Feasibility assessment and additional information regarding previous studies taken at the farm regarding light, noise and traffic

External Events

Identify theme

Ensure licence and conditions are adequate if using copyrighted material (music film and or plays) check if PRS or PPL are required

Work with an acoustic consultant and Environmental Health team

Submit Event management plan to all relevant parties

Licensing

Health and Safety / Environmental Health

Police

Fire

Secure artists

Diarise the venue

Create timetable

Press release

Launch tickets

Organise catering

Design event material

Share on social media

Attached

Lighting scheme light pollution

Noise impact inspection

The two studies were carried out for rebuilding of the factory purposes with regard to the site at Willow Farm, I have included them as an addition to show the findings.

DATE: **18 June 2021**

DESIGNER: **SHD Lighting Consultancy Ltd**

PROJECT No: **SHD246**

PROJECT NAME: **Willow Farm**

SHD
OUTDOOR LIGHTING CONSULTANCY

Light Levels in accordance with : BS 12464-2: 2014 & BS 5489-1:2020

HGV Loading Areas: BS 12464-2: 2014 (Table 5.7)
Minimum maintained average illuminance (Eav): >20.00 lux
Emin/Eav (Lighting Uniformity): >0.25 (25%)

Storage Areas: BS 12464-2:2014 (Table 5.1)
Minimum maintained average illuminance (Eav): >10.00 lux
Emin/Eav (Lighting Uniformity): >0.40 (40%)

Car Park: BS 12464-2:2014 (Table 5.9)
Minimum maintained average illuminance (Eav): >5.00 lux
Emin/Eav (Lighting Uniformity): >0.25 (25%)

Outdoor Lighting Report

PREPARED BY: SHD Lighting Consultancy Ltd
Contact: info@shdlighting.co.uk
Phone: 07834 490 192
Website: www.shdlighting.co.uk

Layout Report

General Data

Dimensions in Metres Angles in Degrees

Calculation Grids

ID	Grid Name	X	Y	X' Length	Y' Length	X' Spacing	Y' Spacing
1	Isolux Light Spill	3866.82	-36.58	372.54	319.20	1.50	1.50
2	HGV Access	3882.62	136.59	45.00	60.00	1.50	1.50
3	Car Park	3920.09	110.01	120.00	51.00	1.50	1.50
4	HGV Loading Area	3979.87	106.40	102.00	80.79	1.50	1.50
5	HGV Access to Rear	4029.42	193.34	76.46	24.00	1.50	1.50
6	Rear Loading / Storage	4140.45	104.16	75.00	144.00	1.50	1.50
7	Side Storage	4058.66	46.52	126.00	22.50	1.50	1.50
8	Pedestrian Crossing Zone	4017.05	41.62	136.33	75.00	1.50	1.50
9	Vertical Grid (House)	4028.15	22.50	5.61	6.00	0.22	0.24

Luminaires

Luminaire B Data

Supplier	D W Windsor
Type	Sabre 64LED 4k C2 1000mA UMSUG 42 0 198 0000 100
Lamp(s)	64 x 4k LED
Lamp Flux (klm)	24.04
File Name	Sabre 64LED 4k C2_1000mA UMSUG 42 0 198 0000 100.ies
Maintenance Factor	0.82
Imax70,80,90(cd/klm)	853.5, 62.5, 0.0
No. in Project	17

Luminaire C Data

Supplier	D W Windsor
Type	Sabre 24LED 4k C2 1000mA UMSUG 42 0 079 0000 100
Lamp(s)	24 x 4k LED
Lamp Flux (klm)	9.34
File Name	Sabre 24LED 4k C2_1000mA UMSUG 42 0 079 0000 100.ies
Maintenance Factor	0.82
Lum. Int. Class	G3
No. in Project	14

Luminaire D Data

Supplier	SHD
Type	BGP703 DW50 BL2
Lamp(s)	LED-HB 5.2S 740
Lamp Flux (klm)	6.50
File Name	Luma Gen2 Mini_BGP703_DW50 BL2_6500_40LED_5.2S_CLO_L90_740.ies
Maintenance Factor	0.82
Lum. Int. Class	G3
No. in Project	12

8158109794

Layout

ID	Type	X	Y	Height	Angle	Tilt	Cant	Out-reach	Target X	Target Y	Target Z
1	D	3910.60	130.95	6.00	313.00	0.00	0.00	0.40			
2	D	3924.38	116.70	6.00	130.00	0.00	0.00	0.40			
3	D	3943.32	159.58	6.00	305.00	0.00	0.00	0.40			
4	B	3967.76	175.27	8.00	300.00	0.00	0.00	0.40			
5	B	3989.28	189.86	8.00	307.00	0.00	0.00	0.40			
6	B	4041.56	209.60	10.00	126.00	0.00	0.00	0.40			
7	D	3936.58	104.23	8.00	42.00	0.00	0.00	0.40			
8	D	3965.06	129.20	8.00	221.00	0.00	0.00	0.40			
9	B	3965.80	135.59	8.00	66.00	0.00	0.00	0.40			
10	D	3994.33	98.10	8.00	227.00	0.00	0.00	0.40			
11	D	4008.71	81.71	8.00	223.00	0.00	0.00	0.40			
12	D	3958.53	80.52	8.00	46.00	0.00	0.00	0.40			
13	D	3979.37	57.63	8.00	49.00	0.00	0.00	0.40			
14	C	4018.72	145.06	6.00	126.00	0.00	0.00	0.40			
15	D	4010.04	50.14	8.00	133.00	0.00	0.00	0.40			
16	D	3951.66	93.56	6.00	313.00	0.00	0.00	0.40			
17	B	4043.34	175.23	10.00	216.00	0.00	0.00	0.40			
18	B	4009.77	203.73	8.00	301.00	0.00	0.00	0.40			
19	C	4006.72	123.72	8.00	215.00	0.00	0.00	0.40			
20	B	4057.65	216.51	11.00	31.00	0.00	0.00	0.40			
21	B	4070.70	240.19	8.00	305.00	0.00	0.00	0.40			
22	B	4072.12	197.69	11.00	31.00	0.00	0.00	0.40			
23	B	4126.71	230.99	8.00	218.00	5.00	0.00	0.40			
24	B	4138.27	215.72	8.00	218.00	0.00	0.00	0.40			
25	B	4100.94	160.07	11.00	30.00	0.00	0.00	0.40			
26	B	4086.71	178.66	11.00	33.00	0.00	0.00	0.40			
27	B	4150.63	199.63	8.00	219.00	0.00	0.00	0.40			
29	C	4137.00	151.11	10.00	37.00	0.00	0.00	0.40			
30	B	4165.41	180.43	8.00	214.00	0.00	0.00	0.40			
31	C	4172.80	136.14	6.00	125.00	0.00	0.00	0.40			
32	C	4153.88	123.00	6.00	125.00	0.00	0.00	0.40			
34	C	4131.36	107.46	6.00	126.00	0.00	0.00	0.40			
35	C	4085.72	76.04	6.00	127.00	0.00	0.00	0.40			
36	C	4062.62	60.20	6.00	125.00	0.00	0.00	0.40			
37	C	4023.53	101.59	8.00	215.00	0.00	0.00	0.40			
38	D	4024.99	71.95	6.00	126.00	0.00	0.00	0.40			

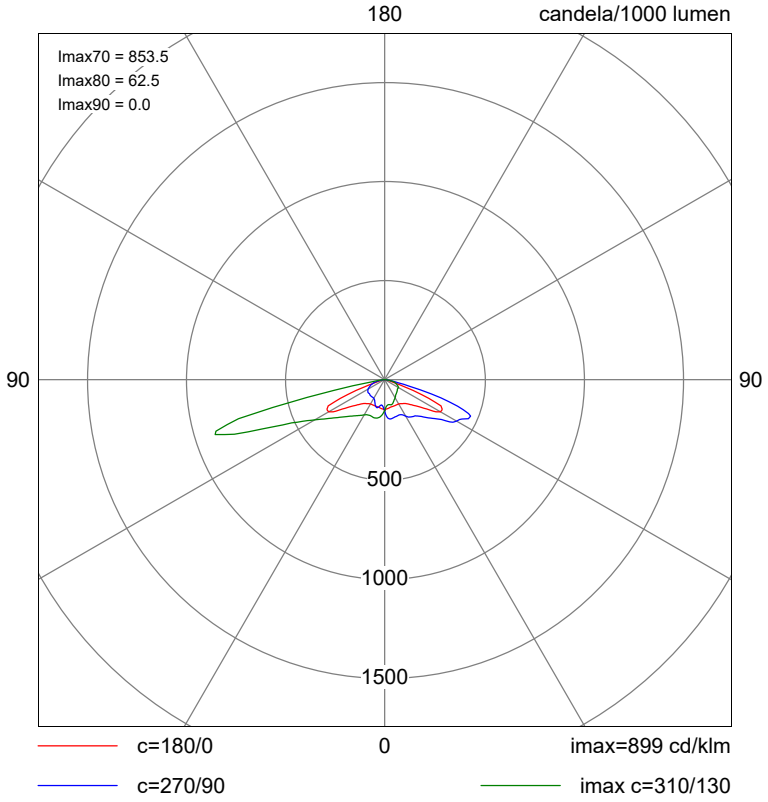
8158109794

Layout Continued

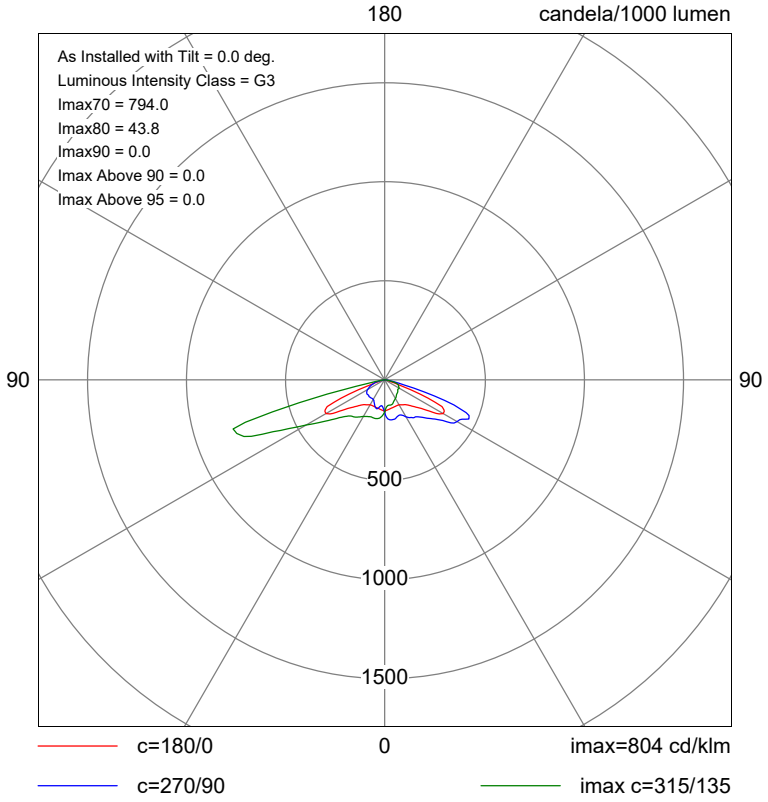
ID	Type	X	Y	Height	Angle	Tilt	Cant	Out-reach	Target X	Target Y	Target Z
39	C	4050.23	103.71	8.00	123.00	0.00	0.00	0.40			
40	C	4079.31	126.02	8.00	131.00	0.00	0.00	0.40			
41	C	4050.00	84.52	8.00	219.00	0.00	0.00	0.40			
42	C	4107.98	148.10	8.00	128.00	0.00	0.00	0.40			
43	B	4010.70	131.82	10.00	128.00	0.00	0.00	0.40			
44	B	4031.66	190.48	10.00	217.00	0.00	0.00	0.40			
44	C	4108.98	91.99	6.00	127.00	0.00	0.00	0.40			

Polar Diagrams

Luminaire B Sabre 64LED 4k C2 1000mA UMSUG 42 0198 0000 100



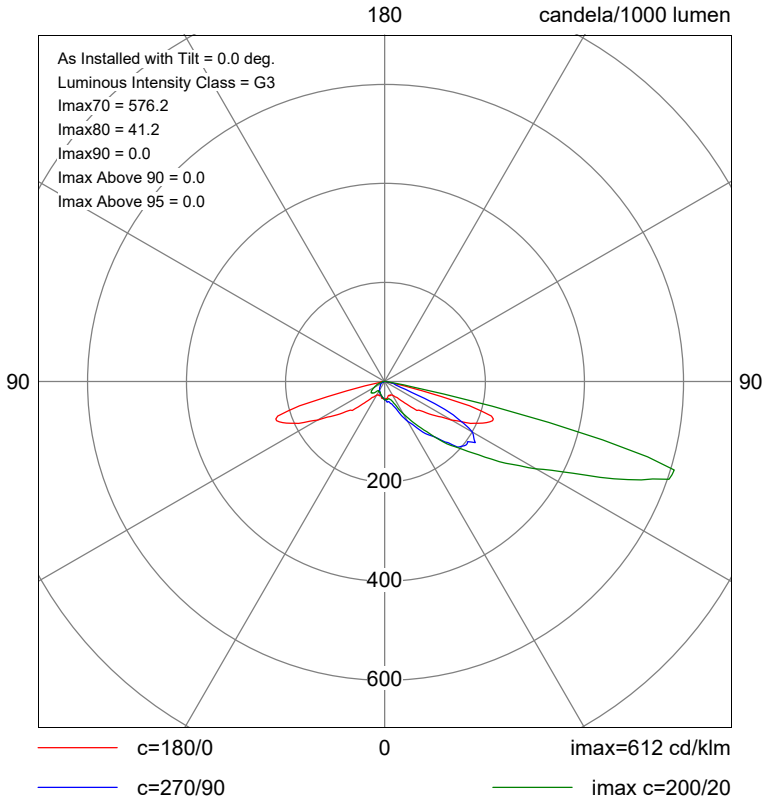
Luminaire C Sabre 24LED 4k C2 1000mA UMSUG 42 0079 0000 100



8158109794

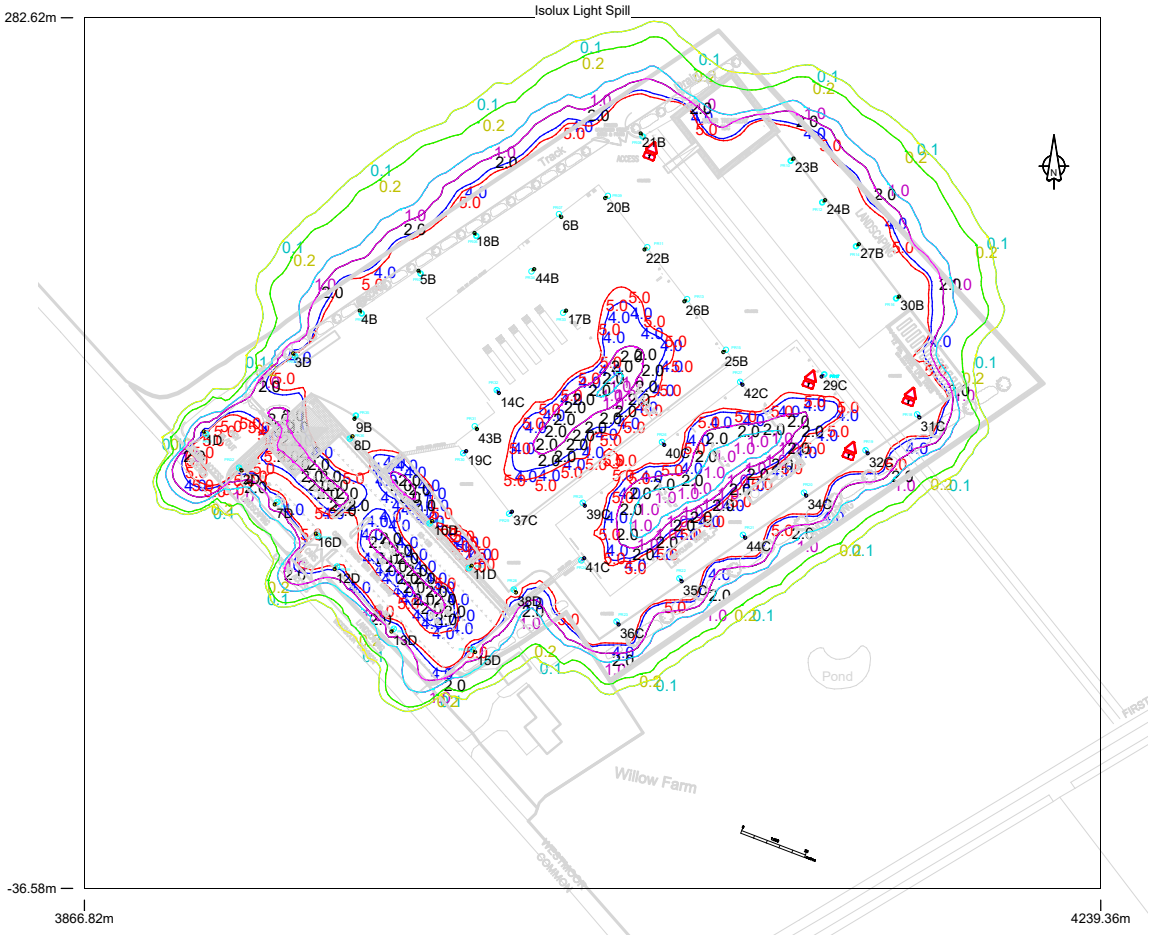
Polar Diagrams Continued

Luminaire D BGP703 DW50 BL2



Horizontal Illuminance (lux)

