DMRB: Assessment of Local Air Quality

OUTPUT SHEET

C	Current reco	eptor												
Receptor Name			Whitmoor Com	mon A320 with	n 100m	Receptor num	nber	8						
Assessment year 2025														
Results							Contrib	ution of e	ach link to	annual me	an			
			Annual mea	an		For comparison	with Air Qua	lity Standards	Link number CO (mg/m ³) Benzene 1,3-butadiene NOx (µg/m ³) PM ₁₀ (µg/m ³)					
	Pollutant	Background concentration	Road traffic component	Total	Units	Metric	Value	Units	1 2 3 4 5	0.01	0.01	0.01	1.35	0.14
	со	0.00	0.01	0.01	mg/m ³	Annual mean*	0.01	mg/m ³	6					
	Benzene	0.00	0.01	0.01	μg/m ³	Annual mean	0.01	μg/m ³	7					
	1,3-butadiene	0.00	0.01	0.01	μg/m ³	Annual mean	0.01	μg/m ³	8					
	NO _x	10.6	1.4	12.0	μg/m ³	Not applicable			9					
	NO ₂	8.1	0.5	8.6	μg/m ³	Annual mean* 8.6		μg/m ³	10					
	PM ₁₀	0.0	0.14	0.14	μg/m ³	Annual mean Days >50µg/m ³	0.1	µg/m ³ Days	11 12					

* See Footnote 32 in DMRB Volume 11 Chapter 3

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All receptors				Pollutant concentrations at receptor							
				CO *	Benzene	1,3-butadiene	NOx	NO ₂ *	PM	1 ₁₀	
Receptor number		Name		Annual mean mg/m ³	Annual mean µg/m ³	Annual mean µg/m ³	Annual mean μg/m ³	Annual mean μg/m ³	Annual mean μg/m ³	Days >50µg/m ³	
1	Whitmoor Common	n A320 without 5m	2025	0.06	0.07	0.06	24.08	12.33	1.38	0.00	
2	Whitmoor Common	n A320 with 5m	2025	0.06	0.08	0.07	24.72	12.50	1.45	0.00	
3	Whitmoor Common	n A320 without 10m	2025	0.05	0.06	0.06	22.77	11.97	1.25	0.00	
4	Whitmoor Common	n A320 with 10m	2025	0.05	0.07	0.06	23.35	12.13	1.31	0.00	
5	Whitmoor Common	n A320 without 50m	2025	0.02	0.02	0.02	14.92	9.61	0.44	0.00	
6	Whitmoor Common	n A320 with 50m	2025	0.02	0.03	0.02	15.13	9.68	0.46	0.00	
7	Whitmoor Common	n A320 without 100m	2025	0.01	0.01	0.01	11.89	8.59	0.13	0.00	
8	Whitmoor Common A320 with 100m		2025	0.01	0.01	0.01	11.95	8.61	0.14	0.00	

* See Footnote 32 in DMRR Volume 11 Chanter 3

Assesment of Impact as a % of Critical Load HORSELL COMMON

Estimated Worst Case Background 2	2020	Critical Load*	Worst	case process P	EC	PEC as % of Critical load
	10.78		10	0.03	10.81	108
	10.78		20	0.03	10.81	54
IS IMPACT LESS THAN 1% OF CRITICA	AL LOA	D?				
Where critical load is taken as						
	10	0.2	271 <mark>NO</mark>			
	20	0.3	135 YES			
IS PEC LESS THAN 70% OF CRITICAL I	LOAD?					
	10	-	108 <mark>NO</mark>			
	20		54 YES			
*CRITICAL LOADS						
APIS 2011		kg N ha-1 y-1				
Northern Atlantic wet Heaths		10 - 20				
with Erica tetralix						
APIS 2011						
		kg N ha-1 y-1				
WOODLARK NIGHTJAR AND		10 - 20				

WOODLARK NIGHTJAR AND DARTFORD WARBLER

Assesment of Impact as a % of Critical Load HORSELL COMMON

Distance (m)	Estimated Worst Case Background 2020	Critical Load*	Worst case pro	ocess PEC	PEC as % of	Critical load
5		10.78	10	0.03	10.81	108
10		10.78	10	0.02	10.80	108
50		10.78	10	0.01	10.79	108
100		10.78	10	0.00	10.78	108

ſ	IS IMPACT LESS THAN 1% OF CRITICAL LOAD?							
	Where critical load is taken as							
5		10	0.271 <mark>NO</mark>					
10		10	0.250 <mark>NO</mark>					
50		10	0.104 <mark>NO</mark>					
100		10	0.034 YES					

Distance Regression (Exponential)						
DISTANCE	EXPONENTIAL					
	50	0.1024				
	55	0.0918				
	100	0.0341				

*CRITICAL LOADS	
APIS 2011	kg N ha-1 y-1
Northern Atlantic wet Heaths with Erica tetralix	10 - 20
APIS 2011	

AF13 2011	
	kg N ha-1 y-1
WOODLARK NIGHTJAR AND	10 - 20
DARTFORD WARBLER	

DMRB Volume 11 Section 3 Part 1 HA 207/07 Assessment of Designated Sites Annex F

1. Identify Sensitive Site

Is the site sensitive to N deposition?

