The Great Grid Upgrade

North Humber to High Marnham

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North Humber to High Marnham

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1. Introduction

1.1.1 This appendix to **Application Document 6.15 Chapter 15 Air Quality** sets out the construction vehicle emissions modelling undertaken for the Project and is supported by **Application Document 6.15.F2 Figure 15.2 Air Quality Construction Vehicle Emissions Study Area and Receptor Locations**.

2. Model Inputs and Parameters

2.1.1 Table 2.1 details the dispersion model parameters that were used to generate the modelled outputs to inform the construction vehicle emissions assessment on human receptors.

Table 2.1 – Model inputs and processing parameters

Work element	Setting/process applied
Model	Atmospheric Dispersion Modelling System for Roads (ADMS-Roads) Version 5.1.0 developed by Cambridge Environmental Research Consultants (CERC)
Pollutants Modelled	Nitrogen oxides (NOx), particulate matter less than 10 microns in diameter (PM_{10}) and particulate matter less than 2.5 microns in diameter ($PM_{2.5}$)
Traffic Base Year	Base Year (BY) 2024
Future Year Scenarios	Do Minimum (DM) (without Project, cumulative) 2029 Do Something (DS) (with Project, cumulative) 2029
Surface Roughness	0.5 m (parkland/open suburbia)
Minimum Monin-Obukhov length[1]	10 m (Small towns <50,000)
Latitude	53
Human Receptor Height	1.5 m
Human Receptors	Modelled as 40 discrete points at façades of buildings representing worst case receptor locations[2] (see Table 2.2 for more details).
Ecological Receptor Height	0 m
Ecological Receptors	Modelled as six discrete points (one for each identified ecological site) at the edge of the ecological site closest to the Affected Road Network (ARN), to represent a worst case location in terms of expected changes in pollutant concentrations (see Table 2.2 for more details).

[1] The Monin-Obukhov length acts as a critical parameter for defining the structure of the atmospheric boundary layer and the dispersion mechanisms of an emitted pollutant.

[2] Representative worst-case receptor locations have been selected within 200 m of the ARN for human receptors, i.e. located where the largest changes in pollutant concentrations are expected as a result of the Project.

Work element	Setting/process applied
Meteorological Data	Humberside Airport 2024, supplied by EnviroData Services
Roads modelled	All construction traffic routes (Primary Access Routes (PARs)) plus internal construction access tracks that exceeded Institute of Air Quality Management and Environmental Protection UK screening criteria (Institute of Air Quality Management and Environmental Protection UK, 2017)
Traffic Data	24-hour Annual Average Daily Traffic (AADT) with % Heavy Duty Vehicle (HDV) split. Speed limits used for average speed, with reduced speeds applied at junctions.
Emission Factors	The Department for Environment, Food and Rural Affairs' (Defra) Emission Factor Toolkit (EFT) v14.1 (Department for Environment, Food and Rural Affairs, 2026) (dated May 2026) Do Something HDVs associated with the Project construction flows assessed as 100% Euro VI. It should be noted that Defra released EFT v14.2 (Department for Environment, Food and Rural Affairs, 2026) shortly before publication of the ES (September 2026); v14.2 made minor process refinements, but there have been no changes to the emission factors, vehicle fleet or the methodology. As such, the update does not affect the assessment outcome.
Traffic mix used in EFT	Rural (not London), Urban (Not London) and Motorway (not London)
Gradients applied	No (not required)
Background values	Defra background maps (2021 reference year) for 2024 and 2029 (Department for Environment, Food and Rural Affairs, 2026). No sector removal as not all roads within each grid square was explicitly modelled due to availability of traffic data.
Post modelling processing method	Defra's NOx to nitrogen dioxide (NO_2) v9.1 tool (Department for Environment, Food and Rural Affairs, 2024), local authority and traffic mix selected according to receptor location.
Verification factor	2.83 (discussed in section 3)

2.1.2 The modelled receptor locations are detailed in Table 2.2. The receptor locations were selected to represent worst-case exposure locations for the assessment. Human receptor IDs, derived from OS AddressBase Plus data, have subsequently been assigned to these locations to provide an address reference. Where multiple AddressBase Plus points are located in close proximity to a modelled receptor location, the nearest address point has been used for identification purposes.

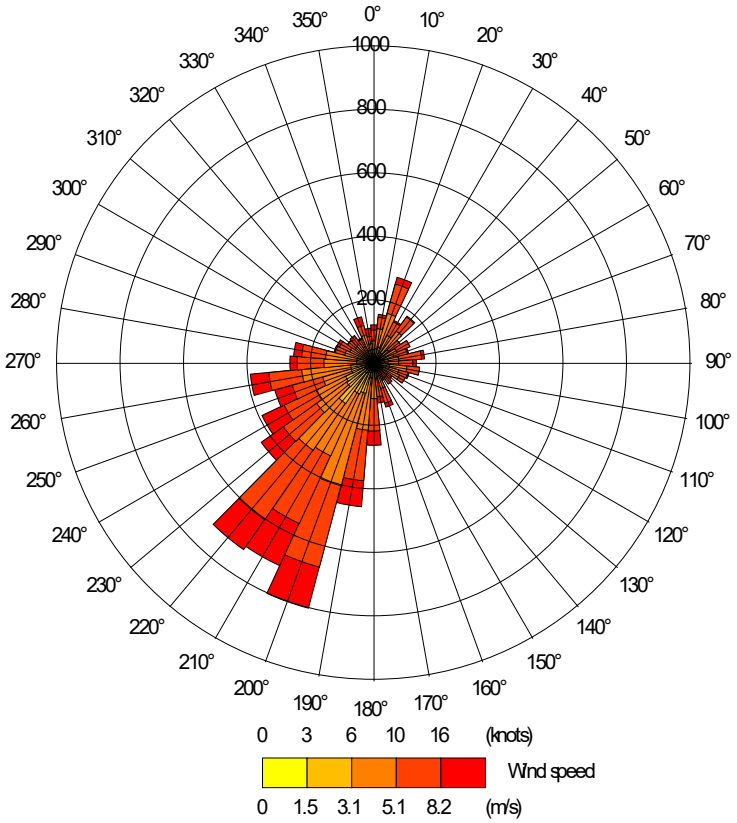
Table 2.2 – Modelled receptor locations

Receptor ID	Description	X	Y
R_2600	Residential property on Carr Lane (PAR 42)	482397.0	415588.0
R_2563	Residential property on Meredyke Road (PAR 135)	483454.6	416454.4
R_28967	Residential property on Whins Gate (PAR 37)	481054.9	418644.9
R_29033	Residential property on Whins Gate (PAR 37)	480908.1	418330.2
R_28993	Residential property on Whins Gate (PAR 37)	480949.4	418404.3
R_29321	Residential property on A161 (PAR 37)	480883.8	417916.2
R_29332	Residential property on A161 (PAR 37)	480909.9	417860.6
R_29532	Residential property on A161 (PAR 37)	480587.7	416460.5
R_29545	Residential property on A161 (PAR 37)	480565.7	416375.1
R_3655	Residential property on A18 Trunk Road (East) (PAR 51)	480757.5	409986.7
R_1339	Residential property on Cave Road (South of Brantingham Road) (PAR 24B)	492994.4	429694.8
R_1324	Residential property on B1230 Main Road (East) (PAR 29)	484515.8	429735.5
R_1392	Residential property on Tongue Lane (PAR 28)	484536.2	429592.9
R_1483	Residential property on Scalby Lane (near to PAR 28)	484514.8	429488.0
R_1864	Residential property on Tongue Lane (PAR 28)	484797.8	428471.8
R_1890	Residential property on Tongue Lane (PAR 28)	484903.5	428056.4
R_696	Residential property on Riplingham Road (PAR 10B)	496256.0	431863.1
R_29559	Residential property on B1392 Luddington Road (PAR 43)	481151.8	416184.8
R_29560	Residential property on B1392 Luddington Road (PAR 43)	480572.5	416175.4
R_2476	Residential property on Meredyke Road (West) (PAR 135)	483005.4	416717.6
R_2525	Residential property on Meredyke Road (West) (PAR 135)	483242.8	416607.2
R_2595	Residential property on Eastoft Road (PAR 136)	482572.8	415850.2
R_2577	Residential property on Eastoft Road (PAR 136)	482719.3	416310.3

