The Mayor of London's Nursery Air Quality Audit Programme

Maxilla and Golborne Children's Centre, Royal Borough of *K*ensington and Chelsea

FEBRUARY 2020

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THE MAYOR'S NURSERY AIR QUALITY AUDIT PROGRAMME

Maxilla & Golborne Children's Centre – Royal Borough of Kensington and Chelsea

ACKNOWLEDGEMENTS & CONTRIBUTIONS

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.

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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 NO$_2$ can cause inflammation of the airways, increasing susceptibility to respiratory infections and to allergens.

The results of the three-month baseline monitoring showed that NO$_2$ concentrations were highest at the **roadside** (42µg/m³), with local road traffic emissions contributing significantly to roadside concentrations.

The three months of baseline NO$_2$ monitoring provides a snap-shot of concentrations in and around the nursery across the winter and spring months. In two of the three months, the measured NO$_2$ concentrations exceeded the legal limits (annual mean NO$_2$ national Air Quality Objective (AQO) of 40µg/m³).

NO_2 concentrations fall to 35µg/m³ in the **playground**, which is partially screened from traffic by fencing and some trees and shrubs. Concentrations at the **nursery entrance** are of a higher level (42µg/m³) to the playground. 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. **Inside the nursery**, the **indoor** concentrations fall to 20-22µg/m³.

Volatile Organic Compounds (VOCs) are emitted from vapours arising from petrol and solvents. In a nursery setting these are likely to originate from a wide variety of products, including furnishing, carpets, upholstery, cleaning products and air fresheners. In the UK, building regulations recommend total Volatile Organic Compounds (TVOCs[1]) concentrations should be below 300 µg/m³. In the nursery they were found to be 469.5 µg/m³. The majority of VOCs identified were likely to be from the fragrances, perfumes and alcohols in, 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 guideline[2]. The World Health Organisation (WHO) indoor air quality guideline for short and long-term exposures to formaldehyde is 100 µg/m³. In Maxilla and Golborne they were found to be 10 µg/m³.

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 Westway (A40). NO_2 concentrations are predicted to be highest along the southern boundary of the nursery, which is closest to the main road.

Particulate Matter (PM_{10} 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 PM_{10}, 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 **12,600 vehicles per day travel** within 200m of the nursery. Buses make up only 3% of these vehicle movements, but contribute 17% of the transport related NO_x emissions locally. Similarly, HGVs only account for 3% of the total traffic but contribute 12% of emissions. Cars account for 23% of emissions.

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[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] PM_{10} 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).

Key observations – summary of potential issues

- The A40 Westway, situated adjacent to the Centre, is a heavily trafficked road and is the main source of emissions nearby.
- The roads adjoining the nursery are only lightly trafficked and there is minimal drop-off and pick-up activity linked to the nursery.
- Some servicing / delivery vehicles are noted to idle outside the school.
- A growing catchment area may result in larger number of parents travelling to the Centre by car.
- Early Years playground that fronts onto Acklam Road and the heavily trafficked A40 West Way is the area of greatest concern from an air quality perspective.
- Most of the building is reliant on natural ventilation.
- The school have limited control of heating systems, leading to localised overheating, and potentially resulting in greater exposure to emission through opening additional windows and doors.

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** - implementation of a green barrier to screen the Early Years playground.in the most polluted southern boundary of the site, which is exposed to the A40 West Way. An additional wall of trees encroaching into the playground may contribute towards intercepting some of the particulates from the A40.
- **Buggy / Scooter Parking Provision** - additional scooter/ cycle parking to encourage sustainable / healthy travel behaviour, particularly near the main entrance. Restricted space means opportunities to provide this outside the school grounds should be explored, such as lockable cycle hangers.
- **Raise awareness of nursery presence and anti-idling awareness raising** – increasing the prominence of the nursery and children to encourage more responsible driving and parking amongst passing traffic. This could include banners, murals or displays, or themed bollards outside the nursery. This approach could also address the issues of idling and anti-social behaviour outside the nursery, by raising awareness of their being young children in the area.
- **Encourage parents to approach the nursery along less polluted routes**, for example, taking routes away from the heavily trafficked A40 Westway. 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.

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 council or TfL, are as follows. See Table 4 for further details on these measures.

Nursery Grounds

Green Infrastructure (e.g. Playground Greening)
Provision of Buggy / Scooter Parking

Nursery Building

Air Quality Monitoring
Improved heating and insulation
Air Filtration Systems
Indoor Fans
Installation of Air Conditioning Units
Electricity Suppliers
Add indoor plants
Switch to lower VOC cleaning products

Behavioural Measures

Clean Air Activities
Welcome Packs / Newsletter
Behaviour change
Monitor London Air website / app
Attain a Gold Award in Healthy Schools
Staff Engagement
Promoting car sharing
Anti-idling campaign

1.   INTRODUCTION

1.1.   BACKGROUND

1.1.1.   Long-term exposure to poor air quality contributes to thousands of premature deaths in London. There is strong scientific evidence of the acute health effects of short-term exposure to very high pollution levels experienced during air pollution episodes.

1.1.2.   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.

1.1.3.   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?

1.1.4.   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 cardio-vascular 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.

1.1.5.   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

1.1.6.   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 (NO_2) and particulate matter (PM_{10} and $PM_{2.5}$) levels near the nursery, and in agreement with the respective local authority.

1.1.7.   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.

1.1.8.   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.

1.1.9. Road transport is a major contributor to emissions, and has a significant impact on air quality, accounting for around half of NO_x emissions. Whilst private car use is decreasing, congestion is increasing[5]. Without significant intervention, as the Capital grows rapidly these trends are set to continue.

1.1.10. 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 stands 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

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[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.

1.1.11. 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.

1.1.12. 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 NO_2, PM_{10} 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
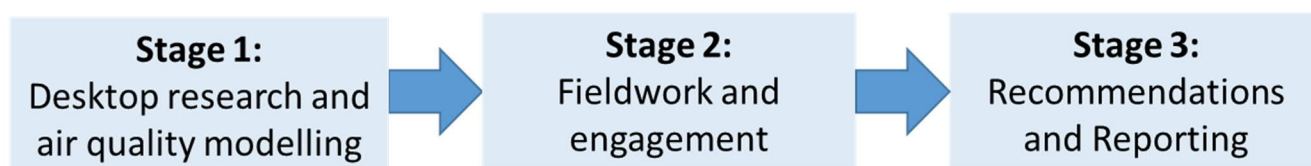
2.1.2. Each audit consists of broadly three key stages:

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 STARS[6] 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.

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[6] 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 (NO_2), 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 NO_2 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 – GOLBORNE CHILDREN'S CENTRE

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	Friday 7th December 2018	
Nursery Representatives	Veronica Hillard (Headteacher)	
Borough Representatives	Gavin Mcintosh (Air Quality Officer), Iaine Steele (Transport Planning), Michael Oskys (Travel Planning)	
WSP Auditors	Matt Croucher, Mark Cottray, Daniel Quan, Alessandro Ciampechini	
Itinerary	**Timings**	**Description**
	0815-0830hrs	Initial observations and site familiarisation by WSP auditors
	0830-0930hrs	Site walk and observations with borough air quality officers/ school transport officer/ nursery staff
	0930 – 1100hrs	Brainstorming Workshop with key staff from the nursery and borough officers.
	1100 – 1130hrs	Audit of building and grounds to appreciate the layout of the building/playgrounds etc. accompanied by the bursar/caretaker
	1530 - 1615hrs	Further observations and completion of site audit template

3. CONTEXT AND INITIATIVES

3.1. NURSERY CONTEXT

Figure 2 - Nursery Context

Borough: Royal Borough of Kensington and Chelsea

Address: 2a Bevington Road, W10 5TN

Pupil Numbers: 65

Age Range:
2-5 years

Gender:
Mixed

Type: Local authority nursery school

Deprivation Rank: 1

Children attending Full Time/ Part Time:

Part Time

Full Time

Children who speak English as an additional language:

Higher than average

Children with disabilities or special educational needs:

Average

3.1.1. **Maxilla and Golbourne Children's Centre** is located in the Royal Borough of Kensington and Chelsea. The centre can be accessed via Bevington Road and Acklam Road, which runs parallel to the A40 Westway.

3.1.2. Approximately **12,600 vehicles per day travel** on the core roads within a 200m radius of the nursery[7]. This is within the 2nd quartile in terms of traffic volumes amongst of the 20 nurseries

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[7] 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.

assessed as part of this programme. For context, in the UK in 2017[8] the average traffic flow on urban minor roads was 2,100 vehicles, and 19,200 vehicles on an urban A-road.

3.1.3.   The Centre merged with Maxilla Nursery in 2015, which is located further west within the borough. The Maxilla site is no longer occupied full time, albeit still used as a teaching facility which the children at Golborne Centre visit at least once a week (as well as other children from other nurseries and schools in the borough).

