APPENDIX 6.3: METHODOLOGY FOR OPERATIONAL PHASE ASSESSMENTS

Process Stack Emissions

Atmospheric Dispersion Modelling

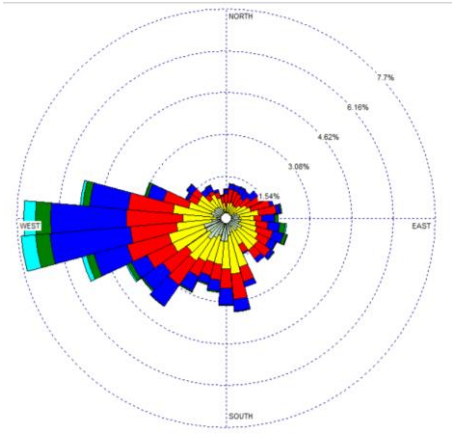
6.3.1 The atmospheric dispersion model AERMOD (Lakes Environmental, Version 11.2) has been used to assess the potential air quality impacts associated with the operation of the proposed battery manufacturing facility. This dispersion model is widely used and accepted for the purpose of undertaking assessments to support both planning and Environmental Permit applications.

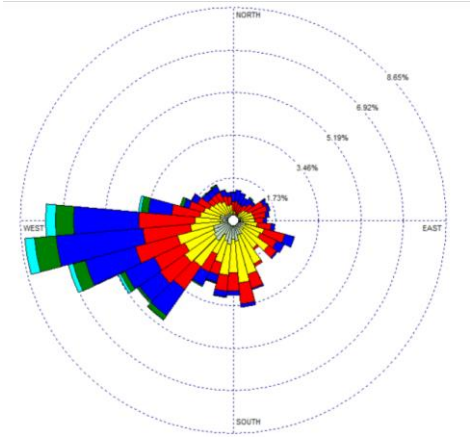
Meteorological Data

6.3.2 The meteorological data used in the air quality modelling has been obtained from ADM Limited and is from the Newcastle Airport recording station, covering the period between 1st January 2018 and 31st December 2022.

6.3.3 The site is located at an altitude of approximately 38m AOD. The Newcastle Airport recording station is located approximately 19km to the north west, at an altitude of approximately 81m AOD. This recording station is considered to be most representative of the conditions at the site.

6.3.4 The 2018 to 2022 wind roses for the Newcastle Airport meteorological recording station are shown in Figure 6.3/1. Each year has been run separately in the model.





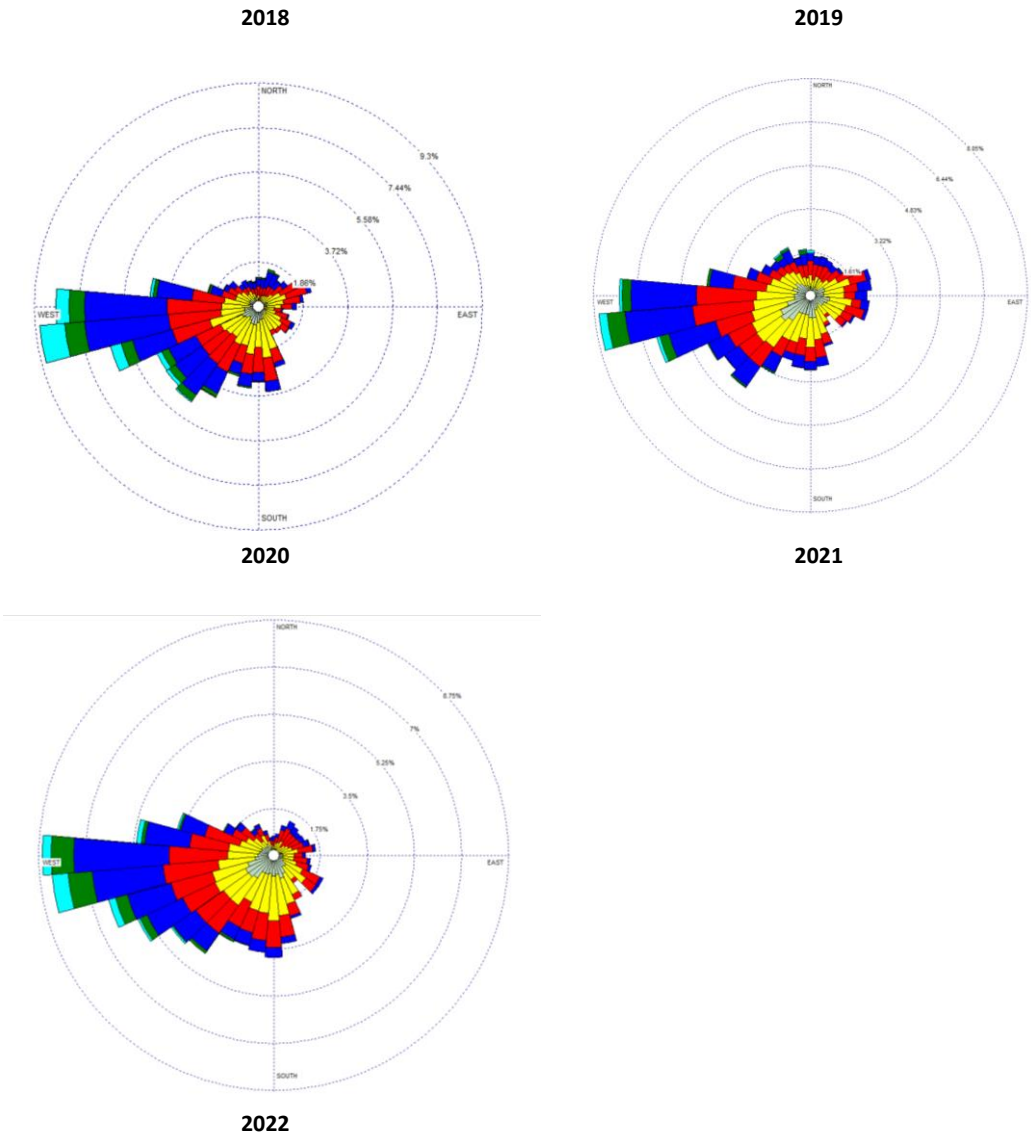


Figure 6.3/1: 2018 to 2022 Wind Roses for Newcastle Airport Meteorological Station

Surface Characteristics

6.3.5 The predominant characteristics of land use in an area provides a measure of the vertical mixing and dilution that takes place in the atmosphere due to factors such as surface roughness and albedo.

6.3.6 The meteorological data has been processed using AERMET, the supporting meteorological pre-processing software (Lakes Environmental, Version 11.2), to enable the surface characteristics to be set in the model.