Receptor ID	Description	X	Y
R_2560	Residential property on Eastoft Road (PAR 136)	482786.3	416462.2
R_2547	Residential property on Eastoft Road (PAR 136)	482866.0	416544.0
R_2479	Residential property on corner of B1392 Eastoft Road (PAR 136)/Meredyke Road (West) (PAR 135)	482984.7	416717.6
R_716	Residential property on B1230 Main Road (East) (PAR 29)	486796.2	430946.1
R_727	Residential property on B1230 Main Road (East) (PAR 29)	486567.3	430873.1
R_23374	Residential property on B1230 Main Road (East) (PAR 29)	485786.0	430339.8
R_23506	Residential property on B1230 Main Road (East) (PAR 29)	485345.3	430098.1
R_1300	Residential property on B1230 Main Road (East) (PAR 29)	484929.8	429815.6
R_1303	Residential property on B1230 Main Road (East) (PAR 29)	484764.8	429798.0
R_1249	Residential property on Cave Road (Between A1034 Roundabout and Brantingham Road) (PAR 24A)	492826.5	430069.1
R_1919	Residential property on Carr Lane (PAR 27)	488039.6	427444.0
R_1968	Residential property off Tongue Lane (PAR 28)	485647.2	427081.9
R_1899	Residential property off Landing Lane (PAR 159)	486551.6	427971.5
R_2037	Residential property on Staddlethorpe Broad Lane (PAR 131)	484481.3	425836.8
R_2041	Residential property on Staddlethorpe Broad Lane (PAR 131)	484428.0	425624.4
C_2140	Eastoft Church of England Primary School (PAR 37)	480570.2	416554.3
C_1755	Newport Primary School on B1230 Main Road (East) (PAR 29)	485561.4	430183.6
E01	Woodhill Path, Cottingham Local Wildlife Site (LWS)	502197.8	434512.0
E02	Drove Road LWS	502136.3	434679.3
E03	Jillywood Lane LWS	502159.3	435248.4
E04	Bridgehead Yorkshire Wildlife Trust Reserve (YWTR)	501754.8	426635.2
E05	Dunswell Adits Candidate LWS	506717.9	434632.6
E06	Figham Pastures LWS	505052.6	438757.1

2.1.3 The wind rose of the meteorological data used in the assessment is displayed in Image 2.1.

Image 2.1 – Humberside Airport wind rose 2024



2.1.4 Table 2.3 details the traffic data provided for use in the air quality modelling assessment of construction vehicle emissions. It should be noted that the traffic data provided for the air quality assessment comprised 2024 base year flows, which had been derived by adjusting 2025 traffic count data. This adjustment was undertaken prior to issue for the air quality assessment to enable verification of the air quality model against 2024 monitoring data.

2.1.5 Speed limits and a standard dual carriageway road width of 7 m were applied to each modelled road link and refined using Google Earth imagery for the ARN and links within 200 m of modelled receptors. For links associated with junctions close to modelled receptors, vehicle speeds were reduced to 20 kph to account for slower-moving and queuing traffic conditions.

Table 2.3 – Traffic data provided for the air quality modelling assessment

PAR ID	PAR name	Base year 2024		Peak year 2029 without committed development				Peak year 2029 with committed development (cumulative)			
		BY AADT	BY HGV %	DM AADT	DM HGV %	DS AADT	DS HGV %	DM AADT	DM HGV %	DS AADT	DS HGV %
PAR 1A	A1079 Beverley Bypass East (between A164/A1079 intersection and BM 001)	18242	4.8	19060	4.8	19097	4.9	20655	6.4	20692	6.5
PAR 1B	A1079 Beverley Bypass East (east of BM 001)	17970	6.3	18776	6.3	18788	6.3	20371	7.8	20383	7.8
PAR 2	A1079 Beverley Bypass West	18595	5.4	19429	5.4	19441	5.5	20236	6.0	20248	6.1
PAR 3	A164 - North of A1079	19649	4.1	20530	4.1	20543	4.1	22459	4.8	22471	4.9
PAR 4	A164 Beverley Road - Between A1079 and Dunflat Road	25127	5.4	26254	5.4	26266	5.4	27684	6.6	27696	6.6
PAR 5	Dunflat Road	3400	4.3	3553	4.3	3659	5.7	3553	4.3	3659	5.7
PAR 6	A164 - Between Dunflat Road and B1233/A164 Roundabout	25575	5.2	26722	5.2	26877	5.4	28152	6.3	28307	6.5
PAR 7	Main Street	4221	3.5	4411	3.5	4517	4.6	4411	3.5	4517	4.6
PAR 8	Little Weighton Road	2367	4.3	2473	4.3	2579	6.2	2473	4.3	2579	6.2
PAR 9	A164 - Between B1233/A164 Roundabout and A164/Riplingham Road Roundabout	25383	6.1	26521	6.1	26676	6.3	27257	7.2	27412	7.4
PAR 10A	Riplingham Road (between A164/Riplingham Road and Rowley Road)	5167	3.8	5399	3.8	5505	4.7	5491	3.9	5597	4.8

PAR ID	PAR name	Base year 2024		Peak year 2029 without committed development				Peak year 2029 with committed development (cumulative)			
		BY AADT	BY HGV %	DM AADT	DM HGV %	DS AADT	DS HGV %	DM AADT	DM HGV %	DS AADT	DS HGV %
PAR 10B	Riplingham Road (west of Rowley Road)	4793	4.3	5008	4.3	5114	5.3	5101	4.4	5207	5.4
PAR 11	Rowley Road (between Riplingham Road/ Rowley Road and BM 008)	479	2.7	501	2.7	607	11.1	501	2.7	607	11.1
PAR 12	A164 - Between A164/Riplingham Road Roundabout and Wingfield Farm Roundabout	18271	7.3	19090	7.3	19245	7.6	19856	8.8	20011	9.1
PAR 13	Lambwell Hill	1590	2.2	1662	2.2	1982	12.7	1662	2.2	1982	12.7
PAR 14	Westoby Lane	2132	4.0	2227	4.0	2279	3.9	2227	4.0	2279	3.9
PAR 15	Brick Dike Lane	1918	4.7	2004	4.7	2056	4.6	2004	4.7	2056	4.6
PAR 16	B1230 - Hunsley Road	8770	5.4	9164	5.4	9216	5.3	9164	5.4	9216	5.3
PAR 17	A1034 - Between Hunsley Road and A1079/A1034 Roundabout (North)	6853	9.0	7160	9.0	7212	8.9	7160	9.0	7212	8.9
PAR 18	A1034 - Between Hunsley Road and Beverley Road (South)	8870	10.3	9268	10.3	9320	10.2	9268	10.3	9320	10.2
PAR 19	A1034 - Beverley Road and A63	8870	10.3	9268	10.3	9320	10.2	9268	10.3	9320	10.2
PAR 20	Beverley Road	25127	5.4	26254	5.4	26306	5.4	26254	5.4	26306	5.4
PAR 21	Ellerker Road	535	5.4	559	5.4	665	12.7	559	5.4	665	12.7
PAR 22	A63 Petuaria Way (South)	38244	14.7	39959	14.7	40159	14.8	40296	14.6	40496	14.8
PAR 23	Brantingham Road	535	5.4	559	5.4	665	12.7	559	5.4	665	12.7
PAR 24A	Brough Road (between A1034 roundabout and Brantingham Road)	6872	3.8	7180	3.8	7404	5.1	7250	3.9	7474	5.1

PAR ID	PAR name	Base year 2024		Peak year 2029 without committed development				Peak year 2029 with committed development (cumulative)			
		BY AADT	BY HGV %	DM AADT	DM HGV %	DS AADT	DS HGV %	DM AADT	DM HGV %	DS AADT	DS HGV %
PAR 24B	Brough Road (South of Brantingham Road)	6601	3.8	6897	3.8	7121	5.1	6967	3.9	7191	5.2
PAR 25	A63 Petuaria Way (West)	35287	15.2	36870	15.2	37070	15.4	37045	15.2	37245	15.4
PAR 26	Ings Lane	278	2.9	290	2.9	368	2.3	290	2.9	368	2.3
PAR 26B	Main Street	278	2.9	290	2.9	368	2.3	290	2.9	368	2.3
PAR 27	Carr Lane	347	7.2	362	7.2	524	21.0	362	7.2	524	21.0
PAR 28	Tongue Lane	572	13.1	598	13.1	822	21.9	598	13.1	822	21.9
PAR 29	B1230 Main Road (East) - a	8052	6.5	8413	6.5	8637	7.5	8448	6.6	8672	7.6
PAR 29	B1230 Main Road (East) - b	7654	6.9	7997	6.9	8221	7.9	8015	6.9	8239	7.9
PAR 29	B1230 Main Road (East) - c	7384	6.8	7715	6.8	7939	7.9	7715	6.8	7939	7.9
PAR 30	M62	35724	14.8	37326	14.8	37526	14.9	37909	14.8	38109	14.9
PAR 31	A161 Tom Pudding Way	6892	11.0	7201	11.0	7317	11.6	7201	11.0	7317	11.6
PAR 32	A161 Swinefleet Road	5740	3.4	5997	3.4	6113	4.2	5997	3.4	6113	4.2
PAR 33	A161 King's Causeway – a	1385	7.6	1447	7.6	1563	10.4	1538	7.1	1654	9.9
PAR 33	A161 King's Causeway - b	1365	7.2	1426	7.2	1500	9.4	1426	7.2	1500	9.4
PAR 34	Main Street (Pennyhill Cottages)	25383	6.1	26521	6.1	26557	6.1	26521	6.1	26557	6.1
PAR 35	Main Street	25383	6.1	26521	6.1	26557	6.1	26521	6.1	26557	6.1
PAR 36	High Street	5167	3.8	5399	3.8	5435	3.8	5399	3.8	5435	3.8
PAR 37	A161 Field Lane (North of Eastoft)	1365	7.2	1426	7.2	1636	12.9	1517	6.8	1727	12.2

