Submission ID: 3960

On behalf of our client , please find attached our DL6 Rep in relation to the noise impact at Fordley Hall.

We are planning to discuss this at the forthcoming ISH on noise.

Regards

Paul Zanna

TECHNICAL NOTE

Date: 5th August 2021

File Ref: PZ/VL/P21-2329/01TN

Subject: **Fordley Hall – Deadline 6 Submission Noise**

1.0 DEADLINE 6 - SUBMISSION

1.1 Create Consulting Engineers have been appointed by the Grant family to provide a written response at Deadline 6 in line with the Planning Inspectorate timescale.

1.2 The purpose of this submission is to provide further technical information to inform PINs on the shortfalls highlighted at Deadline 5 relating to noise matters only.

1.3 As noted at DL5 following the ISH2/3 there are several significant points which the Applicant has also failed to adequately address. These points have yet to be reported on and therefore Create reserve the right to comment further on these points at DL7.

1.4 We would urge the Applicant to engage directly with our Client given the conflicting information we are receiving from their Agent and the time taken to receive the requested information, giving little or no time to respond. The Applicant's lack of engagement since 2019 has been lamentably minimal.

2.0 FORDLEY HALL – NOISE

2.1 At ISH2, Mr Humphrey's highlighted that there was to be a separate ISH on Noise. Create are pleased to see this has now been added to the ISHs on Wednesday 25th August 2021.

2.2 In summary, at DL5 Create stated the following.

Deadline 5 - Summary of Submission - Noise

2.3 The ES details a preliminary assessment of construction noise, undertaken in accordance with Method 1 of BS5228-1:2009+A1:2014. The aforementioned standard details two acceptable methodologies for assessment of construction noise. Method 1: the "ABC Method", and Method 2: the "2-5 dB(A) Change" method. Selecting an appropriate method is discretionary and whilst both are acceptable in broad terms, a distinction should be made based on the situational context at this rural location.

2.4 The threshold noise levels have also been stated incorrectly. Table 3.12 of LA111 (DMRB) suggests that the SOAEL is determined by Section E3.2 and Table E.1 of BS 5228-1. This would result in noise thresholds being set at 65 dB $L_{Aeq,T}$ for day times. It appears however that the thresholds have been set using Table E.2 of BS 5228-1 which is used for eligibility for noise insulation, or for determining the noise insulation trigger level.

2.5 The Assessment provided by the Applicant is considered preliminary only. Assessments of the anticipated works were not based on any contractor method statements, plant schedules or construction phase staging. The construction noise calculations (and in turn, the resultant effects), therefore, have been based on 'professional judgement' and assumptions on behalf of the acoustic consultants. Whereas this would be considered appropriate to assess a site's viability for development, it would not be considered representative of the actual resultant noise levels during phased works and thus on our Client's home and land interests.

2.6 To date, there have been no dedicated construction noise assessments conducted for the receptor sites. For example, the 'Enabling Works' Table (Appendix 4A1, Volume 6.5), has assessed the construction noise for this phase against the sound levels produced by a single excavator alone. It is not clear where the information for calculating the resultant impact at the Fordley Road *et al* residences originated; however, this assumptive approach would not be considered robust or exhaustive to assess any resultant impact in practice.

2.7 The Mitigation Route Map (8.12) details various measures of mitigation for specific works phases in broad terms, stipulating adherence to BPM 'Best Practicable Means' and the CoCP 'Code of Construction Practice'. These mitigative strategies have been based on the assumed construction activities (as discussed above) and have not been directly quantified at the receptor locations to judge their effectiveness.

2.8 The reported ambient levels in section 4.4.5 of the ES states the 'Typical Measured Level – Day' at SLR3 (Fordley Hall) was 45-47 dB $L_{Aeq,T}$. Using the ABC method, a negligible impact would be a resultant sound level ≤ 65 dB(A) $L_{Aeq,T}$, which could be up to 20 dB greater than the measured ambient level. Table 4.15 estimates the work phase noise at the receptor locations to be:

- Preparatory Works: 38-53 dB $L_{Aeq,T}$
- Main Construction Phase: 52-57 dB $L_{Aeq,T}$

2.9 The upper limit of the preparatory works has been calculated to be above the measured residual ambient by 11 dB, which has been deemed to be of a negligible impact. The upper limit of the main construction phase has been predicted to be 19 dB above the residual ambient, for which a moderate adverse significance has been determined (as detailed in the Applicants Table 4.16). Both exceedances would be considered excessive.

2.10 Create consider an appropriate assessment method is to use the 2-5 dB(A) change method. Noise levels generated by site activities are deemed to be potentially significant if the total noise (pre-construction ambient plus site noise) exceeds the pre-construction ambient noise by 5 dB or more, subject to lower cut-off values of 65 dB, 55 dB and 45 dB $L_{Aeq,T}$ from site noise alone, for the daytime, evening and night-time periods, respectively; and a duration of one month or more, unless works of a shorter duration are likely to result in an significant effect.

2.11 Section 4.3.26 states: "*For noise sensitive receptors where the magnitude of change in the short term is minor, moderate or major at noise sensitive buildings, local circumstances must also be considered to determine the final significance, as required by LA111.*" As the new road would be used by most/all of the construction traffic for the next 10+yrs, this would be indicative of a significant effect, in addition to the operational phase going forward beyond this point and should be assessed and mitigated.

2.12 Further dialogue with the Applicant's Agent has confirmed that 30-minute noise measurements took place during 2019. Whilst we accept there is no set measurement duration, typically the minimum measurement duration would be one hour measurement between the hours of 10:00h and 17:00h for daytime hours and the minimum duration for the nighttime would be 15 minutes. Relying on only a small handful of short measurements automatically increases the uncertainty and reduces the reliability of the noise measurements. Given the importance of these levels when producing an ES, the longer the measurement the better and more reliable the results. In essence, the shorter measurement only captures the noise levels at that particular time.

2.13 The author also noted that there was a train for one minute of those 30 minutes, occasional aircraft (which in a rural location can be heard for a long time) and the rustle of vegetation. By virtue, the $L_{Aeq,T}$ is a logarithmic average of the sound levels over the period of time (T) and as these are energy calculations are weighted towards the higher sound levels, as opposed to the arithmetical averaging method. The fact that there was vegetation rustling, would suggest that the breeze was slightly more than “moderate” which again can artificially increase these sound levels, thus we believe the noise monitoring benchmarking is inadequate.

2.14 To accurately gauge the ambient sound level for a day, industry guidance recommends to establish the typical sound level, which would be the most commonly occurring hour long measurement between the hours of 07:00h to 23:00h. That is simply not possible when you are working with one or two 30-minute readings.

3.0 NEW TECHNICAL INFORMATION – NOISE

3.1 Create, attach, at Appendix A the following information;

- New detailed noise monitoring records;
- New detailed noise assessment of background noise levels;
- New predicted noise levels during construction
- New predicted noise levels post construction

3.2 The results are clear and confirm that the baseline sound levels used for the previous noise assessment were approximately 8 dB above the most commonly occurring day time ambient sound level.

3.3 We are seeking a full and conclusive construction noise and vibration assessment be completed once the method statements have been finalised and suitable noise mitigation be implemented to reduce the impact of the construction noise.

3.4 The use of earth bunds are limited at best and would be required to be positioned either close to the receptor or to the noise source to maximise their efficacy. Additional near field screening would be required around some of the noisier items of plant.

3.5 The use of Best Practicable Means (BPM) must be adhered to, which should include the use of mufflers or silencers, nearfield screening, considerate placement of noisy plant, starting ignitions in a synchronised manner and not leaving engines running when not in use. These are examples only and by no means are an exhaustive list.

4.0 CONCLUSIONS

4.1 Create have reviewed the Applicants position. Whilst this DL6 Rep focuses specifically on noise, it has been shown that several important areas have been missed, or remain unanswered, which could misrepresent the final impact outcome.

4.2 Our Client and Create have raised significant, legitimate concerns with respect to the SLR and it is requested that the Applicant responds accordingly. This is expected to lead to the introduction of mitigation measures and/or redesigned components of the overall scheme currently proposed.

Note By: Paul Zanna - Technical Director

APPENDIX A

create
CONSULTING
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FORDLEY HALL – SIZEWELL C LINK ROAD

Construction And Operational Noise Assessment

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FORDLEY HALL – SIZEWELL C LINK ROAD

Construction And Operational

Noise Assessment

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Checked By: Jody Blacklock, BEng(Hons), PGDip IoA, MIoA, MCIBSE

Reference: BD/VL/P21-2329/02

Date: August 2021

FORDLEY HALL – SIZEWELL C LINK ROAD
Construction And Operational Noise Assessment

FORDLEY HALL – SIZEWELL C LINK ROAD
Construction And Operational Noise Assessment

Contents

Appendices

Registration of Amendments

Revision and Date	Amendment Details	Revision Prepared By	Revision Approved By

1.0 EXECUTIVE SUMMARY

About the Authors

1.1 This report has been compiled by, Ben Dixon , BA(Hons), PGDip IoA, AMIOA and Mat Tuora , BSc(Hons), PGDip IoA, MIOA, and checked by Jody Blacklock, BEng(Hons), PGDip IoA, MIoA, MCIBSE.

Jody Blacklock - Technical Director

1.2 Jody is a Chartered Engineer and Acoustic Consultant with over 20 years' experience. He is the Technical Director for the acoustics team across the business and is responsible for managing the Chelmsford office.

1.3 Jody has experience as an Expert Witness and has been involved in a number of multidisciplinary projects since joining the Create in 2017. He has an extensive knowledge of acoustics and is adept at noise modelling and the completion of noise impact assessments. Recently Jody was voted by other acoustic professionals into the role of the Eastern Branch Secretary for the Institute of Acoustics.

1.4 Prior to joining Create Jody worked as a Senior Acoustic Consultant for 10 years at dB Attenuation Ltd and dB Consultation Ltd.

Ben Dixon AMIOA – Principle Acoustic Consultant

1.5 Ben is a Principal Acoustics Consultant and Associate Member of the Institute of Acoustics. Prior to joining the acoustic industry in 2013, Ben worked as a Dryliner where he gained a wealth of practical knowledge in the construction environment. After working on site, Ben returned to university to complete his studies. The findings of his dissertation were presented at the Institute of Acoustics, and subsequently published in the Institute's monthly publication.

