

Air Quality Environmental Impact Assessment
Environmental Statement Volume 1 Appendix 8.1 - Assessment Input
Data

Land North of Birch Business Park



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1.1 Introduction

- 1.1.1 The Proposed Development has the potential to cause air quality impacts as a result of vehicles travelling to and from the Site. In order to assess nitrogen dioxide (NO₂), particulate matter with an aerodynamic diameter of less than 10µm (PM₁₀) and particulate matter with an aerodynamic diameter of less than 2.5µm (PM_{2.5}) concentrations at sensitive locations, detailed dispersion modelling was undertaken in accordance with the following methodology.

1.2 Dispersion Model

- 1.2.1 Dispersion modelling was undertaken using the ADMS-Roads dispersion model (version 5.1.0.2). ADMS-Roads is developed by Cambridge Environmental Research Consultants (CERC) and is routinely used throughout the world for the prediction of pollutant dispersion from road sources. Modelling predictions from this software package are accepted within the UK by the Environment Agency and Department for Environment, Food and Rural Affairs (DEFRA).

- 1.2.2 The model requires input data that details the following parameters:

- Assessment area;
- Traffic flow data;
- Vehicle emission factors;
- Spatial co-ordinates of emissions;
- Street width;
- Meteorological data;
- Roughness length (z₀); and,
- Monin-Obukhov length.

- 1.2.3 The relevant inputs are detailed in the following Sections.

1.3 Traffic Flow Data

- 1.3.1 Traffic data for use in the assessment, including 24-hour Annual Average Daily Traffic (AADT) flows and fleet composition as Heavy Duty Vehicle (HDV) proportion, was provided by Axis P.E.G Ltd, the Transport Consultants for the Proposed Development.

- 1.3.2 Baseline traffic data for a number of links was not available from the Transport Consultants. As such, data for these links was obtained from the Department for Transport (DfT)¹. The DfT web tool enables the user to view and download traffic flows on every link of the 'A' road and motorway network, as well as selected minor roads, in Great Britain for the years 1999 to 2024. It should be noted that the DfT web tool is referenced in DEFRA guidance² as being a suitable source of data for air quality assessments and it is therefore considered to provide a reasonable estimate of traffic flows in the vicinity of the site.
- 1.3.3 The baseline traffic data was converted to the opening year of the development utilising a factor obtained from TEMPro (version 8.0). This software package has been developed by the DfT to calculate future traffic growth throughout the UK.
- 1.3.4 It should be noted that a bus gate is currently proposed on Whittle Lane as part of the wider Northern Gateway development (reference: 25/00418/OUT), which has the potential to affect the distribution of trips on the local network from the Proposed Development. The application has not been approved and therefore does not constitute a committed scheme. However, to provide a robust assessment of potential effects as a result of the Proposed Development, consideration has been given to the potential future bus gate as an alternative future year scenario.
- 1.3.5 Dispersion modelling was undertaken for the following scenarios:
- 2024 - Model Verification (comparison of predicted and measured pollutant concentrations allowing a verification factor to be made to adjust results accordingly);
 - Core Do-Minimum (DM) (predicted flows in 2027 opening year should the Proposed Development not proceed);
 - Core Do-Something (DS) (predicted flows in 2027 opening year should the Proposed Development be completed);
 - Bus gate scenario DM (predicted flows in 2032 should the Proposed Development not proceed, with the future implementation of a bus gate on Whittle Lane); and,
 - Bus gate scenario DS (predicted flows in 2032 should the Proposed Development be completed, with the future implementation of a bus gate on Whittle Lane).

¹ <https://roadtraffic.dft.gov.uk/#6/55.254/-6.053/basemap-regions-countpoints>.

² Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

1.3.6 A summary of the traffic flow data is provided in Table A8.1.1.

Table A8.1.1 Traffic Data

Link		24-hour AADT Flow				
		Verif.	2027 Core DM	2027 Core DS	2032 Bus Gate DM	2032 Bus Gate DS
L1	M62 west of Jct 18 - Northbound (NB)	73,584	75,737	75,767	80,379	80,409
L2	M62 west of Jct 18 - Southbound (SB)	68,700	70,711	70,739	75,065	75,093
L3	M62 NB off slip (north of M62/M66 Jct 18)	11,038	11,361	11,391	12,057	12,087
L4	M62 NB off slip to roundabout (north of M62/M66 Jct 18), Slow Phase (SP)	5,519	5,680	5,680	6,028	6,028
L5	M62 NB off slip to M66 (north of M62/M66 Jct 18)	5,519	5,680	5,710	6,028	6,059
L6	M62 Westbound (WB) on slip (west of M62/M66 Jct 18)	10,305	10,607	10,635	11,260	11,288
L7	M62 WB on slip from roundabout (west of M62/M66 Jct 18)	5,152	5,303	5,333	5,630	5,660
L8	M62 WB on slip from M60 (west of M62/M66 Jct 18)	5,152	5,303	5,303	5,630	5,630
L9	Jun 18 - M62 through roads Eastbound (EB) between slip roads	59,410	61,149	61,149	64,824	64,824
L10	Jun 18 - M62 through roads EB between slip roads	51,106	52,602	52,602	55,777	55,777
L11	M62 EB on slip from roundabout (east of M62/M66 Jct 18)	4,965	5,111	5,111	5,411	5,411
L12	M62 EB on slip from M66 (east of M62/M66 Jct 18)	4,965	5,111	5,111	5,411	5,411
L13	M62 EB on slip (east of M62/M66 Jct 18)	9,931	10,222	10,222	10,822	10,822
L14	M62 SB off slip (east of M62/M66 Jct 18)	7,732	7,959	7,959	8,426	8,426
L15	M62 SB off slip to roundabout (east of M62/M66 Jct 18), SP	3,866	3,979	3,979	4,213	4,213
L16	M62 SB off slip to M60 (east of M62/M66 Jct 18)	3,866	3,979	3,979	4,213	4,213
L17	M62 between Jct 18 and Jct 19	66,206	68,143	68,143	72,147	72,147

Link		24-hour AADT Flow				
		Verif.	2027 Core DM	2027 Core DS	2032 Bus Gate DM	2032 Bus Gate DS
L18	M62 between Jct 18 and Jct 19	51,550	53,059	53,059	56,176	56,176
L19	Jun 18 - M62 through roads south-west bound (SWB) between slip roads	43,919	45,204	45,219	48,123	48,200
L20	Jun 18 - M62 through roads north-east bound (NEB) between slip roads	42,558	43,804	43,816	46,631	46,706
L21	M60 NB on slip from roundabout(north of M62/M66 Jct 18)	3,590	3,695	3,695	3,941	3,941
L22	M60 NB on slip (north of M62/M66 Jct 18)	7,179	7,389	7,419	7,883	7,913
L23	M60 EB off slip to roundabout (north of M62/M66 Jct 18)	3,621	3,727	3,755	3,977	4,005
L24	M60 EB off slip (north of M62/M66 Jct 18)	7,243	7,455	7,483	7,954	7,982
L25	M66 between Jct 3 and M62 Jct 18 - NB	47,861	49,262	49,307	52,551	52,658
L26	M66 between Jct 3 and M62 Jct 18 - SB	48,284	49,698	49,738	53,027	53,130
L27	M60 SB on slip from roundabout (south of M62/M66 Jct 18)	4,129	4,250	4,250	4,515	4,515
L28	M60 SB on slip (south of M62/M66 Jct 18)	8,258	8,500	8,500	9,031	9,031
L29	M60 WB off slip to roundabout (south of M62/M66 Jct 18)	3,921	4,035	4,035	4,288	4,288
L30	M60 WB off slip (south of M62/M66 Jct 18)	7,841	8,071	8,071	8,575	8,575
L31	M60 between M62 Jct 18 and M60 jct 19 - EB	55,054	56,665	56,678	60,204	60,279
L32	M60 between M62 Jct 18 and M60 jct 19 - WB	52,276	53,806	53,820	57,169	57,246
L33	M60 SEB off slip (west of M60 Jct 19)	8,258	8,500	8,500	9,031	9,031
L34	M60 SEB off slip (west of M60 Jct 19), SP	8,258	8,500	8,500	9,031	9,031
L35	M60 NWB on slip (west of M60 Jct 19)	7,841	8,071	8,071	8,575	8,575
L36	M60 NWB on slip from roundabout (west of M60 Jct 19)	3,921	4,035	4,035	4,288	4,288

