

Strand 1: Observations

Prof. Lee Chapman

WM-AIR
CLEAN AIR SCIENCE FOR
THE WEST MIDLANDS



Air Quality Observations

- Aim was to increase the observational capability of air pollution across the West Midlands
- Using a variety of techniques to complement existing capacity:
 - Low Cost Sensors (UoB)
 - Procured 'off the shelf' sensors
 - High time resolution PM2.5 composition / size distribution observation
 - Daily PM2.5 composition for source apportionment

Sensors



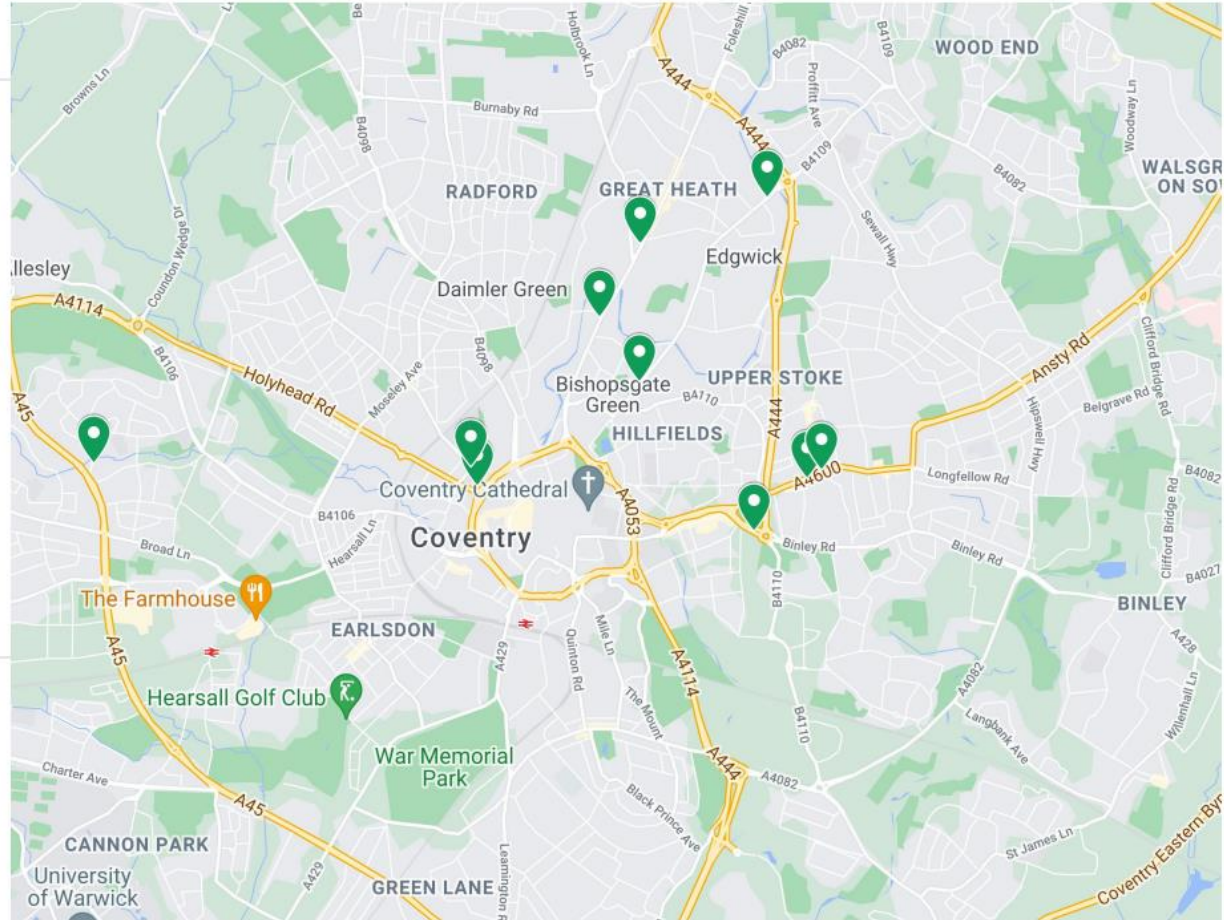
Sensor Locations

Coventry Locations

AltasensePM

Untitled layer

- St Osburgs
- Coundon Rd/Upper Hill Street
- Binley Road nr AURN
- Alleseley AURN
- Foleshill rd/Cash In
- Foleshill rd
- Stoney Stanton Eagle St E
- Stoney Stanton Gallagher Retail Park
- Walsgrave rd/Clay In
- Walsgrave rd