1.6 Ben joined Create in 2018. Prior to joining Create, he worked for BL Acoustics and Stroma Technology where he developed an extensive knowledge of architectural acoustics.

Mat Tuora - Senior Acoustic Consultant

1.7 Mat is a Senior Acoustics Consultant with over 7 years of experience, who recently joined Create. Prior to joining our team, Mat held several roles at Adrian James Acoustics, where he gained experience working on a wide range of projects for a variety of high profile local and national clients.

1.8 Over the first few years in the industry Mat was responsible for reverberation assessments and pre-completion testing. Since then, Mat was involved in far larger and complex schemes, becoming adept at carrying out detailed environmental assessments, acoustic modelling, and multistage building acoustic design. Mat has also supported several expert witnesses by carrying out calculations and drafting reports. He is a proactive Member of the Institute of Acoustics and recently spent time presenting on work undertaken in call centers for the Institute of Acoustics 2020 Conference.

Report Context and Executive Summary

1.9 The following assessment has examined the project specific documentation submitted by EDF Energy (specifically the Environmental Statement and its associated technical documentation) to evaluate the potentially negative acoustical effects of noise arising from the construction and operation of the Sizewell C link road, on the Fordley Hall residence.

1.10 The EDF documentation contained the methodologies and works phasing that informed EDF's initial assessments. The documentation also contains predictions of changes in noise levels arising from anticipated future traffic flows associated with the operation of the road.

1.11 The predicted results of these documents have been compared to the results of a baseline noise survey undertaken by Create Consulting Engineers Ltd (Create), as well as to local, national and international guidance.

1.12 This report has used the EDF documentation and industry standard empirical data (later described, herein) to predict and determine noise levels as they may be experienced at the Fordley Hall residence.

1.13 The results from a recent noise survey carried out by Create have been used in support of this assessment, to compare against those presented within the EDF ES. The ES stated levels were found to be ≈ 7 dB greater than those measured by Create and would be regarded as comparable in terms of location.

1.14 Although indicative, the construction noise calculations provided by EDF should not be considered as robust or exhaustive, as they are suitable for outline scoping only. Primary measures of mitigation have been determined to be necessary within the ES, however further assessment would be warranted to determine whether secondary mitigation would be required.

1.15 The transport noise assessment within the ES was found to be within acceptable tolerances, and the stated significance/magnitude of effects within the ES apply.

1.16 The ES does not consider loss of external amenity, for which it has been assumed would be potentially significant, depending on the context. This should be considered when defining suitable measures of mitigation.

2.0 INTRODUCTION

2.1 Create Consulting Engineers Ltd (Create) have been commissioned by David Grant (Middleton) to undertake a detailed review of the supporting noise and vibration measurements as well as undertaking individual Construction and Operational Noise Assessments to assess proposed works processes for the construction and future use of the Sizewell C link road.

2.2 This baseline assessment has defined the anticipated working noise limits for the construction, and quantified the anticipated future noise levels arising from traffic increases at the property boundary of Fordley Hall. The purpose of this was to ensure the amenity of the residents will be protected.

Site Context

2.3 The site is approximately 101 ha and comprises of predominately agricultural land (which accounts for approximately 92.8 ha of the site) as well as highway land and hardstanding. Approximately 76.5 ha of the agricultural land would be required permanently for the proposed development and approximately 16.3 ha would be required temporarily to facilitate the construction.

2.4 The route of the Sizewell link road would bypass a section of the B1122 with a new 6.8km long single carriageway road to the south-west. The proposed road would be 7.3 metres (m) wide, with additional 1m hardstrips and 2.5m wide verges. Along the route of the Sizewell link road, there would be swales approximately 3.5m wide for highway drainage.

2.5 The road will have a designed speed limit of 60mph, and starts at the A12 south of Yoxford, bypasses Middleton Moor and Theberton before joining the B1122 to the west of the Sizewell C main development site. This proposed development would be retained following completion of the Sizewell C main development site as a lasting legacy of the Sizewell C Project.

2.6 It has also been stated that once operational, it would be open to the public and will be used by SZC Co. during the construction phase of the Sizewell C main development site, to transport construction workers arriving by car, buses from both the northern and the southern park and ride sites, and goods vehicles (both light and heavy) delivering freight to the Sizewell C main development site.

2.7 The EDF Sizewell Environmental Statement (EDF ES) has split the proposed development into six main areas as follows:

- Area 1 – from the A12 to Footpath E-344/013/0 and E584/016/A (land west of the East Suffolk line);
- Area 2 – from land west of the East Suffolk line to Littlemoor Road;

- Area 3 – from Littlemore Road to east of Garden House Farm (including the link to B1122 west of Middleton Moor);
- Area 4 – from east of Garden House Farm to land to the west of Theberton;
- Area 5 – from land to the west of Theberton to the south of Theberton; and
- Area 6 – from the south of Theberton to the B1122 adjacent to Brown's Plantation.

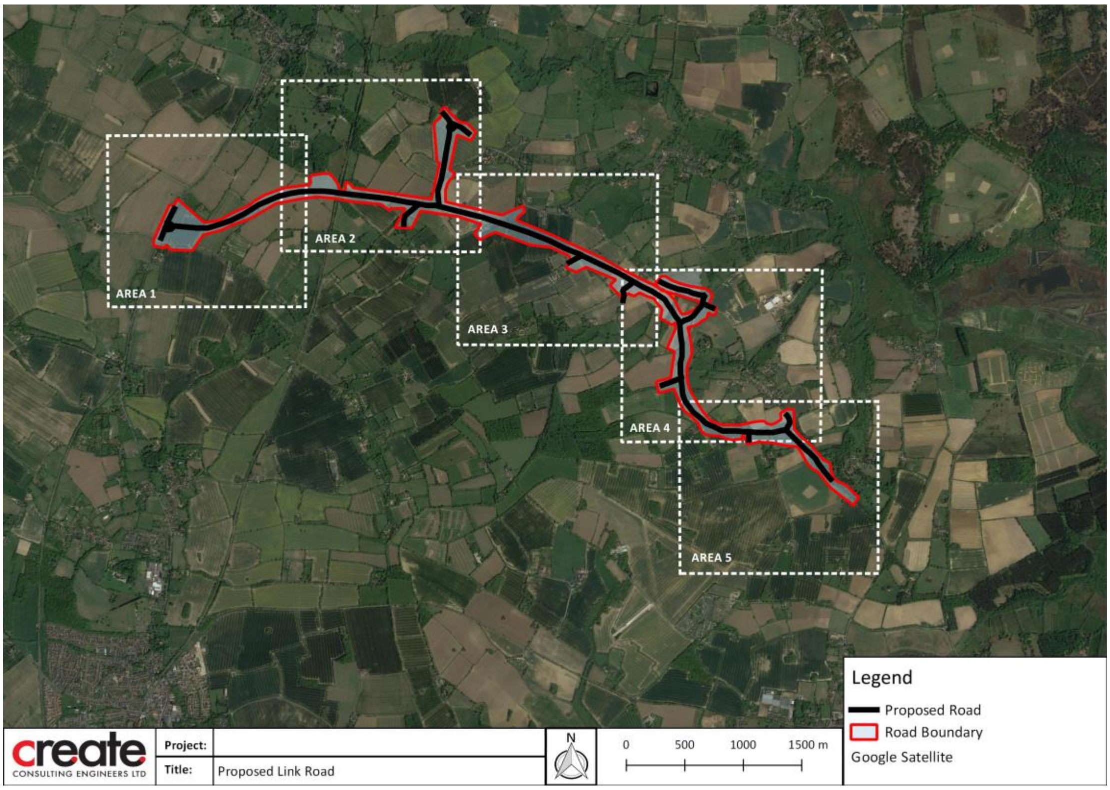

Figure 2.1: Sizewell Link Road. *N.B. Area 6 Location not Illustrated in the ES Chapter*

2.8 The Fordley Hall has been identified in 6.7 Volume 6 Sizewell Link Road Chapter 4 Noise and Vibration Figures 4.1 – 4.2 as Noise Receptor 3 and falls within the boundary of Area 2, which has been shown in greater detail in the following figure:

