

## Lambeth Air Quality Monitoring

## Love Lambeth Air

## **Initial Project Report**





This interim report has been produced by Mapping for Change for Lambeth Council. It has been developed as part of a six month project led by Mapping for Change to engage local residents in Lambeth with the view to increase public understanding about air pollution, its causes, and effects and how concentrations vary both spatially and from day to day. Copies of this report can be obtained from Mapping for Change. Text copyright Mapping for Change. This material is made available for public use subject to acknowledgement being made of the source and its availability directly from Mapping for Change.



## Acknowledgements

We would like to thank all of the community members who are participating in this project, and whose work is used as examples here to help others learn how they can use a citizen science approach to monitor and map local air quality in their own community.

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#### Introduction

Local authorities around the UK regularly monitor air quality to assess compliance with air quality objectives and to measure the effectiveness of plans and programmes to reduce levels of air pollution. However, the collection and analysis of data is a costly process. As such, the majority of monitoring undertaken by local authorities is limited to collecting data from a few static sites within their jurisdiction. These data are then extrapolated using complex models to infer what pollution levels are in areas where there is no data. Whilst this offers an indication of local air quality, it is unable to create an accurate picture at a scale which the public may relate to or find useful on a day-to-day basis, particularly if they are seeking to reduce their exposure to poor air quality.

To establish the variability of air quality at a smaller scale the London Borough of Lambeth commissioned *Love Lambeth Air*, a six month project running from October 2016 to April 2017, led by Mapping for Change. The aims of this project are to obtain a better understanding of hyper-local air quality conditions around the borough and to raise awareness of local and wider air quality issues among the residents. A citizen science approach has been adopted which enables local residents, many of whom have not been involved in a project of this kind before, to carry out grassroots data collection.

Participating residents and businesses have been given diffusion tubes to measure nitrogen dioxide outside their home or office over the course of six months.

Currently there are only three static air quality monitoring stations across Lambeth borough and as such, the project offers an opportunity for local people to get a better understanding, based on hard data, as to the air quality in their neighbourhood.

Every month participants will change the diffusion tube outside their home or office and return the old tube to Mapping for Change. Mapping for Change will send the tube to the lab for analysis and the results will be made available on the <u>Community Air Quality Map</u>.

The idea is that the community will benefit from a raised awareness about air quality issues and the health impacts of air pollution, and how they can take steps to reduce their personal exposure to airborne pollutants. Moving forward it is hoped that they will also benefit from the opportunity to voice support for increased local action.

#### **Project aims:**

- To give local residents a clearer picture of local air quality
- Discover how to reduce your exposure to poor air quality
- Collect data to help inform policy
- To give community members accurate and relevant local data with which to constructively influence/call for change





The images below (Figure 1) show an example of Community Maps, Mapping for Change's platform for participatory mapping. The maps posted here show air quality monitoring across London. Data from the monitoring sites across Lambeth will be input each month onto the Community Air Quality Map for participants of the project to see and the results can then be shared with the wider community. The categories below show the results of each measurement in relation to the EU legal limits.







^ Categories				
🗹 To	ggle all			
	NO <sup>2</sup> (<40) Below EU Limits			
@ 🙋	NO <sup>2</sup> (40-60) Above EU Limits			
	NO <sup>2</sup> (60-80) 50% Above EU Limits			
	NO <sup>2</sup> (80-100) 100% Above EU Limits			
	NO <sup>2</sup> (100+) 150% Above EU Limits			

# Figure 1. (a) Community Air Quality Map with (b) individual measurements depicted by coloured icons and (c) categories based on EU legal limits for nitrogen dioxide

The air quality monitoring map can be found here: https://communitymaps.org.uk/project/air-quality-monitoring.

#### Methodology

#### **Diffusion Tubes**

For this project diffusion tubes which are designed for the passive monitoring of gaseous airborne Nitrogen Dioxide (NO<sub>2</sub>) will be used. The diffusion tubes are made from clear plastic, with a rubber stopper at each end. A steel mesh coated with a chemical called triethanolamine (TEA) is located at one end of the tube. This absorbs nitrogen from the air when the stopper at the other end of the tube is removed, allowing air in. Laboratory analysis provides the average concentration of the pollutant in the air over the period that the tube was exposed. Over the course of the six months measurements will be calculated to provide a monthly mean measurement for each location and a half yearly mean for each.

Diffusion tubes are one of the most common, simplest and well-proven methods for measuring NO<sub>2</sub>. They are very useful for identifying areas of high NO<sub>2</sub> concentration, particularly when dealing with sources such as traffic and vehicle emissions. The measurements collected using this method are also comparable with local council data and can be used for indicative comparison with the Air Quality Strategy Objectives based on the annual mean.





Figure 2. Images depicting three monitoring sites hosting diffusion tubes to monitor nitrogen dioxide



#### Lambeth Sites

The maps below show the location of the sites chosen by participants in this project across the borough of Lambeth. There are currently thirty-four sites across Lambeth.



