Mr Robert Jackson
Dear Mr Jackson

My apologies for sending you the second half of this message before including the first half.
As requested, I have contacted Mike Sandys, the Director of Public Health, and he has supplied with me the attached information which clarifies the point I made during the hearing.
Yours sincerely,

David Bill

-----Original Message-----
From: Mike Sandys [redacted]@leics.gov.uk>
Sent: Thursday, November 2, 2023 11:30 AM
To: David Bill [redacted]@ntlworld.com>
Cc: michael mullaney [redacted]@yahoo.co.uk>
Subject: RE: Air quality

Hello David,

Thank you for your email. I'm not sure if the inspector is asking very generally if poor air quality has an impact on health - I would have thought that would be well understood (either the last, or last but one CMO's report focussed on air pollution ha it effects health, for instance).

I've included a powerpoint slide deck that summarises a report we commissioned from an organisation called Earthsense that sets out:
The key pollutants and sources of pollutants within Leicestershire The location of these sources The potential impact of these pollutants on the residents of the county Pollutant concentrations with local demographic information Best practice mitigation recommendations to reduce exposure to and impact of the pollutants

Additional data that might be useful albeit not specific to the a5 corridor itself but for Hinckley and Bosworth overall:

Asthma prevalence (6+ years) increase from 7.2% in 2020/21 to 7.5% in 2021/22 both years higher than the England value.

Fraction of mortality attributable to particulate air pollution 2021 Hinckley and Bosworth 5.8% which is higher than the England value of 5.5%. Hinckley and Bosworth higher than all other Leicestershire Districts except Charnwood and Oadby and Wigston. (ie roughly 1 in 20 death are attributable to air pollution - the 25% figure I thin applies to 'avoidable deaths' which is a different measure).

Mike

Mike Sandys (he/him)
Director of Public Health

Leicestershire County Council
Rutland County Council
t: 0116 305 4239
e: [redacted]@leics.gov.uk

-----Original Message-----
From: David Bill [redacted]@ntlworld.com>
Sent: 01 November 2023 11:44
To: Mike Sandys [redacted]@leics.gov.uk>
Cc: michael mullaney [redacted]@yahoo.co.uk>
Subject: Air quality

Mike
My apologies for using my personal address but I am in the hearing for the HNRFI and unable to use my county address.

I have raised the question of mortality rates associated with poor air quality and have quoted the figure of 25% which we have discussed on several occasions.

Since that time there has been a massive increase of warehouse and HGV based activities in and around the A5 corridor.

I have now been asked by the Inspector to provide evidence of the impact of poor air quality. Could you please let me have the latest information on this aspect ?

Regards
David

Air Quality and Health Partnership Engagement Project

The partnership is tasked with looking at comms and engagement with the population of Leicestershire around their contribution to and impacts of air pollution.

To inform this comms and engagement, a report has been provided by Earthsense exploring:

- The key pollutants and sources of pollutants within Leicestershire
- The location of these sources
- The potential impact of these pollutants on the residents of the county
- Pollutant concentrations with local demographic information
- Best practice mitigation recommendations to reduce exposure to and impact of the pollutants

Earthsense Report- Summary of Findings

Leicestershire County Council

Report looks at:

Particulate matter (PM 10/2.5/0.1)	**Nitrogen dioxide (NO_2)**
Mix of solid and liquid aerosol suspended in the atmosphere. Main **sources** the combustion of fuels (by vehicles, industry and domestic properties) and other physical processes such as tyre and brake wear. Natural sources include wind-blown soil and dust, sea spray particles, and fires involving vegetation.	**Formed** through oxidation during the combustion process, e.g. petrol/diesel vehicles. Other sources include power generation, industrial processes, and domestic heating
Composition of PM therefore varies by area: e.g. industrial areas see ammonium sulphate, selenium etc. and urban areas exhaust condensate e.g carbon and road dust.	**Defra**- 80% of NO_x emissions in UK areas where NO_2 limits exceed are due to transport, the largest source being emissions from diesel light duty vehicles (cars & vans).
Short term exposure can cause eye, nose, throat and lung irritation, and clinical care requirements particularly for those with pre-existing conditions such asthma and heart disease. **Long term exposure** impacts on morbidity and mortality around Cardiovascular disease, respiratory conditions, cancers and dementia.	**Causes** oxidative stress, increased airway irritation and lung infections. Research has shown longer term changes in lung development, structure and function in adulthood. Some epidemiological studies have shown links to reduced life expectancy.

Earthsense Report- Summary of Findings

When considering air quality in Leicestershire, we need to keep in mind:

- **The behaviour of the pollution:**

- Gases and particulates disperse from their source (air moves!)
- Gases have at atmospheric lifetime which limit their movement.
- Particulates can travel long distances but are subject to gravitational pull, larger PMs settle closer to source.

- **The pollutant limits/thresholds for England:**

- UK current limits and Government **consultation** on revised targets relating to **$PM_{2.5}$:**
- *An annual mean concentration target – a target of **10 µg/m³** across England by 2040.*
- *A population exposure reduction target – a 35% reduction by 2040 (compared to 2018)*

- **And our make up:**

- Roads- M6, M1, M69 (although Leics is broadly comparable regionally around PM emissions)
- Economic Hubs- EMA (largest dedicated cargo operation hub) and Magna Park
- Mining- An established industry in the county

Earthsense Report- Summary of Findings

- **Domestic combustion is relatively high in the county**, especially in western areas.

