



Measuring the Air Quality Changes Arising from the LEZ

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Measuring the AQ changes arising from the LEZ

Second major intervention study within London

Learn the lessons of the CCS study

Establish a monitoring programme to best identify and explain the effects of the LEZ

Where to monitor?

What to monitor?





Rationale – Where?

Utilise the LAEI modelling runs carried out by ERG.

Difference plot outputs of preferred scenario (Euro IV for PM_{10} and NO_x 2010 using 2002 meteorology).

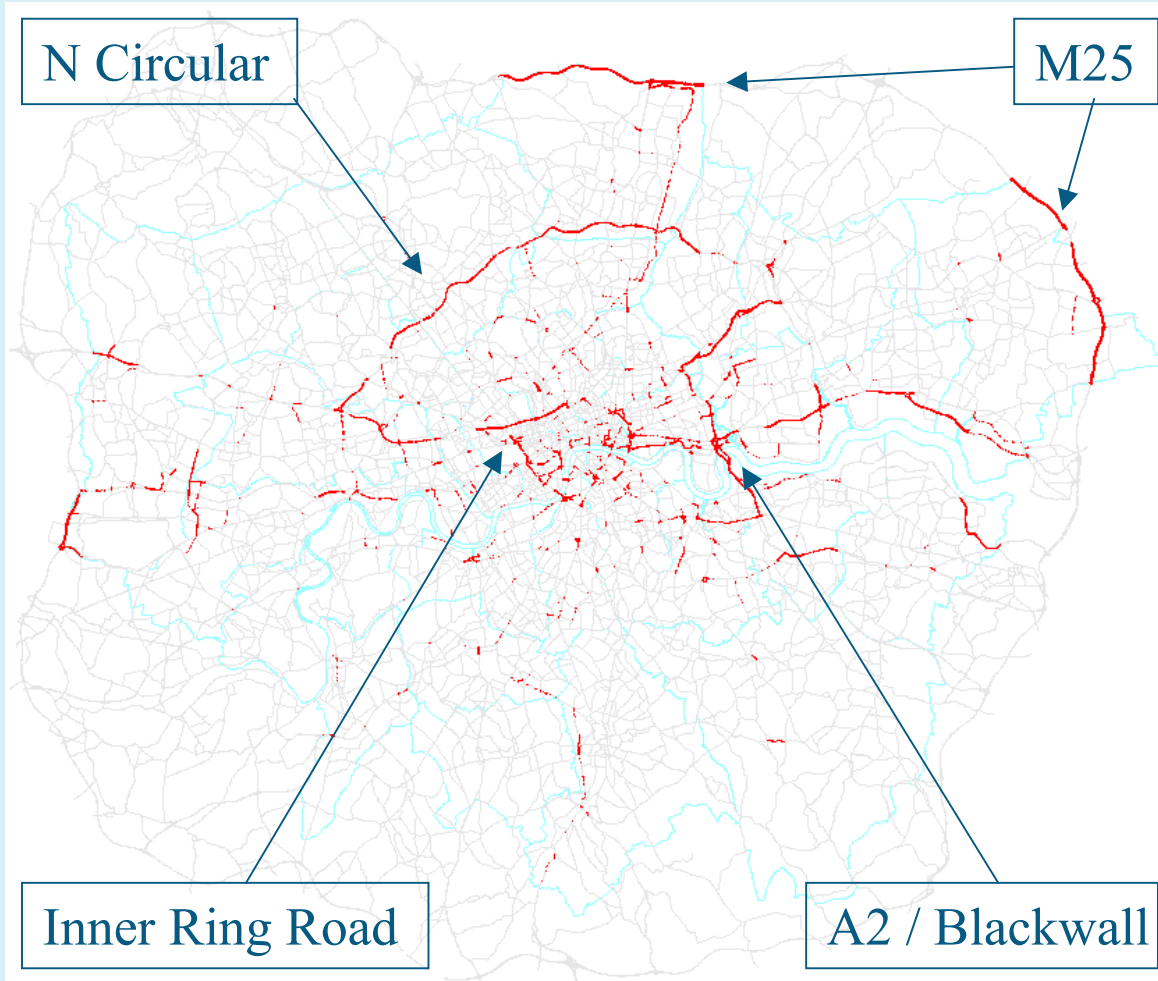
$3\mu g m^{-3}$ difference contour isolated to used to identify 'hot spots' where the greatest change is predicted.

