Charnwood Local Plan Air Quality Study

Charnwood Borough Council

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Quality information

Prepared by	Checked by	Verified by	Approved by
Charlotte Moore Senior Air Quality Consultant	Max Nancarrow Senior Air Quality Consultant	Tom Stenhouse Technical Director	Tom Stenhouse Technical Director

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Prepared for:

Charnwood Borough Council

Prepared by:

AECOM Limited
5th Floor, 2 City Walk
Leeds LS11 9AR
United Kingdom

T: +44 (0)113 391 6800
aecom.com

List of Acronyms and Abbreviations

Acronym / Abbreviation	Definition
AADT	Annual Average Daily Traffic
AQAL	Air Quality Assessment Level
AQAP	Air Quality Action Plan
AQMA	Air Quality Management Area
AQS	Air Quality Strategy
As	Arsenic
CAZ	Clean Air Zone
CBC	Charnwood Borough Council
Cd	Cadmium
Co	Cobalt
CO	Carbon Monoxide
CO_2	Carbon dioxide
Cu	Copper
Cr	Chromium
DfT	Department for Transport
Defra	Department for Environment Food & Rural Affairs
EC	European Commission
EFT	Emission Factor Toolkit
EU	European Union
GHG	Greenhouse Gas
HCl	Hydrochloric Acid
HDV	Heavy Duty Vehicle (HGVs plus buses)
HF	Hydrogen Fluoride
HGV	Heavy Goods Vehicle (truck with a gross combination mass of over 3,500 kilograms)
Hg	Mercury
IMD	Index of Multiple Deprivation
KIA	Key Impact Area
KPA	Key Priority Area
LA	Local Authority
LAQM	Local Air Quality Management
LCC	Leicestershire County Council
LGV	Light Goods Vehicle (i.e. car, van)
LLPG	Local Land and Property Gazetteer
LLITM	Leicester and Leicestershire Integrated Transport Model
LSOA	Lower Level Super Output Area
Mn	Manganese
NAEI	National Atmospheric Emission Inventory
NH_3	Ammonia
Ni	Nickel
NMVOCs	Non-methane volatile organic compounds
NO_2	Nitrogen dioxide
NOx	Nitrogen oxides
NPPF	National Planning Policy Framework
O_3	Ozone

PAH	Pol Aromatic Hydrocarbons
Pb	Lead
PCB	Polychlorinated Biphenyls
PCM	Pollution Climate Mapping
PM_{10}	Particulate matter less than 10 microns in diameter
$PM_{2.5}$	Particulate matter less than 2.5 microns in diameter
PPG	Planning Practice Guidance
Sb	Antimony
SO_2	Sulphur dioxide
SPD	Supplementary Planning Document
Ti	Titanium
V	Vanadium
VOC	Volatile Organic Compounds
WHO	World Health Organisation
$\mu g/m^3$	Microgram (one-millionth of a gram) per cubic metre of air

Definition of Terms

Term	Definition
Active travel	Making journeys by physically active means i.e. walking, cycling
Background air quality	Ambient concentrations of pollutants after emissions from particular sources have dispersed in the atmosphere. For the purposes or air quality assessment, this includes all sources not explicitly modelled. Sometimes sub-defined into local and regional background, where local background components are within a given area, and regional components are outside of that area
Base year	The year against which performance is tested
Baseline conditions	A description of the environmental setting in which a project is to be developed, for example, nature of terrain/landscape, location of populated areas, ecological resources, agriculture, air quality and noise etc.
Concentration	The relative amount of a substance contained within a solution or mixture or in a volume of space
Cumulative	Increasing due to successive additions
Discharge (emission, effluent, waste)	Any release of pollutant(s) into the environment, be it of a gaseous, liquid or solid nature, or a combination thereof.
Emission	The direct or indirect release of substances, vibration, heat or noise from a source into air, water or land.
Exposure	A situation or condition that makes a receptor likely to be harmed by poor air quality
Green infrastructure	A network of multi-functional green space, urban and rural, which is capable of delivering a wide range of environmental and quality of life benefits for local communities
Impact	Any change to the physical, biological or social environment, either adverse or beneficial, wholly or partially resulting from Plan activities, products or services.
Indicator pollutant	A pollutant which gauges the state of air quality
Key Impact Areas	Key areas where the largest impacts on air pollutant concentrations are expected
Key Priority Areas	Key areas that should be prioritised for action when considering existing air quality and social indices
Mitigation	Measures taken to reduce adverse impacts on the environment.
Monitoring	Measurement of the properties of a material (such as a discharge) or [usually] the sampling of a material together with immediate or subsequent analysis or other form of measurement.
Priority Neighbourhood	A neighbourhood identified as priority by Charnwood Borough Council based on deprivation data

Source Apportionment	The deriving of information or data about pollution sources and the amount they contribute to ambient air pollution levels in comparison to each other
Sustainable	Able to be maintained at a certain rate or level
Adopted Plan	Charnwood Local Plan 2011 to 2028
The Draft Plan	The Draft Charnwood Local Plan 2019-2036

1. Executive Summary

AECOM was commissioned by Charnwood Borough Council (CBC) to undertake an Air Quality Study (the 'Project') to inform the air quality and climate change elements of the Draft version of the Charnwood Local Plan 2019-36 (the 'Draft Plan').

The purpose of the Project was to inform the preparation of the Charnwood Local Plan in accordance with the National Planning Policy Framework and National Planning Practice Guidance. This included assessing the potential cumulative air quality impacts of the development strategy in the emerging local plan and making policy recommendations on opportunities to improve air quality, or potential mitigation measures to minimise impacts. It also considered the opportunities to influence air quality through the development plan and take into account Air Quality Management Areas, Clear Air Zones and other areas including sensitive habitats or sites with specific air quality requirements.

Public Health England has recently concluded that over 300 deaths in Leicestershire can be linked to $PM_{2.5}$ pollution and that when added to the figures for NOx, the total could be around 430 deaths each year. A review of the Draft Plan has been undertaken with reference to national, regional, and key local documents. There is currently both national and local policy, and guidance demanding a 'call to action' on air quality and its negative health impacts and new legislation will seek to shift the focus towards prevention of exceedances rather than tackling pollution when limits have been surpassed. For local authorities such as CBC, this will mean continuing to strive to reduce air pollution, even if air quality objectives are not currently being exceeded; which should be a key aspiration of the Draft Plan. Some of the existing policies within the Draft Plan promote active travel, which may, in turn, assist in minimising air quality impact. In particular, the promotion of walking, cycling and increased public transport use, and provision of a higher number of electric vehicle charging points will contribute.

CBC has four declared Air Quality Management Areas (AQMAs); these have been declared either because of emissions from transport or from local industry. Air quality monitoring is currently undertaken for nitrogen dioxide (NO_2), PM_{10} and sulphur dioxide (SO_2); though no $PM_{2.5}$ monitoring is available. There have been no exceedances of objectives for many years and there has been a downward trend in NO_2 concentrations since 2016, though the pollutants of greatest concern and further considered in the Project are NO_2 and $PM_{2.5}$. CBC published an Air Quality Action Plan (AQAP) in 2006, and has included notes on the progress of measures, within Annual Status Reports since its publication. Whilst the four declared AQMAs remain, it is perhaps appropriate that these are referenced more explicitly within the Draft Plan, particularly regarding any allocated sites which may be close to, or within, the AQMAs.

AQAPs and wider strategy documents can be used to provide a clear strategic air quality and climate change direction, and generally increase public communication within the Borough on air quality and other environmental issues; this approach is recommended. For example, there is an opportunity to increase reference to air quality within Neighbourhood Plans, to link policy areas that may have co-benefits with air quality, in transport and green infrastructure. It is recommended that an update to CBC's 2006 Air Quality Action Plan be considered to reflect the current air quality landscape.

An air quality screening model has been built for the whole of CBC's geographic area for Option 3 and Option 4 'low' growth options of the Draft Plan, and with mitigation scenarios aimed at improving road capacity. The AECOM screening tool predicts the annual mean roadside pollution concentrations (NO_X/NO_2 and $PM_{2.5}$); and these do not exceed the relevant objectives for any of the pollutants. The results indicate that the highest pollutant concentrations occur near the major arterial routes, as expected due to higher traffic flows, although many roads within urban areas are also associated with high roadside concentrations. Due to the level of predicted pollutant concentrations for low growth Options 3 and 4, the predicted air quality may allow for a higher growth option whilst maintaining compliance with the relevant objectives, however this would need to be assessed further for full confidence in this conclusion. For CO_2, the results show an increase in road-based emissions over time due to increased traffic volumes. Option 4 with Transport Mitigation represents the scenario with the highest total traffic volume, and therefore the highest CO_2 tonnes per annum emissions.

Industrial facilities were also considered alongside the outputs of the Screening Tool to assist in the identification of Key Impact Areas (KIAs). The impact areas identified from this process are in Shepshed, near residential allocations in south west Loughborough, near to the Loughborough Science & Enterprise Park employment allocation, and along Stanford Lane and Cotes Road. The 'With Transport Mitigation' scenarios assessed have some adverse impacts predicted at Loughborough Science & Enterprise Park employment allocation and several

locations within the centre of Loughborough, although there are also improvements predicted upon the Loughborough AQMA which may offset the adverse effects to some extent.

Key Priority Areas (KPAs) have been identified based on areas of poorer air quality as identified by the AECOM Screening Tool and using the Index of Multiple Deprivation. These were identified in central Loughborough, to the north and south of the A512 in Shepshed, an area in Mountsorrel, along Melton Road in Syston and in Thurmaston. Poor air quality has been found to disproportionately occur in more socially deprived areas, and further detrimental impacts within these areas should be carefully considered in order to avoid affecting health. The most deprived neighbourhoods have been found to overlap with the Priority Neighbourhoods identified by CBC in the most part, with the exception of Shepshed; so consideration may be given to adding Shepshed to the list of Priority Neighbourhoods. Whilst the impact of development upon the identified KPAs can be controlled through the development planning process, large development allocations in the identified KPAs should be avoided, where possible. The allocations as assessed at a strategic level were not significant in their impact, but this may not be the case at detailed application stage.

In terms of industrial sources in the key priority areas, Charnwood Forest Brickworks and Newhurst Quarry in Shepshed should be of priority from an air quality perspective. Whilst the greatest benefits may be achieved by targeting interventions in the KPAs, the potential risks are also recognised, as the populations in these areas may be least able to respond to the economic or practical effects of the interventions, such as a need to purchase a vehicle compliant with any imposed emissions standard.

Where measures to improve air quality are enacted, following source apportionment of emission sources, cars and vans are recommended to be prioritised to reduce emissions as these vehicles have been found to be the most significant emissions sources. Heavy Duty Vehicle (HDV) contributions to road emissions are also notable in KPAs. As well as a continued focus upon air emissions from road sources, which make up 41.6% of nitrogen oxides (NOx), there is an opportunity for policy enhancement to target emission sources other than transport; which makes up a larger proportion of $PM_{2.5}$ emissions in CBC (72% for point/industrial sources), and to a lesser extent, NO_2. This would stand CBC in good stead for working towards CO_2 emission reductions, and should a target for $PM_{2.5}$ be set by the emerging Environment Bill.

Examples of three other Local Authority approaches to incorporating air quality within Local Plans have been presented and two options for CBC have been outlined, one which creates a standalone air quality policy, and another which enhances the present policy content. Given the status of no exceedances in CBC's monitoring, and potentially improving air quality within Charnwood, it is recommended that the Draft Plan content be enhanced to reference air quality more explicitly, in favour of creating a standalone policy specific to air quality. This should be accompanied by the enhancing of present content throughout existing policies and text..

A summary of key conclusions and recommended actions are:

- Legislative reform is currently ongoing, and CBC will need to be cognisant of the Environment Bill as enacted, and possibly update their LAQM procedures when this happens, including potentially the Air Quality Action Plan;
- Air Quality in the Borough is generally improving, with no exceedances of relevant objectives in 2018, despite four AQMAs remaining in situ. It is expected that the current trend of improvement will continue in future years;
- There were no significant impacts identified as a result of either Option 3 or Option 4 (both with and without transport mitigation) of the emerging low development growth set out in the Draft Plan;
- The locations / allocations with the maximum impact were found to be HS39 / 41 at Tickow Lane in both Options, where a combined 669 dwellings are proposed;
- That said, given the relatively low existing and future predicted ambient concentrations, there is anticipated to be a certain degree of headroom available, such that higher growth options should also have similarly insignificant impacts;
- In terms of the source apportionment of emissions, road sources, within which cars and vans are the predominant contributors, are the main contributors to NO_x / NO_2 concentrations. For Particulates, the main sources are industrial point sources, though roads are still a consideration; and
- The following specific recommendations are made:
    - It is considered that there should be no blanket definition of an 'unacceptable' contribution to air quality, as this is dependant not just on the impact of the allocation / development, but also the

wider local context of existing ambient concentrations. Therefore, each allocated site must be considered in detail on a case by case basis at the application stage by the planning authority, which should include, where necessary, any site-specific mitigation required. This consideration should take account of the significance of the impact of each site;

- To reduce negative impacts, consideration should be given to reducing the size of allocations such as HS21 and HS23 which represent relatively large allocations within the Loughborough East Priority Neighbourhood;
- As having been identified as both a Key Impact and Priority Area, allocations in the Shepshed area should be considered cumulatively at the planning application stage. In addition, the presence of Newhurst Quarry Energy Recovery Facility and the recent variation of operations here, mean that developers at sites HS43 and HS38 should also consider emissions from that facility in their proposals;
- Various additions and amendments to the wording and content of the Draft Plan have been suggested, that will strengthen the Council's ambition toward, and consideration of, Air Quality, in the planning process. This includes referencing AQMAs, where relevant; and
- Whilst Neighbourhood Plans will inherently be limited both spatially and in terms of resourcing, these can have an influence with regard to localised micro-scale influences on pollutant dispersion, and in consideration of the infrastructure supporting proposed developments.

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2. Introduction

2.1 Background

AECOM was commissioned by Charnwood Borough Council (CBC) to undertake an Air Quality Study (the 'Project') to inform the air quality and climate change elements of the Draft version of the Charnwood Local Plan 2019-36 (the 'Draft Plan').

Local and regional air quality is an increasingly significant concern, along with consideration of climate change; therefore, the purpose of the Air Quality Study will be to inform the preparation of the Charnwood Local Plan in accordance with the National Planning Policy Framework and National Planning Practice Guidance. This included assessing the potential cumulative air quality impacts of the development strategy in the emerging local plan and making policy recommendations on opportunities to improve air quality, or potential mitigation measures to minimise impacts. It also considered the opportunities to influence air quality through the development plan and take into account Air Quality Management Areas, Clear Air Zones and other areas including sensitive habitats or sites with specific air quality requirements.

CBC is one of seven districts within Leicestershire, formed around the city of Leicester. The main centre of employment and population within Charnwood is Loughborough. A large number of smaller settlements are dotted across the geographic Borough area, with several service centres scattered along the Soar Valley. Charnwood is connected to major UK infrastructure including the M1 motorway to the west, and the Midland Mainline railway line to the east.

The Charnwood Local Plan Core Strategy 2011 to 2028 was adopted in November 2015 (the 'Adopted Plan'), to provide a development strategy up until 2028 for CBC's administrative area. The Draft Plan, which was published for a consultation period of six weeks, aims to build on the existing strategy, specifically including commitments for residential, employment and other developments, by replacing the adopted plan to cover the period 2019-36 and respond to new evidence of the needs of the Borough over that period..

The Project incorporates multidisciplinary considerations and measures to ensure that the interventions can be implemented within the framework of existing and future baseline conditions, legislation and best practice.

2.2 Scope

The Charnwood Air Quality Study was commissioned by CBC in January 2020, led by CBC's Local Plans team.

The overall objectives and outcomes were to:

- Review the existing and emerging air quality and climate change legislation requirements relevant for CBC and the Draft Plan;
- Identify the existing baseline air quality within the Borough, including a summary of Air Quality Management Areas (AQMAs);
- Assess the projected cumulative air quality impact as a result of Option 3 and Option 4 of the emerging low development growth set out in the Draft Plan;
- Define location(s) or allocation(s) with the maximum impact from the emerging development to determine whether there may be an overarching benefit to air quality by re-allocating development sites;
- Summarise emission sources through source apportionment;
- If required, make recommendations:
    - on what measures are required to ensure development does not give rise to significant risks from pollution in locations where air quality is a concern;
    - for opportunities to mitigate impacts on air quality of the development strategy or improve air quality both in the short term and long term;
    - for changes to the Draft Plan policies to further reduce the impacts on air quality and climate change of future development; and

  - how Neighbourhood Plan policies can contribute towards improving ‘air quality’ to help support CBC’s statutory neighbourhood plan obligations.

- Outline a considered view as to whether any new actions are necessary for CBC to consider as part of the Charnwood Air Quality Action Plan and its scope; and
- Provide clarity to the decision making process by assisting CBC to define an ‘unacceptable contribution towards air quality’ for development management purposes.

The geographic area included in the Project encompassed the whole Borough of Charnwood; this includes urban areas between the triangle formed by Nottingham, Leicester and Derby, such as Loughborough, Birstall, Mountsorrel and Shepshed. However, AECOM’s Screening Tool includes traffic data from roads within 5km of the Borough’s boundary, to ensure impacts are not underestimated at the extremities.

2.3 Report Structure

The report is structured as follows:

- Section 2: describes the European and National legislation relevant to the Project.
- Section 3: describes national, regional and local CBC policies for improving air quality.
- Section 4: identification of baseline conditions.
- Section 5: assessment of emerging development strategy.
- Section 6: identification of key areas for air quality.
- Section 7: discussion of the Draft Plan content.
- Section 8: conclusion and recommendations.

3. Legislative Framework

3.1 European Air Quality Directives

The Air Quality Framework Directive (96/62/EC)[1] on ambient air quality assessment and management defines the policy framework for 12 air pollutants known to have a harmful effect on human health and the environment. Ambient concentration limit values for the specific pollutants are set through a series of Daughter Directives.

Following the Daughter Directives, Council Directive 2008/50/EC[2] on ambient air quality and cleaner air for Europe came into force in 2008 and was transposed into national legislation in 2010 (The Air Quality Standards Regulations 2010[3]). It consolidated existing air quality legislation and made provisions for Member States to postpone limit value attainment deadlines and allow an exemption from the obligation to limit values for certain pollutants, subject to strict conditions and assessment by the European Commission (EC).

3.2 National Air Quality Legislation

3.2.1 Air Quality Standards Regulations (2010) (as amended)

The principal air quality legislation within the United Kingdom is the Air Quality Standards Regulations 2010 (as amended by the Air Quality Standards (Amendment) Regulations 2016)[4], which transposes relevant EU Air Quality Directives into national legislation and sets legally binding limits for concentrations in outdoor air of major air pollutants that impact public health such as particulate matter (PM_{10} and $PM_{2.5}$) and nitrogen dioxide (NO_2).

3.2.2 Environment Act (1995)

The provisions of Part IV of the Environment Act 1995[5] establish a national framework for air quality management, which requires all Local Authorities to conduct local air quality reviews. Section 82(1) of the Act requires these reviews to include an assessment of the current air quality in the area and the predicted air quality in future years. Should the reviews indicate that the objectives prescribed in the UK Air Quality Strategy (AQS)[6] and the Air Quality Standards Regulations 2010[3] will not be met, the Local Authority is required to designate an Air Quality Management Area (AQMA). Action must then be taken at a local level to ensure that air quality in the area improves.

The UK Air Quality Strategy (AQS)[6] identifies nine ambient air pollutants that have the potential to cause harm to human health. These pollutants are associated with local air quality problems, with the exception of ozone, which is instead considered to be a regional problem. Similarly, the Air Quality Regulations set objectives, but for just seven of the pollutants that are associated with local air quality. These objectives aim to reduce the health effects of the pollutants to negligible levels.

The air quality objectives and limit values currently applicable to the UK can be split into two groups. Each has a different legal status and is therefore handled differently within the framework of UK air quality policy. These are:

- UK air quality objectives set down in regulations for the purposes of local air quality management; and
- European Union (EU) limit values transcribed into UK legislation for which compliance is mandatory.

3.2.3 UK Plan for Tackling Roadside Nitrogen Dioxide Concentrations

In 2017, the Department for Environment and Rural Affairs (Defra) and Department for Transport (DfT) released the UK plan for tackling roadside NO_2 concentrations[7] as the UK is not compliant with the EU limit values for NO_2. The national plan principally focuses on providing additional funding to local authorities so that local action can be taken to improve air quality in the shortest possible time with measures such as improving bus fleets, support for concessionary travel and sustainable modes of transport and low emission buses. The plan required local

[1] Council Directive (96/62/EC) of 27 September 1996 on ambient air quality assessment and management, Official Journal L 296 , 21/11/1996 P. 0055 - 0063
[2] 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
[3] Defra (2010) The Air Quality Standards Regulations 2010
[4] The Stationery Office Limited, (2016); The Air Quality Standards Regulations (Amended), (2016). Statutory Instrument No. 1001
[5] HM Government (1995) Environment Act
[6] Defra (2007) UK Air Quality Strategy
[7] Defra and DfT (2017) Improving air quality in the UK: tackling nitrogen dioxide in our towns and cities

authorities to set out initial plans by the end of March 2018, followed by final plans by the end of December 2018. Alongside the Defra plan a dataset of Defra's predicted pollutant concentrations along specific roads was published. This dataset is called the Pollution Climate Mapping (PCM) dataset and this is used to inform the assessment of compliance of the proposed Scheme with EU Limit Values.

3.2.4 Clean Air Strategy

In January 2019, Defra published its Clean Air Strategy[8] which outlined proposals to tackle emissions from a range of sources. This included providing clear effective guidance on how AQMAs, Clean Air Zones (CAZ) and Smoke Control Areas interrelate and how they can be used by local Government to tackle pollution.

The UK Clean Air Strategy sets the following reduction targets:

- Fine particulate matter ($PM_{2.5}$) reduction against the 2005 baseline by 30% by 2020, and 46% by 2030;
- Particular matter (PM_{10}) reduction against the 2005 baseline to 50% or less of UK population living in areas with concentrations of (10 µg/m^3) by 2025;
- Ammonia (NH_3) reduce emissions against the 2005 baseline by 8% by 2020 and 16% by 2030;
- Nitrogen oxides (NO_X) reduce emissions against the 2005 baseline by 55% by 2020, and increasing to 73% by 2030;
- Sulphur dioxide (SO_2) reduce emissions against the 2005 baseline by 59% by 2020, increasing to 88% by 2030;
- Non-methane volatile organic compounds (NMVOCs) reduce emissions against the 2005 baseline by 32% by 2020, increasing to 39% by 2030; and
- Ozone (O_3) as secondary pollutant to ensure it does not increase as NO_X reduces and keeps within EU limits.

It is noted within the strategy document that the "*current legislative framework has not driven sufficient action at a local level".* New legislation will seek to shift the focus towards prevention of exceedances rather than tackling pollution when limits have been surpassed. The shift of focus encourages more of a proactive rather than reactive policy framework at regional and local levels on air quality. For local authorities such as CBC, this will mean continuing to strive to reduce air pollution, even if air quality objectives are not currently being exceeded, which should be a key aspiration of the Local Plan.

In long term policy for local councils such as CBC, this is set to emerge in the form of a focus on using cleanest modes of transport, including active travel.

3.3 Local Air Quality Management

Under the requirements of Part IV of the Environment Act (1995)[5], Local Authorities have been responsible for carrying out a phased review and assessment of local air quality since 1998. This responsibility includes the identification of areas at risk of exceeding the air quality objectives as set out above, and declaring an AQMA if required. Once an AQMA has been declared the local authority has a responsibility to make efforts to improve the air quality within it, including publishing Air Quality Action Plans. The work undertaken to date by CBC in this regard is referenced in Section 5.

There is currently no statutory guidance on the method by which an air quality assessment should be undertaken. The Institute of Air Quality Management (IAQM)[9], Environmental Protection UK (EPUK)[10] and Defra[11] have all however published guidance for carrying out air quality assessments for development control purposes.

3.4 Land-use Planning & Development Control: Planning for Air Quality Guidance

Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM) have produced a guidance document[12] on how individual schemes may be considered in relation to air quality. This is not a legal

[8] Defra (2019) Clean Air Strategy
[9] IAQM and EPUK, (2017); Guidance on land-use planning and development control: Planning for air quality. 2017
[10] EPUK, (2010); Development Control: Planning for Air Quality (2010 Update): Update guidance from Environmental Protection UK on dealing with air quality concerns within the development control process.
[11] Department for Environment and Rural Affairs (2016) Local Air Quality Management Technical Guidance (LAQM.TG16)
[12] EPUK & IAQM (2017) Land-use Planning & Development Control: Planning for Air Quality

document however provides useful advice and guidance on land use planning and development control processes on assessing the significance of the impact of new development on local air quality. The document sets out principles of dealing with planning applications, however, it also recognises that decisions made by local authorities have to be made on a case by case basis.

The guidance notes that Supplementary Planning Documents (SPDs) and Guidance (SPGs) can be a very useful tool for providing transparent and consistent advice to developers; these documents can often include significance criteria, which in turn can be used to determine acceptable levels of air quality impact of proposed developments.

The EPUK & IAQM guidance also specifies its own method for determining the significance of the effects arising from air quality impacts, which depends on a number of factors including the long-term average concentration at sensitive receptor locations in the year the development is proposed to be operational and the percentage change in concentration relative to air quality assessment level. This is therefore key when attempting to consider what an unacceptable, or significant, contribution may be to air quality concentrations. The method is not strictly intended to be applied at such a strategic level and the conclusions of this element of the Project should be treated with a appropriate level of caution, but an assessment of significance of impacts near each allocated site using this method is provided to give an indicative feel for likely impacts.

Air quality impacts are considered significant if a development leads to significant impacts at existing sensitive receptors or if air quality objectives / EU limit values are predicted to be exceeded at sensitive receptors. The guidance suggests that a two-stage approach be adopted to determine whether or not a proposed development has a significant impact on local air quality. Firstly, qualitative descriptions are applied to the predicted impacts on local air quality at individual receptors, which is then supplemented by professional judgement about the overall significance of the identified impacts.

In order to assess the potential impacts of a proposed development on local air quality, a description of the impact is given based on the magnitude of change as a percentage of a relevant Air Quality Assessment Level (AQAL). Account must also be taken of predicted pollutant concentrations and their relationship to the air quality objective for the pollutant of concern. Table 1 summarises the impact descriptors for annual mean concentrations. The impact descriptors may be adverse or beneficial depending upon whether concentrations are predicted to increase or decrease.

Table 1. Air Quality Impact Descriptors for Pollutant Concentrations

Annual mean concentration at receptor as percentage of AQAL	Change in concentration relative to AQAL[a]				
	0%	1%	2% – 5%	6% – 10%	>10%
≤75%	Negligible	Negligible	Negligible	Slight	Moderate
76% - 94%	Negligible	Negligible	Slight	Moderate	Moderate
95% - 102%	Negligible	Slight	Moderate	Moderate	Substantial
103% - 109%	Negligible	Moderate	Moderate	Substantial	Substantial
≥110%	Negligible	Moderate	Substantial	Substantial	Substantial

The descriptors presented in in the table above are ascribed to impacts at individual sensitive receptor locations, however they are not, of themselves, a clear and unambiguous guide to reaching a conclusion on significance. The guidance makes it clear that the assessment of significance of the overall impact should be based on professional judgement. Whilst it may be that there are 'slight', 'moderate' or 'substantial' impacts at one or more receptors, the overall impact may not necessarily therefore be judged as being significant in some circumstances. A 'moderate' or 'substantial' impact may not have a significant impact if it is confined to a very small area.

3.4.1 Overall Assessment of Significance

In this way, the significance of the reported likely impacts can then be considered for each of the allocations in the context of anticipated future ambient concentrations, with a focus on determining the significance of any change to the likelihood of future achievement of the air quality objective values.

The achievement of local authority goals for local air quality management is directly linked to the achievement of the air quality objectives and as such this assessment focuses on the likelihood of future achievement of the air quality objectives as a result of the Draft Plan.

3.5 Legislative Uncertainty for the UK

3.5.1 UK leaving the European Union and COVID-19 implications

The UK left the European Union (EU) on 31st January 2020 (exiting the EU is commonly referred to as "Brexit"). Air Quality legislation and policy is currently primarily driven by the EU, as set out in the sections above. Air pollution limits set by the EU technically remain in UK law after Brexit, having been enshrined through the Air Quality Standards Regulations. However, there is concern in some quarters that the EU will no longer have a role in enforcement and the UK Government would therefore be free in theory to repeal the existing limits and introduce weaker air quality rules and review any deadlines for meeting them. Whilst this is presently considered to be unlikely, there is at least a risk of an evolving legislative landscape as a result during the lifetime of the Plan, which CBC will need to keep abreast of.

The coronavirus pandemic (COVID-19) caused the UK Government to enforce rules of social distancing commencing in March 2020; this significantly reduced emissions and improved local air quality, particularly in towns and cities, reiterating the overriding contribution of road transport to urban air pollution[13]. The importance of good air quality is now coming to the forefront of public health, more than at any time in the past; this has been reinforced by recent studies showing those who were exposed to poorer air in the years preceding the pandemic experience far worse outcomes in terms of virus susceptibility than those who have breathed cleaner air.

It is important that a united effort starts planning beyond this event. Many of the changes introduced by social distancing measures may alter public behaviours in the long term and there will be implications of this upon the achievement of long-term positive changes to air quality. CBC may look to use the tragic circumstances of the pandemic as an opportunity to enhance smarter travel choices in the longer term, which will ultimately have a positive impact on local air quality.

Unfortunately, there are no clear indications of exactly what is to happen to air quality legislation moving forward, and so this study must be written on the basis of the existing legislation, and CBC may need to update this over the course of the Plan as policy evolves.

3.5.2 Emerging Environment Bill

The Environment Bill 2019-21[14] was emerging in UK Parliament at the time of writing this report. Air quality is set out as one of four priority areas of environmental targets. The Bill contains a target for $PM_{2.5}$, as follows:

> "*2. Environmental targets: particulate matter*
>
> *(1) The Secretary of State must by regulations set a target ("the $PM_{2.5}$ air quality target") in respect of the annual mean level of $PM_{2.5}$ in ambient air…"*

This target, if it were to remain within the Bill, may not be revoked, but can be further amended. The draft containing the regulation setting the $PM_{2.5}$ target has a deadline of 31 October 2022. The Secretary of State is responsible for achieving of this target and for detailing whether the target has been met.

Schedule 11 of the Environment Bill contains amendments to Part 4 of the Environment Act 1995[5] (air quality).

The following proposed amendments were relevant to the Study:

- Strategies should include consideration to air quality for public authorities, local authorities in England, and county councils, where no district councils exist.
- Local authorities must:
  - identify parts of its jurisdiction which are not likely to achieve air quality standards or objectives;
  - identify relevant sources of emissions which are responsible for the failure to meet air quality standards or objectives;
  - where areas do not achieve these, prepare air quality action plans for that area to

[13] AECOM (2020) Unintended consequences: coronavirus, air quality and transport trends. Available at: https://aecom.com/without-limits/article/coronavirus-air-quality-and-tomorrows-transport/? [Accessed 21/04/2020]
[14] HM Government (2019) Environment Bill 2019-21, Progress through parliament charted at: https://services.parliament.uk/bills/2019-21/environment.html

- set out how the LA will exercise its function to ensure air quality standards and objectives are met, and then maintained; and
- set out particular measures the LA will take to achieve by specific dates.

- There is a duty of air quality partners to co-operate on air quality matters, these must be notified of AQAPs.

This is significant to local authorities, including CBC. Should a target of $PM_{2.5}$ be implemented during the lifetime of the Plan which is in line with other nations and the WHO guideline of 10 µg/m^3, this will need to be carefully planned for.

3.6 Pollutants of Concern

The local air quality review and assessment procedure has identified that NO_2, particulate matter, both PM_{10} and $PM_{2.5}$, and sulphur dioxide (SO_2) are the main pollutants of concern in the Borough due to declared AQMAs. Exceedances of NO_2 have historically been monitored in the Borough, although none have occurred in recent years, and particulates are monitored primarily in relation to Mountsorrel Quarry. SO_2 is also monitored within the Borough, adjacent to the Great Central Railway.

3.6.1 Nitrogen Dioxide

NO_2 and nitric oxide (NO) are both oxides of nitrogen and are collectively referred to as NO_X. All combustion processes produce NO_X emissions, largely in the form of NO, which is then converted to NO_2, mainly as a result of its reaction with ozone in the atmosphere. Therefore, the ratio of NO_2 to NO is primarily dependent on the concentration of ozone and the distance from the emission source.

The Government and the Devolved Administrations adopted two Air Quality Objectives for NO_2 which were to be achieved by the end of 2005. In 2010, mandatory EU air quality limit values on pollutant concentrations were to apply, although it continues to be breached in locations throughout the UK. The EU limit values for NO_2 in relation to human health are the same as the national objectives[6]:

- An annual mean concentration of 40 µg/m^3 (micrograms per metre cubed); and
- An hourly mean concentration of 200 µg/m^3, to be exceeded no more than 18 times per year.

In practice, meeting the annual mean objective has been and is expected to be considerably more demanding than achieving the 1-hour objective. The annual mean objective of 40 µg/m^3 is currently widely exceeded at roadside sites throughout the UK, with exceedances also reported at urban background locations in some major conurbations. Exceedances are associated almost exclusively with road source emissions.

There is considerable year-to-year variation in the number of exceedances of the hourly objective, driven by meteorological conditions which give rise to winter episodes of poor dispersion and summer oxidant episodes. Analysis of the relationship between 1-hour and annual mean NO_2 concentrations at roadside and kerbside monitoring sites indicate that exceedances of the 1-hour objective are unlikely where the annual mean is below 60 µg/m^3 [11].

Exposure to NO_2 is understood to be linked with decreased lung function, growth, increases in respiratory symptoms, asthma prevalence and incidence, cancer incidence, adverse birth outcomes and mortality. However, whilst evidence indicates direct health effects, it is also understood that cumulative effects may occur from exposure to associated pollutants, such as combustion products[15]. Therefore, whilst NO_2 is used as an indicator pollutant, the direct health effects associated with exposure to this pollutant are very complex.

3.6.2 Particulate Matter

Particulate matter is composed of a wide range of materials arising from a variety of sources and is typically assessed as total suspended particulates or as a mass size fraction. Potential background and regional sources include sea-salt, agricultural emissions (e.g. dust from exposure fields), industrial sites, and domestic wood stoves, whilst transport sources are due to combustion products from exhausts, tyre/brake wear, and re-suspended dust from road or rail surfaces.

[15] Committee On The Medical Effects Of Air Pollutants Statement On The Evidence For The Effects Of Nitrogen Dioxide On Health
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/411756/COMEAP_The_evidence_for_the_effects_of_nitrogen_dioxide.pdf

This study considers the annual mean and daily mean air quality objectives, as specified in the 2007 AQS[6] for England, Scotland, Wales and Northern Ireland. Two objectives have been adopted in England and Wales for PM_{10} (fine particulate matter with a diameter of <10 µm), which were to be achieved by the end of 2004:

- An annual mean concentration of 40 µg/m^3 (gravimetric equivalent); and
- A 24-hour mean concentration of 50 µg/m^3 (gravimetric equivalent) to be exceeded no more than 35 times per year.

One objective has been adopted for $PM_{2.5}$ (very fine particulate matter with a diameter of <2.5 µm) in England and Wales which is an annual mean concentration of 25 µg/m^3 (gravimetric). Furthermore, the 2019 Clean Air Strategy[8] includes an objective to reduce $PM_{2.5}$ concentrations across the UK, so that the number of people living in locations above the WHO guideline level of 10 µg/m^3 is reduced by 50% by 2025. Also, as noted above, the emerging Environment Bill 2019-21[14] dictates that a target will be set for annual mean $PM_{2.5}$ by 2022.

Both short-term and long-term exposure to ambient levels of particulate matter are consistently associated with respiratory and cardiovascular illness and mortality as well as other ill-health effects. Particles of less than 10 micrograms in diameter have the greatest likelihood of reaching the thoracic region of the respiratory tract. Here particles may remain resident and therefore have increased likelihood of doing harm.

It is not currently possible to discern a threshold mass concentration below which there are no effects on the whole population's health. Reviews by World Health Organisation and the Committee on the Medical Effects of Air Pollutants[16] have suggested exposure to a finer mass fraction of particles ($PM_{2.5}$, which typically make up around two thirds of PM_{10} emissions and concentrations) give a stronger association with the observed ill health effects, but also warn that there is evidence that the coarse fraction (between PM_{10} – $PM_{2.5}$) also has some effects on health. Therefore, the core focus of this Project is on $PM_{2.5}$, rather than PM_{10}.

3.6.3 Sulphur Dioxide

Sulphur dioxide (SO_2) is a corrosive, acidic gas which is harmful to health and combines with water vapour in the atmosphere to produce acid rain. One of the most significant episodes of increased levels of SO_2 was visible during the London smog in 1952; it has been estimated that between 8,000 and 12,000 deaths were associated with the episode. During recent times, these types of episode are not common; SO_2 sources in the UK are largely from combustion processes, energy generation and domestic burning and have reduced over time following reduction in coal use as a fuel.

Exposure to SO_2 is both a public health and ecosystem preservation concern. It is understood to be associated with asthma and chronic bronchitis and health effects can occur very quickly.

This study recognises that CBC had an AQMA declared for SO_2 and therefore an appreciation of the objectives of this pollutant is provided including the 15-minute, 1-hour and daily mean air quality objectives for SO_2, as specified in the 2007 AQS for England, Scotland, Wales and Northern Ireland as follows:

- A 15-minute mean concentration of 266 µg/m^3 (gravimetric equivalent) to be exceeded no more than 35 times per year, to be achieved by 31 December 2005;
- A one-hour mean concentration of 350 µg/m^3 (gravimetric equivalent) to be exceeded no more than 24 times per year to be achieved by 31 December 2004; and
- A 24-hour mean concentration of 125 µg/m^3 (gravimetric equivalent) to be exceeded no more than 3 times per year to be achieved by 31 December 2004.

Further assessment of SO_2 exposure is however not considered further this in this study.

3.6.4 Air Quality Guidelines and Objectives

Table 2 shows the difference between the WHO guidelines and the UK objectives as described above. The WHO guidelines are health based and are more stringent for particulate matter. This document focuses on the UK objectives as these are the legal criteria which councils need to comply with.

[16] COMEAP (1998). *The Quantification of the Effects of Air Pollution on Health in the United Kingdom. HMSO, London.* Council Directive 2008/50/EC *on Ambient Air Quality and Cleaner Air for Europe.*

Table 2: Comparison of WHO Guidelines and UK Objectives

Pollutant	WHO Guidelines		UK objective	
	Long term	Short term	Annual Mean	Short term
NO_2	40 µg/m^3 Annual Mean	200 µg/m^3 1-hour mean	40 µg/m^3 Annual Mean	200 µg/m^3 1-hour mean To be exceeded no more than 18 times per year.
PM_{10}	20 µg/m^3 Annual Mean	50 µg/m^3 24-hour mean	40 µg/m^3 Annual Mean	50 µg/m^3 24-hour mean To be exceeded no more than 35 times per year.
$PM_{2.5}$	10 µg/m^3 Annual Mean	25 µg/m^3 24-hour mean	25 µg/m^3 Annual Mean	-
SO_2	-	500 µg/m^3 10-minute mean To be exceeded no more than 24 times per year 20 µg/m^3 24-hour mean To be exceeded no more than 3 times per year	-	266 µg/m^3 15-minute mean To be exceeded no more than 35 times per year 350 µg/m^3 1-hour mean To be exceeded no more than 24 times per year 125 µg/m^3 24-hour mean To be exceeded no more than 3 times per year

3.7 Greenhouse Gas Emissions

This study is predominately focussed on local air quality, although it is recognised that emissions of Greenhouse gases (GHG) have been deeply integrated into regional and local polices through a decade of central Government guidance.

The GHG considered in the review focus on those reported in the UK Climate Change Act[17] which includes a target to ensure that the net UK carbon account for the year 2050 is at least 80% lower than the 1990 baseline. The UK Government agreed to a national target of net zero emissions by 2050.

Although GHG and air quality pollutants are both emissions into our atmosphere, the nature of impact is significantly different. Air pollution is often based on the exceedance of local thresholds and the impact on human health based on exposure, and is measured in hours or days. The main GHG CO_2 is measured on global thresholds based on decades, especially given the impact of CO_2 is regional, national and long term.

Co-benefits between air quality and GHG exist, for example the extraction and burning of fossil fuels is the main cause of CO_2 which drives climate change and is also a major source of air pollutants[18]. Therefore, there are many co-benefits around modal shift to lower emission public transport. However, it is recognised that there may be conflicts, such as shifting from diesel to petrol fuel, and so these risks have also been considered.

For this research the potential climate change impacts of GHGs have been considered in the appraisal process, but have not been used as a core outcome from this study.

[17] UK Climate Change Act https://www.legislation.gov.uk/ukpga/2008/27/pdfs/ukpga_20080027_en.pdf (accessed June 2019)
[18] IASS Air Pollution and Climate Change https://www.iass-potsdam.de/en/output/dossiers/air-pollution-and-climate-change (accessed June 2019)

4. Planning Policy and Action Plans

4.1 National Planning Policy

4.1.1 National Planning Policy Framework (2019)

The National Planning Policy Framework[19] (NPPF) outlines the Government's planning policies for England, sets out the framework upon which all Councils determine their planning policy, and as such is relevant to CBC. This NPPF was published in February 2019 and supersedes the previous NPPF published in March 2012 and July 2018. The NPPF sets out a presumption in favour of sustainable development which should be delivered with three main dimensions: economic; social and environmental (Paragraph 8). Within this, mitigating and adapting to climate change and moving to a low carbon economy are examples of meeting the environmental objective and are part of the broader objectives of achieving sustainable development.

The NPPF aims to enable local people and their councils to produce their own distinctive local and neighbourhood plans, which should be interpreted and applied in order to meet the needs and priorities of their communities.

A key component of the revised NPPF is making effective use of land, with a particular focus on 'Achieving appropriate densities'. The revised NPPF aims to standardise the methodology for calculating housing and outlines the approach to the Housing Delivery Test to support local authorities' decision-making. This seeks to ensure that sufficient homes are planned for and built to meet demographic needs. Important factors for local authorities to consider in planning and decision-making include identification of the types of development (including housing) needed, local market conditions, the capacity of existing infrastructure and services and potential for improvements, maintenance of an area's character whilst promoting regeneration and change, and the importance of well-designed, healthy and sustainable places.

In relation to promoting sustainable transport, Paragraph 103 of the NPPF states that:

> *"The planning system should actively manage patterns of growth in support of these objectives. 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."*

With regard to setting of local parking standards, for residential and non-residential development, policies should ensure that the provision of spaces for charging plug-in and other ultra-low emission vehicles are taken into account (Paragraph 105).

Air quality is considered as an important element of the natural environment. On conserving and enhancing the natural environment, Paragraph 170 states that:

> *"Planning policies and decisions should contribute to and enhance the natural and local environment by:*
> *…*
>
> *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 instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality …"*

Air quality in the UK has been managed through the Local Air Quality Management (LAQM) regime using national objectives. The effect of a proposed development on the achievement of such policies and plans may be a material consideration by planning authorities when making decisions for individual planning applications. Paragraph 181 of the NPPF 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*

[19] HM Government (2019) National Planning Policy Framework, Available at: https://www.gov.uk/government/publications/national-planning-policy-framework--2

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."

The different roles of a planning authority and a pollution control authority are addressed by the NPPF in paragraph 183:

"The focus of planning policies and decisions should be on whether proposed development is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). Planning decisions should assume that these regimes will operate effectively. Equally, where a planning decision has been made on a particular development, the planning issues should not be revisited through the permitting regimes operated by pollution control authorities."

With regard to climate change, Paragraph 149 of the NPPF states:

"Plans should take a proactive approach to mitigating and adapting to climate change…in line with the objectives and provisions of the Climate Change Act 2008". Paragraph 151 states that "To help increase the use and supply of renewable and low carbon energy and heat, plans should:

a) provide a positive strategy for energy from these sources, that maximises the potential for suitable development, while ensuring that adverse impacts are addressed satisfactorily (including cumulative landscape and visual impacts);

b) consider identifying suitable areas for renewable and low carbon energy sources, and supporting infrastructure, where this would help secure their development; and

c) identify opportunities for development to draw its energy supply from decentralised, renewable or low carbon energy supply systems and for co-locating potential heat customers and suppliers."

4.1.2 Planning Practice Guidance (2019)

The Planning Practice Guidance (PPG) was first published on the 6th March 2014[20] to provide more in-depth guidance to the NPPF. The PPG aims to make planning guidance more accessible, and to ensure that the guidance is kept up to date. As such, the PPG was amended in July 2017 to reflect the updated EIA Regulations, and subsequently revised more recently in 2019.

The PPG explains the role of air quality within plan-making, noting specifically that it is important to take AQMAs, Clean Air Zones and ecologically sensitive sites into account. It guides that the following may need to be considered when creating a local plan:

- Observed trends in air quality monitoring and what the proposed development allocations may impact on future air quality;
- Impact of stationary sources of air pollution;
- Cumulative impact potential, including impact on vehicular emissions;
- Exploring areas of proposed development allocation which may present air quality concerns and investigating whether it is possible to mitigate so that there are no longer unacceptable risks from pollution. Examples include measures to offset impact, using air quality action plans or low emissions strategies; and
- Identifying opportunities to improve air quality or mitigate impacts. Examples given include through traffic and travel management, green infrastructure provision and enhancement.

The PPG sets out what air quality assessments submitted as part of a planning application should contain. This is directly relevant to those interventions that will require planning permission.

The PPG provides examples for mitigating climate change by reducing emissions, and for adapting to a changing climate and notes that an integrated approach is integral for addressing climate change.

[20] HM Government (2016) Planning Practice Guidance, Available at: https://www.gov.uk/government/collections/planning-practice-guidance

4.1.3 Other Relevant National Policy

National policies relevant to improving air quality in Charnwood are set out below in Table 3.

Table 3: Summary of Relevant Policy

Policy Document	Summary	Relevance to Air Quality in CBC
Department for Transport (DfT) Air Quality – Clean Air Zone framework for England (May 2017) [21].	This framework sets out the principles local authorities should follow when setting up Clean Air Zones in England. It explains the approach they should take if they are introducing a zone to improve air quality, and the types of measures they should include.	Provide a framework for implementing a CAZ where the national modelling approach has identified potential exceedances of the air quality objective.
HM Government "Clean Growth Strategy" (Oct 2017) [22].	This strategy sets out the Government's proposals for decarbonising all sectors of the UK economy through the 2020s. It explains how the whole country can benefit from low carbon opportunities, while meeting national and international commitments to tackle climate change. It complements the Government's Industrial Strategy, Air Quality Plans.	There are many co-benefits around low carbon opportunities and air quality such as modal shift to lower emission public transport. There may however be conflicts between the strategy and air quality, such as shifting from diesel to petrol fuel.
Department for Transport (DfT) HGV Road User Levy (2017)[23]	In this document, the DfT specifically recognises local air quality and climate change as key factors in managing freight and congestion, and introduces the proposed plans for a long-term strategy for zero emission road transport expected in March 2018.	While HGVs represent a small percentage of road vehicles, each vehicle has a high emission rate, making them an important target for reducing overall emissions.
Department for Environment, Food & Rural Affairs (Defra) The Right Tree in the Right Place for a Resilient Future (2018)[24]	The urban tree manual is a guide intended to support local authorities, charities, community groups and land owners in selecting and procuring the right tree for the right place in urban areas.	Green infrastructure and planting is a major part of the place-making theme, and can represent a viable supporting means to reduce exposure and atmospheric pollutants.

4.2 Regional Policy and Strategies

Leicestershire County Council's (LCC) geographic area encompasses seven districts surrounding Leicester City Council - a unitary authority, as follows:

- Blaby District Council;
- Charnwood Borough Council;
- Harborough District Council;
- Hinckley & Bosworth Borough Council;
- Melton Borough Council;
- North West Leicestershire District Council; and
- Oadby & Wigston Borough Council.

The Leicester & Leicestershire Strategic Growth Plan[25] was prepared by a partnership between ten organisations, including; Leicester City, LCC, the seven boroughs and districts (as above), and the Leicester & Leicestershire Enterprise Partnership.

Table 4 outlines the main policies and strategies regarding land use and transport infrastructure in the LCC region, in order or publication. Land use and transport infrastructure main policies and strategies are frameworks which influence travel behaviour and the associated impacts of local air quality. Details of each document are in Appendix B.