6.3.7 The values set within the model are included in Table 6.3/1.

Table 6.3/1: Surface Characteristics Included in Model		
Setting	**Urban**	**Cultivated Land**
Albedo	0.2075	0.28
Bowen ratio	1.625	0.75
Surface roughness	1m	0.0725m

6.3.8 Buildings can also have a significant influence on the behaviour of the local airflow and 'downwash' can occur, where an emission plume can be drawn down in the vicinity of buildings. There are a number of existing buildings near to the sources of the emissions, as well as the proposed buildings, and therefore building effects have been included within the model.

6.3.9 Further details of the buildings included in the model are provided later in this appendix.

Terrain

6.3.10 To consider the impact of terrain surrounding the Proposed Development, on the dispersion of pollutants, OS Terrain 5 data has been used in the model (in x.y.z format). This has been processed using the in-built AERMAP terrain processor.

Emission Parameters

6.3.11 A number of emission sources have been considered within the air dispersion model. These relate to different parts of the battery manufacturing process, and further information on the process is included in Chapter 6 of the Environmental Statement.

6.3.12 The forty-two sources considered within the assessment, and the pollutants considered for each source, are as follows:

- 6 No. stacks associated with the boilers.
- 21 No. stacks associated with N-Methyl-2-Pyrrolidone (NMP) emissions.
- 10 stacks associated with Ethyl Carbonate (EC) emissions.
- 5 stacks associated with Diethyl Carbonate Solvent Vapour (DEC) emissions.

6.3.13 Information regarding the flues for the sources has been provided by the client.

6.3.14 The emission concentrations for each substance, as provided by AESC, as well as the calculated emission rates are shown in Table 6.3/3.

Table 6.3/2: Model Parameters for Sources Included in Model

Parameter	Input in Model															
	Boiler Stack (1 of 6)	**VOC 1-7**	**VOC 8-9**	**VOC 10**	**VOC 11**	**VOC 12-14**	**VOC 15**	**VOC 16-19**	**VOC 20-23**	**VOC 24-27**	**VOC 28**	**VOC 29**	**VOC 30**	**VOC 31**	**VOC 32**	**VOC 33-36**
Flue location	433167, 558781	433148, 558773	433165, 558780	433105, 558753	433105, 558753	433380, 558835	433327, 558721	433196, 558669	433198, 558664	433209, 558675	433116, 558655	433147, 558586	433148, 558586	433149, 558583	433162, 558555	433243, 558564
Base elevation	38.70m AOD	38.70m AOD	38.70m AOD	38.70m AOD	38.70m AOD	38.70m AOD	38.70m AOD	38.70m AOD	38.70m AOD	38.70m AOD	38.70m AOD	38.70m AOD	38.70m AOD	38.70m AOD	38.70m AOD	38.70m AOD
Exhaust height[a]	36m	33m	33m	33m	33m	19m	19m	33m	33m	33m	33m	33m	33m	33m	33m	33m
Exhaust diameter	0.45m	0.45m	0.45m	0.30m	0.41m	0.40m	0.45m	0.46m	0.45m	0.46m	0.30m	0.29m	0.29m	0.37m	0.26m	0.46m
Exhaust gas flow at exit	6660 Am^3/hr (1.850 Am^3/s)	10080 Am^3/hr (2.800 Am^3/s)	10080 Am^3/hr (2.800 Am^3/s)	4564 Am^3/hr (1.268 Am^3/s)	7560 Am^3/hr (2.100 Am^3/s)	8460 Am^3/hr (2.350 Am^3/s)	10432 Am^3/hr (2.898 Am^3/s)	11376 Am^3/hr (3.160 Am^3/s)	10080 Am^3/hr (2.800 Am^3/s)	11376 Am^3/hr (3.160 Am^3/s)	4082 Am^3/hr (1.134 Am^3/s)	4082 Am^3/hr (1.134 Am^3/s)	4082 Am^3/hr (1.134 Am^3/s)	6624 Am^3/hr (1.840 Am^3/s)	3358 Am^3/hr (0.933 Am^3/s)	11376 Am^3/hr (3.160 Am^3/s)
Exhaust efflux velocity	12.00m/s	18.00 m/s	18.00 m/s	17.90 m/s	16.00 m/s	19.00 m/s	18.00 m/s	19.00 m/s	18.00 m/s	19.00 m/s	16.00 m/s	18.00 m/s	18.00 m/s	17.00 m/s	18.00 m/s	19.00 m/s
Exhaust gas exit temp.	128°C	25°C	20°C	20°C	20°C	20°C	20°C	25°C	25°C	20°C	20°C	20°C	20°C	25°C	25°C	25°C

