Breathe Clean

Brent Council's school air quality monitoring and education programme

Breathe Clean is Brent Council's air quality education and monitoring programme, which serves to:

- measure nitrogen dioxide (NO_2) pollution concentrations;
- educate children about air quality; and
- engage with schools about what they can do to limit their exposure to air pollution and minimise their air pollution impact.

The programme provides an excellent baseline of air quality data and engagement with schools in order to support the implementation of measures such as Healthy School Streets, green screens and renewed focus on School Travel Plan measures.

The *Breathe Clean* programme follows the Mayor's School Air Quality Audit Programme, which delivered air quality audits at 50 London schools in order to reduce school emissions and children's exposure to polluted air. This included audits at two Brent schools: Ark Franklin Primary Academy and John Keble Church of England Primary School. Breathe Clean was designed to provide the benefits of the Mayor's programme in a format which can easily be scaled up to all participating schools in Brent, with an additional focus on education and engagement.

For the full details of the *Breathe Clean* programme, please refer to the detailed report (October 2020).

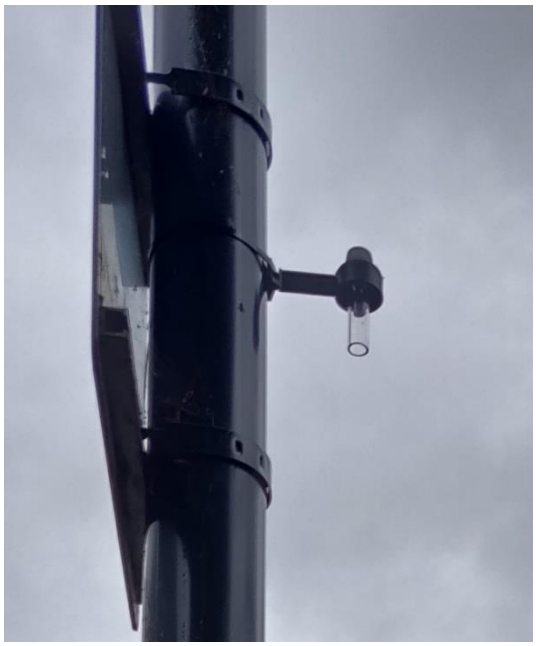
Key achievements

- 78 schools had their air pollution monitored outdoors and inside school buildings, with a total of 572 air quality monitoring diffusion tubes installed and analysed between late 2018 and early 2020;
- NO_2 results demonstrated higher concentrations of NO_2 near sources of air pollution, such as roads and railways; and lower concentrations of NO_2 near green spaces and inside school buildings
- 80 schools across Brent participated in air quality assemblies and air quality monitoring, with positive feedback from school staff and students;
- 157 'No Idling' signs installed across 93 schools and anti-idling engagement with drivers outside school gates

Air quality monitoring

We provided detailed NO_2 air pollution monitoring at an average of 7.3 locations indoors and outdoors at each school, in order to provide a precise analysis of the levels of air pollution where children spend time. To monitor NO_2 we chose to use diffusion tubes consisting of 20% TEA (Triethanolamine) in water due to their affordability, relative accuracy and simplicity to use. They are suitable for children to handle and are an excellent tool for air quality education. Tubes were in place for up to four weeks as per manufacturer's instructions. While the data gathered do not demonstrate exceedance of the UK annual NO_2 concentration limit, they do provide an indication of which locations require attention and resources focussed.

A diffusion tube installed using a spacer and placed in freely-circulating air



MP Smarter Travel consultants installing tubes with pupils

Key findings from NO_2 monitoring

The UK legal limit for annual mean NO_2 concentrations is 40µg/m³. The monitoring showed that 37% of schools showed at least one reading above 40µg/m³. Overall, 8% of diffusion tubes were above 40µg/m³. The key findings from the air pollution monitoring are shown in the table below.[1]

Statistic	Result
Total # of schools with AQ monitoring	78
Total # of tubes analysed	572
Total # of readings above 40µg/m³	62 (8%)
Total # of schools with at least 1 tube above 40µg/m³	29 (37%)
Total # of schools with playground readings above 40µg/m³	17 (22%)
Highest indoor NO_2 reading	50.1 µg/m³
Average indoor NO_2 reading	21.7 µg/m³
Lowest indoor NO_2 reading	1.9 µg/m³
Highest outdoor NO_2 reading	49.4 µg/m³
Average outdoor NO_2 reading	32.1 µg/m³
Lowest outdoor NO_2 reading	6.0 µg/m³
Average playground NO_2 reading	32.0 µg/m³
Average roadside NO_2 reading	34.6 µg/m³
Average NO_2 reading (indoor and outdoor)	29.2 µg/m³
Average margin of error in control tubes	±1.3 µg/m³

[1] While the data gathered over several weeks cannot demonstrate exceedance of the UK and EU annual concentration limit, they can provide an indication of which location requires attention/ resources focussed.

