Ford energy from waste

FORD ENERGY RECOVERY FACILITY AND WASTE SORTING AND TRANSFER FACILITY, FORD CIRCULAR TECHNOLOGY PARK

ENVIRONMENTAL STATEMENT
TECHNICAL APPENDIX J:
NOISE AND VIBRATION ASSESSMENT

JUNE 2020

RAMBOLL Viridor GRUNDON

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FORD ENERGY RECOVERY FACILITY AND WASTE SORTING AND TRANSFER FACILITY, FORD CIRCULAR TECHNOLOGY PARK

NOISE AND VIBRATION ASSESSMENT

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FORD ENERGY RECOVERY FACILITY AND WASTE SORTING AND TRANSFER FACILITY, FORD CIRCULAR TECHNOLOGY PARK
NOISE AND VIBRATION ASSESSMENT

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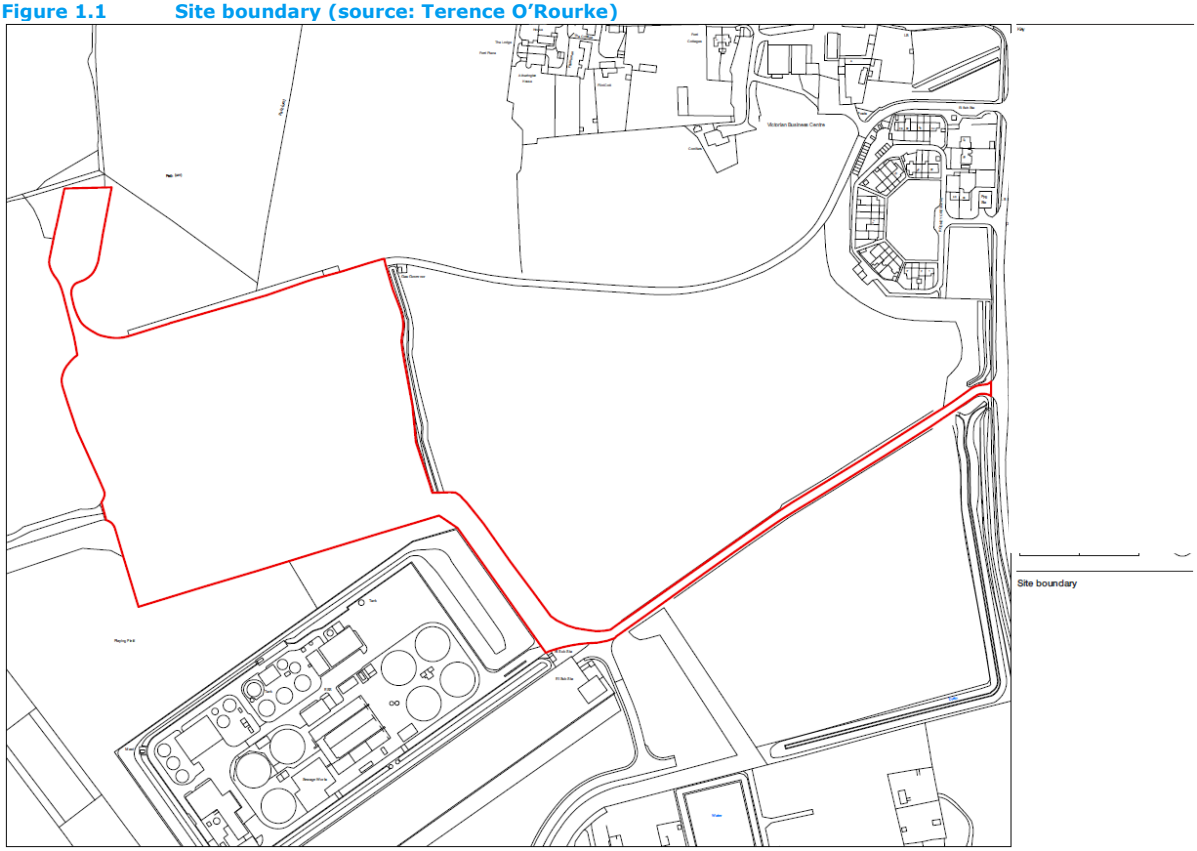
1.1.3 Planning permission was granted in August 2019 for a new access road that has replaced the previous one-way circulation system. The permission also increases the permitted heavy goods vehicle (HGV) movements to / from the site and amends the approved waste delivery hours. Construction of the road was completed in January 2020 and vehicles are no longer using Rollaston Park Road to access the site or the private access road to the north of Rodney Crescent to egress the site onto Ford Road. The access road application was also subject to EIA and accompanied by an ES.

1.1.4 Ford Energy from Waste (EfW) Limited, a joint venture between Grundon Waste Management Limited (Grundon) and Viridor Waste Management Limited (Viridor), is proposing to build and operate a conventional energy recovery facility (ERF) at the site. Grundon Waste Management, the sole owner/operator of the existing WTS, is proposing to continue this operation in a new, purpose built waste sorting and transfer facility (WSTF) on site. A full planning application, including the ERF and WSTF and ancillary uses, will be submitted. As part of this, Ramboll UK Limited (Ramboll) was appointed by Ford EfW Ltd, Grundon and Viridor to undertake a Noise and Vibration Assessment.

1.1.5 The site is located 475m west of Ford Road, 300m south of Ford Lane and 740m north of Horsemere Green Lane. The red line boundary for the site can be seen in Figure 1.1.

Figure 1.1 Site boundary (source: Terence O'Rourke)



2. PLANNING POLICY CONTEXT

2.0 National Planning Policy Framework, 2019

2.0.1 No specific noise criteria are set out in the National Planning Policy Framework (NPPF)[1] or in the Noise Policy Statement for England[2] (NPSE) to which it refers. Regarding noise, the NPPF states that the planning system should contribute to and enhance the natural and local environment by preventing both new and existing development from contributing to, or being put at unacceptable risk from, or being adversely affected by, unacceptable levels of noise pollution.

2.0.2 Paragraph 180 of the NPPF states that:

Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;
b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason…'

2.0.3 To achieve these aims, the NPPF refers to the explanatory note to the NPSE.

2.1 Noise Policy Statement for England, 2010

2.1.1 The NPSE sets out the long-term vision of Government noise policy which is to promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.

2.1.2 The NPSE outlines the following three aims for the effective management and control of mental, neighbour and neighbourhood noise:

i. Avoid significant adverse impacts on health and quality of life;
ii. Mitigate and minimise adverse impacts on health and quality of life; and
iii. Where possible, contribute to the improvement of health and quality of life.

2.2 Planning Practice Guidance

2.2.1 Planning Practice Guidance[3] (PPG) is a web-based resource, which includes a section on noise. This resource provides guidance on how to determine the noise impact in terms of whether a significant adverse effect is likely to occur and/or whether a good standard of amenity can be achieved.

2.2.2 In line with the Noise Policy Statement for England, Planning Practice Guidance introduces the following concepts:

iv. Significant observed adverse effect level (SOAEL): This is the level of noise exposure above which significant adverse effects on health and quality of life occur;

[1] Department for Communities and Local Government, 2019. National Planning Policy Framework. HMSO.
[2] Department of Environment, Food and Rural Affairs, 2010. Noise Policy Statement for England.
[3] GOV.UK. 2018. Noise. [ONLINE] Available at: https://www.gov.uk/guidance/noise--2. [Accessed 12 May 2020].

v. Lowest observed adverse effect level (LOAEL): this is the level of noise exposure above which adverse effects on health and quality of life can be detected;
vi. No observed adverse effect level (NOAEL): this is the level of noise exposure where noise can be heard, but does not cause any change in behaviour, attitude or other physiological response; and
vii. No observed effect level (NOEL): this is the level of noise exposure below which no effect at all on health or quality of life can be detected.

2.2.3 Table 2.1 summarises the noise exposure hierarchy, based on the likely average response.

Table 2.1 Noise exposure hierarchy

Perception	Examples of outcome	Increasing effect level	Action
Not noticeable	No effect	No Observed Effect	No specific measures
No Observed Adverse Effect Level			
Noticeable and not intrusive	Noise can be heard but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

2.3 Other Guidance

British Standard 4142:2014+A1:2019 Method for rating and assessing industrial and commercial sound

2.3.1 BS 4142:2014+A1:2019[4] provides a method for rating industrial and commercial sound and method for assessing resulting impacts upon people. The method is applicable to fixed plant installations, sound from industrial and manufacturing process and other associated activities.

2.3.2 The basis of BS4142 is a comparison between the background noise level in the vicinity of residential locations and the rating level of the noise source under consideration. The relevant parameters in this instance are as follows:

i. Background Level, $L_{A90,T}$: defined in the Standard as the 'A' weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, and quoted to the nearest whole number of decibels;
ii. Specific Level, $L_{Aeq,T}$: the equivalent continuous 'A' weighted sound pressure level at the assessment location in the absence of the specific sound source under consideration, over a given time interval, T; and
iii. Rating Level, $L_{Ar,T}$: the specific sound level plus any adjustment made for the characteristic features of the noise.

2.3.3 Potential impacts are predicted from the difference between the representative background level at a noise sensitive receptor and the rating level from the noise source considered. The standard suggests that the greater the difference, the greater the magnitude of impact.

2.3.4 In determining the significance of the impact, BS 4142 requires a consideration of the context of the assessment i.e. the nature of the existing acoustic environment and the new noise source, and the sensitivity of the affected receptors.

British Standard 5228: 2009+A1: 2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites Parts 1 and 2

2.3.5 BS 5228:2009[5] gives recommendations for basic methods of noise and vibration control relating to construction work. It also provides guidance concerning methods of predicting and measuring noise and vibration and assessing their impacts on those exposed to it. The prediction method considers the noise emission level of proposed plant, the separation distance between the source and the receiver and the effect of the intervening topography and structures.

2.3.6 Part 2 of the standard gives recommendations for basic methods of vibration control relating to construction and open sites where work activities/operations generate significant vibration.

2.3.7 The legislative background to vibration control is described and recommendations are given regarding procedures for the establishment of effective liaison between developers, site operators

[4] British Standards Institute, 2014 and 2019. British Standard BS 4142+A1:2019: Methods for rating and assessing industrial and commercial sound. BSI.
[5] British Standards Institution, 2009 and 2014. British Standard 5228: 2009 +A1 2014 Code of practice for noise and vibration control on construction and open sites. BSI.

and local authorities. The standard also provides guidance on measuring vibration and assessing its effects on the environment.

Calculation of Road Traffic Noise (1988)

2.3.8 Calculation of Road Traffic Noise[6] (CRTN) sets out standard procedures for calculating noise levels from road traffic. The calculation method uses a number of input variables, including traffic flow volume, average vehicle speed and percentage of heavy goods vehicles (HGVs), to predict the $L_{A10,18hour}$ or $L_{A10,1hour}$ noise level for a notional receptor at 10m from the road.

Design Manual for Roads and Bridges – Sustainability & Environment Appraisal - LA 111 Noise and Vibration

2.3.9 The Design Manual for Roads and Bridges[7] (DMRB) provides advice on the assessment of noise and vibration impacts due to road traffic. The guidance provides a classification of magnitude of impacts related to changes in road traffic noise levels. As people are less sensitive to noise level changes over time, the classification of impacts is provided in the short term and in the long term. Receptors typically acclimatise to road traffic noise over time, so that the effects are reduced in the long-term.

[6] Department of Environment, 1988. Calculation of Road Traffic Noise, HMSO.

[7] Design Manual for Roads and Bridges – Sustainability & Environment Appraisal LA111 Noise and vibration Revision 1 (2020)

3. METHODOLOGY

3.0.1 The following section outlines the methodology applied to identify and assess the potential noise impacts likely to result from the proposed development.

