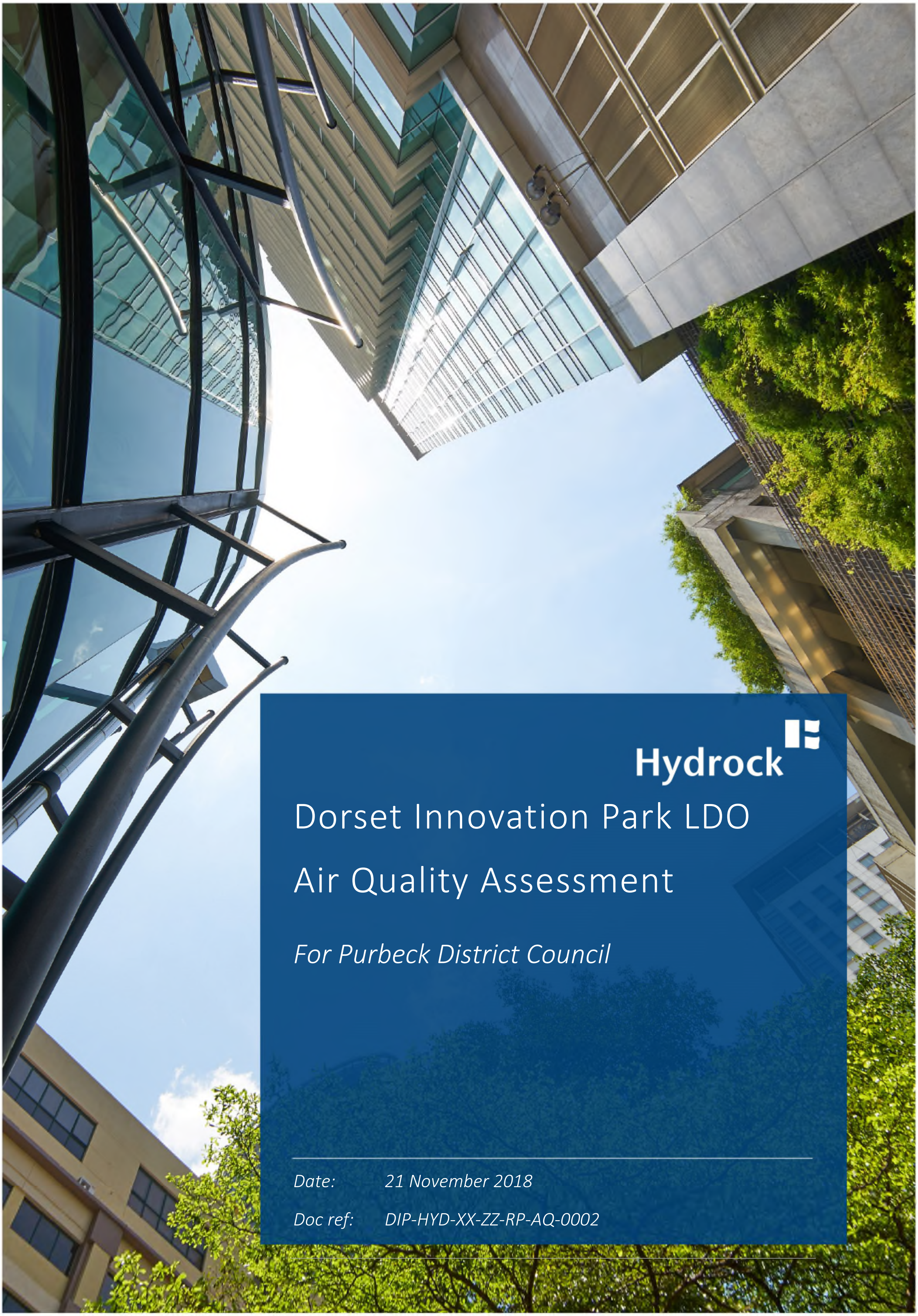

Hydrock

Dorset Innovation Park LDO

Air Quality Assessment

For Purbeck District Council

Date: *21 November 2018*

Doc ref: *DIP-HYD-XX-ZZ-RP-AQ-0002*

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Executive Summary

Dorset Innovation Park

Hydrock have been appointed on behalf of Purbeck District Council to provide planning stage advisory services in relation to the design and construction of the proposed Dorset Innovation Park. This document forms part of a Local Development Order and will help the PDC planning department understand the methodologies behind the recommendations in this report.

Purbeck District Council (PDC) have established that air quality within the area is very good and subsequently, no Air Quality Management Areas (AQMAs) have been declared. PDC have installed ten non-automatic monitoring sites for NO_2 around the district. All ten diffusion tubes are well within the National Air Quality Objectives (NAQOs).

The assessment included the development of an air dispersion model in ADMS Roads to assess the nine following scenarios:

Model #	Emissions Year	Description
Model A	2016	2016 Baseline
Model B	2016	2027 No Development
Model C	2027	2027 No Development
Model D	2016	2027 Development
Model E	2027	2027 Development
Model F	2016	2027 No Development + Committed Development
Model G	2027	2027 No Development + Committed Development
Model H	2016	2027 Development + Committed Development
Model I	2027	2027 Development + Committed Development

The air quality assessment shows that none of the sensitive receptors will see exceedances of the NAQOs and that the development will have a negligible impact on the air quality of the local area if emission factors reduce as predicted. If emission factors remain at 2016 levels then two receptors could experience a slight impact.

Construction impacts at receptors surrounding the proposed site were estimated using IAQM guidelines. All receptors were estimated to have a medium impact for dust, a low impact for human health impacts and a medium or high impact for ecological impacts.

Provided appropriate mitigation procedures are followed it is expected these impacts can be fully mitigated. It is recommended that a Construction Dust Management Plan (DMP) be submitted to PDC based on mitigation guidance from the IAQM which is provided in this report.

1. INTRODUCTION

1.1 Proposed development

Hydrock have been appointment on behalf of Purbeck District Council to undertake an Air Quality Assessment relating to the design and construction of the proposed Dorset Innovation Park.

It is proposed to develop Dorset Innovation Park (DIP) on the site of the former Winfrith nuclear energy test facility on the edge of Wool village near Wareham. The whole development will consist of a mixture of buildings housing light industrial, research & design, industrial and distribution.

Technical assessments relating to the proposed development are based upon an Illustrative Masterplan. This is set out in Appendix A and is appended to the Statement of Reasons. The Illustrative Masterplan presents one potential development scenario and is reflective of the urban design and development plot principles set out within the Design Guide. The masterplan shows a scheme of 14 plots, consisting of 26 buildings.

The development aspires to be a flagship scheme and will be expected to provide high levels of sustainable design, innovation and wellbeing for occupants.

2. RELEVANT LEGISLATION

2.1 EU Legislation

The overriding policy document which governs air regulation is the EU Council Directive on ambient air quality and cleaner air for Europe (2008/50/EC) [1], which came into force in 2008, and provides statutory guidance on air quality. This presents statutory requirements for the protection of human health and ecosystems through long and short-term limit values for: oxides of nitrogen (NOx), nitrogen dioxide (NO_2), sulphur dioxide (SO_2), particulate matter with a diameter of less than 10 microns (PM_{10}), particulate matter with a diameter of less than 2.5 microns ($PM_{2.5}$) carbon monoxide (CO), lead, benzene and ozone (O_3). The above legislation replaces the EU's previous three daughter directives.

The 4th Daughter Directive 2004/107/EC[2] sets target values, where exposure is to be reduced to as low as reasonable possible, for arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons (PaH) within ambient air.

In addition, the Committee on the Medical Effects of Air Pollution (COMEAP)[3], the World Health Organisation (WHO)[4] and the United Nations Economic Commission for Europe (UNECE)[5] provide medical and scientific evidence of the health risks to the general public and recommended concentration limits.

2.2 UK Legislation

The above EU limit/target values within the EU Directives 2008/50/EC and 2004/107/EC were transposed into UK Law as part of the Air Quality Standards Regulations[6] which came into force in 2010.

These describe how the government has interpreted these directives and sets out Air Quality Objectives (AQOs) that are maximum ambient pollutant concentrations that are not to be exceeded either without exception or with a permitted number of exceedances over a specified timescale. One of the main additions to these was the addition of regulatory framework on $PM_{2.5}$.

The Air Quality Strategy 2007 Volume 1[7] outlines the National Air Quality Objectives (NAQO) that should be achieved. Whilst central government is ultimately responsible for meeting these objectives, part of the Environment Act 1995[8] dictates that a local authority is required to assess and periodically review their compliance with the non-binding objectives and any areas that repeatedly exceed the allowed limits should be designated Air Quality Management Areas (AQMAs).

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[1] EC, "Directive 2008/50/EC of the European Parliament and of the Council," May 21, 2008, 50.
[2] EC, 50.
[3] COMEAP, "The Mortality Effects of Long-Term Exposure to Particulate Air Pollution in the United Kingdom" (London: Committee on the Medical Effects of Air Pollutants (COMEAP), November 2010).
[4] WHO, "WHO | Air Pollution," WHO, 2016, http://www.who.int/topics/air_pollution/en/.
[5] UNECE, "Air Pollution - Air Pollution - Environmental Policy - UNECE," 2016, http://www.unece.org/env/lrtap/welcome.html.
[6] Air Quality Standards Regulations 2010.
[7] Defra, "The Air Quality Strategy for England, Scotland, Wales and Northern Ireland - Volume 1" (Department for Food, Environment and Rural Affairs (Defra), July 2007), https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69336/pb12654-air-quality-strategy-vol1-070712.pdf.
[8] Environment Agency, "Environment Act 1995" (The Environment Agency, 2002), http://www.legislation.gov.uk/ukpga/1995/25/contents.

Air quality monitoring in Purbeck has established that pollutant concentrations within the area are well within the NAQOs and no Air Quality Management Areas (AQMA) are required within the district.

The council undertakes annual Air Quality Reports assessing the performance of areas of significant pollution. The most recent Annual Status Report (ASR) was issued in June 2017, based on data from 2016[9].

Purbeck District Council has adopted the Swanage Local Plan as the Purbeck District Council's Local Plan, within which it discusses the need to minimise air pollution. The following extract can therefore be applied at the district level.

> *The improvement of the local facilities and services provided at the town should help to reduce the need for people to travel. Swanage is currently one of the most self-contained towns in Dorset and the improvement of the service offer at the town will help to reduce the need for people to travel outside in order to meet their day-to-day requirements. This, together with the promotion of more sustainable methods of travel both within and around Swanage, should help to ensure that the future level of air pollution within the area does not increase.*

In order to determine if an air quality assessment is required, Defra Local Air Quality management (LAQM) Technical Guidance 2016[10], and the IAQM Land-use Planning & Development Control: Planning for Air Quality[11] and the Highways Agency Design Manual for Roads and Bridges[12] is used as guidance.

The National Planning Policy Framework[13] requires that planning decisions for any new development in or near to an AQMA is consistent with the local air quality action plan. The Planning Practice Guidance[14] states that consideration must be given to the potential impact a development could have on an area where air quality is known to be poor.

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[9] "ASR_Purbeck_2017.Pdf," accessed June 28, 2018, https://www.dorsetforyou.gov.uk/media/221814/Air-Quality-Annual-Status-Report-2015/pdf/ASR_Purbeck_2017.pdf.

[10] Defra, "LAQM Technical Guidance LAQM.TG16," April 2016, 16, http://laqm.defra.gov.uk/documents/LAQM-TG16-April-16-v1.pdf.

[11] IAQM, "Land-Use Planning & Development Control: Planning for Air Quality" (Institute for Air Quality Management (IAQM), January 2017), http://www.iaqm.co.uk/text/guidance/air-quality-planning-guidance.pdf.

[12] DfT, Design Manual for Roads and Bridges, vol. 12.2.1: Traffic Appraisal of Road Schemes. Section 2: Advice (London: Highways Agency, 1996).

[13] Ministry of Housing, Communities and Local Government, "National Planning Policy Framework," July 2018, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/740441/National_Planning_Policy_Framework_web_accessible_version.pdf.

[14] Department for Communities and Local Government, "Air Quality | Planning Practice Guidance," March 2014, http://planningguidance.communities.gov.uk/blog/guidance/air-quality/.

3. ASSESSMENT METHODOLOGY

The assessment has been carried out based on the methodologies and guidance set out in Local Air Quality Management Technical Guidance LAQM TG(16)[15] and the IAQM and Environmental Protection UK (EPUK) Land-Use Planning & Development Control planning for Air Quality guidance[16].

3.1 Scope of Assessment

The main purpose of the assessment is to determine the current conditions in the area and what impact future increases in vehicle movements might have on existing sensitive receptors.

A detailed Air Quality Assessment (AQA) has been undertaken using the air dispersion model ADMS Roads to establish the current air quality situation in the area. This software is commercially available, has been validated for this type of assessment and is used extensively for AQA's.

This software is able to provide an estimate of air quality both before and after the development, taking into account important input data such as background pollutant concentrations, meteorological data, traffic flows and on-site energy generation. The model output can be verified against local monitoring data to increase the accuracy of the predicted pollutant concentrations and it is this approach that has been followed in this assessment. Ten diffusion tubes are located in the Purbeck area with the one most applicable tube used for verification in this assessment.

This model will consider/use the following data:

- Annual Average Daily Flow (AADT) count data provided by Hydrock Transport Consultants using 2018 ATC survey data. This was then factored to 2016 levels to match the monitoring data available from PDC.
- 2016 NO_2 diffusion tube data from PDC.
- Average diurnal profiles for the AADTs taken from the DfT average and the ATC survey.
- Vehicle emissions data from the Defra EFT v8 inventory.
- NAEI emissions inventory area breakdown.
- Road widths and canyon heights taken from Google Maps.
- Weather data for the full year of 2016 taken from Bournemouth met station.

3.1.1 Road Geometry

Road widths and canyon heights were taken from Google Maps. The links were split into main sections of road and junctions. Speed data was assumed to be at the speed limit for each road.

3.1.2 Street canyons

ADMS Roads includes a module to model the effect of street canyons on concentrations. A street canyon is usually defined as when the aspect ratio of the height of buildings along the road is greater than 1/3 the total building to building road width. No street canyons were modelled in this assessment.

[15] Defra, "LAQM Technical Guidance LAQM.TG16," 16.
[16] IAQM, "Land-Use Planning & Development Control: Planning for Air Quality."

The links assessed in the model and their proximity to the development are shown in Figure 1.

