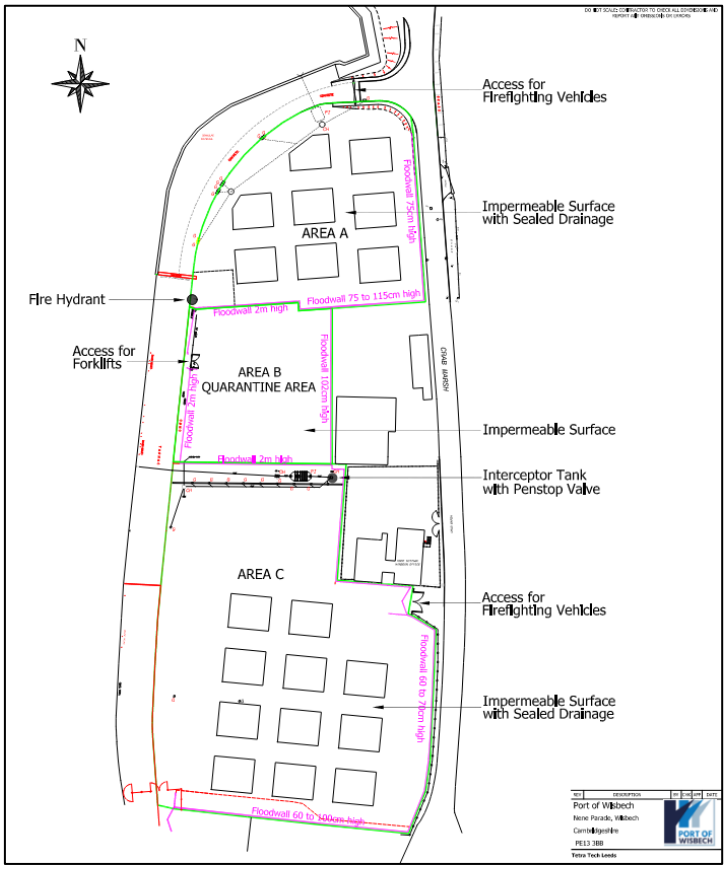
Port of Wisbech, Crab Marsh, Wisbech, PE13 3JG

Noise Assessment

784-B059539



Port of Wisbech Limited

March 2024

Document prepared on behalf of Tetra Tech Group Limited. Registered in England number: 6595608

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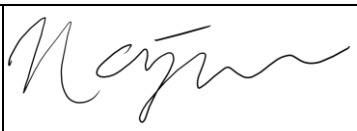
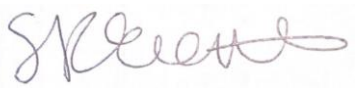
Revision:	0	**Prepared by:**	Najwa Adnan-Smith Environmental Consultant	
Date:	25/03/2024	**Checked by:**	Suzy Everett Senior Environmental Consultant	
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1.0 INTRODUCTION

1.1 PURPOSE OF THIS REPORT

This report presents the findings of a noise assessment to support an environmental permit application for a Refuse Derived Fuel (RDF) storage facility at Port of Wisbech, Crab Marsh, Wisbech, PE13 3JG.

A description of the existing noise environment in and around the site is provided. Noise surveys have been undertaken and the results used to verify predictions of the short-term and long-term effects of noise.

A list of acoustic terminology and abbreviations used in this report is provided in Appendix A and Report Conditions are presented in Appendix B.

1.2 ACOUSTIC CONSULTANTS' QUALIFICATIONS AND PROFESSIONAL MEMBERSHIPS

The lead project Acoustic Consultant is Najwa Adnan-Smith. The report has been checked by Suzy Everett and verified by Dawit Abraham. Relevant qualifications, membership and experience are summarised in Table 1.1 below.

Table 1.1: Acoustic Consultants' Qualifications & Experience

Name	Education	Experience in Undertaking Noise Assessments (Start date of working in noise & acoustics)	Attained Associate Membership of the Institute of Acoustics (date)	Attained Membership of the Institute of Acoustics (date)
Najwa Adnan-Smith	BSc 2016	Oct 2022	-	-
Suzy Everett	BEng 2018	Jul 2016	Aug 2018	Sept 2022
Dawit Abraham	MSc 2008	Oct 2008	Jan 2010	Jan 2016

2.0 ASSESSMENT CRITERIA

2.1 NOISE AND VIBRATION MANAGEMENT: ENVIRONMENTAL PERMITS

Environmental permits have conditions that require operators to control pollution – this includes controlling noise and vibration.

