

The Mayor of London's Nursery Air Quality Audit Programme

Windham Nursery School, London Borough of Richmond



CONTENTS

	NON-TECHNICAL EXECUTIVE SUMMARY	1
1.	INTRODUCTION	9
1.1.	BACKGROUND	9
1.2.	OBJECTIVES	11
2.	AUDIT APPROACH	15
2.1.	OVERALL AUDIT APPROACH	15
2.2.	AUDIT SCHEDULE – CLYDE NURSERY SCHOOL	17
3.	CONTEXT AND INITIATIVES	21
3.1.	NURSERY CONTEXT	21
3.2.	PLANNED SCHEMES & RECENT INITIATIVES	25
4.	AIR QUALITY AUDIT FINDINGS	29
4.1.	BASELINE AIR QUALITY	29
4.2.	HIGHWAYS – KEY OBSERVATIONS	40
4.3.	NURSERY GROUNDS / BUILDING - KEY OBSERVATIONS	42
4.4.	KEY OBSERVATIONS – SUMMARY OF ISSUES	44
5.	RECOMMENDATIONS	47
5.1.	DEVELOPING THE RECOMMENDATIONS	47
5.2.	KEY RECOMMENDATIONS	53
5.3.	PRIORITISED MEASURES FOR THE NURSERY	54
5.4.	STARS ACCREDITATION SCHEME FOR NURSERIES	54
5.5.	HEALTHY SCHOOLS LONDON	55
5.6.	AIR QUALITY ALERTS	55
5.7.	ENGAGEMENT	56
5.8.	FUNDING OPPORTUNITIES	57

5.9.	MONITORING	60
6.	NEXT STEPS	62

TABLES

Table 1 – Audit Details	17
Table 2 – Windham Nursery School: Three Month Baseline NO ₂ Monitoring Results (µg/m ³)	30
Table 3 – Windham Nursery School: Three Month Baseline Formaldehyde and VOC Monitoring Results (µg/m ³)	31
Table 4 – Recommended measures for consideration	49

FIGURES

Figure 1 – Overview of Approach	15
Figure 2 - Nursery Context	21
Figure 3 – Outer Context Plan	23
Figure 4 – Inner Context Plans	24
Figure 5 - Comparison of the average NO ₂ concentrations at Windham Nursery School (µg/m ³)	30
Figure 6 - LAEI Baseline Annual Mean NO ₂ Concentrations within the Immediate Area of Windham Nursery School	33
Figure 7 – Average Road Transport – by Vehicle Type (within 200m of nursery)	34
Figure 8 – Average Road Transport NO _x Emissions by Vehicle Type (within 200m of nursery)	34
Figure 9 – Average Road Transport PM ₁₀ Emissions by Vehicle Type (within 200m of nursery)	35
Figure 10 – Average Road Transport PM _{2.5} Emissions by Vehicle Type (within 200m of nursery)	35
Figure 11 – 2013 LAEI Baseline Annual Mean NO ₂ Concentrations within 2km of Windham Nursery School	37

Figure 12 - 2013 LAEI Baseline Annual Mean PM ₁₀ Concentrations within 2km of Windham Nursery School	38
Figure 13 - 2013 LAEI Baseline Annual Mean PM _{2.5} Concentrations within 2km of Windham Nursery School	39
Figure 14 - Summary of Potential Issues Map	44
Figure 15 – Summary Recommendations Map	53
Figure 16 – Summary of Funding Opportunities	57

THE MAYOR'S NURSERY AIR QUALITY AUDIT PROGRAMME

Clyde Nursery School – London Borough of Lewisham



ACKNOWLEDGEMENTS & CONTRIBUTIONS

Windham Nursery School – Bev Turner (Headteacher)

London Borough of Richmond – Carol Lee (Senior Environmental Health Pollution Practitioner – Air Quality), Lindi Louw (School Travel Officer)

MEMBERS OF THE PROGRAMME ADVISORY GROUP

Annette Figueiredo - Programme Lead, Principal Policy & Programme Officer, Greater London Authority

Agnieszka Griffin - Senior Policy Officer, Greater London Authority

Sarah Macfadyen – Policy Manager, British Lung Foundation

Ben Connor - Senior Policy & Programmes Officer, Greater London Authority

Sara Ramsay - Youth Programmes, Greater London Authority

Ben Gascoyne - Senior External Affairs Officer, University College London

Liz Prosser - Healthy Early Years Manager - Healthy Schools London, Greater London Authority

Magda Balicka - Principal Policy and Projects Officer (Early Years), Greater London Authority

Dr Simon Lenton - Royal College of Paediatrics and Child Health

Paula Martin - Air Quality Analyst, Transport for London

Fiona Coull – Graduate Consultant, Greater London Authority

Olly Offord, Project & Policy Officer, Communities & Intelligence, GLA.

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 nursery.

Supplier



Glenn Higgs, Technical Director, Project Director, WSP
Matt Croucher, Sustainable Transport, Project Manager, WSP
Daniel Quan, Sustainable Transport, Auditor, WSP
Justin Lingard and Peter Walsh, Air Quality, WSP
Alessandro Ciampechini and Andrew Marsh-Patrick, Sustainable Places & Energy, WSP

COPYRIGHT

Greater London Authority
February 2020

Published by
Greater London Authority
City Hall
The Queen's Walk
More London
London SE1 2AA
www.london.gov.uk
enquiries 020 7983 4000
minicom 020 7983 4458
ISBN
Photographs ©

Copies of this report are available
from www.london.gov.uk

NON-TECHNICAL EXECUTIVE SUMMARY

Long-term exposure to poor air quality contributes to thousands of premature deaths in London. The Mayor wants London to have the best air quality of any major world city by 2050. Young children are amongst the most vulnerable to air pollution's effects. Toxic air can stunt their growth, causing significant health problems in later life.

In May 2018, the Mayor launched a programme of air quality audits to help clean up toxic air and protect the health of young children in 20 nurseries in some of London's most polluted areas.

The **Air Quality Audit** followed a structured approach, with desktop research and air quality modelling, followed by fieldwork and air quality monitoring. Recommendations were then developed based on the consultations with nursery staff and borough officers.

The audit has assessed both outdoor and indoor air pollution levels.

Outdoor pollutants are generated by industrial processes and traffic emissions, and can migrate indoors through windows, doors and other means of ventilation.

Indoor air pollution arises from a mixture of pollutants generated inside a building including building materials and furnishings, and through activities such as cooking, heating, smoking and use of paints, varnishes, cleaning products and air fresheners.

Indoor air pollution is still a relatively new area of study, and our understanding is still evolving as further evidence is collected on the complex interactions taking place, and the extent to which they affect our health.

Audit Findings

Nitrogen oxides (NO_x) - Short-term exposure to concentrations of NO₂ can cause inflammation of the airways, increasing susceptibility to respiratory infections and to allergens.

The results of the three-month baseline monitoring showed that NO₂ concentrations were highest at the **roadside** (32.09µg33µg/m³), with local road traffic emissions contributing significantly to roadside concentrations.

The three months of baseline NO₂ monitoring provides a snap-shot of concentrations in and around the school across the winter and spring months, when concentrations are likely to be at their highest due to elevated NO_x emissions driven by the cold weather. However, in each month, the measured NO₂ concentrations were within the annual mean NO₂ national Air Quality Objective (AQO) of 40µg/m³.



NO₂ concentrations fall to 28.42µg29µg/m³ in the **playground**, which is partially screened from traffic by fencing and some trees and shrubs. Concentrations at the **nursery entrance** are lower (25µg/m³) as is it set back further from the road. **Inside the nursery**, concentrations were 21µg/m³. Whilst concentrations were found to be below national legal limits, known as Air Quality Objectives, there is no 'safe' level and children would still benefit from further reductions. Children will also be adversely affected by their journeys to and from nursery.

Volatile Organic Compounds (VOCs) are emitted from vapours arising from petrol and solvents. In a nursery setting are likely to originate from a wide variety of products, including furnishing, carpets, upholstery, cleaning products and air fresheners. Exposure can cause irritation to the eyes and upper airways. In the UK, building regulations recommend total Volatile Organic Compounds (TVOCs¹) concentrations should be below 300 µg/m³. In Windham they were found to be 245.9 µg/m³. The majority of VOC chemical species detected were identified as being likely to be indoor pollutants, and included fragrances, perfumes and alcohols, likely to be products derived from use of cleaning materials and solvents.

Formaldehyde are emitted from vapours arising from solvents and adhesives. In a nursery setting these are likely to originate from glues, adhesives and finishing's. Exposure can cause burning sensations of the eyes, nose, and throat, coughing, wheezing, nausea and skin irritation. The World Health Organisation (WHO) indoor air quality guideline² for short- and long-term exposures to formaldehyde is 100 µg/m³. In Windham they were found to be 8.92 µg/m³.

Overall the monitoring found that indoor air quality at the nursery met legal standards, however there are no entirely safe levels of exposure to harmful pollutants, and the children would still benefit from further reductions.

The wider area around the nursery was assessed using the London Atmospheric Emissions Inventory (LAEI), which showed that pollution levels reducing with distance, away from the heavily trafficked A316 Lower Richmond Road. NO₂ concentrations are predicted to be highest along the southern and eastern sides of the nursery.

Particulate Matter (PM₁₀ and PM_{2.5})³ is derived from a wide range of sources, including industrial processes, road traffic, dust and brake and tyre wear. The fine component of PM₁₀, known as PM_{2.5}, is formed by combustion and is believed to be the main cause of the harmful effects of particulate matter.

Nearly 50% of NO_x emissions in London are from road transport. Larger diesel vehicles in particular are major contributors to local air pollution. Approximately **15,800 vehicles per day travel**

¹ TVOC is a grouping of a wide range of organic chemical compounds to simplify reporting when these are present in ambient air or emissions.

² Chapter 5.8 Formaldehyde. WHO Air Quality Guidelines – Second Edition, 2001

³ PM₁₀ is particulate matter with an aerodynamic diameter of less than 10 micrometres (10µm). PM_{2.5} is particulate matter with an aerodynamic diameter of less than 2.5 micrometres (2.5µm).

within 200m of the nursery. Buses make up only 5% of vehicle movements, they contribute 39% of the transport related NO_x emissions locally. Similarly, HGVs only account for 4% of the total traffic but contribute 19% of emissions. Cars account for 31% of emissions.

Key observations – summary of potential issues

- While the immediate roads adjacent to the nursery are residential in nature, the A316 Lower Richmond Road is heavily trafficked with a large number of car, vans, buses and HGVs. Large volumes, congestion and queuing traffic increases the exposure of parents and children walking to the nursery – particularly for those who live east of the rail line and south of the A316.
- Some rat-running on local roads – a few vans were observed to use Windham Road as a rat run to avoid the Lower Richmond Road / Sandycombe Road roundabout.
- Playground directly on the road – the playground is noted to front the road with limited screening. Although a relatively quiet road, children using the playground are exposed to road based emissions. Security is also an issue.
- Scooter and buggy parking is well-used and noted to fill up during the warmer weather.
- The forest school and nursery has limited screening and fencing from the adjacent park.
- The nursery is reliant on natural ventilation, with windows and doors open in the warmer months, worsening exposure to emissions. However, the classroom spaces are located away from primary sources of pollution.
- As it operates in free-flow, the doors to the playground are left open for the children to move freely, which results in heat loss in winter.
- Limited green plants contained within the nursery.

Audit Recommendations

The Mayor is implementing a significant programme of London-wide measures to improve air quality, including the introduction of the Ultra-low Emission Zone, tougher emission standards for the London wide Low Emission Zone, and the introduction of low emission buses, which will contribute significantly to addressing some of the issues identified.