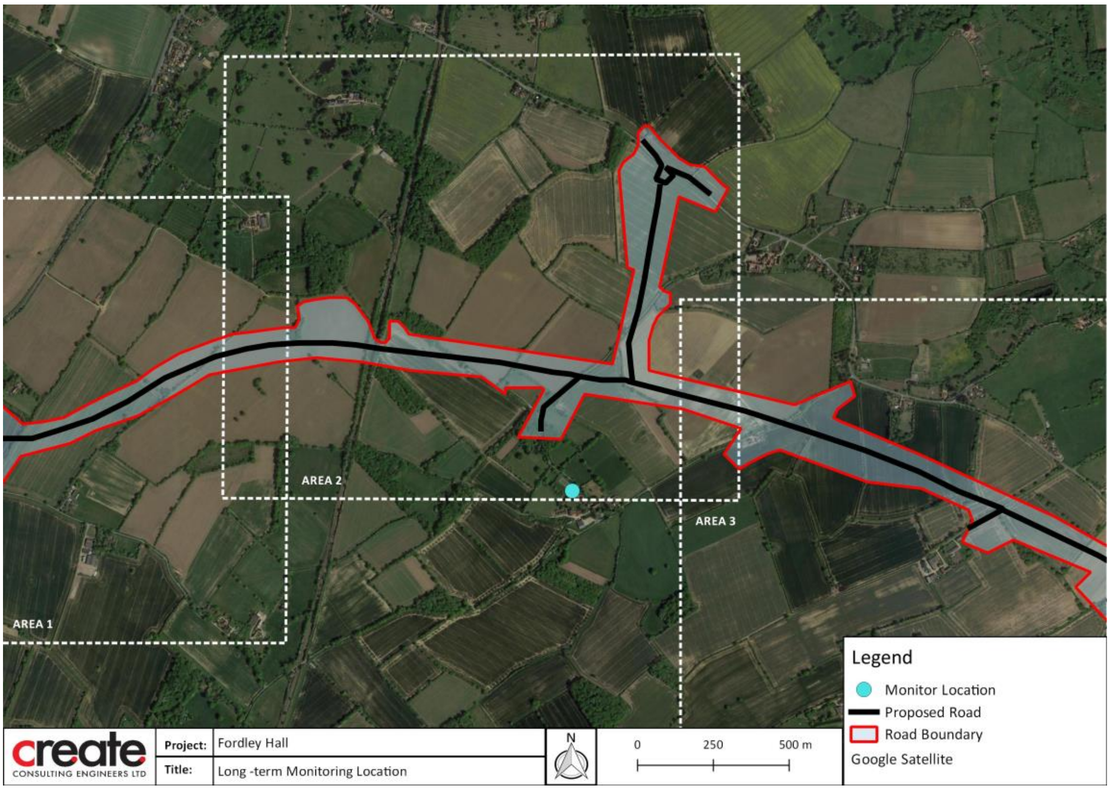

Figure 2.2: Location of Fordley Hall in Area 2

2.9 Key features of the proposed development in Area 2 include:

- A single span railway bridge, approximately 50m in length, to enable the route of the proposed Sizewell link road to cross over the East Suffolk line. At the point of the proposed crossing location, the East Suffolk line is in an approximate 6m deep existing cutting. The proposed Sizewell link road would rise up on a 2.5m embankment, and cross the railway via the bridge, to provide sufficient headroom as required by Network Rail (with 5.2m needed from rail level to soffit (underside) of bridge deck); and
- The diversion of Footpath E396/014/0 east along the proposed route of the Sizewell link road; the footpath would cross the proposed road approximately 270m east of its existing location.

3.0 ASSESSMENT METHODOLOGY AND CRITERIA

3.1 This section has outlined the assessment methodology and the significance criteria that have been used to assess the significance of risk associated with the proposed development.

Data Sources

3.2 The key data sources reviewed as part of this study have been listed in Table 3.2 below.

Data Source	Reference
British Standards Institute (BSI)	BSI (2009). BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites: Noise & Vibration
	BSI (2014). BS 8233:2014 Guidance on sound insulation and noise reduction for buildings
	BS6472-1:2008 Guide to Evaluation of Human Exposure to Vibration in Buildings
	BS7385-2:1993 Evaluation and Measurement for Vibration in Buildings
Design Manual for Roads and Bridges	LA 111 – Noise and Vibration

Table 3.1: Key Information Sources

3.3 This assessment has considered the existing ambient noise levels and the likely significant effects on existing and proposed human receptors within the site and surrounding area in terms of:

- existing baseline conditions;
- noise impacts expected during construction; and
- Vibratory impacts expected during construction.

BS5228-1 - Noise

3.4 Guidance relating to the prediction and assessment of the construction phase noise effects has been taken from BS 5228-1: 2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites' Part 1: 'Noise'[1] which provides recommendations for basic methods of noise control relating to construction and open sites where work activities/operations generate significant noise levels.

3.5 Amongst other things, the annexes to BS 5228 provide information on the following:

[1] British Standards Institute. (2009). BS 5228:-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites. Part 1: Noise. BSI, London.

- relevant legislation (Annex A);
- typical noise sources and advice on mitigating them (Annex B);
- sound level data for use in the prediction methods described in the standard (Annexes C and D);
- assessing the significance of noise effects (Annex E);
- estimating noise levels (Annex F); and
- implementing noise monitoring (Annex G).

BS5228-2 – Vibration

3.6 In a similar vain to the British Standard for noise, this refers to vibration levels and the requirement for consideration of the effect of vibration on persons living and working in the vicinity of construction sites.

3.7 It provides guidance for the protection from vibrational exposure for persons working on site, as well as neighbourhood nuisance from vibration.

3.8 This document also contains many useful annexes at the rear of the Standard, including the following areas:

- Relevant legislation – Annex A;
- Significance of Vibration Effects. This includes guidance on the human response to vibration, as well as threshold values for effects, structural damage and cosmetic damage – Annex B;
- Measured levels for piling – Annex C and D;
- Prediction of Vibration Levels – Annex E;
- Description of Piling – Annex F.

Design Manual for Roads and Bridges (DMRB LA 111)

3.9 This document sets out the requirements for assessing and reporting the effects of highways noise and vibration from construction, operation and maintenance projects.

3.10 The requirements in this document shall be applied to the assessment, reporting and management of environmental effects, specifically changes in noise and vibration emissions, from the delivery of projects.

BS6472-1:2008 Guide to Evaluation of Human Exposure to Vibration in Buildings

3.11 Structural vibration can often be detected within buildings by the occupants, potentially affecting their quality of life. This document provides guidance on predicting a human's response to vibration in buildings over the frequency range 0.5Hz to 80Hz.

3.12 BS6472 describes how to determine the vibration dose value (VDV) from frequency weighted vibration measurements.

BS7385-2:1993 Evaluation and Measurement for Vibration in Buildings

3.13 This document provides guidance on the assessment of the possibility of vibration-induced damage in buildings due to a variety of sources, including blasting, pilling, machinery and road/rail.

3.14 It provides guidance on the correct measurement of Peak Particle Velocity (PPV) whilst also providing within Table 1, the transient vibration guide values for cosmetic damage.

4.0 ACOUSTIC SURVEY PROCEDURE

4.1 To ascertain pre-existing sound levels in the immediate area, environmental noise monitoring was undertaken at the Fordley Hall residence Noise Sensitive receptors (NSR) to the proposed site between Monday 26th July and Wednesday 4th August 2021.

4.2 The microphones were secured to extendable fixtures and the meters were set to capture $L_{\mathrm{Aeq},T}$, $L_{\mathrm{AMAX},F}$ and $L_{\mathrm{feq},T}$ (from 6.3 Hz to 20 kHz) in one second logs and stored the data in 1hr file durations. The Norsonic software NorReview was used to evaluate, post process and calculate the $L_{\mathrm{A90},T}$ and $L_{\mathrm{A10},T}$ values.

4.3 The long-term monitor location was selected to measure the residual sound levels at the NSR, and the results of which have been deemed as representative. The location selected (herein referred to as MP1) has been shown in the following figure below with more details included in Appendix B:

Figure 4.1: Measurement Location

4.4 A weather station was also deployed during the monitor installation period and set to run continuously throughout. The station recorded short, intermittent periods of inclement weather which have been omitted from calculations and have not been presented in the body of the report. Full Results (including the excluded time periods) can be found in the appendix of this document.

The omitted weather included any periods of substantial rainfall and where wind speeds exceeded >5m/s.

Equipment List

4.5 The sound level meters and acoustic calibrator detailed below were Class 1 standard in accordance with the British Standards 60942 and 61672. They were all within the laboratory calibration time-frame of 2yrs during the period of measurement.

4.6 The equipment detailed below was used for all measurements referenced in this report.

Equipment	Make	Model	Serial Number
Sound Level Meters	Norsonic	Nor 140	1406933
Pre-Amp	Norsonic	Nor-1209	21140
Microphone	Norsonic	Nor-1225	285513
Acoustic Calibrator	Norsonic	Nor 1251	34128
Outdoor Microphones	Norsonic	Nor-1217	12175400
UPS power supplies	Campbell	CA-1317	-
Weather Station	ClimeMET	3000	-

Table 4.1: Equipment Used

4.7 The equipment was calibrated with the same acoustic calibrator to the manufacturer’s recommended levels at the beginning and end of the measurement periods and no significant drift in calibration was noted as detailed in the appendices of this report.

4.8 Calibration certificates have not been included but are available upon request.

5.0 NOISE MONITORING RESULTS

5.1 Whilst conducting the environmental noise survey professional judgement was used to identify the principle sources of noise across the entire site, these have been assessed to be:

- Traffic noises from vehicles travelling along the surrounding road network;
- Agricultural vehicles and operations in the area; &
- Occasional sounds such as wildlife and wind in the trees.

5.2 The following table and charts overleaf show the overall $L_{Aeq,T}$, $L_{A10,}$ $L_{A90,T}$ and highest recorded L_{AfMax} sound levels at the monitoring location (N.B. sound levels are exclusive of periods of inclement weather):

Fordley Hall Measurement Results						
Date	Period	Duration (hh:mm:ss)	dB $L_{Aeq,T}$	dB $L_{A10,T}$	dB $L_{A90,T}$	dB $L_{AFmax,T}$
26/07/2021	Day	08:00:00	36.6	39.0	21.7	60.6
	Night	08:00:00	34.4	35.9	17.2	69.6
27/07/2021	Day	14:50:00	39.0	40.8	26.9	71.5
	Night	07:00:00	33.5	35.3	18.0	63.1
28/07/2021	Day	11:00:00	42.8	44.7	31.9	77.2
	Night	08:00:00	37.1	38.5	25.7	65.7
29/07/2021	Day	15:30:00	41.7	44.4	25.9	78.6
	Night	05:30:00	31.6	28.5	17.4	56.3
30/07/2021	Day	10:20:00	46.8	50.6	34.9	67.9
	Night	07:30:00	37.6	39.6	30.5	66.1
31/07/2021	Day	14:30:00	38.1	40.3	27.1	67.3
	Night	08:00:00	32.5	34.6	19.2	64.4
01/08/2021	Day	06:00:00	34.1	36.4	21.8	65.5
	Night	08:00:00	32.9	35.5	17.3	64.7
02/08/2021	Day	09:25:00	35.9	38.8	22.6	66.4
	Night	08:00:00	34.1	35.2	18.7	61.2
03/08/2021	Day	16:00:00	39.2	41.8	27.4	68.0
	Night	08:00:00	31.9	35.7	19.3	60.2
04/08/2021	Day	03:00:00	38.5	41.1	31.8	68.2