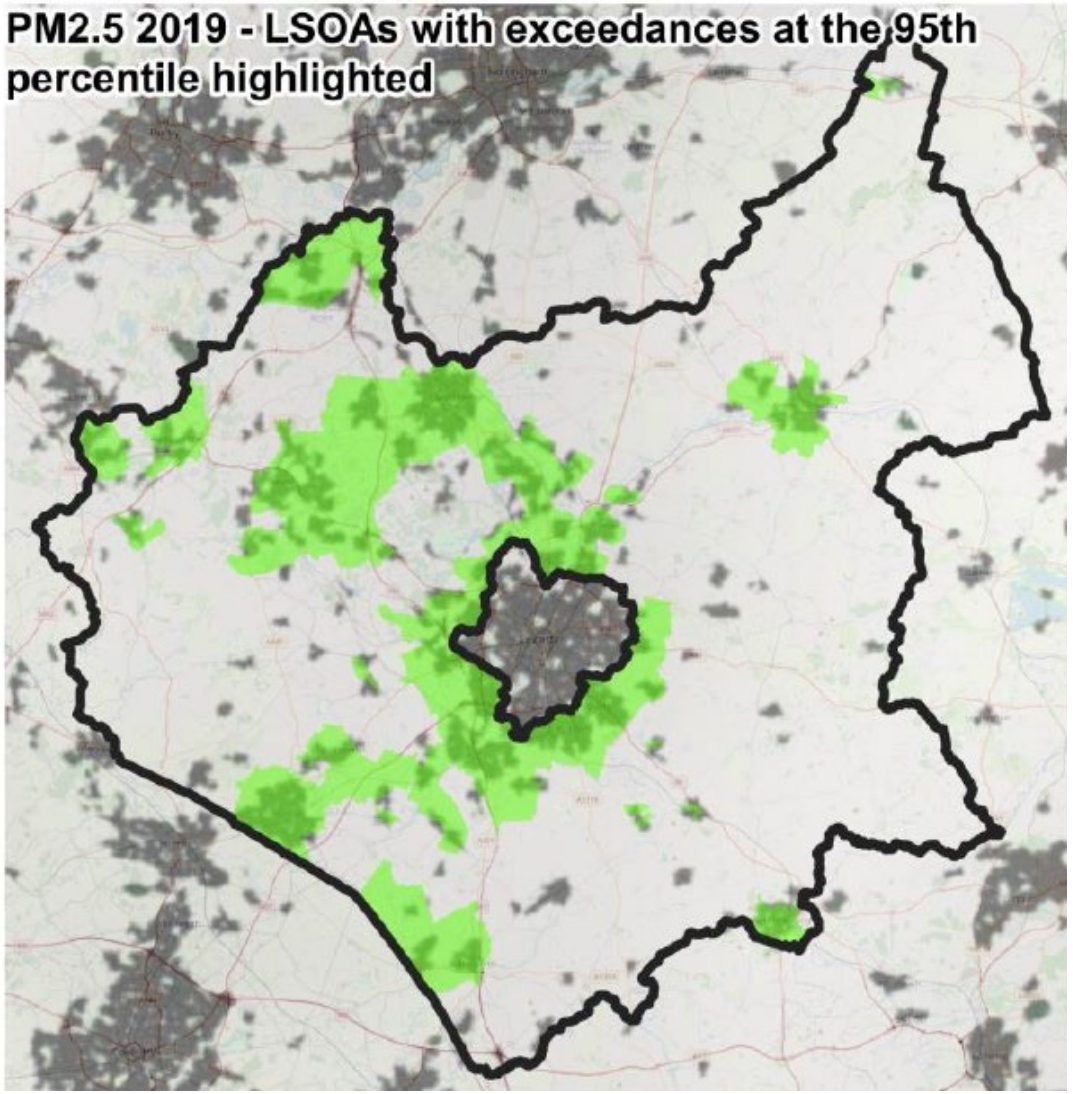
- **2016-19 reductions in air pollution were a significant achievement for Leicestershire:**

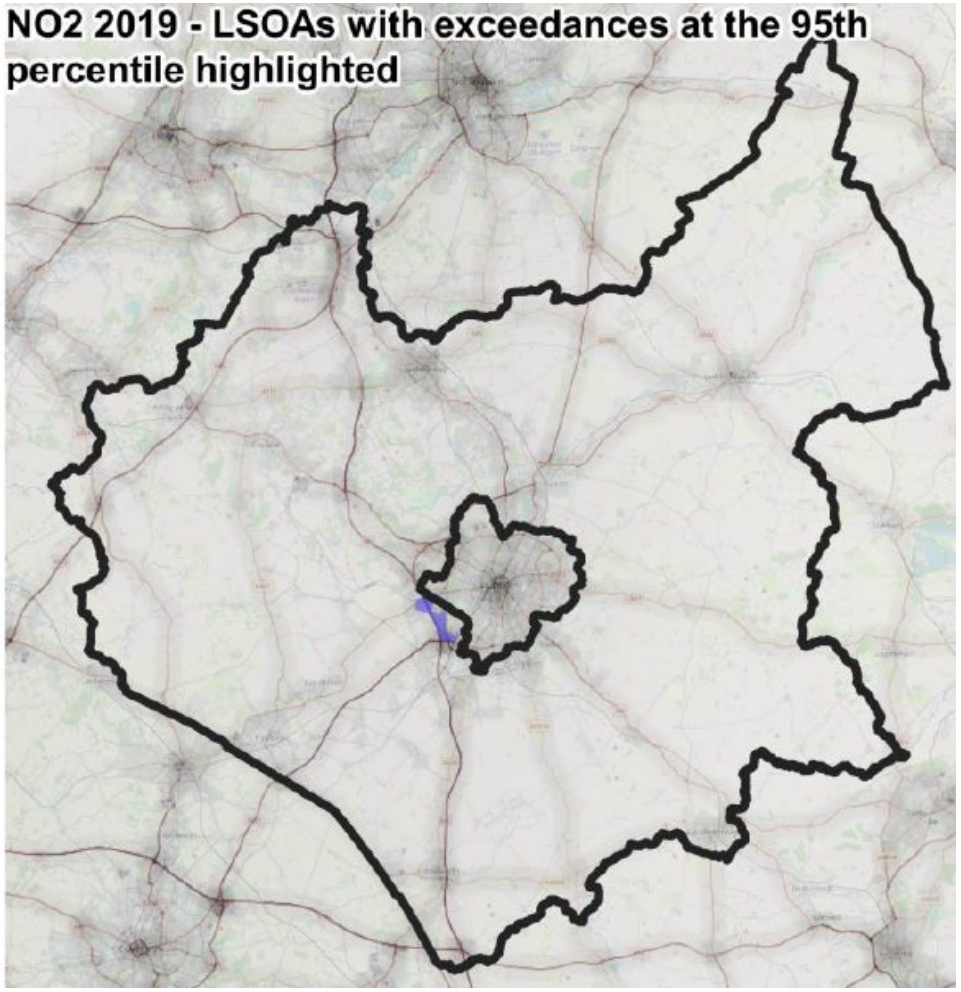
  - NO_2 24% *(national average 19%)*
  - $PM_{2.5}$ 9% *(national average <1%)*

- Defra level **NO_2 exceedances** (for annual average concentration) were concentrated around M1/M69 junction in Blaby. The area is a mix of industrial/commercial aswell as parts of residential settlements i.e. Leicester Forest East and Thorpe Astley.