Isolux Light Spill

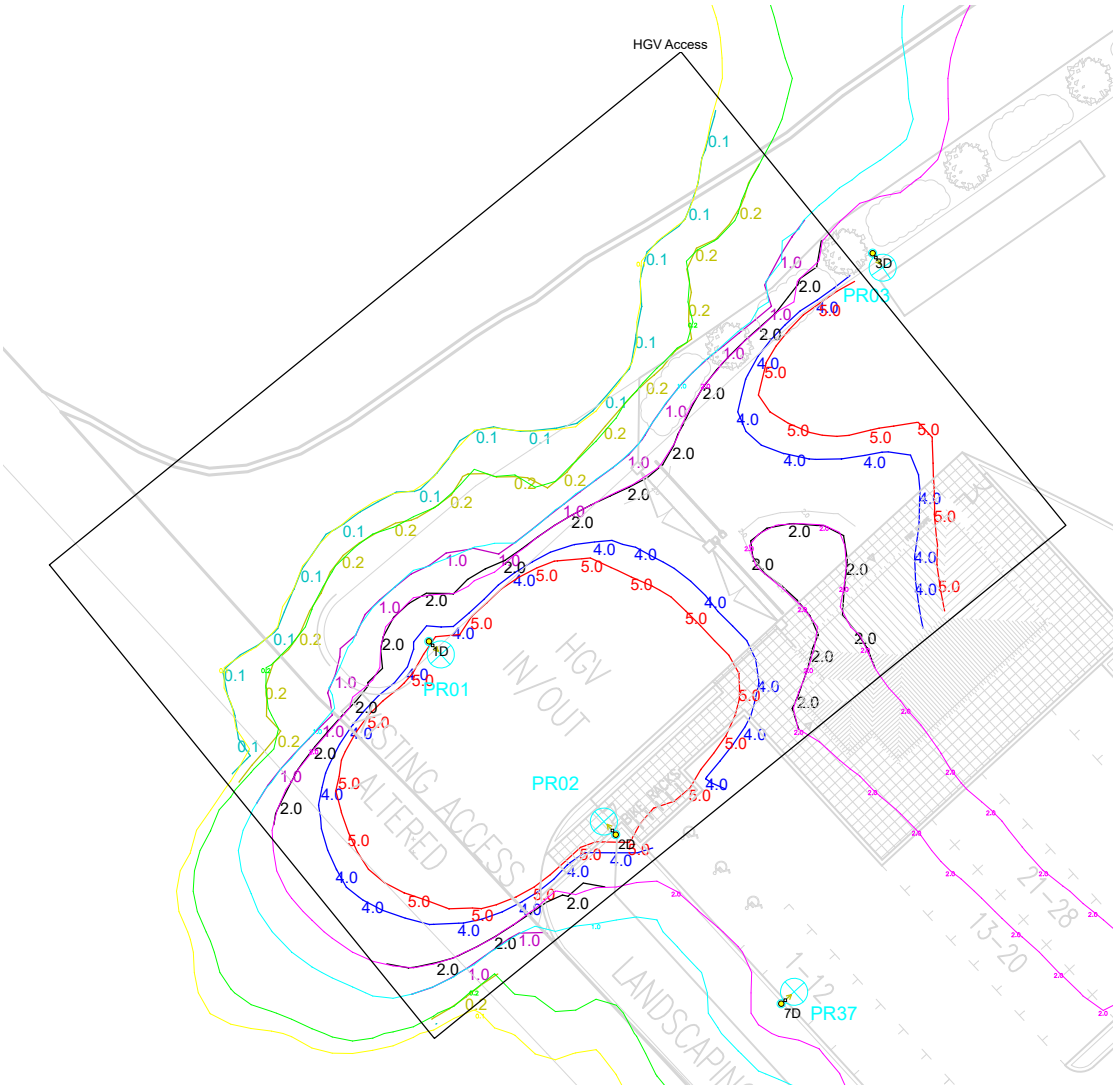


Results

Eav	3.88
Emin	0.00
Emax	66.36
Emin/Emax	0.00
Emin/Eav	0.00

Horizontal Illuminance (lux)

HGV Access

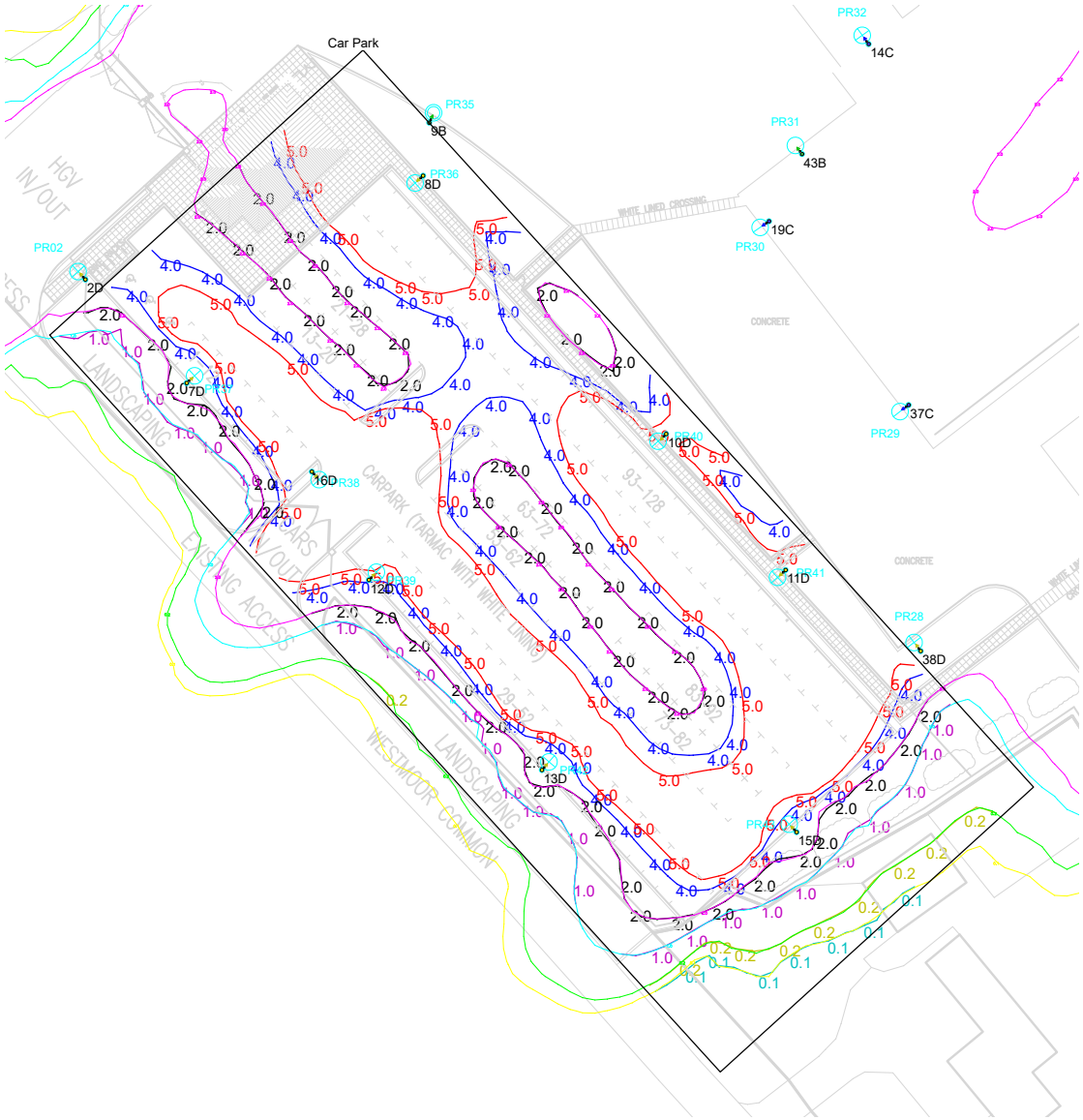


Results

Eav	6.35
Emin	1.70
Emax	12.40
Emin/Emax	0.14
Emin/Eav	0.27

Horizontal Illuminance (lux)

Car Park



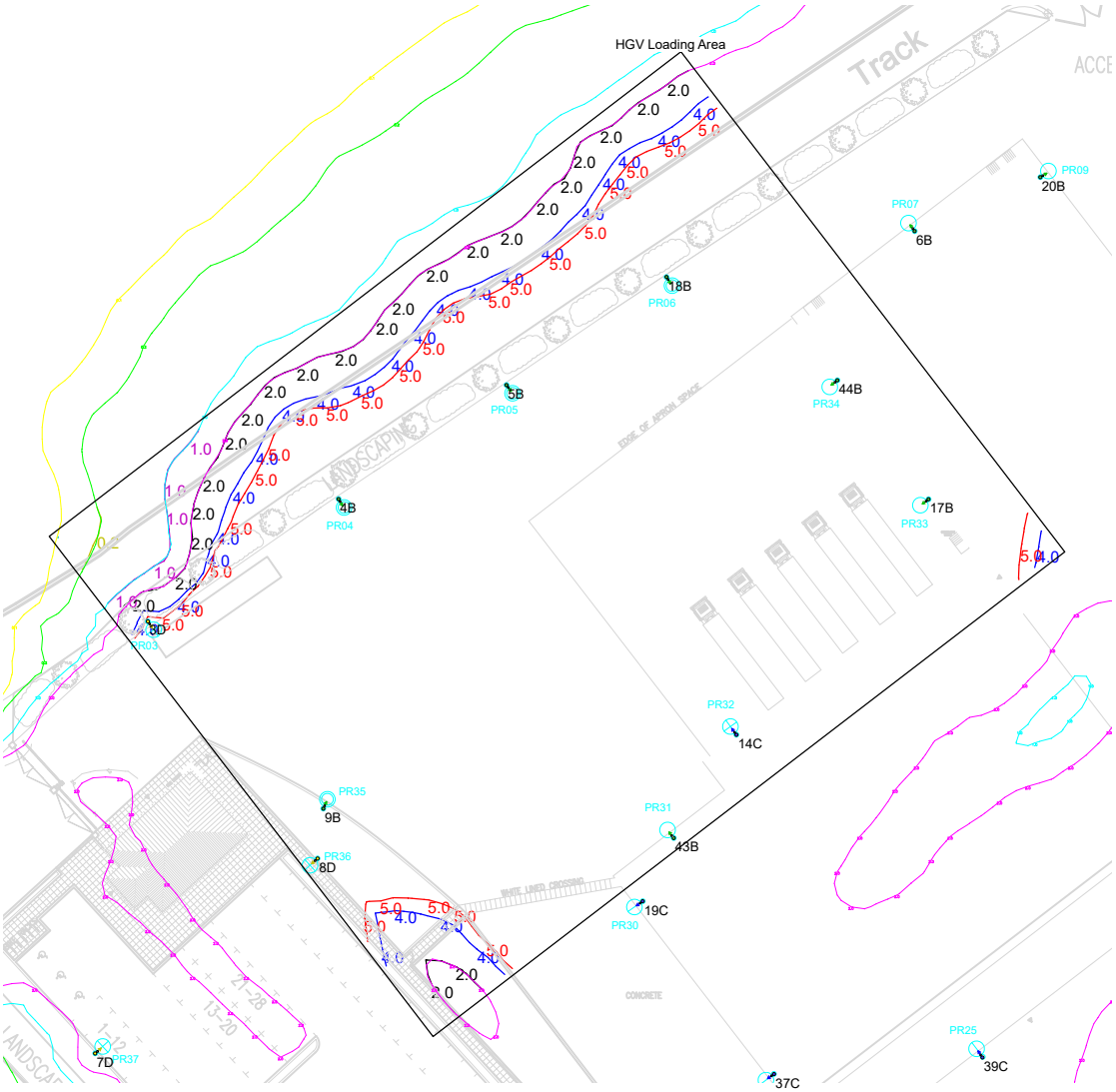
Results

Eav	5.32
Emin	1.31
Emax	16.53
Emin/Emax	0.08
Emin/Eav	0.25

8158109794

Horizontal Illuminance (lux)

HGV Loading Area

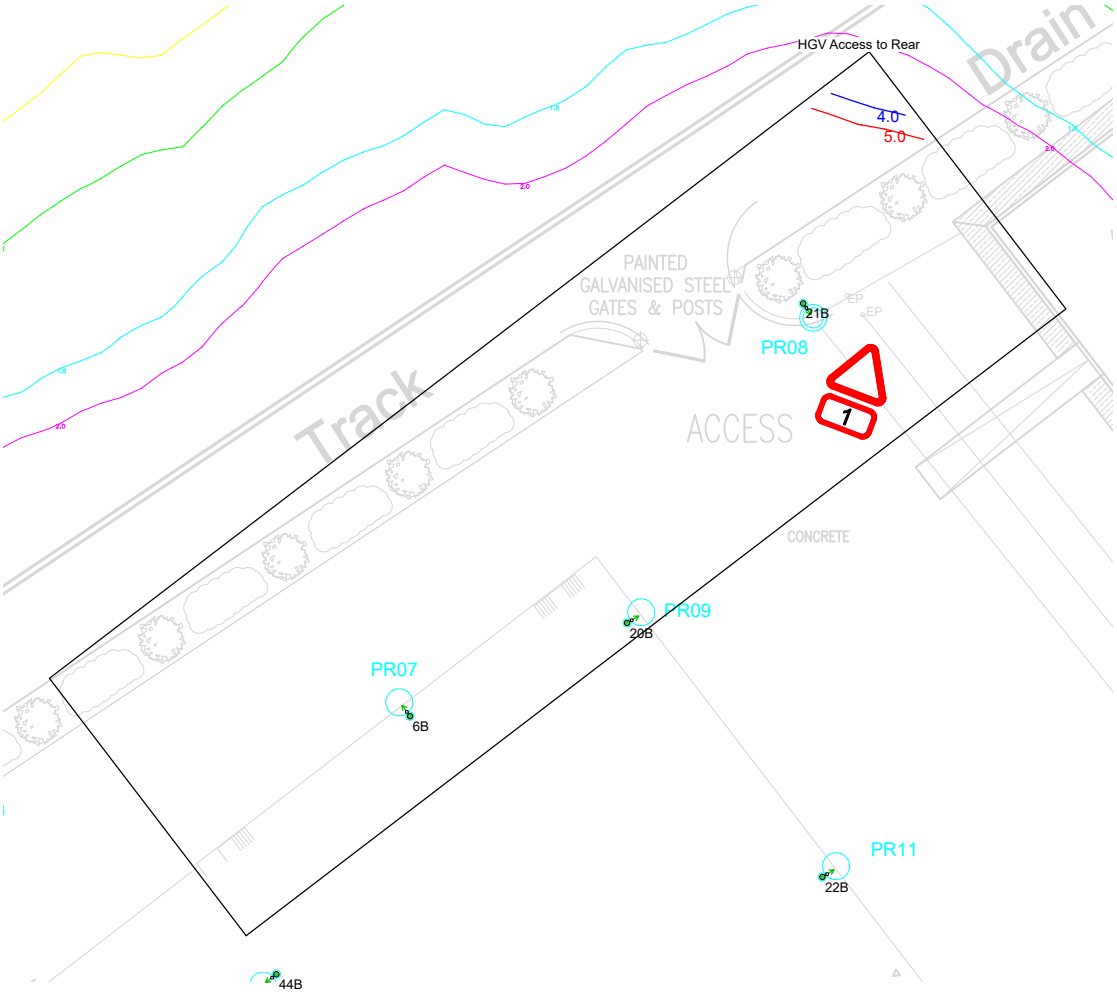


Results

Eav	22.41
Emin	5.51
Emax	65.27
Emin/Emax	0.08
Emin/Eav	0.25

Horizontal Illuminance (lux)

