Appendix 12.1:
Noise Monitoring Results

Appendix 12.1

Noise Monitoring Results

Monitoring Location 1 - North western boundary adjacent to Ipswich Road						
Time	**L_{Aeq} (dB)**	**$L_{A\ min}$ (dB)**	**$L_{A\ max}$ (dB)**	**L_{A90} (dB)**	**L_{A10} (dB)**	**Comments**
25/04/2014 - Night Time						
0509-0524	50.8	34.0	66.2	38.1	56.1	Birdsong. Distant road traffic on the A12. Occasional road traffic on Ipswich Road.
0650-0705	52.6	41.8	64.9	46.7	55.6	Frequent road traffic on Ipswich Road. Distant road traffic on the A12. Birdsong.
25/04/2014 - Daytime						
0729-0744	56.4	52.7	69.2	54.4	57.6	Frequent road traffic on Ipswich Road. Distant road traffic on the A12. Birdsong.
0811-0826	56.7	51.0	64.5	54.3	58.4	Frequent road traffic on Ipswich Road. Distant road traffic on the A12. Birdsong.
0859-0914	56.4	51.1	64.7	53.7	58.1	Frequent road traffic on Ipswich Road. Distant road traffic on the A12. Birdsong.

Monitoring Location 2 - Eastern boundary adjacent to Sandy lane						
Time	**L_{Aeq} (dB)**	**$L_{A\ min}$ (dB)**	**$L_{A\ max}$ (dB)**	**L_{A90} (dB)**	**L_{A10} (dB)**	**Comments**
25/04/2014 - Night Time						
0600-0615	47.7	37.6	60.7	39.8	52.6	Birdsong. Distant road traffic on the A12. 1 car on Sandy Lane. Distant bird scarer.
24/04/2014 - Daytime						
1637-1723	46.9	29.9	63.5	33.7	51.4	Occasional road traffic on Sandy Lane. Birdsong.
1751-1806	44.3	31.8	58.8	33.9	48.9	Occasional road traffic on Sandy Lane. Birdsong. High level aircraft.

Monitoring Location 3 - Southern boundary adjacent to the railway line						
Time	**L_{Aeq} (dB)**	**$L_{A\ min}$ (dB)**	**$L_{A\ max}$ (dB)**	**L_{A90} (dB)**	**L_{A10} (dB)**	**Comments**
25/04/2014 - Night Time						
0620-0641	55.5	39.7	83.1	42.1	46.7	Noise from the passage of 2 passenger trains. Distant road traffic on the A12. Birdsong. High level aircraft.
24/04/2014 - Daytime						
1601-1628	53.5	31.0	80.7	32.4	39.3	Noise from the passage of 2 passenger trains. Birdsong.
1726-1748	56.2	33.4	81.1	35.1	45.9	Noise from the passage of 2 passenger trains. Birdsong. High level aircraft.

Monitoring Location 3 - Southern boundary adjacent to the railway line (Continued)						
Time	**L_{Aeq} (dB)**	**$L_{A\ min}$ (dB)**	**$L_{A\ max}$ (dB)**	**L_{A90} (dB)**	**L_{A10} (dB)**	**Comments**
25/04/2014 - Daytime						
0747-0804	61.7	46.1	84.2	47.0	50.8	Noise from the passage of 2 passenger trains and 1 freight train. Birdsong. Distant road traffic on the A12.
0920-0937	54.1	43.0	79.0	45.0	50.0	Noise from the passage of 1 passenger train. Birdsong. Distant road traffic on the A12.

Monitoring Location 4 - Western boundary adjacent to Top Street						
Time	**L_{Aeq} (dB)**	**$L_{A\ min}$ (dB)**	**$L_{A\ max}$ (dB)**	**L_{A90} (dB)**	**L_{A10} (dB)**	**Comments**
25/04/2014 - Night Time						
0530-0545	49.5	37.8	66.8	44.6	52.1	Distant road traffic on the A12. Birdsong. Occasional road traffic on Top Street and Ipswich Road.
25/04/2014 - Daytime						
0712-0727	55.2	49.8	66.5	52.5	56.9	Noise from road traffic on Ipswich Road and the A12. Occasional road traffic on Top Street. Birdsong.
0829-0849	58.3	52.2	69.7	55.8	59.7	Near constant road traffic on Top Street. Noise from road traffic on Ipswich Road and the A12. Birdsong.

Daytime and Night-time Noise Levels Across the Development Site

During the noise survey, rail movements were audible at monitoring location ML3. However, the frequency of train movements varies throughout the day and night, and therefore short period measured levels are not necessarily representative of the entire day or night time periods.

To adjust the measured levels and properly account for train movements throughout the 24 hour period, the following steps are taken: Firstly, remove railway noise from the measured levels (by omitting it from the time history output of the sound level meter) to obtain the 'residual' noise levels. These are set out in Table 1.

Table 1: Summary of Residual Noise Levels Across the Site		
Monitoring Location	**Time, h**	**Residual L_{Aeq} dB**
Night Time Measurements		
3	0620-0641	47.3
	Night-time Average	**47.3**
Daytime Measurements		
3	1601-1629	36.8
	1726-1748	40.3
	0747-0804	48.7
	0920-0937	47.7
	Daytime Average	**43.4**

Secondly, the average noise level of all trains using the line must be determined from the measurement data. During the noise survey, train movements at measurement location 3, located 20m from the train line, and the Sound Exposure Levels (SEL) of all trains passing the site were measured, and is summarised in Appendix B.

The third step is to determine the total number of train movements during the daytime and night time. The passenger train movements were counted using the Electronic National Rail Timetable (eNRT), valid from 11th May 2015. To be robust, the highest number of timetabled daytime and night time movements throughout the week has been used in this assessment.

The Network Rail Working Time Table (WTT), valid May 2015, has been reviewed, but it did not indicate any timetabled movements of freight train on the line. However, during the time of the survey a freight train consisting of 4 carriages did was witnessed on the line. Therefore, to be robust an estimation of freight train movements has been included.

The total number of train movements passing the site is shown in Table 2:

Table 2: Train Movements Adjacent to the Site	
Time	**Number of Train Movements During the Week (Monday-Friday)**
0700-2300	Weekday = 31 passenger train movements 5 freight train movements
2300-0700	Weekday = 2 passenger train movements 1 freight train movement

For the purpose of this assessment, the average SEL measured at monitoring location 2, during the daytime and night time has been used in the predictions, at a distance of 20m from the train line (the approximate location of the nearest dwelling), to give the worst case scenario. The residual noise levels from measurement location have also been used in the assessment as it is assumed to be representative of levels in the south of the site.