[21] Defra (2017) Clean Air Zone Framework Principles for setting up Clean Air Zones in England
https://www.gov.uk/government/publications/air-quality-clean-air-zone-framework-for-england
[22] HM Government (2017) The Clean Growth Strategy Leading the way to a low carbon future
https://www.gov.uk/government/publications/clean-growth-strategy
[23] Dept. for Transport (2017) Reforming The HGV Road User Levy: Call For Evidence
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/661814/reforming-hgv-road-user-levy.pdf
[24] DEFRA (2018) The Right Tree in the Right Place for a Resilient Future
[25] Leicester & Leicestershire Strategic Growth Plan (2018) Leicester & Leicestershire 2050: Our Vision For Growth

Table 4: Summary of LCC Strategies

Strategy Document	Summary of Document	Relevance to Air Quality in CBC
Leicestershire Local Transport Plan 3 (2014)[26]	Sets out how the transport system will be managed, focussing on the strategic approach, rather than by identifying specific infrastructure schemes. The document lists the three most significant areas to help reach the strategic transport goal of improving the quality of life of residents, including climate change, air quality, and vehicle speed and noise. The document shows that the prior LTP strategies have led to an increase in bus use, cycling, and walking. Encouraging more active and sustainable travel is described as one of the most important activities that the LTP will pursue.	There is a dedicated section describing the 2014 state of air quality following implementation of the LTP 2 Air Quality Strategy, and a discussion of the worsening air quality. The negative impact of lorry movements on air quality is noted as a key issue and the importance of air quality and the health risks associated is highlighted within the encouraging active and sustainable travel section of the document. It is recognised that data shows that transport emissions are one of the largest contributors to poor air quality in Leicestershire. It is noted that the work on the Loughborough Town Centre Transport Improvement Scheme is underpinning the strategy to improve air quality issues within the town. More understanding of the relationship between transport emissions and the level of air quality in the AQMAs is noted as important. Measures to address air quality issues are listed as reducing congestion by relying on schemes in the longer term, and in the shorter term, looking at air quality hotspots when prioritising smaller works, and reducing the use of personal cars by including consideration of travel demand within planning process requirements, and ensuring that the planning process takes the impact of developments upon AQMAs into account.
Annual Report of the Director of Public Health 2017[27]	Annual reports of the Director of Public Health give broad overviews of health in Leicestershire with a different focus each year. The most recent report was 2019 which focussed on physical activity. The 2017 report focussed on a new insight into the population of Leicestershire's health.	Recommendations are given for the strategic direction on air quality and health, noted to be an 'emerging risk'. The document references the Public Health England 2014 publication 'Estimating Local Mortality Burdens Associated with Particulate Air pollution'[28] which concluded that over 300 deaths in Leicestershire can be linked to $PM_{2.5}$ pollution and that when added to the figures for NOx, the total could be around 430 deaths each year. Encouraging active travel is favoured for Leicestershire is the main resulting recommendation; this is supported in the most recent 2019 Annual Report of the Director of Public Health[29].
Leicestershire County Council's Strategic Plan 2018-22 (December 2017)[30]	The Strategic Plan sets out the objectives for the 2018-2022 period and a high-level overview of a number of strategies planned with a vision of "Working together for the benefit of everyone". Strong Economy, Wellbeing and Opportunity, Keeping People Safe, Great Communities, Affordable and Quality Homes are the strategic outcomes from the vision.	A number of the outcomes refer to protecting the environment; better air quality management at the local level has a role to play to achieve these outcomes.
Environment Strategy 2018 – 2030: delivering a better future (June 2018) [31]	The Environment Strategy recognises the significant decline in the natural environment due to anthropogenic impacts. The document provides a framework for action up until 2030 and provides an understanding of how the Environment Strategy contributes to the LCC Strategic Plan 2018-22[30]. The strategy sets out a target reduction of GHGs and focuses on six key areas that LCC have identified as being able to support wider action on the environment and climate change.	The strategy contributes to the LCC Strategic Plan 2018-22[30] including the support of action to improve air quality and reduce the health impacts and number of deaths associated with poor air quality in the 'Wellbeing and Opportunity' and 'Keeping People Safe' Strategic Plan outcomes. The Environment Strategy includes a target to reduce LCC GHG emissions by 38% by 2030.
Leicester & Leicestershire Strategic Growth Plan (December 2018)[25]	A non-statutory plan which sets out the agreed strategy for the period up until 2050, to be delivered through the Local Plans. Broad locations for development are identified and the required infrastructure to support it.	The document recognises that there needs to be a balance between the need for new housing and jobs and the protection of the environment and built heritage and sets this as one of the strategy's four priorities. Congestion is referred to as one of Leicester & Leicestershire's weaknesses and investment in road and rail schemes is noted to allow the reduction of congestion on the rest of the network. Reductions in congestion may in turn, reduce air quality issues.

[26] Leicestershire County Council (2014) Local Transport Planning in Leicestershire 2011-2026 - Leicestershire Local Transport Plan 3
[27] Leicester-shire & Rutland Statistics & Research (2017) 2017 Annual Report of the Director of Public Health
[28] Public Health England (2014) Estimating Local Mortality Burdens Associated with Particulate Air pollution
[29] Leicester-shire & Rutland Statistics & Research, (2019) 2019 Annual Report of the Director of Public Health.
[30] Leicestershire County Council (2017) Leicestershire County Council's Strategic Plan 2018-22
[31] Leicestershire County Council (2018) Environment Strategy 2018 – 2030: delivering a better future

Strategy Document	Summary of Document	Relevance to Air Quality in CBC
Leicestershire Joint Strategic Needs Assessment – Air Quality and Health Chapter (May 2019) [32]	The Air Quality and Health Chapter of the document reviewed the needs of the Leicestershire population in relation to air quality. It describes 'pockets of high deprivation' throughout Leicestershire. An area within Loughborough (Loughborough Bell Foundry) falls into the lowest quintile nationally for both deprivation as well as outdoor environment indicator. The document finds that there is a variation in the number and types of measures across District Councils in Leicestershire to improve air quality and that there is no clear prescribed method for engagement with organisations or the public on air quality issues. There are opportunities for better public understanding of air quality which may reduce emissions. The document recommends that 'the Leicestershire Air Quality and Health Partnership Steering Group should agree a plan to deliver joint actions to tackle poor air quality and related health issues' where all partners commit to deliver over three years.	The document recommends six objectives for the plan: 1. Clear leadership, vision and strategic direction – with the use of AQAPs, and engagement 2. Collaborative partnership and working 3. Consideration of air quality and health in planning and development 4. Aligning air quality and health with environment and transport decisions 5. General communication with the public and organisations about air quality and health 6. Targeted communication and campaigns with priority groups and key organisations about air quality and health Should the above six objectives form the basis of the plan of the Leicestershire Air Quality and Health Partnership Steering Group, CBC will be required to adhere to measure which result from this. The document also identifies each District Council's initiatives to improve air quality, to include CBC.

4.3 Local Policy

4.3.1 Charnwood Local Plan 2011 to 2028 Core Strategy, Adopted Plan

The Charnwood Local Plan 2011 to 2028 Core Strategy[33] was adopted in November 2015 to provide a strategy for development and growth up until 2028. The document provides the vision, objectives and strategic policies set out to deliver growth for CBC and to shape the development, infrastructure and influencing economic investment decisions. The development plan also includes the saved policies of the 2004 Borough of Charnwood Local Plan.

Increased traffic volumes and congestion and global climate change are included in the list of key challenges for the Borough. The vision for Charnwood includes housing demand being focussed on Loughborough and the edge of Leicester, a more walkable Loughborough, and a cleaner and greener environment where reference is made to reducing greenhouse gases.

Policy CS 1 'Development Strategy' sets out development requirements, and makes provision for, at least 13,940 homes, 75 hectares of employment land which are both predominantly Leicester Principal Urban Area based, and a 77 hectare extension to the Science and Enterprise Park.

Strategic objective 7 refers to reducing contributions to climate change and achieving a carbon neutral Borough. A number of strategic objectives within the document are based around improving transport connections such as reducing car use and other measures to reduce environmental impact, including climate change. As such, there are a number of policies with measures that underpin the reduction of car use and/or the efficiency of the road network; these include:

- Policy CS 6 Employment and Economic Development;
- Policy CS 9 Town Centres and Shops;
- Policy CS 12 Green Infrastructure;
- Policy CS 16 Sustainable Construction and Energy;
- Policy CS 17 Sustainable Travel;
- Policy CS 18 The Local and Strategic Road Network;
- Policy CS 19 North East of Leicester Sustainable Urban Extension;

[32] Leicestershire County Council (2019) Leicestershire Joint Strategic Needs Assessment 2018-2021 – Air Quality And Health Chapter

[33] CBC(2015) Charnwood Local Plan 2011 to 2028 Core Strategy, Available at: https://www.charnwood.gov.uk/files/documents/adopted_core_strategy

- Policy CS 20 North of Birstall Direction of Growth;
- Policy CS 22 West of Loughborough Sustainable Urban Extension; and
- Policy CS 23 Loughborough University and Science & Enterprise Park.

There are two policies which directly relate to emissions, Policy CS16 'Sustainable Construction and Energy' and Policy CS 22 'West of Loughborough Sustainable Urban Extension', as below.

Policy CS 16 Sustainable Construction and Energy refers to mitigating against climate change effects by several measures, including:

- *"…encouraging developments to, where viable, exceed Building Regulations for carbon emissions by prioritising measures that reduce the need for energy and secure residual need for energy through low carbon or renewable sources;*
- *requiring the Design and Access Statements for major developments to demonstrate how the need to reduce emissions has influenced the design, layout and energy source used…;*
- *…supporting commercial, community and domestic scale renewable energy or low carbon energy developments where they contribute towards our target of at least 27.5MWe, having regard to the impact upon the wider landscape, biodiversity, the historic environment, public safety, noise, odour and other amenity considerations;*
- *in the case of proposals for wind energy development involving one or more wind turbines, planning permission will only be granted if:*
  - *the development site is in an area identified as suitable for wind energy in the Site Allocations and Development Management Development Plan Document or a Neighbourhood Plan; and*
  - *following consultation, it can be demonstrated that the planning impacts identified by affected local communities have been fully addressed and therefore the proposal has their backing…;*
- *…supporting new development that protects environmental resources including local air quality and our most versatile agricultural land."*

Policy CS 22 West of Loughborough Sustainable Urban Extension has a number of measures set out to achieve a safe, high quality and accessible environment including the following with relevance to air quality and climate change:

- *"…encouraging the development to, where viable, exceed Building Regulations for carbon emissions in accordance with Policy CS16…*
- *…including appropriate measures to mitigate any noise and air quality impact from the M1 Motorway…"*

4.3.2 Draft Charnwood Local Plan 2019-2036

The Draft Charnwood Local Plan 2019-2036[34] has been prepared to align with the new Leicester & Leicestershire Strategic Growth Plan[25] and new evidence of the need for homes and jobs. The Draft Plan was published for a six-week consultation period in November 2019.

Within Chapter 3 of the Draft Plan, the intention to 'improve local air quality' is stated as a key objective, within those set out for preserving the Environment, though there is little explicit reference to air quality currently within the Draft Plan as it currently stands in order to achieve this objective. Reducing and adapting to climate change impacts and reducing net greenhouse gas emissions to achieve a carbon neutral Borough are also included as Environment objectives. The development of transport infrastructure to reduce environmental impact and reducing car use is included within the objectives set out for the Development Strategy; these have the potential to impact on air quality.

Climate change, design and health are noted as key themes that cross all social, economic and environmental objectives.

[34] CBC (2019) Draft Charnwood Local Plan 2019-36, Available at: https://www.charnwood.gov.uk/files/documents/draft_charnwood_local_plan_2019_36

There are a number of items within the Draft Plan to reflect the new development strategy and new policies to help achieve the Draft Plan's objectives. Housing provision over the plan period is expected to focus on Loughborough, and the edge of Leicester.

Draft Policy LP 1 'Development Strategy' states that the most environmentally sensitive areas will be protected and that development proposals are to be supported which minimise the need to travel and contribute to mitigating and adapting to climate change. It is also stated that development proposals should conserve and enhance the built and natural environment. This policy is based around urban concentration and intensification. It notes a provision for at least 19,716 new homes between 2019 and 2036 over the spatial area contained within Table 5 below. It also dictates the provision for

- up to 77.9 hectares of employment land between 2019 and 2036;
- Up to 77 hectares for the extension of Loughborough Science and Enterprise Park; and,
- Between 3,000m^2 and 4,500m^2 (net) of comparison retail floorspace.

Table 5. New Home Provision as per Draft Policy LP 1 'Development Strategy'

	Number of homes	Share of Housing Provision
Leicester Urban Area (Birstall, Syston, Thurmaston)	7,056	36%
Loughborough Urban Centre	6,331	32%
Shepshed Urban Area	2,871	15%
Services Centres (Anstey, Barrow upon Soar, Mountsorrel, Quorn, Rothley, Sileby)	2,490	13%
Other settlements	945	5%
Small villages and Hamlets	23	0.1%
Total	**19,716**	100%

Source: Draft Charnwood Local Plan 2019-36

Figure 1 in Appendix A presents the proposed housing and employment allocations as part of the Draft Plan.

As with the current Adopted Plan, there are several policies set out for transport and infrastructure improvements which have the potential to impact on the air quality and climate change position, including:

- Draft Policy LP 12 Meeting Employment Needs;
- Draft Policy LP 17 Town Centres and Retail;
- Draft Policy LP 21 River Soar and Grand Union Canal Corridor;
- Draft Policy LP33 Sustainable Transport;
- Draft Policy LP34 Local and strategic Road Network;
- Draft Policy LP 35 Car Parking Standards; and
- Draft Policy LP 36 North of Birstall Sustainable Urban Extension.

The specific measures within these policies identified that are relevant to the context of air quality and climate change are as follows:

- reducing car use;
- increasing efficiency of the road network and reducing traffic congestion;
- ensuring that all development proposals consider sustainable travel and produce a transport assessment, include mitigation and consider cumulative impacts;
- ensuring that development proposals include the provision of electric vehicle charging points for residential and non-residential developments. CBC include a promise to deliver infrastructure for electric vehicles and ensure charging points are provided at appropriate locations; and,
- securing new and enhanced bus services serving major developments to ensure the new development is no more than a 400m walk from a bus stop.

There is a chapter dedicated to climate change (Chapter 8) and addressing the issues associated with it. It is noted within Chapter 8 that the Borough is aware of issues surrounding air quality and that the policies proposed on Sustainable Construction and Sustainable Transport seek to also address activities which may negatively impact air quality. This is backed up by showing that the promotion of walking and cycling will reduce congestion and road emissions which will in turn improve air quality in local communities.

Draft Policy LP 30 'Sustainable Construction' states that to adapt to and mitigate against the effects of climate change, CBC will be *"supporting new development that protects environmental resources including local air quality and our most versatile agricultural land"*.

Recommendations for improvements to the Draft Plan are discussed in Section 7. Appendix C contains comments received on the Draft Plan in relation to air quality.

4.3.3 Other Relevant Local Policy

Table 6 outlines the main policies and strategies regarding land use and transport infrastructure at the local level which have the potential to impact on local air quality. Details of each document are in Appendix D.

CBC identified four Priority Neighbourhoods, based on deprivation data, in Loughborough East, Loughborough West, Mountsorrel and South Charnwood; information on these has been included in Appendix E.

A Sustainable Transport Study[35] is running concurrent to this Project. Following a high-level review of the draft report, it is evident that the study is considering air quality in this process. Travelling by car is noted to be lower in Loughborough where there is a higher proportion of walking to work than the rest of Charnwood, however bus use is more common on the fringes of Leicester than in Loughborough or the rest of Charnwood.

Table 6: Summary of Key Local Documents

Document*	Summary of Document	Relevance to Air Quality
Charnwood Economic Development Strategy 2018-2020 (2018)[36]	Sets out the approach to create a strong economy for the Borough including the development of sustainable practices.	The development of sustainable practices improves efficiency in the effort to reduce overall environmental impact, to include air quality.
Charnwood Local Plan Sustainability Appraisal: Spatial Strategy, Second Interim Report, October 2019[37]	Gives an evaluation of the site-specific options scenarios and of the draft Plan, identifying whether draft policies are positive or negative and their effect significance. The document overall determines that the improvements proposed by the Plan would offset the negative effects of the development proposed in Loughborough and Shepshed.	There is a dedicated air quality section within the appraisal document which determines a minor negative effect due to the possibility of causing an increase in exposure to poor air quality and possible delay to the revoking of an AQMA. The document makes a recommendation to air quality to require development within AQMAs to include appropriate mitigation measures.
Charnwood Carbon Management Plan 2015 – 2020[38]	This sets out the commitment of the CBC to reduce their carbon footprint from 2,132 tonnes of CO_2 to 1,812 tonnes and aims to embed carbon management across Charnwood, with a top down approach	Reducing CO_2 emissions can cause a follow-on impact air quality.
Charnwood Renewable and Low Carbon Study, November 2018[39]	The document concludes that there is a significant potential for wind, solar, energy from waste, district heating, biomass and microgeneration in Charnwood, but little potential for small scale hydro. The most suitable areas for potential for large and very large wind are identified within rural areas to the north and east of Charnwood, whereas extensive areas throughout the Borough are noted for freestanding solar PV developments.	A further move towards supplying electricity or heat without combustion can contribute to improvements in air quality. However, renewable technologies that rely on combustion processes lead to air emissions is an important consideration.

[35] WYG (2020) Charnwood Sustainable Transport Study Evidence Base Report Draft
[36] Charnwood Borough Council (2018) Charnwood Economic Development Strategy 2018-2020
[37] AECOM (2019) Charnwood Local Plan Sustainability Appraisal: Spatial Strategy, Second Interim Report, October 2019
[38] Charnwood Borough Council (2015) Charnwood Carbon Management Plan 2015 – 2020
[39] LUC (2018) Charnwood Renewable and Low Carbon Study

Document*	Summary of Document	Relevance to Air Quality
Neighbourhood Plans	There are 12 Parish Councils listed within the Neighbourhood Planning section of the CBC website: Thurscaston and Cropston, Barrow upon Soar, Thrussington, Quorn, Sileby, The Wolds, Rearsby, Rothley, Queniborough, Woodhouse, Anstey and Cossington. At the time of writing this report, documentation is not available for all designated Plans.	Quorn Parish Council[40] identifies air quality within Policy Env 9 as one of the aspects which renewable energy generation infrastructure will not have an adverse impact. Queniborough Parish Council recognises air quality as an issue within their pre-submission neighbourhood plan[41] under Transport and references the Syston AQMA, despite being outside of Queniborough, but within an impactable area. Policy Q16: Design dictates that development must not significantly adversely affect the air quality amenity of residents. No other neighbourhood plan refers directly to air quality however the introduction of green infrastructure mirrored in many documents has relevance to air quality such as: vegetation has the potential to improve air quality on a larger scale; creates barriers between exposure pathways and alter dispersion of emissions; pollution deposition and absorption debates amongst research suggest that green infrastructure should be a supplementary solution rather than a primary solution; and canyon effects can be enhanced or weakened based on the shape of the canopy, highlighting the importance of deliberate planning and maintenance of green infrastructure.

*Carbon neutral planning is currently being undertaken by private consultants on CBC's behalf. Projects arising from this work could be quite significant in achieving carbon savings, but results were not available to review at time of writing

4.4 Air Quality Action Planning

CBC published an Air Quality Action Plan (AQAP) in 2006 and measures have been subsequently updated in Annual Status Reports; these highlight options and measures reasonably available to improve air quality. Measures considered by the Borough to improve air quality contain but are not limited to the Inner Relief Road / Mountsorrel Dust Management Plan; the Adopted Plan; Staff travel schemes; and travel planning to promote alternative travel.

Table 7. Existing measures and progress to improve air quality in Charnwood Borough Council

Measure	EU category	Progress
6% Shift from travel by private car to walking, cycling and public transport (Charnwood Local Plan 2011 to 2028 Core Strategy)	Policy guidance and development control	On-Going
Loughborough Eastern Gateway Project	Transport Planning and Infrastructure	Scheme completed. Continuing review
Loughborough Inner Relief Road	Transport Planning and Infrastructure	Scheme completed. Continuing review
Epinal Way Junction	Traffic management	Scheme completed. Continuing review
Mountsorrel Quarry Dust Management Plan (DMMP)	Environmental Permits	Continuing review
Staff car sharing scheme	Alternatives to private vehicle use	-
CO_2 banding for staff car parking allowance / permits	Traffic management	-
Taxi Testing to comply with VOSA requirements	Vehicle Fleet Efficiency	-
Civil Parking Enforcement	Traffic management	Unknown
Home Working	Promoting Travel Alternatives	Unknown
Workplace Challenge Scheme	Promoting Travel Alternatives	Annual
Evaluation of fewer parking spaces or higher charges to restrain car access to work or shops	Traffic management	-
Investment in cycle route network to reach all parts of Loughborough	Transport Planning and Infrastructure	Unknown
Increasing bus travel through work on Quality Bus Partnership (QBP)	Alternatives to private vehicle use	Unknown

[40] Charnwood Borough Council (2019) Quorn Parish Council Neighbourhood Plan Referendum Version final. Available at https://www.charnwood.gov.uk/files/documents/quorn_neighbourhood_plan_final_version/Quorn%20Neighbourhood%20Plan%20Final%20Version.pdf

[41] Queniborough Parish Council (2019) Queniborough Neighbourhood Plan 2019-2028 Pre-Submission. Available at: https://www.queniboroughpc.org.uk/uploads/queniborough-neighbourhood-plan-pre-submission-v4d.pdf

Measure	EU category	Progress
Increasing travel by train with bus connections to town centre and key destinations	Promoting Travel Alternatives	Unknown
Personalised Travel Planning and Accessibility Team set up to promote sustainable travel choices	Promoting Travel Alternatives	Unknown
Network management for roadworks, incidents, and planned events	Other	-
School Travel Planning	School Travel Plans	-
Providing more consistent and reliable journey times	UTC, Congestion management, traffic reduction	-

Source: 2018 and 2019 ASR CBC

5. Baseline Conditions

The following section provides an overview of existing air quality to gain an understanding of pollutant concentrations and trends across Charnwood.

5.1 Local Air Quality Management

As discussed in Section 2, local authorities are required under Part IV of the Environment Act to carry out a phased review and assessment of local air quality. This responsibility includes the identification of areas at risk of exceeding the air quality objectives and declaring an AQMA if required.

A total of four AQMAs have been designated across Charnwood as illustrated in Figure 2, Figure 3 and Figure 4 in Appendix A. These have been declared either because of emissions from transport or from local industry:

- Loughborough - declared in 2001 (amended in 2004) for exceeding the annual NO_2 mean of 40 µg/m^3;
- Syston - declared in 2001 (amended in 2004) for exceeding the annual NO_2 mean of 40 µg/m^3;
- Great Central Railway (GCR) - declared in 2001 for exceeding the 15-minute SO_2 mean of 266 µg/m^3 more than 35 times in a year; and
- Mountsorrel - declared in 2011 for exceeding the 24-hour PM_{10} mean of 50 µg/m^3.

$PM_{2.5}$ is currently only considered in the Borough by converting monitored PM_{10} via the LAQM.TG(16)[11] ratio.

5.1.1 Air Quality Monitoring

With reference to CBC's 2019 Annual Status Report[42], CBC used four automatic monitoring sites and 48 diffusion tube sites to monitor air pollutant concentrations in 2018. The monitoring network is shown in Figure 5, Figure 6, Figure 7 and Figure 8 in Appendix A. The Loughborough air quality monitoring station is shown in Figure 9.

Figure 9 - Loughborough Air Quality Monitoring Station

No exceedances of the annual or hourly NO_2 mean were monitored in 2018, where the highest concentration recorded was 33.9 µg/m^3 (DT27) and after distance correcting to relevant exposure, this was 23.4 µg/m^3. There were also no exceedances of annual or hourly PM_{10} means, and the highest annual mean concentration was 25 µg/m^3. Short-term monitored concentrations i.e. 1-hour, 24-hour and 15-minute SO_2 means were also not exceeded in 2018.

[42] Charnwood Borough Council, (2019) *Annual Status Report 2019*

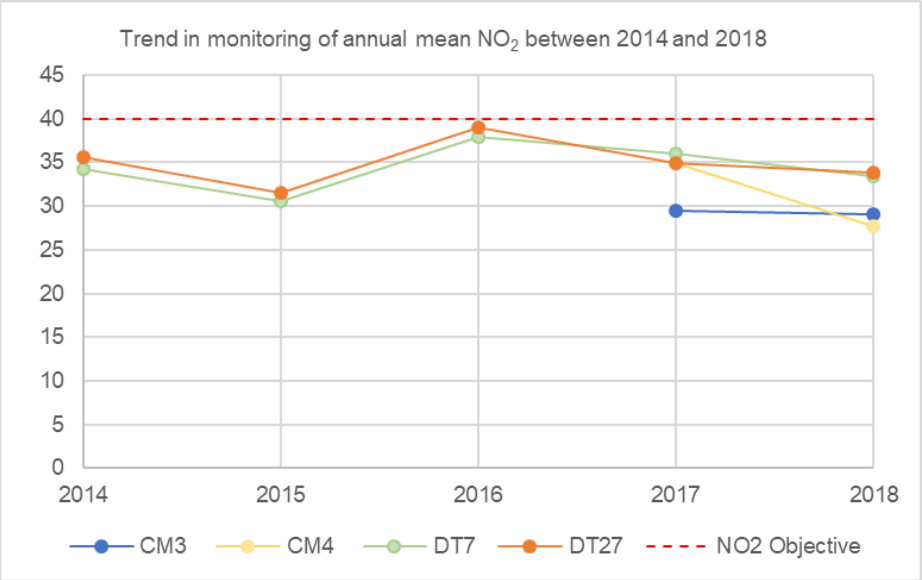
Table 8 presents the automatic monitoring location site parameters, and Figure 10 the trends in concentration at the sites monitoring NO_2 and PM_{10}, as well as two diffusion tube sites with the highest NO_2 concentrations recorded in 2018, located to the west of the motorway near Shepshed (DT27) and in central Loughborough (DT7). There is a downward trend in NO_2 concentrations monitored since 2016 in this data which is also reflected in the overall trend of the remaining NO_2 diffusion tube monitoring data within the CBC 2019 Annual Status Report[42].

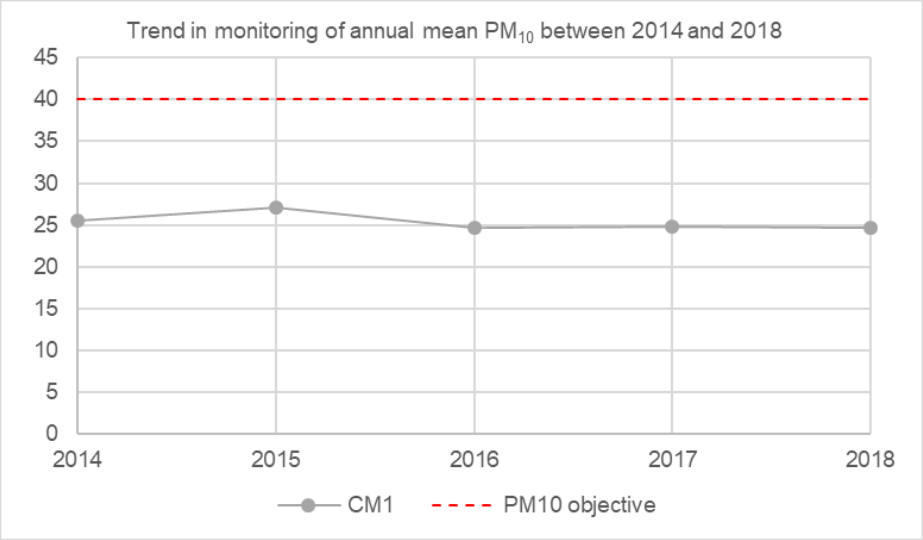
Table 8. Automatic Air Quality Monitoring Locations

Site ID	Site Name	Site Type	X	Y	Pollutants Monitored	In AQMA?	Distance to relevant exposure (m)
CM1	Mountsorrel	Industrial	457355	315396	PM_{10}	Yes	~34
CM2	Great Central Railway	Industrial	454380	319768	SO_2	Yes	0
CM3	Baxter Gate (Loughborough) AQMA	Kerbside	453687	319672	NO_2	Yes	N/A
CM4	Syston AQMA	Roadside	462540	311428	NO_2	Yes	~10

Source: Charnwood Borough Council Annual Status Report (2019)[42]

Figure 10 - Air Quality Monitoring Trends





Source: Charnwood Borough Council Annual Status Report (2019)[42]

CBC have recently stated the intention to revoke the Syston AQMA following a number of years of low NO_2 annual mean concentrations; however, evidence is considered to be too limited to assess the long-term impacts of the Inner Relief Road / Mountsorrel Dust Management Plan to consider revoking the other AQMAs at time of writing.

The above indicates that although there are AQMAs within the Borough, air quality appears to be improving, and the Local Plan should be cognisant of this. However, some pollutants are not currently quantified, for example $PM_{2.5}$, which is expected to be a greater focus of national policy throughout the lifetime of the Plan.

5.1.2 Air Quality Background Concentrations

Modelled estimations of background air quality concentrations are provided by Defra for each 1 km square in the UK for each year between 2017 and 2030[43]. Background concentrations for the whole County have been taken from Defra's background maps for the years 2016 (using 2015-based maps) and 2024 (to represent, conservatively, 2036) and used within the Screening Tool to determine total predicted pollutant concentrations.

Background road contribution to pollutant concentrations were not removed from the total figures, essentially double counting the road contribution to ensure a conservative assumption was taken.

Figures 11 to 14 in Appendix A present the regional distribution of NO_2 and $PM_{2.5}$ in 2018 (representing the most recent year of monitoring available) and 2024 (conservatively representing 2036 future scenario) as the latest projected available year and are a notable improvement from 2018 (representing current) background concentrations.

There are no exceedances of the relevant objectives within the background data. Background NO_2 concentrations reach a maximum of 20 µg/m^3 in 2018 and 17 µg/m^3 in 2024 and whilst background $PM_{2.5}$ concentrations reach a maximum of 11 µg/m^3 in 2018 and 10 µg/m^3 in 2024. Should a more stringent $PM_{2.5}$ objective be enforced as a result of the Environment Bill, background levels already being around 10 µg/m^3 may mean that a large proportion of the Borough will be exceeding.

Unsurprisingly, the more elevated concentrations centre around the existing urban centres such as Loughborough and towards the City of Leicester for NO_2 and $PM_{2.5}$. PM concentrations are also elevated near junction 23 of the M1, associated with increased vehicular movements and the brickworks in this area.

5.2 Public Health

Public Health England produces the Public Health Outcomes Framework[44]. This source has been consulted and the indicator for the fraction of mortality attributable to particulate air pollution in CBC in 2018 was 5%. This is very similar to both the value for the East Midlands region (4.9%) and England as a whole (5.2%).

5.3 Greenhouse Gas Emissions

Greenhouse Gas (GHG) emissions are considered on a regional and national basis, rather than as a local issue, such as NO_x. These data are published by the UK National Atmospheric Emission Inventory (NAEI).

The NAEI for 2017[45] totals CO_2 data by local authority. The data for the map can be downloaded from the UK local authority and regional CO_2 emissions national statistics website[46]. Table 9 presents the CO_2 emissions in Charnwood by sector; 908 kt CO_2 is emitted in the Borough, with a per capita emission of 5 kt CO_2.

Table 9. Local CO_2 emissions by Sector

Sector Name	CO_2 (kt) 2017
Industry & Commercial Electricity	110
Industry and Commercial Gas	119
Large Industrial Installations	3
Industrial & Commercial Other Fuels	74

[43] Department for Environment Food & Rural Affairs (2017), *Background mapping data for local authorities – 2017.* Available at: https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2017 [Accessed 13/02/2020]
[44] Public Health England, Public Health Profiles. Available from: https://fingertips.phe.org.uk/search/pm#page/1/gid/1/pat/6/par/E12000004/ati/101/are/E07000130/iid/30101/age/230/sex/4 Accessed: 12/02/2020
[45] UK National Atmospheric Emissions Inventory. https://naei.beis.gov.uk/laco2app/ Accessed: 13/02/2020
[46] UK local and regional CO_2 emissions 2005-2017. Published June 2019. https://www.gov.uk/government/statistics/uk-local-authority-and-regional-carbon-dioxide-emissions-national-statistics-2005-to-2017 Accessed: 13/02/2020

Sector Name	CO_2 (kt) 2017
Agricultural Combustion	7
Domestic Electricity	67
Domestic Gas	182
Domestic Other Fuels	7
Road Transport (A Roads)	179
Road Transport (Motorways)	57
Road Transport (Minor Roads)	87
Diesel Railways	17
Transport Other	7
Land Use, Land Use Change and Forestry Net Emissions	-8[2]
Total for all sectors (t)	**908**
Per capita emissions[1]	**5**

Notes:

[1] Based on a population of approximately 180,000

[2] LULUCF activities are both a source and sink for atmospheric CO_2. With regard to local authorities, highest emissions tend to correspond to loss in soil carbon associated with grassland conversion to cropland and settlement in addition to the drainage of organic soil under cropland (and for a few LA peat extraction or wildfire). In comparison, the largest removals correspond to forest growth and changes in soil carbon associated with cropland conversion to grassland. This negative LULUCF for CBC is therefore representative of the addition of soil carbon[47]

Source: UK National Atmospheric Emissions Inventory. https://naei.beis.gov.uk/laco2app/ Accessed: 13/02/2020

It is also possible to consider emissions of CO_2 from road transport on an annual basis per road link; this has been undertaken for this Project and is presented in Sections 6.2 and Appendix A.

[47] National Atmospheric Emissions Inventory (2019) *Local and Regional Carbon Dioxide Emissions Estimates for 2005–2017 for the UK - Technical Report.* Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/812146/Local_authority_C02_technical_report_2017.pdf [Accessed 22/04/2020]

6. Assessment of Emerging Development Strategy

6.1 Data Sources

6.1.1 Leicestershire County Council LLITM Transport Model

The traffic data was supplied by LCC's Network Data and Intelligence Team using the recently devised Leicester and Leicestershire Integrated Transport Model Standard Unconstrained v1.8 (LLITM Standard Un v1.8); this is a strategic model that incorporates regional growth and strategic development to calculate the road traffic on each road link.

The base year for the LLITM model was 2014 and full traffic forecasts are available every five years from 2016 to 2051. For this project, 2016 was modelled as the base year and future years were modelled using 2036 data. Seven development growth options were modelled within the transport model, which varied between a low and a high growth.

It should be noted that the aim of the project was to provide a high-level analysis across the entire Borough, therefore, only the highways component of the model was applied in order to produce the traffic data. More detailed local modelling is anticipated to be undertaken as part of the individual planning applications for each of the allocated sites, at which time a final decision on the significance of the impact on air quality of each individual proposed development will be made by CBC.

Data was supplied by LCC to AECOM for the following six scenarios, including data for Option 3 and Option 4 'low' growth development options:

- Base Year (2016) Scenario – LLITM 2016 modelled traffic forecast;
- Projected Base Year (2036) Scenario – LLITM 2036 modelled traffic forecast + committed developments and schemes only;
- With Option 3 Demand (2036) Scenario – Projected base model + additional development demand from Draft Plan Option 3 (detailed in Table 10);
- With Option 4 Demand (2036) Scenario – Projected base model + additional development demand from Draft Plan Option 4 (detailed in Table 10);
- With Option 3 Demand (2036) Scenario with Transport Mitigation – Projected base model + additional development form Draft Plan Option 3. Mitigation involves a percentage increase of junction capacity of 20% in Charnwood and 10% in Leicester City; and
- With Option 4 Demand (2036) Scenario with Transport Mitigation – Projected base model + additional development form Draft Plan Option 4. Mitigation involves a percentage increase of junction capacity of 20% in Charnwood and 10% in Leicester City.

The transport mitigation scenarios include a 'high level' impact appraisal for mitigating the Plan Development Options in the form of increasing junction capacity[48]; these measures have not been designed specifically with the objective of improving air quality. LCC note that the high levels of improvement may not be achievable at all mitigated junctions, and so these scenarios are considered unlikely to be taken forward but are included for information.

Table 10. Details of Growth Options 3 and 4

Title	Growth	Dwellings					
		Loughborough	Shepshed	Leicester Urban Area	Cotes	Other	Total
Option 3	Low	2,000	2,200	1,000	0	2,900	8,100
Option 4	Low	2,000	1,500	2,500	1,000	1,100	8,100

The traffic data was provided by LCC as the peak hour flows from the AM peak period (7am-10am), the IP (inter-peak) period (10am – 4pm) and the PM peak period (4pm – 7pm) which were scaled up in order to represent flows

[48] Leicestershire County Council (2019) Charnwood Borough Council Local Plan: Mitigation Testing - Final Report

for the duration of these periods. Data was not available for the off-peak (OP) period (7pm – 7am) period, therefore 2016 data of fixed site 24-hour Annual Average Daily Traffic (AADT) from four locations was compared with the corresponding base year modelled 12-hour traffic flows at these locations to produce a scaling factor.

This fixed count site data was provided by LCC, and represented a range of road types / characteristics, to best represent the Borough as a whole. This includes main urban roads the A6 Derby Road, Melton Road in Thurmaston, as well as smaller roads including Melton Road, just outside of Syston and Nanpantan Road. The ratio between the traffic monitored at the four sites across a 7-day neutral period for the 12 hours for which LLITM data were supplied, and across a full 24-hour period, was averaged to provide a single scaling factor for adjustment to AADT. This scaling factor was applied to the data for all the scenarios to produce the AADTs used for each link. Whilst it is recognised more robust methods of deriving an AADT would have been preferable, this was the best method available within the timescales available.

Table 11. AADT Adjustment

Fixed Site ID	Fixed Site 7 Day Average AAT Hrs 07:00-19:00	Fixed Site 7 Day Average AADT	7 Day Adjustment Ratio
22214 – Melton Road Syston	9487	11716	1.23
25113 – Melton Road Thurmaston	18703	24968	1.33
20243 – A6 Derby Road	12681	15264	1.20
25123 - Nanpantan Road	7083	8175	1.15

Average Ratio: 1.23

Speeds were provided for each link for the AM, IP and PM periods and it was decided that free flow speeds should be applied for the OP in order to calculate a weighted average daily speed.

Heavy Duty Vehicle (HDV) data was included for each link in the data for the AM, IP and PM periods which was adjusted in the same way as total AADT to provide a 24 hour equivalent of journeys. It is recognised that the OP periods will contain variation in journeys for HDVs, however scheduling information was not available, and so a straightforward growth estimate was considered the most appropriate adjustment.

6.1.2 Emission Factor Toolkit

The emission factor toolkit (EFT) version 9.0[49] and corresponding tools were used to calculate the emission rates in g/s for NO_X, PM_{10}, $PM_{2.5}$ and tailpipe CO_2 for each of the road links in the traffic model in the Draft Plan assessment year.

The EFT uses drive-cycle data from the European COPERT[50] model for various vehicle types and ages to determine speed / emission relationships. The emission profiles are used in conjunction with the traffic flow data to assign rates to each modelled road link.

Each link was assigned its relevant road type (limited to Urban or Motorway, to be conservative) and the location for the dataset was specified as England outside of London. The fleet age and composition was based on the national average values inherent within the EFT based on the year selected, and taking into account the HDV percentage assigned to each link from the traffic data. Scaling factors are applied for future years which assume an improvement in fuel quality and new technology being introduced with a degree of retrofitting to the existing fleet to give decreasing emission rates.

For this study, for the purposes of verification the 2016 base year was modelled using a previous version of the EFT, v8.0.1 and corresponding tools, as the current version 9.0 does not include 2016 as a component output year. This was done for consistency with the LLITM base model output year. The EFT release notes clarify the difference between v8 – 9, which focusses on improvements to the advanced options and PM emission factors[51] and so version 8 was considered to be appropriate for use in this study specifically for the NOx adjustment derived from the baseline year, using a basic fleet split. In the event that more complex fleets are used, or verification using PM is required, then this approach would be invalidated, but that is not an issue for this project.

[49] Defra (2019) Emission Factors Toolkit v 9.0. Available at: https://laqm.defra.gov.uk/review-and-assessment/tools/emissions-factors-toolkit.html
[50] European Environment Agency (2011) COPERT 4 Estimating Emissions from Road Transport. Available at: https://www.eea.europa.eu/publications/copert-4-2014-estimating-emissions
[51] https://laqm.defra.gov.uk/documents/EFTv9-user-guide-v1.0.pdf

An analysis of the projections of the previous version of the EFT (v8.0.1) was undertaken by AECOM in 2018. This noted that the projections inherent to this version of the toolkit indicate that as we approach the mid-2020's fossil-derived petrol and diesel will decrease, whilst electric will continue to be a strong component. However, as biofuels become more prevalent too, it is expected that new engine technology allow us to further develop ICE as low-carbon and low-emission, such as compression-ignition petrol engines alongside significant adoption of micro-hybrid and energy harvesting. Therefore, in the short and medium-term it is expected the fleet will represent a very complex mix of fuels and technologies.

The 2036 modelled data falls outside the current EFT which only allows emissions to be calculated for years up to 2030. It was decided to use 2024 emission factor projections to calculate the emissions for the links in the five future scenarios to ensure that a conservative assessment was undertaken. 2024 was chosen as the end of the current five-year land supply development cycle, as supplied by CBC.

As the data provided included a percentage heavy duty vehicle, the traffic flow data did not explicitly count the bus flow data as a separate vehicle category, and so this was modelled as part of the HDV flow using national average splits of buses as defined within the EFT. Therefore, this may over or under-estimate this emission source in some instances (i.e. where there are no bus routes).

6.1.3 Industrial Sources

In addition to the industrial source information obtained from the NAEI as part of the GHG baseline conditions review, Part A and B process data for the Borough was provided by CBC. Location data was provided for a total of 92 Part A and B installations however a number of these are understood to not currently be operating; as such location data for 86 Part A and B installations have been analysed. Emissions data was not available for all of the installations in a format suitable for inclusion, and these are therefore not explicitly modelled. However, emissions from such installations are typically not significant to annual mean concentrations. Emissions from long established installations will also already be included within the Defra mapped regional background concentration and so have been accounted for within the modelled results. This approach to accounting for regional industrial sources is commonly applied to air quality assessment in the UK for both LAQM and planning application purposes.

Locations of these facilities were collated and have been used to inform the development allocation recommendations.

A waste incineration plant, as described by the Industrial Emissions Directive, is in current operation at Newhurst Quarry, Shepshed. The emissions to air from this facility are regulated by the Environment Agency, and the permitting regime. The nearest allocations to the facility are HS43 and HS38, located to the west and the north of the facility respectively.

The following summarises the key details of the permit regarding emissions from the facility:

- The first application (EPR/TP3036KB/A0001) was lodged on 19/02/2010 for a facility with a waste throughput of 300,000 tonnes/annum. A full assessment of emissions to air was carried out. There was a possible risk from NO_2 emissions determined, but this was deemed insignificant, as were the risks from the other pollutants assessed. Chromium VI was predicted to be potentially significant, however it was concluded that an air quality guideline will not likely be breached, but an improvement condition was required to ensure this. Permit EPR/TP3036KB was therefore determined on 17/12/2010;
- An application (EPR/TP3036KB/V0004[52]) to increase waste throughput to 350,000 tonnes/annum was made in May 2018, which also changed the stack location and buildings configuration. The assessment of emissions to air was updated for the variation. It was concluded that emissions from the plant were unlikely to give rise to significant pollution; and
- The decision document permitting the variation was however subject to conditions. Air emissions monitoring was required, and waste incineration is to be ceased if the monitoring shows exceedances. Further assessment of emissions to air is required by the conditions to use monitoring data and ensure the impacts predicted are appropriate, with specific reference to Chromium VI.

Permit EPR/TP3036KB/V0004 predicted the following impacts from the facility at the worst-case locations, as displayed in Table 12. Of the pollutants assessed, PM_{10}, $PM_{2.5}$, SO_2, Hydrochloric Acid (HCl), Hydrogen Fluoride (HF), Carbon Monoxide (CO), Volatile Organic Compounds (VOC), Ammonia (NH_3), Mercury (Hg), Antimony (Sb),

[52] Biffa Waste Services Ltd (2018) Determination of an Application for an Environmental Permit under the Environmental Permitting (England & Wales) Regulations 2018, Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/802614/Decision_Document_Final_EPR_TP3036KB_V004.pdf

Lead (Pb), Copper (Cu), Manganese (Mn), Vanadium (V) and Chromium (Cr) (II, III & VI) were screened out as insignificant in that the process contribution is less than 1% of the long term objective and less than 10% of the short term objective.

Emissions of Polychlorinated biphenyls (PCB), Nickel (Ni), Arsenic (As), Cadmium (Cd), Titanium (Ti), NO_2, Cobalt (Co) and Poly Aromatic Hydrocarbons (PAH) which could not be screened out, were assessed as unlikely to give rise to significant pollution as the environmental concentration was less than the objectives. The permit variation goes on to assess the impact at CBC's AQMAs, where impacts are all predicted to be below 1% of the objective and therefore insignificant.

Table 12. Predicted Emissions to Air Newhurst Quarry Permit Variation

Pollutant	Objective / Limit	Process Contribution		Predicted Environmental Concentration	
	µg/m^3	µg/m^3	% of Limit	µg/m^3	% of Limit
NO_2 (annual mean)	40	0.4	1	27.7	69.3
NO_2 (hourly mean)	200	7	3.5	-	-
PM_{10} (annual mean)	40	0.03	0.1	-	-
PM_{10} (24 hourly mean)	50	0.1	0.2	-	-
$PM_{2.5}$	25	0.03	0.1	-	-
Cr (VI)	0.0002	0.0000004	0.2	-	-

It is considered that all existing sensitive receptors near to the facility will have been considered in the existing assessments, and will be within future assessments as stipulated by the variation conditions, and that there are no significant impacts from the facility as determined by the Environment Agency. That said, due to the variable nature of pollutant plumes from industrial installations, the conclusion of the permit variation being not significant based on modelling at existing receptors cannot be used to determine that there will be acceptable air quality conditions at all future residential allocations, even though existing receptors are likely to be located between the facility and the allocation sites (for example Ingleberry Lodge Farm is between allocation HS43 and the facility). It is also possible that a further variation to the facility may arise, meaning that any current conclusions may change.

It is therefore recommended that future planning applications made by developers for each allocation in the immediate vicinity of this site (as a minimum HS43 and HS38) consider the effects of emissions to air from this facility as part of the planning application process in consultation with the CBC Environmental Health Officer. This could include screening the requirement for assessment using the most up to date Air Emissions Risk Assessment report as reference, or full dispersion modelling, as appropriate.

6.1.4 Index of Multiple Deprivation (IMD)

Air quality impacts influence, and are influenced by, the health and wellbeing of the population via a complex matrix of interactions. These factors have been considered using the Indices of Multiple Deprivation.

The Index of Multiple Deprivation (IMD) 2019 is the official measure of relative deprivation for Lower Super Output Area (or neighbourhoods, with an average population of 1,500) in England[53]. The IMD ranks every neighbourhood in England from 1 to 32,844 (most to least deprived area). Deprivation quintiles are calculated by ranking the 32,844 neighbourhoods in England from most to least deprived and dividing them into equal groups. The index is based on scores for:

- Income;
- Employment;
- Education, Skills and Training;
- Health Deprivation and Disability;
- Crime;
- Barriers to housing & services; and
- Living Environment.

The IMD has been utilised to identify Key Priority Areas for air quality and the Plan in conjunction with the Priority Neighbourhoods identified by CBC.

6.1.5 Charnwood Local Land and Property Gazetteer (LLPG) Data

The Local Land and Property Gazetteer (LLPG) is a local address database maintained by the relevant Local Authority who are responsible for adding new addresses to the LLPG as they are built within their area. For this project, LLPG data was provided under licence[54] for the CBC administrative area. The data did not include a classification for the addresses provided so each address was considered a location of relevant exposure.

This address data was used in order to indicate the road links in the data which were within 50 m of a location of relevant exposure as these links will have the greatest human health impacts within CBC's administrative area.

This address data was also used in the production of the IMD plots where each address listed was assigned an IMD score based on the neighbourhood/area to provide an overview of deprivation at existing receptors.

6.2 Screening Tool Transport Emissions Modelling

An air quality screening model has been built for the whole of Charnwood using AECOM's Screening Tool. The AECOM Screening Tool predicts the annual mean roadside pollution concentrations (NO_X/NO_2 and $PM_{2.5}$) at 5 m from the centreline using simple pollutant dispersion algorithms. The calculations exclude complex effects of meteorology, canyoning or gradients, but do provide an overall indication of the magnitude and extent of roadside pollutant concentrations and is considered appropriate for its intended purpose for this study, which was as an overarching analysis of the Borough as a whole.

The calculations use background pollution concentrations published by Defra for 1km grid squares as indicated in Section 4.1.2, and NO_2 was calculated using version 6.1 of the NO_X to NO conversion spreadsheet for the base year model and version 7.1 for all future years[55].