Table 5.1: Noise Monitor Results

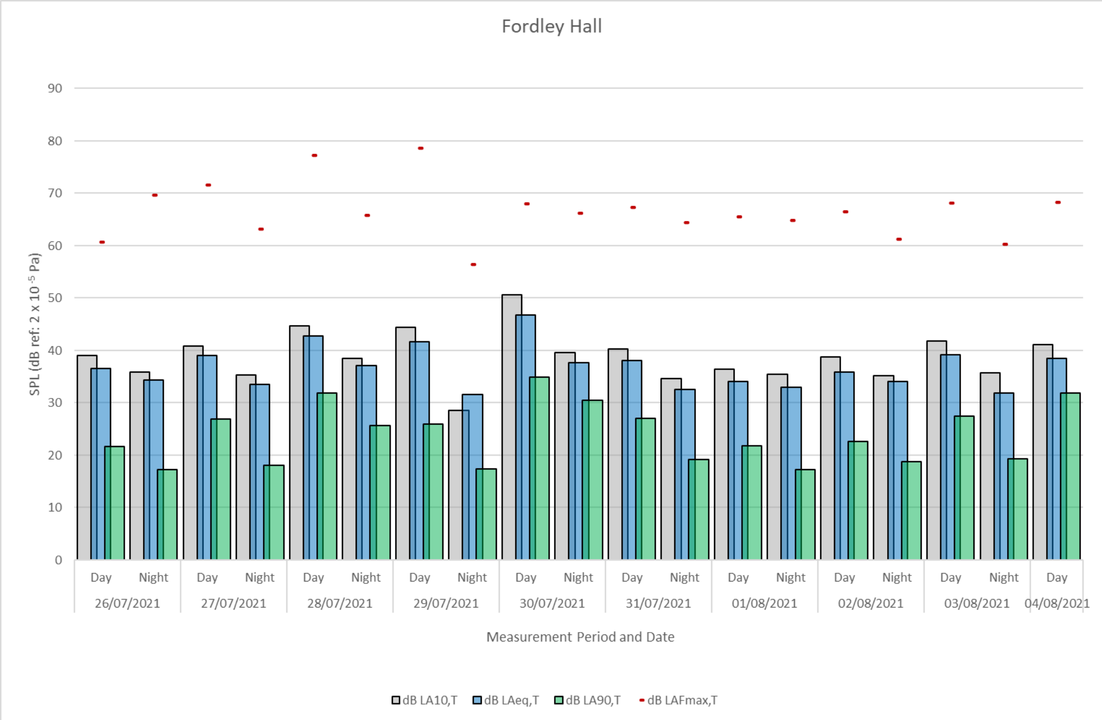

Chart 5.1: Noise Monitor Results

5.3 As can be seen in the table and chart above, the ambient levels remained very low, which is expected for this largely rural location. The most commonly occurring daytime ambient sound level at this location was ≈ 38-39 dB $L_{Aeq,1hr}$ and the daytime background sound level ranged between 22 and 35 dB $L_{A90,Day\ Time}$. The night time background sound levels were far lower, between 17 and 27 dB $L_{A90,Night(8\ hours)}$, but with a most commonly occurring background sound level of 17 dB $L_{A90,1hr}$.

Comparison with EDF ES Levels

5.4 The most representative monitor location in the EDF ES for the Fordley Hall residence NSR would be SLR 3, which was stated to be a typical measured daytime level of 45-47 dB $L_{Aeq,T}$. (Table 4.13, Book 6, Volume 6, Chapter 4). A detailed analysis of the measured sound levels was included within Book 6, ES Volume 2, Chapter 11, the Noise and Vibration Baseline Report.

5.5 Within the submitted document, the baseline sound levels were in 6-8 dB excess to those from the Create baseline sound monitoring for the daytime, and the background sound levels were significantly higher.

5.6 Presumably the considerable difference was due to the reliance on two individual thirty minute measurements during the day and a single one hundred and twenty minute measurement at night time.

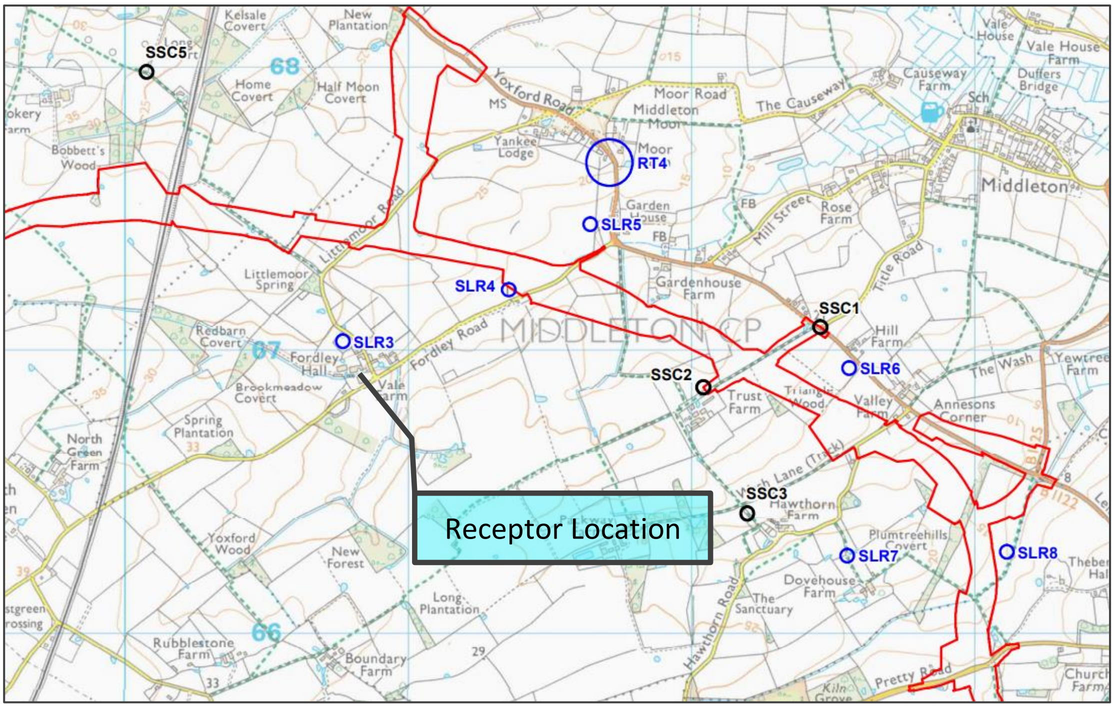

Figure 5.1: Measurement Location *Excerpt from Book 6, Volume 6, Chapter 4, Figure 4.2*

6.0 CONSTRUCTION NOISE - SLR

Construction Activities - Overview

6.1 The EDF ES provides provisional information pertaining to the 'construction sequence', which details the anticipated construction activities throughout the development, as well as some preliminary phasing and a broad stroke construction noise assessment (as discussed later within this Chapter).

Working Hours, Project Duration and Approach

6.2 Construction work would take place during Monday to Saturday 07:00 to 19:00 hours, with no working on Sundays or bank holidays. However, some activities may require 24-hour working and these would be notified to East Suffolk Council (ESC) in advance.

6.3 As the NSR location falls within the East Suffolk district, the working hours would be required to be agreed by the local authority. In accordance with East Suffolk Council, the standard working hours for construction projects is between 07:30 – 18:00 Monday to Friday and 08:00 to 13:00 on Saturdays and no working on Sundays or Bank Holidays. Whilst this time difference is minor, it is unclear whether this has been reconciled with the local authority.

EDF Construction Noise Calculations

6.4 The EDF ES has been divided into two phases comprising preparatory works and main phase construction work. Each phase would contain the following activities:

- Preparatory works: site set up and clearance, including trees and hedgerows, the erection of temporary fencing on land required for construction and the creation of alternative access arrangements and rights of way, setting up of the temporary contractor compounds including security, welfare facilities, and temporary utilities; and
- Construction Works: earthworks, road construction and surfacing, construction of bridges and civil structures (including piling), utility and drainage installation, construction of pavements, kerbs, footways and paved areas, installation of permanent fencing, road signs and marking, and road lighting, permanent connections to existing road networks, and landscaping.

6.5 Over the specified 24-month duration, it has been stated that the Fordley Hall residence receptor would experience each stage.

6.6 The following tables show a repeated example of the calculation methodology used. It has been assumed the sound power (L_{WA}) levels have been taken from the empirical evidence in BS5228-1:2009, which is a common practice and suitable for this application.

6.7 The EDF ES also recognises and states that predictions pertaining to construction related activities are broad:

"The construction arrangements described in this section provide the basis for the assessment presented in this volume. Details of construction are necessarily broad and may be subject to modification during the detailed design stage and / or once a contractor has been appointed. The construction proposals are therefore indicative only but are sufficient to enable robust assessment of a realistic 'worst case' assessment of likely significant effects." – Section 2.4.2

6.8 As the construction noise assessment at this stage was stated to be necessarily broad, the calculations used in the EDF ES have considered the highest-level contributor for each stage only. Whereas this would be considered appropriate for an indicative assessment at the outline stages, it would not be considered a robust assessment, which should assess for the cumulative impact from all processes. An example has been shown in the following tables.

6.9 The table below is an excerpt from the EDF ES, which shows an example calculation method for the 'Preparatory Works' phase, which most closely correlates with the 'Site set up and Clearance' section in Table 1.1 - Volume 6 Sizewell Link Road Chapter 4 Noise and Vibration Appendices 4A - 4B. The following nomenclature applies:

r = Radial distance
A_r = Attenuation over distance
A_g = Ground attenuation
A_{met} = Meteorological attenuation
A_a = Air attenuation
A_b = Barrier attenuation

Receptor 3 Fordley Hall	Vegetation Clearance	TCC B1122	TCC B1122
Operations	Saw/chip	Centre	Edge
Source Value: $L_{Aeq,T}$ @ 40m (dB)	70/74	74	70
r, typical, m	300m	900m	800m
A_r	18	27	26
$A_g + A_a + A_{met}$ or $A_b + A_a + A_{met}$	3	7	6
$L_{Aeq,T}$ (dB)	49/53	40	38

Table 6.1: Equipment List

Receptor 3 Table 1.4 - Volume 6 Sizewell Link Road Chapter 4 Noise and Vibration Appendices 4A - 4B

6.10 The following table shows the calculations repeated (where L_{WA} has been converted into L_{PA} at 10mtrs), inclusive of all equipment items in the works phase at the 300m radial distance.