The final step is to combine the results of the previous three steps to obtain noise levels which are inclusive of all train movements. Following the prediction methodology set out in CORN (Calculation of Railway Noise, 1995), the daytime and night time noise levels have been determined (including all train movements in Table 2) as shown in Table 3.

Table 3: Calculation of Daytime 16 hour L_{Aeq} and Night-time 8 hour L_{Aeq} at Monitoring Locations Across the Site

		Passenger/Freight Train noise only (calculated)	Residual noise Taken from Table 1.	Ambient noise including all train movements (calculated)
Monitoring Location 3				
Daytime		50.5	43.4	53.1
L_{Aeq} = SEL +10log(N) – 10log(T)				
Passenger train SEL =	83.2			
No of Passenger Trains N =	31			
Time period T = 16 hours =	57600			
L_{Aeq} = SEL +10log(N) – 10log(T)		48.4		
Freight train SEL =	89.0			
No of Frieght Trains N =	5			
Time period T = 16 hours =	57600			
Night-time		42	47.3	49.9
LAeq = SEL +10log(N) – 10log(T)				
Passenger train SEL =	83.6			
No of Passenger Trains N =	2			
Time period T = 16 hours =	28800			
LAeq = SEL +10log(N) – 10log(T)		44.4		
Freight train SEL =	89.0			
No of Frieght Trains N =	1			
Time period T = 16 hours =	28800			

Appendix 12.2:
Summary of Train Movements Observed
During the Noise Survey

Appendix 12.2

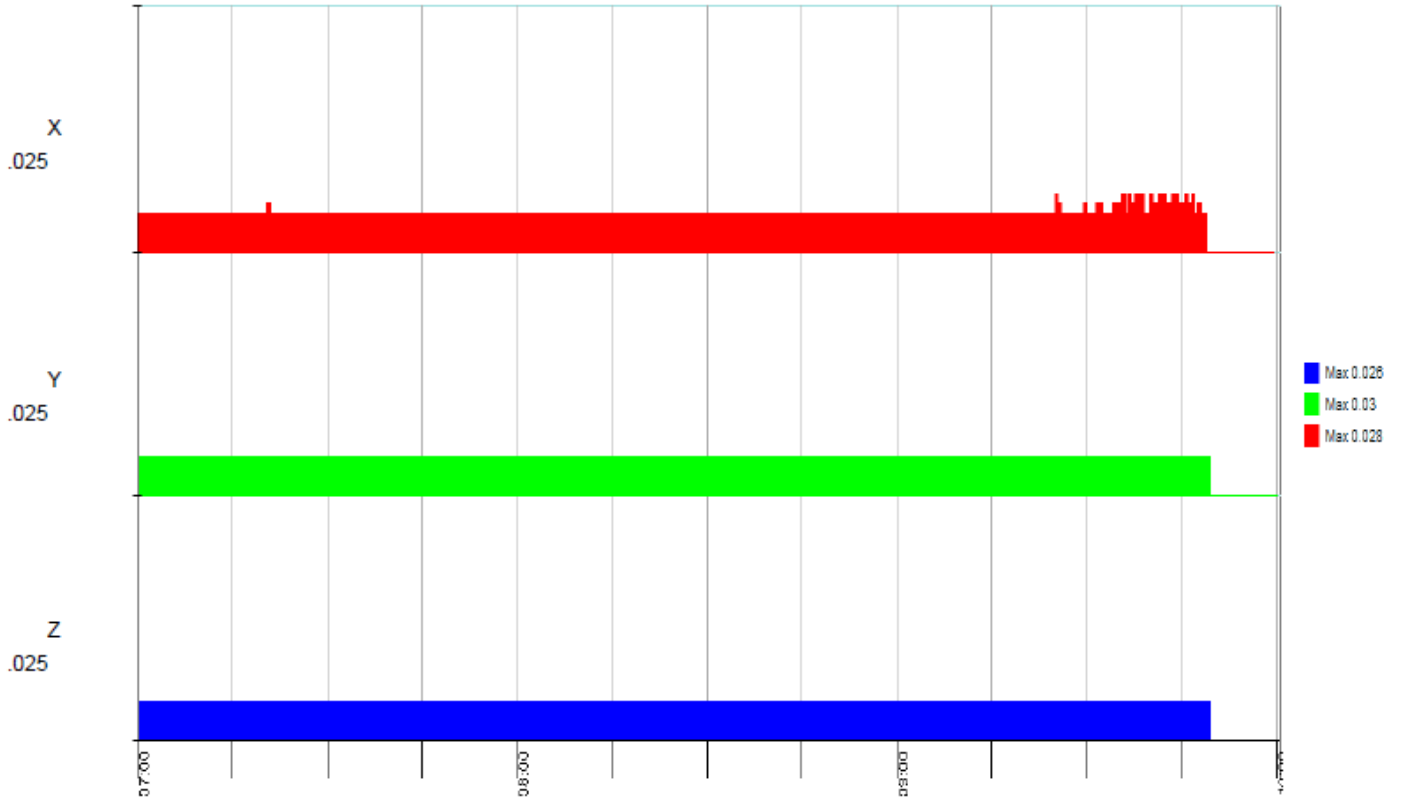
Summary of Train Movements Observed during the Noise Survey

Time	No of Carriages	Type	Direction Travelling	Approx Speed (mph)	Measured $L_{max,f}$ dB	Measured SEL
Monitoring Location 3 - 20m From Railway Line						
24/04/2014						
1608	1	Passenger	East	40	80.7	82.5
1622	3	Passenger	West	40	79.6	82.5
1729	3	Passenger	East	40	81.1	84.3
1731	2	Passenger	West	40	80.7	83.4
25/04/2014						
0633	1	Passenger	East	40	83.1	84.4
0636	2	Passenger	West	40	81.0	82.8
0748	2	Passenger	East	40	81.7	85.2
0754	2	Passenger	West	40	79.7	81.8
0802	4	Freight	East	30	84.2	89.0
0929	2	Passenger	West	40	79.0	82.5