- Defra level PM annual average concentrations exceedances found mostly around the perimeter of the city boundary aswell as routes North to Loughborough, Coalville, Ashby-de-la-Zouch, EMA, Melton Mowbray , Market Harborough, Lutterworth, East Shilton and Hinckley- **22% of the total land area.**

- Please see maps on the following slide- the detailed Earthsense report includes the Lower Super Output Areas for these areas in tabular form and can be shared.


PM2.5 2019 - LSOAs with exceedances at the 95th percentile highlighted
Leicestershire
NO2 exceedance
PM2.5 exceedance
PM2.5 (ugm-3) 2019
11
8


NO2 2019 - LSOAs with exceedances at the 95th percentile highlighted
NO2 (ugm-3) 2019
40
10

There are a number of data sets and maps within the report, which contribute to the source apportionment distribution of emissions for the county below:

Table 3: Distribution of $PM_{2.5}$ emission sources throughout Leicestershire (tonnes per year)

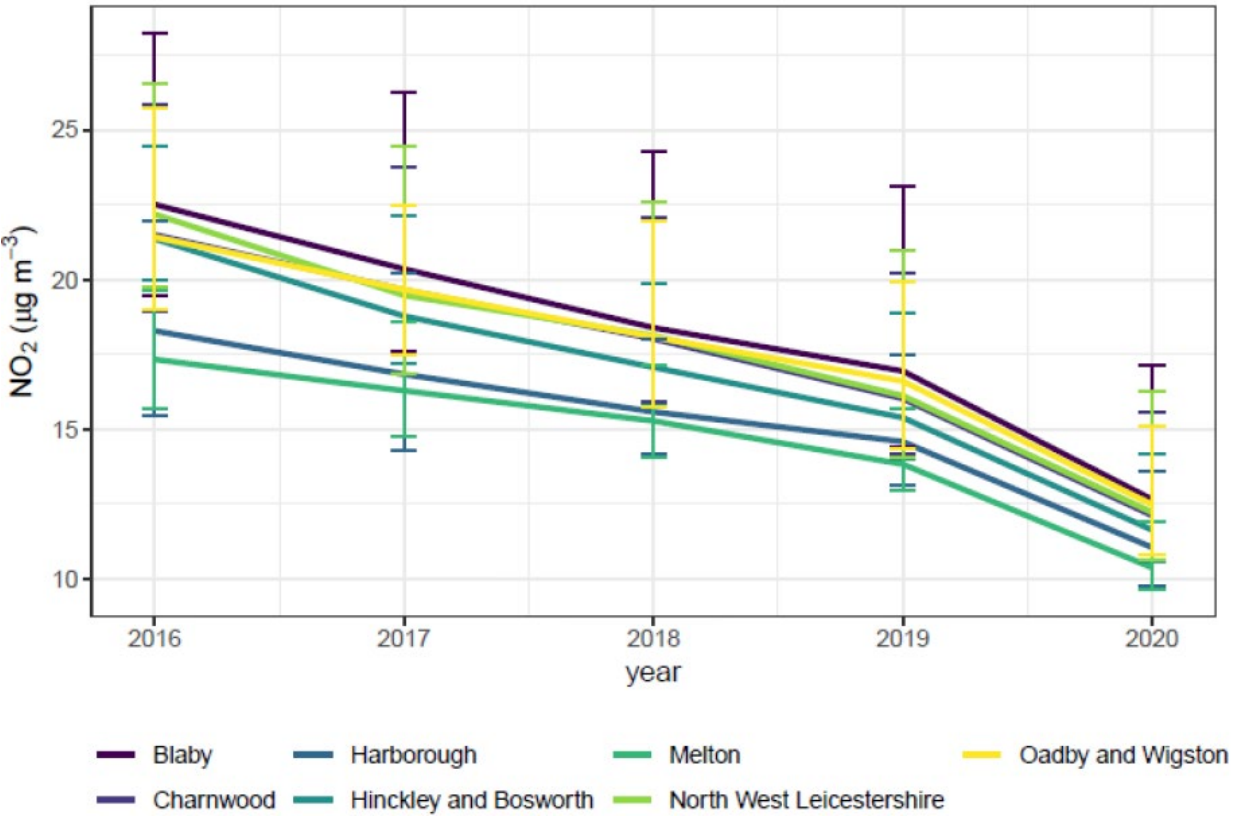
Source	Emissions (tonnes per year)	Percentage Contribution (%)
Agriculture (Forestry & Land-use)	36.35	3.27
Energy Production (& Transformation)	1.93	0.17
Domestic Combustion (from Commercial, Industrial, Residential & Agriculture)	352.41	31.76
Industry Combustion	311.44	28.07
Industry Production Processes	93.41	8.42
Off-shore (Extraction & Distribution of Fossil Fuels)	0.0	0.0
Solvent Use	15.31	1.38
Road Transport	151.06	13.61
Other Transport (Mobile Machinery)	77.56	6.99
Waste (Treatment & Disposal)	58.81	5.30
Nature	11.38	1.03
Total Use	**1109.55**	**100%**