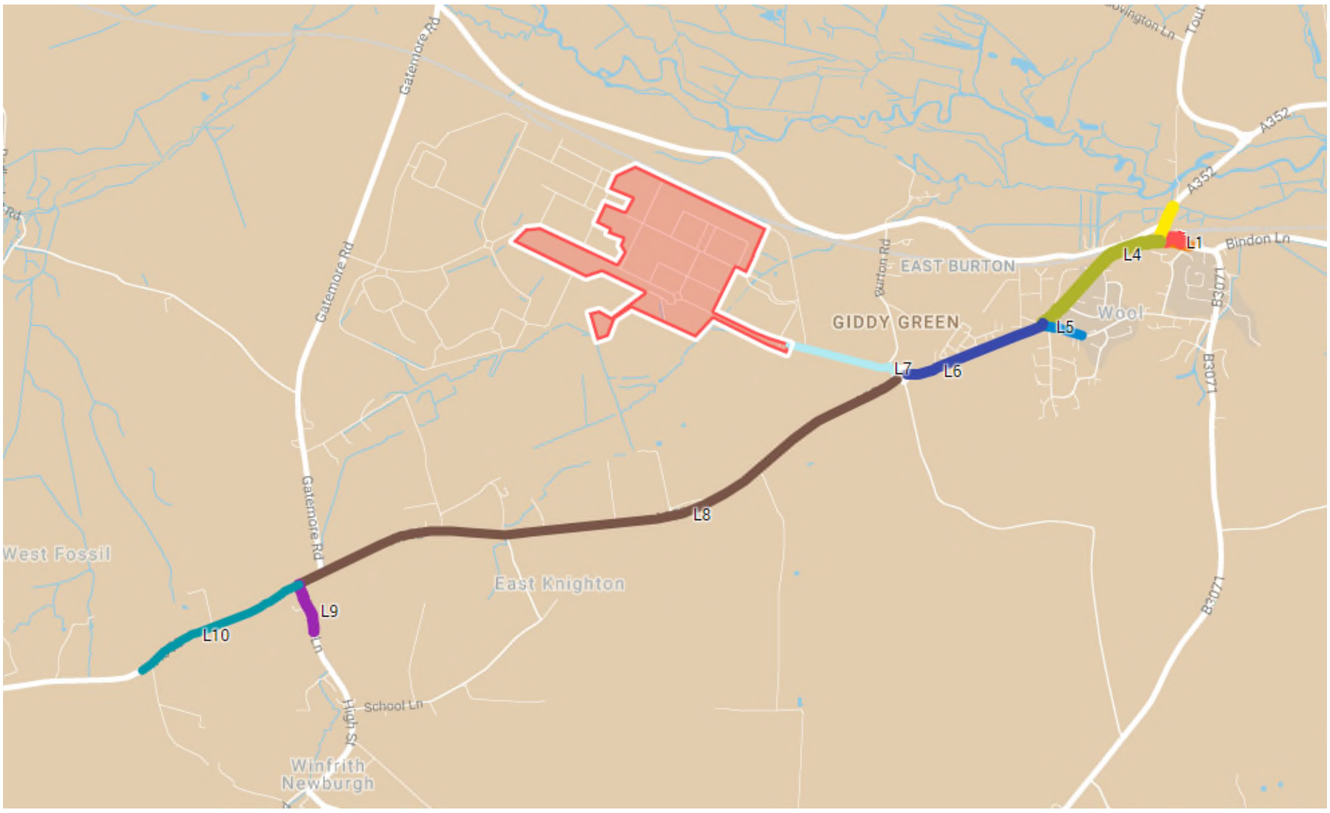

Figure 1 - Links assessed in model ©Google maps 2018

3.1.3 Traffic Data

Traffic flows shown in Table 1 were provided by Hydrock Transport Consultants based on ATC and turning count survey data.

The flows provide basic vehicle flow and classification data in the form LGVs and HGVs. The data was factored to 2016 levels so that it could be validated against the last full year of NO_2 monitoring data available from PDC.

A future baseline was provided for predicted traffic flows in 2027 (which forms the end of the PDC Local Plan period), both with and without other committed development traffic flows. On top of this the proposed development predicted traffic flows were added as a separate column of data.

Table 1 - Hourly traffic flows considered in model

Model	Link #	LGV	HGV	Speed (kph)	Model	Link #	LGV	HGV	Speed (kph)
Model A	L1	154	2	32	Model F and G	L1	175	2	32
	L2	8	1	16		L2	9	1	16
	L3	316	9	48		L3	399	14	48
	L4	269	8	48		L4	346	12	48
	L5	90	1	48		L5	102	1	48
	L6	243	7	48		L6	318	11	48
	L7	82	1	48		L7	178	7	48
	L8	263	8	97		L8	336	12	97
	L9	78	1	48		L9	88	2	48
	L10	299	9	97		L10	376	13	97
Model B and C	L1	174	2	32	Model H and I	L1	175	2	32
	L2	9	1	16		L2	9	1	16
	L3	358	11	48		L3	418	14	48
	L4	304	9	48		L4	365	12	48
	L5	101	1	48		L5	103	1	48
	L6	276	8	48		L6	338	11	48
	L7	93	1	48		L7	218	7	48
	L8	298	9	97		L8	355	12	97
	L9	88	2	48		L9	89	2	48
	L10	338	10	97		L10	394	13	97
Model D and E	L1	175	2	32					
	L2	9	1	16					
	L3	377	12	48					
	L4	324	11	48					
	L5	102	1	48					
	L6	296	10	48					
	L7	133	4	48					
	L8	316	10	97					
	L9	88	2	48					
	L10	356	12	97					

3.1.4 *Vehicle emissions*

Predicting pollutant concentrations in a future year will always be subject to greater uncertainty. For obvious reasons, the model cannot be verified in the future, and it is necessary to rely on a series of projections provided by DfT and Defra as to what will happen to traffic volumes, background pollutant concentrations and vehicle emissions.

Historically, large reductions in nitrogen oxides emissions have been projected, which has led to significant reductions in nitrogen dioxide concentrations from one year to the next being modelled. Over time, it was found that trends in measured concentrations did not reflect the rapid reductions that Defra and the DfT had predicted[17]. It had been estimated that annual mean nitrogen oxides and nitrogen dioxide concentrations should have fallen by around 15-25%, whereas monitoring data showed that concentrations remained relatively stable, or even showed a slight increase. Analysis of more recent data for 23 roadside sites in London covering the period 2003 to 2012 showed a weak downward trend of around 5% over the ten years [18], but this still falls short of the improvements that had been predicted at the start of this period. This pattern of no clear, or limited, downward trend is mirrored in the monitoring data has been addressed by the IAQM who advise that a sensitivity analysis is carried out to predict the effect, should these not be realised[19].

The sensitivity analysis models each scenario with 2016 (worst case) and 2027 (best case) EF to determine the difference the emissions year makes.

The reason for the disparity between the expected concentrations and those measured relates to the on-road performance of modern diesel vehicles. New vehicles registered in the UK have had to meet progressively tighter European type approval emissions categories, referred to as "Euro" standards. While the nitrogen oxides emissions from newer vehicles should be lower than those from equivalent older vehicles, the on-road performance of some modern diesel vehicles has often been no better than that of earlier models. This has been compounded by an increasing proportion of nitrogen dioxide in the nitrogen oxides emissions, i.e. primary nitrogen dioxide, which has a significant effect on roadside concentrations[20]. Defra has attempted to account for the historical discrepancies with continuing revisions in its emissions factors, published in 2014 (EFT V6.0.2), 2016 (V7)[21] and 2017 (8.0.1)[22]. The EFT V8.0.1 is thought to be a significant improvement over previous EFT versions at predicting future emissions

The EFT factors extrapolate current year emissions factors (2016) and anticipate a steady year on year decrease in emissions from vehicles as engine technology improves. In the case of this development it is anticipated that in 2027 vehicle emissions will be significantly lower (around 30%) than today. To account for the remaining uncertainty over future vehicle emissions of nitrogen oxides and nitrogen dioxide, a sensitivity test has been conducted assuming that the future (2027) road traffic emissions per vehicle are unchanged from 2016 values (without emissions reduction). The predictions within this sensitivity test will almost certainly be over-pessimistic, as new Euro VI and Euro 6 vehicles will almost certainly make up greater percentages of vehicles by this future year.

Future concentrations due to road traffic emissions will therefore be below the 'without emissions reduction' values but may be above Defra's 'with emissions reduction' values, i.e. they will lie between the two sets of values.

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[17] David Carslaw et al., "Trends in NOx and NO2 Emissions and Ambient Measurements in the UK," July 18, 2011, https://uk-air.defra.gov.uk/assets/documents/reports/cat05/1108251149_110718_AQ0724_Final_report.pdf.

[18] David Carslaw and Glyn Rhys-Tyler, "Remote Sensing of NO2 Exhaust Emissions from Road Vehicles," n.d., https://uk-air.defra.gov.uk/assets/documents/reports/cat05/1307161149_130715_DefraRemoteSensingReport_Final.pdf.

[19] IAQM, "Dealing with Uncertainty in Vehicle NOx Emissions within Air Quality Assessments - Position Statement" (Institute for Air Quality Management (IAQM), March 10, 2016), http://www.iaqm.co.uk/text/position_statements/vehicle_NOx_emission_factors.pdf.

[20] Carslaw et al., "Trends in NOx and NO2 Emissions and Ambient Measurements in the UK"; Carslaw and Rhys-Tyler, "Remote Sensing of NO2 Exhaust Emissions from Road Vehicles."

[21] Defra, "Emissions Factors Toolkit (EFT) 7.0" (Department for Food, Environment and Rural Affairs (Defra), 2016), http://laqm.defra.gov.uk/review-and-assessment/tools/emissions-factors-toolkit.html.

[22] Defra, "Emissions Factors Toolkit (EFT) v8.0," November 22, 2017, https://laqm.defra.gov.uk/review-and-assessment/tools/emissions-factors-toolkit.html.

Because of this, a sensitivity analysis has been performed by modelling all of the scenarios with 2027 emissions estimates, as well as 2016. This should allow for a best and worst case of future year concentrations to be predicted.

3.1.5 Baseline conditions

PDC has investigated air quality within the area as part of its responsibilities under the LAQM guidance. As part of this they have placed 10 diffusion tubes around Purbeck to monitor concentrations of NO_2, with the closest to the development being approximately 2km away, outside Wool railway station. Purbeck does not undertake automatic monitoring at any location within the area.

Estimated background concentrations of all EU limit value pollutants from DEFRA[23], are presented in Table 2. All pollutants measured below are well within the NAQOs.

Table 2 - Baseline conditions

Pollutant		Period	National Air Quality Objectives (NAQO)	Dorset Innovation Park
				1km
Description	units			Annual Mean
Particles (PM_{10})	µg/m³	Annual mean	40	10.96
Particles ($PM_{2.5}$)	µg/m³	Annual mean	20	6.94
Nitrogen Dioxide (NO_2)	µg/m³	Annual mean	40	5.32
Nitrogen Dioxide (NOx as NO_2)	µg/m³	Annual mean	-	6.84
Ozone (O_3)	days above	8 hour mean	10	0
Sulphur Dioxide (SO_2)	µg/m³	Annual mean	-	0.53
Polycyclic aromatic hydrocarbons (PAH)	ng/m³	Annual mean	0.25	0.05
Benzene	µg/m³	Annual average (England and Wales)	5	0.23
Carbon Monoxide (CO)	mg/m³	Max daily running 8 hour mean (2010)	10	1.43
Lead (Pb)	ng/m³	Annual mean	250	3.42

3.1.6 Point source emissions

The IAQM/EPUK guidance criteria require a detailed modelling assessment if the CHP/boiler plant exceeds 5mg/second of NOx. At this stage of the design, the energy strategy is still under consideration and it is not yet known what boilers and CHP will be required onsite. Without further confirmation of what systems are proposed, it is not possible to accurately model the effects of a boiler and/or CHP as there are too many variables and unknown factors that need to be modelled.

Guidance on principles of good practice for any boilers and CHP plants to be installed are given in Section 6.1.

No other significant point sources were identified in the vicinity of the site. Any point sources in the area will be included in the background emissions factors taken from the Defra/NAEI background maps[24].

[23] for a 2km radius surrounding the development site (https://uk-air.defra.gov.uk/data/gis-mapping)
[24] Food and Rural Affairs (Defra) webmaster@defra gsi gov uk Department for Environment, "Emissions from NAEI Large Point Sources - Defra, UK," 2015, http://naei.defra.gov.uk/data/map-large-source.

These 2015 baseline, 1-kilometre grid resolution maps are derived from a complex modelling exercise that takes into account emissions inventories and measurements of ambient air pollution from both automated and non-automated sites.

3.1.7 Weather data

Detailed dispersion modelling requires hourly sequential meteorological data from a representative synoptic observing station. Hourly measured weather data for the period 01/01/2016 to 31/12/2016 was taken from Bournemouth met weather station, approximately 30km east of the development site.

3.1.8 Limitations to model

A number of factors are unable to be considered in the ADMS Roads simulation

- Stops and starts of vehicles. Traffic flow is assumed to be at a continuous speed.
- As the traffic data was provided as AADTs and the same weekly profile used for the hourly and daily variation, it is not possible to model the monthly variations in flows.
- Ground terrain is assumed to be completely flat, no trees and verges are included in the model.
- As no continuous analyser data was available for the site only annual mean concentrations can be verified. Therefore, short term estimations (i.e. 1 hour exceedances) were not possible.

3.1.9 Assessment scenarios

Predictions of NO_2, PM_{10} and $PM_{2.5}$ have been made for five scenarios in this assessment:

Model #	Emissions Year	Description
Model A	2016	2016 Baseline
Model B	2016	2027 No Development
Model C	2027	2027 No Development
Model D	2016	2027 Development
Model E	2027	2027 Development
Model F	2016	2027 No Development + Committed Development
Model G	2027	2027 No Development + Committed Development
Model H	2016	2027 Development + Committed Development
Model I	2027	2027 Development + Committed Development

3.1.10 Receptors

Receptors have been placed at the façade of buildings along the road network modelled here, which are predicted to be most sensitive to any change in traffic flows as a result of the proposed development.

Ecological receptors are also present to the west of the site where Winfrith Heath (Site of Scientific Interest), Dorset Heaths (Special Area of Conservation) and Dorset Heathlands (Ramsar) are all located. The presence of these receptors means there is a requirement to meet a lower level of NOx concentrations at these points to meet more a stringent objective of 30 $\mu g/m^3$.

The location of the receptors is shown in Figure 2.