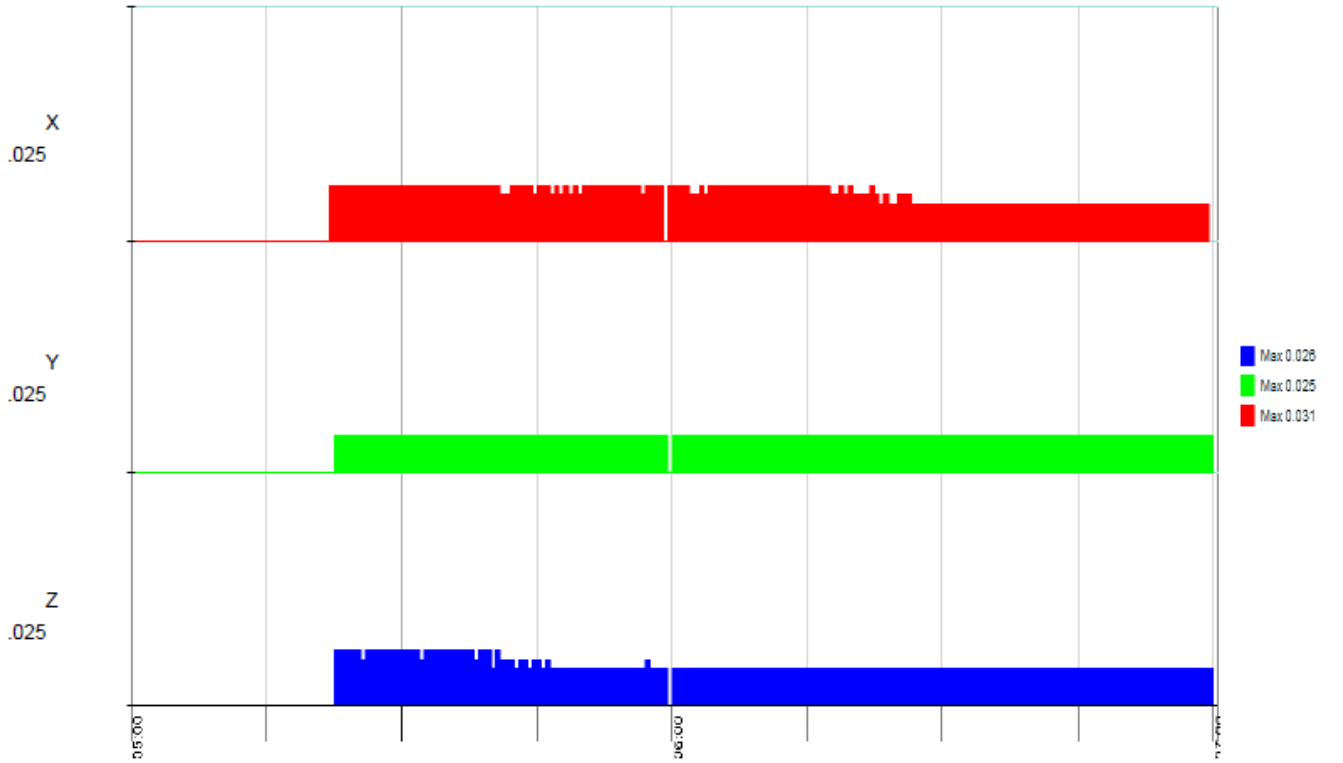
Appendix 12.3:
Vibration Monitoring Results

Appendix 12.3

Vibration Monitoring Results



Event 016	X	Y	Z	X	Y	Z
		16 Hour				
	.028	.030	.026			
		1 Hour			Total	
Hour 1	.013	.015	.013	.013	.015	.013
Hour 2	.013	.015	.013	.016	.018	.015
Hour 3	.016	.015	.013	.018	.019	.017



Event 015	X	Y	Z	X	Y	Z
		8 Hour				
	.031	.025	.026			
		1 Hour			Total	
Hour 1	.020	.014	.018	.017	.013	.016
Hour 2	.017	.015	.013	.020	.017	.017

Appendix 12.4:
CRTN Calculations

Appendix 12.4 - CRTN Calculation - Existing Receptors Base

* Valid for d ≥ 4 metres

** Values from Traffic Data provided by Hydrock

Stage 1	Stage 2						Stage 2	Stage 2	Stage 2	Stage 3									Stage 4				Stage 5	

Without Development 2025

Link	Receptor	Traffic Flow, Q veh/18-hour day**	$L_{10\ (18\text{-hour})}$ dB(A) (CRTN Chart 3)	Traffic Speed		HGV, p %**	Correction for Mean Traffic Speed, V, and Percentage Heavy Vehicles, p (CRTN Chart 4)	Road surface	Road Surface Correction (CRTN Para. 16)	Basic Noise Level dB(A)	Shortest horizontal distance, d (m)	Height of reception point relative to effective source position, h (m)	Shortest slant distance from the effective source position, d' (m) (CRTN Chart 7)	Distance Correction dB(A) (CRTN Chart 7)*	Average Height of Propagation, H (m) (Para 20.2 CRTN)	Absorbent Ground Cover % (Para 20.4 CRTN)	Absorbent Ground Cover, I	Absorbent Ground Cover Correction dB(A) (CRTN Chart 8)	Propagation Correction dB(A)	Façade Correction dB(A) (CRTN Para. 26.1)	Angle of view segment, θ (deg)	Angle of View Correction dB(A) (CRTN Chart 10)	Site Layout Correction dB(A)	Combined Noise Level dB(A)	Combined Façade Noise Level dB(A)
				Mean Speed, V mph**	Mean Speed, V km/h																				
A12 NE	ESR1	39,060	75.0	70	112.6	5.4	4.6	Impervious (SMA)	-1	78.6	30.0	1.2	33.5	-3.9	1.1	≥90	1.0	-4.3	-8.2	2.5	170.0	-0.2	2.3	72.7	**72.7**
																								72.7	

With Development 2025

Link	Receptor	Traffic Flow, Q veh/18-hour day**	$L_{10\ (18\text{-hour})}$ dB(A) (CRTN Chart 3)	Traffic Speed		HGV, p %**	Correction for Mean Traffic Speed, V, and Percentage Heavy Vehicles, p (CRTN Chart 4)	Road surface	Road Surface Correction (CRTN Para. 16)	Basic Noise Level dB(A)	Shortest horizontal distance, d (m)	Height of reception point relative to effective source position, h (m)	Shortest slant distance from the effective source position, d' (m) (CRTN Chart 7)	Distance Correction dB(A) (CRTN Chart 7)*	Average Height of Propagation, H (m) (Para 20.2 CRTN)	Absorbent Ground Cover % (Para 20.4 CRTN)	Absorbent Ground Cover, I	Absorbent Ground Cover Correction dB(A) (CRTN Chart 8)	Propagation Correction dB(A)	Façade Correction dB(A) (CRTN Para. 26.1)	Angle of view segment, θ (deg)	Angle of View Correction dB(A) (CRTN Chart 10)	Site Layout Correction dB(A)	Combined Noise Level dB(A)	Combined Façade Noise Level dB(A)
				Mean Speed, V mph**	Mean Speed, V km/h																				
B1438 East of site access	ESR2	14,292	70.7	30	48.3	3.6	-1.6	Impervious (SMA)	-1	68.0	10.0	1.2	13.6	0.0	1.1	≥90	1.0	-2.2	-2.2	2.5	170.0	-0.2	2.3	68.1	**68.1**
																								68.1	