Link		24-hour AADT Flow				
		Verif.	2027 Core DM	2027 Core DS	2032 Bus Gate DM	2032 Bus Gate DS
L37	M60 NWB on slip from A576 (west of M60 Jct 19)	3,921	4,035	4,035	4,288	4,288
L38	Jun 19 - M60 EB through road link	46,796	48,166	48,178	51,174	51,249
L39	Jun 19 - M60 WB through road link	44,434	45,735	45,750	48,594	48,670
L40	M60 SWB off slip to roundabout (east of M60 Jct 19), SP	9,237	9,495	9,495	9,821	9,821
L41	M60 SWB off slip (east of M60 Jct 19)	9,237	9,495	9,495	9,821	9,821
L42	M60 EB on slip from roundabout (east of M60 Jct 19)	4,604	4,733	4,733	4,895	4,895
L43	M60 EB on slip from Manchester Old Road (east of M60 Jct 19)	4,604	4,733	4,733	4,895	4,895
L44	M60 EB on slip (east of M60 Jct 19)	9,209	9,465	9,465	9,790	9,790
L45	A576 Middleton Road SWB (south of M60 Jct 19)	21,452	22,195	22,237	22,943	22,943
L46	A576 Middleton Road NWB to roundabout (south of M60 Jct 19)	23,290	24,017	24,060	24,865	24,865
L47	A576 Middleton Road NWB (south of M60 Jct 19)	23,290	24,017	24,060	24,865	24,865
L48	A576 WB (north of M60 Jct 19), SP	8,286	8,517	8,559	8,809	8,809
L49	A576 WB (north of M60 Jct 19)	12,890	13,394	13,436	13,840	13,840
L50	A576 NEB (north of M60 Jct 19), SP	12,979	13,418	13,461	13,902	13,902
L51	A576 NEB (north of M60 Jct 19)	12,979	13,418	13,461	13,902	13,902
L52	A576 Manchester Old Road (east of A6045/ A576 / Kelvin Avenue Jct), SP	14,754	15,166	15,166	15,686	15,686
L53	A576 Manchester Old Road (east of A6045/ A576 / Kelvin Avenue Jct)	14,754	15,166	15,166	15,686	15,686
L54	A6045 Heywood Old Road (north of A6045/ A576 / Kelvin Avenue Jct), SP	14,285	14,703	14,788	15,805	15,805
L55	A6045 Heywood Old Road (north of A6045/ A576 / Kelvin Avenue Jct)	14,285	14,703	14,788	15,805	15,805
L56	A6045 Heywood Old Road (South of A6045/ Langley Lane Junction), SP	16,250	16,726	17,617	17,957	18,007

Link		24-hour AADT Flow				
		Verif.	2027 Core DM	2027 Core DS	2032 Bus Gate DM	2032 Bus Gate DS
L57	A6045 Heywood Old Road (North of A6045/ Langley Lane Junction)	16,250	16,726	17,617	17,957	18,007
L58	A6045 Manchester Road (south of the A6045 Manchester Road/ Workers Way Jct), SP	10,833	11,150	11,742	11,971	12,022
L59	SHLR (A6045 to M62 J19) to Manchester Road, NB	5,417	5,575	5,874	5,986	5,986
L60	M62 NEB off slip (Junction 19)	9,931	10,222	10,222	10,822	10,822
L61	M62 NEB off slip to roundabout (Junction 19), SP	3,765	3,875	3,875	2,686	2,686
L62	QEII Way, WB (Immediately Northwest of Jct 19)	6,166	6,347	6,655	8,136	8,473
L63	M62 SWB on slip (Junction 19)	7,732	7,959	7,959	8,426	8,426
L64	Jun 19 - M62 through roads SWB between slip roads	52,297	53,828	53,828	57,104	57,104
L65	Jun 19 - M62 through roads NEB between slip roads	46,859	48,230	48,230	51,433	51,433
L66	M62 NEB on slip (Junction 19)	8,527	8,777	9,087	9,332	9,648
L67	M62 SWB off slip (Junction 19)	49,900	51,360	51,668	55,117	55,430
L68	M62 SWB off slip (Junction 19), SP	49,900	51,360	51,668	55,117	55,430
L69	M62 between Jct 19 and 20 - EB	56,847	58,511	58,821	62,215	62,530
L70	M62 between Jct 19 and 20 - WB	58,706	60,424	60,731	64,844	65,156
L71	A6046 Middleton Road NB (south of the A6046 Middleton Road/ Tangmere Avenue/ Lenten Grove Jct)	9,150	9,406	9,406	9,728	9,728
L72	A6046 Middleton Road SB (south of the A6046 Middleton Road/ Tangmere Avenue/ Lenten Grove Jct), SP	9,780	10,053	10,053	10,398	10,398
L73	A6046 Middleton Road	18,930	19,458	19,458	20,126	20,126
L74	Coronation Avenue (East of Manchester Road), SP	18,930	19,458	19,458	20,126	20,126
L75	QEII Way SEB (Immediately Northwest of Jct 19), SP	4,869	5,012	5,019	6,458	6,799

Link		24-hour AADT Flow				
		Verif.	2027 Core DM	2027 Core DS	2032 Bus Gate DM	2032 Bus Gate DS
L76	QEII Way SEB (Immediately Northwest of Jct 19)	4,869	5,012	5,019	6,458	6,799
L77	SHLR NWB (A6184 to A6184 north of Manchester Road), SP	750	772	780	2,150	3,696
L78	SHLR NWB (West of Junction with A6045 Manchester Road)	6,608	6,802	6,812	8,876	9,381
L79	SHLR SEB (West of Junction with A6045 Manchester Road)	5,530	5,692	5,700	7,469	7,981
L80	SHLR SEB to A6045 Manchester Road, SP	3,966	4,082	4,083	4,408	4,553
L81	SHLR SEB (West of Junction with A6045 Manchester Road) to A6184, SP	1,564	1,609	1,617	3,061	3,428
L82	SHLR (West of Junction with A6045 Manchester Road)	12,138	12,494	12,512	16,345	17,362
L83	A6045 Manchester Road (Immediately north-east of Junction with SHLR), SP	7,933	8,165	8,452	8,816	8,959
L84	A6045 Manchester Road (north-east of Junction with SHLR)	11,899	12,247	12,535	13,224	13,512
L85	Church Street WB	11,369	11,686	11,686	12,088	12,088
L86	Rochdale Road	3,503	3,858	4,146	3,982	4,270
L87	Market Place to York Street	14,142	14,979	15,193	15,479	15,692
L88	Market Street	10,620	11,098	11,204	11,473	11,579
L89	Dawson Street to Market Place	14,142	14,798	14,905	15,297	15,405
L90	Dawson Street	10,360	10,910	11,018	11,276	11,384
L91	A58 Bury Street (East of A58 Bury Street/ Pilsworth Jct)	20,980	22,008	22,222	22,749	22,962
L92	A58 Bury Street (west of A58 Bury Street/ Pilsworth Jct)	20,980	21,964	21,964	22,705	22,705
L93	A58 Bury Street (west of A58 Bury Street/ Pilsworth Jct), SP	20,980	21,964	21,964	22,705	22,705
L94	A58 Bury Street (East of A58 Bury Street/ Pilsworth Jct), SP	20,980	22,008	22,222	22,749	22,962

Link		24-hour AADT Flow				
		Verif.	2027 Core DM	2027 Core DS	2032 Bus Gate DM	2032 Bus Gate DS
L95	A58 Bury Street (Between Pilsworth Jct and Bury Old Road)	20,980	21,964	21,964	22,705	22,705
L96	Market Place	14,142	14,979	15,193	15,479	15,692
L97	Chruch Street to Market Place	11,369	11,686	11,686	12,088	12,088
L98	York Street	14,142	14,979	15,193	15,479	15,692
L99	York Street to Rochdale Road E	17,014	18,189	18,690	18,789	19,291
L100	A58 Bury New Road (west of the A58 Bury New Road/ Heap Brow Jct)	20,980	22,376	22,518	23,117	23,259
L101	A58 Bury New Road from roundabout (west of the A58 Bury New Road/ Heap Brow Jct)	10,360	11,055	11,125	11,420	11,491
L102	A58 Bury New Road to roundabout (west of the A58 Bury New Road/ Heap Brow Jct)	10,620	11,322	11,393	11,697	11,767
L103	A58 Rochdale Road from roundabout (east of the B6221 Wash Lane/ A58 Rochdale Road Jct)	12,559	13,315	13,386	13,758	13,829
L104	A58 Rochdale Road to roundabout (east of the B6221 Wash Lane/ A58 Rochdale Road Jct)	6,218	6,797	6,868	7,016	7,087
L105	A58 Rochdale Road (west of the B6221 Wash Lane/ A58 Rochdale Road Jct)	18,777	20,112	20,253	20,775	20,916
L106	A58 Rochdale Road to Derby Way	18,777	20,112	20,253	20,775	20,916
L107	M66 NB on slip (north of of M66 Jct 2)	4,783	4,916	4,916	5,085	5,085
L108	M66 SB off slip (north of of M66 Jct 2)	5,080	5,222	5,222	5,401	5,401
L109	M66 SB off slip to roundabout (north of of M66 Jct 2)	5,080	5,222	5,222	5,401	5,401
L110	M66 north of Jct 2 - NB	31,886	33,159	33,265	34,285	34,390
L111	M66 north of Jct 2 - SB	33,868	35,091	35,196	36,286	36,392
L112	M66 NB off slip to roundabout (south of of M66 Jct 2)	7,331	7,546	7,546	8,047	8,047
L113	M66 NB off slip (south of of M66 Jct 2)	7,331	7,546	7,546	8,047	8,047

