MAYOR OF LONDON

# The Mayor of London's School Air Quality Audit Programme

## Christopher Hatton Primary School, London Borough of Camden


MAY 2018

# Mayor's Foreword

Poor air quality is a major public health issue and cause of inequality in our city. It is shocking that in London alone, air pollution contributes to thousands of early deaths every year, and has been linked to strokes, heart attacks, asthma, dementia and smaller lungs in our children.

We cannot allow this to continue. That is why, since becoming Mayor, I have made tackling poor air quality a priority. That is also why my administration has nearly doubled spending on cleaning up London's toxic air and we are delivering the boldest and most ambitious plan to tackle air quality anywhere in the world.

This includes introducing a new charge on the oldest, most polluting vehicles coming into central London, consulting on expanding the Ultra Low Emission Zone, making buses in London cleaner and greener, and reducing exposure to air pollution around schools.

As part of this, we launched the Mayor's School Air Quality Audit Programme in January 2017, with the aim of reducing emissions and primary school children's exposure to polluted air. I am delighted that this programme has now been completed, with 50 audits undertaken at primary schools located in the most polluted areas of London.

We are confident that implementing the recommendations from these audits will go a long way to delivering cleaner air, reducing health inequalities and, most importantly, improving the health and wellbeing of our children.

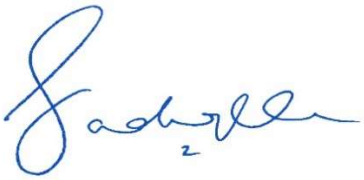
But we want to go even further. The implementation of the recommendations and dissemination of this programme offers us an invaluable opportunity to really make a difference. So, I want to see the London boroughs rolling it out to every school located in pollution hot spots.

The audit recommendations for the 50 schools that have already gone through the process are bespoke to each school, and whilst some recommendations will require funding to implement, there will be some that will not; such as changing walking routes to less exposed routes. Each report also contains a tool kit and template that could be used locally by other schools and similar organisations to undertake their own air quality audit.

We understand that schools and boroughs are under enormous financial pressure, which is why I am encouraging boroughs to prioritise funding through their Local Implementation Plan budgets provided by Transport for London (TfL). I am also urging Clinical Commissioning Groups and local businesses to consider setting aside some funding to support the funding of these recommendations.

In addition, we are keen to encourage schools to sign up to TfL's STARS (Sustainable Travel: Active, Responsible, Safe) programme, if they have not already done so. By swapping car journeys for active travel, through STARS, schools can make a real difference to our city and help create healthier streets for Londoners.

Finally, I would like to commend all those involved in the successful delivery of the School Air Quality Audit Programme - the schools, boroughs, consultants and, above all, the school children.



**Sadiq Khan**
Mayor of London

# THE MAYOR OF LONDON'S SCHOOL AIR QUALITY AUDIT

**Christopher Hatton Primary School, London Borough of Camden**

## ACKNOWLEDGEMENTS & CONTRIBUTIONS

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**London Borough of Camden** – Michelle Jamieson (School Travel Plan Officer) Peter (Engineer)

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## DISCLAIMER

The contents of this report and its recommendations are principally based on the findings of the independent audit as of the date it was undertaken, and may not account for subsequent changes in local policy, conditions and/or circumstances in and/or around the school.

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# Chapter 1 – Introduction

# 1 INTRODUCTION

## 1.1 BACKGROUND

1.1.1. As part of the Mayor's ambition to tackle poor air quality, WSP has been commissioned to identify a combination of hard-hitting measures and quick-win solutions to help protect pupils' health from toxic air quality, and examine new ways to lower emissions and exposure to pollution in and around primary schools.

1.1.2. The Mayor has stated that London is experiencing a '*public health crisis'*, and that he is committed to improving air quality, particularly for the most vulnerable Londoners. Over 400 primary schools are located in areas which exceed legal pollution limits, and 25% of primary schools are in areas with dangerously high levels of air pollution.

1.1.3. Primary school children are amongst the most vulnerable of the at risk groups, as their lungs are still developing, and toxic air can stunt their growth, causing significant health problems in later life.

1.1.4. Road transport is a major contributor to emissions, and has a significant impact on air quality, accounting for around half of $NO_x$ emissions. Whilst private car use is decreasing, congestion is increasing[1]. Without significant intervention, as the Capital grows rapidly these trends are set to continue.


1.1.5. In response the Mayor is implementing a significant programme of measures, including bold proposals to reduce London's deadly air pollution and protect the health and wellbeing of all Londoners, including:

- **The Toxicity Charge** (T-Charge) now applies to older, more polluting vehicles in central London, which means that including the Congestion Charge drivers with these vehicles will now pay £21.50 total during peak congestion.
- **Cleaning up London's Buses** - The Mayor is spending more than £300 million to transform London's bus fleet by retrofitting thousands of buses and committing to phase out pure diesel

[1] London Assembly, London stalling: Reducing traffic congestion in London, January 2017, Transport for London, Travel in London - Report 9 data, 2017

double deck buses from 2018. 12 Low Emission Bus Zones have been announced, two of which have already been delivered, putting the greenest buses on the capital's most polluted routes. The zones are expected to reduce $NO_x$ emissions by 84 per cent and thousands of school children in these areas will benefit from cleaner air.

- **The Ultra Low Emission Zone** (ULEZ) will supersede the T-Charge, and operate 24 hours a day, 7 days a week within the same area as the current Congestion Charging Zone (CCZ), The world's first Ultra Low Emission Zone (ULEZ) is to start 8 April 2019, approximately 17 months earlier than planned, and create stricter emissions standards for diesel vehicles, 24 hours, 7 days a week. Those that do not comply will face a charge. This is expected to reduce harmful $NO_x$ (Nitrogen Oxides) emissions by about 50 per cent in central London, 40 per cent in inner London and 30 per cent in outer London.
- **Expanding the ULEZ and tightening the Low Emission Zone (LEZ)** - As part of the Mayor's pledge to help improve air quality and health for all Londoners, he is also proposing to make the London-wide Low Emission Zone (LEZ) stronger, and expand the Ultra Low Emission Zone (ULEZ) requirements for vehicles. This involves introducing a Euro 6 emissions standard London-wide for heavy duty vehicles (i.e. buses, coaches, Heavy Goods Vehicles (HGVs) vehicles) from 26 October 2020, and expanding the ULEZ for light duty vehicles (i.e. cars, vans and motorcycles) so that all vehicles are subject to emissions standards within an area roughly bounded by the North and South Circular Roads from 25 October 2021. The introduction and expansion of the ULEZ, and tightening of the LEZ standards, is forecast to result in a significant reduction in NOx emissions across London.
- **London's taxis –** New taxis licensed after 1 January 2018 will need to be zero emission capable to help clean up London's dirty air, with new 'zero emission' ranks for drivers who pioneer green technology alongside a network of rapid electric charge points.
- **Low emission neighbourhoods –** five low emission neighbourhoods have been founded across London to pioneer bold new measures to promote the use of low emission vehicles and improve local air quality, including low emission vehicle only streets, measures to promote deliveries by cycle cargo bikes and low emission vehicles, and bold proposals to promote walking and cycling.
- **The London Environment Strategy** – is a bold and ambitious strategy, with a particular focus on air quality. The strategy was consulted on in 2017 and will be published in 2018, and seeks to address the most urgent environmental challenges facing our London, to safeguard its environment over the longer term. This will be the first strategy to bring together approaches to every aspect of London's environment, including: air quality, green infrastructure, climate change mitigation and energy, waste, adapting to climate change and ambient noise. To make the Mayor's vision of transforming the city's environment a reality, this strategy establishes some key aims for London, which include having the best air quality of any major city, making more than half of London's area green and for tree canopy cover to increase by ten per cent by 2050, and making London a zero carbon city by 2050, with energy efficient buildings, clean transport and clean energy.
- **The Draft London Plan -** published in November 2017, places a considerable emphasis on air quality, with policy S|1 stating that London's air quality should be significantly improved, and exposure to poor air quality, especially for vulnerable people, should be reduced. The aim of this policy is to ensure that new developments are designed and built, as far as is possible, to improve local air quality and reduce the extent to which the public are exposed to poor air quality. This means that new developments, as a minimum, must not cause new exceedances of

legal air quality standards, or delay the date at which compliance will be achieved in areas that are currently in exceedance of legal limits. Where legal limits are already met, or are predicted to be met at the time of completion, new developments must endeavour to maintain the best ambient air quality compatible with sustainable development principles. The draft London plan also highlights the importance of creating new, accessible green open space, particularly in areas where this access is lacking. The Mayor is providing funding through his Greener City Fund to create and improve green spaces and to plant trees, including in schools. A proposed new Urban Greening Factor seeks to encourage major new developments to contribute to the greening of London by incorporating measures such as green roofs, tree planting and green walls.

- **Healthy Streets Approach** - the Mayor is embedding the 'Healthy Streets' approach in transport strategy. This promotes a holistic approach that can fulfill multiple objectives such as improving the health, liveability, social cohesion and economic prosperity of an area.
- **The Mayor's Transport Strategy 2018 -** The Mayor has set out ambitious plans to improve transport in London over the next 25 years in his draft Transport Strategy, which will act as the backbone of transport planning across London, helping to deliver The Mayor's ambition for 80% of trips in London to be made on foot, by cycle or using public transport by 2041. It includes record investment in new and improved rail, tube and bus services, an unprecedented focus on walking and cycling, and a commitment to make the entire transport system zero-emission by 2050.

1.1.6. These measures in combination will dramatically improve London's air quality. However, the Mayor also wanted to take early action at 50 primary schools located in areas with some of the highest air pollution levels, so has provided £250k funding to commission The Mayor of London's School Air Quality Audits programme, to identify ***hard-hitting measures*** to minimise the impacts of toxic air on primary school children in some of the worse affected areas across London. This is both in terms of ***reducing the sources*** of harmful emissions, as well as ***reducing the exposure*** to these emissions. The aim is to establish a robust process and toolkit of measures, which the London boroughs and primary schools can roll out, so that every school that is located in an area of high pollution can benefit from this approach.

## 1.2 OBJECTIVES

1.2.1. The key objectives of the Mayor of London's School Air Quality Audit Programme is to:

- Identify the sources of outdoor air quality and potential exposure by primary school children at the school and their surrounding catchment areas, and potential indoor exposure through the internal audits.
- Identify, evaluate and recommend a combination of hard hitting measures and pragmatic approaches, both within and around the school that will help a borough to reduce emissions or reduce primary school children's exposure to poor air quality at those sites, which could be delivered as part of the boroughs' Local Implementation Plan (LIP) funding schemes, as well as other sources of funding such Clinical Commissioning Groups, local businesses and charitable trusts.
- Engage school communities to educate stakeholders about the impacts of air pollution and contribute towards activities, initiatives and policies that the primary school community could implement.
- Engage eligible London boroughs and other relevant stakeholders to inform the feasibility of the proposed recommendations.
- Provide recommendations for the boroughs' consideration and future implementation, and wider dissemination.

# Chapter 2 – Audit Approach

# 2 AUDIT APPROACH

## 2.1 OVERALL AUDIT APPROACH

2.1.1. The Mayor of London's School Air Quality Audits follow a structured approach, summarised in Figure 1.

**Figure 1 – Overview of Approach**


2.1.2. Each audits consists of broadly three key stages:

- **Stage 1:** Pre-planning and scheduling
- **Stage 2:** Fieldwork and engagement
- **Stage 3:** Recommendations and Reporting

### Pre-planning and scheduling

The borough air quality primary contacts were contacted by the lead Auditor, and mutually available potential dates for the audit were agreed. The borough then introduced the auditor to the school, and a schedule for the tasks to be undertaken was agreed to fit in with the operations of the school and availability of key staff contributing to the audit.

Prior to the audit air quality modelling was undertaken for the area around the school, with an assessment of the contribution to emissions made by each vehicle type on the roads around the school.

A desktop review of the local areas around the school site, and the wider catchment was also undertaken, to highlight key features for the auditor to assess further on site. This includes sources of pollution, causes of exposure, and notable features in the local area which may have a bearing on the potential mitigation measures (i.e. bus routes, pedestrian crossing locations, nearby construction sites, physical barriers such as railways or rivers). The school's STARS[2] travel plan progress was also reviewed for reference ahead of the audits. Engagement materials were developed for use in delivering bespoke awareness raising interactive presentations to the children. A toolkit of measures for addressing air quality issues was developed for use in informing our recommendations for each school.

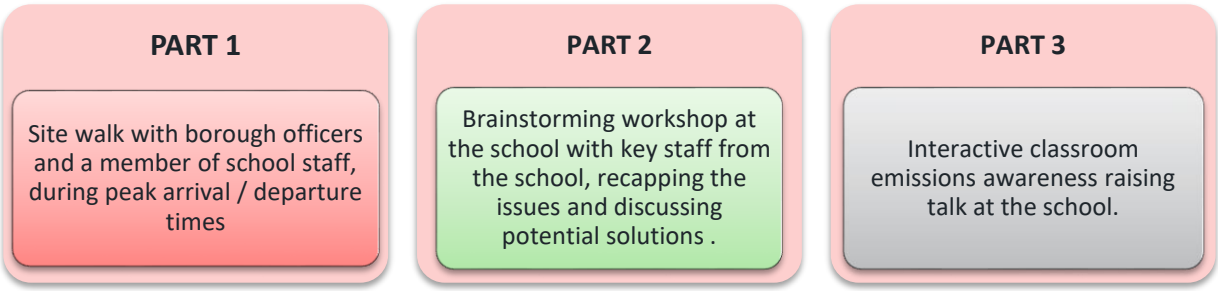
### Fieldwork and engagement

2.1.3. The approach taken in carrying out the audit comprised of several elements, including a visit to the school by the WSP auditor and officers at the borough who deal with air quality, transport planning and school travel. A key element of the audits was to capture the views of school staff, wider school community and relevant borough officers, in understanding operational considerations, behavioural

[2] STARS is TfL's accreditation scheme for London schools and nurseries, promoting travel to school sustainably, actively, responsibly and safely by championing walking, scooting and cycling.

traits and recent history of the school. As such, we proposed a three-fold approach summarised below:

**Figure 2 – Key elements of the Audit**




2.1.4. Initial observations and site familiarisation were undertaken by the auditor prior to the school opening. This allowed us to sense check the context maps compiled initially from desktop assessments. Observations with the borough officers and school staff were then undertaken throughout the period of drop-off and waiting activity, prior to the school gates opening, until parents have dispersed. During this critical period the auditor captured as much information as possible on activity in and around the school, with comprehensive photo records and discussions with the school staff to capture issues which often occur but were not evident during our observations, The external observations were then followed by a walk around the school building and grounds to enable the auditor to familiarise themselves with its layout, and the proximity of classrooms, nurseries, playgrounds etc to areas of poor air quality.

2.1.5. An interactive and bespoke engagement activity was then delivered to a school assembly using presentation slides to raise awareness of air pollution, its causes, the health impact, areas of pollution near the school and a range of measures to reduce air pollution. An audit of the building was then undertaken with the assistance of the facilities manager, including a review of the school's boilers, their flues, the ventilation systems and kitchen extraction.

2.1.6. A brainstorming session was then undertaken, with key staff from the school and the borough officers in attendance. This session served several functions. It enabled the auditor to capture additional information on other issues and concerns not observed directly, and additional information on issues such as whether there are any plans for extensions or additional pupil intake for example. Whilst from the borough officers we were able to establish what planned or committed development is nearby, proposed or previously considered transport schemes etc. We then discussed a range of potential measures to address the issues discussed and collected feedback and suggestions from the borough and school representatives to inform the recommended measures.

## 2.2 AUDIT SCHEDULE – CHRISTOPHER HATTON PRIMARY SCHOOL

2.2.1. Table 1 provides further detail of the audit schedule and key participants from the school and borough.

**Table 1 – Audit Details**

| | | |
|---|---|---|
| **Date of Audit** | Monday 25th September 2017 | |
| **School Representatives** | Gwen Lee (Head Teacher), Blue Quinn (Premises Manager), Kay McAllan (Assistant Head) | |
| **Borough Representatives** | Michelle Jamieson (School Travel Plan Officer) Peter Ashley (Engineer) | |
| **Other Attendees** | Sarah (Parent from the Parent-Teacher Association) | |
| **WSP Auditor** | Tom Holcroft | |
| **Itinerary** | **Timings** | **Description** |
| | 0800 – 0830hrs | Initial observations of surrounding area and site familiarisation by WSP auditor |
| | 0830 – 0900hrs | Site walk during peak arrival time |
| | 0900 – 0930hrs | Internal site walk to appreciate the layout of the buildings/ playgrounds |
| | 0930 – 1000hrs | Engagement activity – interactive presentation at school assembly |
| | 1015– 1130hrs | Brainstorming Workshop |
| | 1130 – 1200hrs | Internal audit of building and school grounds |

**Recommendations and Reporting**

2.2.5. The auditor reviewed the findings of the audit and preparatory assessments, with the specialist support of air quality, transport planning and buildings specialists, to develop advice and recommendations, based on a toolkit of best practice measures and case study examples.

# Chapter 3 – Context and Initiatives

# 3 CONTEXT AND INITIATIVES

## 3.1 SCHOOL CONTEXT

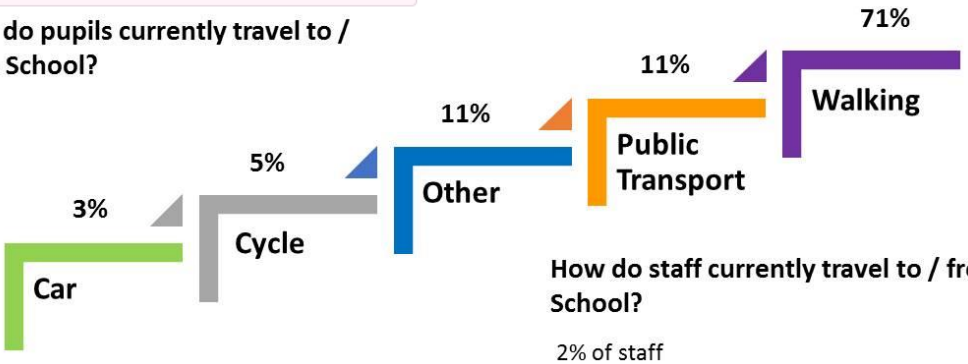
**Borough:** Camden

**Address:** 38 Laystall St, EC1R 4PQ

**Pupil Numbers:** 250 Approximately

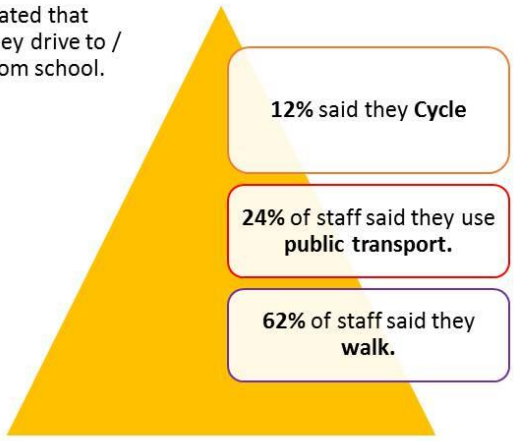
Age Primary | Gender Mixed | Type Community

**How do pupils currently travel to / from School?**

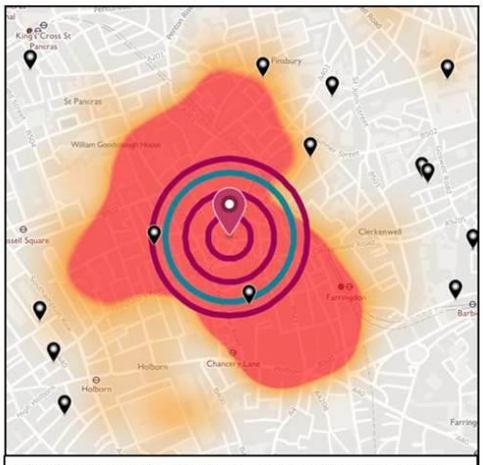



**How do staff currently travel to / from the School?**

2% of staff stated that they drive to / from school.




**What is the catchment area for the school and how long would it take for pupils to walk to / from the School?**



1st Quartile 25% - 0.14km; walking time 2 minutes
2nd Quartile 50% - 0.29km; walking time 4 minutes
3rd Quartile 75% - 0.51km; walking time 6 minutes
Mean – 0.42km; walking time 5 minutes

The map to the left confirms that half of the pupils can travel to / from school within a 4 minute walk, and 75% within a 6 minute walk. The average walking time for pupils is 5 minutes.

3.1.1. Christopher Hatton Primary School is located in Central London and sits within the Borough of Camden. The main entrance is on Laystall St Street, a 20 mph street.

3.1.2. Approximately 12,800 vehicles per day travel on the core roads within a 200m radius of the school[3]. This is within the 1st quartile (0-25%) volumes amongst of the 50 schools assessed as part of this programme.

3.1.3. The desktop review showed that the majority of pupils currently travel to / from school by active modes. The data from STARS hands up surveys showed that 71% of pupils walk to school, 11% scoot and 5% cycle. Of the remaining pupils, 11% of pupils use public transport and just 3% commute in a car.