Without Development 2025

Link	Receptor	Traffic Flow, Q veh/18-hour day**	$L_{10\ (18\text{-hour})}$ dB(A) (CRTN Chart 3)	Traffic Speed		HGV, p %**	Correction for Mean Traffic Speed, V, and Percentage Heavy Vehicles, p (CRTN Chart 4)	Road surface	Road Surface Correction (CRTN Para. 16)	Basic Noise Level dB(A)	Shortest horizontal distance, d (m)	Height of reception point relative to effective source position, h (m)	Shortest slant distance from the effective source position, d' (m) (CRTN Chart 7)	Distance Correction dB(A) (CRTN Chart 7)*	Average Height of Propagation, H (m) (Para 20.2 CRTN)	Absorbent Ground Cover % (Para 20.4 CRTN)	Absorbent Ground Cover, I	Absorbent Ground Cover Correction dB(A) (CRTN Chart 8)	Propagation Correction dB(A)	Façade Correction dB(A) (CRTN Para. 26.1)	Angle of view segment, θ (deg)	Angle of View Correction dB(A) (CRTN Chart 10)	Site Layout Correction dB(A)	Combined Noise Level dB(A)	Combined Façade Noise Level dB(A)
				Mean Speed, V mph**	Mean Speed, V km/h																				
Sandy Lane	ESR3	1,474	60.8	30	48.3	1.8	-2.3	Impervious (SMA)	-1	57.5	10.0	1.2	13.6	0.0	1.1	≥90	1.0	-2.2	-2.2	2.5	130.0	-1.4	1.1	56.4	**56.4**
																								56.4	

With Development 2025

Link	Receptor	Traffic Flow, Q veh/18-hour day**	$L_{10\ (18\text{-hour})}$ dB(A) (CRTN Chart 3)	Traffic Speed		HGV, p %**	Correction for Mean Traffic Speed, V, and Percentage Heavy Vehicles, p (CRTN Chart 4)	Road surface	Road Surface Correction (CRTN Para. 16)	Basic Noise Level dB(A)	Shortest horizontal distance, d (m)	Height of reception point relative to effective source position, h (m)	Shortest slant distance from the effective source position, d' (m) (CRTN Chart 7)	Distance Correction dB(A) (CRTN Chart 7)*	Average Height of Propagation, H (m) (Para 20.2 CRTN)	Absorbent Ground Cover % (Para 20.4 CRTN)	Absorbent Ground Cover, I	Absorbent Ground Cover Correction dB(A) (CRTN Chart 8)	Propagation Correction dB(A)	Façade Correction dB(A) (CRTN Para. 26.1)	Angle of view segment, θ (deg)	Angle of View Correction dB(A) (CRTN Chart 10)	Site Layout Correction dB(A)	Combined Noise Level dB(A)	Combined Façade Noise Level dB(A)
				Mean Speed, V mph**	Mean Speed, V km/h																				
Top Street North	ESR4	10,402	69.3	60	96.5	2.0	2.6	Impervious (SMA)	-1	70.9	5.0	1.2	8.6	2.0	1.1	≥90	1.0	-1.2	0.8	2.5	180.0	0.0	2.5	74.2	**74.2**
																								74.2	

Appendix 12.4 - CRTN Calculation - Existing Receptors Future Years Assessment

* Valid for d ≥ 4 metres

** Values from Traffic Data provided by Hydrock

Stage 1	Stage 2					Stage 2	Stage 2		Stage 2	Stage 3									Stage 4				Stage 5	

Without Development 2025

Link	Receptor	Traffic Flow, Q veh/18-hour day**	$L_{10\ (18\text{-hour})}$ dB(A) (CRTN Chart 3)	Traffic Speed		HGV, p %**	Correction for Mean Traffic Speed, V, and Percentage Heavy Vehicles, p (CRTN Chart 4)	Road surface	Road Surface Correction (CRTN Para. 16)	Basic Noise Level dB(A)	Shortest horizontal distance, d (m)	Height of reception point relative to effective source position, h (m)	Shortest slant distance from the effective source position, d' (m) (CRTN Chart 7)	Distance Correction dB(A) (CRTN Chart 7)*	Average Height of Propagation, H (m) (Para 20.2 CRTN)	Absorbent Ground Cover % (Para 20.4 CRTN)	Absorbent Ground Cover, I	Absorbent Ground Cover Correction dB(A) (CRTN Chart 8)	Propagation Correction dB(A)	Façade Correction dB(A) (CRTN Para. 26.1)	Angle of view segment, θ (deg)	Angle of View Correction dB(A) (CRTN Chart 10)	Site Layout Correction dB(A)	Combined Noise Level dB(A)	Combined Façade Noise Level dB(A)
				Mean Speed, V mph**	Mean Speed, V km/h																				
A12 NE	ESR1	53,084	76.3	70	112.6	2.8	4.2	Impervious (SMA)	-1	79.5	30.0	1.2	33.5	-3.9	1.1	≥90	1.0	-4.3	-8.2	2.5	170.0	-0.2	2.3	73.6	**73.6**
																								73.6	

With Development 2025

Link	Receptor	Traffic Flow, Q veh/18-hour day**	$L_{10\ (18\text{-hour})}$ dB(A) (CRTN Chart 3)	Traffic Speed		HGV, p %**	Correction for Mean Traffic Speed, V, and Percentage Heavy Vehicles, p (CRTN Chart 4)	Road surface	Road Surface Correction (CRTN Para. 16)	Basic Noise Level dB(A)	Shortest horizontal distance, d (m)	Height of reception point relative to effective source position, h (m)	Shortest slant distance from the effective source position, d' (m) (CRTN Chart 7)	Distance Correction dB(A) (CRTN Chart 7)*	Average Height of Propagation, H (m) (Para 20.2 CRTN)	Absorbent Ground Cover % (Para 20.4 CRTN)	Absorbent Ground Cover, I	Absorbent Ground Cover Correction dB(A) (CRTN Chart 8)	Propagation Correction dB(A)	Façade Correction dB(A) (CRTN Para. 26.1)	Angle of view segment, θ (deg)	Angle of View Correction dB(A) (CRTN Chart 10)	Site Layout Correction dB(A)	Combined Noise Level dB(A)	Combined Façade Noise Level dB(A)
				Mean Speed, V mph**	Mean Speed, V km/h																				
A12 NE	ESR1	49,840	76.1	70	112.6	2.8	4.2	Impervious (SMA)	-1	79.3	30.0	1.2	33.5	-3.9	1.1	≥90	1.0	-4.3	-8.2	2.5	170.0	-0.2	2.3	73.3	**73.3**
																								73.3	