Activity	Level	% on Time	On Time Correction (dB)	Distance to Receiver (m)	Distance Correction (dB)	SPL at Receiver (dB)
Lorry loader crane HIAB	76	25	6	300	30	40
Diesel / petrol generators	69	100	0	300	30	39
360 Wheeled / tracked excavators	79	70	1.5	300	30	48
180 Backhoe loaders	79	50	3	300	30	46
Dump Trucks	78	70	1.5	300	30	47
Telehandlers	79	50	3	300	30	46
Chainsaws and brush-cutters	87	17	9	300	30	48
Wood chippers	93	17	9	300	30	54
Road sweeper / gully sucker	79	50	3	300	30	46
Vibratory tamping rollers	83	50	3	300	30	50
			- (Ag + Aa + Amet or Ab + Aa + Amet)			3
			Resultant SPL (dB) at Receiver:			56

Table 6.2: Repeated Calculations

6.11 Whilst agreed as an appropriate indicative approach, the predicted increase of 7 dB over the EDF ES levels emphasizes the inherent uncertainty associated with relying on these provisional calculations alone, as there remains the possibility that these operations can occur simultaneously or 'overlap' with one another. The impact of a construction project should be assessed over a complete hour or daytime period, hence the reliance on the percentage on time function. This highlights the necessity for further, site specific assessments once method statements have been submitted, and inclusion of the findings into the CMP.

6.12 We have calculated the construction activities for the individual elements as defined in the Construction Assumptions within Book 6, Volume 6, Chapter 4, Appendix 4B, which have been included within Table 6.3 below. As stated in the ES, it has been expected that Fordley Hall residence would experience all phases throughout construction, the minimum distance of 300mtrs has been used to assess the impact from each phase at this distance. This has been compared to the representative daytime ambient level as defined in Section 5.3 of this report:

Works Phase	Activity	SPL at NSR	Cumulative SPL at NSR for Phase	Averaged Daytime SPL at NSR
Preparatory	Site set up and Clearance	56	56	39 dB $L_{Aeq,T}$
Construction	Earthworks	54	63	
	Drainage	52		
	Pavements	57		
	Kerbs, Footways and Paved Areas	55		
	Bridges and Civil Structures	56		
	Road Restraints	49		
	Fencing	49		
	Traffic Signs	48		
	Road Lighting	46		

Table 6.3: Construction Noise Calculations

6.13 As can be seen in the table above, all activities are predicted to be in excess of the residual ambient level at this location. The cumulative effect of Construction Phase would be 24 dB above the residual ambient level. As mentioned previously, there would be the potential for construction activities to run concurrently with one another, so there would be the potential for source summing at the NSR. For example, the level sum of 'Pavements' and 'Kerbs, Footways and Paved Areas' would result in a ≈ 59 dB level at the NSR.

6.14 In Table 4.9 of Book 6, Volume 6, Chapter 4, the EDF ES also goes on to define the usage of LOAEL and SOAEL values in the assessment. The descriptions and associated actions were reported to have been discussed with local authorities between 2015 and 2019. The NPSE, NPS and PPG require the assessment of noise (and vibration) against the Lowest Observed Adverse Effect Level (LOAEL) and the Significant Observed Adverse Effect Level (SOAEL).

6.15 Definition of each is dependent on certain variables including residual levels, duration, frequency of occurrence and general context. In instances such as this, there is guidance for determining these effects, for which the EDF ES has correctly identified the Design Manual for Roads and Bridges LA 111 Noise and Vibration Document (May 2020), in which the document defines the LOAEL as the baseline dB $L_{Aeq,T}$ levels, and the SOAEL is determined from the values in Table E.1 of BS5228-1 (Table 3.12 LA 111), which pertains to the ABC method category thresholds, for which this NSR, would be defined as Category A (65 dB $L_{Aeq,T}$).

6.16 In section Book 6, Volume 6, 4.3.36 of the EDF ES however, the values within Table E.2 of BS5228-1 have been used to define the LOAEL/SOAEL, which if assessed against the 08:00 – 18:00 relevant time period, would be 75 dB (10 dB greater than the Category A threshold). The reason for this is explained within section Book 6, Volume 6, 4.3.31-32:

"The NPSE, the NPSs and the PPG require the assessment of noise and vibration against the lowest observed adverse effect levels (LOAEL) and the significant observed adverse effect levels (SOAEL). These will differ on variables such as the level and character of the noise or vibration source, timings of when it would occur, its duration, existing sounds present and the frequency of the occurrence of the source.

Each different source type requires its own specific value for LOAEL and SOAEL, which depends on these factors. The methodology for assigning significance differs from the general methodology set out in Volume 1 Chapter 6 of the ES, as it does not allow for these variables to be properly considered. Each source has therefore been considered separately and values for LOAEL and SOAEL defined for different sensitivities."

6.17 The NPSE was published in March 2010 and the ProPG: Planning and Noise was issued in May of 2017. The ProPG document relates to new residential development and is therefore not considered relevant in this application. Although we agree that this approach is suitable in some applications, we believe that the most recent DMRB methodology should be used. Therefore, the LOAEL should be defined by the existing ambient sound level and the SOAEL should be defined by the Category A Threshold within BS5228-1. The previously described Negligible Impact would therefore require reclassification.

6.18 The following table is an excerpt from Table 4.16 of the ES: *Summary of predicted construction noise effects at the nearest noise sensitive receptor locations around the site at different periods* in which the significance of effects has been determined:

Receptor		Mon-Fri 07:00 to 19:00 Hours and Sat 07:00 to 13:00 Hours		Saturday 13:00 to 19:00 Hours	
		Preparatory Works	Main Construction Phase	Preparatory Works	Main Construction Phase
3	Fordley Hall	Minor Adverse, **not significant**	Minor Adverse, **not significant**	Minor Adverse, **not significant**	Moderate adverse, **significant**

Table 6.4: EDF ES Significance of Effects

6.19 Following review of the ES construction assessment, we disagree with the 'not significant' classification. We believe this distinction to be primarily due to the lack of monitoring data for the Fordley Hall location, for which Create have attended site and collected a more substantial and relevant data set. It is our opinion that this impact would be classed as significant irrespective of the classification and warrants mitigation.

In Summary

6.20 The results and predictions presented in the EDF ES would be considered suitable for the ES stage in the development. The 7 dB discrepancy in the resultant sound levels has given indication of a significant impact. Given the basis of assessment has been professional judgement alone as opposed to project and site-specific method statements, we strongly urge that more detailed and exhaustive construction noise and vibration assessments should be undertaken once works processes have been finalised. This would inform the assessment of secondary mitigation measures.

6.21 Whereas the calculable level of 49/53 dB (67 dB by Create's cumulative assessment) would be defined as exceedance of the SOAEL (in accordance with LA 111), it is also a considerable increase above the existing measured daytime ambient sound level of 39 dB at the Fordley Hall residence.

6.22 This level, subsequently the magnitude of change, is representative of the level at 1mtr from the residence's façade and does not consider the level in any external amenity spaces within the property boundary. The external amenity spaces therefore be exposed to greater sound levels than at the residence.

6.23 The noisiest activity, paving, would result in sound levels in the region of 61 dB $L_{Aeq,1h}$ at a distance of 200m from the road. These sound levels would typically increase the closer to the road, should the residents choose to use their entire grounds.

6.24 A level of annoyance for external amenity spaces is stated in WHO community noise guidelines and has been reflected in the BS8233:2014 guidance for external amenity spaces. Typical design targets for new dwellings are 50 dB $L_{Aeq,T}$, but do not apply to sounds with definable characteristics (this is commonly exclusive of most sources except for traffic noise). As the residence is pre-existing, it would not be regarded as appropriate to assess any resultant impact against these targets, but should prove to be a useful indicator for any potential loss of amenity. It must be noted that the measured sound level show that the external amenity spaces currently fall within these levels.

7.0 TRAFFIC AND TRANSPORT

7.1 A total of 14 measurement locations have been identified in the noise and vibration chapter (6.7 Volume 6 Chapter 4) of the ES. The survey locations used in the assessment of the new road have been identified as positions RT2, RT3, RT4, RT6, RT15, SLR1, SLR2, SLR3, SLR4, SLR5, SLR6, SLR7, SLR8 and SLR9.

7.2 The EDF ES states that the 'study area' includes all noise and vibration sensitive receptors within 300 metres of the new road for construction works and within 600 metres of the new road or other affected roads for operational noise levels, in accordance with recommendations in DMRB, LA111. As the Theberton House estate lies within both of these distances, assessment was warranted.

7.3 The assessment of road traffic noise in the EDF ES have been undertaken for two distinct scenarios:

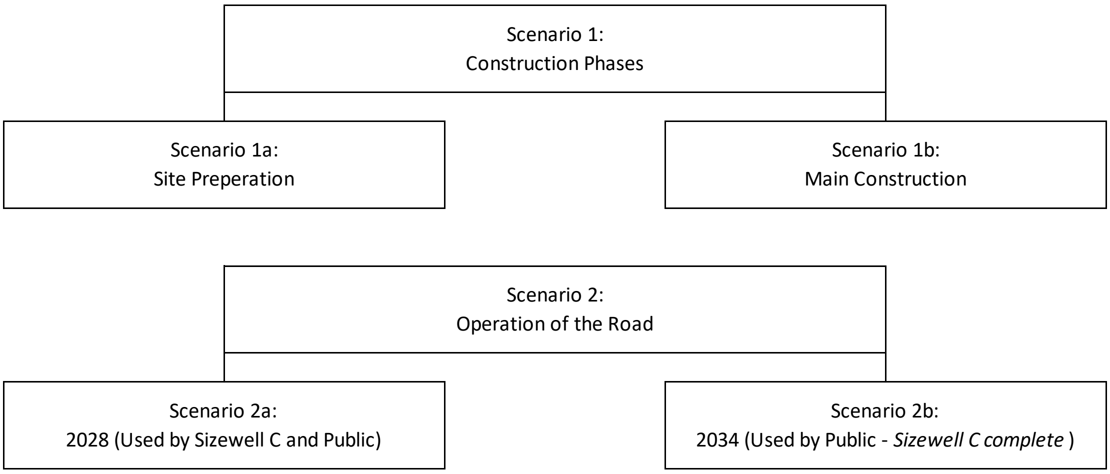

Figure 7.1: Traffic and Transport Assessment Scenarios

7.4 The noise and vibration chapter (6.7 Volume 6 Chapter 4) stated that in order to assess noise from the future link road a computer model was constructed, which used traffic flow count predictions for the following scenarios:

- 2023 early years;
- 2028 peak construction 'typical day';
- 2028 peak construction 'busiest day'; and
- 2034 operational traffic.