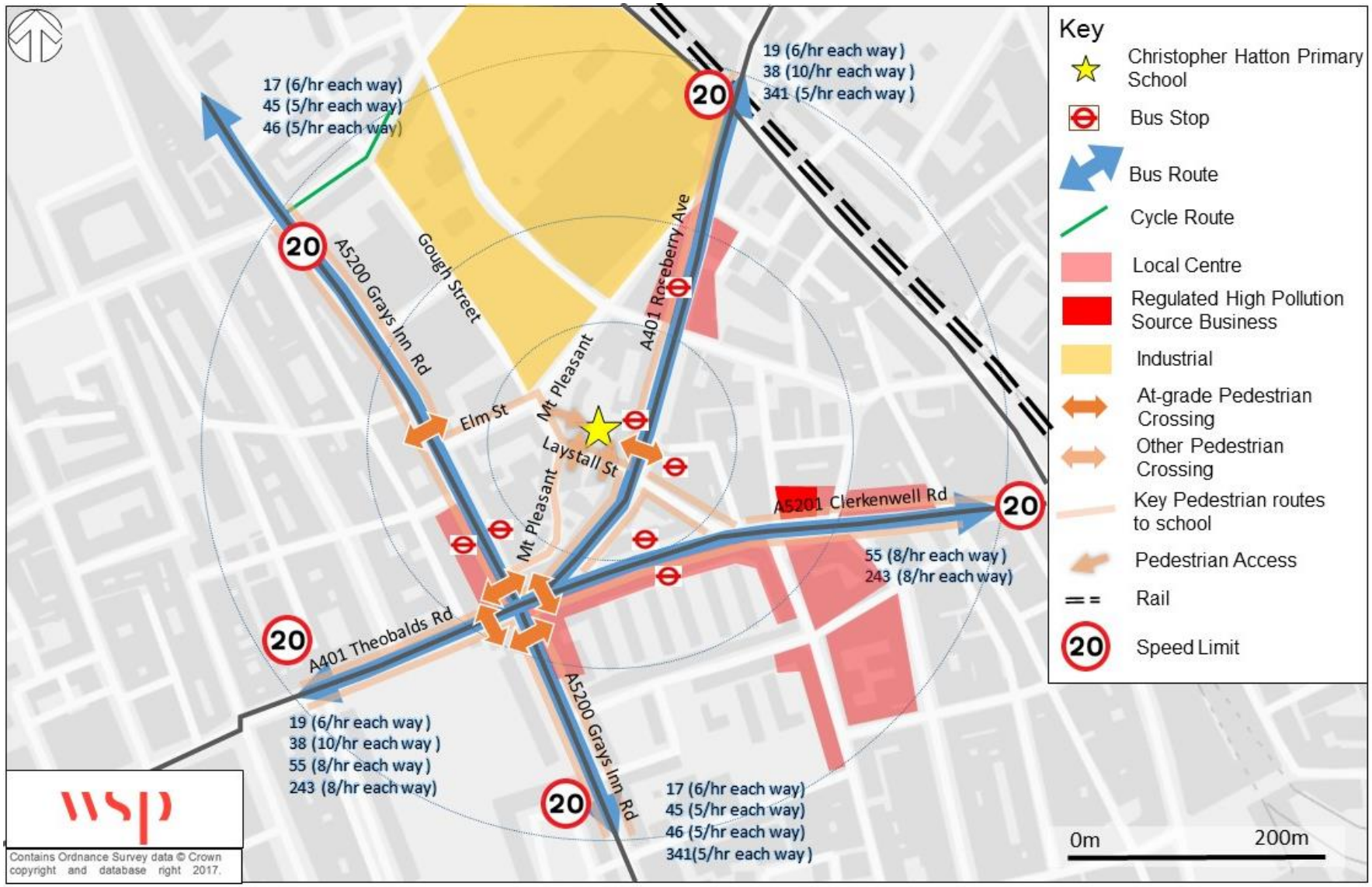
3.1.4. Subsequent discussions with the school revealed that, anecdotally, the proportion of children walking, cycling and scooting to school is even higher than the desktop review showed. Anecdotally, only one child is driven to school. This is partially due to the school's very small catchment area. The vast majority of pupils live in the tall residential blocks that surround the school.

3.1.5. School staff also travel to/from the school sustainably, with 24% of staff members travelling via public transport and 62% on foot, indicating that they live within relatively close proximity of the school.

3.1.6. The subsequent two pages illustrates the inner and outer context plans for the school that provides detail on the main access (both pedestrian and vehicular) to the school, the location of the playgrounds where children are most exposed to air pollution, as well as bus routes in the near vicinity of the school and the catchment area for the school.

[3] The traffic flows and vehicles splits presented are based on the average number of vehicles on each LAEI modelled road link within 200m radius of the school in the LAEI 2013 base.

**Figure 3 – Outer Context Plan**



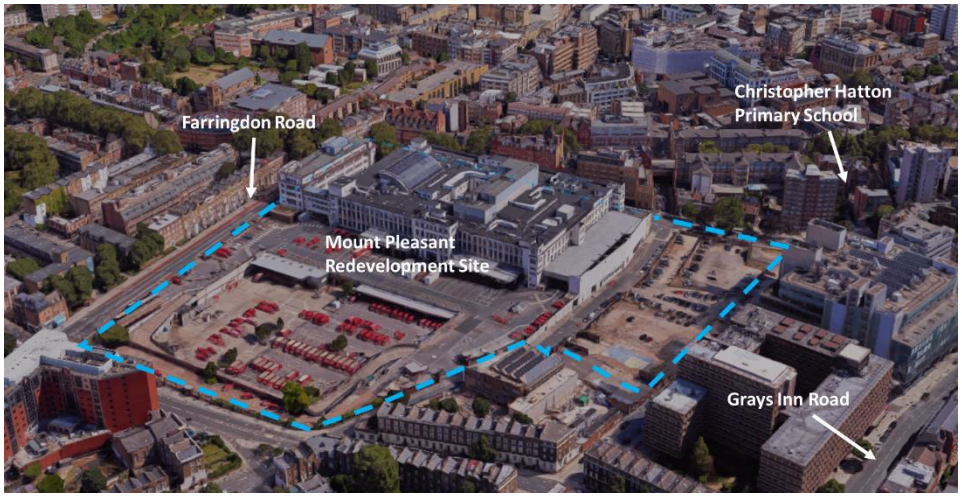
## Figure 4 – Inner Context Plan

## 3.2 PLANNED SCHEMES & RECENT INITIATIVES

3.2.1. There are number of major developments planned or under construction within the immediate locality of the school, including:

### MOUNT PLEASANT REDEVELOPMENT SITE

3.2.2. Christopher Hatton Primary School is very close to a major forthcoming development site. Planning permission was granted in March 2015 for a 681-home redevelopment of the Mount Pleasant Industrial Site, a former Royal Mail sorting office, following the sale of the land from Royal Mail to Taylor Wimpey for £193.5m. The site will also include retail, office space and public space. The development was opposed by the London Boroughs of Islington and Camden (the boroughs which the site is in) but supported by the previous Mayor of London, Boris Johnson. The plans have attracted controversy and many in the school community are unhappy with some aspects of the plans. Construction is expected to start in approximately five years.



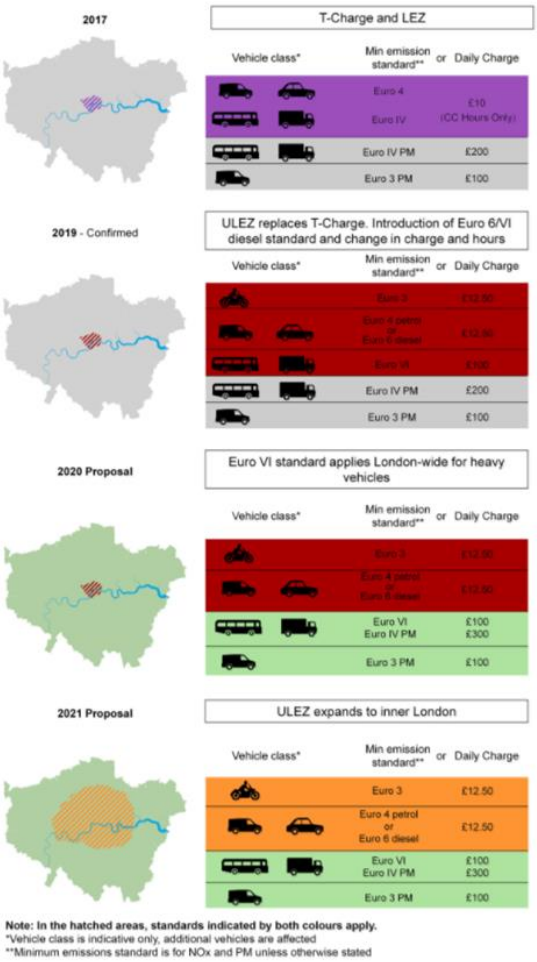

### QUIETWAY 2 CYCLE ROUTE

3.2.3. The second Quietway route, which was nearing completion in mid-2017 connects Bloomsbury and Walthamstow, and runs just to the north of the school, on Guildford Street. The Quietway is a continuous sign-posted route linking Bloomsbury and Walthamstow via more lightly trafficked backstreet roads, with some traffic-free paths for cyclists and improved pedestrian facilities throughout. The route connects with the North-South Cycle Superhighway (CS6) at Pakenham Street and Cycle Superhighway 1 (CS1) at De Beauvoir Road.

## WIDER SCHEMES

ULTRA LOW EMISSION ZONE (ULEZ) AND LOW EMISSION ZONE (LEZ)

3.2.4. The ULEZ will operate 24 hours a day, 7 days a week within the same area as the current Congestion Charging Zone (CCZ), and comes into force on 8th April 2019. The introduction of the ULEZ will reduce exhaust emissions of NO2 and particulate matter PM10 and PM2.5. In 2019, all cars, motorcycles, vans, minibuses, buses, coaches and heavy goods vehicles (HGVs) will need to meet exhaust emission standards, or pay a daily charge. In the case of petrol cars and vans this means Euro 4, and Euro 6 for diesels. HGVs and coaches are also Euro 6.




3.2.5. As part of the Mayor's pledge to help improve air quality and health for all Londoners, he is proposing to make the London-wide Low Emission Zone (LEZ) stronger and expand the Ultra Low Emission Zone (ULEZ). This involves introducing a Euro VI emissions standard London-wide for heavy duty vehicles (buses, coaches, Heavy Goods Vehicles (HGVs) and other specialist heavy vehicles) from 26 October 2020 and expanding the ULEZ for light duty vehicles (such as cars, vans and motorcycles) so that all vehicles are subject to emissions standards within an area roughly bounded by the North and South Circular Roads from 25 October 2021.

3.2.6. The introduction and expansion of the ULEZ, and tightening of the LEZ standards, is forecast to result in an 11% reduction in $NO_x$ emissions in the London borough of Camden by 2020.

T-CHARGE

3.2.7. The T-Charge was brought in (October, 2017) to help improve air quality in London, in particular with regard to nitrogen dioxide ($NO_2$) and particulate matter, both of which have an adverse effect on human health. It means that older vehicles that drive into the central London Congestion Charge zone need to meet minimum Euro emission standards or pay an additional daily charge.


3.2.8. The school site sits within the T-Charge Zone (illustrated to the right).

ZERO EMISSION AND ULTRA LOW EMISSION BUSES


3.2.9. TfL has started to deliver on their plans to introduce around 3,000 Ultra Low Emission double-deck buses in central London by 2019, and over 250 Zero Emission single-deck buses into central London by 2020.

3.2.10. Euro VI is the latest standard in diesel engines, reducing emission of $NO_x$ by up to 95% compared to the previous generation of buses. Since 2014 new buses have been supplied with these Ultra Low Emission engines and continue to get introduced across London at a rate of between 700 and 1,000 buses a year.

ZERO EMISSION CAPABLE (ZEC) TAXIS

3.2.11. TfL introduced new licensing requirements in January 2018 to reduce emissions from the taxi fleet by phasing out diesel taxis and increasing the number of ZEC vehicles in London. This means that:

- From the 1st January 2018, taxis presented for licensing for the first time will need to be ZEC. This means having $CO_2$ emissions of no more than 50g/km and a minimum 30 mile zero emission range;
- A first-time taxi vehicle licence will need to meet the latest emissions standard (currently Euro 6).

3.2.12. To encourage the uptake of ZEC taxis, TfL are helping to fund a Government led Plug in Taxi Grant which gives taxi drivers up to £7,500 off the price of a new ZEC taxi. This is particularly relevant for the site due to the high volume of traffic on the surrounding streets comprising of taxis, discussed further in the subsequent chapter.

SCHOOL STARS ACTIVITIES

3.2.13. STARS (Sustainable Travel: Active, Responsible, Safe), is TfL's accreditation scheme for London schools and nurseries, to inspire young Londoners to travel to school sustainably, actively, responsibly and safely by championing walking, scooting and cycling.

3.2.14. As part of the STARS scheme schools receive bespoke guidance from the borough, high quality on-line resources with over 120 activity cards, access to a London-wide community of schools, priority access to funding, accreditation and recognition.

HEALTHY SCHOOLS LONDON ACCREDITATION

3.2.15. Healthy Schools London is a programme that supports London's schools to provide an environment and culture that helps their pupils grow to be healthy, happy and therefore good learners. This programme supports schools as they work through an award scheme (sponsored by the Mayor of London), with a network of local coordinators, and a range of resources, tools and advice provided through this website and regular workshops for schools. Christopher Hatton Primary School is registered and has **silver accreditation** status. This is further evidence that the school is already well engaged in addressing transport issues and improving air quality. We recommend that the school continues to engage with Healthy School London and aims for the gold award

HEALTHY SCHOOLS LONDON

# Chapter 4 – Audit Findings: Sources of Emissions and Exposure

# 4 AUDIT FINDINGS: SOURCES OF EMISSIONS & EXPOSURE

## 4.1 INTRODUCTION

4.1.1. The audit findings are summarised in this chapter as follows:

- Air quality data
- Observed issues, emission sources or exposure:
  - Highways
  - School grounds and buildings

## 4.2 AIR QUALITY IN THE SURROUNDING AREA

4.2.1. The air quality data used to assess the pollution climate immediately around each school has used a combination of modelled and measured data. Modelled baseline $NO_2$ annual mean concentrations have been taken from the 2013 London Atmospheric Emissions Inventory (LAEI) model. $NO_2$ measurements have been derived for the past ten years (2006-16) for the closest monitoring site to the school from a combination of measurements taken from the London Air Quality Network (LAQN) and Local Authority diffusion tube sites, where available.

4.2.2. Briefly, the LAEI model provides mapped annual mean $NO_x$, $NO_2$, $PM_{10}$ and $PM_{2.5}$ concentrations on a 20m x 20m basis for the whole of London from a base-year of 2013 for 2020, 2025 and 2030. The LAEI uses air pollution emission estimates from a wide range of sources including transport, industrial, domestic and commercial combustion, agriculture and long-range transport using the most up-to-date activity data, emission factors and projection factors. **Figure 5** shows the 2013 LAEI baseline annual mean $NO_2$ concentrations within the vicinity of Christopher Hatton Primary School in Camden. The contours (changes in colours) show how the pollution gradient changes, with distance, away from Rosebery Avenue and the heavily trafficked Clerkenwell Road (A5201). $NO_2$ concentrations are predicted to be higher along the eastern boundary of the school, which is closest to Rosebery Avenue.

**Figure 5 – Localised Air Quality modelling around Christopher Hatton Primary School**

4.2.3. Nearly 50% of $NO_x$ emissions in London are from road transport. Vehicle emissions data for the LAEI modelled road links within 200m of the school, split by source, have been analysed to identify the key sources contributing to $NO_2$ in the vicinity of the school. The pie chart below shows that buses account for 8% of the total traffic but contribute 62% of the transport related $NO_x$ emissions locally.

**Figure 6 – Road Transport $NO_x$ Emissions and Volumes**

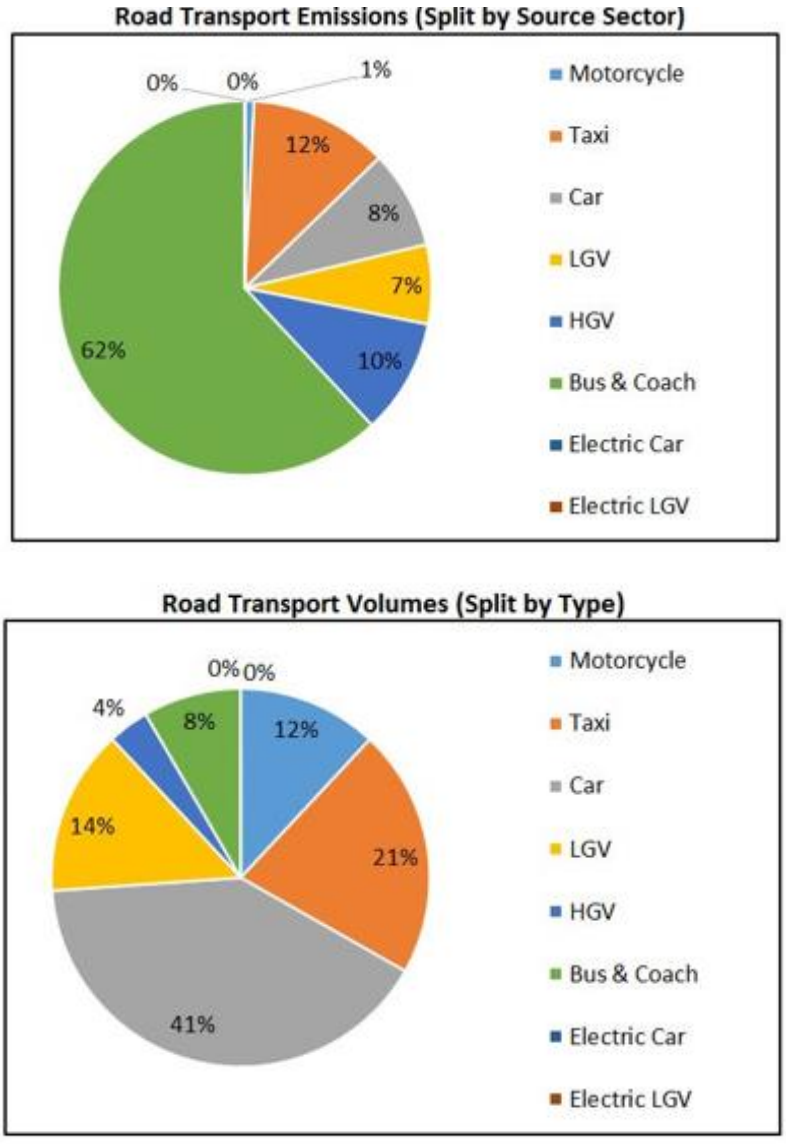
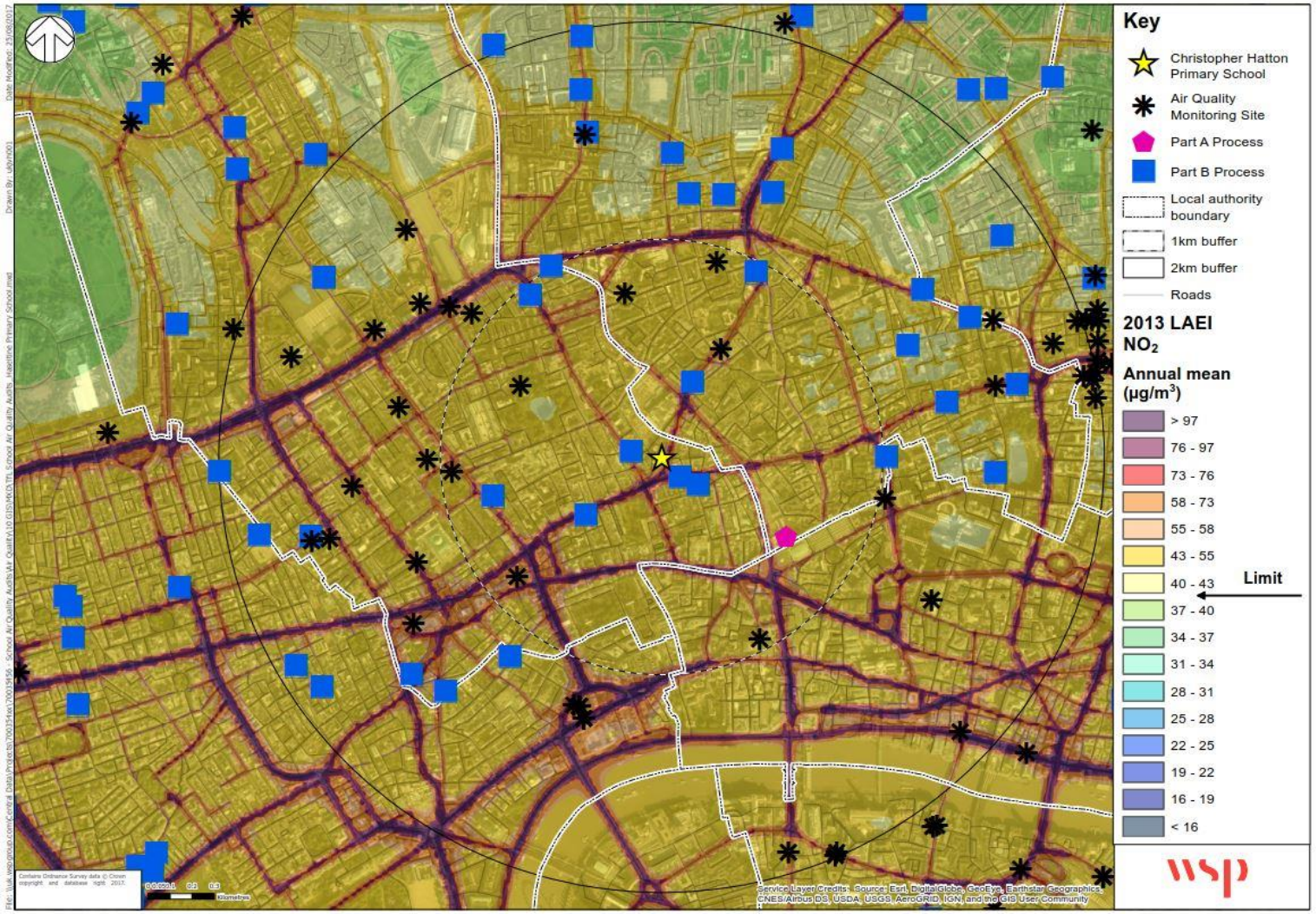


**Figure 7 – Air Pollution in the surrounding areas**




Note: Part A and B Processes include regulated industrial installations that have the potential to cause pollution and are required to have an Environmental Permit to operate, including facilities which carry out industrial processes, waste activities, mobile plant and solvent emission activities.