Without Development 2025

Link	Receptor	Traffic Flow, Q veh/18-hour day**	$L_{10\ (18\text{-hour})}$ dB(A) (CRTN Chart 3)	Traffic Speed		HGV, p %**	Correction for Mean Traffic Speed, V, and Percentage Heavy Vehicles, p (CRTN Chart 4)	Road surface	Road Surface Correction (CRTN Para. 16)	Basic Noise Level dB(A)	Shortest horizontal distance, d (m)	Height of reception point relative to effective source position, h (m)	Shortest slant distance from the effective source position, d' (m) (CRTN Chart 7)	Distance Correction dB(A) (CRTN Chart 7)*	Average Height of Propagation, H (m) (Para 20.2 CRTN)	Absorbent Ground Cover % (Para 20.4 CRTN)	Absorbent Ground Cover, I	Absorbent Ground Cover Correction dB(A) (CRTN Chart 8)	Propagation Correction dB(A)	Façade Correction dB(A) (CRTN Para. 26.1)	Angle of view segment, θ (deg)	Angle of View Correction dB(A) (CRTN Chart 10)	Site Layout Correction dB(A)	Combined Noise Level dB(A)	Combined Façade Noise Level dB(A)
				Mean Speed, V mph**	Mean Speed, V km/h																				
B1438 East of site access	ESR2	19,547	72.0	30	48.3	1.3	-2.4	Impervious (SMA)	-1	68.6	10.0	1.2	13.6	0.0	1.1	≥90	1.0	-2.2	-2.2	2.5	170.0	-0.2	2.3	68.6	**68.6**
																								68.6	

With Development 2025

Link	Receptor	Traffic Flow, Q veh/18-hour day**	$L_{10\ (18\text{-hour})}$ dB(A) (CRTN Chart 3)	Traffic Speed		HGV, p %**	Correction for Mean Traffic Speed, V, and Percentage Heavy Vehicles, p (CRTN Chart 4)	Road surface	Road Surface Correction (CRTN Para. 16)	Basic Noise Level dB(A)	Shortest horizontal distance, d (m)	Height of reception point relative to effective source position, h (m)	Shortest slant distance from the effective source position, d' (m) (CRTN Chart 7)	Distance Correction dB(A) (CRTN Chart 7)*	Average Height of Propagation, H (m) (Para 20.2 CRTN)	Absorbent Ground Cover % (Para 20.4 CRTN)	Absorbent Ground Cover, I	Absorbent Ground Cover Correction dB(A) (CRTN Chart 8)	Propagation Correction dB(A)	Façade Correction dB(A) (CRTN Para. 26.1)	Angle of view segment, θ (deg)	Angle of View Correction dB(A) (CRTN Chart 10)	Site Layout Correction dB(A)	Combined Noise Level dB(A)	Combined Façade Noise Level dB(A)
				Mean Speed, V mph**	Mean Speed, V km/h																				
B1438 East of site access	ESR2	19,651	72.0	30	48.3	1.3	-2.4	Impervious (SMA)	-1	68.6	10.0	1.2	13.6	0.0	1.1	≥90	1.0	-2.2	-2.2	2.5	170.0	-0.2	2.3	68.6	**68.6**
																								68.6	

Without Development 2025

Link	Receptor	Traffic Flow, Q veh/18-hour day**	$L_{10\ (18\text{-hour})}$ dB(A) (CRTN Chart 3)	Traffic Speed		HGV, p %**	Correction for Mean Traffic Speed, V, and Percentage Heavy Vehicles, p (CRTN Chart 4)	Road surface	Road Surface Correction (CRTN Para. 16)	Basic Noise Level dB(A)	Shortest horizontal distance, d (m)	Height of reception point relative to effective source position, h (m)	Shortest slant distance from the effective source position, d' (m) (CRTN Chart 7)	Distance Correction dB(A) (CRTN Chart 7)*	Average Height of Propagation, H (m) (Para 20.2 CRTN)	Absorbent Ground Cover % (Para 20.4 CRTN)	Absorbent Ground Cover, I	Absorbent Ground Cover Correction dB(A) (CRTN Chart 8)	Propagation Correction dB(A)	Façade Correction dB(A) (CRTN Para. 26.1)	Angle of view segment, θ (deg)	Angle of View Correction dB(A) (CRTN Chart 10)	Site Layout Correction dB(A)	Combined Noise Level dB(A)	Combined Façade Noise Level dB(A)
				Mean Speed, V mph**	Mean Speed, V km/h																				
Sandy Lane	ESR3	1,840	61.7	30	48.3	6.1	-0.9	Impervious (SMA)	-1	59.9	10.0	1.2	13.6	0.0	1.1	≥90	1.0	-2.2	-2.2	2.5	130.0	-1.4	1.1	58.7	**58.7**
																								58.7	

With Development 2025

Link	Receptor	Traffic Flow, Q veh/18-hour day**	$L_{10\ (18\text{-hour})}$ dB(A) (CRTN Chart 3)	Traffic Speed		HGV, p %**	Correction for Mean Traffic Speed, V, and Percentage Heavy Vehicles, p (CRTN Chart 4)	Road surface	Road Surface Correction (CRTN Para. 16)	Basic Noise Level dB(A)	Shortest horizontal distance, d (m)	Height of reception point relative to effective source position, h (m)	Shortest slant distance from the effective source position, d' (m) (CRTN Chart 7)	Distance Correction dB(A) (CRTN Chart 7)*	Average Height of Propagation, H (m) (Para 20.2 CRTN)	Absorbent Ground Cover % (Para 20.4 CRTN)	Absorbent Ground Cover, I	Absorbent Ground Cover Correction dB(A) (CRTN Chart 8)	Propagation Correction dB(A)	Façade Correction dB(A) (CRTN Para. 26.1)	Angle of view segment, θ (deg)	Angle of View Correction dB(A) (CRTN Chart 10)	Site Layout Correction dB(A)	Combined Noise Level dB(A)	Combined Façade Noise Level dB(A)
				Mean Speed, V mph**	Mean Speed, V km/h																				
Sandy Lane	ESR3	1,729	61.5	30	48.3	6.1	-0.9	Impervious (SMA)	-1	59.6	10.0	1.2	13.6	0.0	1.1	≥90	1.0	-2.2	-2.2	2.5	130.0	-1.4	1.1	58.5	**58.5**
																								58.5	

