenance / haul road throughout the Site, both the conveyor and the maintenance / haul road are to be located within a cutting within the Site. The cutting would provide screening of noise generating equipment associated with the maintenance / haul road and the conveyor.

As the extraction face progresses through each area the existing embankments would also provide noise screening from activities and protect the amenity of nearby NSRs.

The highest predicted noise level at Bellmoor Farm during PFA extraction is 43 $L_{Aeq,1hr}$ dB whilst extraction is undertaken within HR P3. The noise due to extraction would subsequently decrease as the extraction operations continue northeast within the Site. However, the predicted noise levels remain steady at 40 $L_{Aeq,1hr}$ dB due to HGV movements on the maintenance / haul road and some noise emissions due to the conveyor.

The highest predicted noise level at Wetlands Fisheries during PFA extraction is 43 $L_{Aeq,1hr}$ dB whilst extraction is undertaken within HR P5.

The highest predicted noise level at Low Farm and Sutton Grange Farm during PFA extraction is 48 $L_{Aeq,1hr}$ dB whilst extraction is undertaken within LR P5.

The predicted noise levels at 45 Sutton Lane and Brooklyn House are due to noise emissions from the Main Processing Area C. The predicted noise levels are below the existing ambient noise levels at the location of NSRs which is dominated by noise from the nearby A638.

The predicted PFA extraction noise levels are assessed in accordance with the scale of magnitude and operational noise impact criteria as set out in ES Volume 1 Chapter 12: Table 12.6. The magnitude of impact due to PFA extraction at the location of residential NSRs is considered to be negligible.

12.7.10 Noise Model Assumptions – Embankment Removal

This section presents the results of further noise modelling which has been undertaken in order to quantify the likely worst-case external noise levels due to short-term embankment removal activities in the location of the NSRs. The predicted noise levels are stated in terms of a worst-case $L_{Aeq, 1hr.}$

The noise modelling has assumed, as a reasonable worst-case scenario, that embankment removal activities are located at the Site boundary and in line of sight of the closest NSR. The embankment removal works are required to be undertaken in locations which are approximately 60 - 100 m from NSRs. The embankment removal works are expected to occur over a period of 4-5 days duration in any one year of the Amended Proposed Development. For reference, Table 12.15 identifies the duration of the restoration works for each phase.

12.8 Noise Modelling Results - Embankment Removal – Worst-case Noise Levels

Table 12.15 identifies the predicted worst-case noise levels. In practice, the worst-case noise levels due to embankment removal as identified in Table 12.15 would occur over a maximum period of less than 15 days in any one year.

The noise contours for the embankment removal are provided in ESA Volume 2 Figures 12.33 to 12.43. The calculation area of the noise contours is within the 500 m buffer around the Site. The noise contours are calculated at 1.5 m height and demonstrate how the sound due to embankment removal activities is predicted to propagate across the Site and towards NSRs.

Table 12.15 – Restoration works – Worst-case Noise Levels

NSR	Nearest Embankment Removal Works Area	Embankment Removal Works Duration (days)	Embankment Removal – Worst-case Noise Level $L_{Aeq, 1hr}$ dB
1- Wetlands Fisheries	HR P5 and HR P6	10	65
2- Sutton-cum-Lound	HR P5	10	47
3- Low Farm/Sutton Grange Farm	LR P5	10	69
4- Bellmoor Farm	HR P3	15	61
9- 45 Sutton Lane	HR P1	15	43
10 - Brooklyn House - North Road	HR P1	15	44

The Amended Proposed Development identifies a maximum duration of 15 days in any one year for the embankment removal works, therefore they are considered temporary in nature. Embankment removal works are the noisiest activity associated with the restoration works. However, the duration for removing an embankment within a work area is likely to be undertaken over a duration of less than 4-5 days at any one time.

12.9 Magnitude of Impact – Embankment Removal

The highest noise levels in the location of residential noise sensitive receptors due to embankment removal works are 65 and 69 dB $L_{Aeq,1hr}$ at the Wetlands Fisheries and Sutton Grange Farm. The nearest embankment removal works to these locations are HR P5/P6 and LR P5. The predicted noise levels of this magnitude are due to the embankment removal activities being undertaken within approximately 60-100 m of the nearest NSRs.

The highest predicted noise level at Bellmoor Farm is 61 $L_{Aeq,1hr}$ dB, due to occur whilst embankment removal is undertaken at the west boundary of the HR P3.

The predicted noise levels identify that there would be no exceedance of the noise threshold criterion of 70 dB $L_{Aeq,1hr}$ at any of the residential receptors considered in this chapter. Therefore, the magnitude of impact is negligible.