3.1.4.   Whilst mode split data is not available for nursery, discussions on the day of the audit with staff suggested that the majority of children arrive on foot / scooter, with very few parents driving to / from the Centre. This reflected observations on the day, with minimal drop-off activity recorded. Those parents who do drive were predominantly those with children who suffer from autism or mobility issues.

3.1.5.   The Centre explained that their catching area has grown slightly over recent years, with a number of children travelling greater distances, including from Wembley, Barnet, Middlesex. This is believed to be linked to the challenges in getting parents to subscribe their children to the nursery and the fact that a proportion of parents will work in the area, but live further afield. The proportion of children travelling from further afield was considered likely to grow, as the nursery looks to expand its capacity from 49 children up to 68 over the next couple of years.

3.1.6.   The majority of staff live locally and therefore travel to nursery via sustainable means, whether it be walking, cycling or use of the local bus services. The nursery leases two parking bays for staff to use, albeit it was noted that the lease will expire in April 2019 and that there are no plans for this to be renewed.

3.1.7.   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.

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[8] DfT Road Traffic Estimates: Great Britain 2017 (2018)

Figure 3 – Outer Context Plan

Key

- ⭐ Golborne Children's Centre
- 🔴 Bus Stop
- ➡️ Bus Route
- — Cycle Route
- 40 Speed Limit
- Ⓤ Underground Station
- 🟥 Local Centre
- 🟩 Green Space
- ➤ Pedestrian Access
- = = Rail
- — Key Pedestrian routes to school

23 (8/hr each way)
52 (8/hr each way)
70 (6/hr each way)
228 (3/hr each way)
452 (6/hr each way)

7 (7/hr each way)
N7 (2/hr each way)

7 (7/hr each way)
70 (6/hr each way)
N7 (2/hr each way)

Portobello Rd

Blagrove Rd

Acklam Rd

Ladbroke Grove

Oxford Gardens

A40 Westway

Cambridge Gardens

Ladbroke Grove

Westbourne Park Rd

wsp

Imagery ©2017 , Bluesky, DigitalGlobe, Getmapping plc, Infoterra Ltd & Bluesky, The GeoInformation Group
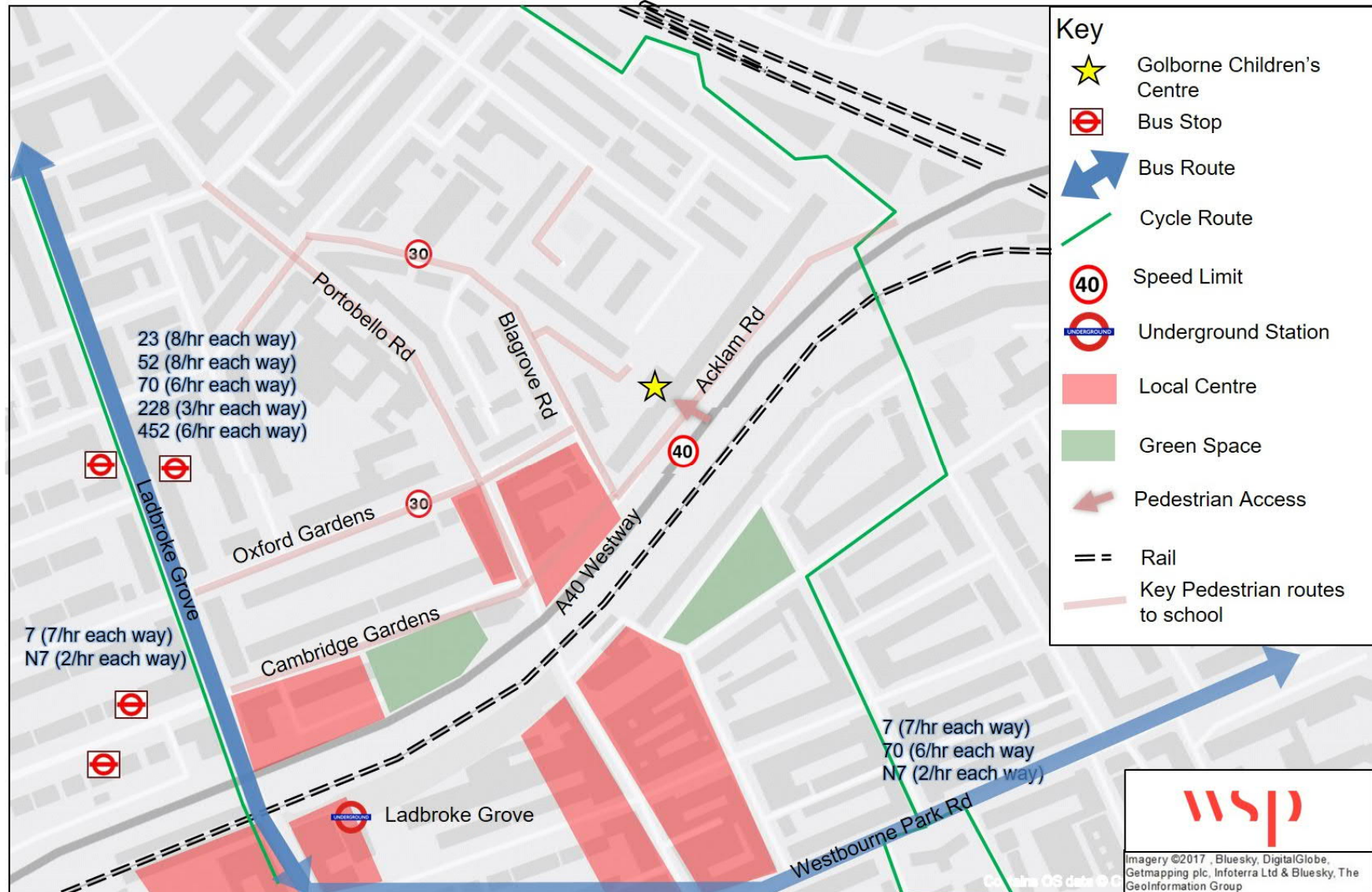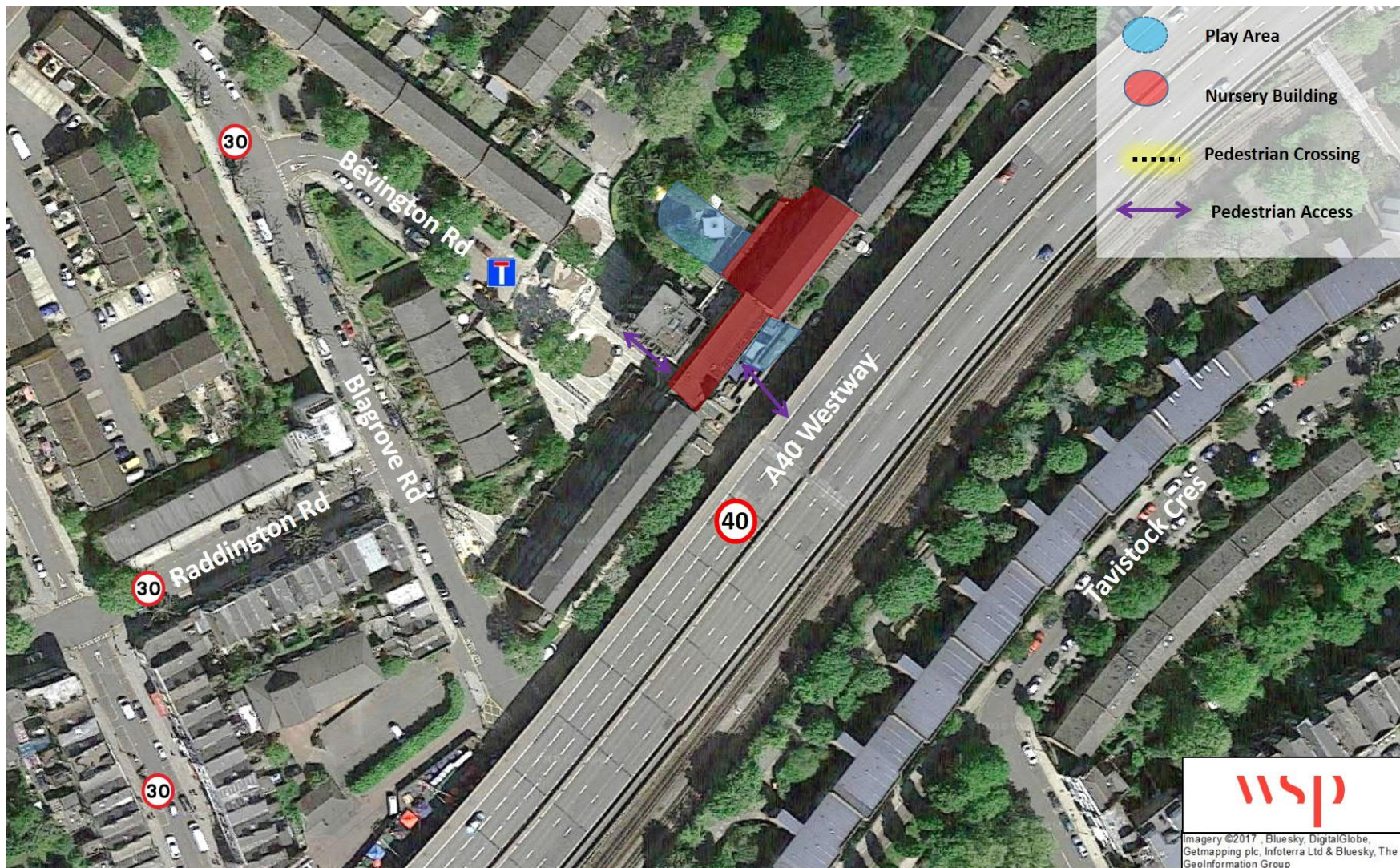
Figure 4 – Inner Context Plans

3.2. PLANNED SCHEMES & RECENT INITIATIVES

3.2.1. A number of notable schemes and initiatives were also highlighted, that will have a significant bearing on the air quality around the nursery, these include:

WIDER SCHEMES

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

3.2.2. 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.

