Issue number	**P02**
Date	**04/08/2021**
Volume Code	**GHX0000 Project Wide**
Document number	**661277-0000-RAM-GHX0000-XX-RP-X-0001**
Suitability Code	**S3 – Suitable for Review and Comment**
Classification	**Official**

GARTREE 2
AIR QUALITY ASSESSMENT

RAMBOLL Bright ideas. Sustainable change.

GARTREE 2
AIR QUALITY ASSESSMENT

Project name	**Gartree 2**
Project no.	**1620010134**
Recipient	**Mace International (UK) Limited**
Date	**04/08/2021**
Prepared by	**Catherine Gould**
Checked by	**Graham Harker**
Approved by	**Graham Harker**

Made by: C. Gould.

Checked/Approved by:

Version Control Log

Revision	Date	Made by	Checked by	Approved by	Description
01	27/07/2021	CG	GH	GH	Issued to Client
02	04/08/2021	CG	GH	GH	Update to red line boundary

Ramboll UK Limited
Registered in England & Wales
Company No: 03659970
Registered office:
240 Blackfriars Road
London
SE1 8NW

CONTENTS

EXECUTIVE SUMMARY		**i**
1.	**INTRODUCTION**	**1**
1.1	Project Background	1
1.2	Scope of Assessment and Objectives	1
1.3	Consultation	1
2.	**Site Description**	**2**
2.1	Site Location	2
2.2	Proposed Development	2
3.	**Legislation and policy**	**4**
3.1	National Legislation and Policy	4
3.1.1	European Union Ambient Air Quality and Clean Air for Europe, 2008	4
3.1.2	Clean Air Strategy, 2019	4
3.1.3	Local Air Quality Management	4
3.1.4	National Planning Policy Framework	7
3.2	Local Planning Policy	8
3.2.1	Harborough Local Plan	8
3.2.2	Kibworth Air Quality Management Area Action Plan	9
3.3	Additional Guidance	10
3.3.1	Institute of Air Quality Management: Construction Dust Guidance, 2014 v1.1	10
3.3.2	Environmental Protection UK/Institute of Air Quality Management Guidance, Land-Use Planning Guidance, 2017	10
4.	**Methodology**	**11**
4.1	Baseline	11
4.2	Construction Impacts	11
4.3	Road Traffic Impacts	11
4.3.1	Human Health Receptors	11
4.3.2	Impact Predictions	13
4.4	Assumptions and Limitations	14
5.	**Baseline Assessment**	**15**
5.1	Local Air Quality Management	15
5.2	Monitoring	15
5.2.1	Nitrogen Dioxide	15
5.3	Defra Background Maps	16
5.4	Assessment of Monitoring Data	16
6.	**Construction Impact Assessment**	**18**

6.1 Introduction 18
6.2 Assessment of Impacts 18
6.3 Mitigation of Construction Impacts 19
6.4 Residual Effects 20
7. Road Traffic Impacts 21
7.1 Existing Human Health Receptors 21
7.2 Mitigation of Operational Effects 22
8. Conclusion 23

TABLE OF TABLES

Table 3.1: Objectives Included in Air Quality Regulations (England) 2000 for Purpose of Local Air Quality Management 5
Table 3.2: UK Objectives for $PM_{2.5}$ 5
Table 3.3: Locations Where National Air Quality Objectives Apply 6
Table 4.1: Receptor Locations 13
Table 4.2: Impact Descriptors for Individual Receptors 14
Table 5.1: Measured NO_2 Concentrations 16
Table 5.2: Estimated Annual Mean Background Concentrations 16
Table 6.1: Dust Emissions Magnitude for Each Construction Activity 18
Table 6.2: Sensitivity of Area to Dust Impacts 18
Table 6.3: Risk of Dust Impacts in Absence of Mitigation 19
Table 6.4: Recommended Dust Mitigation for Medium Risk Sites 19
Table 7.1: Predicted Annual Mean NO_2 Concentrations with the Development and Cumulative Developments (µg/m^3) 21
Table 7.2: Predicted Annual Mean PM_{10} Concentrations With the Development and Cumulative Developments (µg/m^3) 21
Table 7.3:Predicted Annual Mean $PM_{2.5}$ Concentrations With the Development and Cumulative Developments (µg/m^3) 22

TABLE OF FIGURES

Figure 2.1: Site Location 2
Figure 2.2: Development Layout 3
Figure 4.1: Offsite Receptor Locations 12
Figure 5.1: Closest Local Authority Monitoring Locations 15

APPENDICES

Appendix 1

Glossary

Appendix 2
Dust Risk Assessment Methodology

Appendix 3
Model Inputs and Results Processing Tools

Appendix 4
Traffic Data and Road Network

EXECUTIVE SUMMARY

Ramboll UK Ltd (Ramboll) has been appointed by Mace International UK Limited on behalf of the Ministry of Justice to undertake an air quality assessment for an Outline Planning Application for a new Category B prison within a secure perimeter fence together with access parking, landscaping and associated engineering works. The proposed new prison site is located on land adjacent to HMP Gartree, Gallow Field Road, Market Harborough, Leicestershire, LE16 7RP. The Outline Planning Application is to be submitted to Harborough District Council (HDC).

Construction Phase (Dust)

The assessment of potential impacts to air quality during the construction phase has identified that the activities, together with the location of nearby sensitive receptors results in a medium risk of impacts in the absence of suitable mitigation. Mitigation should be provided through a series of standard measures set out in the report. With the mitigation in place, the construction phase effects would be not significant.

Road Traffic Impacts (Emissions)

The development operational impact assessment modelling has been conducted, utilising traffic flows provided for two scenarios; without the development and with development plus cumulative developments.

Concentrations of NO_2, PM_{10} and $PM_{2.5}$ have been predicted for a number of worst case locations representing existing properties adjacent to the road network. The modelling has indicated that the predicted concentrations would be well below the relevant objectives at all existing receptor locations with the proposed development and cumulative developments in place. The impact of the development and cumulative development traffic on air quality is considered to be negligible at all receptor locations.

Concentrations at the proposed prison buildings would be expected to meet all relevant NAQOs. Air quality at the site would therefore be suitable for the proposed development without the need for mitigation.

Mitigation Measures

Mitigation measures to reduce the direct impacts of the development on air quality concentrations are not required, but additional transport related mitigation measures will be employed to reduce emissions from the development in accordance with the Harborough Local Plan.

Conclusion

Overall, it is concluded that the proposed development would not result in a significant effect on air quality.

1. INTRODUCTION

1.1 Project Background

Ramboll UK Ltd (Ramboll) has been commissioned by Mace International (UK) Limited on behalf of the Ministry of Justice (MoJ) to prepare a detailed air quality assessment to support an Outline Planning Application for a new Category B prison within a secure perimeter fence together with access parking, landscaping and associated engineering works. The proposed new prison site is located on land adjacent to HMP Gartree, Gallow Field Road, Market Harborough, Leicestershire, LE16 7RP.

1.2 Scope of Assessment and Objectives

This report describes existing air quality within the study area, considers the suitability of the site for the proposed development, and assesses the impact of the construction and operation of the development on air quality in the surrounding area. The main air pollutants of concern related to construction are dust and fine particulate matter (PM_{10}), and for road traffic are nitrogen dioxide (NO_2), PM_{10} and $PM_{2.5}$.

At present, detailed information regarding the construction methodology for the development, specific activities and traffic movements is not available. Vehicle movements associated with access, demolition and construction will vary through the construction programme, with short periods of peak HGV movements associated with demolition and the delivery of materials during the construction phase. However, when the HGV movements are averaged over a full year period (Annual Average Daily Traffic - AADT), these will be significantly lower than peak movements. Together with the implementation of a Construction Environmental Management Plan (CEMP), the construction vehicle movements impacts on human health receptors in the area are considered to be temporary and not significant, and have therefore been scoped out of this assessment. Moreover, vehicle movements associated with construction are typically significantly lower than the number of vehicle movements associated with operation of the development, which have been taken into account in this assessment.

An additional red line boundary has been proposed to the north of the site around a local community park in Gartree that is to be created. This will not have any significant impact on air quality and therefore, has been scoped out of this assessment.

1.3 Consultation

Consultation has been carried out with the Environmental Health Officer (EHO) at Harborough District Council (HDC), Gareth Rees (via e-mail on 25th September 2020), to agree the approach to the assessment and obtain the latest air quality monitoring data for the Council. The scope was agreed to (via email 7th October 2020).

2. SITE DESCRIPTION

2.1 Site Location

The site is situated in a rural area, comprising predominantly agricultural land approximately 3.4 km to the north west of Market Harborough town centre.