PAR ID	PAR name	Base year 2024		Peak year 2029 without committed development				Peak year 2029 with committed development (cumulative)			
		BY AADT	BY HGV %	DM AADT	DM HGV %	DS AADT	DS HGV %	DM AADT	DM HGV %	DS AADT	DS HGV %
PAR 38	Luddington Road	367	12.7	385	12.7	421	11.6	385	12.7	421	11.6
PAR 39	Carr Lane	67	4.5	70	4.5	106	3.0	70	4.5	106	3.0
PAR 40	B1392 Meredyke Road	557	6.8	583	6.8	619	6.4	583	6.8	619	6.4
PAR 41	Washinghall Lane	4793	4.3	5008	4.3	5144	5.6	5008	4.3	5144	5.6
PAR 42	Carr Lane	29	0.0	30	0.0	166	42.1	30	0.0	166	42.1
PAR 43	B1392 Luddington Road	929	6.9	973	6.9	1319	18.6	973	6.9	1319	18.6
PAR 44	A161 Crowle Road/Wharf Road - Eastoft to Ealand - a	2193	6.1	2296	6.1	2432	8.6	2301	6.1	2437	8.6
PAR 44	A161 Crowle Road/Wharf Road - Eastoft to Ealand - b	8172	5.6	8557	5.6	8693	6.3	8562	5.6	8698	6.3
PAR 45	Outgate (West)	658	8.8	689	8.8	789	7.7	689	8.8	789	7.7
PAR 46	Bonnyhale Dale Road	105	6.7	109	6.7	289	30.2	109	6.7	289	30.2
PAR 47	Main Street	2132	4.0	2227	4.0	2293	3.9	2227	4.0	2293	3.9
PAR 48	Bonnyhale Road	96	13.5	100	13.5	166	8.2	100	13.5	166	8.2
PAR 49	Keadby Power Station Internal Roads/Unnamed Roads - a	1590	2.2	1662	2.2	1742	6.7	1662	2.2	1742	6.7
PAR 49	Keadby Power Station Internal Roads/Unnamed Roads - b	1590	2.2	1662	2.2	1742	6.7	1662	2.2	1742	6.7
PAR 50	A161 - Between Outgate and A18 Interchange	9461	6.0	9907	6.0	10087	6.6	9912	6.0	10092	6.6
PAR 51	A18 Trunk Road (East)	8640	7.6	9047	7.6	9319	8.9	9062	7.6	9334	8.9

PAR ID	PAR name	Base year 2024		Peak year 2029 without committed development				Peak year 2029 with committed development (cumulative)			
		BY AADT	BY HGV %	DM AADT	DM HGV %	DS AADT	DS HGV %	DM AADT	DM HGV %	DS AADT	DS HGV %
PAR 52	A18 High Levels Bank (West)	5136	8.5	5378	8.5	5558	9.7	5381	8.6	5561	9.7
PAR 53	A161 - Between A18 and M180 - a	6337	8.1	6635	8.1	6771	9.0	6716	8.2	6852	9.0
PAR 53	A161 - Between A18 and M180 - b	6442	8.7	6746	8.7	6882	9.6	6826	8.7	6962	9.6
PAR 54	A161 - Between M180 and Belton	10219	6.7	10700	6.7	10742	6.7	10824	6.7	10866	6.7
PAR 55	King Edward Street	1323	6.5	1386	6.5	1522	10.7	1419	6.6	1555	10.7
PAR 56	Bracon	1323	6.5	1386	6.5	1522	10.7	1419	6.6	1555	10.7
PAR 57	Belton Road	944	9.4	988	9.4	1124	14.7	988	9.4	1124	14.7
PAR 58	Hollingsworth Lane	645	9.3	676	9.3	740	8.5	676	9.3	740	8.5
PAR 59	Melwood Hill South	1261	7.7	1320	7.7	1456	12.0	1320	7.7	1456	12.0
PAR 60	Blow Row	2263	4.4	2370	4.4	2370	4.4	2565	4.8	2565	4.8
PAR 61	A161 High Street - Between King Edward Street and Blow Row - a	8046	5.9	8425	5.9	8561	6.6	8581	5.9	8717	6.7
PAR 61	A161 High Street - Between King Edward Street and Blow Row - b	8670	6.4	9078	6.4	9214	7.1	9234	6.4	9370	7.1
PAR 62	Rectory Street	2160	6.7	2261	6.7	2397	9.4	2360	6.9	2496	9.4
PAR 63	Melwood Hill North	1261	7.7	1320	7.7	1456	12.0	1320	7.7	1456	12.0
PAR 64	Newland Lane	278	2.9	290	2.9	354	2.3	290	2.9	354	2.3
PAR 64B	Newland Lane 2	278	2.9	290	2.9	354	2.3	290	2.9	354	2.3
PAR 65	A161 Epworth Road - a	6310	7.1	6607	7.1	6785	8.1	6803	7.2	6981	8.1
PAR 65	A161 Epworth Road - b	6223	7.1	6516	7.1	6694	8.0	6712	7.2	6890	8.1

PAR ID	PAR name	Base year 2024		Peak year 2029 without committed development				Peak year 2029 with committed development (cumulative)			
		BY AADT	BY HGV %	DM AADT	DM HGV %	DS AADT	DS HGV %	DM AADT	DM HGV %	DS AADT	DS HGV %
PAR 66	Burnham Road West	347	7.2	362	7.2	426	6.1	362	7.2	426	6.1
PAR 67	Church Walk	367	12.7	385	12.7	449	10.9	385	12.7	449	10.9
PAR 68	East Lound Road	578	9.8	605	9.8	669	8.9	605	9.8	669	8.9
PAR 69	Brackenhill Road/E Lound Road	922	8.1	965	8.1	1101	13.6	1030	8.3	1166	13.5
PAR 70	B1396 Tower Hill	2843	4.6	2977	4.6	3113	6.7	3041	4.8	3177	6.8
PAR 71	A161 Haxey Lane	3884	8.7	4067	8.7	4245	10.1	4132	8.8	4310	10.2
PAR 72	Ferry Road/Main Street - a	876	8.5	917	8.5	1053	14.3	917	8.5	1053	14.3
PAR 72	Ferry Road/Main Street - b	524	8.9	548	8.9	684	17.7	548	8.9	684	17.7
PAR 73	Stockwith Road	7654	6.9	7997	6.9	8133	7.6	7997	6.9	8133	7.6
PAR 74	A161 Station Road - a	4646	7.0	4865	7.0	5043	8.2	4865	7.0	5043	8.2
PAR 74	A161 Station Road - b	4579	7.6	4795	7.6	4837	7.6	4795	7.6	4837	7.6
PAR 75	Tindale Bank Road	7384	6.8	7715	6.8	7851	7.3	7715	6.8	7851	7.3
PAR 76	A161 Haxey Road	4528	5.8	4745	5.8	4839	6.6	4745	5.8	4839	6.6
PAR 77	Cornley Road	113	7.9	119	7.9	185	23.5	119	7.9	185	23.5
PAR 78	Carr Lane	196	12.2	205	12.2	271	21.7	205	12.2	271	21.7
PAR 79	B1403 Church Street	2164	5.9	2267	5.9	2314	6.8	2267	5.9	2314	6.8
PAR 80	Cattle Road - a	61	14.8	64	14.8	96	9.8	64	14.8	96	9.8
PAR 80	Cattle Road - b	61	14.8	64	14.8	96	9.8	64	14.8	96	9.8