6.3.15 The locations of the stacks included within the model are shown in Figure 6.3/2.

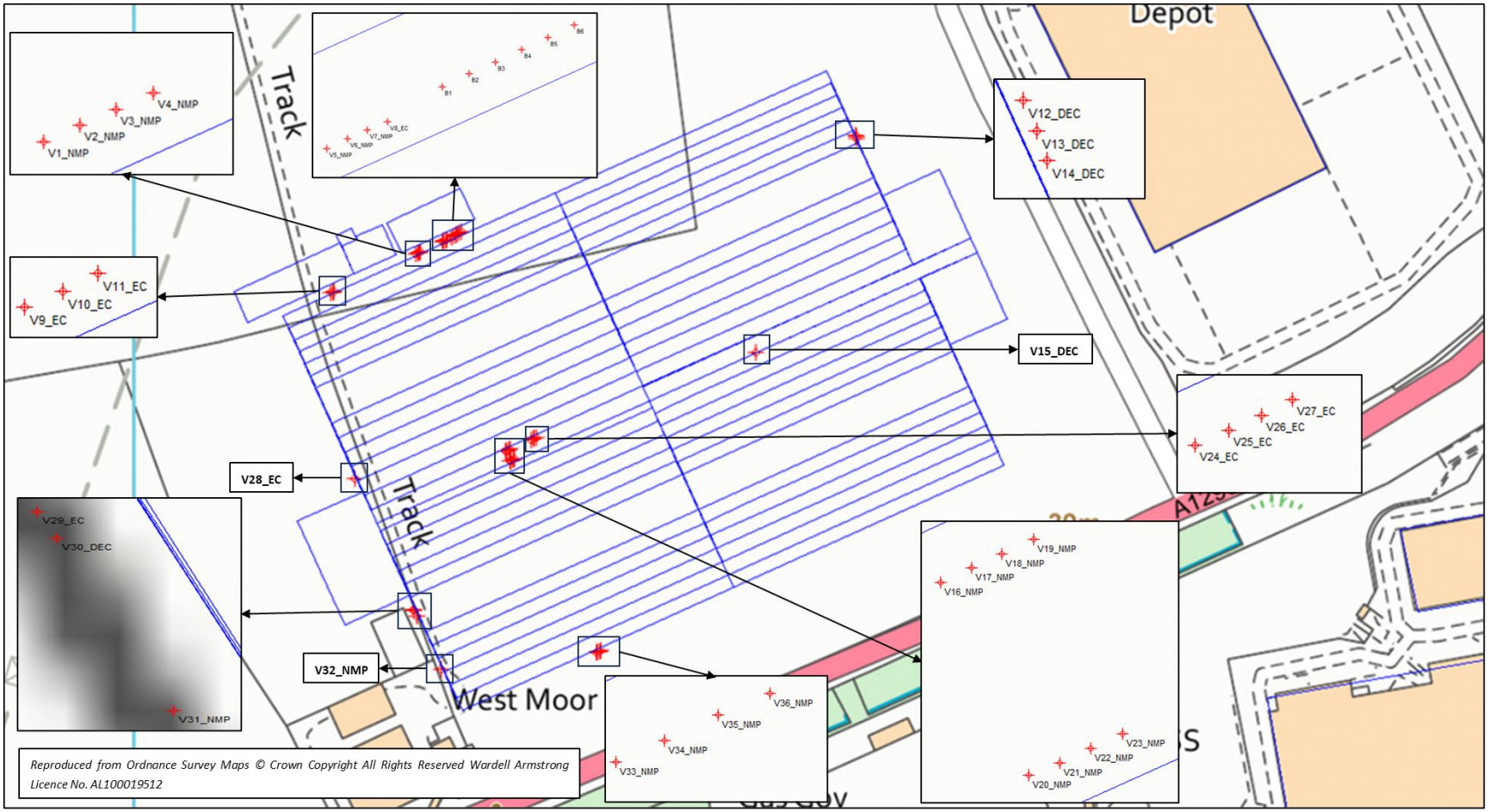


Figure 6.3/2: Location of Emission Sources in Model

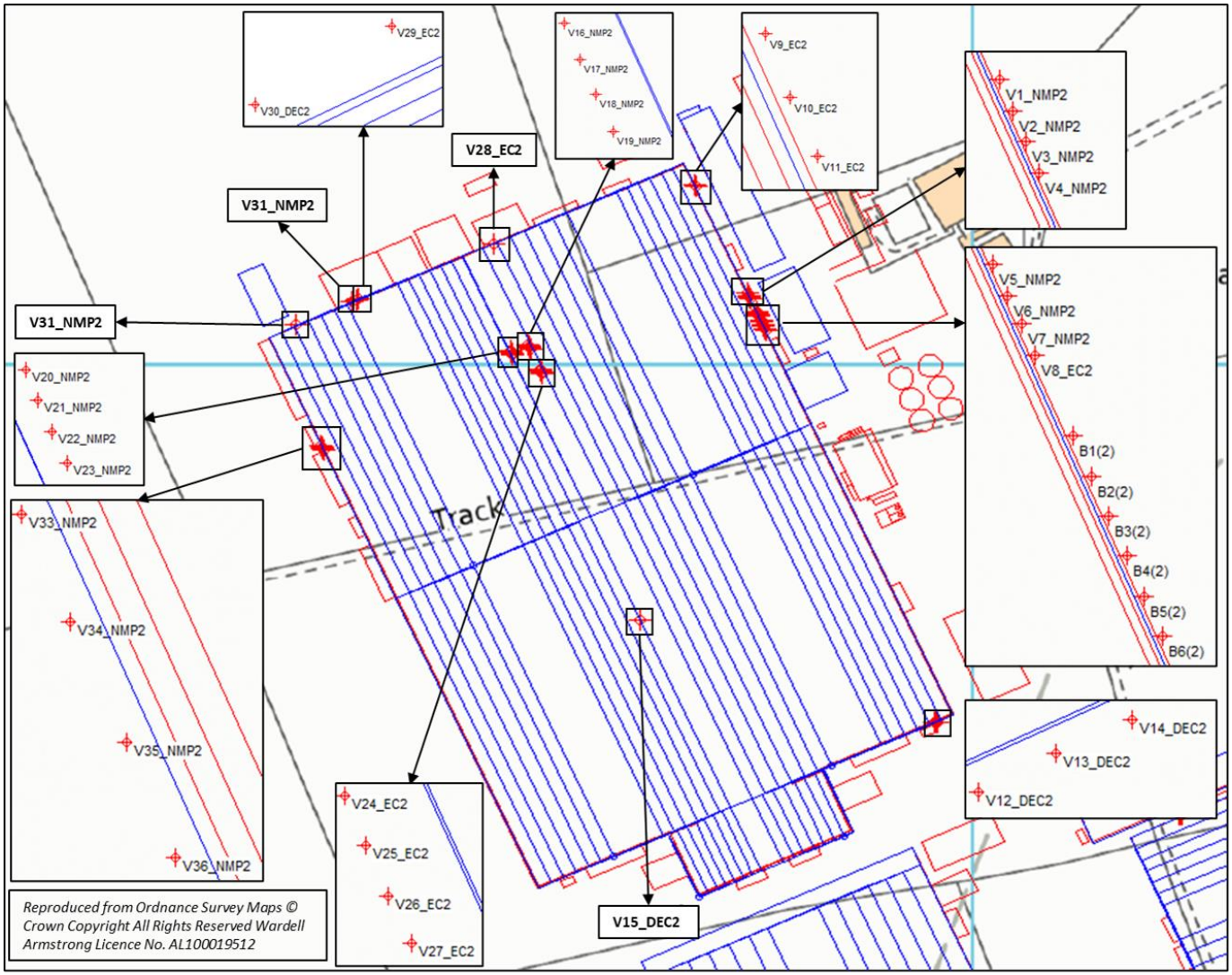


Figure 6.4/2: Location of Emission Sources in Model

Table 6.3/3: Emission Rates for Sources Included in Model																
Emitted Substance	**Input in Model**															
	Boiler Stack (1 of 6)	**VOC 1-7**	**VOC 8-9**	**VOC 10**	**VOC 11**	**VOC 12-14**	**VOC 15**	**VOC 16-19**	**VOC 20-23**	**VOC 24-27**	**VOC 28**	**VOC 29**	**VOC 30**	**VOC 31**	**VOC 32**	**VOC 33-36**
	Emission Concentration (mg/Nm³)															
NO_X	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NMP		2	-	-	-	-	-	2	2	-	-	-	-	2	2	2
Ethyl Carbonate	-	-	8.4*	8.4*	8.4*	-	-	-	-	8.4*	8.4*	8.4*	-	-	-	-
DiEthyl Carbonate	-	-	-	-	-	8.4*	8.4*	-	-	-	-	-	8.4*	-	-	-
	Emission Rate (g/s)															
NO_X	0.1067	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO	0.0213	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NMP	-	0.0051	-	-	-	-	-	0.0058	0.0051	-	-	-	-	0.0034	0.0017	0.0058
Ethyl Carbonate	-	-	0.0215	0.0099	0.0164	-	-	-	-	0.0243	0.0089	0.0089	-	-	-	-
DiEthyl Carbonate	-	-	-	-	-	0.0184	0.0227	-	-	-	-	-	0.0089	-	-	-

Treatment of Buildings

6.3.16 The proposed building for the battery manufacturing processes has been included within the model. The building has been split into different sections, to represent the different heights of each part of the building.