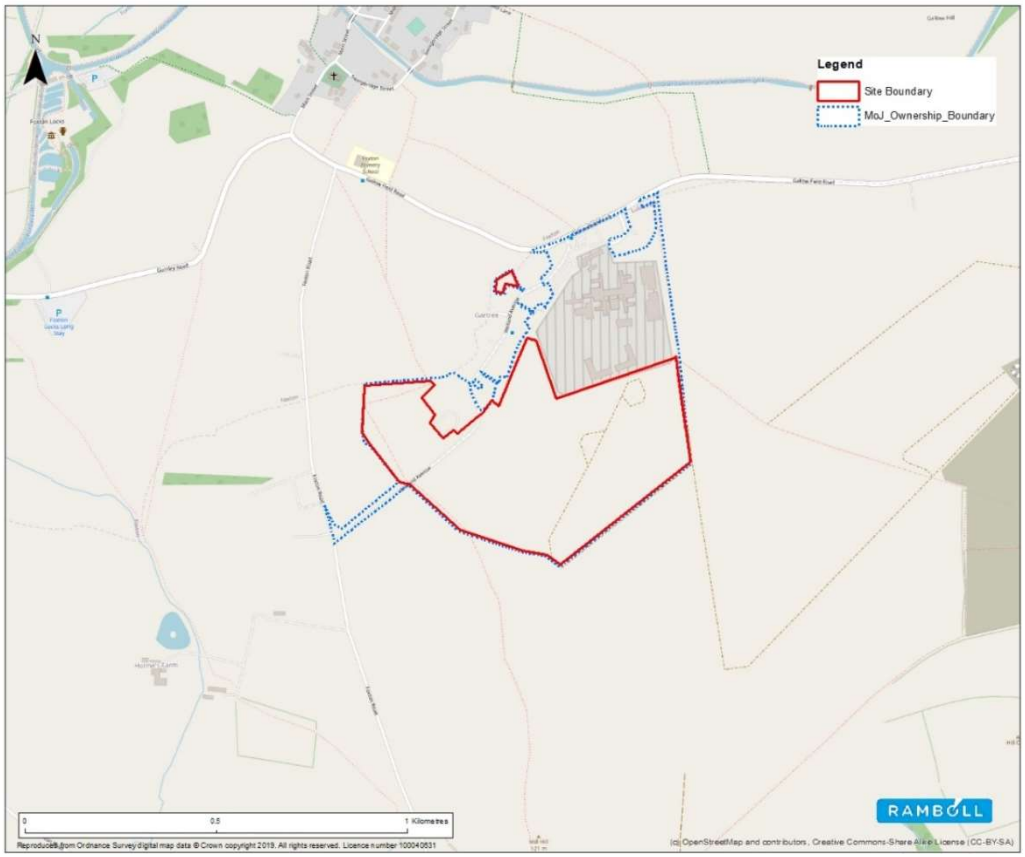


Figure 2.1: Site Location

HDC has investigated air quality within its area as part of its responsibilities under the LAQM regime. To date two AQMAs have been declared in Harborough District due to exceedances of the annual mean NO_2 objective. The proposed site is not located within an AQMA. The closest AQMA is located approximately 5.4 km north in Kibworth, along the A6 Leicester Road.

2.2 Proposed Development

The proposal for the application site, as shown in Figure 2.2, includes the construction of a new prison, up to 82,555 m^2. The proposed development indicative site layout proposes a range of buildings and facilities typical of a Category B resettlement prison, including:

- Seven new houseblocks each accommodating up to 245 prisoners (1,715 prisoners in total), totalling c.53,122 m^2 GEA;
- Supporting development including kitchen, workshops, kennels, Entrance Resource Hub, Central Services Hub and support buildings, totalling c. 29,433 m^2 GEA;

- Ancillary development including car parking (c. 523 spaces), internal road layout and perimeter fencing totalling 1463 linear metres enclosing a secure perimeter area of 11.69 ha.

The house blocks are expected to be four storeys in height, whilst the other buildings will range from one to three storeys.

Figure 2.2: Development Layout

The prison is anticipated to be designed and built to be highly sustainable with the aim to exceed local and national planning policy sustainability requirements. MoJ aspires to include near net zero carbon operations, 10% biodiversity net gain and to a minimum BREEAM 'Excellent' certification with the aim to achieve BREEAM 'Outstanding'.

3. LEGISLATION AND POLICY

3.1 National Legislation and Policy

3.1.1 European Union Ambient Air Quality and Clean Air for Europe, 2008

EU Directive 2008/50/EC[1] on ambient air quality and cleaner air for Europe (the CAFE directive) sets out the ambient air quality standards for nitrogen dioxide (NO_2) and particulate matter with an aerodynamic diameter of less than 10 µm (PM_{10}) to be achieved by 1 January 2010 and 2005 respectively. The Air Quality Standards Regulations 2010[2] implements the requirements of the Directive into United Kingdom (UK) legislation.

The Directive contains a series of limit values for the protection of human health and critical levels for the protection of vegetation. Compliance with the European Union (EU) Limit Values is mandatory. However, Member States can apply for a time extension for compliance, subject to approval of an action plan by the European Commission.

In December 2015, the Department for Environment Food and Rural Affairs (Defra) on behalf of the UK Government produced plans to improve air quality in the UK in order to meet the EU targets in the shortest possible time[3]. The adequacy of these plans to bring about the necessary improvements in air quality to meet the relevant NAQOs within the shortest time possible were successfully challenged within the High Court in 2016.

Subsequently, in 2017 a plan for the reduction in roadside NO_2 concentrations was released[4] which requires local authorities to identify local actions to accelerate the improvement in air quality in their jurisdictions. It also includes the national measures, including banning the sale of conventionally powered cars and light goods vehicles by 2040 and further investment in cleaner transport.

3.1.2 Clean Air Strategy, 2019

Defra published a new Clean Air Strategy 2019[5] in January 2019, setting out how the UK will significantly reduce harmful air pollutant emissions by 2020 and 2030. The Clean Air Strategy contains an intention of working towards the World Health Organisation guideline value for $PM_{2.5}$ of 10 µg/m^3. The timetable for this has not been set.

3.1.3 Local Air Quality Management

Part IV of the Environment Act 1995[6], requires the UK Government to publish an Air Quality Strategy and local authorities to review, assess and manage air quality within their areas. This is known as Local Air Quality Management (LAQM).

The 2007 Air Quality Strategy[7] establishes the policy for ambient air quality in the UK. It includes the NAQOs for the protection of human health and vegetation for 11 pollutants. Those NAQOs included as part of LAQM are prescribed in the Air Quality (England) Regulations 2000[8] and the Air

[1] Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe
[2] Secretary of State, 2010. Statutory Instrument 2010 No. 1001, Air Quality Standards Regulations 2010. HMSO.
[3] Defra, December 2015. Improving air quality in the UK, Tackling nitrogen dioxide in our towns and cities, UK overview document. Defra.
[4] Department for Environment, Food and Rural Affairs, 2017. UK plan for tackling roadside nitrogen dioxide concentrations. Defra.
[5] Defra, 2019. Clean Air Strategy.
[6] Secretary of State, 1995. The Environment Act part IV Air Quality, HMSO.
[7] Department for Environment, Food and Rural Affairs, 2007. Air Quality Strategy for England, Scotland, Wales and Northern Ireland. HMSO.
[8] Secretary of State, 2000. Statutory Instrument 2000 No. 921, The Air Quality (England) Regulations 2000. HMSO.

Quality (Amendment) (England) Regulations 2002[9]. Table 3.1 presents the NAQOs for NO_2 and PM_{10} the two pollutants of most concern in urban areas.

Table 3.1: Objectives Included in Air Quality Regulations (England) 2000 for Purpose of Local Air Quality Management

Pollutant	Air Quality Objective		
	Concentration	Measured As	Date to be Achieved By
NO_2	200 micrograms per metre cubed ($\mu g/m^3$) not to be exceeded more than 18 times per year	1 hour	31 December 2005
	40 $\mu g/m^3$	Annual mean	
PM_{10}	50 $\mu g/m^3$ not to be exceeded more than 35 times per year	24 hour mean	31 December 2004
	40 $\mu g/m^3$	Annual mean	

Analysis of long-term monitoring data suggests that if the annual mean NO_2 concentration is less than 60 $\mu g/m^3$ then the one-hour mean NO_2 objective is unlikely to be exceeded where road transport is the main source of pollution. Therefore, in this assessment this concentration has been used to screen whether the one-hour mean objective is likely to be achieved. Similar to NO_2, a PM_{10} annual mean below 32 $\mu g/m^3$ is used to screen whether the 24-hour PM_{10} mean objective is likely to be achieved.[10]

The 2007 Air Quality Strategy also introduced a new policy framework for tackling $PM_{2.5}$ which included an exposure reduction target and a 'backstop' annual mean NAQO. The exposure reduction target is focussed on reducing average concentrations across the most polluted urban areas and is therefore not applicable to individual schemes, whilst the annual mean NAQO can be considered a concentration cap to ensure environmental compliance. The UK NAQO for $PM_{2.5}$ are provided in Table 3.2.