Without Devlopment 2025

Link	Receptor	Traffic Flow, Q veh/18-hour day**	$L_{10\ (18\text{-hour})}$ dB(A) (CRTN Chart 3)	Traffic Speed		HGV, p %**	Correction for Mean Traffic Speed, V, and Percentage Heavy Vehicles, p (CRTN Chart 4)	Road surface	Road Surface Correction (CRTN Para. 16)	Basic Noise Level dB(A)	Shortest horizontal distance, d (m)	Height of reception point relative to effective source position, h (m)	Shortest slant distance from the effective source position, d' (m) (CRTN Chart 7)	Distance Correction dB(A) (CRTN Chart 7)*	Average Height of Propagation, H (m) (Para 20.2 CRTN)	Absorbent Ground Cover % (Para 20.4 CRTN)	Absorbent Ground Cover, I	Absorbent Ground Cover Correction dB(A) (CRTN Chart 8)	Propagation Correction dB(A)	Façade Correction dB(A) (CRTN Para. 26.1)	Angle of view segment, θ (deg)	Angle of View Correction dB(A) (CRTN Chart 10)	Site Layout Correction dB(A)	Combined Noise Level dB(A)	Combined Façade Noise Level dB(A)
				Mean Speed, V mph**	Mean Speed, V km/h																				
Top Street North	ESR4	14,969	70.9	60	96.5	1.6	2.5	Impervious (SMA)	-1	72.4	5.0	1.2	8.6	2.0	1.1	≥90	1.0	-1.2	0.8	2.5	180.0	0.0	2.5	75.7	**75.7**
																								75.7	

With Devlopment 2025

Link	Receptor	Traffic Flow, Q veh/18-hour day**	$L_{10\ (18\text{-hour})}$ dB(A) (CRTN Chart 3)	Traffic Speed		HGV, p %**	Correction for Mean Traffic Speed, V, and Percentage Heavy Vehicles, p (CRTN Chart 4)	Road surface	Road Surface Correction (CRTN Para. 16)	Basic Noise Level dB(A)	Shortest horizontal distance, d (m)	Height of reception point relative to effective source position, h (m)	Shortest slant distance from the effective source position, d' (m) (CRTN Chart 7)	Distance Correction dB(A) (CRTN Chart 7)*	Average Height of Propagation, H (m) (Para 20.2 CRTN)	Absorbent Ground Cover % (Para 20.4 CRTN)	Absorbent Ground Cover, I	Absorbent Ground Cover Correction dB(A) (CRTN Chart 8)	Propagation Correction dB(A)	Façade Correction dB(A) (CRTN Para. 26.1)	Angle of view segment, θ (deg)	Angle of View Correction dB(A) (CRTN Chart 10)	Site Layout Correction dB(A)	Combined Noise Level dB(A)	Combined Façade Noise Level dB(A)
				Mean Speed, V mph**	Mean Speed, V km/h																				
Top Street North	ESR4	14,969	70.9	60	96.5	1.6	2.5	Impervious (SMA)	-1	72.4	5.0	1.2	8.6	2.0	1.1	0.0	1.0	-1.2	0.8	2.5	180.0	0.0	2.5	75.7	**75.7**
																								75.7	

Appendix 12.4 - CRTN Calculation - Proposed Receptors

* Valid for d ≥ 4 metres

** Values from Traffic Data provided by TTHC

Stage 1	Stage 2					Stage 2	Stage 2	Stage 2	Stage 3										Stage 4				Stage 5	

Without Development 2025

Link	Receptor	Traffic Flow, Q veh/18-hour day**	$L_{10\ (18\text{-hour})}$ dB(A) (CRTN Chart 3)	Traffic Speed		HGV, p %**	Correction for Mean Traffic Speed, V, and Percentage Heavy Vehicles, p (CRTN Chart 4)	Road surface	Road Surface Correction (CRTN Para. 16)	Basic Noise Level dB(A)	Shortest horizontal distance, d (m)	Height of reception point relative to effective source position, h (m)	Shortest slant distance from the effective source position, d' (m) (CRTN Chart 7)	Distance Correction dB(A) (CRTN Chart 7)*	Average Height of Propagation, H (m) (Para 20.2 CRTN)	Absorbent Ground Cover % (Para 20.4 CRTN)	Absorbent Ground Cover, I	Absorbent Ground Cover Correction dB(A) (CRTN Chart 8)	Propagation Correction dB(A)	Façade Correction dB(A) (CRTN Para. 26.1)	Angle of view segment, θ (deg)	Angle of View Correction dB(A) (CRTN Chart 10)	Site Layout Correction dB(A)	Combined Noise Level dB(A)	Combined Façade Noise Level dB(A)
				Mean Speed, V mph**	Mean Speed, V km/h																				
B1438 East of site access	PSR1	19,547	72.0	30	48.3	1.3	-2.4	Impervious (SMA)	-1	68.6	15.0	1.2	18.5	-1.4	1.1	≥90	1.0	-2.9	-4.3	2.5	150.0	-0.8	1.7	66.0	**66.0**
																								66.0	

With Development 2025

Link	Receptor	Traffic Flow, Q veh/18-hour day**	$L_{10\ (18\text{-hour})}$ dB(A) (CRTN Chart 3)	Traffic Speed		HGV, p %**	Correction for Mean Traffic Speed, V, and Percentage Heavy Vehicles, p (CRTN Chart 4)	Road surface	Road Surface Correction (CRTN Para. 16)	Basic Noise Level dB(A)	Shortest horizontal distance, d (m)	Height of reception point relative to effective source position, h (m)	Shortest slant distance from the effective source position, d' (m) (CRTN Chart 7)	Distance Correction dB(A) (CRTN Chart 7)*	Average Height of Propagation, H (m) (Para 20.2 CRTN)	Absorbent Ground Cover % (Para 20.4 CRTN)	Absorbent Ground Cover, I	Absorbent Ground Cover Correction dB(A) (CRTN Chart 8)	Propagation Correction dB(A)	Façade Correction dB(A) (CRTN Para. 26.1)	Angle of view segment, θ (deg)	Angle of View Correction dB(A) (CRTN Chart 10)	Site Layout Correction dB(A)	Combined Noise Level dB(A)	Combined Façade Noise Level dB(A)
				Mean Speed, V mph**	Mean Speed, V km/h																				
B1438 East of site access	PSR1	19,651	72.0	30	48.3	1.3	-2.4	Impervious (SMA)	-1	68.6	15.0	1.2	18.5	-1.4	1.1	≥90	1.0	-2.9	-4.3	2.5	150.0	-0.8	1.7	66.0	**66.0**
																								66.0	