Link		24-hour AADT Flow				
		Verif.	2027 Core DM	2027 Core DS	2032 Bus Gate DM	2032 Bus Gate DS
L114	M66 SB on slip (south of of M66 Jct 2)	7,185	7,395	7,395	7,871	7,871
L115	Jun 2 - M66 through roads NB between slip roads	34,323	35,309	35,415	37,207	37,312
L116	Jun 2 - M66 through roads SB between slip roads	34,751	35,748	35,854	37,605	37,711
L117	M66 between Jct 2 and Jct 3 - NB	48,875	50,305	50,411	53,644	53,750
L118	M66 between Jct 2 and Jct 3 - SB	47,899	49,301	49,406	52,475	52,580
L119	M66 NB on slip (north of M66 Jct 3)	7,331	7,546	7,651	8,047	8,152
L120	M66 SB off slip (north of M66 Jct 3)	7,185	7,395	7,501	7,871	7,977
L121	M66 SB off slip to roundabout (north of M66 Jct 3)	7,185	7,395	7,501	7,871	7,977
L122	M66 NB off slip to roundabout(south of M66 Jct 3)	7,179	7,389	7,434	7,883	7,989
L123	M66 NB off slip (south of M66 Jct 3)	7,179	7,389	7,434	7,883	7,989
L124	M66 SB on slip (south of M66 Jct 3)	7,243	7,455	7,495	7,954	8,057
L125	Jun 3 - M66 through roads NB between slip roads	41,113	42,316	42,316	45,133	45,133
L126	Jun 3 - M66 through roads SB between slip roads	40,878	42,074	42,074	44,838	44,838
L127	Pilsworth Road (Immediately West of M66 J3)	12,280	13,305	13,366	13,738	13,800
L128	Pilsworth Road (SW of the Pilsworth Road/ Pilsworth Way Jct)	12,280	13,305	13,366	13,738	13,800
L129	M66 J3 Connector Road (East of Junction with Pilsworth Road)	11,950	12,300	12,596	15,149	15,569
L130	Pilsworth Road (west of the Pilsworth Road / Viridor Haul Road Jct)	11,950	12,300	12,657	15,149	15,630
L131	Pilsworth Road (East of M66 Jct 3)	11,950	12,300	12,657	15,149	15,630
L132	Whittle Lane (South of Site Centre) ^(a)	2,256	2,322	3,446	-	-
L133	Whittle Lane (North of Site Centre)	5,678	5,844	6,794	2,685	4,758

Link		24-hour AADT Flow				
		Verif.	2027 Core DM	2027 Core DS	2032 Bus Gate DM	2032 Bus Gate DS
L134	Moss Hall Road (Immediately North of 3-Arrows Junction)	14,200	14,616	15,115	18,411	19,035
L135	Moss Hall Road (North of Junction with Pilsworth Road)	6,958	7,161	7,303	8,393	8,535
L136	Heap Brow (north of the Heap Brow/ Bury Old Road/ Moss Hall Road Jct)	6,958	7,161	7,303	8,393	8,535
L137	Pilsworth Road (Between Plot 3 Access to 3-Arrows)	11,073	11,397	11,848	15,302	16,752
L138	Pilsworth Road (Immediately North of Junction with SHLR)	11,011	11,333	11,766	12,886	13,318
L139	Pilsworth Road (South of A58 Bury Street/ Pilsworth Jct)	11,011	11,333	11,766	12,886	13,318
L140	A56 Manchester Road	30,959	32,505	32,566	33,598	33,659
R1	M60 Jct 18 Roundabout	4,941	5,086	5,094	5,396	5,404
R2	M60 Jct 19 Roundabout	11,794	12,162	12,177	12,640	12,640
R3	M62 Jct 19 Roundabout	14,332	14,747	14,851	15,620	15,781
R4	M66 Jct 2 Roundabout	8,017	8,446	8,481	8,787	8,822

Note: (a) Link blocked by bus gate in future year

1.3.7 A summary of the HDV proportions is provided in Table A8.1.2.

Table A8.1.2 HDV Proportion

Link		HDV Proportion of Fleet (%)				
		Verif.	2027 Core DM	2027 Core DS	2032 Bus DM	2032 Bus DS
L1	M62 west of Jct 18 - NB	8.76	8.76	8.77	8.87	8.88
L2	M62 west of Jct 18 - SB	9.16	9.16	9.18	9.31	9.32
L3	M62 NB off slip (north of M62/M66 Jct 18)	8.76	8.76	8.86	8.87	8.97
L4	M62 NB off slip to roundabout (north of M62/M66 Jct 18), SP	8.76	8.76	8.76	8.87	8.87

Link		HDV Proportion of Fleet (%)				
		Verif.	2027 Core DM	2027 Core DS	2032 Bus DM	2032 Bus DS
L5	M62 NB off slip to M66 (north of M62/M66 Jct 18)	8.76	8.76	8.96	8.87	9.06
L6	M62 WB on slip (west of M62/M66 Jct 18)	9.16	9.16	9.25	9.31	9.39
L7	M62 WB on slip from roundabout (west of M62/M66 Jct 18)	9.16	9.16	9.38	9.31	9.52
L8	M62 WB on slip from M60 (west of M62/M66 Jct 18)	9.16	9.16	9.16	9.31	9.31
L9	Jun 18 - M62 through roads EB between slip roads	9.43	9.43	9.43	9.48	9.48
L10	Jun 18 - M62 through roads EB between slip roads	8.86	8.86	8.86	8.94	8.94
L11	M62 EB on slip from roundabout (east of M62/M66 Jct 18)	10.17	10.17	10.17	10.17	10.17
L12	M62 EB on slip from M66 (east of M62/M66 Jct 18)	10.17	10.17	10.17	10.17	10.17
L13	M62 EB on slip (east of M62/M66 Jct 18)	10.17	10.17	10.17	10.17	10.17
L14	M62 SB off slip (east of M62/M66 Jct 18)	8.45	8.45	8.45	8.45	8.45
L15	M62 SB off slip to roundabout (east of M62/M66 Jct 18), SP	8.45	8.45	8.45	8.45	8.45
L16	M62 SB off slip to M60 (east of M62/M66 Jct 18)	8.45	8.45	8.45	8.45	8.45
L17	M62 between Jct 18 and Jct 19	10.17	10.17	10.17	10.17	10.17
L18	M62 between Jct 18 and Jct 19	8.45	8.45	8.45	8.45	8.45
L19	Jun 18 - M62 through roads south-west bound (SWB) between slip roads	4.56	4.56	4.59	4.87	4.89
L20	Jun 18 - M62 through roads NEB between slip roads	4.84	4.84	4.87	5.10	5.12
L21	M60 NB on slip from roundabout(north of M62/M66 Jct 18)	4.76	4.76	4.76	5.12	5.12
L22	M60 NB on slip (north of M62/M66 Jct 18)	4.76	4.76	4.93	5.12	5.29
L23	M60 EB off slip to roundabout (north of M62/M66 Jct 18)	4.70	4.70	4.99	5.15	5.41