Based on the preceding desktop research, site audits and stakeholder feedback, a range of **recommended measures and initiatives** have been identified. See Table 4 for full list of measures. Some of the more key measures were considered to be:

- **Green Infrastructure** – installation of green infrastructure/screens between the playground and the road. The green infrastructure will also act as a visual barrier between the children in the playground and passers-by along Windham Road.
- **Encourage parents to approach the nursery along less polluted routes**, for example taking parallel routes to A316 Lower Richmond Road where possible. This can have a real impact on short-term exposure and is something that parents can be proactive with. The nursery could promote apps / websites such as 'www.walkit.com' to a) promote walking, and b) promote the suitable walking routes to avoid air pollution hotspots.
- **Additional buggy /scooter parking** – the existing buggy and scooter parking is noted to be well utilised. Consideration should be given to expanding the existing provision to encourage more parents and children to walk / buggy / scooter to the nursery.

Next Steps

In working with the nursery and air quality and transport borough officers to complete the air quality audit, we found there to be a passionate group of individuals, who were enthusiastic about improving local air quality for the children, and the wider community as a whole.

The **borough and nursery should investigate the scope for rapidly delivering key measures** from the recommendations.

To take forward the recommendations, the nursery and borough will need to continue to work closely, building on the relationships already in place. A wide range of **potential funding** sources are identified within the report (See Appendix F), and boroughs and nurseries are encouraged to apply for these where appropriate to maximise the potential for delivering the recommendations.

Each nursery will be given a starter grant of £4,500 by the GLA to help kick-start the implementation of recommendations. The GLA will liaise with the nurseries and boroughs to agree which recommendations the grant will be used for.



Summary of Nursery related recommendations

The full range of recommendations primarily applicable to the nursery, as opposed to highways measures to be delivered by the borough or TfL, are as follows. See Table 4 for further details on these measures.

Nursery Grounds

Green Infrastructure (e.g. Playground Greening)
Additional scooter / buggy parking

Nursery Building

Fit Butchers Curtains to Doorways
Monitor air quality in classrooms
Reducing over-heating and tackling heat gain
Switch to lower VOC cleaning products

Behavioural Measures

Promote cleaner routes to school
Attain improved STARS accreditation, ultimately Gold status
Prepare 'Welcome Packs' for new pupils / parents
Join Healthy Early Years London, ultimately attach a Gold award
Awareness raising amongst staff
Monitor London Air website / app

1. INTRODUCTION

1.1. BACKGROUND

- 1.1.1. Tackling air pollution is one of the Mayor of London's top priorities, and he recognises that co-ordinated action is required to reduce exposure, especially amongst the most vulnerable such as young children, whose lungs are still developing.
- 1.1.2. The London Environment Strategy, published in May 2018, seeks to reduce the number of Londoners whose lives are blighted by poor air quality. The Mayor wants London to have the best air quality of any major world city by 2050, going beyond the legal requirements to protect human health and minimise inequalities. This include commitments to act to improve air quality in and around schools and nurseries and provide enhanced information to Londoners.

Why Nurseries?

- 1.1.3. The Mayor is particularly concerned about the impacts of poor air quality on vulnerable groups such as children, the elderly and those with pre-existing health conditions such as asthma and cardiovascular diseases. Young 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. The World Health Organization (WHO) also recognises younger children as being a vulnerable group to air pollution, making nurseries a key consideration in improving air quality.
- 1.1.4. A study led by Kings College in East London found that primary school children had on average 5% lower lung capacity than those growing up in rural areas. A UNICEF report published in December 2017 highlights the impact of air pollution on the critical growth that occurs in the brain in the first 1,000 days of life, making children exposed to pollution more vulnerable to developmental problems. UNICEF estimate that 17 million children globally are breathing air so toxic it is affecting their brain development. Air pollution exacerbates asthma, which affects 1 in every 11 children in England.

The Mayor's Nurseries Air Quality Audits

- 1.1.5. In May 2018, the Mayor launched a programme of air quality audits to help clean up toxic air and protect the health of young children in 20 nurseries in some of London's most polluted areas. The nurseries were selected based on assessments of predicted annual mean nitrogen dioxide (NO₂) and particulate matter (PM₁₀ and PM_{2.5}) levels near the nursery, and in agreement with the respective local authority.
- 1.1.6. The aim is to establish a robust process and toolkit of measures, which the London boroughs and nursery schools can roll out, so that every nursery that is located in an area of high pollution can benefit from this approach.
- 1.1.7. This programme builds on the approach founded in the Mayor's School Air Quality Audit Programme completed in March 2018, and the audit reports the Mayor recently commissioned on indoor air quality in London's primary schools, which included the Toolkit of Measures to Improve Air Quality at

Schools.⁴ The programme is led and funded by the Greater London Authority (GLA) and the audits were conducted by global engineering consultancy WSP, who have visited each of the nurseries, assessing indoor and outdoor air pollution sources, and how children travel to the nurseries.

- 1.1.8. 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 increasing⁵. Without significant intervention, as the Capital grows rapidly these trends are set to continue.



- 1.1.9. 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 Ultra Low Emission Zone (ULEZ)** launched in central London on 8 April 2019. It replaced the T-Charge (Toxicity Charge) and means that vehicles that do not meet the strict ULEZ emissions standards are charged to drive in the zone, 24 hours a day, every day of the year. It is expected that the ULEZ will reduce road transport emissions of nitrogen oxides (NO_x) by around 45 per cent in the central London zone.
- **Expanding the ULEZ and tightening the Low Emission Zone (LEZ).** The ULEZ will expand to inner London, up to the North and South Circulars, in October 2021, and emissions standards for heavy vehicles in the London-wide LEZ will be tightened (to Euro 6) in October 2020.
- **Cleaning up London's buses.** The Mayor is transforming London's bus fleet with a retrofit programme covering thousands of buses, and only procuring hybrid or zero emission double decks since 2018.
- **Cleaning up the taxi fleet.** From 2018, TfL has stopped new diesel taxis from being licensed in London and all new taxis need to be zero emission capable. TfL provide financial incentives to enable this switch to cleaner taxis and over 175 rapid charge points have been installed, with many dedicated to the trade.
- **Low emission neighbourhoods** – have been funded across London to pioneer measures to promote the use of low emission vehicles and improve local air quality, including low emission

⁴ https://www.london.gov.uk/sites/default/files/school_aq_audits_-_toolkit_of_measures_dr_v3.3.pdf

⁵ London Assembly, London stalling: Reducing traffic congestion in London, January 2017, Transport for London, Travel in London - Report 9 data, 2017

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 an ambitious strategy, with a particular focus on air quality published in 2018, and seeks to address the most urgent environmental challenges facing London, to safeguard its environment over the longer term. This strategy establishes aims for London, which include having the best air quality of any major city, and a zero-carbon city by 2050, with energy efficient buildings, clean transport and clean energy. The Mayor is providing funding through his Greener City Fund to create and improve green spaces and to plant trees.
- **The Draft London Plan** - published in November 2017, places a considerable emphasis on air quality. The aim of policies 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.
- **Healthy Streets Approach** - the Mayor is embedding the 'Healthy Streets' approach in transport strategy. This promotes a holistic approach to improve 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. The Mayor's ambition for 80% of trips in London to be made on foot, by cycle or using public transport by 2041, and a commitment to make the entire transport system zero-emission by 2050.

1.1.10. These measures are already starting to have a measurable impact on pollution levels in London.

However, the Mayor also wanted to take early action at 20 nurseries located in areas with some of the highest air pollution levels, so has provided £250k funding to commission this programme.

1.1.11. The Mayor's Nurseries Air Quality Audits Programme follows the approach developed as part of the Mayor's School Air Quality Audit Programme, identifying a combination of hard-hitting measures and quick win improvements, to minimise the impacts of toxic air on nursery 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.

1.2. OBJECTIVES

1.2.1. The key objectives of the Mayor's Nurseries Air Quality Audit Programme are to:

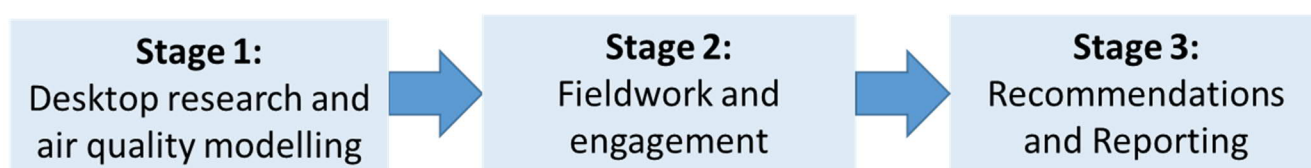
- Audit and identify the sources of poor outdoor air quality and exposure by children at 20 state-funded nurseries and their surrounding nursery catchment areas, including NO₂, PM₁₀ and PM_{2.5}.
- Audit and identify the sources of poor indoor air quality and potential exposure by children attending the nurseries, and establishing a baseline of indoor air quality.
- Assess the feasibility of installing air filtration systems at the selected nurseries' sites.
- Trial and monitor the effectiveness of air filtration systems in at least 5 of the nurseries.
- To identify, evaluate and recommend measures within and around the nurseries' that will help a borough and nursery to reduce particulate matter, emissions and children's exposure to poor air quality, and award grant funding to deliver some of the recommended measures.
- To engage nursery communities and raise awareness about the impacts of air pollution, including an introduction to Transport for London's STARS programme and the GLA's Healthy Early Years London Programme.
- To engage eligible London boroughs and other relevant stakeholders to inform the context and feasibility of the proposed recommendations.

2. AUDIT APPROACH

2.1. OVERALL AUDIT APPROACH

- 2.1.1. The Mayor's Nurseries Air Quality Audits follow the structured approach established through the preceding audit programme of Primary Schools, but this time included air quality monitoring of both indoor and outdoor air pollution. The structured approach the audit followed is summarised in Figure 1 below.

Figure 1 – Overview of Approach



- 2.1.2. Each audit consists of broadly three key stages:

Stage 1: Desktop research and air quality modelling

- 2.1.3. Prior to the site visit **air quality modelling** was undertaken for the area around the nursery, with an assessment of the contribution to emissions made by each vehicle type on the roads around the nursery.
- 2.1.4. A **desktop review** of the local areas around the nursery 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 nurseries STARS⁸ travel plan progress was also reviewed for reference ahead of the audits.

Stage 2: Fieldwork and consultation

- 2.1.5. A site visit to the nursery was undertaken by the WSP auditor and officers at the borough who deal with air quality, transport planning and school/ nursery travel.
- 2.1.6. Observations were undertaken with the borough officers and nursery staff during the peak arrival/ departure time, to capture as much information as possible on drop-off and waiting activity in and around the nursery, **identifying external sources of emissions** close to the nursery, and the areas where the children are exposed to poor air quality when approaching the nursery.

⁸ 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.

- 2.1.7. The external observations were then followed by an **audit of the building and grounds** which was undertaken with the assistance of the facilities manager, to enable the auditor to familiarise themselves with its layout, and the proximity of classrooms and playgrounds to areas of poor air quality. The audit included a review of the nurseries boilers, and considered features likely to lead to emissions of indoor air pollutants, such as building ventilation, evidence of fresh air intrusion, and identifying use and location of potential pollutant sources.
- 2.1.8. A key element of the audits was to capture the views of nursery staff, the wider nursery community, and relevant borough officers, to gain an understanding of operational considerations, behavioural traits and recent history of the nursery.
- 2.1.9. A **brainstorming session** was then undertaken, with staff from the nursery 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 could 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 nursery representatives to inform the recommended measures.
- 2.1.10. Nursery staff were also consulted regarding what they felt would be the most suitable and effective form of **engagement activity**, which could be undertaken at the nursery to raise awareness of air pollution, its causes, the health impact, and a range of measures to reduce air pollution.
- 2.1.11. A 3-month baseline **air quality survey** was undertaken to monitor Nitrogen Dioxide (NO₂), Formaldehyde and Volatile Organic Compounds (VOCs) at sites both inside and outside the nursery building, in order to capture any attenuating influence the indoor environment may have on NO₂ concentrations.