## 4.3 HIGHWAYS – KEY OBSERVATIONS

4.3.1. The school is on the corner of Laystall Street and Rosebery Avenue (A401). The latter is a heavily trafficked street with large numbers of buses. The school is surrounded by tall buildings, many of which have flues on their facades.

4.3.2. A very small number of pupils, but more staff, use the bus stops on Rosebery Avenue near the school. There are parking bays on Rosebery Avenue near the school, as well as a southbound bus stop (in a bus lane) and two northbound bus stops within 120m of each other. Traffic can be slow moving in the morning peak.

4.3.3. The pupil entrance to the school is at the western side of the school site and so most walking routes taken by the pupils avoid the polluted Rosebery Avenue. This entrance is next to a large, car free public realm area. The Mount Pleasant redevelopment site is opposite this and the school is campaigning for a pocket park to be installed here as part of this redevelopment. There are some trees in this area, but there is potential to make the space a much greener, pleasant and more interesting environment. There are collapsible bollards restricting vehicles from the area while still allowing fire access to the school.

4.3.4. There is a rubbish collection point in this area as well as a loading bays (in use on the day of the audit). Three vehicles were seen dropping children off legally on the morning of the visit, using residential parking bays on Mount Pleasant. These bays, and another development on Mount Pleasant, are the main obstacles to the school's desire to pedestrianize a section of Mount Pleasant. The school claimed that, other than the potential pocket park, there are no plans to change or add to the infrastructure in the area near the school as part of the Mount Pleasant redevelopment, despite hundreds of new flats being built. The school also has ongoing road safety concerns about children crossing Elm Street and mentioned syringes and dog faeces on Gough Street.

4.3.5. Cars and vans (notably Post Office vans) are known to travel quite fast on Laystall Street, past the school's official entrance. Laystall Street is narrow and this is especially dangerous in the morning peak period, if pupils are walking in the area along narrow footways in close proximity to speeding vehicles. One child was hit by a post office van a few years ago and a speed bump was put in on Mount Pleasant as a result. There are also barriers on the street.

### Summary – Key Issues

- Rosebery Avenue is a heavily trafficked road with large numbers of buses, polluting the local environment
- Laystall St is narrow and vehicles sometimes speed through it and Elm Road in close proximity to children
- The forthcoming redevelopment of the Mount Pleasant site may not be mitigating its future air quality and transport impacts sufficiently. Air quality will worsen in the local area will worsen once construction begins in five years' time unless appropriate mitigation measures are sought.


Laystall Street, showing the school keep clear markings outside the school's official entrance

Public realm area, with Mount Pleasant to the right, leading to Laystall Street. Note the collapsible bollards (to allow access to the school)

The public realm area and passageway leading to the school gate, with the main school building behind

Rosebery Avenue, looking north, with pedestrian crossing, parking and a northbound bus at a bus stop. The school is to the left.


Rosebery Avenue, looking south, with southbound bus lane and bus stop. The school building is on the right, with parking outside.

## 4.4 SCHOOL GROUNDS / BUILDING - KEY OBSERVATIONS

4.4.1. Pupils access the school site from the west via Laystall Court, a small passageway which ends in the school gate leading to the main playground. This gate is open from 8.45am-9am. Late pupils must use the school's official entrance on Laystall Street, south of the school, where visitors enter via the reception. There is cycle parking for staff and visitors in the forecourt outside this entrance.

4.4.2. The oldest parts of the school building date from 1876, with the thick walls, tall rooms and large windows typical of this era (though these have recently been double glazed). Some of the insulation in the school buildings is poor. Despite this, the school does not have major issues with hot or cold rooms. However, this may result in increased run times for the school boilers and therefore greater emissions.

4.4.3. The main school building is on Laystall Street. North of this, the school's main playground is surrounded by buildings, including residential blocks to the north. To the east, the playground is next to Rosebery Avenue. The playground is at a lower level than Rosebery Avenue and it even extends under the street, in caverns. The main playground was previously smaller, and so other playgrounds were created, one on top of the official entrance and reception area (known as the mid-level playground) and one at the top of the school (the rooftop playground). A nursery playground faces Laystall St, slightly below road level. There is a green screen between this playground and the street. All playgrounds except for the rooftop playground have plants and trees. The boilers (3) are located in a single plant room on the ground level in the main building, and are relatively new (2011). They appear in good condition. The flue exits via a reasonable height. However, the rooftop playground is next to these flues and so children are playing in close proximity to this source.

4.4.4. The main school hall and most school classrooms are in the main building. The windows in the main hall and some of the classrooms open out onto the polluted Rosebery Avenue. Ventilation at the school is reliant on natural ventilation via windows and doors.

4.4.5. There is a smaller building on the corner of Laystall Street and Rosebery Avenue which contains an IT room, a music room, and is also where the breakfast club happens between from 8am – 8.45am. There is an entrance into this building directly from Laystall Street.

4.4.6. Pupil scooter/cycle parking is well used, with limited space available. There is no staff vehicle parking on site.

### Summary – Key Issues

- Rooftop playground used by pupils in close proximity to flues
- Some classrooms and the school hall face Rosebery Avenue, which exposes children to pollution when windows are opened
- Parts of the building are poorly insulated, potentially leading to increased running times of boilers
- Cycle/scooter parking near capacity

The main playground, overlooked by residential blocks

View from the playground looking up towards Rosebery Avenue. Note the climber plants

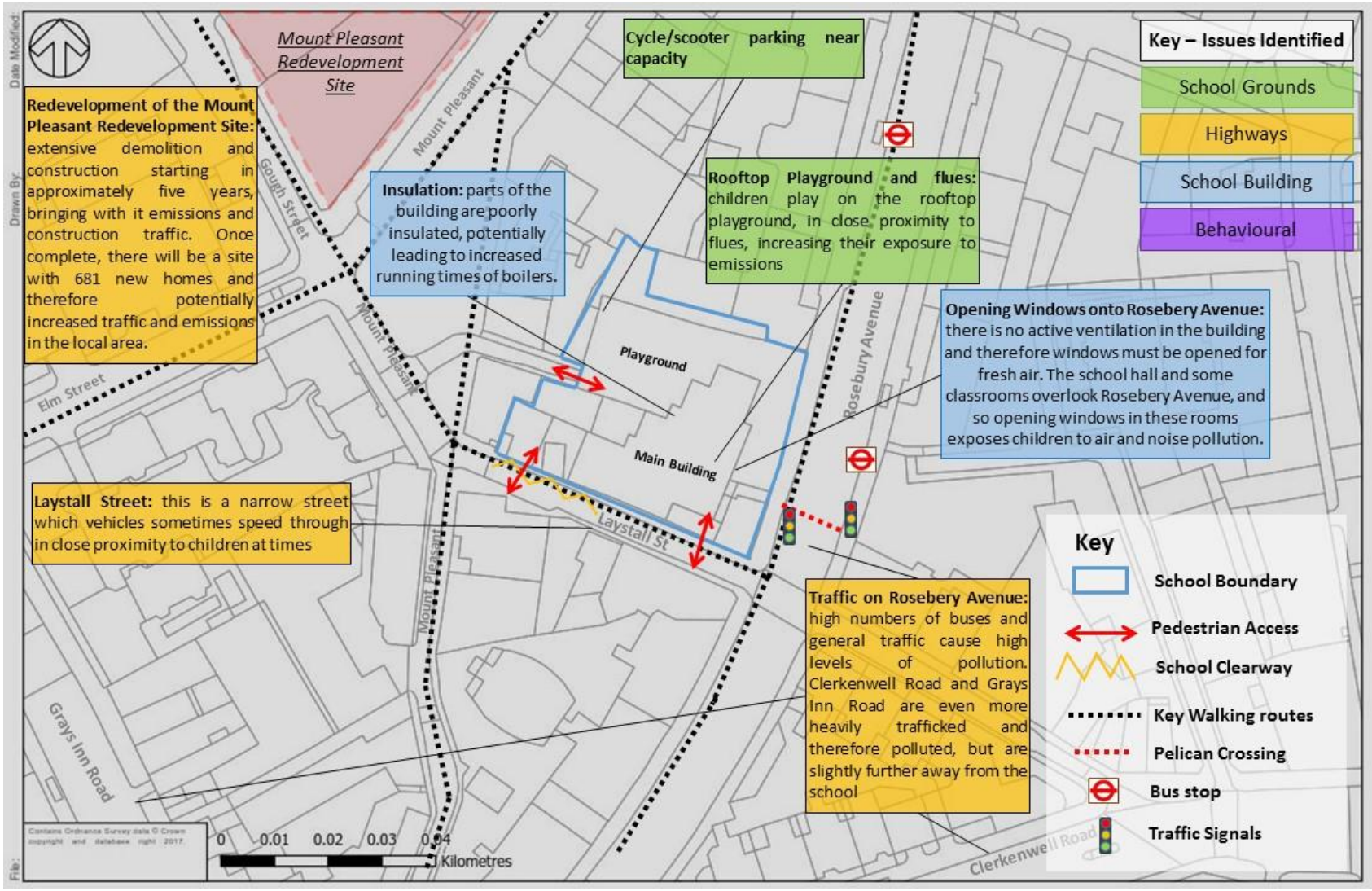
The rooftop playground

View from the playground of the smaller building on the corner of Laystall Street and Rosebery Avenue (containing the IT suite and other rooms)

Pupil bike and scooter parking

## 4.5 KEY OBSERVATIONS

### Figure 8 – Summary Issue Map



# Chapter 5 – Recommendations

# 5 RECOMMENDATIONS

## 5.1 DEVELOPING THE RECOMMENDATIONS

5.1.1. Based on the preceding desktop research, site audits and stakeholder feedback, a range of recommended measures and initiatives have been identified to deliver air quality improvements and reduced exposure to air pollution. The recommendations will not in themselves solve the air quality problem, but will each contribute directly or indirectly to helping improve the situation in and around the schools.

5.1.2. These recommendations are drawn from a comprehensive School Air Quality Audit Toolkit of Measures, researched and developed as part of the Mayor's Air Quality Audits project (see Appendix D for further details). The toolkit has been compiled from a review of best practice approaches and new technologies, including both well established and simple measures, and more innovative or harder hitting measures. The measures include both physical measures and softer behavioural measures.

5.1.3. The characteristics of the local area, school site and school building have then been accounted for in identifying and tailoring a suitable package of measures to address the issues identified in causing sources of pollution or exposure to air pollution. These recommendations have also sought to be cognisant of any relevant existing plans for the local and wider area around the school (see Section 3.2).

5.1.4. A key facet of this approach, and the palette of measures from which measures were identified, is that they represent a holistic approach, as promoted by the Healthy Streets approach, in seeking to address a broad range of factors which each influence how streets are used, how people travel and consequently how clean the air is in and around the school. As such whilst a number of measures are less directly related to air quality, they were felt to offer the potential for contribute indirectly, for example through creating a better and safer environment for travelling by sustainable modes.

5.1.5. Table 2 on the following page sets out the list of recommendations. For the purposes of this assessment they have been categorised as proposals associated with either Highways, school grounds or school building. In order to enable comparison of each measure, and to assist the school, borough and other stakeholders, in determining which measures to prioritise, each has been assessed against a series of key criteria:

- Potential Air Quality Improvement
  - Low – nominal measureable change but a tangible reduction in sources or exposure
  - Medium – a small measurable change in air quality
  - High – a large measureable improvement in air quality
- Wider Benefits
  - Such as improved safety, visual amenity, child health and welfare, improve learning environments, costs savings, promotion of sustainable transport, contributes to STARS or Healthy Schools London.
- Cost *(Note these reflect the overall costs, but these may vary amongst difference stakeholders*).
  - Low - <£10k
  - Medium - £10k-100k
  - High - >100k
- Deliverability

- Quick Win – readily deliverable within 12 months
- Medium term – deliverable within 1-3 years
- Longer term – only deliverable in the longer term (i.e. over 3 years)

- Stakeholder Support

- Low – likely to be significant objections which could delay/prevent the scheme
- Medium – may be some objections and will require consultation but not significant delays
- High – likely to be strong support from key stakeholders

5.1.6. These are high level comparative analyses intended to offer a means of considering the recommendations against one another in relative terms. Further more detailed research and options development would be required to quantify these recommendations in greater detail, such as would be undertaken in a subsequent feasibility study. The implementation of the measures will be dependent on securing funding to enable delivery over time (see section 5.8), as well as undertaking feasibility assessments and scheme prioritisation.

**Table 2 - Recommended measures for consideration**

| Measure | | Description | Purpose | Potential Air Quality Improvement | | | Wider Benefits | Cost | | | Deliverability | | | Stakeholder Support | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Low | Medium | High | | Low | Medium | High | Quick Win | Medium Term | Long Term | Low | Medium | High |
| ***Highway*** *(Key Stakeholder: Borough)* | | | | | | | | | | | | | | | | |
| 1 | Anti-Idling | The Borough are introducing legislation that will allow them to fine idling drivers. In the long term, this kind of enforcement might be possible on Laystall Street and/or Rosebery Avenue. In the short term, signage and/or banners raising awareness near the school might help reduce the number of idling cars. | Reduce sources and exposure | X | | | ▪ Supports STARS and HSL objectives | X | | | X | | | | | X |
| 2 | Walking Route Maps / Leaflets | Regardless of exposure on the school site, pupils are still exposed to polluted streets while walking to/from the school. Walking along Rosebery Avenue and Grays Inn Road in particular should be avoided. Alternative routes along local streets might take a few extra minutes but would greatly reduce exposure. We recommend creating maps of the least polluted streets (with journey times) and distributing these to families. This could count as a STARS 'Other Walking Activity' and could contribute to progress. The production of route maps should be done in conjunction with leaflets raising awareness about the science behind air pollution and its effects. This could be done in conjunction with the Borough. | Reduce exposure to emissions | X | | | ▪ Promotion of active/sustainable transport<br>▪ Supports STARS objectives<br>▪ Engagement with school community | X | | | X | | | | | X |
| 3 | School Street/ Play Street | Consider the scope for introducing a school street restriction on Laystall Street to reduce emissions and exposure around the school at pick-up and drop-off times, and to help create a safer, more pleasant environment for children / parents travelling to school. Signs will inform drivers of the restrictions. We understand that the borough has previously investigated this measure and was unsure whether it would be sufficiently beneficial. A possible approach would be to implement a play street as a form of trial to better understand the benefits and impacts and informing a decision on whether to implement the measure. | Reduce sources and exposure | X | | | ▪ Road safety | | X | | | | X | | X | |
| 4 | Future planning conditions - construction/ freight traffic | In future, freight/construction vehicles associated with new developments (i.e. the Mount Pleasant Redevelopment Site) can be required to use only Euro 6 compliant vehicles, and ULEVs as they become available, with consolidation of trips and re-timing of deliveries to off-peak periods as part planning permissions. | Reduce sources and exposure | | X | | ▪ Promotion of sustainable transport<br>▪ Road safety | X | | | | | X | | X | |

| Measure | | Description | Purpose | Potential Air Quality Improvement | | | Wider Benefits | Cost | | | Deliverability | | | Stakeholder Support | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Low | Medium | High | | Low | Medium | High | Quick Win | Medium Term | Long Term | Low | Medium | High |
| 5 | Construction sites compliance | Construction sites, such as the one that will eventually exist at Mount Pleasant, are required to comply with certain conditions to be granted planning permission. For example, they are required to capture as many as possible of the particulates that are created as a result of their processes. The school/borough can hold the forthcoming construction sites to account if they are not complying with their conditions. This could also be a STARS 'Partnership Activity'. | Reduce emissions at source | X | | | ▪ Supports STARS objectives | X | | | | X | | | X | |
| 6 | Green Infrastructure in the Surrounding Area | Section 5.3 lists potential locations for green infrastructure in the local area, such as on Rosebery Avenue and Gough Street, and a pocket park in the public realm area by Mount Pleasant (it also includes text on indoor plants). The infrastructure proposed will better protect pedestrians using footways around the school and/or reduce levels of pollutants in the playground. The locations of potential green infrastructure is shown in Figure 9. | Reduce exposure to emissions | X | | | ▪ Visual amenity<br>▪ Potential for educational benefits | | X | | | X | | | X | |
| 7 | Healthy Streets approach, sustainable transport and roadspace reallocation from vehicular traffic | Promote the Mayor of London's Healthy Streets approach which aims to improve air quality, reduce congestion and help make London's diverse neighbourhoods greener, healthier and more attractive places to live, work, play and do business. Take a proactive role in endorsing the approach and supporting these initiatives. | Reduce sources and exposure | | | X | ▪ Promotion of sustainable travel | | | X | | | X | | X | |
| 8 | Non-Road Mobile Machinery Audit | The Council could consider a requirement for a Non-Road Mobile Machinery (NRMM) Audit to be undertaken at construction sites. This requirement is being trialled within some Low Emission Neighbourhoods to help ensure compliance of vehicles used for developments. Currently, NRMM is the third largest contributor of NOx emissions and the fifth largest contributor of PM emissions in London, and any comprehensive plan to reduce London's emissions should attempt to address emissions from construction machinery. | Reduce sources of emissions | X | | | ▪ Reduce noise | X | | | X | | | | X | |
| 9 | Control of Dust and Emissions during | Introduce a requirement in planning conditions to manage dust and emissions associated with construction based on the Control of Dust and Emissions during | Reduce sources of emissions | X | | | | X | | | X | | | | X | |

| Measure | | Description | Purpose | Potential Air Quality Improvement | | | Wider Benefits | Cost | | | Deliverability | | | Stakeholder Support | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Low | Medium | High | | Low | Medium | High | Quick Win | Medium Term | Long Term | Low | Medium | High |
| | Construction and Demolition SPG | Construction and Demolition SPG prepared by the GLA, which includes requirements for construction sites to monitor air quality and share the results with the borough council – https://www.london.gov.uk/what-we-do/planning/implementing-london-plan/supplementary-planning-guidance/control-dust-and | | | | | | | | | | | | | | |
| ***Highway*** *(Key Stakeholder: TfL)* | | | | | | | | | | | | | | | | |
| 10 | Bus Stop Removal | The northbound bus stop on Rosebery Avenue near the school is in close proximity to other northbound bus stops on the same route. The preceding bus stop, this bus stop and the following bus stop are all within 400m of each other. The potential for removal (or relocation) of the bus stops closest to the school should be investigated, as buses stopping near the school is a major local emissions source. | Reduce emissions at source | X | | | | | X | | | X | | | X | |
| ***School Grounds*** *(Key Stakeholder: School/ Borough)* | | | | | | | | | | | | | | | | |
| 11 | Scooter/ Cycle Parking | Increase scooter and cycle parking spaces to encourage sustainable / healthy travel behaviour. | Promoting walking, scooting and cycling by providing improved local conditions | X | | | ▪ Promotion of sustainable transport<br>▪ Supports STARS objectives<br>▪ Potential STARS measure | X | | | X | | | | | X |
| ***School Building*** *(Key Stakeholder: School/ Borough)* | | | | | | | | | | | | | | | | |
| 12 | Improved insulation | Install new insulation panels or spray on polyurethane foam between ceiling beams to improve energy efficiency, reduce heat loss, lessen energy usage, and potentially boiler run-times. Potentially less heat gain in hot weather, lessening need for ventilation via opening doors/windows. | Reduce sources and exposure | X | | | ▪ Reduced energy consumption and reduced operating costs<br>▪ Improved learning environments | | X | X | X | | | | X | |
| 13 | Optimising Compensator Control System | Installation of an Optimising Compensator Control System in the old building to reduce time the boilers there are used based on e.g. weather, occupancy of school etc. | Reducing sources and exposure | X | | | | X | | | X | | | | | X |
| 14 | Air Filtration Systems | Consider investing in air filtration systems in classrooms most exposed to poor air quality and reliant on natural ventilation. These systems are relatively high cost, only cover a single room per unit, and do require ongoing maintenance and power consumption, but have demonstrated some encouraging initial | Reduce exposure to emissions | X | | | ▪ Improved learning environments | | X | | | X | | | X | |