3.2.3. 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 result in 17 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.

LOW EMISSION BUSES

3.2.4. Since 2018, all new double deck buses are hybrid or zero emission. The Mayor has also launched an £85m programme to upgrade around 5,000 buses so that the entire fleet meets the Euro VI emissions standard in 2020. Around 75 per cent of all TfL buses – including all buses operating in the ULEZ – now meet or exceed the strict ULEZ emission standards. By October 2020 every TfL bus in London – over 9,000 buses - will meet or exceed the ULEZ standards. This will mean that next year the entire city will become a Low Emission Bus Zone.

3.2.5. Twelve new low Emission Bus Zones are being introduced in areas where Londoners are exposed to some of the highest levels of nitrogen dioxide pollution. The Mayor has completed ten of these zones, reducing NOx emissions from buses by an average of 90 per cent along some of the capital's most polluted roads. The Mayor will complete delivery of all 12 routes ahead of schedule in 2019 rather than 2020.

Impact of scheme:
- Reduced air pollution as buses are replaced with low emission buses.

NURSERY STARS ACTIVITIES

3.2.6. 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.

3.2.7. 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.

3.2.8. Maxilla and Golborne Children's Centre have previously engaged with the STARS programme, albeit were not engaged at the time of the audit, due to competing priorities for staff. Despite this, the Centre have undertaken a number of activities that complement the objectives of STARS, such as:

- Walking Once a Week;
- Park & Stride events
- Encouraging scooting to nursery.

Impact of scheme:
- 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 (NO$_2$)**, **formaldehyde (CH$_2$O)** 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. NO$_2$ 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 NO$_2$. 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 Golborne Children's Centre, five NO$_2$ diffusion tubes, one formaldehyde diffusion tube and one VOC diffusion tube were deployed in the following locations:

Nitrogen Dioxide (NO$_2$)
- 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 NO$_2$ concentrations at Maxilla and Golborne Children's Centre (μg/m^3)

4.1.8.   The results of the three-month baseline NO$_2$ monitoring at Golborne Children's Centre, shown in Table 2.

Table 2 – Maxilla and Golborne Children's Centre: Three Month Baseline NO$_2$ Monitoring Results (μg/m^3)

Diffusion Tube Location	Indoor / Outdoor Location	Baseline NO$_2$ Monitoring Results - NO$_2$ (μg/m^3)			
		December	January	February	Average
Roadside	Outdoor	37.28	42.56	47.19	42.34
Playground	Outdoor	34.17	35.77	-	34.97
Nursery entrance	Outdoor	39.80	-	43.25	41.53
Nursery entrance	Indoor	17.05	22.98	25.81	21.95
Classroom	Indoor	16.50	20.71	22.54	19.92
Ratio of indoor to outdoor (I/O) concentrations		0.43	-	0.60	0.51

4.1.9.   NO$_2$ concentrations were found to be highest at the **roadside** (42.34 μg/m³), with local road traffic emissions contributing significantly to roadside concentrations.

4.1.10. The three months of baseline NO_2 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 two of the three months, the measured NO_2 concentrations exceeded the annual mean NO_2 national Air Quality Objective (AQO) of 40µg/m³.

4.1.11. NO_2 concentrations fall to 34.97µg/m³ in the **playground**, which is partially screened from traffic by fencing and some trees and shrubs. Concentrations at the **nursery entrance** are of a higher level (41.53µg/m³) to the playground.

4.1.12. **Inside the nursery**, concentrations fall by 13-22µg/m³ compared to external concentrations. It should be noted that indoor NO_2 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 NO_2 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 NO_2 I/O ratio was 0.51 at Maxilla and Golborne Children's Centre, indicating that uncontrolled infiltration rates are at the lower end of the spectrum, and so offer reasonable protection to its occupants relative to a more airtight building.

4.1.15. The results of the three-month baseline VOC and Formaldehyde monitoring are shown in Table 3.

Table 3 – Maxilla and Golborne Children's Centre: Three Month Baseline Formaldehyde and VOC Monitoring Results (µg/m$_3$)

Pollutant	Baseline Formaldehyde and VOC Monitoring (µg/m³)			
	December	January	February	Average
VOCs	299.5	1014.3	94.9	469.5
Formaldehyde	14.79	8.93	6.91	10.21

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

(TVOCs[9]) concentrations should be below 300 µg/m^3. In Maxilla and Golborne they were found to be 469.54 µg/m$_3$. The majority of VOC chemical species 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 guideline[10] for short- and long-term exposures to formaldehyde is 100 µg/m^3. In Maxilla and Golborne they were found to be 21 µg/m^3.

4.1.18. In addition to the monitoring undertaken at the site, 2013 baseline annual mean NO_2, PM_{10} and $PM_{2.5}$ 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 $PM_{2.5}$ 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 Maxilla and Golborne Children's Centre.

4.1.22. The changes in colours show the change in the change in pollution gradients, with distance, away from the heavily trafficked Westway. NO_2 concentrations are predicted to be highest along the southern boundary of the nursery, which is closest to the main road.

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[9] TVOCs denote a wide-ranging group of organic chemical compounds. For simplicity they are commonly reported together.

[10] Chapter 5.8 Formaldehyde. WHO Air Quality Guidelines – Second Edition, 2001

Figure 6 - LAEI Baseline Annual Mean NO₂ Concentrations within the Immediate Area of Golborne Children's Centre

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 NO_2 in the vicinity of the nursery.

4.1.24. The pie chart below shows that while buses make up only 3% of vehicle movements, they contribute 54% of the transport related NO_x emissions locally. Similarly, HGVs only account for 3% of the total traffic but contribute 12% 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.