Stage 3: Recommendations and Reporting

- 2.1.12. 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. The auditor was also able to draw on an updated version of the toolkit of best practice measures and case study examples, developed for the previous primary school audit programme.

2.2. AUDIT SCHEDULE – CLYDE NURSERY SCHOOL

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

Table 1 – Audit Details

Date of Audit	Thursday 13 th December 2018	
Nursery Representatives	Bev Turner (Headteacher)	
Borough Representatives	Carol Lee (Senior Environmental Health Pollution Practitioner – Air Quality) Lindi Louw (School Travel Officer)	
WSP Auditors	Daniel Quan	
Itinerary	Timings	Description
	0800 - 0830hrs	Initial observations and site familiarisation by WSP auditors
	0830 – 0900hrs	Site walk and observations with borough travel plan coordinator / air quality officer and nursery staff
	0900 – 0930hrs	Internal site walk to appreciate the layout of the building/playgrounds etc.
	0930 – 1100hrs	Brainstorming Workshop
	1100 – 1200hrs	School Building audit

3. CONTEXT AND INITIATIVES

3.1. NURSERY CONTEXT

Figure 2 - Nursery Context

Borough: Richmond upon Thames

Address: Windham Road, TW9 2HP

Pupil Numbers: 110

Age Range:
2-5 years



Gender:
Mixed

Type: Local authority nursery school



Children who speak English as an additional language:

Higher than average

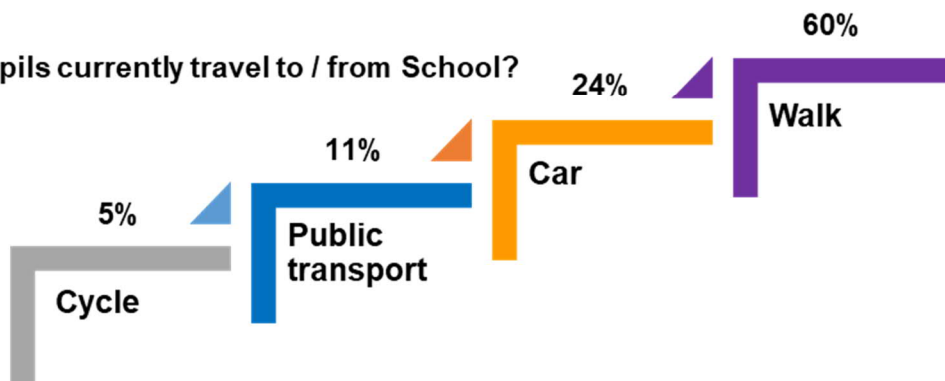


Children with disabilities or special educational needs:

Higher than average

Deprivation Rank:
9

How do pupils currently travel to / from School?



- 3.1.1. Windham Nursery School is located in South London and sits within the London Borough of Richmond upon Thames. The main entrance is on Windham Road, a 30 mph speed limit. The Council is currently consulting on the implementation of a borough-wide 20 mph speed limit.
- 3.1.2. At the time of the audit the nursery had **110 children**.
- 3.1.3. Approximately **15,800 vehicles per day travel** on the core roads within a 200m radius of the nursery⁹. This is within the 1st quartile in terms of traffic volumes amongst of the 20 nurseries assessed as part of this programme. For context, in the UK in 2017¹⁰ the average traffic flow on urban minor roads was 2,100 vehicles, and 19,200 vehicles on an urban A-road.
- 3.1.4. The 2017-18 Hands Up Survey for the school indicated that 60% of children and staff walk to / from school, 5% cycle, 11% use public transport and 24% use car or are driven to school.
- 3.1.5. Despite the relatively small catchment area, 24% of children travel to / from school by car. The school has pre-school specialist provision and also caters for a number of children registered as disabled. For parents who have children with disabilities, it is often preferable to drop and pick up their children by car.
- 3.1.6. The subsequent two pages illustrate the context of the nurseries within the local area.
- The **outer context** plan highlights key roads and land uses in the area, including the frequencies of buses, as well as other notable sources of air pollution. The figure also illustrates the key walking routes taken by the children when approach the nursery.
 - The **inner context** plan provides detail on the main accesses (both pedestrian and vehicular) to the nursery, and the location of the playgrounds where children are most exposed to air pollution.

⁹ 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 nursery in the LAEI 2013 base.

¹⁰ DfT Road Traffic Estimates: Great Britain 2017 (2018)

Figure 3 – Outer Context Plan

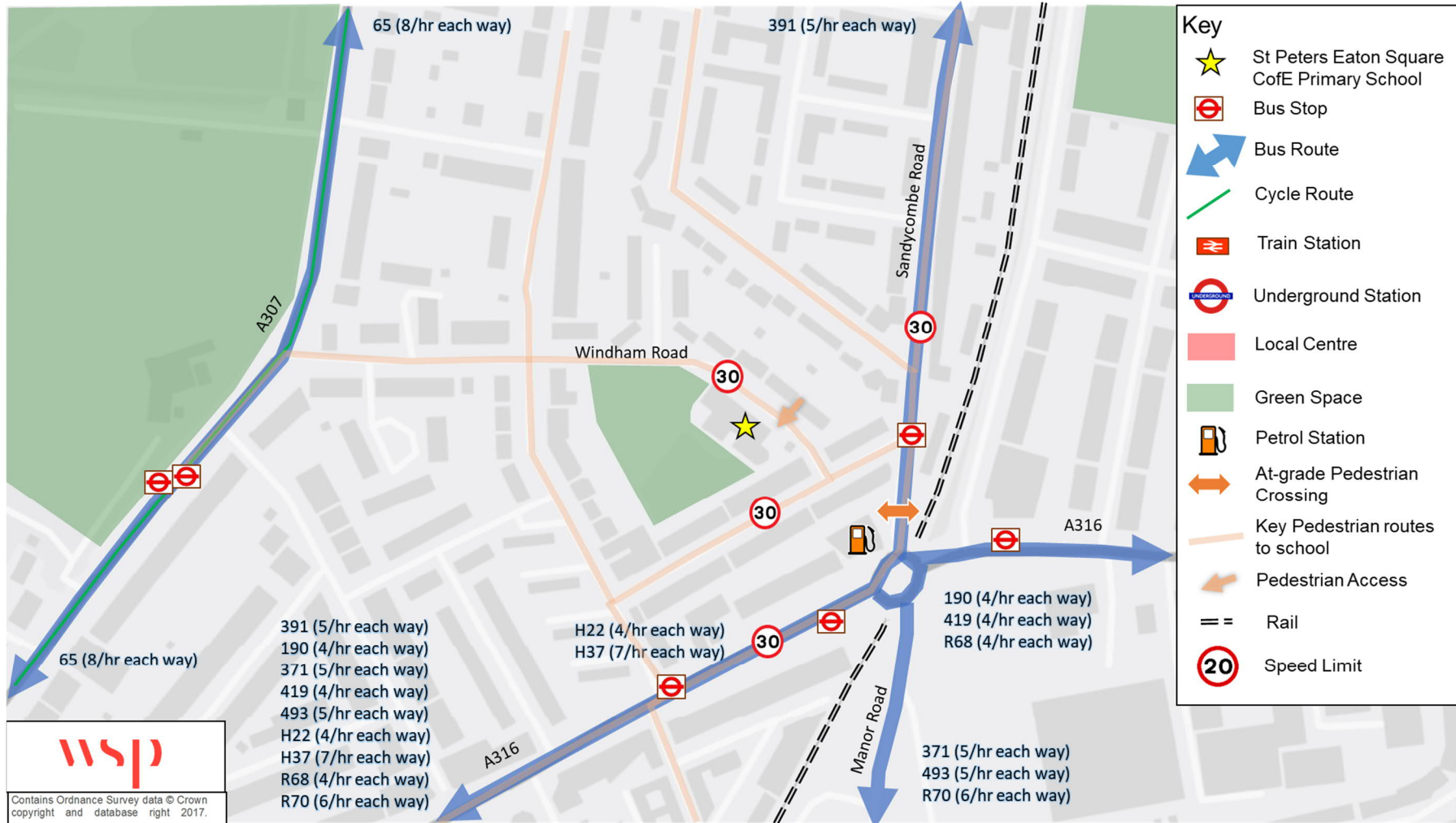


Figure 4 – Inner Context Plans



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 nursery, including:

HOMEBASE SITE (MANOR ROAD)

- 3.2.2. The existing Homebase site along Manor Road is proposed to be converted into residential units (up to 400 in total). The development is planned to include 151 one-bed flats, 161 two-bed flats and 72 three-bed flats, resulting in a total of 384 new homes. Within the proposal, 35% of the flats will be 'affordable units'.

HEATHROW AIRPORT EXPANSION

- 3.2.3. The proposed expansion at nearby Heathrow Airport was highlighted by officers as a notable development that would further impact on air quality at the school and surrounding areas. Heathrow Airport currently has two runways and operates 480,000 flights per year. The introduction of a third runway will mean that the Airport can accommodate up to 740,000 flights per year¹¹.
- 3.2.4. Whilst the additional flights will result in an increase in pollution, the primary concern at a more local level is the additional vehicle traffic travelling to / from the airport, with almost double the number of flights taking place than at present.

Impact of scheme:

- Air pollution associated with construction activity.
- Potential for additional traffic once completed.

WIDER SCHEMES

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

- 3.2.5. The recently launched ULEZ will operate 24 hours a day, 7 days a week within the same area as the current Congestion Charging Zone (CCZ). 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. Further details on emissions standards and classification of vehicles can be found through TfL.
- 3.2.6. The London-wide Low Emission Zone (LEZ) is being tightened to a Euro VI emissions standard for heavy duty vehicles (buses, coaches, Heavy Goods Vehicles (HGVs) from October 2020. The ULEZ will be expanded 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 October 2021. It is forecast that an expanded ULEZ and tighter LEZ standards will

¹¹ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/654320/aos-revised-draftairports-nps-non-technical-summary.pdf

result in 23 per cent less harmful nitrogen oxide (NOx) from road transport in the borough from 2021.

Impact of scheme:

- Reduced air pollution as more polluting vehicles are discouraged from travelling in the ULEZ.

NURSERY STARS ACTIVITIES

3.2.7. 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.

3.2.8. As part of the STARS scheme nurseries receive bespoke guidance from the borough, on-line resources, access to a London-wide community of schools and nurseries, priority access to funding, accreditation and recognition.

3.2.9. Windham Nursery School holds Bronze status of the STARS programme, and has been active in undertaking a range of STARS activities, with the following recorded since 2008/09.

- **Travel Activity:** Cycling lessons, parking poster, bling your bike/scooter/walking hat, walk to school week, scooter training, balance bike training, walking trips, pool bikes and scooters scheme, promote responsible behaviour on public transport, pupil journey planning, car sharing promotion.
- **Supporting Activity:** communicating with parents/carers, empty classroom day, environmental benefits of active travel, biking at break, zigzag lines enforcement, public transport for school trips.



**HEALTHY SCHOOLS
LONDON**

3.2.10. Healthy Schools London is a programme that supports London's schools and nurseries in providing an environment and culture that helps their pupils grow to be healthy happy and learn. This programme supports schools as they work towards 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.

3.2.11. Windham Nursery School is currently registered with the Healthy Schools programme.

Impact of schemes:

- Awareness raising and promotion of sustainable travel options, lessening sources of emissions and incidences of exposure.

