

Air Quality Inside Out

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Quality - Service - Innovation

Indoor Air Quality

Temperature
Humidity
Carbon Dioxide (CO₂)



Outdoor Air Quality

- SO₂**
- NO_x**
- NO₂**
- NO**
- O₃**
- CO**
- CO₂**
- PM₁**
- PM_{2.5}**
- PM₁₀**
- VOC's**



The Three Essentials For Sensors



• Sensitivity



- Sufficient signal / noise at ambient concentrations

• Specificity / Selectivity



- Reactive only / mostly to the target gas

• Stability



- Maintain stable performance over time



Sensor Systems Technology



- ✓ Some lower cost sensors now deliver the sensitivity for ambient air monitoring
✗ ...but not the stability, specificity or accuracy on their own
- ✓ Apply corrections for interfering gases
- ✓ Characterise the sensor performance in the environmental conditions they will be used
- ✓ Design the system to maintain performance over time
- Success requires a **systems** approach

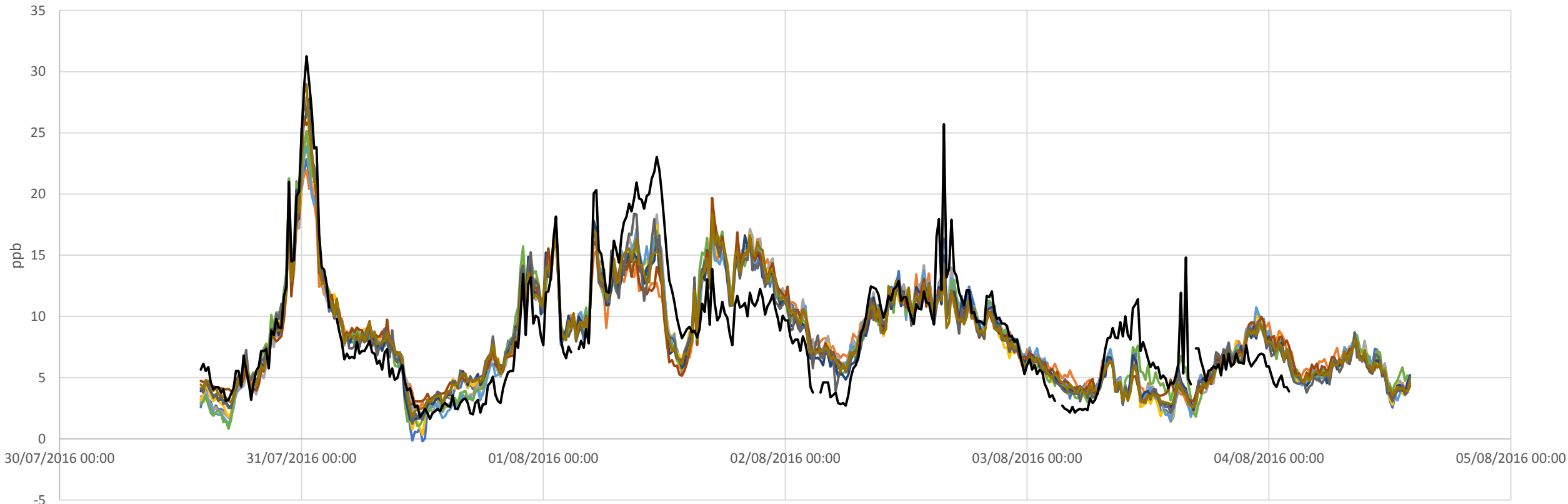




AQMesh Performance

South Kensington Pods (10) vs Reference (15 minute Ave)