Link		HDV Proportion of Fleet (%)				
		Verif.	2027 Core DM	2027 Core DS	2032 Bus DM	2032 Bus DS
L24	M60 EB off slip (north of M62/M66 Jct 18)	4.70	4.70	4.84	5.15	5.28
L25	M66 between Jct 3 and M62 Jct 18 - NB	4.76	4.76	4.81	5.12	5.17
L26	M66 between Jct 3 and M62 Jct 18 - SB	4.70	4.70	4.75	5.15	5.19
L27	M60 SB on slip from roundabout (south of M62/M66 Jct 18)	4.43	4.43	4.43	4.62	4.62
L28	M60 SB on slip (south of M62/M66 Jct 18)	4.43	4.43	4.43	4.62	4.62
L29	M60 WB off slip to roundabout (south of M62/M66 Jct 18)	4.92	4.92	4.92	5.08	5.08
L30	M60 WB off slip (south of M62/M66 Jct 18)	4.92	4.92	4.92	5.08	5.08
L31	M60 between M62 Jct 18 and M60 jct 19 - EB	4.43	4.43	4.45	4.62	4.64
L32	M60 between M62 Jct 18 and M60 jct 19 - WB	4.92	4.92	4.94	5.08	5.10
L33	M60 SEB off slip (west of M60 Jct 19)	4.43	4.43	4.43	4.62	4.62
L34	M60 SEB off slip (west of M60 Jct 19), SP	4.43	4.43	4.43	4.62	4.62
L35	M60 NWB on slip (west of M60 Jct 19)	4.92	4.92	4.92	5.08	5.08
L36	M60 NWB on slip from roundabout (west of M60 Jct 19)	4.92	4.92	4.92	5.08	5.08
L37	M60 NWB on slip from A576 (west of M60 Jct 19)	4.92	4.92	4.92	5.08	5.08
L38	Jun 19 - M60 EB through road link	4.43	4.43	4.45	4.62	4.64
L39	Jun 19 - M60 WB through road link	4.92	4.92	4.95	5.08	5.11
L40	M60 SWB off slip to roundabout (east of M60 Jct 19), SP	4.56	4.44	4.44	4.29	4.29
L41	M60 SWB off slip (east of M60 Jct 19)	4.56	4.44	4.44	4.29	4.29
L42	M60 EB on slip from roundabout (east of M60 Jct 19)	4.73	4.60	4.60	4.45	4.45
L43	M60 EB on slip from Manchester Old Road (east of M60 Jct 19)	4.73	4.60	4.60	4.45	4.45

Link		HDV Proportion of Fleet (%)				
		Verif.	2027 Core DM	2027 Core DS	2032 Bus DM	2032 Bus DS
L44	M60 EB on slip (east of M60 Jct 19)	4.73	4.60	4.60	4.45	4.45
L45	A576 Middleton Road SWB (south of M60 Jct 19)	2.45	2.37	2.37	2.29	2.29
L46	A576 Middleton Road NWB to roundabout (south of M60 Jct 19)	2.28	2.21	2.21	2.14	2.14
L47	A576 Middleton Road NWB (south of M60 Jct 19)	2.28	2.21	2.21	2.14	2.14
L48	A576 WB (north of M60 Jct 19), SP	1.85	1.80	1.79	1.74	1.74
L49	A576 WB (north of M60 Jct 19)	2.88	2.77	2.76	2.68	2.68
L50	A576 NEB (north of M60 Jct 19), SP	2.61	2.53	2.52	2.44	2.44
L51	A576 NEB (north of M60 Jct 19)	2.61	2.53	2.52	2.44	2.44
L52	A576 Manchester Old Road (east of A6045/ A576 / Kelvin Avenue Jct), SP	3.40	3.30	3.30	3.19	3.19
L53	A576 Manchester Old Road (east of A6045/ A576 / Kelvin Avenue Jct)	3.40	3.30	3.30	3.19	3.19
L54	A6045 Heywood Old Road (north of A6045/ A576 / Kelvin Avenue Jct), SP	1.39	1.39	1.38	1.36	1.36
L55	A6045 Heywood Old Road (north of A6045/ A576 / Kelvin Avenue Jct)	1.39	1.39	1.38	1.36	1.36
L56	A6045 Heywood Old Road (South of A6045/ Langley Lane Junction), SP	1.29	1.29	1.23	1.27	1.27
L57	A6045 Heywood Old Road (North of A6045/ Langley Lane Junction)	1.29	1.29	1.23	1.27	1.27
L58	A6045 Manchester Road (south of the A6045 Manchester Road/ Workers Way Jct), SP	1.29	1.29	1.23	1.27	1.27
L59	SHLR (A6045 to M62 J19) to Manchester Road, NB	1.29	1.29	1.22	1.27	1.27
L60	M62 NEB off slip (Junction 19)	10.17	10.17	10.17	10.17	10.17
L61	M62 NEB off slip to roundabout (Junction 19), SP	8.29	8.29	8.29	19.42	19.42
L62	QEII Way, WB (Immediately Northwest of Jct 19)	11.31	11.31	10.92	19.94	19.25

Link		HDV Proportion of Fleet (%)				
		Verif.	2027 Core DM	2027 Core DS	2032 Bus DM	2032 Bus DS
L63	M62 SWB on slip (Junction 19)	8.45	8.45	8.45	8.45	8.45
L64	Jun 19 - M62 through roads SWB between slip roads	10.49	10.49	10.49	10.54	10.54
L65	Jun 19 - M62 through roads NEB between slip roads	10.04	10.04	10.04	10.37	10.37
L66	M62 NEB on slip (Junction 19)	10.87	10.87	10.58	10.98	10.69
L67	M62 SWB off slip (Junction 19)	11.44	11.44	11.39	12.03	11.97
L68	M62 SWB off slip (Junction 19), SP	11.44	11.44	11.39	12.03	11.97
L69	M62 between Jct 19 and 20 - EB	10.87	10.87	10.83	10.98	10.93
L70	M62 between Jct 19 and 20 - WB	11.44	11.44	11.40	12.03	11.98
L71	A6046 Middleton Road NB (south of the A6046 Middleton Road/ Tangmere Avenue/ Lenten Grove Jct)	5.68	5.68	5.68	5.68	5.68
L72	A6046 Middleton Road SB (south of the A6046 Middleton Road/ Tangmere Avenue/ Lenten Grove Jct), SP	5.11	5.11	5.11	5.11	5.11
L73	A6046 Middleton Road	5.38	5.38	5.38	5.38	5.38
L74	Coronation Avenue (East of Manchester Road), SP	5.38	5.38	5.38	5.38	5.38
L75	QEII Way SEB (Immediately Northwest of Jct 19), SP	11.57	11.57	11.69	22.19	21.18
L76	QEII Way SEB (Immediately Northwest of Jct 19)	11.57	11.57	11.69	22.19	21.18
L77	SHLR NWB (A6184 to A6184 north of Manchester Road), SP	11.31	11.31	10.92	19.94	19.25
L78	SHLR NWB (West of Junction with A6045 Manchester Road)	8.65	8.65	8.78	16.73	15.94
L79	SHLR SEB (West of Junction with A6045 Manchester Road)	8.84	8.84	8.97	18.10	17.04
L80	SHLR SEB to A6045 Manchester Road, SP	3.52	3.52	3.53	3.45	3.36
L81	SHLR SEB (West of Junction with A6045 Manchester Road) to A6184, SP	22.32	22.32	22.69	39.19	35.22

Link		HDV Proportion of Fleet (%)				
		Verif.	2027 Core DM	2027 Core DS	2032 Bus DM	2032 Bus DS
L82	SHLR (West of Junction with A6045 Manchester Road)	8.74	8.74	8.87	17.36	16.44
L83	A6045 Manchester Road (Immediately north-east of Junction with SHLR), SP	3.52	3.52	3.41	3.45	3.41
L84	A6045 Manchester Road (north-east of Junction with SHLR)	3.52	3.52	3.45	3.45	3.39
L85	Church Street WB	3.55	3.55	3.55	3.55	3.55
L86	Rochdale Road	3.45	3.23	3.03	3.24	3.04
L87	Market Place to York Street	2.74	2.66	2.63	2.66	2.64
L88	Market Street	5.96	5.87	5.82	5.87	5.82
L89	Dawson Street to Market Place	2.74	2.69	2.68	2.69	2.68
L90	Dawson Street	5.52	5.39	5.35	5.40	5.35
L91	A58 Bury Street (East of A58 Bury Street/ Pilsworth Jct)	5.74	5.63	5.58	5.63	5.58
L92	A58 Bury Street (west of A58 Bury Street/ Pilsworth Jct)	5.74	5.63	5.63	5.64	5.64
L93	A58 Bury Street (west of A58 Bury Street/ Pilsworth Jct), SP	5.74	5.63	5.63	5.64	5.64
L94	A58 Bury Street (East of A58 Bury Street/ Pilsworth Jct), SP	5.74	5.63	5.58	5.63	5.58
L95	A58 Bury Street (Between Pilsworth Jct and Bury Old Road)	5.74	5.63	5.63	5.64	5.64
L96	Market Place	2.74	2.66	2.63	2.66	2.64
L97	Chruch Street to Market Place	3.55	3.55	3.55	3.55	3.55
L98	York Street	2.74	2.66	2.63	2.66	2.64
L99	York Street to Rochdale Road E	3.75	3.61	3.53	3.61	3.54
L100	A58 Bury New Road (west of the A58 Bury New Road/ Heap Brow Jct)	5.74	5.53	5.50	5.54	5.51
L101	A58 Bury New Road from roundabout (west of the A58 Bury New Road/ Heap Brow Jct)	5.52	5.32	5.29	5.33	5.30