6.3.17 There are also a number of existing buildings located in the neighbouring industrial area to the south, and the buildings within Phase 1 of IAMP to the north east.

6.3.18 The buildings included within the model are detailed in Table 6.3/4.

Table 6.3/4: Onsite Buildings Included in Model

Building Number	Building Name in Model	Building Description	Base Elevation (m)	Height of Building (m)	Grid Reference of SW Corner	
					X	Y
1[a]	BLD_1	ON-SITE BUILDING 1*	38.70	30.00	433078.96	558740.09
2[a]	BLD_2	ON-SITE BUILDING 2*	38.70	30.00	433172.70	558533.07
3[a]	BLD_3	ON-SITE BUILDING 3*	38.70	16.00	433267.77	558703.55
4[a]	BLD_4	ON-SITE BUILDING 4*	38.70	16.00	433315.63	558597.67
5	BLD_5	ON-SITE BUILDING 5*	38.70	11.20	433271.10	558695.81
6	BLD_6	ON-SITE BUILDING 6*	38.70	16.00	433111.43	558578.35
7	BLD_7	ON-SITE BUILDING 8*	38.70	16.00	433429.07	558725.26
8	BLD_8	ON-SITE BUILDING 9*	38.70	16.00	433451.44	558705.23
9	BLD_9	OFF-SITE BUILDING 1	38.79	12.00	433026.14	558095.42
10	BLD_10	OFF-SITE BUILDING 2	40.50	12.00	433262.55	558264.52
11	BLD_11	OFF-SITE BUILDING 3	35.18	15.00	433725.71	558146.97
12	BLD_12	OFF-SITE BUILDING 4	36.54	25.00	433674.63	558585.11
13	BLD_13	OFF-SITE BUILDING 5	35.96	19.00	433536.75	558773.64
14	BLD_14	OFF-SITE BUILDING 6	35.67	15.00	433659.35	559063.87
15	BLD_15	OFF-SITE BUILDING 7	36.05	15.00	433714.85	559264.98
16	BLD_16	ON-SITE BUILDING 10*	38.70	11	433052.94	558753.20
17	BLD_17	ON-SITE BUILDING 11*	38.70	17	433109.49	558776.92
18	BLD_18	STAIR ROOF*	38.70	22	433106.86	558782.50
19	BLD_19	ON-SITE BUILDING 12*	38.70	14	433133.53	558789.49
20	BLD_20	AESC 3 NE	38.70	30.5	432852.67	559109.24
21	BLD_21	AESC 3 NW	38.70	23.5	432642.2	559014.02

Table 6.3/4: Onsite Buildings Included in Model

Building Number	Building Name in Model	Building Description	Base Elevation (m)	Height of Building (m)	Grid Reference of SW Corner	
					X	Y
22	BLD_22	AESC 3 SW	38.70	15.5	432706.87	558871.17
23	BLD_23	AESC 3 SE	38.70	15.5	432816.14	558920.65
24	BLD_24	Plant Deck	38.70	17.95	432850.66	559133.28
25	BLD_25	ON-SITE BUILDING 13**	38.70	17.5	432890.87	559044.36
26	BLD_26	ON-SITE BUILDING 14**	38.70	16.5	432904.02	558995.97
27	BLD_27	Ancillary Plant Rooms	38.70	6.05	432626.83	559048.41
28	BLD_28	Plant Deck	38.70	20.8	432740.38	559058.67
29	BLD_29	Plant Deck 2	38.70	11.3	432805.02	558915.77
30	BLD_30	Out Goods Canopy SW	38.70	15.5	432844.88	558742.03
31	BLD_31	Goods Out Canopy SE	38.70	15.5	432887.21	558761.33
32	BLD_32	Plant Roof 3	38.70	11.3	432876.71	558756.45
33	BLD_33	Warehouse	38.70	14	432835.19	558663.24
34	BLD_34	ON-SITE BUILDING 15**	38.70	4.5	432835.04	558663.17
35	BLD_35	Plant Room Stairs	38.70	26	432849.29	559136.28

[a] Modelled as tiered buildings to take into account the curvature of the roof. The ridge has been set to 30m above base elevation and the eaves at 28m above base elevation

**Buildings associated with AESC Plant 2*

*** Buildings associated with AESC Plant 3*

6.3.19 The locations of the on-Site buildings are shown in Figure 6.3/3, and the off-Site buildings are shown in Figure 6.3/4 below.