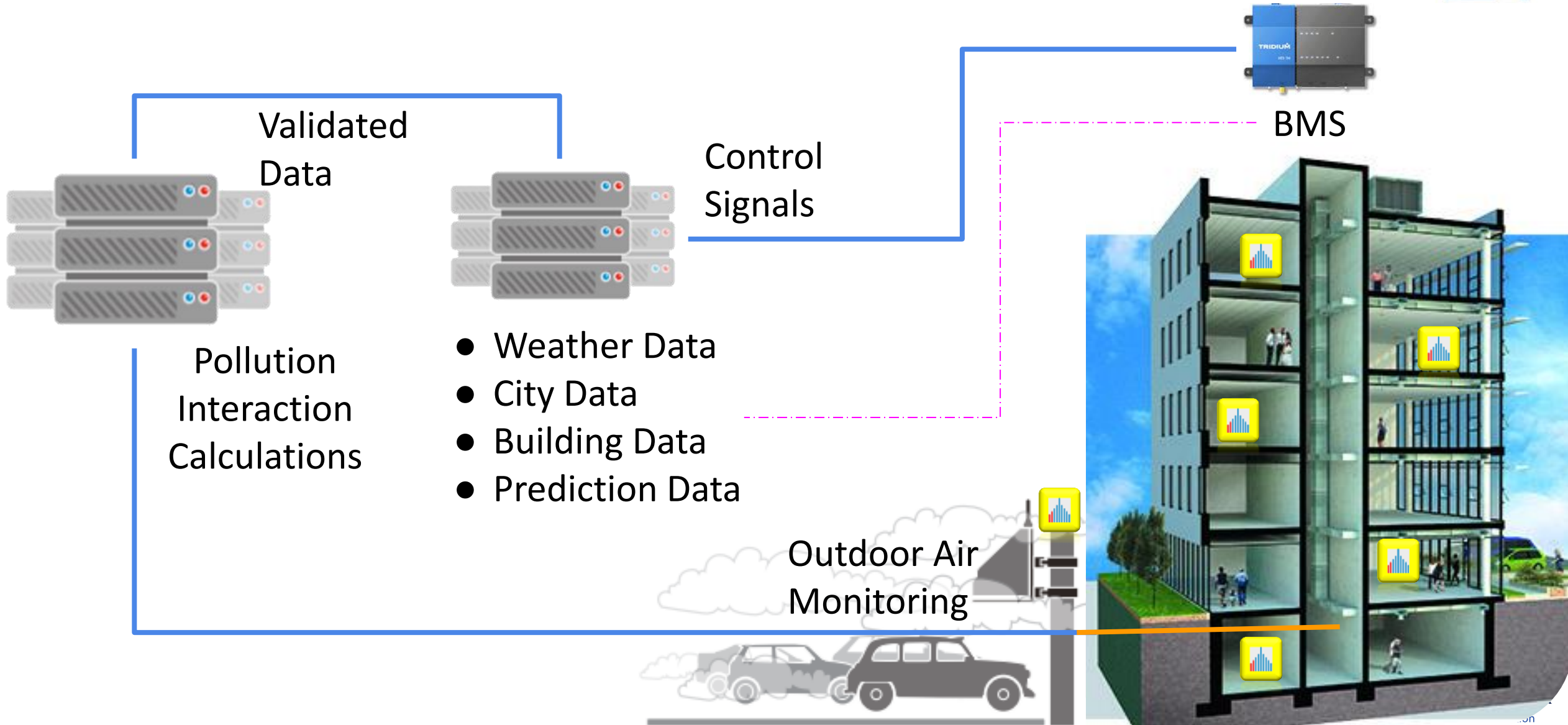
NO2



- (102) NO2_Scaled (ppb)
- (1503) NO2_Scaled (ppb)
- (1504) NO2_Scaled (ppb)
- (154) NO2_Scaled (ppb)
- (156) NO2_Scaled (ppb)
- (379) NO2_Scaled (ppb)
- (380) NO2_Scaled (ppb)
- (381) NO2_Scaled (ppb)
- (382) NO2_Scaled (ppb)
- (361) NO2_Scaled (ppb)
- NO2 (ppb)