Link		HDV Proportion of Fleet (%)				
		Verif.	2027 Core DM	2027 Core DS	2032 Bus DM	2032 Bus DS
L102	A58 Bury New Road to roundabout (west of the A58 Bury New Road/ Heap Brow Jct)	5.96	5.75	5.72	5.76	5.73
L103	A58 Rochdale Road from roundabout (east of the B6221 Wash Lane/ A58 Rochdale Road Jct)	5.02	4.86	4.84	4.87	4.85
L104	A58 Rochdale Road to roundabout (east of the B6221 Wash Lane/ A58 Rochdale Road Jct)	7.57	7.13	7.06	7.14	7.08
L105	A58 Rochdale Road (west of the B6221 Wash Lane/ A58 Rochdale Road Jct)	5.87	5.63	5.60	5.64	5.61
L106	A58 Rochdale Road to Derby Way	5.87	5.63	5.60	5.64	5.61
L107	M66 NB on slip (north of of M66 Jct 2)	8.48	8.48	8.48	8.48	8.48
L108	M66 SB off slip (north of of M66 Jct 2)	8.87	8.87	8.87	8.87	8.87
L109	M66 SB off slip to roundabout (north of of M66 Jct 2)	8.87	8.87	8.87	8.87	8.87
L110	M66 north of Jct 2 - NB	8.48	8.73	8.72	8.72	8.72
L111	M66 north of Jct 2 - SB	8.87	9.20	9.19	9.18	9.18
L112	M66 NB off slip to roundabout (south of of M66 Jct 2)	4.42	4.42	4.42	4.60	4.60
L113	M66 NB off slip (south of of M66 Jct 2)	4.42	4.42	4.42	4.60	4.60
L114	M66 SB on slip (south of of M66 Jct 2)	4.58	4.58	4.58	4.82	4.82
L115	Jun 2 - M66 through roads NB between slip roads	6.02	6.02	6.02	6.10	6.10
L116	Jun 2 - M66 through roads SB between slip roads	6.36	6.36	6.36	6.47	6.47
L117	M66 between Jct 2 and Jct 3 - NB	4.42	4.42	4.42	4.60	4.60
L118	M66 between Jct 2 and Jct 3 - SB	4.58	4.58	4.59	4.82	4.83
L119	M66 NB on slip (north of M66 Jct 3)	4.42	4.42	4.45	4.60	4.63
L120	M66 SB off slip (north of M66 Jct 3)	4.58	4.58	4.63	4.82	4.86
L121	M66 SB off slip to roundabout (north of M66 Jct 3)	4.58	4.58	4.63	4.82	4.86

Link		HDV Proportion of Fleet (%)				
		Verif.	2027 Core DM	2027 Core DS	2032 Bus DM	2032 Bus DS
L122	M66 NB off slip to roundabout(south of M66 Jct 3)	4.76	4.76	5.12	5.12	5.42
L123	M66 NB off slip (south of M66 Jct 3)	4.76	4.76	5.12	5.12	5.42
L124	M66 SB on slip (south of M66 Jct 3)	4.70	4.70	5.00	5.15	5.39
L125	Jun 3 - M66 through roads NB between slip roads	4.59	4.59	4.59	4.86	4.86
L126	Jun 3 - M66 through roads SB between slip roads	4.64	4.64	4.64	4.99	4.99
L127	Pilsworth Road (Immediately West of M66 J3)	3.62	3.45	3.46	3.45	3.46
L128	Pilsworth Road (SW of the Pilsworth Road/ Pilsworth Way Jct)	3.62	3.45	3.46	3.45	3.46
L129	M66 J3 Connector Road (East of Junction with Pilsworth Road)	6.82	6.82	7.20	10.49	10.64
L130	Pilsworth Road (west of the Pilsworth Road / Viridor Haul Road Jct)	6.82	6.82	7.20	10.49	10.63
L131	Pilsworth Road (East of M66 Jct 3)	6.82	6.82	7.20	10.49	10.63
L132	Whittle Lane (South of Site Centre)(a)	2.13	2.13	1.44	-	-
L133	Whittle Lane (North of Site Centre)	10.45	10.45	10.39	25.11	16.17
L134	Moss Hall Road (Immediately North of 3-Arrows Junction)	5.99	5.99	6.28	8.84	8.94
L135	Moss Hall Road (North of Junction with Pilsworth Road)	2.49	2.49	2.46	2.26	2.23
L136	Heap Brow (north of the Heap Brow/ Bury Old Road/ Moss Hall Road Jct)	2.49	2.49	2.46	2.26	2.23
L137	Pilsworth Road (Between Plot 3 Access to 3-Arrows)	7.18	7.18	7.09	11.18	10.34
L138	Pilsworth Road (Immediately North of Junction with SHLR)	3.97	3.97	3.85	3.71	3.61
L139	Pilsworth Road (South of A58 Bury Street/ Pilsworth Jct)	3.97	3.97	3.85	3.71	3.61
L140	A56 Manchester Road	2.59	2.54	2.55	2.54	2.55
R1	M60 Jct 18 Roundabout	8.31	8.31	8.37	8.42	8.48

Link		HDV Proportion of Fleet (%)				
		Verif.	2027 Core DM	2027 Core DS	2032 Bus DM	2032 Bus DS
R2	M60 Jct 19 Roundabout	3.19	3.11	3.11	3.07	3.07
R3	M62 Jct 19 Roundabout	9.92	9.92	9.88	11.41	11.31
R4	M66 Jct 2 Roundabout	5.95	5.95	5.79	5.85	5.83

Note: (a) Link blocked by bus gate in future year

1.3.8 Road parameters for input into the model were based on the following:

- Road widths were estimated from aerial photography and UK highway design standards;
- Vehicle speeds were estimated as an average for the relevant road link over the course of a 24-hour period;
- Vehicle speeds were determined following review of speed limits within the study extents, as well as congestion data available from GoogleMaps;
- Vehicle speeds specific to slow phases were determined using the methodology outlined in the DEFRA guidance³;
- Necessary adjustments to slow phase vehicle speeds were based upon congestion data available from GoogleMaps; and,
- The length for slow phases was derived using the approaching distance of 25m outlined in the DEFRA guidance⁴, and adjusted accordingly based on aerial photography and congestion data available from GoogleMaps.

1.3.9 A summary of the road parameters used in the assessment is provided in Table A8.1.3.

Table A8.1.3 Road Width and Vehicle Speed

Link		Road Width (m)	Average Vehicle Speed (km/h)
L1	M62 west of Jct 18 - NB	14.8	110
L2	M62 west of Jct 18 - SB	14.2	110

³ Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

⁴ Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

Link		Road Width (m)	Average Vehicle Speed (km/h)
L3	M62 NB off slip (north of M62/M66 Jct 18)	10.7	80
L4	M62 NB off slip to roundabout (north of M62/M66 Jct 18), SP	6.8	25
L5	M62 NB off slip to M66 (north of M62/M66 Jct 18)	4.4	65
L6	M62 WB on slip (west of M62/M66 Jct 18)	13.1	80
L7	M62 WB on slip from roundabout (west of M62/M66 Jct 18)	7.4	65
L8	M62 WB on slip from M60 (west of M62/M66 Jct 18)	3.7	65
L9	Jun 18 - M62 through roads EB between slip roads	11.2	110
L10	Jun 18 - M62 through roads EB between slip roads	11.0	110
L11	M62 EB on slip from roundabout (east of M62/M66 Jct 18)	9.9	65
L12	M62 EB on slip from M66 (east of M62/M66 Jct 18)	4.0	65
L13	M62 EB on slip (east of M62/M66 Jct 18)	8.1	80
L14	M62 SB off slip (east of M62/M66 Jct 18)	6.3	80
L15	M62 SB off slip to roundabout (east of M62/M66 Jct 18), SP	9.0	25
L16	M62 SB off slip to M60 (east of M62/M66 Jct 18)	3.9	65
L17	M62 between Jct 18 and Jct 19	13.8	110
L18	M62 between Jct 18 and Jct 19	14.2	110
L19	Jun 18 - M62 through roads south-west bound (SWB) between slip roads	7.3	110
L20	Jun 18 - M62 through roads NEB between slip roads	7.3	110
L21	M60 NB on slip from roundabout(north of M62/M66 Jct 18)	8.6	65
L22	M60 NB on slip (north of M62/M66 Jct 18)	9.8	80
L23	M60 EB off slip to roundabout (north of M62/M66 Jct 18)	12.6	25
L24	M60 EB off slip (north of M62/M66 Jct 18)	9.4	80
L25	M66 between Jct 3 and M62 Jct 18 - NB	10.4	110
L26	M66 between Jct 3 and M62 Jct 18 - SB	11.7	110
L27	M60 SB on slip from roundabout (south of M62/M66 Jct 18)	7.6	65
L28	M60 SB on slip (south of M62/M66 Jct 18)	10.1	80