4. AIR QUALITY AUDIT FINDINGS

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

- Baseline air quality; and
- Observed issues, emission sources and potential exposure

4.1. BASELINE AIR QUALITY

- 4.1.1. The air quality audit used a combination of modelled and measured data to establish the local, baseline pollution levels in and around each nursery.
- 4.1.2. Three pollutants were monitored in and around the nursery, these were **nitrogen dioxide (NO₂)**, **formaldehyde (CH₂O)** and **Volatile Organic Compounds (VOCs)**. All three pollutants can cause respiratory inflammation which can exacerbate to respiratory problems such as asthma and bronchitis at high levels.
- 4.1.3. NO₂ is both a primary and secondary pollutant, derived from emissions of nitrogen oxides (NO_x) from combustion sources. In London key sources include road vehicles and domestic boilers. Vehicle emissions contribute significantly to local increases in concentrations especially near busy roads.
- 4.1.4. VOCs are made up of a range of organic compounds, including formaldehyde. They have a significant photochemical oxidant forming potential and contribute to the formation of secondary pollutants, such as NO₂. They arise from a wide variety of products commonly used in homes and workplaces, including furnishing, carpets, upholstery, cleaning products and air fresheners.
- 4.1.5. Formaldehyde is a notable VOC, and can be released from furniture, finishes and building materials, and is formed in chemical reactions from combustion processes, such as smoking, heating, cooking or candle burning.
- 4.1.6. Baseline air pollutant monitoring was undertaken for three months. At Windham Nursery School, five NO₂ diffusion tubes, one formaldehyde diffusion tube and one VOC diffusion tube were deployed in the following locations:

Nitrogen Dioxide (NO₂)

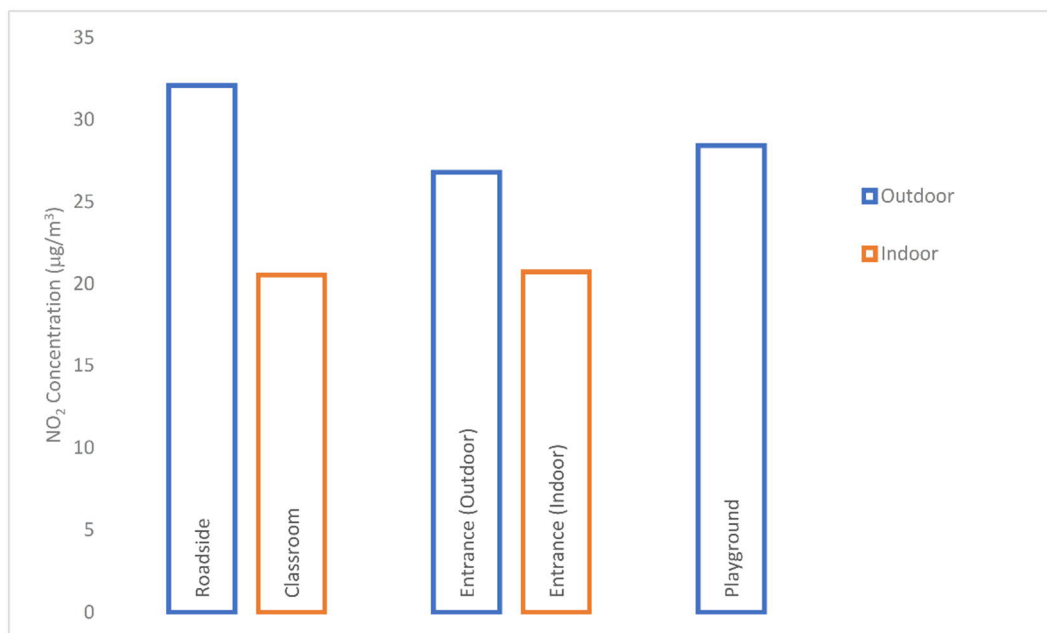
- roadside outside the nursery
- immediately outside the nursery entrance
- playground
- immediately inside the nursery entrance
- inside a nursery classroom.

Formaldehyde and VOCs

- Inside a nursery classroom.

4.1.7. See Appendix C for further details on the location of the diffusion tubes.

Figure 5 - Comparison of the average NO₂ concentrations at Windham Nursery School (µg/m³)



4.1.8. The results of the three-month baseline NO₂ monitoring at Windham Nursery School, shown in Table 2.

Table 2 – Windham Nursery School: Three Month Baseline NO₂ Monitoring Results (µg/m³)

Diffusion Tube Location	Indoor / Outdoor Location	Baseline NO ₂ Monitoring Results - NO ₂ (µg/m ³)			
		January	February	March	Average
Roadside	Outdoor	32.94	30.29	33.03	32.09
Playground	Outdoor	28.80	26.89	29.56	28.42
Nursery entrance	Outdoor	25.42	24.48	30.52	26.81
Nursery entrance	Indoor	21.33	19.20	21.66	20.73
Classroom	Indoor	-	20.53	20.54	20.54
Ratio of indoor to outdoor (I/O) concentrations		0.73	0.73	0.68	0.71

4.1.9. NO₂ concentrations were found to be highest at the **roadside** (32.09µg33µg/m³), with local road traffic emissions contributing significantly to roadside concentrations.

4.1.10. The three months of baseline NO₂ monitoring provides a snap-shot of concentrations in and around the nursery across the winter and spring months, when concentrations are likely to be at their

highest due to elevated NO_x emissions driven by the cold weather. However, in each month, the measured NO₂ concentrations were within the annual mean NO₂ national Air Quality Objective (AQO) of 40µg/m³.

- 4.1.11. NO₂ concentrations fall to 28.42µg29µg/m³ in the **playground**, which is partially screened from traffic by fencing and some trees and shrubs. Concentrations at the **nursery entrance** are lower (25µg/m³) as is it set back further from the road.
- 4.1.12. **Inside the nursery**, concentrations fall by 4-12µg/m³ compared to external concentrations. It should be noted that indoor NO₂ is not regulated against EU limits, it is regulated against HSE exposure limits.
- 4.1.13. Previous research undertaken for the GLA found that outdoor NO₂ concentrations and the airtightness of the building envelope explained 84% of the variation between classrooms, indicating the influence of strong outdoor pollution sources and the importance of the building envelope. Overall, **indoor to outdoor (I/O) ratios** in both seasons ranged from 0.3-0.5 in an airtight, contemporary school compared with 0.7-0.9 in Victorian schools that have original wooden window frames.
- 4.1.14. The NO₂ I/O ratio was 0.71 at Windham Nursery School, indicating that uncontrolled infiltration rates are at the higher end of the spectrum, and so offer less protection to its occupants than a more airtight building, though it should be noted the concentrations of emissions recorded are relatively low.
- 4.1.15. The results of the three-month baseline VOC and Formaldehyde monitoring are shown in Table 3.

Table 3 – Windham Nursery School: Three Month Baseline Formaldehyde and VOC Monitoring Results (µg/m³)

Pollutant	Baseline Formaldehyde and VOC Monitoring (µg/m ³)			
	January	February	March	Average
VOCs	110.7	211.6	415.4	245.9
Formaldehyde	7.97	9.23	9.57	8.92

- 4.1.16. **Volatile Organic Compounds (VOCs)** are emitted from vapours arising from petrol and solvents. In a nursery setting are likely to originate from a wide variety of products, including furnishing, carpets, upholstery, cleaning products and air fresheners. Exposure can cause irritation to the eyes and upper airways. In the UK, building regulations recommend total Volatile Organic Compounds (TVOCs¹³) concentrations should be below 300 µg/m³. In Windham they were found to be 245.9

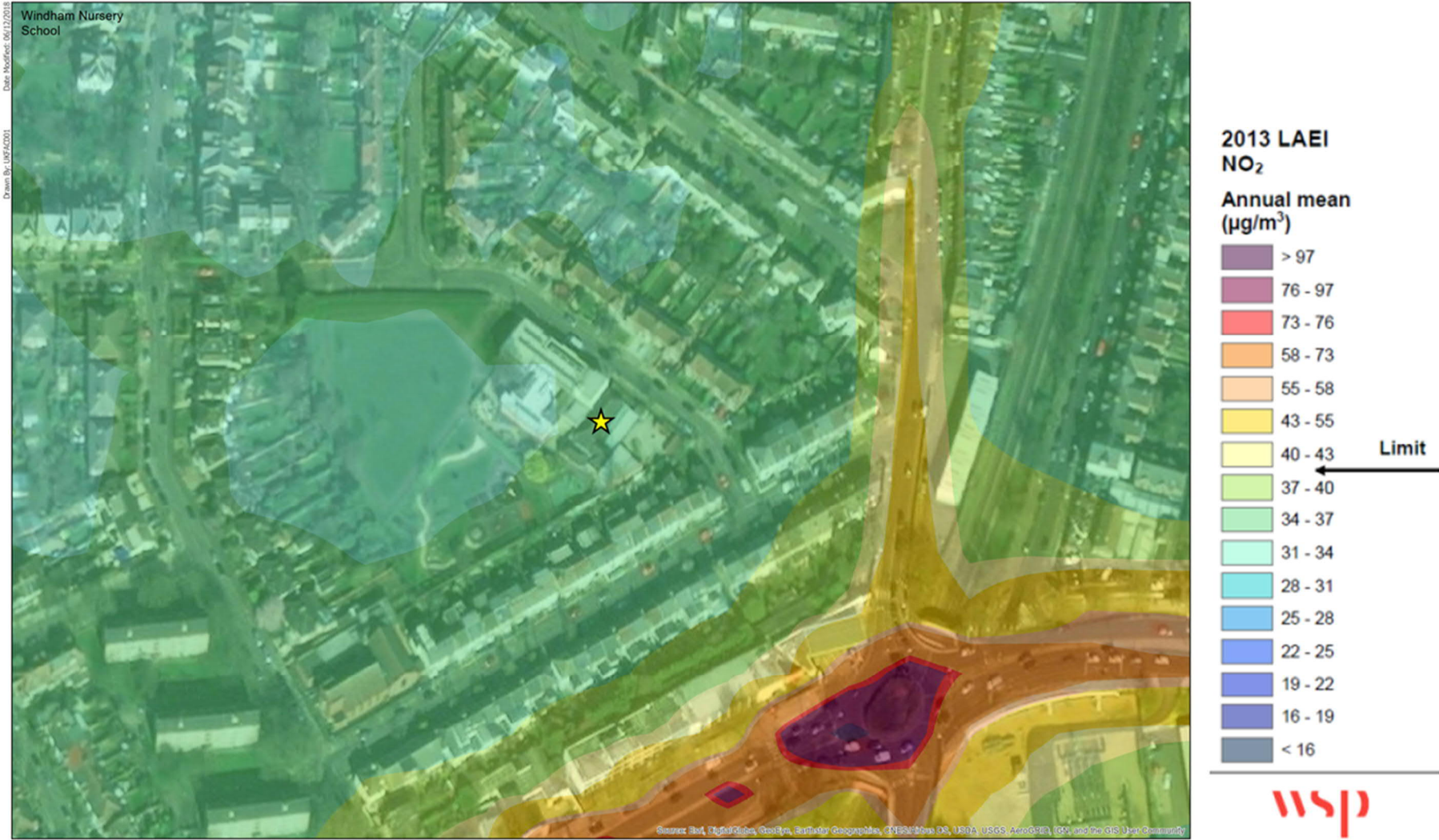
¹³ TVOC is a grouping of a wide range of organic chemical compounds to simplify reporting when these are present in ambient air or emissions.

$\mu\text{g}/\text{m}^3$. The majority of VOC chemical species detected were identified as being likely to be indoor pollutants, and included fragrances, perfumes and alcohols, likely to be products derived from use of cleaning materials and solvents.