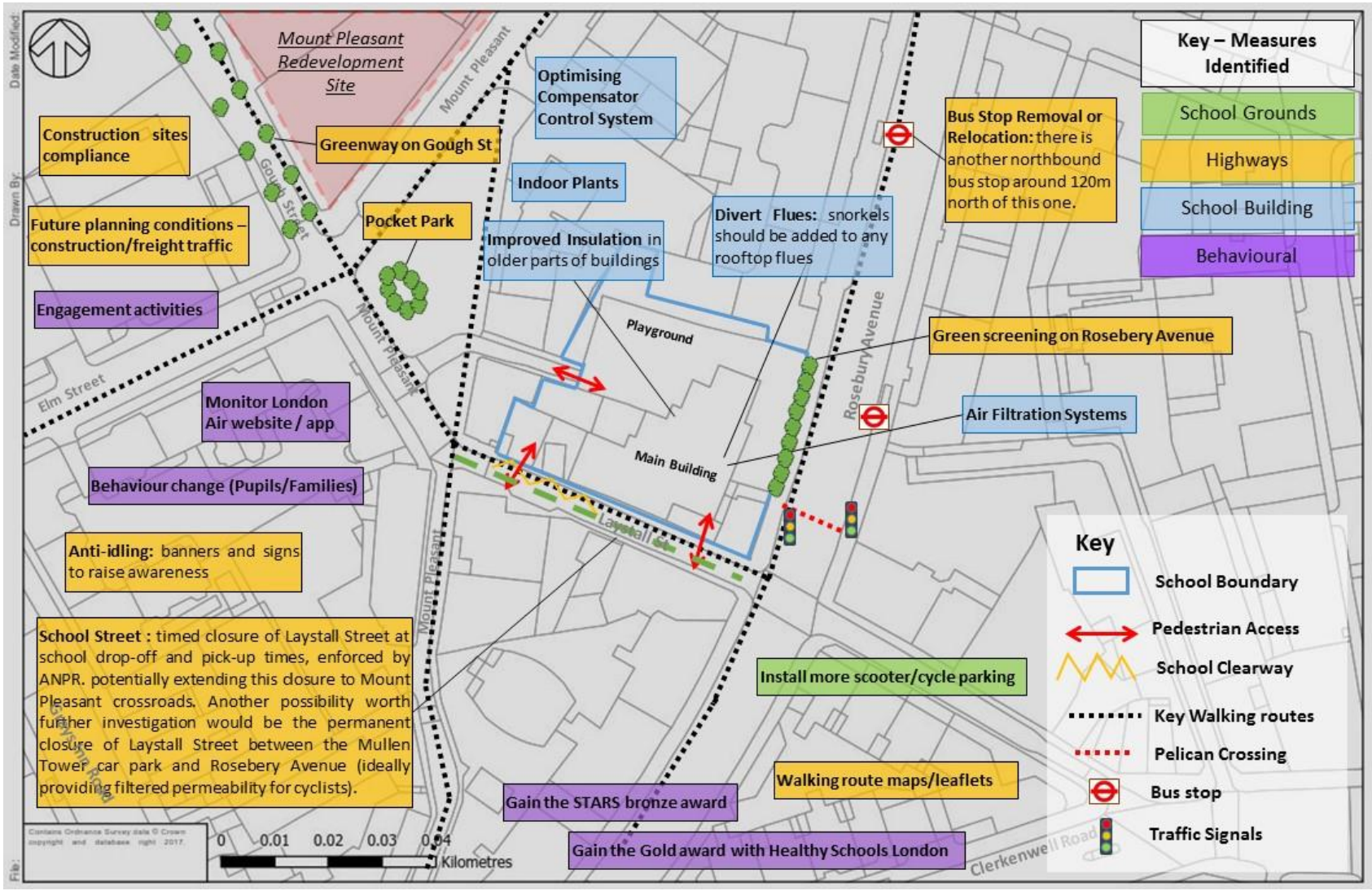
| Measure | | Description | Purpose | Potential Air Quality Improvement | | | Wider Benefits | Cost | | | Deliverability | | | Stakeholder Support | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Low | Medium | High | | Low | Medium | High | Quick Win | Medium Term | Long Term | Low | Medium | High |
| | | scientific evidence of efficacy, with titanium dioxide proven to act as a reducer for $NO_x$ and $NO_2$, and some claims it will eliminate 99.5% of $NO_2$. They can also assist with virus elimination/reduction. | | | | | | | | | | | | | | |
| 15 | Indoor Plants | See Section 5.3 for information on this measure. | Reduce exposure | X | | | | X | | | X | | | | | X |
| 16 | Divert Flues | Install snorkels for rooftop flues to raise their exhaustion height further away from children playing in the rooftop playground. Flues and extraction equipment should ideally be exhausting above roof ridge height like the main boiler flues to aid quick dispersal. | Reduce exposure | X | | | | X | | | X | | | | | X |
| ***Behavioural Measures*** *(Key Stakeholder: School/ Borough)* | | | | | | | | | | | | | | | | |
| 17 | Monitor London Air website / app | Daily monitoring of London Air website / app to understand air quality on the day and whether e.g. opening of windows will increase exposure of air pollution to staff and students | Reduce exposure to emissions | X | | | ▪ Awareness raising<br>▪ Child health and welfare | X | | | X | | | | | X |
| 18 | Engagement Activities | Deliver lesson plans with bespoke materials, poster and London school curriculum (see Appendix C), raising awareness of the issues and the type of measures that can have a positive impact on reducing poor air quality | Awareness raising and behavioural measures | X | | | ▪ Awareness raising<br>▪ Supports STARS and HSL objectives | X | | | X | | | | | X |
| 19 | Behaviour change (Pupils/ Families) | The school could promote apps / sites such as 'www.walkit.com' to promote suitable walking routes to avoid air pollution hotspots (i.e. minimising time spent walking on Rosebery Avenue). It could also co-produce a leaflet raising awareness about the science behind air pollution and its effects in collaboration with the borough. | Behavioural measures / reducing exposure to emissions. | X | | | ▪ Awareness raising<br>▪ Secure community buy-in for measures<br>▪ Potential STARS measure | X | | | X | | | | X | |
| 20 | Attain a Gold Award in Healthy Schools | This will entail reviewing the school's practices in promoting health & wellbeing that must be evidenced (via a Review Tool). | Behavioural measures | X | | | ▪ Supports STARS and HSL objectives | X | | | X | | | | | X |
| 21 | Attain Bronze status in STARS | We would recommend that the school continues to upload details of the various good sustainable travel activities that are being undertaken so that it can be awarded bronze status. On the day of the audit, the Borough's School Travel Plan Officer offered to assist with the administrative side of this. After achieving bronze status, the school should continue its engagement through to the silver and gold award categories. | Behavioural measures / reducing exposure to emissions. | X | | | ▪ Awareness raising<br>Secure community buy-in for measures<br>▪ Supports STARS and HSL objectives | X | | | X | | | | | X |

| Measure | | Description | Purpose | Potential Air Quality Improvement | | | Wider Benefits | Cost | | | Deliverability | | | Stakeholder Support | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Low | Medium | High | | Low | Medium | High | Quick Win | Medium Term | Long Term | Low | Medium | High |
| | | By being a part of the STARS scheme, the school may be eligible for sources of funding (for measures that will improve air quality) which it otherwise wouldn't be. Doing this would also entail achieving a range of measures promoting active travel and reduced emissions, also signposting additional initiatives and avenues of support. The framework also helps document and track progress, and implement recommendations.<br>As mentioned earlier in the table, the Anti-Idling, Walking Route Maps / Leaflets, School Street, Play Street, Construction Site Compliance, Scooter/Cycle Parking, Engagement Activities and Behaviour Change measures could all count towards STARS progress and help the school attain the bronze award. | | | | | | | | | | | | | | |
| ***Wider Measures*** *(Key Stakeholder: Borough/ TfL/ GLA/ Central Government)* | | | | | | | | | | | | | | | | |
| 22 | Targeted scrappage scheme for polluting vehicles entering London | Engage with any future proposals or consultations regarding the introduction of a targeted scrappage scheme, aimed at more polluting vehicles recorded entering London regularly over an extended period, promoting a transition to ultra-low emission vehicles, in conjunction with measures to promote more sustainable transport. | Reduce sources and exposure | | | X | | | | X | | | X | X | | |
| 23 | Reform Vehicle Excise Duty | Lobby national government to reform Vehicle Excise Duty to reflect emissions of local pollutants as well as $CO_2$, and remove the ongoing incentivisation this lends to diesel vehicles. | Reduce sources and exposure | | | X | | | X | | | | X | X | | |
| 24 | Promote a transition to electric heating and heat pumps | Seek to promote the principles of 'an all-electric city', including reducing/eliminating the use of gas in buildings, which city wide account for over 33% of emissions, by requiring or incentivising the use of electric heating/cooling via heat pumps in new buildings and major redevelopments. | Reduce sources and exposure | | | X | | | X | | | | X | X | | |
| 25 | Reform Buildings Regulations to promote heat pumps | Support and promote dialogue at a national level concerning buildings regulations and how they're calculated to better account for local air quality issues as well as energy efficiency, and so promote wider deployment of technologies such as heat pumps. | Reduce sources and exposure | | X | | | | X | | | | X | X | | |
| 26 | Zero emission zones | Review the effectiveness of planned measures and develop an approach for introducing a zero emission zone in central London and town centres in the short to | Reduce sources and exposure | | | X | | | | X | | | X | X | | |

| Measure | | Description | Purpose | Potential Air Quality Improvement | | | Wider Benefits | Cost | | | Deliverability | | | Stakeholder Support | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Low | Medium | High | | Low | Medium | High | Quick Win | Medium Term | Long Term | Low | Medium | High |
| | | medium term, and larger inner London and London-wide zones in the longer term. To be developed in conjunction with other policies such as the creation of Liveable Neighbourhoods, reducing road danger and making more efficient use of the street network, including for freight and servicing. Any specific schemes would be subject to statutory consultation. | | | | | | | | | | | | | | |

## 5.2 KEY RECOMMENDATIONS

### Figure 9 – Summary Recommendations Map



## 5.3 PRIORITISED MEASURES FOR THE SCHOOL

5.3.1. To help prioritise what measures should be progressed for the school, borough officers and representatives of the school were asked:

*'Based on the toolkit of measures and the findings of the observations and initial analysis, what are the top three measures you would prioritise for the school?'*

5.3.2. Three of the more key measures were considered to be (in no particular order):

**School Street/ Play Street on Laystall Street**

5.3.3. Consider the scope for introducing a school street restriction on Laystall Street (i.e. between Mount Pleasant and Rosebery Avenue) to reduce emissions and exposure around the school at pick-up and drop-off times, and to help create a safer, more pleasant environment for children / parents travelling to school. Signs will inform drivers of the restrictions.

5.3.4. This is a measure being trialled by several Boroughs, including Camden, whereby the roads outside the school are closed to traffic during certain hours of the day, usually during drop-off and pick-up times (e.g. 08.30-9.30 and 15.00-16.00 Mon-Fri). Closing streets to school traffic and through traffic helps to make a safer, more pleasant environment for everyone while ensuring residents, businesses, pedestrians and cyclists can still use the streets.

5.3.5. Vehicles would not be able to drive on Laystall Street between Mount Pleasant and Rosebery Avenue during the timed closures unless they have been given an exemption. It is proposed that residents and businesses who live and work on a school street, and blue badge holders, would be able to register for an exemption. Signs would inform drivers of the restrictions before the entrance to the closed street. Non-registered vehicles entering the street during the times of operation would be identified by camera and issued a fixed penalty notice.

5.3.6. We understand that the borough has previously investigated this measure and was unsure whether it would be sufficiently beneficial. A possible approach would be to implement a play street as a form of trial to better understand the benefits and impacts and informing a decision on whether to implement the measure. A 'play street' is effectively a timed closure outside the school, and games and activities are organised for children and parents on the reclaimed street space during the morning and/or afternoon drop-off and pick-up periods. Signing and enforcing the closure is a joint exercise between the Borough and the school. 'Play streets' involve quite a lot of organisation and it is best if a local resident or parent is closely involved in the process who can rally others to the cause. The parent community at the school is quite active, so there is a good chance that a scheme like this could be a success, especially seeing as the school community are concerned about the air quality and road safety issues in the area.

**Green Infrastructure**

5.3.7. There are significant opportunities in and around the school to implement green barriers to better protect both the school and pedestrians from air pollution, while also improving the public realm.

5.3.8. Green screening/climbers could be added to the street side of the wall between the playground and Rosebery Avenue. A dense vegetation layer with a high leaf density would catch some particulates and hang on to them until they can be washed away by rainfall. The potential for additional trees and hedges on Rosebery Avenue, next to the school playground, should also be investigated.

5.3.9. During the workshop, a parent at the school suggested that a 'Greenway' on Gough Street would be a welcome improvement to the streetscape. This is one of the key routes to the school, so hedges along this route would be of some benefit in reducing exposure of children to air pollutants. This could perhaps be supported by the developers working on the Mount Pleasant redevelopment site.

5.3.10. During the workshop, the school explained that they have put forward plans for a Pocket Park in the public realm area by Mount Pleasant and are hoping that this is funded by the Mount Pleasant Redevelopment (i.e. as part of a Section 106 agreement).

5.3.11. On the day of the audit, Peter (an engineer at the Borough) explained that any green infrastructure to be installed on Borough Roads such as the Greenway on Gough Street or the Green Screening on Rosebery Avenue would need to be done through the Borough's parks department. The question of maintenance would also need to be addressed. Ideally, the school would be able to assist with the maintenance of any new plants that are added to the streetscape as a result of this audit.

5.3.12. The school expressed an interest in learning which plants were good for indoor air purification. There is some uncertainty in the benefit offered by using plants to improve indoor air quality. Other schools audited had spider plants, peace lilies and ferns in classrooms which are reported to reduce volatile organic compounds (VOCs) in indoor air. For advice on maintaining such plants, the school could consult with an ecological charity.

**Air Filtration**

5.3.13. Consider investing in air filtration systems in classrooms most exposed to poor air quality and reliant on natural ventilation. These systems are relatively high cost, only cover a single room per unit, and do require ongoing maintenance and power consumption, but have demonstrated some encouraging initial scientific evidence of efficacy, with titanium dioxide proven to act as a reducer for $NO_x$ and $NO_2$, and some claims it will eliminate 99.5% of NO2. They can also assist with virus elimination/reduction.

5.3.14. On the day of the audit, the school expressed great interest in HEPA filters. High Efficiency Particulate Filters are filters (in this case fitted to ventilation systems) that will filter air to a high standard. HEPA filters would work with a centralised ventilation system (i.e. air handling unit), but won't have much impact on a school reliant on natural ventilation, such as by opening windows and doors, which is the case at Christopher Hatton Primary School. As such unless these are plans to introduce a centralised ventilation system we would recommended the targeted introduction of air filtration units as described above.

**Additional Measures**

5.3.15. The school also expressed an interest in collecting additional monitoring data for air quality on the school site, with monitoring equipment installed over a period of time.

## 5.4 STARS ACCREDITATION SCHEME FOR SCHOOLS

5.4.1. STARS is TfL's world leading school travel accreditation scheme, inspiring young Londoners to travel smarter and more sustainably, and should form the framework within which the behaviour change related components of the above recommendations are recorded.

5.4.2. Many of the recommendations would also serve to contribute towards the required 'travel activities' and 'support activities' required to attain Gold status – which should ultimately be the aim for the school.

5.4.3. Equally by embracing the STARS process, delivering sustainable travel activities, achieving modal shift targets and demonstrating effective community engagement, the school will have successfully delivered air quality improvements through reduced travel by cars. The framework of STARS enables the school and borough to document, track and share their continued progress, and embed and implement the recommendations throughout the school community.

5.4.4. Schools are encouraged to note any air quality related activity undertaken on their TfL STARS profile stars.tfl.gov.uk, and to help inspire other schools, they are required to tell their story for each activity they have delivered.

5.4.5. Table 3 outlines the requirements for achieving the Bronze, Silver and Gold accreditation. Christopher Hatton Primary School is currently registered, without accreditation.

**Table 3 – STARS Scheme Accreditation Requirements**

| Bronze | Silver | Gold |
|---|---|---|
| – Complete 10 different 'travel activities' from the list of 80. Evidence is not required but it is recommended.<br>– Complete 6 different 'supporting activities' from the list of 40. Evidence is not required but it is recommended.<br>– Complete a hands up survey (with a respondent rate of at least 90%) to get a baseline understanding of how pupils get to school<br>– Set targets for a minimum of two modes | – Complete 20 different 'travel activities' from the list of 80. Evidence is required and must be submitted to the STARS website.<br>– Complete 10 different 'supporting activities' from the list of 40. Evidence is required and must be submitted to the STARS website.<br>– Demonstrate that a shift away from the car has been achieved through hands up survey results<br>– Record its staff travel patterns, through the same hands up survey method<br>– Set up a School Travel Plan working group with student representatives | – Complete 25 different 'travel activities' from the list of 80. Evidence is required and must be submitted to the STARS website.<br>– Complete 15 different 'supporting activities' from the list of 40. Evidence is required and must be submitted to the STARS website.<br>– Demonstrate that mode share has been shifted away from the car by at least 6%, or that 90% of travel is done by non-car modes<br>– Demonstrate that the targets from the last academic year were achieved or exceeded |

| | | |
|---|---|---|
| | — Present various bits of evidence of pupil, governor, staff and school council involvement (such as meeting minutes)<br>— Conduct consultation with parents and show results of this<br>— Carry out research and/or consultation | — Demonstrate that residents and neighbours are aware of the school's plans to promote safer and more active travel<br>— Demonstrate that the travel plan is an agenda item on at least one senior management meeting per year<br>— Demonstrate that safe and active travel is part of the School Development Plan |

Our recommended measures for the school include a number or initiatives that would also count towards the school attaining their Gold STARS scheme accreditation, including:

- Anti-Idling
- School Street
- Play Street
- Walking Route Maps / Leaflets
- Construction Sites Compliance
- Scooter / Cycle Parking
- Engagement Activities
- Behaviour Change

5.4.6. STARS activity cards are available for these measures, as well as wide range of other topics https://stars.tfl.gov.uk/Explore/Idea.

## 5.5 HEALTHY SCHOOLS LONDON

5.5.1. The Healthy Schools London programme should also as framework for promoting sustainable transport measure that will contribute towards improved local air quality. To achieve the Healthy Schools London Bronze award, one of the criteria is that "*the school promotes active travel to and from school*", and provides a number of examples, including:

- By implementing a school travel plan and running active travel initiatives such as:
- walk/cycle to school days
- walkers/cyclers breakfast clubs
- cycling at break times
- pedestrian skills and cycle training
- active travel competitions
- accreditation programmes

5.5.2. The schools must complete the following statements:

- Active Travel is promoted by:
- School travel plan: Date awarded/reviewed
- Active travel initiatives including:

5.5.3. Our recommended measures for the school include a number or initiatives that would also count towards these criteria, including a variety of proposals to promote improved environments for walking, scooting and cycling, and initiatives to promote behaviour change and raise awareness of benefits of active travel.

## 5.6 AIR QUALITY ALERTS

5.6.1. When high and very high air pollution is forecast, air quality alerts are displayed at many public locations across London including 2,500 bus stop countdown signs and all Tube stations. Alerts and guidance are also available via social media, an app and a text alert service providing information and guidance on the alert level.

5.6.2. The Mayor has recently (January 2018) expanded his existing air quality alerts systems and appointed King's College London to continuously monitor air pollution using the existing air quality monitoring network and cutting-edge modelling tools, delivering alerts as required. They will also directly notify a wider group of stakeholders so that the alerts are disseminated more widely and targeted at Londoners who are most vulnerable to the impacts of poor air, including schools.

5.6.3. Each school has been provided with further information via email on what the alert means, and how to reduce pupils' personal exposure, and they can contact AirQualityLondon@london.gov.uk for more information.

## 5.7 ENGAGEMENT

5.7.1. Engagement activities to raise awareness of the issue of air quality amongst children and the school community are fundamental to achieving change.

### MAYOR'S LONDON CURRICULUM PROGRAMME

5.7.2. The London Curriculum offers a wide range of high-quality teaching resources supporting most subjects on the national curriculum, CPD for teachers and events for children. Resources and activities are inspired by the city's diverse culture, heritage, science and technology, built environment, green spaces and rivers.

5.7.3. The Mayor of London's Air Quality Audits will be supported by a new programme of targeted activity delivered through the London Curriculum. The focus of the programme is to support teacher subject knowledge, and confidence to tackle air quality as a science subject recognising that this requires a wide knowledge and skill base of science, statistics and mapping. Activities associated with the above is detailed in Appendix C, for delivery by the schools / London Curriculum during the spring and summer terms, and summarised below:

### AUTUMN TERM

- WSP undertake school AQ audits
- London Curriculum engage with schools / school champion.
- By mid-October publish forward dates for spring term activity.
- Publish London.gov. web page which brings together the offer.

### SPRING TERM – TEACHER FOCUSED ACTIVITY

- STEM Learning package of available cpd on air quality
- RGS primary school geography network meeting

- ESRI training on mapping software for schools
- GLA provides schools with results and recommendations from WSP's audits, including outputs to be used for lesson material to use in future projects / initiatives.

### SUMMER TERM – PUPIL FOCUSED ACTIVITY

- Schools undertake project with pupils.
- National Clean Air Day June 2018.
- Support from IRIS/Science Learning Partnership/STEM Ambassador TBC.
- Schools recognition of air quality projects/celebration TBC.

### HEALTHY EARLY YEARS LONDON (HEYL)

5.7.4. Building on the success of Healthy Schools London, Healthy Early Years London is an awards scheme funded by the Mayor of London that supports and recognises early years setting achievements in child health, wellbeing and school readiness. Healthy Early Years London focuses on the whole child and gives settings a framework for their activity with children, parents, carers and staff and the wider community. HEYL will help to reduce health inequalities by creating environments which support a healthy start to life and promote a whole setting and targeted approach across a number of themes including Sustainability-active travel and air quality.