HGV Access to Rear



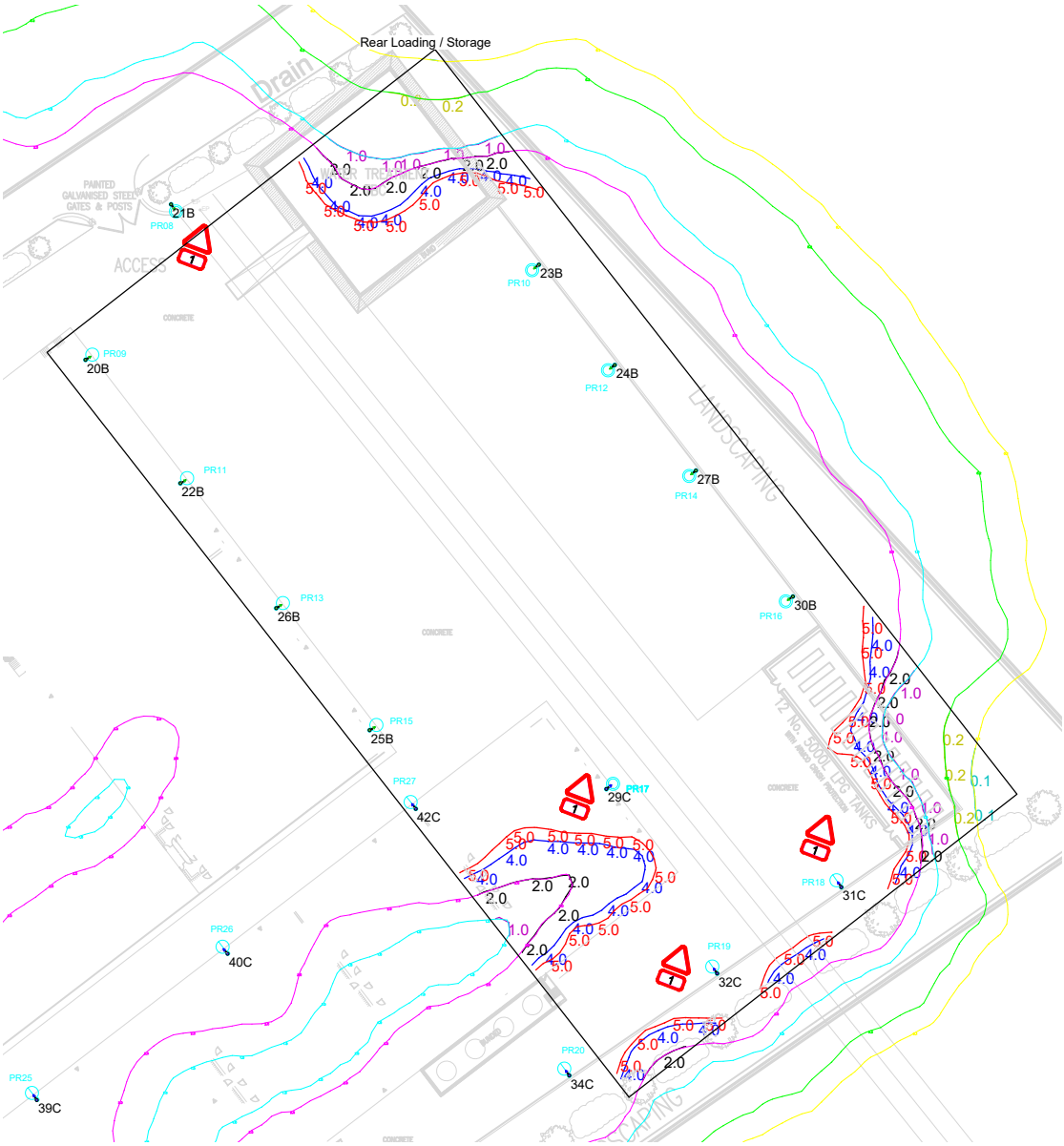
Results

Eav	27.32
Emin	14.36
Emax	61.56
Emin/Emax	0.23
Emin/Eav	0.53

8158109794

Horizontal Illuminance (lux)

Rear Loading / Storage



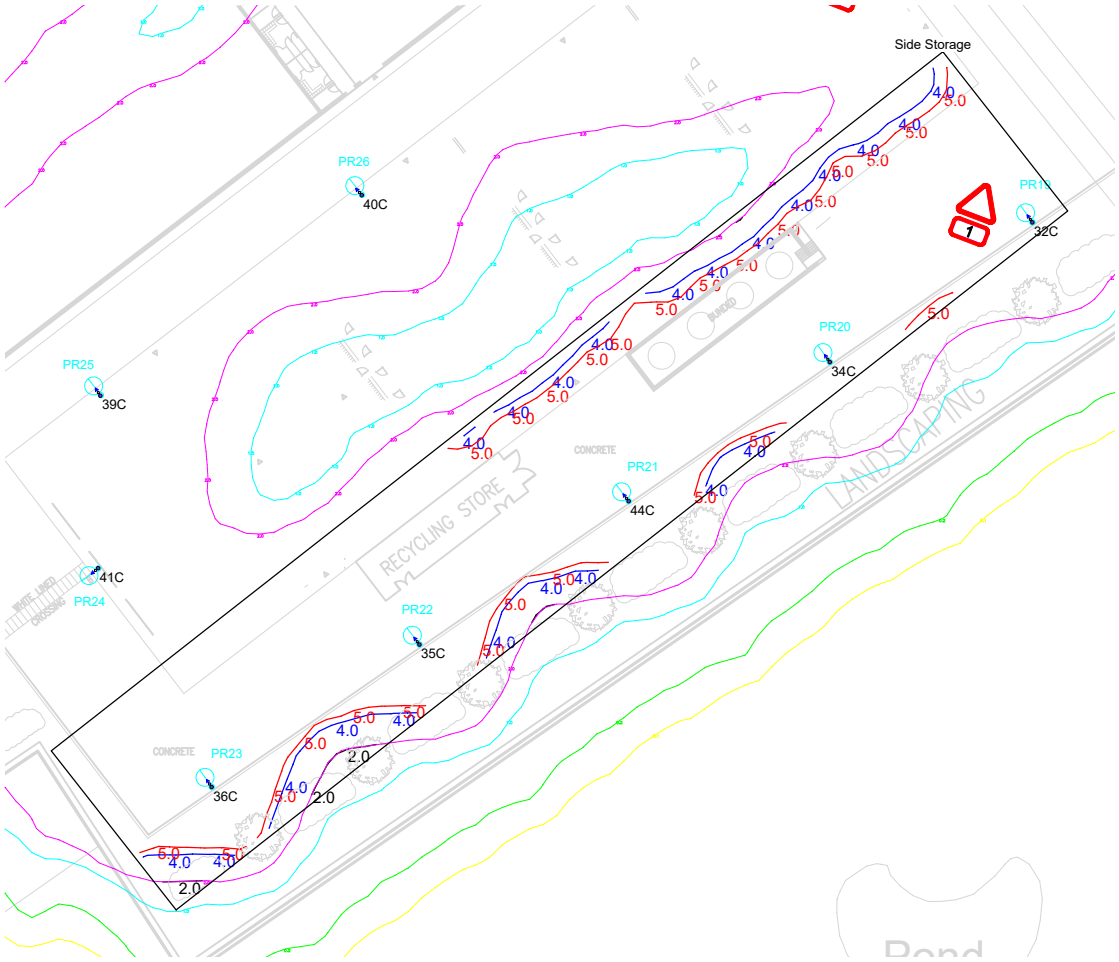
Results

Eav	20.08
Emin	5.15
Emax	66.87
Emin/Emax	0.08
Emin/Eav	0.26

8158109794

Horizontal Illuminance (lux)

Side Storage

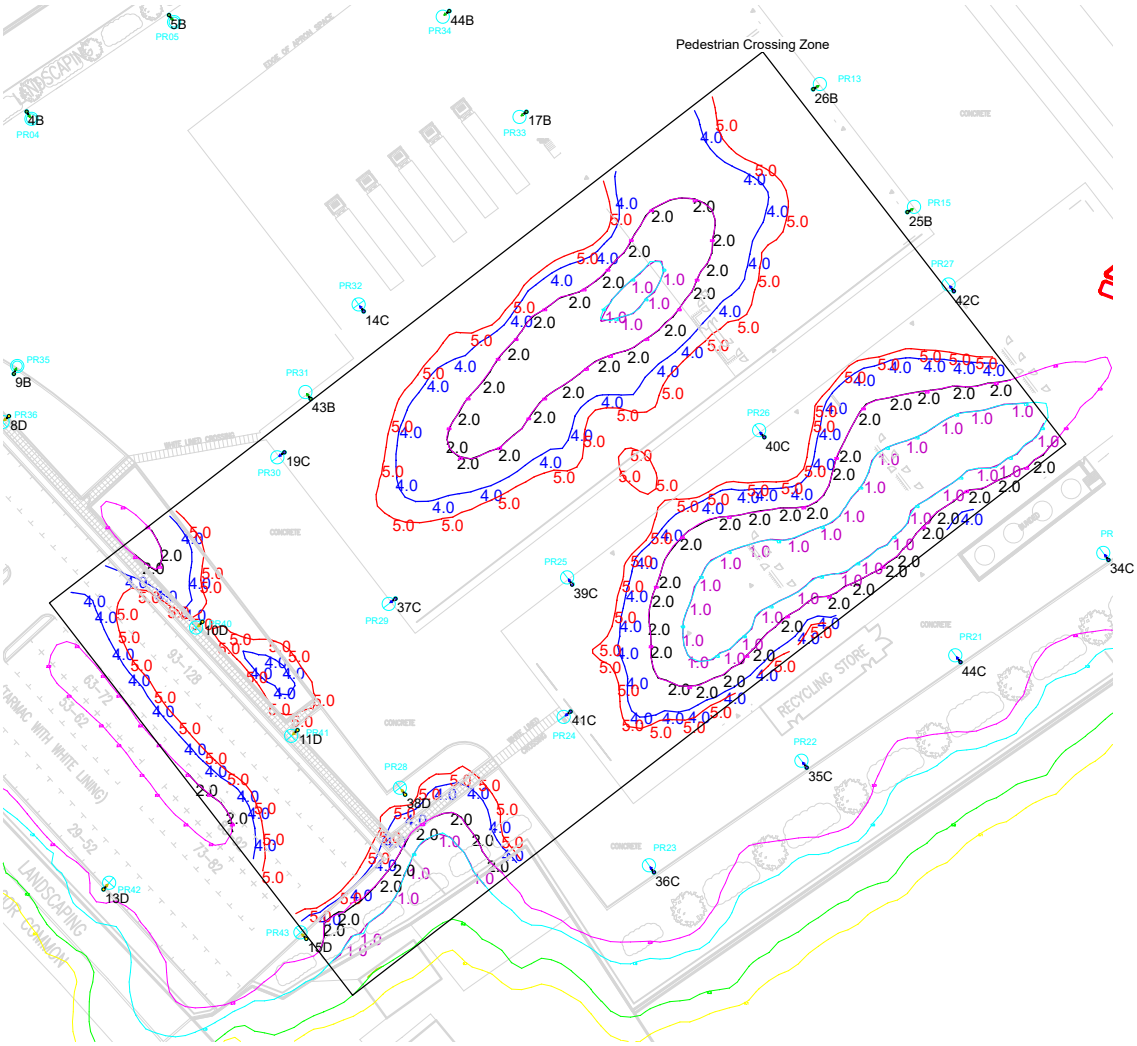


Results

Eav	15.48
Emin	6.54
Emax	42.29
Emin/Emax	0.15
Emin/Eav	0.42

Horizontal Illuminance (lux)

Pedestrian Crossing Zone



Results

Eav	10.91
Emin	4.40
Emax	30.54
Emin/Emax	0.14
Emin/Eav	0.40

Illuminance (lux)

Vertical Grid (House)

0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1

Results

Eav	0.02
Emin	0.00
Emax	0.06
Emin/Emax	0.06
Emin/Eav	0.19

8158109794

CRESTWOOD ENVIRONMENTAL LTD

www.crestwoodenvironmental.co.uk
Tel: 01902 229 563

for

SMITHERS PURSLOW
ENGINEERING ▪ SURVEYING ▪ ARCHITECTURE
Independent Professional Expertise

CORKERS
BRITISH GOOD TASTE

Noise Impact Assessment

Redevelopment of the Corkers Crisps Factory at Pymoor, Ely, Cambridgeshire

Report Reference: CE-WF-1857-RP05 - Final

Report Date: 16 September 2021

Produced by Crestwood Environmental Ltd.

*Sustainable solutions, tailored to **your** needs*

ENVIRONMENT	LANDSCAPE	NOISE	LIGHTING
ECOLOGY	HERITAGE	WATER	TREES
MINERALS / WASTE	AIR QUALITY	LAND QUALITY	VISUALISATION

Crestwood Report Reference: CE-WF-1857-RP05 - Final:

Issued Version Status	Date Produced	Written / Updated by:	Checked & Authorised by:
Final	16/09/21	Tony Higgins BSc (Hons), MSc, PGDip, MIOA, CMCIEH. Associate Director (Noise and Environmental Health)	Adam Collinge Technical Director

Crestwood Environmental Limited

Registered Office:
Science, Technology and Prototyping Centre, UoWSP, Glaisher Drive, Wolverhampton, WV10 9RU, UK

Company Reg. no. 06544898
(Registered in England & Wales)

Tel: +44 (0)1902 229 563

Email: info@crestwoodenvironmental.co.uk

Web: www.crestwoodenvironmental.co.uk

CONTENTS

LIST OF TABLES:

LIST OF APPENDICES:

1 INTRODUCTION

1.1 BACKGROUND

1.1.1 This report supports a planning application for the redevelopment of the Corkers Crisps site following fire damage in June 2020.

1.1.2 Corkers Crisps operated a 24 hour 7 days a week facility at Willow Farm Pymoor Common Pymoor Ely Cambridgeshire until the fire destroyed the main manufacturing facility at the site.

1.1.3 The proposed redevelopment seeks to reinstate the crisp factory using modern construction techniques and materials similar to those used in the surviving storage unit. The new construction will (acoustically) be an improvement over the former agricultural style buildings. The site is seeking to operate continuously on a 24 hour a day basis

1.1.4 Crestwood has contacted East Cambridgeshire District Council (ESDC) to establish if data for the pre-existing background with the former factory operating is available. Regrettably no data is available, though the Environmental Health Officer noted that, "noise levels in the area are very quiet in the absence of the factory".

1.1.5 In the absence of background noise data, the approach to the impact assessment for the redevelopment is to prepare a screening assessment of the proposed activities and provide data in the form of predicted maximum and predicted average noise levels. This data can be compared directly to World Health Organisation and BS8233:2014 standards, and, in conjunction with the measured background noise data available, assessed against BS4142:2014. The BS4142 assessment, will, by definition, be very conservative as the measured background levels are taken in the absence of the Corkers factory noise that would ordinarily form part of the background.

1.1.6 Crestwood has therefore:

a. *Carried out a survey of the area to establish the suitability of carrying out baseline sound level measurements*
b. *Prepared a schedule of activities, plant and equipment proposed for the new site, including noise emission data for each significant element, where this is not available a maximum predicted level has been quoted.*
c. *Prepared a modelled noise assessment the items noted in (b) above, and established predicted operational noise levels at sensitive receptor location(s)*
d. *Confirmed intended operational hours for items noted in (b) above*
e. *Compared predicted data World Health Organisation and BS8233:2014 guidelines values*
f. *Compared predicted data against existing background and residual levels using a BS4142:2014+A1 (2019) method (notwithstanding that the result is likely to be very much lower than the pre fire levels).*
g. *Compared the predicted data against planning consent reference 12/00957/FUL condition 3*
h. *Identified and quantified the effects of specified mitigation needed to comply with appropriate standards and demonstrate compliance with planning policy*
i. *Provided context.*

1.1.7 This report provides the predicted noise data based on measurements of plant and equipment currently operated at the existing Corkers site, sound power data on plant supplied by the equipment manufacturers or an estimate of sound levels based as specified in the report. The redevelopment of the site is to reinstate a manufacturing process that operated successfully for over 10 years, the new facility will have very similar activities to those formerly carried out, and is considered that those original activities were/are part of the existing residual noise in the area. Context is provided accordingly.