Air pollution maps

One of the key outputs from the *Breathe Clean* programme was a detailed air quality map for each school, showing NO_2 concentrations at each monitoring location. These maps demonstrated that NO_2 air pollution is a localised phenomenon, with higher concentrations of air pollution found close to sources of pollution, such as such as roads and railways; and lower concentrations of NO_2 near green spaces and inside school buildings.

These maps helped children visualise the localised nature of NO_2 pollution, and allowed their hypotheses about how NO_2 disperses to be tested and observed. An example of an air pollution map for Sudbury Primary School is shown below.

An example of a school air pollution map

Air quality education

We delivered a series of two air quality assemblies at a total of 80 schools. The content of these assemblies covered London's current air quality, methodologies for measuring air quality and ways of combatting pollution.

Assembly 1 – About air pollution

The first assembly gave a broad introduction to air pollution and its effects on the environment and all living things. Key elements of the presentation include defining air pollution, explaining how it is measured, and demonstrating that nitrogen dioxide levels vary across London.

Delivering an assembly at Ark Franklin Primary Academy

A screen shot from the Assembly 1 presentation

Following the first assembly, children helped install air quality monitoring diffusion tubes at indoor and outdoor locations. Children were responsible for logging the tube reference number and placement location. At each school, two tubes were placed side-by-side to calculate the consistency of results. The test tubes remain open for a period of 4-6 weeks. After which we collected the test tubes to be sent to Gradko Labs for analysis.

An example tube reference table filled out by students

Tube	Tube Ref (On tube's label)	Location (Indoor/Outdoor/Room number)
A	1285888	Outdoor carpark
B	1285835	Outdoor Carpark
C	1285863	~~bathroom~~ outdoor - lunch club garden.
D	1285848	Indoor hallway
E	1285871	Outdoor KS1 playground
F	1285854	Outdoor mugs
G	1285879	~~Outdoor~~ Outdoor mugs
H	1285890	Dep. Office
I	1285842	Headteachers office
J		
Date of installation: 8/1/19		
Time of installation: 11:30 - 12:00		
White cap location: Reception desk draw.		

Assembly 2 – mitigating air pollution and minimising exposure

The second assembly introduced community-level solutions to London's air quality crisis. Solutions include walking and cycling, reducing engine idling, installing green screens, and building community awareness of air quality issues. We emphasise to students that they have the ability (and responsibility) to improve their local air quality.

In these assemblies we also showed the air pollution results, and compared the air pollution levels with children's hypotheses about concentrations at the different placement locations across school grounds. We also showed air pollution concentrations in Brent more broadly, introducing students to heat mapping.

London Air Annual NO_2 map, showing the Brent area

Air quality engagement

Air quality engagement refers to working with schools to discuss actions they can take to mitigate their impact on air pollution, and to minimise their exposure. This consists of topics covered in assembly 2, the installation of 'No Idling' signs, and anti-idling engagement.

No Idling signs

Idling refers to running a vehicle's engine when the vehicle is not in motion. Unless a vehicle is in traffic, idling an engine for more than a few seconds is an unnecessary cause of air pollution. The *Breathe Clean* programme addressed engine idling in near schools in order to reduce children's exposure to vehicle exhaust.

As part of the programme, we installed 157 'No Idling' signs outside 93 schools in Brent. The signs are A3 size, 3mm thick, and made of weatherproof material.