Sensor Locations

Birmingham Sensor Locations

CAZ

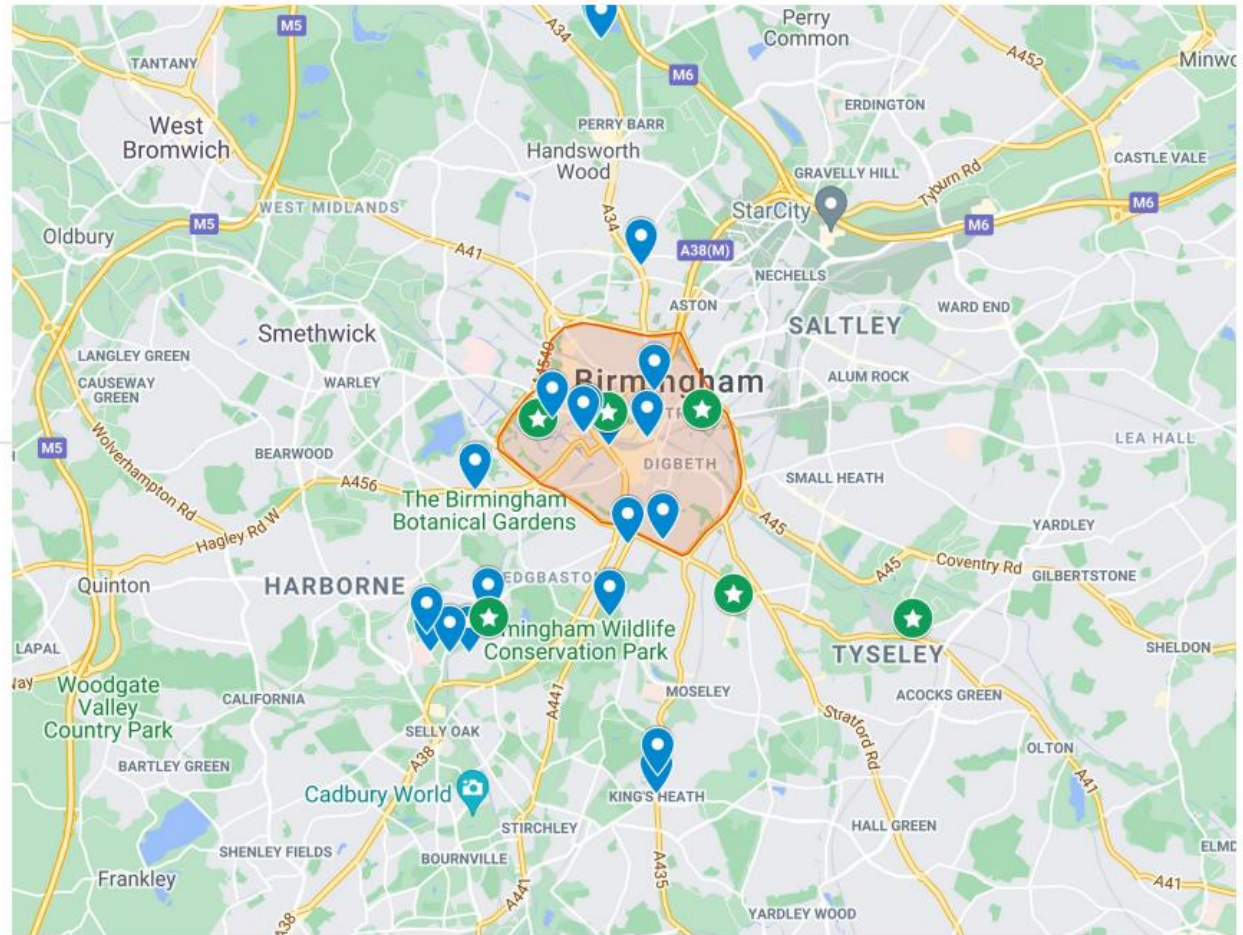


AltasensePM

- Ladywood
- Tyseley Redfern
- Eastside City Park
- BAQS
- Ladypool Rd
- Newhall St

Zephyrs

- BAQS
- Geography Building
- QE Main Entrance
- University Station
- Women's Hospital
- Pershore Rd
- Horton Sq
- Town Hall Car Park
- New Street
- Children's Hospital
- A34
- Summer Hill St
- Hagley Rd