Table 3.2: UK Objectives for $PM_{2.5}$

Averaging Period	Objective	Target Date
Annual mean	25 $\mu g/m^3$	2020
3 year running annual mean	15 % reduction in concentrations measured at urban background sites	Between 2010 and 2020

The NAQOs apply to external air where there is relevant exposure to the public over the associated averaging periods within each NAQO. Guidance is provided within LAQM.TG (16)[11] issued by Defra for Local Authorities, on where the NAQOs apply, as detailed in Table 3.3. The NAQOs do not apply in workplace locations, to internal air or where people are unlikely to be regularly exposed (i.e. centre of roadways).

[9] Secretary of State, 2002. Statutory Instrument 2002 No. 3034, The Air Quality (England) (Amendment) Regulations 2002. HMSO.
[10] Department for Environment, Food and Rural Affairs, 2016. Local Air Quality Management Technical Guidance LAQM.TG (16). HMSO., London.
[11] Department for Environment, Food and Rural Affairs, 2016. Local Air Quality Management Technical Guidance LAQM.TG (16). HMSO., London.

Table 3.3: Locations Where National Air Quality Objectives Apply

Averaging Period	Objectives should apply at	Objectives should generally not apply at
Annual mean	All locations where members of the public might be regularly exposed. Building façades of residential properties, schools, hospitals, care homes etc.	Building façades of offices or other places of work where members of the public do not have regular access. Hotels, unless people live there as their permanent residence. Gardens of residential properties.
24 Hour Mean	All locations where the annual mean objective would apply, together with hotels. Gardens of residential properties.	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term.
1 Hour Mean	All locations where the annual mean and: 24 and 8-hour mean objectives apply. Kerbside sites (for example, pavements of busy shopping streets). Those parts of car parks, bus stations and railway stations etc. which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more. Any outdoor locations where members of the public might reasonably expect to spend one hour or longer.	

It should be noted that the EU Limit Values are numerically the same as the NAQO values but differ in terms of compliance dates, locations where they apply and legal responsibility. The compliance date for the NO_2 Limit Values was 1 January 2010, which is five years later than the date for the NAQO.

The Limit Values are mandatory whereas the NAQOs are policy objectives. Local authorities are not required to achieve them, but have to demonstrate effort of working towards their achievement. In addition, the Limit Values apply in all locations except:

- where members of the public do not have access and there is no fixed habitation;
- on factory premises or at industrial installations; and
- on the carriageway/central reservation of roads except where there is normally pedestrian access.

Where a local authority's review and assessment of its air quality identifies that air quality is likely to exceed the NAQOs, it must designate these areas as AQMAs and draw up an Air Quality Action Plan (AQAP) setting out measures to reduce pollutant concentrations with the aim of meeting the NAQOs.

3.1.4 National Planning Policy Framework

The revised National Planning Policy Framework (NPPF)[12] sets out the Government's planning policies for England and how they are expected to be applied (Ministry of Housing, Communities & Local Government, 2021). In relation to achieving sustainable development, paragraph 8 states that:

"Achieving sustainable development means that the planning system has three overarching objectives, which are interdependent and need to be pursued in mutually supportive ways (so that opportunities can be taken to secure net gains across each of the different objectives):…

c) an environmental objective – to contribute to protecting and enhancing our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy."

So that sustainable development is pursued in a positive way, at the heart of the Framework is a presumption in favour of sustainable development. Paragraph 11 states that plans and decisions should apply a presumption in favour of sustainable development, which for decision-taking means:

"… d) where there are no relevant development plan policies, or the policies which are most important for determining the application are out-of-date, granting permission unless: …

ii. any adverse impacts of doing so would significantly and demonstrably outweigh the benefits, when assessed against the policies in this Framework taken as a whole."

Paragraph 55 on planning conditions and obligations states:

"Local planning authorities should consider whether otherwise unacceptable development could be made acceptable through the use of conditions or planning obligations. Planning obligations should only be used where it is not possible to address unacceptable impacts through a planning condition."

Paragraph 104 on promoting sustainable transport states:

"Transport issues should be considered from the earliest stages of plan-making and development proposals, so that: …

d) the environmental impacts of traffic and transport infrastructure can be identified, assessed and taken into account – including appropriate opportunities for avoiding and mitigating any adverse effects, and for net environmental gains; …"

Paragraph 105 continues to state:

"Significant development should be focused on locations which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes. This can help to reduce congestion and emissions, and improve air quality and public health."

Paragraph 174 on conserving and enhancing the natural environment states:

"Planning policies and decisions should contribute to and enhance the natural and local environment by: …

[12] Ministry of Housing, Communities and Local Government, 2021. National Planning Policy Framework. HMSO.

e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land stability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans, and…"

Paragraph 180 within ground conditions and pollution states:

"Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development."

Paragraph 186 states that:

"Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan."

Paragraph 187 states that:

"Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed".

3.2 Local Planning Policy

3.2.1 Harborough Local Plan

The Harborough Local Plan 2011 to 2031[13] was adopted in April 2019 and sets out the vision, objectives, strategy and policies for managing development in the district up until 2031. Polices relating to air quality are detailed below.

Policy IN2 - Sustainable transport states:

1. *Development proposals should have regard to the transport policies of the Local Transport Authority (and where appropriate adjoining transport authorities) and where there are impacts on the national road network be aligned with policies of Highways England. Proposals should seek to maximise the use and efficiency of existing transport facilities and where necessary provide mitigating measures to deal with the impacts of development on the transport network, both within and outside the District.*

[13] Harborough District Council, 2019. Harborough Local Plan 2011 to 2031. Adopted 30 April 2019.

2. *Residential and commercial development proposals will be permitted, subject to the provision of:*

   a. safe access, servicing and parking arrangements having regard to highways authority guidance and standards;

   b. measures to facilitate and encourage safe access by cycle and on foot;

   c. protection of, connection to, and extension where practicable of existing pedestrian, cycle and equestrian routes;

   d. provision for public transport enhancement where justified, including information and waiting facilities and measures to encourage public transport use;

   e. provision for the transport needs of specific groups in the community, such as the elderly and those with disabilities;

   f. provision of electric vehicle recharging facilities where appropriate; and

   g. mitigation for any adverse impact on air quality, especially in Air Quality Management Areas, and residential amenity, including traffic noise.

With supporting text as follows:

11.3.5 The Council is anxious to ensure that both the occupiers and users of new development, and those elsewhere who may be affected by it indirectly, will not be subjected to below acceptable standards of air quality. Therefore, in controlling the potential impact of development upon air quality, the Council will require an effective air pollution mitigation strategy if a development proposal would be likely to either:

- *Have a moderate adverse, or worse, impact upon air quality within an existing Air Quality Management Area (AQMA) whether the proposal is inside or outside of that AQMA; or*
- *Contribute directly or indirectly to the declaration of another AQMA be it in this district or an adjoining one.*

11.3.6 An AQMA is an area identified as one in which the national air quality objectives are unlikely to be achieved. A moderate adverse impact is defined by Land-Use Planning & Development Control: Planning For Air Quality May 2015 b(v1.1) EPUK & IAQM (or a successor document).

3.2.2 Kibworth Air Quality Management Area Action Plan

The 2019 Air Quality Action Plan (AQAP)[14] is a fulfilment of Part IV of the Environment Act 1995 Local Air Quality Management, in response to the AQMA declared within Kibworth for exceedances of the annual mean NO_2 AQO. The plan outlines actions for improving air quality as detailed below:

- Undertaking of impact assessment of local traffic management options, including traffic surveys as well as traffic simulation and air quality impact assessment of proposed and implemented junction improvements;
- Consultation between regulatory services and development management;

[14] Harborough District Council, 2019. Kibworth Air Quality Management Area Action Plan.

- Guidance and training to the members on assessing air quality impacts and their significance when considering planning applications;
- Ensuring air quality policies are included in the Local Plan all future local planning documents;
- Provide information about the AQMA to local residents; and
- Development of local air quality monitoring.

3.3 Additional Guidance

3.3.1 Institute of Air Quality Management: Construction Dust Guidance, 2014 v1.1

The IAQM produced guidance[15] to assist in the assessment of air quality impacts from demolition and construction activities. This guidance provides a consistent methodology for assessing the risks of dust impacts from demolition and construction activities and for identifying the correct level of mitigation which should be applied to avoid significant air quality effects.

3.3.2 Environmental Protection UK/Institute of Air Quality Management Guidance, Land-Use Planning Guidance, 2017

Environmental Protection UK (EPUK), together with the IAQM, produced updated guidance in 2017[16] on how air quality impacts should be assessed within the land-use planning and development control process. This guidance provides clear criteria to determine when a detailed air quality assessment is required and a methodology for assessing the significance of air quality effects.

[15] Holman et al, 2014. IAQM Guidance on the assessment of dust from demolition and construction V1.1. Institute of Air Quality Management, London.
Available: http://www.iaqm.co.uk/text/guidance/construction-dust-2014

[16] Institute of Air Quality Management and Environmental Protection UK, 2017. Land-Use Planning & Development Control: Planning for Air Quality. Available: http://www.iaqm.co.uk/text/guidance/air-quality-planning-guidance.pdf

4. METHODOLOGY

4.1 Baseline

In order to establish baseline air quality in the vicinity of the application site, relevant monitoring data was reviewed and assessed. Data was obtained from the following sources:

- diffusion tubes operated by HDC, and HDC Annual Progress Report[17]; and
- Department of Environment, Food and Rural Affairs (Defra) background maps[18].