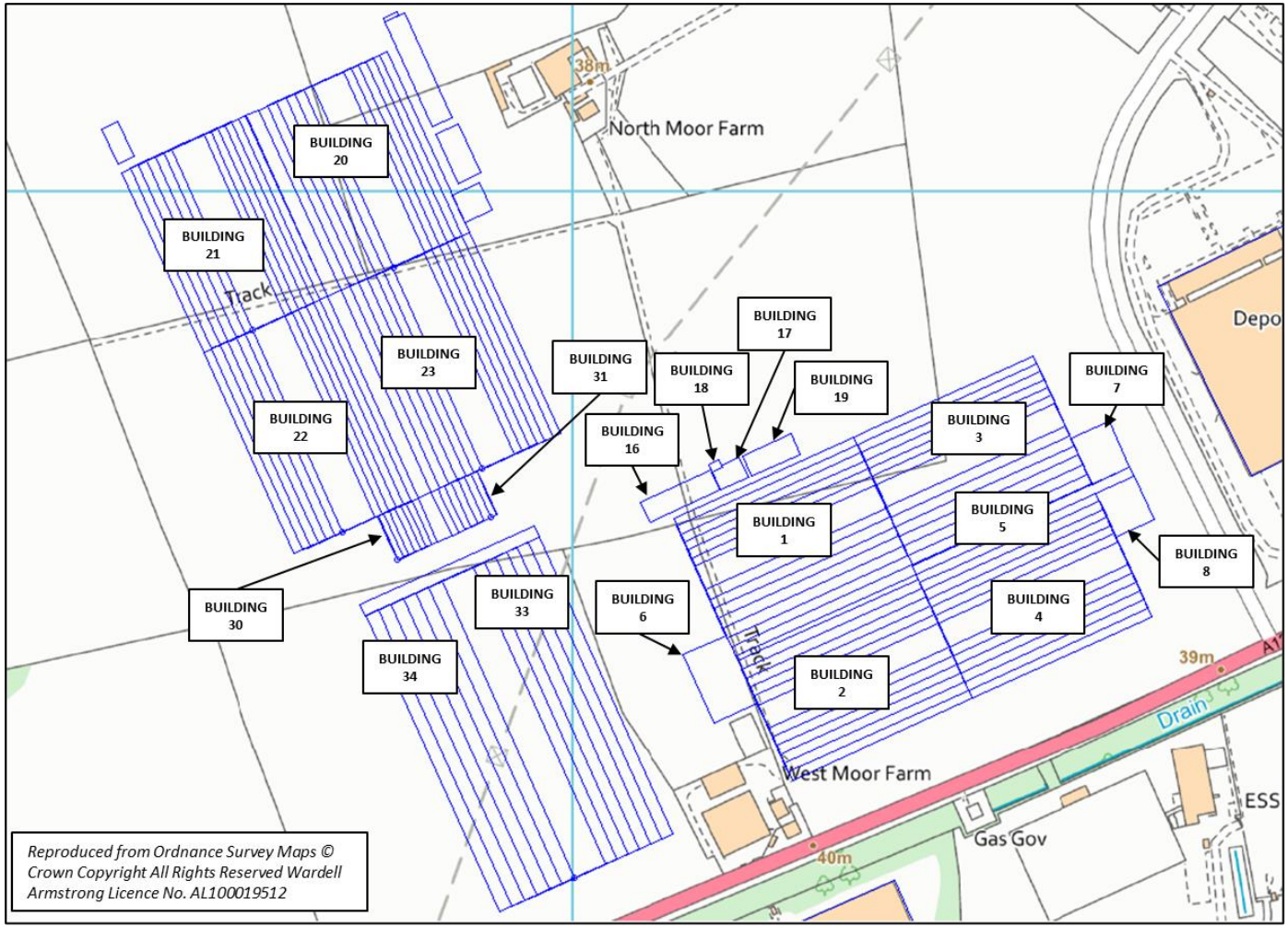


Figure 6.3/3: Location of On-site Buildings in Model

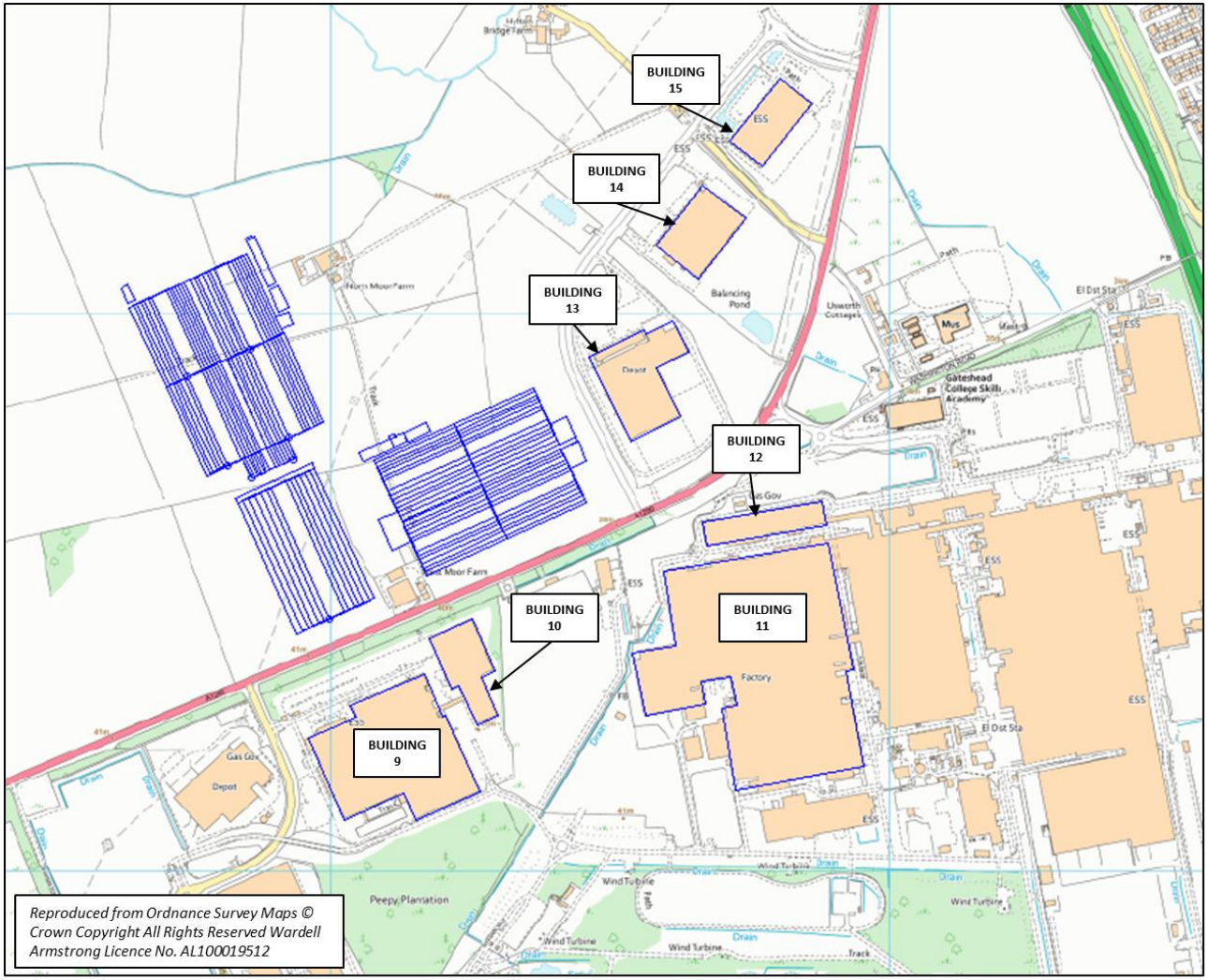


Figure 6.3/4: Location of Off-site Buildings in Model

Methodology for Operational Phase Assessment – Road Traffic Emissions Assessment

Air Dispersion Modelling Inputs

The air dispersion model ADMS-Roads (CERC, Version 5.0.1) has been used to assess the potential impact of development generated road traffic on air quality at existing receptor locations and the designated habitat sites. In addition, pollutant concentrations have been predicted at locations within the site which are considered to be representative of the proposed residential uses. This dispersion model is widely used and accepted for the purpose of undertaking assessments to support both planning and Environmental Permit applications.