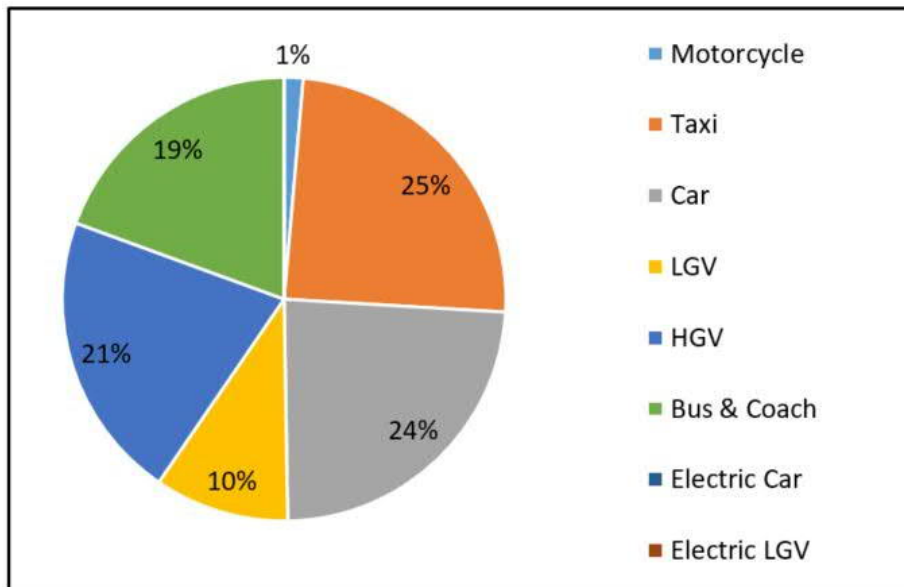**Figure 7 – Average Road Transport – by Vehicle Type (within 200m of nursery)**
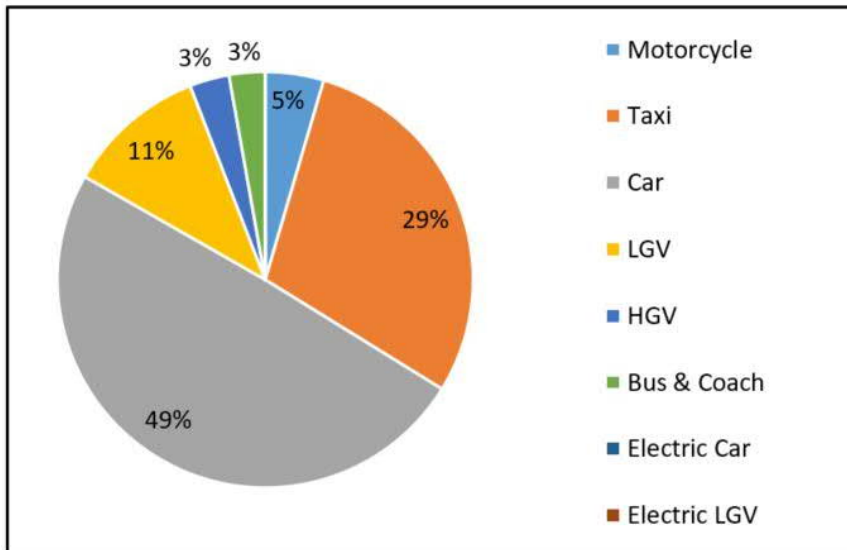
**Figure 8 – Average Road Transport NO_x Emissions by Vehicle Type (within 200m of nursery)**
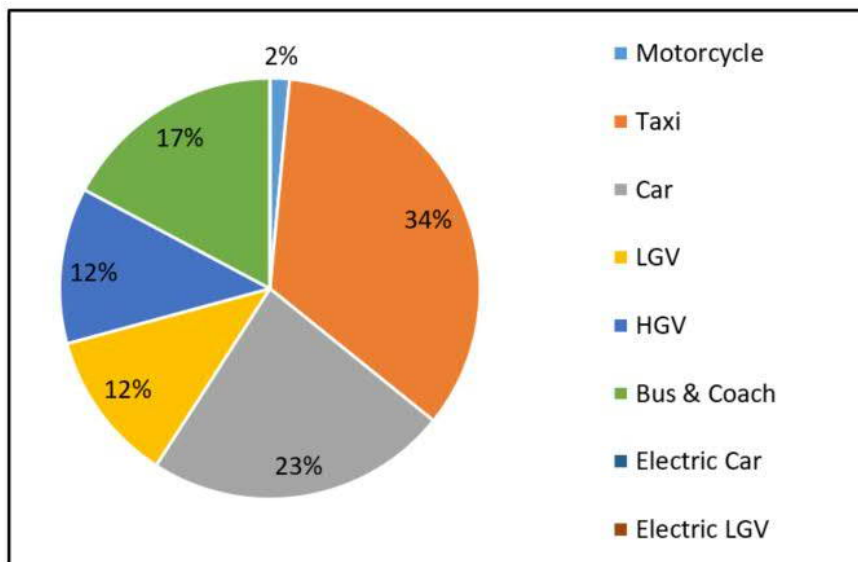
4.1.25. The pie charts below illustrate that PM_{10} and $PM_{2.5}$, like NO_x, are emitted in higher levels by large vehicles such as buses, HGVs and LGVs, though not to the same extent. Buses make 3% of vehicle movements, and contribute 19% of the transport related PM_{10} emissions locally, and 27% of $PM_{2.5}$.

Figure 9 – Average Road Transport PM$_{10}$ Emissions by Vehicle Type (within 200m of nursery)

Figure 10 – Average Road Transport PM$_{2.5}$ Emissions by Vehicle Type (within 200m of nursery)
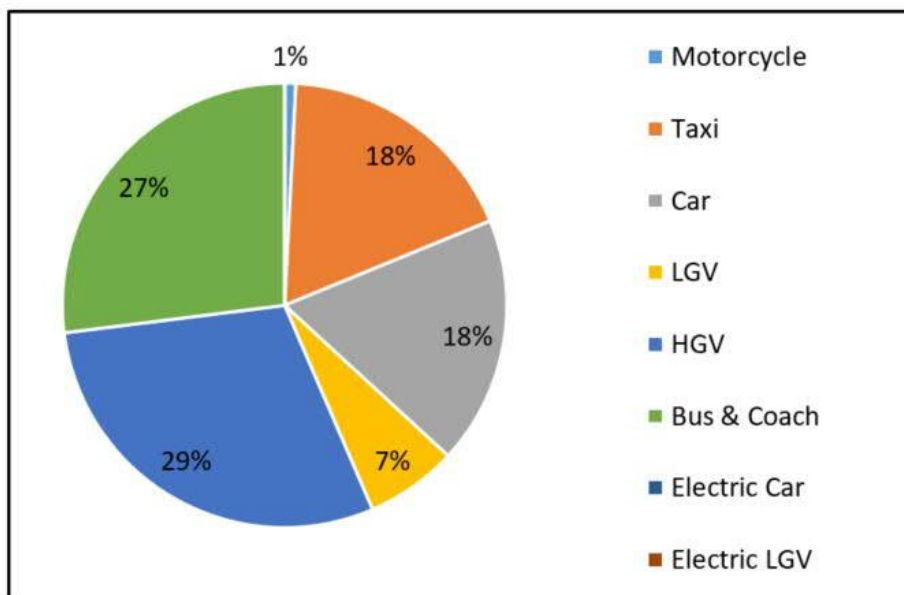
4.1.26.   Figures 11-13 show the 2013 LAEI baseline annual mean NO$_x$, PM$_{10}$ and PM$_{2.5}$ concentrations in within 2km of Maxilla and Golborne Children's Centre. The contours (changes in colours) show how the pollution gradient changes, with distance, away from the heavily trafficked roads and other key sources.

4.1.27.   PM$_{10}$ and PM$_{2.5}$ sources are much more universal and dispersed than NO$_2$ sources. A proportion of PM$_{2.5}$ and PM$_{10}$ 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 PM$_{10}$ (Figure 11) and PM$_{2.5}$ (Figure 12) appear less defined than for NO$_2$.

Figure 11 – 2013 LAEI Baseline Annual Mean NO₂ Concentrations within 2km of Golborne Children's Centre

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
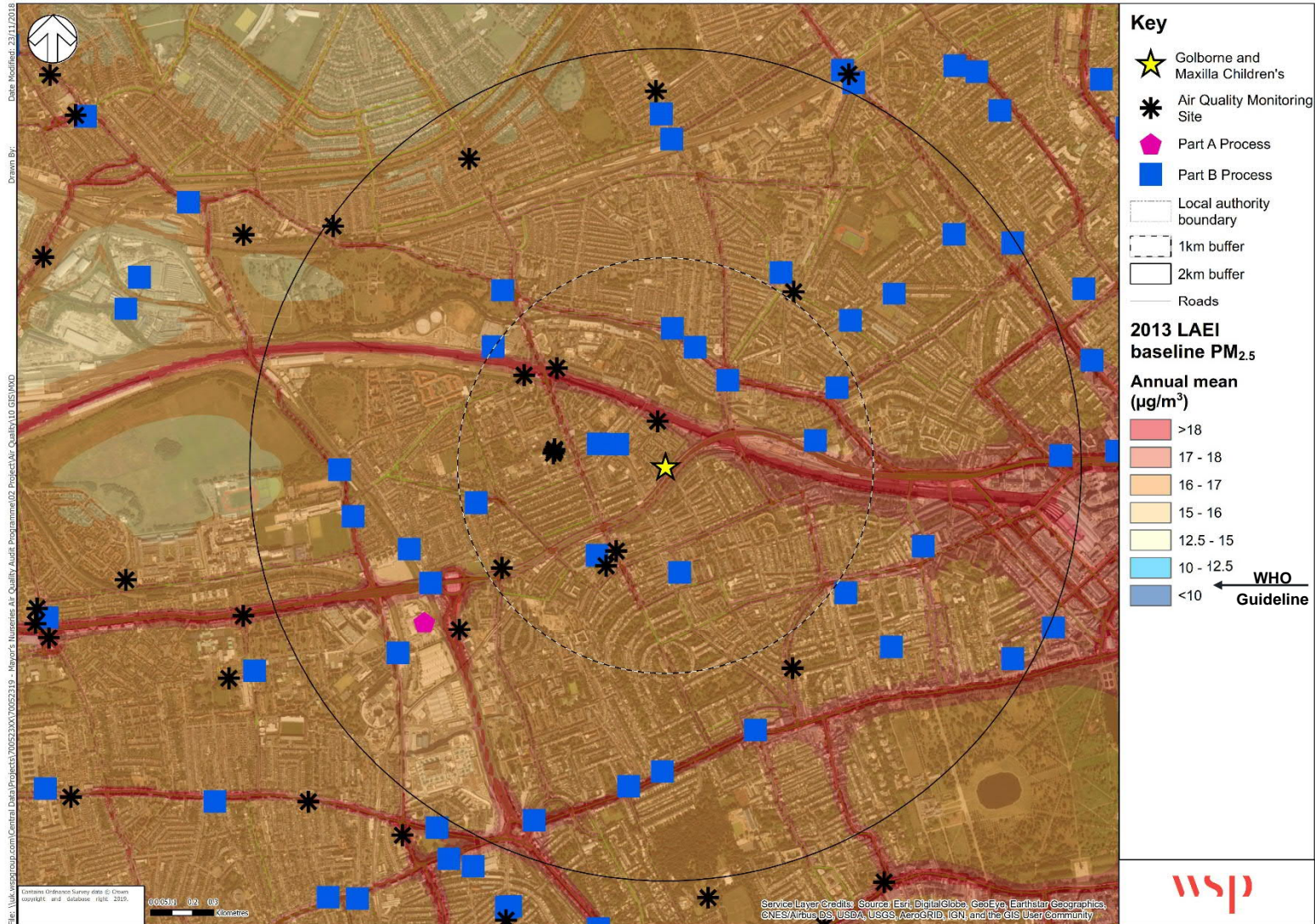
Figure 12 - 2013 LAEI Baseline Annual Mean PM$_{10}$ Concentrations within 2km of Golborne Chidren's Centre