In order to verify the model, eight CBC diffusion tube locations were initially selected that were all roughly 10 m from the kerbside and spread out across the study area. One site, ID 29, was eventually excluded from consideration due to a lower data capture of 83%, which whilst considered acceptable by LAQM.TG(16)[11], reduces the reliability of the annual mean comparison at this site. The average NO_2 concentrations recorded at these sites for 2016 were gathered from CBC's 2017 ASR[56] and converted to road NOx concentrations. On comparison with road NOx concentrations produced by the model for the corresponding location in the data, a generic scaling factor

[53] UK Government (2019) English indices of deprivation 2019. Available at: https://www.gov.uk/government/statistics/english-indices-of-deprivation-2019
[54] PSMA Standard Form Contractor Licence v2.0 November 2011 Crown Copyright
[55] Defra (2019) NOx to NO2 Calculator. Available at: https://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html#NOxNO2calc
[56] Charnwood Borough Council (2017) Annual Status Report 2017. Available at: https://www.charnwood.gov.uk/files/documents/2017_annual_status_report_asr/2017%20Annual%20Status%20Report%20%28ASR%29.pdf

of 1.17 was calculated and applied across all modelled results. After the application of this factor to the data the model gave a much better fit when re-evaluated against measured concentrations, with an adjusted root mean square error (RMSE) of 3.6 µg/m^3, as opposed to 6.5 µg/m^3 pre-verification. Fractional bias also reduces from 0.211 to 0.032. After this verification step, confidence in the model is increased within the range of from 5 m from the centre line up to 10 m from the kerbside.

Table 13 demonstrates the verification parameters used to derive the adjustment factor. It is noted that the model over predicts at sites 41 and 45 (hence a factor less than 1) which is unusual in air quality modelling, and this reduces the overall verification factor. However, the overall factor is still greater than 1 (i.e. modelled emissions are increased post adjustment) and use of a calculated factor was deemed preferable to a 'best estimate' factor being applied, based on previous project experience. One possible cause for the over-estimate of the model at these locations is that they are slightly closer to the road centre than the other sites, and that the background component makes up a large percentage of the total concentration (and therefore the road NO_x is low).

Post adjustment, five of the seven results are within the ±25% threshold recommended as being acceptable in LAQM.TG(16)[11], with two of these within the more desirable ±10%. The two outliers are both within 1.2% of this threshold, which for a model of this spatial extent and technical limitation is encouraging and provides confidence in the data.

Table 13. Comparison of Verified Results Against Monitoring Data

Site ID	Ratio of monitored road contribution NO_x / modelled road contribution NO_x	Adjustment factor for modelled road NO_x	Adjusted modelled road contribution NO_x (µg/m^3)	Adjusted Modelled total NO_2 (based upon empirical NO_x / NO_2 relationship) (µg/m^3)	Monitored total NO_2 (µg/m^3)	% Difference (adjusted modelled NO_2 vs. monitored NO_2)
13	1.20	1.17	22.1	27.1	27.4	-0.9%
41	0.48		21.9	30.8	24.6	25.4%
45	0.66		11.7	24.8	22.2	11.6%
46	1.37		7.6	21.5	22.2	-3.0%
42	2.32		8.7	21.5	25.8	-16.5%
6	2.78		10.3	19.7	26.7	-26.2%
17	1.42		21.8	24.9	27.1	-8.0%

As there was not suitable coverage of roadside monitoring locations available for the purposes of verifying predicted PM_{10}/$PM_{2.5}$ modelled concentrations, PM_{10}/$PM_{2.5}$ results have been verified by applying the same adjustment factor as that determined for NO_x/NO_2. This is considered valid, as stated in LAQM.TG(16)[11], unless exceedances are predicted, which is not the case here.

The Screening Tool was subsequently used with the calculated verification factor to model all six scenarios using traffic data provided by LCC.

Appendix F presents the impact (on nearest road) per allocation, per scenario. Based on this, housing allocations contributing to consistent (i.e. across the majority of scenarios) increased emissions on the nearest road are HS7, HS8, HS30, HS34, HS35, HS37, HS38, HS39, HS41, HS43, HS44, HS48, and HS49. HS34 and HS8 have notable detrimental impacts in the 'with Transport mitigation' scenarios. HS39 Land at Tickow Lane (Phase 2) and HS41 Land west of Tickow Lane allocations in Shepshed are the largest contributors overall. Employment allocations contribute considerably less to emissions on the nearest road however, ES7 Employment land at Watermead Business Park and ES8 Employment land at North East of Leicester Sustainable Urban Extension were the largest contributors overall.

6.2.1 Existing Baseline (2016)

The base year for the study was 2016. The annual mean predicted roadside concentration of NO_2 and $PM_{2.5}$ in 2016 is presented in Figure 15 and Figure 16 in Appendix A, respectively.

Pollutant concentrations do not exceed the relevant objectives for any of the pollutants. The highest pollutant concentrations fall between 30 to 40 µg/m^3 for annual mean NO_2 and between 15 and 20 µg/m^3 for annual mean $PM_{2.5}$,occurring near the major routes. This is as expected due to higher traffic flows, although many roads within the urban areas are also associated with high roadside concentrations due to relatively lower speeds and higher background concentrations.

In terms of annual link emissions of CO_2 for all modelled road links, the modelled roads contribute 1,161,408.2 tonnes of CO_2 in 2016, 22.5% of which came from diesel cars, and 33.4% from HDVs.

6.2.2 2036 Core Scenario (Projected Baseline)

The projected base year for the study was 2036. The annual mean predicted roadside concentration of NO_2 and $PM_{2.5}$ in 2036 is presented in Figure 17 and Figure 18 in Appendix A, respectively.

There are overall reductions in all pollutant concentrations predicted for the 2036 Projected Base Case scenario as compared to 2016. This is largely due to the inherent nature of emission predictions for future years to decrease due to improvements in emissions technology and abatement, despite the conservative method approach taken, as described in Section 5.1.2.

In comparison with the existing baseline 2016 scenario results in Figure 15 and Figure 16, there are no annual mean NO_2 concentrations predicted above 30 µg/m^3. Those concentrations that were 30 to 40 µg/m^3 in 2016 in locations such as along the A6, A46 and A607 main arterial routes as well as main routes through Loughborough centre such as the A6004 and A512, are predicted to fall to a lower concentration of 20-25 µg/m^3 in 2036. The $PM_{2.5}$ concentrations follow a similar relative level of reductions in these locations.

In terms of annual link emissions of CO_2 for all modelled road links, the modelled roads contribute 1,256,978.3 tonnes of CO_2 in the 2036 Core scenario, 21.3% of which came from diesel cars, and 36.4% from HDVs. The increase is primarily due to the increased total AADT (53,465,007 versus 46,166,910 in 2016).

6.2.3 2036 With Option 3 and 4 Demand Scenarios, With and Without Transport Mitigation

The annual mean roadside concentration of NO_2 and $PM_{2.5}$ for the With Option 3 Demand 2036 scenario, With Option 4 Demand 2036 scenario, With Option 3 Demand 2036 scenario With Transport Mitigation and With Option 4 Demand 2036 scenario With Transport Mitigation are presented in Figures 19 to 26 in Appendix A.

Analysis is considered appropriate on the existing road links only in this instance; links which may represent connections to new developments (or a data loading 'spigot' in the transport modelling) to the existing road network will, by their nature have a high level of increase. Across the Borough, both increases and decreases in pollutant concentrations are predicted when comparing the With Option 3 and 4 Demand scenarios with the 2036 Projected Baseline. A range of -1.5 to +3 µg/m^3 differences were predicted for annual mean NO_2, and -1 to +1.5 µg/m^3 for $PM_{2.5}$ as shown in Figures 27 to 34 in Appendix A. The largest increase in pollutant concentrations for both Options is in Shepshed along Tickow Lane, likely associated with allocations HS39 and HS41. In Loughborough, the difference between Options 3 and 4 is more varied: Highland Drive has the highest increases for Option 3 with a slight impact upon Forest Road and Shelthorpe Road whereas the predicted increase for Option 4 is highest at Stanford Lane in Cotes with a lesser impact on Highland Drive. The results therefore indicate that the maximum impacts from the Draft Plan are most often in locations with relatively better air quality. For example, predicted annual mean pollutant concentrations for Option 3 Without Mitigation along the highest impacted road Tickow Lane in Shepshed are below 20 µg/m^3 for NO_2 and below 15 µg/m^3 for $PM_{2.5}$. This is analysed further in Section 7.

When comparing the With and Without Transport Mitigation Options, there are apparent differences. These include a lower increase or a decrease in annual mean NO_2 and $PM_{2.5}$ in Shepshed along Tickow Lane and Charnwood Road, and in Loughborough along the A6, Meadow Lane, Belton Road West, Stanford Lane and at Hathern. The maximum decreases compared to the 'Without Mitigation' Options were as much as -1.5 µg/m^3. This means that a benefit from the transport mitigation is predicted for air quality at these locations; some of these locations are near to or within portions of the Loughborough AQMA. Conversely, along some roads such as the A6004, Forest Road, Snell's Nook Lane and Park Road there is an increase in pollutant concentrations predicted with the transport mitigation at some points by up to +1 µg/m^3 compared to the Without Mitigation Option. That said, the positive effects listed above in Loughborough, among other places, may on balance offset these negative effects to a certain extent.

The transport mitigation does therefore have beneficial impacts with regard to the concentrations modelled, near to some residential development allocations and within the centre of Loughborough, but creates a higher development impact at Loughborough Science & Enterprise Park employment allocation and a number of locations within the centre of Loughborough, most likely due to traffic being diverted along this route under the mitigation measures.

When considering the significance of the impacts of the Draft Plan, as demonstrated in Appendix F, across all scenarios and locations there were no impacts greater than 'Negligible' at sites near to allocations, so these impacts

are not considered to be significant. In Option 4 and Option 4 with Mitigation, there was an impact of 'Slight' adverse, along Nanpantan Road, though this was in a location of low existing concentrations, so is also not significant.

In terms of annual link emissions of CO_2 for all modelled road links, the modelled roads contribute a similar tonnage of CO_2 in all the scenarios (1,268,994.4, 1,271,127.1, 1,269,741.6, and 1,271,842.8 tonnes in Option 3, Option 3 with Transport Mitigation, Option 4, and Option 4 with Transport Mitigation, respectively). In all scenarios 21.7% of the CO_2 emissions came from diesel cars, and an average of 36.4% from HDVs. The increase as compared to the Core scenario is primarily due to the increased total AADT (an average of 54,307,479 versus 53,465,007 in the 2036 Core scenario).

6.2.4 Screening Tool Results Summary

Pollutant concentrations do not exceed the relevant objectives in any of the scenarios modelled, for any of the pollutants, nor are there any significant impacts. The transport mitigation scenarios do have an adverse impact with regard to the concentrations modelled in some locations, but on the basis of the absolute concentrations modelled, consideration of these increases may not be an explicit requirement within the Plan period. It is considered that unlike many urban areas, PM concentrations will potentially be more of a constraint than NO_2, particularly as particulate pollution moves more to the forefront of the political agenda through the Clean Air Strategy[8] over the duration of the Draft Plan.

For CO_2, the results show an increase in road-based emissions over time due to increased traffic volumes. Option 4 with Transport Mitigation represents the scenario with the highest total AADT across the modelled road network, and therefore the highest CO_2 tonnes per annum emissions. This is likely an overestimate as the results include data loading spigots, which it was not possible to remove due to time constraints.

There is a higher level of capacity on the roads and air quality concentrations than the low growth options assessed in this report, therefore in theory, the predicted pollutant concentrations for low growth Options 3 and 4 may allow for a higher growth option, however this would need to be assessed further for full confidence in this conclusion. As per Table 10, it is recognised that a relatively low growth allocation has been assessed. Whilst it was not possible to fully assess further growth options, an estimate of the impact of higher growth options is provided in Table 14, based on a linear extrapolation of the maximum impacts in the assessed scenarios. It is recognised that there are many subtle variables that would affect the resultant impact of an increased allocation and that Table 14 represents a crude estimate of impacts, but it does provide an indicative indication of likely worst case impacts.

Table 14. Linear Estimate of Impact of Higher Growth Allocations

Scenario	Growth Level	Dwellings	Impact	
		Total	Worst Case NO_2 Impact ($\mu g/m^3$)	Worst Case $PM_{2.5}$ Impact ($\mu g/m^3$)
Option 3	Low (assessed)	8,100	2.1	0.9
Option 3 Mitigation			2.1	0.9
Option 4	Low (assessed)	8,100	1.9	0.8
Option 4 Mitigation			1.9	0.8
Estimate Op 3	Most Likely	9,500	2.5	1.1
Estimate Op 3 Mitigation			2.5	1.1
Estimate Op 4	Most Likely	9,500	2.2	1.0
Estimate Op 4 Mitigation			2.2	1.0
Estimate Op 3	Worst Case	10,000	2.6	1.2
Estimate Op 3 Mitigation			2.6	1.2
Estimate Op 4	Worst Case	10,000	2.3	1.0
Estimate Op 4 Mitigation			2.3	1.0

Similar levels of impacts are seen under both the 'Most Likely' and 'Worst Case' (9,500 and 10,00 dwellings respectively), with a maximum NO_2 impact of 2.6 $\mu g/m^3$ under Option 3 at the 'Worst Case' growth level.

6.3 Source Apportionment of Emission Sources

There are numerous emission sources in the Borough, broadly divided into road transport, industrial sources and background sources.

Industrial emissions are a major regional emission source. These are typically included in the background component, as is the case in this assessment, due to the effects of proximity to the source and the relatively better dispersion than from transport-related emissions at road-level, and as LAQM.TG(16) states that industrial sources are unlikely to make a significant contribution to annual mean concentrations. Furthermore, as they are generally managed using the permitting process, there is limited scope to define specific interventions.

The remainder of this section provides a discussion of the contribution of each source to pollutant concentrations. This is an essential component of the study as it will reveal which sources may need to be specifically targeted to achieve maximum improvements.

6.3.1 Background Air Quality Source Apportionment

Modelled estimations of background air quality concentrations are provided by Defra for each 1 km square in the UK for each year between 2017 and 2030[57]. As part of this, the contribution to the total pollutant concentration from various sources is also provided. Figure 35 provides a breakdown of the background concentrations from Defra's background maps, and outlines the main contributors to regional concentrations. Point and industrial sources are notable contributors to background concentrations for all pollutants. The background maps are used in preference to other sources of background information primarily due to their comprehensive spatial coverage and variability, as well as their estimation of future years, which could not be achieved using monitored concentrations.

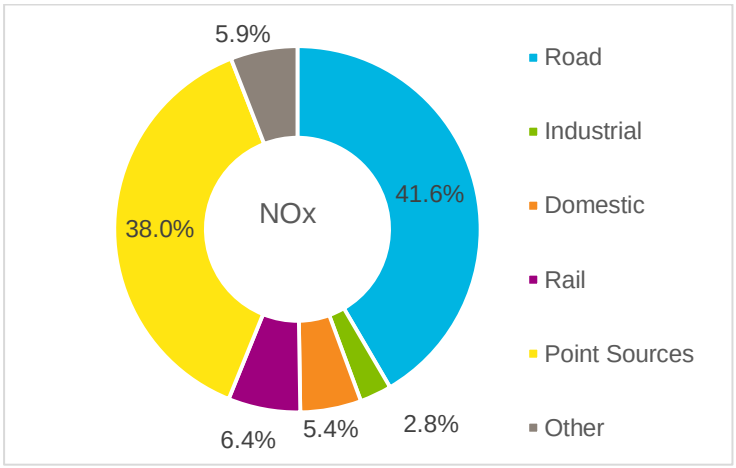
With reference to Figure 35, 41.6% of background NOx concentrations are from road sources and 40.8% are from industrial and point sources. In comparison, only 10.7% of PM_{10} background concentrations are from road sources and a much larger contribution (72.2%) from industrial and point sources. 9.8% of $PM_{2.5}$ concentrations are from road sources, almost in line with data for PM_{10}, however an overall smaller proportion of industrial and point sources (64.4%) is found as other sources such as domestic are proportionally higher. For PM, domestic heating is another significant source, at 14.2 and 19.6% for PM_{10} and $PM_{2.5}$ respectively. PM_{10} has been included within the background air quality source apportionment because of this inherently different relationship with its sources than $PM_{2.5}$.

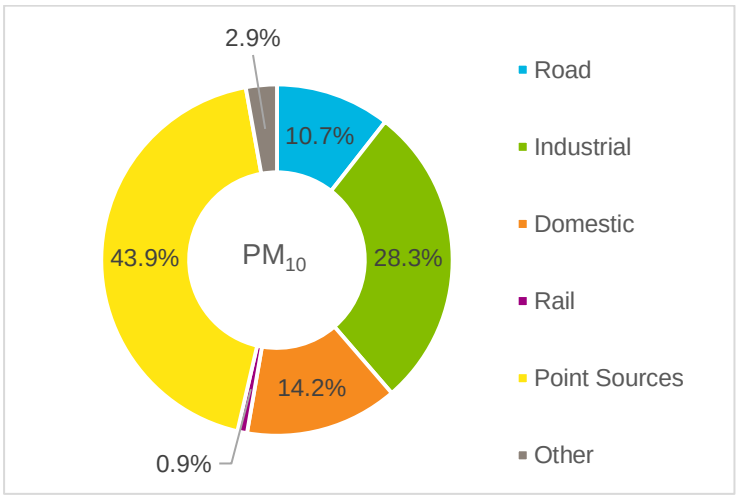
NOx concentrations are more heavily influenced by road traffic concentrations, whereas PM concentrations tend to be more influenced by industrial and domestic heating concentrations, with the road component being much less. Domestic heating and point source/industrial concentrations could accordingly be targeted within the Plan to achieve further reductions outside of those sought through road traffic. It should be noted that many sources emit both NOx and PM and therefore actions targeted at these sources will result in reduction of both pollutants.

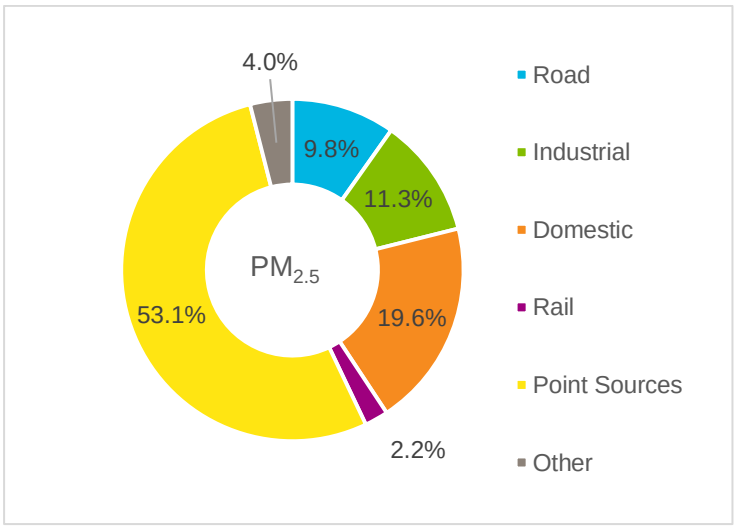
Regional policies to reduce air quality concentrations have largely been grouped around reducing transport related concentrations, with documents such as the Leicestershire Local Transport Plan 3[26] noting that transport related concentrations are one of the largest contributors to poor air quality in Leicestershire. This is true in that transport related concentrations do make up a large proportion to NOx concentrations, however almost equal quantities of background NOx concentrations comes from point and industrial sources. Regarding background PM concentrations, this may not be as true with only around 10% of PM_{10} and $PM_{2.5}$ background concentrations coming from transport sources. Given the larger mortality rates associated with $PM_{2.5}$ pollution as per the Annual Report of the Director of Public Health 2017[27], this may be a proposed area for policy enhancement in the Plan.

[57] Department for Environmental, Food & Rural Affairs (2017) Available at:https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2017 [Accessed 25/03/2020]

Figure 35 – Borough wide Background Source Apportionment (2018) (excluding Rural components)







6.3.2 Transport Sources

With regard to local air quality effects, the proximity to the source is a key factor linking the resultant exposure and health effects. Therefore, the predominant pollutant sources affecting public exposure are generally attributed to emissions from road transport.

Figure 36 and Figure 37 in Appendix A demonstrate the relative contributions to the modelled road NOx across the Borough in the Future Base Case 2036 scenario of two specifically significant vehicle types in terms of emissions; diesel cars and HDVs.

The contribution of HDVs to road NOx emissions is apparent on main arterial routes through the Borough, where up to 40% of road NOx can be attributed to HDV sources, whereas on more rural routes, HDVs contribute to less than 2% of road NOx. This is consistent with the pattern of larger vehicles tending to operate predominantly on the Key Route Network rather than shorter routes through urban settlements. Diesel cars contribute more than 40% of road NOx emissions across the Borough, with urban areas above 60% and with a handful of road links where the contribution is less than 2%. This is disproportionate to the number of diesel vehicle movements, which would typically comprise somewhere in the region of 30% of the fleet.

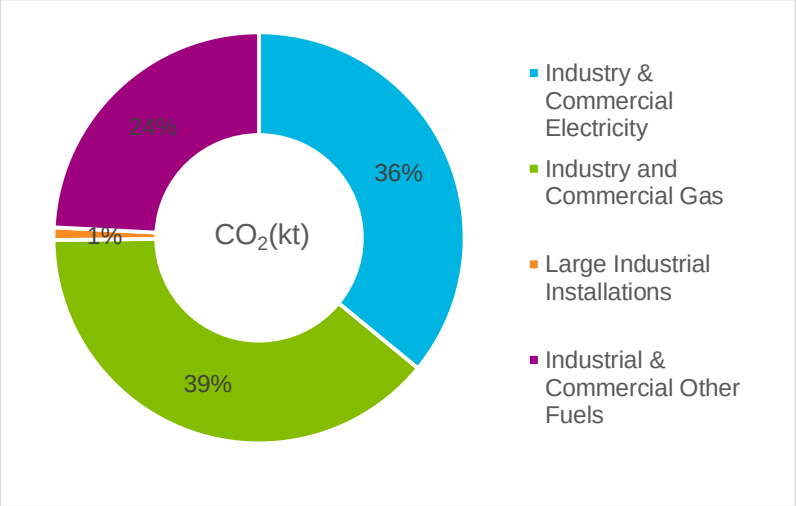
The negative impact of lorry movements on air quality is reflected in this data, as was noted as a key issue in the Leicestershire Local Transport Plan 3[26]. Diesel cars are, however, across much of the Borough, the main contributor to road NOx emissions, and should accordingly be targeted with appropriate measures to achieve CBC's stated aim of improving air quality through the Draft Plan, although HDVs are typically disproportionally significant relative to the traffic flow. That said, it is recognised that CBC is not the highway authority so has limited control over their emissions.

Another notable emission source from transport in Charnwood is rail travel. These are discrete sources where the exposure pathway is constrained by infrastructure (e.g. where passengers at rail stations are exposed on platforms) and is either outside the scope of this strategic study, or is being tackled with specific management plans or regional aspirations. There are no airports within Charnwood.

6.3.3 Industrial Sources

Industrial source CO_2 emissions (kt) by sector are displayed in Figure 38, derived from the NAEI dataset. The Industry and Commercial Gas sector appears to be the largest contributor across the Borough, closely followed by Industry and Commercial Electricity.

Figure 38 – Industrial Emission Sources of CO_2 by Sector within Charnwood Borough Council



Source: UK National Atmospheric Emissions Inventory. https://naei.beis.gov.uk/laco2app/ Accessed: 13/02/2020

Figure 39 in Appendix A demonstrates the five major industrial point source locations across the Borough as derived from the NAEI as well as the Part A and B process locations provided by CBC. The Barrow upon Soar and Astra Zeneca sites reported zero emissions in 2017, but the other three sites remain active, though both Charnwood Forest Brickworks and Mountsorrel Asphalt are significantly higher emitters than Loughborough University.

Some industrial processes naturally emit more problematic emissions due to their inherent nature. For example, having a development allocation proposed within a 200m distance to a site where blending of bulk cement was undertaken on a routine basis may cause reverse sensitivity issues in terms of air quality in comparison to the same distance from a petrol station. When considering each site however, a site specific assessment would need to be employed, as this assumption may not be accurate depending on a number of factors such as how much material is handled at both sites, how frequent the activity, what mitigation is in place etc.

Taking this broad, more high level view however, would indicate that residential development allocations proposed to both the north and south of the A512 (i.e. HS49, HS45, HS46, and HS43) may be influenced by emissions from industrial facilities including the Charnwood Forest Brickworks and the rubber processing plant Meggitt Polymers & Composites. However, emissions from these installations are regulated via the permitting regime to mitigate their

impacts, and are accounted for within the background component applied to this assessment. Emissions data were not available to incorporate the Newhurst Quarry site within these calculations.

7. Key Areas for Air Quality

7.1 Health and Wellbeing

The Index of Multiple Deprivation (IMD) has been charted across CBC's administrative area. The IMD Score for each neighbourhood is shown in Figure 40 in Appendix A; group 1 is the least deprived while group 5 is the most deprived. There are two neighbourhoods in Loughborough centre that were scored in the most deprived areas in the Borough; these are 002A Loughborough Bell Foundry and 003F Loughborough Warwick Way.

All neighbourhoods in England have then been ranked according to their level of deprivation relative to that of other areas nationally. High ranking neighbourhoods can be referred to as the most deprived. Figure 41 in Appendix A shows the IMD 2019 Rank across CBC's area; group 1 is the most deprived 20% while group 5 is the least deprived 20%. There are four neighbourhoods within Charnwood which are in the 20% most derived IMD neighbourhoods nationally. These are: 003F Loughborough Warwick Way, 002A Loughborough Bell Foundry, 002B Loughborough Canal South and 002C Loughborough Central Station. These neighbourhoods have all been identified within CBC's priority neighbourhoods.

This data indicates that central Loughborough and the south of the Borough have an overall higher level of deprivation in comparison to their rural counterparts, tying in with the Priority Neighbourhoods identified by CBC. This supports the IMD 2015 referenced by the Leicestershire Joint Strategic Needs Assessment (JSNA)[32] – Air Quality and Health Chapter which detailed five neighbourhoods (Loughborough Bell Foundry, Loughborough Warwick Way, Loughborough Canal South, Loughborough Central Station and Loughborough Midland Station) in central Loughborough. As the JSNA used IMD 2015, the 2019 data used in this Study may vary slightly however the conclusions of the JSNA would still be considered relevant.

The IMD score is used in this study to indicate the potential health effects of changes in air quality, and to indicate the ability of a population to adapt to potential interventions, where accessibility or economic impacts may occur.

It is broadly understood that individuals living in more deprived areas may be disproportionally sensitive to the cumulative health effects of poor air quality. Areas with a low IMD (and especially, with low health index scores) are at greatest risk of detrimental effects from poor air quality. For example, where respiratory or cardiovascular disease is already prevalent in a population, the cumulative effects of air pollution are worse than in an otherwise healthy population.

Conversely, the most significant health benefits may be attained by targeting interventions in areas where existing poor air quality coincides with low IMD and health index scores. Key priority areas have been identified with this in mind.

Whilst the greatest benefits may be achieved by targeting interventions in areas with low IMD, there are also potential risks associated with this approach, as the populations in these areas may be least able to respond to the economic or practical effects of the interventions.

Potential interventions must therefore be targeted based on the ability of a population to adopt them, which is indicated by the IMD (and especially, the income index scores). Examples include:

- Interventions to stimulate the purchase of compliant vehicles may have lower take-up in areas of low IMD where older, more polluting vehicles are kept on the road longer as the upfront cost of purchasing a new vehicle may be prohibitive;
- Interventions to promote the use of public transport are expected to be less effective in areas of high IMD where household budgets are more likely to be able to stretch to private car ownership;
- Interventions to promote walking and cycling are expected to be less effective in areas of low IMD where there are higher barriers to participation including large distances from the home to essential services and poorer health, including disability, which may preclude these activities partially or entirely; and
- Interventions based around education and engagement may be less effective in areas of low IMD where baseline education levels of the population may be lower.

It is essential that interventions intended to reduce emissions and public exposure do not contribute to reduced accessibility or social inclusion, such as penalising owners of older vehicles without ensuring suitable alternative travel opportunities are in place.

7.2 Identification of Key Impact Areas

The impact of the Plan with Option 3 and Option 4 demand has been analysed using the screening tool outputs; as presented in Figure 27 to Figure 30 in Appendix A. The 'With Transport Mitigation' scenarios have not been analysed in this task, as it is considered unlikely that these will be brought forward in their current form. The most significant adverse impacts are predicted in Shepshed and Loughborough. Consideration has also been given to industrial installation locations as shown in Figure 39 in Appendix A.

An adverse increase in pollutant concentrations for both Options is predicted in Shepshed along Tickow Lane, in the region of residential allocations HS39 and HS41, which are both proposed to have over 300 dwellings developed in Shepshed. Adverse impacts are also predicted to a lesser extent to the north and south of the A512, in the region of HS38 and HS43. Numerous residential allocations are in this area, and perhaps initially represents the location of most constraint from an air quality perspective. This is particularly pertinent given its proximity to Charnwood Forest Brickworks. Interest shown in a site in Shepshed (land south of Ashby Road Central)[58] for 200 dwellings for example falls within this impact area and the Plan should contain sufficient provisions for air quality such that the air quality impact is considered by developers at the application stage. This will allow CBC to define a significant impact to air quality for developers to assess proposals against, which would in turn, provide CBC with an indication of whether proposals put forward would cause an 'unacceptable contribution' towards air quality.

In Loughborough, the difference between Options 3 and 4 is more varied. Both Options have an adverse impact near to, and possibly associated with, residential allocation HS36 and the Loughborough Science & Enterprise Park employment allocation, however the impact is larger for Option 4. Highland Drive also has an adverse impact predicted for Option 3, possibly associated with residential allocations HS30, HS35, HS36 and HS37, whereas the impact of Option 4 is predicted to have a lesser adverse impact. Option 4 also has an adverse impact predicted at Stanford Lane and Cotes Road; whilst it is not possible to tell within the data provided which specific development allocation increases this impact, Option 4 includes development at Cotes which is the most likely cause of the adverse impact. This would need to be considered cumulatively at the application stage.

The impacts of traffic associated with the development allocations modelled, placed in the context of the relatively low concentrations, would not be deemed significant if brought forward through well considered detailed planning applications which apply mitigation as appropriate. However, should a target for $PM_{2.5}$ be introduced to be in line with the World Health Organisation (WHO) guideline value of 10 µg/m^3, this conclusion may change.

Following a review of the industrial installation locations against the development allocations, the residential development allocations proposed to both the north and south of the A512 (i.e. HS49, HS45, HS46, and HS43) may be influenced by emissions from industrial facilities including the Charnwood Forest Brickworks and the rubber processing plant Meggitt Polymers & Composites. CBC have also informed AECOM that an incinerator has been proposed to be located at Newhurst Quarry near Shepshed, and concerns from the Draft Plan consultation reflect that this could have an impact upon local air quality. Recommendations pertaining to this facility are made in section 6.1.3. Careful consideration of the location and operation of this facility should be given with respect to existing sensitive receptors, and those proposed as part of housing allocations prior to its development. Air quality monitoring of the facility has been enforced as part of the Permit, with the ability to enforce a cessation of operations if required, to ensure that adverse effects to local air quality are minimised. However, it is considered that the permitting process will sufficiently mitigate the negative air quality impacts of any such installation.

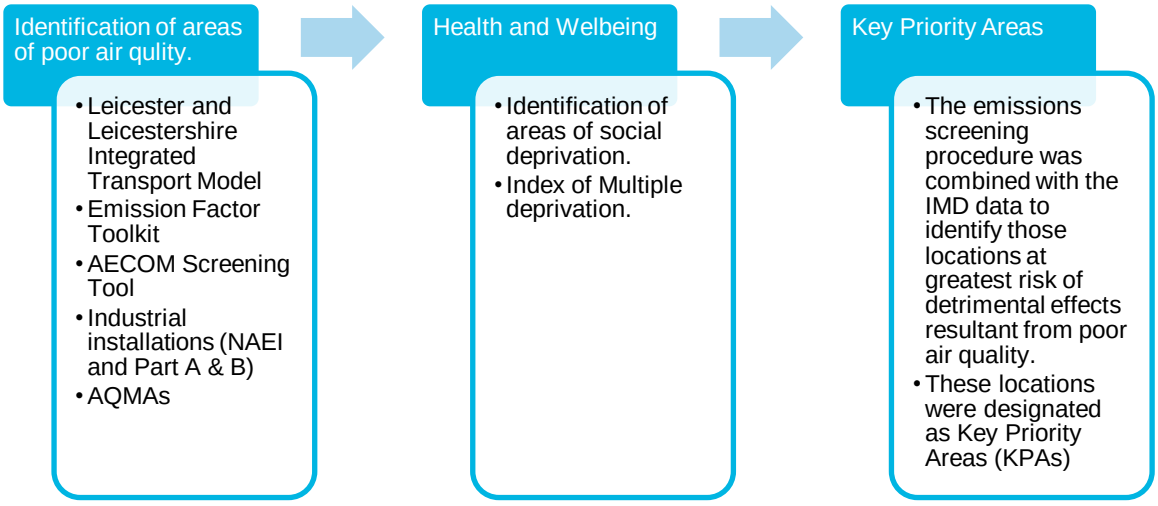
The following locations are therefore identified as Key Impact Areas (KIAs) for both Option 3 and 4:

- Tickow Lane and the north and south of the A512 in Shepshed;
- South, and south-west Loughborough area surrounding residential allocations HS36, HS30, HS35, HS36 and HS37 and the Loughborough Science & Enterprise Park employment allocation; and
- Stanford Lane and Cotes Road.

7.3 Identification of Key Priority Areas

Key Priority Areas (KPA) were identified within CBC's administrative area, where interventions should be targeted. KPA were based on areas of poor air quality as identified by the AECOM Screening Tool. The KPA also took into consideration social characteristics in the region in terms of health and wellbeing.

[58] Barton Willmore (2020) Charnwood Local Plan Review - Preferred Options Consultation 2019 Land South Of Ashby Road Central, Shepshed – Obo Michelmersh Brick Holdings Plc



The emissions screening procedure was combined with the IMD scores to identify those locations at greatest risk of detrimental effects resultant from poor air quality. Figure 42 in Appendix A summarises the IMD scores for the properties included in the screening modelling (i.e. within 50 m of modelled roads). Figure 43 in Appendix A presents the properties with predicted annual mean $PM_{2.5}$ concentrations above 10 µg/m^3 for 2036 which have been coded with the IMD score for deprivation, to indicate those areas that should be prioritised with regard to air quality interventions. The use of this is an indicator in this case is due to the high-risk health effects associated with fine PM well documented in research, and the possibility of a more stringent target for $PM_{2.5}$ being introduced.

This demonstrates where poor air quality impacts the most deprived locations. These locations were designated as KPAs and used to inform the development of the interventions.

The key considerations indicated by this data are:

- Key Priority Areas are:
  - in central Loughborough and Warwick Way in north-west Loughborough;
  - to the north and south of the A512 in Shepshed;
  - a small area in Mountsorrel;
  - along Melton Road, Syston; and
  - in Thurmaston.
- There is a clear bias towards the higher IMD scores (i.e. more deprived) near the urban centre of Loughborough, with lower scores (i.e. less deprived) on the surrounding areas. Overall, the potential exposure to high concentrations is greater for more deprived population groups.
- In terms of the transport emission sources in the KPAs, cars and LGVs, in particular diesel cars, are the most significant source on urban routes, followed by HDVs. This indicates that cars and vans should be prioritised to reduce emissions in the most deprived areas with high pollutant concentrations. The negative impact of lorry movements on air quality is still a key issue, and may be the more practicable option to reduce emissions in the shorter term.
- In terms of industrial sources in the KPAs, Charnwood Forest Brickworks and Newhurst Quarry in Shepshed should be of priority.
- The neighbourhoods most deprived overlap with the Priority Neighbourhoods identified by CBC in the most part, with the exception of Shepshed. Given both transport and industrial emissions potential for air quality impact, consideration should be given to whether Shepshed should be added to the list of Priority Neighbourhoods.
- The KPAs fall within or near to AQMAs declared in Loughborough and Syston.

This indicates poor air quality has a tendency to disproportionately impact the more socially deprived, and further detrimental impacts within these areas should be very carefully considered in order to avoid affecting health in these areas.

Whilst the greatest benefits may be achieved by targeting interventions in the KPAs, the potential risks are also recognised, as the populations in these areas may be least able to respond to the economic or practical effects of the interventions, such as a need to purchase a compliant vehicle.

7.4 KIA and KPA Summary

The preceding sections identify key areas within Charnwood relating to air quality, deprivation and the Draft Plan impact. The KIAs are simply the areas where the greatest change in concentration due to the allocations within the Draft Plan are expected, regardless of social issues. The KPAs identify areas where existing air quality issues tie in with social and wellbeing issues, such that adverse impacts in these areas would be relatively more significant.

Therefore, if an area is identified as being both a KIA and KPA, the Draft Plan is anticipated to have a large impact on air quality, within an area likely to be adversely affected by this.

One such location falls within this category, namely the area surrounding the A512 in Shepshed.

As such, whilst the impacts of the allocations in isolation are not significant, it will be necessary to consider applications bringing forward allocated areas in Shepshed cumulatively, that is to say in combination with the impacts of other allocations in the area, so as to avoid an overall significant impact on air quality. The number of sites included in any cumulative assessment will need to considered for each application in isolation on a case by case basis, as it will not always be appropriate to consider every allocation (either due to the time that they are brought forward, or the size of the allocation in question). However, it is recommended that the following allocations in Shepshed should form the long list for consideration at the application stage for their cumulative impacts.

Table 15. Shepshed Allocations to be Considered Cumulatively

HS Ref	Location	Settlement	Homes
HS38	Land off Fairway Road	Shepshed	378
HS39	Land at Tickow Lane (Phase 2)	Shepshed	394
HS40	32 Charnwood Road	Shepshed	15
HS41	Land west of Tickow Lane	Shepshed	330
HS42	Land at Oakley Road	Shepshed	133
HS43	Land west of the B591/Ingleberry Road and north of Iveshead Lane	Shepshed	174
HS44	Land north of Hallamford Road and west of Shepshed	Shepshed	250
HS45	20 Moscow Lane	Shepshed	49
HS46	Land rear of 62 Iveshead Road	Shepshed	76
HS47	Land rear of 54 Iveshead Road,	Shepshed	5
HS48	Land at Tickow Lane	Shepshed	210
HS49	Land off Ashby Road West	Shepshed	27

Given the large employment allocation of LSEP (Loughborough Science & Enterprise Park) it may also be prudent to consider that site, at the Council's discretion. CBC should carefully consider the cumulative impact of these allocations in Shepshed before approving planning for any of these allocated sites.

There should be no blanket definition of an 'unacceptable' air quality impact, as it is dependant on both the impact and the existing concentration, and therefore it is necessary to consider each allocation on a case by case basis at the planning application stage, taking into account the significance of the impact of each allocated site. The planning authority should continue to exercise their judgement of each application, which should include, where necessary, any site-specific mitigation required. Whilst it is more likely that any unacceptable, or significant, impacts will occur in the locations stated above, that does not exclude the possibility that these will occur elsewhere, once detailed consideration is given to the site at application.

8. Draft Plan Discussion

Section 4.3.2 states that in its current form the Draft Plan states the intention to improve local air quality, but there is little explicit reference to air quality after this statement, that might go toward achieving that goal. As such, the following section demonstrates options available to CBC to give air quality improvement greater credence within the Draft Plan.

One of the simpler ways to potentially develop Air Quality specific policy within a Local Plan is to reference existing Local Plans from other Local Authorities, many of which directly reference Air Quality. This section first looks at three other Local Authority approaches to incorporating air quality within Local Plans, then discusses this regarding the outcomes from this Project. Finally, two options are presented, one which creates a standalone air quality policy, and another which enhances the present policy content.

8.1 Local Authority Policy Examples

Some examples are summarised here to provide context to the potential options available to CBC. Whilst the scale of air quality issues is different in different locations, and therefore Air Quality is given varied weighting, this does provide a reference point for CBC.

8.1.1 Winchester City Council

Winchester City Council's (WCC) Local Plan[59] references Air Quality through multiple policies such as Policy WT1 - Development Strategy for Winchester Town, stating the spatial planning vision for Winchester Town will be achieved through:

"implementation of the Winchester Access Plan and the Winchester Air Quality Action Plan (AQAP) to ensure that transport provision and access to and within the Town provides opportunities for sustainable transport provision and reduces pollution and carbon emissions".

Reference to an AQAP is a good way to set the Air Quality agenda in the Plan, as the AQAP can clearly be much more prescriptive with regard to specific policies. Their AQAP also states the intention to produce an Air Quality Supplementary Planning Document (SPD) that is integrated into the planning process. This provides developers with clear advice on how to assess Air Quality as part of their proposals when applying to the planning authority, and should ensure Air Quality is appropriately considered proportional to the scale of the development. This is more commensurate with an area with poorer air quality than Charnwood, but could be enacted depending on CBC's ambition with respect to Air Quality. However, the central policy governing air quality is tied with various other pollution types, as follows:

Policy DM19 – Development and Pollution
Development which generates pollution or is sensitive to it, and accords with the Development Plan, will only be permitted where it achieves an acceptable standard of environmental quality. As a minimum, development should not result in unacceptable impacts on health or quality of life.
Proposals should comply with all national statutory standards relating to environmental quality and include a statement setting out how such requirements have been met, where relevant, in designing the proposal.
The pote-ntial for unacceptable pollution, resulting in adverse health or quality of life impacts, should be addressed by applications. Where there is potential for adverse impacts to occur on the following matters a detailed assessment should be conducted:

i. odour;
ii. light intrusion;
iii. ambient air quality;
iv. water pollution;
v. contaminated land; and
vi. construction phase pollution impacts for large or prolonged developments.

The report should identify and detail any mitigation measures that are necessary to make the development acceptable in respect of the adverse impacts on health and quality of life. The Local Planning Authority may require specific mitigation measures to be undertaken in order to make developments acceptable in terms of matters relating to pollution.

[59] Winchester City Council (2018) Local Plan (Part 1). Available at: https://www.winchester.gov.uk/planning-policy/local-plan-part-1/adoption/

Again, this policy sets an agenda to ensure Air Quality is appropriately considered as part of individual applications. Incorporating other types of pollution with the policy gives it added relevance within the Plan, and doesn't give Air Quality perhaps un-warranted precedence over other pollutants.

8.1.2 Salford City Council

Salford's current Draft Plan[60] affords a full Chapter to Air Quality and contains multiple other references through policies relating to climate change (CC1), health (HH1) and transport (A5). Having a stand-alone Air Quality chapter clearly gives much greater weight to the issue within the context of the Plan, and allows the wider context to be presented to the reader. Whilst this may not be appropriate for CBC given the reduced scale of the air quality issues, it shows the relative credence given as compared to other Local Plans, in locations where Air Quality is more of a concern.

The main policy specific to Air Quality is AQ1, which states:

Policy AQ1 Air quality
A substantial improvement will be sought in Salford's air quality, and particularly in air quality management areas, including by:
1) Reducing emissions from road vehicles through a wide range of measures such as: A) Minimising the need to travel and maximising the ability to do so by walking, cycling and public transport, B) Promoting the use of low and zero emission vehicles, C) Investigating the potential for Clean Air Zones;
2) Supporting the electrification of rail lines through the city to reduce diesel emissions;
3) Carefully controlling industrial uses and energy generation schemes that could increase the emission of air pollutants;
4) Enhancing the green infrastructure network to assist in the absorption of air pollutants;
5) Designing the built environment to minimise the potential for air pollution to become trapped close to the ground;
6) Requiring development to minimise and mitigate pollution as far as practicable, both during the construction and operational phases of development; and
7) Locating sensitive uses away from areas of high air pollution, and, where this is not possible, incorporating mechanical ventilation as appropriate.

Clear reference to AQMAs gives a spatial variation to the level of Air Quality provision likely to be imposed on developers, and targets potentially more stringent assessment and mitigation at areas which are most likely to be in need of them.

Again, this Policy also ties in multiple other elements such as renewable transport and green infrastructure within the context of the Air Quality policy, which is something CBC were keen to explore.

[60] Salford City Council (2019) Revised Draft Local Plan. Available at: https://www.salford.gov.uk/media/393434/revised-draft-local-plan-final.pdf

8.1.3 St Helens Council

St Helen's Draft Local Plan[61] again contains a standalone Air Quality policy, Policy LPD09, and is mentioned in several other supporting policies related to transport (LPA07), green infrastructure (LPA09) and health (LPA11).

Policy LPD09: Air Quality
1. Development proposals must demonstrate that they will not: a) impede the achievement of any objective(s) or measure(s) set out in an Air Quality Management Area (AQMA) Action Plan; or b) introduce a significant new source of any air pollutant, or new development whose users or occupiers would be particularly susceptible to air pollution, within an AQMA; or c) lead to a significant deterioration in local air quality resulting in unacceptable effects on human health, local amenity or the natural environment, that would require a new AQMA to be created; or d) having regard to established local and national standards, lead to an unacceptable decline in air quality in any area.
2. Major development schemes should demonstrably promote a shift to the use of sustainable modes of transport to minimise the impact of vehicle emissions on air quality.
3. New development that would result in increased traffic flows on the M62 past Manchester Mosses Special Area of Conservation (SAC) of more than 1000 vehicles per day or 200 Heavy Goods Vehicles (HGVs) per day must be accompanied by evidence identifying whether the resultant impacts on air quality would cause a significant effect on ecological interests within the SAC. Where such effects are identified they would need to be considered in accordance with Policy LPC06.

This is perhaps the most comprehensive of the provided examples, and also incorporates ecological considerations, as well as the more conventional references to AQMAs and AQAPs, which may be relevant to many of CBC's designated areas.

These examples are by no means a comprehensive list but do provide a reference against which specific policies could be developed if required, and should CBC wish to continue to strive to reduce air pollution, even if air quality objectives are not currently being exceeded, as per the aspirations of the Government's UK Clean Air Strategy[8] cited in section 3.2.4.

8.2 CBC Plan Policy Opportunities

8.2.1 Standalone Policy

In terms of a standalone Policy, this would perhaps sit best within the current Chapter 7, which focusses on wider environmental issues, than adapting Chapter 8 to include Air Quality (whilst air quality is mentioned within Chapter 8 already, this Chapter would require a larger re-work to specifically address Air Quality).

Whilst it is apparent that currently Air Quality is improving in Charnwood, a standalone Policy helps to ensure that this continues to be the case into the future, and that continual improvements are made.

With accompanying text which could easily be drafted by CBC's planning team or Environmental Health Officer, a Policy along the lines of that included by St Helens and the following could be incorporated in the Plan:

Policy LP XX: Air Quality
1. Development proposals must demonstrate that they will not: a) impede the achievement of any air quality objective(s), particularly in locations currently or historically declared as Air Quality Management Areas (AQMAs); b) introduce a significant new source of any air pollutant, or a new development whose users or occupiers would be exposed to concentrations in excess of air quality objectives; c) lead to a significant impact on, and deterioration of, local air quality resulting in unacceptable effects on human health, local amenity or the natural environment;
2. Major development schemes should demonstrably promote a shift to the use of sustainable modes of transport and energy generation to minimise the impact of increased emissions on air quality.
3. New development that would result in increased traffic flows on roads adjacent or within any of the Council's 18 Sites of Special Scientific Interest (SSSI) or 5 Local Nature Reserves (LNR).

Specific reference may be made to mitigation, such as mechanical ventilation or green infrastructure, within the Policy as appropriate, but it is considered unlikely to be required at this stage given there are no exceedances of objectives within Charnwood. Item 1 of the Policy covers this to a certain extent, as significant impacts would have

[61] St Helens Borough Council (2019) St Helens Borough Local Plan 2020 – 2035, A Balanced Plan For A Better Future. Available at: https://www.sthelens.gov.uk/media/9525/local-plan-written-plan-web.pdf

to be mitigated by the developer in order to satisfy the Policy, but CBC could quite simply enhance the Policy with those additions.

The above Policy could be enhanced still further by defining how the developers may demonstrate their impacts through a Supplementary Planning Document, at CBC's discretion.

A policy focussed on a broader suite of pollution may also be appropriate, for instance incorporating noise and vibration, or water quality as well.

8.2.2 Enhancing Present Content

Here, suggestions are made for enhancements to existing policies and text to more frequently and comprehensively reference Air Quality within the Plan, either without the need for a standalone Policy or to supplement the specific Air Quality Policy. Suggested additions are highlighted in red and deletions struck through.

Draft Policy LP 22 can be enhanced to include reference to air quality in nutrient nitrogen and acid deposition by adding the following bullet point:

- *Assess the impact of the development on nutrient nitrogen and acid deposition on designated sites (where the designated feature is sensitive to this).*

It would be relatively straightforward to incorporate air quality into the following statement in paragraph 8.20 within Chapter 8, as follows. This approach may also require some amendments to earlier parts of the chapter (for example adding a further introductory paragraph detailing that air quality will be considered within the chapter as well), at CBC's discretion

8.20 All major development proposals should be accompanied by an assessment, ~~in their Design and Access Statement,~~ proportionate to their scale, of their sustainability and impact on air quality, setting out the actions that have been taken to reduce greenhouse gas and pollutant emissions, having regard to:

1. Reducing the need for energy, reducing ~~CO_2~~ pollutant emissions and reducing the heat island effect through design features that provide natural heating, cooling and lighting, using landform, building layout orientation, massing and landscaping;

2. Generating the residual energy required through the use of low or zero carbon energy technologies;

3. Adapting to the effects of climate change whilst contributing to health and well-being; and

4. The development's impact on local air quality and the exposure of existing and proposed future residents to pollutants.