Link		Road Width (m)	Average Vehicle Speed (km/h)
L29	M60 WB off slip to roundabout (south of M62/M66 Jct 18)	8.6	25
L30	M60 WB off slip (south of M62/M66 Jct 18)	10.8	80
L31	M60 between M62 Jct 18 and M60 jct 19 - EB	14.1	110
L32	M60 between M62 Jct 18 and M60 jct 19 - WB	14.1	110
L33	M60 SEB off slip (west of M60 Jct 19)	7.2	80
L34	M60 SEB off slip (west of M60 Jct 19), SP	9.7	25
L35	M60 NWB on slip (west of M60 Jct 19)	7.4	80
L36	M60 NWB on slip from roundabout (west of M60 Jct 19)	6.1	65
L37	M60 NWB on slip from A576 (west of M60 Jct 19)	4.8	65
L38	Jun 19 - M60 EB through road link	10.9	110
L39	Jun 19 - M60 WB through road link	11.1	110
L40	M60 SWB off slip to roundabout (east of M60 Jct 19), SP	9.5	25
L41	M60 SWB off slip (east of M60 Jct 19)	6.8	80
L42	M60 EB on slip from roundabout (east of M60 Jct 19)	7.5	65
L43	M60 EB on slip from Manchester Old Road (east of M60 Jct 19)	4.2	65
L44	M60 EB on slip (east of M60 Jct 19)	6.1	80
L45	A576 Middleton Road SWB (south of M60 Jct 19)	7.8	65
L46	A576 Middleton Road NWB to roundabout (south of M60 Jct 19)	8.6	25
L47	A576 Middleton Road NWB (south of M60 Jct 19)	7.8	65
L48	A576 WB (north of M60 Jct 19), SP	10.9	25
L49	A576 WB (north of M60 Jct 19)	7.4	45
L50	A576 NEB (north of M60 Jct 19), SP	8.0	25
L51	A576 NEB (north of M60 Jct 19)	9.6	45
L52	A576 Manchester Old Road (east of A6045/ A576 / Kelvin Avenue Jct), SP	12.4	25

Link		Road Width (m)	Average Vehicle Speed (km/h)
L53	A576 Manchester Old Road (east of A6045/ A576 / Kelvin Avenue Jct)	8.5	45
L54	A6045 Heywood Old Road (north of A6045/ A576 / Kelvin Avenue Jct), SP	10.0	25
L55	A6045 Heywood Old Road (north of A6045/ A576 / Kelvin Avenue Jct)	7.2	45
L56	A6045 Heywood Old Road (South of A6045/ Langley Lane Junction), SP	18.5	45
L57	A6045 Heywood Old Road (North of A6045/ Langley Lane Junction)	8.7	45
L58	A6045 Manchester Road (south of the A6045 Manchester Road/ Workers Way Jct), SP	11.2	25
L59	SHLR (A6045 to M62 J19) to Manchester Road, NB	4.0	25
L60	M62 NEB off slip (Junction 19)	7.1	80
L61	M62 NEB off slip to roundabout (Junction 19), SP	5.9	25
L62	QEII Way, WB (Immediately Northwest of Jct 19)	8.0	65
L63	M62 SWB on slip (Junction 19)	6.9	80
L64	Jun 19 - M62 through roads SWB between slip roads	14.0	110
L65	Jun 19 - M62 through roads NEB between slip roads	13.4	110
L66	M62 NEB on slip (Junction 19)	4.9	80
L67	M62 SWB off slip (Junction 19)	6.7	80
L68	M62 SWB off slip (Junction 19), SP	6.5	25
L69	M62 between Jct 19 and 20 - EB	13.4	110
L70	M62 between Jct 19 and 20 - WB	13.4	110
L71	A6046 Middleton Road NB (south of the A6046 Middleton Road/ Tangmere Avenue/ Lenten Grove Jct)	6.1	45
L72	A6046 Middleton Road SB (south of the A6046 Middleton Road/ Tangmere Avenue/ Lenten Grove Jct), SP	6.9	25
L73	A6046 Middleton Road	8.5	45
L74	Coronation Avenue (East of Manchester Road), SP	10.2	25

Link		Road Width (m)	Average Vehicle Speed (km/h)
L75	QEII Way SEB (Immediately Northwest of Jct 19), SP	8.0	25
L76	QEII Way SEB (Immediately Northwest of Jct 19)	8.0	65
L77	SHLR NWB (A6184 to A6184 north of Manchester Road), SP	10.0	25
L78	SHLR NWB (West of Junction with A6045 Manchester Road)	7.5	65
L79	SHLR SEB (West of Junction with A6045 Manchester Road)	7.5	65
L80	SHLR SEB to A6045 Manchester Road, SP	7.5	25
L81	SHLR SEB (West of Junction with A6045 Manchester Road) to A6184, SP	7.5	25
L82	SHLR (West of Junction with A6045 Manchester Road)	15.0	65
L83	A6045 Manchester Road (Immediately north-east of Junction with SHLR), SP	10.5	25
L84	A6045 Manchester Road (north-east of Junction with SHLR)	8.3	45
L85	Church Street WB	8.7	35
L86	Rochdale Road	9.3	35
L87	Market Place to York Street	3.7	25
L88	Market Street	5.7	25
L89	Dawson Street to Market Place	16.5	25
L90	Dawson Street	5.9	25
L91	A58 Bury Street (East of A58 Bury Street/ Pilsworth Jct)	7.4	35
L92	A58 Bury Street (west of A58 Bury Street/ Pilsworth Jct)	7.9	45
L93	A58 Bury Street (west of A58 Bury Street/ Pilsworth Jct), SP	8.0	25
L94	A58 Bury Street (East of A58 Bury Street/ Pilsworth Jct), SP	7.7	25
L95	A58 Bury Street (Between Pilsworth Jct and Bury Old Road)	8.0	45
L96	Market Place	9.8	25
L97	Chruch Street to Market Place	9.0	25
L98	York Street	9.0	35
L99	York Street to Rochdale Road E	10.0	45

Link		Road Width (m)	Average Vehicle Speed (km/h)
L100	A58 Bury New Road (west of the A58 Bury New Road/ Heap Brow Jct)	8.5	45
L101	A58 Bury New Road from roundabout (west of the A58 Bury New Road/ Heap Brow Jct)	8.0	35
L102	A58 Bury New Road to roundabout (west of the A58 Bury New Road/ Heap Brow Jct)	10.4	25
L103	A58 Rochdale Road from roundabout (east of the B6221 Wash Lane/ A58 Rochdale Road Jct)	9.4	45
L104	A58 Rochdale Road to roundabout (east of the B6221 Wash Lane/ A58 Rochdale Road Jct)	9.7	25
L105	A58 Rochdale Road (west of the B6221 Wash Lane/ A58 Rochdale Road Jct)	12.2	45
L106	A58 Rochdale Road to Derby Way	15.3	25
L107	M66 NB on slip (north of of M66 Jct 2)	5.6	80
L108	M66 SB off slip (north of of M66 Jct 2)	6.3	80
L109	M66 SB off slip to roundabout (north of of M66 Jct 2)	11.4	25
L110	M66 north of Jct 2 - NB	7.4	110
L111	M66 north of Jct 2 - SB	7.4	110
L112	M66 NB off slip to roundabout (south of of M66 Jct 2)	9.4	25
L113	M66 NB off slip (south of of M66 Jct 2)	6.7	80
L114	M66 SB on slip (south of of M66 Jct 2)	7.5	80
L115	Jun 2 - M66 through roads NB between slip roads	7.0	110
L116	Jun 2 - M66 through roads SB between slip roads	7.0	110
L117	M66 between Jct 2 and Jct 3 - NB	10.6	110
L118	M66 between Jct 2 and Jct 3 - SB	10.1	110
L119	M66 NB on slip (north of M66 Jct 3)	6.1	80
L120	M66 SB off slip (north of M66 Jct 3)	6.7	80
L121	M66 SB off slip to roundabout (north of M66 Jct 3)	7.6	25
L122	M66 NB off slip to roundabout(south of M66 Jct 3)	7.3	25