1.2 Statement of Qualifications

1.2.1 Tony Higgins has over 30 years of regulatory and consultancy experience dealing with noise and nuisance issues and holds a Post Graduate Diploma in Acoustics and Noise Control. He is a Member of the Institute of Acoustics and also an elected member of the IOA Measurement & Instrumentation Group. He has spoken

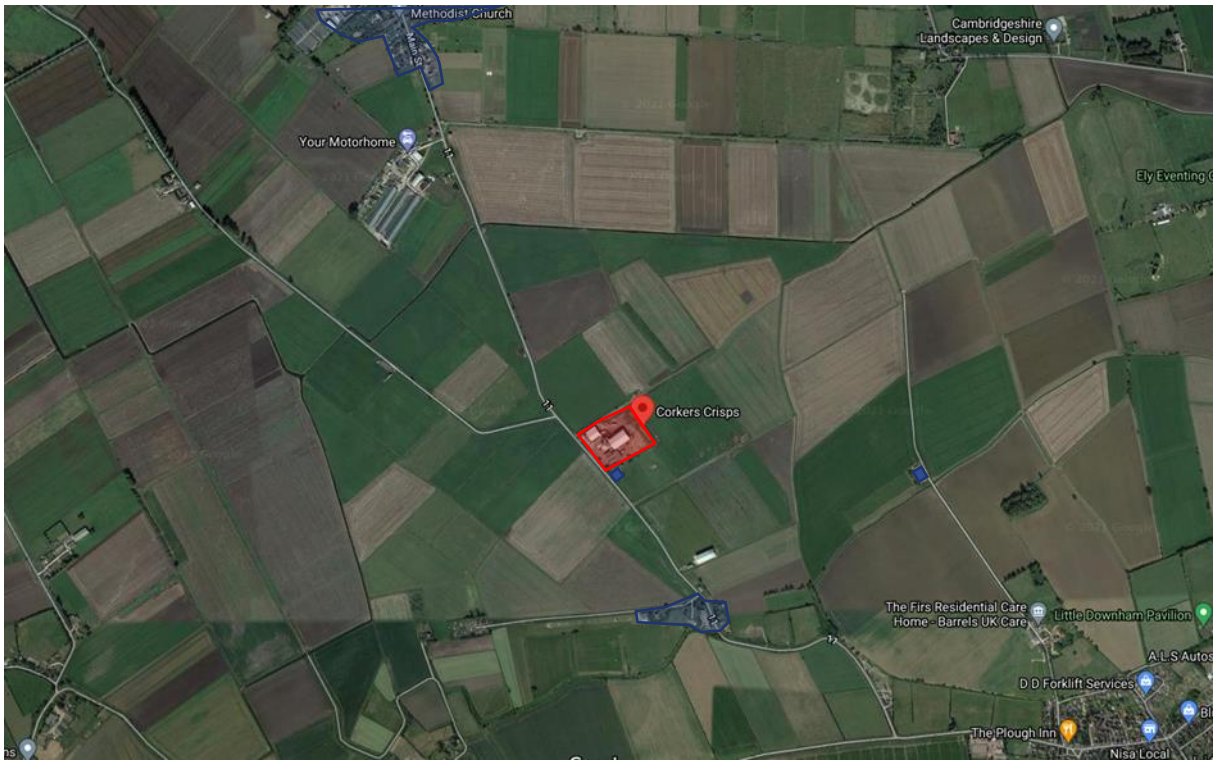
at (and organised) many IOA training events considering the implementation of BS4142:2014 and the use of noise measurements in both planning and licensing appeals. Tony managed the Public Protection service at Telford and Wrekin Council, including the Licensing Service, noise and statutory nuisance service and the consultation responses to the planning service. Tony has also prepared and delivered training materials for the EMAQ training package advising local authorities on the implementation of BS4142:2014. Tony has significant experience carrying out and evaluating data in determination of acoustic impact for complaints, licensing and planning work, in formal and informal hearings as well as court.

1.3 Site Description

1.3.1 The proposed Corkers site is located east of the B1411 (Westmoor Common) approximately 3.5 km north of Ely and 1 km south of Pymoor. The site is topographically flat, and located within extensive farmland. Currently the site has one surviving building used as a cold store.

1.3.2 The nearest sensitive receptor is located 20m to the south of the site (immediately adjacent), with the next closest being approximately 0.5 km to the south. Most receptors (including the village of Pymoor are located more than a kilometre from the site.

Plate 1 Schematic site location and monitoring location.



Courtesy of Google Earth Image (2021).

Application Site
Sensitive receptors

1.3.3 The existing industrial buildings made of modern portal frame clad with insulated profile sheets, concrete and blockwork. The roofs of the primary buildings are steel clad construction with heavy linings comprising layers of dense rockwool and sheet steel. The building is constructed to be thermally efficient.

1.4 Existing Acoustic Environment

1.4.1 The site is located on in the open countryside, on a busy secondary road. The existing acoustic environment is relatively quiet except for:

- General steady drone of road traffic on main road
- Road traffic events, (tractors, HGV's, car horns, revving of engines etc.)

- Distant Vehicle movements from surrounding farmland
- Loading/Unloading activities (site)
- Hum of condenser fans from site
- Construction noise (rear of site) very limited.
- Vehicle parking/manoeuvring alarms, slamming doors, (adjacent residential property)
- Local 'residential' noise and activities

1.4.2 Additional night time noise sources were noted as:

- Hum of condenser fans and other sources (Pymoor direction)
- Deliveries to site

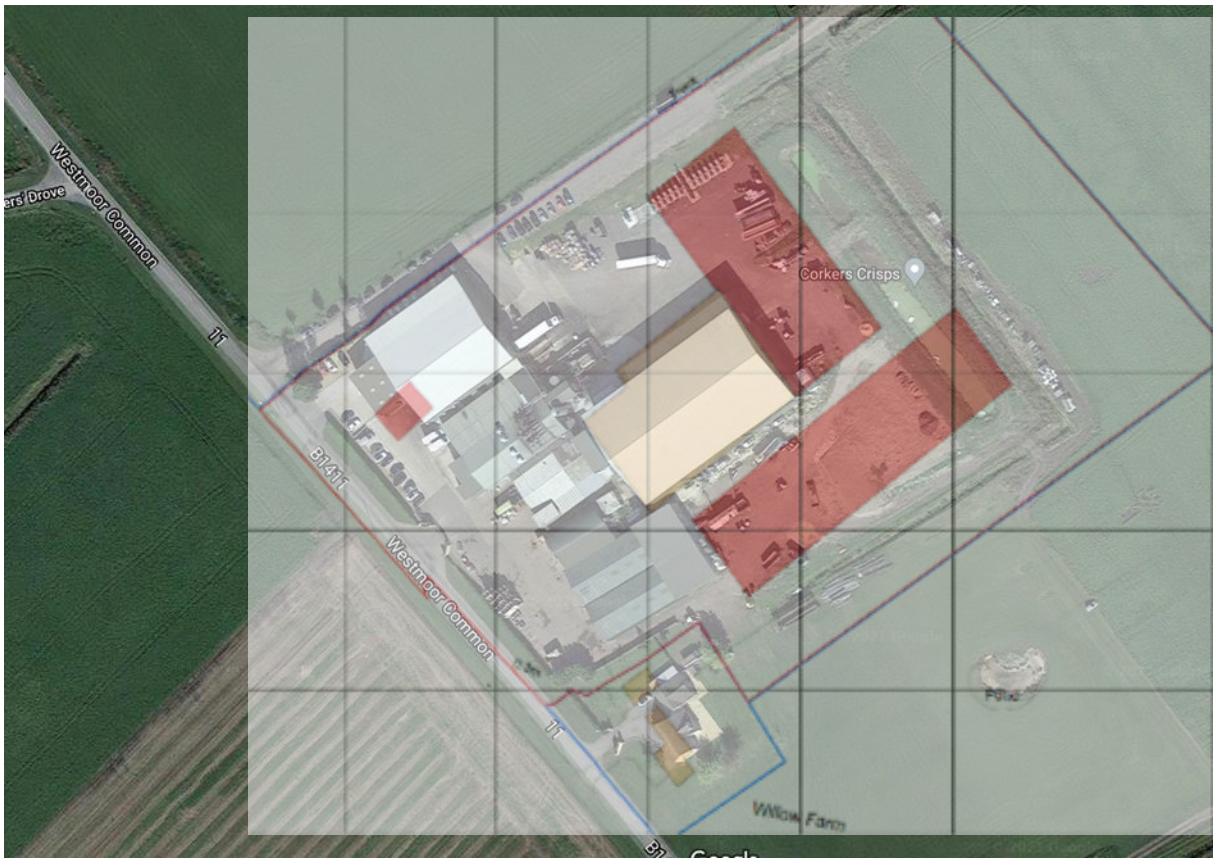
1.4.3 The site was observed to be generally very quiet both day and night time.

1.4.4 The receptor locations to the south, were both noted to have a similar acoustic character to that observed onsite.

1.5 Proposed site layout

1.5.1 A comparison of the proposed redevelopment of the site compared to the former layout is shown in Plate 2 below, The proposed layout is overlaid against the google image for the former layout.

Plate 2 Site Layout comparison



1.5.2 The key design features for the new facility that impact on emitted noise are noted as follows:

1. All manufacturing buildings are now further from the closest residential receptor
2. The new process buildings shield noise from the delivery yard and forklift truck activity from the principle receptors

1.5.3 The source noise arising from the factory has been assessed as comprising the following:

- HGV Delivery noise
- External Fork Lift Trucks (daytime)
- External plant
- Boiler plant flues
- Noise breakout from buildings

2 Legislation and Guidance

2.1 National Planning Policy Framework (NPPF) 2021

2.1.1 The National Planning Policy Framework sets out Governmental planning policies for England and how these are expected to be applied. It provides a framework within which local people can influence planning policy using distinctive local and neighbourhood plans, which reflect the needs and priorities of their communities. The NPPF requires that Local Planning Authorities develop their own specific planning policies, however, all local plans are required to have regard to the principle enshrined in the NPPF and in particular sustainable development.

2.1.2 Paragraph 175outlines general requirements in terms of noise:

> *175. Planning policies and decisions should contribute to and enhance the natural and local environment by: ….*
>
> *e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and…" [my emphasis]*

2.1.3 Paragraph 186 provides additional detail:

> *186. 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[60];*
> *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; and*
> *c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation." [my emphasis]*
>
> 60. See Explanatory Note to the Noise Policy Statement for England (Department for Environment, Food & Rural Affairs, 2010).

2.1.4 Paragraph 183 makes reference to duplication of function where there is overlap between planning requirements and other regulatory regimes, it states:

> *188. The focus of planning policies and decisions should be on whether proposed development is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). Planning decisions should assume that these regimes will operate effectively. Equally, where a planning decision has been made on a particular development, the planning issues should not be revisited through the permitting regimes operated by pollution control authorities.*

2.1.5 The guidance echoes the commentary in the Horizontal Guidance on Noise. The intent is to ensure consistency of regulation and avoid duplication.

2.1.6 The NPPF also specifically references the strategic Noise Policy Statement for England (*NPSE*) that post dates the latest update of the Horizontal Guidance on Noise, though the policy itself clearly intends that the principles should apply to *"...the use of the land use and transport planning systems, compensation measures, the statutory nuisance and licensing regimes and other related legislation."* Which would include environmental permitting, the principles of the NPSE are therefore relevant.

2.2 Noise Policy Statement for England 2010 (NPSE)

2.2.1 The Noise Policy Statement vision 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'.

2.2.2 The NPSE refers to the World Health Organisation guidance and deals with noise in the context of health. Health is defined as 'physical and mental well-being' and is quoted in terms of standards with 'observed' health impacts. Additionally, quality of life is also mentioned which is a subjective measure and can be considered to promote amenity standards and in all cases equate to prevention of nuisance. The NPSE makes reference to two concepts documented by the WHO, namely:

- No Observed Effect Level (*NOEL*): the level below which no effect can be detected
- Lowest Observed Adverse Effect Level (*LOAEL*): the level above which adverse effects on health and quality of life can be detected.

2.2.3 And (by extrapolation from WHO criteria), a further level,

- Significant Observed Adverse Effect Level (*SOAEL*): the level above which significant adverse effects on health and quality of life occur.

2.2.4 There is no specific definition of how these levels are to be calculated, however it is noted that methodologies comparing results (either measured or calculated) to background and ambient levels are considered appropriate.

2.2.5 Determining how these impacts are to be demonstrated will depend on the nature of the noise, acoustic properties of the noise, and the site-specific circumstance of design and construction of development locations in which the noise is present. In most cases the local council within whose area the application site exists will provide additional guidance on what is required to determine impact in accordance with local policy that will, by definition, have regard to local conditions and circumstances.

2.3 East Cambridgeshire Local Plan 2015 (ESDC Local Plan)

2.3.1 The above local plan was last issued in 2015, but has been subject to two reviews. Neither of the reviews modify the requirements for noise and disturbance.

2.3.2 The local plan Policy ENV 9: Pollution states:

"All development proposals should minimise, and where possible, reduce all emissions and other forms of pollution, including light and noise pollution, and ensure no deterioration in air and water quality. All applications for development where pollution is suspected must contain sufficient information to enable the Council to make a full assessment of potential hazards and impacts.

Proposals will be refused where, individually or cumulatively, there are unacceptable impacts arising from the development on:

- *The natural environment, general amenity and the tranquillity of the wider rural area, including noise and light pollution.*
- *Health and safety of the public.*
- *Air quality.*
- *Surface and groundwater quality.*
- *Land quality and condition; or*
- *Compliance with statutory environmental quality standards.*

In exceptional cases, development proposals may be permitted where it can be clearly demonstrated that the environmental benefits of the development and the wider social and economic need for the development substantially outweigh any adverse impact in terms of pollution. In such cases, where pollution is unavoidable, mitigation measures to reduce pollution levels will be required in order to meet acceptable standards.

New development will not be permitted where there is a potential to conflict with existing developments that require particular conditions for their operation, or that are authorised or licensed under pollution control or hazardous substances legislation, where it would be likely to impose significant restrictions on the activities of the existing use in the future.

Development proposals on contaminated land (or where there is reason to suspect contamination) must include an assessment of the extent of the contamination and any possible risks. Proposals will only be permitted where the land is, or can be made, suitable for the proposed use. Development proposals where there is a risk of pollution should include a Pollution Management Plan which includes details of the identified risks and the proposed control measures.

Conditions may be attached to any planning permission, or Section 106 agreements used, to ensure adequate reduction and management of impacts." [author's emphasis]

2.3.3 The local planning policy echoes that in national guidance. It should be noted that the proposed development is existing land use, and not a new development in terms of principle of development.

2.4 Summary of Noise Policy

2.4.1 Based on the above, it is clear that the acoustic assessments need to be consistent and that there is agreement in practical terms between the basic requirements of the various regimes with the aim of reducing the potential for noise from businesses subject to planning, permitting and environmental nuisance regulation.

2.4.2 Determination of how the impact of noise is to be demonstrated will depend on the nature of the noise source, acoustic properties of the noise, the time and duration over which the noise impacts occur, and the site-specific circumstances and perception of the noise in context. *It is also important to have regard to the character of the area.*

2.4.3 The specific impact assessment method to be used is normally one of a relatively few standards, that may or may not be suitable for particular circumstances. This will often determine the methods to be used and the standards required.

2.4.4 Helpfully, for Planning applications, the Planning Policy Guidance provides helpful clarification of how impacts can be characterised and translated into easily understood measures of impact.

2.5 Noise Impact

2.5.1 The standards required to be met depend on the nature of the sound and the acoustic environment within which the sound is perceived. The Planning Practice Guidance (PPG) recommends an approach on determining the impact of sounds as follows:

*"**How to determine the noise impact?***

Local planning authorities' plan-making and decision taking should take account of the acoustic environment and in doing so consider:

- *whether or not a significant adverse effect is occurring or likely to occur;*
- *whether or not an adverse effect is occurring or likely to occur; and*
- *whether or not a good standard of amenity can be achieved.*

In line with the Explanatory Note of the Noise Policy Statement for England, this would include identifying whether the overall effect of the noise exposure (including the impact during the construction phase wherever applicable) is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation. As noise is a

complex technical issue, it may be appropriate to seek experienced specialist assistance when applying this policy."

2.5.2 The PPG also stipulates the appropriate actions in accordance with the likely response to noise exposure:

Perception	Examples of Outcomes	Increasing effect level	Action
Not Noticeable	No effect	No observed Effect	No specific measures
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
		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

Source: http://planningguidance.planningportal.gov.uk/blog/guidance/noise/noise-guidance/

2.5.3 The applicability of the above needs to reference the existing acoustic environment, that, for the purposes of the application site, needs to reflect the existing land use as a factory within the context of the character of the area. The actual impact can then be determined based on compliance with appropriate standards (see paragraph 2.6 below), and the context of the area.

2.6 Standards

2.6.1 Standards for determination of impact are normally based on absolute fixed levels or derived values based on comparisons. They are normally divided into standards set externally to sensitive developments or internally for particular rooms/activities.

2.6.2 The particular standard(s) to be applied depends on the character of the noise to be assessed, the sensitives of the receptors and the intended use/design of the development.

External Standards

2.6.3 In order to determine the appropriate level of impact, the most appropriate metric for determination of that impact is required.

2.6.4 The **BS4142:2014 Method for rating and assessing industrial and commercial sound**, provides a mechanism for evaluating the impact of a specified sound. The method requires that the level of the sound is averaged over set time periods and then corrections are applied in line with the prescribed acoustic

features of the sound under evaluation. The resulting level is then compared against the background LA90 sound level for the area. The assessment level is then reviewed against the criteria specified within the standard to help determine impact.

2.6.5 BS4142:2014 requires that any results are evaluated *and placed into context* so that the impact is properly characterised.

- A result of +10dB or more would indicate *significant acoustic impact*;
- A result of +5 or more would indicate the potential for an *adverse impact*.