Good overlap with existing monitoring sites – six key locations identified and a number of 'gaps'.

Recommendations for the location and nature of additional monitoring made to TfL.

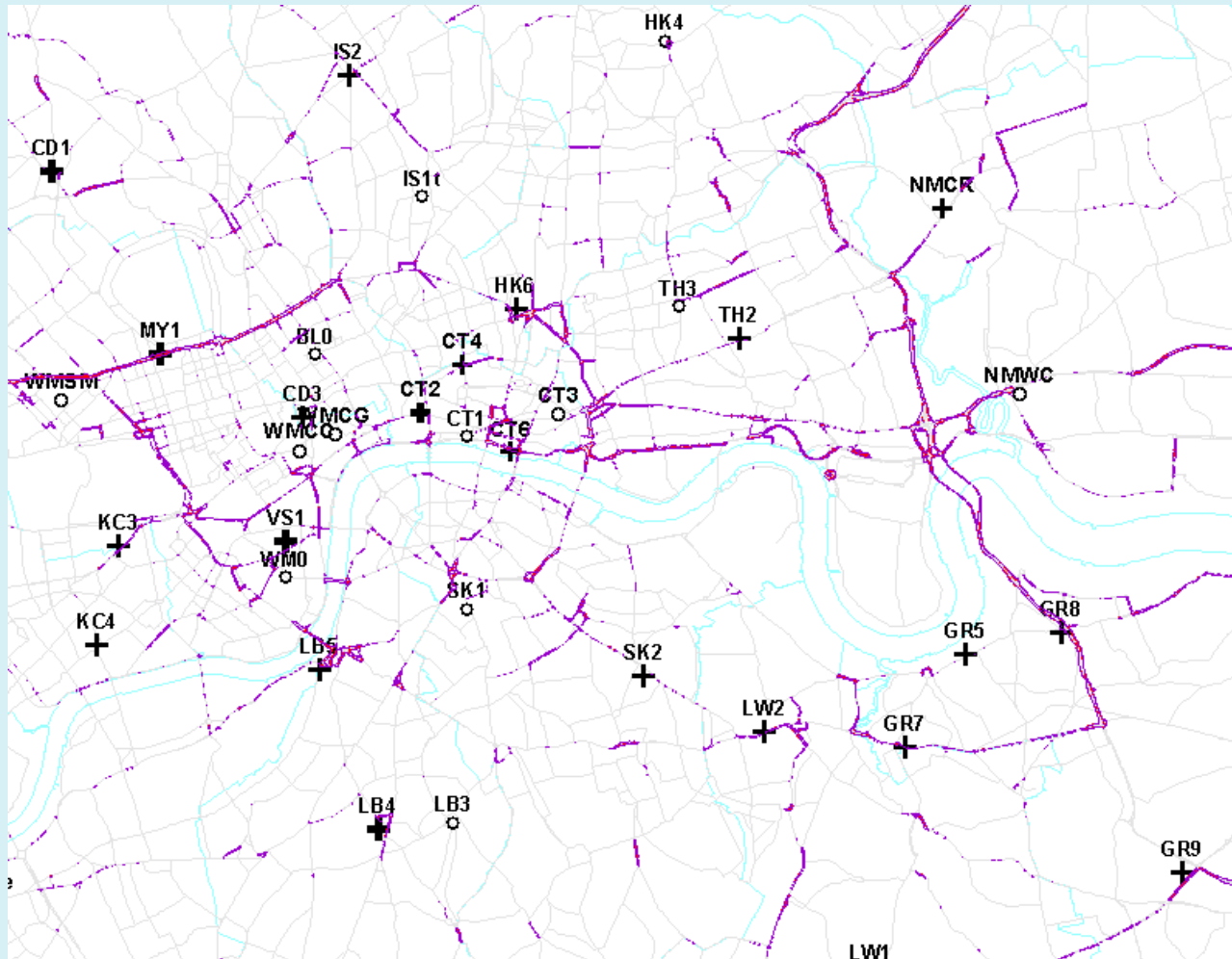
Additional equipment funded by TfL and installed during 2006.