3.1 Receptor locations

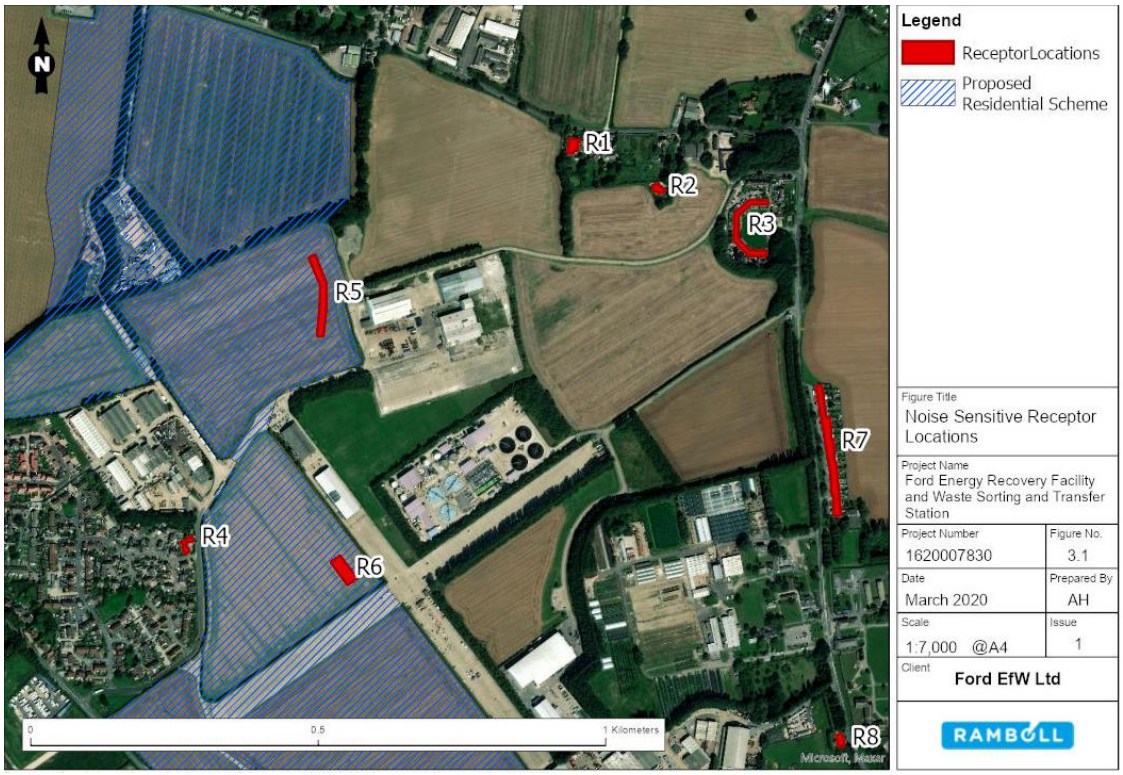
3.1.1 The receptors considered in this assessment are detailed in Table 3.1 and Figure 3.1.

Table 3.1 Receptor locations

Location	Description	Distance from site (m) at closest point
R1	Residential dwellings along Ford Lane	200
R2	Residential dwelling set back from Ford Lane	290
R3	Residential dwellings along Rodney Crescent	385
R4	Residential dwellings along Rollaston Park	400
R5	Proposed residential dwellings to the north west of the site[8]	50
R6	Proposed residential dwellings to the south of the site[9]	255
R7	Properties along Nelson Row	505
R8	Residential property along Ford Road	840

[8] As part of current planning application Land at Ford Airfield, Ford (F/4/20/OUT)
[9] As part of current planning application Land at Ford Airfield, Ford (F/4/20/OUT)

Figure 3.1 Receptor locations



3.2 Consultation

3.2.1 The Environmental Health team at Arun District Council were consulted by email on 17 January 2020 and 20 January 2020 to agree the assessment methodology and criteria.

3.2.2 The Environmental Health team at West Sussex County Council were also consulted by email on 17 January 2020 to agree assessment methodology and criteria.

3.2.3 Details of both consultations are provided in Appendix 2.

3.3 Baseline characterisation

3.3.1 A baseline noise survey was carried out at the nearest noise sensitive receptors (NSRs) and across the application site, to quantify the prevailing ambient and background noise levels during daytime and night-time periods. The purpose of the baseline survey was to establish the ambient noise level to inform the assessment criteria for construction noise effects and operational plant noise effects.

3.3.2 Benchmarking measurements from an existing energy from waste facility (i.e. the Lakeside EfW facility at Slough) have been used to inform the operational noise assessment.

3.4 Demolition and construction noise and vibration assessment

Demolition and construction noise

3.4.1 The demolition and construction works associated with the proposed development will involve the use of a variety of working methods which will change throughout the construction period. Therefore, noise levels from the works are likely to vary significantly over time as the type of construction activities change.

3.4.2 The exact working methodology and plant to be employed during construction has not been established at this stage in the design. However, following best practice, an estimate of the expected noise levels over a representative period had been undertaken using assumed plant items and the associated noise emission data from BS 5228:2009+A1:2014.

3.4.3 The significance criteria for construction noise levels at the NSRs have been established by reference to ABC method described in BS 5228:2009+A1:2014. The thresholds are made relative to the pre-existing ambient noise levels at assessment locations, as shown in Table 3.2.

Table 3.2 BS5228 'ABC' Method for Construction Noise

Assessment period	Threshold values, $L_{Aeq,T}$ (dB)		
	Category A	Category B	Category C
Daytime (07:00 – 19:00) Saturday (07:00 – 13:00)	65	70	75
Evenings (19:00 – 23:00) Saturday (13:00 – 23:00)	55	60	65
Night-time (23:00-07:00)	45	50	55

3.4.4 A potential significant noise effect is indicated when the demolition or construction noise exceeds the threshold level for the category appropriate to the ambient noise level:

i. Threshold values of Category A for construction noise should be used when the pre-existing ambient noise level, rounded to the nearest 5 dB, is less than those values shown under Category A;

i. Threshold values of Category B should be used when pre-existing ambient noise level, rounded to the nearest 5 dB, is equal to values in Category A;

ii. Threshold values of Category C should be used when pre-existing ambient noise level, rounded to the nearest 5 dB, is more than values in Category A.

3.4.5 Demolition and construction noise predictions have been based on the methodology contained within BS 5228:2009+A1:2014. This enables predictions to be made of the noise emissions from the construction activities for given distances from the application site boundary.

Construction traffic noise

3.4.6 Noise levels generated by construction traffic on the local highways have been calculated using the haul route method set out in Annex F.2.5 of BS5228:2009+A1:2014.

Construction vibration

3.4.7 Vibration levels from piling may be perceptible at distances up to 100m from the works. Of the receptors identified, the closest existing receptor is 200m away from the site boundary.

3.4.8 The nearest proposed residential receptor (R5) is 50m from the western site boundary.

3.4.9 Section 5.3 of Chapter 5 *Construction Methodology and Phasing* of the Environmental Statement for Ford Airfield (application F/4/20/OUT) states that, 'Demolition and Construction of the Development is anticipated to commence in 2020/2021, subject to gaining planning permission, and span approximately 10 years. The construction works would begin in the north and south of the Site and progress to the centre of the Site. Overall, the construction process is expected to be completed by 2030/2031.'

3.4.10 As receptor R5 is deemed to be within the middle of the proposed residential site, it is not expected that dwellings at this location will be built until late in the construction programme, e.g. 2030/2031. The construction of the proposed ERF and WSTF is expected to be completed within a 61-month programme (with the majority of the WSTF works being completed as part of Phase 1 which is expected to be 10 months in duration). Although vibration from piling could be perceptible at distances of up to 100m from the works, it remains unlikely that piling works would occur once the residential dwellings are occupied at this distance from the works.

3.4.11 Therefore, significant effects are not expected to occur due to demolition and construction vibration at this receptor, or any other receptor location. No further assessment of demolition and construction vibration is provided in this report.

3.5 Operational noise assessment

3.5.1 The operational noise assessment will comprise:

i. Setting noise limits from fixed plant and site processes, using the methodology of BS4142:2014+A1:2019;
ii. Prediction of plant and site process noise emissions to the nearest sensitive receptors; and
iii. Assessment of the changes in road traffic noise levels due to the operation of the site.

Operational noise limits

3.5.2 Operational noise limits will be set based on the background noise levels measured during the baseline survey. In accordance with BS4142:2014+A1:2019, the rating noise level limits will be set equal to the representative background noise levels, allowing for any penalties for acoustic characteristics of the noise.

Noise emissions from plant and site processes

3.5.3 Using the benchmarking measurement results and data provided by the engineering design team, a noise prediction model of the site has been built to predict noise emissions to the nearest

receptor locations. The model uses the calculation method of ISO9613-2:1996 and allows for the effects of building massing, site topography, ground absorption and any screening.

Road traffic noise levels

3.5.4 The changes in road traffic noise levels were calculated following the methodology set out in CRTN.

3.5.5 To determine the change in road traffic noise level, the Basic Noise Level (as defined in CRTN) prediction has been completed for a notional receptor located 10 m from the edge of the carriageway, at a height 1.5 m above ground level. The change in Basic Noise Level was then assessed against the long term DMRB criteria.

3.6 Significance criteria

3.6.1 Effects that are described as SOAEL are considered to be significant effects.

Demolition and construction noise

3.6.2 Table 3.3 details the significance of effects for demolition and construction noise.

Table 3.3 Demolition and construction noise significance criteria

Description	Magnitude of impact	Adverse effect level
Predicted construction noise levels are less than or equal to the threshold value at receptor	Negligible	NOAEL
Predicted construction noise levels are ≤5 dB above the threshold value at receptor	Slight	LOAEL
Predicted construction noise levels are 5-10 dB above the threshold value at receptor	Moderate	SOAEL
Predicted construction noise levels are above the threshold value at receptor by 10 dB or more	Substantial	SOAEL

Operational noise

3.6.3 Table 3.4 details the significance of effects for operational noise based on:

i. The numerical difference between predicted Rating Level and the prevailing Background Level at a receptor and the criteria from BS4142:2014+A1:2019.

Table 3.4 Operational noise significance criteria

Description	Magnitude of impact	Adverse effect level
Predicted Rating Level is 10 dB or more below the prevailing Background Level at the receptor.	No Effect	NOEL
Predicted Rating Level is between 10 dB and -0.1 dB below the prevailing Background Level at the receptor.	Negligible	NOAEL
Predicted Rating Level is between 0 dB and 4.9 dB above the prevailing Background Level at the receptor.	Slight	LOAEL
Predicted Rating Level is between 5 dB and 9.9 dB above the prevailing Background Level at the receptor.	Moderate	SOAEL
Predicted Rating Level is ≥10 dB or more above the prevailing Background Level at the receptor.	Substantial	SOAEL

Changes in road traffic noise levels

3.6.4 The proposed development, when completed, has a potential to change traffic flows on the existing roads in the area surrounding the application site.

3.6.5 The results have been assessed using the guidance on long-term changes in traffic noise levels in LA111. The magnitude of the predicted impact in noise levels uses the scale shown in Table 3.5.

Table 3.5 Magnitude of Impact - Road Traffic Noise Changes (long term)

Change in Traffic Basic Noise Level $L_{A10,18h}$ dB	Magnitude of impact	Adverse effect level
≥ 10.0	Substantial	SOAEL
5.0 to 9.9	Moderate	SOAEL
3.0 to 4.9	Slight	LOAEL
< 3.0	Negligible	NOAEL

3.6.6 The change in noise levels between the baseline year (2018) and 2025 with committed development and construction of the proposed development, have been assessed against the short-term criteria of LA111. The magnitude of the predicted impact in noise levels uses the short-term scale shown in Table 3.6.

Table 3.6 Magnitude of Impact - Road Traffic Noise Changes (short term)

Change in Traffic Basic Noise Level $L_{A10,18h}$ dB	Magnitude of impact	Adverse effect level
≥ 5.0	Substantial	SOAEL
3.0 to 4.9	Moderate	SOAEL
1.0 to 2.9	Slight	LOAEL
< 1.0	Negligible	NOAEL

3.7 Assumptions and limitations

3.7.1 All reasonable measures have been undertaken to reduce uncertainty in the baseline noise survey data and the calculations detailed in this report.

3.7.2 Uncertainty has been minimised by completing unattended measurements over daytime, evening, weekend and night-time periods. Attended measurements were completed (where possible) at the nearest receptor locations to support the unattended measurements.

3.7.3 Results have been rounded to the nearest A-weighted decibel.

3.7.4 It is understood that peak HGV movement months are during year 2 months 1-3 of the construction phase for mechanical erection. There will be 10 2-way HGV movements during the AM peak hour of 08:00-09:00, and 102 total 2-way HGV movements during the working day. This period has been assumed to be representative of the worst-case scenario.

3.7.5 The baseline noise prediction model was calibrated to the noise survey results for road traffic noise sources, and accounts for intervening topography and existing building massing. The model uses the calculation method of ISO9613-2:1996.

3.7.6 Plant noise emissions are based on benchmarking measurements from an existing energy recovery facility and based on indicative plant noise emission levels stated by the engineering design team.

3.7.7 The assessments and calculations undertaken in this report are based on data and plans of the proposed development provided by the client and consultees. Should any of this change, the results of the assessments may not be valid and would need to be updated.

4. BASELINE NOISE SURVEY

4.1 Survey methodology

4.1.1 Unattended noise monitors were installed at LT1, LT2 and LT3 (as shown on Figure 4.1) between Friday 07/02/2020 and Friday 14/02/2020.

4.1.2 All unattended monitors were installed at a height of 1.5m above local ground level and under free-field conditions.

4.1.3 Noise levels were monitored continuously over the survey period and averaged over 15-minute intervals.

4.1.4 The sound level meter calibration was checked upon installation and upon completion of the surveys. No significant drift in calibration was recorded.