Draft Policy LP 29 related to renewable energy can also be enhanced as follows:

Proposals for wind and solar energy installations will be supported where any adverse impacts on the environment including local amenity, the historic environment and the setting of heritage assets, noise and odour, air quality, the wider landscape, biodiversity and public safety have been fully addressed

This policy may also benefit from greater clarification on the types of energy generation acceptable for development, for example specifying if biomass installations are to be discouraged in urban areas (due to emissions of particulates), the specification of low NO_x boilers (<40 mg/kWh) where conventional heating types are employed, and many other considerations.

Draft Policy LP 30 'Sustainable Construction' states that to adapt to and mitigate against the effects of climate change, CBC will be:

"supporting new development that protects environmental resources including local air quality and our most versatile agricultural land."

This has not been amended or added to since the Adopted Plan, in the Draft Plan. This policy can be strengthened in a number of areas; for example, by specifying what the promotors of the new development can consider in order to contribute toward this objective, possibly with reference to AQAPs, similar to the route WCC has taken. An amended statement may read:

"supporting new development that protects environmental resources including local air quality and our most versatile agricultural land. New developments will be expected to demonstrate they do not have a significant impact on local air quality, within either the construction or operational phase"

Draft Policy LP 33 currently references electric vehicle provision, which will be beneficial to Air Quality. However, it could also go further and reference the need for air quality assessment of major developments as follows:

We will require all major developments to have robust transport assessments and travel plans and to consider sustainable travel options at the outset so that they form an integral part of the development. These developments will also require an assessment of the impact of the transport plans on local air quality.

The following additional items, which are common to air quality policies and guidance could be considered for addition at the discretion of the Council, within suitable policies / explanatory text:

- *Within the Construction Phase - Emissions Mitigation and Assessment from construction stage required;*
- *Electric Vehicle Charging Infrastructure - details of charging points and plugs specifications for both exterior and garage situations at a specified ratio;*
- *Heating and Hot Water Generating Appliances e.g. All gas-fired boilers to meet a minimum standard of 40mgNOx/kWh or consideration of alternative heat sources;*
- *Where a development scheme requires a Travel Plan; Promotion of cycling and other methods of active travel – need for developing cycle routes or pedestrianised areas and infrastructure to support low emission modes of transport; and*
- *Damage cost calculation is required as part of an air quality assessment, and mitigation offset to an equivalent value.*

8.2.3 Neighbourhood Planning

As referenced in Table 6, there is currently little mention of air quality within local Neighbourhood Plans in Charnwood. There is an opportunity to increase reference to air quality within Neighbourhood Plans, for example to tie in where policy areas may have co-benefits, such as in transport and green infrastructure, which would facilitate the understanding of the link.

The role of Neighbourhood Plans will be inherently limited, that is not to say they cannot play a part in working towards air quality improvements

Limitations of these Plans will be both spatially and in terms of resourcing, but primarily these can have an influence with regard to localised micro-scale influences on pollutant dispersion, such as the layout of barriers (be they green or otherwise) or street canyon effects. This could be considered in Neighbourhood Plans where applicable, to limit the creation of recirculation vortexes which might entrain and trap pollutant emissions, thus increasing ambient pollutant concentrations. Likewise, the strategic placing of barriers might create isolated areas of reduced pollution downwind from emissions sources.

Finally, consideration can be given to the infrastructure supporting proposed developments, for example, the Neighbourhood Plan might require a certain number of electric vehicle charging points, provision of pedestrianised space or cycle storage, all of which would encourage more sustainable forms of transport, thereby reducing pollutant emissions.

8.3 Discussion

Given that there is currently both national and local policy demanding a call to action on air quality and its negative health impacts, and new legislation which will seek to shift the focus towards continual improvements and prevention of exceedances rather than tackling pollution only when limits have been surpassed, there are a number of ways in which the air quality stance can be improved in the Draft Plan. Local authorities such as CBC will need comply with the Defra Clean Air Strategy which will mean continuing to strive to reduce air pollution, even if air quality objectives are not currently being exceeded, which should be a key aspiration of the Draft Plan. As the JSNA (2019) recommends the formation of a Leicestershire Air Quality and Health Partnership Steering Group and associated plan to meet six identified objectives, it would be advisable to put a number of measures in place. This would include preparing for the possibility of being required in future to consider air quality and health in planning, development and environment and transport decisions, the use of AQAPs to provide a clear strategic air quality direction, and generally increasing public communication within the Borough on air quality.

Encouraging of active travel resonates through national and regional policy which in turn has the potential to impact on the air quality position; the measures within the Draft Plan policies support this. A number of policies within the Draft Plan may assist in minimising air quality impact. In particular the promotion of walking, cycling and increased public transport use, and provision of a higher number of electric vehicle charging points in car parks.

Fuel technology projections are an intrinsic part of planning for the adoption and management of new transport technology, where planning must recognise opportunities to promote and enable those technologies with beneficial effects, and discourage risks. For example, diesel fuel was promoted by central Government due to the CO_2 savings, but relatively recent understanding of the increased local air quality effects have led to a revaluation of this approach. Industry expectations are for the overall trend to shift towards a broadly 30% split for each of the major fuel-types in 2030[62]. CBC should ensure it has a good understanding of emerging technologies and market adoption, and ensure that appropriate policy and infrastructure is placed to support this.

Regional policies to reduce air quality emissions have largely been grouped around reducing transport emissions, due to transport emissions being noted as one of the largest contributors to poor air quality in Leicestershire. This is true in that transport emissions do make up a large proportion to NOx emissions, however almost equal quantities of road emissions of NOx emissions come from point and industrial sources. This may not be as true for PM with only around 12% of PM_{10} and $PM_{2.5}$ emissions coming from transport sources. Given the larger mortality rates associated with $PM_{2.5}$ pollution, this may introduce an opportunity for policy enhancement to target emission sources other than transport, as Salford's policy AQ1 does, for example; which would support the LCC Environment Strategy[31] 2018's aim to reduce health impacts and number of deaths associated with poor air quality and would put CBC in good stead should a more stringent target for $PM_{2.5}$ be set. Background levels of $PM_{2.5}$ are currently at the level of the objective set by the World Health Organisation. This may highlight the largest cause for air quality concern for CBC.

Key Impact Areas (KIAs) for the Plan have been identified in terms of air quality; these are in Shepshed and near residential allocations HS30, HS35, HS36 and HS37, near to the Loughborough Science & Enterprise Park employment allocation, and along Stanford Lane and Cotes Road. On the basis of the absolute concentrations, focus on these areas may not be an explicit requirement within the Draft Plan. The 'With Transport Mitigation' scenarios assessed have some adverse impact locations at Loughborough Science & Enterprise Park employment allocation and several locations within the centre of Loughborough, although there are also improvements predicted upon the Loughborough AQMA which may offset the adverse effects to a certain extent. One way to reduce such impacts in all scenarios may be to reduce the size of allocations such as HS21 and HS23 which represent relatively large allocations within the Loughborough East Priority Neighbourhood.

Air quality has been identified as a concern in relation to air pollution concentrations and IMD in the form of Key Priority Areas. These include central Loughborough, to the north and south of the A512 in Shepshed, a small area in Mountsorrel, along Melton Road in Syston and in Thurmaston. In terms of industrial sources in the key priority areas, Charnwood Forest Brickworks and Newhurst Quarry in Shepshed should be of priority from an air quality perspective. Poor air quality has been found to disproportionately occur in more socially deprived areas, and further detrimental impacts within these areas should be very carefully considered in order to avoid affecting health in these areas. Neighbourhoods most deprived have been found to overlap with the Priority Neighbourhoods identified by CBC in the most part, with the exception of Shepshed. It is recommended to consider the inclusion of Shepshed as a Priority Neighbourhood with respect to air quality, as well as significant development allocations in the identified KPAs be avoided, where possible. Impact of development upon these identified KPAs should be controlled using the development planning process. With health effects not distributed equally, they often disproportionally affect societal groups with limited income or other constraint, and are least able to respond to either poor air quality, or the interventions that are introduced to tackle it. For example, electric vehicles are promoted to improve poor air quality, although these are relatively more expensive to purchase than a petrol/diesel car, and those members of society who could benefit from the local air quality improvements are least likely to be able to afford to buy one.

Under the EPUK & IAQM methodology[14], there were found to be no significant impacts identified as a result of either Option 3 or Option 4 (both with and without transport mitigation) of the emerging low development growth set out in the Draft Plan. This encourages confidence that the low growth option of the Draft Plan will not have a significant impact on local air quality. However, this is caveated by the limitations of that methodology and the strategic level nature of this assessment, and it is essential that each allocation is still considered at the application stage to ensure no significant impacts when the effects of localised emissions sources are taken into account.

[62] Defra (2017) Emission Factor Toolkit version 8.0.1

Whilst CBC reported no exceedances of relevant air quality objectives in 2018, a total of four AQMAs have been designated across the Charnwood. These have been declared either because of emissions from transport or from local industry and are in Loughborough, Syston, the Great Central Railway, and Mountsorrel. The proximity of development locations to the AQMAs in the urban area of Loughborough has the potential to cause air quality issues, possibly causing an increase in exposure of those most deprived, to poor air quality. Ensuring that the planning process also takes the impact of developments upon AQMAs into account would support the Leicestershire Local Transport Plan 3 (2014) and requiring development within AQMAs to include appropriate mitigation measures could enhance this. Whilst these AQMAs remain, it is perhaps pertinent that these are referenced more explicitly within the Draft Plan, particularly with regard to any allocated sites which may be close to, or within, the AQMAs, as the SCC example displayed.

Whilst there are a number of policies where air quality has the potential to be affected, there is currently no specific and standalone air quality policy. Such a policy could contain a multitude of guidelines for developers and residents alike, and there are numerous examples from other Council's Local Plans which could be used as a reference, in addition to those in Section 7.1. This would give weight to, and help to strengthen, the stated intention to not only maintain, but improve air quality in the Borough. This standalone Policy would sit well within Chapter 7 of the Plan, wherein wider environmental issues are currently addressed. Additionally, many Councils have prepared Supplementary Planning Documents (SPDs) which provide guidance for developers and applicants detailing how they can tailor their developments to minimise their impact on local air quality. The introduction of a specific policy would allow CBC to frame the SPD on that, providing a clear framework to applicants as to what will be acceptable on air quality grounds. An SPD would allow CBC to direct developers to use set criteria to determine the development impact significance on air quality; this would inform the decision making process and whether proposals would have an 'unacceptable contribution' to air quality. This approach would also vastly assist with communication with applicants interested in sites such as that received for Land South of Ashby Road, Shepshed.

In the Adopted Plan, Policy CS 22 West of Loughborough Sustainable Urban Extension had a number of measures set out with relevance to air quality and climate change: "…encouraging the development to, where viable, exceed Building Regulations for carbon emissions in accordance with Policy CS16…" and "…including appropriate measures to mitigate any noise and air quality impact from the M1 Motorway…". Similar enhancements of policies and text to more frequently and comprehensively reference Air Quality within the Draft Plan is therefore an advisable option, as presented above in Section 8.2.2.

It is understood that given there are no modelled exceedances of air quality objectives, CBC intend to pursue the option demonstrated within Section 8.2.2, thereby enhancing the current Draft Plan content to further reference air quality, rather than creating a standalone policy. This is considered a robust approach, given the extent of air quality issues faced by CBC.

Climate change, design and health are noted as key themes that cross all social, economic and environmental objectives. There is an opportunity to tie air quality in with these key linkages, in a similar way to SCC's current Draft Plan through climate change, health and transport. Climate change is well addressed within the Plan, with an entire chapter (Chapter 8) dedicated to addressing the issues associated with it. As stated above, many of the policies identified as beneficial for climate change are also beneficial to local air quality, but that is not always guaranteed to be the case (for example, the historic prioritisation of diesel cars for reasons of carbon efficiencies lead to a greater prevalence of diesel vehicles within the vehicle fleet, which is detrimental to local air quality) so caution should be exercised if associating and packaging climate and local air quality policies together in a 'one size fits all' approach.

9. Conclusion and Recommendations

Key Impact Areas of the development allocations of the Plan have been identified in terms of air quality; these are in Shepshed and near residential allocations in south west Loughborough, near to the Loughborough Science & Enterprise Park employment allocation, and along Stanford Lane and Cotes Road. However, on the basis of the absolute concentrations predicted, focus on these areas may not be an explicit requirement within the eventually adopted Plan. The 'With Transport Mitigation' scenarios assessed have some adverse impacts predicted at Loughborough Science & Enterprise Park employment allocation and a number of locations within the centre of Loughborough, although there are also improvements predicted upon the Loughborough AQMA which could likely offset the adverse effects. One way to reduce such impacts in all scenarios may be to reduce the size of allocations such as HS21 and HS23 which represent relatively large allocations within the Loughborough East Priority Neighbourhood. However, given the relatively high level approach taken to developing the 'With Transport Mitigation' scenarios, it is unlikely these will be taken forward, at least not in the form modelled.

Key Priority Areas have been identified in central Loughborough, to the north and south of the A512 in Shepshed, an area in Mountsorrel, along Melton Road in Syston and in Thurmaston. Poor air quality has been found to disproportionately impact the more socially deprived, and further detrimental impacts within these areas should be carefully considered in order to avoid affecting health in these areas. The most deprived neighbourhoods have been found to overlap with the Priority Neighbourhoods identified by CBC in the most part, with the exception of Shepshed. Whilst the impact of development upon these identified KPAs should be controlled through the development planning process, large development allocations in the identified KPAs should be avoided, where possible. The allocations as assessed at a strategic level were not significant in their impact, but this may not be the case at detailed application stage. Whilst the four declared AQMAs remain, it is perhaps pertinent that these are referenced more explicitly within the Plan, particularly with regard to any allocated sites which may be close to, or within, the AQMAs.

Where the KPIs and KPAs overlap, in Shepshed, more explicit consideration is required of the cumulative impacts of the proposed allocations in these areas. The allocated sites where the cumulative impacts should be considered, in consultation with CBC and on a case by case basis, are presented in Table 15. This area is also likely to be subject to emissions from the increased operations of Newhurst Quarry, and it is also therefore recommended that for the two allocated sites nearest to this plant (HS43 and HS38) the effects of emissions to air from this facility are considered as part of the planning application process in consultation with the CBC Environmental Health Officer, to ensure future occupants are not exposed to poor air quality.

In consideration of the significance of the impact of the allocated sites, it was concluded that no significant impacts should arise on air quality. That said, this assessment is at a strategic level and does not account for detailed, highly local variations in concentrations, and therefore it will be necessary for each allocation to be considered in detail at the planning application stage, as is already the case in Charnwood.

There is currently both national and local policy and guidance demanding a call to action on air quality and its negative health impacts and new legislation will seek to shift the focus towards prevention of exceedances rather than tackling pollution when limits have been surpassed, there are a number of ways in which the air quality stance can be improved in the Draft Plan, presented in Section 8.2. Within Defra's Clean Air Strategy, there is a push to continuing to endeavour to reduce air pollution, even if air quality objectives are not currently being exceeded; local authorities such as CBC are expected to comply with this, and this should therefore be a key aspiration of the Draft Plan.

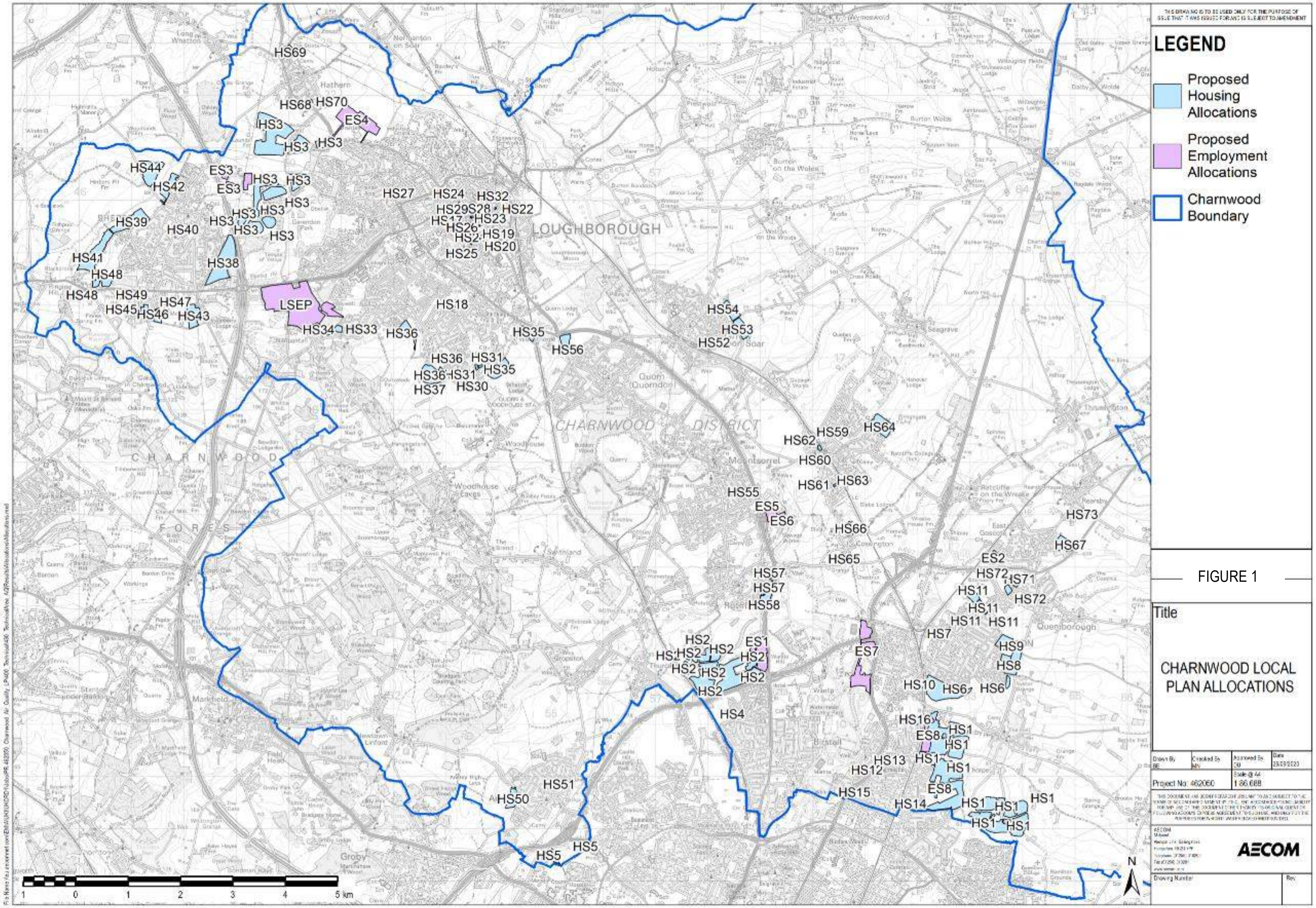
Where measures to improve air quality are enacted, based on the source apportionment results, in future Council policy, cars and vans should be prioritised to reduce emissions, particularly in the most deprived areas with high pollutant concentrations as diesel cars have been found to be the most significant source in key priority areas, with HDVs secondary, dependant on practicability and likelihood of public cooperation. As well as continued focus upon transport emissions, there is an opportunity for policy enhancement to target emission sources other than transport; which have been found to be a larger proportion of $PM_{2.5}$ emissions. As well as improving CO_2 emissions, this would put CBC in good stead should a target for $PM_{2.5}$ be set by the emerging Environment Bill.

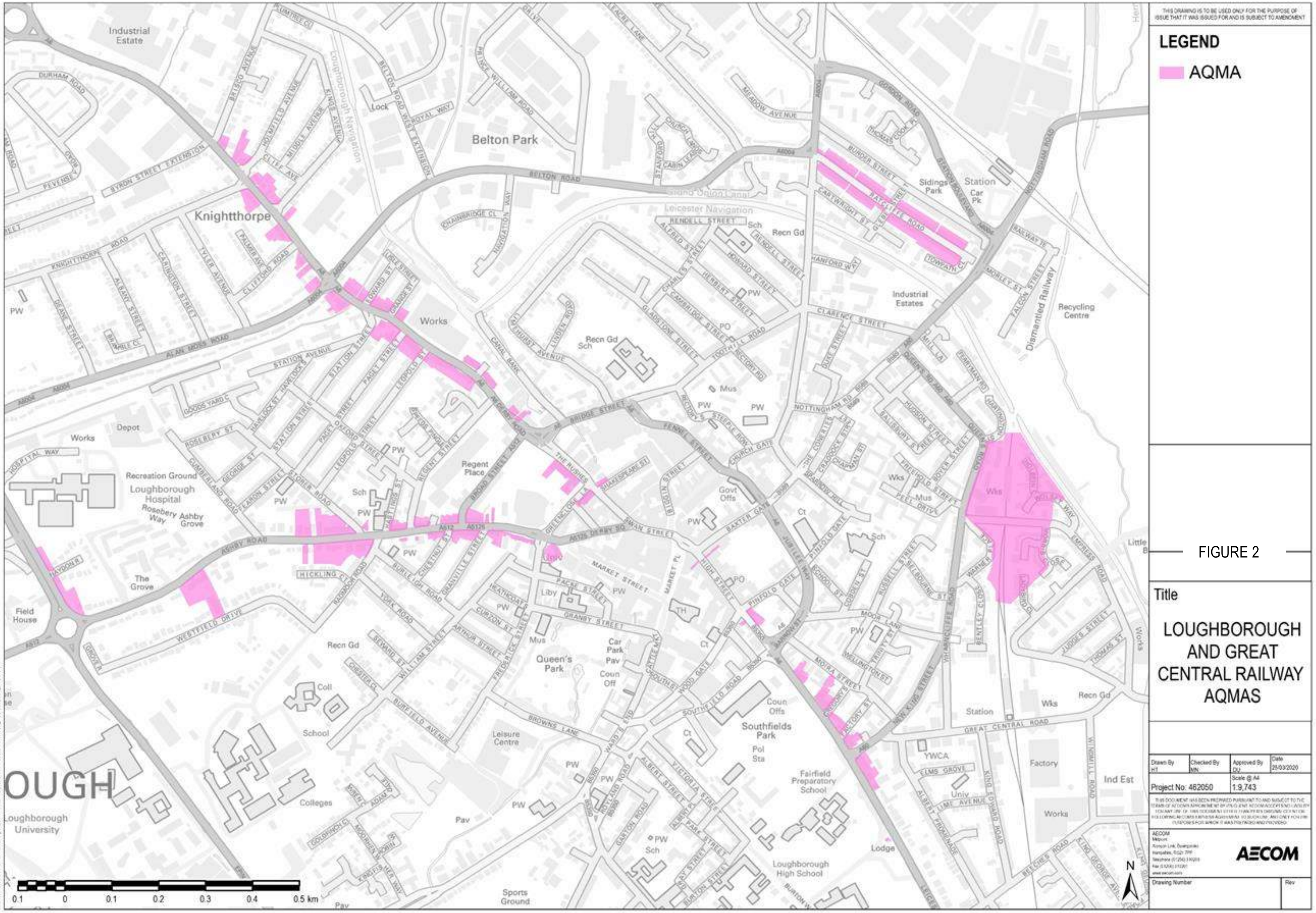
Summary of key conclusions and recommended actions:

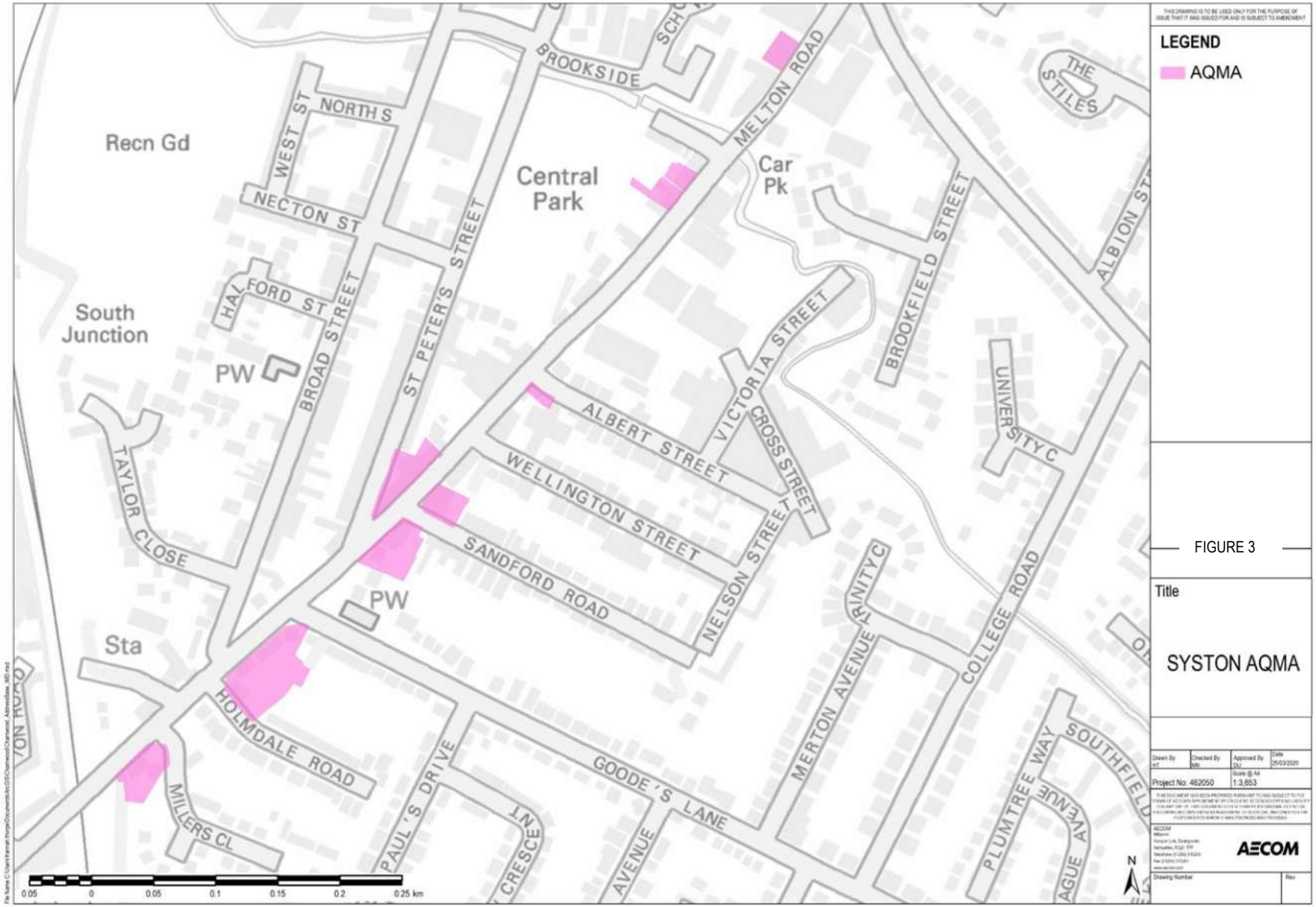
- Legislative reform is currently ongoing, and CBC will need to be cognisant of the Environment Bill as enacted, and possibly update their LAQM procedures when this happens. It is also recommended that an update to CBC's 2006 Air Quality Action Plan be considered to reflect the current air quality landscape;

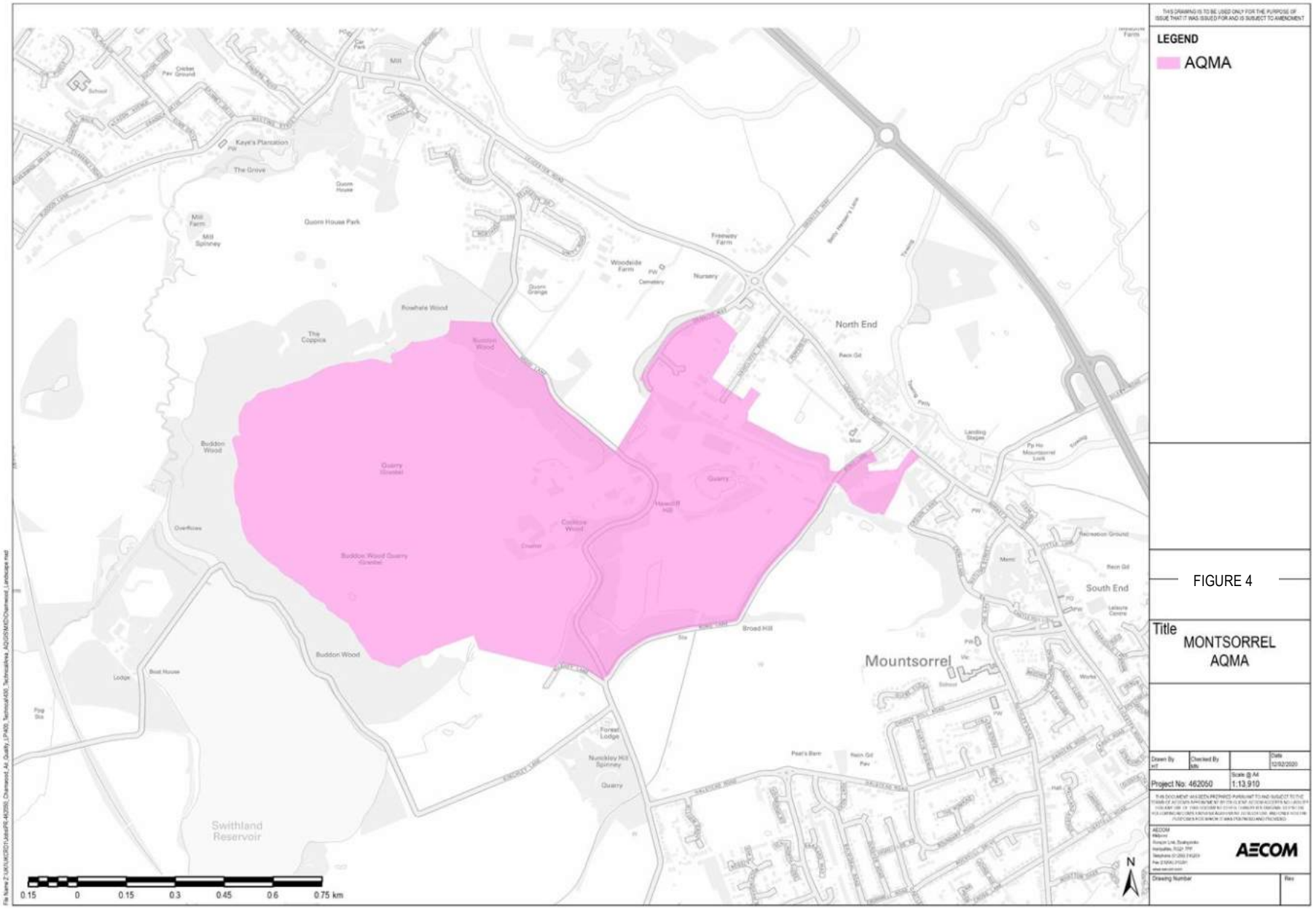
- Air Quality in the Borough is generally improving, with no exceedances of relevant objectives in 2018, despite four AQMAs remaining in situ. It is expected that the current trend of improvement will continue in future years;
- There were no significant impacts identified as a result of either Option 3 or Option 4 (both with and without transport mitigation) of the emerging low development growth set out in the Draft Plan;
- The location / allocations with the maximum impact was found to be HS39 / 41 at Tickow Lane in both Options, where a combined 669 dwellings are proposed;
- That said, given the relatively low existing and future predicted ambient concentrations, there is anticipated to be a certain degree of headroom available, such that higher growth options should also have similarly not significant impacts;
- In terms of the source apportionment of emissions, road sources, within which cars and vans are the predominant contributors, are the main contributors to NO_x / NO_2 concentrations. For Particulates, the main sources are industrial point sources, though roads are still a consideration; and
- The following specific recommendations are made:
  - It is considered that there should be no blanket definition of an 'unacceptable' contribution to air quality, as this is dependant not just on the impact of the allocation / development, but also the wider local context of existing ambient concentrations. Therefore, each allocated site must be considered in detail on a case by case basis at the application stage by the planning authority, which should include, where necessary, any site-specific mitigation required. This consideration should take account of the significance of the impact of each site;
  - To reduce negative impacts, consideration should be given to reducing the size of allocations such as HS21 and HS23 which represent relatively large allocations within the Loughborough East Priority Neighbourhood.
  - As having been identified as both a Key Impact and Priority Area, allocations in the Shepshed area should be considered cumulatively at the planning application stage. In addition, the presence of Newhurst Quarry Energy Recovery Facility and the recent variation of operations here, mean that developers at sites HS43 and HS38 should also consider emissions from that facility in their proposals;
  - Various additions and amendments to the wording and content of the Draft Plan have been suggested, that will strengthen the Council's ambition toward, and consideration of, Air Quality, in the planning process. This includes referencing AQMAs, where relevant; and
  - Whilst Neighbourhood Plans will inherently be limited both spatially and in terms of resourcing, these can have an influence with regard to localised micro-scale influences on pollutant dispersion, and in consideration of the infrastructure supporting proposed developments.

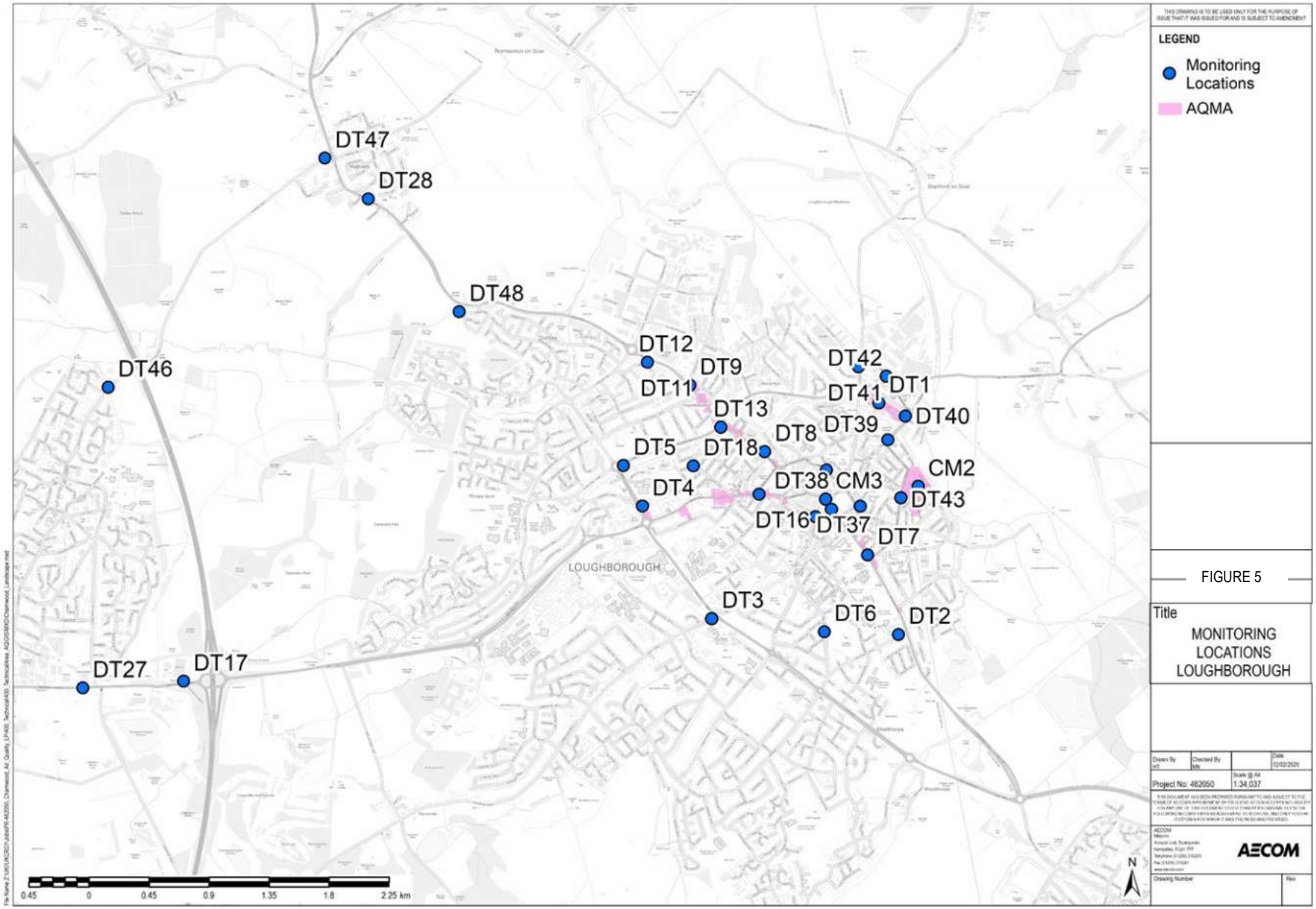
Appendix A : Figures


LEGEND
Proposed Housing Allocations
Proposed Employment Allocations
Charnwood Boundary
FIGURE 1
Title
CHARNWOOD LOCAL PLAN ALLOCATIONS
AECOM
LOUGHBOROUGH
CHARNWOOD DISTRICT
HS69
HS68 HS70
ES4
HS3
HS44
HS42
ES3
HS27
HS24 HS32
HS22
HS23
HS19
HS20
HS25
HS39
HS40
HS41
HS48
HS38
HS49
HS47
HS43
LSEP
HS18
HS34
HS33
HS36
HS35
HS56
HS54
HS53
HS52
HS31
HS30
HS37
HS64
HS62
HS59
HS60
HS61
HS63
HS55
ES5
ES6
HS66
HS65
HS73
HS67
ES2
HS71
HS72
HS11
HS57
HS58
HS7
HS2
ES1
ES7
HS9
HS8
HS10
HS6
HS4
HS16
ES8
HS1
HS13
HS12
HS15
HS14
HS51
HS50
HS5
0 1 2 3 4 5 km
N


LEGEND
AQMA
FIGURE 2
Title
LOUGHBOROUGH AND GREAT CENTRAL RAILWAY AQMAS
Project No: 462050
Scale @ A4 1:9,743
AECOM
Knightthorpe
Belton Park
Queen's Park
Southfields Park
Loughborough Hospital
Loughborough University
Loughborough High School
Fairfield Preparatory School
0.5 km


LEGEND
AQMA
FIGURE 3
Title
SYSTON AQMA
Project No: 462050
Scale @ A4
1:3,653
AECOM
Drawing Number
Rev
Recn Gd
Central Park
Car Pk
South Junction
Sta
PW
PW
BROOKSIDE
MELTON ROAD
WEST ST
NORTH S
NECTON ST
ST PETER'S STREET
BROAD STREET
HALFORD ST
TAYLOR CLOSE
ALBERT STREET
WELLINGTON STREET
SANDFORD ROAD
VICTORIA STREET
CROSS STREET
NELSON STREET
BROOKFIELD STREET
ALBION ST
THE STILES
UNIVERSITY C
TRINITY C
MERTON AVENUE
COLLEGE ROAD
PLUMTREE WAY
SOUTHFIELD
HOLMDALE ROAD
MILLERS CL
PAUL'S DRIVE
GOODE'S LANE
AVENUE
0.05 0 0.05 0.1 0.15 0.2 0.25 km
N


LEGEND
AQMA
FIGURE 4
Title
MONTSORREL
AQMA
Mountsorrel
North End
South End
Swithland
Reservoir
Buddon Wood
Quorn House Park
Broad Hill
0.15 0 0.15 0.3 0.45 0.6 0.75 km
N
AECOM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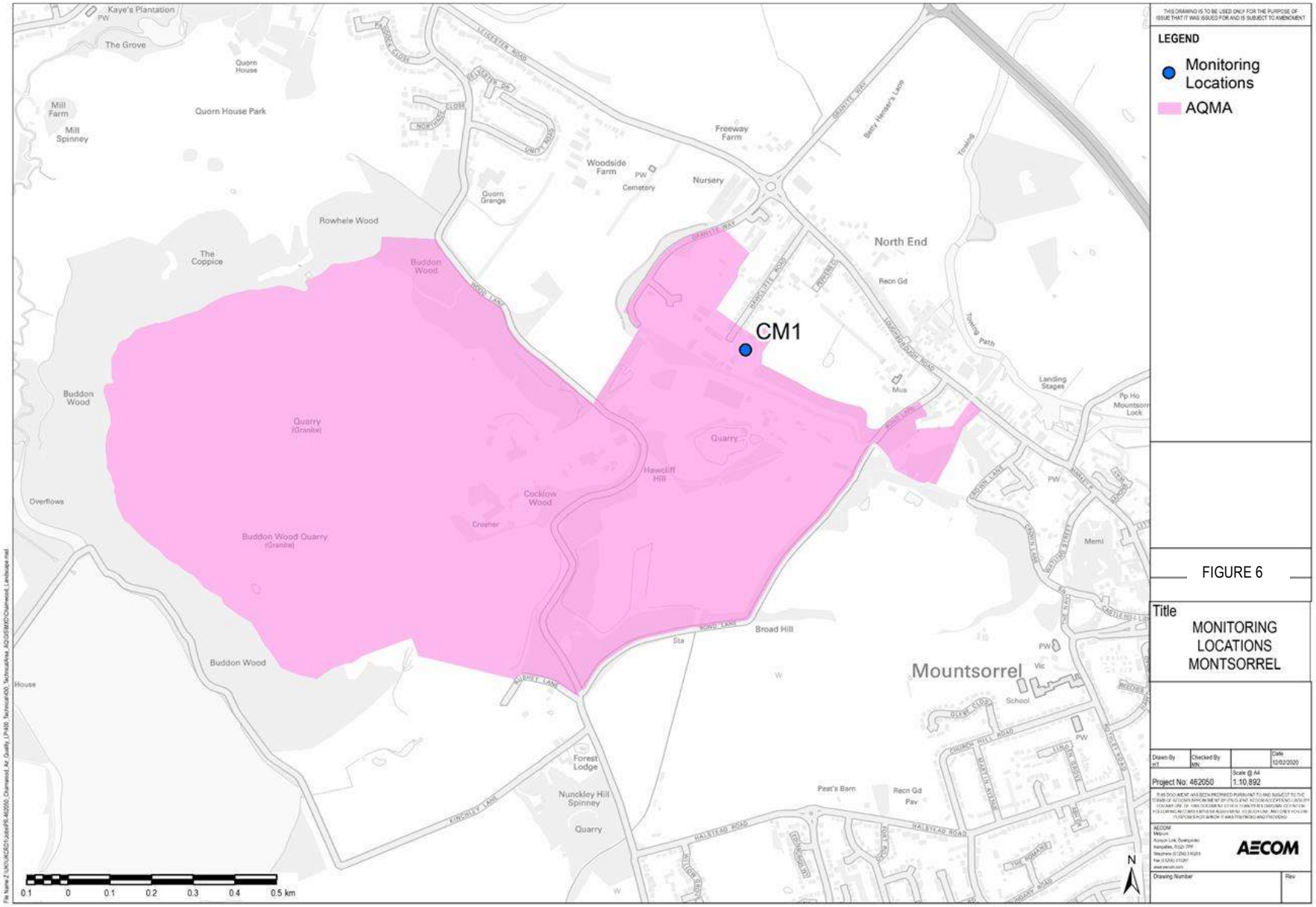
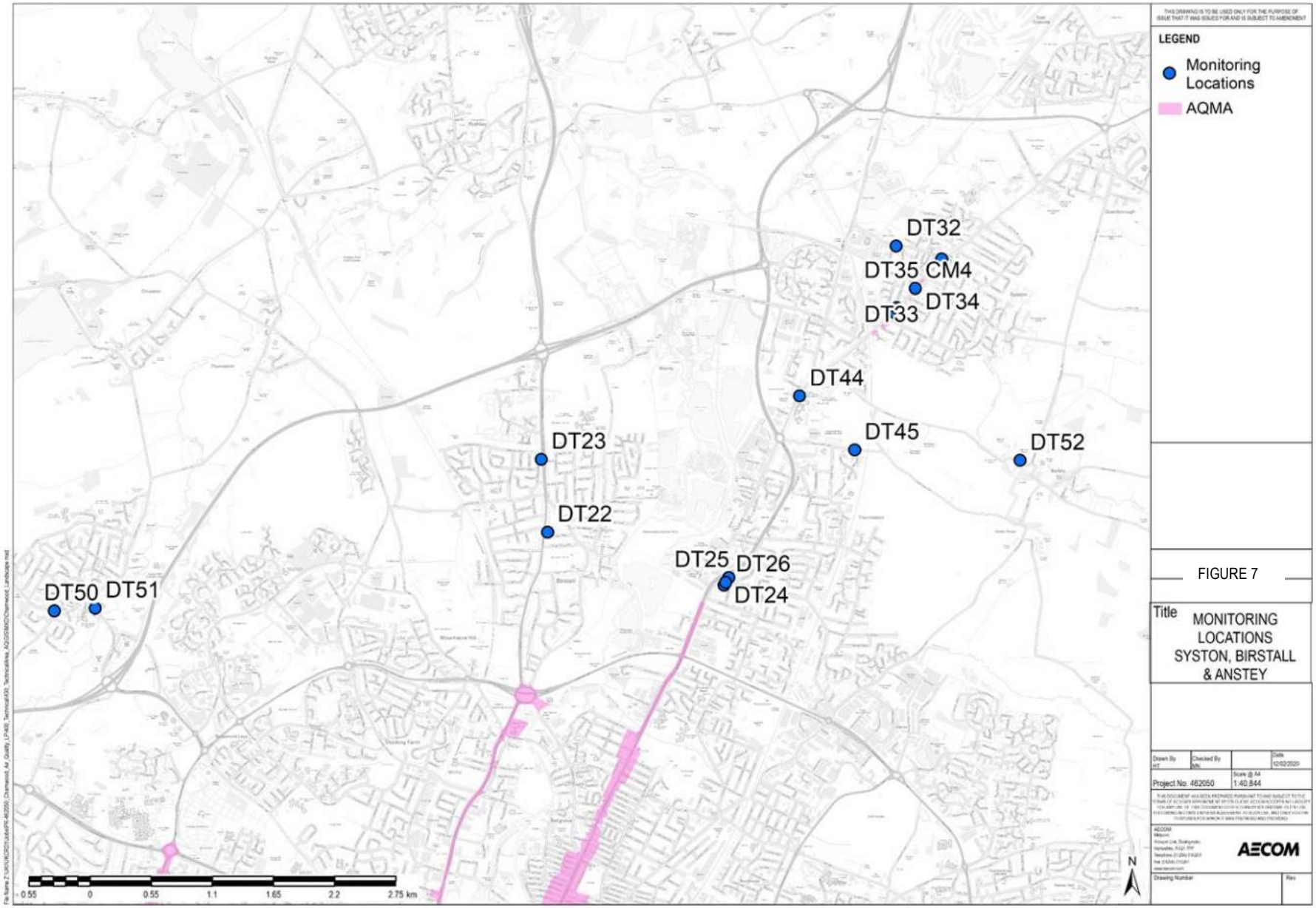
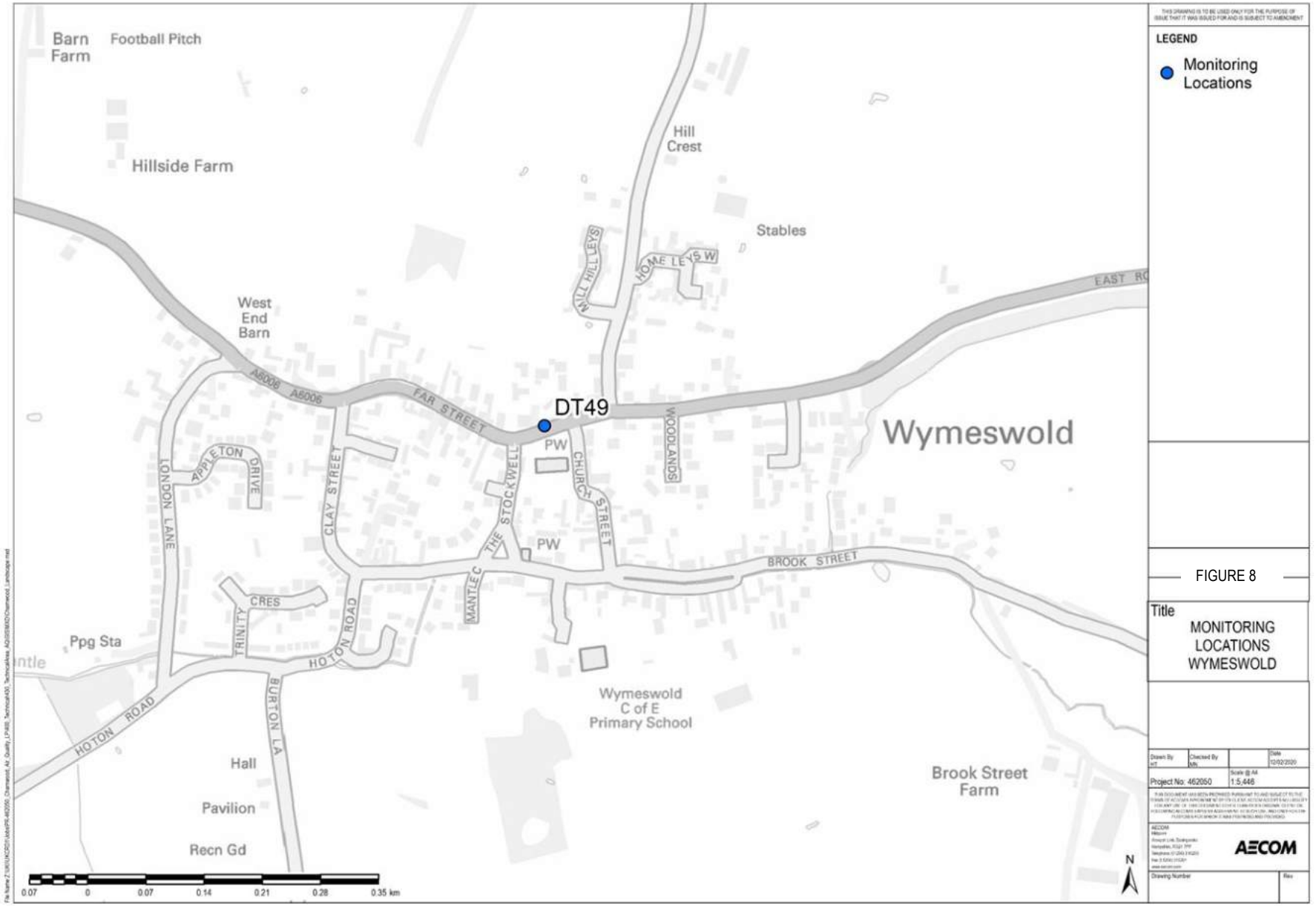
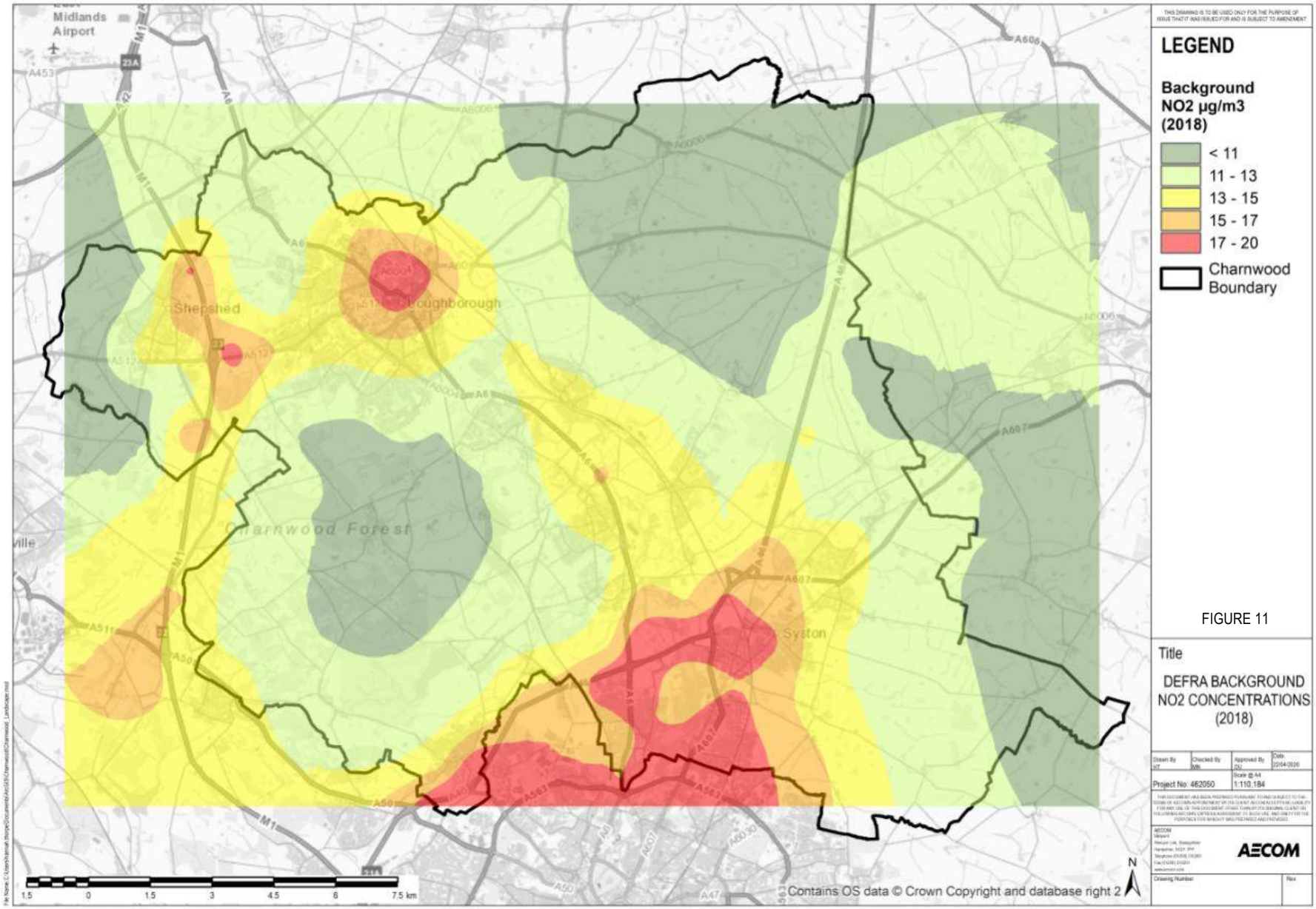
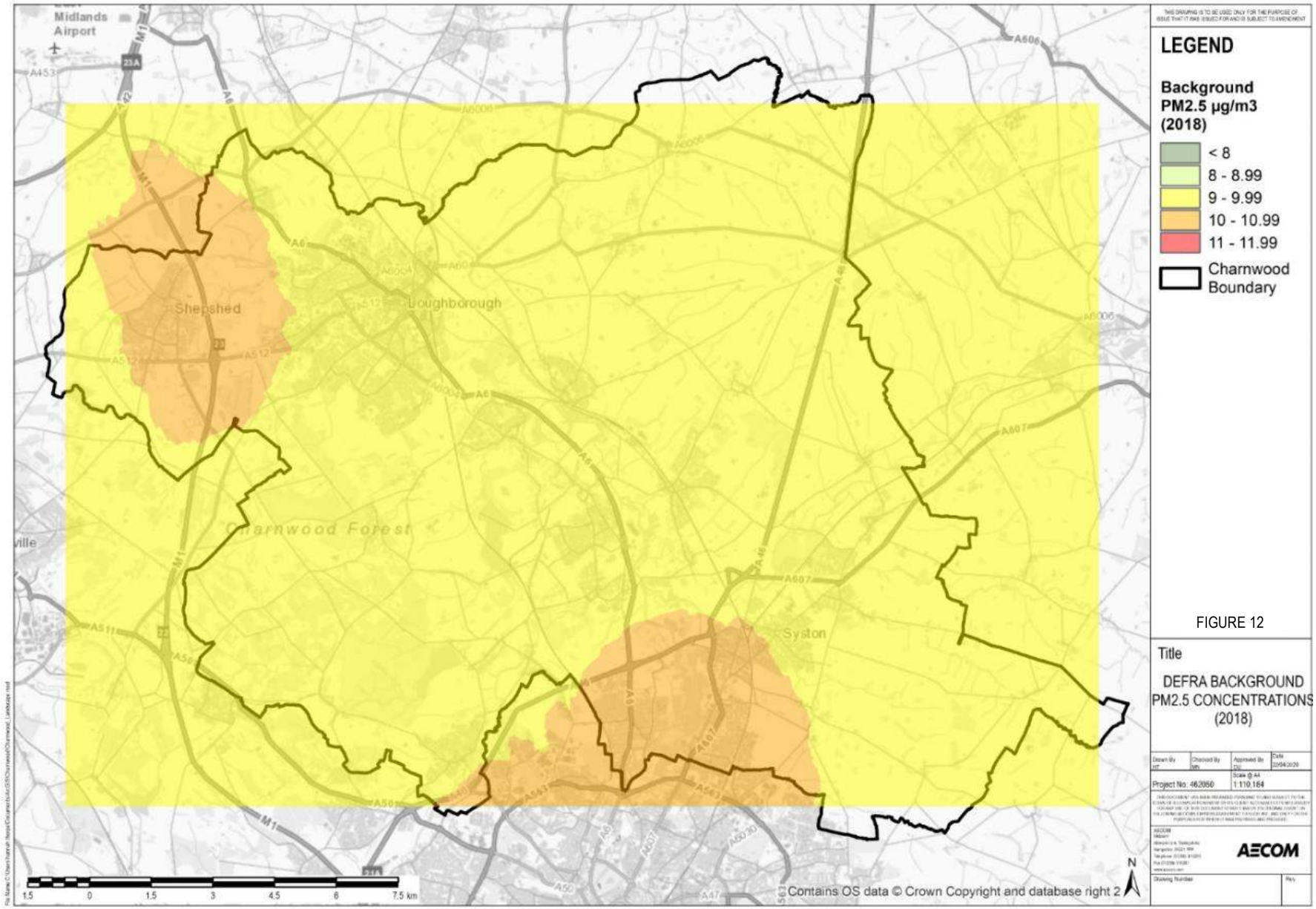
Monitoring Locations
AQMA
DT47
DT28
DT48
DT46
DT12
DT9
DT11
DT13
DT8
DT5
DT18
DT4
DT38
CM3
CM2
DT43
DT16
DT37
DT7
DT42
DT1
DT41
DT40
DT39
DT3
DT6
DT2
DT27
DT17
LOUGHBOROUGH
0.45 0 0.45 0.9 1.35 1.8 2.25 km
N
FIGURE 5
Title
MONITORING LOCATIONS LOUGHBOROUGH
Project No: 462050
Scale @ A4
1:34,037
AECOM