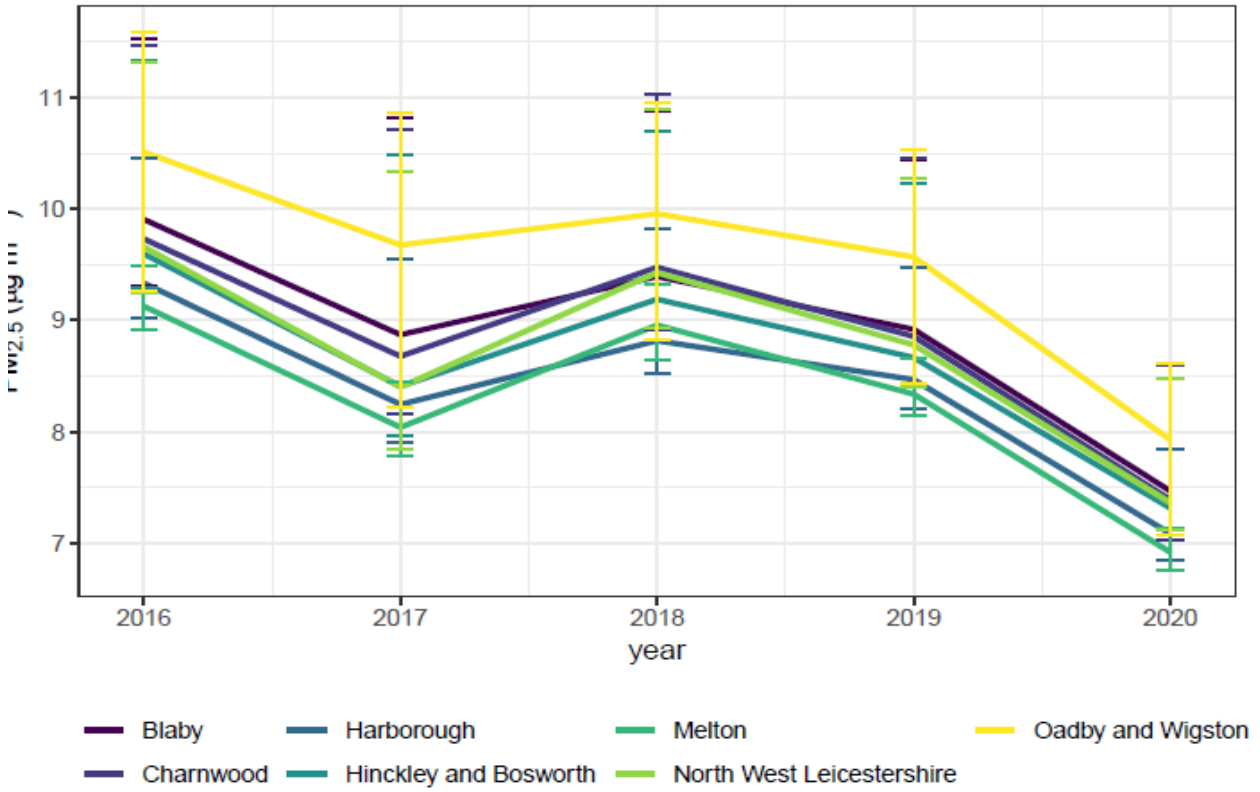
- For NO2 on a district level, **Leicestershire is compliant with the 40*µg/m³* threshold set** by Defra, but **<u>not</u> the WHO 10*µg/m³* annual average limit.**

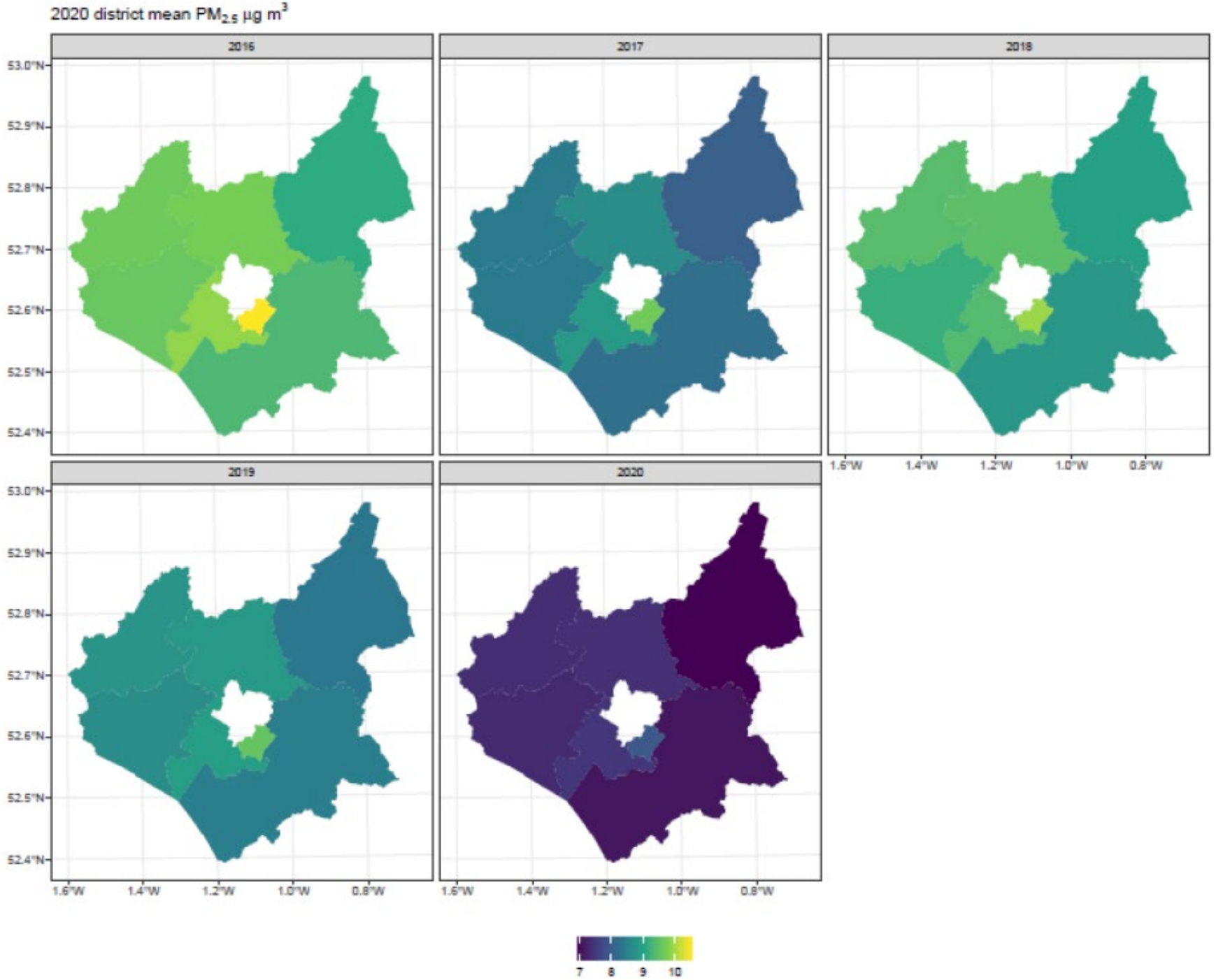
  Melton and Harborough show the lowest concentrations of NO2, Blaby the highest.