Birmingham Urban Observatory

data.birminghamurbanobservatory.com/map/platforms



Birmingham Urban Observatory

Map

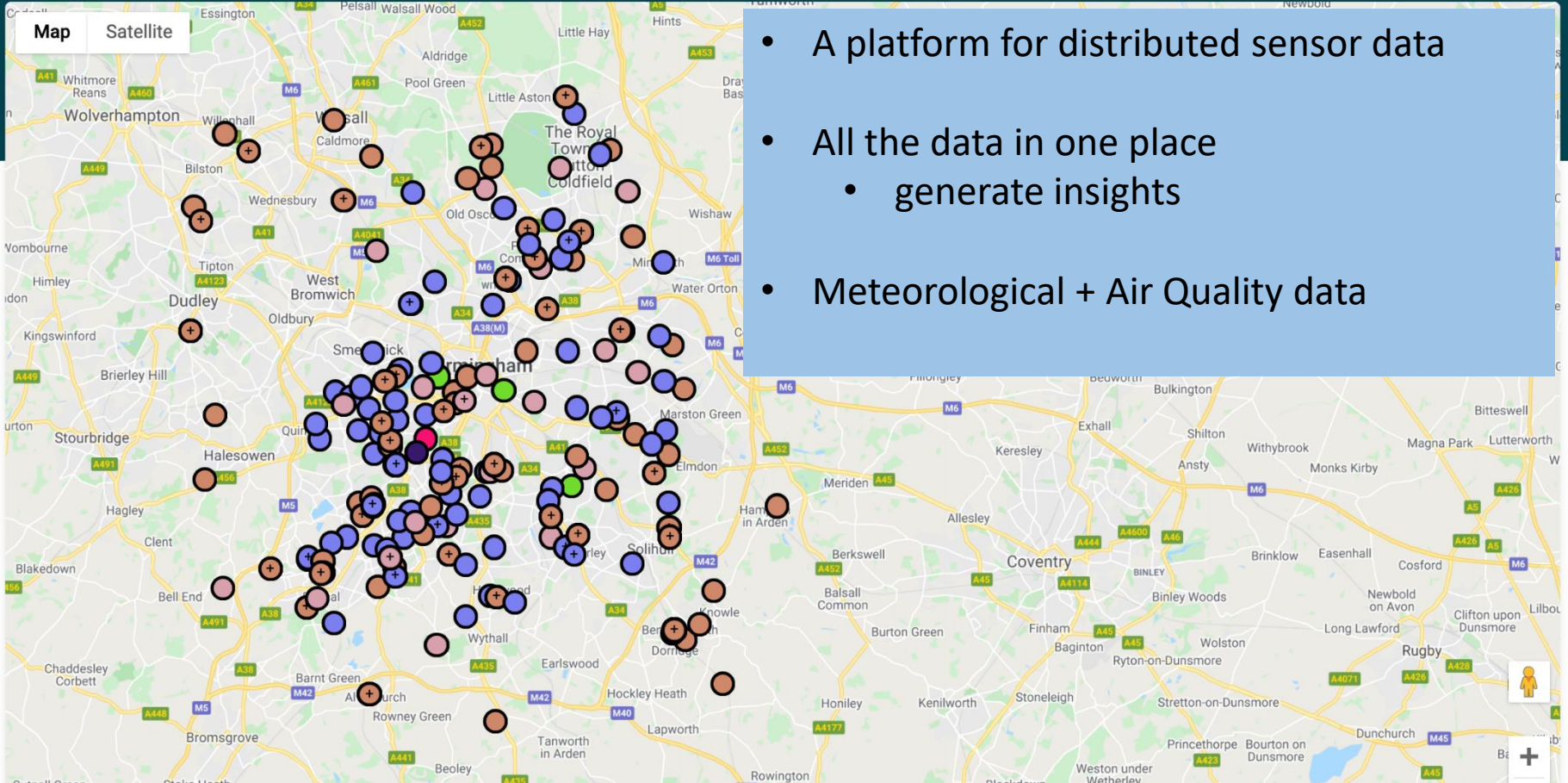
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