LEGEND
Monitoring Locations
AQMA
CM1
FIGURE 6
Title
MONITORING LOCATIONS MONTSORREL
Project No: 462050
Scale @ A4
1:10,892
AECOM
Kaye's Plantation
The Grove
Quorn House
Quorn House Park
Mill Farm
Mill Spinney
Freeway Farm
Woodside Farm
Cemetery
Nursery
Quorn Grange
Rowhele Wood
The Coppice
Buddon Wood
North End
Recn Gd
Landing Stages
Quarry (Granite)
Quarry
Hawcliff Hill
Cocklow Wood
Crusher
Overflows
Buddon Wood Quarry (Granite)
Broad Hill
Mountsorrel
School
Vic
Memi
Forest Lodge
Nunckley Hill Spinney
Quarry
Peat's Barn
Recn Gd
Pav
0.1 0 0.1 0.2 0.3 0.4 0.5 km
N


LEGEND
Monitoring Locations
AQMA
DT32
DT35
CM4
DT34
DT33
DT44
DT45
DT52
DT23
DT22
DT25
DT26
DT24
DT50
DT51
FIGURE 7
Title
MONITORING LOCATIONS SYSTON, BIRSTALL & ANSTEY
Project No: 462050
Scale @ A4
1:40,844
AECOM
Drawing Number
Rev
N
0.55
0
0.55
1.1
1.65
2.2
2.75 km


Barn Farm
Football Pitch
Hillside Farm
Hill Crest
Stables
West End Barn
A6006
FAR STREET
DT49
Wymeswold
WILL HILL LEYS
HOME LEYS W
EAST RO
WOODLANDS
CHURCH STREET
THE STOCKWELL
PW
APPLETON DRIVE
LONDON LANE
CLAY STREET
BROOK STREET
MANTLE C
TRINITY CRES
HOTON ROAD
Ppg Sta
Wymeswold C of E Primary School
Brook Street Farm
BURTON LA
Hall
Pavilion
Recn Gd
0.07 0 0.07 0.14 0.21 0.28 0.35 km
N
LEGEND
Monitoring Locations
FIGURE 8
Title
MONITORING LOCATIONS WYMESWOLD
Project No: 462050
Scale @ A4
1:5,446
Date
12/02/2020
AECOM


LEGEND
Background NO2 µg/m3 (2018)
< 11
11 - 13
13 - 15
15 - 17
17 - 20
Charnwood Boundary
Midlands Airport
Shepshed
Loughborough
Charnwood Forest
Syston
Contains OS data © Crown Copyright and database right 2
1.5 0 1.5 3 4.5 6 7.5 km
N
FIGURE 11
Title
DEFRA BACKGROUND NO2 CONCENTRATIONS (2018)
Project No: 462050
1:110,184
AECOM


Midlands Airport
Shepshed
Loughborough
Charnwood Forest
Syston
LEGEND
Background PM2.5 µg/m3 (2018)
< 8
8 - 8.99
9 - 9.99
10 - 10.99
11 - 11.99
Charnwood Boundary
FIGURE 12
Title
DEFRA BACKGROUND PM2.5 CONCENTRATIONS (2018)
Project No: 462050
Scale @ A4 1:110,164
AECOM
1.5 0 1.5 3 4.5 6 7.5 km
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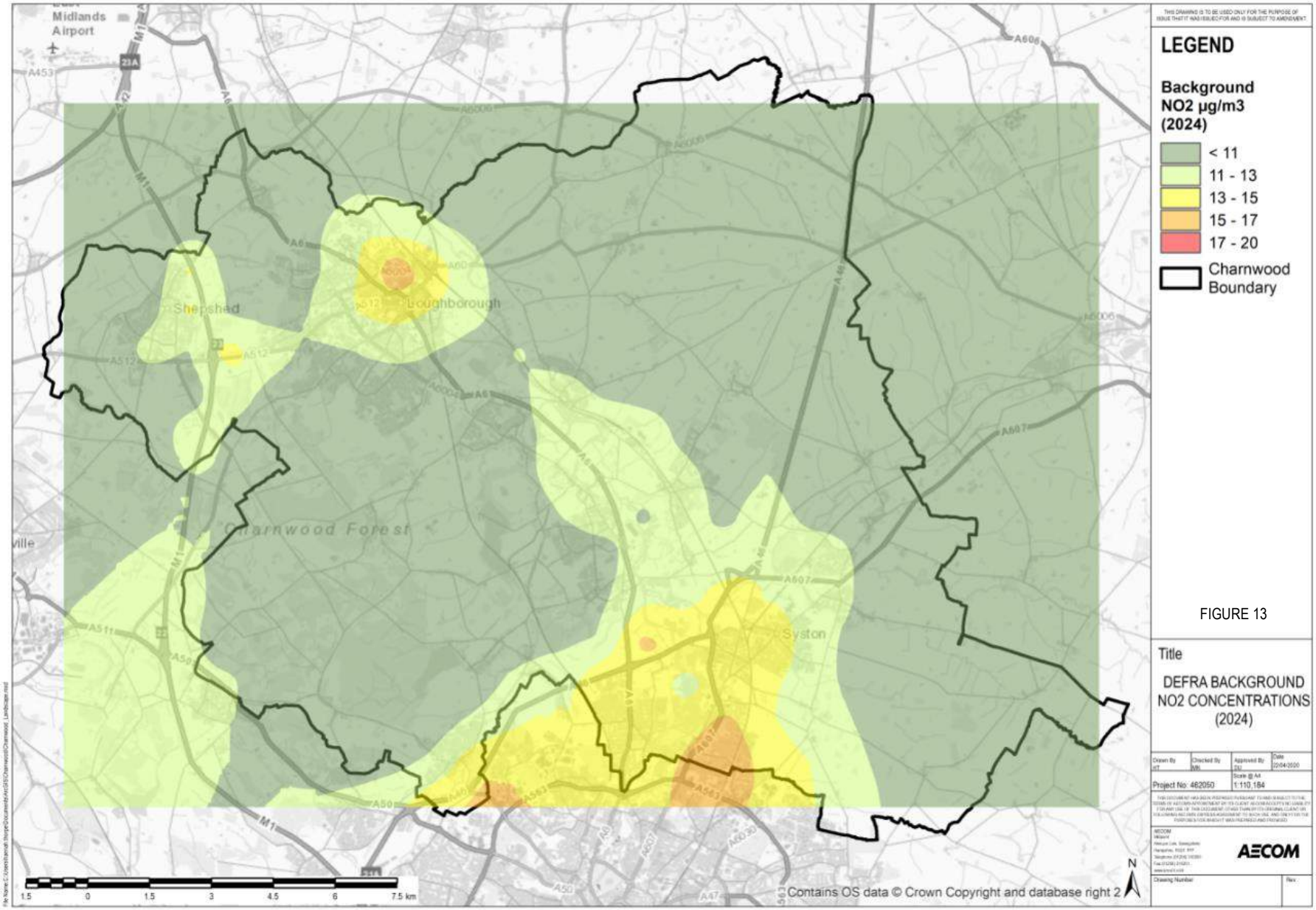
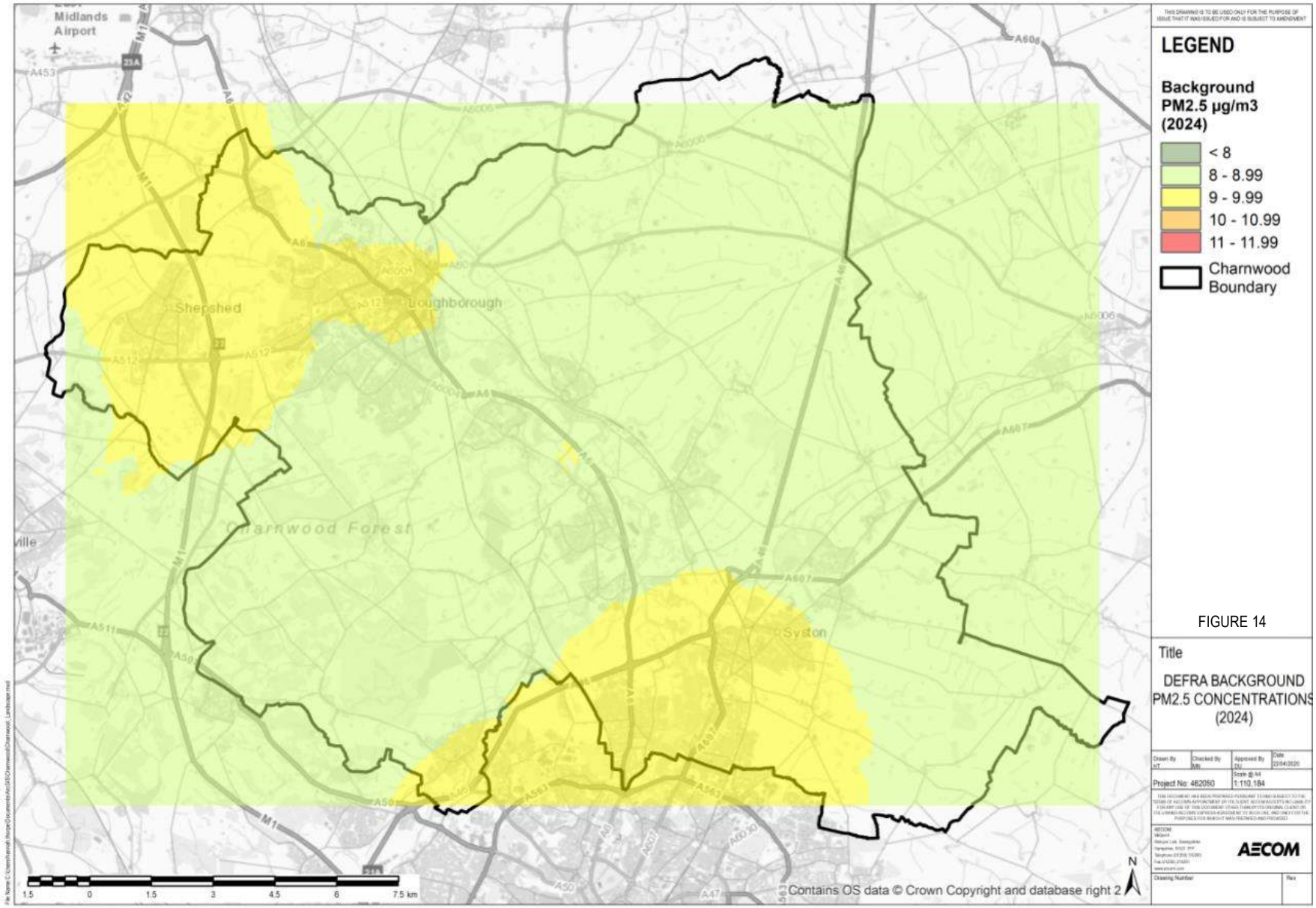
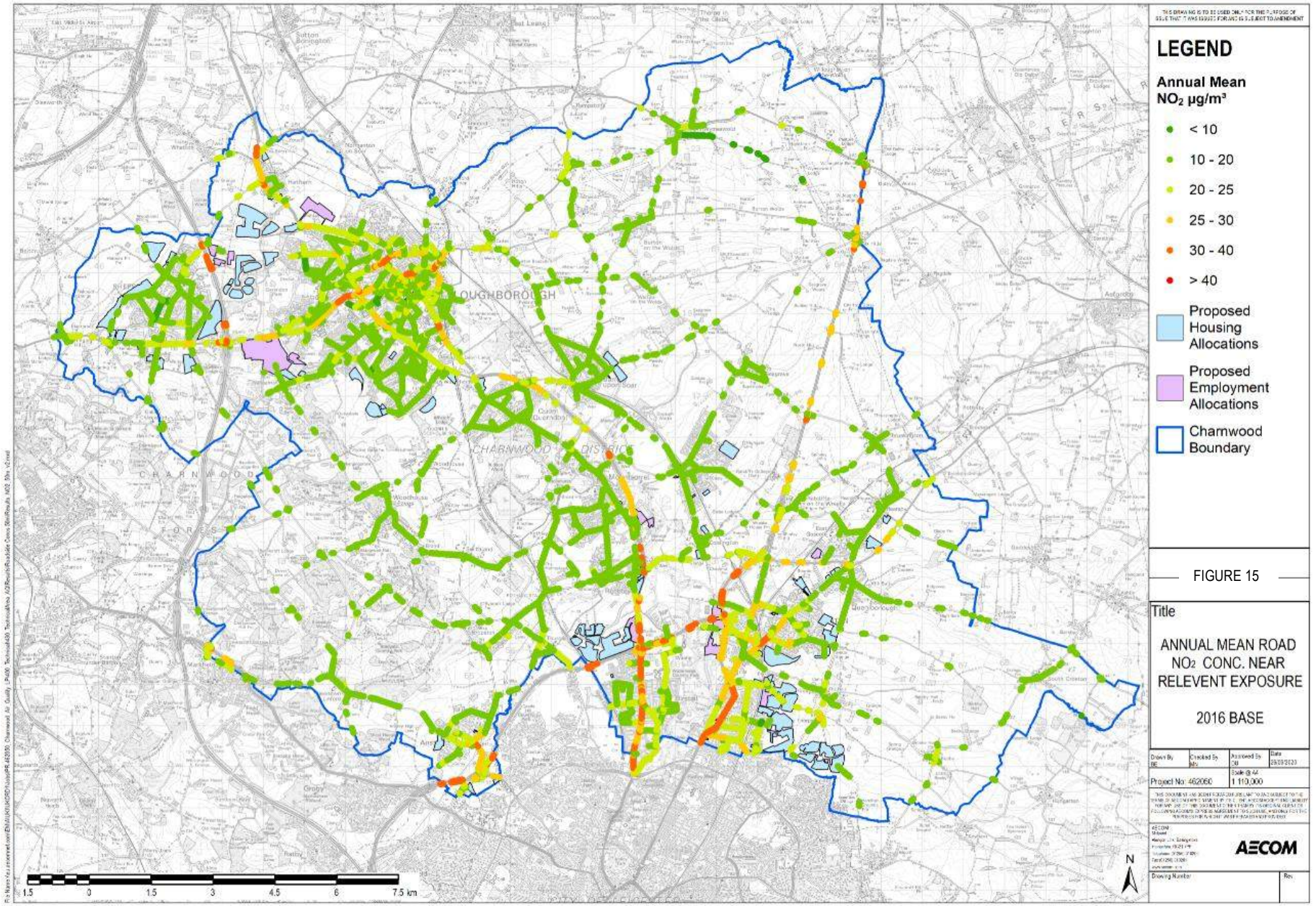
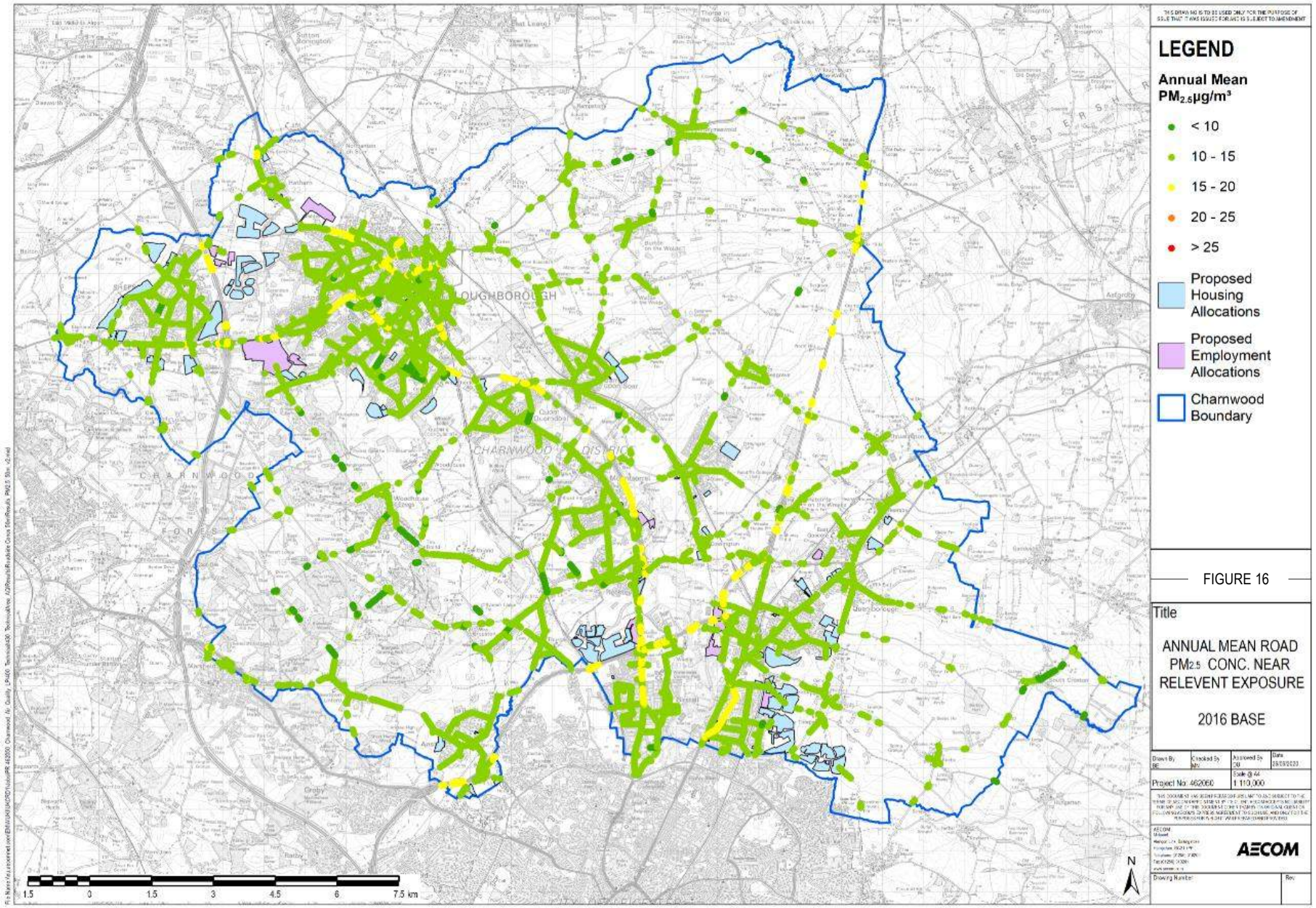
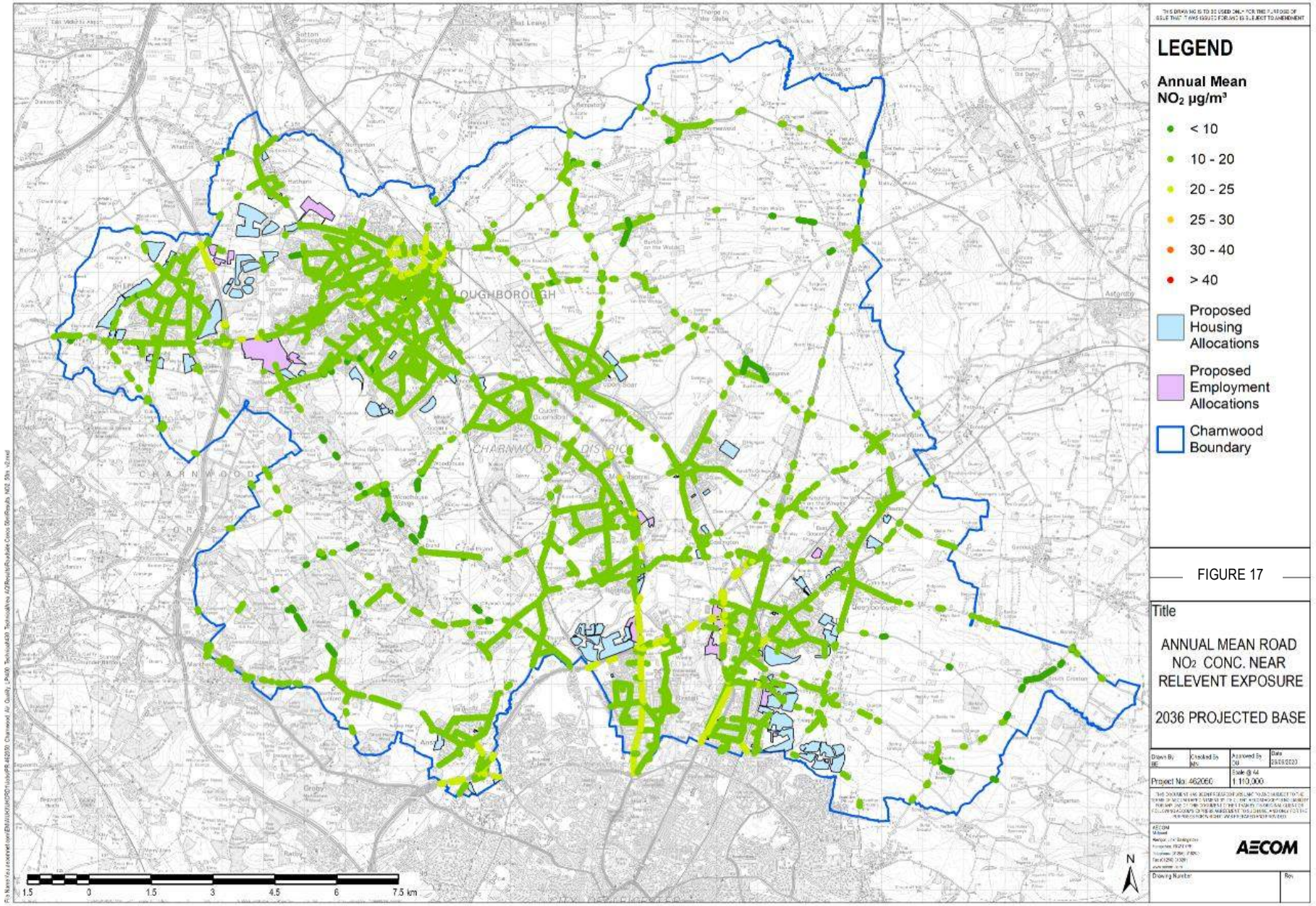
Contains OS data © Crown Copyright and database right 2

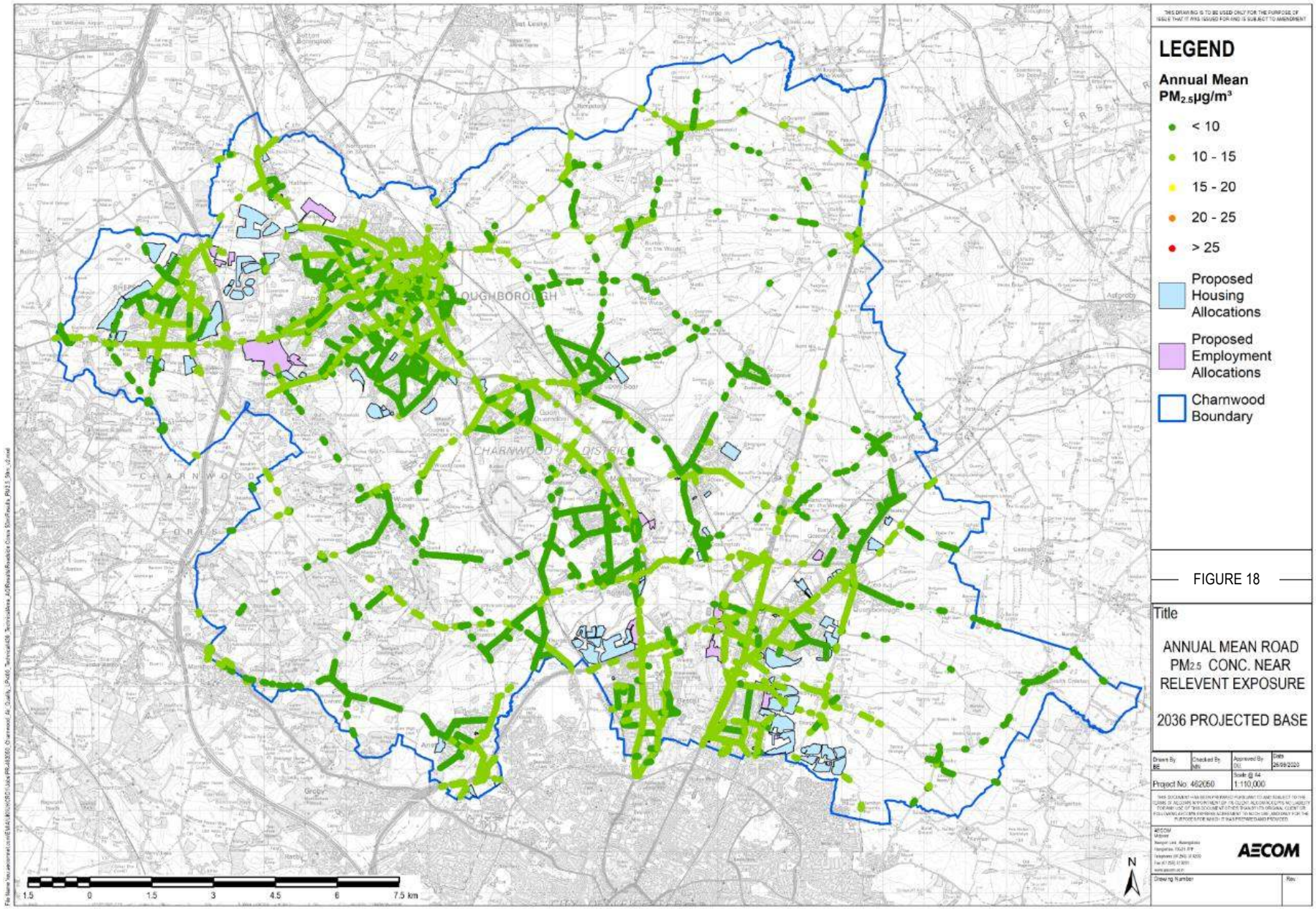

Midlands Airport
Shepshed
Loughborough
Charnwood Forest
Syston
Contains OS data © Crown Copyright and database right 2
LEGEND
Background NO2 µg/m3 (2024)
< 11
11 - 13
13 - 15
15 - 17
17 - 20
Charnwood Boundary
FIGURE 13
Title
DEFRA BACKGROUND NO2 CONCENTRATIONS (2024)
Project No: 462050
AECOM

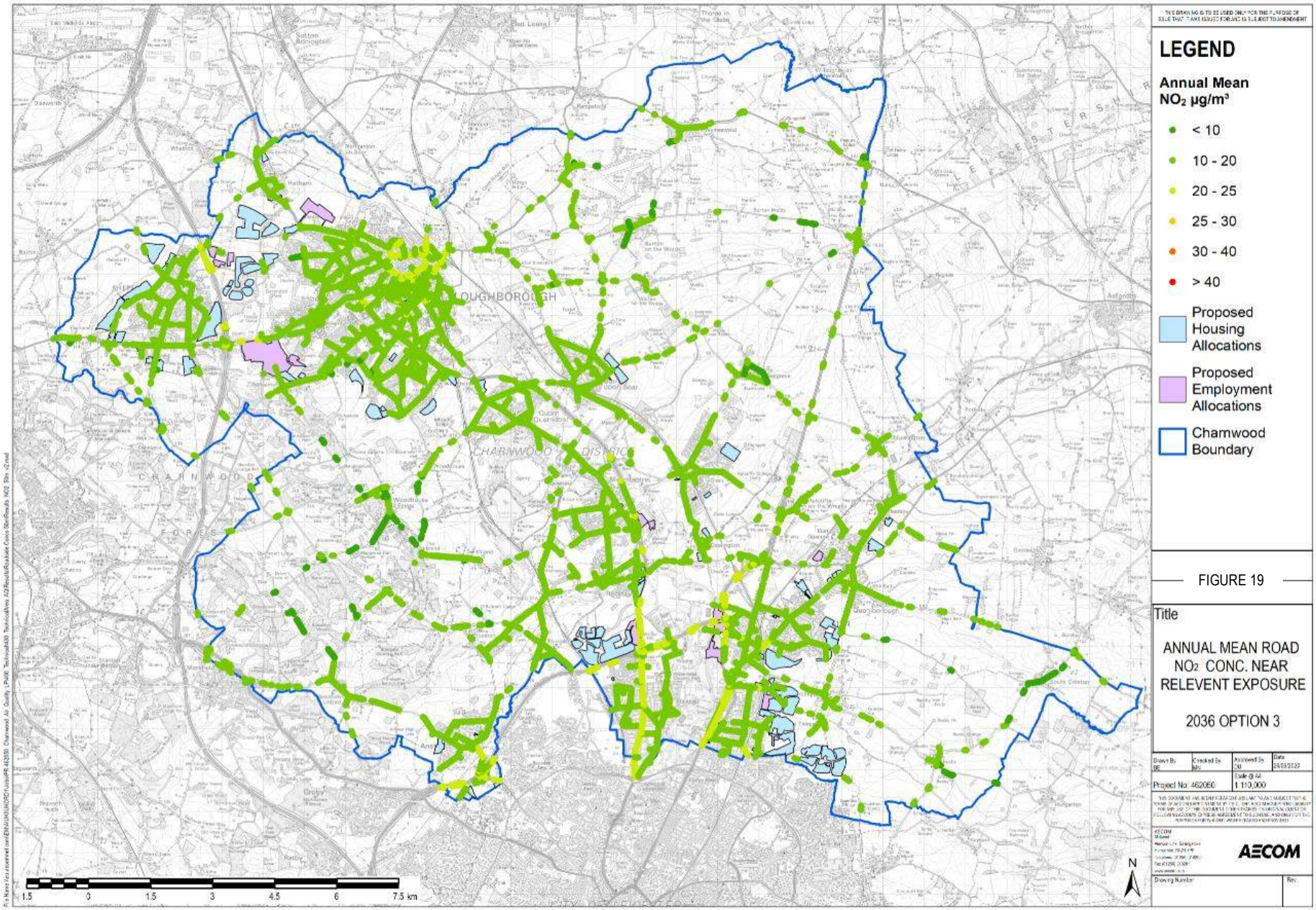

LEGEND
Background PM2.5 µg/m3 (2024)
< 8
8 - 8.99
9 - 9.99
10 - 10.99
11 - 11.99
Charnwood Boundary
Loughborough
Shepshed
Charnwood Forest
Syston
Contains OS data © Crown Copyright and database right 2
FIGURE 14
Title
DEFRA BACKGROUND PM2.5 CONCENTRATIONS (2024)
AECOM

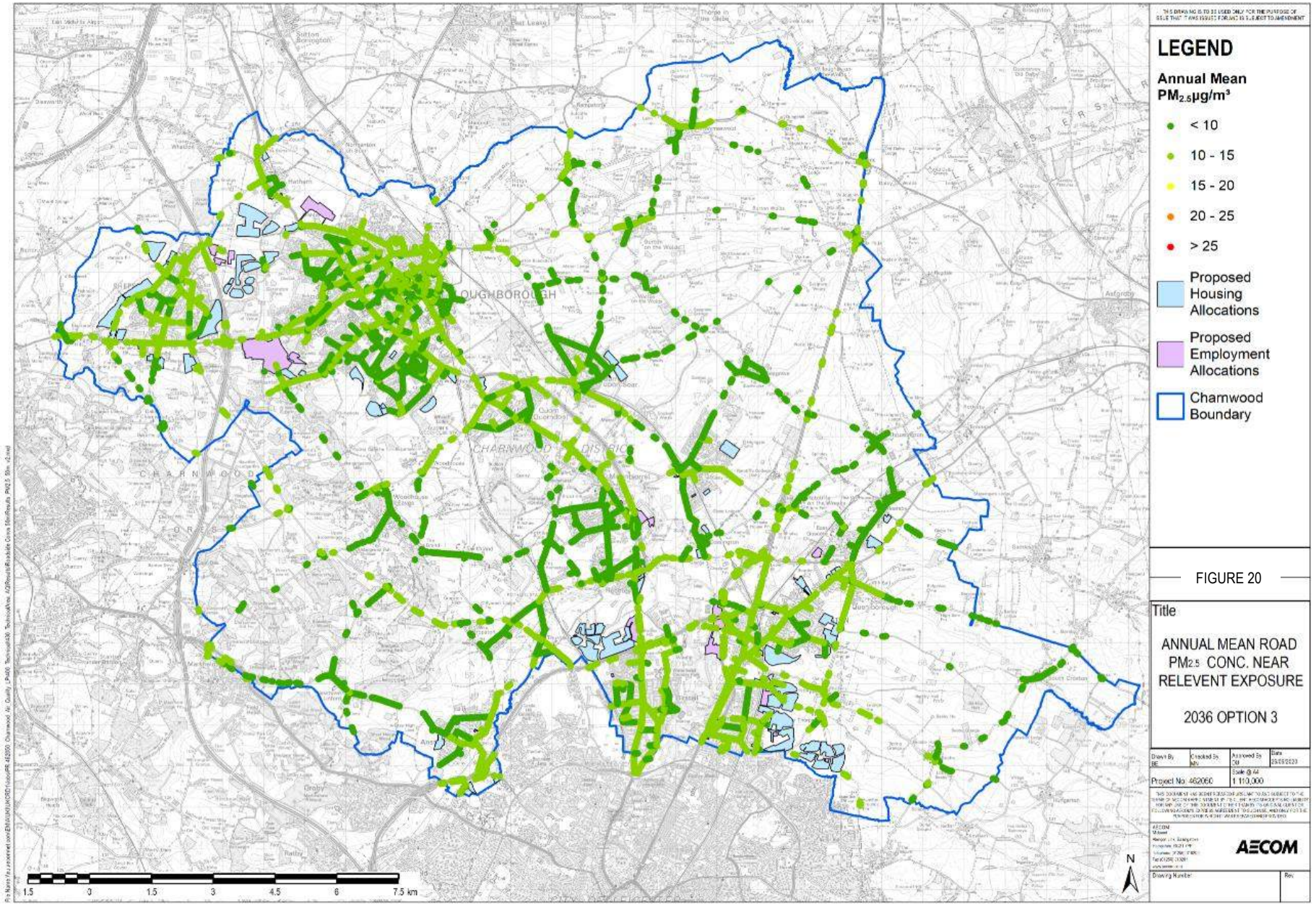

LEGEND
Annual Mean
NO2 µg/m3
< 10
10 - 20
20 - 25
25 - 30
30 - 40
> 40
Proposed Housing Allocations
Proposed Employment Allocations
Charnwood Boundary
FIGURE 15
Title
ANNUAL MEAN ROAD NO2 CONC. NEAR RELEVENT EXPOSURE
2016 BASE
AECOM
1.5 0 1.5 3 4.5 6 7.5 km
N

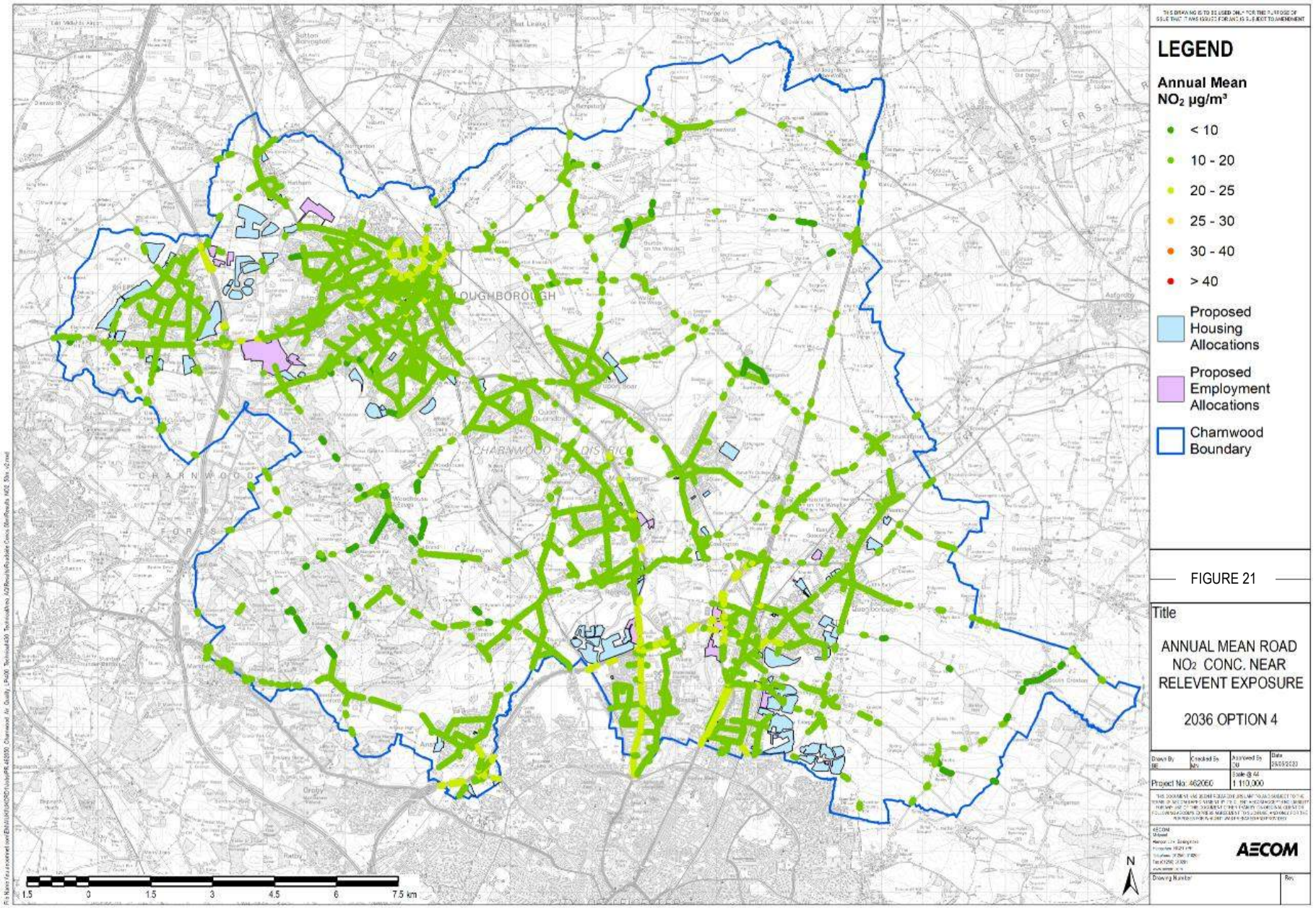

LEGEND
Annual Mean
PM2.5µg/m³
< 10
10 - 15
15 - 20
20 - 25
> 25
Proposed Housing Allocations
Proposed Employment Allocations
Charnwood Boundary
FIGURE 16
Title
ANNUAL MEAN ROAD PM2.5 CONC. NEAR RELEVENT EXPOSURE
2016 BASE
Project No: 462060
1:110,000
AECOM
N
1.5 0 1.5 3 4.5 6 7.5 km