- 4.1.17. **Formaldehyde** are emitted from vapours arising from solvents and adhesives. In a nursery setting these are likely to originate from glues, adhesives and finishing's. Exposure can cause burning sensations of the eyes, nose, and throat, coughing, wheezing, nausea and skin irritation. The World Health Organisation (WHO) indoor air quality guideline¹⁴ for short- and long-term exposures to formaldehyde is $100 \mu\text{g}/\text{m}^3$. In Windham they were found to be $8.92 \mu\text{g}/\text{m}^3$.
- 4.1.18. In addition to the monitoring undertaken at the site, 2013 baseline annual mean NO_2 , PM_{10} and $\text{PM}_{2.5}$ concentrations have been estimated for each nursery from the **London Atmospheric Emissions Inventory (LAEI)** maps.
- 4.1.19. Briefly, the LAEI model provides mapped annual mean NO_x , NO_2 , PM_{10} and $\text{PM}_{2.5}$ concentrations on a 20m x 20m basis for the whole of London from a base-year of 2013 for 2020, 2025 and 2030.
- 4.1.20. 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.
- 4.1.21. Figure 5 shows the 2013 LAEI baseline annual mean NO_2 concentrations within the vicinity of Windham Nursery School.
- 4.1.22. The contours (changes in colours) show the change in the change in pollution gradients, with distance, away from the heavily trafficked A316 Lower Richmond Road. NO_2 concentrations are predicted to be highest along the southern and eastern sides of the nursery.

¹⁴ Chapter 5.8 Formaldehyde. WHO Air Quality Guidelines – Second Edition, 2001

Figure 6 - LAEI Baseline Annual Mean NO₂ Concentrations within the Immediate Area of Windham Nursery School



4.1.23. 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 nursery, split by source, have been analysed to identify the key sources contributing to NO₂ in the vicinity of the nursery.

4.1.24. The pie chart below shows that while buses make up only 5% of vehicle movements, they contribute 39% of the transport related NO_x emissions locally. Similarly, HGVs only account for 4% of the total traffic but contribute 19% of emissions. However, it should be noted that with TfL's commitment to upgrading the whole bus fleet to the cleanest Euro VI vehicles as a minimum, by October 2020, that the emissions contributed by buses will be expected to fall significantly.

Figure 7 – Average Road Transport – by Vehicle Type (within 200m of nursery)

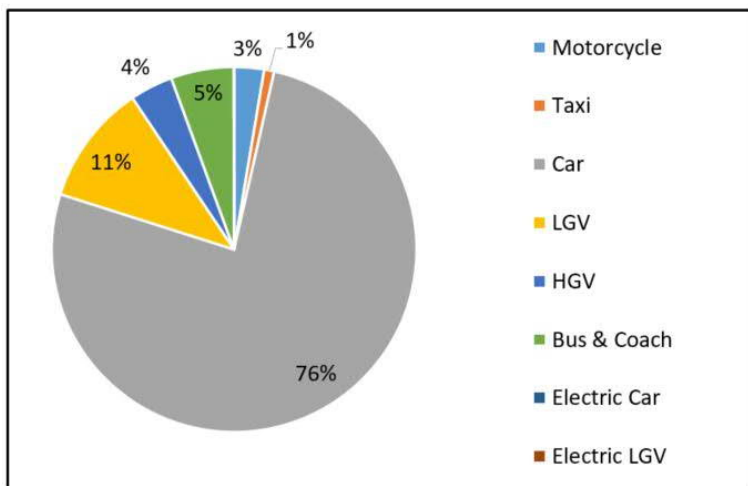
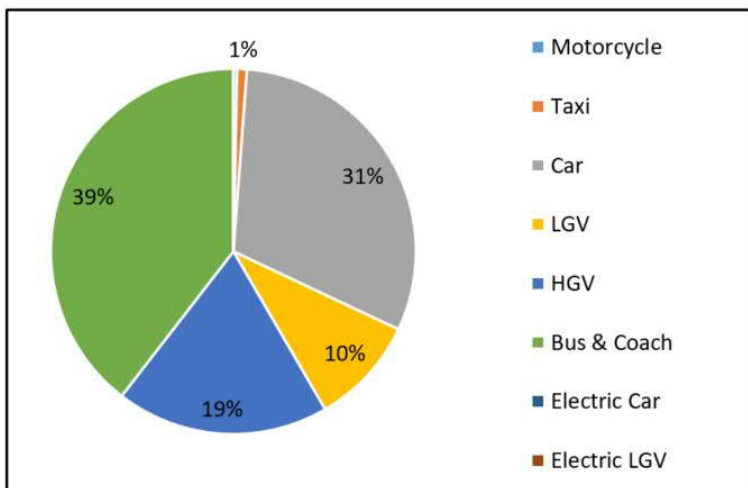


Figure 8 – Average Road Transport NO_x Emissions by Vehicle Type (within 200m of nursery)



4.1.25. The pie charts below illustrate that PM₁₀ and PM_{2.5}, like NO_x, are emitted in higher levels by large vehicles such as buses, HGVs and LGVs, though not to the same extent. Buses make 5% of vehicle movements, and contribute 26% of the transport related PM₁₀ emissions locally, and 17% of PM_{2.5}.

Figure 9 – Average Road Transport PM₁₀ Emissions by Vehicle Type (within 200m of nursery)

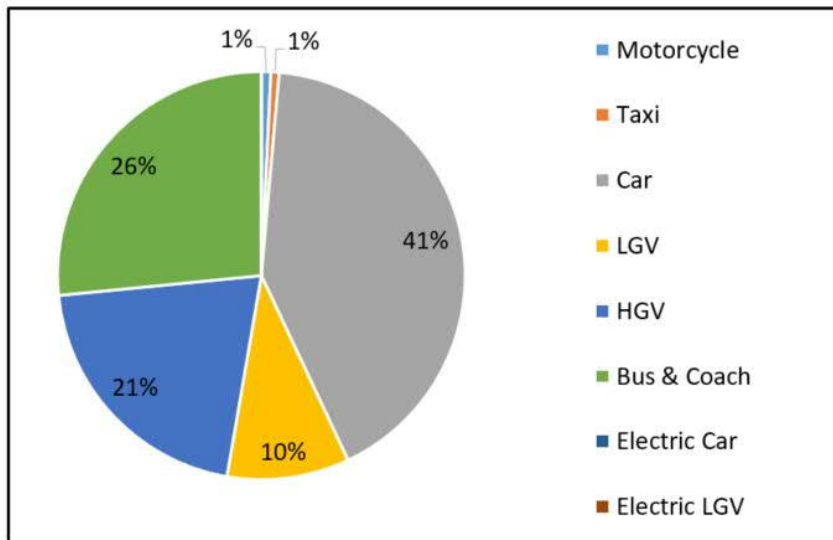
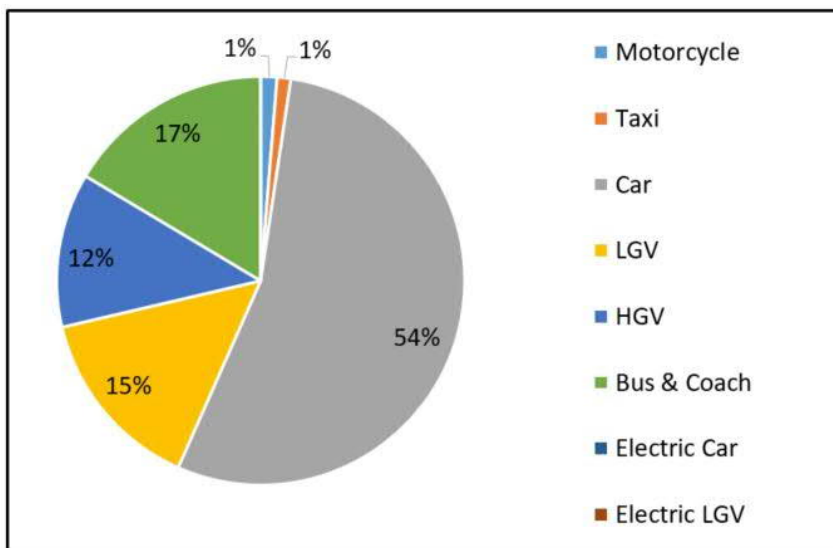
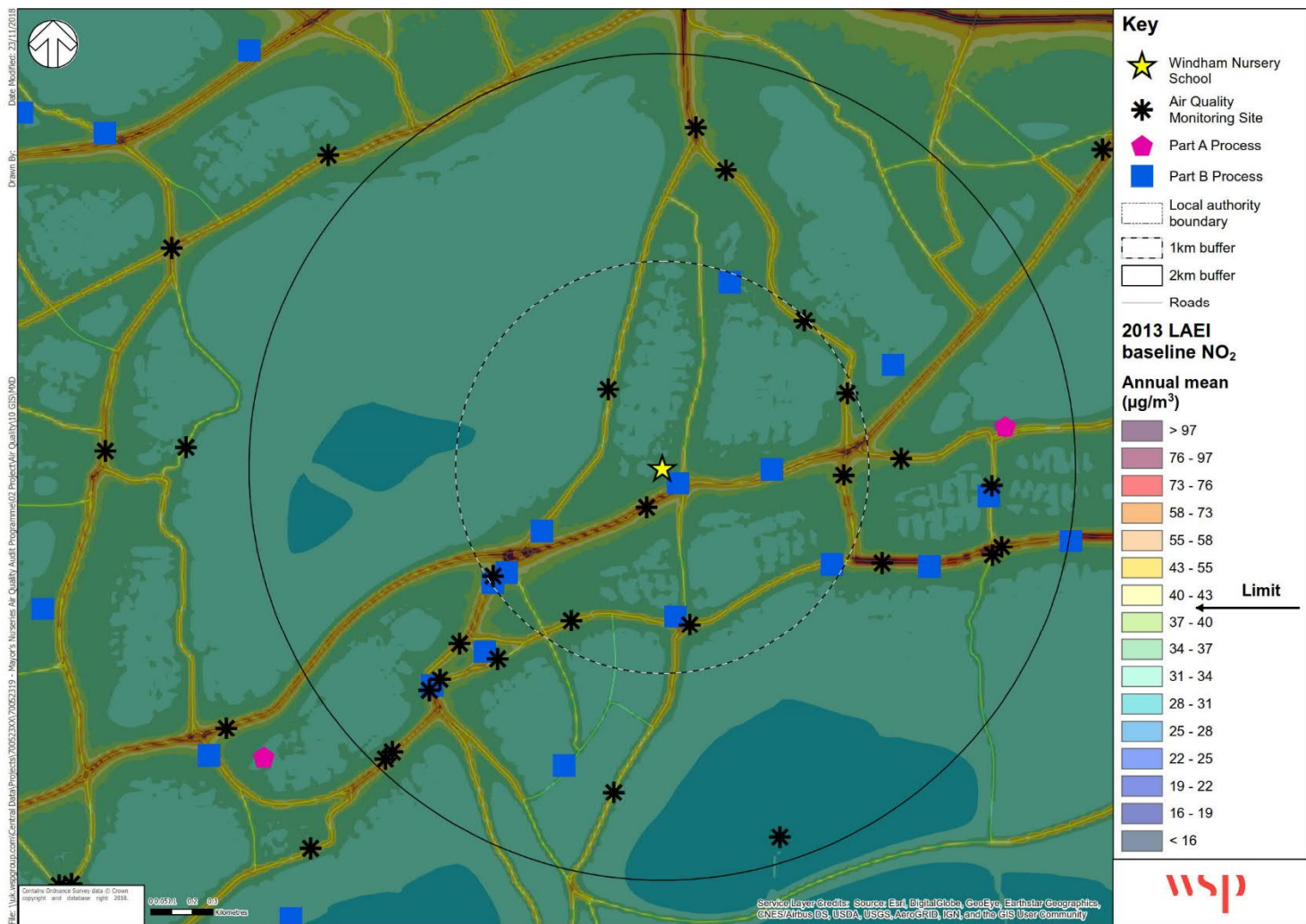


Figure 10 – Average Road Transport PM_{2.5} Emissions by Vehicle Type (within 200m of nursery)



- 4.1.26. Figures 11-13 show the 2013 LAEI baseline annual mean NO_x, PM₁₀ and PM_{2.5} concentrations in within 2km of Windham Nursery School. The contours (changes in colours) show how the pollution gradient changes, with distance, away from the heavily trafficked roads and other key sources.
- 4.1.27. PM₁₀ and PM_{2.5} sources are much more universal and dispersed than NO₂ sources. A proportion of PM_{2.5} and PM₁₀ is imported via weather events from regions outside of London, with other contributions coming from combustion processes, cleaning street sweeping/ dust re-entrainment, construction dust, etc. Therefore, concentration profiles of PM₁₀ (Figure 11) and PM_{2.5} (Figure 12) appear less defined than for NO₂.