2.6.6 Both the above results provide an indication of impact that must be placed into context. Context is normally added by comparison of the absolute measured levels against other standards, e.g. WHO, and by subjectively assessing the potential impact and evaluating the result in light of existing ambient noise levels. Clearly the pre-existing character of the area is relevant to such assessments.

2.6.7 It is normal for BS4142:2014 results to be used as indicators of required mitigation. Where mitigation cannot be carried out, it would be normal to demonstrate that noise exposure has been reduced to a minimum in line with best practice.

The BS4142 standard may not be wholly applicable in this case. Application of BS4142 relies on a screening method that assesses the difference between the subjectively adjusted sound source and the background level without that source being present. Where background levels are very low the BS4142 correction factors adversely impact results disproportionately. Moreover there is additional uncertainty in the assessment results. This appears to have been reflected in planning condition 3 of the original Corkers Crisps planning consent 12/00957/FUL in 2012 where 'not to exceed' rating level at the 'unrelated' residential receptor was identified as an appropriate standard.

2.6.8 For reference planning application condition 3 of consent 12/00957/FUL states:

> *3. The specific rated noise level from the application building shall not exceed 35 dB at any **unrelated** residential property when measured and calculated in accordance with BS4142.*

2.6.9 The immediately adjacent premises Willow Farm Pymoor Common Pymoor Ely Cambridgeshire CB6 2WA is noted to be in the same ownership as the factory and therefore related to the application site premises.

2.6.10 **BS8233:2014 Guidance on sound insulation and noise reduction for buildings**, also provides guidance on external noise levels, in particular for amenity areas such as gardens. External noise levels for most development are suggested to not exceed 50dB $L_{Aeq,T}$, and noisier urban environments should not exceed the guideline value of 55 dB $L_{Aeq,T}$.

2.6.11 The **World Health Organisation (WHO) Guidelines on Community Noise** is a document which specifies a number of absolute sound levels which seek to prevent health impacts, including the avoidance of noise and disturbance. The key external noise level standards quoted in the document are:

Specific environment	Critical health effect(s)	LAeq [dB]	Time base [hours]	LAMax, fast [dB]
Outdoor living area	Serious annoyance, daytime and evening	55	16	-
	Moderate annoyance, daytime and evening	50	16	-
Outside bedrooms	Sleep disturbance, window open (outdoor values)	45	8	60

2.6.12 Both BS8233:2014 and the WHO criteria for daytime operation are directly relevant to this installation and application.

2.6.13 The **World Health Organisation (WHO) Night Noise Guidelines for Europe 2009** is a document which extends the night time noise standards to include a level considered to *'prevent subclinical adverse health effects in the population'*. The guidance states:

> *"For the primary prevention of subclinical adverse health effects related to night noise in the population, it is recommended that the population should not be exposed to night noise levels greater than 40 dB of $L_{night,outside}$ during the part of the night when most people are in bed. The LOAEL of night noise, 40 dB $L_{night,outside}$, can be considered a health-based limit value of the night noise guidelines (NNG) necessary to protect the public, including most of the vulnerable groups such as children, the chronically ill and the elderly, from the adverse health effects of night noise."*

2.6.14 It follows that, an external target noise level of 40 dB $L_{night,outside}$ must be acceptable in planning terms.

Internal Standards

2.6.15 In addition to the above values, **BS8233:2014** gives guidance for noise levels *inside* habitable rooms based on their sensitivity. Table 1 Indoor ambient noise levels for dwellings lists the acceptable sound levels inside properties:

Activity	Location	07:00 to 23:00 hours	23:00 to 07:00
Resting	Living Room	35 dBA $L_{Aeq,16hour}$	
Dining Room	Dining Room/Area	40 dBA $L_{Aeq,16hour}$	
Sleeping (daytime resting)	Bedroom	35 dBA $L_{Aeq,16hour}$	30 dBA LAeq,8hour

2.6.16 BS8233:2014 offers additional guidance in the form of notes appended to the above table. In particular:

> *NOTE 5: If relying on closed windows to meet the guide values, there needs to be an appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level.*
> *NOTE 7: Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved.*

2.6.17 The standard for long term L_{AEQ} is consistent with the WHO guidelines on Community Noise standards.

Specific environment	Critical health effect(s)	LAeq [dB]	Time base [hours]	LAMax, fast [dB]
Dwelling, indoors	Speech intelligibility and moderate annoyance, daytime and evening	35	16	45
Inside bedrooms	Sleep disturbance, night-time	30	8	

2.6.18 These standards are directly relevant to the proposed site as not to exceed target levels for daytime operation.

3 Assessment Strategy

3.1 Methodology

3.1.1 As agreed with the ESDC EHO, prediction of impact is based on:

(i) Measurement of background and residual sound levels
(ii) Prediction of source sound levels from the site and then;
   a. Comparison of predicted incident noise levels with standards and guideline levels stated in BS8233:2014, and WHO guidelines.
   b. Comparison of predicted incident noise levels with background sound levels (see paragraph 3.1.1 below) and use of BS4142:2014 + A1(2019) (where applicable – see below).
   c. Comparison of a predicted rating level from the new development with the standard identified in condition 3 of planning application 12/00957/FUL.
   d. Consideration of context of the incident noise at sensitive receptors.

3.1.2 A summary of the data sources for both background and residual is included below.

Note on the applicability of BS4142:2014 + A1(2019)

3.1.3 BS4142 is a standard that predicts the potential impact of a source against the background level at the receptor location. In this instance, the measured background levels do not include the already existing Corker's Crisps land use. The proposal seeks to reinstate pre-existing development whilst allowing for efficiency and streamlining of the process.

3.1.4 Paragraph 8 of the BS4142:2014 states:

"Care is necessary in circumstances where background sound levels are low to ensure that self-generated and electrical noise within the measurement system does not unduly influence reported values, which may be the case if the measured background sound levels are less than 10 dB above the noise floor of the measuring system."

3.1.5 The note in Paragraph 8.5 also states:

"NOTE Where a new noise-sensitive receptor is introduced and there is extant industrial and/or commercial sound, it should be recognized that the industrial and/or commercial sound forms a component of the acoustic environment. In such circumstances other guidance and criteria in addition to or alternative to this standard can also inform the appropriateness of both introducing a new noise-sensitive receptor and the extent of required noise mitigation."

3.2 Background and residual data

3.2.1 Attended surveys have been undertaken at locations identified in paragraph 3.4 below. These locations are determined to be suitable for use in acoustic assessments and for BS4142:2014 purposes.

3.2.2 Measurements taken characterise typical background and residual sound levels that are subsequently used as a baseline for determination of impacts.

3.2.3 The monitoring location selected (see paragraph 3.4 below) are approximately 25m from the B1411, and at a location similar to the distance of the closest residential receptor (Willow Farm) from the local road.

3.2.4 Impact assessments are based on either measurement taken of specific sound sources or levels calculated based on source data obtained.

3.2.5 Incident noise, (LAMax data) was collected during the site monitoring for period. The maximum recorded LAMax event has been used to predict the impact of potential night time noise for the area.

3.2.6 The impact assessment used depends on the standard applied. The number and type of measurements taken is dependent on the potential degree of impact and the level of assurance required. The measurement methodology was discussed and agreed with the EHO for the area prior to implementation.

Monitoring Limitations and Uncertainty

3.2.7 The baseline noise measurement surveys used equipment and methods that generally would be expected to give results accurate to within ±1 dBA. The inherent uncertainty in measurement was minimised by ensuring measurements carried out complied with appropriate standards.

3.2.8 The monitoring carried out was noted to reflect the residual and background levels and are considered typical for the area, however, COVID restrictions had just finished at the time of monitoring, and there may not have been a normal level of activity on local roads and businesses.

3.2.9 Other sources of potential uncertainty were minimised by ensuring:

- Weather conditions were recorded as generally dry, with maximum wind speeds of approximately 1m/s.
- The ambient temperature during measurements was mainly above 5°C.
- Measurement locations were located 1.5m above ground level and more than 3.5m away from reflective surfaces (see Fig.1.2 above and photographs paragraph 3.3 below)
- Survey periods were carried out in accordance with approved standards and sufficiently characterise the sounds assessed.

Measurement equipment, location and monitoring conditions

3.2.10 Noise measurements were taken with two Cirrus 171B Class 1 integrating sound level meters located at measurement point MP1 and MP2 as noted below

- G300930 (MP1)
- G079497 (MP2)

3.2.11 The meters were field calibrated prior to measurements with Cirrus CR515 calibrators ref: 89211 and 79811 respectively. The meter was compliance checked after measurements; no significant drift was noted.

3.2.12 Copies of calibration certificates can be seen in Appendix 2 of this report.

MP1

3.2.13 Monitoring point 1 was located on the north west edge of the site approximately 25m from the B1411 on the permitter of the site adjacent to the unmade accessway road. It should be noted that the perimeter road had occasional HGV activities servicing the works at the rear of the factory.

3.2.14 The sound level meter microphone was located 1.5m from the floor and >3.5m from reflecting surface.

MP2

3.2.15 Monitoring point 2 was located on the south west edge of the site directly opposite the rear façade of Willow Farm, The location was approximately 35m from the B1411 and 10m from the façade of the house

3.2.16 The sound level meter microphone was located 1.5m from the floor and >3.5m from reflecting surface.

Weather conditions

3.2.17 Measurements and observations were taken on 03.06.21 – 04.06.21 from the locations noted above.

3.2.18 Weather conditions were observed to be hot (22°C) during the day and mild (12°C) at night, with dry, humid, with light 3 mph winds westerly wind, through the monitoring period. Cloud cover was 1/8 during monitoring on 03.06.21 daytime, completely clear at night, and slightly cloudy during 04.06.21 (3/8 cloud cover).

3.2.19 Weather conditions were therefore acceptable for monitoring of sound.

3.3 Source noise for plant and equipment (predicted)

3.3.1 The site plant and equipment was evaluated based the site plans (specifically the plan in Appendix 2) and levels predicted levels from within buildings that are considered overestimates of the actual likely sound level.

3.3.2 Source sound levels were established from measurement of remaining plant onsite, or estimates of sound power based on type of plant.

3.3.3 The source data was input into a noise model as noted in paragraph 3.4 below. The source data inputs into the model are itemised in paragraph 3.4.1 below and is split into source data for buildings, vehicle movements, and external plant. The combined impact of all sources operating as per the model inputs is provided as a worst case scenario. In practice, and particularly at night, full scale operation of all plant, and all deliveries is highly unlikely.

3.4 Noise Modelling

3.4.1 SoundPLAN is a noise modelling software designed specifically to provide visual representations of noise level predictions. The model requires a natural topographical digital map to be overlaid with generic man made feature data such as building heights and widths, roads, local barriers etc. The model is then updated to ensure that model 'surfaces' behave appropriately in respect of absorption and reflection of noise. Lastly noise sources are added, with known sound power or sound pressure levels and frequency spectra data as noted in 3.1.2 above. The model then calculates the resulting transit of sound from the source(s) to receptor(s) taking into account the various obstacles, reflections and absorption characteristics that would impede the propagation of sound through the environment.

3.4.2 SoundPLAN is a model that is capable of using multiple different modelling techniques. This assessment (common to most assessments in the UK) utilises the calculation methods for ISO 9613 part 2. This is an internationally recognised standard for the modelling of noise and is accepted as suitable for assessment of industrial noise sources.

3.4.3 SoundPLAN as a standard acoustic model, would be expected to provide an accuracy of ±3 dB for the modelling aspect, but overall uncertainty is heavily dependent on the quality of the data input. Uncertainty has been minimised by applying a worst case approach, the results are therefore considered to be higher than may actually be the case, as the source data is conservative.

Model Assumptions

3.4.4 The results for modelling are based on the plan 200954/118 Rev F and the following assumptions:

BUILDINGS

3.4.5 It is assumed that the main production building will operate at the highest level permitted under the Control of Noise and Vibration at Work Regulations 2005, and that other building sources are lower e.g. stores. The main production building is estimated to have a level of 85 dB(A) internally, whilst the stores 75 dB(A) internally. No significant noise is expected from offices.

3.4.6 It is assumed that the building construction matches the existing stores building and will provide an estimated sound reduction for roof and wall cladding – 35 dB R_W. All production buildings doors are

assumed to have rapid closing vinyl shutters, closed at all times except to allow vehicle movements – 10dB R_W.

3.4.7 Main loading bays assumed to be dock loaders, with vehicles reversed up to building

3.4.8 No account has been made for any forklift movements between stores and production building, but these activities are assumed to be low frequency and only during the day if they occur at all.

VEHICLE MOVEMENTS

3.4.9 It is assumed that during daytime there will be 10 vehicle movements around site per hour and 2 per hour overnight as a worst case, *actual levels may be substantially less*.

3.4.10 An assumed source term 101 dB(A) SWL @15km/h has been used.

3.4.11 It is assumed that typically there will be 3 HGV parked in loading bays with chiller units using electric hook ups at any one time – 88 dB(A) SWL.

EXTERNAL PLANT ASSUMED FOR BOTH MODELS

3.4.12 Only the external plant identified on the planning drawing (comprising 5 pieces of plant located between the two new buildings) has been considered within the prediction model, this includes refrigeration condensers and compressors, the assumed levels as a worst case the model considers these sources to be:

- Compressors – 93 dB(A) SWL
- Refrigeration units – 73 dB(A) SWL

MITIGATION

3.4.13 It is assumed that a 3 metre high timber reflective fence constructed alongside boundary with Willow Farm provides a reduction in noise levels from site operations.

3.4.14 It is assumed that doors are kept closed during normal operation except for access.

3.5 Limitations & Uncertainty

3.5.1 Impact assessments have been prepared in accordance with source data obtained for 'as installed' plant and equipment at the existing Corkers, Budden Road site, and drawn from manufacturer data for new plant. The calculations using SoundPLAN conform to ISO9613 that has an uncertainty reported as ±3dB uncertainty. ISO9613 assumes a *downwind* model output that will tend to over estimate actual noise transmission from source to receptor locations. The calculated levels are therefore based on worst case data. Estimates assume the continuous operation of all plant except where specifically noted, in reality some plant will idle or not operate.

3.5.2 The 'Uncertainty Budget' has been derived using the methodology detailed in 'Uncertainties in Noise Measurement' produced by Kerry and Craven (Craven, N. J., Kerry, G. 2007. '*Uncertainties in Noise Measurement*'. University of Salford). This document requires an uncertainty budget to be calculated based on the following approach:

1. Define the half value (for example; 3 for ± 3 dB) of each source of uncertainty,
2. Apply a correction for the standard uncertainty for a rectangular distribution ($x / \sqrt{3}$) for each source of uncertainty,
3. Add together the values found in 2 for all uncertainties,
4. Take the square root to find the combined uncertainty',
5. Multiply by 2 to calculate the expanded uncertainty to 95% confidence.

3.5.3 The paper advises that for a single sound level meter the uncertainty budget would be "like the ±0.7 dB tolerance of a type 1 sound level meter". It also advises that "measuring under downwind conditions usually

produce worst-case conditions at distance of several hundred metres", therefore the ± 3 dB uncertainty advised in ISO 9613-2 has been used due to the short distances between measurement location and source.

3.5.4 These calculations are repeated for each of the model parameters for the uncertainty budget:

Parameter	Accuracy	variance	Comments
Measurement Uncertainty			
Measurement of source. Instrumentation accuracy	±1dB	$1/\sqrt{3}$ = ***0.57dB***	Minimised by use of calibrated traceable instrumentation
Use of windscreen	±0.19dB	$0.2/\sqrt{3}$ = ***0.116dB***	Prevents local wind effects, all meters collecting data used wind screens
Measurement of sources Distance from source (estimate)	±0.5m (Worst case 50cm error over 10m)	20*log(9.5/10) = -0.45 20*log(10.5/10) = +0.42 Difference is ***0.87dB*** ***0.87/***$\sqrt{3}$ = ***0.6dB***	Minimised by use of laser measurement devices
Measurement uncertainty	Total variance = 1.286	$\sqrt{1.286}$ = ***1.13 dB***	The uncertainty in background due to measurement location alone
Modelling uncertainty	Total variance = 6	$\sqrt{3}$ = ***1.73 dB***	Quoted as ± 3dB Table 5 ISO9613
TOTAL	Total of uncertainty variance is 1.13 + 1.73 dB	***√2.86dB = 1.7dB***	Total variance. *NB: this figure has been incorporated into the model results to reflect a 'typical' worst case*
Total uncertainty		**±3.4 dB**	95% confidence for all uncertainties.

Results obtained from modelling can be up to 4 dB better or worse than predicted assuming the data collected is representative, if the uncertainty expands to +3 dB for the full worst case assessment this equates to a doubling of activity on site that is already predicted to be significantly above pre-existing levels for assessment purposes.

However the predicted results are based on conservative estimates and worst case scenarios and it would be expected that the results presented are higher than the likely actual levels and therefore the predictions are already considered worst case making it more likely that the actual observed values will be lower than expected.