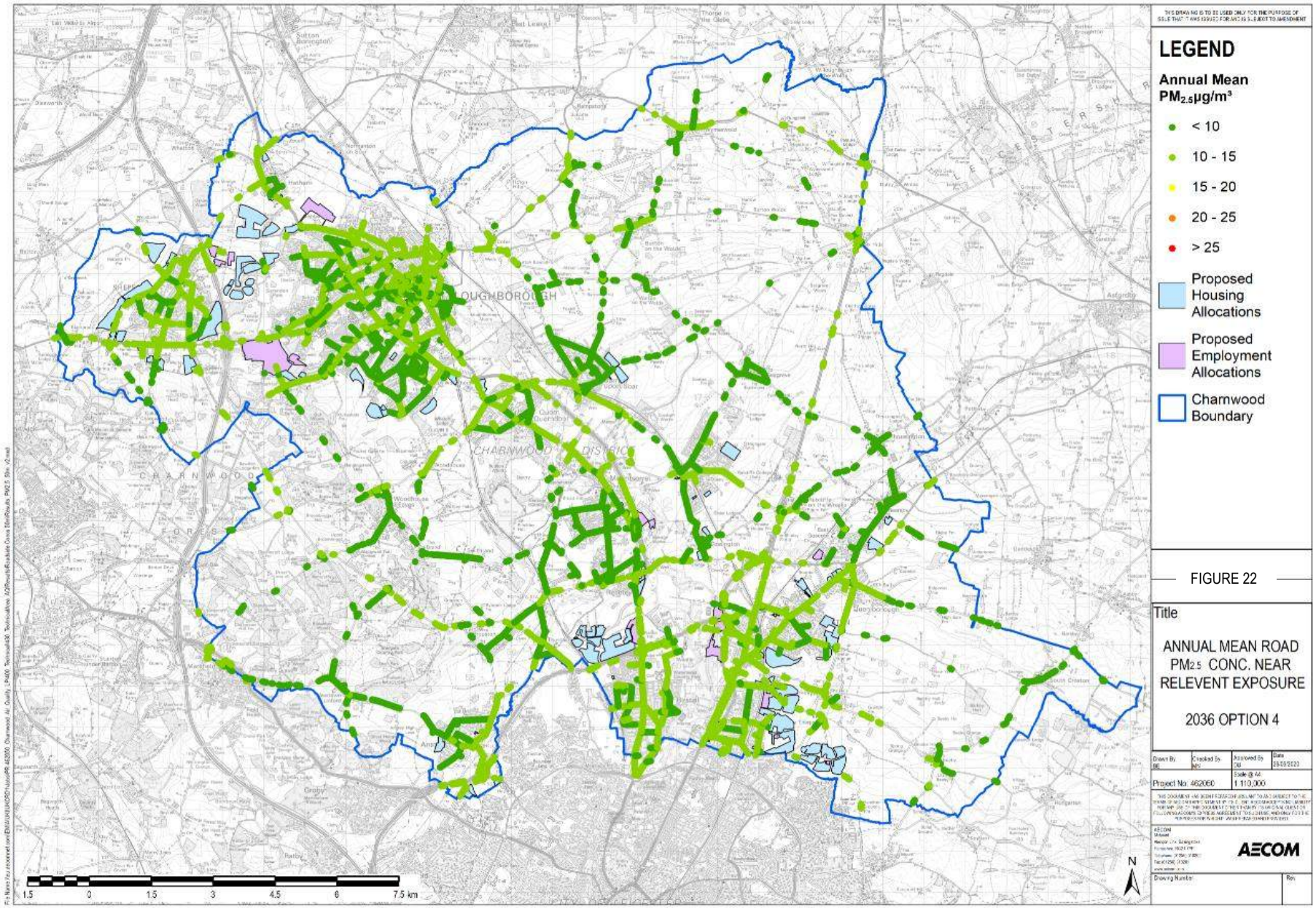

LEGEND
Annual Mean
NO2 µg/m3
< 10
10 - 20
20 - 25
25 - 30
30 - 40
> 40
Proposed Housing Allocations
Proposed Employment Allocations
Charnwood Boundary
FIGURE 17
Title
ANNUAL MEAN ROAD NO2 CONC. NEAR RELEVENT EXPOSURE
2036 PROJECTED BASE
Project No: 462060
Scale @ A4
1:110,000
AECOM
Drawing Number
Rev
N
1.5 0 1.5 3 4.5 6 7.5 km

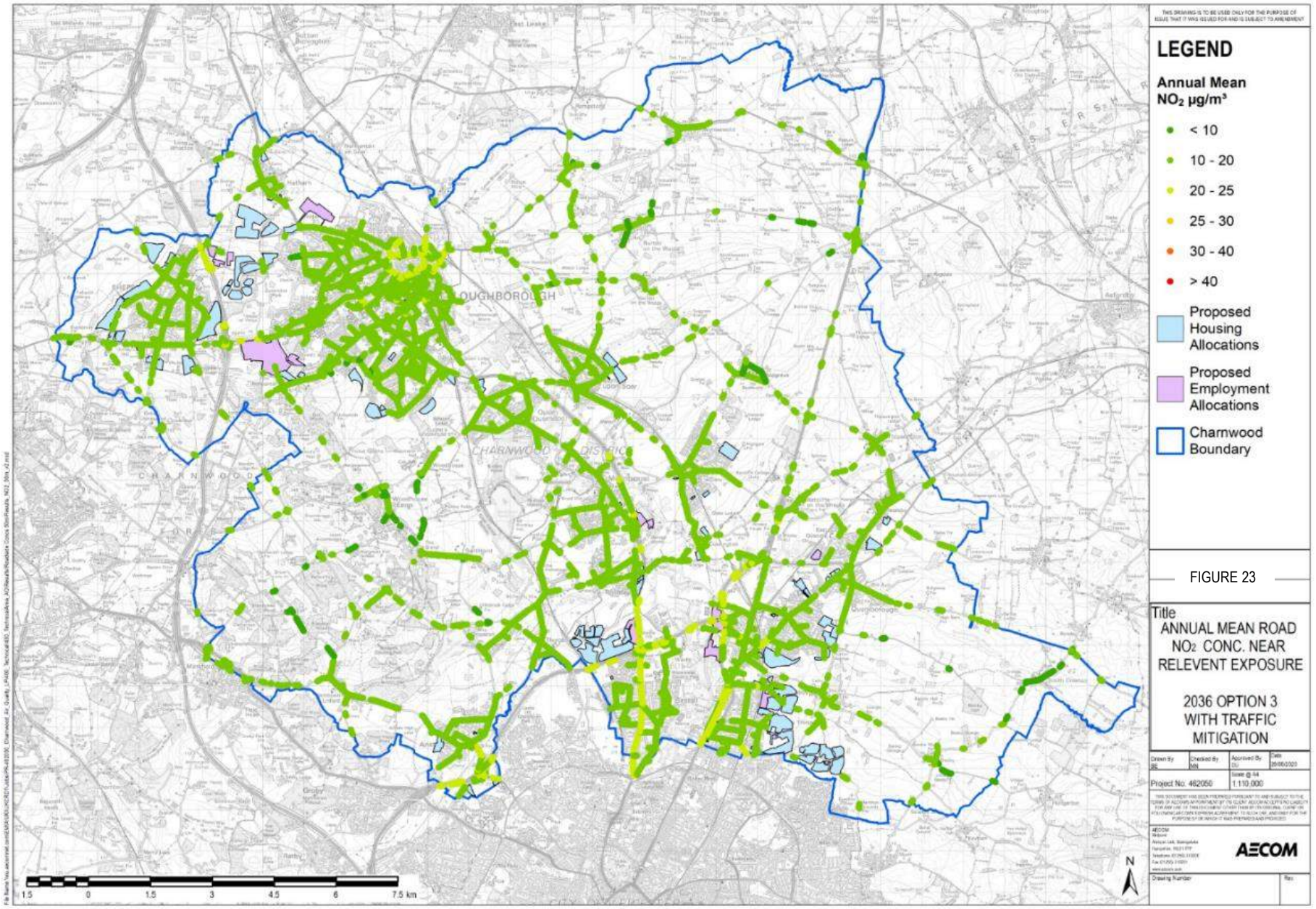

LEGEND
Annual Mean
PM2.5µg/m³
< 10
10 - 15
15 - 20
20 - 25
> 25
Proposed Housing Allocations
Proposed Employment Allocations
Charnwood Boundary
FIGURE 18
Title
ANNUAL MEAN ROAD PM2.5 CONC. NEAR RELEVENT EXPOSURE
2036 PROJECTED BASE
Project No: 462050
Scale @ A4 1:110,000
AECOM
N
1.5 0 1.5 3 4.5 6 7.5 km

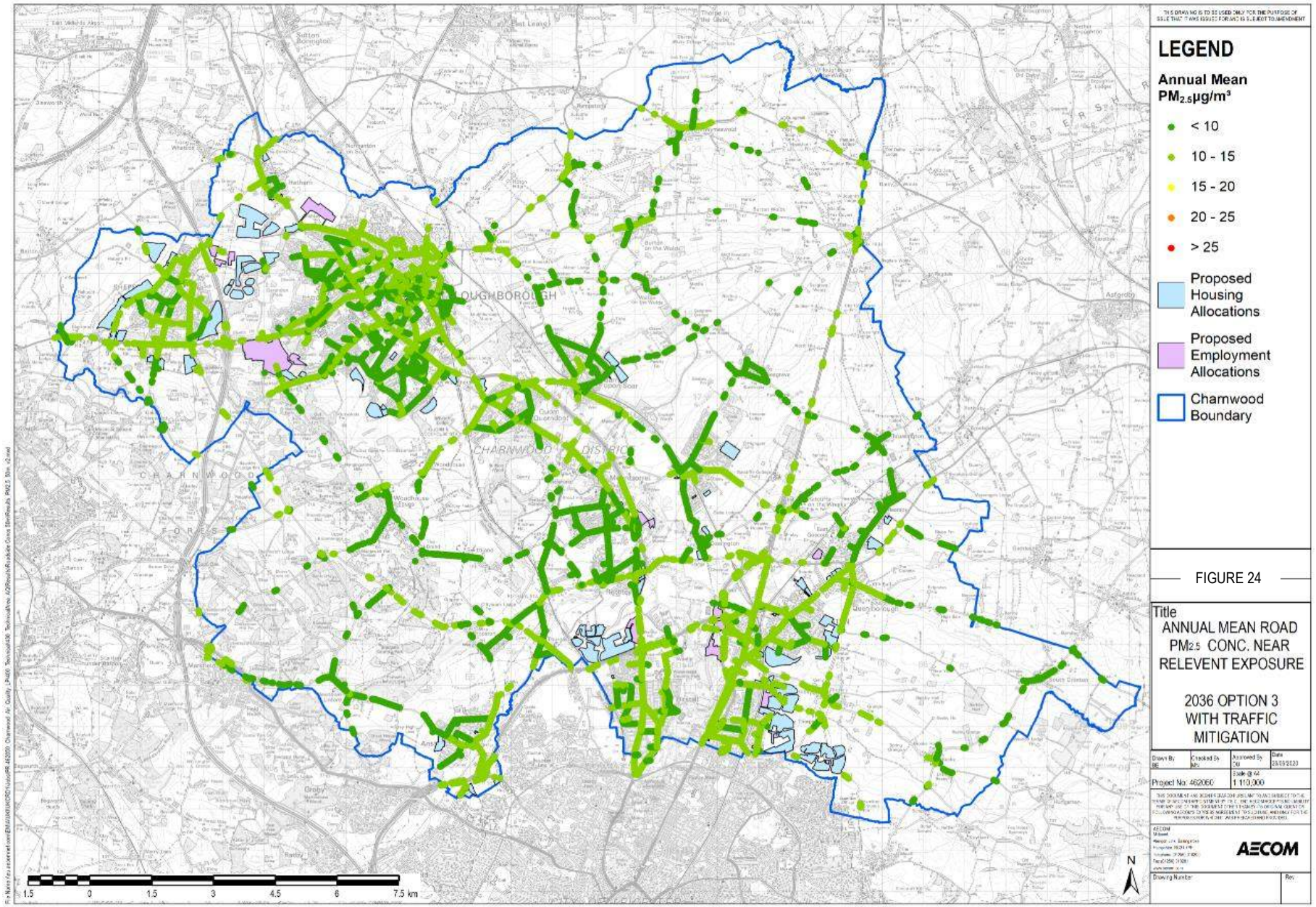

LEGEND
Annual Mean
NO2 µg/m3
< 10
10 - 20
20 - 25
25 - 30
30 - 40
> 40
Proposed Housing Allocations
Proposed Employment Allocations
Charnwood Boundary
FIGURE 19
Title
ANNUAL MEAN ROAD NO2 CONC. NEAR RELEVENT EXPOSURE
2036 OPTION 3
Project No: 462060
1:110,000
AECOM
1.5 0 1.5 3 4.5 6 7.5 km
N

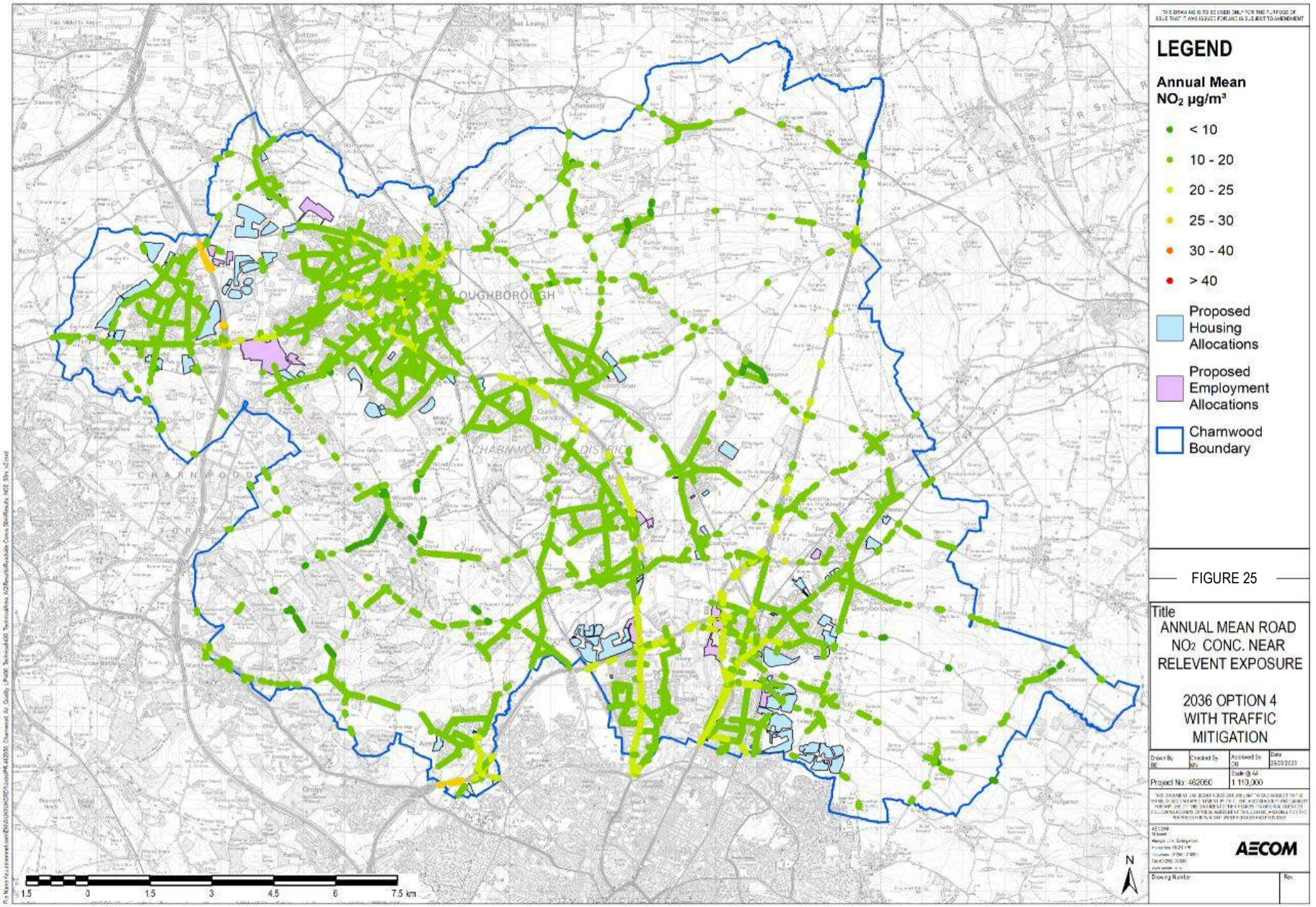

LEGEND
Annual Mean
PM2.5µg/m³
< 10
10 - 15
15 - 20
20 - 25
> 25
Proposed Housing Allocations
Proposed Employment Allocations
Charnwood Boundary
FIGURE 20
Title
ANNUAL MEAN ROAD PM2.5 CONC. NEAR RELEVENT EXPOSURE
2036 OPTION 3
Project No: 462060
1:10,000
AECOM
1.5 0 1.5 3 4.5 6 7.5 km
N

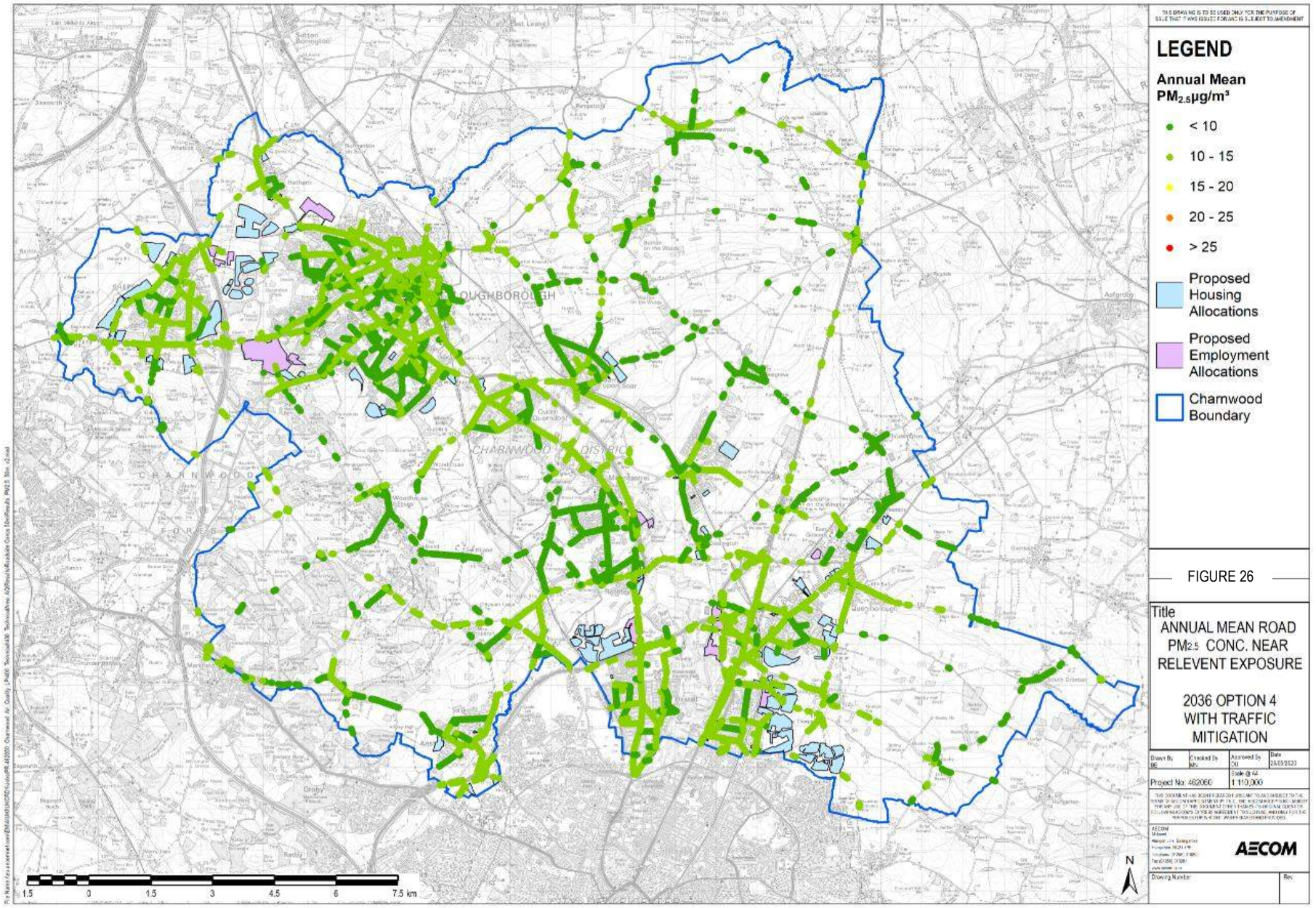

LEGEND
Annual Mean
NO2 µg/m3
< 10
10 - 20
20 - 25
25 - 30
30 - 40
> 40
Proposed Housing Allocations
Proposed Employment Allocations
Charnwood Boundary
FIGURE 21
Title
ANNUAL MEAN ROAD NO2 CONC. NEAR RELEVENT EXPOSURE
2036 OPTION 4
Project No: 60620E0
Scale @ A4
1:110,000
AECOM
1.5 0 1.5 3 4.5 6 7.5 km
N

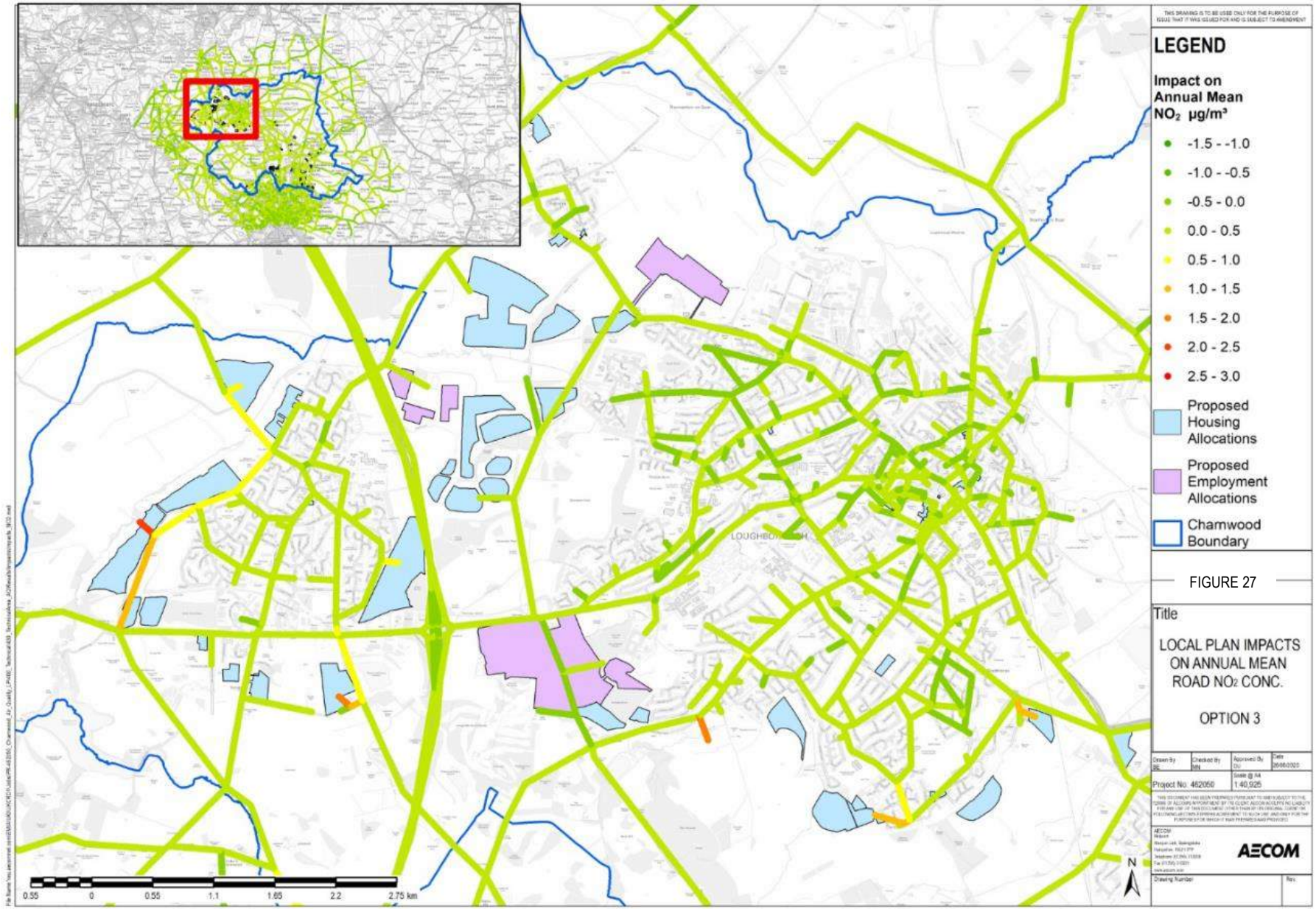

LEGEND
Annual Mean
PM2.5µg/m³
< 10
10 - 15
15 - 20
20 - 25
> 25
Proposed Housing Allocations
Proposed Employment Allocations
Charnwood Boundary
FIGURE 22
Title
ANNUAL MEAN ROAD PM2.5 CONC. NEAR RELEVENT EXPOSURE
2036 OPTION 4
Project No: 462060
1:10,000
AECOM
N
1.5 0 1.5 3 4.5 6 7.5 km

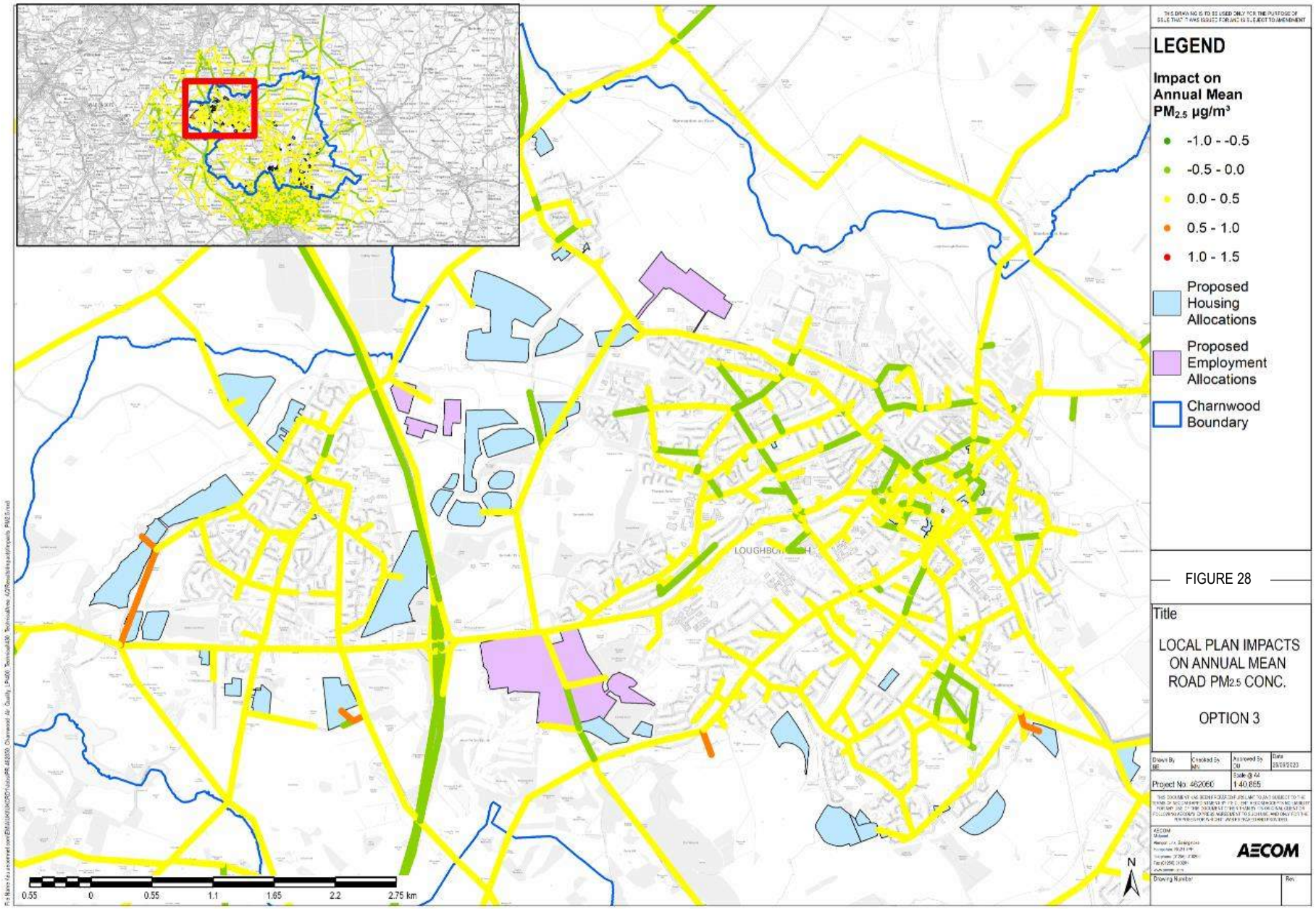

LEGEND
Annual Mean
NO2 µg/m3
< 10
10 - 20
20 - 25
25 - 30
30 - 40
> 40
Proposed Housing Allocations
Proposed Employment Allocations
Charnwood Boundary
FIGURE 23
Title
ANNUAL MEAN ROAD NO2 CONC. NEAR RELEVENT EXPOSURE
2036 OPTION 3 WITH TRAFFIC MITIGATION
Project No. 462050
1:110,000
AECOM
1.5 0 1.5 3 4.5 6 7.5 km
N

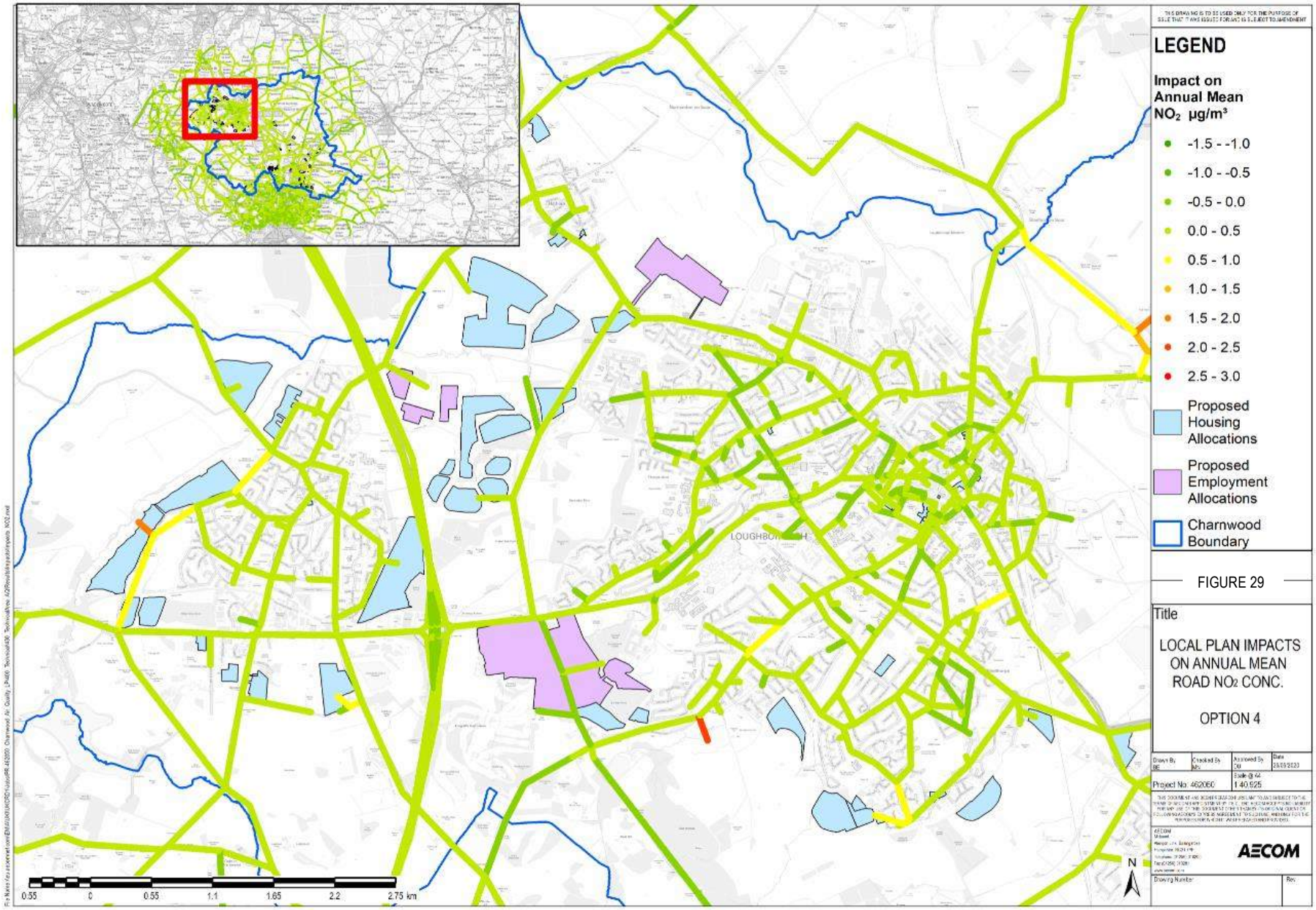

LEGEND
Annual Mean
PM2.5µg/m³
< 10
10 - 15
15 - 20
20 - 25
> 25
Proposed Housing Allocations
Proposed Employment Allocations
Charnwood Boundary
FIGURE 24
Title
ANNUAL MEAN ROAD PM2.5 CONC. NEAR RELEVENT EXPOSURE
2036 OPTION 3 WITH TRAFFIC MITIGATION
AECOM
1.5 0 1.5 3 4.5 6 7.5 km
N

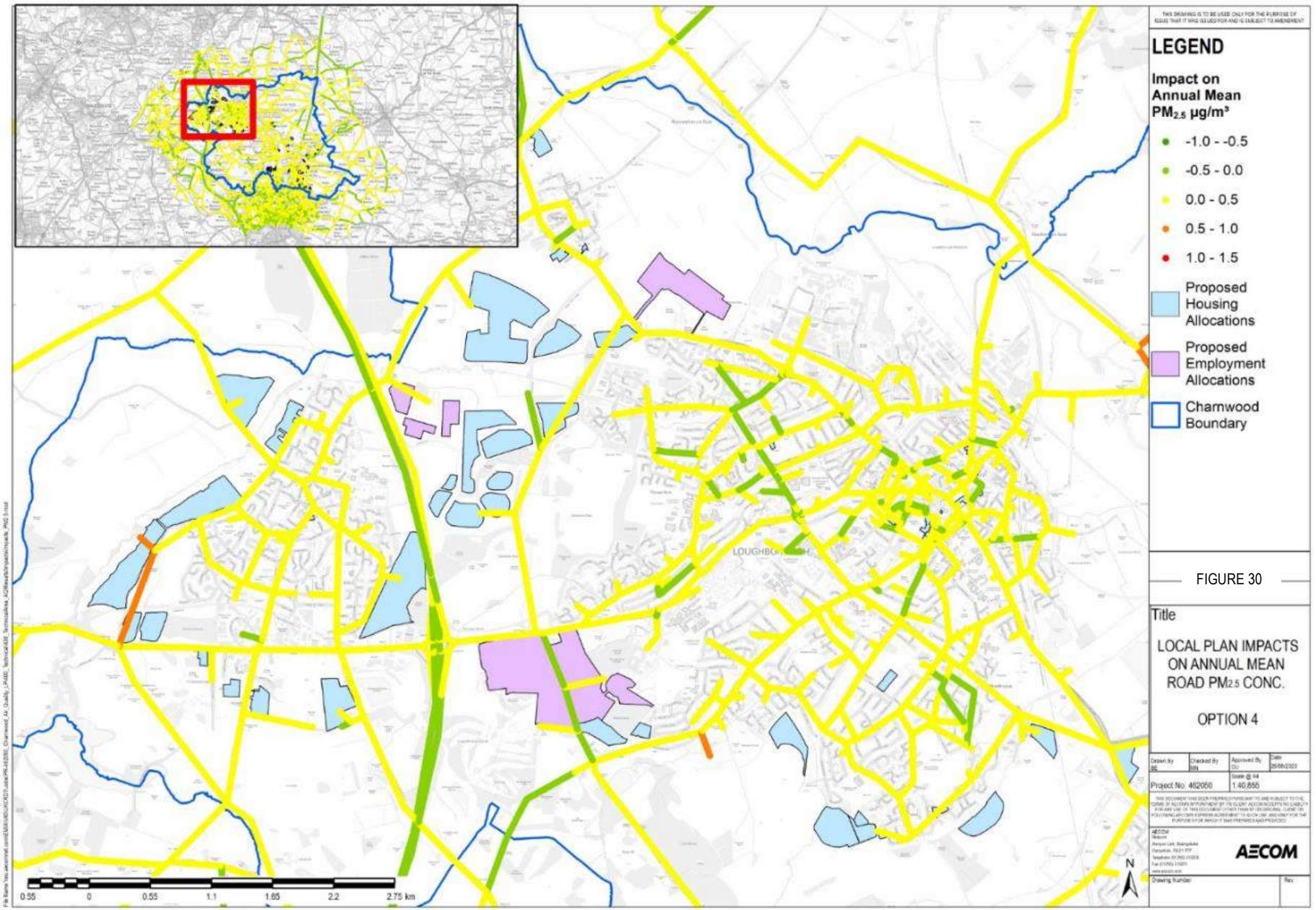

LEGEND
Annual Mean
NO2 µg/m3
< 10
10 - 20
20 - 25
25 - 30
30 - 40
> 40
Proposed Housing Allocations
Proposed Employment Allocations
Charnwood Boundary
FIGURE 25
Title
ANNUAL MEAN ROAD NO2 CONC. NEAR RELEVENT EXPOSURE
2036 OPTION 4 WITH TRAFFIC MITIGATION
Project No: 462060
1:10,000
AECOM
1.5 0 1.5 3 4.5 6 7.5 km
N

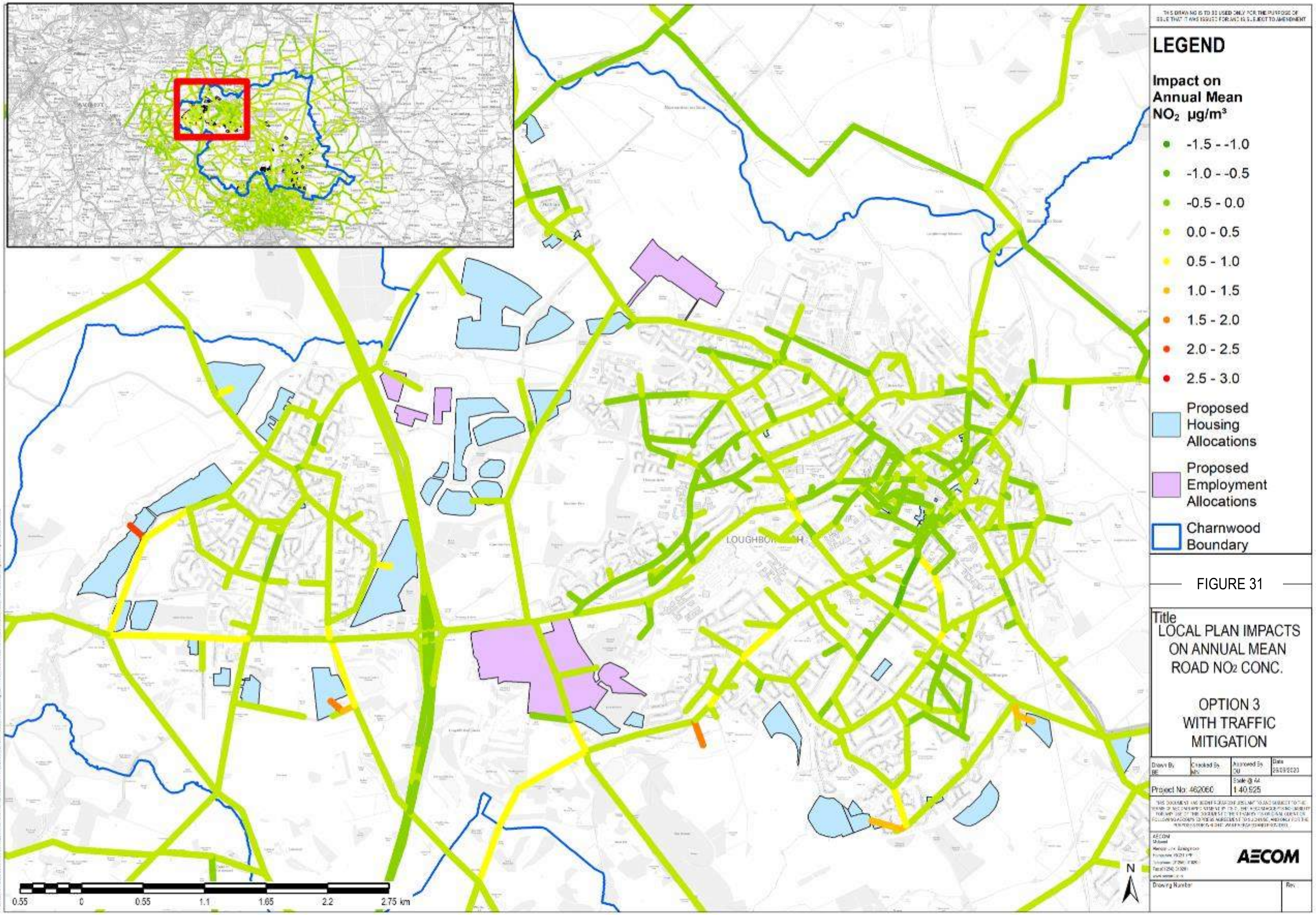

LEGEND
Annual Mean
PM2.5µg/m³
< 10
10 - 15
15 - 20
20 - 25
> 25
Proposed Housing Allocations
Proposed Employment Allocations
Charnwood Boundary
FIGURE 26
Title
ANNUAL MEAN ROAD PM2.5 CONC. NEAR RELEVENT EXPOSURE
2036 OPTION 4 WITH TRAFFIC MITIGATION
Project No: 462060
1:10,000
AECOM
N
1.5 0 1.5 3 4.5 6 7.5 km

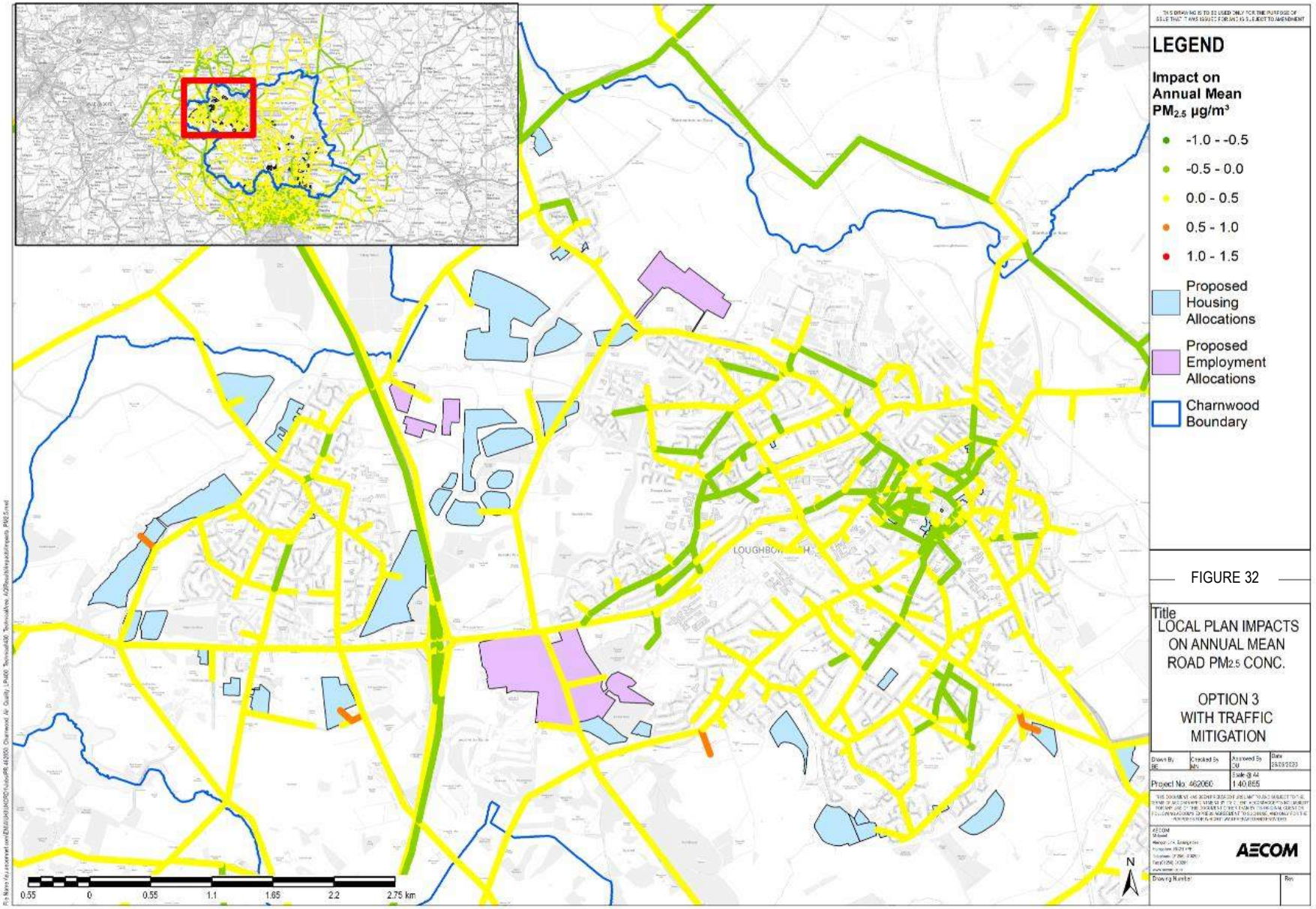

LEGEND
Impact on Annual Mean NO_2 µg/m³
-1.5 - -1.0
-1.0 - -0.5
-0.5 - 0.0
0.0 - 0.5
0.5 - 1.0
1.0 - 1.5
1.5 - 2.0
2.0 - 2.5
2.5 - 3.0
Proposed Housing Allocations
Proposed Employment Allocations
Charnwood Boundary
FIGURE 27
Title
LOCAL PLAN IMPACTS ON ANNUAL MEAN ROAD NO_2 CONC.
OPTION 3
Project No: 462050
Scale @ A4 1:40,925
AECOM
0.55 0 0.55 1.1 1.65 2.2 2.75 km
N

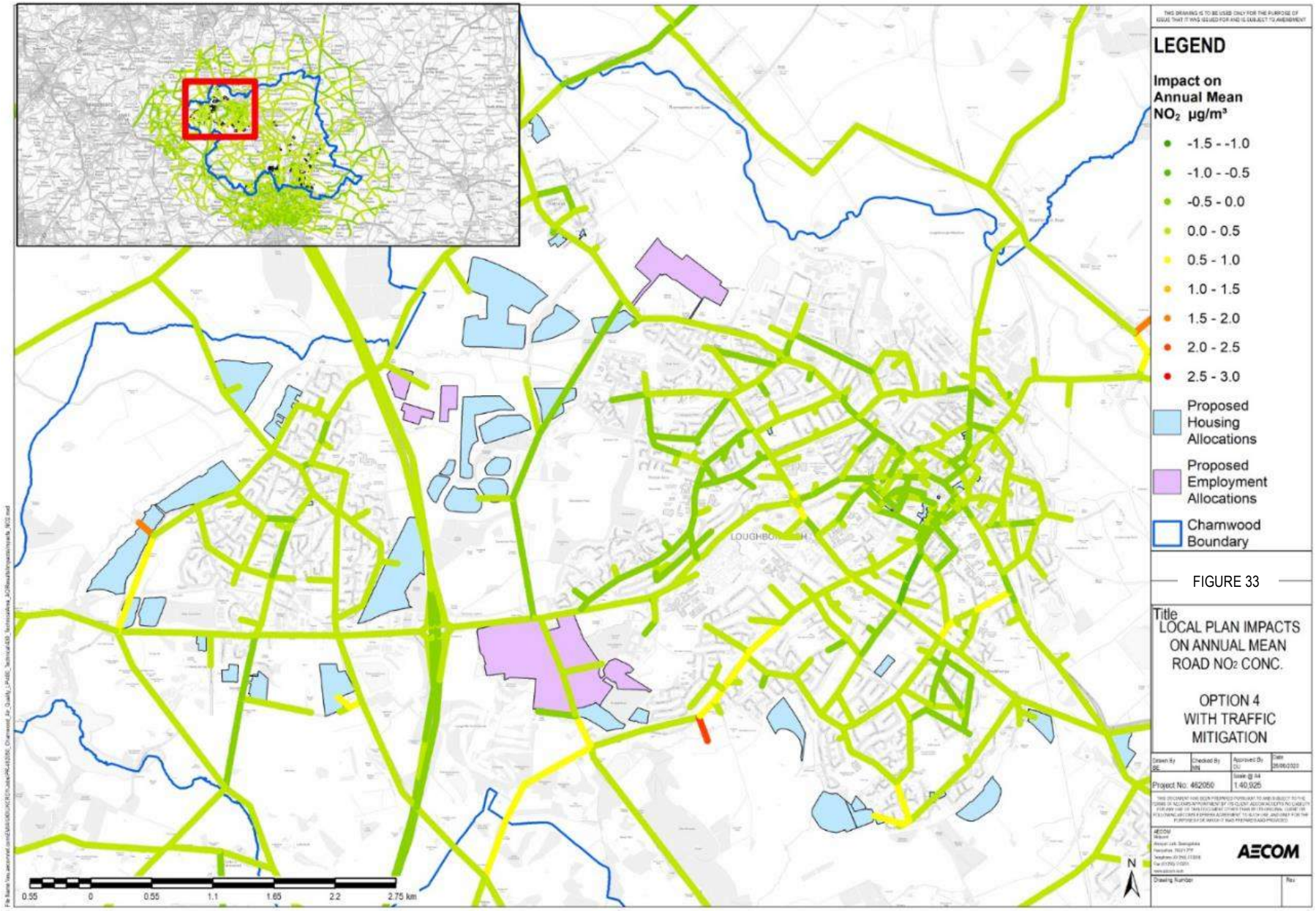

LEGEND
Impact on Annual Mean PM2.5 µg/m³
-1.0 - -0.5
-0.5 - 0.0
0.0 - 0.5
0.5 - 1.0
1.0 - 1.5
Proposed Housing Allocations
Proposed Employment Allocations
Charnwood Boundary
FIGURE 28
Title
LOCAL PLAN IMPACTS ON ANNUAL MEAN ROAD PM2.5 CONC.
OPTION 3
Project No. 462060
1:40,865
AECOM
0.55 0 0.55 1.1 1.65 2.2 2.75 km
N