The Environment Agency have produced a guidance to help holders and potential holders of permits to apply for, vary, and comply with their permits. When the term 'environment agencies' is used in the guidance, it is in reference to this organisation.

Table 2.1 below considers the guidance of noise impact levels in relation to the document Noise and vibration management: environmental permits dated 31st January 2022. It provides the effect levels at sensitive receptors in relation to the closest corresponding BS 4142:2014+A1:2019 criteria for each defined level. A description of the level and the actions required dependant on the level is also included.

Table 2.1: Level of Noise Impact Criteria and Actions

Effect Level	Corresponding BS 4142 Criteria	Description / Actions
No noise, or barely audible or detectable noise	The closest Corresponding BS 4142 descriptor is 'low impact or no impact'	This level of noise means that no action is needed beyond basic appropriate measures or Best Available Techniques (BAT). Low impact does not mean there is no pollution. However, if correctly assessed as low impact under BS 4142, the environment agencies may decide that taking action to minimise noise is a low priority.
Audible or detectable noise	The closest corresponding BS 4142 descriptor is 'adverse impact' (following consideration of the context).	This level of noise means that noise pollution is being (or is likely to be) caused at a receptor. At this level there is a duty is to use appropriate measures to prevent or, where that is not practicable, minimise noise. You are not in breach if appropriate measures are used. There is a need to rigorously demonstrate that appropriate measures are being used.
Unacceptable level of audible or detectable noise	The closest corresponding BS 4142 descriptor is 'significant adverse impact' (following consideration of the context).	This level of noise means that significant pollution is being, or is likely to be, caused at a receptor (regardless of whether you are taking appropriate measures). You must take further action or you may have to reduce or stop operations. The environment agencies will not issue a permit if you are likely to be operating at this level.

2.2 OPERATIONAL NOISE – BS 4142:2014 ASSESSMENT CRITERIA

BS 4142:2014+A1:2019 sets down the following guidelines for assessing the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes, based upon difference between the measured background noise level and the rating level of the source under consideration. In particular, the standard states:

a) Typically, the greater the difference, the greater the magnitude of the impact.
b) A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
c) A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.
d) The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

In addition to noise levels the significance of the impact depends on the individuals affected and to the acoustic features present which may be assessed subjectively or objectively as appropriate. Section 9 of BS 4142:2014 recommends that correction factors be applied to the specific noise level if the noise contains certain acoustic features such as:

- tonality;
- impulsivity;
- other sound characteristics which are readily distinctive; and
- intermittency.

3.0 ASSESSMENT METHODOLOGY

3.1 SITE OPERATING TIMES

The proposed operation time is between 07:00 and 19:00 from Monday to Saturday.

3.2 NOISE MODELLING METHODOLOGY

Three-dimensional noise modelling has been undertaken based on the monitoring data to predict noise levels at a number of locations both horizontally and vertically. CadnaA noise modelling software has been used. This model is based on ISO 9613-2 noise propagation methodology and allows for detailed prediction of noise levels to be undertaken for large numbers of receptor points and different noise emission scenarios both horizontally and vertically. The modelling software calculates noise levels based on the emission parameters and spatial settings that are entered. Input data and model settings as given in Table 3.1 below have been used. Figure 3.1 below presents the 3D view of the model.