Difference plot for 2010 annual mean PM₁₀ & NO₂ using 2002 meteorology within and including the M25 showing 3µgm⁻³ difference contour.





Difference plot detail showing position of existing monitoring sites in relation to 'hot spot' contour





Rationale – What?

HGV & LGV-related pollutants

Secondary pollutants (O_x)

*Effects of vehicle age, emissions abatement
technology*

Future proofing – preparing for unknowns

Detailed vehicle flow information





The Key LEZ Monitoring Sites

Six roadside sites identified as falling within 'hot spot' locations representative of the LEZ area:

- Marylebone Road, Westminster (Central)
- Old Street, Hackney (Central)
- A206 Cray, Bexley (East)
- A2 / South Circular Interchange, Greenwich (South East)
- Woolwich Flyover (A2), Greenwich (South East)
- North Circular, Brent (North West)

One new roadside site to improve coverage in the north east:

- Blackwall Tunnel Northern Approach, Tower Hamlets





The Key LEZ Monitoring Sites

All seven sites monitor:

- NO_x/NO_2
- O_3
- PM_{10} , $\text{PM}_{2.5}$ (TEOM or FDMS)

In addition five sites have collocated wind sensors

Traffic count loops have been installed in all lanes adjacent to the monitoring sites

Condensing particle counters (CPCs) and Black Smoke Aethelometer installed at three sites.

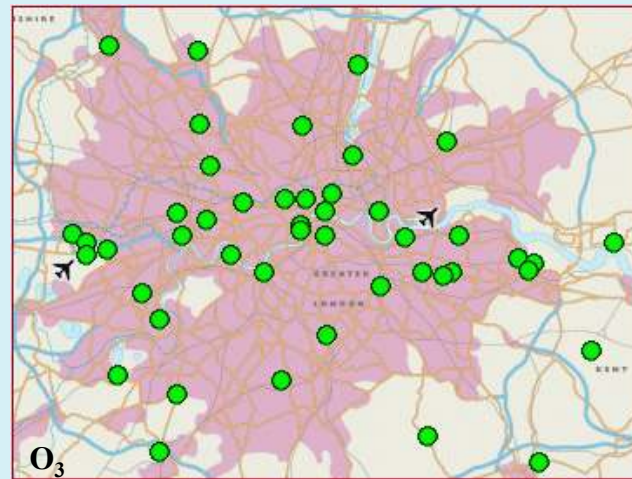
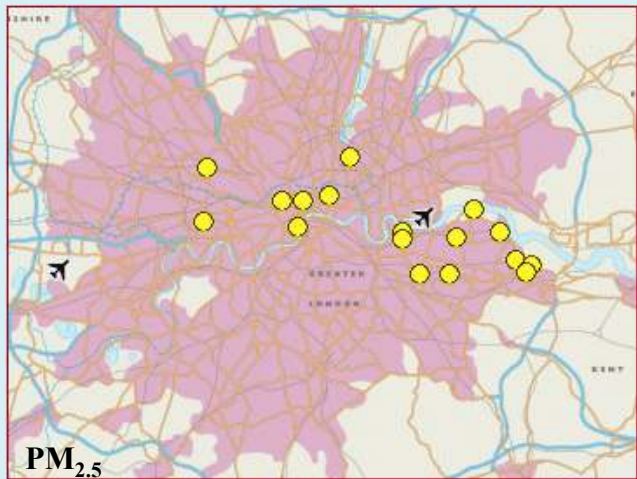
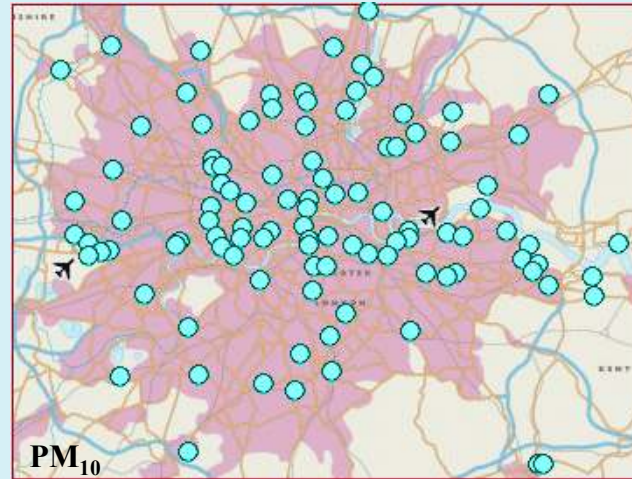
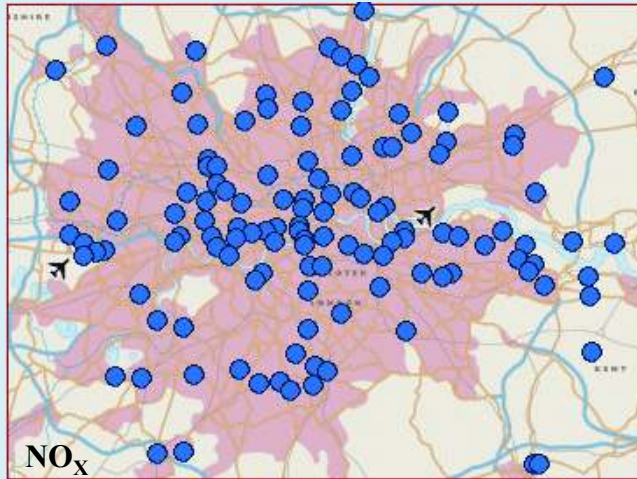
All TEOM filters stored for toxicity analysis and future-proofing