7.5 Each scenario has been compared against the equivalent period with traffic flow predictions adjusted for natural growth, as though the development did not go ahead.

7.6 It was unclear from the reports how (or if) the survey measurements were used to validate the propagation characteristics of the computer model. This is not strictly a requirement but is considered to be good practice to calibrate the noise model. It was stated in paragraph 4.4.6 of the noise and vibration chapter (6.7 Volume 6 Chapter 4) that:

"The baseline noise levels used for the assessment of road traffic noise are those predicted by modelling. Measured levels do not always match modelled values as measurements were generally made close to receptors in publicly accessible locations rather than at the receptor itself, and measurements are highly dependent on prevailing conditions during the survey whereas modelled values are based on annually averaged traffic data."

7.7 Although we do not disagree with this statement, this is precisely why a survey may involve measurements over several days, weeks, or even a full year to allow for short term variations in noise climate to be accounted for.

7.8 In some cases, the Sharps Redmore report site measurements were found to be in excess of 10 dB above their predicted levels, once the 2 dB reduction was accounted for when converting between $L_{10,18\text{-hour}}$ and $L_{Aeq,\ 16\text{-hour}}$ in accordance with BS8233:2014 and the TRL document for converting the UK road traffic noise index $L_{A10,18h}$ to the EU noise indices for road mapping. Through review of the survey notes it would appear that this anomaly was mainly due to local wildlife dominating the noise environment. Considering that only 30 minute measurements were used, it is confusing why this location was used, if there was continuous additional noise witnessed.

7.9 The acoustic climate at this location was reported to consist of birdsong, road traffic noise, occasional aircraft and at times a diesel water pump in a nearby field. The water pump emitted a low level, continuous sound which contributed to the background sound level. The afternoon survey was undertaken over two days and the pump remained operable. There was no details of the weather at the time of the monitoring, although the statement about the diesel pump being less detectable with a different wind direction does add further uncertainty.

7.10 We have reviewed some of the hourly traffic flow data contained in the appendix (6.7 Volume 6 Chapter 4 Appendix 4A - 4B) with the hourly counts contained in the transport assessment (6.3 Volume 2 Chapter 10) and found that the data correlated well (within 2%). The reason for any discrepancies was not clear and not discussed in the report, but in practice small changes in traffic flows will not significantly alter the outcome of their report.

7.11 We have attended the site and carried out our own measurements as shown in the appendices. Our long-term measurements were within 5 dB from the results of the Sharps Redmore computer model, and we therefore would expect their proposed methodology to be suitable given the information available.

In Summary

7.12 We believe the results of the Sharps Redmore predictions are likely to be reliable, given the information currently available.

7.13 The Sharps Redmore report stated that this site will be subject to the following changes in noise levels:

Period	Daytime $L_{A10,\ 18\text{-hour}}$	Night-time L_{night}
Baseline 2028	46.4 dB	37.2 dB
Typical day 2028	50.3 dB	43.7 dB
Difference (Effect)	3.9 dB (Moderate adverse)	6.5 dB (Major adverse)
Peak day 2028	50.8 dB	43.8 dB
Difference (Effect)	4.4 dB (Moderate adverse)	6.6 dB (Major adverse)
Baseline 2034	46.6 dB	37.3 dB
Typical day 2034	47.5 dB	39.5 dB
Difference (Effect)	1.1 dB (Negligible)	2.3 dB (Negligible)

Table 7.1: Assessment of impacts

7.14 It can be seen that the short-term impact for the site is considered major while the long-term impact is negligible.

7.15 When compared to the existing measured daytime ambient sound level of 42 dB $L_{A10,18h}$ the effect is more noticeable, which would result in a difference of 5.5 dB which would be considered Major Adverse in the short term and Moderate Adverse in the long term. In line with Table 3.58 of the DMRB LA111, this is considered significant.

7.16 The WHO Guidelines for Community Noise indicates that moderate annoyance can occur when outdoor amenity spaces exceed 50 dB(A). Again, assuming the 2 dB reduction to convert $L_{A10,\ 18\text{-hour}}$ to $L_{Aeq,\ 16\text{-hour}}$ it can be seen that the external levels are likely to exceed this during the day. We would recommend that further mitigation measures are designed to reduce noise levels in amenity areas to below this level.

8.0 CONCLUSIONS

8.1 Create Consulting Engineers have undertaken a review of the Environmental Noise statement associated with the Sizewell Link Road (SLR) for the Sizewell C development plans.

8.2 The results from a noise survey carried out by Create have been used in support of this assessment, to compare against those presented within the EDF ES. The ES stated levels were found to be ≈ 8 dB greater than those measured by Create and would be regarded as comparable in terms of location.

8.3 Although indicative, the construction noise calculations provided by EDF should not be considered as robust or exhaustive, as they are suitable for outline scoping only. Primary measures of mitigation have been determined to be necessary within the ES, however further assessment would be warranted to determine whether secondary mitigation would be required.

8.4 The transport noise assessment within the ES was found to be within acceptable tolerances, and the stated significance/magnitude of effects within the ES apply. When comparing these levels to the measured sound levels however, the significance was found to increase from Not Significant to Significant.

8.5 The ES does not consider loss of external amenity, for which it has been assumed would be potentially significant, depending on the context as the extent of the amenity spaces . This should be considered when defining suitable measures of mitigation.

8.6 We are seeking a full and conclusive construction noise and vibration assessment be completed once the method statements have been finalised and suitable noise mitigation be implemented to reduce the impact of the construction noise.

8.7 The use of earth bunds are limited at best and would be required to be positioned either close to the receptor or to the noise source to maximise their efficacy. Additional near field screening would be required around some of the noisier items of plant.

8.8 The use of Best Practicable Means (BPM) must be adhered to, which should include the use of mufflers or silencers, nearfield screening, considerate placement of noisy plant, starting ignitions in a synchronised manner and not leaving engines running when not in use. These are examples only and by no means are an exhaustive list.

9.0 DISCLAIMER

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APPENDICES

APPENDIX A

Glossary of Acoustic Terminology

dB(A)

The human ear is less sensitive to low (below 125Hz) and high (above 16kHz) frequency sounds. A sound level meter can be used to duplicate the ear's variable sensitivity to sound across a spectrum of frequencies. This is achieved by building a filter into the instrument with a similar frequency response to that of the average ear. This is called an "A-weighting filter". Measurements of sound made with this filter are called A-weighted sound level measurements and the unit is dB(A).

$L_{eq,T}$

The sound from noise sources often fluctuates widely during a given period of time. An average value can be measured, the equivalent sound pressure level L_{eq}. The L_{eq} is the equivalent sound level which would deliver the same sound energy as the actual fluctuating sound measured in the same time period (T).

$L_{10,T}$

This is the minimum level exceeded for not more than 10% of the time period (T). This parameter is often used as a "not to exceed" criterion for noise.

$L_{90,T}$

This is the minimum level exceeded for not more than 90% of the time period (T). This parameter is often used as a descriptor of "background noise" for environmental impact studies.

L_{fmax}

This is the maximum sound pressure level that has been measured over a period using a fast time constant.

Octave Bands

In order to completely determine the composition of a sound it is necessary to determine the sound level at each frequency individually. Usually, values are stated in octave bands. The audible frequency region is divided into 10 such octave bands whose centre frequencies are defined in accordance with international standards.

Addition of noise from several sources

Noise from different sound sources combine, on a logarithmic scale, to produce a sound level higher than that from any individual source. Two equally intense sound sources operating together produce a sound level which is 3dB higher than one alone and 3 identical sources produce a 5dB higher sound level.

Attenuation by distance

Sound which propagates from a point source in free air attenuates by 6dB for each doubling of distance from the noise source. Sound energy from line sources (e.g. stream of cars) drops off by 3dB for each doubling of distance.

Sound Exposure Level (SEL)

This is the level at the reception point which, if maintained constant for a period of 1 second, would cause the same A weighted sound energy to be received as is actually received from a given noise event. The SEL is used to categorise and quantify the noise generated by individual railway vehicles and individual trains. As such, it serves as a "building block" to determine the L_{Aeq} for the total flow of trains over a given time period.

Subjective impression of noise

Sound intensity is not perceived directly at the ear; rather it is transferred by the complex hearing mechanism to the brain where acoustic sensations can be interpreted as loudness. This makes hearing perception highly individualised. Sensitivity to noise also depends on frequency content, time of occurrence, duration of sound and psychological factors such as emotion and expectations. The following table is a reasonable guide to help explain increases or decreases in sound levels for many acoustic scenarios.

Change in sound level (dB)	Change in perceived loudness
1	Imperceptible
3	Just barely perceptible
6	Clearly noticeable
10	About twice as loud
20	About 4 times as loud

Barriers

Outdoor barriers can be used to reduce environmental noises, such as traffic noise. The effectiveness of barriers is dependent on factors such as its distance from the noise source and the receiver, its height and its construction.

Reverberation control

When sound falls on the surfaces of a room, part of its energy is absorbed and part is reflected back into the room. The amount of reflected sound defines the reverberation of a room, a characteristic that is critical for spaces of different uses as it can affect the quality of audio signals such as speech or music. Excess reverberation in a room can be controlled by the effective use of sound-absorbing treatment on the surfaces, such as fibrous ceiling boards, curtains and carpets.