5.7.5. HEYL complements and enhances the statutory Early Years Foundation Stage (EYFS) framework, providing further focus on children, families and staff health and wellbeing. There are 4 levels of Awards: HEYL First Steps, Bronze, Silver and Gold. HEYL can be used as an improvement tool to support practice in all Early Years settings including active travel:

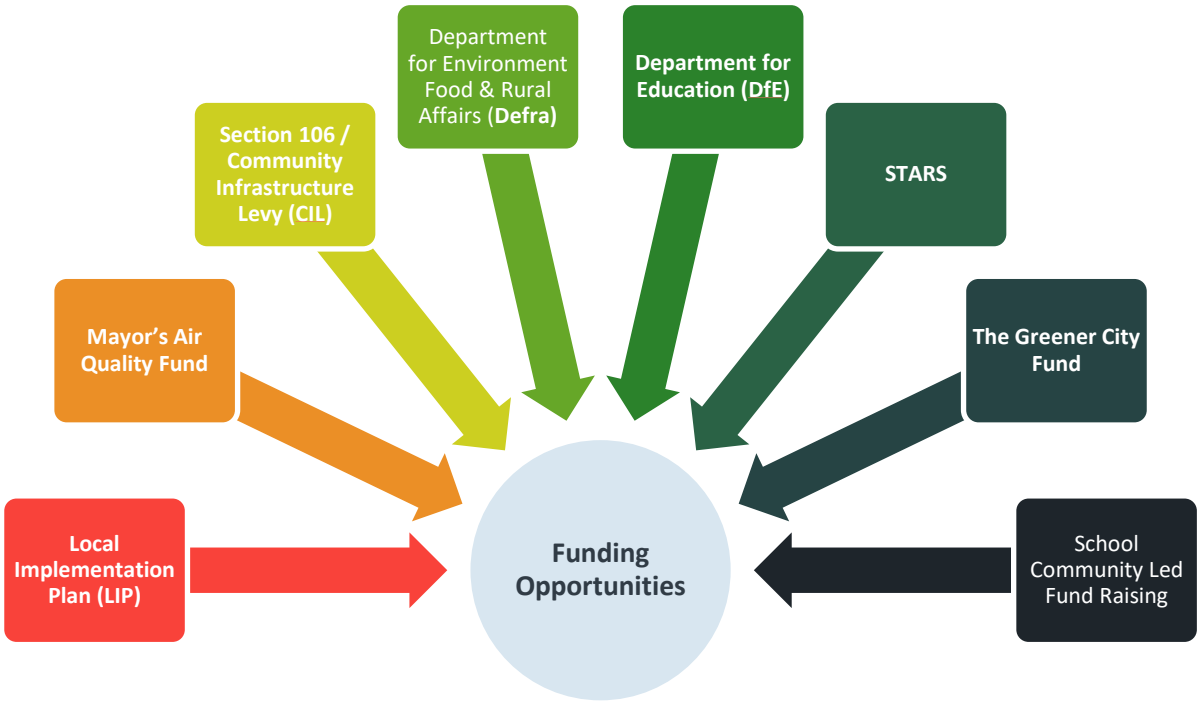
- Active travel is supported and encouraged, both for journeys to and from the setting and for trips (e.g. walking, scooting)
- The setting is signed up to receive air quality alerts from www.airtext.info/alerts
- There are activities and information available for parents and carers to support sustainability including: active travel, recycling or energy saving
- Practitioners are able to discuss and advise parents and carers on active travel

5.7.6. The full programme is due for official launch in spring 2018 which is intended to reach all 13,000+ settings and providers of childcare across London.

## 5.8 FUNDING OPPORTUNITIES

5.8.1. A wide range of potential funding sources are available and should be considered to progress some of the measures outlined above, as set out in the figure below.

**Figure 10 – Summary of funding opportunities**




5.8.2. Below, we discuss each of these in turn and set out the criteria associated with obtaining these funding opportunities, to enable the borough / schools to understand what measures they could progress with the funding opportunities that exists.

**Local Implementation Plan (LIP)**

5.8.3. A primary source of funding is linked to the Local Implementation Plan (LIP) 3 that will provide spending from April 2019 until April 2020, with bidding closing in October 2018. The guidance on bidding specifically references the need to improve air quality at schools:

> *'2.34 In the short- to medium-term, there must be a particular focus on action to reduce air, pollution, reducing exposure to it and tackling pollution hotspots, which boroughs should support through their LIP. Locations that have large numbers of vulnerable Londoners, such as schools, should be prioritised for action.* ***In particular, the boroughs have an important role in ensuring recommendations from the Mayor's school air quality audit programme are implemented, and LIP funding can be directed at both the audits and the delivery of measures****.'*

5.8.4. It is expected that certain recommendations from the audits can be implemented by the London boroughs using funding from TfL's Local Implementation Plan (LIP) funding stream, but this is subject to boroughs prioritising this area. It is ultimately at the discretion of the borough to follow this guidance and allocate money to fund the measures outlined above.

5.8.5. Whilst the Mayor has allocated funding for the first 50 audits, he expects the London boroughs to roll this out so that every school that is located in an area of high pollution can benefit from this approach. LIP funds are a source of funding for this, and guidance is being developed, alongside an audit toolkit and template, to be used locally to complete school air quality audits for other schools.

**Mayor's Air Quality Fund (MAQF)**

5.8.6. The MAQF is a £20 million fund, over ten years to support new projects by London boroughs to improve air quality. The first round of funding supported a wide range of projects, including: freight consolidation, green walls, low emission vehicles, reducing pollution from construction sites and digital signage to reduce engine idling.

5.8.7. In summer 2018, the third round of MAQF funding will open for applications (for projects commencing in April 2019).

**Section 106 / Community Infrastructure Levy**

5.8.8. Section 106 (S106) agreements and Community Infrastructure Levy (CIL) are potential sources of funding towards measures to address local air pollution.

5.8.9. S106 agreements, also known as planning obligations, are legal agreements made between local authorities and developers, and designed to address issues that new developments may cause or worsen on local infrastructure. The content of a S106 agreement is agreed during the consultation period of the planning application and the agreement is prepared by the council's solicitor.

5.8.10. A Community Infrastructure Levy (CIL) is a planning charge introduced by the government via the Planning Act 2008. It provides a means of ensuring that a new development contributes to the cost of the infrastructure that the development will rely on, such as schools and roads.

5.8.11. The levy applies to most new buildings and charges are based on the size and type of the floor space being created. The idea behind the CIL is that it's fairer, faster and more certain than the system of S106 planning obligations, which are negotiated on a case-by-case basis and that contributions can be sought in accordance with local policy objectives.

5.8.12. It is likely that there will be Section 106 money available from the Mount Pleasant Redevelopment in the coming years. These could be used to fund some of the measures identified in this report.


**Liveable Neighbourhoods**

5.8.13. A Liveable Neighbourhood scheme will deliver attractive, healthy and safe neighbourhoods for people and involves changes to improve conditions for walking and cycling and reducing traffic dominance – all of which can play a part in reducing air pollution. The types of measures that can be funded via this programme may include new pedestrian crossings, a network of good cycle routes, redesigned junctions, restrictions on motor traffic in town centres as well as wider improvements against each of the ten Healthy Streets Indicators.

5.8.14. The programme has a budget totalling £85.9m over the five financial years (2017/18 – 2021/22), excluding the funding for the remaining Major Schemes that will be completed during this period. Although costs will vary considerably from scheme to scheme, it is expected that TfL contributions for most schemes will fall within a range of £1m to £10m, with the majority probably under £5m.

**Department for Environment Food & Rural Affairs (Defra) Air Quality Grant Scheme**

5.8.15. Defra's air quality grant scheme provides funding to eligible local authorities to help improve air quality. The scheme helps local authorities to make air quality improvements and to meet their statutory duties under the Environment Act 1995. It has awarded over £52 million in funding to a variety of projects since it started in 1997.

5.8.16. It is noted that the applications for 2017 to 2018 has now passed (December 2017) but it is recommended that Local Authorities submit future applications to implement some of the measures outlined within this report. It is noted that LA's have previously successful applied for funding some behavioural / awareness raising measures. For example, the London borough of Islington was awarded £50,000 as part of a school focussed awareness and engagement campaign.

**Department for Education (DfE)**

5.8.17. There may be scope for delivering some of the measures identified through DfE funding for school buildings and land, including capital funding for schools and academies, such as the Condition Improvement Fund, Priority School Building Programme, Early Years Capital Fund.

5.8.18. Additionally, the Salix Energy Efficiency Loan Scheme provides funding for schools and colleges through DfE, to reduce energy costs through the installation of energy efficiency technologies. This funding would apply to measures designed to reduce emissions through improving building energy use – such as replacing an older boiler with a heat pump, or increasing building insulation. To receive funding a project would need to save energy as well as improve air quality, and energy savings would need to have a payback period of eight years or less. In addition, the project must not exceed a maximum cost of £200 per tonne of $CO_2$ saved.

**Greener City Fund**

5.8.19. The Mayor's Greener City Fund (www.london.gov.uk/greenercity) includes a range of programmes to create and improve green spaces and encourage tree planting in London. This is part of the Mayor's commitment to making a London a National Park City.

5.8.20. Two grant schemes, offering grants between £5,000 and £50,000 are open to applications from schools:

- Community Tree Planting Grants will support applicants to plant trees and help improve children's access to nature. This includes supporting tree planting in areas where there are currently low levels of tree cover, or where trees could help tackle issues such as air pollution. The next funding round will open in spring 2018 for projects to take place in the winter 2018/19.
- Community Green Space Grants aim to improve and increase green space across London, and can include greening playgrounds or routes to school, or natural play space for children. The next funding round will open in summer 2018 for projects to take place in 2019.

5.8.21. The school has previously successfully applied for money from this fund and has used it to install ivy and other plants in the main playground.

**RE:FIT**

5.8.22. RE:FIT London is jointly funded by the GLA and the European Union European Regional Development Fund, and is helping to achieve the Mayor's aim for London to be a zero carbon city by 2050. The programme is designed to help public sector organisations save carbon, energy and money by retrofitting buildings to make them more energy efficient, from simple measures like lighting and controls to solar panels. Since it was established in 2009 the programme has not only reduced carbon emissions, but also resulted in large guaranteed energy savings (typically around 15-25%).

5.8.23. The RE:FIT London Programme Delivery Unit is an expert team which provides free end to end support to deliver projects.

5.8.24. The RE:FIT framework of energy service companies saves time and resources for organisations that are procuring retrofit services and works and – because it is an energy performance contracting framework - guarantees energy and cost savings. Schools in particular benefit from being able to procure through this framework via a fast-track route. Further information is available at www.london.gov.uk/refit

**TfL STARS Reward Scheme**

5.8.25. Whilst there is no specific funding attached to STARS, as gaining STARS accreditation helps boroughs to achieve their targets for reducing school related car travel, and increasing cycling and walking, they often choose to link it to incentives – such as local grant funding through their LIP programmes and priority access to other opportunities.

5.8.26. It is important for boroughs to highlight that a possible benefit of getting STARS Accreditation is that it will potentially enable them to access funding for a variety of measures that contribute towards improving air quality and health. In broad terms, funding can be secured if the proposed measure:

- Promotes one aspect of safer and smarter travel choices (walking, cycling, scooting, safer / smarter driving, public transport and road safety).
- Helps the school reduce congestion (and pollution) in the vicinity of the school.

5.8.27. Ideas include, but are not limited to:

- Training – pedestrian skills, scooter safety, balance bike, cycling
- Cycling – storage, helmets, pool bikes, bike market, Dr Bike
- Resources – sustainable travel and road safety books, reflective and fluorescent products

5.8.28. It is increasingly important that boroughs seek to create a portfolio of funding opportunities, and with that in mind other potential funding sources include:

- **Local Clinical Commissioning Groups.(CCG)** - https://www.nhscc.org/ccgs/
- **Health and Wellbeing Boards:** https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/215261/dh_131733.pdf
- **Charitable Trusts**
- **Local business funding**
- **Consortium approach** – pooling funding with other boroughs and achieve economies of scale

**Other Funding Sources**

5.8.29. There are several grant funding bodies who may be interested in funding recommendations particularly if a borough links up with a community organisation - https://www.dsc.org.uk/category/fundraising/funding-sources/

5.8.30. Boroughs could also seek to influence the Joint Strategic Needs Assessment process undertaken by Health and Well Being Boards and Directors of Public Health. This is the process which looks at local clinical, health and well -being population needs, and on which CCGs base their funding priorities.

**Other sources of funding for green infrastructure**

5.8.31. Potential sources of funding for green infrastructure in schools include:

- The Tree Council's **Trees for Schools** programme offers grants between £100 and £700 to fund tree planting www.treecouncil.org.uk/grants/trees-for-schools
- The **Woodland Trust** offers free trees for schools www.woodlandtrust.org.uk/get-involved/schools/trees-for-schools/
- The **Gregg's Foundation Environmental Grants** offer up to £2,000 for projects that improve the physical environment in a way that will improve people's lives, including in schools where the project is accessible to the wider community www.greggsfoundation.org.uk/environmental-grant
- **Tesco Bags of Help** offer up to £4,000 to a wide range of projects, including environmental improvements to school grounds www.groundwork.org.uk/Sites/tescocommunityscheme
- **The Big Lottery Fund's Awards for All programme** offers up to £10,000 for a wide range of projects that "improve the places and spaces that matter to communities", including schools www.biglotteryfund.org.uk
- **Learning Through Landscapes Nature Grants Scheme** –grants will re-open in Spring 2018 www.ltl.org.uk/naturegrants
- **Trees for Cities** – are a charity able to match-fund the remaining shortfall after the financial contribution towards the project from the land owner. Their most notable schools programme is the Edible Playgrounds programme, which includes the design and creation of an edible teaching garden space within school grounds. Their other programmes include School Greening projects (mini forest style spaces, wildlife areas, biodiversity features) and Trees for Schools, a programme funded by Defra and delivered in partnership with the Woodland Trust. https://treesforcities.org/projects/schools/
- **Groundwork London** – are an environmental regeneration charity specialising in community-based green interventions and behaviour change, with a team of Landscape Architects and community officers who can support schools in designing and implementing green interventions, supporting the curriculum and taking a 'whole school' approach to understanding air quality. They also manage programmes that could offer funding for schools in considering their interventions, and fundraising support. Contact londonairquality@groundwork.org.uk, www.groundwork.org.uk/london.

**School Community Led Fund Raising Initiatives**

5.8.32. As well as the specific funding opportunities outlined above, there is an important role for the School, Ward Councillors, the Parent's Teachers Association (PTA) and School Governors, both in a lobbying and leadership capacity, and as vehicles for fundraising to support and promote particular measures and initiatives.

## 5.9 MONITORING

5.9.1. An important outcome of the school air quality audits will be in assessing the effectiveness of different schemes and initiatives implemented, so that the findings can be used to continually update and refine the toolkit of measures for use in future audits.

5.9.2. Whilst it will likely prove difficult to disaggregate the impact of a range of measures when implemented simultaneously, by recording this information across all participating schools in London, and pooling the findings, it will provide some useful overall insights into what types of solutions work best in practice amongst a given set of conditions.

5.9.3. In order to undertake these assessments and build on the existing evidence available, it will be essential to establish an effective baseline dataset, and plan a programme of monitoring post implementation of any measures. This monitoring may include a wide range of metrics including surveys, traffic information, and air quality monitoring. The scope for monitoring should be proportionate to the extent of the problem and the scale of the investment.

5.9.4. Where possible such monitoring should cover:

- Key pollutants ($NO_x$, $PM_{10}$, $PM_{2.5}$), and/or
- a range of other suitable metrics (i.e. travel to school mode shares, STARS and Healthy Schools accreditations, traffic counts (as a proxy for road transport emissions), school buildings and boiler conditions, surveys and behavioural responses of parents/staff).

5.9.5. The Mayor recently announced the trial of new air quality monitoring sensors in hundreds of hot spots across London, including schools, as well as fleet of mobile sensors, which if successful may be used to monitor localised air quality around the school, in addition to the network of existing monitors when already located near the school.

5.9.6. The GLA will be seeking to maintain the dialogue with boroughs, and to facilitate the sharing of findings and experiences as different measures and initiatives are implemented following the audits. This will enable an assessment of their effectiveness in reducing sources of, or exposure to, local air pollution. It is envisaged this will take place 6-12 months after the audit programme is concluded.

# Chapter 6 – Next Steps

# 6 NEXT STEPS

6.1.1. Based on our experiences in undertaking the audit, we found there to be a passionate group of individuals representing both the school and the borough council, who were eager to make a difference, and enthusiastic about delivering a range of solutions to improve local air quality for the children, and the wider community as a whole.

6.1.2. The borough and key stakeholders should investigate the scope for rapidly delivering key measures from the recommendations, in order achieve a combination of quick win improvements for the school, but also thinking more holistically about how some of the medium to longer term recommendations can be progressed, to deliver transformational change, to the lasting benefit of future generations.'

6.1.3. By participating in this audit the following steps have been completed:

- Identified the sources of outdoor air quality and potential exposure by primary school children.
- Engaged school communities, including in a review of their TfL STARS travel plan, educating stakeholders about the impacts of air pollution and providing recommendations on activities, initiatives and policies that the primary school could implement to further reduce emissions and/or exposure.
- Engaged with the borough to inform the feasibility of the proposed recommendations.
- Recommendations for the boroughs consideration and future implementation.

6.1.4. In order to take forwards the recommendations identified within this report, the borough council will need to continue to work closely with the school and local community, building on the relationships already in place.

6.1.5. A wide range of potential funding sources are identified within the report, and borough councils and schools are encouraged to apply for these where appropriate to maximise the potential for delivering the recommendations.

6.1.6. The School and wider school community, including School Governors, have an important leadership role in ensuring that measures to reduce exposure and emissions are included in the school's strategic plan.

6.1.7. STARS is an ongoing process, and the school should continue working towards the targets they have set, and continue adding to their air quality related activities, and uploading evidence to contribute towards achieving and sustaining higher levels of accreditation.

6.1.8. An important outcome from this project will be to build on our knowledge of how effective different measures prove to be over time, so that the findings can be used to continually update and refine the toolkit of measures for use in future audits.

6.1.9. We also hope that the borough and school will come together as part of a wider School Air Quality forum, to share their experiences with other boroughs and schools facing similar challenges.

6.1.10. A wide range of guidance and useful literature is available to support further studies, schemes or initiatives with the aim of improving local air quality:

- **GLA** – Local Authorities and Air Quality – A summary of action taken by London boroughs to improve air quality - https://www.london.gov.uk/sites/default/files/borough_air_quality_report_2017_final_2.pdf
- **GLA** – Updated Analysis of Air Pollution Exposure in London https://www.london.gov.uk/sites/default/files/aether_updated_london_air_pollution_exposure_final_20-2-17.pdf
- **British Lung Foundation** - Air Pollution Guidance for School Staff (https://neu.org.uk/system/files_force/publication-files/NEU%20BHF%20air%20pollution%20guidance%20FINAL.PDF?download=1
- **DfE** - Guidelines on ventilation, thermal comfort, and indoor air quality in schools
- **Better Places for People** (World Green Building Council) – Indoor Air Quality at Schools

# Appendix A – The Mayor’s commitment to improving air quality: Key Documents

# The Mayor's commitment to improving air quality: Key Documents

The Mayor is implementing a significant programme of measures to reduce London's deadly air pollution and protect the health and wellbeing of all Londoners, enshrined within the following key documents:

- **The London Environment Strategy** – a bold and ambitious strategy, with a particular focus on air quality. This is the first strategy to bring together approaches to every aspect of London's environment, including: air quality, green infrastructure, climate change mitigation and energy, waste, adapting to climate change and ambient noise. https://www.london.gov.uk/sites/default/files/london_environment_strategy-_draft_for_public_consultation.pdf

- **The Draft London Plan -** published in November 2017, places a considerable emphasis on air quality, with policy S|1 stating that London's air quality should be significantly improved, and exposure to poor air quality, especially for vulnerable people, should be reduced. https://www.london.gov.uk/what-we-do/planning/london-plan

- **The Mayor's Transport Strategy 2018 -** The Mayor has set out ambitious plans to improve transport in London over the next 25 years in his draft Transport Strategy. It includes record investment in new and improved rail, tube and bus services, an unprecedented focus on walking and cycling, and a commitment to make the entire transport system zero-emission by 2050. https://www.london.gov.uk/sites/default/files/mayors-transport-strategy-2018.pdf

- **Expanding the Ultra Low Emission Zone (ULEZ) and tightening the Low Emission Zone (LEZ)** https://consultations.tfl.gov.uk/environment/air-quality-consultation-phase-3b/user_uploads/suporting-information-document-updated-12.12.17.pdf

A wide range of further information, guidance, funding and useful literature is available to support further studies, schemes or initiatives with the aim of improving local air quality, including, but not limited to:

- **Local Authorities and Air Quality** – A summary by the GLA of action taken by London boroughs to improve air quality - https://www.london.gov.uk/sites/default/files/borough_air_quality_report_2017_final_2.pdf
- **Updated Analysis of Air Pollution Exposure in London** – GLA https://www.london.gov.uk/sites/default/files/aether_updated_london_air_pollution_exposure_final_20-2-17.pdf
- **British Lung Foundation** - Air Pollution Guidance for School Staff (https://neu.org.uk/system/files_force/publication-files/NEU%20BHF%20air%20pollution%20guidance%20FINAL.PDF?download=1
- **Guidelines on ventilation, thermal comfort, and indoor air quality in schools** – DfE - https://www.gov.uk/government/consultations/ventilation-thermal-comfort-and-indoor-air-quality-in-schools
- **Better Places for People** (World Green Building Council) – Indoor Air Quality at Schools - http://www.worldgbc.org/sites/default/files/Better%20Places%20for%20People%20-%20Schools%20Briefing%20Notes%20-IAQ.pdf
- **Air quality alerts** - Each school has been provided with further information via email on what the alert means, and how to reduce pupils' personal exposure AirQualityLondon@london.gov.uk
- **Control of Dust and Emissions during Construction and Demolition SPG** prepared by the GLA, which includes requirements for construction sites to monitor air quality and share the results with the borough – https://www.london.gov.uk/what-we-do/planning/implementing-london-plan/supplementary-planning-guidance/control-dust-and
- **The Mayor's Greener City Fund** - www.london.gov.uk/greenercity
- **RE:FIT London** - jointly funded by the GLA and the European Union European Regional Development Fund, and helping to achieve the Mayor's aim for London to be a zero carbon city by 2050 as part of the Mayor's £34m Energy for Londoners programme. The programme is designed to help public sector organisations save carbon, energy and money by retrofitting buildings to make them more energy efficient. The RE:FIT framework of energy service companies saves time and resources procuring retrofit services and works. Schools in particular benefit from being able to procure through this framework via a fast-track route. Further information is available at www.london.gov.uk/refit