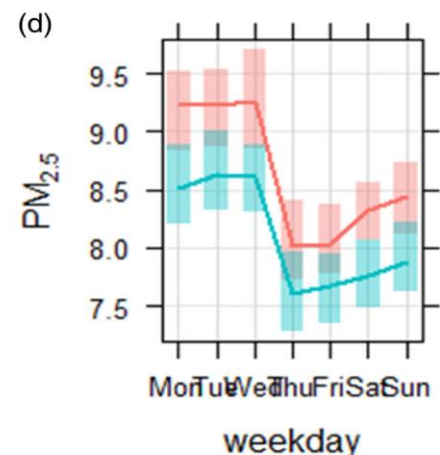
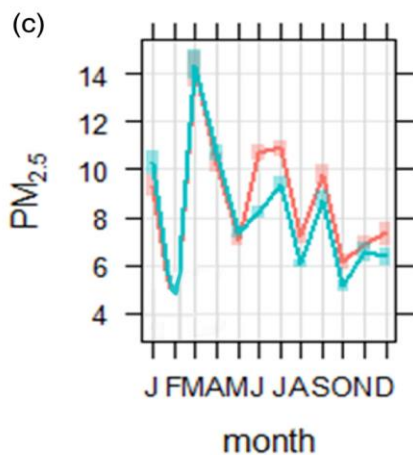
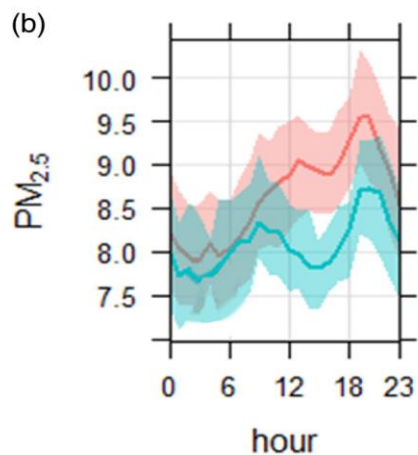
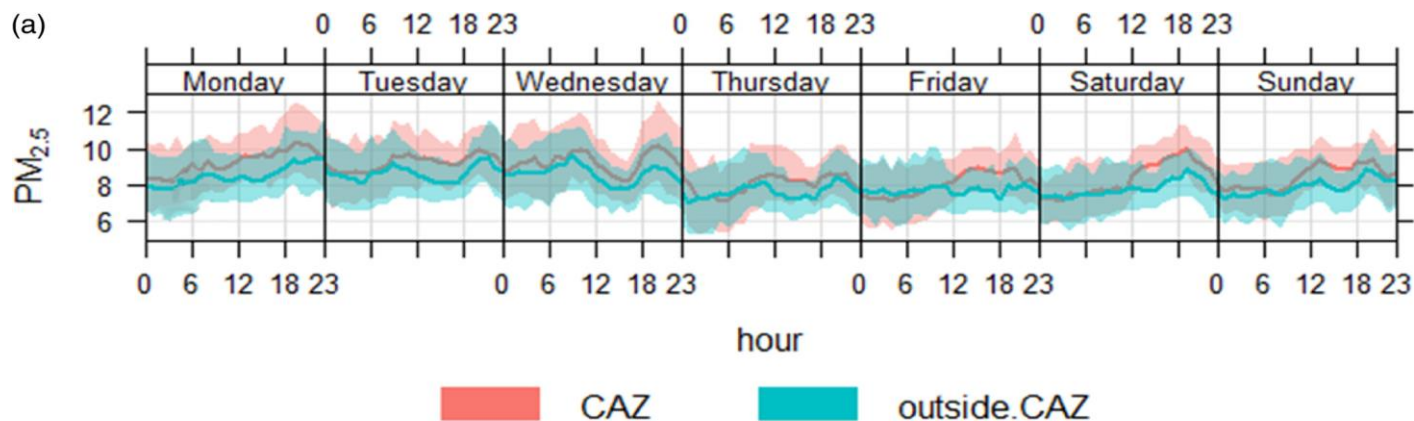
Sensor Platforms