12.9.1 Effects of Concurrent Phases

It is understood that each phase of the Amended Proposed Development would be completed before works progress to a subsequent phase. Therefore, there would be no cumulative effects at NSRs due to activities being undertaken at concurrent phases.

12.9.2 Operational Traffic Movements

A brief summary statement was initially provided in the ES Volume 1, Chapter 12 which concluded that the introduction of additional HGV and associated light vehicle movements would result in a negligible effect in the location of NSRs in the vicinity of the local road network. This section has been included within this chapter to provide further clarification as to how this conclusion was reached. It should be noted that the assessment considers daytime only, as no HGV movements due to the Amended Proposed Development are expected at night-time.

To quantify the likely increase in noise levels at NSRs due to operational HGV and light vehicle traffic, calculations have been undertaken in accordance with DMRB 2019. In this instance, the projected baseline traffic flows for Do-Minimum 2024 scenario (DM2024) have been compared with the operational traffic flows for the Do-Something scenario (DS2024). The DM2024 scenario considers the projected baseline traffic flows only, the DS2024 scenario considers the projected baseline traffic flows plus the additional operational traffic flows due to the Amended Proposed Development operational phases.

The basic noise level (BNL[7]) has subsequently been calculated for each road link considering the total traffic flow, the number of HGVs and light vehicles, the typical speed in kph and the percentage of HGV traffic. The BNLs have then been compared for both the DM2024 and the DS2024 scenarios. The traffic data for each road link and each scenario are identified in Table 12.16 and Table 12.17 followed by the comparison of the calculated corrected BNLs in Table 12.18.

Table 12.16 – DM2024 Scenario – Projected baseline traffic flows 2024

Road Link	Annual Average Weekday Traffic (AAWT)	No. of HGV	Percentage HGV
A638, between Scooby and Ranskill	5412	258	4.8%
A638, near Torworth	5270	323	6.1%
A638, South of Barnby Moor	8824	407	4.6%
A638, Retford	15692	310	2.0%
A638, near Gamston	9326	273	2.9%

Table 12.17 – DS2024 Scenario – Projected baseline traffic flows plus operational HGV traffic 2024

Road Link	Annual Average Weekday Traffic (AAWT)	No. of HGV	Percentage HGV
A638, between Scooby and Ranskill	5548	354	6.4%
A638, near Torworth	5406	419	7.8%

[7] The Basic Noise Level is the calculated L_{A10} at a reference distance of 10 m from the nearest kerbside. Calculated in accordance with the Department of Transport – Calculation of Road Traffic Noise

A638, South of Barnby Moor	8960	503	5.6%
A638, Retford	15828	406	2.6%
A638, near Gamston	9462	369	3.9%

Table 12.18 – Basic Noise Level comparison – DM2024 vs DS2024

Road Link	DM2024 $L_{A10, 18hr}$ dB	DS2024 $L_{A10, 18hr}$ dB	DS2024 – DM2024 dB Difference
A638, between Scooby and Ranskill	67.1	67.2	+0.1
A638, near Torworth	65.2	65.3	+0.1
A638, South of Barnby Moor	67.5	67.5	+0.0
A638, Retford	68.1	68.1	+0.0
A638, near Gamston	69.4	69.5	+0.1

The comparison above has shown that the corrected BNLs would increase by a maximum of +0.1 dB on all road links utilised by the HGV traffic during operational phases. Therefore, the DM2024 total traffic flows are of a magnitude where the likely impact at NSRs in the vicinity of the local road network would be negligible.

12.10 Noise Predictions – Ecology Receptors

This section presents the results of the noise predictions (at a normal height of 1.5m) for each activity of the Amended Proposed Development, at the location of ecological and ornithological receptors within the adjacent SSSI. The tabulated results are provided in addition to the noise contours which have been referenced in proceeding sections of the chapter.

It should be noted that NSRs 5, 7 and 10 are excluded from the noise contour figures due the large separation distance from the noise sources. Furthermore, the noise contour results do not extend to these locations as noise levels less than 35 dB(A) are not shown.

Table 12.19 identifies the NSRs, the area of working and the predicted noise levels for the dig-down, soil stripping, PFA extraction (i.e. 'normal' operations), and embankment removal activities. The predicted noise levels identified are considered to be the maximum $L_{Aeq, 1hr.}$ The predicted noise levels are colour coded as follows: green to identify noise levels less than 55 dB(A) and light orange to identify noise levels greater than 55 dB(A). Further discussion is provided in ESA Volume 1, Chapter 8 where the predicted noise level is greater than 55 dB(A).