No additional site-specific air quality monitoring was carried out.

4.2 Construction Impacts

Likely effects as a result of demolition and construction dust emissions, unlike other air borne pollutants, cannot be accurately predicted and quantified because they are highly dependent on local weather conditions and mitigation measures implemented at source.

This assessment has followed the guidance published by the IAQM, on the assessment of the effects of demolition and construction on air quality. The IAQM assessment methodology considers three separate dust effects and defines their significance according to the sensitivity of the study area, as follows:

- Annoyance due to dust soiling; and
- The risk of health effects due to a significant increase in exposure to PM_{10}.

The construction impact significance criteria are based on the IAQM guidance. The guidance recommends that no assessment of the significance of effects is made without mitigation in place, as mitigation is assumed to be secured by planning conditions, legal requirements or required by regulations.

With appropriate mitigation in place, the residual effect of construction impacts on air quality is always assessed as not significant. The purpose of the construction dust assessment is therefore to identify the appropriate level of mitigation to employ during construction activities.

Full details of the dust risk assessment methodology which includes the assessment criteria is provided in Appendix 2.

4.3 Road Traffic Impacts

4.3.1 Human Health Receptors

Relevant sensitive locations are places where members of the public might be expected to be regularly present over the averaging period of the objectives. For the annual mean and daily mean objectives that are the focus of this assessment, sensitive receptors will generally be residential properties, schools, nursing homes, etc. When identifying these receptors, particular attention has been paid to assessing impacts close to junctions, where traffic may become congested, and where there is a combined effect of several road links.

The area assessed also takes into account guidance developed by EPUK and the IAQM. The guidance provides indicative criteria for when an air quality assessment is required. Existing

[17] District of Harborough, 2020. 2020 Air Quality Annual Status Report. (ASR) June 2020.
[18] Defra, Background Mapping data for local authorities – 2018. Available at: https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2018

receptors have been included in the assessment where they are adjacent to roads with an increase in traffic above the IAQM/EPUK[19] guidance criteria below:

- A change of Light Duty Vehicles (LDVs) flows of more than 100 AADT within or adjacent to an AQMA or more than 500 AADT elsewhere.
- A change of Heavy Duty Vehicles (HDVs) flows of more than 25 AADT within or adjacent to an AQMA or more than 100 AADT elsewhere[20]

Based on the above criteria, seven existing properties have been identified as residential receptors for the assessment. The locations of existing residential receptors were chosen to represent locations where impacts from road traffic related to the proposed development are likely to be the greatest, i.e. as a result of development traffic at junctions. These locations are described in Table 4.1. Receptors were modelled at a height of 1.5 m representing ground floor exposure (shown in Figure 4.1).

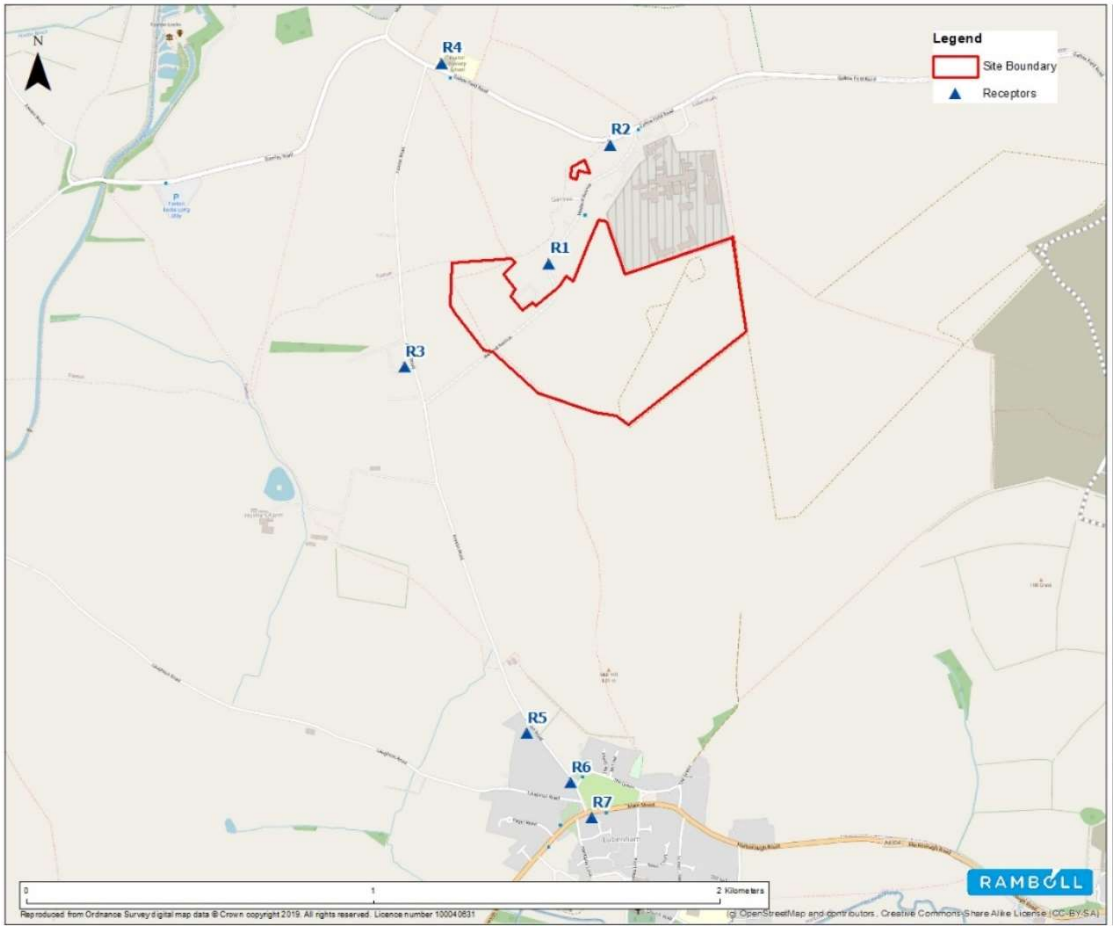


Figure 4.1: Offsite Receptor Locations

[19] Institute of Air Quality Management (IAQM) and Environmental Protection UK, 2017, Land-Use Planning & Development Control: Planning for Air Quality

[20] Moorcroft and Barrowcliffe et al. (2017). 'Land-use Planning & Development Control: Planning for Air Quality'. V1.2. The Institute for Air Quality Management, London

Table 4.1: Receptor Locations

Receptor	x	y	Height (m)
R1	470271	288939	1.5
R2	470446	289281	1.5
R3	469854	288641	1.5
R4	469960	289517	1.5
R5	470207	287585	1.5
R6	470332	287444	1.5
R7	470395	287342	1.5

4.3.2 Impact Predictions

Predictions have been carried out using the ADMS-Roads dispersion model (v5). The model requires the user to provide various input data, including the Annual Average Daily Traffic (AADT) flow, the proportion of Heavy Duty Vehicles (HDVs), road characteristics (including road width and street canyon height, where applicable), and the vehicle speed. It also requires meteorological data. The model has been run using 2020 meteorological data from the Church Lawford meteorological station, which are considered suitable for this area (see Appendix 3 for further details on the model inputs).

AADT flows and the proportions of HDVs, for roads within 250 m of the proposed development site, existing receptors and monitoring site have been provided by the project's transport consultants. Peak hour flows used in the Transport Assessment have been used by the transport consultants to calculate AADT flows. Traffic data used in this assessment are summarised in Appendix 4.

Traffic emissions were calculated using the latest version of Defra's Emission Factor Toolkit (EFT) v10.1. The traffic data were entered into the model, along with speed data to provide combined emission rates for each of the road links entered into the model.

In carrying out the assessment of operational traffic impacts the following scenarios have been assessed:

- 2025 future baseline; and
- 2025 future baseline with development traffic plus cumulative traffic.

The relevant objectives for human health are set out in Table 3.1 and Table 3.2. There is no official guidance in the UK on how to assess the significance of air quality impacts of a new development. The significance criteria provided in the guidance produced by IAQM and EPUK has been used to assess the significance of effects on air quality as a result of the proposed development.

The guidance has produced a matrix which is to be used to calculate the impacts at individual receptor locations as shown in Table 4.2. This takes into account both the change in concentration and the resulting overall concentration. The guidance states that the overall significance of effects should be based on professional judgement and needs to take account of such factors as:

- The existing and future air quality in the absence of the development;

- The extent of current and future population exposure to the impacts; and
- The influence and validity of any assumptions adopted when undertaking the prediction of impacts.