PAR ID	PAR name	Base year 2024		Peak year 2029 without committed development				Peak year 2029 with committed development (cumulative)			
		BY AADT	BY HGV %	DM AADT	DM HGV %	DS AADT	DS HGV %	DM AADT	DM HGV %	DS AADT	DS HGV %
PAR 81	A161 High Street to A161/A631 Roundabout - a	3744	6.1	3923	6.1	3970	6.5	4152	6.3	4199	6.7
PAR 81	A161 High Street to A161/A631 Roundabout - b	4306	5.3	4512	5.3	4559	5.8	4512	5.3	4559	5.8
PAR 81	A161 High Street to A161/A631 Roundabout - c	4576	5.9	4795	5.9	4842	6.3	4795	5.9	4842	6.3
PAR 81	A161 High Street to A161/A631 Roundabout - d	5134	6.3	5380	6.3	5427	6.7	5380	6.3	5427	6.7
PAR 82	B1403 Gringley Road	2039	7.7	2136	7.7	2183	8.6	2136	7.7	2183	8.6
PAR 83	B1403 Fountain Hill	2039	7.7	2136	7.7	2183	8.6	2136	7.7	2183	8.6
PAR 85	B1403 Walkeringham Road	2448	7.9	2565	7.9	2628	8.8	2565	7.9	2628	8.8
PAR 86	A631 (Gringley on the Hill West)	9275	9.5	9719	9.5	9883	10.1	9881	10.1	10045	10.7
PAR 87	A631 (Gringley on the Hill East) - a	8124	10.4	8512	10.4	8582	10.7	8903	11.1	8973	11.4
PAR 87	A631 (Gringley on the Hill East) - b	8122	10.6	8510	10.6	8540	10.7	8901	11.2	8931	11.4
PAR 88	A631 - Between A161/A631 Roundabout and Wood Lane	11764	5.2	12326	5.2	12356	5.3	12934	5.9	12964	6.0
PAR 89	A631 - Between Wood Lane and A620/A631 Roundabout	11886	5.1	12454	5.1	12484	5.3	13062	5.8	13092	6.0
PAR 90	Wood Lane	38	10.5	40	10.5	70	29.0	40	10.5	70	29.0
PAR 91	A620 - Between A620/A631 Roundabout to Saundby/Sturton/ Gainsborough Road Roundabout	6620	5.8	6936	5.8	6966	6.0	7329	7.2	7359	7.4

PAR ID	PAR name	Base year 2024		Peak year 2029 without committed development				Peak year 2029 with committed development (cumulative)			
		BY AADT	BY HGV %	DM AADT	DM HGV %	DS AADT	DS HGV %	DM AADT	DM HGV %	DS AADT	DS HGV %
PAR 92	Sturton Road	2396	10.7	2511	10.7	2641	12.7	2829	13.4	2959	15.1
PAR 93	Gainsborough Road	2396	10.7	2511	10.7	2641	12.7	2829	13.4	2959	15.1
PAR 94	Station Road	711	9.0	745	9.0	809	8.3	745	9.0	809	8.3
PAR 95	Wheatley Road	711	9.0	745	9.0	809	8.3	745	9.0	809	8.3
PAR 96	Sturton Road	945	6.7	990	6.7	1054	6.3	990	6.7	1054	6.3
PAR 97	Low Street	945	6.7	990	6.7	1054	6.3	990	6.7	1054	6.3
PAR 98	A620 - Gainsborough Road	4492	8.0	4707	8.0	4837	9.2	4727	8.0	4857	9.1
PAR 99	A620 - Between Low Street in North Wheatley to Spital Hill in Retford - a	5061	7.6	5303	7.6	5433	8.6	5323	7.5	5453	8.6
PAR 99	A620 - Between Low Street in North Wheatley to Spital Hill in Retford - b	6643	4.5	6961	4.5	7091	5.4	6981	4.5	7111	5.3
PAR 99	A620 - Between Low Street in North Wheatley to Spital Hill in Retford - c	6759	5.8	7082	5.8	7212	6.6	7100	5.8	7230	6.7
PAR 100	A620 Amcott Way	18524	4.3	19409	4.3	19539	4.6	19481	4.3	19611	4.6
PAR 101	Cross Street	2637	5.2	2763	5.2	2829	7.4	2783	5.2	2849	7.4
PAR 102	Springs Lane	5	0.0	5	0.0	71	92.7	5	0.0	71	92.7
PAR 103	Retford Road West	3421	6.2	3585	6.2	3759	7.9	3585	6.2	3759	7.9
PAR 104	Leverton Road/Spital Hill - a	3368	5.3	3528	5.3	3702	7.1	3528	5.3	3702	7.1
PAR 104	Leverton Road/Spital Hill - b	3965	4.1	4154	4.1	4328	5.7	4154	4.1	4328	5.7
PAR 105	A638 Arlington Way/London Road - a	12823	4.9	13436	4.9	13610	5.4	13612	5.0	13786	5.5

PAR ID	PAR name	Base year 2024		Peak year 2029 without committed development				Peak year 2029 with committed development (cumulative)			
		BY AADT	BY HGV %	DM AADT	DM HGV %	DS AADT	DS HGV %	DM AADT	DM HGV %	DS AADT	DS HGV %
PAR 105	A638 Arlington Way/London Road - b	13845	4.6	14507	4.6	14681	5.0	14683	4.6	14857	5.1
PAR 106	A638 Great North Road - To the A1	9574	6.5	10032	6.5	10206	7.1	10207	6.5	10381	7.2
PAR 107	Cocking Lane	2290	4.4	2400	4.4	2466	7.0	2420	4.4	2486	6.9
PAR 108	Town Street/Forewood Lane	353	6.5	370	6.5	436	20.6	390	6.1	456	19.7
PAR 109	Wood Lane/Main Street	618	6.6	648	6.6	712	6.0	648	6.6	712	6.0
PAR 110	Grove Road	1787	5.0	1872	5.0	2002	8.0	1872	5.0	2002	8.0
PAR 111	Lady Well Lane	1787	5.0	1872	5.0	2002	8.0	1872	5.0	2002	8.0
PAR 112	Main Street	481	6.8	504	6.8	634	15.8	504	6.8	634	15.8
PAR 113	Hazelwood Lane	1473	3.9	1544	3.9	1674	7.6	1544	3.9	1674	7.6
PAR 114	Ashley Lane	60	6.7	63	6.7	323	42.2	63	6.7	323	42.2
PAR 115	Retford Road (North of Rampton Hospital)	1373	4.9	1438	4.9	1504	9.1	1438	4.9	1504	9.1
PAR 116	Laneham Road (between Retford Road and Main Street) - a	2864	7.1	3001	7.1	3131	8.9	3021	7.1	3151	8.9
PAR 116	Laneham Road (between Retford Road and Main Street) - b	2226	8.1	2332	8.1	2462	10.4	2352	8.1	2482	10.3
PAR 116	Laneham Road (between Retford Road and Main Street) - c	2679	7.3	2807	7.3	2937	9.2	2838	7.3	2968	9.2
PAR 117	A57 Broad Gate	9284	9.4	9728	9.4	9912	10.2	9728	9.4	9912	10.2
PAR 118	A57 - Between Darlton Road and BM 52/53	9201	10.0	9640	10.0	9824	10.7	9763	10.5	9947	11.2

PAR ID	PAR name	Base year 2024		Peak year 2029 without committed development				Peak year 2029 with committed development (cumulative)			
		BY AADT	BY HGV %	DM AADT	DM HGV %	DS AADT	DS HGV %	DM AADT	DM HGV %	DS AADT	DS HGV %
PAR 119	A57 - Between BM 52/53 east along A57 to PAR 120	9201	10.0	9640	10.0	9694	10.2	9763	10.5	9817	10.7
PAR 120	A57 - East of PAR 119 to Laneham Road Junction	9201	10.0	9640	10.0	9694	10.2	9763	10.5	9817	10.7
PAR 121	A57 - Between A57/Main Street Junction East	9167	9.3	9605	9.3	9659	9.5	9658	9.3	9712	9.5
PAR 122	Main Street	1208	11.4	1266	11.4	1320	13.0	1444	14.7	1498	15.9
PAR 123	Retford Road (East Drayton)	267	4.5	280	4.5	410	19.2	280	4.5	410	19.2
PAR 124	Top Street/Darlton Road	1395	4.5	1461	4.5	1591	8.3	1473	4.5	1603	8.3
PAR 125	Dale Road	479	2.7	501	2.7	605	2.2	501	2.7	605	2.2
PAR 126	Willow Flats	4541	4.0	4745	4.0	4907	5.6	4745	4.0	4907	5.6
PAR 127	Ellerker Lane	959	5.5	1002	5.5	1164	12.0	1019	5.6	1181	11.9
PAR 128	Norfolk Bank Lane	434	7.3	454	7.3	616	19.0	454	7.3	616	19.0
PAR 129	Common Road	619	6.0	647	6.0	809	15.2	664	6.1	826	15.0
PAR 130	Wallingfen Lane	616	8.3	643	8.3	805	17.0	661	8.3	823	16.9
PAR 131	Staddlethorpe Lane - a	2417	5.7	2525	5.7	2687	8.5	2525	5.7	2687	8.5
PAR 131	Staddlethorpe Lane - b	1255	10.6	1311	10.6	1473	15.2	1311	10.6	1473	15.2
PAR 132	Thornton Dam Lane/Scalby Lane - a	2406	4.5	2519	4.5	2681	7.3	2519	4.5	2681	7.3
PAR 132	Thornton Dam Lane/Scalby Lane - b	2415	5.7	2528	5.7	2690	8.5	2528	5.7	2690	8.5