4.1.5 Attended measurements of 15 minutes in duration were taken at two positions (as shown on Figure 4.1) on 07/02/2020:

i. ST1: representative of noise levels affecting the nearest noise sensitive receptors on Ford Lane.
ii. ST2: representative of noise levels at noise sensitive receivers along Rodney Crescent;
iii. ST3: representative of noise levels at the south east corner of the site;
iv. ST4: representative of noise levels at the north west corner of the site;
v. ST5: representative of noise levels at the nearby industrial units;
vi. ST6: representative of noise levels at noise sensitive receivers along Rollaston Park; and
vii. ST7: representative of noise levels at noise sensitive receivers along Yapton Road

4.1.6 Each measurement was taken at a height of 1.5m above local ground level and under free-field conditions.

Figure 4.1 Baseline monitoring locations

Legend

- Short Term Measurement Locations
- Long Term Measurement Locations

Figure Title	Noise Measurement Locations
Project Name	Ford Energy Recovery Facility and Waste Sorting and Transfer Station
Project Number	1620007830
Figure No.	4.1
Date	March 2020
Prepared By	AH
Scale	1:10,000 @A4
Issue	1
Client	Ford EfW Ltd

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4.2 Weather

Start of unattended survey:
Friday 07/02/2020
Dry, sunny, ~8°C, wind speed (average) 5 m/s, precipitations 0 mm,

Unattended survey:
Temperatures in the range of 5-12°C.
Some periods of wind speeds > 5 m/s occurred on each day. Winds were in variable direction.
Some periods of heavy rain occurred on Sunday 09/02/2020, Periods of heavy wind were also experienced on Sunday 09/02/2020 and Monday 10/02/2020 which have been excluded from the survey.

End of unattended survey:
Friday 14/02/2020
Dry, partly sunny, ~10°C, wind speed (average) 6 m/s, no precipitations.

Attended survey:
Friday 07/02/2020
Dry, mostly sunny, ~8°C, wind speed (average) 4 m/s, no precipitations.

Some periods of high wind speeds (>5 m/s) and heavy rainfall may have affected the results of the unattended measurements. These periods of measurement have been excluded from the assessment.

4.3 Equipment

4.3.1 The following measurement equipment was used:

Unattended survey:

i. 3 x 01dB CUBE Class 1 Sound Level Meter (serial no.'s 10414, 11165 & 11119);
ii. 01dB CAL21 Sound Calibrator (serial no. 34323957).

Attended survey

i. Norsonic Class 1 Sound Analyser Nor140 (serial no. 1403396) and associated microphone Nor1225 (serial no. 112825).
ii. Norsonic Class 1 Field Calibrator type 1251 (serial no. 32853).
iii. Brüel & Kjær 2270 Class 1 Sound Analyser (serial no. 2644605) and associated microphone 4189 (serial no. 287722).
iv. Brüel & Kjær 4231 Class 1 Calibrator (serial no. 2642788).
v. Rion NA-28 Class 1 Sound Analyser (serial no. 01070571).
vi. Rion NC-74 Class 1 Field Calibrator (serial no. 35125833).

4.3.2 Calibration certificates are available upon request.

4.4 Attended noise survey results

4.4.1 A summary of the attended survey results is shown in Table 4.1.

Table 4.1 Summary of attended noise survey results

Measurement position	Representative $L_{Aeq,T}$ (dB)	Highest L_{AFmax} (dB)	Lowest $L_{A90,15mins}$ (dB)
ST1 (Ford Lane)	68	86	38
ST2 (Rodney Crescent)	46	60	43
ST3 (South-east corner of site)	58	86	40
ST4 (North-west corner of site)	52	75	39
ST5 (Industrial units along Rollaston Park)	55	77	47
ST6 (Residential along Rollaston Park/Beagle Drive)	65	87	45
ST7 (Yapton Road)	66	88	52

4.4.2 The noise climate at ST1 was dominated by traffic noise from Ford Lane. Some noise from vehicles on Ford Road was also audible. No noise from the existing waste management site was audible.

4.4.3 The noise climate at ST2 was dominated by site traffic noise from the industrial park, some traffic noise from Ford Road and birdsong was also audible. No noise from the existing waste management site was audible.

4.4.4 The noise climate at ST3 was dominated by site traffic movements at the Grundon waste management site. Traffic from surrounding roads was audible, along with noise from a loud drain cover when vehicles drove over it directly opposite the measuring position at LT3. Occasional air traffic was also audible.

4.4.5 The noise climate at ST4 was dominated by site traffic movements and birdsong. Some works from nearby industrial units was audible along with distant road traffic noise. Occasional train passbys were also audible along with occasional aircraft noise.

4.4.6 The noise climate at ST5 was dominated by works noise from industrial units, and occasional traffic along Rollaston Park. Distant road traffic noise and occasional aircraft noise was also audible.

4.4.7 The noise climate at ST6 was dominated by birdsong, and traffic along Rollaston Park. Works noise audible from industrial units along with distant traffic noise and occasional air traffic.

4.4.8 The noise climate at ST7 was dominated by road traffic noise along Yapton Road. Distant traffic noise and occasional aircraft noise was also audible.

4.5 Unattended noise survey results

4.5.1 The unattended survey results are shown in Figures 4.2-4.4. A summary of the results of attended and unattended measurements is provided in Appendix 3.

4.5.2 The noise climate LT1 was dominated by site traffic movements from the existing Grundon waste management site. Some aircraft noise from Gatwick Airport was audible.

4.5.3 Typical daytime average noise levels ranged from 52-56 dB $L_{Aeq,16hour.}$ Daytime background noise levels ranged from 46-49 dB $L_{A90,\ 16hour.}$ Daytime maximum noise levels were dictated by individual vehicle movements on and off the Grundon waste management site.

4.5.4 Night-time average noise levels ranged from 48-58 dB $L_{Aeq,8hour}$. Night-time background noise levels ranged from 44-49 dB $L_{A90,8hour}$. Night-time maximum noise levels were expected to be dictated by traffic noise along surrounding roads.

4.5.5 The noise climate LT2 was dominated by air traffic movements and train passbys. Occasional site traffic was audible.

4.5.6 Typical daytime average noise levels ranged from 47-55 dB $L_{Aeq,16hour}$. Daytime background noise levels ranged from 39-47 dB $L_{A90,16hour.}$ Daytime maximum noise levels were dictated by individual vehicle movements on and off the Grundon waste management site.

4.5.7 Night-time average noise levels ranged from 41-59 dB $L_{Aeq,8hour}$. Night-time background noise levels ranged from 31-47 dB $L_{A90,8hour}$. Night-time maximum noise levels were expected to be dictated by traffic noise along surrounding roads.

4.5.8 The noise climate LT3 was dominated by traffic along Ford Road and site movements on and off site. A loud drain cover directly opposite measuring position also caused loud, impulsive events.

4.5.9 Typical daytime average noise levels ranged from 64-67 dB $L_{Aeq,16hour}$. Daytime background noise levels ranged from 41-53 dB $L_{A90,16hour.}$ Daytime maximum noise levels were dictated by traffic along Ford Road, and noise from a loud drain cover directly opposite the measurement position, when vehicles drove over it.

4.5.10 Night-time average noise levels ranged from 56-63 dB $L_{Aeq,8hour}$. Night-time background noise levels ranged from 34-48 dB $L_{A90,8hour}$. Night-time maximum noise levels were expected to be dictated by traffic along Ford Road, the loud drain cover directly opposite the measurement position, and traffic from surrounding roads.

4.5.11 Note that there are gaps in the data shown on the graphs. This period of data has been omitted from the results of the survey due to storm weather between 9 February 2020 and 10 February 2020.