Figure 3.1: 3D View of the Noise Model

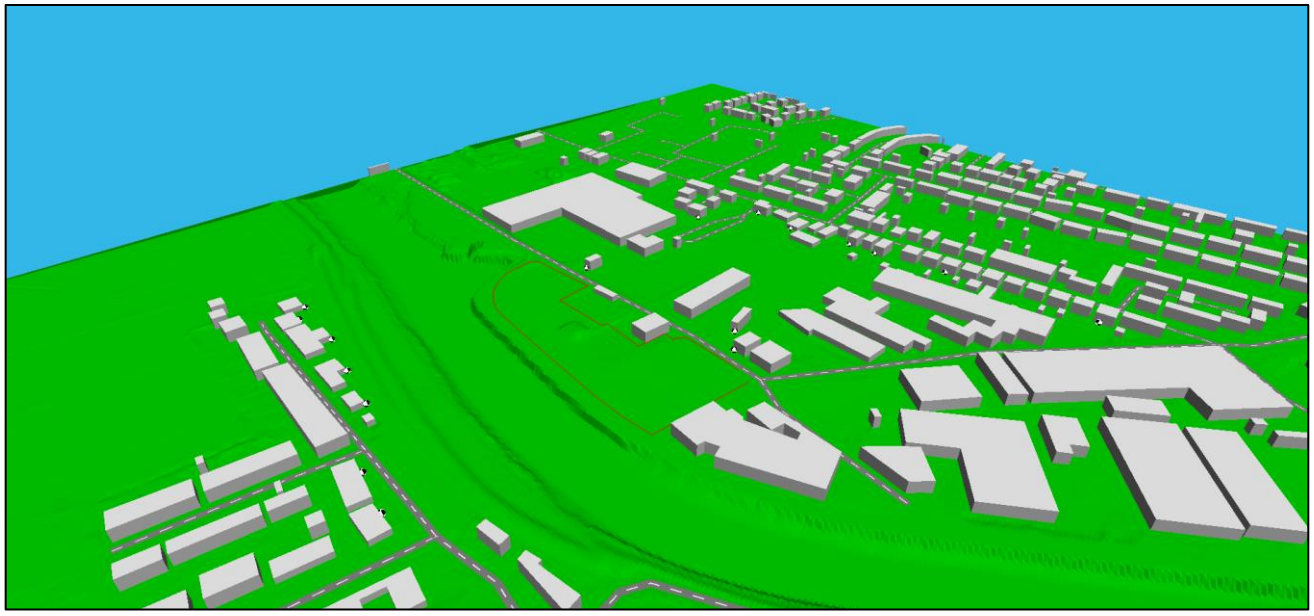

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Table 3.1: Modelling Parameters Sources and Input Data

Parameter	Source	Details
Horizontal distances – around site	Ordnance Survey	Ordnance Survey
Ground levels – around site	DEFRA	LIDAR 2m DTM
Building heights – around site	Tetra Tech Observations	8 m height for two storey residential properties, and 4 m for Bungalows.
Receptor positions	Tetra Tech	1 m from façade, height of 1.5 m for ground floor, 4 m for first floor properties.

Parameter	Source	Details
Proposed Plans	Tetra Tech	Drawing Title: Permit Boundary and Location of RDF Stockpiles Drawing No: PLW/B059539/LAY/01 Dated: 19th February 2024

It is acknowledged that a number of the values of parameters chosen will affect the overall noise levels presented in this report. However, it should be noted that the values used, as identified above, are worst-case.

3.3 MODEL INPUT DATA

3.3.1 Plant and Equipment

The proposed activities include the baled RDF being delivered to site by HGVs, stored outdoors on site and then exported by ships. There will be no waste processing undertaken on site. The loading process for exporting the RDF will include individual bales being lifted and placed onto a ship vessel by a Fuchs crane with a bale clamp attachment. Forklifts for moving the RDF bales will also operate throughout the site.

It is understood that the site is already in operation, storing timber product within the ownership boundary. It should be noted that the site can only have one vessel operating at a time and therefore no timber discharging or RDF loading can occur simultaneously.