# Appendix B – Audit Template

# SCHOOL AIR QUALITY AUDIT TEMPLATE

## School Name:

Address:

Key Telephone Contact:

Key Email Contact:

Head Teacher:

School Staff (name/role):

School Staff (name/role):

School Staff (name/role):

Borough Name:

Sub-region:

Borough AQ Officer:

Borough TP Officer:

Borough School Transport Officer:

WSP Auditor/s:


Audit Date:

Audit Time:

Weather Conditions:

Any exceptional circumstances:

Notable Events/ Traffic incidents:

## Background Information

1. Pupil Numbers:

2. Building Description

3. School Building Age
    a. Any extensions (building age)
    b. Any planned growth?
    c. BREEAM rating (if available)

4. Mode share and trip numbers, recent trends
    a. Walk
    b. Cycle
    c. Public Transport
    d. Car
    e. Other

5. STARS status:

6. Local Area Type
    a. City Centre  b. Major Centre  c. Metropolitan Centre
    d. Suburban  e. Residential

7. Road Type
    a. TLRN Road
    b. Main Road
    c. Near Main Road
    d. Residential Street
    e. Cul-de-sac

8. Street Type (Movement/Place)


9. Proximity to Road

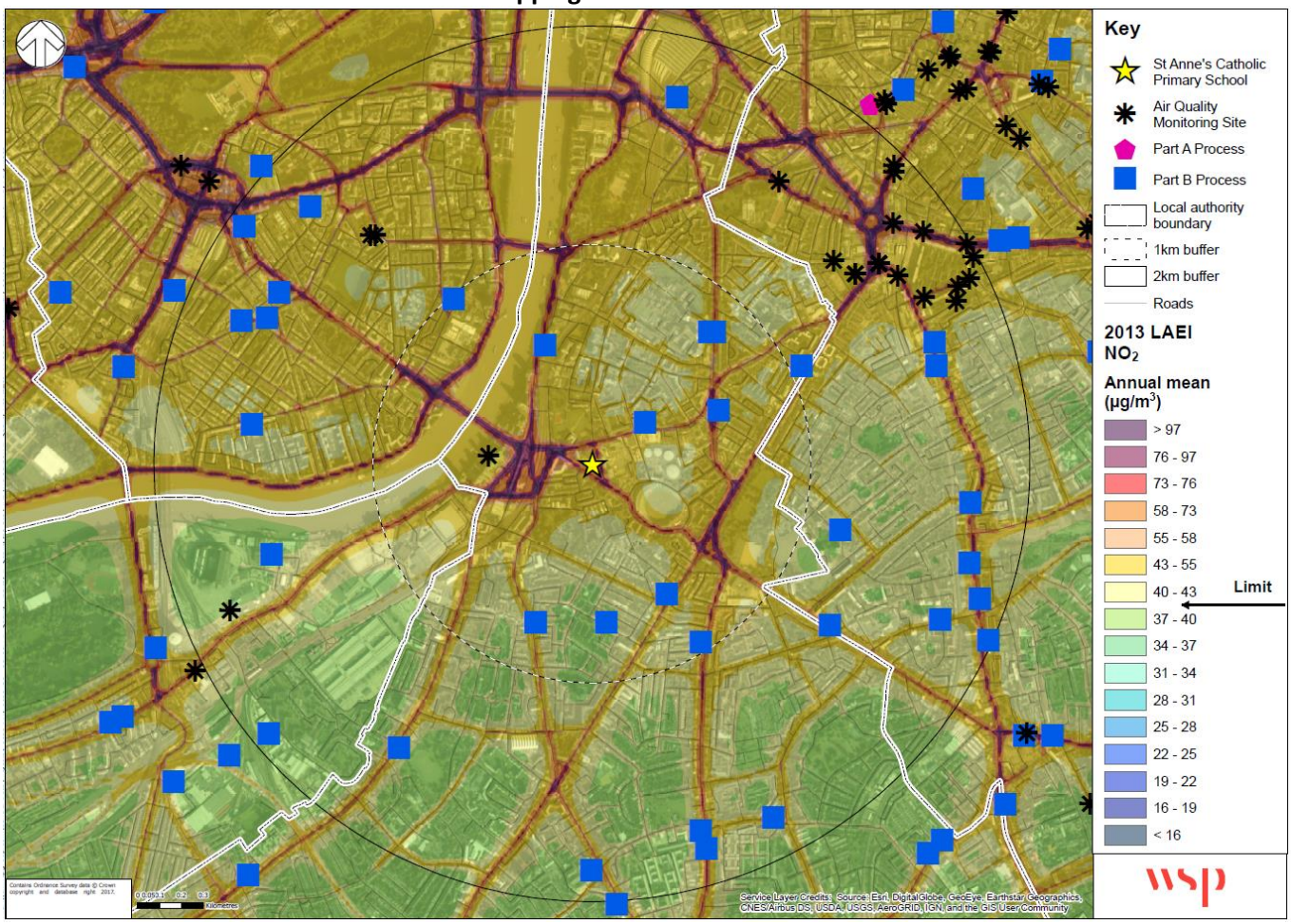
Distance to largest adjacent road (m):

10. Context Notes from School/Borough:

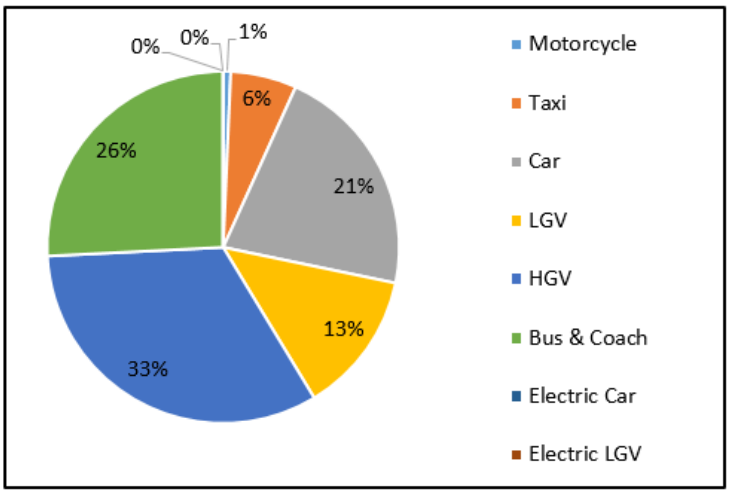
GREATER LONDON AUTHORITY  Transport for London  WSP

# AIR QUALITY MODELLING RESULTS

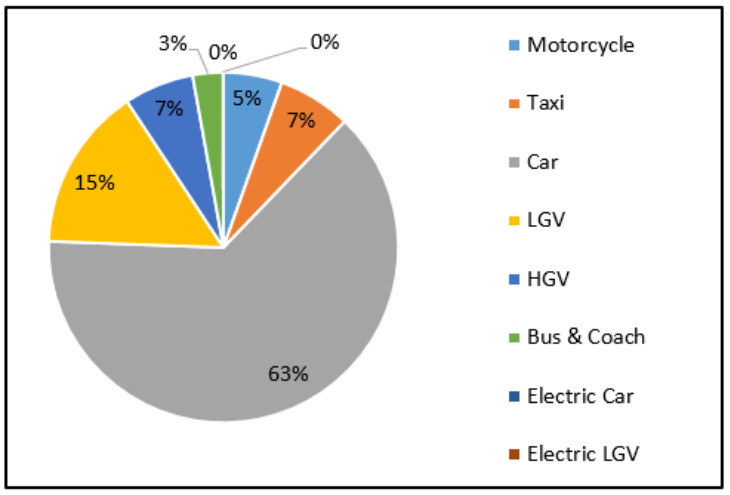
## NO2 Mapping




## Road Transport Emissions – Split by Source Sector




## Road Transport Volumes (Split by Type)

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# SCHOOL GROUNDS AUDIT CHECKLIST

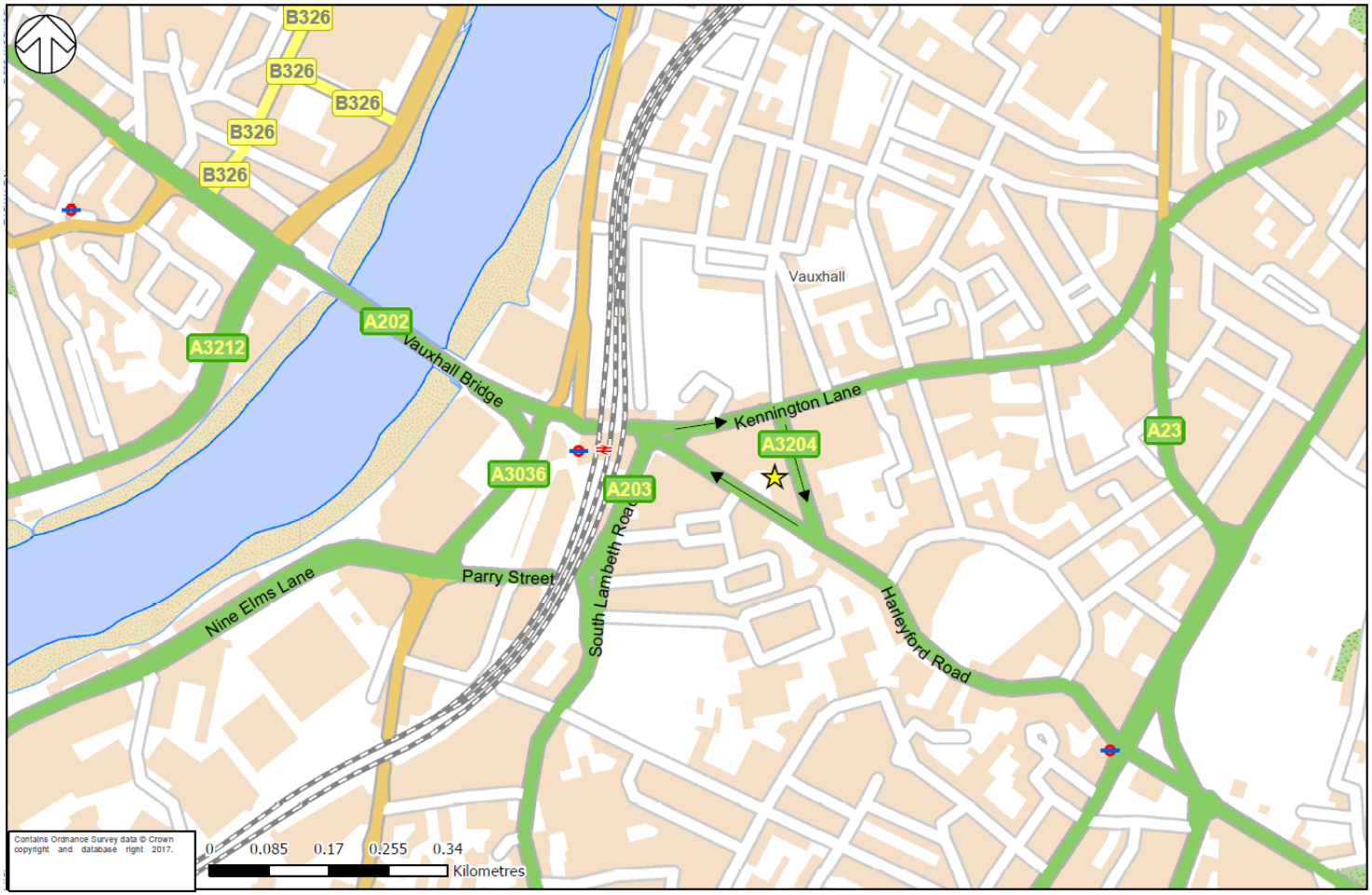
1) Work through checklist - Label each observation/issue with applicable letter (A, B, C)
2) Add number prefix if multiple (A1, A2)
3) Verify context plan – i.e. bus stop, tube station locations

| School Grounds Checklist | | | |
|---|---|---|---|
| A | Vehicle access & egresses | S | School Visitor parking |
| B | Pedestrian access & egresses | T | School Staff parking |
| C | Key walking routes and pedestrian environment quality | U | School Vehicles (i.e. Minibus) |
| D | Pedestrian crossings/ School crossing patrols | V | Other Parking |
| E | Configuration and use of school outdoor space | Y | Cycling environment quality |
| J | Pick-up/ drop off activity | Z | Extent of Trees/ Shrubs/ Green barriers |
| K | Idling activity | * | Emissions from on-site energy generating plant |
| L | Road safety | + | Localised industrial sources |
| P | Enforcement | ! | Construction activity |
| R | Delivery/ Servicing/ waste collection activity | # | Street canyons |

| **SCHOOL GROUNDS OBSERVATION NOTES** | **Source** (i.e. factors influencing output of harmful emissions) | **Exposure** (i.e. factors influencing movement of children through an area, or waiting in an area) | **Feedback Notes** (i.e. from consultations, during observations/brainstorming session) |
|---|---|---|---|
| | | | |

# SCHOOL APPROACHES AUDIT CHECKLIST

1) Work through checklist - Label each observation/issue with applicable letter (A, B, C)
2) Add number prefix if multiple (A1, A2)
3) Verify context plan – i.e. bus stop, tube station locations




**School Approaches Checklist**

| | |
|---|---|
| C | Key walking routes and pedestrian environment quality |
| D | Pedestrian crossings/ School crossing patrols |
| F | Other pedestrian waiting spaces |
| G | Traffic volumes, flow and composition |
| H | Congested junctions |
| I | Road widths, speed limit and traffic calming measures |
| J | Pick-up/ drop off activity |
| K | Idling activity |
| L | Road safety |
| M | Road access restrictions |
| N | School Keep Clear hatching |
| O | Waiting and Loading restrictions |
| P | Enforcement |
| Q | Bus stops/ Coach stops |
| R | Delivery/ Servicing/ waste collection activity |
| S | School Visitor parking |
| T | School Staff parking |
| U | School Vehicles (i.e. Minibus) |
| V | Other Parking |
| W | On-street parking restrictions |
| X | Key nearby attractors/ traffic generators |
| Y | Cycling environment quality |
| Z | Extent of Trees/ Shrubs/ Green barriers |
| * | Emissions from off-site energy generating plant |
| + | Localised industrial sources |
| ! | Construction activity |
| # | Street canyons |

| **SCHOOL APPROACHES OBSERVATION NOTES** | **Source** (i.e. factors influencing output of harmful emissions) | **Exposure** (i.e. factors influencing movement of children through an area, or waiting in an area) | **Feedback Notes** (i.e. from consultations, during observations/brainstorming session) |
|---|---|---|---|
| | | | |

## EXTERNAL CHECKLIST FACTORS – GUIDANCE FOR AUDITORS

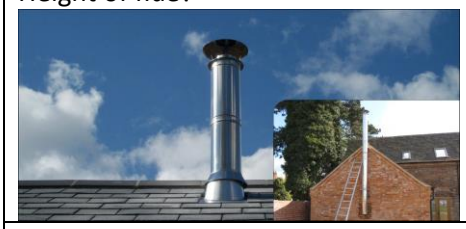
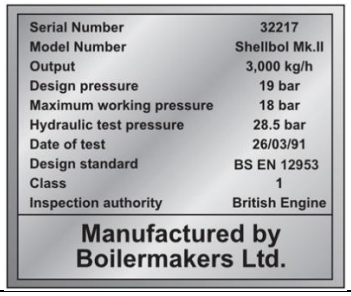
| Checklist Factors | | Description | School Grounds | School Approaches |
|---|---|---|---|---|
| A | Vehicle access & egresses | Level of activity (indic % of total movements) | x | |
| B | Pedestrian access & egresses | Level of activity (indic % of total movements) | x | |
| C | Key walking routes and pedestrian environment quality | Pedestrian Desire lines catered for? Footway widths (distance of peds from carriageway). Barriers/ obstacles to walking? Lighting? Public realm quality? Pedestrians from all walks of life? Shade and shelter? Places to stop and rest? Not too noisy? People feel safe? Things to see and do? People feel relaxed? | x | x |
| D | Pedestrian crossings/ School crossing patrols | Proximity to emissions sources? Safety. Convenience. Routed over crossing in proximity to traffic emissions? Wait time? Maintenance condition? Personal safety? Accessibility? | x | x |
| E | Configuration and use of school outdoor space | Playgrounds, outdoor spaces. Proximity to emissions sources, particularly where children are exposed for longer durations. Where do children spend time outside, during breaks, PE, queuing, off-site? Differ by age groups? | x | |
| F | Other pedestrian waiting spaces | i.e. outside the school gates, other areas children/parents wait | | x |
| G | Traffic volumes, flow and composition | HGVs? LGVs? Taxis? ULEVs? Nature of flow – speed, stop-start? | | x |
| H | Congested junctions | Congested - resulting in queuing vehicles, stop-start traffic and additional emissions? | | x |
| I | Road widths, speed limit and traffic calming measures | Conducive to speeding, long crossing distances? Hostile/ unsafe? | | x |
| J | Pick-up/ drop off activity | Drop off location/ activity | x | x |
| K | Idling activity | Where do vehicles idle, type, approx age, time, duration | x | x |
| L | Road safety | Illegal or undesirable manoeuvring, pedestrian accident data | x | x |
| M | Road access restrictions | Pedestrian Zones? No Motor Vehicles? Time based access restrictions? | | x |
| N | School Keep Clear hatching | Where? Observed/ enforced? | | x |
| O | Waiting /Loading restrictions | Single, double yellow lines? Kerb blips? Signage | | x |
| P | Enforcement | How well are restrictions obeyed/ enforced? | | x |
| Q | Bus stops/ Coach stops | Where do vehicles stop, type, approx age, time, duration? Which are used by children, where do children wait? | | x |
| R | Delivery/ Servicing/ waste collection activity | Delivery to school or other site? Vehicle types, routing, timings, goods, locations | x | x |
| S | School Visitor parking | Where, how many, vehicle mix, active during visit | x | x |
| T | School Staff parking | Where, how many, vehicle mix, active during visit | x | x |
| U | School Vehicles (i.e. Minibus) | Where, how many, vehicle mix, active during visit | x | x |
| V | Other Parking | Nearby Resident/ P+D/ Business. Parking On-street/ off-street? Utilisation? Activity? | x | x |
| W | On-street parking restrictions | Resident Permit holder only? Business Permit holder? P+D? Unrestricted? | | x |
| X | Key nearby attractors/ traffic generators | i.e. employment, supermarkets, shops, stations | | x |
| Y | Cycling environment quality | Cycle parking? Evidence of demand? Cycle friendly/hostile? Cycle routes? | x | x |
| Z | Extent of Trees/ Shrubs/ Green barriers | Presence of planting and screening from roads | x | x |
| * | Emissions from on-site/ off-site energy generating plant | Gas-fired boilers and CHP Units | x | x |
| + | Localised industrial sources | Look out for additional part B sources not mapped – i.e. Dry cleaners, takeaway's etc. Car garages – painting cars | x | X |
| ! | Construction activity | Are there any construction sites? Construction traffic routing? Visible dust? Visible dust suppression/monitoring in place? | x | x |
| # | Street canyons | Where building height on both sides of the road is greater than road width | x | x |

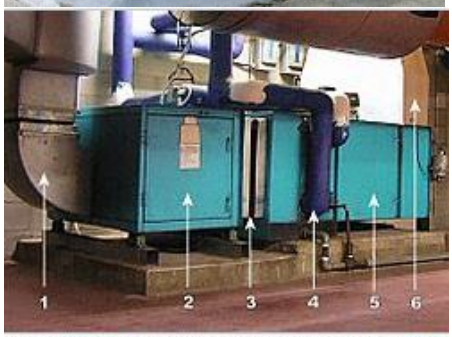
## SCHOOL BUILDING AUDIT CHECKLIST

*Mark on plant room (i.e. Boiler Room).*

| **Internal Layout** | |
|---|---|
| Layout of building – class rooms and other rooms and exposure to emissions sources | Mark onto map – classrooms/assembly hall/staff room i.e. you could have store rooms or staff offices nearer the roads rather than classrooms. Class room windows fronting onto main road? |

| **Heating** | |
|---|---|
| Heat source type | e.g. gas boiler, heat pump, biomass boiler (wood fired, pellet fired, bio-diesel). Back up diesel generator? |
| Number | e.g. 3 |
| Heating only or heating & hot water? | |
| Central or Distributed | i.e. single plant room or smaller local boilers |
| If central, common flue | i.e. do all the boilers run into a single large flue, or multiple small flues |

| | |
|---|---|
| Height of flue?<br>  | Take a picture<br><br>Short - <1m (i.e. similar to domestic boiler length of flue)<br>Medium – 1m to 2m (small to medium commercial boiler size of flue)<br>Tall – >3m (for larger boilers) |
| Boiler age | |
| Boiler manufacturer | |
| Boiler model | |
| Boiler Rating (kW output) | |
| Insert picture of rating plate<br>  <br> | Take a picture – includes info on boiler age, manufacturer, model, rating. |
| Boiler condition | (fair, poor, excellent etc.) |
| Supply fan? Variable speed? | (Sending air into boiler) |
| Boiler control system | Advanced (digital, PC) or manual? |
| Air Conditioning? | If so is it used – at what times of year and how frequently? |
| Local Heaters? | Standalone heaters around the school? |
| Are these used? | (e.g. in sports hall) |
| If yes, what kind? | Convection (warm air blower), radiant? |
| Fuel source | Gas or electric |
| Flue system | I.e. flue to outside building? |
| Control system | Simple, or advanced (e.g. tied to PC) |
| Maintenance Regularity | |

| **Ventilation** | |
|---|---|
| Form | i.e. centralised (air handling units), passive (windows) |
| If windows then | Do any of the classroom windows which are regularly opened for ventilation or cooling purposes, front onto pollution sources (i.e. main roads)? |
| If centralised system then | i.e. air handling units? |
| Air Handling Units    An air handling unit; air flow is from the right to left in this case. Some AHU components shown are<br>1 – Supply duct<br>2 – Fan compartment<br>3 – Vibration isolator ('flex joint')<br>4 – Heating and/or cooling coil<br>5 – Filter compartment<br>6 – Mixed (recirculated + outside) air duct | Single or multiple? |
| Fed from boiler or direct fired? | |
| Filters in place and changed regularly | should have bag and screen filters, changed at least every 6 months or on pressure difference |
| Air intake location | roof level? |
| Air intake suitable | clear of other vents, heat sources, extract outputs? |
| General condition of system | appears in good condition, average, dilapidated? |
| Extract from classrooms? | |
| Recirculation of extract air? | If so how much. |

| | |
|---|---|
| Control system | manual, PC (i.e. building management system) |
| Variable speed supply & extract? | Speed control on internal CO2 basis or temperature? |

| **Hot Water** | |
|---|---|
| Same as above or separate system? | |
| If separate: | |
| Gas or electric? | |
| Central or local? | i.e. one large central system or lots of small local water heaters |
| Control system? | i.e. timer, thermostat? |
| Well insulated? | must be greater than 25mm, ideally around 50mm on tank and pipework |

| **Kitchen** | |
|---|---|
| Extract system in place? | most likely extract from e.g. hobs |
| Extracts to… | Should exit to roof |
| Filtered? | Should have local filters for great if above hobs |
| Control System | Always on? On timed control? |

| **Internal Conditions** | |
|---|---|
| Incidence of overheating | Occasional/regular/severe + temperature |
| Fresh Air | Does it feel "stuffy"? Need more fresh air? |
| Green plants within building? | If so, where? |
| Damp or mould present? | If so, where and to what extent? |

| **Comments** |
|---|
| |

## STAKEHOLDER DISCUSSION POINTS:

1) Is there anything you would like to add or comment on regarding our recorded observations? Where do children spend time outside, during breaks, PE, queuing, off-site? Differ by age groups?