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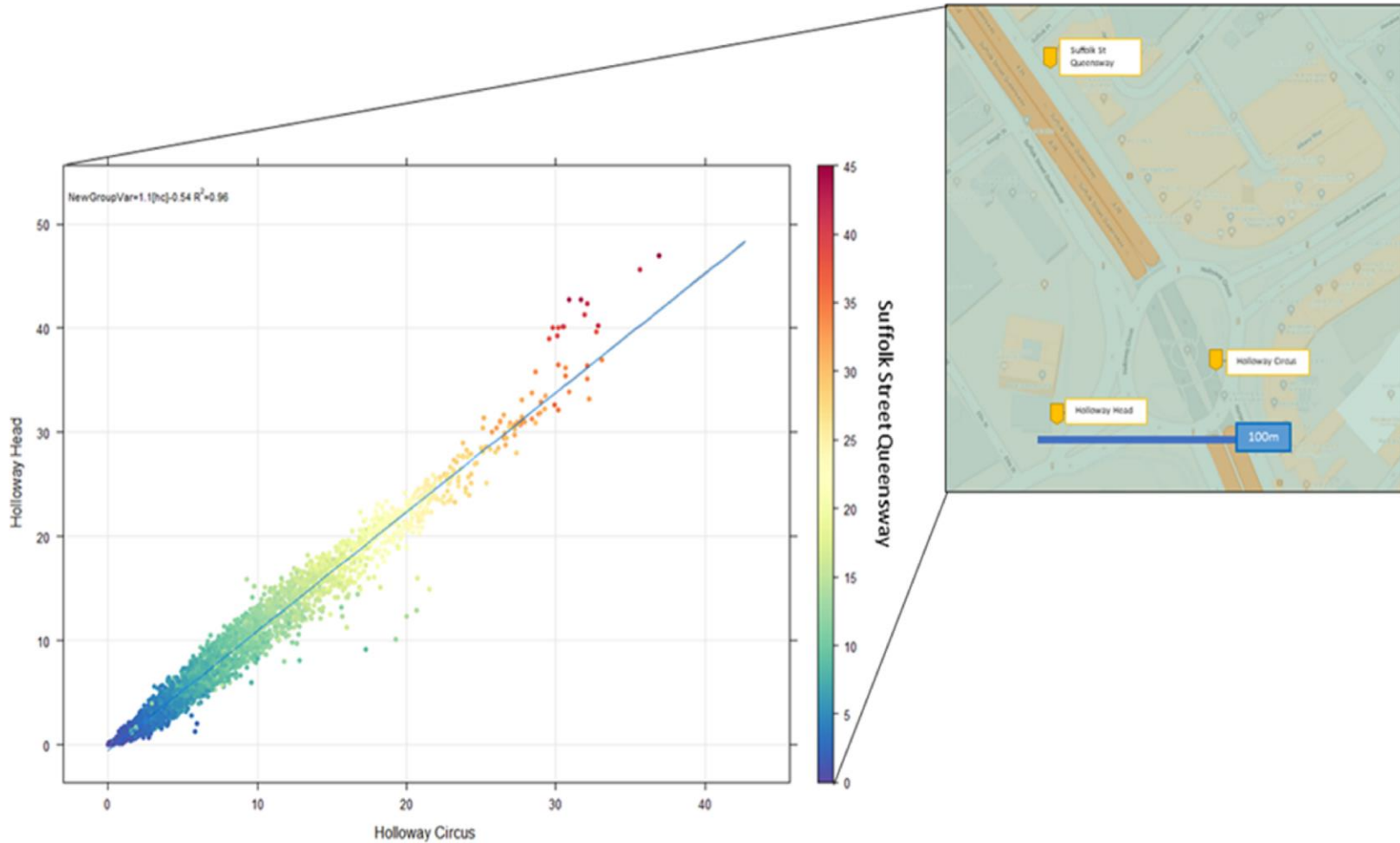