Figure 3. Map depicting Lambeth monitoring sites in the north of Lambeth



Figure 4. Map depicting Lambeth monitoring sites in the south of Lambeth



Site	Location in Lambeth			
number				
1	National Theatre, Stage Door Avenue off Upper Ground, London SE1 9PX			
2	Corner of concert hall approach opposite the Imax, Waterloo			
3	St John's Church, 73 Waterloo Rd, London SE1 8TY			
4	Stamford Street, London, SE1 9NH			
5	Young Vic, 66 The Cut, London SE1 8LZ			
6	Baylis Road, London SE1 7AA			
7	Outside Cubana, Lower Marsh, London SE1 7RG			
8	Walpole House, 126 Westminster Bridge Road, SE1 7UN			
9	Kennington Rd, London SE1 7BL			
10	The Clarence Centre, 6 St George's Circus, London, SE1 6FE			
11	Near Eden Caterers, 199 Hercules Road, London SE1 7LD			
12	Corner of Renfrew Road and Gilbert Road, SE11 4NL			
13	Kennington Park Road, SE11 4DJ			
14	Harleyford Road, SE11			
15	The Cut, London, SE1 8LN			
16	Bonnington Square, SW8 1TG			
17	Pearman Street, SE1 7RB			
18	Kennington Ln, Lambeth, London SE11 4HP			
19	The Greenhouse, Myatt's Fields Park, Cormont Road, London, SE5 9RA			
20	Mayflower Road, SW9 9JY			
21	Stockwell Road, SW9 9TG			
22	Alleyway by Canterbury Court junction with Brixton Road, SW9			
23	Wanless Road, Herne Hill, SE24 0HW			
24	Third floor roof garden, The Whitehouse Apartments, 9 Belvedere Road, SE1 8YS			
25	Barnwell Road, SW2 1PN			
26	Brixton Water Lane, Brixton, SW2 1NG			
27	Trouville Road, SW4 8QW			
28	Christchurch Road, SW2 3EY			
29	Daysbrook Road, Streatham Hill, London, SW2 3TH			
30	Oasis School Playground fence, Baylis Road, SE7 7AY			
31	Dingley Lane, SW16, leading to primary school			
32	Knights Hill, London SE27 0HS			
33	Gipsy Road, SE27 9RE			
34	Westminster Bridge Road (under railway bridge), SE1			

The table below provides a more detailed explanation of the site locations:



#### Results so far

The figures presented below show the results of the NO<sub>2</sub> monitoring so far for all 34 sites across Lambeth. Some of the figures show a comparison of the sites across location and across the three months of data already collected. The EU legal limit of 40  $\mu$ g/m3 (annual mean) is highlighted in all figures.



Figure 5. Shows the results for Nov, Dec and Jan of the nitrogen dioxide (NO<sub>2</sub>) monitoring in Lambeth. The EU legal limit of 40  $\mu$ g/m3 (annual mean) is highlighted.



Figure 6. Shows the nitrogen dioxide (NO<sub>2</sub>) monitoring results for sites in the North of Lambeth, including areas such as Waterloo, Kennington and Vauxhall. The EU legal limit of 40 μg/m3 (annual mean) is highlighted.



Figure 7. Shows the nitrogen dioxide (NO<sub>2</sub>) monitoring results for sites in the South of Lambeth, including areas such as Brixton, Clapham, Streatham and West Norwood. The EU legal limit of 40 μg/m3 (annual mean) is highlighted.











## Training Workshops

At the start of the project there were two days of training workshops which took place on Thursday 20th and Friday 21st October 2016. These training sessions gave participants the opportunity to learn more about the project, during which they were shown how to carry out the monitoring using diffusion tubes and were given their first months monitoring equipment.

In total 22 participants attended the training sessions and those unable to attend were provided with the materials and information via email, post and face-to-face meetings.

On completion of the monitoring over the next six months a further workshop will be held to share and discuss the monitoring results. This will include a discussion on ways to help improve air quality and reduce personal exposure and explore steps for further action.

#### Next steps

Monitoring commenced on 26<sup>th</sup> October for the month of November. The diffusion tubes need to be changed monthly on the dates in the table below. We are currently halfway through the monitoring period.

Year	Month	Start Date	Duration (weeks)
2016	November	26-Oct	5
	December	30-Nov	5
2017	January	04-Jan	4
	February	01-Feb	4
	March	01-Mar	4
	April	29-Mar	4
	May	26 April	5

#### NITROGEN DIOXIDE DIFFUSION TUBE MONITORING

CALENDAR OF SUGGESTED EXPOSURE PERIODS 2016-17

Tubes should be changed on the specified date.

Once all the diffusion tubes are collected each month they are then sent off to the laboratory for analysis. The results will be posted on Community Maps Air Quality Map monthly and distributed to participants, local stakeholders and project partners.

#### Feedback Event

To conclude the six months of data collection and air quality monitoring in Lambeth we are holding a feedback event for participants and stakeholders. Here we will have the opportunity to discuss results and ways to help improve air quality and reduce personal exposure.