- For $PM_{2.5}$ on a **district level we are compliant with the WHO 10*µg/m³* annual average limit.**

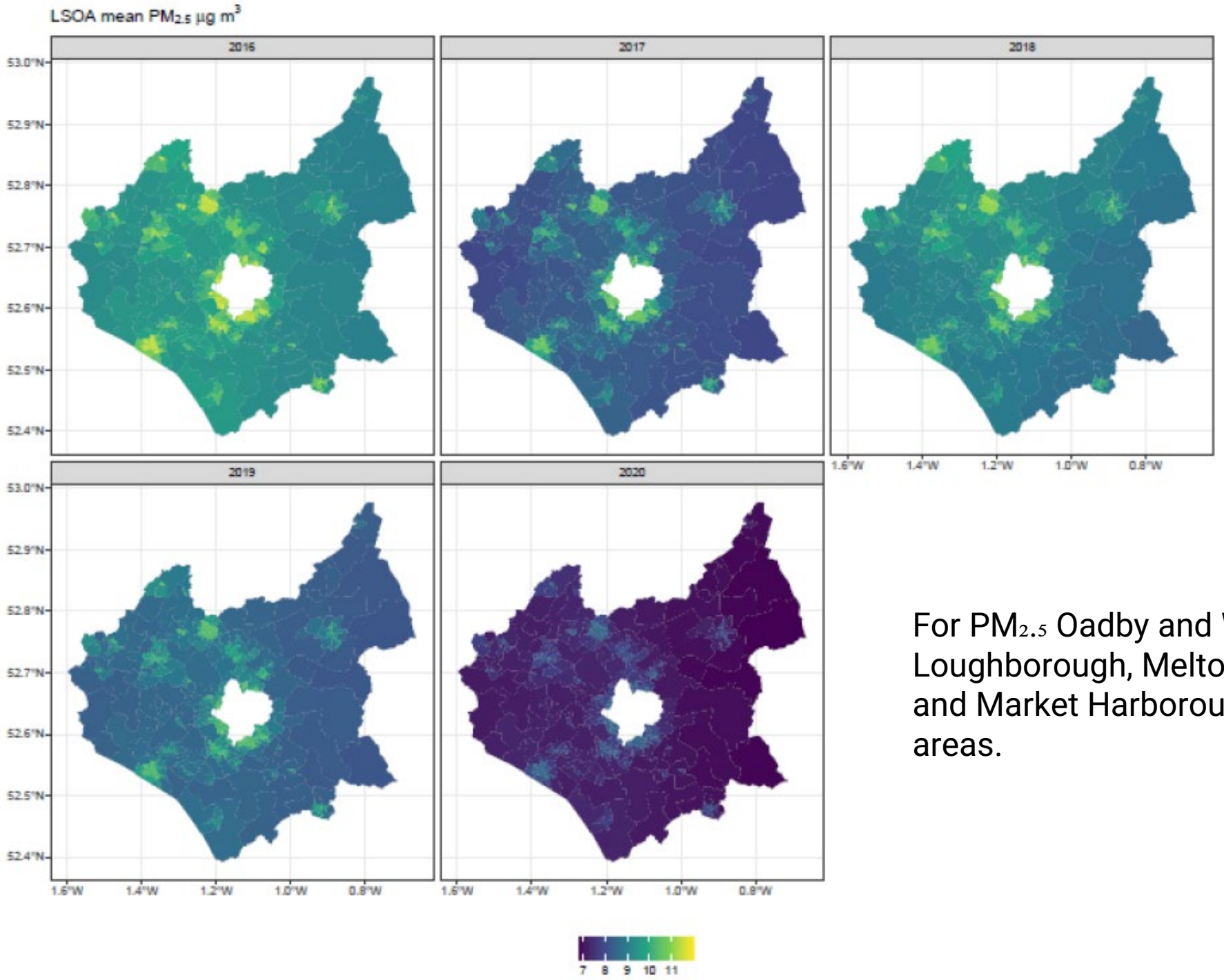
  Melton shows the lowest concentrations of $PM_{2.5}$, with Oadby and Wigston (followed by Blaby), the highest.