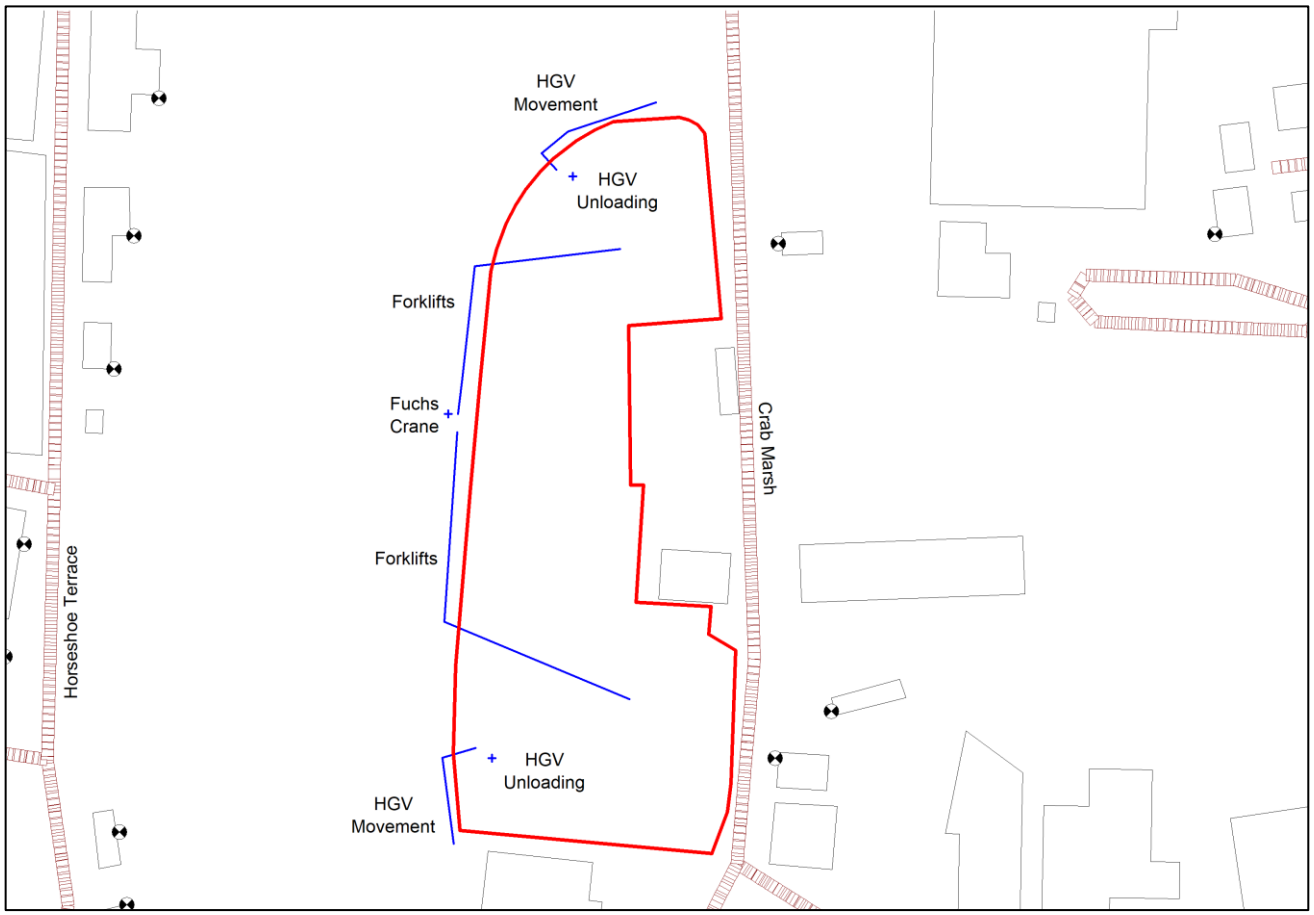
As such, the noise model only includes noise sources associated with the handling of the RDF bales and assessed for the daytime period only. The sound pressure levels for the noise sources were measured on site and are used in the noise model. The data is presented in Table 3.2 below and Figure 3.2 shows the locations of the modelled noise sources.

Table 3.2: Plant and Equipment Noise Data

Equipment	Type	Data Source	Octave Band Sound Pressure Levels (dB)								Sound Pressure Level at 10m (dB(A))	Number of Item Modelled
			63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz		
HGV Movements*	Maximum Level	BS 5228-1:2009 Annex C.11.4	82.0	80.0	78.0	75.0	76.0	78.0	75.0	69.0	83.0	2
HGV Unloading	Average Level	On-site measurement by Tetra Tech	77.4	70.5	68.3	65.3	63.5	62.0	55.9	47.7	68.9	2
Forklift*	Maximum Level		81.6	76.7	72.3	74.7	69.0	78.9	71.1	55.1	81.5	4
Fuchs Crane	Average Level		70.8	72.7	70.5	72.4	67.7	64.8	59.8	53.6	73.2	1

*Drive-by maximum sound pressure level L_{max} (octave bands) and L_{AFmax} (overall level) applied to moving point source to simulate movements.

Figure 3.2: Locations of Modelled Noise Sources



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3.4 SENSITIVE RECEPTORS

Table 3.3 below summarises receptor locations that have been selected to represent worst-case sensitive receptors with respect to direct noise from the site. Façades of the nearest noise sensitive properties to the development site have been represented. The locations of the receptors are shown in Figure 3.3 below.