Figure 11 – 2013 LAEI Baseline Annual Mean NO₂ Concentrations within 2km of Windham Nursery School

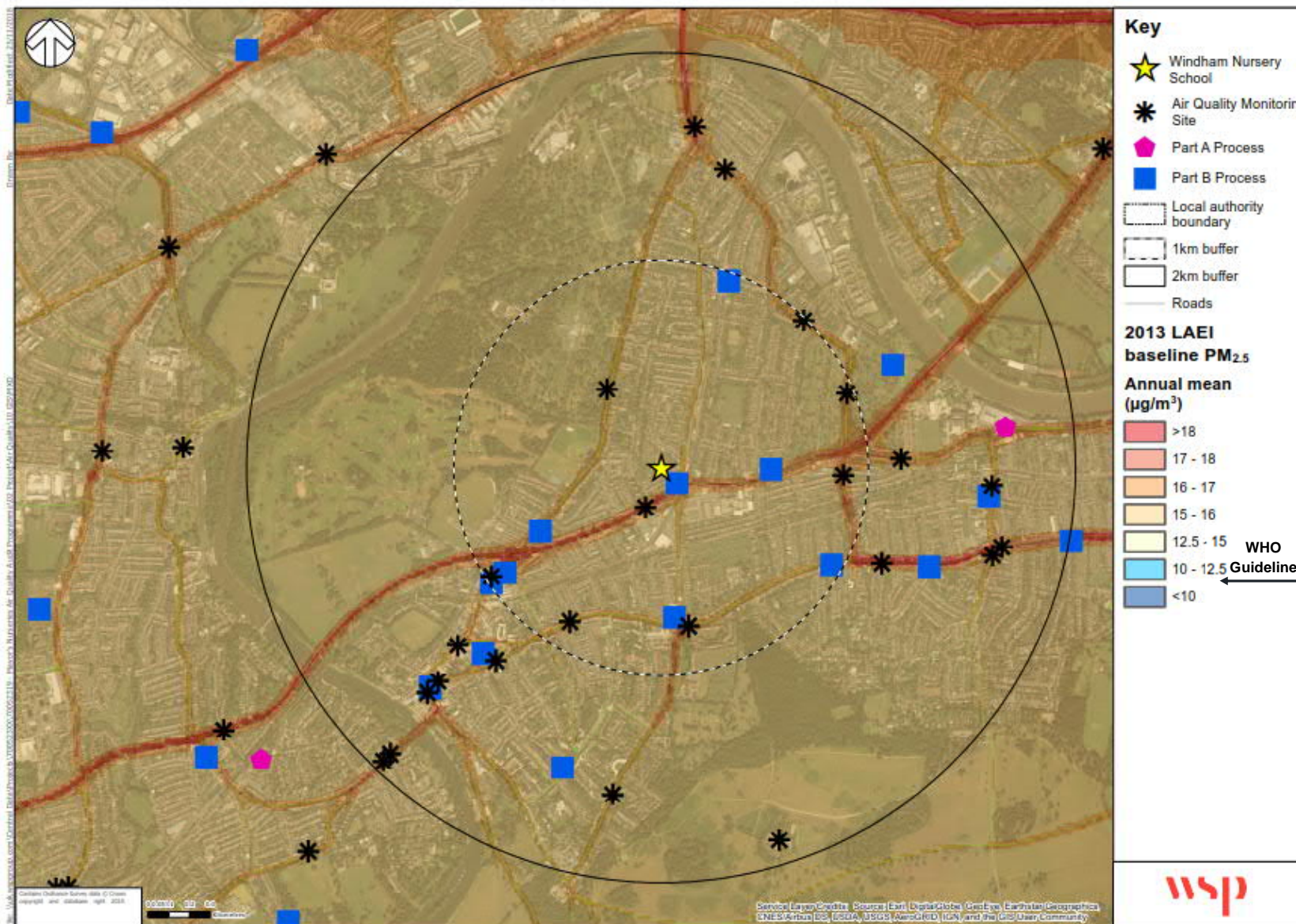


Note: Part A and B Processes include regulated industrial installations that have the potential to cause pollution and are required to have an Environmental Permit to operate, including facilities which carry out industrial processes, waste activities, mobile plant and solvent emission activities

Figure 12 - 2013 LAEI Baseline Annual Mean PM₁₀ Concentrations within 2km of Windham Nursery School



Figure 13 - 2013 LAEI Baseline Annual Mean PM_{2.5} Concentrations within 2km of Windham Nursery School



4.2. HIGHWAYS – KEY OBSERVATIONS

- 4.2.1. Access to the school is on Windham Road which is a relatively **quiet residential street**. Based on observations, there was an even split amongst parents and children approaching the nursery from the north and the south along Windham Road.
- 4.2.2. The busy A316 Lower Richmond Road is located about 100 metres to the south of the nursery, a wide four lane road carrying **large volumes of cars, buses, vans and heavy goods vehicles**. This road and the B353 Sandycombe Road roundabout, are the primary sources of local air pollution. It is noted that **engine idling resulting from queuing at the roundabout** compounds the issue. As well as being set back from the main road, the **nursery is also screened by rows of buildings**, lessening the impact of the noise and emissions reaching the site.
- 4.2.3. Parents and children travelling to / from the east of the rail line and south of the A316 are **exposed to the resulting emissions**. Exposure is even higher if using the B353 Sandycombe Road roundabout, with more queuing traffic evident during the audit.
- 4.2.4. For parents and children travelling to / from areas north and west of the nursery, there are several less polluted residential streets from which to access the site.
- 4.2.5. **Most parents and children walk, scoot or cycle** to the nursery, with a few parents dropping off children by car. The result is that even at peak times, the street is relatively clear of traffic. The street is restricted to resident permit holders only (Mon-Sat, 10am to 4:30pm). There is also a keep clear zone along the nursery frontage.
- 4.2.6. The site visit confirmed that a small proportion of parents drop off their children by car, with **no engine idling encountered**. One instance of a parent stopping and **parking along the 'keep clear' zone** was observed.
- 4.2.7. A limited number of vans were observed to use Windham Road, which could be used as a **minor rat-run** between the A316 Lower Richmond Road / B353 Sandycombe Road and the A307 Kew Road. While noted, this does not appear to be a major issue.
- 4.2.8. Many of the roads around the nursery are local residential streets, with low volumes of traffic which allow parents and children to easily cross. However, while not directly outside the nursery, it is noted that there are **limited pedestrian crossing facilities on the B353 Sandycombe Road**. With higher levels of traffic, it may be more difficult to cross.
- 4.2.9. To the south of the A316 Lower Richmond Road is a **retail park** (with a Sainsbury's), as well as light industrial development, and is a major attractor of vehicle traffic locally. The Homebase site is planned to be redeveloped and will include about 400 dwellings (including affordable housing).
- 4.2.10. A **petrol station** is located at the junction of the A316 and Sandycombe Road, with a continual flow of vehicles stopping to refuel, and so is likely to contribute to an increase in local emissions. Petrol stations are also known to be a source of benzene, including the displacement of vapour from the storage tanks during delivery, from the pumps during refuelling, and through spillage and evaporative losses from storage tanks.

Summary – Key Issues

- While the immediate roads adjacent to the nursery are residential in nature, the A316 Lower Richmond Road is heavily trafficked with a large number of car, vans, buses and HGVs. Large

volumes, congestion and queuing traffic increases the exposure of parents and children walking to the nursery – particularly for those who live east of the rail line and south of the A316.

- Some rat-running on local roads – a number of vans were observed to use Windham Road as a rat run to avoid the Lower Richmond Road / Sandycombe Road roundabout.



Nursery access on Windham Road



Nursery playground along Windham Road



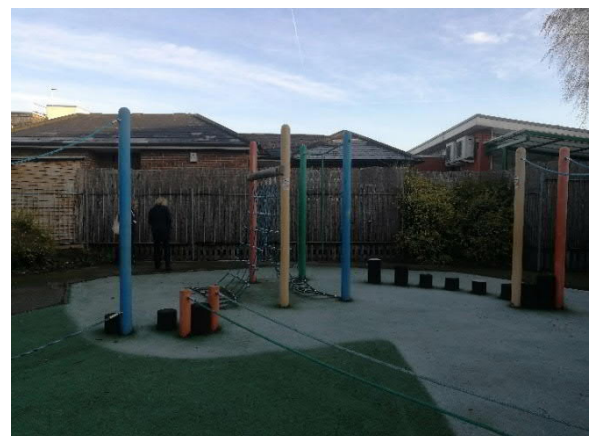
Nursery playground and fence along Windham Road



Keep clear along the nursery frontage



Nursery rear along Raleigh Road Recreation Ground



Raleigh Road Recreation Ground

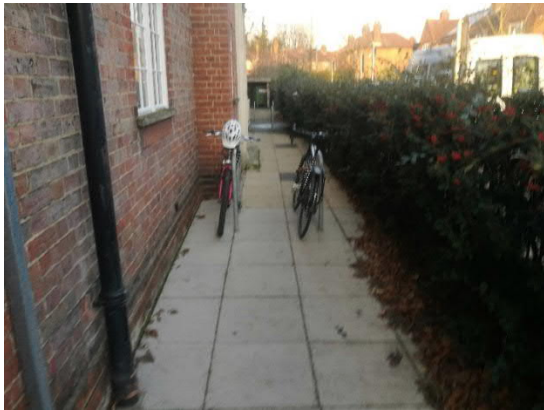
NURSERY GROUNDS / BUILDING - KEY OBSERVATIONS

- 4.3.1. The nursery school and children's centre site has one pedestrian access from Windham Road.
- 4.3.2. There is buggy, scooter and cycle parking available at the front of the nursery and children's centre. It was well-used and noted by the school to become over-subscribed in the warmer months.
- 4.3.3. The nursery and children's centre is contained within several interconnected buildings, with the nursery school located to the south of the site, with a central entrance and administration building, followed by the children's centre to the north of the site.
- 4.3.4. The main nursery **classroom** leads directly to the outdoor playground and is set-up for free-flow. The school is reliant on **natural ventilation**, and was reported to get hot in the warmer months. Overall the quality of the buildings suggested that they have adequate insulation.
- 4.3.5. The classroom's windows and doors open are set back from the road and open onto the playground. No butcher's curtains were present, with the doors open for children to access the playground.
- 4.3.6. The SEN (Jigsaw) classrooms are to the rear of the children's centre, while several offices are located above.
- 4.3.7. The main **playground** is located to the front of the site and fronts Windham Road. It is noted that the fence between the road and the playground is quite open, with limited screening both from an air quality and visual/security point-of-view. The school has installed reed fencing to provide additional screening.
- 4.3.8. The **forest school** is located to the rear of the site and backs onto a public park, and similarly to the main playground has limited screening from the public, though is sheltered from emissions from any nearby roads.
- 4.3.9. The school and children centre's **boilers** is located in a basement that is accessed from the administration area. The boilers were assessed to be in a good condition.
- 4.3.10. The nursery does not have a **staff car park** or parking area for parents. As a result, parents and staff are required to either use Windham Road or park in adjacent streets.
- 4.3.11. **School deliveries** take place via Windham Road; with the nursery receiving a maximum of two deliveries per day, which includes the lunch van, staff deliveries, milk and post.
- 4.3.12. There was not a strong odour of **cleaning products** in the building, and when not in use they are stored away from the classrooms behind closed doors, which is not accessible to the children.
- 4.3.13. The classroom has moderately high ceilings as can be seen in the photos. The classroom **floors** are predominantly comprised of wooden flooring, with some areas of carpet tiles. The rooms are **furnished** with items made from a variety of materials including wood (some of which are likely to be MDF), plastic, metal, wicker, as well as some soft furnishings.
- 4.3.14. The nursery building contained only a limited number of **green plants**.