Link		Road Width (m)	Average Vehicle Speed (km/h)
L123	M66 NB off slip (south of M66 Jct 3)	5.8	80
L124	M66 SB on slip (south of M66 Jct 3)	6.4	80
L125	Jun 3 - M66 through roads NB between slip roads	10.9	110
L126	Jun 3 - M66 through roads SB between slip roads	10.9	110
L127	Pilsworth Road (Immediately West of M66 J3)	11.8	25
L128	Pilsworth Road (SW of the Pilsworth Road/ Pilsworth Way Jct)	7.4	45
L129	M66 J3 Connector Road (East of Junction with Pilsworth Road)	11.1	35
L130	Pilsworth Road (west of the Pilsworth Road / Viridor Haul Road Jct)	9.4	25
L131	Pilsworth Road (East of M66 Jct 3)	6.7	45
L132	Whittle Lane (South of Site Centre) (a)	7.4	45
L133	Whittle Lane (North of Site Centre)	7.4	45
L134	Moss Hall Road (Immediately North of 3-Arrows Junction)	8.3	45
L135	Moss Hall Road (North of Junction with Pilsworth Road)	7.1	45
L136	Heap Brow (north of the Heap Brow/ Bury Old Road/ Moss Hall Road Jct)	7.1	45
L137	Pilsworth Road (Between Plot 3 Access to 3-Arrows)	7.1	45
L138	Pilsworth Road (Immediately North of Junction with SHLR)	7.5	45
L139	Pilsworth Road (South of A58 Bury Street/ Pilsworth Jct)	13.9	25
L140	A56 Manchester Road	9.2	45
R1	M60 Jct 18 Roundabout	15.0	35
R2	M60 Jct 19 Roundabout	10.8	35
R3	M62 Jct 19 Roundabout	9.8	35
R4	M66 Jct 2 Roundabout	12.2	35

1.3.10 Reference should be made to Figure 8.1 in Chapter 8 - Air Quality for a graphical representation of the road link locations.

1.4 Emission Factors

- 1.4.1 The emission factors were calculated using the relevant traffic flows and the Emissions Factor Toolkit (version 14.1). This has been produced by DEFRA and incorporates COPERT 5.8 vehicle emission factors and fleet information.

1.5 Meteorological Data

- 1.5.1 Meteorological data used in the assessment was taken from Manchester Airport meteorological station over the period 1st January 2024 to 31st December 2024 (inclusive). Manchester Airport is located at NGR: 381792, 384116, which is approximately 24.6km south of the development. It is anticipated that conditions would be reasonably similar over a distance of this magnitude. The data was therefore considered suitable for an assessment of this nature.
- 1.5.2 All meteorological records used in the assessment were provided by Atmospheric Dispersion Modelling (ADM) Ltd, which is an established distributor of data within the UK. Reference should be made to Figure A8.1.1 in for a wind rose of the utilised meteorological data.

1.6 Roughness Length

- 1.6.1 The z_0 is a modelling parameter applied to allow consideration of surface height roughness elements. A z_0 of 0.5m was used to describe the modelling extents. This is considered appropriate for the morphology of the area and is suggested within ADMS-Roads as being suitable for 'parkland, open suburbia'.
- 1.6.2 A z_0 of 0.2m was used to describe the meteorological site. This is considered appropriate for the morphology of the area and is suggested within ADMS-Roads as being suitable for 'agricultural areas (min)'.

1.7 Monin-Obukhov Length

- 1.7.1 A minimum Monin-Obukhov length of 30m was used to describe the modelling extents and meteorological site. This value is considered appropriate for the nature of both areas and is suggested within ADMS-Roads as being suitable for 'cities and large towns'.

1.8 **Background Concentrations**

- 1.8.1 Monitoring was undertaken by Redmore Environmental Ltd during 2024 in support of the Northern Gateway development (reference: 25/00418/OUT). As reported in the Air Quality Environmental Impact Assessment⁵, the DT11 - Seathwaite Close urban background monitor was located 2.4km south-east of the Proposed Development. The annual mean NO₂ background concentration at this position was 15.03µg/m³. This was used to represent background NO₂ concentrations across the assessment extents as it was higher than the DEFRA background for the grid square containing the Site, as shown in Table A8.2.5 in Appendix 8.2 - Supporting Information.
- 1.8.2 Monitoring of annual mean PM₁₀ and PM_{2.5} concentrations is not undertaken at a background location within the modelling extents. As such, predictions for these species were taken from the DEFRA mapping grid square containing the BURW - Bury Whitefield monitor, NGR: 380500, 406500. These are shown in Table A8.1.4

Table A8.1.4 Background Pollutant Concentration

Pollutant	Predicted 2024 Background Concentration (µg/m ³)
PM ₁₀	12.56
PM _{2.5}	7.29

- 1.8.3 Background NO₂, PM₁₀ and PM_{2.5} concentrations from the baseline year were utilised in preference to the opening year. This provided a robust assessment and is likely to overestimate pollutant concentrations during the operation of the proposal.

1.9 **NO_x to NO₂ Conversion**

- 1.9.1 Predicted annual mean oxides of nitrogen (NO_x) concentrations were converted to NO₂ concentrations using the spreadsheet (version 9.1) provided by DEFRA, which is the method detailed within DEFRA guidance⁶.

⁵ Northern Gateway - Air Quality Environmental Impact Assessment, Redmore Environmental, 2025.

⁶ Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

1.10 Verification

1.10.1 The predicted results from a dispersion model may differ from measured concentrations for a large number of reasons, including:

- Estimates of background concentrations;
- Uncertainties in source activity data such as traffic flows and emission factors;
- Variations in meteorological conditions;
- Overall model limitations; and,
- Uncertainties associated with monitoring data, including locations.

1.10.2 Model verification is the process by which these and other uncertainties are investigated and where possible minimised. In reality, the differences between modelled and monitored results are likely to be a combination of all of these aspects.

1.10.3 For the purpose of the assessment model verification was undertaken for 2024 using traffic data, meteorological data and monitoring results from this year.

Nitrogen Dioxide

1.10.4 Monitoring of NO₂ concentrations was undertaken at 18 monitors in the vicinity of roads included within the modelling extents during 2024. Review of the monitors indicated that a number of positions were not suitable for use in the verification process. Commentary is provided in Table A8.1.5.

Table A8.1.5 Monitors Removed from Verification Process

Monitor		Justification
RO6ANO	Heywood Old Road Birch	Monitor located at a kerbside position
BU1NO	BU1 Baguley Crescent	Monitor set back from nearest road and a lower elevation than Middleton Road The adjacent portion of the M60 is within a 'cutting' and sits below the monitor elevation Pollutant concentrations are therefore underestimated at this position
BU3CNO	BU3 Bury Roadside (AURN)	Monitor is co-located with the automatic monitor BURW

Monitor		Justification
BU7NO	Ferngrove	Monitor positioned behind a fence which inhibits dispersion of pollution. Pollutant concentrations are therefore underestimated at this position
BU12NO	Rochdale Road	Monitor located at a kerbside position
BU13NO	Rochdale Road	Monitor located at a kerbside position
BU20NO	Droughts Lane	Monitor is both set back from and a lower elevation than the M60. Pollutant concentrations are therefore underestimated at this position
CAP_BURY_005	A58 (Rochdale Road)	Monitor located at a kerbside position
CAP_BURY_033	A58	Monitor located at a kerbside position
CAP_BURY_034	A58	Monitor located at a kerbside position

1.10.5 The results from the remaining monitors were obtained and the road contribution to total NO_x concentration calculated following the methodology contained within DEFRA guidance⁷. The monitored annual mean NO₂ concentrations and calculated road NO_x concentrations are summarised in Table A8.1.6.

Table A8.1.6 Verification - Monitoring Results

Monitoring Location		Monitored NO ₂ Concentration (µg/m ³)	Calculated Road NO _x Concentration (µg/m ³)
RO20ANO	Manchester Road / Bader Drive	30.2	36.60
RO21ANO	York Street, Heywood	26.3	26.22
CAP_BURY_006	A576 (Middleton Road)	38.0	60.00
CAP_BURY_008	A576 (Middleton Road)	26.7	27.25
CAP_BURY_009	A58 (Rochdale Road)	33.7	46.63
CAP_BURY_010	A58 (Bury New Road)	29.2	33.86
CAP_BURY_028	Rochdale Road	37.5	58.38
BURW	Bury Whitefield	18.6	7.79