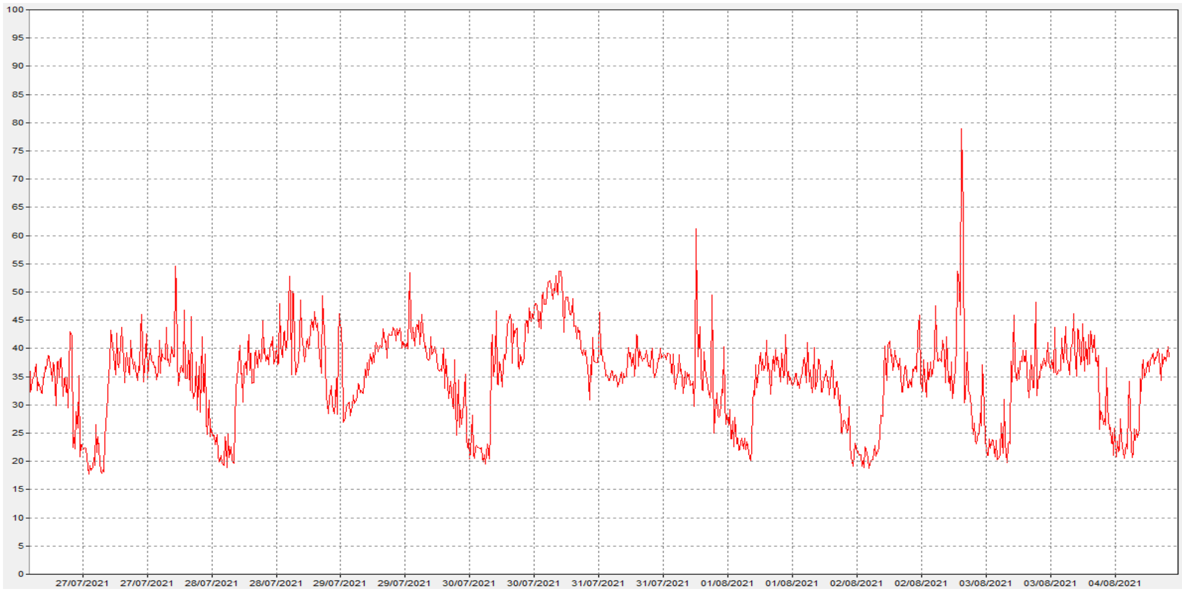
APPENDIX B
Survey Results

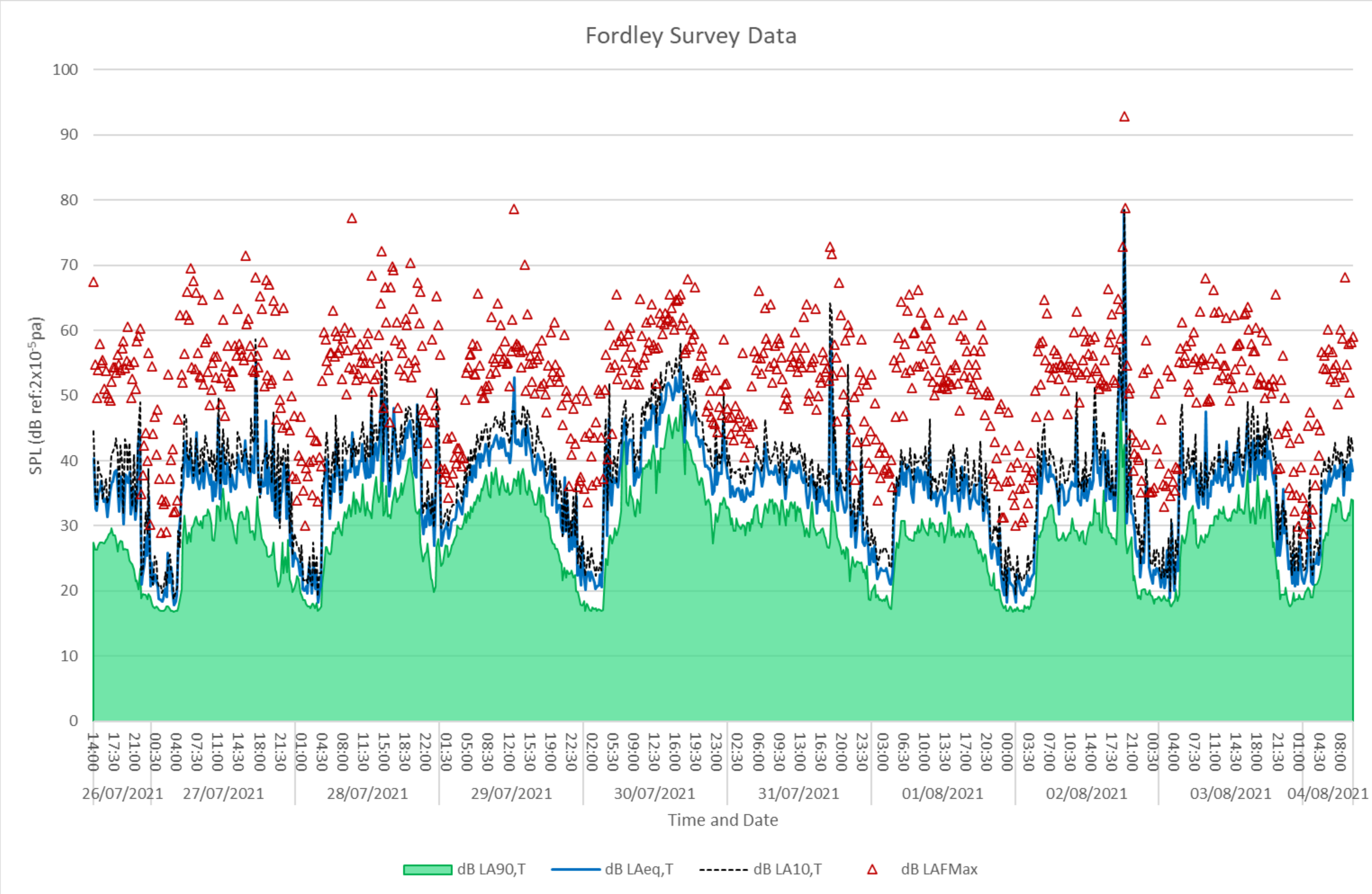
Project title	Fordley Hall				
Project number	P21-2329				
Date & Time of Deployment	26/07/21 - 14:00		**Duration**	8d 20h 5m 11s	
Sound level meter and calibrator model	Nor 140 with Environmental Kit & C1251 Calibrator				
Calibration ref. level	113.8 dB	**Before**	113.8 dB	**After**	113.9 dB
Person in charge of measurements	Sam Ward				
Other people present	n/a				
Weather station make and model	ClimeMet CM3000				

Site description:

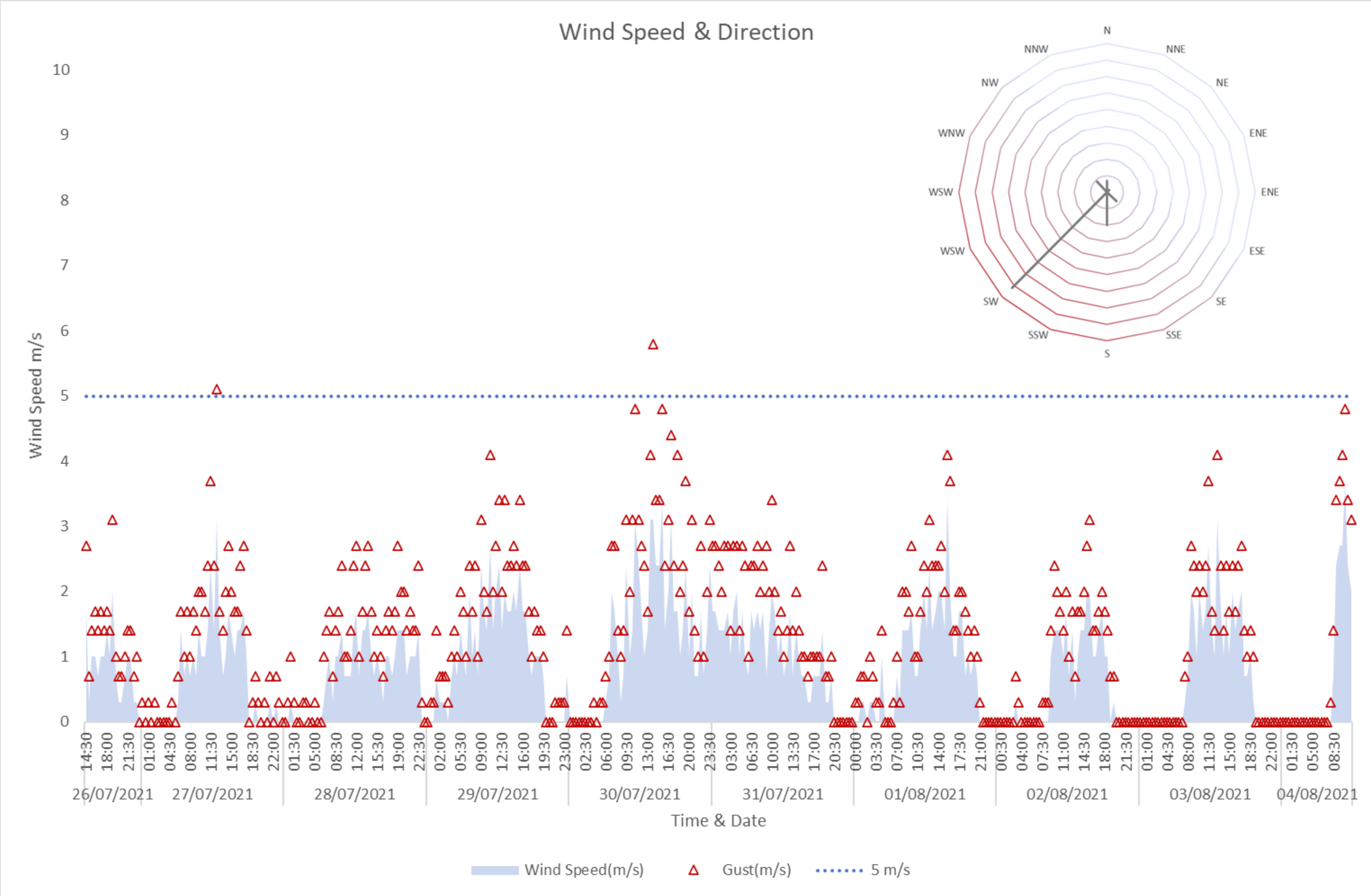
Site located alongside littlemoor road, closer to other houses. No traffic was observed along Littlemoor Road during equipment set up and visit to download current data. Closest major road situated approximatly 1km to the east of the site. Dominant noise sources were foliage and wildlife, road was inaudible at this location.