Site name and location	Parameters monitored
Marylebone Road, Westminster	FDMS PM ₁₀ , PM _{2.5} , P _{NUM} , BSmoke, NO _x , O ₃ , CO, SO ₂ , Hydrocarbons, traffic count, met.
Old Street, Hackney	PM ₁₀ , PM _{2.5} , NO _x , O ₃ , traffic count
A206 Cray, Bexley	FDMS PM ₁₀ , FDMS PM _{2.5} , NO _x , O ₃ , traffic count, met.
Westhorne Avenue (A2 / South Circular Interchange), Greenwich	FDMS PM ₁₀ , FDMS PM _{2.5} , NO _x , O ₃ , traffic count, met.
Woolwich Flyover (A2), Greenwich	PM ₁₀ , PM _{2.5} , NO _x , O ₃ , traffic count
North Circular (Ikea), Brent	PM ₁₀ , PM _{2.5} , NO _x , O ₃ , SO ₂ , P _{NUM} , BSmoke, traffic count, met.
Blackwall Tunnel Northern Approach, Tower Hamlets	FDMS PM ₁₀ , FDMS PM _{2.5} , P _{NUM} , BSmoke, NO _x , O ₃ , traffic count, met.





Distribution of NO_x, PM₁₀, PM_{2.5} and O₃ continuous monitoring in the LEZ area within the LAQN database as of September 2006 (all site classifications).





Traffic monitoring

A neglected parameter in London?

Few ATCs collocated with monitoring sites.

ATCs installed with 'LEZ' configuration to better distinguish the 3.5t HGV/LGV split:

- Class 1 - 0 - 5.2m (cars or short LGVs)
- Class 2 - 5.2 - 6.3m (LGVs ~2% error)
- Class 3 - 6.3 - 12m (HGVs ~2% error)
- Class 4 - 12m+

Also 9 speed classes and total flow.

Data integrated into LAQN database for direct comparison.





The Future...

Baseline monitoring commenced March 2006 or earlier at existing sites, September 2006 at Blackwall Tunnel.

Statistical analysis methods being developed and the CCS study.

Toxicological analysis has also started.





Acknowledgements

TfL for funding the study and additional monitoring.

London Boroughs of Hackney, Brent and Greenwich for agreeing to host the additional analysers within their sites.