2) Any comments on recent trends/ issues regarding travel to school? Travel patterns of children and parents etc.

3) What do you feel are likely to be key sources of emissions in and around the school?

4) Where do you feel exposure to poor air quality is greatest in and around to school?

5) Key initiatives already underway to promote sustainable travel and reduce emissions? Which have worked well? Which haven't?

6) What more could the school do to lessen incidents of exposure and reduce sources of emissions?

7) Based on the toolkit of measures, and the findings of the observations and analysis, what are the top 3 measures you would prioritise for the school?

8) What sources of funding do you feel may be available to contribute towards localised schemes to address poor air quality at the school?

9) Is there any planned growth at the school (in terms of number of pupils or the school building/ grounds?

10) Are there any notable committed developments planned in the local area?

11) To what extent do you feel issues relating air quality are well understood by the children, parents, teachers, local community, borough officers and decision makers?

12) Are you aware of the air quality related lesson materials available?

13) Any other activities or behaviours not observed today you would wish to highlight?

14) Can you provide us with a copy of the deliveries log for the week of the audit?

**STAKEHOLDER FEEDBACK NOTES:**

# Appendix C – Engagement Material

# Supporting material for Air Quality related lessons

Bespoke material for each school is provided to add value to lessons with a focus on air quality and the environment, including:

- Map of air pollution at the school;
- Pie charts summarising the type of traffic near the school and how much air pollution is produced by which vehicles.

For example, this information could be used in conjunction with LSx Part 2: Investigating Air Quality whereby the objectives are listed as:

- Collecting scientific evidence
- Carrying out fieldwork investigations
- Making a labelled field sketch

The bespoke air quality modelling outputs for each school can add value to the lesson plan by being used to summarise the 'baseline' conditions prior to any measures being implemented and to identifying areas to target fieldwork investigations.

The pie charts illustrating the type of traffic near the school and how much air pollution is produced by which vehicles can contribute towards LSx Part 4: Action Planning whereby pupils learn about:

- How decisions and actions can affect the quality of people's lives
- Different ways in which people can improve their environment
- How to present a persuasive argument
- To make real choices and decisions

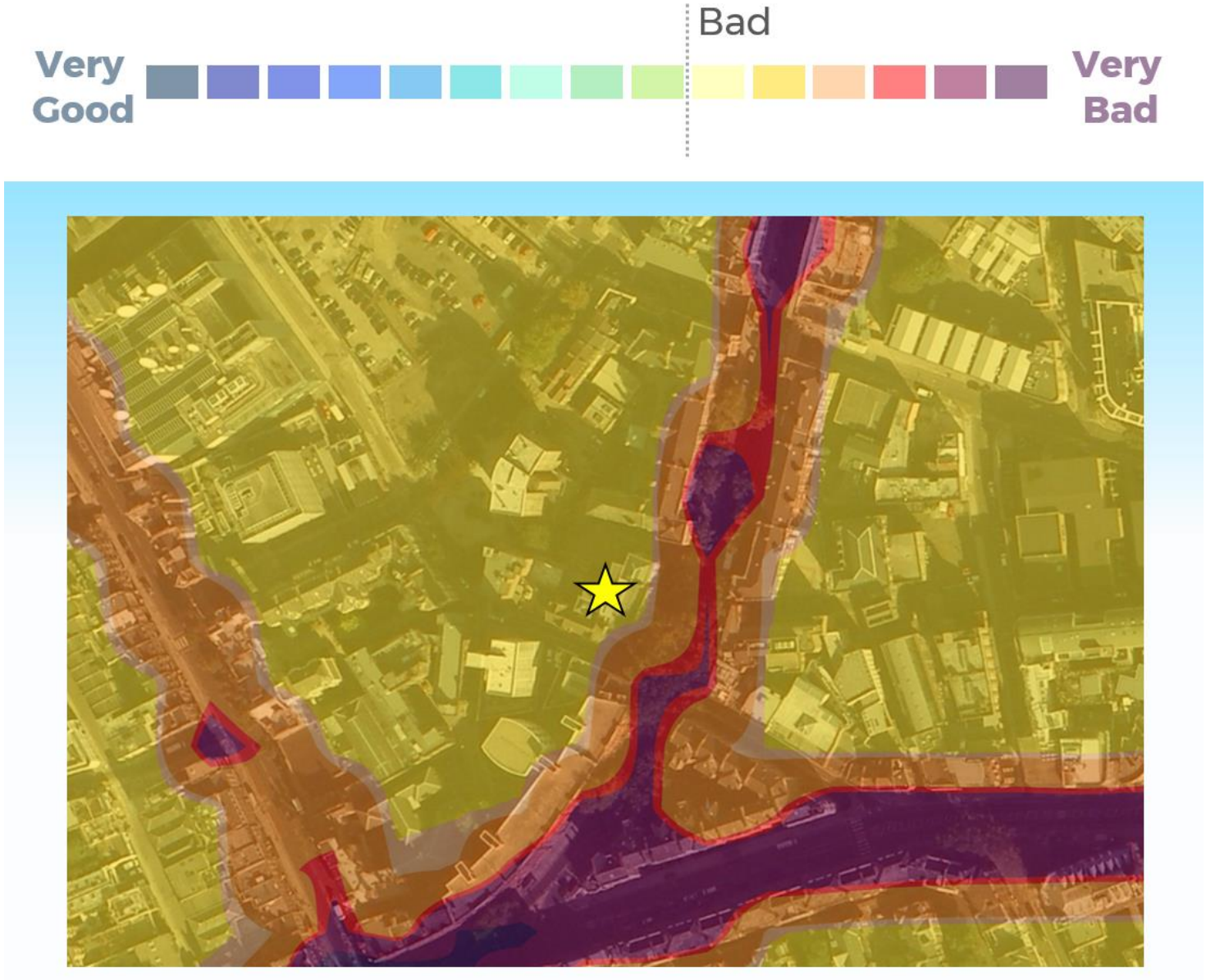
An understanding of how you travel to / from school (as well as other non-school related journeys) and the impacts it has on air quality can provide them with knowledge to travel via active means i.e. walking, scooting and cycling where possible.

The above can be linked to the National Curriculum, namely Science, Geography, PSHE / Citizenship and English Speaking and Listening. It is recommended that these lessons / materials are delivered by teaching staff as part of wider initiatives, such as National Clean Air Day.

## Relevant Links:

- LSx: http://www.lsx.org.uk/get-involved/schools/
- National Clean Air Day: https://www.cleanairday.org.uk/
- London Curriculum: https://www.anewdirection.org.uk/what-we-do/london-curriculum

# Christopher Hatton Primary School



# Christopher Hatton Primary School

**Chart 1** - Traffic near the school

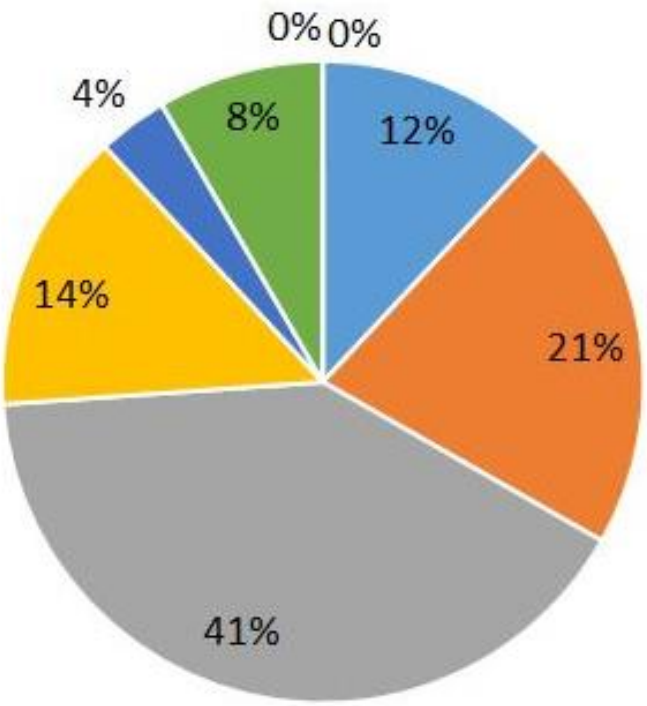
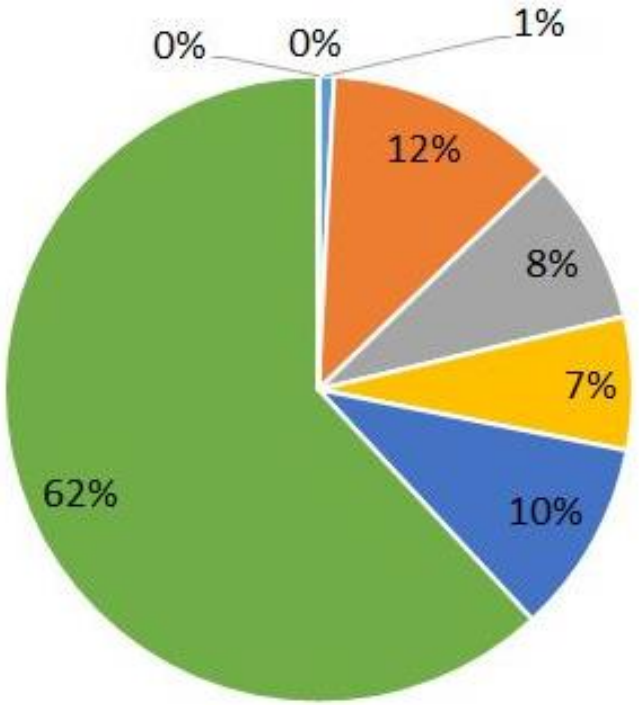



**Chart 2** - Air pollution by traffic near the school




Key

- Motorcycle
- Taxi
- Car
- Vans
- Lorries
- Buses & Coaches
- Electric Car
- Electric LGV

Contact x@london.gov.uk to receive the accompanying PowerPoint slides for your school.


Introduction to air pollution (20-30 minutes)

- Interactive presentation highlighting the issue of poor air quality, the causes, the impacts, and the types of measures that can have a positive impact on reducing poor air quality.
- Suitable for KS1 and KS2, with supplementary points for KS2.
- Use the discussion questions on each slide to encourage the children to volunteer their own ideas.
- Then reveal the answers, see if they got them all, and explain any they may have missed.


KS1/KS2

- It can be hard to describe can't it?
- It is made up of fumes (gas or smoke) and dust in the air.
- Sometimes you can see it or smell it.
- They are made up of gases, and tiny particles too small to see with the human eye.

KS2

- Nitrogen Dioxide (fumes/ gases)
- 'Particulate matter' or PM. The two main types are $PM_{10}$ and $PM_{2.5}$.
- Really small particles – you could fit 40 $PM_{2.5}$.particles across the width of a human hair.


KS1/ KS2

- Factories
- Power stations
- Boilers heating houses, businesses, the school
- Chemicals from cleaning products etc.
- Transport produces a lot of pollution:
    - Cars, Taxis,
    - Lorries, Buses
- Large vehicles like lorries and buses cause a lot of pollution.

KS2

- Diesel vehicles are bad as they produce more Nitrogen Dioxide and Particulate matter'.
- Lorries, buses, and vans and taxis are often diesels.


KS1/ KS2

- Cough
- Breathing difficulties
- Asthma – makes it harder for people with asthma to breath
- Makes us ill
- May need to see the doctor or go to hospital

- So it's a real problem we need to something about.


KS1/ KS2

- Can anyone tell me what this image is?
- It's our school – point out features like the playground and main roads to get bearings.

- Based on what we've talked about, and what the causes of air pollution are, which place do you think is most polluted by show of?
  - A
  - B
  - C


KS1/ KS2

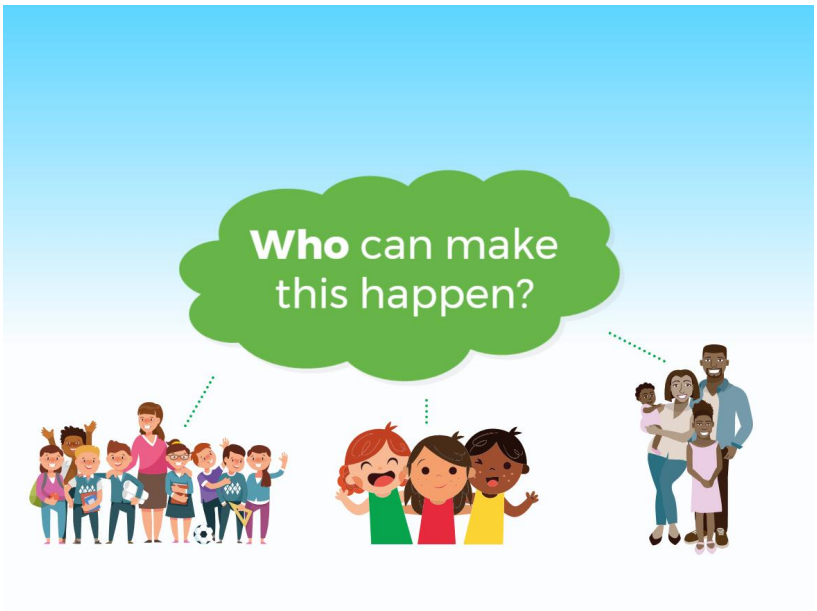
- Explain the bar along the top shows that areas in blue or green are good, areas in yellows/orange/red/purple are more polluted
- Well done to everyone who got it right
- Explain it's because all the traffic on the main roads is a major source of the pollution


KS1/ KS2

- We've seen what a big part transport plays in air pollution, so let's think about how we travel to school
- Show of hands
- Which is best in terms of air pollution?
- Why?


KS1/ KS2

- Key in the ignition = stopping engine idling (where people leave the engine running when parked).
- More travel by walking, scooting, cycling ….or public transport
- Though we know some people may need to travel by car
- Electric cars
- Planting trees to capture and absorb some pollution (particulates)




KS1/ KS2

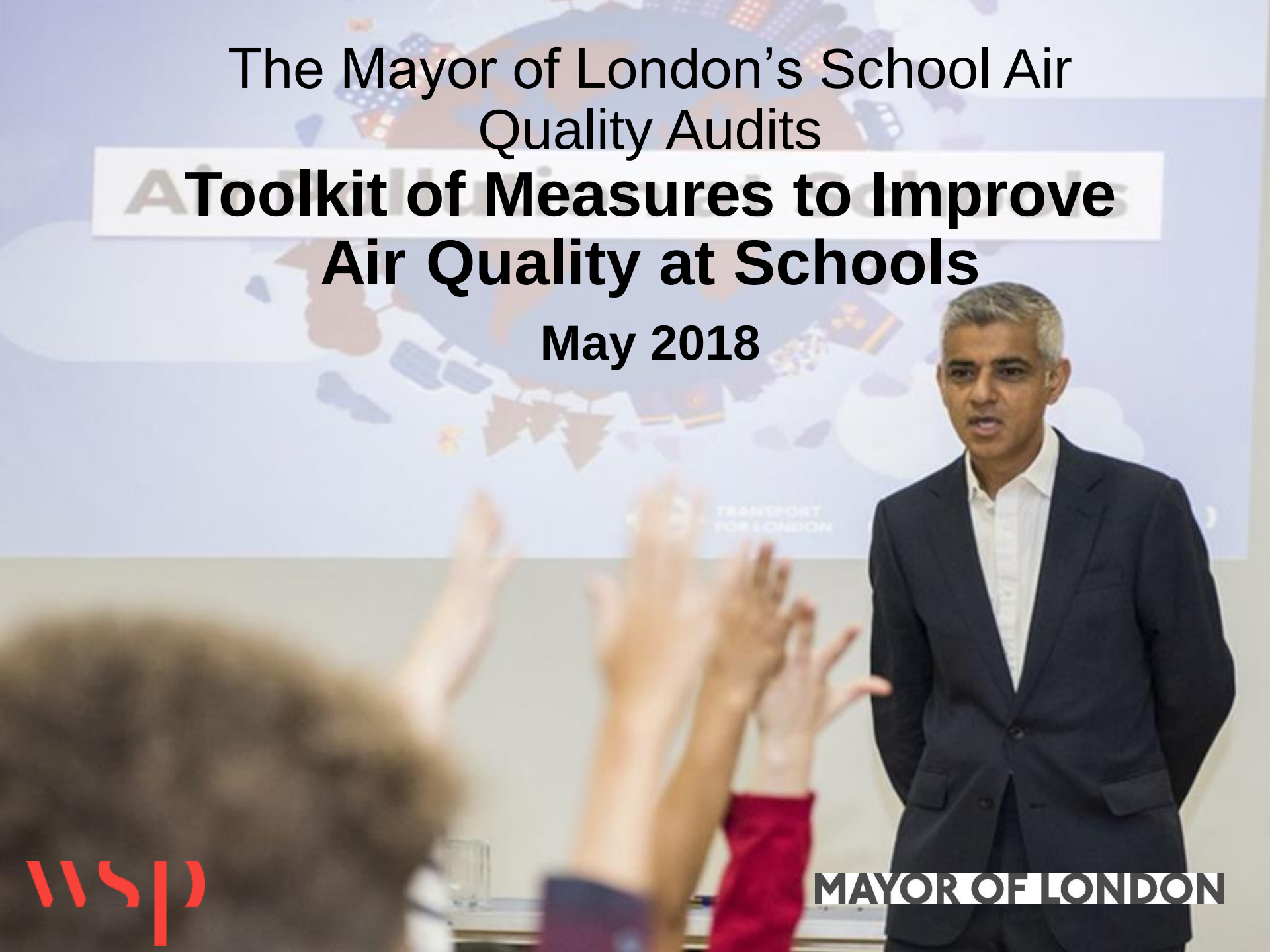
- Themselves
- Class mates
- Teachers
- Family
- Wider community
- The Council
- The Mayor
- Transport for London
- The Government
- ….everyone has a part to play