PAR ID	PAR name	Base year 2024		Peak year 2029 without committed development				Peak year 2029 with committed development (cumulative)			
		BY AADT	BY HGV %	DM AADT	DM HGV %	DS AADT	DS HGV %	DM AADT	DM HGV %	DS AADT	DS HGV %
PAR 133	Meredyke Road East (Between Carr Ln and B1392 Shore Road)	618	6.0	647	6.0	713	5.4	647	6.0	713	5.4
PAR 134	B1392	1310	5.3	1372	5.3	1438	5.1	1372	5.3	1438	5.1
PAR 135	Meredyke Road West	557	6.8	583	6.8	793	18.6	583	6.8	793	18.6
PAR 136	B1392 Eastoft Road	907	6.7	950	6.7	1160	14.8	950	6.7	1160	14.8
PAR 137	Outgate East	105	6.7	109	6.7	279	27.7	109	6.7	279	27.7
PAR 138	Greengate	746	3.1	781	3.1	845	2.8	781	3.1	845	2.8
PAR 139	Fledborough Road	1153	12.5	1208	12.5	1244	13.6	1208	12.5	1244	13.6
PAR 140	A15 (From Wingfield Farm Roundabout to A180 Interchange)	23530	9.3	24638	9.3	24838	9.6	24638	9.3	24838	9.6
PAR 141	A63 (From A15 Interchange to A1079)	52874	9.9	55245	9.9	55245	9.9	55245	9.9	55245	9.9
PAR 142	M62 (From A614 Interchange to M18 Interchange)	55631	15.7	58126	15.7	58442	15.9	58126	15.7	58442	15.9
PAR 143	M180 (Between M18 Interchange and A161)	40528	22.7	42436	22.7	42525	22.7	42785	22.8	42874	22.8
PAR 144	M180 (Between A161 and M181)	41309	22.4	43254	22.4	43343	22.5	43598	22.5	43687	22.6
PAR 145	M181	16906	14.1	17702	14.1	17791	14.2	17702	14.1	17791	14.2
PAR 146	M180 (Between M181 Interchange and A15)	29981	25.4	31393	25.4	31482	25.4	31393	25.4	31482	25.4
PAR 147	M180 (Between A15 Interchange and A180)	40080	22.7	41967	22.7	42056	22.7	41967	22.7	42056	22.7

PAR ID	PAR name	Base year 2024		Peak year 2029 without committed development				Peak year 2029 with committed development (cumulative)			
		BY AADT	BY HGV %	DM AADT	DM HGV %	DS AADT	DS HGV %	DM AADT	DM HGV %	DS AADT	DS HGV %
PAR 149	Epworth Road North	1261	7.7	1320	7.7	1384	7.4	1320	7.7	1384	7.4
PAR 150	Epworth Road South	1007	5.6	1054	5.6	1118	5.3	1054	5.6	1118	5.3
PAR 151	Burnham Road East	1007	5.6	1054	5.6	1118	5.3	1054	5.6	1118	5.3
PAR 152	Church Street	1007	5.6	1054	5.6	1118	5.3	1054	5.6	1118	5.3
PAR 153	Leverton Road	2693	5.8	2821	5.8	2887	8.0	2841	5.8	2907	7.9
PAR 154	Main Street	595	13.0	624	13.0	690	21.4	624	13.0	690	21.4
PAR 155	Retford Road (East)	2041	4.7	2138	4.7	2204	7.6	2138	4.7	2204	7.6
PAR 156	B1230 Main Road (West)	7384	6.8	7715	6.8	7877	7.8	7715	6.8	7877	7.8
PAR 157	A18 Althorpe Bypass	8640	7.6	9047	7.6	9113	7.5	9047	7.6	9113	7.5
PAR 158	Sands Lane	535	5.4	559	5.4	721	15.8	559	5.4	721	15.8
PAR 159	Landing Lane	347	7.2	362	7.2	524	21.0	362	7.2	524	21.0
PAR 160	Pasture Lane	367	12.7	385	12.7	459	19.0	385	12.7	459	19.0
PAR 161	A15 Boothferry Road	52874	9.9	55245	9.9	55445	10.0	55245	9.9	55445	10.0

3. Model Verification

3.1.1 The comparison of modelled concentrations with local monitored concentrations is a process termed 'verification'. Model verification identifies any discrepancies between modelled and measured concentrations, which can arise for a range of reasons. The following are examples of potential causes of such discrepancies:

- Background pollutant concentration uncertainties;
- Meteorological data uncertainties;
- Traffic data uncertainties;
- Emission factor uncertainties; and
- Overall limitations of the ability of the dispersion model to model dispersion in a complex urban environment.

3.1.2 The verification process involves a review of the modelled pollutant concentrations against corresponding monitoring data to determine how well the air quality model has performed. Depending on the outcome, it may be considered that the model has performed adequately and that there is no need to adjust any of the modelled results.

3.1.3 Alternatively, the model may perform poorly against the monitoring data (acceptable limits of model verification performance are set out in the Local Air Quality Management Technical Guidance (LAQM.TG(22)) (Department for Environment, Food and Rural Affairs, 2025), as a result there is a need to check all the input data to ensure that it is reasonable and accurately represented in the air quality modelling process. Where all input data, such as traffic data, emissions rates and background concentrations have been checked and considered reasonable, then the modelled results may require adjustment to best align them with the monitoring data. This may either be a single verification adjustment factor to be applied to the modelled concentrations across the study area or a range of different adjustment factors to account for different situations within the study area.

3.2 Residual Uncertainty and Model Performance

3.2.1 Residual uncertainty may remain after systematic error or 'overall model accuracy' has been accounted for in the final predictions. Residual uncertainty may be considered synonymous with the 'residual inaccuracies' of the model predictions, i.e., how wide the scatter or residual variability of the predicted values compare with the monitored 'true value', once systematic error has been allowed for. The quantification of final model accuracy provides an estimate of how the final predictions may deviate from the 'true' (monitored) values at the same location over the same period. It must, though, be recognised that some of the residual uncertainty will be down to uncertainties in the monitored values. This is greater for monitoring using diffusion tubes than for automatic monitors.

3.2.2 An evaluation of model performance has been undertaken to establish confidence in model results. LAQM.TG(22) (Department for Environment, Food and Rural Affairs, 2025) identifies a number of statistical procedures that are appropriate to evaluate

model performance and assess the uncertainty. The following statistical parameters were used in this assessment:

- Root Mean Square Error (RMSE);
- Fractional Bias (FB); and
- Correlation Coefficient (CC).

3.2.3 A brief explanation of each statistic is provided in Table 3.1 and further details can be found in Box 7-21 of LAQM.TG(22) (Department for Environment, Food and Rural Affairs, 2025).

Table 3.1 – Statistical parameters used to estimate model performance

Statistical parameter	Comments	Ideal value
RMSE	RMSE is used to define the average error or uncertainty of the model. The units of RMSE are the same as the quantities compared. If the RMSE values are higher than 25% of the objective being assessed, it is recommended that the model inputs and verification should be revisited in order to make improvements. For example, assuming the model predictions are for the annual mean NO_2 objective of 40µg/m^3, if an RMSE of 10µg/m^3 or above is determined for a model, it is advised to revisit the model parameters and model verification. Ideally an RMSE within 10% of the air quality objective would be derived, which equates to ±4µg/m^3 for the annual mean NO_2 objective.	0.00
FB	FB is used to identify if the model shows a systematic tendency to over- or underpredict. FB values vary between +2 and −2 and have an ideal value of zero. Negative values suggest a model overprediction and positive values suggest a model underprediction.	0.00
CC	CC is used to measure the linear relationship between predicted and observed data. A value of zero means no relationship and a value of one means absolute relationship. This statistic can be particularly useful when comparing a large number of model and observed data points.	1.00

3.2.4 These parameters estimate how the model results agree or diverge from the observations. These calculations have been carried out prior to, and after adjustment and provide information on the improvement of the model predictions as a result of the application of the verification adjustment factors.

3.3 Verification Methodology

3.3.1 The verification method followed the process detailed in LAQM.TG(22) (Department for Environment, Food and Rural Affairs, 2025), which involves comparing modelled and monitored road NOx concentrations. Diffusion tube road NOx concentrations were calculated using the version of the latest Defra NOx to NO_2 calculator (v9.1) (Department for Environment, Food and Rural Affairs, 2024) because diffusion tubes only measure NO_2 and do not directly measure NOx.