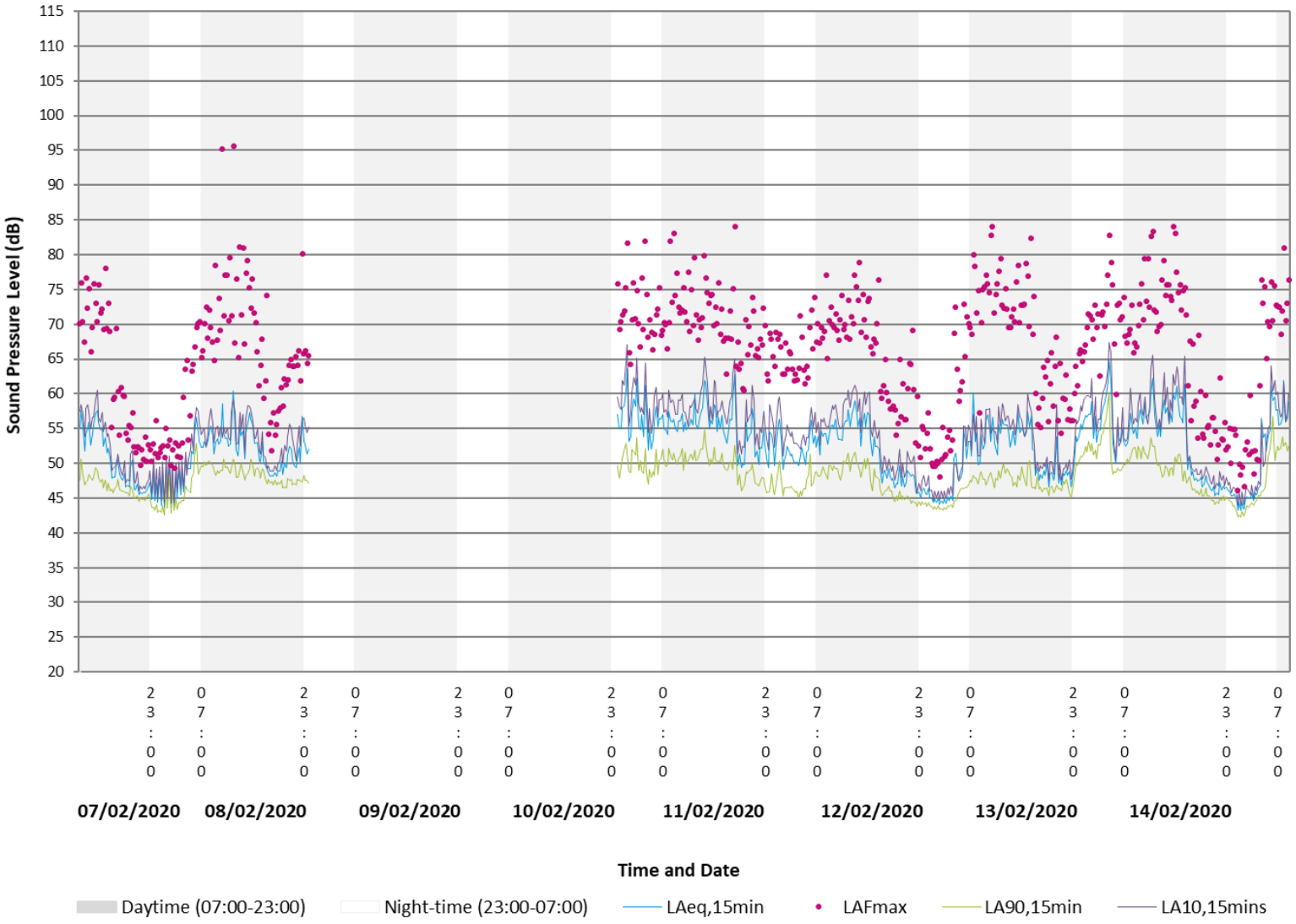


Figure 4.2 **Unattended survey results at LT1**

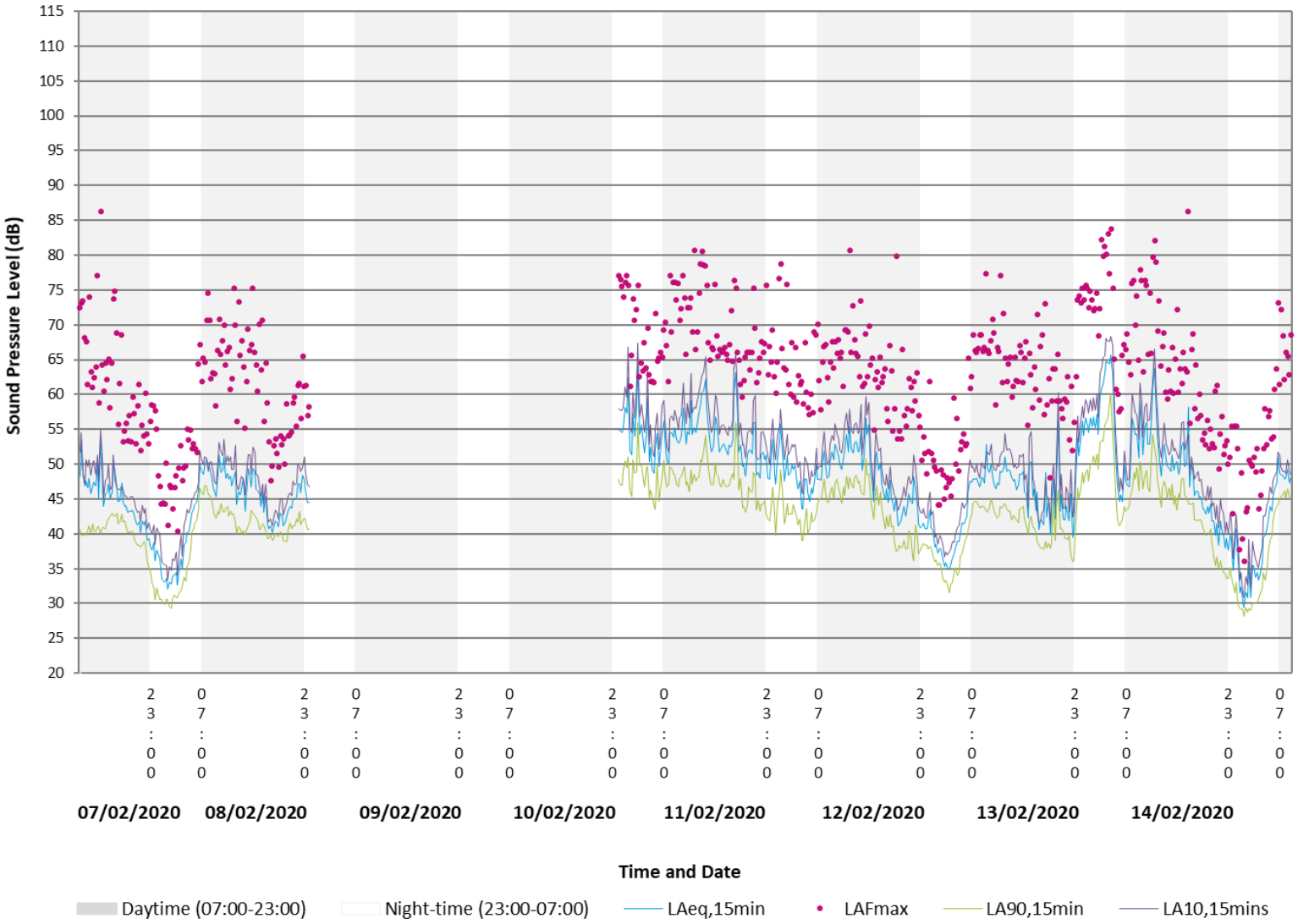


Figure 4.3 **Unattended survey results at LT2**

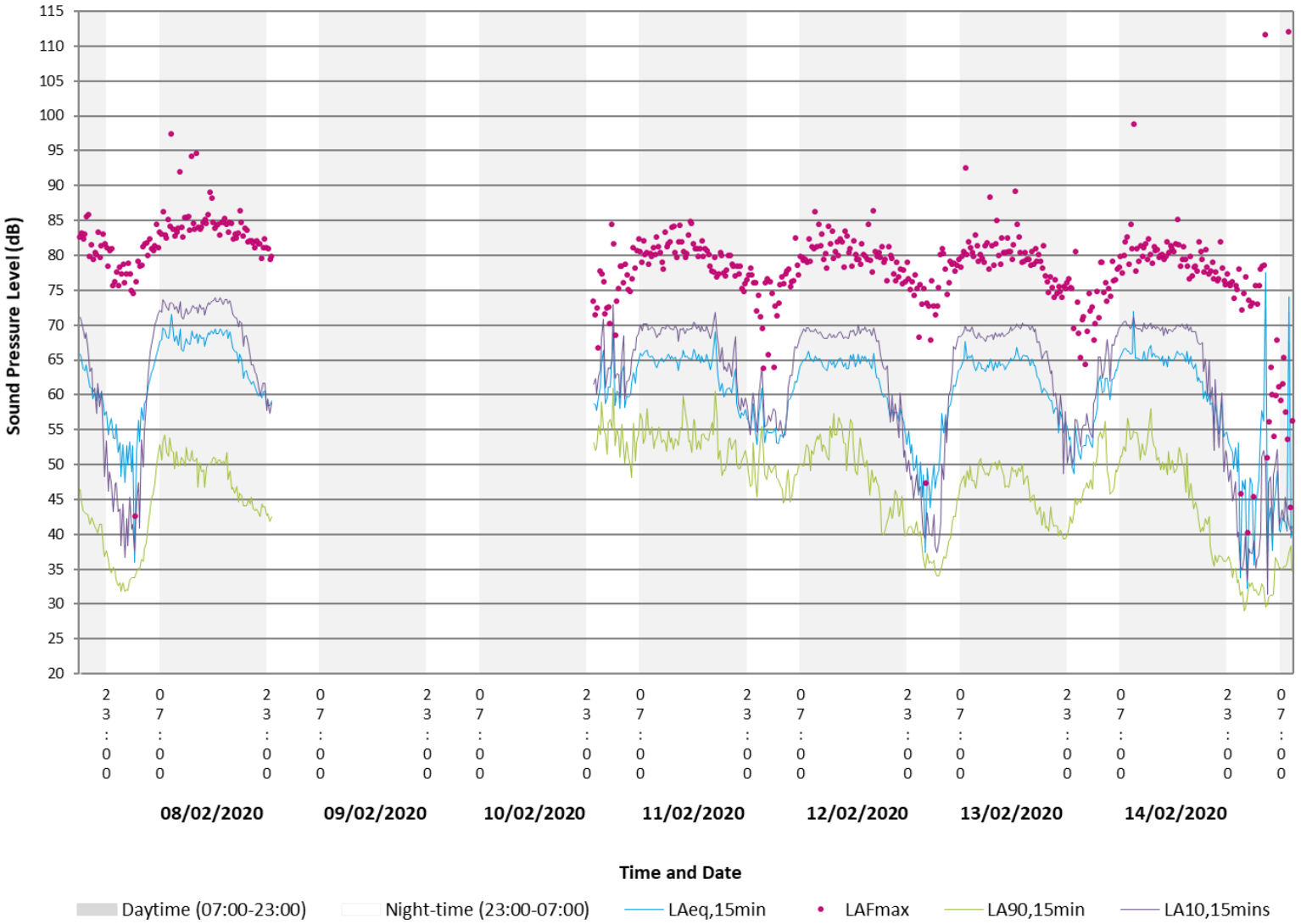


Figure 4.4 **Unattended survey results at LT3**

5. DEMOLITION AND CONSTRUCTION NOISE ASSESSMENT

5.1 Demolition and construction noise emission thresholds

5.1.1 Demolition and construction noise emission thresholds have been determined based on the methodology set out in BS 5228:2009+A1:2014 and measured ambient noise levels on site. The thresholds are summarised in Table 5.1.

Table 5.1 Demolition and Construction noise thresholds at NSR

NSR considered	Prevailing ambient noise level during daytime period, $L_{Aeq,T}$ (dB)	BS5228 noise emission category	Construction noise threshold at NSR, dB $L_{Aeq,T}$ Daytime (07:00-19:00) and Saturdays (07:00-13:00)	Construction noise threshold at NSR, dB $L_{Aeq,T}$ Saturdays (13:00-19:00)
R1: Ford Lane R2: Ford Lane	68	C	75	65
R3: Rodney Crescent	46	A	65	55
R4: Residential along Rollaston Park/Beagle Drive	62			
R5: Proposed residential to the north west of site	43			
R6: Proposed residential to the south of site	42			
R7: Residential along Nelson Row	65	B	70	60
R8: Residential along Ford Road**	68	C	75	65

*Based on rear façade levels taken from the noise prediction model, and verified against the results of the attended survey at measurement position ST2

**Noise level is assumed to be the same as noise data measured at survey location LT3. It is believed noise levels will be similar to those at receptor location R8.

5.1.2 Noise emissions during demolition and construction activities have been calculated at the nearest NSRs. The emissions were calculated based on a number of assumptions relating to construction methods and plant. The actual construction noise levels may vary depending on the type of activity, periods of operation, and distances between source of noise and receivers. However, conservative assumptions have been made regarding these parameters.

5.1.3 Noise emissions from each of the following anticipated construction activities was calculated:

- Demolition

- Substructure;
- Superstucture;
- Earthworks; and
- External Works.

5.1.4 We assume that the construction area would be surrounded by standard site hoarding, and that the Main Contractor would adopt Best Practicable Means (BPM).

5.2 Demolition and construction noise assessment

5.2.1 Demolition and construction noise emissions levels were calculated following the methodology from BS5228:2009+A1:2014. The total noise levels at 10 m from the construction area for each activity was determined, and propagation calculations are carried out to determine the noise levels at a receptor. Details of the plant items used in our calculations for each activity are shown in Appendix 4.

5.2.2 The calculations consider the screening factors shown in Table 5.2 and/or soft ground attenuation in line with calculation methodology of BS 5228:2009+A1:2014.

Table 5.2 Screening corrections

Receptor Location	Line of Sight	Screening Correction (dB)
R1-7	Partial line of sight	-5
R8	No line of sight	-10

5.2.3 BS 5228:2009+A1:2014 states that calculations performed for receptors over 300 m away from the source should be used with caution, especially on applying the soft ground curves, because of the increasing importance of meteorological effects. On this basis, calculations for receptors over 300m have not been included in the assessment.

5.2.4 Noise levels from demolition, substructure and superstructure works have been calculated from the existing/proposed building footprints to the nearest receptor locations. Noise levels from earthworks and external works have been assessed from the site boundary.

5.2.5 The results of the construction noise assessment are shown in Table 5.3.

Table 5.3 Demolition and construction noise assessment results

Activity	Noise level at 10 m per activity, $L_{Aeq,T}$ (dB)	R1, $L_{Aeq,T}$ (dB)	R2, $L_{Aeq,T}$ (dB)	R5, $L_{Aeq,T}$ (dB)	R6, $L_{Aeq,T}$ (dB)
Min. separating distance (m)		**200**	**290**	**50**	**255**
Demolition	94	61	58	72	62
Substructure	92	62	60	71	61
Superstructure	95	57	54	69	58
Earthworks	89	58	55	71	56
External Works	87	56	53	68	54

5.2.6 The results of the calculations show that the predicted construction noise levels at the NSR are below the thresholds set in Table 5.1, except for at the proposed residential receptor locations R5 and R6, dependent upon the working period.

5.2.7 Based on the weekday daytime (07:00-19:00) and Saturday (07:00-13:00) thresholds, the effect level at receptor location R5 would be LOAEL for superstructure and earthworks. The effect level for demolition, substructure and earthworks would be SOAEL (moderate impact). At R6, the effect level would be NOAEL for each activity.

5.2.8 During Saturday hours of 13:00-19:00, the effect level at receptor location R5 would be SOAEL (substantial impact) for each activity. At R6, the effect level would be NOAEL for external works, LOAEL for superstructure and earthworks, and SOAEL (moderate impact) for demolition and substructure works.

5.2.9 Chapter 5 *Construction Methodology and Phasing* of the Environmental Statement for Ford Airfield states that, '*Demolition and Construction of the Development is anticipated to commence in 2020/2021, subject to gaining planning permission, and span approximately 10 years. The construction works would begin in the north and south of the Site and progress to the centre of the Site. Overall, the construction process is expected to be completed by 2030/2031*.'

5.2.10 Receptors R5 and R6 are deemed to be within the middle of the proposed housing development site, i.e. within Phase 3 of the proposed residential development. It is not expected that these dwellings will be built until late in the construction programme, e.g. 2030/2031. The construction of the proposed ERF and WSTF is expected to be completed with a 61-month programme, with the majority of the WSTF works being completed as part of Phase 1 which is expected to be 10 months in duration, at the closest point to the receptor location R5.

5.2.11 Based on the predicted noise levels from each demolition and construction activity, Table 5.4 details the distances from the works at which the effect levels would apply, for weekday daytime hours (07:00-19:00) and Saturday hours (07:00-13:00).

Table 5.4 Approximate distances from the works to proposed residential receptors at effect levels

Activity	NOAEL (≤65 dB $L_{Aeq,T}$)	LOAEL (66-70 dB $L_{Aeq,T}$)	SOAEL moderate impact (71-75 dB $L_{Aeq,T}$)	SOAEL substantial impact (>75 dB $L_{Aeq,T}$)
Demolition	170	115	70	≤65
Substructure	175	100	55	≤55
Superstructure	120	80	50	≤45
Earthworks	90	55	30	<30
External Works	70	40	20	<20

5.2.12 During demolition and substructure works, the noise threshold could be exceeded for up to 175m from the works, which is expected to be within Phase 3 of the proposed residential development. However, it is unlikely that residential dwellings will be occupied during the demolition works and if they were, these works would be seemed to be relatively short duration. It is deemed that significant effects are unlikely to occur.

5.2.13 During superstructure, earthworks and external works, the noise threshold could be exceeded at distances of up to 120m from the works, within Phase 3 of the proposed residential development. At these relatively short distances from the site/works, it is unlikely that the proposed residential dwellings will be occupied during these works.

5.2.14 Based on the predicted noise levels from each demolition and construction activity, Table 5.5 details the distances from the works at which the effect levels would apply for Saturday hours (13:00-19:00).