Table 3.3: Existing Receptor Locations

Ref.	Description	Type of Use	Receiver Height (m) Daytime
R01	1 Crab Marsh	Residential	1.5
R02	6 Crab Marsh	Residential	1.5
R03	2 Crab Marsh	Residential	1.5
R04	7 Timber Yard Gardens	Residential	1.5
R05	131 Osborne Road	Residential	1.5
R06	123 Osborne Road	Residential	1.5
R07	113 Osborne Road	Residential	1.5
R08	105 Osborne Road	Residential	1.5
R09	89 Osborne Road	Residential	1.5

Ref.	Description	Type of Use	Receiver Height (m) Daytime
R10	59 Osborne Road	Residential	1.5
R11	3 Malvern Gardens	Residential	1.5
R12	1 Malvern Gardens	Residential	1.5
R13	Horseshoe Terrace	Residential	1.5
R14	Horseshoe Terrace	Residential	1.5
R15	Horseshoe Terrace	Residential	1.5
R16	Horseshoe Terrace	Residential	1.5
R17	Horseshoe Terrace	Residential	1.5
R18	Horseshoe Terrace	Residential	1.5
R19	Garway, Horseshoe Terrace	Residential	1.5

Figure 3.3: Sensitive Receptor Locations

4.0 NOISE SURVEY

A monitoring survey was undertaken to characterise baseline ambient noise levels currently experienced on the site and to establish the relative local background and traffic noise levels. Equipment used during the survey included:

Rion NL52	Environmental Noise Analyser	s/n	219905
Rion NC75	Sound Calibrator	s/n	34313029

The measurement equipment was checked against the appropriate calibrator at the beginning and end of the measurements, in accordance with recommended practice and no drift was observed. The accuracy of the calibrators can be traced to National Physical Laboratory Standards, calibration certificates for which are available on request.

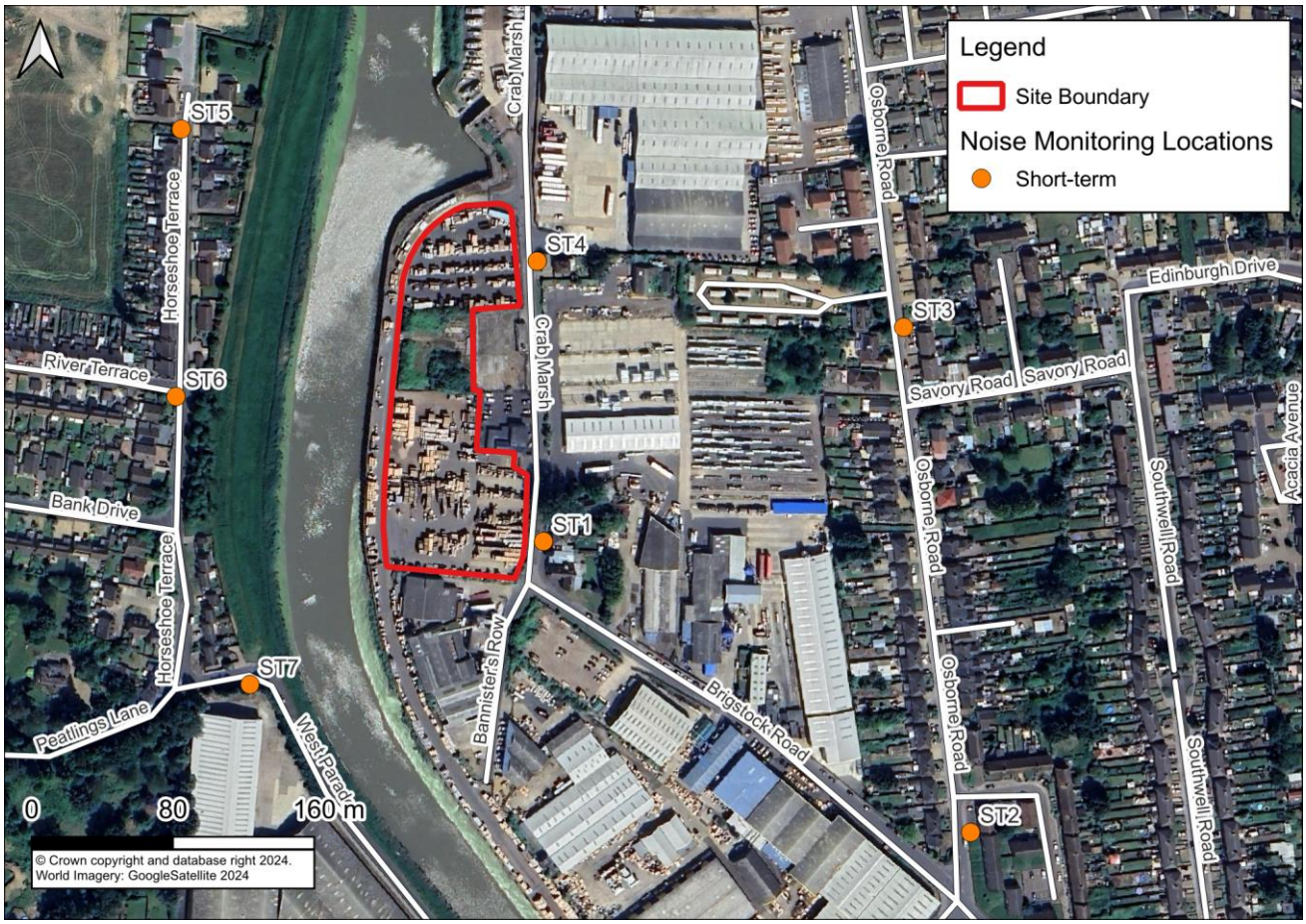
Attended short-term (ST) measurements were undertaken at seven locations (as specified in Table 4.1 and shown in Figure 4.1 below) during the daytime period on Thursday 14th March.