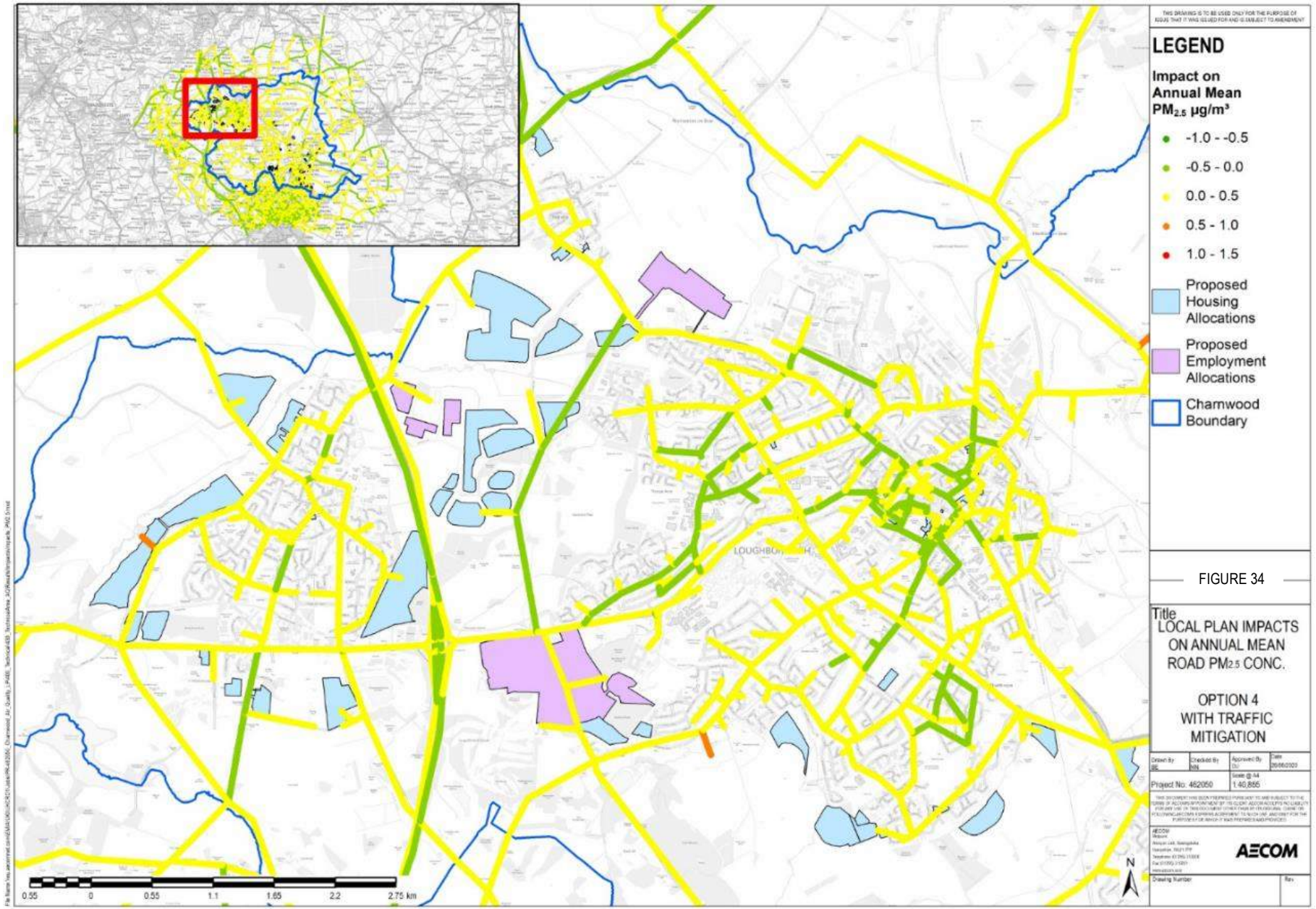

LEGEND
Impact on Annual Mean NO_2 µg/m³
-1.5 - -1.0
-1.0 - -0.5
-0.5 - 0.0
0.0 - 0.5
0.5 - 1.0
1.0 - 1.5
1.5 - 2.0
2.0 - 2.5
2.5 - 3.0
Proposed Housing Allocations
Proposed Employment Allocations
Charnwood Boundary
FIGURE 29
Title
LOCAL PLAN IMPACTS ON ANNUAL MEAN ROAD NO_2 CONC.
OPTION 4
Project No: 462060
1:40,525
AECOM
N
0.55 0 0.55 1.1 1.65 2.2 2.75 km

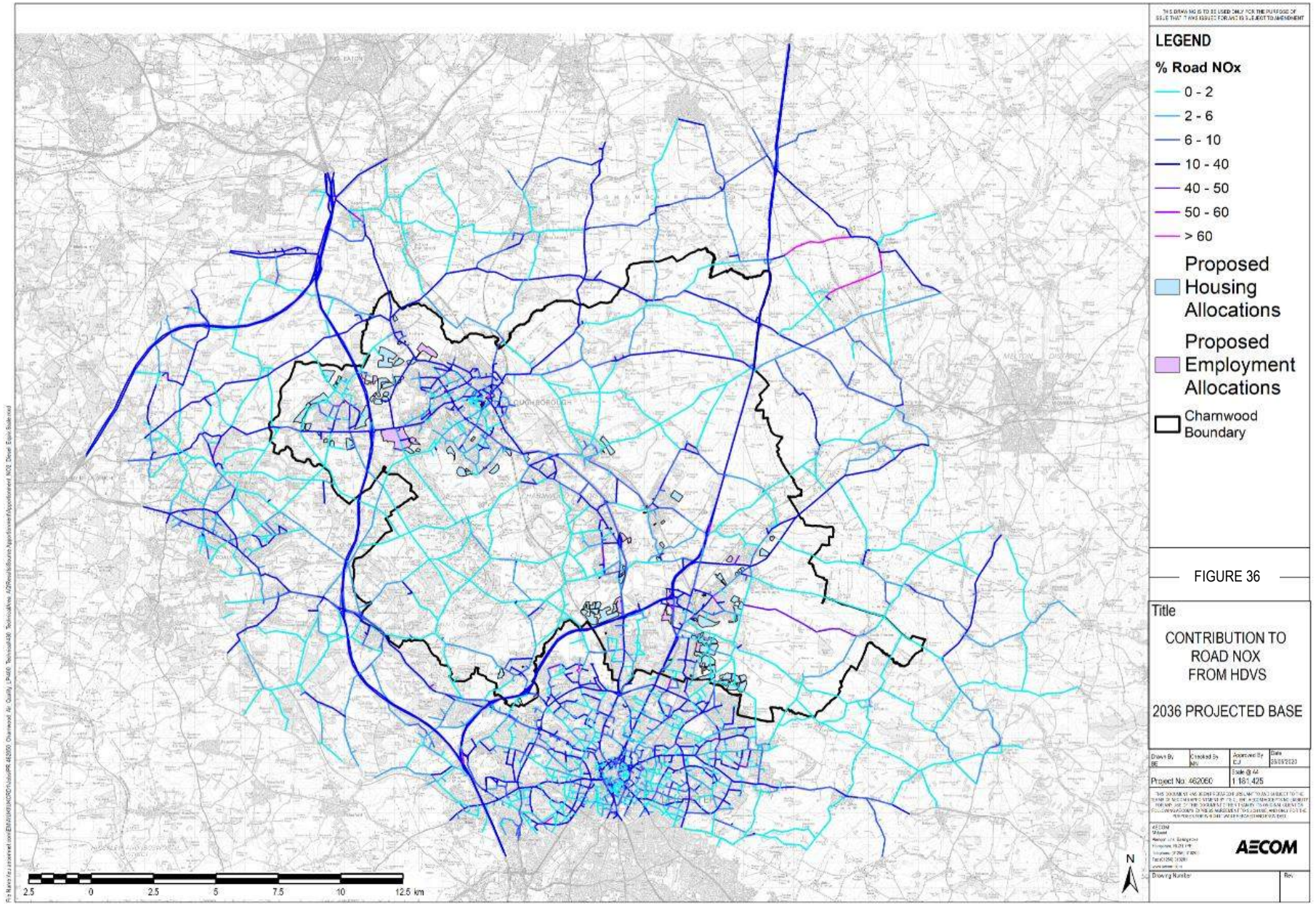

LEGEND
Impact on Annual Mean PM2.5 µg/m³
-1.0 - -0.5
-0.5 - 0.0
0.0 - 0.5
0.5 - 1.0
1.0 - 1.5
Proposed Housing Allocations
Proposed Employment Allocations
Charnwood Boundary
FIGURE 30
Title
LOCAL PLAN IMPACTS ON ANNUAL MEAN ROAD PM2.5 CONC.
OPTION 4
Project No: 462050
1:40,855
AECOM
0.55 0 0.55 1.1 1.65 2.2 2.75 km
N

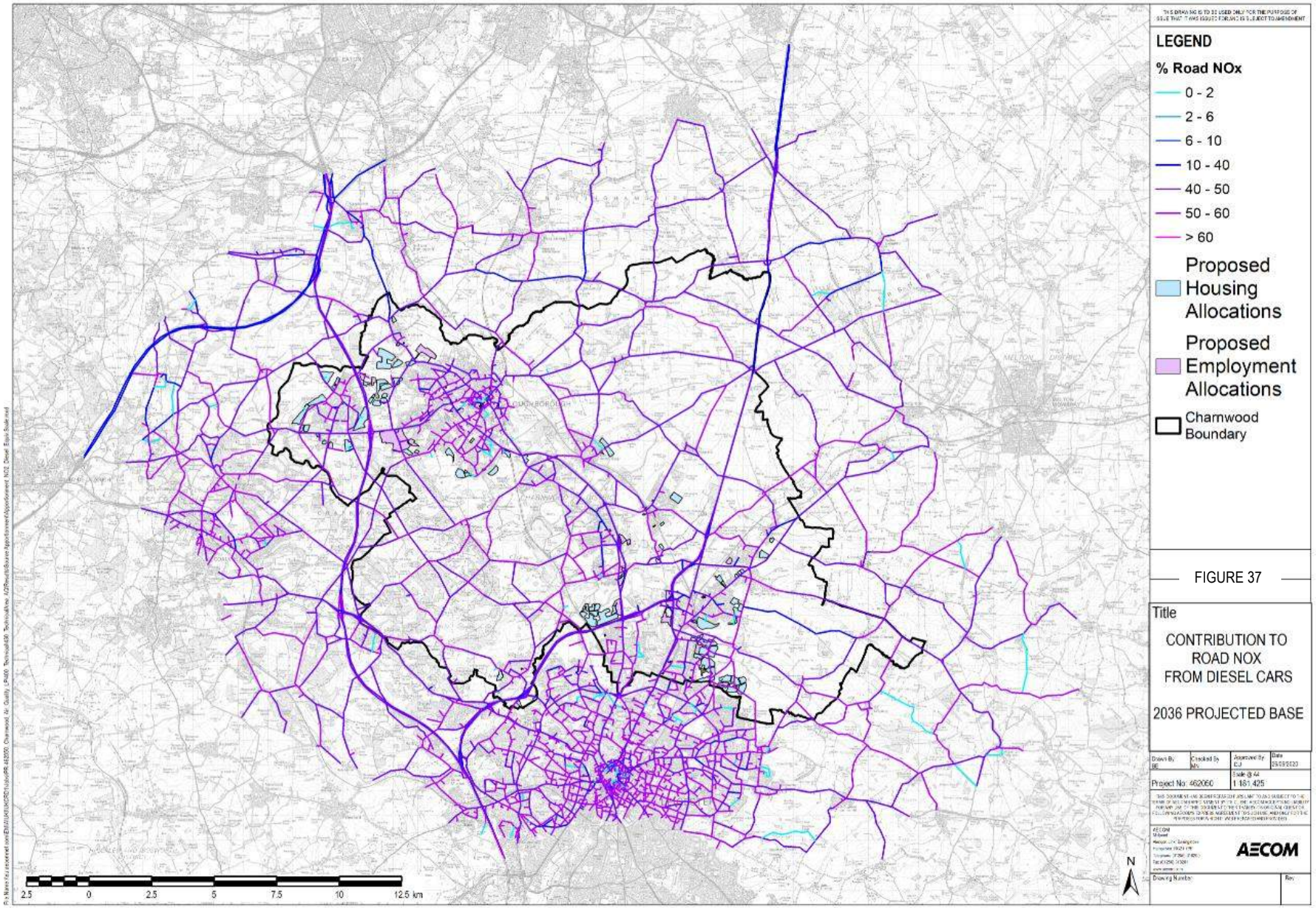

LEGEND
Impact on Annual Mean NO_2 µg/m³
-1.5 - -1.0
-1.0 - -0.5
-0.5 - 0.0
0.0 - 0.5
0.5 - 1.0
1.0 - 1.5
1.5 - 2.0
2.0 - 2.5
2.5 - 3.0
Proposed Housing Allocations
Proposed Employment Allocations
Charnwood Boundary
FIGURE 31
Title
LOCAL PLAN IMPACTS ON ANNUAL MEAN ROAD NO2 CONC.
OPTION 3 WITH TRAFFIC MITIGATION
Project No: 462060
Scale @ A4 1:40,925
AECOM
N
0.55 0 0.55 1.1 1.65 2.2 2.75 km

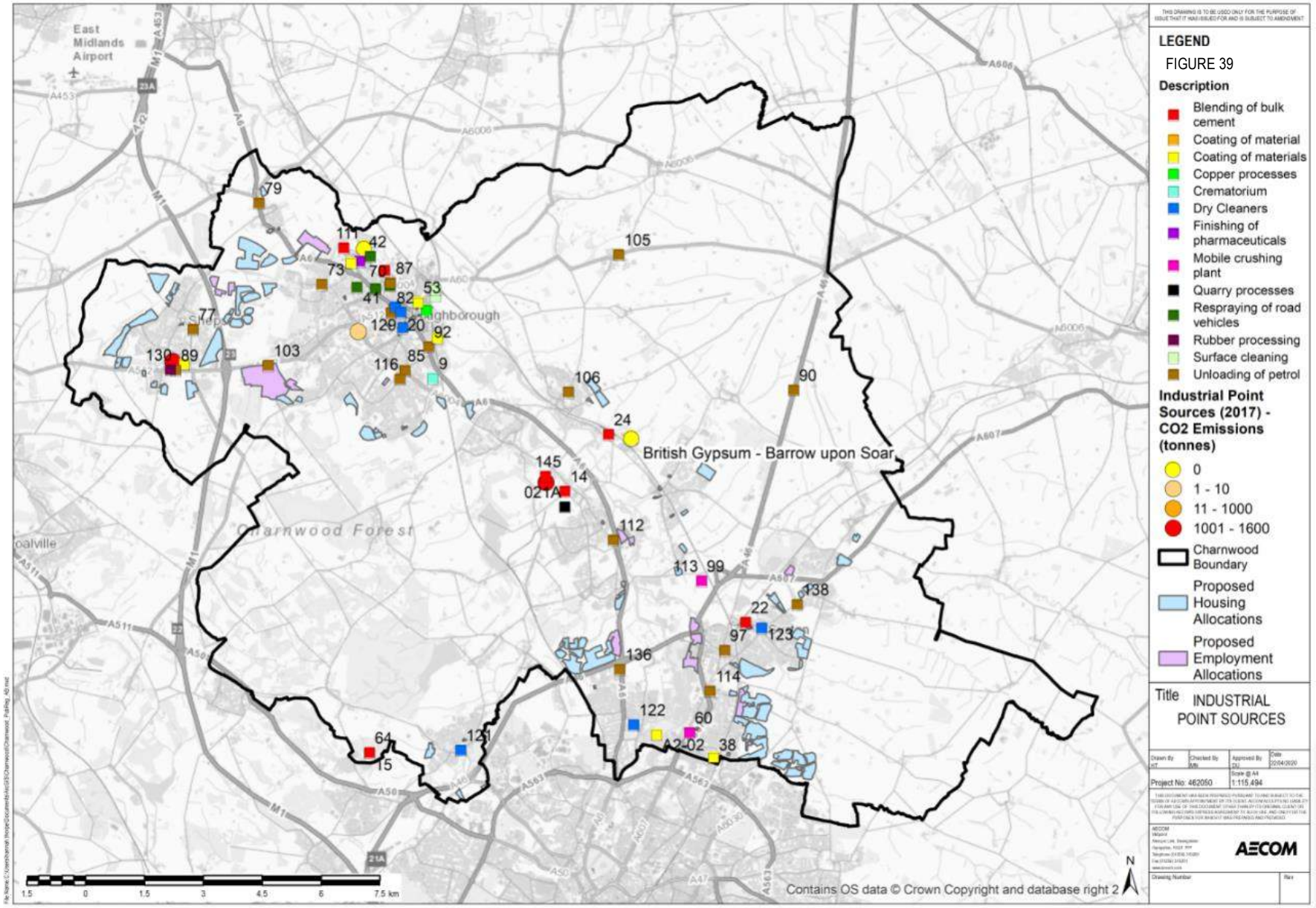

LEGEND
Impact on Annual Mean PM2.5 µg/m³
-1.0 - -0.5
-0.5 - 0.0
0.0 - 0.5
0.5 - 1.0
1.0 - 1.5
Proposed Housing Allocations
Proposed Employment Allocations
Charnwood Boundary
FIGURE 32
Title
LOCAL PLAN IMPACTS ON ANNUAL MEAN ROAD PM2.5 CONC.
OPTION 3 WITH TRAFFIC MITIGATION
AECOM
N
0.55 0 0.55 1.1 1.65 2.2 2.75 km

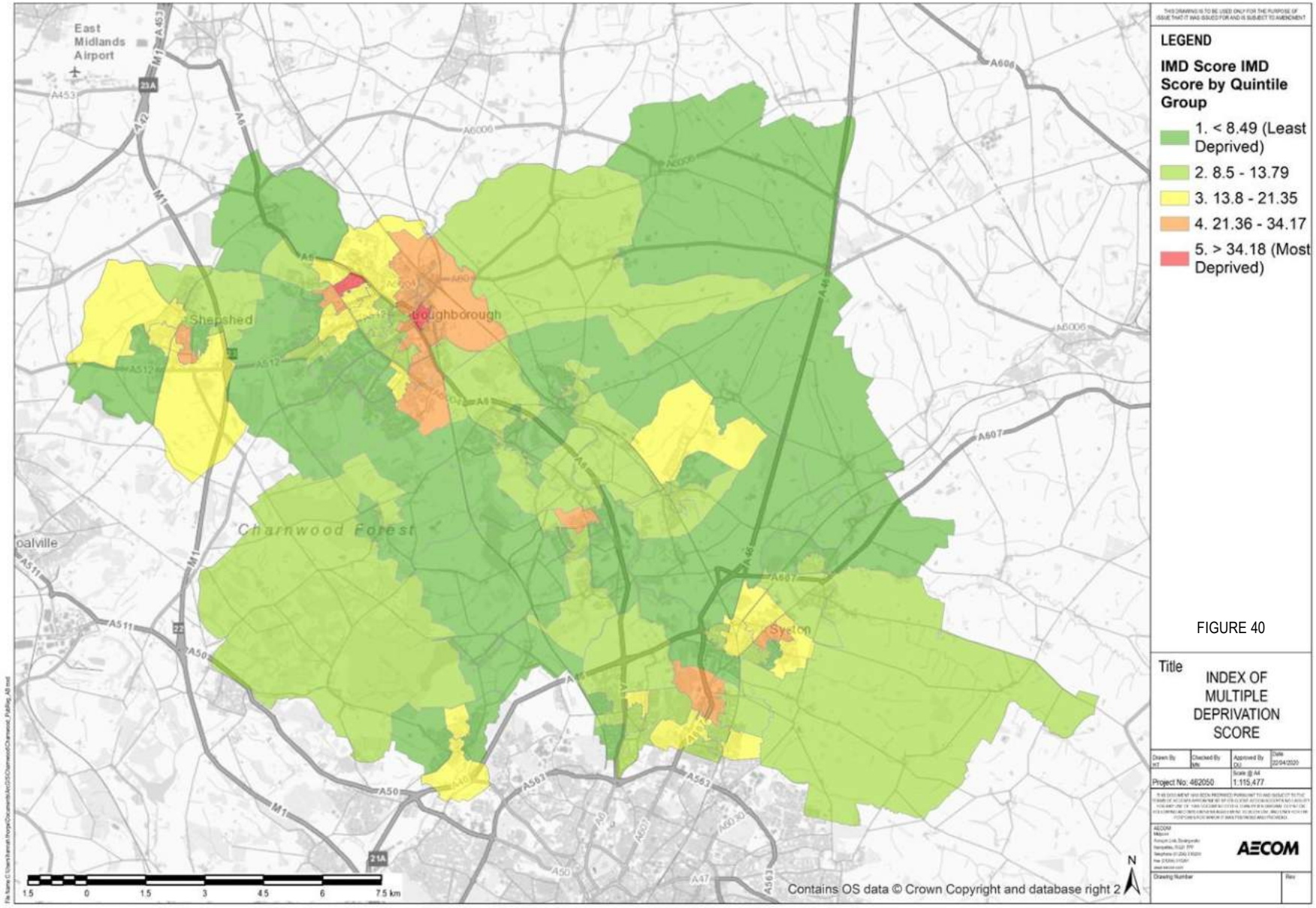

LEGEND
Impact on Annual Mean NO_2 µg/m³
-1.5 - -1.0
-1.0 - -0.5
-0.5 - 0.0
0.0 - 0.5
0.5 - 1.0
1.0 - 1.5
1.5 - 2.0
2.0 - 2.5
2.5 - 3.0
Proposed Housing Allocations
Proposed Employment Allocations
Charnwood Boundary
FIGURE 33
Title
LOCAL PLAN IMPACTS ON ANNUAL MEAN ROAD NO2 CONC.
OPTION 4 WITH TRAFFIC MITIGATION
Project No: 462050
1:40,925
AECOM
N
0.55 0 0.55 1.1 1.65 2.2 2.75 km

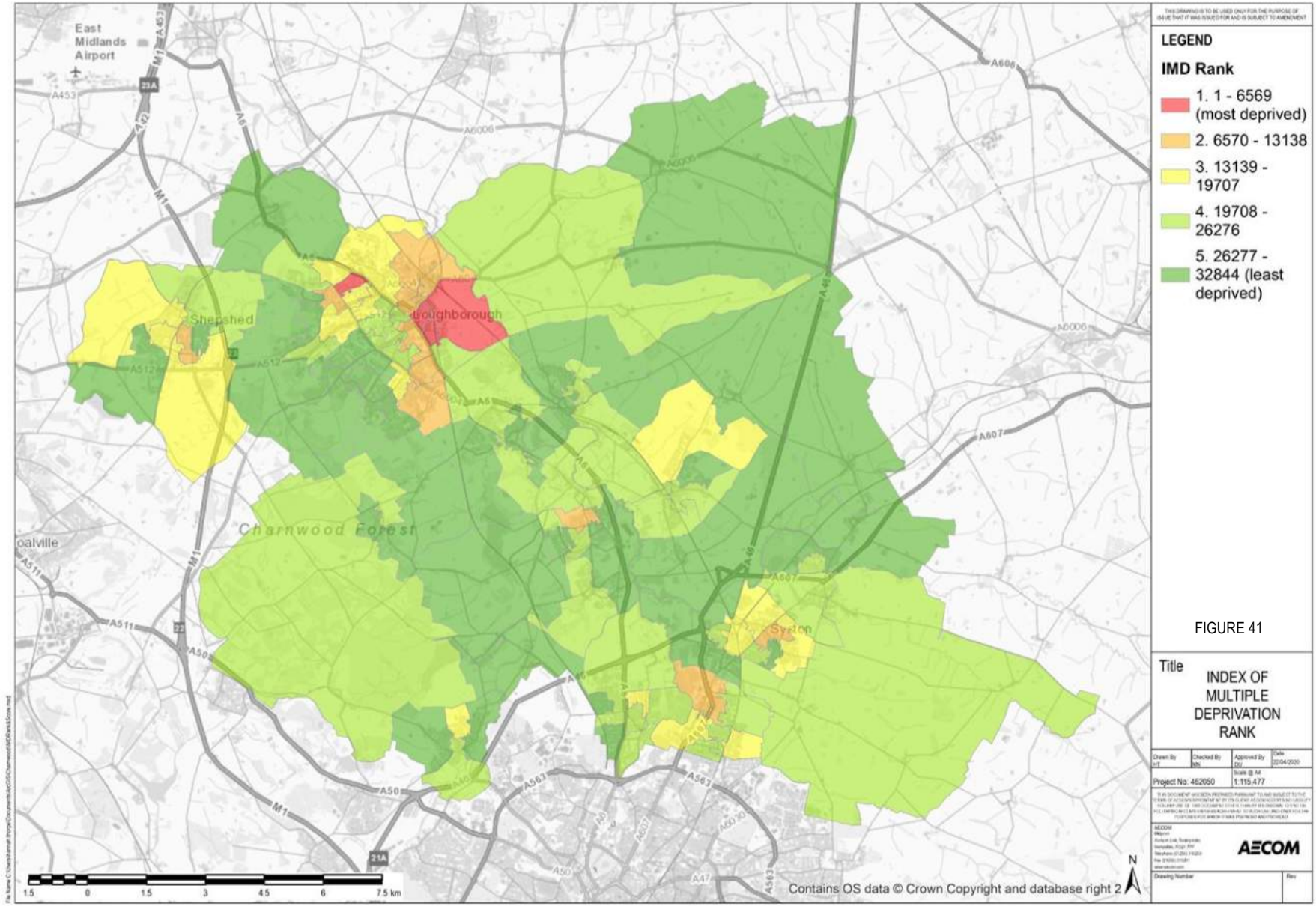

LEGEND
Impact on Annual Mean PM2.5 µg/m³
-1.0 - -0.5
-0.5 - 0.0
0.0 - 0.5
0.5 - 1.0
1.0 - 1.5
Proposed Housing Allocations
Proposed Employment Allocations
Charnwood Boundary
0.55
0
0.55
1.1
1.65
2.2
2.75 km
N
FIGURE 34
Title
LOCAL PLAN IMPACTS ON ANNUAL MEAN ROAD PM2.5 CONC.
OPTION 4 WITH TRAFFIC MITIGATION
Project No: 462050
1:40,865
AECOM

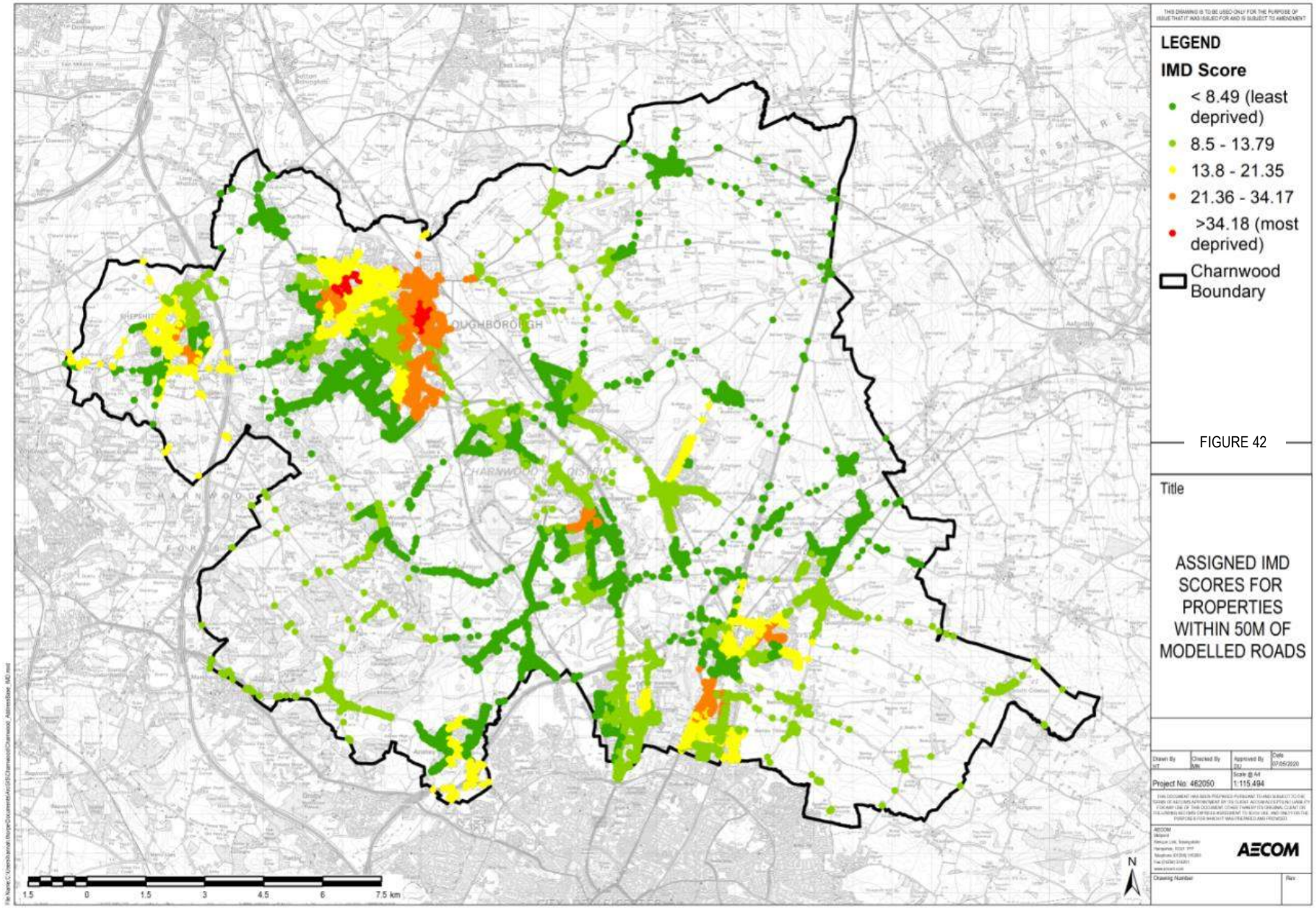

LEGEND
% Road NOx
0 - 2
2 - 6
6 - 10
10 - 40
40 - 50
50 - 60
> 60
Proposed Housing Allocations
Proposed Employment Allocations
Charnwood Boundary
2.5 0 2.5 5 7.5 10 12.5 km
N
FIGURE 36
Title
CONTRIBUTION TO ROAD NOX FROM HDVS
2036 PROJECTED BASE
Project No: 462060
AECOM

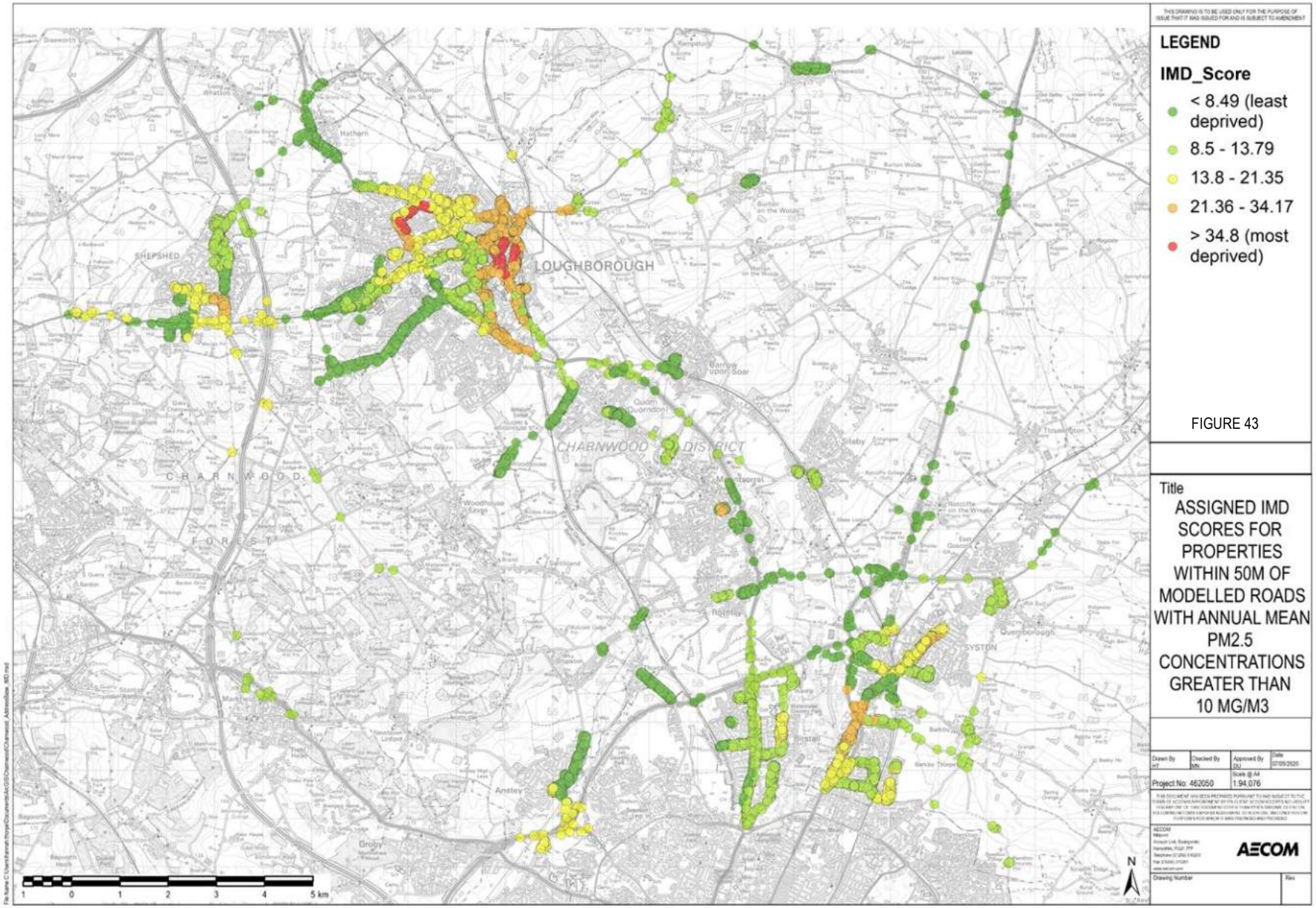

LEGEND
% Road NOx
0 - 2
2 - 6
6 - 10
10 - 40
40 - 50
50 - 60
> 60
Proposed Housing Allocations
Proposed Employment Allocations
Charnwood Boundary
FIGURE 37
Title
CONTRIBUTION TO ROAD NOX FROM DIESEL CARS
2036 PROJECTED BASE
Project No: 462060
1:161,425
AECOM
N
2.5 0 2.5 5 7.5 10 12.5 km


East Midlands Airport
British Gypsum - Barrow upon Soar
Charnwood Forest
Loughborough
Coalville
LEGEND
FIGURE 39
Description
Blending of bulk cement
Coating of material
Coating of materials
Copper processes
Crematorium
Dry Cleaners
Finishing of pharmaceuticals
Mobile crushing plant
Quarry processes
Respraying of road vehicles
Rubber processing
Surface cleaning
Unloading of petrol
Industrial Point Sources (2017) - CO2 Emissions (tonnes)
0
1 - 10
11 - 1000
1001 - 1600
Charnwood Boundary
Proposed Housing Allocations
Proposed Employment Allocations
Title
INDUSTRIAL POINT SOURCES
Project No: 462050
Scale @ A4
1:115,494
AECOM
Contains OS data © Crown Copyright and database right 2
N


East Midlands Airport
Shepshed
Loughborough
Charnwood Forest
Coalville
Syston
LEGEND
IMD Score IMD Score by Quintile Group
1. < 8.49 (Least Deprived)
2. 8.5 - 13.79
3. 13.8 - 21.35
4. 21.36 - 34.17
5. > 34.18 (Most Deprived)
FIGURE 40
Title
INDEX OF MULTIPLE DEPRIVATION SCORE
Project No: 462050
Scale @ A4
1:115,477
AECOM
Drawing Number
1.5 0 1.5 3 4.5 6 7.5 km
N
Contains OS data © Crown Copyright and database right 2


East Midlands Airport
Loughborough
Shepshed
Charnwood Forest
Coalville
Syston
LEGEND
IMD Rank
1. 1 - 6569 (most deprived)
2. 6570 - 13138
3. 13139 - 19707
4. 19708 - 26276
5. 26277 - 32844 (least deprived)
FIGURE 41
Title
INDEX OF MULTIPLE DEPRIVATION RANK
Project No: 462050
Scale @ A4 1:115,477
AECOM
Contains OS data © Crown Copyright and database right 2
1.5 0 1.5 3 4.5 6 7.5 km
N


LEGEND
IMD Score
< 8.49 (least deprived)
8.5 - 13.79
13.8 - 21.35
21.36 - 34.17
>34.18 (most deprived)
Charnwood Boundary
FIGURE 42
Title
ASSIGNED IMD SCORES FOR PROPERTIES WITHIN 50M OF MODELLED ROADS
Project No: 462050
Scale @ A4 1:115,494
AECOM
N
1.5 0 1.5 3 4.5 6 7.5 km


LEGEND
IMD_Score
< 8.49 (least deprived)
8.5 - 13.79
13.8 - 21.35
21.36 - 34.17
> 34.8 (most deprived)
FIGURE 43
Title
ASSIGNED IMD SCORES FOR PROPERTIES WITHIN 50M OF MODELLED ROADS WITH ANNUAL MEAN PM2.5 CONCENTRATIONS GREATER THAN 10 MG/M3
Project No: 462050
AECOM
LOUGHBOROUGH
SHEPSHED
CHARNWOOD FOREST
CHARNWOOD DISTRICT
SYSTON
Anstey
Groby
1 0 1 2 3 4 5 km
N

Appendix B : Leicestershire Region Strategies

Leicestershire County Council's Strategic Plan 2018-22

Leicestershire County Council's Strategic Plan 2018-22, published in December 2017[30], sets out its objectives for the 2018-2022 period and a high level overview of a number of strategies planned with a visions of "Working together for the benefit of everyone".

Strong Economy, Wellbeing and Opportunity, Keeping People Safe, Great Communities, Affordable and Quality Homes are the strategic outcomes from the vision. A number of these refer to protecting the environment.

Leicester & Leicestershire Strategic Growth Plan (2018)

The Leicester & Leicestershire Strategic Growth Plan[25] was prepared by a partnership between ten organisations, including; Leicester City, Leicester County Council, the seven boroughs and districts, and the Leicester & Leicestershire Enterprise Partnership. It lists Leicester & Leicestershire's strengths and weaknesses, recognising congestion on roads and railways as a weakness. The Plan is non-statutory, but is to be delivered through the Statutory Local Plans, and was published in December 2018.

The document sets out the agreed strategy for the period up until 2050. The economic growth areas highlighted by the Midlands Engine Strategy (2017)[63] are mapped, to include the Loughborough & Leicester Enterprise Zone, Loughborough University, and the Life Sciences Opportunity Zone.

Broad locations for development are identified and the required infrastructure to support it are listed. The document notes that they are proposing to reduce the amount of development that is to be located in existing towns, villages and rural areas, and instead build within major strategic locations. The spatial strategy identifies Leicester as the centralised piece of the strategy, with Loughborough highlighted as an area of managed growth in Local Plans, where development is dependent on local infrastructure being built.

The document recognises that there needs to be a balance between the need for new housing and jobs and the protection of the environment and built heritage, and sets this as one of the strategy's four priorities. Congestion is referred to as one of Leicester & Leicestershire's weaknesses and investment in road and rail schemes is recognised as a factor which can allow the reduction of congestion on the rest of the network.

Leicestershire County Council Annual Report of the Director and Public Health strategic direction on air quality and health

Annual reports of the Director of Public Health give broad overviews of health in Leicestershire with a different focus each year. Within the 2017 annual report[27], recommendations were given for the strategic direction on air quality and health, noted to be an 'emerging risk'.

The document references the Public Health England 2014 publication 'Estimating Local Mortality Burdens Associated with Particulate Air pollution'[28] which concluded that over 300 deaths in Leicestershire can be linked to $PM_{2.5}$ pollution and that when added to the figures for NOx, the total could be around 430 deaths each year. Encouraging active travel is favoured for Leicestershire is the main recommendation from the annual report. The most recent 2019 Annual Report of the Director of Public Health[29] also has this priority embedded in the recommendations.

Leicestershire County Council Environment Strategy 2018-30

The Leicestershire County Council Environment Strategy 2018-30 was published in June 2018[31] which recognises the significant decline in the natural environment due to anthropogenic impacts. The document provides a framework for action up until 2030 and provides an understanding of how the Environment Strategy contributes to the LCC Strategic Plan 2018-22; this includes the support of action to improve air quality and reduce the health impacts and number of deaths associated with poor air quality in the 'Wellbeing and Opportunity' and 'Keeping People Safe' Strategic Plan outcomes.

[63] Midlands Connect (2017) Midlands Connect Strategy: Powering the Midlands Engine March 2017

The strategy sets out a target for LCC reduction of GHGs and focuses on six key areas that LCC have identified as being able to support the wider action on the environment and climate change, listed below:

- Carbon and Climate Change Impacts;
- Resource Use and Low/Zero Carbon Energy;
- Travel and Transport;
- Biodiversity, Habitats and Local Environment;
- Community and Wellbeing; and
- Local Economy.

The Environment Strategy includes a target to reduce LCC GHG emissions by 38% by 2030. In May 2019, LCC declared a climate emergency and put forward their aim to become carbon neutral by 2030.

Leicestershire Joint Strategic Needs Assessment (2019)

Local authorities and Clinical Commissioning Groups have an equal statutory responsibility to prepare a Joint Strategic Needs Assessment therefore the Leicestershire Joint Strategic Needs Assessment published in May 2019[32] provides an assessment of current and future health and social care needs. The Air Quality and Health Chapter of the document reviewed the needs of the Leicestershire population in relation to air quality.

The document identifies each District Council's initiatives to improve air quality, to include CBC, noting the AQAP in 2006) and the updates given in the most recent Annual Status Report[42].

It also describes 'pockets of high deprivation' throughout Leicestershire measured using the Index of Multiple Deprivation (IMD). It is noted that five of the eight neighbourhoods in Leicestershire within the 20% most deprived IMD areas in England fall within Charnwood: Loughborough Bell Foundry, Loughborough Warwick Way, Loughborough Canal South, Loughborough Central Station and Loughborough Midland Station. Loughborough Bell Foundry also falls within the lowest quintile based on the outdoor living environment domain from the Indices of Deprivation.

The document finds that there is a variation in the number and types of measures across District Councils in Leicestershire to improve air quality and that there is no clear prescribed method for engagement with organisations or the public on air quality issues. There are identified opportunities for better public understanding of air quality which may reduce emissions. Another note is included on the lack of knowledge given to the public about the emissions associate with the use of wood burning stoves as a form of home heating. There are six recommended objectives given:

1. Clear leadership, vision and strategic direction – with the use of AQAPs, and engagement;
2. Collaborative partnership and working;
3. Consideration of air quality and health in planning and development;
4. Aligning air quality and health with environment and transport decisions;
5. General communication with the public and organisations about air quality and health; and
6. Targeted communication and campaigns with priority groups and key organisations about air quality and health.

Leicestershire Local Transport Plan 3 (2014)

The Leicestershire Local Transport Plan 3, published in 2014[26], sets out how the transport system will be managed, focussing on the strategic approach, as opposed to identifying specific infrastructure schemes. It is noted that several of the transport initiatives identified which focussed on schemes taking traffic away from air pollution hotspots which AQAPs were reliant on, had not progressed.

It describes the state of air quality in 2014 following implementation of the (previous) LTP 2 Air Quality Strategy. The document notes that there was progress in limiting the growth in traffic in Loughborough, Lutterworth and Kegworth, and some of the actions in the action plans, however that "*there was little or no progress in improving levels of air quality in each of these areas*". Three additional AQMAs are noted to have been created due to motorway emissions, with two AQMAs thought of a potential risk to exceed national objectives; one of which is the

Melton Road, Syston AQMA in CBC's administrative area. Current challenges in trying to improve air quality levels are identified within a list of key issues requiring consideration when trying to reduce traffic impacts.

The negative impact of lorry movements on air quality is noted as a key issue affecting the current and future movement of road freight across the County.

The importance of air quality and the health risks associated is highlighted within the encouraging active and sustainable travel section of the document. The document shows that the prior LTP strategies have led to an increase in bus use, cycling, and walking.

Encouraging more active and sustainable travel is described as one of the most important activities that the LTP will pursue, with one of the three strategic transport goals is to have "*A transport system that helps to reduce the carbon footprint of Leicestershire*". This is to have outcomes including more walking, cycling and use of public transport and a lesser impact upon the environment and individuals.

One of the key elements of the long-term strategy to encourage more active and sustainable travel is the commitment to encourage less polluting travel by car, through:

- Developing the approach to the management of the road network;
- Working with business community to look at ways to improve information and training opportunities for green driving courses;
- Continuing to support the development of car-sharing initiatives; and
- Seeking to encourage the take-up of alternative fuel vehicles.

Within the Section on Managing the impact of the transport system on the quality of life, the document lists the three most significant areas to help reach the strategic transport goal of improving the quality of life of residents, including climate change, air quality, and vehicle speed and noise. Climate change is noted to be assisted by the actions identified for encouraging more active and sustainable travel. Regarding air quality, it is recognised that data shows that transport emissions are one of the largest contributors to poor air quality in Leicestershire. It is noted that the work on the Loughborough Town Centre Transport Improvement Scheme is underpinning the strategy to improve air quality issues within the town. More understanding of the relationship between transport emissions and the level of air quality in the AQMAs is noted as important. This is to be done by working with district councils and use air quality monitoring with modelling tools to project future year scenarios. Other measures to address air quality issues are:

- Reduction in congestion by relying on schemes such as the Loughborough Town Centre Transport Improvement Scheme in the longer term, and in the shorter term, looking at air quality hotspots when prioritising smaller works; and
- Reducing the use of personal cars by including consideration of travel demand within planning process requirements and ensuring that the planning process takes the impact of developments upon AQMAs into account.

Appendix C : Comments Received on the Draft Local Plan in Relation to Air Quality

This Appendix contains a selection of the comments received in relation to air quality on the Draft Local Plan.

Response No / Consultee	Representation Summary	Officer Response	AECOM / Report Response
Q1 - Do you think we have included the right information in the Profile? If not, what would you include or exclude and why?			
DCLP/215 Professor David Infield	Air quality is a key health and environment indicator and should be included under the Environment heading.	Noted – inclusion of information about air quality will be considered.	Suggestions made to this effect in Section 8.
Q2 - Do you have any comments on the vision and objectives or think we have missed something?			
DCLP/15 Dr Catharine Ferraby	I think the mention of air quality could be expanded identify which polluting components will be limited, e.g. particulates, agricultural pollution? Taking flood risk into account is essential. It may be mentioned later but public sports facilities are overused and under maintained in the Borough. Would love to see more swimming pools (the benefit an aging population as they provide weightless exercise)	Improving air quality is an important part of the overall objectives of the draft local plan. However, it is agreed, that a stronger reference to air quality could be made in the draft local plan. This will be reviewed before the plan is next consulted on. Flood risk is a priority and a series of policies ensure that flood risk is taken into account when choosing locations for new development. Sport provision will be managed through the implementation of Draft Policy LP25.	Suggestions made to this effect in Section 8.
EDCLP/252 Leicestershire County Council	Next to attractive opportunity to mention the word 'green'. This would cover aspirations to ensure that the town is green, addresses any considerations of air quality and opportunities for biodiversity and combat climate change such as the likelihood of urban heating and flooding.	Noted – proposed amendments will be reviewed as part of drafting the next version of the local plan.	Suggestions made to this effect in Section 8.
Q4 - Do you agree with our preferred development strategy and the way it allocates development to different parts of the Borough? If not, what alternative distribution would you suggest and why?			
EDCLP/38 John Malpus	Almost 1800 houses are proposed for the Syston/ East Goscote/ Rearsby/ Queniborough area. This amounts to approx. 3500 cars and 4000 patients plus many children for local schools. Health – The East Goscote Surgery recently closed due to the retirement of the practice GP. The CCG were not able to find a replacement. There is a current shortage of GPs. The 1400 patients moved to other practices, with the majority moving to Syston Health Centre. There is a long waiting time for appointments there. What will happen if these houses are built? Traffic – A huge increase of cars in the area will cause an increase in air pollution. A Charnwood report published earlier this year indicated that in some parts of Syston the Nitrogen levels were rapidly rising towards the maximum allowable. Land – Some of the sites proposed involve good agricultural land. As agricultural land is swallowed up around the country, UK will be more reliant on imports therefore the economy will suffer.	The Council is aware of the impact of development on services, facilities, and infrastructure. The impact on healthcare, the transport network, air quality, and the loss of agricultural land are all considered as part of the SHELAA, IDP, and SA. The Council is working directly with the statutory providers to understand the impacts of development, and agree any necessary mitigation measures.	Impacts have been assessed as per Appendix E. Over the duration of the Draft Plan, background air quality is predicted to improve, which means the impacts are less significant.
Q8 LP3 - Housing Sites			
Specific Sites – Shepshed **HS38 - Land off Fairway Road, Shepshed**			
EDCLP/34	• 2074 new homes is not acceptable in Shepshed given recent completions and commitments	2074 new homes is not acceptable in Shepshed given recent completions and commitments	As per Table 10, a lower growth option has also been assessed.