4 Results

4.1 General

4.1.1 The results are divided into; (i) determination of pre-existing background and residual sound levels, and (ii) modelled predictions for operational noise (the sum total of all sources as modelled using the SoundPLAN outputs). These details are provided below.

4.2 Background and Residual sound levels

4.2.1 The full background and residual results are provided in Appendix 1. They are summarised below:

4.2.2 The average levels for L_{day} and L_{night} time are indicated below. The results for MP1 are affected by measured noise from construction activities and deliveries to the site and therefore are no truly representative of residual with no Corker's activity, though they provide an indication of possible pre-fire levels.

MP1

Start Time	End Time	Duration	LAeq (dB)	LAMax (dB)	LA90 (dB)
03/06/2021 14:00	03/06/2021 23:00	09:00:00	54.1	82.4	29.2
03/06/2021 23:00	04/06/2021 07:00	08:00:00	52.5	85.1	22.1
04/06/2021 07:00	04/06/2021 13:09	06:09:28	59.9	80.9	45.5

4.2.3 MP2 results reflect the background and residual level at receptor locations. The results for MP2 below are therefore considered to represent background and residual levels for the area *in the absence of* Corkers Crisps being operational.

MP2

Start Time	End Time	Duration	LAeq (dB)	LAMax (dB)	LA90 (dB)
03/06/2021 12:54	03/06/2021 23:00	10:05:55	47.9	78.4	25.3
03/06/2021 23:00	04/06/2021 07:00	08:00:00	42.2	67.7	20.2
04/06/2021 07:00	04/06/2021 13:00	06:00:09	49.1	71.3	35.9

4.2.4 The daytime residual level is noted to vary between 44 dB $L_{AEQ1hour}$ and 51 dB $L_{AEQ1hour}$ with an average level of 48 dB $L_{AEQ16hour,}$ the night time level is noted to vary between 21 dB $L_{AEQ15minute}$ and 52 dB $L_{AEQ15minute}$ with an average of is 42 dB $L_{AEQ8hour}$, and background levels are (at lowest) 25 dB LA90 daytime and 20 dB LA90 night time respectively.

4.2.5 These figures have been used in the impact assessments below.

4.3 Modelled Operational Noise

4.3.1 Operational noise levels have been modelled using SoundPLAN software as noted described in section 3.4 above. The modelled outputs can be seen in Appendix 3.

4.3.2 The modelled data provides details of two modelled scenarios:

- The maximum level (generated by all operating plant, 10 HGV vehicles per hour, and high levels of internal factory noise all used simultaneously) and used to assume continuous worst case operation for 1 hour as part of the BS4142:2014 assessments and to compare to WHO 16hour L_{day}
- The maximum level (generated by all operating plant, 2 HGV vehicles per hour, and high levels of internal factory noise all used simultaneously) and used to assume continuous worst case operation for 15 minute as part of the BS4142:2014 assessments and to compare to WHO 8hour

L_{night}.

4.3.3 The model results are shown in detail in Appendix 3, but data from the predicted sound levels for typical levels are summarised in the paragraphs below.

4.4 Summary Data (All operational plant)

4.4.1 Based on the model outputs as noted above, Table 1 summarises compliance with the identified standards.

4.4.2 The modelled outputs clearly note that the impact of the site activities complies with WHO guideline values averaged over a day. The maximum 1 hour levels determined are used to predict short duration impacts using the BS4142 assessment method.

4.4.3 Compliance with the WHO guideline levels indicates that the predicted noise levels will, at worst, create a moderate impact on residential receptors. Given that the activities are limited to day time and finish at 5.30pm it is unlikely that the impact will be worse than the previous 24 hour foundry use.

Table 1 LAEQ and plant contribution data (mitigated)

Receptor	**Predicted levels**		**Standards**			
	$L_{Aeq,16hour}$ (L_{day})	**$L_{Aeq,8hour}$ (L_{night})**	**WHO Guidelines (external)**		**WHO 2009**	**Condition 3 12/00957/FUL**
			L_{day} 55 dB	**L_{night} 45 dB**	**L_{night} 40 dB**	**35 dB L_{night}**
Mount Pleasant Cottages	27	27	✓	✓	✓	✓
Willow Farm	44	42	✓	✓	+2	NA
Guildacre Farm	27	24	✓	✓	✓	✓
Hearthersnet, Cophall Drove	26	24	✓	✓	✓	✓

4.4.4 The above data, in conjunction with that presented in paragraph 4.1 above, has been used to predict impact using the BS4142 assessment below.

4.5 BS4142 Assessment

4.5.1 The following assessment has been produced based on the data summarised above for the premises not connected with the business.

4.5.2 BS4142:2014 requires that the specific noise source is acoustically assessed for character as part of the procedure. *The character is always assessed at the receptor location*. The degree of perception of a sound is based on its overall loudness, frequency, duration, and distinctive features. Determining the character of the specific noise, where the assessment relies on prediction alone is difficult. However, a subjective assessment carried can be inferred by comparing the predicted level to the existing measured residual. Where the prediction of specific noise is below the measured residual it is not likely that noise will be audible, where there prediction is 10 dB or more below the residual, it is unlikely that a source would be audible and therefore the BS4142 assessment would not apply.

4.5.3 For completeness a BS4142 assessment is included below, but it is considered to be of little practical value as all other compliance metrics are complied with, and the result of BS4142 is a mathematical anomaly.

4.5.4 A arbitrary +5 dB character correction for potential barely audible tonal noise (+2 dB) and barely audible impact noise (+3 dB) has been applied.

Table 2 BS4142 assessment (worst case)

Results	Sound Level (dB)	Relevant BS4142 Clause	Comments
Modelled Specific Level (maximum)	27	7.3.2	Assumes all plant is operational.
Residual Level	-		Not considered, representative residual levels not available. No corrections applicable.
Acoustic feature correction	+5	9.2	Estimation of impact for no mitigation is consider +6 dB, clearly audible crashes and bangs, and +4 dB clearly audible engine noise. Based on estimations of impact, observed noise is likely to be slightly audible impulsive noise +3 dB impulse correction (crashing of metal on metal), and possible tonal noise from operation of external plant, +2 dB tonal correction. High residual noise levels may mask daytime operation.
Rating level	32	9.2	
Background sound level	23	8.1.1 8.1.3 8.3	The median background level has been determined as shown in Appendix 1
Excess of rating over background sound level	+9	11	**Adverse impact**
Assessment (context)	The site is remote (over 400m) from the nearest receptor. Residual sound levels are low. Existing background levels are very low. The specific noise level of 27 dB is over 15 dB less than the average residual level of noise in the area. It is very unlikely the sound of activities on the site will be audible. The background levels selected are night time, most residential units will not be using garden areas at night, hence the only impact would be for those using garden areas well after midnight. This is assumed to be infrequent and unlikely to cause any adverse impacts other than an occasional barely noticeable distance sound. In context the assessment considers that there is little or no potential for adverse impact.		

4.6 LAMax Assessment

4.6.1 WHO guidelines state that external LAMax events above 60 dB at the façade of sensitive receptor have the potential for adverse health impacts.

4.6.2 Measurements reported in Appendix 1 above, show LAMax levels to be above this criterion level without Corker's operating. The events were identified as road traffic noise occurring between 23.00hrs and 07.00hrs.

4.6.3 The nature of event noise from the application site will be delivery noise, engine noise, occasional clanks and bangs, but not markedly different from the existing. All deliveries are noted to be at least 40m from the nearest receptor (Willow Farm) and the next closest receptor is 490m from the source.

4.6.4 The screening assessment in Appendix 4 clearly shows that the potential for impulsive noises to be exceed WHO guideline values at receptor locations is very low.

4.6.5 Potential LAMax event noise is not considered to be a significant factor and can be screened out.

5 Conclusions

5.1.1 The proposed development is to reinstate and update a the Corker's Crisps factory following the fire in June 2020. The site formerly operated 24 hours a day.

5.1.2 The assessments carried out assume a worst case. It is highly unlikely that internal factory noise will be 85 dB in operational areas. It is more likely to be around 75 dB. However, the worst case has been applied to ensure a conservative assessment.

5.1.3 The area is mixed industrial/agricultural uses with relatively few (distant) residential units, more than 400m from the site. The only residential use within close proximity is Willow Farm itself and is in the ownership of the applicant. The existing background and residual levels are low and the receptor locations will receive sound level contributions from a wide range of sources at the receptor location, including the proposed installation when it recommences operation. Calculated levels of potential noise from the application site would indicate that the distant receptors will receive no significant perceptible sound (see table 5.0 below).

5.1.4 The loudest proposed activities are deliveries, and the use of external operational plant, predictions indicate that these will no be audible except at night, where they will be clearly audible at Willow Farm, but likely inaudible at other receptors. Willow Farm will require a 3m acoustic barrier to ensure that incident vehicle movements in the revised layout are mitigated to an acceptable level.

5.1.5 With the above controls in place the modelled data provides the outcomes summarised in the Table 3 below.

Table 3 Summary of impact predictions

Receptor	**Predicted levels**		**Compliance with Standards**				
	Maximum $L_{Aeq,1hour}$	**$L_{Aeq,16hour}$ (L_{day})**	**WHO Guidelines (external) daytime**		**WHO 2009**	**WHO Guidelines (internal) night-time**	**BS4142 assessment level**
			L_{day} 55 dB	**L_{day} 50 dB**	**L_{nighty} 40 dB**	**30 dB L_{night}**	**Nighttime**
Mount Pleasant Cottages	27	27	✓	✓	✓	✓	+9 dB
Willow Farm	44	42	✓	✓	+2 dB	✓	NA
Guildacre Farm	27	24	✓	✓	✓	✓	+6 dB
Hearthersnet, Cophall Drove	26	24	✓	✓	✓	✓	+6 dB

5.1.6 The modelled data is a worst case, the actual observed levels may be lower.

5.1.7 The data clearly shows that both the World Health Organisation guideline levels are met for 16-hour L_{day}, based on a worst case.

5.1.8 Similarly, assuming a transmission loss through a window of 15 dB, the internal acoustic environment of homes, meets the requirements of WHO guidelines for internal noise at all receptor locations, including Willow Farm.

5.1.9 The BS4142:2014 results show an exceedance of the +5 dB threshold and indicates a potential for adverse impact at Willow Farm, however, BS4142 clearly advises that any result needs to be placed in context. Clause 11 of the standard states:

"The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs. An effective assessment cannot be conducted without an understanding of the reason(s) for the assessment and the context in which the sound occurs/will occur. When making assessments and arriving at decisions, therefore, it is essential to place the sound in context." ***Author's emphasis***

5.1.10 In the context of the former site, the sources of noise were present without the environment for many years without complaint. The redevelopment of the site with updated modern buildings, revised production layouts, new plant and equipment, and local barriers, will further reduce potential impacts.

5.1.11 Noise from the site will be audible outside in the garden areas for Willow Farm, probably as muffled thumps and occasional clangs, and dull hums in between road traffic events using the B1411. Some distant reversing bleepers may be just noticeable. This would be consistent with pre-existing noise, and, in planning terms, the outcome is considered to be *'noticeable but not intrusive'* overall for Willow Farm. All other locations are likely unlikely to perceive the activities on site, and the outcome is considered to be *'not noticeable'* in planning terms.

5.1.12 No external forklift truck activity has been considered at night. If fork lifts are in use after 23.00hrs there may be potential for these to be audible at Willow Farm but it is unlikely that their activities will impact other receptors (see screening assessment in Appendix 4). The likely outcome of use of forklifts is considered to be '*noticeable but not intrusive*' overall for Willow Farm. All other locations are likely unlikely to perceive the activities on site, and the outcome is considered to be '*not noticeable*' in planning terms.

5.2 Mitigation measures

5.2.1 Mitigation measures for the proposed site have been considered and are summarised below.

5.2.2 The new buildings should be constructed to provide a minimum sound reduction (R_w) of 35 dB.

5.2.3 The access doors in the building should (as a minimum) be fitted with rapid closing vinyl shutters, closed at all times except to allow vehicle movements that provide a minimum sound reduction (R_W) of 10dB. Ideally doors that are not used routinely should be more robust acoustic roller shutter doors with a minimum sound reduction (R_W) of 20dB.

5.2.4 In context the site should have a lower overall impact than the previous site layout, and has been positively demonstrated to meet all the relevant standards, including the more onerous standard outlined in Condition 3 of the 2012 planning consent,

5.2.5 It is my opinion that the evidence provided positively demonstrates compliance with local and national planning policy and that consent for the development should not be withheld on acoustic grounds.

GLOSSARY:

Sound – an acoustic effect perceived by an individual. Sound is perceived differently by individuals and is highly subjective. Acoustically for sound to be perceived it has to be above the threshold of hearing (typically taken to be 0dB) but this threshold varies between individuals.

Noise – noise is defined as unwanted sound. The level at which noise is present will indicate the potential impact. In order for a sound to become noise, it has to be perceivable by the individual. Technically noise can be described in terms of its acoustic profile, typically though noise at or below the ambient levels is rarely loud enough to be considered significant.

Acoustic environment sound from all sound sources as modified by the environment [BS ISO 12913-1:2013]

'A' Weighting – This function modifies the linear frequency response of the meter sound profile to attempts to simulate the characteristics of human hearing. Hence a dB(A) reading is a subjective evaluation of what we actually hear whereas dB (LIN) (now written dBZ), is an objective reading of what is actually present. A weightings are normally used in environmental and occupational measurements

Ambient – This is the general level of sound in an area. It is usually composed of sound from many sources near and far, that together make the 'average' noise for an area. Ambient noise is normally described using a long term average sound level (typically LAEQ).

Ambient sound – totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far. *NOTE The ambient sound comprises the residual sound and the specific sound when present.*

Ambient sound level, LAeq,T – equivalent continuous A-weighted sound pressure level of the totally encompassing sound in a given situation at a given time, usually from many sources near and far, at the assessment location over a given time interval, *T*. *NOTE The ambient sound level is a measure of the residual sound and the specific sound when present.*

Attenuation – The loss in energy level of the sound usually used in relation to the loss due to sound passing through a structure or enclosure.

Background Noise Level – The underlying level of sound in the absence of the source is normally measured as an LA90, the level which is exceeded by 90% of sound present. This measurement effectively screens out transient noises. Occasionally LA99 is used which is the level which is exceeded by 99% of the sound present.

Background sound level, LA90,T – A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, *T*, measured using time weighting F and quoted to the nearest whole number of decibels

Decibel (dB) – a unit or level, derived from the logarithm of the ratio between the sound pressure measured and a reference value. For sound pressure level the reference quantity is 20μPa, the threshold of normal hearing is in the region of 0 dB and 140 dB is the threshold of pain. A change of 1 dB is only barely perceptible whilst a change of 10dB is considered significant. Sound pressure levels are noted as SPL, sound power can also be measured as a ratio of energy values, and is normally noted as SWL.

dB(A) (See A weighting above) – decibels measured on a sound level meter weighted by a scale which is designed to reflect the perception by the human ear. A noise meter incorporates a frequency weighting device to create this differentiation. Measurements in dB(A) broadly agree with people's assessment of loudness for broadband noise. A change of 3 dB(A) is the minimum perceptible under normal conditions, and a change of 10 dB(A) corresponds roughly to halving or doubling the loudness of a sound. The background noise level in a living room may be about 30 dB(A); normal conversation about 60 dB(A) at 1 metre; a busy factory may have a level around 85dB(A); the level near a pneumatic drill about 100 dB(A).

Equivalent continuous A-weighted sound pressure level, LAeq,T – value of the A-weighted sound pressure level in decibels of continuous steady sound that, within a specified time interval, $T = t2 - t1$, has the same mean-squared sound pressure as a sound that varies with time. *NOTE The equivalent continuous A-weighted sound pressure level is normally quoted to the nearest whole number of decibels.*

Frequency – This is the number wavelengths passing a given point per second. The unit is the hertz (Hz). Frequency is the normal variation in pitch that most sounds have over time. Sound is normally made up of many different frequencies, and they behave differently within the environment. For example, moderate and high frequencies are damped out easily by barriers, screens or enclosures while low frequencies are more difficult to attenuate, which explains why loud music from a neighbour perceived through a wall often only sounds like a dull base thumping noise.

Impulse Noise – Single or repeated sound of short duration such as a bang or crash.

LA90 – The A weighted noise level exceeded for 90% of the specified measurement period. It is a statistical measurement. Used in BS 4142:2014 as the baseline for impact assessment and more generally it is used to define background noise level. Example, if a sound measurement carried out each second over 100 seconds the LA90 result would be the level representing the quietest 10% of the readings i.e. 10seconds.

LAeq – The equivalent continuous sound level - the sound level of a notionally steady sound having the same energy as a fluctuating sound over a specified measurement period. LAeq is used to describe many types of noise and can be measured directly with an integrating sound level meter. It is obtained by continuously integrating ('adding up the energy of') a fluctuating sound signal and dividing by the elapsed time, to give the true mathematical average of any time varying signal. An Leq reading must always be related to a time period, it should not be read as an instantaneous value of sound pressure.