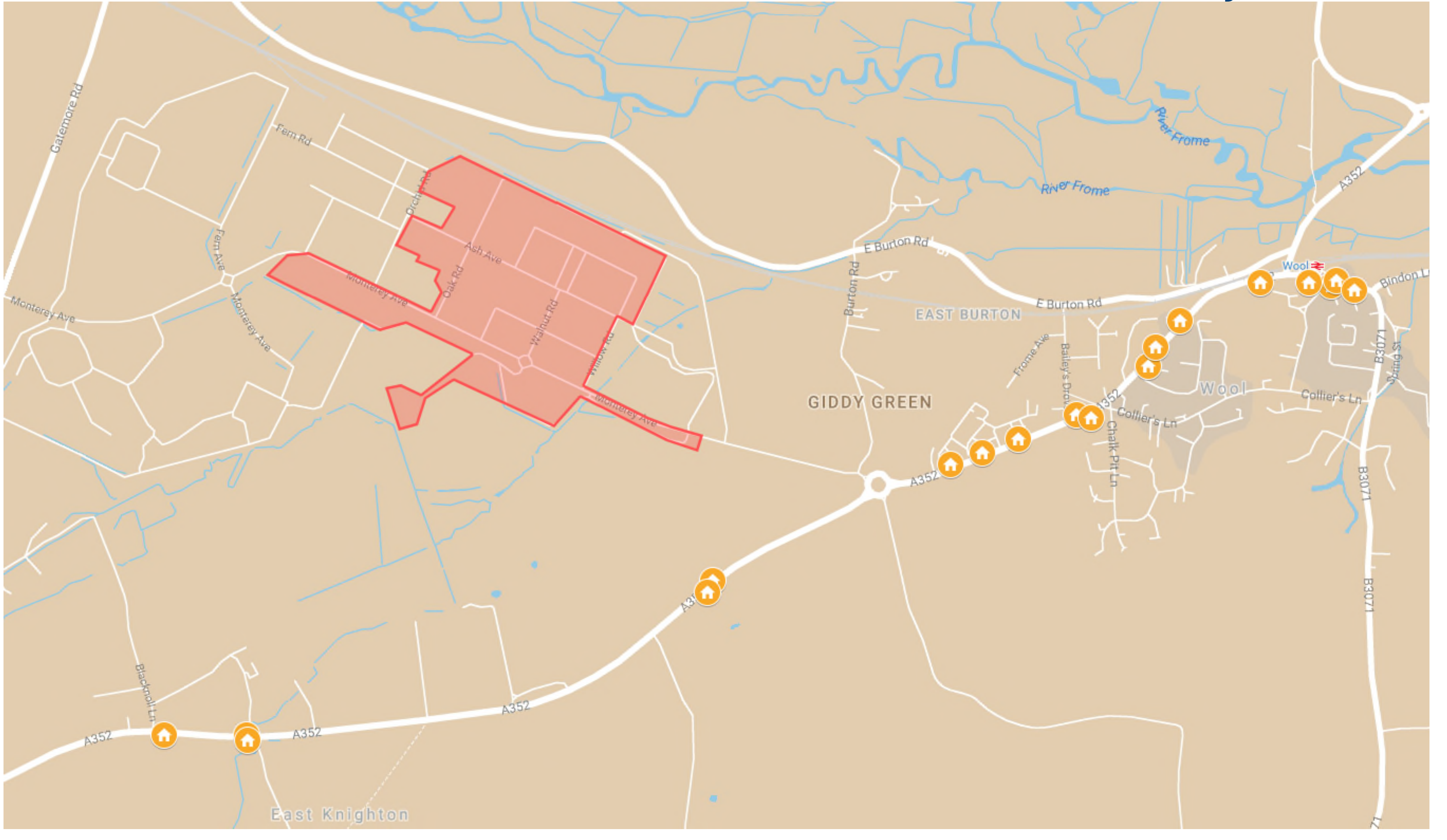


Figure 2 - Receptor locations

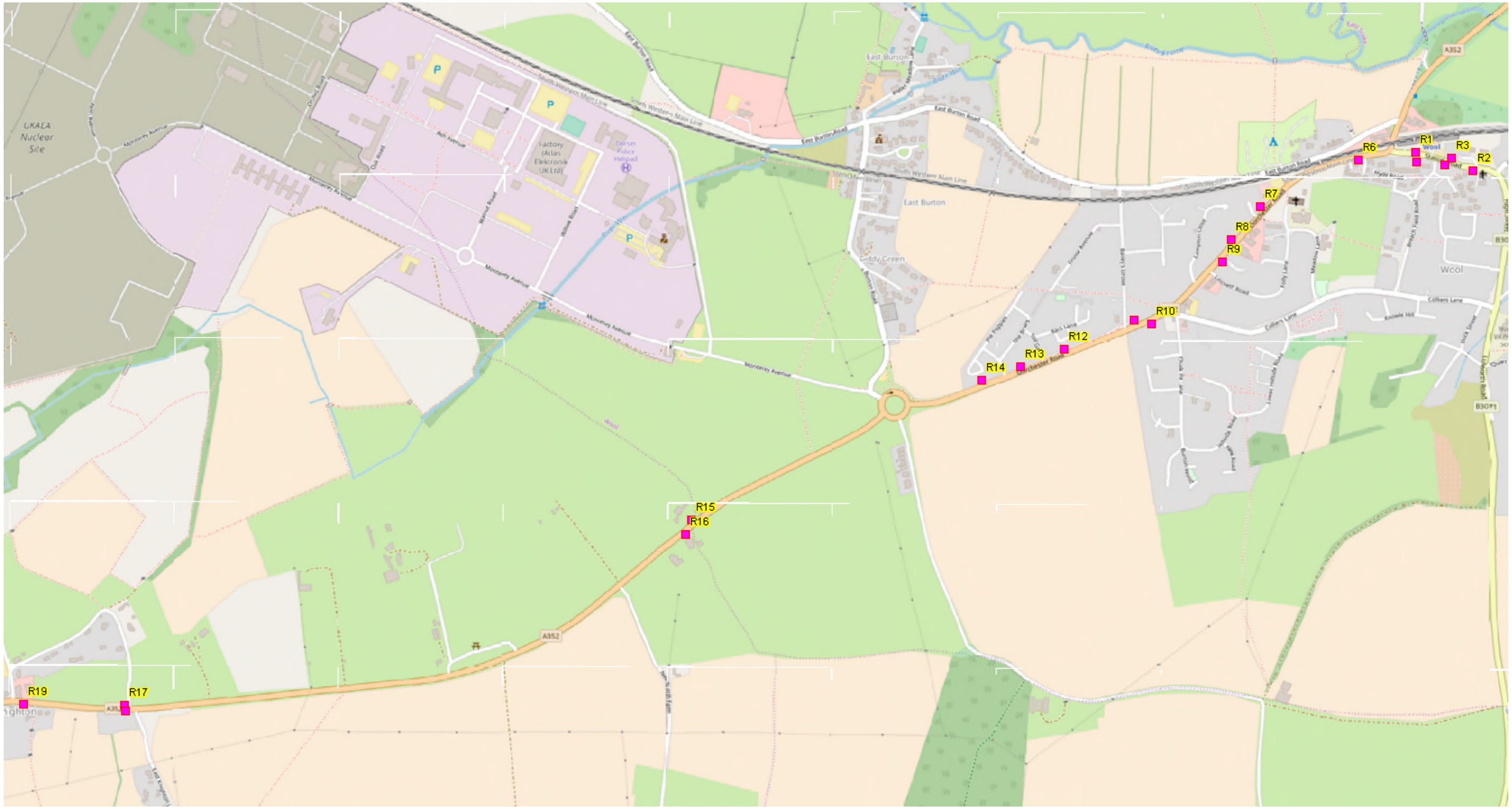


Figure 3 - Receptors labelled

Table 3 - Receptor locations (DT = Diffusion Tube)

		Coordinates		
R#	Receptor	X	Y	Z
R1	Station Approach	384430	86879	2.25
R2	Dorset Coastal Cottages	384565	86834	1.5
R3	3 Station Road	384514	86864	1.5
R4	8 Locks Piece	384499	86848	1.5
R5	Hyde Row	384433	86856	1.5
R6	126 Dorchester Rd	384294	86859	1.5
R7	The Priests House	384064	86749	1.5
R8	5 Dorchester Rd	383994	86673	1.5
R9	Dorchester Rd	383973	86619	1.5
R10	Dorchester Rd	383807	86472	1.5
R11	Dorchester Rd	383765	86481	1.5
R12	Dorchester Rd	383600	86413	1.5
R13	Dorchester Rd	383497	86373	1.5
R14	Dorchester Rd	383405	86339	1.5
R15	A352	382722	86010	1.5
R16	A352	382707	85976	1.5
R17	A352	381383	85573	1.5
R18	A352	381385	85559	1.5
R19	A352	381146	85575	1.5

X, Y and Z coordinates are given for each receptor in Table 3. Z is the height from street level in metres (m).

3.1.11 Construction phase

During construction of the proposed development Heavy Goods Vehicles (HGVs), earthmoving plant and other mobile machinery such as cranes and generators will be moving to and from site. These machines produce emissions, most notably NO_2, $PM_{2.5}$ and PM_{10}.

As well as construction traffic, dust and PM_{10} releases will occur from demolition, earthworks, construction and possible track out from vehicles.

These impacts are assessed using the IAQM guidance on construction dust[25]. The impact at each receptor is estimated for the four main construction activities through a series of matrices.

[25] IAQM, "Guidance on the Assessment of Dust from Demolition and Construction" (Institute of Air Quality Management (IAQM)), February 2014), http://www.iaqm.co.uk/text/guidance/construction-dust-2014.pdf.

4. MODEL RESULTS

4.1 Model verification

An important stage in the process is model verification of the road traffic model, which involves comparing the model output with measured concentrations. Because the model has been verified and adjusted, there can be reasonable confidence in the prediction of baseline year (2016) concentrations.

Most nitrogen dioxide (NO_2) is produced in the atmosphere by reaction of nitric oxide (NO) with ozone. It is therefore most appropriate to verify the model in terms of primary pollutant emissions of nitrogen oxides (NOx = NO + NO_2). The model has been run to predict the annual mean NOx concentrations during 2016 at the Wool Railway Station diffusion tube monitoring site.

The model output of road-NOx (i.e. the component of total NOx coming from road traffic) has been compared with the 'measured' road-NOx. Measured road-NOx has been calculated from the measured NO_2 concentrations and the predicted background NO_2 concentration using the NOx from NO_2 calculator (Version 6) available on the Defra LAQM Support website.

One diffusion tube was used to verify this model. The modelled and monitored results are given in Table 4.

Table 4 - 2016 modelled and monitored diffusion tube results

R#	Receptor	X	Y	Z	Modelled NOx µg/m³	Modelled NO_2 µg/m³	Monitored NO_2 µg/m³	Monitored NOx µg/m³	Diff Mod/Mon NOx %	Regression factor
R1	Station Approach	384430	86879	2.25	8.62	13.71	21.90	24.42	35%	2.83
									Overall	2.83

The model was found to be under predicting at the monitoring site. A graph showing the line of best of fit and subsequent correction factor is shown below. A correction factor of 2.83 was applied to all modelled NOx outputs before being converted to NO_2.

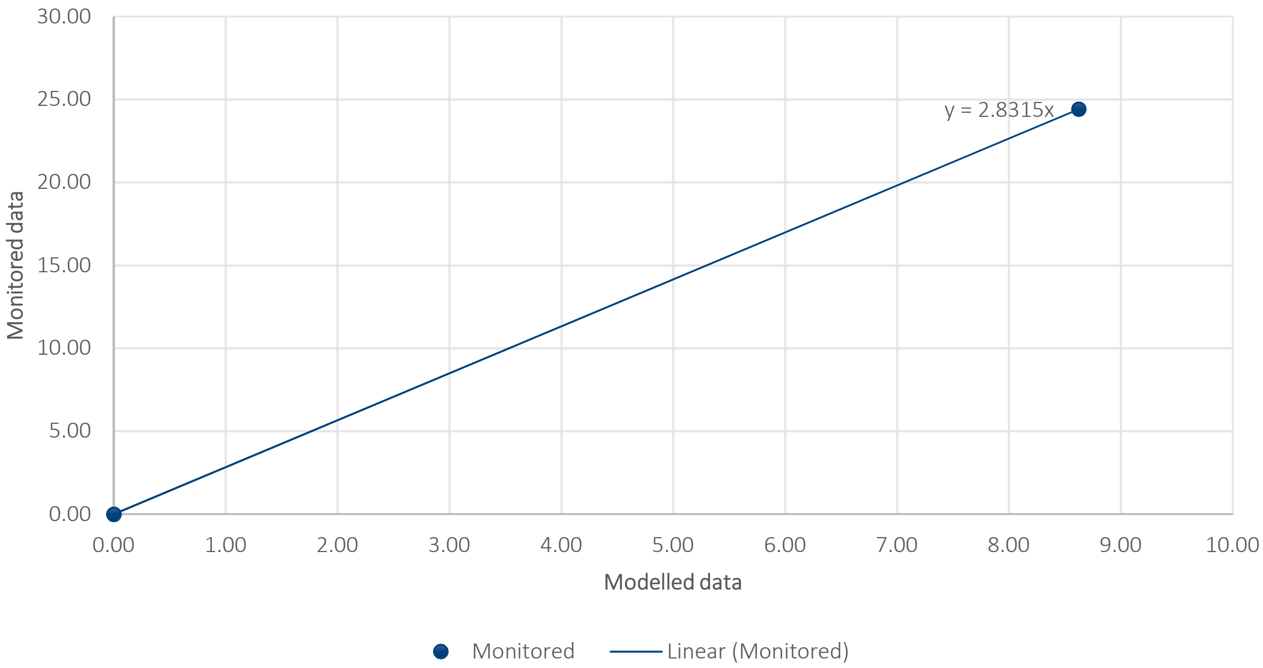


Figure 4- Comparison of monitored road NOx to unadjusted modelled road NOx concentrations