Horsell Common SPA (within 200m of A320/A245) **Part of Thames Basin Heaths** SPA due to three bird species - See APIS All sensitive to Nitrogen - See APIS Dec 2011 Horsell Common - Assessment of Designated Sites DMRB HA 207 07 Annex F.xlsAve N depostion

2. Obtain total average N deposition for 5km grid square

See APIS Horsell Common SPA - Location for SSSI unit 4* - TQ11606 TQ11606 - www.gridreferencefinder.com - 501 100, 160, 600 NB - Location ~350m from A320/A245 roundabout www.apis.ac.uk - search database by habitat or species - Site Relevant Critical Loads

Therefore:		
Species	2005 N deposition (kg/ha/yr)	2020 N deposition (kg/ha/yr)
Woodlark	16.24	10.78
Nightjar	16.24	10.78
Dartford Warbler	16.24	10.78
TYPICAL N DEPOSTION FOR CALCU	JLATION	10.78
*www.english-nature.org.uk		
SSSI Horsell Common	2005 N deposition (kg/ha/yr)	2020 N deposition (kg/ha/yr)
Northern Atlantic wet Heaths with Erica tetralix	15.893	10.08

3. Obtain NO2 and NOX background

Air Quality Archive - http://uk-air.defra.gov.uk/ Local Air quality Managment (LAQM) - Tools for LAQM - Background Maps - Nox NO2 etc 2008 background maps - download CSV 2008 2020 background maps Select Authority - Select Pollutants (NO2 -Nox) - Select year (2010) - Get data - save Locate grid ref (see previous sheet)

Therefore: Closest Grid ref to 501100, 160600

 Grid Ref chosen
 NO2 2020
 NOX 2020

 500500, 161500*
 8.19
 10.87

*NB this location is approx 1.2km from roadside. Guidance reccomends background is taken from up to 4km away so that road contrib is not Double Counted. Road contribution to Nox is calculated here as at ~1.65 ug/m3

4. Calculate the NO2 Concentration in transect near the road

See typical DMRB screening

Most App Backgroun	d for Horsell Common 2020 (Only A	vailable to 2020)						
	Nox	NO2						
500500, 161500	10.8	37	8.19					
				% HGV		Speed (Kpl	h)	
With out dev flows A	With Dev (scenario D) flows A245	WITH MINUS WITHOUT	-	without	with	without	with	
15824	1677	'1	947	4	4	62	59	
				TYPICAL	4		AVERAGE	60.5
	SPEED REDUCTION SIGNIFICANTLY S	QUEWS RESULTS RUN AGA	AIN	% HGV		Speed (kpl	n)	
With out dev flows A	With Dev (scenario D) flows A320	WITH MINUS WITHOUT	-	without	with	without	with	
27440	3270	13	5263	5	4	65	59	
				TYPICAL	4		AVERAGE	62
					N	0 _x	NO ₂ *	WORST
Receptor number		Name		Year	A		Annual	CASE PC
					Annual m	ean µg/m	mean	
1	Horsell Common A245 without			2025	21	.99	11.73	-
2	Horsell Common A245 with			2025	22	.25	11.81	0.07
3	Horsell Common A320 without			2025	24	.74	12.49	_
4	Horsell Common A320 with			2025	25	.74	12.76	0.27

See traffic analysis for derivation of AADF

See NO2 from Road check sheet for indentification of outlier attributes

NB IS ASSUMED THAT NEGATIVE PROCESS CONTRIBUTION IS A FACTOR OF THE REDUCTION IN SPEED WITHIN THE DMRB CALCS.

NB IS 'WITH MINUS WITHOUT' GREATER THAN 1000? FURTHER ANALYSIS REQUIRED

5. Estimate the dry deposition of NO2 in a transect near the road

Distance from RoadNO2 2020N deposition 2020*5m0.270.027

10m	0.25	0.025
50m	0.10	0.010
100m	0.03	0.003

* As per EMEP Eulerian photochemistry model see Annex F

**USING RELATIONSHIP DERIVED FROM AEA REPORT TO PUSH I i.e. Reduction of 44%

6. Determine the road increment to NO2 dry deposition

Step 6 not clear. Therefore :

APIS Background N for this location in 2020	10.78
Calculated 'process contribution' N deposition for this location at 5m*	0.027
Calculated 'process contribution' N deposition for this location at 10m*	0.025
Calculated 'process contribution' N deposition for this location at 50m *	0.010
Calculated 'process contribution' N deposition for this location at 100m*	0.003

* Based upon Annex F instructions