Figure 13 - 2013 LAEI Baseline Annual Mean PM$_{2.5}$ Concentrations within 2km of Golborne Children's Centre

4.2. HIGHWAYS – KEY OBSERVATIONS

4.2.1. The Centre is accessed from Bevington Road that is a **quiet residential cul-de-sac**, and Acklam Road.

4.2.2. Acklam Road runs parallel to the **heavily trafficked A40 Westway**. The latter is located within 10m (albeit elevated) from the Centre and is the main source of pollution in the local area. It currently accommodates 12,600 vehicle movements per day, including large numbers of cars, taxis and vans.

4.2.3. Whilst the **majority of children walk or scoot to nursery**, auditors observed **some parents dropping off / picking up their children by car**. The nursery highlighted that these parents have disabled children or make multiple trips to different schools meaning it is impractical to walk / scoot to nursery. Peak drop-off activity takes place between 0900-0930hrs.

4.2.4. Acklam Road is within a Controlled Parking Zone (CPZ) that operates Monday-Friday between 0830-1830hrs, albeit there are just three public parking bays for parents to drop-off or pick-up their children by vehicle. The other parking spaces on Acklam Road are private spaces, two of which belonged to the nursery (for staff) at the time of the audit. The nursery confirmed that as of April 2019, these spaces would not be renewed.

4.2.5. Bevington Road is also within a CPZ with on-street parking spaces available for resident permit holders only. Of the two roads providing access to the Centre, Bevington Road appeared to be more widely used by parents for pick-up and drop-off activity. It is however recognised that the travel to nursery by car activity is only a very small contributor to overall poor air quality around the nursery and that the majority of air pollution in this location will be associated with wider background emissions.

4.2.6. Relevant to the above, is the fact that the **catchment area for the Centre has grown slightly over recent years**, with a number of children travelling greater distances. The catchment area extends as far as Wembley, Barnet and Middlesex. This is linked to the fact that a proportion of parents will work in the area but live further afield meaning they cannot walk to nursery. The nursery also highlighted that some of their children were involved in the Grenfell tragedy and that they now travel via taxi having relocated further afield.

4.2.7. The Centre stated that a number of **goods vehicles park outside the nursery premises** on Acklam Road and leave their **engine idling**. Whilst relatively infrequent, this does increase sources of pollution as it takes place directly adjacent to the Early Years playground facing Acklam Road.

4.2.8. Another source of localised pollution is **minibuses using Acklam Road to access its depot**, further east on Acklam Road and **Portobello Road Market**, which takes place on a Friday when the Centre is open.

4.2.9. There was evidence of **drug use** and **anti-social behaviour**, which the nursery confirmed is an on-going issue.

4.2.10. Staff commented that these is **demand for additional buggy / scooter parking** at the nursery, albeit space is limited within the nursery grounds.

Summary – Key Issues

- The A40 Westway, situated adjacent to the Centre, is a heavily trafficked road and is the main source of emissions nearby.
- The roads adjoining the nursery are only lightly trafficked and there is minimal drop-off and pick-up activity linked to the nursery.
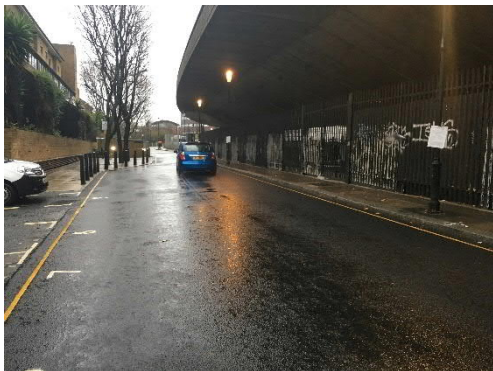
- Some servicing / delivery vehicles are noted to idle outside the nursery.
- A growing catchment area may result in larger number of parents travelling to the Centre by car.

Entrance via Bevington Road

On-Street Parking on Bevington Road

Acklam Road (adjacent to elevated A40 Westway)

On-Street Parking on Acklam Road

Minibus Depot off Acklam Road

Santander Cycle Docking Station on Bevington

4.3. NURSERY GROUNDS / BUILDING - KEY OBSERVATIONS

4.3.1. The nursery building is thought to be of 1970s construction and is split over two storeys. It is set within a block of flats and was originally used for residential purposes, but converted into a children's centre at a later date.

4.3.2. The Centre benefits from having been **refurbished internally** and has **double glazed windows** which reduce heat loss. However, it was noted that heating is regulated by boiler room used to service the surrounding flats, and staff have limited control of the system. As a result, staff commented that when the building is too warm during the summer months, resulting in additional doors and windows being opened, and potentially worsening exposure to emissions.

4.3.3. The **Early Years playground** is situated between the nursery building and Acklam Road, and is located immediately adjacent to the elevated A40 Westway. The playground is lined with steel vertical bar fencing, with some wooden cladding, providing **limited screening from the emissions** originating from the adjacent roads.

4.3.4. The Centre's **main playground** is located on the northern perimeter of the site, away from local roads, and screened from the A40 by the Nursery buildings. The playground is also encircled by a brick wall topped with a chain link fence, and trees and shrubs in the green space around the playground. The children free-flow and spend the majority of their time outdoors, having access to the playground in the morning between 0945 – 1145hrs and the afternoon between 1330-1445hrs.

4.3.5. When inside, the children spend the majority of their time within the room facing onto the northern perimeter of the nursery ground, away from the major pollution sources to the south of the nursery.

4.3.6. The rooms facing the southern perimeter are predominantly used by staff as opposed to children, including the **kitchen**. Staff highlighted that in the short / medium future, the nursery would be getting their food delivered as opposed to preparing it on-site.

4.3.7. It was noted that there was **insufficient space for scooter / buggy parking**, that could act as a deterrent for parents to travel via active modes. There was not a particularly strong odour of **cleaning products** in the building, albeit the Volatile Organic Compounds (VOCs) recorded as part of the audit was above the 300 µg/m^3 recommended levels. There appeared to be clear evidence of hydrocarbon source at or close to the nursery during the month of January.

4.3.8. It is noted that cleaning products are stored away from the classrooms behind closed doors when not in use, and are not accessible to the children. The nursery receives only 1 or 2 deliveries a week typically, with vehicles accessing via the front of the building. As would be expected in a nursery, **paints and glue sticks** were used widely by the children throughout the classrooms, and consequently the odour was noticeable around these areas. When not in use they are stored in a store room, which is not accessible to the children.

4.3.9. The classroom **floors** comprised lino or vinyl, with areas of carpet tiles. There is wood flooring in the main hall. 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. The nursery building contained only a limited number of **green plants**.

Summary – Key Issues

- Early Years playground that fronts onto Acklam Road and the heavily trafficked A40 West Way is the area of greatest concern from an air quality perspective.

- Most of the building is reliant on natural ventilation.
- The nursery have limited control of heating systems, leading to localised overheating, and potentially resulting in greater exposure to emission through opening additional windows and doors.
- High levels of indoor pollutants (VOCs) recorded.