3.3.2 For Bassetlaw District Council, the latest set of monitoring data available at the time of assessment was for 2023, therefore concentrations have been annualised to 2024 in accordance with the methodology set out in LAQM.TG(22) (Department for Environment, Food and Rural Affairs, 2025) using automatic continuous monitoring data from the Urban Background sites Sheffield Tinsley, and Chesterfield Loundsley Green, of the Defra Automatic Urban and Rural Network (AURN) (Department for Environment, Food and Rural Affairs, 2026).

3.3.3 The approach is based on the principle that patterns in pollutant concentrations are usually consistent across broad regions and therefore considers the relationship between period means and annual means at monitoring stations in the same region as the site of interest. The period mean is the period that the diffusion tube data is available for (i.e. 2023). The average of the ratios of the continuous monitor data annual mean to the period mean (2024/2023) provided the annualisation factor of 0.89 as detailed below in Table 3.2. This annualisation factor was then applied to the Bassetlaw District Council diffusion tube 2023 data to provide an adjusted annual average representative estimation of 2024 mean concentrations.

Table 3.2 – Continuous monitoring data used for annualisation

Site name	Site type	2023 annual mean NO_2 (µg/m³)	2024 annual mean NO_2 (µg/m³)	2024/2023 ratio
Sheffield Tinsley	Urban Background AURN	19.82	17.49	0.88
Chesterfield Loundsley Green	Urban Background AURN	8.46	7.62	0.90
Annualisation Factor:				**0.89**

3.3.4 Total modelled NO_2 concentrations were compared to those monitored at eight local authority diffusion tube monitoring sites. Table 3.3 details the monitoring sites that have been used to verify the dispersion model prediction and obtain adjustment factors which can be applied to predictions of pollutant concentrations in the base year and in future years.

3.3.5 Table 3.3 summarises the background NO_2 concentrations, unadjusted modelled and monitored road NOx concentrations, and unadjusted modelled and monitored total NO_2 concentrations at diffusion tube sites utilised. It should be noted that none of North Lincolnshire Council's diffusion tubes are located within 5 km of the Order Limits, hence no North Lincolnshire monitoring sites are presented in Table 3.3 or on **Application Document 6.15.F4 Figure 15.4 Air Quality Baseline.**

Table 3.3 – Monitoring vs modelled data used for model verification

Tube ID	Local authority	X	Y	Background NO_2 (µg/m³)	Monitored total NO_2 (µg/m³)	Modelled total NO_2 (µg/m³)	Ratio of monitored vs modelled total NO_2	Monitored road NOx (µg/m³)	Modelled road NOx (µg/m³)	Ratio of monitored vs modelled road NOx
S17	ERYC	497106	426463	7.7	22.5	8.1	2.78	33.5	11.5	2.91
S33	ERYC	496980	426492	7.6	13.4	7.9	1.70	12.2	8.7	1.40
S34	ERYC	496884	426504	7.6	21.7	8.1	2.68	31.6	13.8	2.29
S37	ERYC	495753	427021	7.9	24.2	8.4	2.88	37.3	12.1	3.08
S39	ERYC	492352	431095	5.6	18.3	6	3.05	27.7	3.2	8.66
22	BDC	481353	374497	5.7	13.5	5.7	2.37	16.4	2.3	7.13
25	BDC	470747	380700	8.6	16.8	9.6	1.75	17.7	3.8	4.66
27	BDC	470787	381103	7.7	19.1	8.6	2.22	25	3.1	8.06

Notes:

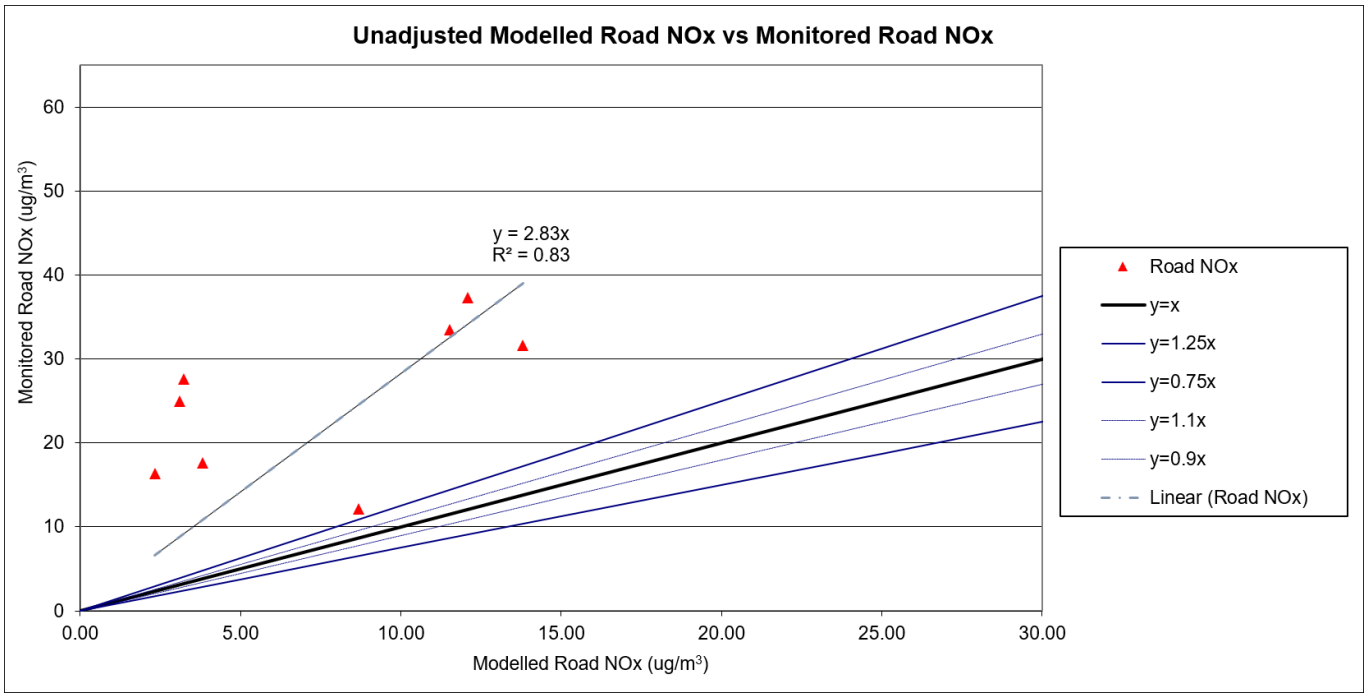
ERYC - East Riding of Yorkshire Council

BDC - Bassetlaw District Council

The coordinates presented in this table are those used within the air quality model and may differ slightly from coordinates reported by the local authorities. Monitoring locations were reviewed and verified using Google Earth and other available site information to ensure the model accurately represented the physical monitoring locations.

3.3.6 A scatterplot of the comparison of monitored and unadjusted modelled road NOx is presented in Image 3.1.

Image 3.1 – Unadjusted modelled versus monitored road NOx



3.3.7 The verification factor derived from the model verification as shown in the graph presented in was 2.83, showing that the model underestimated pollutant concentrations in relation to the monitored concentrations.

3.3.8 Image 3.2 presents the un-adjusted modelled versus monitored total NO_2 concentrations. Image 3.3 demonstrates that once adjusted for road NOx, total modelled NO_2 concentrations are closer to monitored total NO_2 concentrations than the unadjusted total modelled NO_2 in Image 3.2.