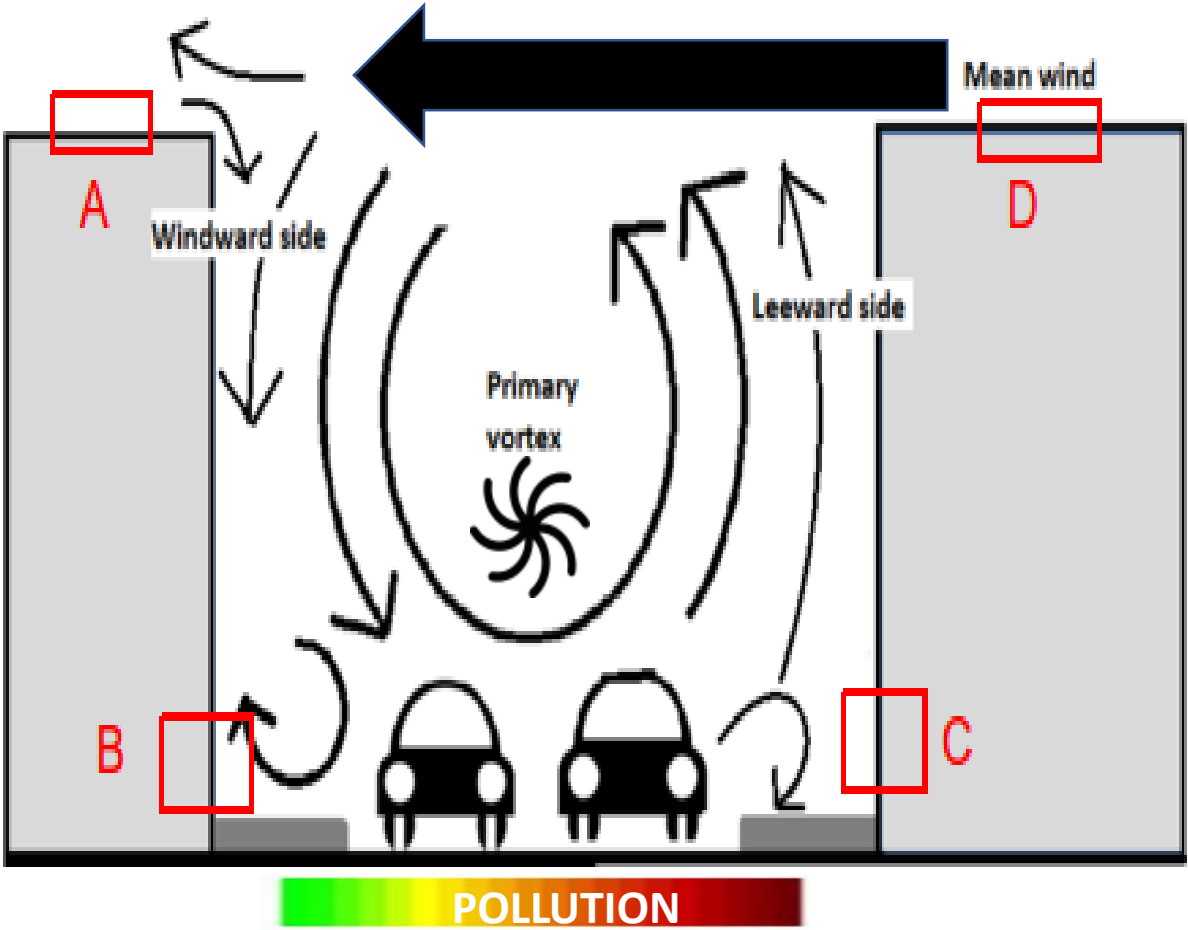
Trial of AQMesh v4.2 –June/July 2016, KCL, London. UK