Table 4.2: Impact Descriptors for Individual Receptors

Long term average concentration at receptor with development	Percentage Change in Concentration Relative to Annual Mean Air Quality Objective (AQO)			
	<1	2 - 5	6 – 10	>10
75% or less of NAQO	Negligible	Negligible	Slight	Moderate
76 – 94% of NAQO	Negligible	Slight	Moderate	Moderate
95 – 102% of NAQO	Slight	Moderate	Moderate	Substantial
103 – 109% of NAQO	Moderate	Moderate	Substantial	Substantial
110% or more of NAQO	Moderate	Substantial	Substantial	Substantial

NAQO for NO_2 and PM_{10} is 40 µg/m^3
Changes of less than 0.5% are considered to be negligible
Changes are rounded up

Where impacts can be considered in isolation at an individual receptor, moderate or substantial impacts (i.e. per Table 4.2) may be considered to be a significant environmental effect, whereas negligible or minor impacts would not be considered significant. The overall effect however needs to be considered in the round taking into account the changes at all of the modelled receptor locations, with a judgement made as to whether the overall air quality effect of the development is significant or not.

4.4 Assumptions and Limitations

There are many components that contribute to the uncertainty in predicted concentrations. The model used in this assessment is dependent upon the traffic data that have been input which will have inherent uncertainties associated with them. There is then additional uncertainty as the model is required to simplify real-world conditions into a series of algorithms.

The complete development impact assessment modelling has been based on 2025 emission factors and background concentrations, whilst utilising traffic flows for 2025. The model has been verified using an agreed factor of 3 as there is no local monitoring data with which to verify the model. This is considered to provide a conservative assessment taking into account the uncertainties regarding future vehicle emission factors.

5. BASELINE ASSESSMENT

5.1 Local Air Quality Management

The site is not in close proximity of HDC monitoring sites. HDC has investigated air quality within its area as part of its responsibilities under the LAQM regime. To date two AQMAs have been declared in Harborough District due to exceedances of the annual mean NO_2 objective. The proposed site is not located within an AQMA, however the closest AQMA is located approximately 5.4 km north in the Kibworth, along the A6 Leicester Road.

5.2 Monitoring

5.2.1 Nitrogen Dioxide

HDC carries out monitoring at one automatic monitoring station located 5.6 km north from the proposed development. The Council also deploys NO_2 diffusion tubes at 32 locations. The closest and most representative monitoring locations are shown in Figure 5.1 and described in Table 5.1.

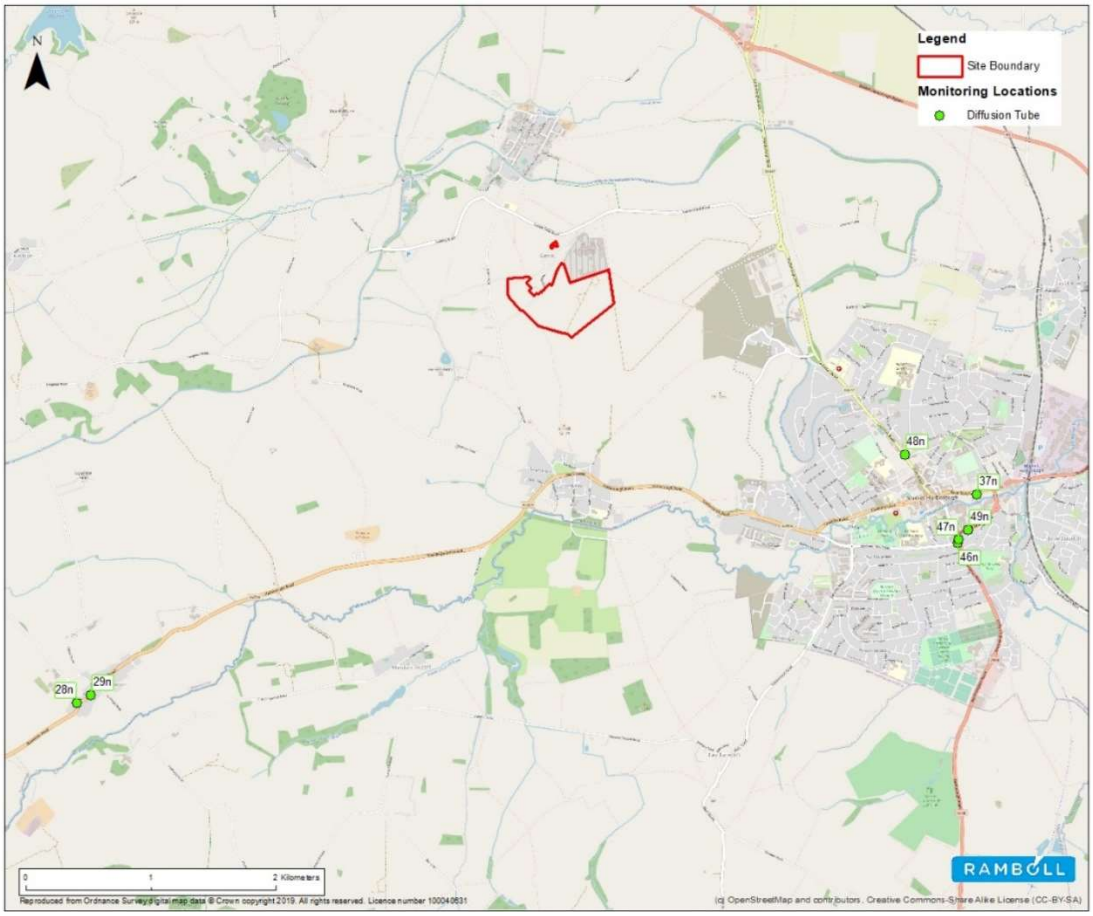


Figure 5.1: Closest Local Authority Monitoring Locations

Table 5.1: Measured NO_2 Concentrations

Site ID	Site Type	Distance from Site (km)	Within AQMA	Annual Mean (µg/m³)				
				2015	2016	2017	2018	2019
Diffusion Tubes								
48n	R	2.6	No	-	-	-	-	26.15
37n	R	3.3	No	-	**50.44**	29.70	25.86	27.74
49n	R	3.4	No	-	-	-	-	26.03
47n	R	3.4	No	-	-	-	-	27.01
46n	R	3.4	No	-	-	-	-	31.36
29n	R	4.4	No	28.15	26.77	27.90	22.17	21.61
28n	R	4.5	No	19.43	16.89	16.45	16.38	17.52

Exceedances of the objective highlighted in **bold**.
R – Roadside
2015 – 2019 data taken from the 2020 Annual Status Report

5.3 Defra Background Maps

In addition to these measured concentrations, estimated background concentrations for the site have been obtained from the national maps provided by Defra (Defra, 2021) (shown in Table 5.2).

Table 5.2: Estimated Annual Mean Background Concentrations

Year	Location	Annual Mean (µg/m³)		
		NO_2	PM_{10}	$PM_{2.5}$
2019	470500 287500	8.0	13.5	8.5
	470500 288500	7.7	13.1	8.3
	470500 289500	8.6	14.3	8.6
2025	470500 287500	6.4	12.5	7.7
	470500 288500	6.2	12.1	7.5
	470500 289500	7.1	13.3	7.8
Objectives		**40**	**40**	**25**

5.4 Assessment of Monitoring Data

The results presented in Table 5.1 indicate that roadside monitoring concentrations within the wider vicinity of the site were in compliance with the annual mean objective, with the exception of site 37n. Monitoring at St Mary's Road (37n) recorded a concentration in exceedance of the annual mean objective in 2016, however as this was based on one month of data, it is not considered wholly representative of air quality in the area. Measured NO_2 concentrations at this site were all below the objectives from 2017 onwards.

Whilst no ambient air quality monitoring data for NO_2 is available in the immediate site area, the HDC monitoring locations are situated in areas significantly more built up that the proposed site's surroundings. Furthermore, the monitoring locations are closer to the roadside and adjacent to busy A-roads, with the exception of monitoring site 48n which is located on the B6047. Therefore, site specific concentrations are expected to be lower than those values presented in a Table 5.1, and therefore comfortably below the NAQO.

There are no PM_{10} and $PM_{2.5}$ monitoring sites in proximity to the application site, but the Defra background map data for the site indicates that the NAQOs for PM_{10} and $PM_{2.5}$ will be comfortably met within the site. In addition, the background $PM_{2.5}$ concentration is below the World Health Organisation guideline value of 10µg/m^3.

6. CONSTRUCTION IMPACT ASSESSMENT

6.1 Introduction

The site is located in a rural area. Residential receptors are located within 50 m of the site boundary and in accordance with IAQM guidance a detailed assessment of the demolition and construction impacts is required. There are no ecological receptors or habitats that would be sensitive to dust impacts within 50 m of the application site boundary, therefore, no ecological effects are predicted to occur.

6.2 Assessment of Impacts

Using the evaluation criteria within the IAQM's Guidance the potential dust emission magnitude has been identified for each stage of the proposed development as shown in Table 6.1 below.