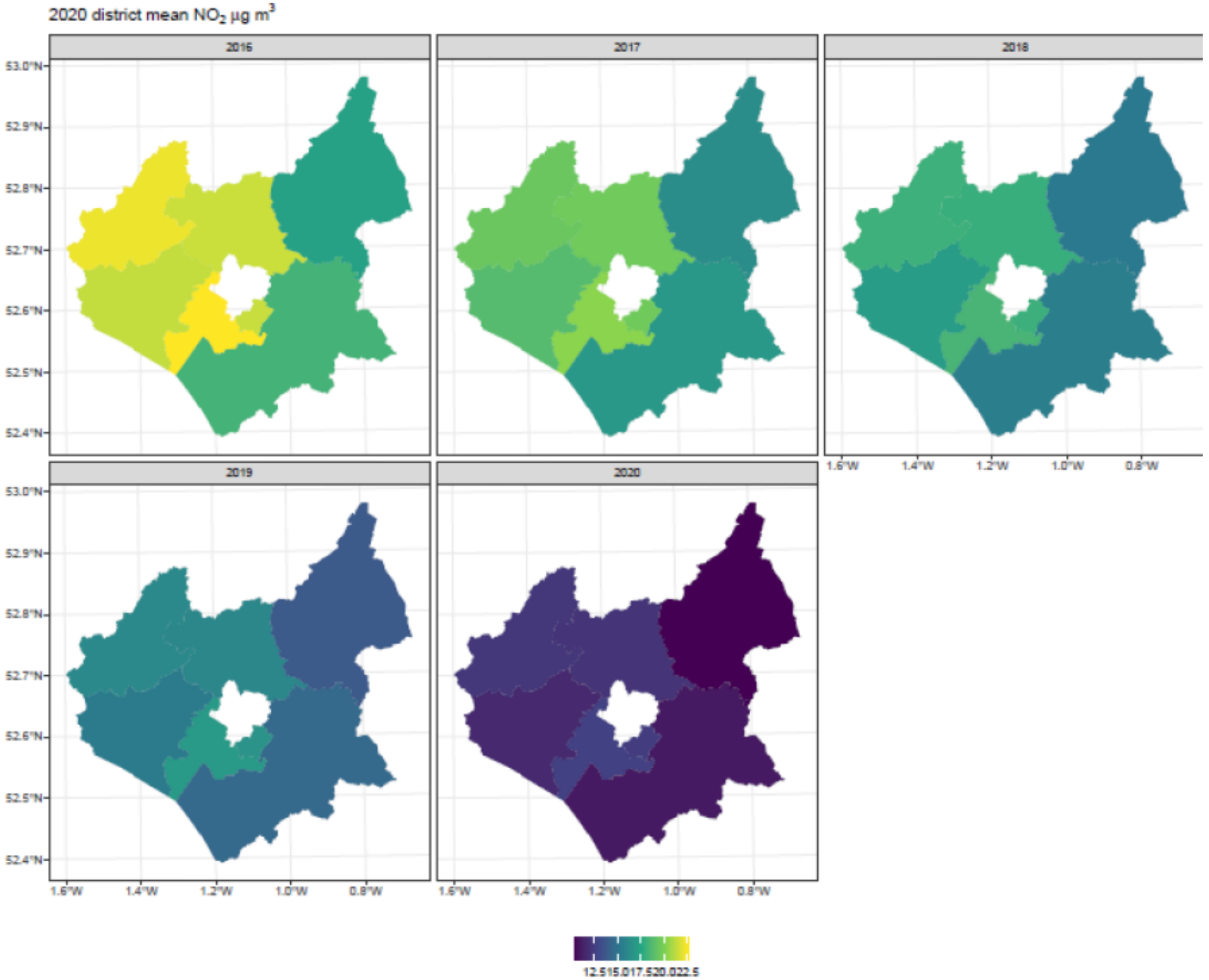


District data



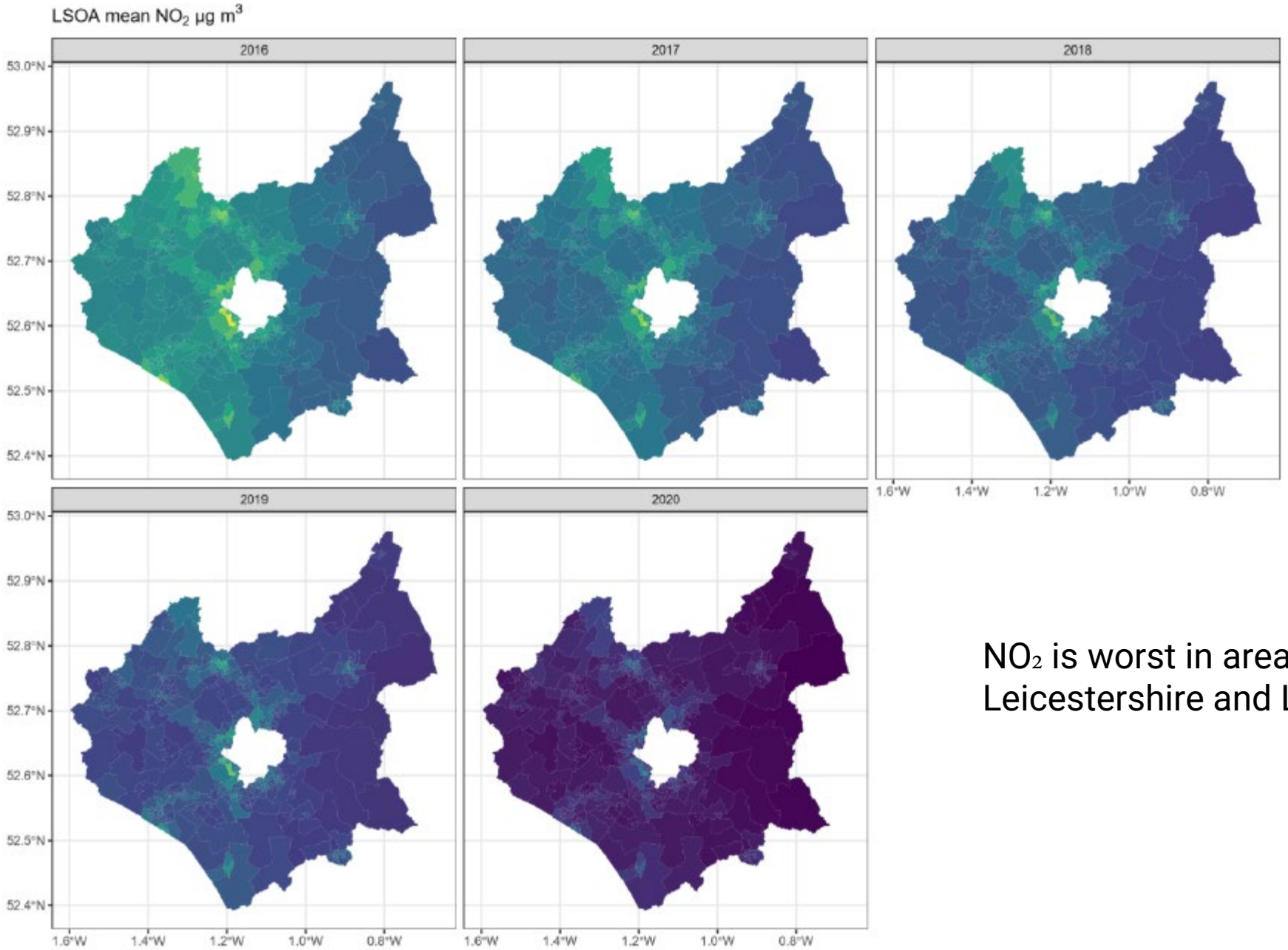
LSOA data

For $PM_{2.5}$ Oadby and Wigston, Narborough, Loughborough, Melton Mowbray, Hinckley, Coalville and Market Harborough are amongst the worst areas.