Early Years Playground adjacent to the A40 Westway
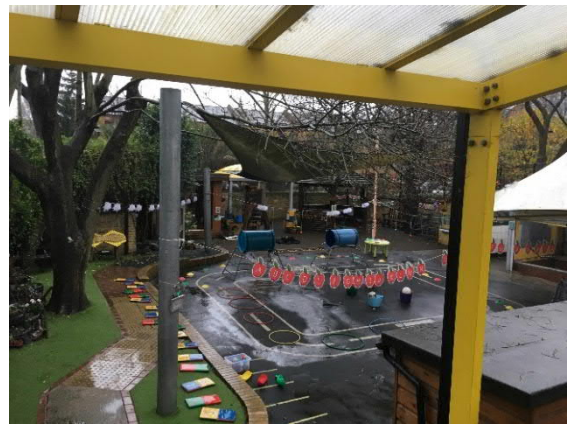
Playground facing northbound away from the A40 Westway

Opening of windows for natural ventilation

Kitchen Extractor

Air Conditioning Units in upstairs classroom

Main classroom used by children – facing northbound

4.4. KEY OBSERVATIONS – SUMMARY OF ISSUES

Figure 14 - Summary of Potential Issues Map
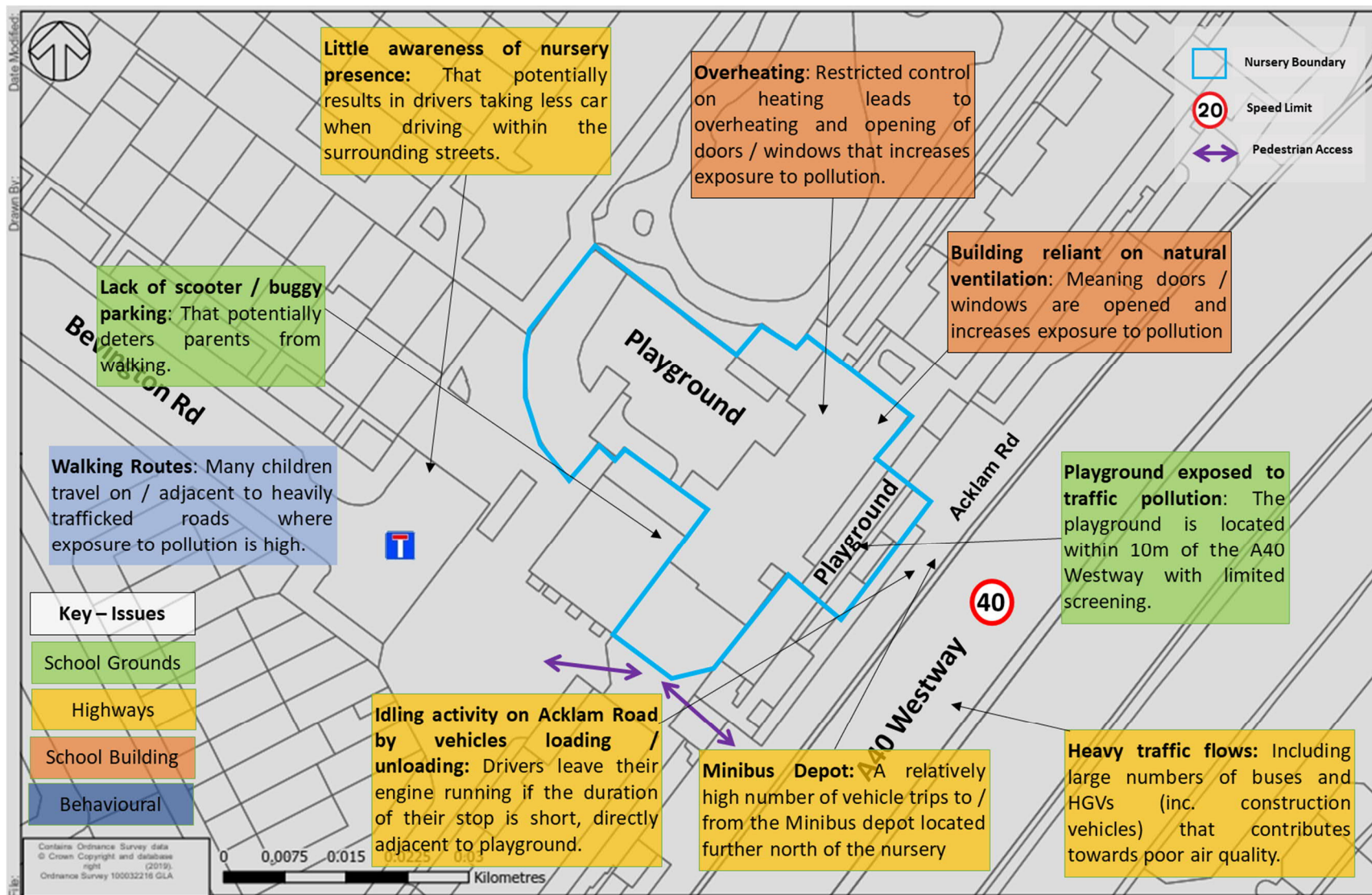
5.   RECOMMENDATIONS

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)*																
1	Anti-Idling / Awareness Raising	Introduce anti-idling signage on the southern perimeter of the nursery to discourage such activity on Acklam Road. For some schools, children have contributed towards the design of the signage that helps highlight to drivers that young children are nearby as well as raising awareness of pollution to children.	Reduce sources and exposure	X			▪ Support STARS and HSL objectives	X			X					X
2.	Provision of scooter / buggy parking	Explore opportunity to provide secure parking provision for scooters and buggies near the entrance of the nursery. This would require permission from the landowners. If unsuccessful, consideration could be given to converting an existing on-street parking bay for scooter / cycle parking. The neighbouring authority, Hammersmith & Fulham have been introducing Bikehangars as well as parklets. 		X			▪ Active Travel	X			X				X	
3	Increase visibility of the nursery	Increase prominence of nursery to encourage more responsible driving and parking i.e. referenced in the Tachbrook Estate site plan, a banner, mural, or display, themed bollards outside the nursery. Greater awareness of the presence of the nursery and young children may also contribute towards reducing drug-use and anti-social behaviour in the area.	Reduce sources and exposure, promoting walking and scooting by providing improved local conditions	X			▪ Road Safety	X			X					X

Measure		Description	Purpose	Potential Air Quality Improvement			Wider Benefits	Cost			Deliverability			Stakeholder Support		
				Low	Medium	High		Low	Medium	High	Quick Win	Medium Term	Long Term	Low	Medium	High
		To further raise awareness, the appetite for a 'play street' from the nursery could be considered. Play streets have proved popular in a number of neighbouring boroughs, such as Westminster, Hammersmith, Camden, Brent, Islington, Lambeth etc.		(green)				(green)			(green)					(green)
4	Removal or relocation of parking bays	Investigate opportunities to remove or relocate the on-street parking bay adjacent to the Early Years playground to minimise the opportunity for idling activity taking place at this location. Whilst it is envisaged bikehangars (or parklets) would be better suited to Bevinton Road due to greater passive surveillance, such provision could be considered at this location if appropriate.		X				X				X			X	
5	Healthy Streets approach, sustainable transport and roadspace reallocation from vehicular traffic	Promote the Mayor of London's Healthy Streets approach which aims to improve air quality, reduce congestion and help make London's diverse neighbourhoods greener, healthier and more attractive places to live, work, play and do business. Take a proactive role in endorsing the approach and supporting these initiatives.	Reduce sources and exposure			X	▪ Promotion of sustainable travel		X				X		X	
6	Additional parking charges for more polluting vehicles	Consider introducing charges on top of existing parking charges for more polluting vehicles. A trial in Westminster found the number of dirtier diesel vehicles using the parking bays dropped by 12%. The revenue used can be used to contribute towards measures to improve air quality.	Reduce sources and exposure			X			X			X		X		
7	Non-Road Mobile Machinery Audit	The Council could consider a requirement for a Non-Road Mobile Machinery (NRMM) Audit to be undertaken at construction sites. This requirement is being trialled within some Low Emission Neighbourhoods to help ensure compliance of vehicles used for developments. Currently, NRMM is the third largest contributor of NOx emissions and the fifth largest contributor of PM emissions in London, and any comprehensive plan to	Reduce sources of emissions	X			▪ Reduce noise	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
		reduce London's emissions should attempt to address emissions from construction machinery.		(green)				(green)			(green)				(orange)	
Highway (Key Stakeholder: TfL)															
8	Low Emission Buses	Since 2018, all new double deck buses are hybrid or zero emission. The Mayor has also launched an £85m programme to upgrade around 5,000 buses so that the entire fleet meets the Euro VI emissions standard in 2020. Around 75 per cent of all TfL buses – including all buses operating in the ULEZ – now meet or exceed the strict ULEZ emission standards. By October 2020 every TfL bus in London – over 9,000 buses - will meet or exceed the ULEZ standards. Twelve new low Emission Bus Zones are being introduced in areas where Londoners are exposed to some of the highest levels of nitrogen dioxide pollution. The Mayor has completed ten of these zones, reducing NOx emissions from buses by an average of 90 per cent along some of the capital's most polluted roads. The Mayor will complete delivery of all 12 routes ahead of schedule in 2019 rather than 2020.	Reduce sources and exposure			X				X		X				X	
9	Road Screening Barriers	Investigate the scope for installing screening such as noise barriers along a section of the elevated A4 where it passes the nursery. Previous studies have found that pollutants can be trapped on the upwind side of the structure. However wider design considerations would need to be carefully considered, as this may lead to increased concentrations on the road, and the barrier may also result in higher concentrations at further distances (~150 m) with a barrier than without, though the previous research found that generally overall concentrations are lower at these further distances, so reduced concentrations closer to the road with the barrier often outweigh the increased concentrations further away.	Reduce exposure	X						X				X	X		
Nursery Grounds (Key Stakeholder: Nursery/ 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
10	Green Infrastructure	Install green screening/climbers around the exposed outdoor spaces linked to the Early Years playground on the southern perimeter of the nursery boundary, adjacent to the A40 Westway. 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 NO_2 and 38% for PM_{10}. 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.	Reduce exposure to emissions	X			▪ Visual amenity Security, privacy		X			X			X	
11	Provision of Buggy / Scooter Parking	Monitor use of scooter parking spaces to ensure sufficient provision to meet demand. See Recommendation 2 in re to opportunities to provide more secure places for scooter / buggy parking.	Behavioural measures	X				X			X					X
Nursery Building *(Key Stakeholder: Nursery/ Borough)*																
12	Air Quality Monitoring	LB Islington has TV screens linked to air quality monitors which are installed	Awareness raising and	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
		temporarily in schools to provide real-time information on air quality and to provide information on ways to lower exposure. Investigate opportunities for a similar initiative so that parents can see this information at drop-off and pick-up time and it also raises awareness of pollution within the nursery. The TVs can be linked to AirTEXT to provide wider London air pollution forecasts	behavioural measures													
13	Improved heating and insulation	Review heating and local control system for more efficient heating of building, and lessening incidences of winter overheating that result in windows and doors being opened and worsening exposure to pollution from the nearby roads. Also upgrade windows where possible to further reduce heat loss, lessen energy usage, and potentially boiler run-times. Potentially less heat gain in hot weather.	Reduce sources and exposure	X			• Reduced energy consumption and reduced operating costs • Improved learning environments		X	X	X				X	
14	Air Filtration Systems	Consider investing in air filtration systems in classrooms most exposed to poor air quality and reliant on natural ventilation. These systems are relatively high cost, only cover a single room per unit, and do require ongoing maintenance and power consumption, but have demonstrated some encouraging initial scientific evidence of efficacy. They can also assist with virus elimination/ reduction. The findings of the Air Filtration System trials will be available to inform this decision in early 2020. The potential air quality improvement from Air Filtration System is identified as being low, however this is subject to the findings of the trial.	Reduce exposure to emissions	X			• Improved learning environments • Child health and welfare	X			X				X	
15	Indoor Fans	Any future indoor fans (used in summer months) are sourced to be the most efficient, such as using low friction magno drives.	Reduce exposure to emissions	X			• Improved learning environments	X			X					X
16	Installation of Air Conditioning Units	Consider installing air conditioning units in the main classroom to prevent overheating and lessening need for ventilation via	Reduce exposure to emissions	X			• Improved learning environments		X			X			X	