Without Development 2025

Link	Receptor	Traffic Flow, Q veh/18-hour day**	$L_{10\ (18\text{-hour})}$ dB(A) (CRTN Chart 3)	Traffic Speed		HGV, p %**	Correction for Mean Traffic Speed, V, and Percentage Heavy Vehicles, p (CRTN Chart 4)	Road surface	Road Surface Correction (CRTN Para. 16)	Basic Noise Level dB(A)	Shortest horizontal distance, d (m)	Height of reception point relative to effective source position, h (m)	Shortest slant distance from the effective source position, d' (m) (CRTN Chart 7)	Distance Correction dB(A) (CRTN Chart 7)*	Average Height of Propagation, H (m) (Para 20.2 CRTN)	Absorbent Ground Cover % (Para 20.4 CRTN)	Absorbent Ground Cover, I	Absorbent Ground Cover Correction dB(A) (CRTN Chart 8)	Propagation Correction dB(A)	Façade Correction dB(A) (CRTN Para. 26.1)	Angle of view segment, θ (deg)	Angle of View Correction dB(A) (CRTN Chart 10)	Site Layout Correction dB(A)	Combined Noise Level dB(A)	Combined Façade Noise Level dB(A)
				Mean Speed, V mph**	Mean Speed, V km/h																				
B1438 West of site access	PSR2	19,023	71.9	30	48.3	1.8	-2.3	Impervious (SMA)	-1	68.6	70.0	1.2	73.5	-7.4	1.1	≥90	1.0	-6.0	-13.4	2.5	10.0	-12.6	-10.1	45.2	**68.8**
Top Street North		14,969	70.9	60	96.5	1.6	2.5	Impervious (SMA)	-1	72.4	20.0	1.2	23.5	-2.4	1.1	≥90	1.0	-3.5	-5.9	2.5	170.0	-0.2	2.3	68.8	
																								68.8	

With Development 2025

Link	Receptor	Traffic Flow, Q veh/18-hour day**	$L_{10\ (18\text{-hour})}$ dB(A) (CRTN Chart 3)	Traffic Speed		HGV, p %**	Correction for Mean Traffic Speed, V, and Percentage Heavy Vehicles, p (CRTN Chart 4)	Road surface	Road Surface Correction (CRTN Para. 16)	Basic Noise Level dB(A)	Shortest horizontal distance, d (m)	Height of reception point relative to effective source position, h (m)	Shortest slant distance from the effective source position, d' (m) (CRTN Chart 7)	Distance Correction dB(A) (CRTN Chart 7)*	Average Height of Propagation, H (m) (Para 20.2 CRTN)	Absorbent Ground Cover % (Para 20.4 CRTN)	Absorbent Ground Cover, I	Absorbent Ground Cover Correction dB(A) (CRTN Chart 8)	Propagation Correction dB(A)	Façade Correction dB(A) (CRTN Para. 26.1)	Angle of view segment, θ (deg)	Angle of View Correction dB(A) (CRTN Chart 10)	Site Layout Correction dB(A)	Combined Noise Level dB(A)	Combined Façade Noise Level dB(A)
				Mean Speed, V mph**	Mean Speed, V km/h																				
B1438 West of site access	PSR2	20,070	72.1	30	48.3	1.8	-2.3	Impervious (SMA)	-1	68.9	70.0	1.2	73.5	-7.4	1.1	≥90	1.0	-6.0	-13.4	2.5	10.0	-12.6	-10.1	45.4	**68.8**
Top Street North		14,969	70.9	60	96.5	1.6	2.5	Impervious (SMA)	-1	72.4	20.0	1.2	23.5	-2.4	1.1	≥90	1.0	-3.5	-5.9	2.5	170.0	-0.2	2.3	68.8	
																								68.8	

Without Development 2025

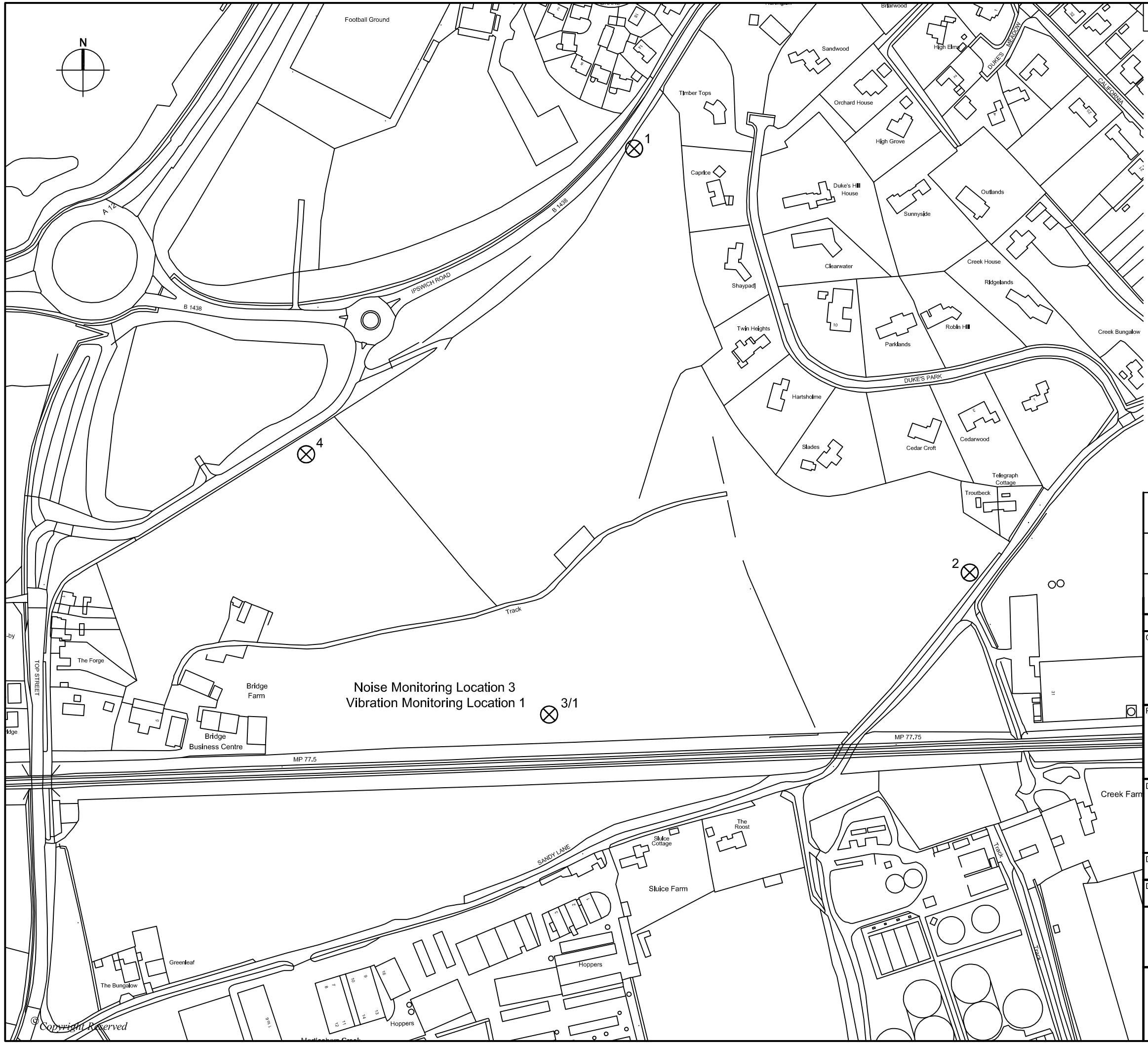
Link	Receptor	Traffic Flow, Q veh/18-hour day**	$L_{10\ (18\text{-hour})}$ dB(A) (CRTN Chart 3)	Traffic Speed		HGV, p %**	Correction for Mean Traffic Speed, V, and Percentage Heavy Vehicles, p (CRTN Chart 4)	Road surface	Road Surface Correction (CRTN Para. 16)	Basic Noise Level dB(A)	Shortest horizontal distance, d (m)	Height of reception point relative to effective source position, h (m)	Shortest slant distance from the effective source position, d' (m) (CRTN Chart 7)	Distance Correction dB(A) (CRTN Chart 7)*	Average Height of Propagation, H (m) (Para 20.2 CRTN)	Absorbent Ground Cover % (Para 20.4 CRTN)	Absorbent Ground Cover, I	Absorbent Ground Cover Correction dB(A) (CRTN Chart 8)	Propagation Correction dB(A)	Façade Correction dB(A) (CRTN Para. 26.1)	Angle of view segment, θ (deg)	Angle of View Correction dB(A) (CRTN Chart 10)	Site Layout Correction dB(A)	Combined Noise Level dB(A)	Combined Façade Noise Level dB(A)
				Mean Speed, V mph**	Mean Speed, V km/h																				
Sandy Lane	PSR3	1,840	61.7	30	48.3	6.1	-0.9	Impervious (SMA)	-1	59.9	10.0	1.2	13.6	0.0	1.1	≥90	1.0	-2.2	-2.2	2.5	180.0	0.0	2.5	60.2	**60.2**
																								60.2	