⁷ Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

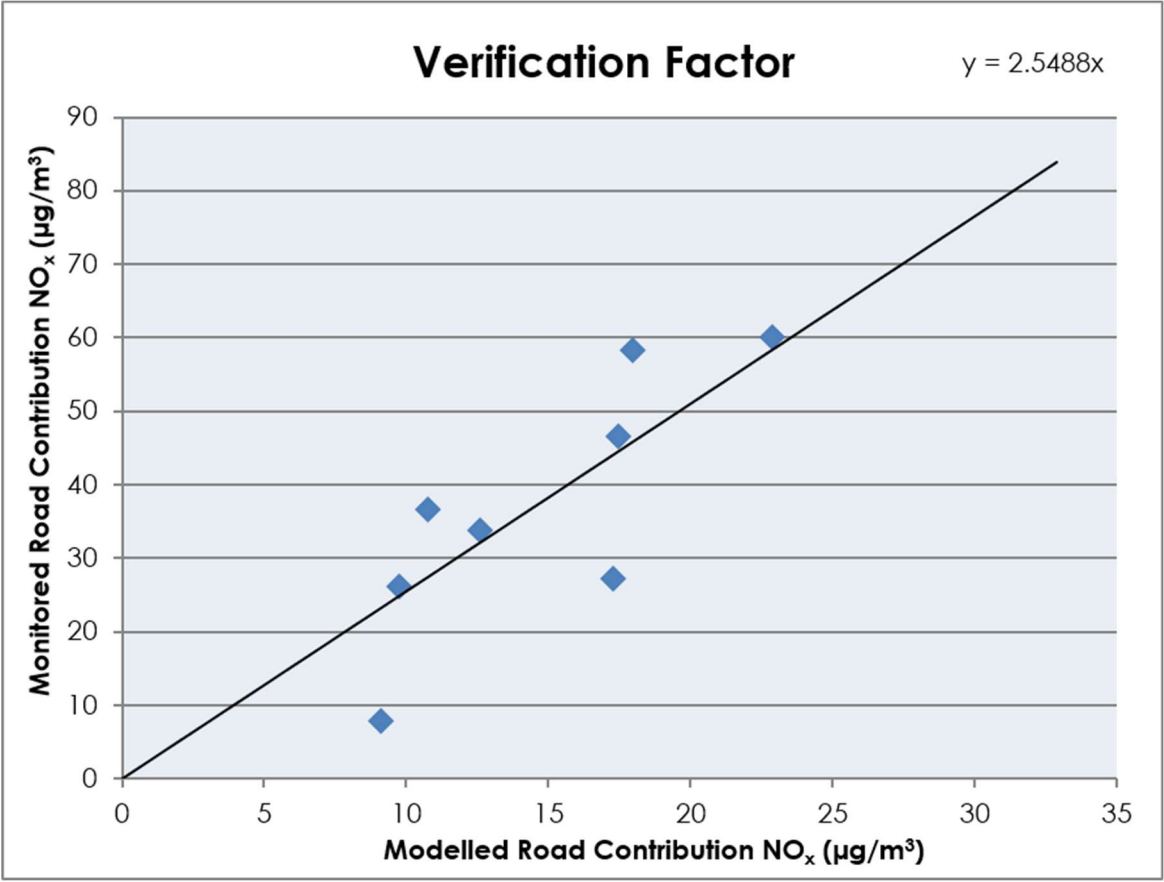
1.10.6 The annual mean road NO_x concentrations predicted from the dispersion model and the 2024 road NO_x concentrations calculated from the monitoring result are summarised in Table A8.1.7.

Table A8.1.7 Verification - Modelling Results

Monitoring Location		Calculated Road NO _x Concentration (µg/m ³)	Modelled Road NO _x Concentration (µg/m ³)
RO20ANO	Manchester Road / Bader Drive	36.60	10.78
RO21ANO	York Street, Heywood	26.22	9.76
CAP_BURY_006	A576 (Middleton Road)	60.00	22.90
CAP_BURY_008	A576 (Middleton Road)	27.25	17.29
CAP_BURY_009	A58 (Rochdale Road)	46.63	17.48
CAP_BURY_010	A58 (Bury New Road)	33.86	12.62
CAP_BURY_028	Rochdale Road	58.38	17.99
BURW	Bury Whitefield	7.79	9.11

1.10.7 The monitored and modelled road NO_x concentrations were compared to calculate the associated ratio. This indicated a verification factor of 2.5488 was required to be applied to all modelling results, as shown in Graph 1.

Graph 1 NO_x Verification Factor



Particulate Matter

1.10.8 Monitoring of PM₁₀ was undertaken at one location within the modelling extents during 2024. The result was obtained and the road contribution to total PM₁₀ concentration calculated. The monitored annual mean PM₁₀ concentration, calculated road PM₁₀ concentration and modelled PM₁₀ concentration is shown in Table A8.1.8.

Table A8.1.8 PM₁₀ Verification - Modelling Result

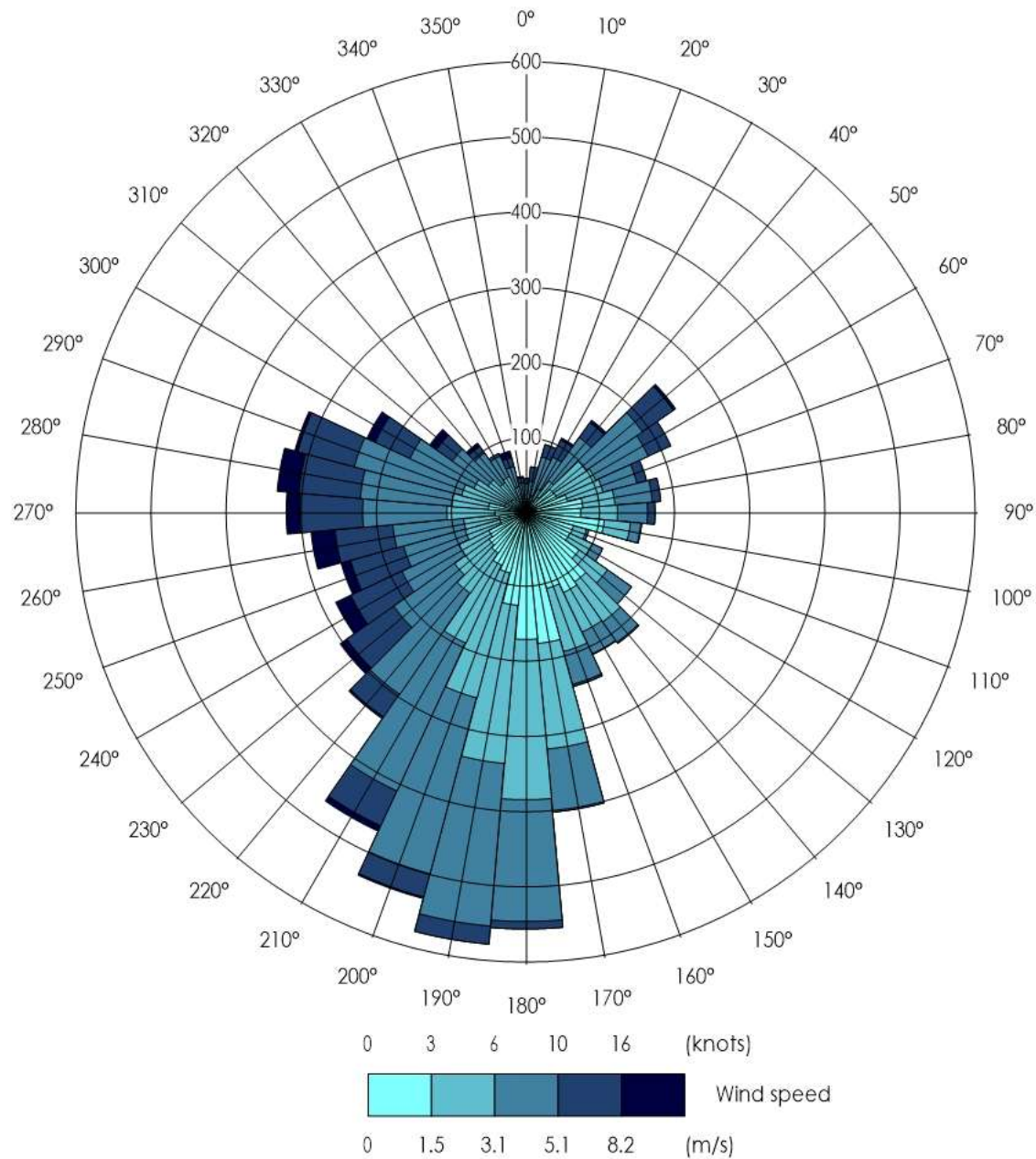
Monitor		Monitored PM ₁₀ Concentration (µg/m³)	Calculated Road PM ₁₀ Concentration (µg/m³)	Modelled Road PM ₁₀ Concentration (µg/m³)
BURW	Bury Whitefield	13.1	0.54	1.22

1.10.9 The calculated and modelled road PM₁₀ concentrations were compared to determine the associated ratio. This indicated that a verification factor of 0.44 was required to be applied to all PM₁₀ modelling results.

1.10.10 Monitoring of PM_{2.5} concentrations is not undertaken within the assessment extents. The PM₁₀ verification factor was therefore used to adjust model predictions of this species in lieu of more accurate data in accordance with DEFRA guidance⁸.

⁸ Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

Figures



Legend

Title

Figure A8.1.1 - Wind Rose of 2024
Manchester Airport Meteorological
Data

Project

Air Quality Environmental Impact
Assessment
Birch Business Park.

Project Reference

10111

Date

29th May 2026



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