Measure		Description	Purpose	Potential Air Quality Improvement			Wider Benefits	Cost			Deliverability			Stakeholder Support		
				Low	Medium	High		Low	Medium	High	Quick Win	Medium Term	Long Term	Low	Medium	High
		opening doors / windows, which worsens exposure to air pollution		(green)					(orange)			(orange)				(orange)	
17	Butchers Curtains	Install 'butchers curtains' for doors that open onto the playground. This will help retain heat and reduce exposure from outdoor pollution for children indoors.	Reduce exposure to emissions	X				X			X					X
18	Electricity Suppliers	Consider using electricity suppliers that have a high renewable content in their fuel mix, but ideally by those that have a 100% green tariff.	Reduce exposure to emissions	X				X			X					X
19	Add indoor plants	Consider deploying additional air purifying plants. Whilst the research to date is inconclusive, and further testing is required, some studies have found certain house plants can remove CO_2, and that the growing substrate, and the microorganisms within, are involved in the removal of pollutants. A limitation is that tests often include a greater number of potted plants than would be feasible indoors to achieve measurable concentration reductions, so the density provided by green walls may be more suitable, and studies are now beginning to investigate green walls and, additionally, how the substrate may influence removal – as measured with VOCs. (University of Birmingham and the Royal Horticultural Society). Plants also have a number of wider health benefits, including promoting reductions in stress. https://www.cibsejournal.com/technical/plants-as-a-building-service/ provide	Reduce exposure to emissions	X			▪ Improved learning environment ▪ Visual amenity	X			X					X
20	Switch to lower VOC	Switch to lower VOC alternative cleaning products, such as unperfumed cleaning products to help reduce VOCs levels indoor.	Reduce sources and exposure	X				X			X				X	
21	Review purchasing choices and switch to low VOC content furnishings	Ensuring that when introducing new furniture, the use of hazardous compounds and residues is limited. Review purchasing choices and switch to low-VOC content furnishings, including pre-owned furniture and following schemes such as the EU ecolabel, or a UK specific version if introduced as referenced in DEFRA's Clean Air Strategy 2019.	Reduce sources and exposure	X				X				X			X	

Measure		Description	Purpose	Potential Air Quality Improvement			Wider Benefits	Cost			Deliverability			Stakeholder Support		
				Low	Medium	High		Low	Medium	High	Quick Win	Medium Term	Long Term	Low	Medium	High
22	Monitoring	There appeared to be clear evidence of hydrocarbon source at or close to the nursery and it is recommended that further source apportionment is undertaken.	Reduce sources and exposure	X				X			X					X
Behavioural Measures *(Key Stakeholder: Nursery/ Borough)*																
23	Promote cleaner routes to nursery	Encourage parents to travel to / from the nursery along less polluted routes, avoiding the more heavily trafficked route (such as those nearby the A40).		X				X			X					X
24	Leaflets / Poster	Publicise clean air maps of the area so staff, parents and visitors know the low pollution areas / routes nearby.	Awareness raising and behavioural measures	X			▪ Awareness raising	X			X					X
25	Clean Air Activities	Seek for opportunities for children and staff to get involved in clean air activities e.g. Children can ask their parents to walk / scoot to nursery on Car-Free day.	Awareness raising and behavioural measures	X			▪ Awareness raising	X			X					X
26	Welcome Packs / Newsletter	Provide information on air quality and its health impacts within any induction material.	Awareness raising and behavioural measures	X			▪ Awareness raising	X			X					X
27	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 nursery and b) promote the suitable walking routes to avoid air pollution hotspots.	Behavioural measures / reducing exposure to emissions.	X			▪ Awareness raising ▪ Secure community buy-in for measures	X			X					X
28	Monitor London Air website / app	Daily monitoring of London Air website / app to understand air quality on the day and whether e.g. opening of windows, will increase exposure of air pollution. Sign up to receive air quality alerts when very high air pollution is forecast, and information on how to reduce pupils' personal exposure.	Reducing exposure to emissions	X			▪ Awareness raising ▪ Child health and welfare	X			X					X
29	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			▪ Awareness raising ▪ Supports STARS and HSL objectives	X			X					X