CAZ versus outside CAZ



mean and 95% confidence interval in mean

Hyperlocal Air Quality



Best Practice Guidelines

<https://tinyurl.com/yjyadxkj>



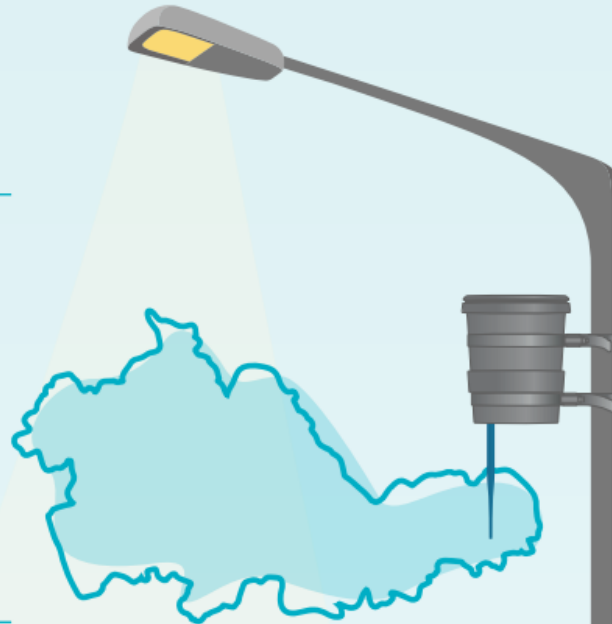
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PROCURING AND DEPLOYING LOW-COST SENSOR NETWORKS:

Guidance and questions for low-cost
and commercial AQ sensing networks

Low-cost sensors provide a novel opportunity to monitor air quality at unprecedented spatial resolution. Devices are available at capital costs which are significantly lower than traditional monitoring methods. Whilst such devices allow for greater spatial resolution of air quality data there are a number of important things to consider during the procurement and deployment of low-cost sensor networks. This briefing document identifies some key considerations for using low-cost sensor networks based on experiences drawn from the NERC and EPSRC funded WM-Air & Birmingham Urban Observatory projects.



provide meaningful AQ data. Low-cost sensing offers the opportunity for sensors to be deployed in larger numbers to gain a better sense of spatial variations and are often more agile than reference instruments making it easier to monitor in areas previously unattainable.

Before procuring low-cost AQ sensors it is best practice to consider the purpose and goals of the network. Consider:

- Is this a long-term or a short-term network?
- Is the project aiming to capture a specific AQ intervention or source?
- Could the network act as an alternative method of screening for exceedances of AQ objectives? Whilst a low-cost network may not confidently report a

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Next Steps

- Sustainable means for long-term air quality monitoring in the West Midlands
 - TfWM: 62 weather and AQ sensors deployed with Vaisala across the WM.
 - Interactive product planned
- Exploring how live data streams can be used for real time decision making
 - DfT & the National Digital Twin