# Appendix D – Toolkit of Measures to Improve Air Quality at Schools

# The Mayor of London's School Air Quality Audits

# Toolkit of Measures to Improve Air Quality at Schools

**May 2018**



wsp

MAYOR OF LONDON

# Summary of Measures



| 1. HIGHWAY MEASURES | |
|---|---|
| **A** | **Anti-idling** |
| A1 | Fines |
| A2 | Campaigns, including driver engagement |
| A3 | Information signage |
| **B** | **Reducing traffic flow** |
| B1 | 'School Streets' |
| B2 | Collapsible bollards |
| B3 | 'Play Streets' *(temporary measure)* |
| B4 | Road closure |
| B5 | Filtered permeability |
| B6 | One-way streets/ No entry restrictions |
| B7 | ULEV-only streets |
| B8 | Width restriction (e.g. 7ft) |
| B9 | Environmental weight limit signs |
| B10 | Reallocate roadspace |
| B11 | Weight restrictions |
| **C** | **Smoothing traffic flow/speed** |
| C1 | Modify traffic calming |
| C2 | Optimise traffic signals |
| C3 | Junction improvements |
| **D** | **Reducing drop-off activity** |
| D1 | Public Space Protection Orders |
| D2 | School Keep Clear markings |
| D3 | Double/single yellow lines |
| D4 | Improve enforcement of restrictions |
| **E** | **Improved pedestrian and cyclist environment** |
| E1 | Improved pedestrian environment - footway widening, kerb build-outs |
| E2 | Improved crossing facilities on desire lines |
| E3 | Traffic calming |
| E4 | Improve Visibility of the School |
| E5 | Cycle hangers |
| **F** | **Promote a switch to low emission vehicles** |
| F1 | Ultra-low Emission Zone (ULEZ) & Low Emission Zone (LEZ) |
| F2 | Comprehensive charging provision for ULEVs |

| **G** | **Parking/loading** |
|---|---|
| G1 | Identify a Park & Stride site |
| G2 | Remove or relocate parking/ loading bays and/or amend restrictions |
| G3 | Introduce kerb blip loading restrictions |
| G4 | Enforce parking restrictions |
| G5 | Additional parking charges for more polluting vehicles |
| G6 | Introduce or amend CPZ restrictions around school to restrict non-residents parking |
| G7 | Parking rationalisations with ULEV car clubs |
| **H** | **Buses** |
| H1 | Bus stop relocation |
| H2 | Low emission buses |
| **I** | **Freight and Deliveries** |
| I1 | Engage with local businesses to reduce freight/ delivery emissions |
| I2 | Promote low emission vehicles for freight and deliveries |
| I3 | Delivery Servicing Plans (DSPs) for new developments |
| I4 | Re-time Borough commercial waste collection |
| **J** | **Construction** |
| J1 | Planning conditions to reduce impacts of freight traffic |
| J2 | Managing the impact of dust and emissions during construction and demolition |
| J3 | Retrospective discussions with already permitted developments to lessen the impacts |
| J4 | Non-Road Mobile Machinery Audit |
| **K** | **Planning Policy and Strategy** |
| **K1** | Healthy Streets approach, sustainable transport and roadspace reallocation from vehicular traffic |
| **L** | **Green Infrastructure** |
| L1 | Green screens |
| L2 | Trees, shrubs, planters |
| L3 | Green Gateways |
| L4 | Pocket parks |

| 2. SCHOOL SITE MEASURES | |
|---|---|
| **M** | **School Grounds** |
| M1 | Additional scooter/ cycle parking |
| M2 | Staff car parking |
| M3 | Anti-idling for deliveries |
| M4 | Re-timing for deliveries |
| M5 | Reduce number of deliveries, staff/visitor vehicle trips and/or use more sustainable modes |
| M6 | Relocate pedestrian entrances |
| M7 | Green screens |
| M8 | Trees/ shrubs/ planters |
| M9 | Green spaces |
| M10 | Pupil & staff cycle parking |
| M11 | Reduced waiting times to enter school grounds |
| M12 | Relocate playgrounds and free flow spaces |
| M13 | Co-ordinate start/ finish times with nearby schools |
| M14 | Reconsider playground layouts to reduce exposure |
| M15 | Sheltered waiting areas for parents/ guardians |
| **School Building** | |
| **N** | **School boilers/ heating** |
| N1 | Upgrade aging boilers |
| N2 | Install Optimising Compensator Control System for School Boilers |
| N3 | Boiler flues and extraction equipment |
| N4 | Reducing over-heating and tackling heat gain |
| N5 | Replace aging radiators |
| **O** | **Improve product choice (e.g. cleaning products)** |
| O1 | Improve product choice (e.g. cleaning products) |
| **P** | **Regular service & maintenance of appliances and equipment** |
| P1 | Regular service & maintenance of appliances and equipment |
| **Q** | **Improve school building insulation** |
| Q1 | Improve school building insulation |
| Q2 | Upgrade windows |
| Q3 | Replace temporary classrooms with permanent structures |
| Q4 | Green Roofs |
| **S** | **Ventilation / Air Filtration** |
| S1 | Installation of Air Conditioning Units |
| S2 | Introduce Air Filtration Systems |
| S3 | Install HEPA Filters in Air Handling Units |
| S4 | Other air filtration systems - air purifiers |
| **S** | **Other** |
| S1 | Air quality monitoring and information provision eco-monitors and walking route maps. |

| 3. BEHAVIOURAL MEASURES | |
|---|---|
| T1 | Attain improved STARS accreditation status, ultimately Gold status. |
| T2 | Promote cleaner walking routes to school |
| T3 | Promoting Park & Stride |
| T4 | Promoting car sharing |
| T5 | Walking Route Maps / Leaflets |
| T6 | Parent and Public Workshops |
| T7 | Prepare 'Welcome Packs' for new pupils / parents |
| T8 | Deliver Air Quality focused lesson/s to children |
| T9 | Awareness raising session amongst staff |
| T10 | Daily monitoring of London Air website/ app |
| T11 | Add Air Quality to Junior Citizenship Scheme |
| T12 | Anti-idling campaign |
| T13 | Attain an improved Award in Healthy Schools London, ultimately a Gold Award |
| T14 | Awareness raising events amongst the wider community |
| T15 | Cycle training and promotional initiatives |
| T16 | Gamification to promote active travel |
| T17 | Restrict or reduce personal deliveries |
| T18 | CPD supporting teachers subject knowledge on air quality |
| T19 | Walking Buses |

| 4. WIDER MEASURES | |
|---|---|
| U1 | Targeted scrappage scheme for polluting vehicles entering London |
| U2 | Reform Vehicle Excise Duty |
| U3 | Promote a transition to electric heating and heat pumps |
| U4 | Reform Buildings Regulations to promote heat pumps |
| U5 | Zero emission zones |

# Summary of Measures, including Assessment Criteria



## Highway Measures

| **Air quality audit approach:**<br>A.) Air quality assessments and context plan preparation<br>B.) Fieldwork – complete audit templates with input from the school and borough officers (air quality, school travel, transport planning). Use Toolkit as reference.<br>C.) Review findings and identify key issues, sources of emissions and causes of exposure<br>D.) Identify measures from the Toolkit to address these issues, informed by the audit findings<br>E.) Identify funding sources and task owners<br>F.) Establish an approach to monitoring the effectiveness of measures | | **Purpose** | | **Assessment Criteria** | | | | **Wider Benefits** | | | | | | | | | | **Suitability** | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reduce Sources | Reduce Exposure | Potential Air Quality Improvement | Cost | Deliverability | Stakeholder Support | Road safety | Promotion of sustainable transport | Visual amenity | Security, privacy | Noise reduction | Biodiversity | Improved learning environment | Reduced operating costs | Awareness raising | Support STARS and HSL objectives | Main roads | Minor Roads | Suitability for a trial |
| **1. HIGHWAY MEASURES (Key Stakeholder: Borough/ TfL)** | | | | | | | | | | | | | | | | | | | | |
| **A** | **Anti-idling** | | | | | | | | | | | | | | | | | | | |
| A1 | Fines | X | | L | L | L | H | | | | | | | | | | X | Y | Y | Y |
| A2 | Campaigns, including driver engagement | X | | L | L | L | H | | | | | | | | | | X | Y | Y | Y |
| A3 | Information signage | X | | L | L | L | H | | | | | | | | | | X | Y | Y | Y |
| **B** | **Reducing traffic flow** | | | | | | | | | | | | | | | | | | | |
| B1 | 'School Streets' | X | | L | M | M | M | X | | | | | | | | | | | Y | Y |
| B2 | Collapsible bollards | X | | L | L | M | M | X | | | | | | | | | | | Y | Y |
| B3 | 'Play Streets' *(temporary measure)* | X | | L | L | S | H | X | X | | | | | | | X | | | Y | Y |
| B4 | Road closure | X | X | H | L-M | S-M | L-M | | | | | | | | | | | | Y | Y |
| B5 | Filtered permeability | X | | M | M | M | L | X | X | | | | | | | | | | Y | Y |
| B6 | One-way streets/ No entry restrictions | X | | M | L-H | S-M | M | X | X | | | | | | | | | | Y | Y |
| B7 | ULEV-only streets | X | | M | M | M | L | | X | | | | | | | | | | Y | Y |
| B8 | Width restriction (e.g. 7ft) | X | | L | L | S | M | | | | | | | | | | | | Y | |
| B9 | Environmental weight limit signs | X | | L | L | S | M | | | | | | | | | | | | Y | |
| B10 | Reallocate roadspace | X | | M | H | L | M | | X | | | | | | | | | Y | Y | |
| B11 | Weight restrictions | X | | M | L | M | M | X | | | | | | | | | | | Y | |
| **C** | **Smoothing traffic flow/speed** | | | | | | | | | | | | | | | | | | | |
| C1 | Modify traffic calming | X | | L | M | S | H | | | | | | | | | | | Y | Y | |
| C2 | Optimise traffic signals | X | | L | L-M | S-M | M | | | | | | | | | | | Y | Y | Y |
| C3 | Junction improvements | X | | L | M-H | M-L | L | | | | | | | | | | | Y | Y | |
| **D** | **Reducing drop-off activity** | | | | | | | | | | | | | | | | | | | |
| D1 | Public Space Protection Orders | X | | L | M | M | M | X | | | | | | | | | | Y | Y | |
| D2 | School Keep Clear markings | X | | L | L | S | M-H | X | | | | | | | | | | Y | Y | |
| D3 | Double/single yellow lines | X | | L | L | S | M | X | | | | | | | | | | Y | Y | |
| D4 | Improve enforcement of restrictions | X | | L | L | S-M | M | X | | | | | | | | | | Y | Y | |

# Summary of Measures, including Assessment Criteria



## Highway Measures

| 1. HIGHWAY MEASURES (Key Stakeholder: Borough/ TfL) | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **E** | **Improved pedestrian and cyclist environment** | | | | | | | | | | | | | | | | | | | |
| E1 | Improved pedestrian environment - footway widening, kerb build-outs | X | X | L | L-M | S-M | H | X | X | | | | | | | | Y | Y | Y | |
| E2 | Improved crossing facilities on desire lines | | X | L | L-M | S-M | H | X | X | | | | | | | | Y | Y | Y | |
| E3 | Traffic calming | X | | L | L-M | S-M | H | X | X | | | | | | | | Y | Y | Y | |
| E4 | Improve Visibility of the School | X | | L | L | S | H | X | | | | | | | | | Y | Y | | |
| E5 | Cycle hangers | X | | L | L-M | S | M | | X | | | | | | | X | Y | Y | | |
| **F** | **Promote a switch to low emission vehicles** | | | | | | | | | | | | | | | | | | | |
| F1 | Ultra-low Emission Zone (ULEZ) & Low Emission Zone (LEZ) | X | X | H | H | M | M | | X | | | | | | | | Y | Y | | |
| F2 | Comprehensive charging provision for ULEVs | X | | L | M | M | M | | X | | | | | | | | Y | Y | Y | |
| **G** | **Parking/loading** | | | | | | | | | | | | | | | | | | | |
| G1 | Identify a Park & Stride site | X | | L | L | M | M | | | | | | | | | | | | Y | |
| G2 | Remove or relocate parking/ loading bays and/or amend restrictions | X | | M | L | S-M | M | | | | | | | | | | Y | Y | | |
| G3 | Introduce kerb blip loading restrictions | X | | L | L | S | M | | | | | | | | | | Y | Y | | |
| G4 | Enforce parking restrictions | X | | L | L | S | M | X | | | | | | | | | Y | Y | | |
| G5 | Additional parking charges for more polluting vehicles | X | | M | M | M | L | | | | | | | | | | Y | Y | | |
| G6 | Introduce or amend CPZ restrictions around school to restrict non-residents parking | X | | M | M | M | L | X | | | | | | | | | Y | Y | | |
| G7 | Parking rationalisations with ULEV car clubs | X | | L | M | L | L | | X | | | | | | | | Y | Y | | |
| **H** | **Buses** | | | | | | | | | | | | | | | | | | | |
| H1 | Bus stop relocation | X | | M | M | M | L | | | | | | | | | | Y | | | |
| H2 | Low emission buses | X | | H | H | M | M | | | | | | | | | | Y | | | |

# Summary of Measures, including Assessment Criteria



## Highway Measures

| 1. HIGHWAY MEASURES (Key Stakeholder: Borough/ TfL) | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **I** | **Freight and Deliveries** | | | | | | | | | | | | | | | | | | | | | | |
| I1 | Engage with local businesses to reduce freight/ delivery emissions | X | | M | L | M | L | X | | | | | | | | | | | | Y | | |
| I2 | Promote low emission vehicles for freight and deliveries | X | | M | L | M | L | | X | | | | | | | | | | | Y | | |
| I3 | Delivery Servicing Plans (DSPs) for new developments | X | | L | L | M | L | | | | | | | | | | | | | Y | Y | |
| I4 | Re-time Borough commercial waste collection | X | | L | M | M | M | | | | | | | | | | | | | Y | Y | |
| **J** | **Construction** | | | | | | | | | | | | | | | | | | | | | | |
| J1 | Planning conditions to reduce impacts of freight traffic | X | | M | L | M | L | | X | | | | | | | | | | | Y | | |
| J2 | Managing the impact of dust and emissions during construction and demolition | X | X | L | L | S | M | | | | | | | | | | | | X | Y | | |
| J3 | Retrospective discussions with already permitted developments to lessen the impacts | X | | M | L | L | L | | X | | | | | | | | | | | Y | | |
| J4 | Non-Road Mobile Machinery Audit | X | | L | L | S | M | | | | | X | | | | | | | | | | |
| **K** | **Planning Policy and Strategy** | | | | | | | | | | | | | | | | | | | | | | |
| **K1** | Healthy Streets approach, sustainable transport and roadspace reallocation from vehicular traffic | X | X | H | H | L | L | | X | | | | | | | | | | | Y | Y | |
| **L** | **Green Infrastructure** | | | | | | | | | | | | | | | | | | | | | | |
| L1 | Green screens | | X | L | L | S | H | | | X | X | | | | | | | | | Y | Y | |
| L2 | Trees, shrubs, planters | | X | L | L | S-M | M | | | X | | | | | | | | | | Y | Y | |
| L3 | Green Gateways | | X | L | L | S | H | | | X | | | | | | | | | | Y | Y | |
| L4 | Pocket parks | | X | L | M | S-M | H | | | | | | | | | | | | | Y | Y | |

# Summary of Measures, including Assessment Criteria



## School Site Measures: school grounds

| 2. SCHOOL SITE MEASURES (Key Stakeholder: School/ Borough) | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **M** | **School Grounds** | | | | | | | | | | | | | | | | | | | | |
| M1 | Additional scooter/ cycle parking | X | | L | L | S | H | | X | | | | | | | | X | | | | |
| M2 | Staff car parking | X | | L | L | M | L | | X | | | | | | | | | | | | |
| M3 | Anti-idling for deliveries | X | | L | L | S | H | | | | | | | | | | | | | | |
| M4 | Re-timing for deliveries | X | | L | L | S | M | X | | | | | | | | | | | | | |
| M5 | Reduce number of deliveries, staff/visitor vehicle trips and/or use more sustainable modes | X | | L | L | M | M | | X | | | | | | | | | | | | |
| M6 | Relocate pedestrian entrances | | X | L | L | S | M | | | | | | | | | | | | | | |
| M7 | Green screens | | X | L | M | M | M | | | X | X | | X | | | | | | | | |
| M8 | Trees/ shrubs/ planters | | | L | L-M | M | H | | | | | | X | | | X | | | | | |
| M9 | Green spaces | | X | L | L | S | H | | | | | | | | | | | | | | |
| M10 | Pupil & staff cycle parking | X | | L | L | S | H | | X | | | | | | | | **X** | | | | |
| M11 | Reduced waiting times to enter school grounds | | X | L | L | S | H | | X | | | | | | | | | | | | Y |
| M12 | Relocate playgrounds and free flow spaces | | X | M | M-H | M | M | | | | X | X | | | | | | | | | |
| M13 | Co-ordinate start/ finish times with nearby schools | X | X | L | L | S | L | X | | | | | | | | | | | | | |
| M14 | Reconsider playground layouts to reduce exposure | | X | L | L | S | M | | | | | | | | | | | | | | |
| M15 | Sheltered waiting areas for parents/ guardians | X | X | L | L | S | M | | X | | | | | | | | | | | | |

# Summary of Measures, including Assessment Criteria



## School Site Measures: school building

| 2. SCHOOL SITE MEASURES (Key Stakeholder: School/ Borough) | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **School Building** | | | | | | | | | | | | | | | | | | | | | | |
| **N** | **School boilers/ heating** | | | | | | | | | | | | | | | | | | | | | |
| N1 | Upgrade aging boilers | X | | L | L-H | S-M | M-H | | | | | | | | X | | | | | | | |
| N2 | Install Optimising Compensator Control System for School Boilers | X | | L | L | S | H | | | | | | | | X | | | | | | | |
| N3 | Boiler flues and extraction equipment | | X | L | L | S | M | | | | | | | | | | | | | | | |
| N4 | Reducing over-heating and tackling heat gain | X | | L | L-M | S | H | | | | | | | X | X | | | | | | | |
| N5 | Replace aging radiators | X | | L | M | S-M | M | | | | | | | X | X | | | | | | | |
| **O** | **Improve product choice (e.g. cleaning products)** | | | | | | | | | | | | | | | | | | | | | |
| O1 | Improve product choice (e.g. cleaning products) | X | X | L | L | S | H | | | | | | | | | | | | | | | |
| **P** | **Regular service & maintenance of appliances and equipment** | | | | | | | | | | | | | | | | | | | | | |
| P1 | Regular service & maintenance of appliances and equipment | X | | L | L | S | H | | | | | | | | | | | | | | | |
| **Q** | **Improve school building insulation** | | | | | | | | | | | | | | | | | | | | | |
| Q1 | Improve school building insulation | X | | L | L-M | S-M | M-H | | | | | X | | X | X | | | | | | | |
| Q2 | Upgrade windows | | X | L | L-H | S-M | M-H | | | | | X | | X | X | | | | | | | |
| Q3 | Replace temporary classrooms with permanent structures | X | | L | H | M-L | M | | | | | | | X | X | | | | | | | |
| Q4 | Green Roofs | | X | L | M | M | M | | | X | | | X | | | | | | | | | |
| **S** | **Ventilation / Air Filtration** | | | | | | | | | | | | | | | | | | | | | |
| S1 | Installation of Air Conditioning Units | | X | L | L-H | S-M | M-H | | | | | | | X | | | | | | | | |
| S2 | Introduce Air Filtration Systems | | X | L | M | M | M | | | | | | | X | | | | | | | | |
| S3 | Install HEPA Filters in Air Handling Units | | X | L | L | S-M | M | | | | | | | X | | | | | | | | |
| S4 | Other air filtration systems - air purifiers | | X | L | L-M | S-M | M | | | | | | | X | | | | | | | | |
| **S** | **Other** | | | | | | | | | | | | | | | | | | | | | |
| S1 | Air quality monitoring and information provision eco-monitors and walking route maps. | X | X | L | L | S | H | | | | | | | | | X | | | | | | |

# Summary of Measures, including Assessment Criteria



## Behavioural Measures

| 3. BEHAVIOURAL MEASURES (Key Stakeholder: School/ Borough) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| T1 | Attain improved STARS accreditation status, ultimately Gold status. | X | | L | L | S-M | H | | | | | | | | X | | | | |
| T2 | Promote cleaner walking routes to school | X | X | L | L | S | H | | X | | | | | | X | X | | | |
| T3 | Promoting Park & Stride | X | | L | L | S-M | H | | X | | | | | | X | X | | | |
| T4 | Promoting car sharing | X | | L | L | S | H | | X | | | | | | | X | | | |
| T5 | Walking Route Maps / Leaflets | | X | L | L | S | H | | X | | | | | | **X** | **X** | | | |
| T6 | Parent and Public Workshops | X | X | L | L | S | H | | | | | | | | **X** | **X** | | | Y |
| T7 | Prepare 'Welcome Packs' for new pupils / parents | X | X | L | L | S | H | X | X | | | | | | **X** | **X** | | | Y |
| T8 | Deliver Air Quality focused lesson/s to children | X | X | L | L | S | H | | | | | | | | **X** | **X** | | | Y |
| T9 | Awareness raising session amongst staff | X | X | L | L | S | H | | | | | | | | **X** | | | | |
| T10 | Daily monitoring of London Air website/ app | X | X | L | L | S | H | | | | | | | X | **X** | | | | |
| T11 | Add Air Quality to Junior Citizenship Scheme | X | X | L | L | S | H | | | | | | | | **X** | | | | |
| T12 | Anti-idling campaign | X | | L | L | S | H | | | | | | | | **X** | **X** | | | |
| T13 | Attain an improved Award in Healthy Schools London, ultimately a Gold Award | X | X | L | L | S-M | H | | | | | | | | **X** | **X** | | | |
| T14 | Awareness raising events amongst the wider community | X | X | L | L | S-M | M | | | | | | | | **X** | | | | |
| T15 | Cycle training and promotional initiatives | X | | L | L | S | M | X | X | | | | | | | **X** | | | |
| T16 | Gamification to promote active travel | X | | L | L-M | M | M | | X | | | | | | | **X** | | | |
| T17 | Restrict or reduce personal deliveries | X | | L | L | S | M | | | | | | | | | | | | |
| T18 | CPD supporting teachers subject knowledge on air quality | X | X | L | L | S-M | M | | | | | | | | **X** | **X** | | | |
| T19 | Walking Buses | X | | L | L | S | M | | X | | | | | | **X** | **X** | | | |

## Wider Measures

| 4. WIDER MEASURES (Key Stakeholder: Borough/ TfL/ GLA/ Central Government) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| V1 | Targeted scrappage scheme for polluting vehicles entering London | X | | H | H | L | L | | | | | | | | | | | | |
| V2 | Reform Vehicle Excise Duty | X | | H | M | L | L | | | | | | | | | | | | |
| V3 | Promote a transition to electric heating and heat pumps | X | | H | M | L | L | | | | | | | | | | | | |
| V4 | Reform Buildings Regulations to promote heat pumps | X | | M | M | L | L | | | | | | | | | | | | |
| V5 | Zero emission zones | X | X | H | H | L | L | | | | | | | | | | | | |

## Other formats and languages

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