Table 6.1: Dust Emissions Magnitude for Each Construction Activity

Activity	Dust Emission Magnitude	Justification
Demolition	NA	There is no anticipated demolition in relation to the proposed development.
Earthworks	Large	Total site area requiring earthworks above 10,000 m^2. Rough ground present in the eastern site area, with potentially dusty soil type (e.g. loamy / clayey, which will be prone to suspension when dry due to small particle size).
Construction	Large	Total building volume of above 100,000 m^3.
Trackout	Medium	It is assumed that maximum HDV movements over the course of the development will be a maximum of between 10 and 50 outward movements per day[1].

[1] Assumed, based on likely level of construction activity

The next stage of the process is to define the sensitivity of the assessment area to dust soiling and human health impacts. This process combines the sensitivity of the receptor with distance from the source to determine the overall sensitivity as summarised in Table 6.2.

Table 6.2: Sensitivity of Area to Dust Impacts

Sensitivity to Dust Soiling	Sensitivity to Human Health Impacts	Sensitivity to Ecological Receptors
Medium: 10-100 residential properties within 50 m of the site boundary and the trackout routes.	Low: 10-100 residential properties within 50 m of the site boundary and the trackout routes. PM_{10} concentrations from Defra backgrounds significantly less than 24 µg/m^3 in 2019 (14.3 µg/m^3).	Not Applicable: no ecological receptors sensitive to dust within 50 m of the application site or within 50 m of the route used by construction vehicles for a distance of 500 m.

The dust emission magnitude determined in Table 6.1 has been combined with the sensitivity assessment in Table 6.2 to define the risk of impacts for each construction activity of the proposed development in the absence of mitigation, as shown in Table 6.3.

Table 6.3: Risk of Dust Impacts in Absence of Mitigation

Sensitivity of Surrounding Area to Impacts	Dust Emission Magnitude		
	Earthworks (Large)	Construction (Large)	Trackout (Medium)
Dust Soiling (Medium)	Medium Risk	Medium Risk	Low Risk
Human Health (Low)	Low Risk	Low Risk	Low Risk

6.3 Mitigation of Construction Impacts

The control of dust emissions from construction sites relies upon good site management and mitigation techniques to reduce emissions of dust and limit dispersion. A summary of the mitigation measures recommended in the IAQM guidance to reduce impacts from medium risk sites is provided in Table 6.4. It is recommended that these measures are included within a Construction Environmental Management Plan (CEMP) which could be secured through an appropriately worded planning condition. The proposed mitigation provided below are tried and tested and standard measures included in CEMPs on a regular basis.

Table 6.4: Recommended Dust Mitigation for Medium Risk Sites

Phase	Mitigation Measure
Communications	Implement a stakeholder communication plan. Display name and contact details of responsible person for dust issues on Site boundary in addition to head/regional office contact information.
Dust Management Plan	Develop and implement a Dust Management Plan (DMP) which would be included as part of the CEMP, to be approved by the Local Authority.
Site Management	Record all complaints and incidents in a site log. Take appropriate measures to reduce emissions in a timely manner, and record the measures taken within the log. Make the complaints log available to the Local Authority if requested. Record any exceptional dust incidents on or off site.
Monitoring	Undertake daily on and off-site visual inspections where there are nearby receptors. Carry out regular inspections to ensure compliance with the DMP and record results in the site log book. Increase the frequency of inspections during activities with a high potential to create dust or in prolonged dry weather.
Preparing and Maintaining the Site	Plan site layout to locate dust generating activities as far as possible from receptors. Use solid screens around dusty activities and around stockpiles. Avoid site runoff of water and mud. Fully enclose the site or specific operations where there is a high potential for dust production and the site is active for an extensive period. Keep site fencing barriers and scaffolding clean using wet methods.

Phase	Mitigation Measure
	Remove dusty materials from site as soon as possible. Minimise emissions from stockpiles by covering, seeding, fencing or damping down.
Operating Vehicle/Machinery and Sustainable Travel	Enforce an on-site speed limit of 15 mph on surfaced roads and 10 mph on unsurfaced areas. Ensure vehicles switch of engines when stationary. Avoid use of generators where possible. Produce a Construction Logistics Plan to manage the sustainable delivery of materials. Implement a sustainable travel plan for site workers.
Operations	Only use cutting, grinding or sawing equipment with suitable dust suppression equipment or techniques. Ensure adequate water supply for effective dust and particulate matter suppression. Use enclosed chutes, conveyors and covered skips. Minimise drop heights of materials. Ensure suitable cleaning material is available at all times to clean up spills.
Waste Management	Avoid bonfires.
Measures Specific to Earthworks	Re-vegetate earthworks and exposed areas/soil stockpiles as soon as practicable. Use hessian, mulch or trackifiers where it is not possible to re-vegetate or cover with topsoil. Only expose small areas of ground or stockpile when working.
Measures Specific to Construction	Ensure aggregates are stored in bunded areas and are not allowed to dry out. Avoid concrete scabbling where possible. Ensure bulk cement and other fine powder is delivered in tankers and stored in silos with suitable emission control. Smaller supplies of fine powder material to be in sealed containers and stored appropriately.
Measures Specific to Trackout	Use water-assisted dust sweepers to clean access and local roads. Avoid dry sweeping of large areas. Ensure vehicles entering and leaving the site are appropriately covered. Inspect on-site haul roads for integrity and repair as necessary. Inspections of haul roads to be recorded in site log, including any remedial action taken. Implement a wheel washing system. Access gates to be located at least 10 m from receptors where possible.

6.4 Residual Effects

Using the IAQM guidance, and on the assumption that appropriate dust mitigation measures are applied commensurate with the risk of potential dust impacts, the effect of construction dust on nearby sensitive receptors would not be significant.

7. ROAD TRAFFIC IMPACTS

7.1 Existing Human Health Receptors

Predicted concentrations of NO_2, PM_{10} and $PM_{2.5}$ at existing receptors with the proposed development and cumulative developments are presented in in Table 7.1, Table 7.2 and Table 7.3.

Table 7.1: Predicted Annual Mean NO_2 Concentrations with the Development and Cumulative Developments (µg/m³)

Receptor	2025 Without Development	2025 With Development and Cumulative Developments	Change (%)	Impact Descriptor
R1	6.8	7.1	0.5	Negligible
R2	8.2	8.4	0.7	Negligible
R3	6.7	6.9	0.5	Negligible
R4	8.6	9.1	1.4	Negligible
R5	7.3	7.4	0.4	Negligible
R6	8.7	9.1	0.9	Negligible
R7	10.1	10.3	0.5	Negligible
Objectives		**40**		**-**

Table 7.2: Predicted Annual Mean PM_{10} Concentrations With the Development and Cumulative Developments (µg/m³)

Receptor	2025 Without Development	2025 With Development and Cumulative Developments	Change (%)	Impact Descriptor
R1	12.2	12.3	0.1%	Negligible
R2	13.5	13.6	0.2%	Negligible
R3	12.5	12.5	0.1%	Negligible
R4	12.7	12.8	0.3%	Negligible
R5	12.7	12.7	0.1%	Negligible
R6	13.0	13.1	0.2%	Negligible
R7	13.4	13.4	0.1%	Negligible
Objectives		**40**		**-**

Table 7.3:Predicted Annual Mean $PM_{2.5}$ Concentrations With the Development and Cumulative Developments (µg/m³)

Receptor	2025 Without Development	2025 With Development and Cumulative Developments	Change (%)	Impact Descriptor
R1	7.6	7.6	0.1	Negligible
R2	8.0	8.0	0.1	Negligible
R3	7.6	7.6	0.1	Negligible
R4	7.8	7.9	0.3	Negligible
R5	7.8	7.8	0.1	Negligible
R6	8.0	8.1	0.2	Negligible
R7	8.2	8.3	0.1	Negligible
Objectives		**40**		**-**

The predicted NO_2, PM_{10} and $PM_{2.5}$ concentrations with the proposed development with and with cumulative developments are below the relevant objectives at all existing receptor locations. None of the predicted annual mean NO_2 concentrations exceed 60 µg/m³ and therefore exceedance of the 1-hour mean NO_2 objective is unlikely. None of the predicted annual mean PM_{10} concentrations exceed 32 µg/m³ and therefore the 24-hour mean PM_{10} objective is not predicted to be exceeded.

The largest increase in NO_2 concentrations is predicted to be 0.57 µg/m³ with the proposed development and with cumulative developments at R4. Using the criteria set out in Table 4.2, the impact on annual mean NO_2 concentrations is described as negligible at all receptor locations. The impact on PM_{10} concentrations is described as negligible, and the annual mean of 32 µg/m³ equating to 35 days above 50 µg/m³ for PM_{10} is described as negligible at all receptor locations.

As discussed in Section 4, the overall assessment of significance should be based on professional judgement taking into account a number of factors including the overall air quality with the development and cumulative developments in place, the future population exposure and to what extent the assessment is considered a worst case.