Importantly, note than none of the normal operations exceed the limit of 55 dB(A).

The impact of these operations on ecological and ornithological receptors within the SSSI is considered in ESA Volume 1, Chapter 8, Section 8.8.3.1.

Table 12.19 – Noise Predictions – NSRs within the SSSI - $L_{Aeq, 1hr}$ dB

[INSERT PDF TABLE IN LANDSCAPE]

Table 12.19 – Noise Predictions – NSRs within the SSSI - $L_{Aeq, 1hr}$ dB

	5- Footpath SSSI				6- Footpath Tiln				7- River Idle Footpath			
Activity Area	*Dig-Down*	*Soil Stripping*	*Extraction*	*Embankment Removal*	*Dig-Down*	*Soil Stripping*	*Extraction*	*Embankment Removal*	*Dig-Down*	*Soil Stripping*	*Extraction*	*Embankment Removal*
HR P1	43	47	43	44	30	39	30	35	25	34	25	30
HR P2	45	44	43	43	31	40	32	35	26	33	28	29
HR P3		44	43	43		42	33	27		36	30	24
HR P4		43	43	43		38	34	37		34	30	31
HR P5		43	43	42		40	33	34		35	27	28
HR P6		43	43	43		40	34	38		36	27	31
LR P1		43	43	43		45	35	47		38	30	38
LR P2		43	43	43		44	35	41		37	30	34
LR P3	43	43	43	43	42	46	40	46	38	40	36	40
LR P4		42	43	42		45	40	45		42	37	42
LR P5		42	43	42		41	38	40		39	36	39

	8- River Idle Footpath				11 – Additional SSSI 1				12 – Additional SSSI 2			
Activity Area	*Dig-Down*	*Soil Stripping*	*Extraction*	*Embankment Removal*	*Dig-Down*	*Soil Stripping*	*Extraction*	*Embankment Removal*	*Dig-Down*	*Soil Stripping*	*Extraction*	*Embankment Removal*
HR P1	32	41	34	37	57	65	45	63	32	38	34	35
HR P2	37	56	40	40	42	41	44	39	38	61	41	36
HR P3		52	40	33		41	44	39		40	39	33
HR P4		42	40	38		36	44	36		33	39	32
HR P5		44	39	37		36	44	35		34	38	33
HR P6		44	39	42		36	44	36		35	39	34
LR P1		46	41	45		35	44	36		43	40	42
LR P2		48	41	47		36	44	35		45	40	43
LR P3	41	43	41	43	34	35	44	35	35	41	40	41
LR P4		41	40	41		35	44	35		39	40	39
LR P5		40	40	40		35	44	35		39	40	37

	13 – Additional SSSI 3				14 – Additional SSSI 4				15 – Additional SSSI 5			
Activity Area	*Dig-Down*	*Soil Stripping*	*Extraction*	*Embankment Removal*	*Dig-Down*	*Soil Stripping*	*Extraction*	*Embankment Removal*	*Dig-Down*	*Soil Stripping*	*Extraction*	*Embankment Removal*
HR P1	30	35	31	33	30	42	31	38	27	38	28	34
HR P2	34	43	40	41	33	45	36	44	30	39	31	38
HR P3		65	41	36		50	38	31		42	33	28
HR P4		38	42	37		42	39	40		37	34	36
HR P5		40	42	37		47	38	39		40	32	35
HR P6		40	43	39		48	40	44		43	33	38
LR P1		48	45	46		58	51	56		49	37	50
LR P2		52	45	51		65	51	60		46	37	42
LR P3	34	44	43	44	50	50	43	51	47	56	47	55
LR P4		42	43	41		46	41	46		65	51	67
LR P5		35	42	35		45	40	44		48	40	48

12.11 Additional Considerations

The points below are provided in order to address comments raised by consultees regarding the ES. The concerns are previously set out in Section 12.3.1 consultation responses.

- Conveyor Belt Sirens - There would be no regular use of conveyor belt sirens during operational phases. There may be times where emergency sirens would be used. However, any noise relating to emergency situations such as conveyor belt sirens or other emergency alarms have not been considered within the scope of the noise impact assessment due to their limited temporary and infrequent use.
- Shredding and Screening Activities - The noise calculations presented in Section 12.6 consider both shredding and screening activities. The source noise levels utilised within the noise modelling and provided in Volume 3, Technical Appendix 12.1 included in Volume 3 of the ES and ESA are the reasonable worst-case source noise levels and include a +2 dB uplift of the source values to account for uncertainties in the source data.
- Dewatering Plant – As the PFA would be wet worked (refer to Volume 1, Chapter 5, Section 5.2.3.3 there is no requirement for the use dewatering plant to pump water from extraction phases. Therefore, potential noise impacts due to dewatering plant, including at night, have not been considered within the assessment.