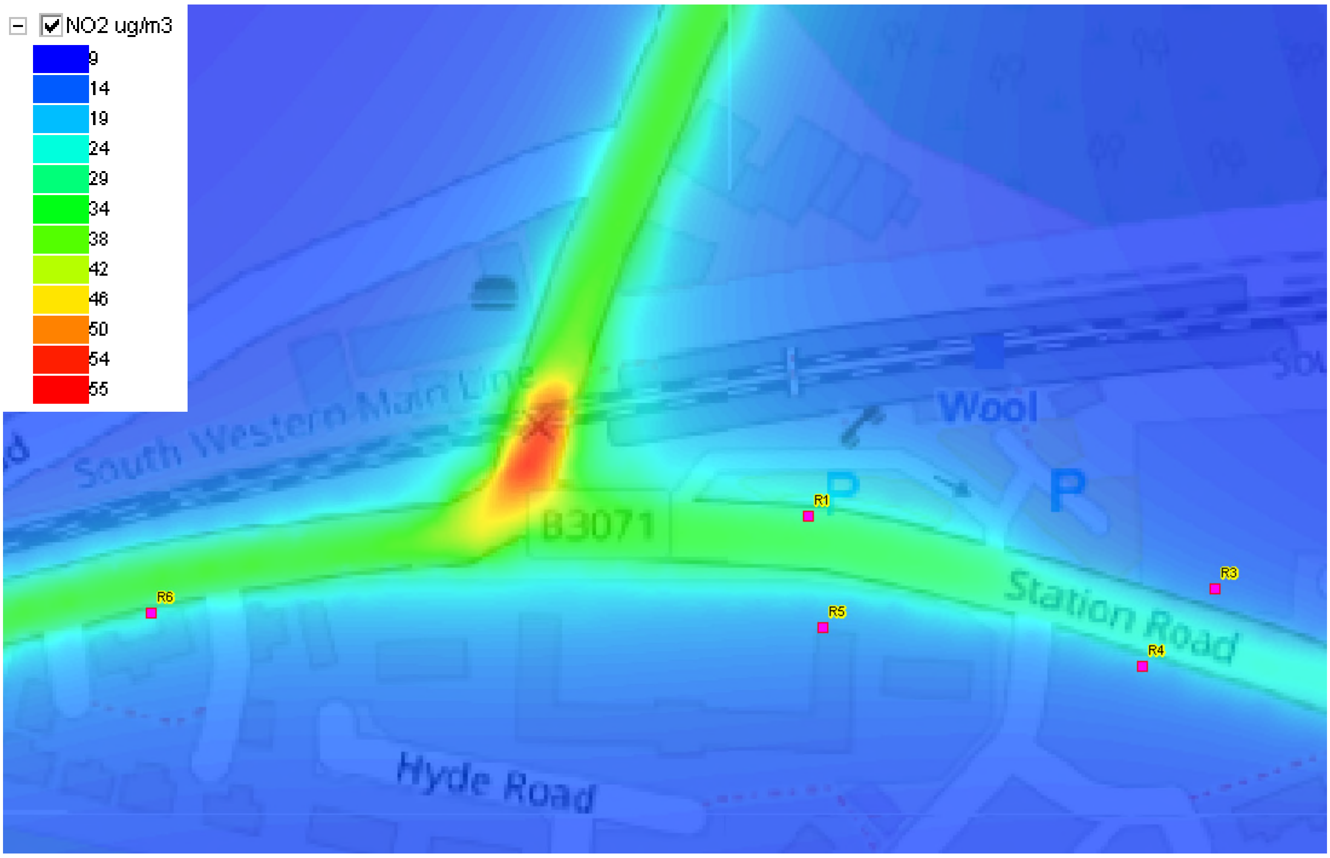


Figure 5 - Concentration plot of annual average NO2 concentrations at R1 - R6

4.2 Operational

The nine modelled scenarios are:

Model #	Emissions Year	Description
Model A	2016	2016 Baseline
Model B	2016	2027 No Development
Model C	2027	2027 No Development
Model D	2016	2027 Development
Model E	2027	2027 Development
Model F	2016	2027 No Development + Committed Development
Model G	2027	2027 No Development + Committed Development
Model H	2016	2027 Development + Committed Development
Model I	2027	2027 Development + Committed Development

Receptor R1 corresponds to the location of the PDC diffusion tube site outside Wool railway station. Receptors R2 – R19 are all located along the road network modelled in this assessment at the facades of residential houses.

The concentrations of NO_2, PM_{10} and $PM_{2.5}$ at each receptor for all modelled scenarios are outlined in Table 5.

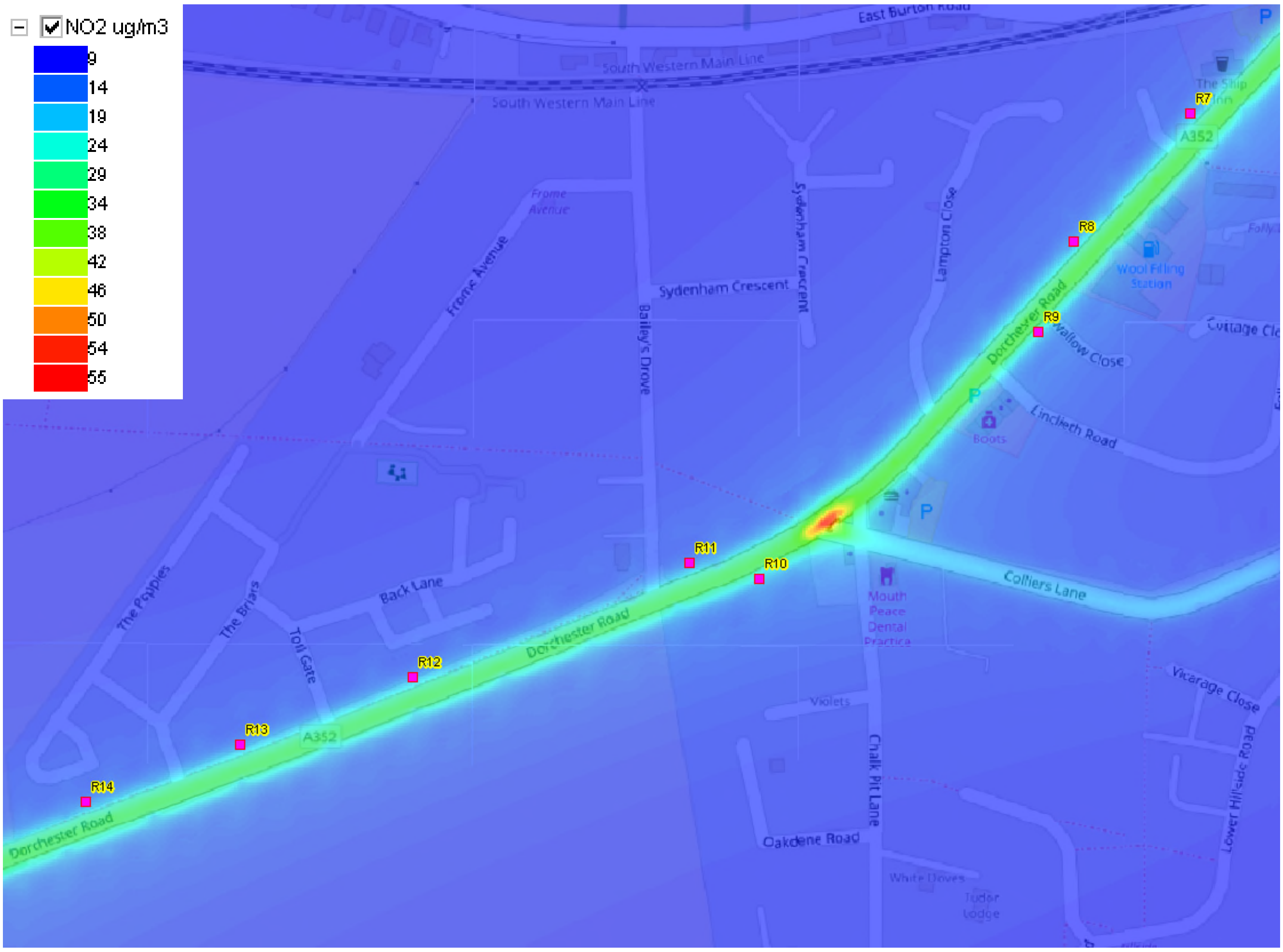


Figure 6 - Concentration plots for receptors R7 to R14

Table 5 – Pollutant concentrations for all receptors and models

R#	NO_2 Concentrations (µg/m³)								PM_{10} Concentrations (µg/m³)								$PM_{2.5}$ Concentrations (µg/m³)							
	2016 EF				2027 EF				2016 EF				2027 EF				2016 EF				2027 EF			
	B	D	F	H	C	E	G	I	B	D	F	H	C	E	G	I	B	D	F	H	C	E	G	I
	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³
R1	23.31	23.61	23.89	24.14	14.99	15.11	15.22	15.31	14.06	14.09	14.12	14.15	13.81	13.84	13.86	13.88	8.61	8.63	8.64	8.66	8.37	8.38	8.40	8.41
R2	16.38	16.48	16.56	16.64	12.13	12.18	12.21	12.23	13.63	13.64	13.65	13.66	13.50	13.51	13.52	13.52	8.30	8.31	8.31	8.32	8.17	8.18	8.18	8.19
R3	15.86	15.99	16.11	16.21	11.88	11.93	11.98	12.02	13.55	13.57	13.58	13.59	13.43	13.44	13.45	13.46	8.25	8.26	8.27	8.27	8.13	8.14	8.15	8.15
R4	17.90	18.05	18.17	18.28	12.77	12.83	12.87	12.92	13.77	13.78	13.80	13.81	13.61	13.62	13.63	13.64	8.39	8.40	8.41	8.41	8.24	8.24	8.25	8.26
R5	18.05	18.30	18.54	18.76	12.74	12.84	12.93	13.01	13.63	13.66	13.68	13.70	13.48	13.50	13.52	13.53	8.31	8.33	8.35	8.36	8.17	8.18	8.19	8.20
R6	22.52	23.54	24.45	25.41	14.62	14.99	15.36	15.71	14.46	14.58	14.70	14.82	14.21	14.31	14.41	14.51	8.82	8.90	8.97	9.04	8.58	8.64	8.69	8.75
R7	16.36	16.96	17.49	18.06	12.02	12.23	12.44	12.64	13.72	13.79	13.86	13.92	13.59	13.65	13.70	13.76	8.35	8.39	8.43	8.48	8.22	8.25	8.29	8.32
R8	16.55	17.16	17.70	18.29	12.10	12.31	12.53	12.73	13.74	13.82	13.88	13.95	13.61	13.67	13.72	13.78	8.36	8.41	8.45	8.49	8.23	8.27	8.30	8.33
R9	20.88	21.82	22.64	23.53	13.93	14.27	14.60	14.92	14.28	14.39	14.50	14.61	14.06	14.16	14.25	14.34	8.70	8.77	8.84	8.91	8.49	8.55	8.60	8.65
R10	19.73	20.67	21.48	22.39	13.44	13.77	14.10	14.42	14.09	14.20	14.29	14.40	13.89	13.98	14.06	14.15	8.58	8.65	8.71	8.78	8.40	8.45	8.50	8.55
R11	15.88	16.51	17.06	17.68	11.82	12.04	12.26	12.48	13.65	13.72	13.78	13.86	13.53	13.58	13.64	13.70	8.30	8.35	8.39	8.43	8.18	8.22	8.25	8.28
R12	16.33	17.01	17.62	18.29	12.01	12.25	12.49	12.73	13.72	13.80	13.87	13.95	13.58	13.65	13.71	13.78	8.34	8.39	8.44	8.49	8.22	8.26	8.29	8.33
R13	16.06	16.73	17.34	18.00	11.90	12.14	12.38	12.61	13.68	13.76	13.83	13.91	13.55	13.62	13.68	13.74	8.32	8.37	8.42	8.46	8.20	8.24	8.27	8.31
R14	15.87	16.53	17.15	17.83	11.82	12.05	12.30	12.53	13.65	13.72	13.79	13.87	13.52	13.58	13.64	13.71	8.30	8.35	8.39	8.44	8.18	8.22	8.25	8.29
R15	20.48	21.17	21.99	22.78	13.88	14.16	14.48	14.78	14.21	14.30	14.41	14.51	13.95	14.02	14.11	14.19	8.68	8.73	8.80	8.87	8.42	8.46	8.51	8.56
R16	26.53	27.50	28.65	29.75	16.57	16.98	17.43	17.86	14.98	15.11	15.28	15.43	14.57	14.67	14.81	14.93	9.18	9.26	9.36	9.46	8.78	8.84	8.91	8.99
R17	22.19	22.93	23.84	24.70	14.63	14.94	15.29	15.62	14.43	14.53	14.65	14.76	14.12	14.20	14.30	14.39	8.82	8.88	8.96	9.03	8.52	8.57	8.62	8.68
R18	28.41	29.43	30.67	31.83	17.42	17.86	18.35	18.81	15.23	15.37	15.55	15.72	14.77	14.88	15.03	15.16	9.34	9.43	9.54	9.65	8.89	8.96	9.04	9.12
R19	27.94	28.94	30.14	31.27	17.21	17.64	18.11	18.56	15.17	15.31	15.48	15.64	14.72	14.83	14.97	15.10	9.30	9.39	9.50	9.60	8.87	8.93	9.01	9.08

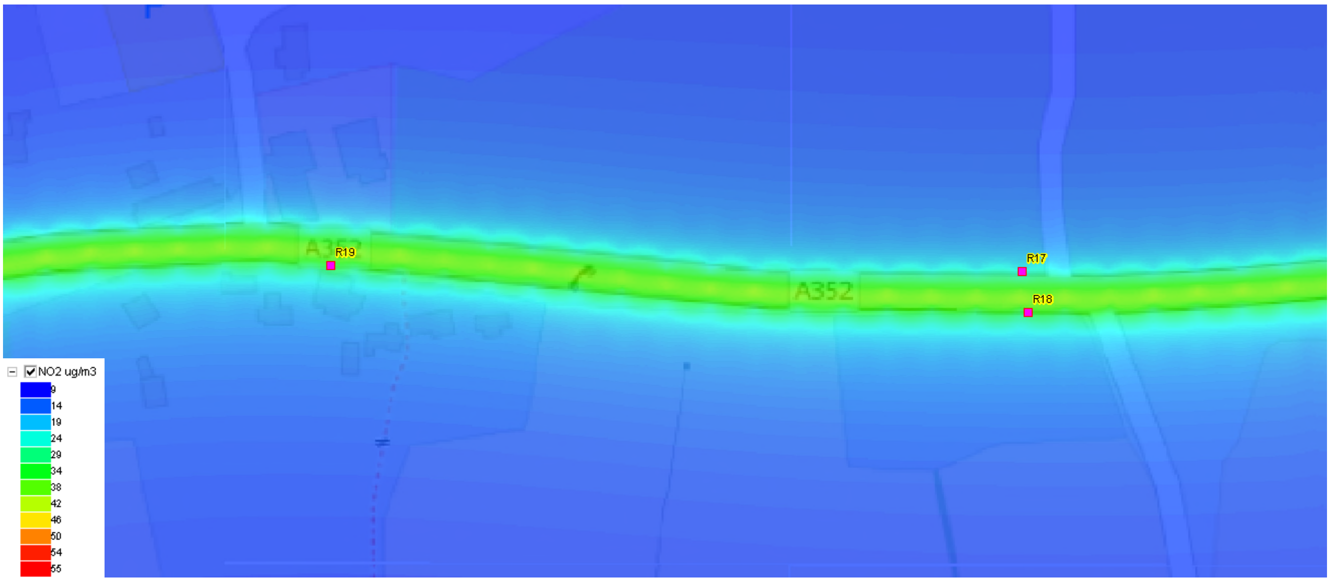


Figure 7 - Annual Average concentration plot of NO2 concentrations at R17 to R19

The results show that in all scenarios modelled there are no predicted exceedances of the NAQOs. All sensitive receptors modelled here are well below the 40 µg/m^3 limit. As outlined in the methodology section, these results do not consider the impacts of any boilers and CHP that may be used onsite. Therefore, once the energy strategy is decided for the site, a further assessment to include this detail will be required to ensure any impacts are understood.