Measurements were taken in general accordance with BS 7445-1:2003 The Description and Measurement of Environmental Noise: Guide to quantities and procedures. Weather conditions during the survey period were observed as being dry. Anemometer readings confirmed that wind speeds were less than 5 ms^{-1} at all times during the survey, with a predominant north-eastern wind direction during the survey. The attended noise monitoring meteorological conditions are presented in Table 4.2.

Table 4.1: Noise Monitoring Locations

Ref	Description
ST1	On Crab Marsh south, southeast of site boundary.
ST2	On Osborne Road south, southeast of site boundary.
ST3	On Osborne Road north, west of site boundary.
ST4	On Crab Marsh north, northeast of site boundary.
ST5	On Horseshoe Terrace north, northwest of site boundary.
ST6	On Horseshoe Terrace, west of site boundary.
ST7	On West Parade/Malvern Gardens, southwest of site boundary.

Figure 4.1: Noise Monitoring Locations



4.1 NOISE SURVEY RESULTS

The dominant noise sources found in the area, as specified in Table 4.2 below, include factory and machinery noise and road traffic noise from Crab Marsh, Osborne Road and Horseshoe Terrace. Other contributions to the ambient noise environment consist of birdsong and trees rustling in the wind.

Ambient and background noise levels are usually described using the L_{Aeq} index (a form of energy average) and the L_{A90} index (i.e. the level exceeded for 90% of the measurement period) respectively. Road traffic noise is generally described using the L_{A10} index (i.e. the level exceeded for 10% of the measurement period).

Table 4.2: Meteorological Conditions During the Survey

Survey Location	Date & Time	Temperature (°C)	Wind Speed (m/s)	Wind Direction	Cloud Cover (Oktas)	Dominant Noise Source
ST1	14/03/2024 12:49	16	2.6	S	6	Occasional HGVs, motorbikes and cars passing on adjacent Crab Marsh, occasional birdsong and seagulls, constant sound of factory/machinery at Oil Dri UK on opposite side of road.
ST2	14/03/2024 17:19	14	1.5	SE	7	Cars in distance on nearby Mount Pleasant Road, hum of factory far in distance, seagulls, cars frequently passing on adjacent Osborne Road.

Survey Location	Date & Time	Temperature (°C)	Wind Speed (m/s)	Wind Direction	Cloud Cover (Oktas)	Dominant Noise Source
ST3	14/03/2024 17:00	14	1.5	SE	7	Dog barking, cars occasionally passing on adjacent Osborne Road, machinery hum in distance coming from north-west of ST3.
ST4	14/03/2024 12:32	16	2.6	S	6	Constant machinery hum in distance coming from south of ST4, seagulls, beeping of HGVs/forklift horns and reversing in distance, HGV occasionally passing on adjacent Crab Marsh, machinery banging and hum from both north and south of ST4.
ST5	14/03/2024 17:48	14	1.5	SE	7	Seagulls, factory hum far in distance, cars far in distance.
ST6	14/03/2024 18:07	14	1.5	SE	7	Birdsong, cars infrequently passing on adjacent Horseshoe Terrace and River Terrace, dog barking in distance.
ST7	14/03/2024 18:28	14	1.5	SE	7	Cars infrequently passing on adjacent West Parade Road, seagulls.