The air dispersion model has been used to predict NO_2, PM_{10} and $PM_{2.5}$ concentrations, as these are the pollutants considered most likely to exceed the air quality objectives for human health. With regards to sensitive vegetation communities and ecosystems, NO_x is considered to be the major pollutant of concern.

Air dispersion modelling has been carried out to estimate pollutant concentrations, due to road traffic emissions, for five scenarios, as follows:

- **Scenario 1**: 2022 Base Year, the most recent year for which traffic flow information, local monitored pollution data and meteorological data is available;
- **Scenario 2**: 2024 Construction Year, including committed developments but without the construction in place;
- **Scenario 3**: 2024 Opening/Future Year, including committed developments and with the construction in place;
- **Scenario 4:** 2027 Opening/Future Year, including committed developments but without the proposed development in place; and
- **Scenario 5:** 2027 Opening/Future Year, including committed developments and with the proposed development in place.

Traffic Emission Factors

EFT version 11.0 was released by Defra in November 2021, and is the most recent version of the tool; EFT v11.0 has therefore been used in this assessment.

Traffic Flow Data

The ADMS-Roads model requires the input of detailed road traffic flow information for those routes which will be affected by the proposed development. Detailed traffic flow information, for use in the ADMS-Roads air dispersion model, has been provided by Systra Ltd, the

appointed transport consultant for the project. The study extent of the model is shown below in Figure 1.

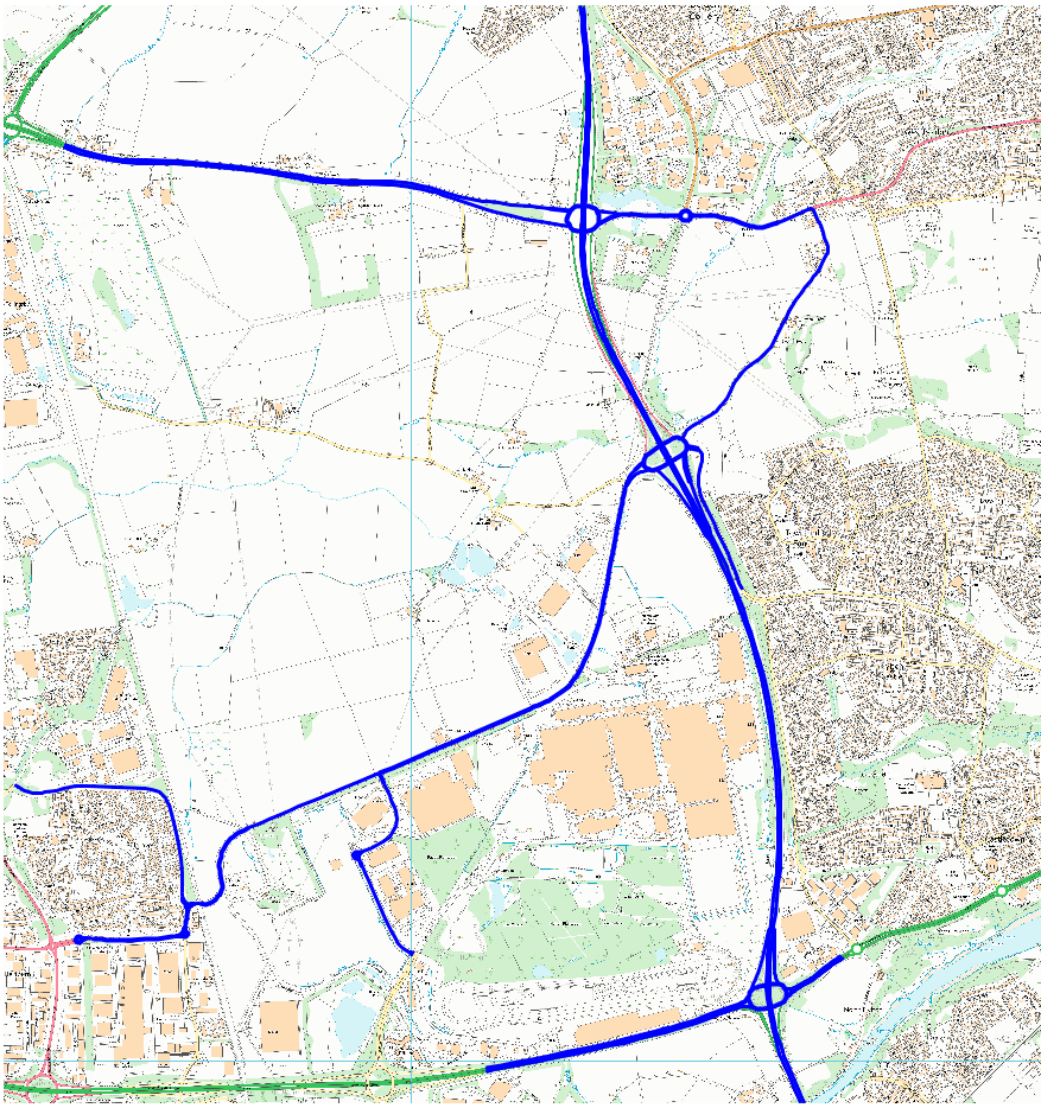


Figure 1: Study Extent of Air Dispersion Model; the roads modelled in the assessment can be seen in blue ('Reproduced from Ordnance Survey Maps © Crown Copyright All Rights Reserved Licence No. 0100031673')

Data has been provided as 24-hour Annual Average Daily Traffic (AADT) flows, with HGV percentages. Average speed data was provided and speeds were reduced to 20kph in locations where congestion or the slowing down of vehicles would be expected. The detailed traffic flow information is included in Chapter 13.

The traffic data used in the assessment is presented in the table overleaf.