Table 5.5 Approximate distances from the works to proposed residential receptors at effect levels (Saturday 13:00-19:00)

Activity	NOAEL (≤55 dB $L_{Aeq,T}$)	LOAEL (56-60 dB $L_{Aeq,T}$)	SOAEL moderate impact (61-65 dB $L_{Aeq,T}$)	SOAEL substantial impact (≥65 dB $L_{Aeq,T}$)
Demolition	420	265	170	≤165
Substructure	550	310	175	≤170
Superstructure	300	190	120	≤115
Earthworks	285	160	90	≤85
External Works	215	125	70	≤65

5.2.15 During demolition and substructure works, the noise threshold could be exceeded for up to 420m and 550m from the works, respectively. However, it is unlikely that residential dwellings will be occupied during the demolition works and if they were, these works would be seemed to be relatively short duration. It is deemed that significant effects are unlikely to occur, as the distances from site at which significant effects would occur would be much less (up to 175m from the site).

5.2.16 During superstructure, earthworks and external works, the noise threshold could be exceeded at distances of up to 300m from the works. NOAEL and LOAEL effect levels could be apparent for a relatively small proportion of Phases 2 and 3 of the proposed residential development, dependent upon the construction phasing for the residential development. However, significant effects are unlikely to occur, as the distances from site at which significant effects would occur would be much less (up to 120m from the site within Phase 3 of the proposed residential development). It is unlikely that residential dwellings will be occupied at these short distances from the site, during the construction phase of the proposed development.

5.2.17 BPM as defined by the Control of Pollution Act 1974, will be implemented as part of the working methodology. This will serve to minimise the noise and vibration effects at receptors nearest to the construction works. The reduction in noise levels provided through the implementation of BPM will vary depending on the nature of the works.

5.2.18 Typical BPM measures which will be considered, where reasonably practical, include:

- Programming noisy works so that these do not occur during Saturday working hours of 13:00-19:00
- Plan working hours to take account of the effects of noise and vibration upon persons in areas surrounding site operations and upon persons working on-site

- Adopt quiet working methods, using plant with lower noise emissions
- Adopt working methods that minimise vibration generation
- Locate plant away from noise and vibration sensitive receptors, where feasible
- Use silenced and well-maintained plant conforming with the relevant EU directives relating to noise and vibration
- Avoid unnecessary revving of engines and switch off equipment when not required
- Keep internal haul routes well maintained
- Start-up plant and vehicles sequentially rather than all together
- Carry out regular inspections of noise mitigation measures to ensure integrity is maintained at all times
- Provide briefings for all site-based personnel so that noise and vibration issues are understood, and mitigation measures are adhered to
- Manage plant movement to take account of surrounding receptors, as far as is reasonably practicable

5.2.19 If work is required to extend into periods beyond the agreed hours, separate authorisation will be requested from with the local authority.

5.2.20 If residential dwellings are occupied at and around the receptor locations R5 and R6 during the construction phase of the proposed development, community liaison and communication regarding construction works will be undertaken throughout the construction stage. This will be done to inform receptors of the nature of the works and to reduce the likelihood of adverse effects and complaints. The level of engagement required will vary during the construction period, depending upon the expected effects experienced by individual receptors due to the construction works.

5.2.21 Details relating to liaison with the local community will be managed by the contractor. It is envisaged that community liaison will provide local residents with the following information in relation to the construction works:

- The nature of the works being undertaken
- The expected duration of the works
- The contractor’s working hours
- Mitigation measures that will be adopted to minimise noise and vibration
- Contact details in the event of a noise disturbance.

5.2.22 Given the predicted demolition and construction noise levels, along with the phasing of the proposed residential development and the implementation of BPM, is not expected that significant effects will occur at the proposed residential receptor locations, or any other existing receptor location.

5.2.23 Vehicles and cranes used in the construction works will be fitted with reversing alarms and horns for safety. Reversing alarms can generate a sound level of up to 90 dB(A) at 1 m from the source. Assuming unscreened hemispherical propagation over 200 m, the resulting noise level at the NSR would be up to 44 dB(A) at the nearest receptor (R1). This is significantly below the construction noise threshold and therefore noise impacts are not expected from reversing alarms.

5.2.24 As part of the construction phase, a grid connection will need to be made so that the ERF can supply energy to the National Grid. The local distribution network operator (Scottish and Southern Electricity (SSE)) will be responsible for connecting the ERF to the National Grid. As such the planning application boundary does not include the grid connection route from the proposed development site to the existing substation to the north of Arundel Road / A27 near Crockerhill, which is the closest available point of connection for the ERF.

5.2.25 The construction noise emissions along the grid connection route are expected to be similar in nature and duration to those of typical road and utilities works, and so temporary significant effects are not expected.

5.3 Construction traffic assessment

5.3.1 Noise from construction traffic was calculated using the haul route method set out in BS 5228:2009+A1:2014. Details of the lorry type used in the calculations can be found in Appendix 4.

5.3.2 The receptors most exposed to construction traffic noise will be the receptors along Ford Road, on Nelson Row (R7), and further along Ford Road (R8). The receptors at R7 and R8 are approximately 23m and 10m from the centre of the carriageway respectively.

5.3.3 During Saturday hours of 13:00-19:00, HGV movement numbers will be reduced when lower construction noise thresholds apply, to reduce the potential effect levels experienced by the receptors.

Table 5.6 Construction traffic noise assessment

Receptor	Period	Speed (km/h)	Distance from centre of haul route (m)	Two way HGV movements per period	Noise Level (dB $L_{Aeq,T}$)
Nelson Row (R7)	Weekday Daytime 07:00-19:00	40	23	102	61
	Peak Weekday Hour 08:00-09:00			10	61
	Saturday 07:00-13:00			13	62
	Saturday 13:00-19:00			4	58
Ford Road (R8)	Working Daytime 07:00-19:00		10	102	65
	Peak Weekday Hour 08:00-09:00			10	65
	Saturday 07:00-13:00			13	66

Receptor	Period	Speed (km/h)	Distance from centre of haul route (m)	Two way HGV movements per period	Noise Level (dB $L_{Aeq,T}$)
	Saturday 13:00-19:00			4	61

5.3.4 Calculated noise levels from table 5.6 include a 3 dB façade correction.

5.3.5 HGV noise levels at the receptors are below the construction noise thresholds set out in BS 5228:2009+A1:2014. Therefore, it is expected that effects from demolition and construction HGV movements will be negligible (NOAEL).

6. OPERATIONAL NOISE ASSESSMENT

6.1 Plant noise assessment

6.1.1 A 3D computer noise model was prepared to calculate the plant and activity noise emissions from the proposed facility at each NSR. Daytime levels were predicted at a height of 1.5m and night-time noise levels were predicted at a height of 4m at the façade. The exception to this is receptor location R2 which from evaluation of satellite imagery is understood to be single storey. The levels predicted for receptor location R2 are therefore at a height of 1.5m above ground level.

6.1.2 The noise model was done using the proprietary software Cadna-A. The software implements the common European methods of noise prediction. The noise predictions have been undertaken in accordance with ISO9613-2[10].

6.1.3 The noise sources associated with the facility used in the model are detailed in Table 6.1.

Table 6.1 Operational noise assessment input levels

Area/Plant Item	Noise level	Reference
Process Areas	85 dB L_{Aeq} reverberant level	Benchmarking measurements
Turbine Hall	85 dB L_{Aeq} reverberant level	Benchmarking measurements
Tipping Hall	80 dB L_{Aeq} reverberant level	Benchmarking measurements
Air cooled condensers	80 dB L_{wA} per m^2	Benchmarking measurements
Stack and Odour Control Stack	89 dB L_{wA} at the top of stacks	Assumed from previous schemes
Transformer	87 dB L_{wA}	Benchmarking measurements
Roof extract fans	50 dB(A) at 5m, 71 dB L_{wA}	Advised by engineering consultants
Lorries (44t)	106 dB L_{wA} moving point sources	BS 5228:2009+A1:2014 C8.19
Refuse Collection Vehicles (26t)	107 dB L_{wA} moving point sources	BS 5228:2009+A1:2014 C11.16
WTSF North (360° grab)	75 dB L_{Aeq} reverberant level	BS 5228:2009+A1:2014 C8.12
WTSF South (Loading shovel)	81 dB L_{Aeq} reverberant level	BS 5228:2009+A1:2014 C6.34

6.1.4 Where the results of benchmark noise measurements have been used, the highest measured ambient reverberant sound level in each area of the facility has been used. This is considered representative of a worst-case scenario, as large variations of noise levels are expected to occur within each area of the facility.

6.1.5 It is assumed that attenuators would be fitted in the Stack to reduce noise emissions. Based on experience on similar projects, we have assumed a sound power of 89 dB L_{wA} at the top of the

[10] International Standards Organisation, 1996. Acoustics - Attenuation of sound during propagation outdoors - Part 2: General method of calculation. ISO

stack in the noise prediction model. The same noise emission level has been applied to the Odour Control Stack, although it is expected that this is a worst-case assumption as the air volume flow rate from this stack will be much less than that of the main Stack (and may only be operational during shut down periods).

6.1.6 The following external envelope and inherent mitigation measures were assumed in the model:

- Typical external envelope (including roof) to be a composite cladding panel system (or equivalent) rated at least R_w 23 dB;
- Non-acoustic weather louvres to the ERF and WSTF (assuming to provide R_w 4 dB attenuation);
- The screen around the Air Cooled Condensers and 5m site boundary (total) screening comprise a minimum density of 10kg/m^2. All boundary screens must contain no gaps and must extend down to ground level (where applicable). The noise from the condensers is modelled as emitting from just below the bottom of the screen to provide a worst case assessment; and
- Standard roller shutter doors rated at least R_w 15 dB.

6.1.7 The number of HGVs accessing the site during evening and night-time periods have been input to the model as advised by the transport assessment. However, night-time HGV movements are understood to be confined to the hours of 06:00-07:00, Monday to Friday.

6.1.8 Saturday HGV movements are expected to be confined to 08:00-18:00. Therefore, the daytime operational noise assessment is applicable to the likely noise emissions for Saturdays.

6.1.9 Daytime HGV movements (44t lorries and 26t refuse collection vehicles (RCV)) in the model have been input based on the results of the transport assessment but have been factored to account for the baseline daytime HGV movements. This includes 100 baseline two-way HGV movements (67 RCVs and 33 44t lorries) as would have been present during the baseline noise survey. It is understood that more typically, baseline HGV movements are 72 two-way HGV movements. The model therefore considers the increase over the baseline HGV movements along the site access road off Ford Road, and the total number of HGV movements serving both the ERF and WSTF on site.

6.1.10 Of the HGVs serving the ERF, the model assumes that 50% use the ramp into the Tipping Hall. 25% are assumed to enter the IBA Storage area and 25% are assumed to use the road around site and enter the ERF by the Turbine Hall.

6.1.11 Lorry and RCV speeds were assumed to be 20mph on the site access road and 10mph on site. These are conservative assumptions as noise exposure will increase with lower HGV speeds.

6.1.12 Following BS 4142:2014+A1:2019, penalties should be added to the specific noise level at a receptor to account for acoustic features such as tonality, intermittency and impulsivity, if such features are discernible at the receptor.

6.1.13 From the noise input data, no plant items have been deemed to be tonal. Therefore, a tonality penalty has not been applied to the calculated specific noise levels. The facility will therefore be designed so that tonal plant is not operated on the site.

6.1.14 A 3dB penalty has been applied for impulsivity which may just be perceptible at the noise receptor to obtain the resultant rating levels. This penalty has been applied to account for HGV movements

on site and on the access road, and noise activity from the WTSF, e.g. handling of waste which may be audible over the typical noise climate. However, it should be noted that these noise sources and impulsive noise characteristics are already present on site.

6.1.15 The results of the noise model are summarised in Table 6.2. Background noise levels have been determined using the noise prediction model that is calibrated to road traffic noise sources. The predicted levels have been verified for receptor location R3 using the noise survey data from locations LT3 and ST2. The background levels for receptor R7 are taken from the results of the baseline survey.

6.1.16 Rating levels are at the receptor façade location and do not include a façade reflection.

6.1.17 The specific and rating noise levels are in terms of daytime 1-hour periods and night-time 15-minute periods.

Table 6.2 Operational noise assessment

Receptor	Background Level, $L_{A90,T}$ (dB)		Predicted Specific Noise Level, $L_{Aeq,T}$ (dB)		Resulting Rating Level, $L_{Ar,T}$ (dB)		Excess of rating level over background level (dB)	
	Daytime	Night-time	Daytime	Night-time	Daytime	Night time	Daytime	Night-time
R1	39.5	34.7	35.3	33.2	38.3	36.2	-1	2
R2	39.3	32.3	38.1	34.5	41.1	37.5	2	5
R3	40.8	36.0	31.9	32.2	34.9	35.2	-6	-1
R4	36.8	31.3	33.9	32.2	36.9	35.2	0	4
R5	41.0	35.8	38.8	38.5	41.8	41.5	1	6
R6	40.3	34.9	37.1	35.4	40.1	38.4	0	4
R7	49.0	42.0	40.5	32.1	43.5	35.1	-6	-7

R8	40.1	35.6	29.4	27.4	32.4	30.4	-8	-5

6.1.18 The following daytime effect levels are predicted:

- NOAEL at receptor R1, R3, R7 and R8; and
- LOAEL at R2, R4, R5 and R6.