On this basis it is concluded that the proposed development would not have a significant effect on air quality.

7.2 Mitigation of Operational Effects

The predicted increases in pollutant concentrations from the development and cumulative developments are negligible and therefore there are no requirements to mitigate the direct impacts of the development and cumulative developments. In accordance with the Harborough Local Plan, mitigation in the form of electric vehicle charging points, measures to enable access and encourage travel via cycle and public transport are to be incorporated into the development.

8. CONCLUSION

The air quality impacts associated with the proposed development of land adjacent to HMP Gartree, Gallow Field Road, Market Harborough, Leicestershire, LE16 7RP located within the boundary of HDC have been assessed.

To date HDC has declared two AQMAs due to exceedances of the annual mean NO_2 objective. The proposed site is not located either AQMA.

The assessment of potential impacts to air quality during the construction stage has identified that the activities, together with the location of nearby sensitive receptors, results in a medium risk of impacts in the absence of suitable mitigation. Suitable mitigation would be provided through a series of measures set out in a dust management plan to form part of a CEMP to be agreed with the local authority. With mitigation in place, the effects of construction dust on nearby sensitive receptors would not be significant.

Concentrations of NO_2, PM_{10} and $PM_{2.5}$ have been predicted for a number of worst case locations representing existing properties adjacent to the road network. Predicted concentrations are well below the relevant objectives at all of the existing receptor locations with the proposed development and cumulative developments in place and the impact of the development and cumulative developments is negligible and therefore not significant.

Mitigation measures to reduce the direct impacts of the development on air quality concentrations are not required, but additional transport and energy source related mitigation measures will be employed to reduce emissions from the development in accordance with the Harborough Local Plan.

Overall, it is concluded that there are no air quality constraints to the proposed development.

APPENDIX 1
GLOSSARY

Abbreviations	Meaning
AADT	Annual Average Daily Traffic
ADMS	Air Dispersion Modelling System
APIS	Air Pollution Information System
AQAP	Air Quality Action Plan
AQMA	Air Quality Management Area
AURN	Automatic Urban and Rural Network
CHP	Combined Heat and Power
CEMP	Construction Environmental Management Plan
Defra	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
Diffusion Tube	A passive sampler used for collecting NO_2 in the air
EA	Environmental Agency
EFT	Emission Factor Toolkit
EHO	Environmental Health Officer
EPUK	Environmental Protection UK
HDC	Harborough District Council
HDV	Heavy Duty Vehicle; a vehicle with a gross vehicle weight greater than 3.5 tonnes. Includes Heavy Goods Vehicles and buses
IAQM	Institute of Air Quality Management
LAQM	Local Air Quality Management
NAQO	National Air Quality Objective as set out in the Air Quality Strategy and the Air Quality Regulations
NO_2	Nitrogen Dioxide
NO_x	Nitrogen oxides, generally considered to be nitric oxide and NO_2
NPPF	National Planning Policy Framework
$PM_{10}/PM_{2.5}$	Small airborne particles less than 10/2.5 microns in aerodynamic diameter
PPG	Planning Practice Guidance
Receptor	A location where the effects of pollution may occur
SSSI	Site of Special Scientific Interest
SPG	Supplementary Planning Guidance

APPENDIX 2
DUST RISK ASSESSMENT METHODOLOGY

Determining Dust Emission Magnitude

Large	Medium	Small
Demolition		
• total building volume >50,000 m^3 • potentially dusty construction material (e.g. concrete) • on-site crushing and screening • demolition activities >20 m above ground level	• total building volume 20,000m^3 – 50,000m^3 • potentially dusty construction • demolition activities 10-20m above ground level	• total building volume <20,000m^3 • construction material with low potential for dust release (e.g. metal cladding or timber) • demolition activities <10m above ground • during wetter months
Earthworks		
• total site area >10,000m^2 • potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size) • >10 heavy earth moving vehicles active at any one time • formation of bunds >8m in height • total material moved >100,000 tonnes	• total site area 2,500m^2 - 10,000m^2 • moderately dusty soil type (e.g. silt) • 5-10 heavy earth moving vehicles active at any one time • formation of bunds 4m - 8m in height • total material moved 20,000 - 100,000 tonnes	• total site area <2,500m^2 • soil type with large grain size (e.g. sand) • <5 heavy earth moving vehicles active at any one time • formation of bunds <4m in height • total material moved <20,000 tonnes • earthworks during wetter months
Construction		
• total building volume >100,000m^3 • piling • on-site concrete batching • sandblasting	• total building volume 25,000m^3 - 100,000m^3 • potentially dusty construction material (e.g. concrete) • piling • on-site concrete batching	• total building volume<25,000 m^3 • construction material with low potential for dust release (e.g. metal cladding or timber)
Trackout		
• >50 HDV (>3.5t) movements in any one day • potentially dusty surface material (e.g. high clay content) • unpaved road length >100m	• 10-50 HDV (>3.5t) movements in any one day • moderately dusty surface material (e.g. high clay content) • unpaved road length 50m – 100m	• <10 HDV (>3.5t) movements in any one day • surface material with low potential for dust release • unpaved road length <50m

Determining Receptor Sensitivity

High	Medium	Low
Sensitivities of People to Dust Soiling Effects		
• users can reasonably expect a enjoyment of a high level of amenity; or • The appearance, aesthetics or value of their property would be diminished by soiling; and the people or property would reasonably be expected a to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land. • indicative examples include dwellings, museums and other culturally important collections, medium and long term car parks and car showrooms.	• users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home; or • the appearance, aesthetics or value of their property could be diminished by soiling; or • The people or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land. • Indicative examples include parks and places of work.	• the enjoyment of amenity would not reasonably be expected; or • property would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling; or • there is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land. • indicative examples include playing fields, farmland (Unless commercially-sensitive horticultural), footpaths, short term car parks and roads.
Sensitivities of People to the Health Effects of PM_{10}		
• locations where members of the public are exposed over a time period relevant to the air quality objective for PM_{10} (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day). • Indicative examples include residential properties, Hospitals, schools and residential care homes should also be considered as having equal sensitivity to residential areas for the purposes of this assessment.	• locations where the people exposed are workers, and exposure is over a time period relevant to the air quality objective for PM_{10} (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day). • Indicative examples include office and shop workers, but will generally not include workers occupationally exposed to PM_{10}, as protection is covered by Health and Safety at Work legislation.	• Locations where human exposure is transient. • Indicative examples include public footpaths, playing fields, parks and shopping streets.
Sensitivities of Receptors to Ecological Effects		
• locations with an international or national designation *and* the designated features may be affected by dust soiling; or • locations where there is a community of a particularly dust sensitive species such as vascular species included in the Red Data List For Great Britain. • Indicative examples include a Special Area of Conservation (SAC) designated for acid heathlands or a local site designated for lichens adjacent to the demolition of a large site containing concrete (alkali) buildings.	• locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown; or • Locations with a national designation where the features may be affected by dust deposition. • Indicative example is a Site of Special Scientific Interest (SSSI) with dust sensitive features.	• Locations with a local designation where the features may be affected by dust deposition. • Indicative example is a local Nature Reserve with dust sensitive features.

Determining Sensitivity of the Area

Dust Soiling Effects on People and Property

Receptor Sensitivity	Number of Receptors	Distance from the Source (m)			
		<20	<50	<100	<350
	>100	High	High	Medium	Low
High	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Human Health Impacts

	Annual Mean PM_{10} concentration	Number of Receptors	Distance from the Source (m)				
			<20	<50	<100	<200	<350
		>100	High	High	High	Medium	Low
	>32 µg/m^3	10-100	High	High	Medium	Low	Low
		1-10	High	Medium	Low	Low	Low
		>100	High	High	Medium	Low	Low
	>28-32 µg/m^3	10-100	High	Medium	Low	Low	Low
High		1-10	High	Medium	Low	Low	Low
		>100	High	Medium	Low	Low	Low
	>24-28 µg/m^3	10-100	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
		>100	Medium	Low	Low	Low	Low
	<24 µg/m^3	10-100	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium		>1	High	Medium	Low	Low	Low
Low		>1	Medium	Low	Low	Low	Low

Ecological Impacts

Receptor Sensitivity	Distance from the Source (m)	
	<20	<50
High	High	Medium
Medium	Medium	Low
Low	Low	Low

Determining Risk of Dust Impacts

Demolition

Sensitivity of Area	Dust Emission Magnitude		
	Large	**Medium**	**Small**
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Medium Risk	Low Risk	Negligible

Earthworks

Sensitivity of Area	Dust Emission Magnitude		
	Large	**Medium**	**Small**
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Construction

Sensitivity of Area	Dust Emission Magnitude		
	Large	**Medium**	**Small**
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