Monitoring and Managing IAQ

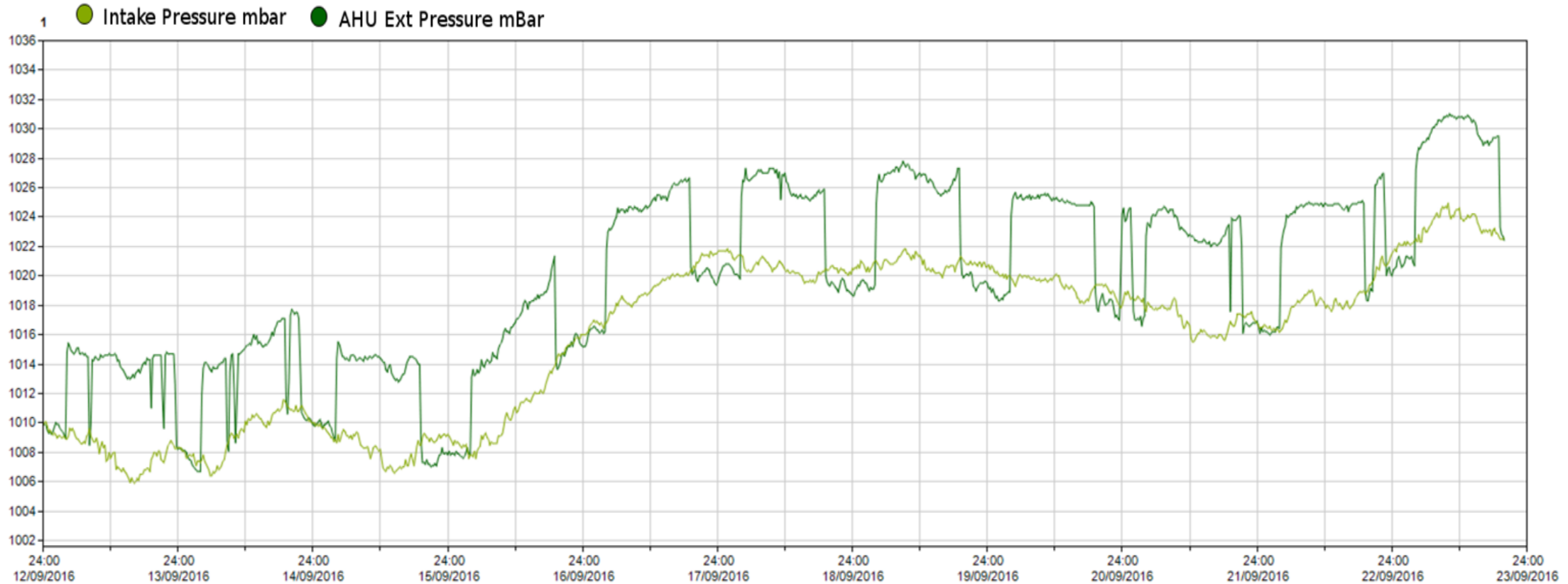


Where to Take the Air ?