6.1.19 The following night-time effect levels are predicted:

- NOAEL at receptor R3, R7 and R8;
- LOAEL at R1, R4, and R6; and
- SOAEL at R2 and R5, with a moderate magnitude of impact.

6.1.20 The results of the noise model for 06:00-07:00 Monday to Friday when HGVs are operational during night-time periods are summarised in Table 6.3.

Table 6.3 Operational night-time noise levels between 06:00-07:00

Receptor	Background Level, $L_{A90,T}$ (dB)	Predicted Specific Noise Level, $L_{Aeq,1\text{-hour}}$ (dB)	Resulting Rating Level, $L_{Ar,1\text{-hour}}$ (dB)	Excess of rating level over background level (dB)
R1	37.4	36.2	39.2	2
R2	37.1	38.3	41.3	4
R3	38.6	36.4	39.4	1
R4	34.7	34.3	37.3	3
R5	38.9	39.4	42.4	4
R6	38.3	37.8	40.8	3
R7	44.0	41.0	44.0	0
R8	38.2	30.1	33.1	-5

6.1.21 The following night-time effect levels are predicted between 06:00-07:00:

- NOAEL at receptor R8; and
- LOAEL at R1-R7.

6.1.22 It should be noted that the existing site comprises noise from the waste transfer station and the arrival and departure of lorries/refuse collection vehicles. Therefore, the magnitude of impact may be lessened for the nearest noise sensitive receptors due to the current context of the site, i.e. there are already impulsive characteristics to the noise.

6.1.23 With the proposed employment use to the east of the site boundary (as part of application F/4/20/OUT), the predicted magnitude of impact would not change for any of the assessed receptor locations.

6.1.24 Inherent mitigation measures designed into the scheme include a 3m acoustic fence along the southern site boundary and a total of 5m screening around the remaining site perimeter, using a 2m gabion wall and 3m acoustic fence. Screening has been allowed for around the Air Cooled Condensers. The assessment makes reasonable assumptions as to the sound insulation performance of the building cladding to reduce noise exposure, as detailed in section 6.1.6 of this report.

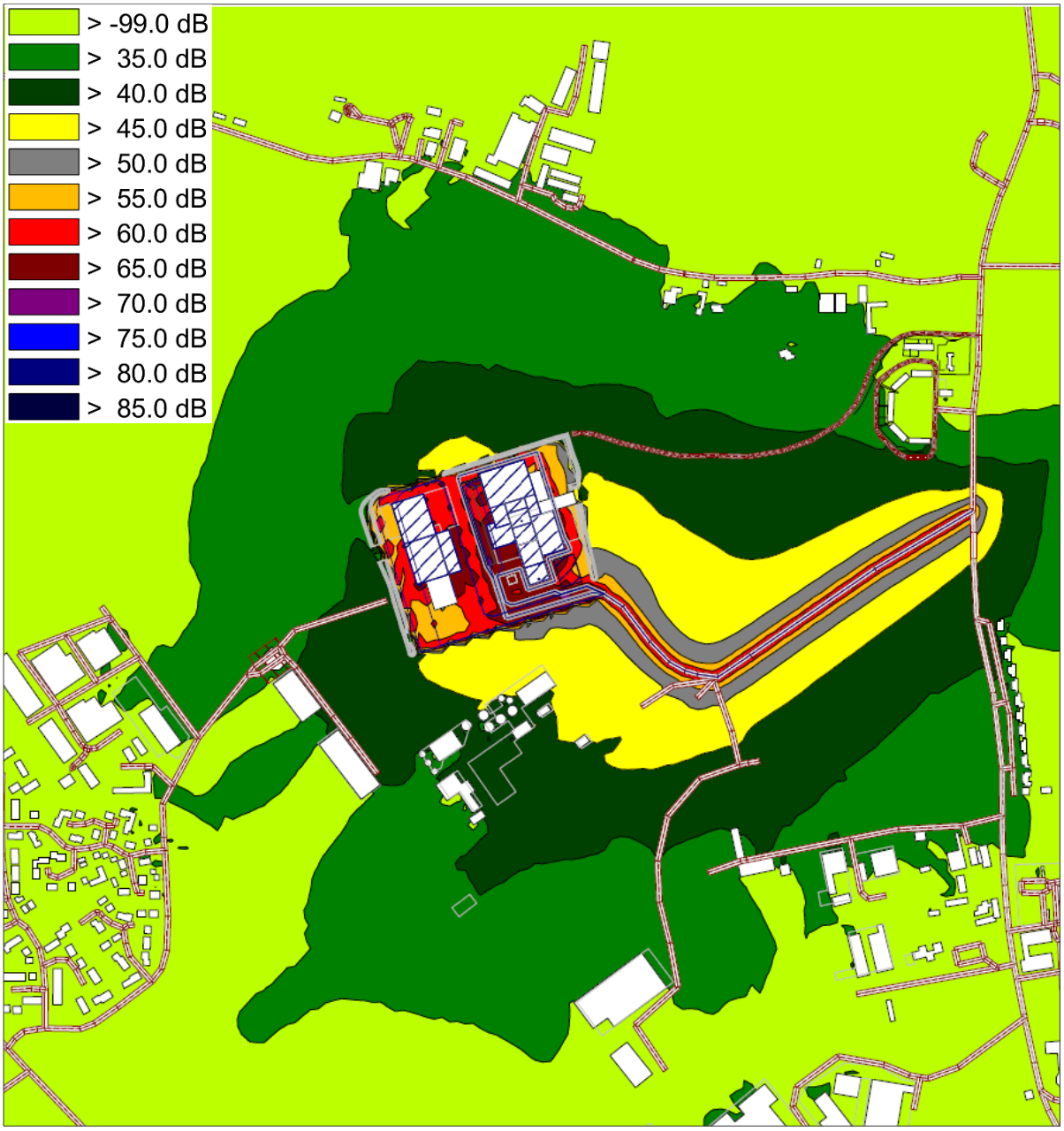
6.1.25 All reasonable measures have been taken in the site layout design to reduce noise exposure to the nearest receptors.

6.1.26 During the detailed design of the facilities, low noise emission plant would be sought to reduce operational noise levels at the nearest receptors.

6.1.27 As such, additional mitigation is not proposed.

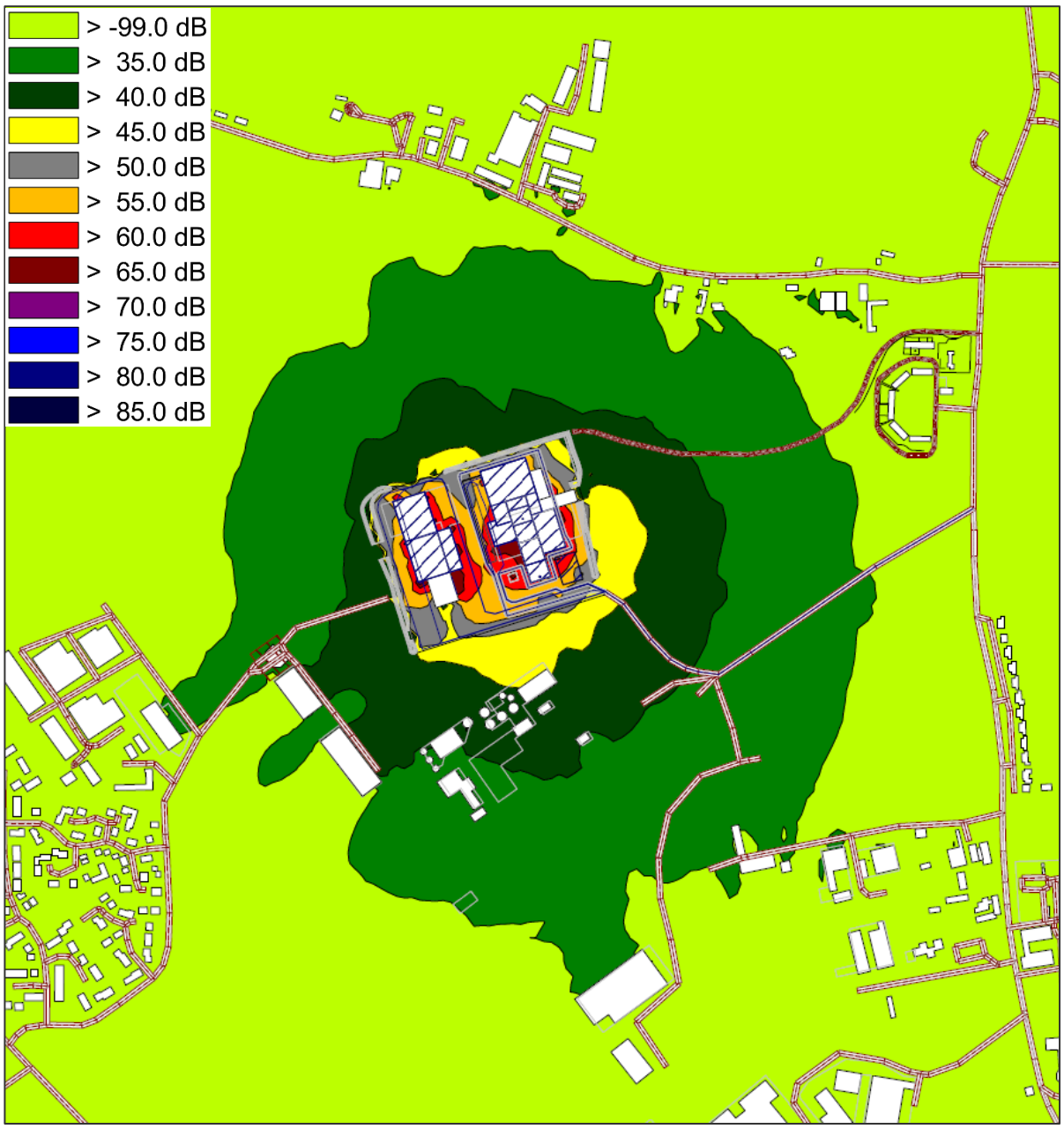
6.1.28 A daytime noise propagation map of the proposed facility is shown on Figure 6.1. Note that the figure shows the predicted daytime specific noise levels in terms of $L_{Aeq,T}$ dB.

Figure 6.1 Predicted daytime noise levels at 1.5m height



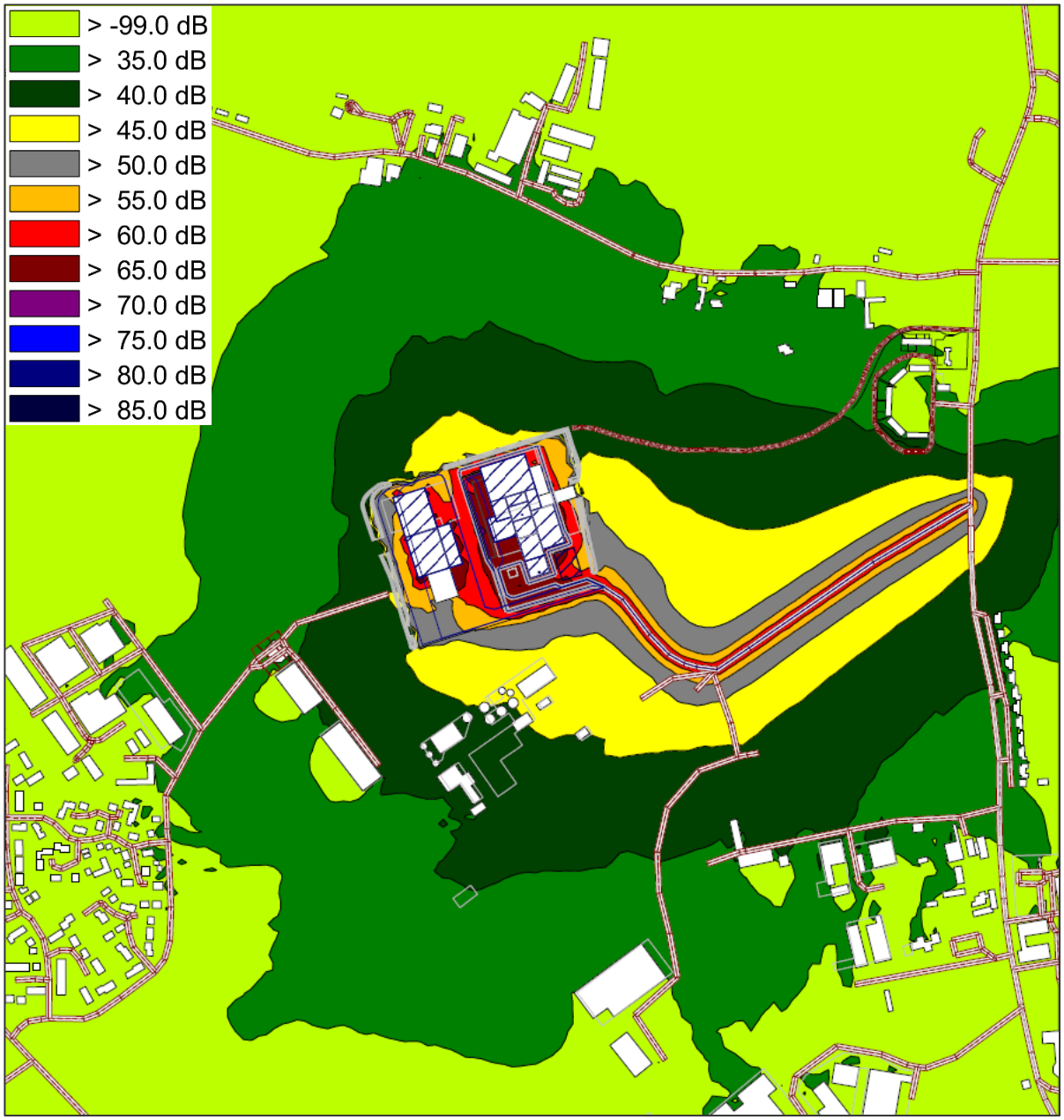
6.1.29 A night-time noise propagation map of the proposed facility is shown on Figure 6.2. Note that the figure shows the predicted night-time specific noise levels in terms of $L_{Aeq,T}$ dB.