LAMax – The highest A weighted noise level recorded during a noise event. The time weighting used (F or S) should be stated. Almost all environmental measurements are 'Fast' weighted.

Logarithmic – A scale where the exponent indicating the power to which a fixed number, the base, must be raised to produce a given number. The base used in acoustics is 10. Thus, the logarithm of 10 = 1, the logarithm of 100 = 2 and the logarithm of 1000 = 3. Logarithms are used to convert very spans of pressure or energy measurements into usable scales.

Loudness – An observer's auditory impression of the strength of a sound. It is a subjective effect which is a function of the way we hear, and psychoacoustic response as well as the amplitude and frequency of the sound.

Masking – The process by which the threshold of hearing of one sound is reduced due to the presence of another which 'masks' the first.

Measurement Periods (T) – is the period over which the measurement is taken, normally varies between 5mins to an hour. More commonly 'real time' analysis and new data storage capabilities has allowed measurement times to be reduced to 1 second

Measurement time interval, Tm – total time over which measurements are taken. *NOTE This may consist of the sum of a number of non-contiguous, short-term measurement time intervals.*

Meter response and time weightings – Sound Level Meters are provided with a sampling reference time weightings dependent on the sounds to be assessed. The variable time response control with settings are:- 'S' Slow; 'F' Fast; 'I' Impulse; 'P' Peak.

'S' Slow – meter response is over damped with a time constant of approximately 1000ms. The setting tends to average out variations in sound levels in the readings.

'F' Fast – meter responses sample over a response of 125ms. i.e. the measurement for variable sound will respond each 1/8th of a second showing a value.

'I' Impulse – uses a special electrical circuit with a time constant of about 35ms (of the same order as the response time of the human ear) to permit a very rapid response for investigating very sudden, short duration - impulsive - sounds. This setting incorporates a detector which in effect stores the signal for sufficient time to allow it to be displayed. Also, a slow decay rate is incorporated with time response of approx. 1500ms to allow more easy reading of the maximum value as the indicator moves back relatively slowly.

Peak – Sound Level Meters often incorporate this setting which enables the **absolute peak** (as opposed to the rms) value of an impulsive waveform to be measured. A time constant of the order of 20 - 50 micro seconds is now involved to permit the following of very sharp impulsive events. Evidently electrical signal storage is also required to permit the meter to register the peak of such very fast events.

Rating Level – The specific noise level of a source when measured at receiver location (usually averaged over a time interval) plus any adjustment (penalty or weighting) for the characteristic features of the noise. It is used in BS4142 to rate the likelihood of complaints.

Reference time interval, Tr – specified interval over which the specific sound level is determined. *NOTE This is 1 h during the day from 07:00 h to 23:00 h and a shorter period of 15 min at night from 23:00 h to 07:00 h.*

Residual sound – ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound

Residual sound level, Lr = LAeq,T – equivalent continuous A-weighted sound pressure level of the residual sound at the assessment location over a given time interval, *T*

Specific sound level, Ls = LAeq,Tr – equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, *Tr*

Specific sound source – sound source being assessed

WHO – World Health Organisation

REFERENCES:

- BS 7445-1:2003: Description and measurement of environmental noise. Guide to quantities and procedures
- BS 4142:2014+A1(2019) Method for rating and assessing industrial and commercial sound
- BS 8233:2014
- WHO Guidelines on Community Noise 1999
- http://www.who.int/docstore/peh/noise/guidelines2.html
- WHO Guidelines NIGHT NOISE GUIDELINES FOR EUROPE 2009
- www.euro.who.int/en/health-topics/environment-and-health/noise/publications/2009/night-noise-guidelines-for-europe
- WHO Noise Guidelines for Europe 2018
- http://www.euro.who.int/en/health-topics/environment-and health/noise/publications/2018/environmental-noise-guidelines-for-the-european-region-2018

APPENDICES:

LIST OF APPENDIX TABLES:

No table of contents entries found.

APPENDIX 1 MEASURED SOUND LEVELS

Background/Residual noise levels 03.06.21 – 04.06.21

		MP1			MP2		
Start Time	**Duration**	**LAeq**	**LAMax**	**LA90**	**LAeq**	**LAMax**	**LA90**
03/06/2021 12:54	00:05:55				49.7	64.4	39.1
03/06/2021 13:00	01:00:00				48.3	68.6	37.9
03/06/2021 14:00	01:00:00	53.8	80.2	34.5	47.7	66.7	38.3
03/06/2021 15:00	01:00:00	56.8	78.6	34.7	49.9	68	37.5
03/06/2021 16:00	01:00:00	57.6	79.2	40	49.6	68.2	38.9
03/06/2021 17:00	01:00:00	56	82.4	33.9	48.6	66.6	31.5
03/06/2021 18:00	01:00:00	54.6	80.6	33.2	48.4	67.9	30.5
03/06/2021 19:00	01:00:00	51.3	69	31.3	47	64.7	30
03/06/2021 20:00	01:00:00	50.4	70.4	28.3	45.4	70	25.9
03/06/2021 21:00	01:00:00	47.5	69.1	28.5	43.7	65.1	23.2
03/06/2021 22:00	01:00:00	47.5	71.6	21.4	46.7	78.4	20.3
03/06/2021 23:00	00:15:00	41.3	53.6	31.2	32.3	47.5	22.8
03/06/2021 23:15	00:15:00	42.2	64.6	27.1	38.9	65.4	21.7
03/06/2021 23:30	00:15:00	39.7	62.9	24.2	39.6	62.3	20.6
03/06/2021 23:45	00:15:00	54	71.3	24.8	51.5	67.7	21
04/06/2021 00:00	00:15:00	47	66.6	21.4	42.1	66	19.1
04/06/2021 00:15	00:15:00	24	31.2	21.2	24.9	40.5	19.1
04/06/2021 00:30	00:15:00	28.8	42.8	21.5	27.4	43.7	20.3
04/06/2021 00:45	00:15:00	23.4	35.8	20.8	22.3	33.8	18.8
04/06/2021 01:00	00:15:00	27.5	42.7	20.7	25.5	39	18.9
04/06/2021 01:15	00:15:00	23.6	37.8	20.7	20.7	31.8	18.8
04/06/2021 01:30	00:15:00	31.1	40.3	22	26	35.6	20.6
04/06/2021 01:45	00:15:00	27.2	37.5	21.7	22.7	32.8	19.7
04/06/2021 02:00	00:15:00	29.9	40.8	21	25.5	33.9	19.6
04/06/2021 02:15	00:15:00	44	66.2	21.5	43.4	65	20.2
04/06/2021 02:30	00:15:00	44.2	65.4	21.7	28.6	49.4	20.7
04/06/2021 02:45	00:15:00	29.7	50.5	22.8	25.4	39.6	22.2
04/06/2021 03:00	00:15:00	33.4	45.7	24	28.6	42.1	22.5
04/06/2021 03:15	00:15:00	34.4	52.3	24.5	35.5	54.5	23.3
04/06/2021 03:30	00:15:00	51.4	75.1	27.6	40.1	54.9	25.4
04/06/2021 03:45	00:15:00	46.6	70.8	29.2	39.5	54.8	26.6
04/06/2021 04:00	00:15:00	39.3	61.9	29.4	37.9	53.9	26.7
04/06/2021 04:15	00:15:00	48.8	69.4	29.8	44.3	64.4	28.6
04/06/2021 04:30	00:15:00	40.9	62.1	29.2	39	59.1	27.5
04/06/2021 04:45	00:15:00	49.1	61.2	30.6	35.8	49.7	27.4
04/06/2021 05:00	00:15:00	51.5	74.6	30.5	42.5	65.4	27.7
04/06/2021 05:15	00:15:00	56.8	85.1	33.3	43	62.6	30
04/06/2021 05:30	00:15:00	48.5	62.8	34.4	43.8	62.3	32.1
04/06/2021 05:45	00:15:00	53.7	74.6	33.9	44.8	62.4	30.7
04/06/2021 06:00	00:15:00	58.1	76.9	39.1	44.8	62.1	33.8
04/06/2021 06:15	00:15:00	59.6	74.9	46.7	45.9	63.8	34.1
04/06/2021 06:30	00:15:00	60.3	70.7	48.7	45.9	65.2	35.5
04/06/2021 06:45	00:15:00	61.5	76	49	48.1	62.7	36
04/06/2021 07:00	01:00:00	60	76.4	47	48.2	67.2	35
04/06/2021 08:00	01:00:00	60.5	75.7	46.5	48.5	68.7	34
04/06/2021 09:00	01:00:00	60.7	80.9	48.2	49.7	69.2	38.9
04/06/2021 10:00	01:00:00	60.8	76.7	47	49.9	71.2	38.8
04/06/2021 11:00	01:00:00	58	76.6	41.6	48.5	71.3	34.6
04/06/2021 12:00	01:00:00	59.2	76.7	46	49.6	67.2	37.1
04/06/2021 13:00	00:09:28	53.5	66.2	42.8	44.7	48.2	39.7

The average levels for L_{day} and L_{night} time are indicated below. The results for MP1 are affected by measured noise from construction activities and deliveries to the site. MP2 results reflect the background and residual level at receptor locations. The results for MP2 below are therefore considered to represent background and residual levels for the area in the absence of Corkers Crisps being operational.

MP1

Start Time	End Time	Duration	LAeq (dB)	LAMax (dB)	LA90 (dB)
03/06/2021 14:00	03/06/2021 23:00	09:00:00	54.1	82.4	29.2
03/06/2021 23:00	04/06/2021 07:00	08:00:00	52.5	85.1	22.1
04/06/2021 07:00	04/06/2021 13:09	06:09:28	59.9	80.9	45.5

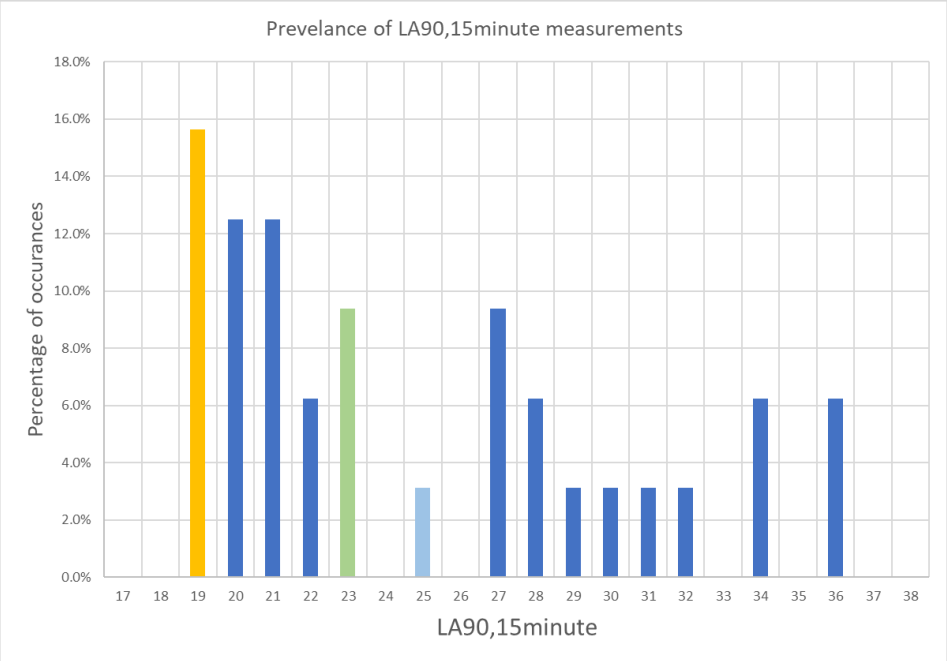
MP2

Start Time	End Time	Duration	LAeq (dB)	LAMax (dB)	LA90 (dB)
03/06/2021 12:54	03/06/2021 23:00	10:05:55	47.9	78.4	25.3
03/06/2021 23:00	04/06/2021 07:00	08:00:00	42.2	67.7	20.2
04/06/2021 07:00	04/06/2021 13:00	06:00:09	49.1	71.3	35.9

The daytime residual level is therefore 48 dB $L_{AEQ16hour,}$ the night time level is 42 dB $L_{AEQ8hour}$, and background levels are (at lowest) 25 dB LA90 daytime and 20 dB LA90 night time respectively.

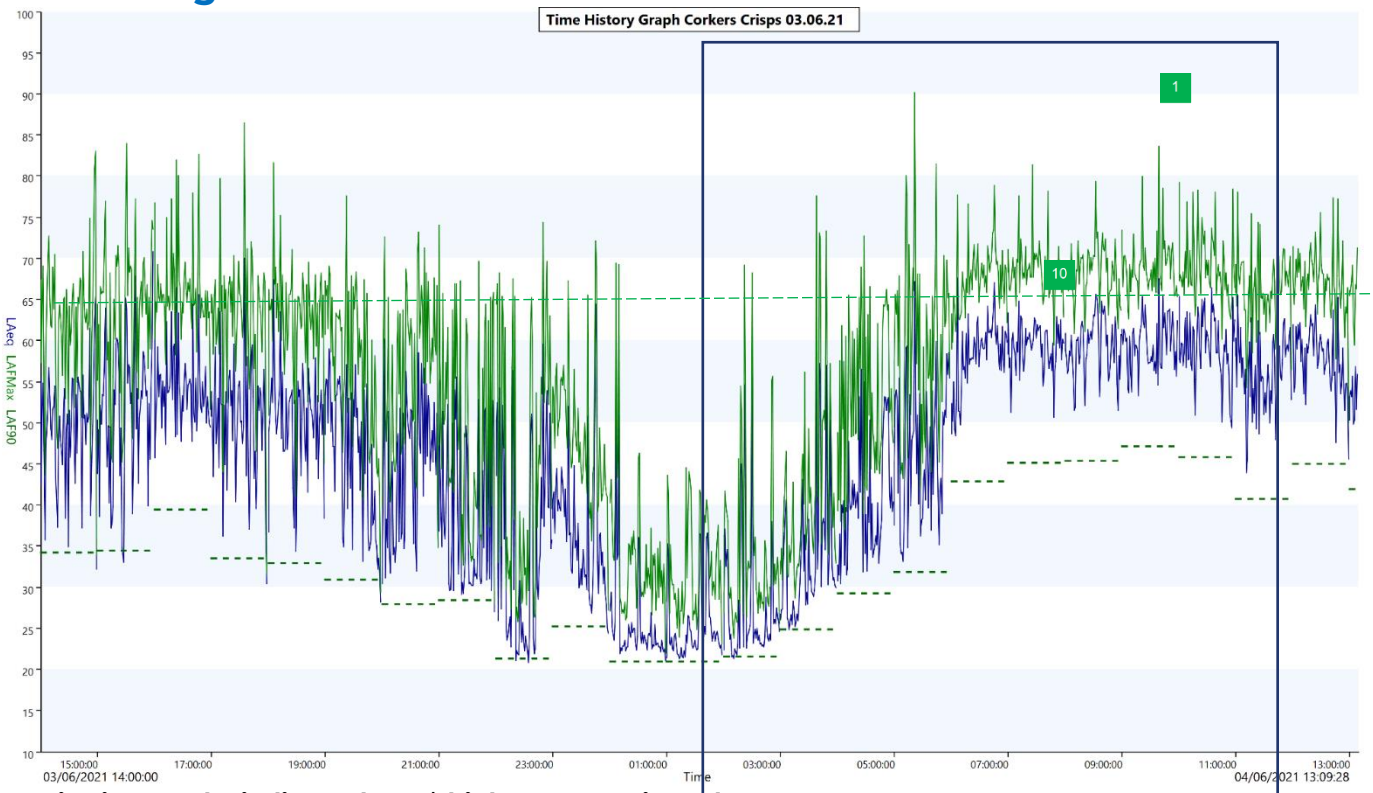
Background sound level LA90

Assessment the typical LA90 background 15mins at the nearest receptor for night time is shown below. The measured levels were assessed and the percentage occurrence of each measured LA90 integer is displayed below:



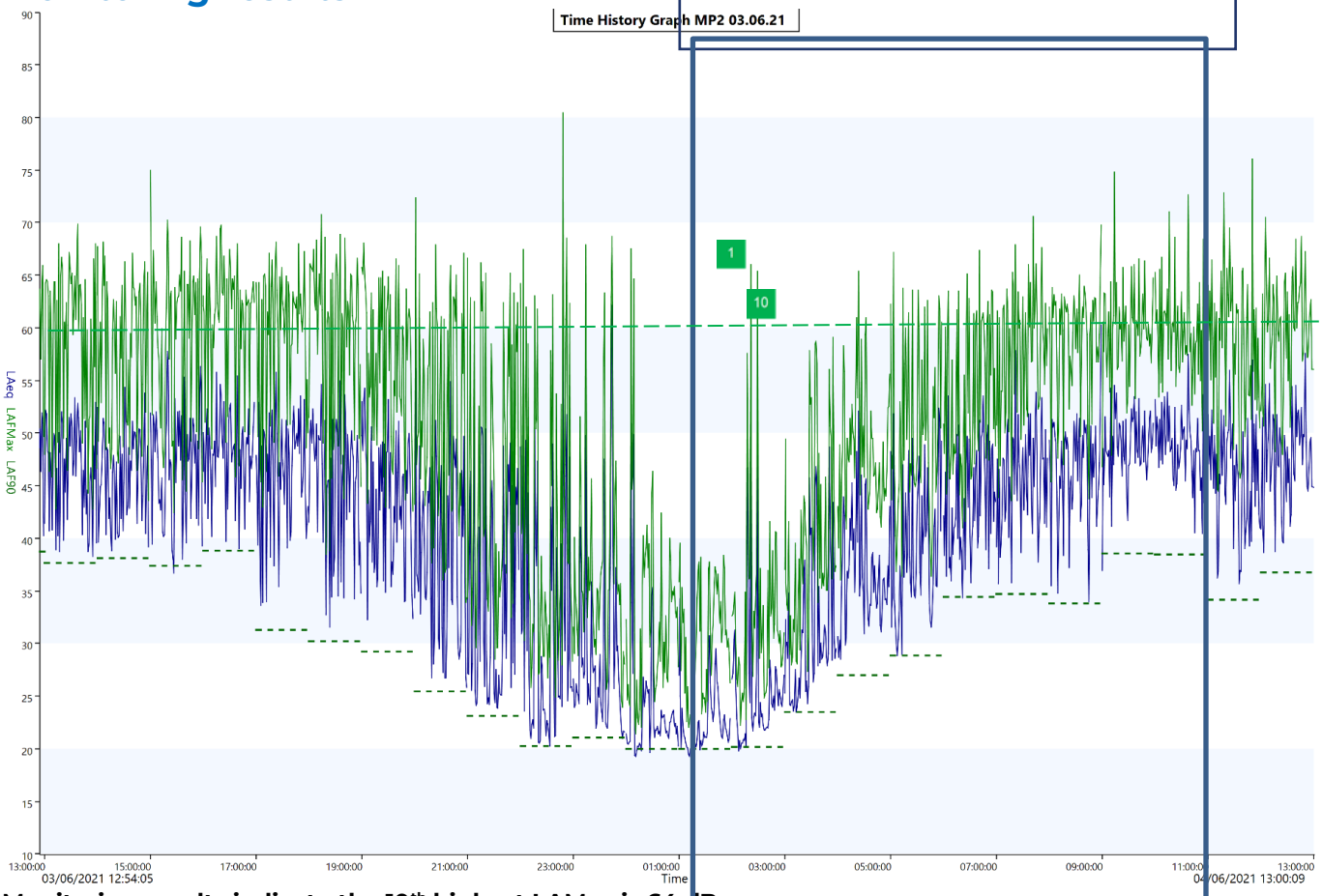
The chart shows the modal value (orange), the median value (green) and the mean value (light blue). There is no good agreement between the values indicating that the background sound level is extremely variable and *typical levels* will be difficult to determine. This is often the case with rural areas that will be affected by occasional noise sources such as road traffic, irregular farming activities and other occasional sources. It is also why the use of measured LA90 for quiet areas in BS4142 assessments provides for artificially very high assessment levels. Paragraph 8.1 BS4142 advises "*Among other considerations, diurnal patterns can have a major influence on background sound levels and, for example, the middle of the night can be distinctly different (and potentially of lesser importance) compared to the start or end of the night-time period for sleep purposes…*"

Monitoring results MP1



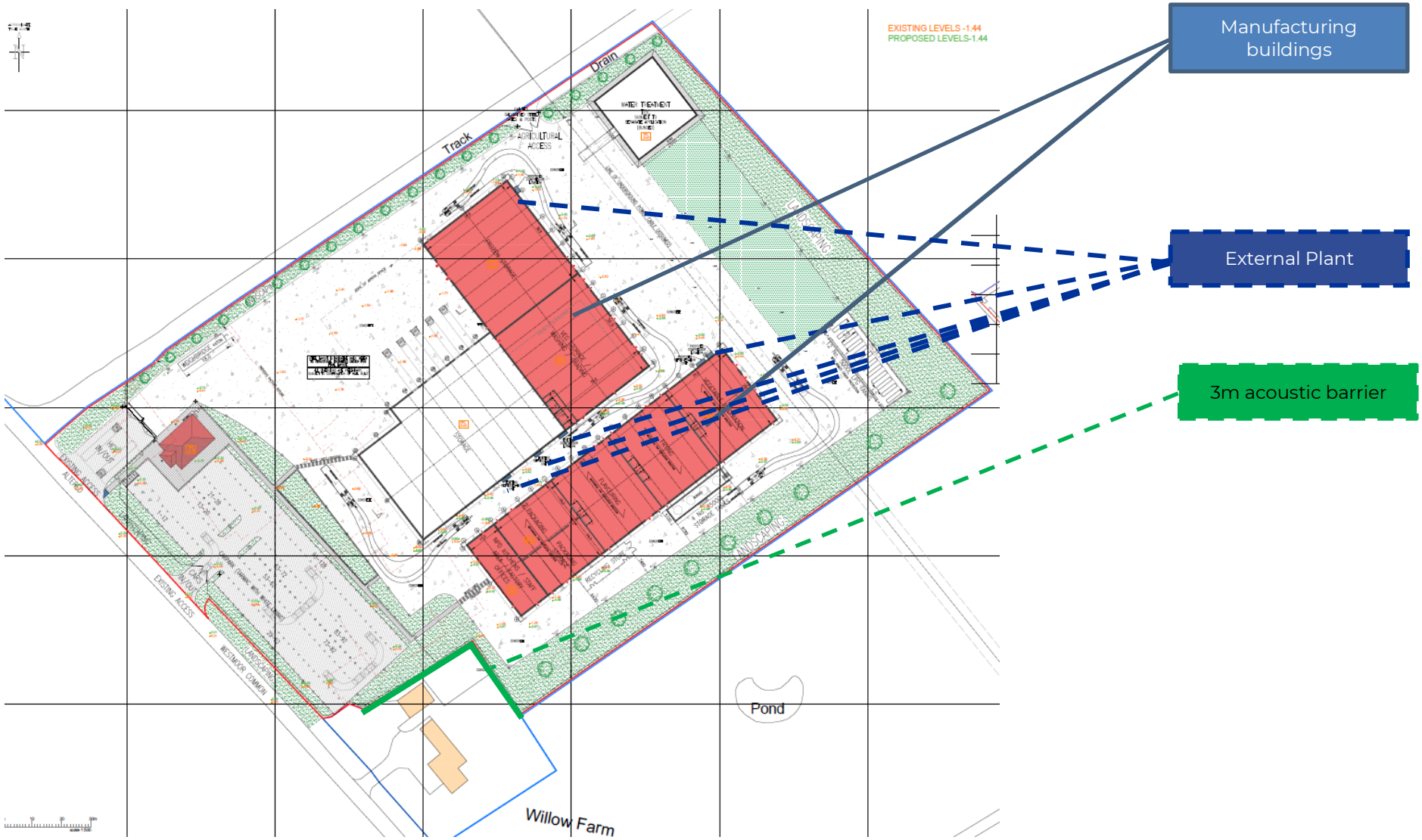
Monitoring results indicate the 10th highest LAMax is 73 dB

Monitoring results MP2



Monitoring results indicate the 10th highest LAMax is 64 dB

APPENDIX 2 SITE PLAN



APPENDIX 3 MODEL OUTPUTS

The model data outputs for ground floor sound levels at receptors to reflect garden area sound levels and incident levels in daytime usable rooms. E.g. living/dining rooms by inference (assuming a 15 dB reduction for an open window.

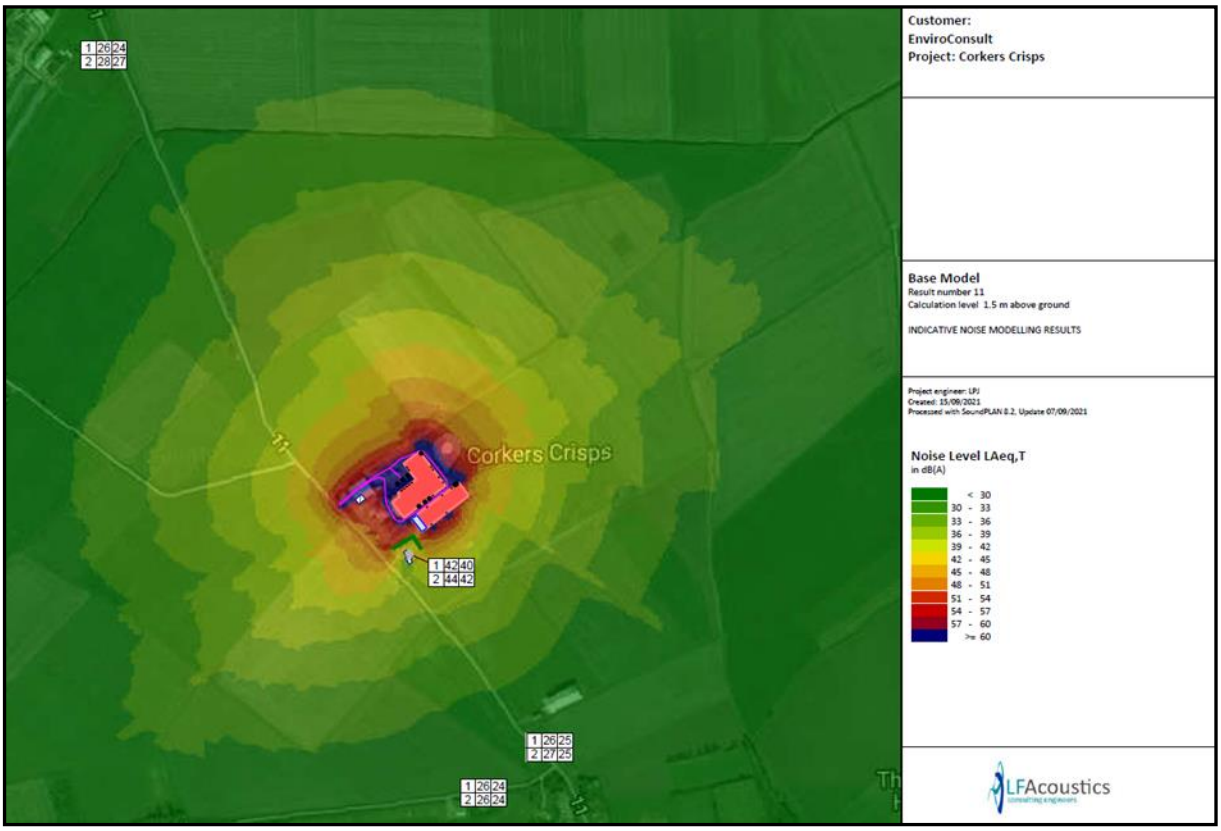
The data is presented in a colour coded format according to the key provided, and also numerically at key receptors in the following format:

Daytime Level at ground floor	Night time Level at ground floor
Daytime Level at first floor Labelled 2	Night time Level at first floor Labelled 2

Example below means, 47 dB at ground floor and 49 dB at first floor daytime, and the same for night time 54 dB and 55 dB respectively .

47	54
49	55

Modelled data daytime



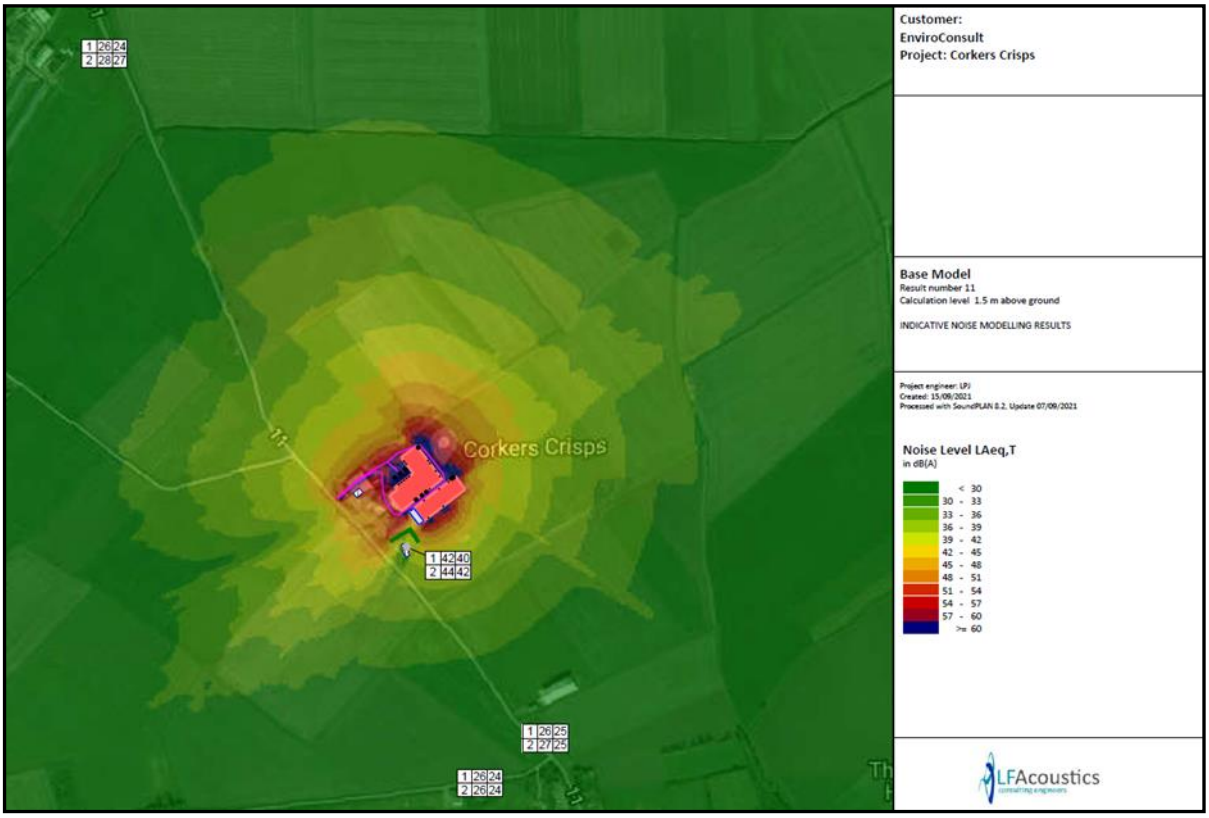
The predicted levels of noise emitted from the site are dominated by delivery noise, though external plant contributes some noise to the local receptor at Willow Farm. The robust building structure and insulation anticipated prevent noise levels at Willow Farm exceeding WHO guideline levels for daytime. The acoustic barrier protects Willow Farm from incidental yard noise and delivery noise.

Breakout from the openings to the north and south of the main process buildings is minimised with roller shutter doors. Without these additional controls for the process building, noise breakout is significant and dominates the noise climate.

Levels of noise do not exceed the WHO criterion (even at Willow Farm) would indicate potential adverse health impacts for either day or night are avoided and overall the impact is likely to be LOW.

More distance residential receptors are noted to comply with the 35 dB LAEQ limit set in the 2012 planning consent.

Modelled data night time



APPENDIX 4 LAMAX EVENTS

WHO guidelines state that external LAMax events above 60 dB at the façade of sensitive receptor have the potential for adverse health impacts.

Measurements reported in Appendix 1 above, show LAMax levels to be above this criterion level without Corker's operating. The events were identified as road traffic noise occurring between 23.00hrs and 07.00hrs.

The nature of event noise from the application site will be delivery noise, engine noise, occasional clanks and bangs, but not markedly different from the existing. All deliveries are noted to be at least 40m from the nearest receptor (Willow Farm) and the next closest receptor is 490m from the source.

Sound decays in proportion to distance reducing by 6 dB per doubling of distance. The table below provides a reference table for sound reduction over distance:

Sound level	Reduction in sound level (dB)	Comments
Source (@ 1m)	-	
2	6	
4	12	
8	18	
16	24	
32	30	
40	31	LAMax event would need to be >91 dB to cause breach of WHO guidelines
64	36	
128	42	
256	48	
490	53	LAMax event would need to be >113 dB to cause breach of WHO guidelines
512	54	

Typical LAMax events from deliveries are approximately 75 dB @ 5m which is approximately 89 dB at 1m (below the limits identified in the table above).

Potential LAMax event noise is not be a significant factor and can be screened out.

*Sustainable solutions, tailored to **your** needs*

CRESTWOOD ENVIRONMENTAL LTD

www.crestwoodenvironmental.co.uk

Tel: 01902 229 563

SafeWise Health, Safety and HR Advisors

CEnv Chartered Environmentalist EMPLOYER CHAMPION

interface ISO 14001 CERTIFICATION

interface ISO 9001 CERTIFICATION

Landscape Institute Registered practice