With Development 2025

Link	Receptor	Traffic Flow, Q veh/18-hour day**	$L_{10\ (18\text{-hour})}$ dB(A) (CRTN Chart 3)	Traffic Speed		HGV, p %**	Correction for Mean Traffic Speed, V, and Percentage Heavy Vehicles, p (CRTN Chart 4)	Road surface	Road Surface Correction (CRTN Para. 16)	Basic Noise Level dB(A)	Shortest horizontal distance, d (m)	Height of reception point relative to effective source position, h (m)	Shortest slant distance from the effective source position, d' (m) (CRTN Chart 7)	Distance Correction dB(A) (CRTN Chart 7)*	Average Height of Propagation, H (m) (Para 20.2 CRTN)	Absorbent Ground Cover % (Para 20.4 CRTN)	Absorbent Ground Cover, I	Absorbent Ground Cover Correction dB(A) (CRTN Chart 8)	Propagation Correction dB(A)	Façade Correction dB(A) (CRTN Para. 26.1)	Angle of view segment, θ (deg)	Angle of View Correction dB(A) (CRTN Chart 10)	Site Layout Correction dB(A)	Combined Noise Level dB(A)	Combined Façade Noise Level dB(A)
				Mean Speed, V mph**	Mean Speed, V km/h																				
Sandy Lane	PSR3	1,729	61.5	30	48.3	6.1	-0.9	Impervious (SMA)	-1	59.6	10.0	1.2	13.6	0.0	1.1	≥90	1.0	-2.2	-2.2	2.5	180.0	0.0	2.5	59.9	**59.9**
																								59.9	

Drawing 12.1:
Monitoring Locations

DO NOT SCALE FROM THIS DRAWING | A3



LEGEND:

Monitoring Location ⊗ X

REVISION	DETAILS	DATE	DRAWN	CHK'D	APP'D

CLIENT

GLADMAN DEVELOPMENTS

PROJECT

WOODBRIDGE

DRAWING TITLE

NOISE MONITORING LOCATIONS

DRG No.	SCALE	DATE
LE12277-002	1:2500@A3	03/11/2015

DRAWN BY	CHECKED BY	APPROVED BY
LC	MF	EG

☐ STOKE-ON-TRENT (HEAD OFFICE)	TEL 0845 111 7777	☐ CARDIFF	TEL 029 2072 9191
		■ LEIGH	TEL 01942 260101
☐ NEWCASTLE UPON TYNE	TEL 0191 232 0943	☐ SHEFFIELD	TEL 0114 245 6244
☐ WEST BROMWICH	TEL 0121 580 0909	☐ EDINBURGH	TEL 0131 555 3311
☐ LONDON	TEL 020 7287 2872	☐ TAUNTON	TEL 01823 703100

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Drawing 12.2:
Existing and Proposed Receptors

DO NOT SCALE FROM THIS DRAWING | A3

LEGEND

- ESR
- PSR
- CESR

ESR1
ESR2
ESR3
ESR4
CESR1
CESR2
CESR3
CESR4
PSR1
PSR2
PSR3
PSR4

Track
Path (um)
CLAYTON COURT
FINN ROAD
TURNER GARDENS
CRANE CLOSE
Football Ground
Chandlers Lodge
Little Justins
IPSWICH ROAD
Ashton House
Gusford Lodge
Little Briarwood
Hartington
Sandwood
High Elms
DUKE'S MEADOW
Timber Tops
Orchard House
High Grove
Caprice
Duke's Hill House
Outlands
Sunnyside
Clearwater
Creek House
Ridgelands
Shaypadj
Twin Heights
Parklands
Robin Hill
DUKE'S PARK
Hartsholme
Slades
Cedar Croft
Cedarwood
Telegraph Cottage
Troutbeck
A 14
B 1438
Lay-by
The Forge
TOP STREET
Hall
Fynnbridge
Bridge Farm
Bridge Business Centre
MP 77.5
MP 77.75
The Roost
Sluice Cottage

REVISION	DETAILS	DATE	DRAWN	CHK'D	APP'D

CLIENT

GLADMAN DEVELOPMENTS

PROJECT

WOODBRIDGE

DRAWING TITLE

EXISTING & PROPOSED SENSITIVE RECEPTORS

DRG No.	SCALE	DATE
LE12277-003	1:2500@A3	03/11/2015
DRAWN BY: LC	CHECKED BY: MF	APPROVED BY: EG

☐ STOKE-ON-TRENT (HEAD OFFICE)	TEL 0845 111 7777	☐ CARDIFF	TEL 029 2072 9191
		■ LEIGH	TEL 01942 260101
☐ NEWCASTLE UPON TYNE	TEL 0191 232 0943	☐ SHEFFIELD	TEL 0114 245 6244
☐ WEST BROMWICH	TEL 0121 580 0909	☐ EDINBURGH	TEL 0131 555 3311
☐ LONDON	TEL 020 7287 2872	☐ TAUNTON	TEL 01823 703100

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