Response No / Consultee	Representation Summary	Officer Response	AECOM / Report Response
Cllr Mary Draycott	Adjacent land uses (animal feed factory, M1, incinerator) will impact on site in terms of noise, air quality and odour		Shepshed found to be an area of potential air quality constraint
DCLP-425-470 Environment Agency	Site within 250m of three Environment Agency permit sites and development may be adversely affected by amenity issues (Shepshed Feed Mill, Newhurst Recovery Facility and Morris Recycling Limited). Aware of odour and noise issues at Shepshed Feed Mill.	Allocated sites will seek to ensure that the amenities of people who will live in new developments are protected.	Noise and odour issues outside of the scope of this assessment, as was explicit assessment of the ERF. Permitting process is designed to regulate these facilities adequately so as not to detrimentally impact adjacent dwellings, and detailed assessments will be undertaken at the planning stage.
EDCLP/89 Biffa	Newhurst Quarry Energy Recovery Facility implemented and an Environmental Agency permit issued in close proximity to the two housing allocations which should be taken into account and not impact upon operation	Site selection was informed by evidence but will be reviewed in light of information received from this consultation	Explicit assessment of the ERF outside of the scope of this study. Permitting process is designed to regulate facilities such as this adequately so as not to detrimentally impact adjacent dwellings, and detailed assessments will have been undertaken at the planning stage.
HS43 – Land west of B591/Ingleberry Road & north of Iveshead Road, Shepshed			
DCLP-425-470 Environment Agency	Site in close proximity to two Environment Agency permit sites and development may be adversely affected by amenity issues (Newhurst Recovery Facility and Morris Recycling Limited).	Allocated sites will seek to ensure that the amenities of people who will live in new developments are protected.	Permitting process is designed to regulate facilities such as this adequately so as not to detrimentally impact adjacent dwellings, and detailed assessments will be undertaken at the planning stage.
EDCLP/89 Biffa	Newhurst Quarry Energy Recovery Facility implemented, and an Environmental Agency permit issued in close proximity to the two housing allocations which should be taken into account and not impact upon operation	Site selection was informed by evidence but will be reviewed in light of information received from this consultation	Explicit assessment of the ERF outside of the scope of this study. Permitting process is designed to regulate facilities such as this adequately so as not to detrimentally impact adjacent dwellings, and detailed assessments will be undertaken at the planning stage.
Specific Sites – Loughborough excluding HS33, HS34, HS35, HS36 and HS37 - Land off Beacon Road, Loughborough			
DCLP-425-470 Environment Agency	Land within the Beacon Road Landfill 's Permitted boundary, IMMEDIATELY adjacent to a Permitted Landfill (EAWML 43294), which is regulated by the Environment Agency. High concentrations of Hydrogen Sulphide within the site at concentrations above human health exposure limits and extreme caution should be exercised for further residential development.	The site was selected following evidence known at the time. This will be reviewed in light of representations received.	Outside of the scope of this study.
Q30 a-d - LP25 - Open Spaces, Sport and Recreation **Do you have any comments on this draft policy? If you don't agree with the proposed policy please set out why and what alternative approach would you suggest? Do you think we have missed something?**			
EDCLP/252 Leicestershire County Council	Feel policy does not sufficiently take into account the wider health issues. Open space in itself will not support people's health and wellbeing. The quality of that open space and the available facilities is also an important factor as is the environment within which it is set especially in terms of air quality.	We welcome your comments. The Draft Policy emphasises healthier and more active lifestyles. In addition we have commissioned further work on air quality to provide evidence for our policies.	Suggestions made to this effect in Section 8.
Q38 - LP33 - Sustainable Transport **Do you have any comments on this draft policy? If you don't agree with the proposed policy please set out why and what alternative approach would you suggest? Do you think we have missed something?**			

Response No / Consultee	Representation Summary	Officer Response	AECOM / Report Response
EDCLP/115 Charnwood Constituency Labour Party	Bike paths separated from roads integrated to improved local public transport routes will be a requirement. The authority will invest in a fleet of electric buses and build links with neighbouring authorities to discuss joint planning of an integrated electric public transport network. This may include electric trams and train routes with subsidised fares and regular services to make the use of public transport cheaper, and more desirable than driving. This is to improve road safety and air quality in areas such as Anstey, Birstall, Thurmaston.	Comments are noted. We are undertaking a sustainable transport study to understand how the local plan can help to increase the number of journeys made by public transport, walking and cycling. We are also undertaking a separate but related study which looks at air quality.	This study addresses the air quality assessment stated. Transport provision assessed was as provided by the County Council. Sustainable transport provision may be higher or lower than that assessed. No explicit measures such as bike paths considered, but could be at a later date at the Council's discretion.
EDCLP/130 Lee Perkins	Bike paths separated from roads and integrated to improved local public transport routes will be a requirement. The authority will invest in a fleet of electric buses and build links with neighbouring authorities to discuss joint planning of an integrated electric public transport network. This may include electric trams and train routes with subsidised fares and regular services to make the use of public transport cheaper and more desirable than driving. This is to improve road safety and air quality in areas such as Anstey, Birstall, Thurmaston.	Comments are noted. We are undertaking a sustainable transport study to understand how the local plan can help to increase the number of journeys made by public transport, walking and cycling. We are also undertaking a separate but related air quality study.	This study addresses the air quality assessment stated. Transport provision assessed was as provided by the County Council. Sustainable transport provision may be higher or lower than that assessed. No explicit measures such as bike paths considered, but could be at a later date at the Council's discretion.
Q39 - LP34 - Local and Strategic Road Network **Do you have any comments on this draft policy? If you don't agree with the proposed policy please set out why and what alternative approach would you suggest? Do you think we have missed something?**			
EDCLP/91 Queniborough Parish Council	Traffic was the number one concern raised in the Neighbourhood Plan consultation. 81% of respondents to the Neighbourhood Plan Household Survey were concerned about traffic speeds, 71% with pedestrian safety, 66% with the number of heavy vehicles using the village despite the weight restrictions, and 93% about traffic volumes (Neighbourhood Plan 3.7, 3.13, 3.23). The new sites on Melton Road, East Goscote and Rearsby, will generate a large amount of additional traffic using Queniborough as the route into Leicester. HS8 and HS9 in Syston, will add to traffic using Queniborough as the route to the A46 and the M1. The Crossroads is already at capacity at morning and evening peak periods. The Council would wish to see a current base traffic survey carried out to establish the current use and capacity of the roads affected by the proposed developments. The amount of traffic has caused concerns about air pollution. Charnwood Borough Council has not declared an AQMA in Queniborough but an AQMA has been declared for the Melton Road, as it is not likely to meet national air quality standards within the agreed deadlines. This is the very place that the proposed plan wishes to develop at HS10, HS71 and HS72. The Parish Council would wish to see a study on how the new developments will affect a road that already has an AQMA designated on it. Significant concern about traffic has been identified in the Queniborough	Concerns over traffic are noted. We are undertaking further transport modelling to understand what measures need to be put in place to help mitigate the impact of new developments. We are also undertaking an air quality study and will assess through this whether this is potential for an AQMA on Melton Road in Queniborough. We are undertaking a sustainable transport study which will look at how we can increase the number of journeys' being made by sustainable modes of transport, helping to reduce congestion and CO_2 emissions. The Local Plan transport evidence will assess the impact of the whole development strategy however, individual site proposals will be supported by transport assessments and travel plans which will assess the more localised traffic impacts.	This report represents the air quality assessment stated. Impacts have been assessed at specific allocations as per Appendix E. Over the duration of the Draft Plan, background air quality is predicted to improve, which means the impacts are less significant. The Council has already demonstrated that in recent years, their AQMAs are compliant with the relevant objectives, and this is expected to continue based on the outcomes of this assessment. Impacts on transport have been separately assessed and this work is understood to be ongoing. Transport mitigation to address the issue of junction capacity has been preliminarily assessed, though it is noted these scenarios are associated with some detrimental impacts. Should the underlying traffic data supporting this assessment be updated, the resultant air quality assessments can also be updated in due course if required.

Response No / Consultee	Representation Summary	Officer Response	AECOM / Report Response
	Neighbourhood Plan and the new housing sites in Queniborough, East Goscote and Rearsby are all positioned just off the Melton Road, and as such will generate significant additional traffic using Queniborough and Syston as the main route into Leicester. Concern that further proposed housing sites on the Barkby Road, Syston, (HS8 and HS9) will lead to increased traffic through Queniborough. It is stated that The Crossroads is already at capacity at morning and evening peak periods. A current base traffic survey should be carried out to establish the current use and capacity of the roads affected by the proposed developments. There is particular concern about the effect of increased traffic levels on air pollution. The Parish Council would wish to see a study on how the new developments will affect the existing Air Quality Management Area as Sites HS10, HS71 and HS72 are all in the vicinity of Melton Road.		
DCLP/172 County Councillor Max Hunt	The statement that the authority "will reduce [traffic] congestion" and the efficiency of the network is worthy but difficult to understand if the number of journeys, presumably by car, van and heavy goods vehicle, is likely to increase as stated in 9.4. I think the policy would be more effective if it addressed the carbon emissions and cleaner air agenda. Concerns raised that the policy objective to reduce congestion is unlikely to be achievable in the light of an increase in the number of journeys. Draft Policy LP34 should include reference to carbon emissions and the cleaner air agenda.	It is the role of the local plan, local transport plans and planning decisions to ensure that sustainable transport is promoted and that any increase in journeys can take place using sustainable transport modes. The criteria within the policy on Sustainable Transport will help to achieve this objective. Further consideration will be given to the way in which the plan deals with the important issues of carbon emissions and air quality.	Whilst no explicit consideration of this specific policy was undertaken, suggestions have been made to this effect pertaining to other policies in Section 8.
Additional Comments - Air Quality			
EDCLP/88 Loughborough Air Quality Protection Group	I believe there should be a strong reference to AQM in the Chapter 7?? of the Local Plan; given the potential impact (especially on the University) of emissions from the Biffa Incinerator and Charnwood's plan for a scheme to install AQM equipment to measure the levels of PM2.5 particulates.	Draft Policy LP30 seeks to ensure that new development protects environmental resources including local air quality.	Suggestions made to this effect in Section 8.
EDCLP/52 (1 of 2) Shepshed Town Council	There is very little attention to the problem of air quality in the Local Plan. Parts of Shepshed have some of the worst air quality readings in Charnwood, and with the huge increase in emissions from the proposed incinerator and expansion of the A512, this will only get worse. This will also affect Loughborough University. Would you please include in the Local Plan measures to greatly increase measurement of air quality and a strategy to improve the environment around Shepshed and the University?	Draft Policy LP30 seeks to ensure that new development protects environmental resources including local air quality. However, there may be additional opportunities to raise the issue of air quality management in the draft local plan. This consultation response will be used to inform the next draft, where considerations of air quality and air quality management will be explored.	Suggestions made to this effect in Section 8.

Source: Charnwood Borough Council (2020) Draft Charnwood Local Plan 2019-36 Statement of Consultation https://www.charnwood.gov.uk/pages/draft_charnwood_local_plan_2019_36

Appendix D : Local Policies

Charnwood Economic Development Strategy 2018-2020 (2018)

The Charnwood Economic Development Strategy 2018-2020[36], published in 2018, sets out the approach to create a strong economy for the Borough. One of four priority areas is their places and infrastructure provision within the strategy. The development of sustainable practices where initiatives which support businesses to make efficient use of resources, reduce waste and improve efficiency in the effort to reduce overall environmental impact are promoted.

Charnwood Local Plan Sustainability Appraisal: Spatial Strategy, Second Interim Report, October 2019

The Sustainability Appraisal[37] gives an evaluation of the site-specific options scenarios and of the Draft Plan, identifying whether draft policies are positive or negative and their effect significance. There is a dedicated air quality section within the appraisal document. The following points are of key relevance to this Study:

- A minor negative effect is derived for:
  - Areas in Loughborough and the proximity of development locations to the AQMAs in the urban area of Loughborough which is noted to have potential to cause air quality issues, possibly causing an increase in exposure to poor air quality. Mitigation for this is suggested in the form of street trees and other urban greening.
  - Larger sites in Loughborough are noted to not be located within the same proximity to AQMAs however traffic associated with these larger developments may increase and impact the A6004 and A502, causing a possible delay to the revocation of the Syston AQMA, currently not experiencing any exceedances of air quality standards.
  - The Loughborough Science Park is suggested as a major attractor of traffic from a regional area.
  - Shepshed is recognised as having a large increase in development but thought to not significantly impact air quality.
  - Rearsby, East Goscote, Queniborough and Sileby developments are noted as possible to lead to increased trips, and therefore emissions through the AQMA at Syston.
- A number of policies within the Draft Plan are noted to minimise air quality impact. In particular the promotion of walking, cycling and increased public transport use, and provision of a higher number of electric vehicle charging points in car parks are given a significant positive effect;
- The document overall determines that the improvements proposed by the plan would offset the negative effects of the development proposed in Loughborough and Shepshed. The A46 is noted to have the potential to alleviate traffic along the routes in Syston and into Leicester. The inclusion of electric vehicles is favoured but uncertainty around consumer behaviour in this change of use is noted;
- The document makes a recommendation to air quality to require development within AQMAs to include appropriate mitigation measures; and
- It proposes monitoring the number of new properties which fall within AQMAs, number of electric vehicle charging points, and the proportion of trips moving away from car use.

The document appraises the Draft Plan in terms of climate change effects which are also very relevant for air quality. It notes that some site allocations are not ideal for service and transport links but that policies appear to ensure that this is addressed so that traffic emissions do not rise and that the focus on industrial and warehouse growth may lead to emissions from freight.

A minor positive effect is given to policies with respect to greenhouse gas emissions reduction although a note is included that they are similar to existing policies and unlikely to lead to a large change in travel behaviour. Wind energy development within Policy LP29 ‘Renewable and low carbon energy installations’ is favoured, and a recommendation given for the exploring of wind energy in the planning permission process for renewable energy schemes.

Charnwood Carbon Management Plan 2015 – 2020

CBC created a carbon management plan with the Carbon Trust in 2015[38]. This sets out the commitment of CBC to reduce their carbon footprint from 2,132 tonnes of carbon dioxide (CO_2) to 1,812 tonnes and aims to embed carbon management across Charnwood, with a top down approach. A link between reducing CO_2 emissions and the follow on impact air quality is made.

Charnwood Renewable and Low Carbon Study, November 2018

The Charnwood Renewable and Low Carbon Study[39] document, undertaken by Land Use Consultants in November 2018 to provide a part of the evidence base for policies relating to renewable and low carbon energy generation and low carbon development within the Draft Plan. It gives the technical potential for renewable and low carbon in CBC's administrative area.

The document concludes that there is a significant potential for wind, solar, energy from waste, district heating, biomass and microgeneration in Charnwood but little potential for small scale hydro. The most suitable areas for potential for large and very large wind are identified within rural areas to the north and east of Charnwood, whereas extensive areas throughout the Borough are noted for freestanding solar PV developments.

Appendix E : Priority Neighbourhoods identified by Charnwood Borough Council

Priority Area	Lower Level Super Output Area (LSOA) Number	Lower Level Super Output Area (LSOA) Name
Charnwood South	**Zone 1**	
	E01025752	Syston East
	E01025753	Syston Central
	E01025759	Syston North
	Zone 2	
	E01025766	Thurmaston North West
	E01025767	Thurmaston North East
Loughborough East	E01025705	Loughborough Midland Station
	E01025706	Loughborough Meadow Lane
	E01025699	Loughborough Bell Foundry
	E01025700	Loughborough Canal South
	E01025701	Loughborough Central Station
	E01025718	Loughborough Centre South
	E01025715	Loughborough Shelthorpe North
	E01025716	Loughborough Shelthorpe West
	E01025717	Loughborough Woodthorpe
Loughborough West	E01025691	Loughborough Dishley East
	E01025697	Loughborough Thorpe Acre East
	E01025723	Loughborough Roebery
	E01025725	Loughborough Warwick Way
	E01025689	Loughborough Ashby East
	E01025690	Loughborough Ashby West
Mountsorrel	E01025727	Mountsorrel Centre
	E01025728	Mountsorrel South

Appendix F : Summary of Impacts

Housing – Option 3

			Option 3						Option 3 Mitigation					
ID	Area Name	Dwellings	NO_2 Impact	NO_2 Nearest Modelled Location	NO_2 within 50m of Exposure	$PM_{2.5}$ Impact	$PM_{2.5}$ Nearest Modelled Location	$PM_{2.5}$ within 50m of Exposure	NO_2 Impact	NO_2 Nearest Modelled Location	NO_2 within 50m of Exposure	$PM_{2.5}$ Impact	$PM_{2.5}$ Nearest Modelled Location	$PM_{2.5}$ within 50m of Exposure
HS63	Kendal Road	32	0.3	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	0.3	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)
HS21	Devonshire Square Opportunity Site	252	0.2	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)
HS38	Land off Fairway Road	378	0.7	Neg. (A)	Neg. (A)	0.3	Neg. (A)	Neg. (A)	0.7	Neg. (A)	Neg. (A)	0.3	Neg. (A)	Neg. (A)
HS50	High Leys Farm/Manor Farm	110	0.3	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	0.3	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)
HS18	Land off Beacon Road	54	0.1	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	-0.1	Neg. (B)	Neg. (B)	0.0	Neg. (B)	Neg. (B)
HS20	Southfields Road Car Park	33	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (B)	Neg. (B)
HS22	Former Petrol Station, Pinfold Gate	25	0.0	Neg. (B)	Neg. (B)	0.0	Neg. (B)	Neg. (B)	0.1	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)
HS17	Land at Frederick Street	10	0.1	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	-0.1	Neg. (B)	Neg. (B)	0.0	Neg. (B)	Neg. (B)
HS24	Retail Warehouse Car Park, Regent Place	37	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)
HS19	Sital House, 3-6 Cattlemarket	15	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)
HS16	Land off Barkby Thorpe Lane	70	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)
HS7	Brook Street	45	0.3	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)
HS51	Albion Street/Rosebery Road	8	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)
HS27	138-144 Kingsthorpe Road	13	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.2	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)
HS32	30 Meadow Lane	52	0.1	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	-0.1	Neg. (B)	Neg. (B)	0.0	Neg. (B)	Neg. (B)
HS39	Land at Tickow Lane (Phase 2)	394	2.1	Neg. (A)	No Nearby Exposure	0.9	Neg. (A)	No Nearby Exposure	2.1	Neg. (A)	No Nearby Exposure	0.9	Neg. (A)	No Nearby Exposure
HS28	Former Main Post Office, Sparrow Hill	16	0.1	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	-0.1	Neg. (B)	Neg. (B)	0.0	Neg. (B)	Neg. (B)

			Option 3						Option 3 Mitigation					
ID	Area Name	Dwellings	NO_2 Impact	NO_2 Nearest Modelled Location	NO_2 within 50m of Exposure	$PM_{2.5}$ Impact	$PM_{2.5}$ Nearest Modelled Location	$PM_{2.5}$ within 50m of Exposure	NO_2 Impact	NO_2 Nearest Modelled Location	NO_2 within 50m of Exposure	$PM_{2.5}$ Impact	$PM_{2.5}$ Nearest Modelled Location	$PM_{2.5}$ within 50m of Exposure
HS11	Queniborough Lodge	132	0.2	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	0.0	Neg. (B)	Neg. (B)	0.0	Neg. (B)	Neg. (B)
HS9	Barkby Road	208	0.1	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	0.2	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)
HS30	Park Grange Farm, Newstead Way	15	1.0	Neg. (A)	Neg. (A)	0.5	Neg. (A)	Neg. (A)	1.0	Neg. (A)	Neg. (A)	0.5	Neg. (A)	Neg. (A)
HS31	Land off Highland Drive and Knox Road	24	0.4	Neg. (A)	Neg. (A)	0.2	Neg. (A)	Neg. (A)	0.3	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)
HS33	Land off Leconfield Road	25	0.1	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.3	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)
HS34	Land rear of Snell's Nook Lane	120	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (B)	Neg. (B)	0.5	Neg. (A)	Neg. (A)	0.3	Neg. (A)	Neg. (A)
HS43	Land west of the B591/Ingleberry Road and north of Iveshead Lane	174	1.6	Neg. (A)	No Nearby Exposure	0.7	Neg. (A)	No Nearby Exposure	1.6	Neg. (A)	No Nearby Exposure	0.7	Neg. (A)	No Nearby Exposure
HS70	J R Walton, The Leys	6	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)
HS69	Land off Zouch Road	50	0.1	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (B)	Neg. (B)	0.0	Neg. (B)	Neg. (B)
HS68	Land rear of 89 Loughborough Road	29	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)
HS67	Land off Melton Road	223	0.0	Neg. (A)	No Nearby Exposure	0.0	Neg. (B)	No Nearby Exposure	0.0	Neg. (A)	No Nearby Exposure	0.0	Neg. (A)	No Nearby Exposure
HS73	Land off Gaddesby Lane	47	0.2	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	0.2	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)
HS65	Land west of Main Street and north of Syston Road	54	0.1	Neg. (A)	No Nearby Exposure	0.1	Neg. (A)	No Nearby Exposure	0.1	Neg. (A)	No Nearby Exposure	0.0	Neg. (A)	No Nearby Exposure
HS10	Land at Melton Road	34	0.1	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)
HS15	Rear of Manor Medical Centre, Melton Road	20	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)
HS14	Rear of 36-46 Colby Road	12	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)
HS29	Carillon Court Shopping Centre Derby Square	43	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)
HS42	Land at Oakley Road	133	0.3	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	0.2	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)
HS4	Land off Birstall Meadow Road/Long Meadow Way	10	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)

			Option 3						Option 3 Mitigation					
ID	Area Name	Dwellings	NO_2 Impact	NO_2 Nearest Modelled Location	NO_2 within 50m of Exposure	$PM_{2.5}$ Impact	$PM_{2.5}$ Nearest Modelled Location	$PM_{2.5}$ within 50m of Exposure	NO_2 Impact	NO_2 Nearest Modelled Location	NO_2 within 50m of Exposure	$PM_{2.5}$ Impact	$PM_{2.5}$ Nearest Modelled Location	$PM_{2.5}$ within 50m of Exposure
HS58	Land at Woodcock Farm	107	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (B)	Neg. (B)	0.0	Neg. (B)	Neg. (B)
HS57	Land south of Rothley	44	0.2	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)
HS59	Factory at the corner of Park Road and Seagrave Road	11	0.3	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	0.2	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)
HS60	Land rear of The Maltings site High Street	13	0.3	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	0.2	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)
HS61	36 Charles Street	11	0.1	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)
HS62	9 King Street	14	0.1	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)
HS64	Land off Barnards Drive	228	0.3	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	0.3	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)
HS12	Works opposite 46 Brook Street	7	0.0	Neg. (B)	Neg. (B)	0.0	Neg. (B)	Neg. (B)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)
HS13	Works adjacent 46 Brook Street	5	0.0	Neg. (B)	Neg. (B)	0.0	Neg. (B)	Neg. (B)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)
HS8	Land north of Barkby Road	157	0.2	Neg. (A)	No Nearby Exposure	0.1	Neg. (A)	No Nearby Exposure	0.3	Neg. (A)	No Nearby Exposure	0.1	Neg. (A)	No Nearby Exposure
HS37	Extend Park Grange Farm	83	1.0	Neg. (A)	Neg. (A)	0.5	Neg. (A)	Neg. (A)	1.0	Neg. (A)	Neg. (A)	0.5	Neg. (A)	Neg. (A)
HS49	Land off Ashby Road West	27	0.4	Neg. (A)	Neg. (A)	0.2	Neg. (A)	Neg. (A)	0.6	Neg. (A)	Neg. (A)	0.3	Neg. (A)	Neg. (A)
HS47	Land rear of 54 Iveshead Road,	5	0.2	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)
HS46	Land rear of 62 Iveshead Road	76	0.1	Neg. (A)	No Nearby Exposure	0.0	Neg. (A)	No Nearby Exposure	0.0	Neg. (A)	No Nearby Exposure	0.0	Neg. (A)	No Nearby Exposure
HS45	20 Moscow Lane	49	0.2	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)
HS66	Land rear of Derry's Garden Centre	70	0.1	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)
HS71	Land off Melton Road	55	0.2	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)
HS25	Beacon House, Forest Road	9	0.2	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	-0.1	Neg. (B)	Neg. (B)	0.0	Neg. (B)	Neg. (B)
HS26	31-32 Market Place	5	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (B)	Neg. (B)
HS52	84 Melton Road	18	0.1	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)

			Option 3						Option 3 Mitigation					
ID	Area Name	Dwellings	NO_2 Impact	NO_2 Nearest Modelled Location	NO_2 within 50m of Exposure	$PM_{2.5}$ Impact	$PM_{2.5}$ Nearest Modelled Location	$PM_{2.5}$ within 50m of Exposure	NO_2 Impact	NO_2 Nearest Modelled Location	NO_2 within 50m of Exposure	$PM_{2.5}$ Impact	$PM_{2.5}$ Nearest Modelled Location	$PM_{2.5}$ within 50m of Exposure
HS53	Land south of Melton Road	130	0.1	Neg. (A)	No Nearby Exposure	0.0	Neg. (A)	No Nearby Exposure	0.1	Neg. (A)	No Nearby Exposure	0.0	Neg. (A)	No Nearby Exposure
HS54	Land north of Melton Road	120	0.1	Neg. (A)	No Nearby Exposure	0.0	Neg. (A)	No Nearby Exposure	0.1	Neg. (A)	No Nearby Exposure	0.0	Neg. (A)	No Nearby Exposure
HS55	Leicester Road	10	0.0	Neg. (B)	Neg. (B)	0.0	Neg. (B)	Neg. (B)	0.0	Neg. (B)	Neg. (B)	0.0	Neg. (B)	Neg. (B)
HS40	32 Charnwood Road	15	0.1	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)
HS41	Land west of Tickow Lane	330	2.1	Neg. (A)	No Nearby Exposure	0.9	Neg. (A)	No Nearby Exposure	2.1	Neg. (A)	No Nearby Exposure	0.9	Neg. (A)	No Nearby Exposure
HS44	Land north of Hallamford Road and west of Shepshed	250	0.6	Neg. (A)	No Nearby Exposure	0.3	Neg. (A)	No Nearby Exposure	0.6	Neg. (A)	No Nearby Exposure	0.3	Neg. (A)	No Nearby Exposure
HS23	Part of Baxter Gate Opportunity Site	210	0.1	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)
HS3	West of Loughborough SUE	3200	0.1	Neg. (A)	No Nearby Exposure	0.0	Neg. (A)	No Nearby Exposure	0.0	Neg. (A)	No Nearby Exposure	0.0	Neg. (A)	No Nearby Exposure
HS1	North East of Leicester SUE	4500	0.1	Neg. (A)	No Nearby Exposure	0.1	Neg. (A)	No Nearby Exposure	0.1	Neg. (A)	No Nearby Exposure	0.0	Neg. (A)	No Nearby Exposure
HS56	Loughborough Road	75	0.1	Neg. (A)	No Nearby Exposure	0.0	Neg. (A)	No Nearby Exposure	0.1	Neg. (A)	No Nearby Exposure	0.1	Neg. (A)	No Nearby Exposure
HS2	North of Birstall SUE	1,950	0.0	Neg. (A)	No Nearby Exposure	0.0	Neg. (B)	No Nearby Exposure	0.0	Neg. (A)	No Nearby Exposure	0.0	Neg. (A)	No Nearby Exposure
HS36	Nanpantan Grange, Land south west of Loughborough.	544	0.3	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	0.3	Neg. (A)	Neg. (A)	0.2	Neg. (A)	Neg. (A)
HS35	Land at Woodthorpe, east and west of A6004 Epinal Way	334	1.2	Neg. (A)	No Nearby Exposure	0.5	Neg. (A)	No Nearby Exposure	1.2	Neg. (A)	No Nearby Exposure	0.5	Neg. (A)	No Nearby Exposure
HS48	Land at Tickow Lane	210	1.1	Neg. (A)	No Nearby Exposure	0.6	Neg. (A)	No Nearby Exposure	0.8	Neg. (A)	No Nearby Exposure	0.4	Neg. (A)	No Nearby Exposure
HS6	Land south east of Syston	747	0.5	Neg. (A)	Neg. (A)	0.2	Neg. (A)	Neg. (A)	0.5	Neg. (A)	Neg. (A)	0.2	Neg. (A)	Neg. (A)
HS5	Land at Gynsill Lane & Anstey Lane	120	0.0	Neg. (A)	No Nearby Exposure	0.0	Neg. (A)	No Nearby Exposure	0.0	Neg. (A)	No Nearby Exposure	0.0	Neg. (A)	No Nearby Exposure
HS72	Land at Threeways Farm	100	0.2	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	0.0	Neg. (B)	Neg. (B)	0.0	Neg. (B)	Neg. (B)

Notes: Neg. = Negligible. Red data denotes the impacts greater than 0.4 ***µg/m³****, and green data the negative impacts (i.e. improving concentrations)*

Housing – Option 4

			Option 4						Option 4 Mitigation					
ID	Area Name	Dwellings	NO_2 Impact	NO_2 Nearest Modelled Location	NO_2 within 50m of Exposure	$PM_{2.5}$ Impact	$PM_{2.5}$ Nearest Modelled Location	$PM_{2.5}$ within 50m of Exposure	NO_2 Impact	NO_2 Nearest Modelled Location	NO_2 within 50m of Exposure	$PM_{2.5}$ Impact	$PM_{2.5}$ Nearest Modelled Location	$PM_{2.5}$ within 50m of Exposure
HS63	Kendal Road	32	0.2	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	0.2	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)
HS21	Devonshire Square Opportunity Site	252	0.2	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)
HS38	Land off Fairway Road	378	0.3	Neg. (A)	Neg. (A)	0.2	Neg. (A)	Neg. (A)	0.3	Neg. (A)	Neg. (A)	0.2	Neg. (A)	Neg. (A)
HS50	High Leys Farm/Manor Farm	110	0.2	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	0.2	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)
HS18	Land off Beacon Road	54	0.1	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	-0.1	Neg. (B)	Neg. (B)	0.0	Neg. (B)	Neg. (B)
HS20	Southfields Road Car Park	33	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (B)	Neg. (B)
HS22	Former Petrol Station, Pinfold Gate	25	0.0	Neg. (B)	Neg. (B)	0.0	Neg. (B)	Neg. (B)	0.1	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)
HS17	Land at Frederick Street	10	0.1	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	-0.1	Neg. (B)	Neg. (B)	0.0	Neg. (B)	Neg. (B)
HS24	Retail Warehouse Car Park, Regent Place	37	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)
HS19	Sital House, 3-6 Cattlemarket	15	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)
HS16	Land off Barkby Thorpe Lane	70	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)
HS7	Brook Street	45	0.6	Neg. (A)	Neg. (A)	0.3	Neg. (A)	Neg. (A)	0.4	Neg. (A)	Neg. (A)	0.2	Neg. (A)	Neg. (A)
HS51	Albion Street/Rosebery Road	8	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)
HS27	138-144 Kingsthorpe Road	13	0.1	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.2	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)
HS32	30 Meadow Lane	52	0.1	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	-0.1	Neg. (B)	Neg. (B)	0.0	Neg. (B)	Neg. (B)
HS39	Land at Tickow Lane (Phase 2)	394	1.9	Neg. (A)	No Nearby Exposure	0.8	Neg. (A)	No Nearby Exposure	1.9	Neg. (A)	No Nearby Exposure	0.8	Neg. (A)	No Nearby Exposure
HS28	Former Main Post Office, Sparrow Hill	16	0.1	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)
HS11	Queniborough Lodge	132	0.2	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	-0.1	Neg. (B)	Neg. (B)	0.0	Neg. (B)	Neg. (B)
HS9	Barkby Road	208	0.1	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.2	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)

			Option 4						Option 4 Mitigation					
ID	Area Name	Dwellings	NO_2 Impact	NO_2 Nearest Modelled Location	NO_2 within 50m of Exposure	$PM_{2.5}$ Impact	$PM_{2.5}$ Nearest Modelled Location	$PM_{2.5}$ within 50m of Exposure	NO_2 Impact	NO_2 Nearest Modelled Location	NO_2 within 50m of Exposure	$PM_{2.5}$ Impact	$PM_{2.5}$ Nearest Modelled Location	$PM_{2.5}$ within 50m of Exposure
HS30	Park Grange Farm, Newstead Way	15	0.8	Neg. (A)	Neg. (A)	0.4	Neg. (A)	Neg. (A)	0.8	Neg. (A)	Neg. (A)	0.4	Neg. (A)	Neg. (A)
HS31	Land off Highland Drive and Knox Road	24	0.3	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	0.3	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)
HS33	Land off Leconfield Road	25	0.1	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.3	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)
HS34	Land rear of Snell's Nook Lane	120	0.0	Neg. (B)	Neg. (B)	0.0	Neg. (B)	Neg. (B)	0.5	Neg. (A)	Neg. (A)	0.3	Neg. (A)	Neg. (A)
HS43	Land west of the B591/Ingleberry Road and north of Iveshead Lane	174	0.7	Neg. (A)	No Nearby Exposure	0.3	Neg. (A)	No Nearby Exposure	0.7	Neg. (A)	No Nearby Exposure	0.3	Neg. (A)	No Nearby Exposure
HS70	J R Walton, The Leys	6	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)
HS69	Land off Zouch Road	50	0.1	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (B)	Neg. (B)
HS68	Land rear of 89 Loughborough Road	29	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)
HS67	Land off Melton Road	223	0.0	Neg. (B)	No Nearby Exposure	0.0	Neg. (B)	No Nearby Exposure	0.0	Neg. (A)	No Nearby Exposure	0.0	Neg. (A)	No Nearby Exposure
HS73	Land off Gaddesby Lane	47	0.1	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)
HS65	Land west of Main Street and north of Syston Road	54	0.2	Neg. (A)	No Nearby Exposure	0.1	Neg. (A)	No Nearby Exposure	0.1	Neg. (A)	No Nearby Exposure	0.0	Neg. (A)	No Nearby Exposure
HS10	Land at Melton Road	34	0.1	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.2	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)
HS15	Rear of Manor Medical Centre, Melton Road	20	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)
HS14	Rear of 36-46 Colby Road	12	0.1	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)
HS29	Carillon Court Shopping Centre Derby Square	43	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)
HS42	Land at Oakley Road	133	0.3	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	0.2	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)
HS4	Land off Birstall Meadow Road/Long Meadow Way	10	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)
HS58	Land at Woodcock Farm	107	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)
HS57	Land south of Rothley	44	0.1	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)

			Option 4						Option 4 Mitigation					
ID	Area Name	Dwellings	NO_2 Impact	NO_2 Nearest Modelled Location	NO_2 within 50m of Exposure	$PM_{2.5}$ Impact	$PM_{2.5}$ Nearest Modelled Location	$PM_{2.5}$ within 50m of Exposure	NO_2 Impact	NO_2 Nearest Modelled Location	NO_2 within 50m of Exposure	$PM_{2.5}$ Impact	$PM_{2.5}$ Nearest Modelled Location	$PM_{2.5}$ within 50m of Exposure
HS59	Factory at the corner of Park Road and Seagrave Road	11	0.2	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	0.2	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)
HS60	Land rear of The Maltings site High Street	13	0.3	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	0.2	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)
HS61	36 Charles Street	11	0.1	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)
HS62	9 King Street	14	0.1	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)
HS64	Land off Barnards Drive	228	0.2	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	0.2	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)
HS12	Works opposite 46 Brook Street	7	0.0	Neg. (B)	Neg. (B)	0.0	Neg. (B)	Neg. (B)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (B)	Neg. (B)
HS13	Works adjacent 46 Brook Street	5	0.0	Neg. (B)	Neg. (B)	0.0	Neg. (B)	Neg. (B)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (B)	Neg. (B)
HS8	Land north of Barkby Road	157	0.5	Neg. (A)	No Nearby Exposure	0.2	Neg. (A)	No Nearby Exposure	0.6	Neg. (A)	No Nearby Exposure	0.3	Neg. (A)	No Nearby Exposure
HS37	Extend Park Grange Farm	83	0.8	Neg. (A)	Neg. (A)	0.4	Neg. (A)	Neg. (A)	0.8	Neg. (A)	Neg. (A)	0.4	Neg. (A)	Neg. (A)
HS49	Land off Ashby Road West	27	0.3	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	0.5	Neg. (A)	Neg. (A)	0.3	Neg. (A)	Neg. (A)
HS47	Land rear of 54 Iveshead Road,	5	0.1	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (B)	Neg. (B)	0.0	Neg. (B)	Neg. (B)
HS46	Land rear of 62 Iveshead Road	76	0.1	Neg. (A)	No Nearby Exposure	0.0	Neg. (A)	No Nearby Exposure	0.0	Neg. (A)	No Nearby Exposure	0.0	Neg. (A)	No Nearby Exposure
HS45	20 Moscow Lane	49	0.1	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (B)	Neg. (B)	0.0	Neg. (B)	Neg. (B)
HS66	Land rear of Derry's Garden Centre	70	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)
HS71	Land off Melton Road	55	0.2	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)
HS25	Beacon House, Forest Road	9	0.2	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	-0.1	Neg. (B)	Neg. (B)	0.0	Neg. (B)	Neg. (B)
HS26	31-32 Market Place	5	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (B)	Neg. (B)
HS52	84 Melton Road	18	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)
HS53	Land south of Melton Road	130	0.0	Neg. (A)	No Nearby Exposure	0.0	Neg. (A)	No Nearby Exposure	0.0	Neg. (A)	No Nearby Exposure	0.0	Neg. (A)	No Nearby Exposure
HS54	Land north of Melton Road	120	0.0	Neg. (A)	No Nearby Exposure	0.0	Neg. (A)	No Nearby Exposure	0.0	Neg. (A)	No Nearby Exposure	0.0	Neg. (A)	No Nearby Exposure

			Option 4						Option 4 Mitigation					
ID	Area Name	Dwellings	NO_2 Impact	NO_2 Nearest Modelled Location	NO_2 within 50m of Exposure	$PM_{2.5}$ Impact	$PM_{2.5}$ Nearest Modelled Location	$PM_{2.5}$ within 50m of Exposure	NO_2 Impact	NO_2 Nearest Modelled Location	NO_2 within 50m of Exposure	$PM_{2.5}$ Impact	$PM_{2.5}$ Nearest Modelled Location	$PM_{2.5}$ within 50m of Exposure
HS55	Leicester Road	10	0.0	Neg. (B)	Neg. (B)	0.0	Neg. (B)	Neg. (B)	0.0	Neg. (B)	Neg. (B)	0.0	Neg. (B)	Neg. (B)
HS40	32 Charnwood Road	15	0.1	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)
HS41	Land west of Tickow Lane	330	1.9	Neg. (A)	No Nearby Exposure	0.8	Neg. (A)	No Nearby Exposure	1.9	Neg. (A)	No Nearby Exposure	0.8	Neg. (A)	No Nearby Exposure
HS44	Land north of Hallamford Road and west of Shepshed	250	0.5	Neg. (A)	No Nearby Exposure	0.2	Neg. (A)	No Nearby Exposure	0.5	Neg. (A)	No Nearby Exposure	0.2	Neg. (A)	No Nearby Exposure
HS23	Part of Baxter Gate Opportunity Site	210	0.1	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)
HS3	West of Loughborough SUE	3200	0.0	Neg. (A)	No Nearby Exposure	0.0	Neg. (A)	No Nearby Exposure	0.0	Neg. (A)	No Nearby Exposure	0.0	Neg. (B)	No Nearby Exposure
HS1	North East of Leicester SUE	4500	0.1	Neg. (A)	No Nearby Exposure	0.1	Neg. (A)	No Nearby Exposure	0.1	Neg. (A)	No Nearby Exposure	0.0	Neg. (A)	No Nearby Exposure
HS56	Loughborough Road	75	0.1	Neg. (A)	No Nearby Exposure	0.0	Neg. (A)	No Nearby Exposure	0.1	Neg. (A)	No Nearby Exposure	0.1	Neg. (A)	No Nearby Exposure
HS2	North of Birstall SUE	1,950	0.0	Neg. (A)	No Nearby Exposure	0.0	Neg. (B)	No Nearby Exposure	0.0	Neg. (A)	No Nearby Exposure	0.0	Neg. (A)	No Nearby Exposure
HS36	Nanpantan Grange, Land south west of Loughborough.	544	0.2	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	0.3	Neg. (A)	Neg. (A)	0.2	Neg. (A)	Neg. (A)
HS35	Land at Woodthorpe, east and west of A6004 Epinal Way	334	0.4	Neg. (A)	No Nearby Exposure	0.2	Neg. (A)	No Nearby Exposure	0.4	Neg. (A)	No Nearby Exposure	0.2	Neg. (A)	No Nearby Exposure
HS48	Land at Tickow Lane	210	0.9	Neg. (A)	No Nearby Exposure	0.5	Neg. (A)	No Nearby Exposure	0.7	Neg. (A)	No Nearby Exposure	0.4	Neg. (A)	No Nearby Exposure
HS6	Land south east of Syston	747	1.1	Neg. (A)	Neg. (A)	0.5	Neg. (A)	Neg. (A)	1.1	Neg. (A)	Neg. (A)	0.5	Neg. (A)	Neg. (A)
HS5	Land at Gynsill Lane & Anstey Lane	120	0.0	Neg. (A)	No Nearby Exposure	0.0	Neg. (A)	No Nearby Exposure	0.1	Neg. (A)	No Nearby Exposure	0.0	Neg. (A)	No Nearby Exposure
HS72	Land at Threeways Farm	100	0.2	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	-0.1	Neg. (B)	Neg. (B)	0.0	Neg. (B)	Neg. (B)

Notes: Neg. = Negligible. Red data denotes the impacts greater than 0.4 µg/m^3, and green data the negative impacts (i.e. improving concentrations)

Employment – Option 3

ID	Location	Option 3						Mitigation 3					
		NO_2 Impact	NO_2 Nearest Receptor	NO_2 Exposure within 50m	$PM_{2.5}$ Impact	$PM_{2.5}$ Nearest Receptor	$PM_{2.5}$ Exposure within 50m	NO_2 Impact	NO_2 Nearest Receptor	NO_2 Exposure within 50m	$PM_{2.5}$ Impact	$PM_{2.5}$ Nearest Receptor	$PM_{2.5}$ Exposure within 50m
ES1	Employment land at North of Birstall Sustainable Urban Extension in accordance with Draft Policy LP35	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)
ES7	Employment land at Watermead Business Park in accordance with Draft Policy LP36	0.1	Neg. (A)	No Nearby Exposure	0.0	Neg. (A)	No Nearby Exposure	0.1	Neg. (A)	No Nearby Exposure	0.1	Neg. (A)	No Nearby Exposure
ES8	Employment land at North East of Leicester Sustainable Urban Extension	0.1	Neg. (A)	No Nearby Exposure	0.1	Neg. (A)	No Nearby Exposure	0.2	Neg. (A)	No Nearby Exposure	0.1	Neg. (A)	No Nearby Exposure
ES3	Employment land at West of Loughborough Sustainable Urban Extension	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)
ES4	Employment land at Dishley Grange	0.1	Neg. (A)	No Nearby Exposure	0.0	Neg. (A)	No Nearby Exposure	0.1	Neg. (A)	No Nearby Exposure	0.0	Neg. (A)	No Nearby Exposure
LSEP	Loughborough Science & Enterprise Park	0.0	Neg. (A)	No Nearby Exposure	0.0	Neg. (A)	No Nearby Exposure	0.0	Neg. (A)	No Nearby Exposure	0.0	Neg. (A)	No Nearby Exposure
ES5	Employment land at Rothley Lodge, for industrial uses and small warehouses	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)
ES2	Employment land at The Warren, for industrial uses and small warehouses	0.0	Neg. (A)	No Nearby Exposure	0.0	Neg. (A)	No Nearby Exposure	0.0	Neg. (A)	No Nearby Exposure	0.0	Neg. (A)	No Nearby Exposure
ES6	Employment land at Land at Loughborough Road, for industrial uses and small warehouses	0.1	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)

Notes: Neg. = Negligible.

Employment – Option 4

ID	Location	Option 4						Mitigation 4					
		NO_2 Impact	NO_2 Nearest Receptor	NO_2 Exposure within 50m	$PM_{2.5}$ Impact	$PM_{2.5}$ Nearest Receptor	$PM_{2.5}$ Exposure within 50m	NO_2 Impact	NO_2 Nearest Receptor	NO_2 Exposure within 50m	$PM_{2.5}$ Impact	$PM_{2.5}$ Nearest Receptor	$PM_{2.5}$ Exposure within 50m
ES1	Employment land at North of Birstall Sustainable Urban Extension in accordance with Draft Policy LP35	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)
ES7	Employment land at Watermead Business Park in accordance with Draft Policy LP36	0.2	Neg. (A)	No Nearby Exposure	0.1	Neg. (A)	No Nearby Exposure	0.2	Neg. (A)	No Nearby Exposure	0.1	Neg. (A)	No Nearby Exposure
ES8	Employment land at North East of Leicester Sustainable Urban Extension	0.2	Neg. (A)	No Nearby Exposure	0.1	Neg. (A)	No Nearby Exposure	0.2	Neg. (A)	No Nearby Exposure	0.1	Neg. (A)	No Nearby Exposure
ES3	Employment land at West of Loughborough Sustainable Urban Extension	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)

ID	Location	Option 4						Mitigation 4					
		NO_2 Impact	NO_2 Nearest Receptor	NO_2 Exposure within 50m	$PM_{2.5}$ Impact	$PM_{2.5}$ Nearest Receptor	$PM_{2.5}$ Exposure within 50m	NO_2 Impact	NO_2 Nearest Receptor	NO_2 Exposure within 50m	$PM_{2.5}$ Impact	$PM_{2.5}$ Nearest Receptor	$PM_{2.5}$ Exposure within 50m
ES4	Employment land at Dishley Grange	0.0	Neg. (A)	No Nearby Exposure	0.0	Neg. (A)	No Nearby Exposure	0.1	Neg. (A)	No Nearby Exposure	0.0	Neg. (A)	No Nearby Exposure
LSEP	Loughborough Science & Enterprise Park	0.0	Neg. (A)	No Nearby Exposure	0.0	Neg. (A)	No Nearby Exposure	0.0	Neg. (A)	No Nearby Exposure	0.0	Neg. (A)	No Nearby Exposure
ES5	Employment land at Rothley Lodge, for industrial uses and small warehouses	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.1	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)
ES2	Employment land at The Warren, for industrial uses and small warehouses	0.1	Neg. (A)	No Nearby Exposure	0.0	Neg. (A)	No Nearby Exposure	0.0	Neg. (A)	No Nearby Exposure	0.0	Neg. (B)	No Nearby Exposure
ES6	Employment land at Land at Loughborough Road, for industrial uses and small warehouses	0.1	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)	0.0	Neg. (A)	Neg. (A)

Notes: Neg. = Negligible.

ROAD TRANSPORT CO_2 EMISSIONS

Scenario	Total AADT (all modelled road links)*	Total Annual Emissions CO_2 (tonnes / yr)^	% Diesel Cars	% HDV
2016 Base	46,166,910	1,161,408.2	22.5	33.4
2036 Core	53,465,007	1,256,978.3	21.3	36.4
2036 Op 3	54,226,169	1,268,994.4	21.7	36.3
2036 Op 3 Mitigation	54,328,651	1,271,127.1	21.7	36.5
2036 Op 4	54,286,482	1,269,741.6	21.7	36.3
2036 Op 4 Mitigation	54,388,613	1,271,842.8	21.7	36.5

*Includes loading spigots, so likely an overestimate. Across all modelled road links in the domain, which extends beyond the boundary of Charnwood. 2016 scenarios contains 8786 road links, 2036 scenarios 8921 road links, so increases would be expected.
^2016 Based on version 8.0.1 of EFT, 2036 on version 9, which may account for a certain degree of the variation in emissions.

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