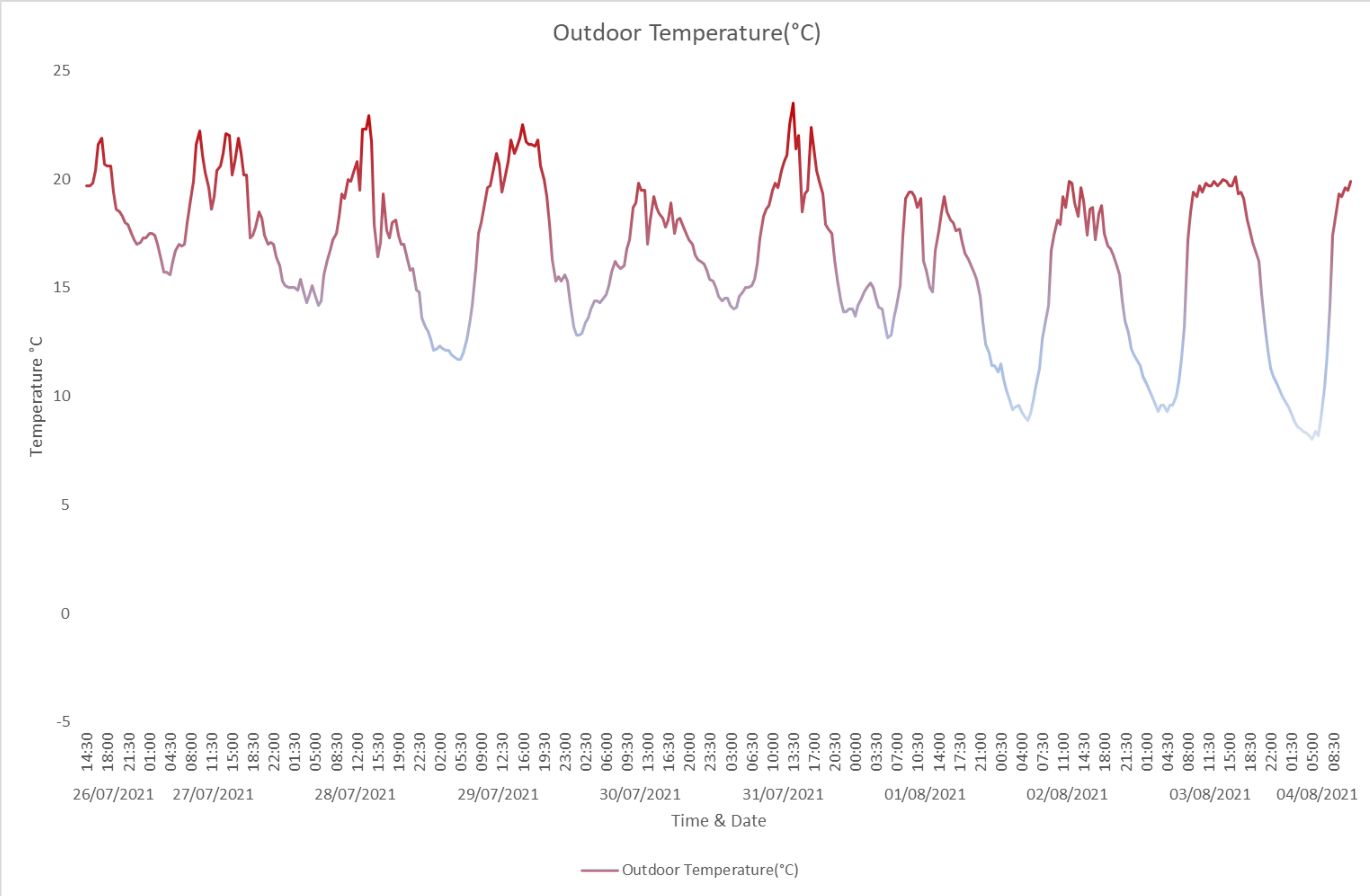
Measurement location(s)	**Ref No:**		**Photo(s)**



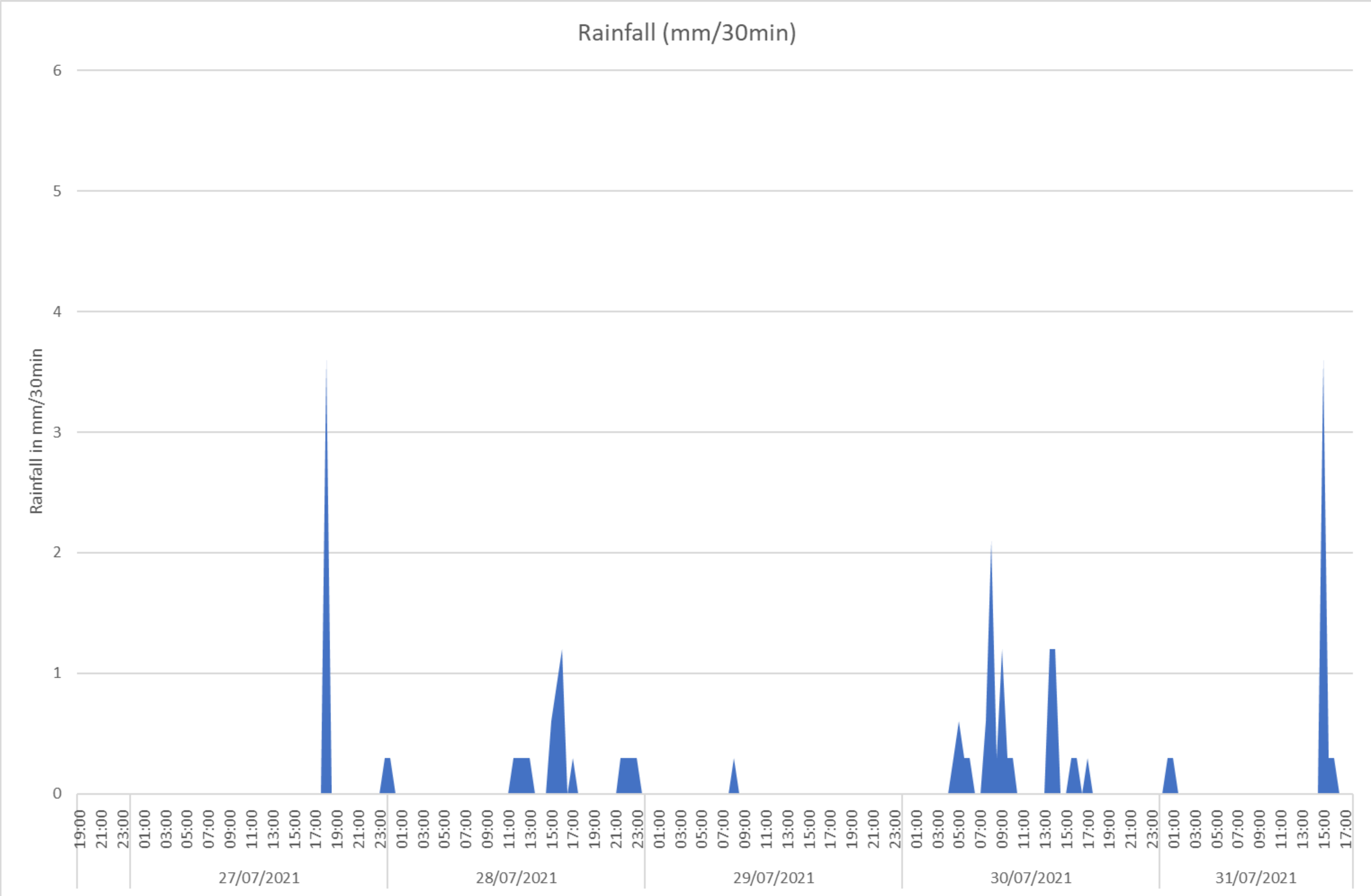

Fordley Survey Data
SPL (dB ref:2x10-5pa)
Time and Date
26/07/2021
27/07/2021
28/07/2021
29/07/2021
30/07/2021
31/07/2021
01/08/2021
02/08/2021
03/08/2021
04/08/2021
dB LA90,T
dB LAeq,T
dB LA10,T
dB LAFMax

APPENDIX C
Weather Data


Wind Speed & Direction
Wind Speed m/s
10
9
8
7
6
5
4
3
2
1
0
N
NNE
NE
ENE
ENE
ESE
SE
SSE
S
SSW
SW
WSW
WSW
WNW
NW
NNW
26/07/2021
27/07/2021
28/07/2021
29/07/2021
30/07/2021
31/07/2021
01/08/2021
02/08/2021
03/08/2021
04/08/2021
Time & Date
Wind Speed(m/s)
Gust(m/s)
5 m/s



Outdoor Temperature(°C)
25
20
15
10
5
0
-5
Temperature °C
14:30
18:00
21:30
01:00
04:30
08:00
11:30
15:00
18:30
22:00
01:30
05:00
08:30
12:00
15:30
19:00
22:30
02:00
05:30
09:00
12:30
16:00
19:30
23:00
02:30
06:00
09:30
13:00
16:30
20:00
23:30
03:00
06:30
10:00
13:30
17:00
20:30
00:00
03:30
07:00
10:30
14:00
17:30
21:00
00:30
04:00
07:30
11:00
14:30
18:00
21:30
01:00
04:30
08:00
11:30
15:00
18:30
22:00
01:30
05:00
08:30
26/07/2021
27/07/2021
28/07/2021
29/07/2021
30/07/2021
31/07/2021
01/08/2021
02/08/2021
03/08/2021
04/08/2021
Time & Date
Outdoor Temperature(°C)



Rainfall (mm/30min)
Rainfall in mm/30min
6
5
4
3
2
1
0
19:00
21:00
23:00
01:00
03:00
05:00
07:00
09:00
11:00
13:00
15:00
17:00
27/07/2021
28/07/2021
29/07/2021
30/07/2021
31/07/2021