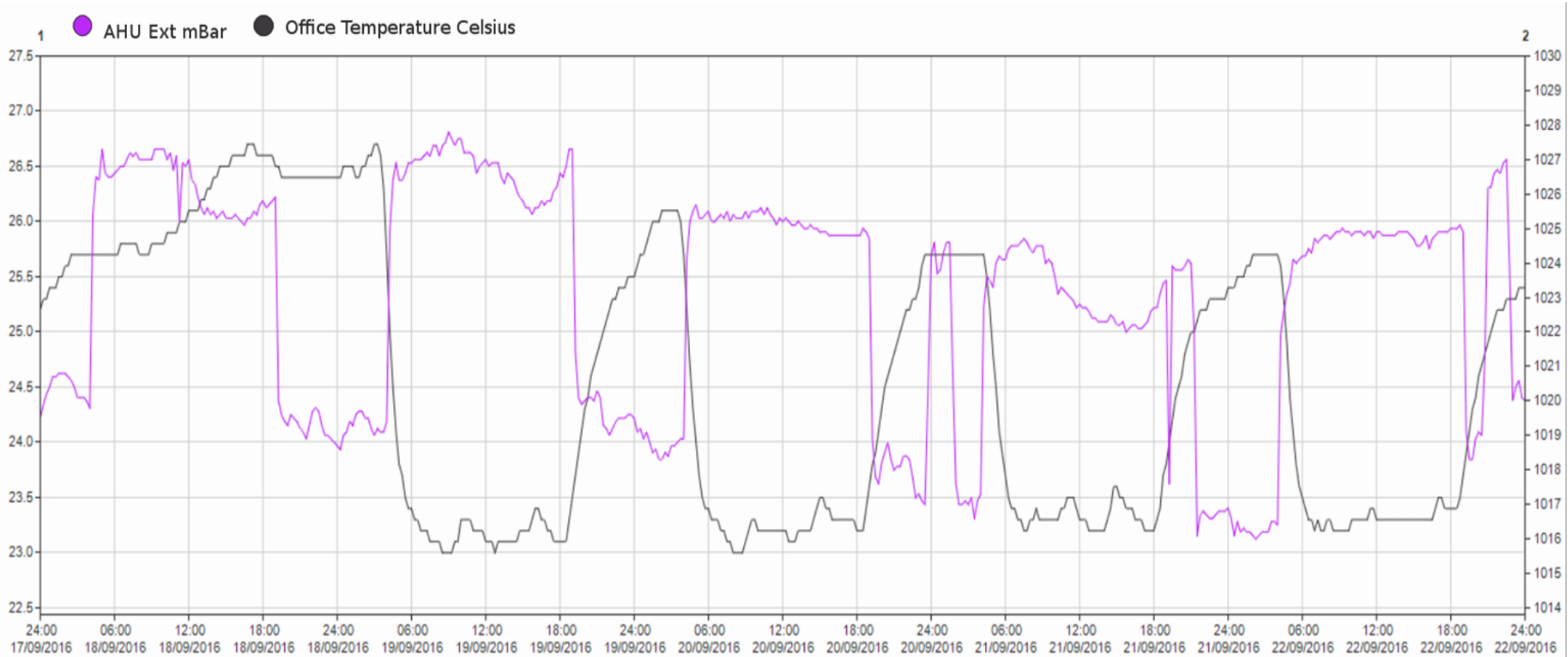
Street Canyon Effects



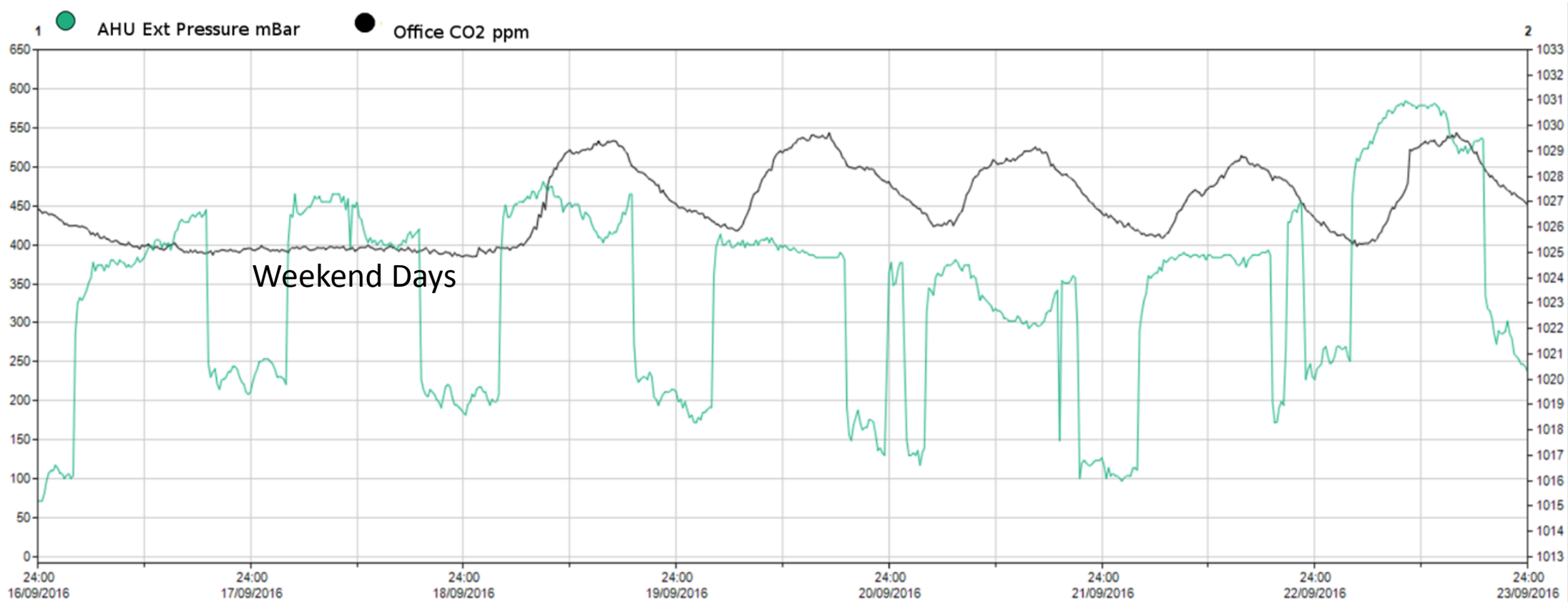
Air Handling Units (AHU's)