Table 9: Traffic Data used in the Assessment

Link Name	Speed Limit (kph)	Scenario 1: 2022 Verification and Base Year		Scenario 2: 2024 Construction Year, including committed developments but without the construction in place		Scenario 3: 2024 Opening/Future Year, including committed developments and with the construction in place		Scenario 4: 2027 Opening/Future Year, including committed developments but without the proposed development in place		Scenario 5: 2027 Opening/Future Year, including committed developments and with the proposed development in place	
		24-hour LGV AADT	24-hour HDV AADT	24-hour LGV AADT	24-hour HDV AADT	24-hour LGV AADT	24-hour HDV AADT	24-hour LGV AADT	24-hour HDV AADT	24-hour LGV AADT	24-hour HDV AADT
A184 west of Testos	112	32204	1122	35466	1354	35622	1444	35466	1354	35740	1359
A184 east of Testos	64	17225	298	18808	380	18808	380	18808	380	19037	382
Downhill Lane east of A19	64	3378	20	3937	23	3937	23	3937	23	4051	23
A19 south of DHL	112	62388	3098	69402	4355	69558	4445	69402	4355	70063	4384
A1231 east of A19	112	31690	1221	34233	1711	34233	1711	34233	1711	34416	1722
A1231 east of Nissan Way	112	53981	3333	57410	4386	57410	4386	57410	4386	57866	4410
A1290 north of Nissan	64	15173	186	26387	2465	26634	2607	26387	2465	27505	2518
A1290 south of Nissan	64	10005	206	14576	308	14589	316	14576	308	14690	310
Glover Road	48	9097	317	11710	340	11710	340	11710	340	11847	340
Cherry Blossom Way	64	3655	344	6509	2795	6509	2795	6509	2795	6851	2844
A1290 south of Nissan	64	9122	154	16047	2376	16060	2384	16047	2376	16504	2428
A19 north of DHL	112	60330	2947	66781	4181	66937	4271	66781	4181	67557	4210
A19 north of Testos	112	48332	2625	52566	4023	52566	4023	52566	4023	52954	4055
A19 south of A1231	112	92486	5067	97607	6028	97763	6118	97607	6028	98269	6049
Washington Road	64	8409	194	9783	266	9783	266	9783	266	10011	268
A19 SB ON Slip Downhill Lane	96	2084	44	6036	561	6192	651	6036	561	6419	591
A19 NB Off Slip Downhill Lane	96	5636	118	8610	801	8766	891	8610	801	8993	827
A19 SB Off Slip A1231	96	8186	508	8410	639	8410	639	8410	639	8422	640
A19 NB On Slip A1231	96	5551	344	5749	437	5749	437	5749	437	5761	432
Sulgrave Road	48	3543	106	3860	116	3873	123	3860	116	3860	116

Note: Observed flows have been undertaken in 2023, therefore an adjustment factor of 0.971 (provided by Prime) has been applied, to adjust the 2023 observed flows to a 2019 Base Year.

Committed Developments

Systra Ltd have confirmed that the following committed developments have been considered in the traffic data for the Construction and Opening/Future Year scenarios:

- IAMP ONE Northern Employment Area - 21/02807/HE4 - Hybrid planning application including demolition works, erection of industrial units (up to 168,000sqm) (Gross Internal Area) for light industrial, general industrial and storage & distribution uses (Class E(g)(iii), B2 and B8)) with ancillary office and research & development floorspace (Class E(g)(i) and E(g)(ii) with internal accesses, parking, service yards and landscaping, and associated infrastructure, earthworks, landscaping and all incidental works (Outline, All Matters Reserved); and dualling of the A1290 between the A19/A1290 Downhill Lane Junction and the southern access from International Drive, provision of new access road including a new bridge over the River Don, electricity sub-stations, pumping station, drainage, and associated infrastructure, earthworks, landscaping and all incidental works (Detailed). (Cross Boundary Planning Application with South Tyneside Council). (Amended and Additional Information received 4th and 8th November 2022 and 3rd April 2023);
- IAMP ONE Phase One, Washington – 18/00092/HE4 – Hybrid planning application – Approved May 2018 – First unit and infrastructure delivered;
- IAMP ONE Phase One, Washington – 19/00245/REM – Reserved matters application – Approved May 2019 – Unit built and now occupied;
- IAMP ONE Phase One, Washington – 19/00280/REM – Reserved matters application – Approved April 2019 – Unit built and currently being used at Nightingale Hospital / COVID-19 vaccination centre;
- Unipres, Washington Road – 18/02055/FUL – Full planning application – Approved March 2019;
- Three Horseshoes, Washington Road – 18/01964/FUL – Full planning application – Approved December 2019;
- Unipres UK Ltd, Cherry Blossom Way. 18/01869/FUL and 19/02161/VAR – Full planning application and variation of condition – Approved October 2019 March 2020;
- Elm Tree Nursery, Washington Road – 18/01964/FUL – Full planning application – Approved December 2019;
- Hillthorn Farm – 21/00401/HE4 – Full planning application – September 2021;

- Hillthorn Farm – 21/00605/OU4 – Outline planning application – September 2021;
- Follingsby International Enterprise Park and Follingsby Park South – DC/17/01117/OUT – Outline planning application – Approved June 2018;
- Follingsby International Enterprise Park and Follingsby Park South – DC/18/00111/REM – Reserved matters application – Approved April 2018;
- Follingsby International Enterprise Park and Follingsby Park South – DC/18/00237/OUT – Outline planning application – Approved May 2018;
- Follingsby International Enterprise Park and Follingsby Park South – DC/18/00574/FUL – Variation of condition – Approved April 2019;
- Follingsby International Enterprise Park and Follingsby Park South – DC/18/00573/COU – Change of use application – Approved September 2018;
- Follingsby International Enterprise Park and Follingsby Park South – DC/20/00021/REM – Reserved matters Application – Approved March 2020;
- Follingsby International Enterprise Park and Follingsby Park South – DC/20/00208/REM – Reserved matters application;
- Follingsby International Enterprise Park and Follingsby Park South – DC/20/00021/REM and DC/20/00208/REM relate to the outline application (DC18/00574/FUL). The outline application is for no more than 225,000 m2 of gross external floorspace for Class B2/B8 use, with class B2 use restricted to a maximum of 27,000 m2. The total GIA for Unit A is 187,024 m^2, (which is subject to RM application DC/20/00021/REM) and the total GIA for Plot B is 13,667. The total is therefore 200,691 m2 which is 24,309 m^2 floorspace less than that consented under permission DC/18/00574/FUL and under DC/18/00573/COU;
- Follingsby Park, Gateshead – DC/18/00860/OUT – Outline planning application – Approved September 2018;
- Land North of Follingsby Lane, Gateshead – DC/19/01252/OUT – Outline planning application – Approved September 2022;
- Former Wardley Colliery, Gateshead – DC/16/00698/OUT – Outline planning application – Approved June 2019;
- Former Wardley Colliery, Gateshead – DC/19/00813/REM – Reserved matters application – Approved November 2020;

- Northern Area Playing Fields Stephenson Road, Washington – 17/02425/LP3 – Approved April 2018 – Works now delivered;
- Unit 1 Spire Road Glover Washington – 18/02226/FUL – Approved October 2019;
- Local Plan Site H3.62, South Tyneside, Residential, 400 dwellings;
- Local Plan Site MSGP1.12, Gateshead, Employment, B2 16,500m^2;
- Local Plan Site H3.25, South Tyneside, Residential, 19 dwellings;
- Local Plan Site H3.65, South Tyneside, Residential, 54 dwellings; and
- Local Plan Site MSGP1.10, Gateshead, Employment, B2 4650m^2.