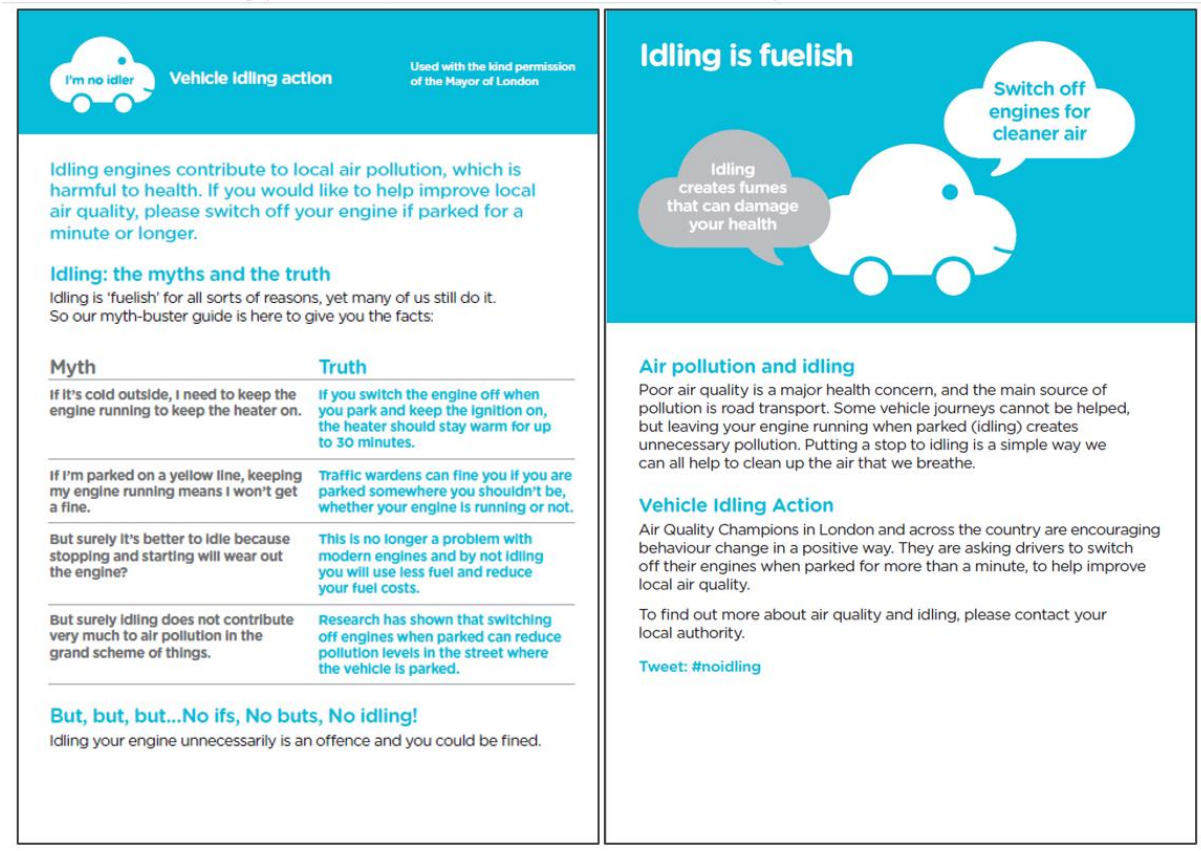
'No Idling' sign including examples of signs installed outside schools

Anti-idling engagement

Brent Council officers and MP Smarter Travel also subsequently took part in *idling action* volunteer work, which was supported by The Idling Action Project. Working in pairs, volunteers asked members of the public who were idling to switch off their engines. A Brent Council civil enforcement officer was present to give tickets to any drivers who refused to switch off.

In addition to idling engagement, Idling Action work included air quality engagement students including a large outdoor air pollution 'snakes and ladders' game and 'smoothie bike'.

Idling Action leaflet



I'm no idler

Vehicle idling action

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Idling engines contribute to local air pollution, which is harmful to health. If you would like to help improve local air quality, please switch off your engine if parked for a minute or longer.

Idling: the myths and the truth

Idling is 'fuelish' for all sorts of reasons, yet many of us still do it. So our myth-buster guide is here to give you the facts:

Myth	Truth
If it's cold outside, I need to keep the engine running to keep the heater on.	If you switch the engine off when you park and keep the ignition on, the heater should stay warm for up to 30 minutes.
If I'm parked on a yellow line, keeping my engine running means I won't get a fine.	Traffic wardens can fine you if you are parked somewhere you shouldn't be, whether your engine is running or not.
But surely it's better to idle because stopping and starting will wear out the engine?	This is no longer a problem with modern engines and by not idling you will use less fuel and reduce your fuel costs.
But surely idling does not contribute very much to air pollution in the grand scheme of things.	Research has shown that switching off engines when parked can reduce pollution levels in the street where the vehicle is parked.

But, but, but...No ifs, No buts, No idling!

Idling your engine unnecessarily is an offence and you could be fined.

Idling is fuelish

Switch off engines for cleaner air

Idling creates fumes that can damage your health

Air pollution and idling

Poor air quality is a major health concern, and the main source of pollution is road transport. Some vehicle journeys cannot be helped, but leaving your engine running when parked (idling) creates unnecessary pollution. Putting a stop to idling is a simple way we can all help to clean up the air that we breathe.

Vehicle Idling Action

Air Quality Champions in London and across the country are encouraging behaviour change in a positive way. They are asking drivers to switch off their engines when parked for more than a minute, to help improve local air quality.

To find out more about air quality and idling, please contact your local authority.

Tweet: #noidling

Idling Action team

Outdoor air pollution 'snakes and ladders' game