12.11.1 Area C – Main Processing Site

The layout changes which could affect noise emissions are discussed below:

- Storage silos – these have been relocated to the west boundary of Area C. The silos were not considered to be noise generating equipment in the ES. Therefore, the relocation would not adversely affect noise levels at NSRs.
- External filters and condensers for the drying line – the addition of an external filtration system for each drying line (filters, stacks and condensers). Previously, as described in ES Volume 1, Chapter 5 and shown on the Site Layout (Appendix 5.1, Volume 3), these elements were proposed to be internal and vented, but to achieve more efficient exhaust air dispersal these are now external. More information can be found in ESA Volume 1 Chapter 13, and the supporting Technical Appendices in Volume 3. The system also allows for more water vapour to be condensed and reused at the Site. It is understood that the noise generating elements of the external filtration system are similar to those of the previously proposed internal vented system. Therefore, the noise generated by these external elements would be similar, and any noise differences between the previous and newly proposed filtration system would be negligible.
- Two new weighbridges – the addition of HGVs utilising the two proposed weighbridges located within the south-west section of Area C would not significantly increase noise levels at NSRs. All HGVs which are stationary on the weighbridges would be instructed to turn off engines in order to reduce noise emissions.

12.12 Summary of Cumulative Effects

There are no likely cumulative effects due to noise in the location of the noise sensitive receptors considered within the assessment.

12.13 Summary of Effects

Receptor (sensitivity)	Potential Effect	Magnitude of impact with embedded mitigation	Justification	Significance of Effect	Additional Mitigation Proposed	Residual Significance
Soil Stripping						
Residential (Very High)	Noise disturbance due to soil stripping activities	Negligible	The soil stripping activities are considered to be temporary in nature and the predicted noise levels in the location of noise sensitive receptors fall below the threshold noise level criteria of 70 dB(A) for residential receptors.	Minor	None	Minor
Dig-Down						
Residential (Very High)	Noise disturbance due to initial dig down activities	Negligible	The initial dig-down activities are considered to be temporary in nature and the predicted noise levels in the location of noise sensitive receptors fall below the threshold noise level criteria of 70 dB(A) for residential receptors.	Minor	None	Minor
Extraction						
Residential (Very High)	Noise disturbance due to extraction	Negligible	Predicted noise levels in the location of noise sensitive receptors fall below the threshold noise level criteria of LA90+10 dB(A) and < 55 dB(A) for residential receptors.	Minor	None	Minor

Restoration – Embankment Removal						
Residential (Very High)	Noise disturbance due to embankment removal	Negligible	The embankment removal activities are considered temporary in nature and the predicted noise levels in the location of noise sensitive receptors fall below the threshold noise level criteria of 70 dB(A) for residential receptors.	Minor	None	Minor

12.14 Statement of Significance

The assessment presented in the Chapter has considered the activities of soil stripping, the initial dig-down (to form the extraction base), extraction, and the restoration phases outlined in ESA, Volume 1, Chapter 5. The residential NSRs considered in this noise impact assessment are all of a very high sensitivity. Therefore, the minimum significance of effect in accordance with the EIA methodology at each NSR would be minor. The significance of effect cannot be concluded to be negligible at any of the NSRs considered in this noise impact assessment due to their very high sensitivity.

No significant effects in terms of the EIA Regulations are predicted in relation to noise during the temporary soil stripping, initial dig down, operation or restoration phases of the Amended Proposed Development, at any of the residential NSRs considered as part of the assessment.

12.14.1 Significance of Effect - Soil Stripping

When the magnitude of impact is considered in combination with the sensitivity of the residential NSRs, **the effect due to the initial dig down activities is considered to be of minor significance**.

12.15 Significance of Effect – Initial Dig-Down

When the magnitude of impact is considered in combination with the sensitivity of the residential NSRs, **the effect due to the initial dig down activities is of minor significance**.

12.15.1 Significance of Effect – PFA Extraction

When the magnitude of impact is considered in combination with the sensitivity of the residential NSRs, **the effect due to the extraction activities is of minor significance**.

12.15.2 Significance of Effect – Embankment Removal

When the magnitude of impact is considered in combination with the sensitivity of the residential NSRs, **the effect due to the embankment removal activities in the location of residential receptors is of minor significance**.