Image 3.2 – Un-adjusted modelled versus monitored total NO_2

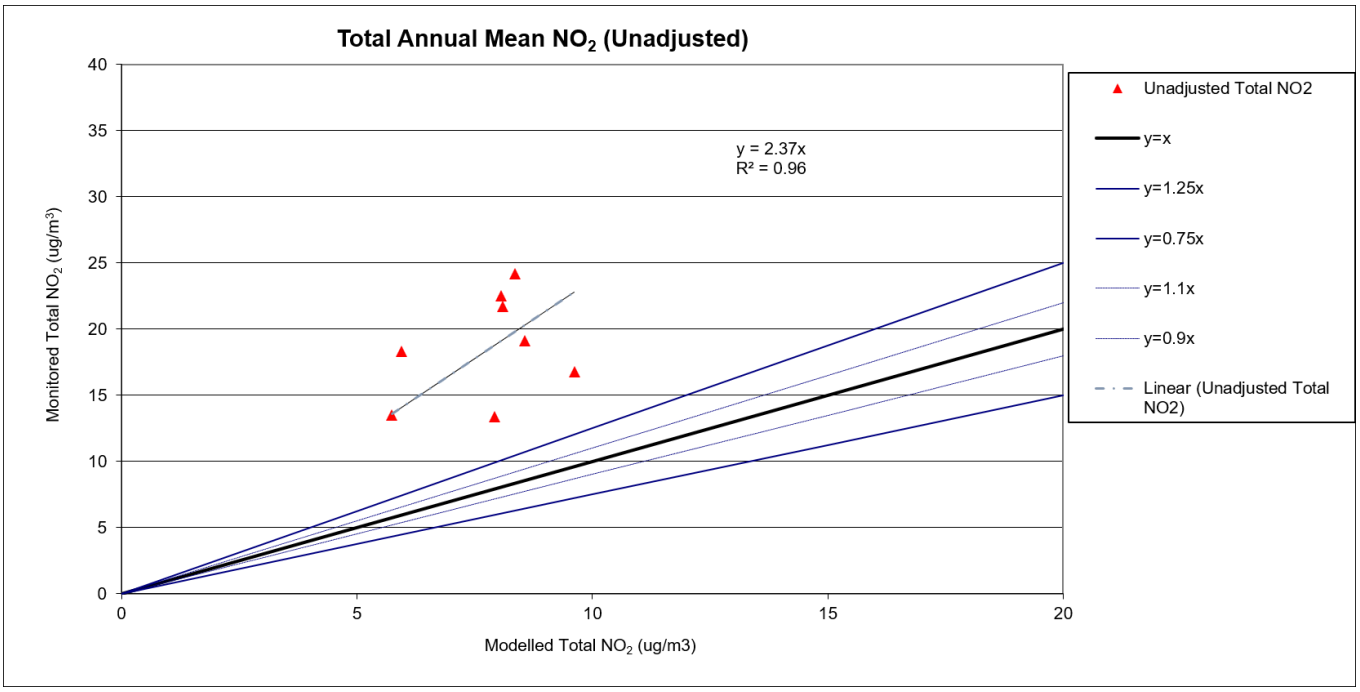
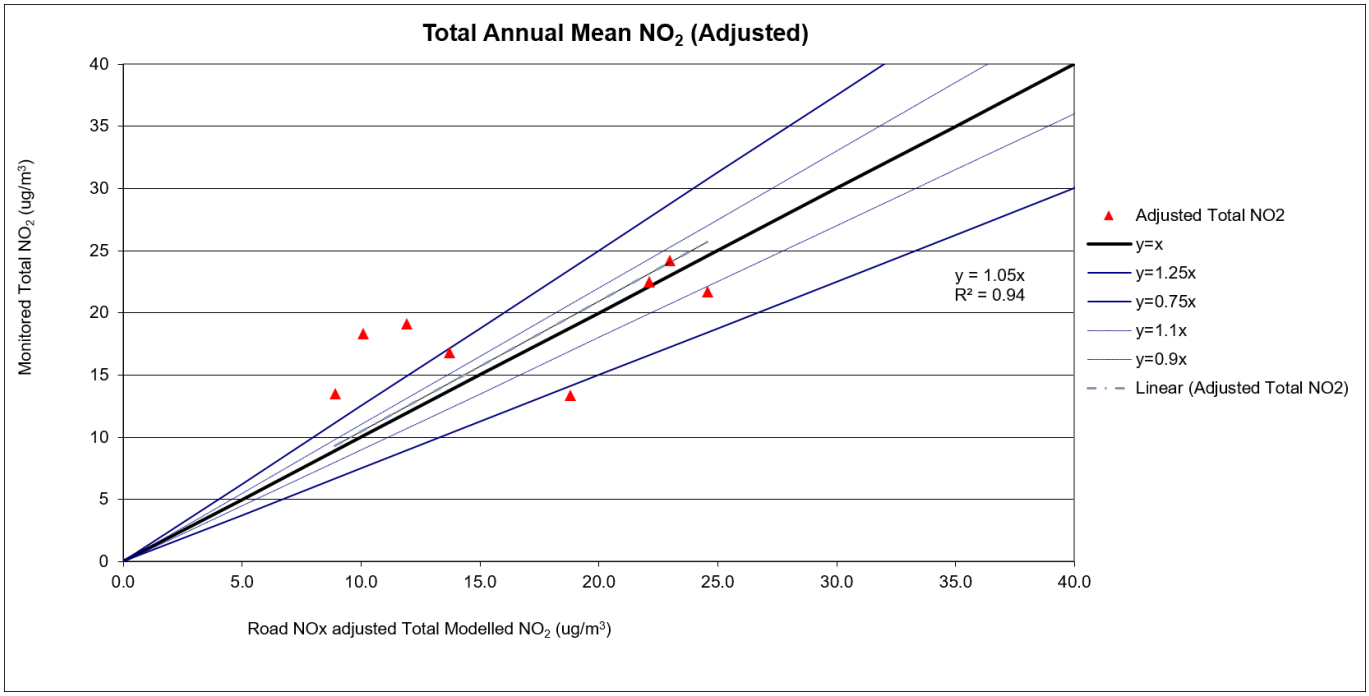


Image 3.3 – Adjusted modelled versus monitored total NO_2



3.3.9 Table 3.4 summarises the model performance statistics for before and after adjustment.

Table 3.4 – Model performance statistics

Summary table	Before adjustment	Following adjustment
Within +10	0	2
Within -10	0	0
Within +-10	0	2
Within +10 to 25	0	1
Within -10 to 25	0	1
Within +-10 to 25	0	2
Over +25	8	3
Under -25	0	1
Greater +-25	8	4
Within +-25	0	4
Total	8	8
Correlation	0.3	0.7
RMSE (µg/m^3)	11.5	4.9
Fractional Bias	0.8	0.1

3.3.10 The model performance statistics show that the model had a tendency to under predict actual concentrations because the fractional bias was greater than zero. When road NOx is adjusted by applying the verification factor, the RMSE is reduced from 11.5 µg/m^3 to 4.9 µg/m^3. The adjusted model thus provides an improved model performance. Given that predicted concentrations are well below the relevant air quality assessment levels (AQALs), the residual model uncertainty is not considered material to the overall assessment conclusions.

3.3.11 To provide a robust assessment, the verification factor was applied to the modelled results for all receptors. The same verification factor was applied for both NOx and particulate matter modelled results at each relevant receptor as no particulate matter monitoring data was available for verification purposes.

4. Modelling Results

4.1.1 The modelled NO_2 results for all scenarios at all human receptors are detailed in Table 4.1. Receptors ae shown on **Application Document 6.15.F2 Figure 15.2 Air Quality Construction Vehicle Emissions Study Area and Receptor Locations**.

Table 4.1 – Modelled NO_2 results – human receptors

Receptor ID	Total NO_2 concentration ($\mu g/m^3$)				% Change in relation to AQAL	Impact descriptor
	BY (2024)	DM (2029)	DS (2029)	Change (DS-DM)		
R_2600	5.9	5.0	5.0	0.0	0	Negligible
R_2563	6.1	5.0	5.1	0.1	0	Negligible
R_28967	6.0	5.0	5.0	0.0	0	Negligible
C_2140	6.2	5.1	5.1	0.0	0	Negligible
R_29033	6.0	5.0	5.0	0.0	0	Negligible
R_28993	6.0	5.0	5.0	0.0	0	Negligible
R_29321	6.0	5.0	5.0	0.0	0	Negligible
R_29332	6.1	5.0	5.1	0.1	0	Negligible
R_29532	7.1	5.6	5.7	0.1	0	Negligible
R_29545	7.1	5.6	5.7	0.1	0	Negligible
R_3655	7.8	6.0	6.0	0.0	0	Negligible
R_1339	8.6	6.3	6.4	0.1	0	Negligible
R_1324	9.0	6.8	6.9	0.1	0	Negligible
R_1392	7.2	5.8	5.8	0.0	0	Negligible
R_1483	6.7	5.6	5.6	0.0	0	Negligible
R_1864	6.7	5.5	5.6	0.1	0	Negligible
R_1890	6.5	5.4	5.4	0.0	0	Negligible
R_696	16.5	10.7	10.9	0.2	1	Negligible
R_29559	6.2	5.1	5.2	0.1	0	Negligible
R_29560	6.7	5.4	5.5	0.1	0	Negligible
R_2476	6.4	5.2	5.3	0.1	0	Negligible

Receptor ID	Total NO_2 concentration ($\mu g/m^3$)				% Change in relation to AQAL	Impact descriptor
	BY (2024)	DM (2029)	DS (2029)	Change (DS-DM)		
R_2525	6.1	5.0	5.1	0.1	0	Negligible
R_2595	6.4	5.2	5.2	0.0	0	Negligible
R_2577	6.4	5.2	5.2	0.0	0	Negligible
R_2560	6.4	5.2	5.3	0.1	0	Negligible
R_2547	6.2	5.1	5.1	0.0	0	Negligible
R_2479	6.5	5.2	5.3	0.1	0	Negligible
R_716	9.8	7.1	7.1	0.0	0	Negligible
R_727	10.4	7.4	7.4	0.0	0	Negligible
R_23374	13.4	10.2	10.2	0.0	0	Negligible
C_1755	11.5	9.1	9.2	0.1	0	Negligible
R_23506	12.5	9.7	9.8	0.1	0	Negligible
R_1300	8.6	6.6	6.6	0.0	0	Negligible
R_1303	10.9	7.8	7.9	0.1	0	Negligible
R_1249	9.7	6.9	7.0	0.1	0	Negligible
R_1919	5.8	4.9	4.9	0.0	0	Negligible
R_1968	6.9	6.0	6.0	0.0	0	Negligible
R_1899	5.9	5.0	5.0	0.0	0	Negligible
R_2037	5.8	4.8	5.0	0.2	1	Negligible
R_2041	5.6	4.7	4.8	0.1	0	Negligible

4.1.2 The modelled PM_{10} results for all scenarios at all human receptors are detailed in Table 4.2. Receptors ae shown on **Application Document 6.15.F2 Figure 15.2 Air Quality Construction Vehicle Emissions Study Area and Receptor Locations**.