The results of the statistical measurements conducted during the survey are summarised in Table 4.3 below. All values are sound pressure levels in dB (re: 2 x 10^{-5} Pa).

Table 4.3: Results of Baseline Noise Monitoring Survey (Average Levels)

Period	Duration (T)	Monitoring Date and Times	Location	$L_{Aeq,T}$ (dB)	$L_{AFmax,T}$ (dB)	$L_{AFmin,T}$ (dB)	$L_{A10,T}$ (dB)	$L_{A90,T}$ (dB)
Daytime 07:00 - 19:00	15 Mins	14/03/2024 12:49	ST1	67.5	82.3	63.3	67.8	66.0
	15 Mins	14/03/2024 17:19	ST2	60.6	80.2	44.6	63.9	48.0
	15 Mins	14/03/2024 17:00	ST3	60.7	82.5	46.3	60.9	49.0
	15 Mins	14/03/2024 12:32	ST4	58.7	79.4	47.6	57.0	50.0
	15 Mins	14/03/2024 17:48	ST5	52.1	74.2	41.8	52.0	45.0
	15 Mins	14/03/2024 18:07	ST6	53.9	80.4	43.3	57.4	46.0
	15 Mins	14/03/2024 18:28	ST7	52.7	71.5	42.3	55.6	44.0

All values are sound pressure levels in dB re: 2x 10^{-5} Pa.

4.2 REPRESENTATIVE BACKGROUND LEVELS

Using the data collected during the baseline survey, representative background noise levels have been derived for all receptor locations presented in Figure 3.3. Table 4.4 presents the representative background noise levels considered appropriate for the existing sensitive receptors within the area.

Table 4.4: Representative Background Noise Levels (All Receptors)

Receptors	Monitoring Location	Time Period	Representative Background Noise Level ($L_{A90,T}$ dB)
R01	ST4	Daytime (07:00 – 19:00)	50.0
R02, R03	ST1		66.0
R04 – R08	ST3		49.0
R09, R10	ST2		48.0
R11, R12	ST7		44.0
R13 – R19	ST5		45.0

The representative noise levels presented in Table 4.4 have been used to inform the assessment presented in Section 5.0.

5.0 ASSESSMENT OF EFFECTS

5.1 BS 4142:2014 ASSESSMENT

This assessment compares the predicted cumulative noise levels from the proposed RDF storage facility with the measured background noise levels L_{A90} at the surrounding existing residential receptors.

BS 4142:2014 states that corrections should be applied to account for certain acoustic features which have the potential to increase the level of effect at nearby properties.

Observations during the baseline monitoring identified that the ambient noise climate was characterised by the presence of noise from the surrounding road networks as well as nearby industrial premises. The noise characteristics associated with the proposed RDF storage facility are not expected to vary significantly from the existing noise climate. As such, no corrections have been applied to the predicted cumulative noise levels. Table 5.1 presents the results of the assessment.

Table 5.1: BS 4142:2014 Operational Noise Assessment

Location	Existing Measured Background L_{A90}	Noise Rating Level $L_{Ar,Tr}$	BS 4142 Score	BS 4142 Impact Conclusion
	Daytime	Daytime	Daytime	
R01	50	48	-2	No Impact
R02	66	49	-17	No Impact
R03	66	51	-15	No Impact
R04	49	38	-11	No Impact
R05	49	39	-10	No Impact
R06	49	38	-11	No Impact
R07	49	38	-11	No Impact
R08	49	35	-14	No Impact
R09	48	26	-22	No Impact
R10	48	25	-23	No Impact
R11	44	44	-1	No Impact
R12	44	44	-1	No Impact
R13	45	43	-2	No Impact
R14	45	43	-2	No Impact
R15	45	44	-1	No Impact
R16	45	42	-3	No Impact
R17	45	41	-4	No Impact
R18	45	41	-4	No Impact
R19	45	36	-9	No Impact

All values are sound pressure levels in dBA re: 2×10^{-5} Pa.

Location	Existing Measured Background L_{A90}	Noise Rating Level $L_{Ar,Tr}$	BS 4142 Score	BS 4142 Impact Conclusion
	Daytime	Daytime	Daytime	

All calculations used to derive the above table (including averaging of background noise levels and predicted source noise levels) have been undertaken to 1 decimal place to avoid perpetuation of rounding errors. However, in accordance with BS4142 para 8.6 the levels are expressed as integers (with 0.5 dB being rounded up). This may mean that the arithmetic in the above table may appear to be up to 1 dB incorrect due to this rounding.