4.3 Impacts

In order to assess the impact that the project might have on the local area, the IAQM/EPUK impact descriptor methodology table has been used as shown in Table 6. The percentage increase in emissions at a receptor is compared with the percentage of the Air Quality Assessment Limit (AQAL) for the area.

Table 6 - Impact descriptor for individual receptors taken from IAQM/EPUK guidance

Long term average concentration at receptor in assessment year	% Change in concentration relative to Air Quality Assessment Level (AQAL)			
	1	2-5	6-10	>10
75% or less of AQAL	Negligible	Negligible	Slight	Moderate
76 - 94% of AQAL	Negligible	Slight	Moderate	Moderate
95 - 102% of AQAL	Slight	Moderate	Moderate	Substantial
103 - 109% of AQAL	Moderate	Moderate	Substantial	Substantial
110% or more of AQAL	Moderate	Substantial	Substantial	Substantial

The impact results for each receptor are given in Table 7.

Table 7 – Results colour coded using the IAQM/EPUK impact assessment methodology

R#	Impact of scenarios NO2				Impact of scenarios PM10				Impact of scenarios PM2.5			
	2016 EF		2027 EF		2016 EF		2027 EF		2016 EF		2027 EF	
	B - D	F-H	C-E	G-I	B - D	F-H	C-E	G-I	B - D	F-H	C-E	G-I
R1	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible
R2	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible
R3	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible
R4	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible
R5	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible
R6	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible
R7	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible
R8	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible
R9	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible
R10	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible
R11	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible
R12	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible
R13	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible
R14	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible
R15	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible
R16	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible
R17	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible
R18	Negligible	Slight	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible
R19	Negligible	Slight	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible

The impact assessment shows that R18 and R19, which are located along the A352, will experience a slight impact as a result of the development traffic flows and other committed development traffic flows, assuming emission factors remain at 2016 level. All other receptors in this scenario will experience a negligible impact.

In all other scenarios, the changes to the traffic flows as a result of the proposed development will have a negligible impact on the modelled receptors.

5. CONSTRUCTION DUST

Emissions of dust to air can occur during the preparation of the land and during construction. To assess these impacts and keep a check on dust (<75µm) and Particulate Matter PM_{10} (<10µm) releases, an assessment has been carried out in accordance with IAQM Guidance[26].

Step 1 of the guidance requires the site to be screened for existing human receptors within 350m of the site boundary or 50m of a route used by construction vehicles up to 500m from the site entrance.

The main stages of the works are construction, digging of foundations (earthworks) and disturbance caused by dust and dirt emissions from construction vehicles arriving and leaving the site (trackout).

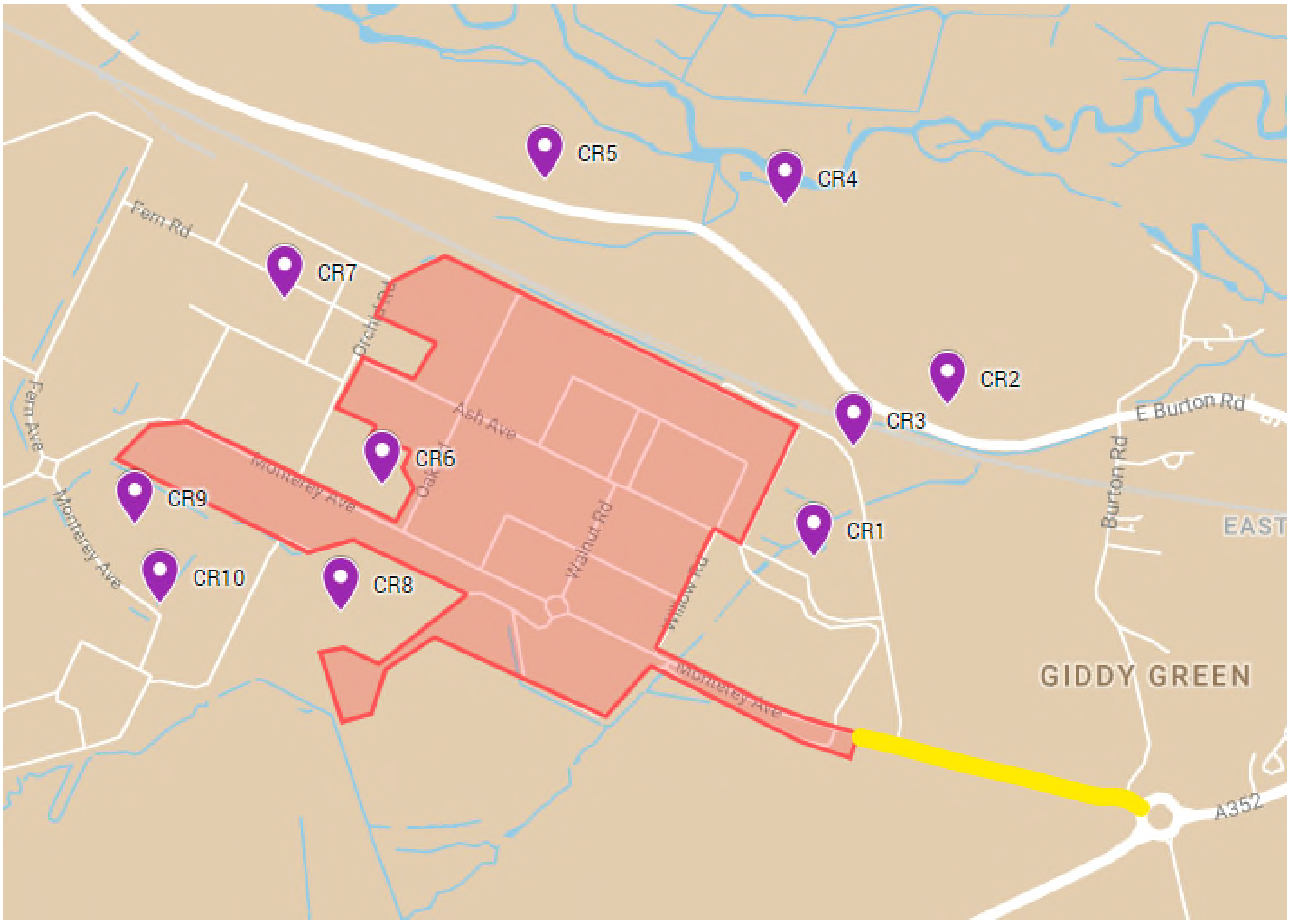


Figure 8 shows the main receptor points within the 350m radius of the site. All residential sites are classified as High Sensitivity receptors for dust and human health.

5.1 Construction

The first step is to identify the scale and nature of the works. Risks are determined in terms of Low, Medium and High. A matrix, which considers the distance of a source, its sensitivity and the magnitude of the works, is used to determine the impact of the construction.

26 IAQM.

Table 8 - Construction site magnitudes

Site Area (m^2)
>10000
Previous Building Volume (m^3)
<20,000
New Building Volume (m^3)
>100,000
HGV Vehicle Movements per day
10-50
Unpaved road length (m)
<50
Annual Mean PM_{10} Concentration ($\mu g/m^3$)
<24

The proposed development will consist of a mixture of buildings housing light industrial, research & design, industrial and distribution. The Atlas building in the north-east of the site will remain in situ as will the entrance buildings to the site on Monterey Avenue. All other onsite infrastructure will be demolished. The demolition phase is classified as Small.

Earthworks for the site will be classified as Large as the area of the site being built on is larger than 10,000m^2. The construction phase is classified as Large due to the volume of the development buildings being greater than 100,000m^2.

The site is situated in a rural area in Purbeck, west of the town Wool. A small number of receptors are present within the 350m radius, shown in Table 9. All residential, commercial and industrial receptors must be considered in a construction dust assessment and each is assigned a different level of sensitivity according to its function.

The nearby receptors are predominantly commercial locations and fields with a couple of residential houses. Winfrith Heath (Site of Scientific Interest), Dorset Heaths (Special Area of Conservation) and Dorset Heathlands (Ramsar) are located immediately west of the site, and these have therefore been included as ecological receptors. These receptors are grouped to reduce repetition, i.e. existing commercial units surrounding the site boundary are grouped together to avoid repetition.

The location of the receptors and trackout is shown in

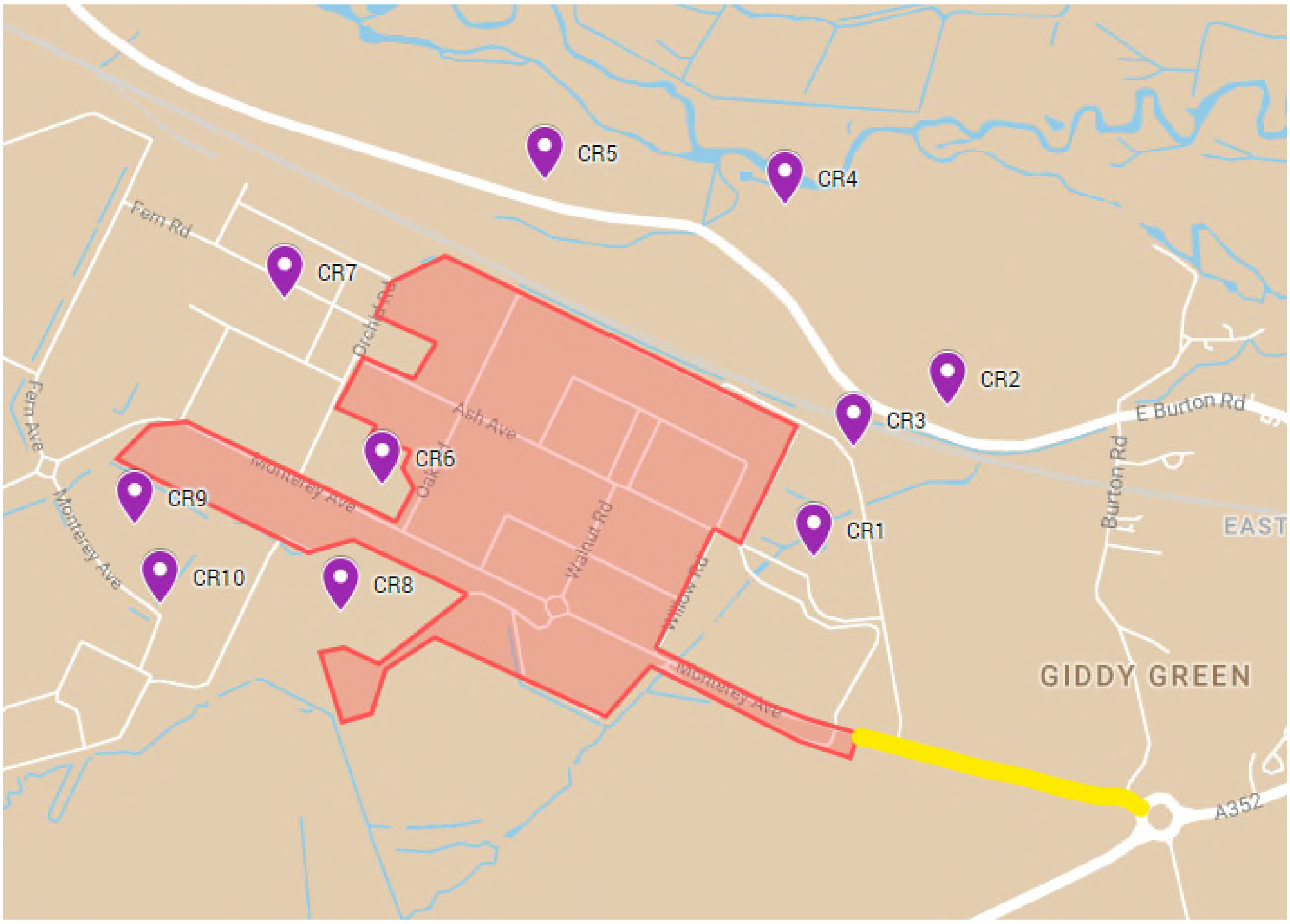


Figure 8.