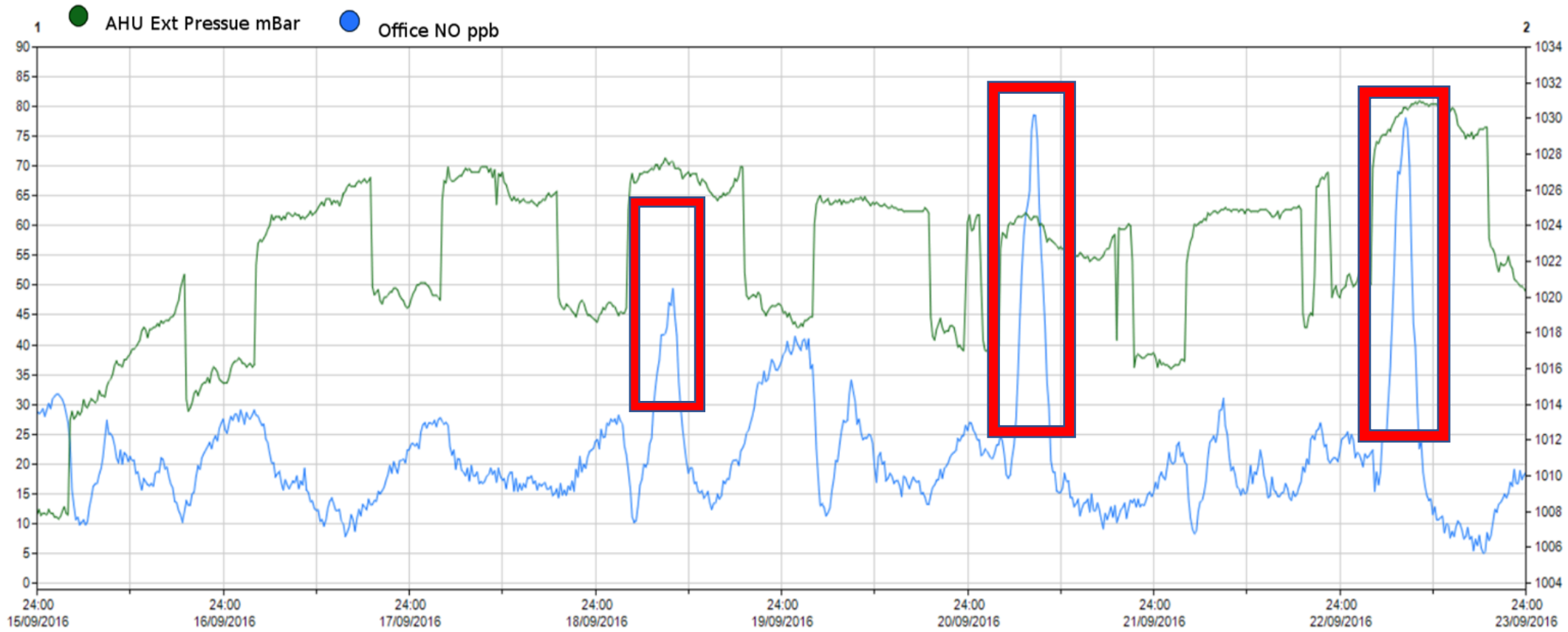
Temperature Controls



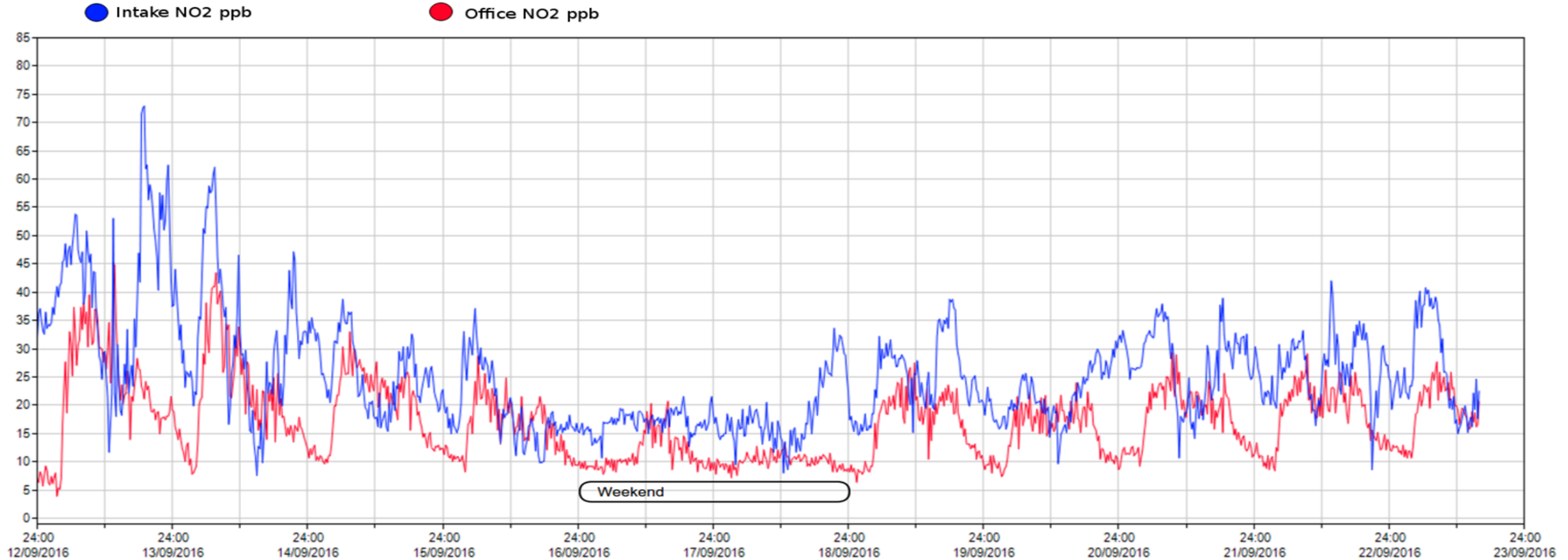
CO₂ Controls



Air Pollution – Outside NO Inside

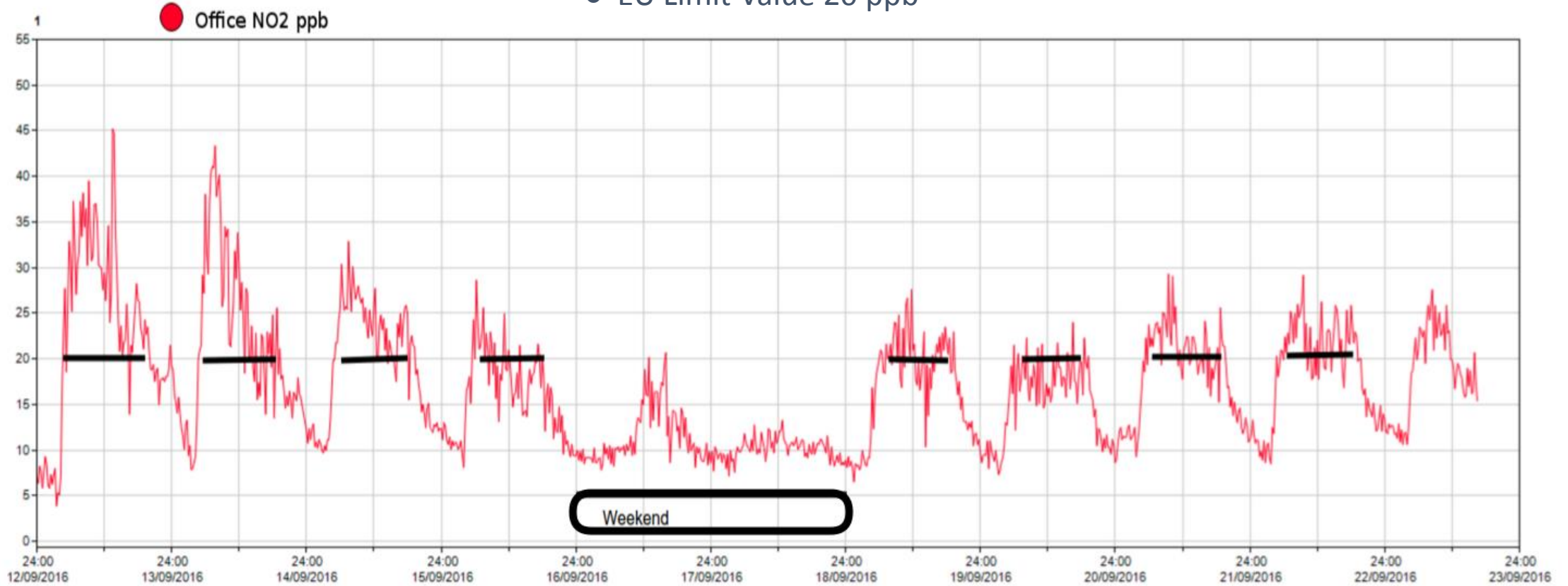


NO₂ Outside / Inside

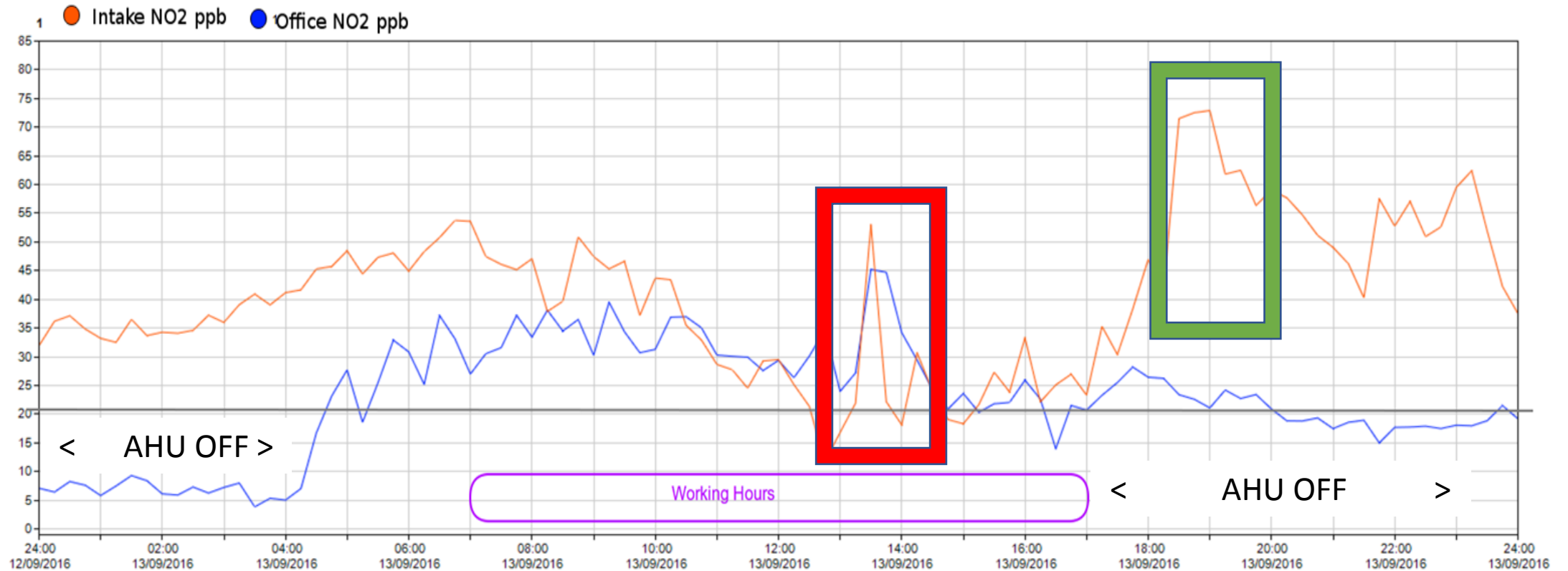


NO₂ Indoors

- Average NO₂ in Office 15.4ppb
- Average NO₂ in Office during work hours **24.1ppb**
- EU Limit Value 20 ppb



Nitrogen Dioxide Inside - Out



In Conclusion



- IAQ is no longer only about CO₂, Temperature & Humidity
- An understanding of the **outdoor** air quality around a building is important when attempting to manage the air quality inside the building
- Low cost sensors if used alone, can provide poor quality data, leading to false conclusions and poor decisions
- **Sensor systems** can provide reliable measurements of **outdoor** and **indoor** air with good accuracy & stability.
- Potential to improve IAQ and reduce energy which is the fastest way to reduce the exposure of city dwellers to air pollution

THANK
YOU



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