Summary – Key Issues

- Playground directly on the road – the playground is noted to front the road with limited screening. Although a relatively quiet road, children using the playground are exposed to road based emissions. Security is also an issue.
- Scooter and buggy parking is well-used and noted to fill up during the warmer weather.

- The forest school and nursery has limited screening and fencing from the adjacent park.
- The nursery is reliant on natural ventilation, with windows and doors open in the warmer months, worsening exposure to emissions. However, the classroom spaces are located away from primary sources of pollution.
- As it operates in free-flow, the doors to the playground are left open for the children to move freely, which results in heat loss in winter.
- Limited green plants contained within the nursery.



Bike racks at nursery entrance



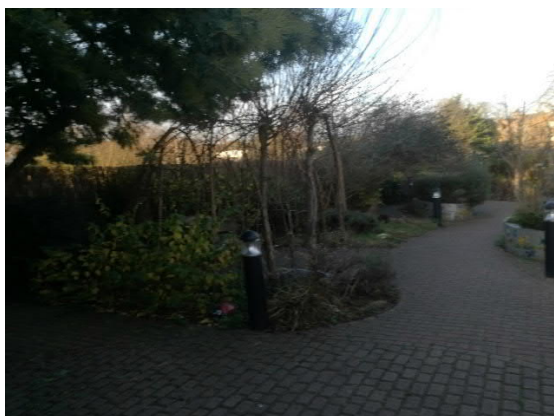
Playground area adjacent to Windham Road



Playground area adjacent to Windham Road



Classroom area



Forest school at rear of nursery



Outdoor area at rear of nursery

4.4. KEY OBSERVATIONS – SUMMARY OF ISSUES

Figure 14 - Summary of Potential Issues Map



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 nurseries.
- 5.1.2. These recommendations are drawn from a comprehensive Air Quality Audit **Toolkit of Measures**, researched and developed as part of the Mayor's Primary School Air Quality Audit Programme, and updated as part of this programme (see Appendix E for further details).
- 5.1.3. 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.
- 5.1.4. The characteristics of the local area, nursery site and 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 nursery (see Section 3.2).
- 5.1.5. 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 nursery. 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.
- 5.1.6. Table 4 on the following page sets out the list of recommendations. For the purposes of this assessment they have been categorised as proposals associated with:



- **Highways** – where recommendations would predominantly be delivered by either the borough council or TfL, who manage the highways.
- **Nursery grounds** – where the nursery, often supported by the borough council, would typically deliver the types of measures recommended.
- **Nursery building** – as with the nursery grounds, the building measures would primarily be delivered by the nursery and borough council.
- **Behavioural** – many of the behavioural measures can be delivered at minimal cost by the nursery, sometimes with the support of the borough council or TfL.
- **Wider measures** – these are larger schemes or policy changes, which would need to be delivered by TfL, the borough council or the UK Government.

5.1.7. In order to enable comparison of each measure, and to assist the nursery, 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 Early Years 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 have strong support from key stakeholders

5.1.8. These are high level comparative analyses intended to offer a means of considering the recommendations against one another in relative terms.

5.1.9. 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.

5.1.10. 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 4 – 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 / School)															
1	Healthy Streets approach, sustainable transport and roadspace reallocation from vehicular traffic	Continue to follow the Healthy Streets approach, promote sustainable transport and roadspace reallocation from vehicular traffic, and take a proactive role in endorsing the approach and supporting these initiatives, and equally hold TfL, London Councils and the GLA to account in implementing these principles.	Reduce sources and exposure			X	<ul style="list-style-type: none"> Promotion of sustainable travel 			X				X	X
2	Discourage rat running and speed with traffic calming	Consider introducing modest traffic calming and measures to discourage rat-running, proportionate to the extent of the issue. This could take the form of build outs to create single lane priority narrowing's.	Reduce sources and exposure	X			<ul style="list-style-type: none"> Road safety Promotion of sustainable transport 		X			X			X
3	Additional parking charges for more polluting vehicles	Consider introducing surcharges on top of existing parking charges for more polluting vehicles. A trial in Westminster found that the number of dirtier diesel vehicles using the parking bays dropped by 12%. The revenue raised can be used to contribute towards measures to improve air quality.	Reduce sources and exposure			X			X			X		X	
School Grounds (Key Stakeholder: School / Borough)															
4	Green Infrastructure	Install green screening/climbers around the exposed perimeter of the school ground. From an air quality perspective, the priority should be the frontage between the playground and the road. The remaining nursery perimeter would benefit from screening to improve privacy. A dense vegetation layer with a high leaf density can as much as halve the levels of pollution just behind the barrier, though the benefit tails off with increasing distance. The	Reduce exposure to emissions	X			<ul style="list-style-type: none"> Visual amenity Security, privacy 		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	
		benefit is mainly attributable to their effect on dispersion, though the deposition of some pollutants onto the leaf surfaces from air that passes through the vegetation will also have a small but beneficial effect. A study by Kings College London assessed the efficacy of green screens in preventing vehicle emissions from nearby roads reaching school grounds, through the installation of an ivy screen. In this instance the screen was found to be an effective pollution barrier, once the ivy had started growing and a significant impact could be seen once the screen had matured. It led to a decrease in the pollution concentrations on the playground side by 23% for NO2 and 38% for PM10. Green screens also provide aesthetic benefits as well as increased privacy, biodiversity and noise reduction. The screens can be planted directly into the ground or into planters and are maintained with the option of a drip line irrigation system. It should be noted however that the same level of reduction would not necessarily be achieved in each instance, as the local conditions and designs are specific to each site. It should be noted that green screens need ongoing maintenance.														
5	Scooter/ Cycle Parking	Increase scooter and cycle parking spaces to encourage sustainable / healthy travel behaviour, particularly near the main entrance.	Promoting walking, scooting and cycling by providing improved local conditions	X			<ul style="list-style-type: none"> Promotion of sustainable transport Supports STARS objectives 	X			X					X
School Building (Key Stakeholder: School / Borough)																

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		
6	Fit Butchers Curtains to Doorways	Consider installing Butchers curtains in external doorways left open for free flow activities to retain heat in the winter, and lessen exposure to air pollution.	Reduce exposure to emissions	X			<ul style="list-style-type: none"> Reduced energy consumption and reduced 	X			X				X		
7	Monitor air quality in classrooms	Installation of air quality monitoring equipment within classrooms would help staff understand when pollution is at its worst (i.e. during peak rush hour traffic) and the impact actions can have (i.e. opening of windows during summer months, as opposed to turning off radiators).	Reduce exposure to emissions	X			<ul style="list-style-type: none"> Awareness raising Reduced energy consumption and reduced operating costs Child health and welfare 	X			X						X
8	Reducing over-heating and tackling heat gain	Install thermostatic radiator valves (TRVs) to enable more efficient heating of school, and lessening incidences of winter overheating that result windows and door being opened and worsening exposure to pollution from the nearby roads. Heat gain as a consequence of classrooms with lots of south facing glass (i.e. solar gain) could be lessened through the introduction of internal blinds or film on the glass.	Reduce exposure to emissions	X			<ul style="list-style-type: none"> Improved learning environment Reduced operating costs 	X			X						X
9	Switch to lower VOC cleaning products	Switch to lower VOC alternative cleaning products, such as unperfumed cleaning products.	Reduce sources and exposure	X				X			X				X		
Behavioural Measures (Key Stakeholder: School / Borough)																	
10	Promote cleaner routes to school	Encourage children to avoid busy routes, in particular, the A316 Lower Richmond Road. In conjunction with awareness raising. Identify a Park & Stride site – Lions Gate Gardens or Manor Road Sainsburys (however this would require crossing the A316).	Reduce 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	
11	Staff Engagement	Awareness raising session amongst staff about the impacts / costs of heating classrooms and share best practice.	Reducing sources and exposure	X				X			X					X
12	Behaviour change	Prepare 'Welcome Packs' for new pupils / parents that includes the promotion of apps / sites such as 'www.walkit.com' to a) promote walking to / from school and b) promote the suitable walking routes to avoid air pollution hotspots.	Behavioural measures / reducing exposure to emissions.	X			<ul style="list-style-type: none"> Awareness raising Secure community buy-in for measures 	X			X				X	
13	Attain Gold status in STARS	Strive for gold status, which would 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.	Behavioural measures / reducing exposure to emissions.	X			<ul style="list-style-type: none"> Awareness raising Secure community buy-in for measures 	X			X	X				X
14	Attain a Gold Award in Healthy Schools	This will entail reviewing its practice in promoting health & wellbeing and evidence achieving the planned outcomes.	Behavioural measures / reducing exposure to emissions.	X				X			X					X
Wider Measures (Key Stakeholder: Borough / TfL / GLA / Central Government)																
15	Targeted scrappage scheme for polluting vehicles being driven in London	Ensure parents and staff are aware of the low income scrappage scheme being introduced by the Mayor and TfL, so that those that are eligible apply to the scheme. Encourage central Government to at a minimum match-fund the Mayor's scrappage commitments, to help enable even more Londoners to switch from polluting vehicles to ultra-low emission vehicles and more sustainable forms of transport.	Reduce sources and exposure			X				X			X	X		

5.2. KEY RECOMMENDATIONS

Figure 15 – Summary Recommendations Map



5.3. PRIORITISED MEASURES FOR THE NURSERY

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

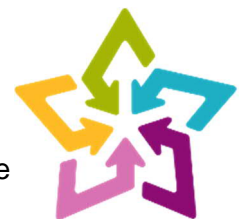
'Based on the toolkit of measures and the findings of the observations and initial analysis, what are the measures you would prioritise for the nursery?'