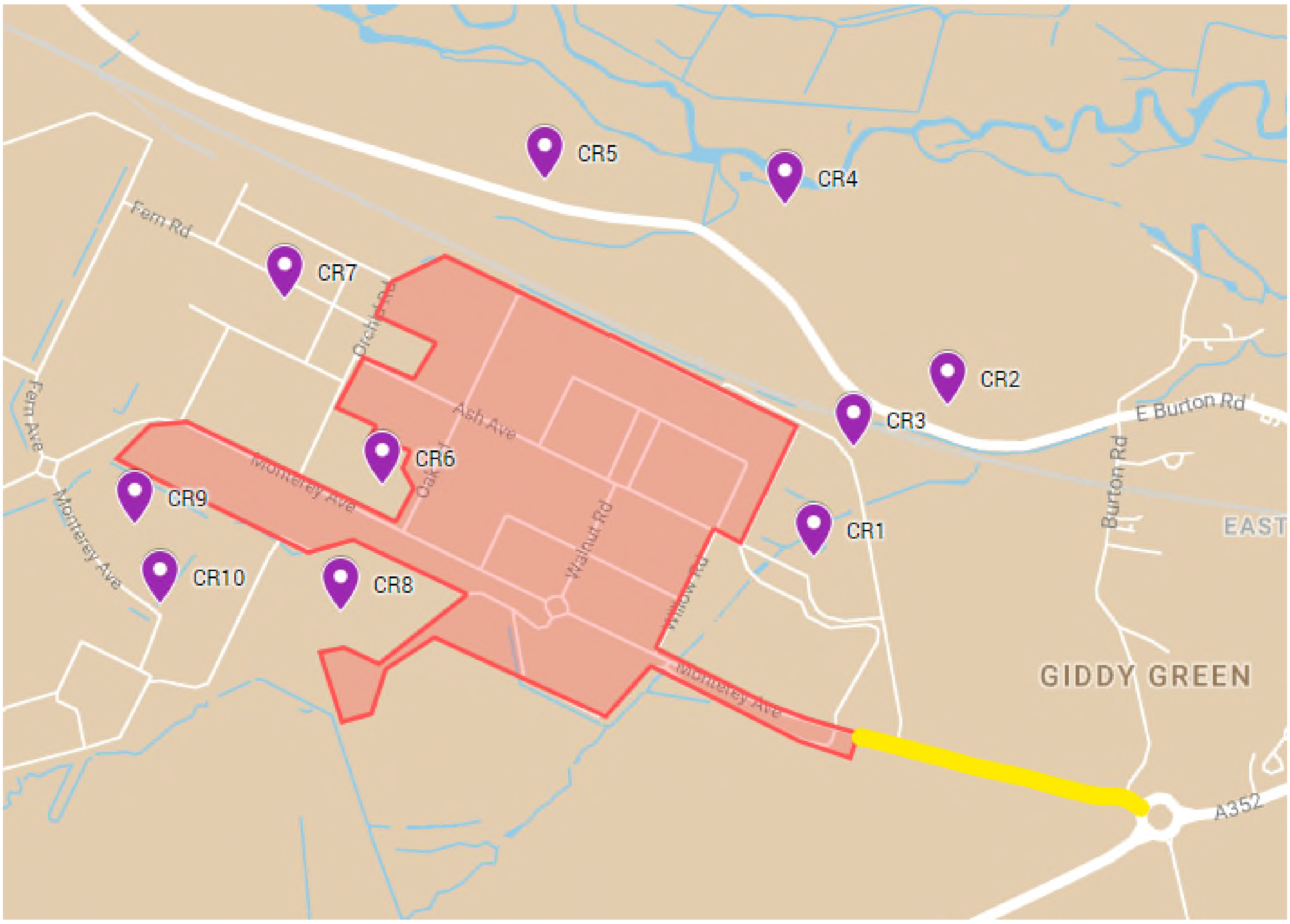


Figure 8 - Construction dust receptors within 350m radius of the site and 50m of the trackout route (yellow line) @Google2018

5.2 Trackout

During all the construction phases "trackout" can be an issue. This is where dust and dirt from the site is transported onto the public highway causing potentially dangerous and nuisance conditions. For a large construction site, such as this development, any receptors within 50m of the first 500m of road from the construction site are considered in the assessment. There are no residential properties within 50m of the first 500m of trackout.

It has been assumed that construction traffic will be routed out of the site along Monteray Avenue towards the A352 roundabout.

5.3 Impacts

Using the methodology laid out in the IAQM guidance, the estimated impact from dust soiling and potential health impacts can be established for the main sensitive receptors identified.

Building site dust mainly consists of Particulate Matter less than 10 microns (PM_{10}). The annual mean PM_{10} concentration (10.96 $\mu g/m^3$ background) is low.

Receptor CR9 could potentially experience a high impact from dust in relation to ecological impacts for earthworks and construction and a medium impact from dust for demolition works.

CR1 and CR6 could experience a medium impact from dust in earthworks and construction, in relation to construction dust.

All other receptors could experience a low and negligible impact from dust in regards to construction and trackout.

All receptors could experience low impact from effects of PM_{10}.

Providing the mitigation guidelines detailed in the appendix, are implemented, it should be possible to fully mitigate these impacts.

Table 9 - Construction dust impacts at identified sensitive receptors

Construction impacts																	
Receptor #	Receptor Description	Sensitivity of Area			Dust				Human Health				Ecological				
		Dust	Human Health	Ecological	D	E	C	T	D	E	C	T	D	E	C	T
CR1	Dorset Police Station	Medium	Low	n/a	1					1	1		n/a	n/a	n/a	n/a
CR2	Seven Stars Inn	Low	Low	n/a		1	1			1	1		n/a	n/a	n/a	n/a
CR3	Industrial 1	Low	Low	n/a		1	1			1	1		n/a	n/a	n/a	n/a
CR4	Clift Cottage	Low	Low	n/a		1	1			1	1		n/a	n/a	n/a	n/a
CR5	Industrial 2	Low	Low	n/a		1	1			1	1		n/a	n/a	n/a	n/a
CR6	Industrial 3	Medium	Low	n/a	1					1	1		n/a	n/a	n/a	n/a
CR7	Industrial 4	Low	Low	n/a		1	1			1	1		n/a	n/a	n/a	n/a
CR8	Fields	Low	Low	n/a		1	1			1	1		n/a	n/a	n/a	n/a
CR9	Dorset Heaths (SAC)	n/a	n/a	High	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a		3	3	
CR10	Dorset Heaths (SAC)	n/a	n/a	Medium	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1			

	High
	Medium
	Low
	Negligible

D = Demolition E = Earthworks C = Construction T = Trackout

6. MITIGATION MEASURES

6.1 Operational

The proposed development is not predicted to cause any exceedances of the NAQOs based on an assessment of projected traffic flows at the end of the Local Plan in 2027. This does not include an assessment of potential onsite combustion and therefore it will be important when deciding the energy strategy for the site to consider the following guidance from the IAQM regarding boiler and CHP standards:

- All gas-fired boilers to meet a minimum standard of <40mgNOx/kWh.
- All gas-fired CHP plant to meet a minimum emissions standard of:
  - » Spark ignition engine: 250 mgNOx/Nm^3;
  - » Compression ignition engine: 400 mgNOx/Nm^3;
  - » Gas turbine: 50 mgNOx/Nm^3.
- A presumption should be to use natural gas-fired installations.
- Where biomass is proposed within an urban area it is to meet minimum emissions standards of:
  - » Solid biomass boiler: 275 mgNO/Nm^3 and 25 mgPM/Nm^3.

These suggested emission benchmarks represent readily achievable emission concentrations by using relatively simple technologies. They can be bettered by using more advanced control technology and at additional cost over and above the 'typical' installation.

6.2 Construction

It is estimated that, unmitigated, dust from construction site activities at nearby residential receptors could have a high impact. However, guidance from the IAQM[27], where implemented has been proven to be effective at mitigating impacts from large scale operations.

As such it is recommended that measures outlined in this guidance are incorporated into a Dust Management Plan (DMP) and submitted to PDC for approval. These measures are given in the appendix.

[27] IAQM.

7. CONCLUSION

This report has assessed the concentrations of NO_2, PM_{10} and $PM_{2.5}$ at the proposed development site as well as operational and construction air quality impacts on the local air quality conditions at sensitive receptors on surrounding roads.

7.1 Operational

Concentrations were modelled for 19 receptors alongside main roads surrounding the site. All receptors would experience a negligible increase in NO_2 concentrations assuming emission factors reduce as predicted by 2027 and none would experience any exceedances of the NAQOs. If emission factors remain at 2016 levels then R18 and R19 along the A352 could experience a slight impact from NO2 concentrations but will still remain within the NAQOs.

If emissions factors stay at 2016 levels the annual average concentration of NO_2 at the receptors modelled will increase by 2.41µg/m^3 without the development and by 3.06µg/m^3 with the development, including the impact from other committed development traffic flows. The annual average concentration of NO_2 not including committed development flows, will increase by 1.14µg/m^3 without the development and by 1.77µg/m3 with the development.

If 2027 projected emissions factors are realised, the annual average concentration of NO_2 at the site will decrease by 5.15µg/m^3 without the development and by 4.9µg/m^3 with the development, not including committed development flows. This changes to a decrease of 4.65µg/m^3 and 4.41µg/m^3 respectively when committed development traffic flows are included.

7.2 Construction phase

Receptor CR9 could potentially experience a high impact from dust in relation to ecological impacts for earthworks and construction and a medium impact from dust for demolition works.

CR1 and CR6 could experience a medium impact from dust in earthworks and construction, in relation to construction dust.

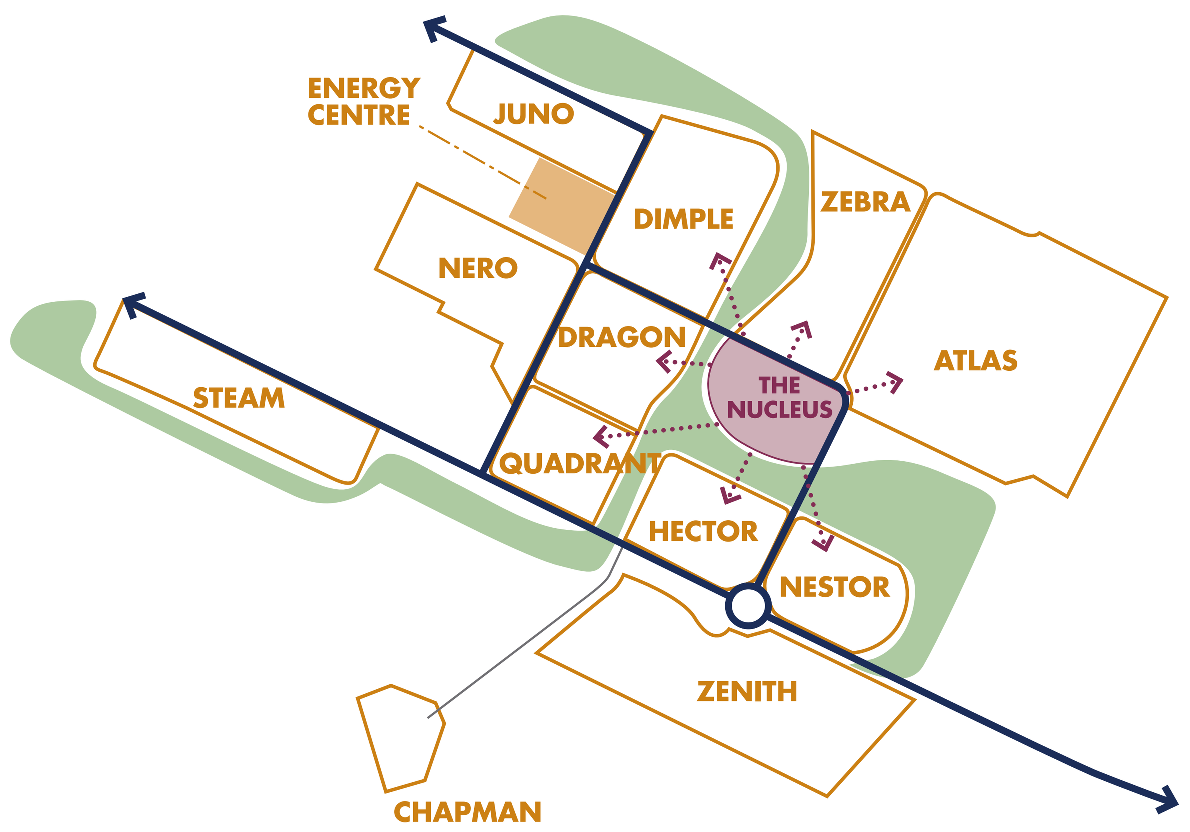
All other receptors could experience a low and negligible impact from dust in regards to construction and trackout.

All receptors will could experience low impact from effects of PM_{10}.

It should be possible to mitigate these impacts provided the guidance recommended by the IAQM and provided in the appendix of this report, is followed. It is recommended a construction dust management plan is devised based on this guidance and submitted to PDC for approval.

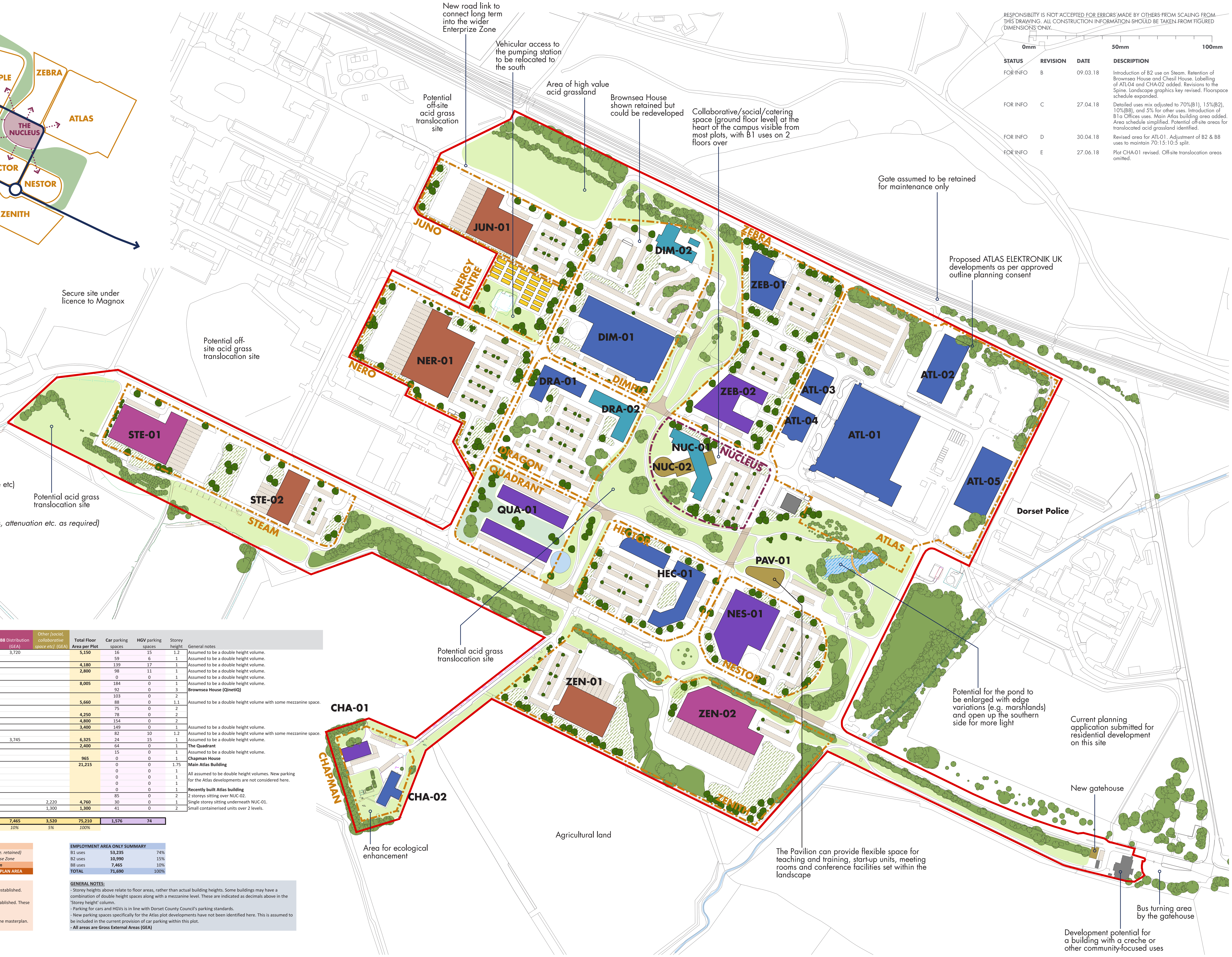
Appendix A Illustrative Masterplan

PLOT ZONING PLAN:



KEY:

- Existing building/structure retained
- Proposed building (B1a: offices)
- Proposed building (B1b: Light industrial)
- Proposed building (B1c: R+D)
- Proposed building (B2: Industrial)
- Proposed building (B8: Distribution)
- Proposed building (Other uses - catering/conference etc)
- Existing tree retained
- Proposed tree *(indicative locations)*
- Area for proposed landscaping *(inc. grasses, shrubs, attenuation etc. as required)*
- Existing water feature
- Landscape spine
- Shared spaces (pedestrian and vehicular)
- Plot zone *(refer to zoning plan above)*
- LDO boundary



RESPONSIBLITY IS NOT ACCEPTED FOR ERRORS MADE BY OTHERS FROM SCALING FROM THIS DRAWING. ALL CONSTRUCTION INFORMATION SHOULD BE TAKEN FROM FIGURED DIMENSIONS ONLY.