Leicestershire County Council

District data



LSOA data

NO_2 is worst in areas of Blaby, Northwest Leicestershire and Lutterworth

- Generally air pollution concentrations are higher in areas of greater **ethnic diversity**, with the inequality most severe in Blaby and Charnwood (less pronounced in Oadby and Wigston).
- Air pollution concentrations tend to be greater in the most **deprived** areas, especially in Blaby, Charnwood and Melton. However, in Hinckley and Bosworth and North West Leicestershire the least deprived neighbourhoods were the most polluted.
- **Age-** Under 16s (vulnerable population) exposure to $PM_{2.5}$ and NO_2exceedances:

Table 8: Sum of under 16 population by year and Leicestershire district where the 95th percentile NO_2 exceeded 40 ugm^3

year	Blaby	Charnwood	Harborough	Hinckley and Bosworth	Melton	North West Leicestershire	Oadby and Wigston
2016	2875	1063	0	981	0	497	0
2017	1559	858	0	646	0	0	0
2018	1618	930	0	670	0	0	0
2019	1671	0	0	0	0	0	0
2020	0	0	0	0	0	0	0

Table 9: Sum of under 16 population by year and Leicestershire district where the 95th percentile $PM_{2.5}$ exceeded 10 ugm^3

year	Blaby	Charnwood	Harborough	Hinckley and Bosworth	Melton	North West Leicestershire	Oadby and Wigston
2016	17552	28817	12759	17412	6051	16573	9837
2017	17231	26965	10440	15112	6025	14154	10140
2018	18256	29642	11008	17246	6117	16887	10365
2019	17666	27208	9884	13971	4848	14724	10506
2020	0	0	0	0	0	0	0

- **Age**- Over 65s (vulnerable population) exposure to $PM_{2.5}$and NO_2 exceedances:

Table 10: Sum of over 65 population by year and Leicestershire district where the 95th percentile NO_2 exceeded 40 ugm^3

year	Blaby	Charnwood	Harborough	Hinckley and Bosworth	Melton	North West Leicestershire	Oadby and Wigston
2016	2665	939	0	880	0	661	0
2017	1292	544	0	707	0	0	0
2018	1349	569	0	745	0	0	0
2019	1355	0	0	0	0	0	0
2020	0	0	0	0	0	0	0

Table 11: Sum of over 65 population by year and Leicestershire district where the 95th percentile PM exceeded 10 ugm^3

year	Blaby	Charnwood	Harborough	Hinckley and Bosworth	Melton	North West Leicestershire	Oadby and Wigston
2016	18784	30355	14441	20768	6682	17378	12049
2017	18058	28568	11969	17327	6817	14506	12076
2018	19239	31550	12634	20698	6961	17896	12264
2019	18331	28815	11451	16523	5265	15159	12362
2020	0	0	0	0	0	0	0

- **Deprivation:**

PM2.5

concentrations have generally trended downwards over the study period

It can be seen that for all districts concentrations of fine particulate matter trends upwards with deprivation score.

In 2020, it can be seen that all districts and all neighbourhoods observed an average concentration below the 10 μgm^3 threshold.

Taking the 2019 business as usual case, every district apart from Harborough had some neighbourhoods with concentrations above the 10 μgm^3 threshold. Within the index of multiple deprivation deprived decile, median values above the 10 μgm^3 threshold were observed in Blaby, Charnwood, Hinckley and Bosworth, and Oadby and Wigston (seen by the median line on box plots). These are the districts that are at greatest risk of having fine particulate matter concentrations above safe limits

NO2

NO_2 has decreased yet on year, though at a local level there is volatility.

The results show that Blaby, Charnwood, Harborough, Melton, Oadby and Wigston shows that the most deprived are exposed to lower air pollutant concentrations than the least deprived, where air pollutant concentrations are higher. Typically, the most deprived areas experience higher air pollutant concentrations.

The analysis of Hinckley and Bosworth and North West Leicestershire show an inverse relations, whereby the least deprived are in areas with the higher air pollutant concentrations, and the most deprived neighbourhoods observe the lowest NO2 concentrations

The relationship between pollutant concentrations and IMD may be associated with several variable including income, employment, education, health, crime, barriers to housing and living environment which are used to calculate the IMD, Therefore, there are likely to be number of variables which would contribute to the relationship between air pollution and deprivation.

Around the beginning of the study period, a small number of LSOA's we're close to exceeding Defra's NO_2 annual limit of 40 μgm^3. There were no neighbourhoods which were below the World Health Organisation limit of 10 μgm^3. In 2020 the situation was greatly improved which is likely to be in part to do with COVID-19. Taking the business as usual year 2019, it can be seen that in the most deprived decile (1), neighbourhoods in Blaby, Charnwood and Melton present high inequalities within their regions.

Earthsense Report- Summary of Findings

- **Report recommendations:**

- Link to Net Zero Carbon plans- modal shift work could have a co-benefit to air pollution aswell as climate change, with lower per-capita emissions. The report recommends sustainable, active travel promotion for all age groups to benefit the environment and health in a wider sense (links to physical activity).
- Continue dialogue with mining companies to minimise dust emissions from mining and associated haulage of aggregate.
- Consider education of the farming community could be undertaken to highlight best practice methods of farming practices to reduce exposure of the surrounding community.
- Expanded access to electric vehicle charging infrastructure and work with industry to motivate investment will work to reduce NO_2 in the county. *[N.b. Electric vehicles weigh around 1.5 times more than their combustion engine equivalent35, which may bring changes to the overall composition of fine particulate matter from non-exhaust vehicle sources, namely brake dust and tyre wear.]*

- **Report recommendations:**

- Work with new development on impact assessment and links to harm and mitigation.
- Where school streets may not be able to be imposed, anti-idling campaigns could be established to reduce exposure at congested locations within the community. Living Streets, have published an anti-idling campaign toolkit to support in the introduction of this campaign.
- Domestic wood burning presents a major opportunity, due to its contribution to PM emissions (1/3 of the total-38% of UK total). Public messages on wood burning, harms on the individual and communities should be considered, with the cost of living crisis in mind. To mitigate and reduce the exposure on those situated in areas where wood burning smoke and domestic fuel burners are high, consider information to households of the correct burner and/or fuel to burn (as defined by Defra).