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

- **Green Infrastructure** – installation of green infrastructure/screens between the playground and the road. The green infrastructure will also act as a visual barrier between the children in the playground and passers-by along Windham Road. A dense vegetation layer with a high leaf density can as much as halve the levels of pollution just behind the barrier, though the benefit tails off with increasing distance. The benefit is mainly attributable to their effect on dispersion, though the deposition of some pollutants onto the leaf surfaces from air that passes through the vegetation will also have a small but beneficial effect. A study by Kings College London assessed the efficacy of green screens in preventing vehicle emissions from nearby roads reaching school grounds, through the installation of an ivy screen. In this instance the screen was found to be an effective pollution barrier, once the ivy had started growing and a significant impact could be seen once the screen had matured. It led to a decrease in the pollution concentrations on the playground side by 23% for NO₂ and 38% for PM₁₀. Green screens also provide aesthetic benefits as well as increased privacy, biodiversity and noise reduction. The screens can be planted directly into the ground or into planters and are maintained with the option of a drip line irrigation system. It should be noted however that the same level of reduction would not necessarily be achieved in each instance, as the local conditions and designs are specific to each site. It should be noted that green screens need ongoing maintenance.
- **Encourage parents to approach the nursery along less polluted routes**, for example taking parallel routes to A316 Lower Richmond Road where possible. This can have a real impact on short-term exposure and is something that parents can be proactive with. The nursery could promote apps / websites such as 'www.walkit.com' to a) promote walking, and b) promote the suitable walking routes to avoid air pollution hotspots.
- **Additional buggy /scooter parking** – the existing buggy and scooter parking is noted to be well utilised. Consideration should be given to expanding the existing provision to encourage more parents and children to walk / buggy / scooter to the nursery.

5.4. STARS ACCREDITATION SCHEME FOR NURSERIES

5.4.1. STARS is TfL's world leading school and nursery 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 nursery.

5.4.3. Equally by embracing the STARS process, delivering sustainable travel activities, achieving modal shift targets and demonstrating effective community engagement, the nursery will have successfully

delivered air quality improvements through reduced travel by cars. The framework of STARS enables the nursery and borough to document, track and share their continued progress, and embed and implement the recommendations throughout the nursery community.

- 5.4.4. Nurseries are encouraged to note any air quality related activity undertaken on their TfL STARS profile stars.tfl.gov.uk, and to help inspire other nurseries, they are required to tell their story for each activity they have delivered.
- 5.4.5. Windham Nursery School has achieved Bronze accreditation. Our recommended measures for the school include a number of initiatives that would also count towards the attaining Gold STARS scheme accreditation, including: 'welcome packs for new children / parents measures', 'awareness raising amongst staff', 'engagement activities with parents' and 'park and stride'. 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 nursery promotes active travel to and from nursery*", and provides a number of examples, including:

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

- 5.5.2. The nurseries must complete the following statements:

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

- 5.5.3. Our recommended measures for the nursery 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 nurseries.

- 5.6.3. Each nursery 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 nursery community are fundamental to achieving change.
- 5.7.2. Following consultation with the nurseries and borough council as part of the audit process, bespoke awareness raising posters and web material were provided for each nursery – see Appendix D.

HEALTHY EARLY YEARS LONDON (HEYL)

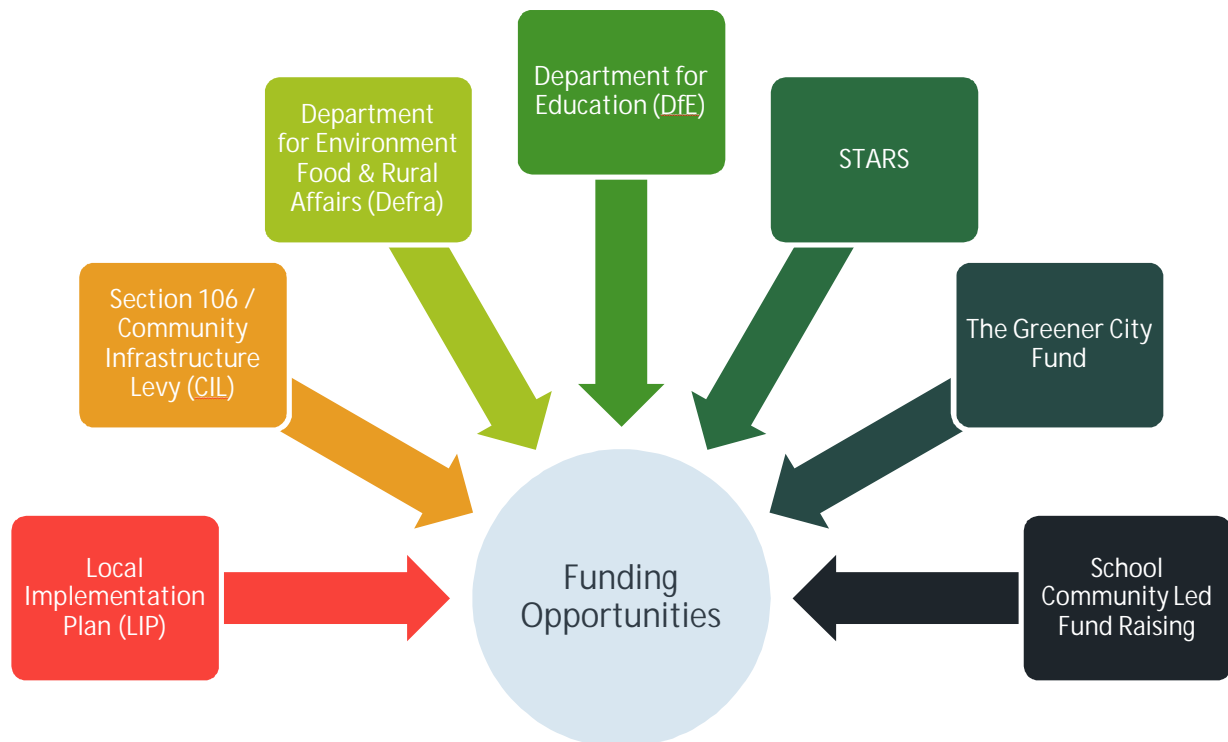
- 5.7.3. Building on the success of Healthy Schools London, Healthy Early Years London is an awards scheme funded by the Mayor of London that supports and recognises early years setting achievements in child health, wellbeing and school readiness. Healthy Early Years London focuses on the whole child 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.
- 5.7.4. 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

5.8. 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 16 – Summary of Funding Opportunities



Local Implementation Plan (LIP)

5.8.2. A primary source of funding is linked to the Local Implementation Plan (LIP) 3 that will provide spending from April 2019 until April 2020. The guidance on bidding specifically referenced the need to improve air quality at schools and nurseries.

Section 106 / Community Infrastructure Levy (CIL)

5.8.3. Section 106 (S106) agreements and Community Infrastructure Levy (CIL) are potential sources of funding towards measures to address local air pollution. A Community Infrastructure Levy (CIL) is a planning charge introduced by the government via the Planning Act 2008.

TfL Liveable Neighbourhoods

5.8.4. 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 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.

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

- 5.8.5. 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.

Department for Education (DfE)

- 5.8.6. There may be scope for delivering some of the measures identified through DfE funding for nursery buildings and land, including capital funding for nurseries and academies, such as the Condition Improvement Fund, Priority School Building Programme, Early Years Capital Fund.
- 5.8.7. Additionally, the Salix Energy Efficiency Loan Scheme provides funding for nurseries through DfE, to reduce energy costs through the installation of energy efficiency technologies.

Greener City Fund

- 5.8.8. 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. The Community Tree Planting Grant and Community Green Space grant schemes are open to applications from nurseries.

RE:FIT

- 5.8.9. RE:FIT London is jointly funded by the GLA and the European Union European Regional Development Fund. The programme helps public sector organisations save carbon, energy and money by retrofitting buildings to make them more energy efficient. The RE:FIT London Programme Delivery Unit is an expert team which provides free end to end support to deliver projects.

TfL STARS Reward Scheme

- 5.8.10. Whilst there is no specific funding attached to STARS, as gaining STARS accreditation helps boroughs reduce car travel, and increase cycling and walking, they often choose to link it to incentives – such as local grant funding through their LIP programmes.
- 5.8.11. 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)**
 - **Health and Wellbeing Boards:**
 - **Charitable Trusts**
 - **Local business funding**
 - **Consortium approach** – pooling funding with other boroughs and achieve economies of scale

Nursery Community Led Fund Raising Initiatives

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

Other Funding Sources

- 5.8.13. There are several grant funding bodies who may be interested in funding recommendations particularly if a borough links up with a community organisation.

- 5.8.14. 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 Clinical Commissioning Groups (CCGs) base their funding priorities.

Other sources of funding for green infrastructure

- 5.8.15. Potential sources of funding for green infrastructure in nurseries include:

- The Tree Council's **Trees for Schools** programme
- The **Woodland Trust** offers free trees for schools and nurseries.
- The **Gregg's Foundation Environmental Grants** offer up to £2,000 for projects that improve the physical environment
- **Tesco Bags of Help** offer up to £4,000 to projects including school and nursery grounds
- **The Big Lottery Fund's Awards for All programme** offers up to £10,000 for projects that "improve the places and spaces that matter to communities", including nurseries
- **Trees for Cities** –match-fund the creation of Edible Playground teaching garden space, School Greening projects and Trees for Schools
- **Groundwork London** –support nurseries in designing and implementing green interventions.¹⁵ Groundwork London's Our Space award¹⁶ offers grants between £500 and £5,000.

- 5.8.16. See Appendix F for further information on potential funding sources.

¹⁵ <https://www.groundwork.org.uk/Sites/london/pages/school-air-quality-greening>

¹⁶ <https://www.groundwork.org.uk/Sites/london/pages/our-space-award>

5.9. MONITORING

- 5.9.1. An important outcome of the nursery 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 nurseries 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 baseline dataset generated as part of this audit, it will be essential to 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} , $\text{PM}_{2.5}$), and/or
- a range of other suitable metrics (i.e. travel to nursery mode shares, STARS and Healthy Schools accreditations, traffic counts (as a proxy for road transport emissions), nursery buildings and boiler conditions, surveys and behavioural responses of parents/staff).

6. NEXT STEPS

6.1.1. In working with the nursery and borough officers to complete the air quality audit, we found there to be a passionate group of individuals, 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.

6.1.2. The borough and nursery should investigate the scope for rapidly delivering key measures from the recommendations, to achieve a combination of quick win improvements for the nursery, whilst also thinking more holistically about how some of the medium to longer term recommendations can be progressed, to deliver more transformational change. By participating in this audit, the following steps have been completed:



- **Identified the sources of poor outdoor air quality** and exposure at nursery and within the surrounding catchment areas.
- **Identified the sources of poor indoor air quality** and potential exposure by children attending the nurseries, and established a baseline of indoor air quality.
- **Engaged the borough and other relevant stakeholders** to inform the context and feasibility of the proposed recommendations.
- **Identified, evaluated and developed recommended measures** within and around the nurseries' that will help a borough and nursery to reduce particulate matter, emissions and children's exposure to poor air quality.
- **Raised awareness within the nursery community** about the impacts of air pollution.

6.1.3. In order to take forwards the recommendations identified within this report, the nursery and borough council will need to continue to work closely, building on the relationships already in place. A wide range of potential funding sources are identified within the report, and borough councils and nurseries are encouraged to apply for these where appropriate to maximise the potential for delivering the recommendations. The nursery has an important leadership role in ensuring that measures to reduce exposure and emissions are included in the nurseries strategic plans.

6.1.4. STARS is an ongoing process, and the nursery 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. 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. The findings of the Air Filtration System trials currently underway will be made available as an update to the toolkit of measures.

6.1.5. We also hope that the borough and nursery will come together as part of a wider School and Nursery Air Quality forum, to share their experiences with other nurseries and boroughs facing similar challenges. A wide range of guidance and useful literature is available to support further studies, schemes or initiatives for improving local air quality – see Appendix A.

Other formats and languages

For a large print, Braille, disc, sign language video or audio-tape version of this document, please contact us at the address below:

Greater London Authority
City Hall
The Queen's Walk
More London
London SE1 2AA

Telephone **020 7983 4000**
www.london.gov.uk

You will need to supply your name, your postal address and state the format and title of the publication you require.

If you would like a summary of this document in your language, please phone the number or contact us at the address above.