Table 4.2 – Modelled PM_{10} results – human receptors

Receptor ID	Total PM_{10} concentration ($\mu g/m^3$)				% Change in relation to AQAL	Impact descriptor
	BY (2024)	DM (2029)	DS (2029)	Change (DS-DM)		
R_2600	13.4	13.1	13.1	0.0	0	Negligible
R_2563	13.5	13.2	13.2	0.0	0	Negligible
R_28967	13.4	13.1	13.1	0.0	0	Negligible
C_2140	13.6	13.3	13.3	0.0	0	Negligible
R_29033	13.4	13.1	13.1	0.0	0	Negligible
R_28993	13.4	13.1	13.1	0.0	0	Negligible
R_29321	13.5	13.2	13.2	0.0	0	Negligible
R_29332	13.5	13.2	13.2	0.0	0	Negligible
R_29532	13.8	13.5	13.6	0.1	0	Negligible
R_29545	13.8	13.5	13.6	0.1	0	Negligible
R_3655	14.2	13.8	13.8	0.0	0	Negligible
R_1339	12.9	12.5	12.6	0.1	0	Negligible
R_1324	13.7	13.3	13.4	0.1	0	Negligible
R_1392	13.3	12.9	13.0	0.1	0	Negligible
R_1483	13.2	12.8	12.9	0.1	0	Negligible
R_1864	13.6	13.2	13.2	0.0	0	Negligible
R_1890	13.5	13.1	13.2	0.1	0	Negligible
R_696	15.8	15.4	15.5	0.1	0	Negligible
R_29559	13.5	13.2	13.3	0.1	0	Negligible
R_29560	13.7	13.4	13.5	0.1	0	Negligible
R_2476	13.6	13.3	13.4	0.1	0	Negligible
R_2525	13.5	13.2	13.2	0.0	0	Negligible
R_2595	13.6	13.2	13.3	0.1	0	Negligible
R_2577	13.6	13.3	13.3	0.0	0	Negligible
R_2560	13.6	13.3	13.4	0.1	0	Negligible
R_2547	13.5	13.2	13.3	0.1	0	Negligible
R_2479	13.6	13.3	13.4	0.1	0	Negligible

Receptor ID	Total PM_{10} concentration ($\mu g/m^3$)				% Change in relation to AQAL	Impact descriptor
	BY (2024)	DM (2029)	DS (2029)	Change (DS-DM)		
R_716	13.9	13.5	13.5	0.0	0	Negligible
R_727	14.0	13.6	13.6	0.0	0	Negligible
R_23374	14.3	13.8	13.9	0.1	0	Negligible
C_1755	13.7	13.3	13.3	0.0	0	Negligible
R_23506	14.0	13.6	13.7	0.1	0	Negligible
R_1300	13.7	13.3	13.3	0.0	0	Negligible
R_1303	14.2	13.8	13.8	0.0	0	Negligible
R_1249	14.8	14.4	14.4	0.0	0	Negligible
R_1919	13.3	13.0	13.0	0.0	0	Negligible
R_1968	13.4	13.0	13.0	0.0	0	Negligible
R_1899	13.9	13.5	13.5	0.0	0	Negligible
R_2037	13.2	12.9	13.0	0.1	0	Negligible
R_2041	13.2	12.9	12.9	0.0	0	Negligible

4.1.3 The modelled $PM_{2.5}$ results for all scenarios at all human receptors are detailed in Table 4.3. Receptors ae shown on **Application Document 6.15.F2 Figure 15.2 Air Quality Construction Vehicle Emissions Study Area and Receptor Locations**.

Table 4.3 – Modelled $PM_{2.5}$ results – human receptors

Receptor ID	Total $PM_{2.5}$ concentration ($\mu g/m^3$)				% Change in relation to AQAL	Impact descriptor
	BY (2024)	DM (2029)	DS (2029)	Change (DS-DM)		
R_2600	5.8	5.6	5.6	0.0	0	Negligible
R_2563	5.9	5.6	5.6	0.0	0	Negligible
R_28967	5.8	5.6	5.6	0.0	0	Negligible
C_2140	5.9	5.7	5.7	0.0	0	Negligible
R_29033	5.8	5.6	5.6	0.0	0	Negligible
R_28993	5.8	5.6	5.6	0.0	0	Negligible
R_29321	5.9	5.6	5.6	0.0	0	Negligible
R_29332	5.9	5.6	5.6	0.0	0	Negligible

Receptor ID	Total $PM_{2.5}$ concentration ($\mu g/m^3$)				% Change in relation to AQAL	Impact descriptor
	BY (2024)	DM (2029)	DS (2029)	Change (DS-DM)		
R_29532	6.1	5.8	5.9	0.1	1	Negligible
R_29545	6.1	5.8	5.9	0.1	1	Negligible
R_3655	6.1	5.8	5.8	0.0	0	Negligible
R_1339	6.1	5.7	5.7	0.0	0	Negligible
R_1324	6.4	6.1	6.1	0.0	0	Negligible
R_1392	6.2	5.8	5.9	0.1	1	Negligible
R_1483	6.1	5.8	5.8	0.0	0	Negligible
R_1864	6.0	5.7	5.7	0.0	0	Negligible
R_1890	5.9	5.6	5.6	0.0	0	Negligible
R_696	7.4	7.0	7.1	0.1	1	Negligible
R_29559	5.9	5.6	5.7	0.1	1	Negligible
R_29560	6.0	5.8	5.8	0.0	0	Negligible
R_2476	5.9	5.7	5.7	0.0	0	Negligible
R_2525	5.9	5.6	5.6	0.0	0	Negligible
R_2595	5.9	5.6	5.7	0.1	1	Negligible
R_2577	5.9	5.7	5.7	0.0	0	Negligible
R_2560	6.0	5.7	5.7	0.0	0	Negligible
R_2547	5.9	5.6	5.7	0.1	1	Negligible
R_2479	6.0	5.7	5.8	0.1	1	Negligible
R_716	6.3	5.9	6.0	0.1	1	Negligible
R_727	6.4	6.0	6.0	0.0	0	Negligible
R_23374	7.0	6.6	6.6	0.0	0	Negligible
C_1755	6.6	6.2	6.2	0.0	0	Negligible
R_23506	6.8	6.4	6.4	0.0	0	Negligible
R_1300	6.4	6.1	6.1	0.0	0	Negligible
R_1303	6.7	6.4	6.4	0.0	0	Negligible
R_1249	6.5	6.1	6.2	0.1	1	Negligible
R_1919	5.8	5.4	5.4	0.0	0	Negligible

Receptor ID	Total $PM_{2.5}$ concentration ($\mu g/m^3$)				% Change in relation to AQAL	Impact descriptor
	BY (2024)	DM (2029)	DS (2029)	Change (DS-DM)		
R_1968	5.7	5.4	5.4	0.0	0	Negligible
R_1899	5.8	5.5	5.5	0.0	0	Negligible
R_2037	5.7	5.4	5.5	0.1	1	Negligible
R_2041	5.7	5.4	5.4	0.0	0	Negligible

4.1.4 The modelled NOx results for all scenarios at all ecological receptors are detailed in Table 4.4. Receptors ae shown on **Application Document 6.15.F2 Figure 15.2 Air Quality Construction Vehicle Emissions Study Area and Receptor Locations**.

Table 4.4 – Modelled NOx results – ecological receptors

Receptor ID	Ecological Site	Total NOx concentration ($\mu g/m^3$)				% Change in relation to AQAL
		BY (2024)	DM (2029)	DS (2029)	Change (DS-DM)	
E01	Woodhill Path, Cottingham LWS	14.5	11.8	11.8	0.0	0
E02	Drove Road LWS	20.4	15.1	15.1	0.0	0
E03	Jillywood Lane LWS	23.1	16.3	16.4	0.1	0
E04	Bridgehead YWTR	29.0	20.9	21.0	0.1	0
E05	Dunswell Adits Candidate LWS	29.6	20.7	20.7	0.0	0
E06	Figham Pastures LWS	12.9	10.9	10.9	0.0	0

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