As presented in Table 5.1 above, the predicted noise rating levels are below the background noise levels at all nearest sensitive receptors during the operational daytime period (07:00 – 19:00). The BS 4142:2014 conclusion for a difference of this scale would be '**No Impact**'. In relation to the guidance given by the Environment Agency, this corresponds to there being no noise or noise is barely audible or detectable. This level of noise means that no action is needed beyond basic appropriate measures or Best Available Techniques (BAT) which will be implemented in accordance with the accompanying Operational Noise Management Plan.

6.0 CONCLUSIONS

This report presents the findings of a noise assessment to support an environmental permit application for a Refuse Derived Fuel (RDF) storage facility at Port of Wisbech, Crab Marsh, Wisbech, PE13 3JG.

The assessment is based on the proposed daytime operations between 07:00 to 19:00 Mondays to Saturdays. The representative background noise levels are representative of the site operating times.

Predicted noise rating levels are below the background noise levels at all nearest sensitive receptors during the operational daytime period. The BS 4142:2014 conclusion for a difference of this scale would be '**No Impact**' which corresponds to there being no noise or noise is barely audible or detectable.

This level of noise means that no action is needed beyond basic appropriate measures or Best Available Techniques (BAT) which will be implemented in accordance with the accompanying Operational Noise Management Plan.

APPENDICES

APPENDIX A – ACOUSTIC TERMINOLOGY AND ABBREVIATIONS

Acoustic Terminology

dB — Sound levels from any source can be measured in frequency bands in order to provide detailed information about the spectral content of the noise, i.e. whether it is high-pitched, low-pitched, or with no distinct tonal character. These measurements are usually undertaken in octave or third octave frequency bands. If these values are summed logarithmically, a single dB figure is obtained. This is usually not very helpful as it simply describes the total amount of acoustic energy measured and does not take any account of the ear's ability to hear certain frequencies more readily than others.

dB(A) — Instead, the dBA figure is used, as this is found to relate better to the loudness of the sound heard. The dBA figure is obtained by subtracting an appropriate correction, which represents the variation in the ear's ability to hear different frequencies, from the individual octave or third octave band values, before summing them logarithmically. As a result the single dBA value provides a good representation of how loud a sound is.

L_{Aeq} — Since almost all sounds vary or fluctuate with time it is helpful, instead of having an instantaneous value to describe the noise event, to have an average of the total acoustic energy experienced over its duration. The $L_{Aeq,\ 07:00\ -\ 23:00}$ for example, describes the equivalent continuous noise level over the 16-hour period between 7 am and 11 pm. During this time period the L_{pA} at any particular time is likely to have been either greater or lower that the $L_{Aeq,\ 07:00\ -\ 23:00}$.

L_{Amin} — The L_{Amin} is the quietest instantaneous noise level. This is usually the quietest 125 milliseconds measured during any given period of time.

L_{Amax} — The L_{Amax} is the loudest instantaneous noise level. This is usually the loudest 125 milliseconds measured during any given period of time.

L_n — Another method of describing, with a single value, a noise level which varies over a given time period is, instead of considering the average amount of acoustic energy, to consider the length of time for which a particular noise level is exceeded. If a level of x dBA is exceeded for say. 6 minutes within one hour, then that level can be described as being exceeded for 10% of the total measurement period. This is denoted as the $L_{A10,\ 1\ hr}$ = x dB.

The L_{A10} index is often used in the description of road traffic noise, whilst the L_{A90}, the noise level exceeded for 90% of the measurement period, is the usual descriptor for underlying background noise. L_{A1} and L_{Amax} are common descriptors of construction noise.

R_w — The *weighted sound reduction index* determined using the above *measurement* procedure, but weighted in accordance with the procedures set down in BS EN ISO 717-1. Partitioning and building board manufacturers commonly use this index to describe the inherent sound insulation performance of their products.

Abbreviations

CADNA – Computer Aided Noise Abatement

DMRB – Design Manual for Roads and Bridges

HGV – Heavy Goods Vehicle

PPG – Planning Practice Guidance

UDP – Unitary Development Plan

UKAS – United Kingdom Accreditation Service