Figure 6.2 Predicted night-time noise levels at 4m height



6.1.30 A noise propagation map of the proposed facility between 06:00-07:00, Monday to Friday, is shown on Figure 6.3. Note that the figure shows the predicted specific noise levels in terms of $L_{Aeq,T}$ dB.

Figure 6.3 Predicted noise levels at 4m height between 06:00-7:00



6.2 Changes in road traffic noise levels

6.2.1 Road traffic noise levels have been calculated in accordance with the data provided by the Traffic Consultant. Table 6.4 details the calculated baseline and future noise levels using the Annual Average Weekday Traffic (18-hour) data for the following scenarios:

- 2018 Baseline year;
- 2026 Do Nothing (future baseline year);
- 2026 Do Nothing (future baseline year) with committed development;
- 2026 Do Something with committed and proposed development; and
- 2025 Baseline year with committed development and construction of the proposed development.

6.2.2 Calculations have not been completed for the site access road as HGV vehicles on the site access road have been included in the plant noise and activity noise assessment. The calculation methodology of CRTN would not be appropriate as the predicted flows are 0 or less than 1000 movements in an 18-hour period, for the baseline year and 'Do Nothing' scenarios.

Table 6.4 Road traffic noise levels

Road	Basic Noise Level at 10m dB L_{A10}				
	2018 Baseline	**2026 Do Nothing**	**2026 Do Nothing with committed development**	**2026 Do Something with committed development**	**2025 Baseline with committed development and construction**
North End Road – Ford Lane	67.1	67.2	67.8	67.8	67.8
Ford Lane (North End Road – mid Ford Lane)	66.2	66.3	67.6	67.6	67.5
Ford Lane - Station Road/Ford Road	65.4	65.5	67.0	67.0	67.0
Station Road	67.3	67.4	67.9	67.9	67.9
Ford Road (Ford Lane/Station Road to Access Road)	68.7	68.9	69.4	69.4	69.4
Ford Road - A259 Crookthorn Lane	69.1	69.3	69.9	70.2	70.2
A259 Crookthorn Lane	72.8	72.9	73.2	73.3	73.3
B2233 Yapton Road	67.6	67.7	68.6	68.6	68.6
A259 Grevatt's Lane	71.7	72.0	72.3	72.3	72.3
B2233 Yapton Road	67.8	67.9	68.7	68.7	68.7
A259 Burndell Road	66.7	66.8	67.5	67.5	67.5
Bilsham Road	65.0	65.1	65.9	65.9	65.9
B2233 Main Road	68.4	68.5	69.1	69.1	69.1
North End Road	64.2	64.3	65.4	65.4	65.4

6.2.3 The resultant change in road traffic noise levels are detailed in Table 6.5.

Table 6.5 Changes in road traffic noise levels

Road	Change in Basic Noise Level at 10m dB L_{A10}				
	2018 Baseline to 2026 Do Nothing	**2018 Baseline to 2026 Do Nothing with committed development**	**2018 Baseline to 2026 Do Something with committed development**	**2026 Do Nothing with committed development to 2026 Do Something**	**2018 Baseline to 2025 Baseline with committed development and construction**
North End Road to Ford Lane	0.1	0.7	0.7	0.0	0.7
Ford Lane (North End Road to mid Ford Lane)	0.1	1.4	1.4	0.0	1.3
Ford Lane to Station Road/Ford Road	0.1	1.6	1.6	0.0	1.6
Station Road	0.1	0.6	0.6	0.0	0.6
Ford Road (Ford Lane/Station Road to Access Road)	0.2	0.7	0.7	0.0	0.7
Ford Road to A259 Crookthorn Lane	0.2	0.8	1.1	0.3	1.1
A259 Crookthorn Lane	0.1	0.4	0.5	0.1	0.5
B2233 Yapton Road	0.1	1.0	1.0	0.0	1.0
A259 Grevatt's Lane	0.3	0.6	0.6	0.0	0.6
B2233 Yapton Road	0.1	0.9	0.9	0.0	0.9

Road	Change in Basic Noise Level at 10m dB L_{A10}				
	2018 Baseline to 2026 Do Nothing	**2018 Baseline to 2026 Do Nothing with committed development**	**2018 Baseline to 2026 Do Something with committed development**	**2026 Do Nothing with committed development to 2026 Do Something**	**2018 Baseline to 2025 Baseline with committed development and construction**
A259 Burndell Road	0.1	0.8	0.8	0.0	0.8
Bilsham Road	0.1	0.9	0.9	0.0	0.9
B2233 Main Road	0.1	0.7	0.7	0.0	0.7
North End Road	0.1	1.2	1.2	0.0	1.2

6.2.4 The predicted change in road traffic noise levels on all road links in the long term, due to the proposed development, is negligible (NOAEL).

6.2.5 The predicted change in road traffic noise levels between the baseline year (2018) and 2025 with committed development and construction of the proposed development, presents a short term LOAEL on:

- Ford Lane (North End Road to mid Ford Lane)
- Ford Lane to Station Road/Ford Road
- Ford Road to A259 Crookthorn Lane
- B2233 Yapton Road
- North End Road

6.2.6 However, it should be noted that the increase in noise level is mostly due to traffic growth and committed development between 2018 and 2025. The construction traffic in 2025 does not cause an increase in the noise level over the 2018 baseline to 2026 'Do Nothing' with committed development scenario, except for:

- Ford Road to A259 Crookthorn Lane where the noise level in 2025 is +0.3 dB higher than the noise level predicted in 2026; and
- A259 Crookthorn Lane where the noise level in 2025 is +0.1 dB higher than the noise level predicted in 2026.

6.2.7 These noise level increases would be considered to represent a short term NOAEL.

6.2.8 The short-term change in noise levels on all other road links to those discussed above present a short term NOAEL.

7. CONCLUSION

7.0.1 The potential demolition, construction and operational noise impacts associated with the proposed new ERF and WSTF have been assessed.

7.0.2 Demolition and construction noise and vibration levels, and construction HGV noise levels are expected to result in negligible effects at existing noise sensitive receptors.

7.0.3 Operational noise from the proposed facility is expected to result in NOAEL-LOAEL effect levels during daytime periods. Night-time operational noise has the potential to result in LOAEL-SOAEL (moderate) effect levels at the nearest existing noise sensitive receptors. Night-time operational noise including HGV movements between 06:00-07:00 has the potential to result in NOAEL-LOAEL effect levels.

7.0.4 If the proposed residential development is consented, there is potential for moderate effects at night-time at the nearest proposed dwellings due to operational noise from the proposed development. There would be negligible effects during the daytime. Night-time operational noise including HGV movements between 06:00-07:00 has the potential to result in NOAEL-LOAEL effect levels at the nearest proposed residential receptors.

7.0.5 These assessment outcomes assume that proposed residential dwellings would be located at the minimum distances from the existing and proposed facilities, to the nearest residential dwelling locations as shown on the masterplan for the Land at Ford Airfield development. If the proposed residential dwellings were at a greater distance from the proposed development, the activity noise levels, and resultant effect levels may reduce.

7.0.6 No additional mitigation measures other than the inherent mitigation design measures are proposed to reduce noise impacts. Low noise emission plant will be sought at the detailed design stage to minimise operational noise levels at the nearest receptor locations.

7.0.7 The predicted increase in road traffic noise levels on all road links, due to the proposed development, is negligible in the long term. The change in road traffic noise levels in the short term, including committed development and construction traffic, has the potential to result in NOAEL-LOAEL effect levels. However, the increase in noise level due to the contribution of construction traffic in 2025 alone is expected to be negligible on all road links.

7.0.8 The predicted demolition and construction noise levels could result in up to SOAEL (substantial) effects at the nearest proposed residential receptors. However, due to the construction phasing of the proposed residential development, it is considered that significant effects are unlikely. The construction of the proposed development is expected to be completed prior to construction and occupation of the nearest proposed dwellings to the proposed development site.

APPENDIX 1
ACOUSTIC TERMINOLOGY

Term	Definition
$L_{eq,T}$ or Ambient noise	A noise level index called the equivalent continuous noise level over the time period T. Often described as the average.
$L_{90,T}$ or Background Noise Level	A noise level index defined as the noise level exceeded for 90% of the time over the time period T. L_{90} is used to describe the background noise.
Vibration	The periodic movements of structures transferred by ground and parts of the building, due to events such as train pass-by, piling, blasting or use of heavy machinery.
Decibel (dB)	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds s1 and s2 is given by 20 log10 (s1/s2). The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is 20μPa.
A-weighting, dB(A)	The unit of sound level, weighted according to the A-scale, which takes into account the increased sensitivity of the human ear at some frequencies.
BNL	The Basic Noise Level is the road traffic noise at a reference distance of 10 m from the road edge, expressed in terms of the L_{A10} statistical level (18-hour or 1-hour), and calculated according by Calculation of Road Traffic Noise (CRTN) based on the traffic flow.
AAWT	Annual Average Weekday Traffic is the total number of vehicles annually (on Monday – Fridays) divided by the total number of weekdays in this period.
Rating Level ($L_{Ar,Tr}$)	To BS 4142:2014+A1:2019, the rating level is defined as the equivalent continuous A-weighted sound pressure level produced by the specific sound source over a given reference time interval, Tr plus any adjustment for the characteristic features of the sound (tonality, impulsivity, etc.).
NSR	A Noise Sensitive Receiver is any receiver that is classed as being sensitive to noise sources, (residential properties, churches, music studios etc.)

APPENDIX 2
RECORD OF CONSULTATION

Consultation with Arun District Council

This appendix contains three emails, reproduced in chronological order. Sensitive information (including email addresses and phone numbers) have been removed. The body of the emails remain unchanged.

Email 1 – Initial contact from Ramboll Acoustics to ADC
From: David Harbon of Ramboll
Date: Friday, 17 January 2020, 14:40:00
To: Environmental Health Team at Arun District Council
Subject: Ford Circular Technology Park - Noise and Vibration Assessment Methodology [CSE: Pp8tKH, TKT: AR7q8f]

Good afternoon,

Ramboll have been commissioned to complete a noise and vibration impact assessment of the proposed Ford Circular Technology Park (the former Tarmac blockworks site) to the west of the village of Ford. I would be grateful for your review and comment on the proposed survey and assessment methodologies outlined below.

The 7.14 ha site is partially used for existing waste transfer station (WSTF) operations and is partially vacant. The existing WSTF building is located towards the centre of the site and portacabins, parking and containers associated with this operation are situated to the west of the WSTF. There are two vacant, derelict former hangar buildings towards the north of the site and a large area of hardstanding is situated towards the south and east of the site.

Ford EfW Ltd, a joint venture between Grundon Waste Management Limited and Viridor, is now proposing to build and operate a conventional energy recovery facility (ERF) at the site. Grundon Waste Management, the sole owner/operator of the existing WSTF, is proposing to continue this operation in a new, purpose built facility on site. A full planning application, including the ERF and WSTF and ancillary uses, will be submitted later this year. As part of this application Ramboll will be providing the noise and vibration impact assessment.

Baseline survey
We propose to complete unattended noise monitoring at up to three locations (depicted as LT locations in the figure below – each location is subject to review of suitability on site). Monitoring will be completed for up to one week, to include daytime, evening, night-time and weekend periods.

Attended noise measurements will be completed at the indicative ST locations shown in the figure below. Measurements may not be taken at all of the ST locations shown, but these are indicative locations that are subject to review of their suitability once on site. Measurements at each of the chosen locations will be 15 minutes in duration.