Of these sites considered, the following developments have been identified as generating traffic movements that will increase traffic flows within the study area:

- IAMP ONE Northern Employment Area - 21/02807/HE4 Hybrid planning application;
- 07/03132/OUT, 10/03039/EXT1 Turbine Business Park, Sunderland;
- 18/00459/FUL, Unipres Extension, 90 parking spaces & 11,100m$_2$ B2 extension;
- 18/00092/HE4, IAMP ONE;
- 21/00401/HE4, Hillthorn Farm;
- DC/18/00237/OUT, DC/20/00021/REM, DC/20/00208/REM, Follingsby International Enterprise Park, Industrial / Warehousing, totalling 200,841m^2 B8 Use;
- DC/18/00860/OUT, Gateshead, Industrial Unit, 7,433m^2;
- DC/19/01252/OUT – Gateshead - Industrial Unit, 4,600m^2;
- 19/01427/FU4 – Sunderland - Residential, 105 dwellings;
- DC/16/00698/OUT - Gateshead - Residential, 144 dwellings;
- 18/01869/OUT - Sunderland, 36 bed Hotel;
- Local Plan Site H3.62 - South Tyneside - Residential, 400 dwellings;
- Local Plan Site MSGP1.12 - Gateshead - Employment, B2 16,500m^2;
- Local Plan Site H3.25, South Tyneside – Residential, 19 dwellings;
- Local Plan Site H3.65, South Tyneside - Residential, 54 dwellings; and
- Local Plan Site MSGP1.10, Gateshead - Employment, B2 4650m.

Meteorological Data

The meteorological data used in the air dispersion modelling has been obtained from ADM Limited. Meteorological data has been obtained for 2022 from the Newcastle Meteorological recording station. This is located approximately 18.7km north of the Proposed Development and is considered to be the most representative of the conditions at the Proposed Development and the designated habitat sites, due to its relative location and similar altitude.

The 2022 wind rose for the Newcastle Meteorological Recording Station is shown below in Figure 2.

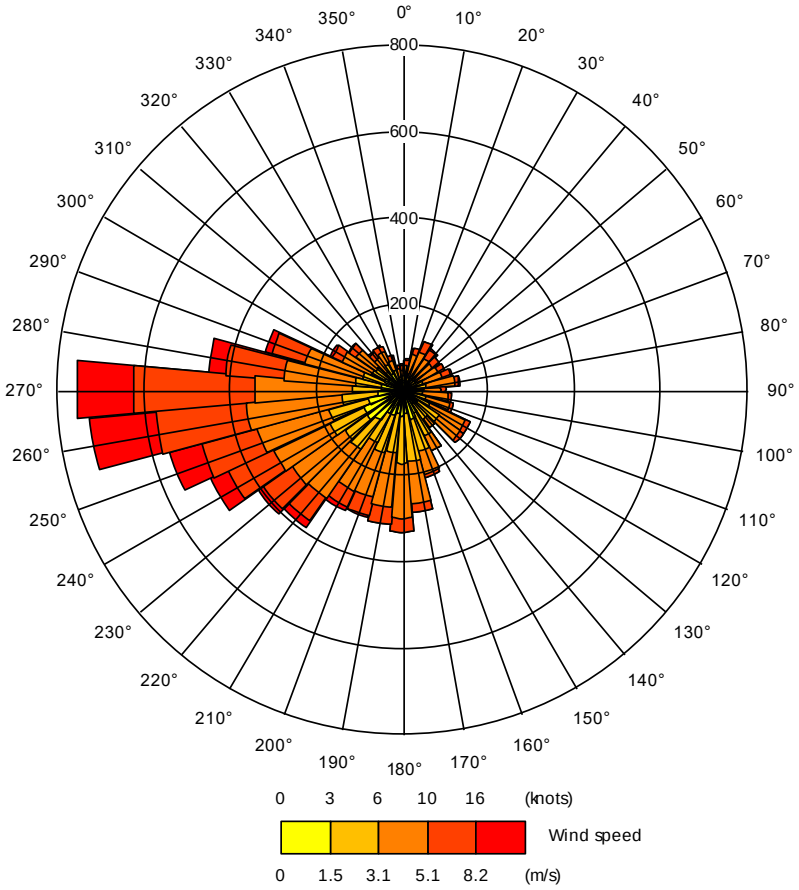


Figure 2: 2022 Wind Rose for the Newcastle Meteorological Recording Station

Dispersion and Meteorological Site Characteristics

The characteristics for the dispersion site and meteorological sites, included in the ADMS-Roads model, are detailed in Table 10.

Table 10: Dispersion and Meteorological Site Characteristics		
Setting	**Dispersion Site**	**Meteorological Site**
Surface Roughness	0.5m	0.5m

Table 10: Dispersion and Meteorological Site Characteristics		
Setting	**Dispersion Site**	**Meteorological Site**
Surface Albedo	0.23	0.23
Minimum Monin-Obukhov Length	30m	10m
Priestley-Taylor Parameter	1	1

NO_x to NO_2 Conversion

In accordance with the guidance within LAQM.TG(22), the ADMS-Roads model has been run to predict the road-contribution NO_x concentrations for each receptor location. These have then been converted to NO_2 concentrations using the Defra NO_x to NO_2 calculator[1].

Model Validation, Verification and Adjustment

LAQM.TG(22) refers to model validation as "the general comparison of modelled results against monitoring data carried out by model developers". ADMS-Roads is widely accepted by regulatory authorities for use in this type of assessment.

Model verification is used to check the performance of the model at a local level. The verification of the ADMS-Roads air dispersion model is achieved by modelling concentration(s) at existing monitoring location(s) in the vicinity of the proposed development and comparing the modelled concentration(s) with the measured concentration(s).

As no NO_2, PM_{10} or $PM_{2.5}$ monitoring locations are situated along roads where traffic flow data is available, it has not been possible to carry out model verification. Therefore, a sensitivity analysis has been undertaken, whereby Base Year background pollutant concentrations and vehicle emission factors have been applied to the 2024 Construction Year and 2027 Opening/Future Year scenarios.

It is considered that the results of the sensitivity analysis provide a conservative upper-bound to the assessment. The sensitivity analysis methodology and results are included in Appendix 6.5.

[1] Defra Local Air Quality Management web pages (http://laqm.defra.gov.uk/tools-monitoring-data/no-calculator.html)