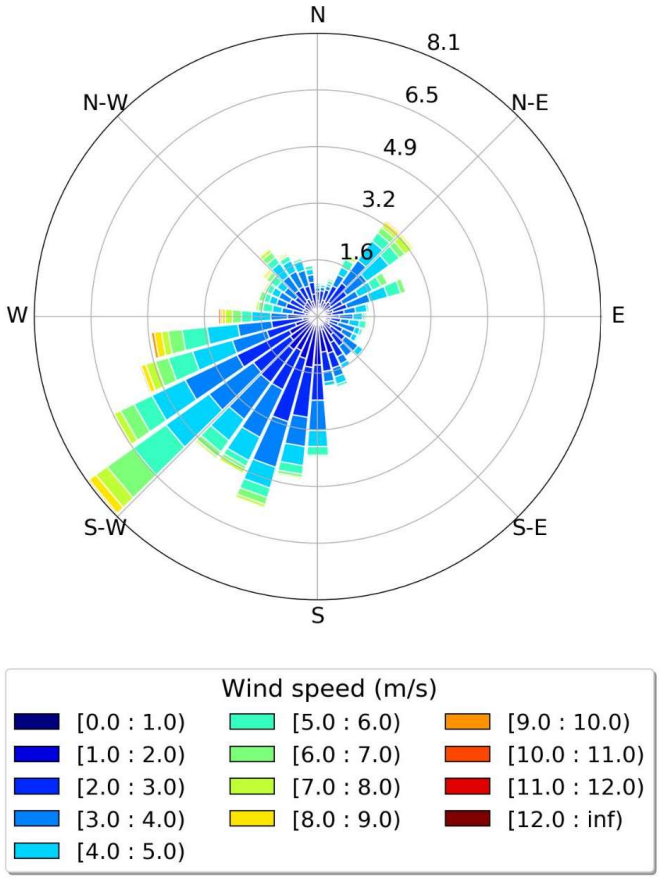
Trackout

Sensitivity of Area	Dust Emission Magnitude		
	Large	**Medium**	**Small**
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Low Risk	Negligible
Low	Low Risk	Low Risk	Negligible

APPENDIX 3
MODEL INPUTS AND RESULTS PROCESSING TOOLS

Meteorological Data	2019 Hourly meteorological data from Church Lawford Station has been used in the model. The wind rose is shown overleaf.
ADMS	Version 5
Time Varying Emission Factors	Based on Department for Transport statistics. Table TRA0307. Motor vehicle traffic distribution by time of day and day of the week on all roads, Great Britain: 2020.
Latitude	52.4º
Surface Roughness	A value of 0.3 for agricultural areas was used to represent the modelled area and the meteorological station site.
Minimum Monin-Obukhov length	A value of 10 for Small towns <50,000 was used to represent the modelled area and meteorological station site.
Street Canyon	No canyons were included in the model.
Emission Factor Toolkit (EFT)	V10.1, August 2020.
NO_x to NO_2 Conversion	NO_x to NO_2 calculator version 8.1, May 2019. Traffic Mix All UK Traffic.
Background Maps	2018 reference year background maps

2020 Church Lawford Wind rose



APPENDIX 4
TRAFFIC DATA AND ROAD NETWORK

Road ID	Location	Speed (kph)	2025 Baseline		2025 With Development + Cumulative	
			AADT	%HDV	AADT	%HDV
A	Leicester Lane, east of Harborough Road / Leicester Lane / Gallow Field Road Junction	60	1652	1	1652	1
B	Harborough Road, north of Harborough Road / Leicester Lane / Gallow Field Road Junction	50	13833	5	14400	5
C	Harborough Road, south of Harborough Road / Leicester Lane / Gallow Field Road Junction	50	12522	5	12779	5
D	Gallow Field Road, west of Harborough Road / Leicester Lane / Gallow Field Road Junction	48.5 *	3466	4	4290	4
E	Gallow Field Road, east of Gallow Field Road / Welland Avenue Junction	60	3465	5	4289	5
F	Welland Avenue, south of Gallow Field Road / Welland Avenue Junction	15.3 *	993	1	1124	2
G	Gallow Field Road, west of Gallow Field Road / Welland Avenue Junction	60	3005	5	3814	5
H	Gallow Field Road, east of Gallow Field Road / Foxton Road Junction	60	2990	5	3799	5
I	Gallow Field Road, west of Gallow Field Road / Foxton Road Junction	60	2350	4	2350	4
J	Foxton Road, south of Gallow Field Road / Foxton Road Junction	60	2694	5	3503	5
K	Foxton Road, north of Foxton Road / Welland Avenue Junction	60	2707	5	3517	5
L	Welland Avenue, east of Foxton Road / Welland Avenue Junction	34.3 *	263	3	1608	5
M	Foxton Road, south of Foxton Road / Welland Avenue Junction	50.2 *	2856	5	3507	5
N	Foxton Road, north of A4304 Main Street / Foxton Road Junction	30	4039	3	4691	3
O	A4304 Main Street, east of A4304 Main Street / Foxton Road Junction	30	8482	5	8846	5
P	A4304 Main Street, west of A4304 Main Street / Foxton Road Junction	30	8199	6	8485	6

Q	Proposed Site Access	New Access	0	0	1345	5
R	Welland Avenue between Welland Avenue / Proposed Site Access Junction and Welland Avenue / HMP Gartree Junction	15	340	13	340	13

*Traffic data provided by the project transport consults Atkins

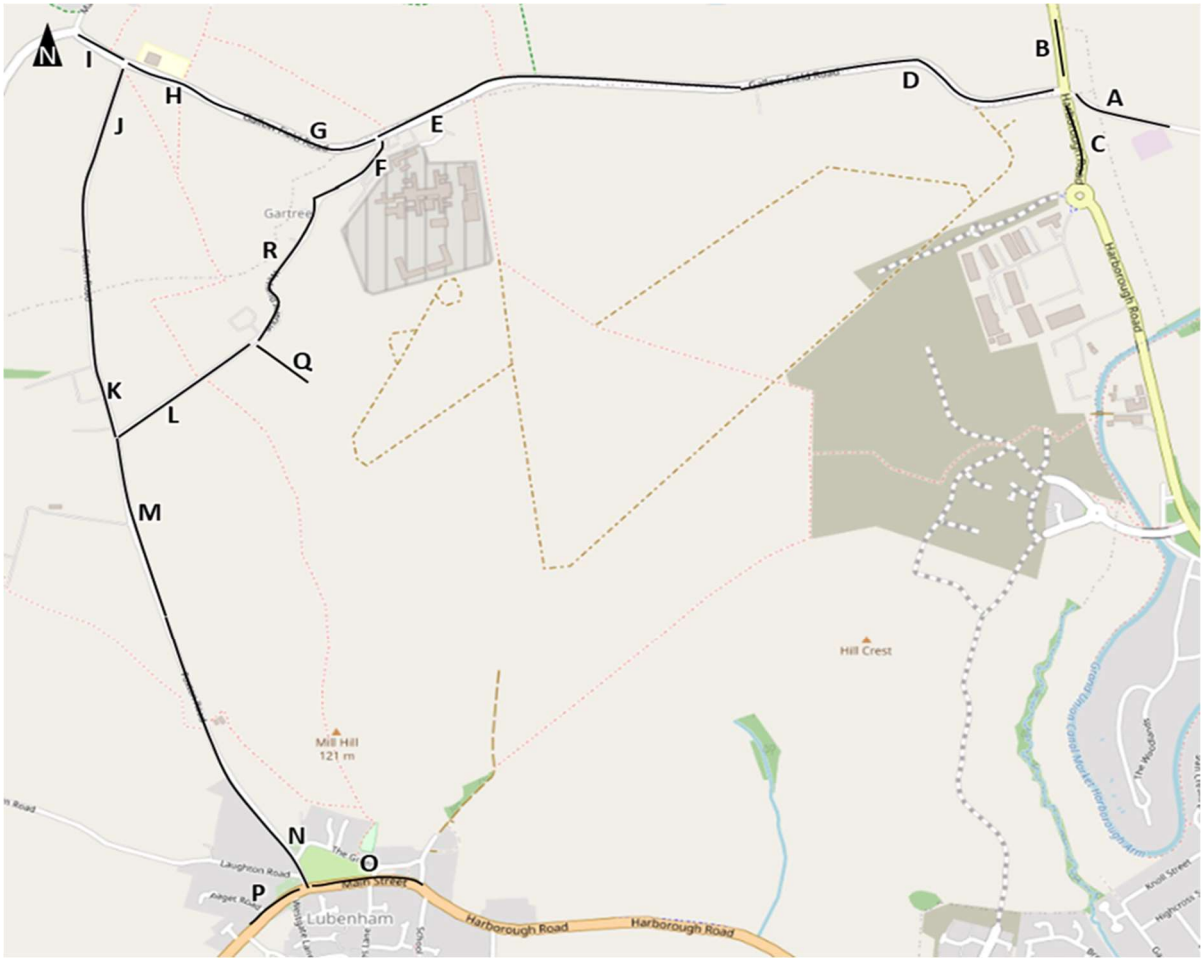


Figure A4.1: Map of the Road Links of Transport Data Provided by Transport Consultants