Measure		Description	Purpose	Potential Air Quality Improvement			Wider Benefits	Cost			Deliverability			Stakeholder Support		
				Low	Medium	High		Low	Medium	High	Quick Win	Medium Term	Long Term	Low	Medium	High
30	Staff Engagement	Awareness raising session amongst staff about the impacts / costs of heating classrooms and share best practice. The Mayors London Curriculum Programme offers a wide range of high-quality teaching resources supporting most subjects on the national curriculum, CPD for teachers and events for children. A programme of targeted activity for air quality is being assembled to be delivered through the London Curriculum, with a focus on supporting teacher subject knowledge and confidence to tackle air quality as a science subject recognising that this requires a wide knowledge and skill base of science, statistics and mapping.	Awareness raising and behavioural measures	X			▪ Awareness raising ▪ Supports STARS and HSL objectives	X			X					X
31	Promoting car sharing	Make use of websites such as Liftshare.com to help find prospective car sharing partners, or the nursery could act as a forum to manage car sharing amongst the nursery community.	Reducing sources and exposure	X			▪ Awareness raising ▪ Supports STARS and HSL objectives	X			X				X	
32	Travel Plan	Production of a Travel Plan to encourage active travel to / from the nursery and commitment to monitor travel behaviour. The nursery should display their efforts (completed activities and initiatives) and achievements within the building entrance where possible, to help raise awareness of success of encouraging active travel.	Reduce sources and exposure	X			▪ Supports STARS objectives	X			X				X	
Wider Measures *(Key Stakeholder: Borough/ TfL/ GLA/ Central Government)*																
33	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
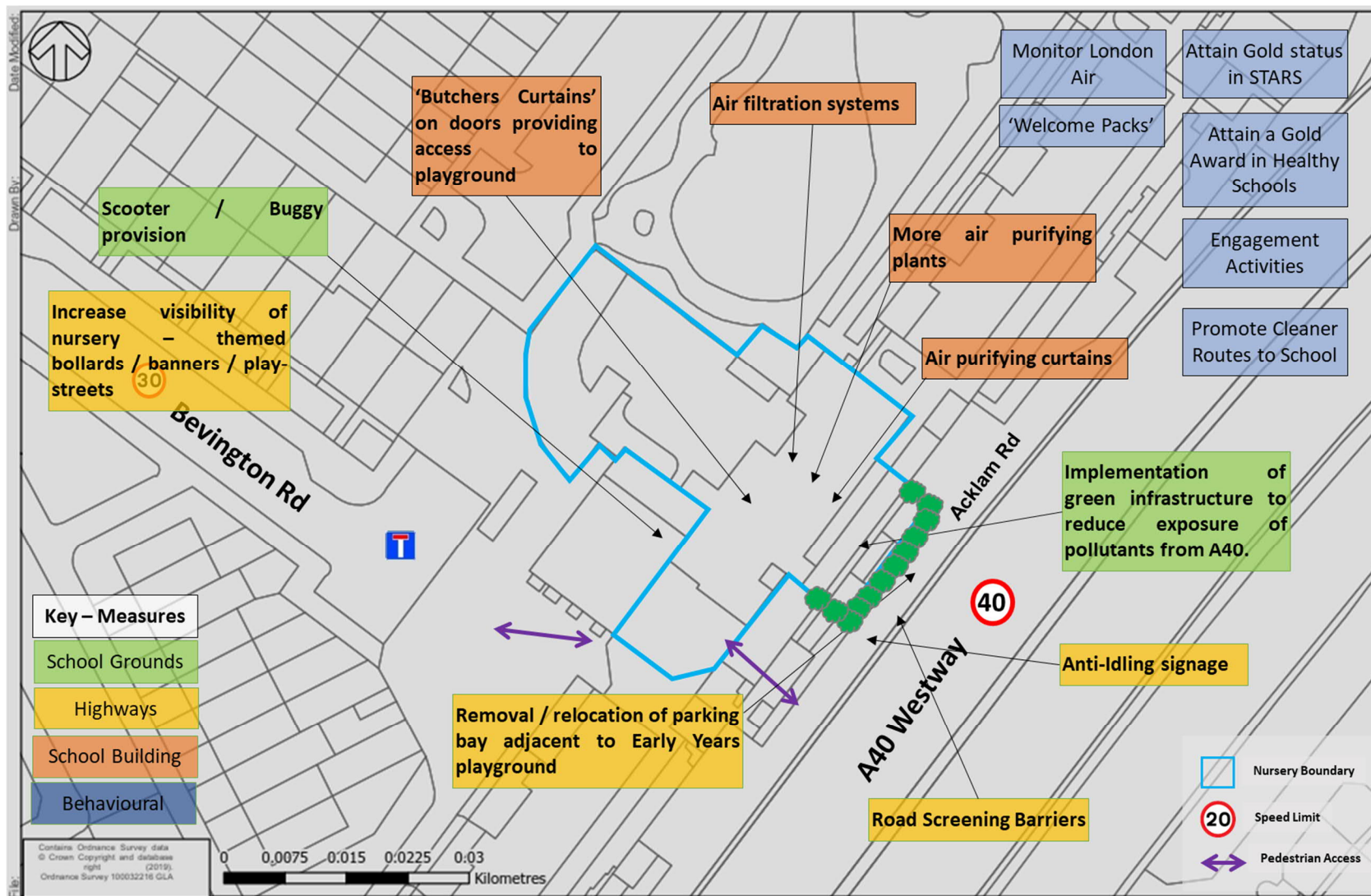
5.3. PRIORITISED MEASURES FOR THE NURSERY

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** - It was agreed that one of the key measures that should be progressed is the implementation of a green barrier to screen the Early Years playground.in the most polluted southern boundary of the site, which is exposed to the A40 West Way. An additional wall of trees encroaching into the playground may contribute towards intercepting some of the particulates from the A40, possibly using the space currently occupied by planters / parking bays. 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 NO_2 and 38% for PM_{10}. 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 planers 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 and any proposals will need to take into account that the pollutants originate from above ground level at this location. It is also important to note that green screens need ongoing maintenance.

- **Buggy / Scooter Parking Provision** - Additional scooter/ cycle parking to encourage sustainable / healthy travel behaviour, particularly near the main entrance. Restricted space means opportunities to provide this outside the nursery grounds should be explored, such as lockable cycle hangers. Staff noted that the limited buggy / scooter parking potentially acts as a deterrent for some parents to travel to / from nursery via active modes. The nursery has limited space to provide this within their grounds and therefore any future provision would need to be located within close proximity on Council / private land. There may be space available in the area outside of the

nursery entrance. This would be the ideal location as it is partially overlooked by the nursery reception area, and sheltered by the building.

Alternatively, there are opportunities to replace on-street parking adjacent to the nursery ground with a bikehangar or parklet either on Bevington Road where there is greater passive surveillance, or on Acklam Road where there are proposals to remove / relocate the parking bay directly adjacent to the Early Years playground. The parklet could be designed to accommodate scooter and buggy parking.

Remove on-street parking bay that is located directly adjacent to Early Years playground

▪ **Raise awareness of nursery presence and anti-idling awareness raising -** Increase prominence of nursery and children to encourage more responsible driving and parking amongst passing traffic. This could include banners, murals or displays, or themed bollards outside the nursery. This approach could also address the issues of idling and anti-social behaviour outside the nursery, by raising awareness of their being young children in the area. The anti-idling awareness raising campaign feature a banner and leaflet, incorporating designs by the children, combined with enforcement.

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. Golborne Children Centre is not currently accredited. Our recommended measures for the nursery include a number or initiatives that would also count towards the achieving their Gold STARS scheme accreditation, including: 'anti-idling awareness raising measures' and 'park and stride'.
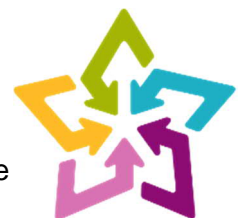
STARS activity cards are available for these measures, as well as wide range of other topics https://stars.tfl.gov.uk/Explore/Idea.

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
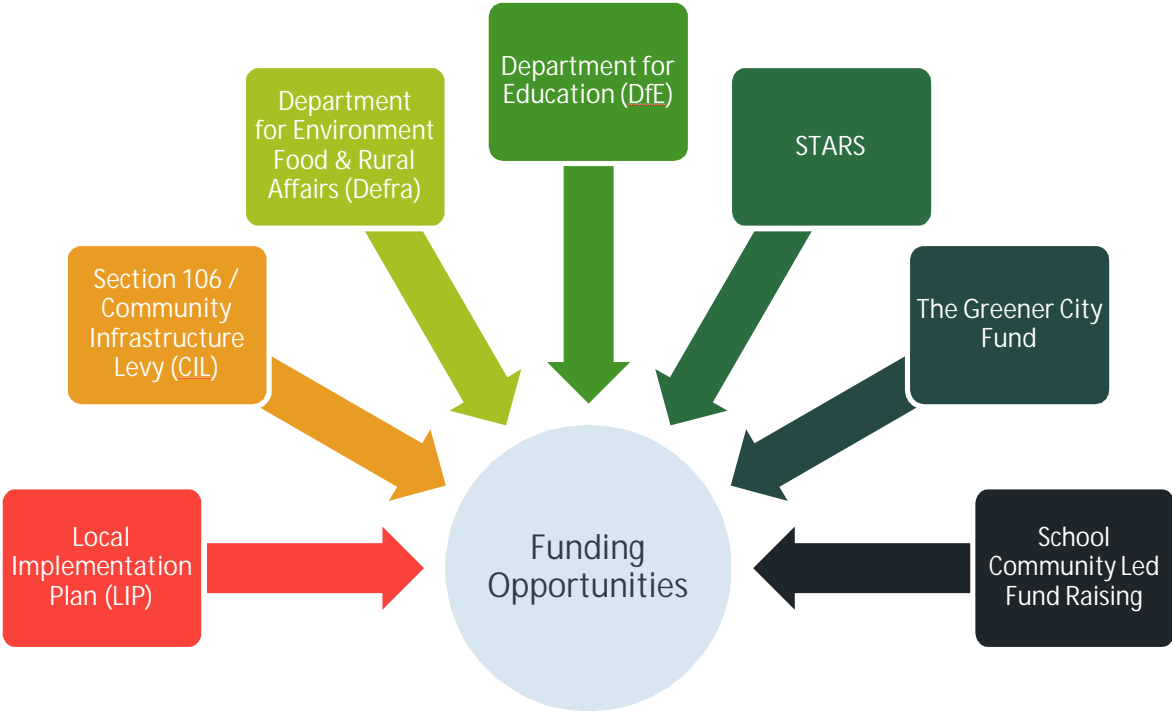
Local Implementation Plan (LIP)

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.[11]
- Groundwork London's Our Space award[12] offers grants between £500 and £5,000.

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

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[11] https://www.groundwork.org.uk/Sites/london/pages/school-air-quality-greening

[12] 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}, $PM_{2.5}$), 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

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