0mm 50mm 100mm

STATUS	REVISION	DATE	DESCRIPTION
FOR INFO	B	09.03.18	Introduction of B2 use on Steam. Retention of Brownsea House and Chesil House. Labelling of ATL-04 and CHA-02 added. Revisions to the Spine. Landscape graphics key revised. Floorspace schedule expanded.
FOR INFO	C	27.04.18	Detailed uses mix adjusted to 70%(B1), 15%(B2), 10%(B8), and 5% for other uses. Introduction of B1a Offices uses. Main Atlas building area added. Area schedule simplified. Potential off-site areas for translocated acid grassland identified.
FOR INFO	D	30.04.18	Revised area for ATL-01. Adjustment of B2 & B8 uses to maintain 70:15:10:5 split.
FOR INFO	E	27.06.18	Plot CHA-01 revised. Off-site translocation areas omitted.

AREA SCHEDULE (BY PLOT):

Main Plot	Sub-Plot	B1(a) Offices (GEA)	B1(b) R+D (GEA)	B1(c) Light Ind (GEA)	B2 Industrial (GEA)	B8 Distribution (GEA)	Other *[social, collaborative space etc]* (GEA)	Total Floor Area per Plot	Car parking spaces	HGV parking spaces	Storey height	General notes
Steam	STE-01					3,720		**5,150**	16	15	1.2	Assumed to be a double height volume.
	STE-02				1,430				59	6	1	Assumed to be a double height volume.
Nero	NER-01				4,180			**4,180**	139	17	1	Assumed to be a double height volume.
Juno	JUN-01				2,800			**2,800**	98	11	1	Assumed to be a double height volume.
	JUN-02								0	0	1	Assumed to be a double height volume.
Dimple	DIM-01		5,530					**8,005**	184	0	1	Assumed to be a double height volume.
	DIM-02	2,475							92	0	3	**Brownsea House (QinetiQ)**
Zebra	ZEB-01		3,100						103	0	2	
	ZEB-02			2,560				**5,660**	88	0	1.1	Assumed to be a double height volume with some mezzanine space.
Dragon	DRA-01		2,090						75	0	2	
	DRA-02	2,160						**4,250**	78	0	2	
Hector	HEC-01		4,800					**4,800**	154	0	2	
Nestor	NES-01			3,400				**3,400**	149	0	1	Assumed to be a double height volume.
Zenith	ZEN-01				2,580				82	10	1.2	Assumed to be a double height volume with some mezzanine space.
	ZEN-02					3,745		**6,325**	24	15	1	Assumed to be a double height volume.
Quadrant	QUA-01			2,400				**2,400**	64	0	1	**The Quadrant**
Chapman	CHA-01			450					15	0	1	Assumed to be a double height volume.
	CHA-02		515					**965**	0	0	1	**Chapman House**
Atlas	ATL-01		14,875					**21,215**	0	0	1.75	**Main Atlas Building**
	ATL-02		2,100						0	0	1	All assumed to be double height volumes. New parking for the Atlas developments are not considered here.
	ATL-03		825						0	0	1	
	ATL-04		825						0	0	1	
	ATL-05		2,590						0	0	1	**Recently built Atlas building**
The Nucleus	NUC-01	2,540							85	0	2	2 storeys sitting over NUC-02.
	NUC-02						2,220	**4,760**	30	0	1	Single storey sitting underneath NUC-01.
Pavilion	PAV-01						1,300	**1,300**	41	0	2	Small containerised units over 2 levels.
TOTALS (masterplan end state)		**7,175**	**37,250**	**8,810**	**10,990**	**7,465**	**3,520**	**75,210**	**1,576**	**74**		
Uses as % of overall total		*10%*	*50%*	*12%*	*15%*	*10%*	*5%*	*100%*				

SUMMARY (inc Other uses)		
EZ Baseline	17,865 sqm	*Floorspace existing before the Enterprise Zone (i.e. retained)*
Already Built	4,990 sqm	*Floorspace built since the creation of the Enterprise Zone*
Proposed	**52,355 sqm**	***Total new floorspace proposed in the masterplan***
TOTAL	**75,210 sqm**	**TOTAL FLOORSPACE FOR THE OVERALL MASTERPLAN AREA**

EMPLOYMENT AREA ONLY SUMMARY		
B1 uses	**53,235**	74%
B2 uses	**10,990**	15%
B8 uses	**7,465**	10%
TOTAL	**71,690**	100%

NOTES ON THE SUMMARY TABLE ABOVE:

- ***'EZ Baseline'*** refers to the buildings that existed within the Park prior to the Enterprise Zone being established. These include the main Atlas Building, Chapman House and Brownsea House.
- ***'Already Built'*** refers to those buildings that have been built since the Enterprise Zone has been established. These include The Quadrant and the lastest Atlas building.
- ***'Proposed'*** refers to all new buildings that are proposed in the masterplan.
- ***'Total'*** refers to all development that will exist throughout the whole Park at the end of the life of the masterplan.

GENERAL NOTES:

- Storey heights above relate to floor areas, rather than actual building heights. Some buildings may have a combination of double height spaces along with a mezzanine level. These are indicated as decimals above in the 'Storey height' column.
- Parking for cars and HGVs is in line with Dorset County Council's parking standards.
- New parking spaces specifically for the Atlas plot developments have not been identified here. This is assumed to be included in the current provision of car parking within this plot.
- **All areas are Gross External Areas (GEA)**

STRIDE TREGLOWN

PRELIMINARY MASTERPLAN
PROJECT: DORSET INNOVATION PARK LDO
CLIENT: PURBECK DISTRICT COUNCIL

REVISED BY: PS
CHECKED BY: GKS
ORIGINATOR NO: 151671

SUITABILITY STATUS: FOR INFORMATION ONLY
SCALE: 1:2000@A1

PROJECT - ORIGINATOR - ZONE - LEVEL - TYPE - ROLE - CLASSIFICATION - NUMBER
151671_SK_002
REVISION: E

stridetreglown.com

Appendix B Percentage Increase in Pollutants

Percentage increase from baseline to post-development

Table 10 - % increase in pollutant concentrations for 2016 EF (B – D and F-H) and 2027 EF (C – E and G – I) scenarios

	% increase over baseline (2016 EF)			% increase over baseline (2016 EF)			% increase over baseline (2027 EF)			% increase over baseline (2027 EF)		
R#	NO_2	PM_{10}	$PM_{2.5}$	NO_2	PM_{10}	$PM_{2.5}$	NO_2	PM_{10}	$PM_{2.5}$	NO_2	PM_{10}	$PM_{2.5}$
	B - D	B - D	B - D	F-H	F-H	F-H	C-E	C-E	C-E	G-I	G-I	G-I
	%	%	%	%	%	%	%	%	%	%	%	%
R1	0.75	0.07	0.10	0.63	0.06	0.08	0.30	0.06	0.07	0.23	0.05	0.06
R2	0.25	0.03	0.04	0.20	0.02	0.03	0.12	0.02	0.03	0.05	0.02	0.02
R3	0.33	0.03	0.05	0.25	0.03	0.04	0.12	0.03	0.03	0.10	0.02	0.03
R4	0.38	0.04	0.05	0.27	0.03	0.04	0.15	0.03	0.04	0.13	0.02	0.03
R5	0.63	0.06	0.08	0.55	0.05	0.07	0.25	0.05	0.06	0.20	0.04	0.05
R6	2.55	0.31	0.40	2.40	0.30	0.38	0.93	0.26	0.30	0.88	0.25	0.28
R7	1.50	0.17	0.22	1.43	0.17	0.21	0.53	0.15	0.17	0.50	0.14	0.16
R8	1.53	0.18	0.23	1.48	0.17	0.22	0.53	0.15	0.17	0.50	0.14	0.16
R9	2.35	0.29	0.36	2.23	0.27	0.35	0.85	0.24	0.27	0.80	0.23	0.26
R10	2.35	0.27	0.34	2.28	0.26	0.34	0.83	0.22	0.25	0.80	0.22	0.25
R11	1.58	0.18	0.23	1.55	0.18	0.23	0.55	0.15	0.17	0.55	0.15	0.17
R12	1.70	0.20	0.25	1.68	0.20	0.25	0.60	0.16	0.19	0.60	0.16	0.19
R13	1.68	0.19	0.24	1.65	0.19	0.25	0.60	0.16	0.18	0.57	0.16	0.18
R14	1.65	0.19	0.24	1.70	0.19	0.24	0.58	0.16	0.18	0.57	0.16	0.18
R15	1.73	0.22	0.28	1.98	0.26	0.34	0.70	0.17	0.20	0.75	0.21	0.24
R16	2.43	0.32	0.42	2.75	0.39	0.50	1.03	0.26	0.30	1.08	0.32	0.36
R17	1.85	0.24	0.31	2.15	0.29	0.38	0.77	0.19	0.22	0.83	0.24	0.27
R18	2.55	0.35	0.45	2.90	0.42	0.54	1.10	0.28	0.32	1.15	0.34	0.39
R19	2.50	0.34	0.44	2.83	0.41	0.53	1.08	0.28	0.31	1.13	0.33	0.38

Figure 9 - Concentration plot of NO2 emissions over full modelled area

Appendix C Weather Data

Weather Data

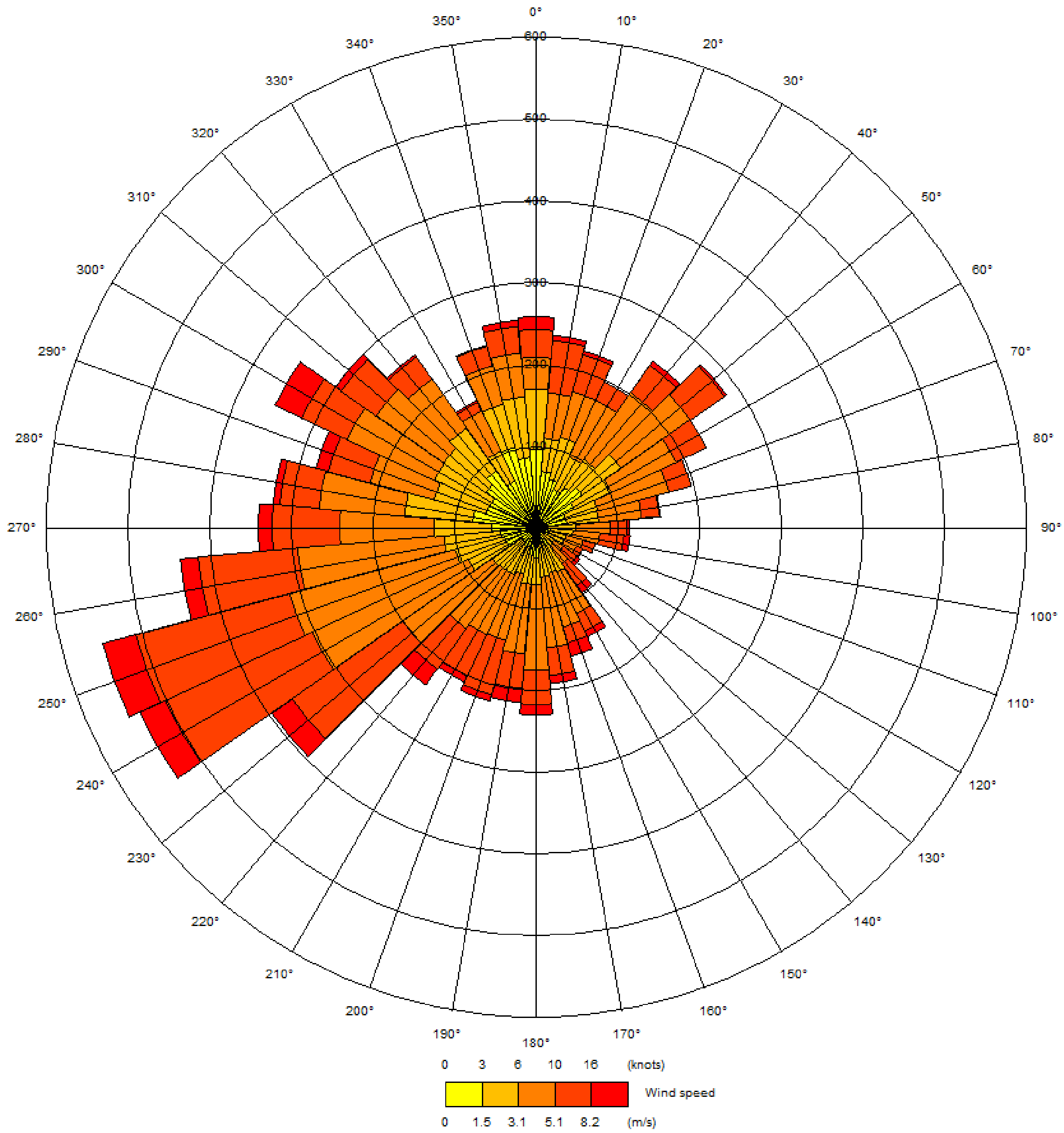


Figure 10 - Wind rose for weather data supplied from Bournemouth weather station

Appendix D Emission Split

Emissions Split

The NAEI source apportionment database was interrogated for the area surrounding the site and a breakdown of emissions for NO_x, PM_{10} and $PM_{2.5}$ given below.