Vibration measurements will not be completed as we have not identified any vibration sources on or around the site. Therefore, operational vibration will be scoped out of our assessments.

Assessment methodology

We will:

- Review national/local legislation, policy and guidance applicable to the development;
- Consult with the Environmental Health Departments at West Sussex County Council (WSCC) and Arun District Council (ADC) to confirm assessment methodology and criteria;
- Assess demolition and construction noise and vibration in outline terms, in accordance with the methodology of BS 5228:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites*. Construction noise thresholds will be set to the ABC Method and assessment of HGV noise will be carried out in accordance with the Haul Route Method of BS 5228:2009+A1:2014;
- Assess the predicted changes in traffic noise levels on the nearby road network at notional receptor locations, based on data provided by the Transport Consultant and using the methodology set out in the *Calculation of Road Traffic Noise* (CRTN) 1988 and the *Design Manual for Roads and Bridges* (2013);
- Set noise emission limits from proposed fixed plant based on local policy and BS 4142:2014 *Methods for rating and assessing industrial and commercial sound*. Plant rating noise level limits will be set equal to the representative background noise levels, with penalties applied based on the expected future characteristics of the site noise emissions;
- Complete noise prediction modelling of the proposed facility to predict plant noise emissions levels at the nearest noise sensitive receptors to be assessed against the plant noise limits;
- Recommend suitable mitigation measures in outline terms for cladding, ventilation strategy, and plant screens/barriers to mitigate noise impacts during the construction and operational phases of the facility; and
- Provide a noise and vibration assessment report, including cumulative assessments on existing and future noise sensitive receptors.

I would be grateful for your comments and approval of the methodology outlined above. Please let me know if you have any questions.

Subject to suitable weather conditions, we hope to start the baseline noise survey measurements shortly and so your earliest response would be appreciated.

Thank you and I hope to hear from you shortly.

Kind regards
David Harbon

MSc CEng MIOA
Principal Consultant
Acoustics

Email 2 – Response from ADC to Ramboll
From: Environmental Health at Arun District Council
Sent: 17 January 2020 14:58
To: David Harbon from Ramboll
Subject: RE: Ford Circular Technology Park - Noise and Vibration Assessment Methodology [CSE: Pp8tKH, TKT: AR7q8f]

Good afternoon,

I have logged this to the Environmental Health team for a response, the reference is 237959.

Kind regards

Zoe

Email 3 – Further response from ADC to Ramboll
From: Fiona Fitzgerald of Arun District Council
Sent: 20 January 2020 11:44
To: David Harbon of Ramboll
Subject: FW: Ford Circular Technology Park - Noise and Vibration Assessment Methodology [CSE: Pp8tKH, TKT: AR7q8f]

Dear David,

Thank you for your email below and proposed methodology. Environmental Health are happy with the methodology as it stands, I would just ask you to ensure that you take account of any school holidays in your monitoring to ensure that the results are representative.

Regards

Fiona Fitzgerald

Email 4 – Answer from Ramboll to ADC regarding comments on methodology
From: David Harbon of Ramboll
Sent: 20 January 2020 12:25
To: Fiona Fitzgerald of Arun District Council
Subject: RE: Ford Circular Technology Park - Noise and Vibration Assessment Methodology [CSE: Pp8tKH, TKT: AR7q8f]

Dear Fiona,

Thank you for your prompt response.

School holidays will be avoided to ensure representative noise monitoring conditions.

Kind regards
David Harbon
Principal Consultant

Email 5 – Final response from ADC
From: Fiona Fitzgerald of Arun District Council
Sent: 20 January 2020 12:25
To: David Harbon of Ramboll
Subject: RE: Ford Circular Technology Park - Noise and Vibration Assessment Methodology [CSE: Pp8tKH, TKT: AR7q8f]

Great, many thanks.

Fiona

Consultation with West Sussex County Council
Email 1 – Initial contact from Ramboll Acoustics to ADC
From: David Harbon of Ramboll
Sent: 17 January 2020 14:44
To: ENV Preappadvice
Subject: Ford Circular Technology Park - Noise and Vibration Assessment Methodology

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Ford EfW Ltd, a joint venture between Grundon Waste Management Limited and Viridor, is now proposing to build and operate a conventional energy recovery facility (ERF) at the site. Grundon Waste Management, the sole owner/operator of the existing WSTF, is proposing to continue this operation in a new, purpose built facility on site. A full planning application, including the ERF and WSTF and ancillary uses, will be submitted later this year. As part of this application Ramboll will be providing the noise and vibration impact assessment.

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- Assess the predicted changes in traffic noise levels on the nearby road network at notional receptor locations, based on data provided by the Transport Consultant and using the methodology set out in the *Calculation of Road Traffic Noise* (CRTN) 1988 and the *Design Manual for Roads and Bridges* (2013);
- Set noise emission limits from proposed fixed plant based on local policy and BS 4142:2014 *Methods for rating and assessing industrial and commercial sound*. Plant rating noise level limits will be set equal to the representative background noise levels, with penalties applied based on the expected future characteristics of the site noise emissions;
- Complete noise prediction modelling of the proposed facility to predict plant noise emissions levels at the nearest noise sensitive receptors to be assessed against the plant noise limits;
- Recommend suitable mitigation measures in outline terms for cladding, ventilation strategy, and plant screens/barriers to mitigate noise impacts during the construction and operational phases of the facility; and
- Provide a noise and vibration assessment report, including cumulative assessments on existing and future noise sensitive receptors.

I would be grateful for your comments and approval of the methodology outlined above. Please let me know if you have any questions. Subject to suitable weather conditions, we hope to start the baseline noise survey measurements shortly and so your earliest response would be appreciated. Thank you and I hope to hear from you shortly.

Kind regards
David Harbon

MSc CEng MIOA
Principal Consultant
Acoustics

Email 2 – Response from WSCC to Ramboll
From: Mark Penny On Behalf Of ENV Preappadvice
Sent: 17 January 2020 14:58
To: James Neave
Subject: FW: Ford Circular Technology Park - Noise and Vibration Assessment Methodology

Hi James,

I understand that you have previously been involved in an enquiry regarding noise.

Would you be able to advise on the methodology listed below?

Kind Regards,

Mark Penny

Mark Penny | Administrator, Business Services supporting Highways Planning
West Sussex County Council, County Hall, Chichester, PO19 1RQ

Email 3 – Further Response from WSCC to Ramboll
From: James Neave
Sent: 20 January 2020 09:07
To: Steve Molnar; David Harbon
Cc: Mark Penny
Subject: RE: Ford Circular Technology Park - Noise and Vibration Assessment Methodology

Steve,

With regard to the specific noise assessment advice sought below, this will be something for EHO officers at Arun to comment, most likely as part of the scoping process. I have passed contact details as required already. The only thing I additional thing I would add., is to ensure that HGV noise is dealt with as may be necessary (and any surveys carried out if thresholds triggered). Be aware of the approved outline permission (Policy SD10 at 'Climping' for the provision of 300 new homes). that could affect the HGV route to the A259 (and the context).

Regards,

James

James Neave| Principal Planner, Planning Services, West Sussex County Council

Email 4 – Answer from Ramboll to WSCC regarding comments on methodology
James,

Thank you for your prompt response. We have started consulting with Arun District Council but we sent you the email to see if you had any specific queries regarding road traffic noise/HGVs.

Thank you for your comments.

Kind regards
David Harbon

MSc CEng MIOA
Principal Consultant
Acoustics

APPENDIX 3
BASELINE NOISE SURVEY RESULTS

The results of the baseline attended measurements are shown in the table below:

Location of measurement	Start time	Duration, mm:ss	L_{AFmax} (dB)	$L_{Aeq,T}$ (dB)	$L_{A90,T}$ (dB)
Daytime period (07:00-23:00)					
ST1 – Ford Lane	06/02/2020 13:35	15:00	83	67	42
	06/02/2020 14:14	15:00	86	67	39
	06/02/2020 16:02	15:00	81	68	38
	06/02/2020 16:19	15:00	82	68	40
ST2 – Rodney Crescent	06/02/2020 14:46	15:00	60	47	43
	06/02/2020 15:06	15:00	60	46	43
	06/02/2020 16:43	15:00	58	47	44
	06/02/2020 16:59	15:00	58	47	45
ST3 – South-East Corner of Site	06/02/2020 12:54	15:00	86	60	41
	06/02/2020 13:10	15:00	86	60	40
	06/02/2020 17:36	15:00	60	46	43
	06/02/2020 17:51	15:00	84	56	42
ST4 – North-West Corner of Site	06/02/2020 12:24	15:00	58	44	41
	06/02/2020 12:47	15:00	70	48	39
	06/02/2020 15:19	15:00	75	53	41
	06/02/2020 15:35	15:00	74	55	41
ST5 – Industrial Units	06/02/2020 13:57	15:00	64	51	48
	06/02/2020 14:12	15:00	75	56	47
	06/02/2020 16:02	15:00	77	57	47
	06/02/2020 16:17	15:00	74	55	48
ST6 – Rollaston Park	06/02/2020 13:21	15:00	85	64	50
	06/02/2020 13:37	15:00	82	62	45
	06/02/2020 18:34	15:00	86	63	45
	06/02/2020 18:50	15:00	87	68	46
ST7 – Yapton Road	06/02/2020 14:35	15:00	77	66	53
	06/02/2020 14:51	15:00	88	67	54
	06/02/2020 18:55	15:00	83	66	53
	06/02/2020 19:10	15:00	83	65	52

APPENDIX 4
DEMOLITION AND CONSTRUCTION NOISE ASSESSMENT

Activity	Plant	BS5228 Source Data	No	Typical Noise level at 10m for one plant item dB(A)	% on time	L_{Aeq} at 10m dB(A)	Noise level per activity dB(A)
Demolition	Dozer	C 8.6	2	81	20	77	**93**
	Pneumatic Breaker	D.2 avg 7-10	2	91	30	89	
	Compressor	D.7 avg 18-22	1	76	50	73	
	Wheeled Loader	C.2 avg 2-7	2	81	50	81	
	Hand-held Breaker	C 1.6	2	86	30	84	
	Excavator (tracked)	D.3 avg 34-40	2	85	50	85	
	Dumper	D.7 avg 81-92	2	76	33	74	
	Fork Lift	D 7.94	1	88	10	78	
	Hydraulic Cutters	C 1.7	1	93	20	86	
	Water Pump	C 2.46	1	65	50	62	
	Road Sweeper	C 4.90	1	76	10	66	
	Air Compressor	D 7.9	1	74	10	64	
	Generator	C 4.32	1	74	100	74	
Substructure	Mobile crane	C4.38	1	78	50	75	**92**
	Generator	C8.24	2	59	100	62	
	Small excavator	C2.24	2	73	60	74	
	Hammer	C1.19	2	69	50	69	
	Dozer	C2.10	2	80	60	81	
	Tracked excavator	C2.3	2	78	60	79	
	Wheeled loader	C2.27	2	80	50	80	
	Nail gun	C4.95	2	73	30	71	
	Dump truck	C2.30	2	79	40	78	
	Hydraulic hammer piling rig	C3.1	1	89	80	88	
	Handheld breaker	C1.7	1	93	30	88	
Super-structure	Mobile crane	C4.38	2	78	50	78	**87**
	Small excavator	C2.24	2	73	60	74	
	Dozer	C2.10	2	80	60	81	

Activity	Plant	BS5228 Source Data	No	Typical Noise level at 10m for one plant item dB(A)	% on time	L_{Aeq} at 10m dB(A)	Noise level per activity dB(A)
	Tracked excavator	C2.3	2	78	60	79	
	Wheeled loader	C2.27	2	80	50	80	
	Dump truck	C2.30	2	79	40	78	
	Lifting platform	C4.57	2	67	40	66	
	Concrete pump	C3.25	2	78	20	74	
	Concrete mixer	C4.27	2	79	20	75	
	Poker vibrator	C4.33	2	78	30	76	
	Generator	C8.24	2	59	100	62	
Earthworks	Mobile crane	C4.38	2	78	50	78	**86**
	Small excavator	C2.24	2	73	60	74	
	Dozer	C2.10	2	80	60	81	
	Tracked excavator	C2.3	2	78	60	79	
	Wheeled loader	C2.27	2	80	50	80	
	Dump truck	C2.30	2	79	40	78	
External Works	Mobile telescopic crane	C4.46	2	67	50	67	**84**
	Lifting platform	C4.57	2	67	40	66	
	Tracked excavator	C2.14	1	79	50	76	
	Generator	C4.86	2	65	100	68	
	Compressor	C5.5	2	65	40	64	
	Asphalt paver & tipper lorry	C5.31	1	77	70	75	
	Vibratory roller	C5.20	1	75	70	73	
	Hand-held circular saw	C4.73	1	84	20	77	
	Dozer	C2.10	1	80	60	78	
	Dump truck	C2.30	1	79	40	75	

Activity	Plant	Source data ref	Typical Noise level at 10m for one plant item operating dB(A)
Construction Traffic	Lorry 44t	C11.4	83