Table 13: Mitigation Measures

Sector	Short-term (One-year)	Medium (Two to Five years)	Long-term (Five+ years)
Travelling via Vehicle	• Car sharing scheme • Active travel education & awareness	• Car sharing incentives • Workplace Parking Levy	• Highways improvements
Travelling to School	• Education about air pollution • Anti-idling campaigns • Walking buses	• School streets	• Automatic anti idling vehicles

- **Report recommendations:**

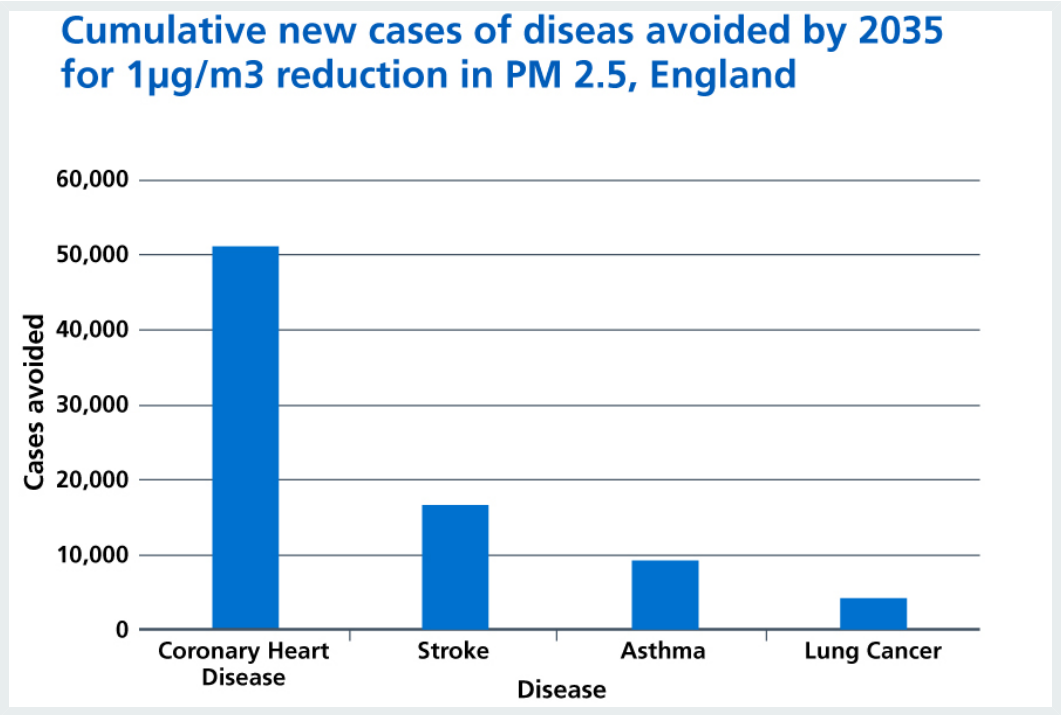
Sector	Short-term (One-year)	Medium (Two to Five years)	Long-term (Five+ years)
Travelling via Bike or Walking	• Leicestershire Cycling & Walking Strategy • Cycle purchasing schemes • Active travel schemes • Choose How You Move awareness	• Park & Ride scheme expansion including Park & Cycle provision • Highways improvement (increased access to cycle lanes) • High pollutant episode alerting & behavioural change advice	• Highways improvements (e.g. increase cycle lanes away from adjacent road networks)
Electric vehicle infrastructure	• Increase vehicle charging infrastructure (including trickle chargers at Park & Ride locations)	• Electric vehicle purchasing & use	
Domestic wood burning	• Education on wood burning stoves • Highlight available guidance & best practice • Education	• Introduction of digital healthcare to promote information	
Industry	• Dust Management & Monitoring Plans • Alerting of exceedances & raising awareness of best practice methods • Promote sustainable delivery options (including pick up of multiple delivery from one central location)	• Retro fitting vehicles • Sustainable delivery options (e.g. last mile collections) • Route optimisation for deliveries	• Centralised fulfilment centres
Farming	• Education • Alerting of exceedances & raising awareness of best practice methods		
Other technologies		• Scenario planning & modelling • Source apportionment analysis • Routing mobile app development	

Notes:

- *Earthsense use high resolution annual average air pollution models which map nitrogen dioxide and PM to a highly validated level of accuracy. The MappAir model was used to analyse trends across districts and LSOAs. This model reports annual average data at 100m x 100m.*
- *The timescale for this report is 2016-2020. For improvement calculations only, 2020 data has been omitted to reflect a 'business as usual' case.*
- *The report identifies the role of vegetation removing air pollutants from the air, and how increased foilage around the roadsides can increase deposition of gases and particulates, citing the GLA 'right infrastructure, right place' workstream as good practice. Links to Value of Trees project?*

Air pollution

2.21. **While wider action on air pollution is for government to lead, the NHS will work to reduce air pollution from all sources. Specifically, we will cut business mileages and fleet air pollutant emissions by 20% by 2023/24.** Almost 30% of preventable deaths in England are due to non-communicable diseases specifically attributed to air pollution. More than 2,000 GP practices and 200 hospitals are in areas affected by toxic air [42]. In 2017, 3.5% (9.5 billion miles) of all road travel in England was related to patients, visitors, staff and suppliers to the NHS [43]. At least 90% of the NHS fleet will use low-emissions engines (including 25% Ultra Low Emissions) by 2028, and primary heating from coal and oil fuel in NHS sites will be fully phased out. Redesigned care and greater use of 'virtual' appointments as set out in Chapter One will also reduce the need for patient and staff travel.



and outcomes
Chapter 4: NHS staff will get the backing they need
Chapter 5: Digitally-enabled care will go mainstream across the NHS
Chapter 6: Taxpayers' investment will be used to maximum effect
Chapter 7: Next steps
Appendix
Glossary of terms

References

42. British Lung Foundation (2018) Toxic air at the door of the NHS. Available from: https://www.blf.org.uk/take-action/campaign/nhs-toxic-air-report

43. Sustainable Development Unit (2018) Natural Resource Footprint. Available from: https://www.sduhealth.org.uk/policy-strategy/reporting/natural-resource-footprint-2018.aspx