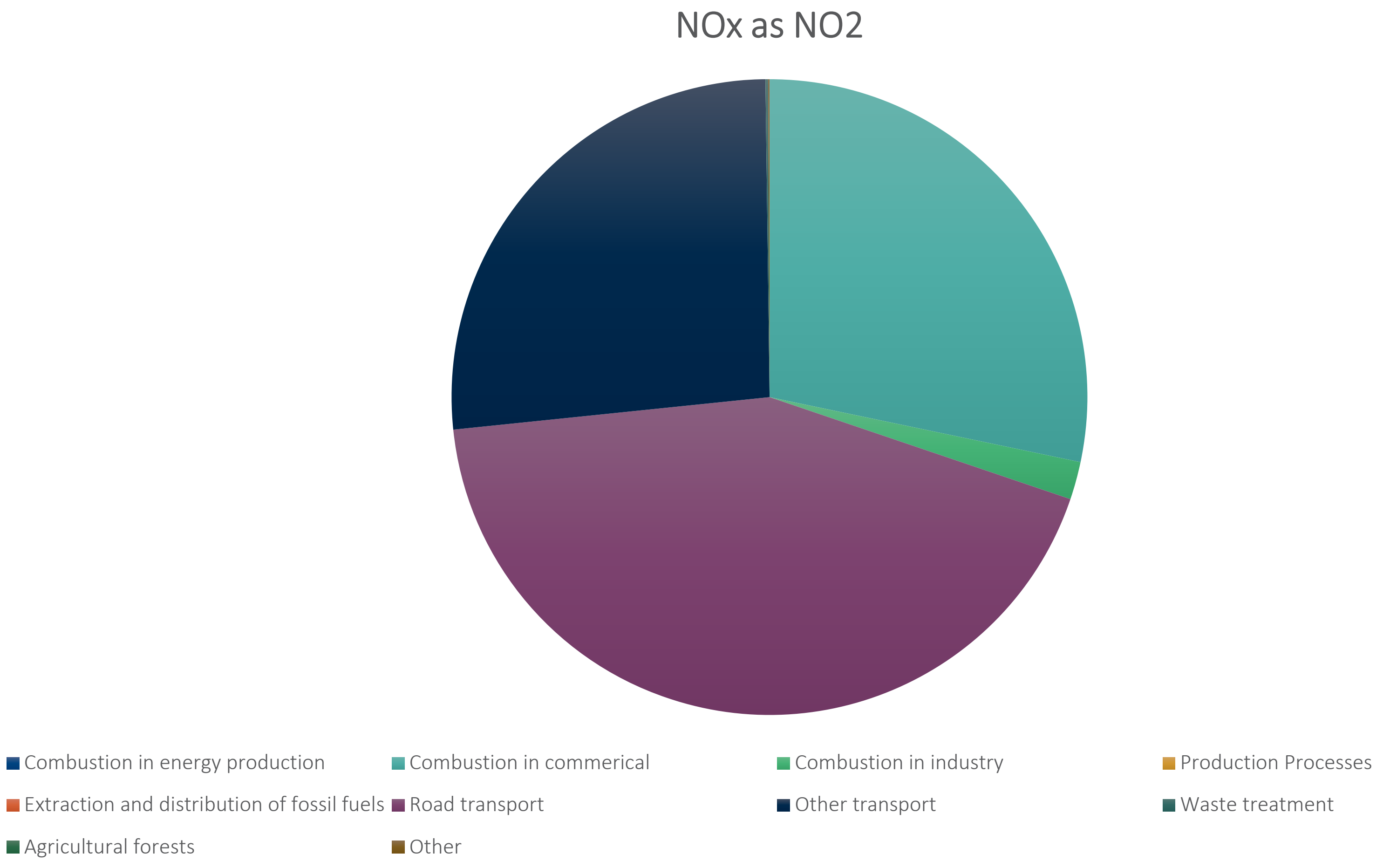


Figure 11 - NOx source apportionment diagram

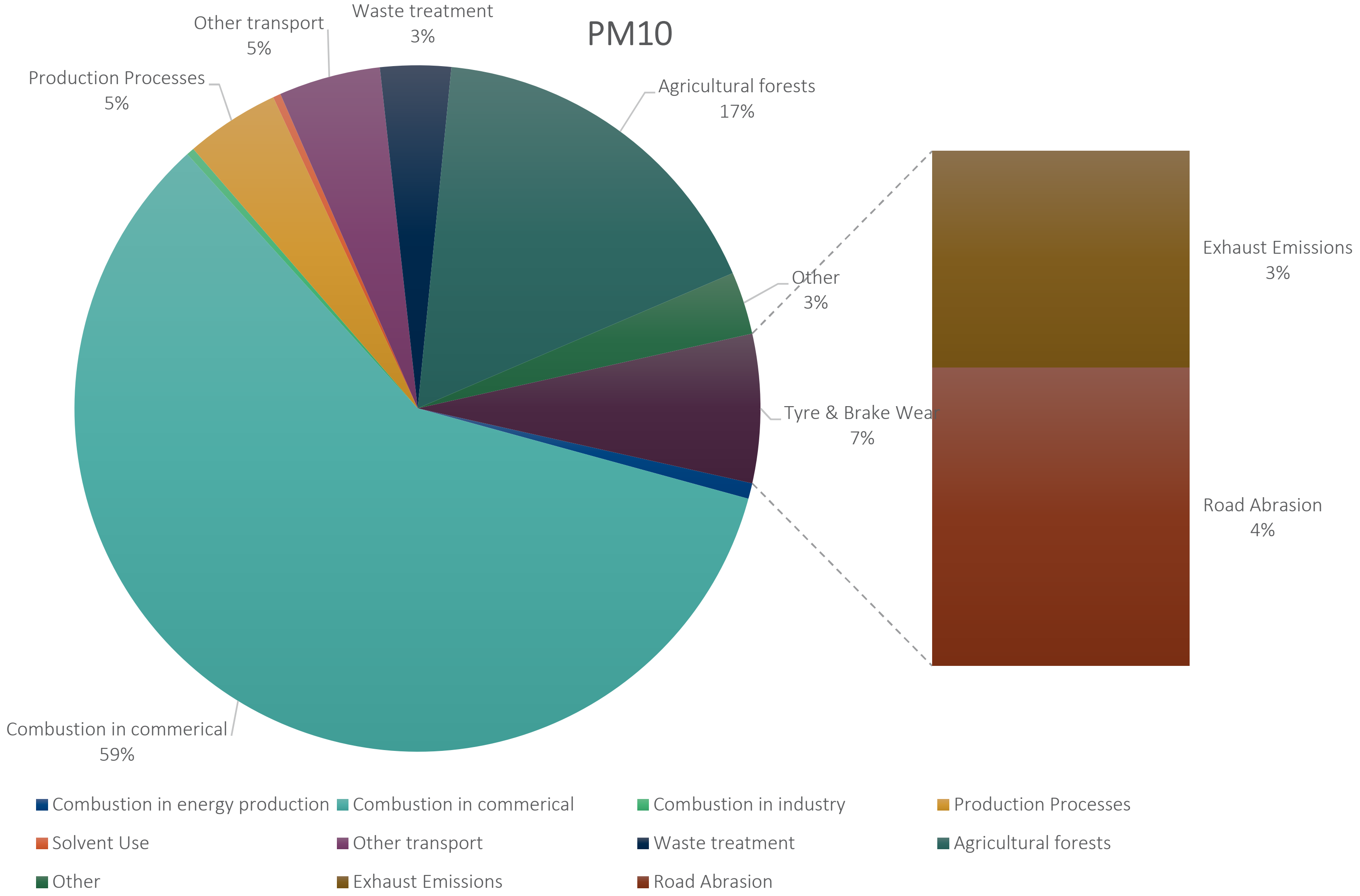


Figure 12 - PM_{10} source apportionment

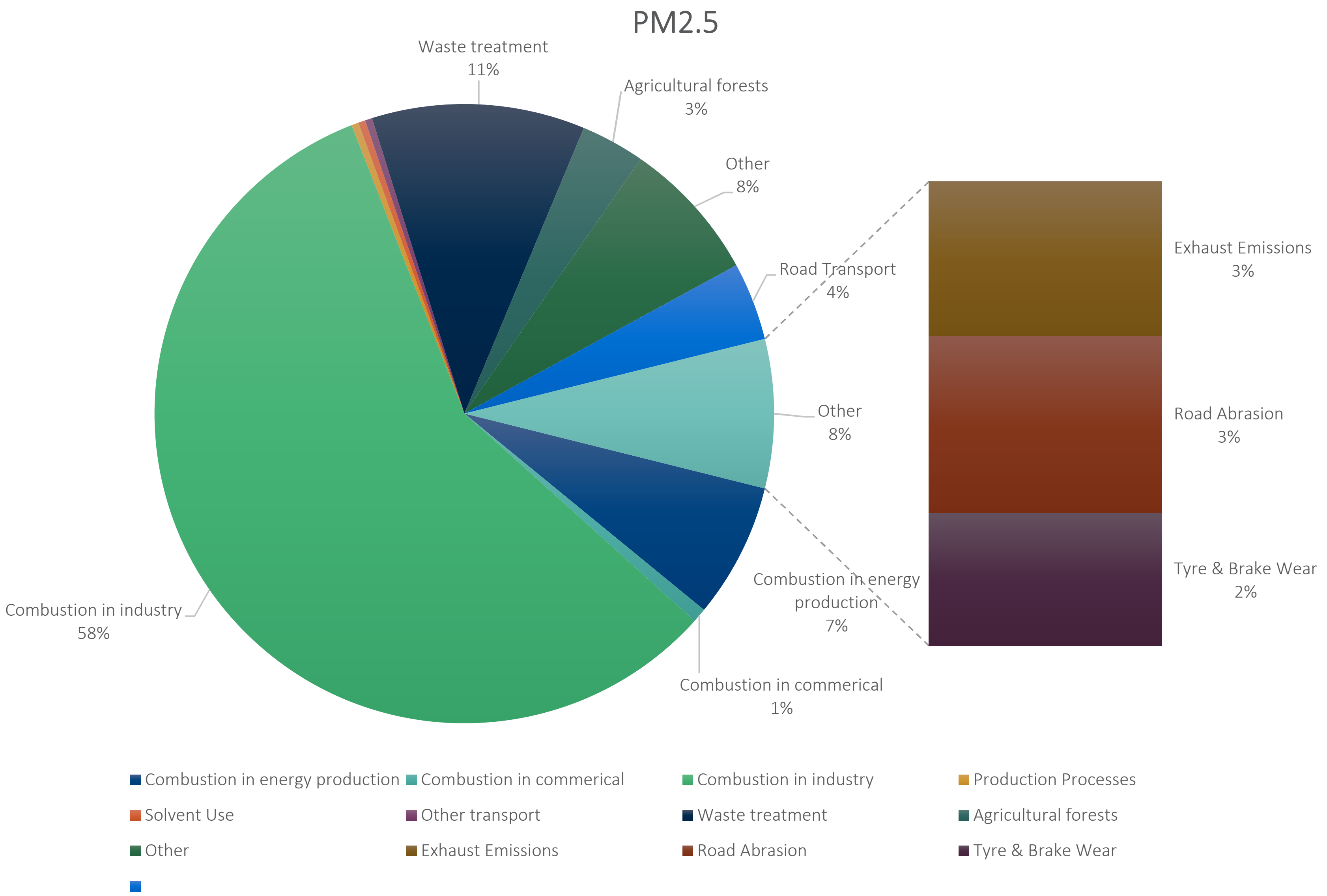


Figure 13 - $PM_{2.5}$ source apportionment

Appendix E Construction Dust Mitigation

Construction Dust Mitigation

In order to mitigate the worst-case dust impacts the following mitigation measures are highly recommended by the IAQM[28].

Highly Recommended

- Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.
- Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.
- Display the head or regional office contact information.
- Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk and should include as a minimum the highly recommended measures in this document. The desirable measures should be included as appropriate for the site. The DMP may include monitoring of dust deposition, dust flux, real-time PM10 continuous monitoring and/or visual inspections.
- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.
- Make the complaints log available to the local authority when asked.
- Record any exceptional incidents that cause dust and/or air emissions, either on- or off-site, and the action taken to resolve the situation in the log book.
- Hold regular liaison meetings with other high-risk construction sites within 500 m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/deliveries which might be using the same strategic road network routes.
- Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100m of site boundary, with cleaning to be provided if necessary.
- Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked.
- Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
- Agree dust deposition, dust flux, or real-time PM.
- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.
- Erect solid screens or barriers around dusty activities or the site boundary which are at least as high as any stockpiles on site.

[28] IAQM.

- Fully enclose site or specific operations where there is a high potential for dust production and the site is actives for an extensive period.
- Avoid site runoff of water or mud.
- Keep site fencing, barriers and scaffolding clean using wet methods.
- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below.
- Cover, seed or fence stockpiles to prevent wind whipping.
- Ensure all vehicles switch off engines when stationary - no idling vehicles.
- Avoid the use of diesel or petrol-powered generators and use mains electricity or battery powered equipment where practicable.
- Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate).
- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.
- Use enclosed chutes and conveyors and covered skips.
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
- Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.
- Avoid bonfires and burning of waste materials.
- Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).
- Ensure effective water suppression is used during demolition operations. Hand held sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed.
- Avoid explosive blasting, using appropriate manual or mechanical alternatives.
- Bag and remove any biological debris or damp down such material before demolition.
- Avoid scabbling (roughening of concrete surfaces) if possible.
- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.
- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.
- Avoid dry sweeping of large areas.

- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.
- Record all inspections of haul routes and any subsequent action in a site log book.
- Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).
- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.
- Access gates to be located at least 10 m from receptors where possible.

Desirable

- For smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust.