Slough Low Emission Strategy (LES)
2018 – 2025
Draft

The LES forms part of the Slough Air Quality Action Plan (AQAP) in line with the requirements of Part IV of the Environment Act 1995

November 2017
About the Low Emission Strategy (LES)

The Slough Low Emission Strategy (LES) forms part of the Slough Air Quality Action Plan. The LES lays out an integrated, year on year plan to improve air quality over the period until 2025 through a reduction in vehicle emissions by accelerating the uptake of cleaner fuels and technologies.

The LES development has been part funded through the DEFRA Air Quality Grant Programme.

The LES project is managed by Jason Newman, Environmental Quality Manager, Slough Borough Council (SBC), with additional support provided by SBC Officers, representing:

* Transport Policy & Management
* Public Health
* Planning Policy & Development Management
* Environmental Strategy and Governance, including Fleet Management
* Procurement Policy
* Taxi Licensing
* Carbon Management & Sustainability

The LES has been produced with technical support from Low Emission Strategies Ltd.

We are undertaking consultation on this draft LES from the 24th November 2017 to the 8th January 2018. If you would like to provide input into the final Low Emission Strategy, please complete the on-line survey or send your written comments to:

Environmental Quality Team
2nd Floor West
St Martins Place
51 Bath Road
SL1 3UF
Foreword

Like many areas of the UK, Slough experiences elevated levels of air pollution which have a marked impact on the health of its residents. While several factors contribute to the borough’s air quality, the emissions from road transport vehicles are the most significant source.

The council’s draft LES supports our new transport strategy and forms part of the Slough Air Quality Action Plan (AQAP). It lays out an integrated, year on year plan to improve air quality up to 2025, reducing vehicle emissions by accelerating the uptake of cleaner fuels and technologies.

Reducing air pollution from road transport through a low emission strategy is a Slough Labour Party manifesto pledge and improving the borough’s air quality is a key commitment in the council’s Five Year Plan (2017-2021).

The council has developed a low emissions strategy which supports our transport strategy in targeting reductions in vehicle emissions across the borough. The health and wellbeing of our residents and the people who visit and work in Slough is paramount and we can make great improvements to our local air quality if we work together towards a shared vision.

We are committed to making immediate and long lasting improvements to our environment and we’d like residents and businesses to help us shape our plans. We’d like people to tell us what they think about our strategy, and share their ideas for creating a low emissions future for Slough.

Counsellor Joginder Bald
Cabinet Member for Environment and Leisure
Executive Summary

Slough, like many urban areas in the UK, experiences elevated levels of air pollution which have a measurable impact on the health of the local population. While there are several factors contributing to our local air quality, including heating and energy production and the cross-boundary transportation of pollution, the emissions from road transport vehicles are the most significant source.

Slough Borough Council (SBC) has designated 4 Air Quality Management Areas (AQMA) due to elevated levels of nitrogen dioxide (NO₂) which breach the EU Limit Value (annual average NO2) and where there is relevant exposure of residents. The AQMA are located around the M4, Tuns lane, Town Centre/A4 and Brands Hill. Slough has an extensive air quality monitoring network that has shown some improvement in air quality in certain areas while other areas have either remained stubbornly elevated or deteriorated slightly. Levels in Langley may require the designation of a new AQMA.

While levels of particulate matter (PM) do not exceed EU Limit Values, the Joint Strategic Needs Assessment (JSNA) shows that levels of fine particulates (PM_{2.5}) in 2015 accounted for 19.1 premature deaths per 100,000 people in Slough compared with a rate of 11.7 for the South East. The health impacts of air pollution are becoming more apparent with evidence showing effects such as heart attacks, strokes, low birth weight babies and impaired lung and brain development. The World Health Organisation (WHO) categorises diesel exhaust fumes as carcinogenic.

The SBC Five Year Plan and Wellbeing Strategy commit us to improving health outcomes in the Borough and we have developed a Low Emission Strategy (LES) which will support the new Transport Strategy in targeting reductions in vehicle emissions by accelerating the uptake of cleaner vehicles and technologies, that are capable of improving air quality and health and also contribute to sustainable growth as part of the transition to a low emission economy.

The LES development has been supported by Government funding and includes practical policies and measures that are in line with best practice and Government policies. The Government has published the ‘UK plans for tackling roadside NO₂ concentrations’ in 2017. The plans include a national Clean Air Zone (CAZ) Framework.

The LES comprises sections outlining the reasons why we are taking action (Evidence for Change), the measures that we can take as a Council to reduce vehicle emissions and improve air quality and health (Creating a Low Emission Future: Leading by Example), a Clean Air Zone (CAZ) Framework for Slough that we can deliver in partnership with key stakeholders to improve the emissions of buses and freight vehicles, while encouraging the take-up of ultra-low emission vehicles (ULEV) through a Slough Electric Vehicle Plan. A Delivery Plan will detail how we can communicate key messages through our Public Health team, set roles, responsibilities and timescales for delivery while monitoring implementation and updating the strategy when necessary.
The LES builds on significant activity in the Borough in demonstrating leadership in *Creating a Low Emission Future*;

- SBC has developed extensive cycling infrastructure in the Borough, including cycle hire facilities
- SBC has successfully introduced electric vehicle charge points in the town centre that show significant use
- We have successfully introduced charge points at Council premises as part of the My Electric Avenue project which allows staff to use electric vehicles
- We have introduced electric pool cars and bikes as part of the Slough Fleet Challenge to reduce ‘grey’ vehicle emissions and costs
- Slough has the 3rd largest number of plug-in vehicles registered per local authority with over 4,000.
- SBC Environmental Services Fleet will meet the latest European (Euro VI) Emission Standard by December 1st 2017 with plans to look at alternative fuels to diesel as part of the next fleet replacement cycle (2024). The SBC appraisal of alternative fuels and technologies using whole life costs (WLC) has been published as best practice by the Local Government Association (LGA).
- SBC is reviewing van and light commercial vehicle operations with a view to procuring the cleanest (Euro 6/VI) vehicles while transitioning to ULEVs where feasible
- SBC is consulting on new emission standards for taxis, including both CAZ standards and future ultra-low emission vehicle (ULEV) standards
- SBC has secured £157,000 in Government funding to develop a dedicated, rapid charging network to support high growth in plug-in taxis
- We will support the cleanest emission standards for vehicles through Social Value procurement criteria and relevant contracts
- We will introduce Air Quality Planning Guidance in line with national planning policy and guidance to support the Local Plan, requiring mitigation to be integrated into the design stage of new developments,
- Electric charge points will be required on new developments where practical

As part of the *Slough Clean Air Zone (CAZ) Framework* we will:

- raise awareness of vehicle emissions and their impact on air quality and health
- look at the feasibility of introducing a CAZ in Slough which could potentially set emission standards for taxis, buses, coaches, lorries and vans
- develop a low emissions pathway to 2025 in partnership with local bus operators
- promote the development of alternative refueling infrastructure for buses and freight vehicles
- provide co-ordination in supporting the uptake of ULEV and developing charging infrastructure to support growth through the *Slough Electric Vehicle Plan*
Central to the delivery of the LES will be the development and implementation of an effective *Communications Plan*, in partnership with Public Health, which will raise public awareness and support stakeholder engagement through key messaging about vehicle emissions and actions that can be taken to tackle the problems we face. SBC will work with key stakeholder partners to look at creating a *Slough Clean Air Recognition Scheme* to promote and reward activity to reduce road transport emissions in the community.
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## Aims and Objectives

### Aims

- Improve air quality and health outcomes across Slough by reducing vehicle emissions through the accelerated uptake of cleaner fuels and technologies
- Embed an innovative approach to vehicle emission reduction through integrated policy development and implementation
- Provide a platform for inward investment as part of the transition to a low emission economy

### Objectives

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<td>Ensure all relevant Council strategies consider and support measures to improve air quality and health outcomes in partnership with stakeholders</td>
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<td>Provide a robust framework for monitoring and modelling air quality across Slough</td>
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<td>Use national and local data to assess the impact on health of Slough residents arising from air pollution</td>
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<td>Work with local health professionals to promote awareness of the impact of vehicle emissions on health</td>
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<th>3 Creating a Low Emission Future: Leading by Example</th>
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<td>Provide measures to improve vehicle emissions through the Transport Strategy</td>
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<td>Provide policies to support improvements in air quality through the Local Plan</td>
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<td>Develop air quality and planning guidance to promote air quality mitigation at design stage and support wider air quality improvements through off-set mitigation</td>
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<td>Implement vehicle emission standards through Social Value procurement practices</td>
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<td>Consider whole life costs and alternatives to diesel in SBC vehicle fleet procurements</td>
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<td>Introduce Clean Air Taxi emission standards and infrastructure to support the take-up of ultra-low emission taxis</td>
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<td>Implement the Fleet Challenge to reduce emissions from the SBC ‘grey fleet’</td>
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<th>4 Slough Clean Air Zone (CAZ) Framework</th>
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<td>Look at the feasible implementation of a Borough-wide Clean Air Zone (CAZ) including emission standards for buses, taxis, lorries and vans, in line with National Air Quality Plans</td>
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<td>Develop measures to support a CAZ through Clean Air Partnerships and Clean Air Awareness and Recognition Schemes</td>
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<td>Provide policies and measures to support the take-up of ultra-low emission vehicles (ULEV) through the development of a Slough Electric Vehicle Plan</td>
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<td>Work in partnership with bus and freight operators to reduce emissions</td>
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<th>5 Communication and Delivery Plan</th>
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<td>Produce an integrated communications and delivery plan for measures in the LES</td>
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1 Introduction

1.1 Like many urban areas Slough experiences elevated levels of air pollution that has a measurable health impact on the residents of the Borough. As industrial emissions have reduced they have been replaced with vehicle related pollution, exacerbated by the position of the Borough in the vicinity of the national strategic motorway network and international aviation hub - Heathrow Airport.

Slough Borough Council (SBC) has developed a Low Emission Strategy (LES) as part of its Air Quality Action Plan (AQAP) to tackle road transport related pollution and improve health outcomes by implementing innovative policies and measures that seek to reduce vehicle emissions by helping to accelerate the uptake of cleaner fuels and technologies. It is believed that this approach will also secure win wins in reducing vehicle emissions of Carbon and noise. The LES has been produced with funding support from DEFRA\(^1\) Air Quality Grant Programme. The LES supports and compliments key SBC Strategies.

1.2 Levels of nitrogen dioxide (NO\(_2\)) have remained stubbornly elevated over the last decade in some measured locations as action to improve air quality has stuttered for several reasons. Firstly, because over-optimistic predictions of future air quality have encouraged the belief that things would get better on their own, as newer vehicles, required to meet more stringent emission standards, enter the fleet. Evidence has shown that many new vehicles emit far more oxides of nitrogen (NO\(_x\), a precursor for NO\(_2\)) in real-world driving than in tests by manufacturers.

Secondly, national transport and travel planning guidance has tended to focus on measures to avoid using vehicles and shifting to sustainable transport modes as a key approach to solving air quality problems. The LES acknowledges that we can go further and promotes an emission reduction progression that also seeks to improve the emissions of the vehicle fleet, whereby, the LES compliments transport and travel planning. See figure 1.

Thirdly, there has been an increase in focus on reducing carbon emissions with some measures adversely affecting air quality. The Government has encouraged diesel car sales through reduced Vehicle Excise Duty (VED)\(^2\) with sales increasing from 20% of cars bought to 60% within the last 15 years\(^3\). We now know that even the newest diesel cars can emit significantly more NO\(_x\) than petrol cars and in some

\(^1\) Department for Environment, Food and Rural Affairs
\(^2\) https://www.gov.uk/government/publications/vehicle-excise-duty
\(^3\) www.smmt.co.uk

Figure 1 - Emission Reduction Progression
cases certainly more than the manufacturer’s tests claim.

Lastly, while transport and travel planning plays a major role in potentially improving air quality, local authorities can make use of wider policy areas, including land-use planning, procurement practices and licensing standards to support the accelerated take-up and use of low emission vehicles that also have the potential to provide an enhanced platform for inward investment. The LES provides an over-arching framework of vehicle emission reduction activity to be delivered through an integrated policy approach. Figure 2 illustrates this approach, highlighting the drivers, policy areas, key stakeholders and potential outcomes of the LES.

1.3 A key driver of the LES is improving public health. It is acknowledged that poor air quality affects deprived communities disproportionately and in line with the Slough Wellbeing Strategy (2016-2020) and Slough 5 Year Plan (2017-2021) the LES will seek to deliver outcomes that assist in:

- Protecting vulnerable children
- Increasing life expectancy by focusing on inequalities
- Improving mental health and wellbeing

1.4 The LES has been structured into 3 sections:

* Evidence for Change - which highlights the information gathered by Slough on air quality and vehicle emissions and the health impacts of air pollution. This section also looks at the legal obligations of local air quality management (LAQM).

* Creating a Low Emission Future: Leading by Example – this section looks at how SBC can use a variety of policy mechanisms to improve air quality and achieve good growth.

* Slough Clean Air Zone (CAZ) Framework – detailing specific vehicle measures to both discourage the most polluting vehicles while encouraging the uptake of cleaner vehicle technologies and fuels.

A detailed delivery plan will be developed to allocate roles, responsibilities and timescales for implementing key LES measures. The structure of the LES is illustrated in figure 3.

1.5 The Slough LES is one of the first emerging strategies of its kind in the UK and has been developed in parallel with other local authorities. DEFRA’s Plans to Improve Air Quality⁴ recognises the approach taken by Slough and others and states, “As a minimum we expect all local authorities with areas currently exceeding the required levels to consider putting in place a Low Emission Strategy. Such a Strategy could be used to set out a range of commitments and actions to tackle pollution as part of a coherent multi-year programme and ensure they identify and exploit the national assistance available.”

Figure 2 - Low Emission Strategy Drivers, Policy Areas, Stakeholders & Outcomes

<table>
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<th>Stakeholders</th>
<th>Outcomes</th>
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<td>Economic Growth</td>
<td>Business &amp; Commerce</td>
<td>Green Economy</td>
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<td>Transport</td>
<td>Transport Authority</td>
<td>Cleaner Transport</td>
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<td>Spatial Planning</td>
<td>Transport Organisations</td>
<td>Sustainable Development</td>
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<td>Public Health</td>
<td>Highways England</td>
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<td>Procurement</td>
<td>Environmental Protection</td>
<td>Social Value Procurement</td>
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<td>Climate Change</td>
<td>Public Sector Fleet Managers</td>
<td>Improved Air Quality</td>
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<td>Public Sector Procurement</td>
<td>Carbon Reduction</td>
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<td>Air Quality</td>
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<td>Noise</td>
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Slough Low Emission Strategy (LES)

Evidence for Change:
Air Quality & vehicle emissions
Public Health
Legal requirements

Creating a Low Emission Future:
Transport management & travel planning
Planning & development management
Public procurement of vehicles, goods & services
Fleet management
Fleet challenge
Taxi licensing
Economic development, including partnership working

Slough Clean Air Zone (CAZ) Framework:
Raising awareness of vehicle emissions
Clean Air Zone/s
Electric Vehicle Plan
Bus
Freight
Taxis
Public Sector Fleet

Communication, Implementation, Monitoring & Review
2 EVIDENCE FOR CHANGE

2.1 AIR QUALITY AND VEHICLE EMISSIONS

Nitrogen Dioxide (NO$_2$)

SBC has an extensive air quality monitoring network of automatic monitoring stations (looking at NO$_2$ and particulate matter) and diffusion tubes (monitoring NO$_2$). Full details of the monitoring results can be found on the SBC website$^5$.

Figure 4 – Example of automatic NO$_2$ monitoring results at Colnbrook and Lakeside

![Graph showing NO$_2$ levels over time]

Levels of NO$_2$ in key locations in the borough where there is relevant exposure to the public have remained stubbornly elevated over the last decade and exceed the Government’s Air Quality Objectives (AQO) and the European Union (EU) Limit Value$^6$. SBC has designated these affected areas as Air Quality Management Areas (AQMA), including:

- Slough Town Centre
- M4 corridor
- Tuns Lane
- Brands Hill

A map showing the locations of the AQMA can be seen in figure 5. The emissions from road transport vehicles are the most significant cause of elevated NO$_2$ levels in all the AQMA. Modelled concentrations of NO$_2$ in the AQMA in 2014 can be seen in figures 6, 7, 8 and 9.

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$^6$ https://uk-air.defra.gov.uk/air-pollution/uk-eu-limits
Figure 5 - Air Quality Management Areas (AQMA) in Slough

Figure 6 – Modelled NO₂ concentrations in the Town Centre AQMA (2014)
Figure 7 – Modelled NO₂ concentrations in the M4 AQMA (2014)

Figure 8 – Modelled NO₂ concentrations in the Tuns Lane AQMA (2014)

Figure 9 – Modelled NO₂ concentrations in the Brands Hill AQMA (2014)
SBC has undertaken modeling to look at the impact on NO$_2$ levels by improving the European Emission Standards$^7$ of conventional vehicle technologies and also through the replacement of conventional vehicles with alternative technologies such as electric. The scenario modelling showed:

- The introduction of electric or Euro VI Standard buses would have a noticeable impact on NO$_2$ levels in the Town Centre AQMA
- Improving Heavy Goods Vehicles (HGV), Light Goods Vehicle (LGV) and bus emissions to a Euro VI Standard would have a significant impact at Brands Hill
- Simply switching diesel cars to petrol would have a very significant impact in all the AQMA

**Particulate Matter**

SBC monitors and has modelled the predicted levels of the fractions of particulate matter (PM$_{10}$ and PM$_{2.5}$) that are known to have a significant health impact. While levels are compliant with AQO there is still a significant health impact. Based on concentrations in 2010 it is estimated that levels of PM$_{2.5}$ alone accounted for 6.8% of all deaths in Slough (see table 2).

Levels of PM$_{10}$ and PM$_{2.5}$ relating to the Town Centre, Tuns Lane and M4 AQMA in 2014 are shown in figures 10 and 11 respectively. Particulate pollution can be influenced by the long-range transportation of polluted air masses, however, road transport vehicles and non-road mobile machinery (NRMM) are the most significant sources in the urban area$^8$.

**Figure 10 - Modelled PM10 concentrations for 2014 in the Town Centre, at Tuns Lane and along the M4**

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$^7$ https://www.dieselnet.com/standardsieu/ld.php

$^8$ Defra
HEALTH IMPACTS of AIR POLLUTION

It is estimated that the health impact of NO$_2$ in the UK accounts for 23,000 (9,500 – 38,000) premature deaths (see table 1), while the combined impact of NO$_2$ and particulate matter (PM$_{2.5}$) in the UK is estimated to cause 44,750 to 52,500 attributable deaths per annum, with an annual cost to society of £25.3bn to £27.9bn.

Table 1 – Estimated health impact of NO$_2$ in the UK (2013 data)

<table>
<thead>
<tr>
<th></th>
<th>Central (2.5%)</th>
<th>Low (1%)</th>
<th>High (4%)</th>
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<tr>
<td><strong>Annual equivalent</strong></td>
<td><strong>23,500</strong></td>
<td><strong>9,500</strong></td>
<td><strong>38,000</strong></td>
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<tr>
<td><strong>attributable deaths</strong></td>
<td></td>
<td></td>
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<tr>
<td><strong>Annual Social Cost</strong></td>
<td><strong>£13.3bn</strong></td>
<td><strong>£5.3bn</strong></td>
<td><strong>£21.4bn</strong></td>
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Studies show that the adverse health effects from short and long-term exposure to air pollution include:

- Increase in deaths from cardiovascular and respiratory diseases (COMEAP)$^{10}$
- Increase in coronary events, including myocardial infarction and ischaemic heart disease$^{11}$

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$^{9}$ Tackling nitrogen dioxide in our towns and cities, UK overview document, DEFRA, December 2015,

$^{10}$ https://www.gov.uk/government/groups/committee-on-the-medical-effects-of-air-pollutants-comeap

$^{11}$ Cesaroni, BMJ, 2014
• Increase in low birth weight babies (<2500g)\textsuperscript{12}
• Increase in childhood asthma development and wheeze\textsuperscript{13}
• Inhibits neurological development in children\textsuperscript{14} (it is thought that particulates pass through the olfactory system into the brain where they prevent normal synapse development)
• Inhibits lung function in children, permanently affecting lung capacity\textsuperscript{15}

The World Health Organisation (WHO) classifies diesel exhaust emissions as carcinogenic to humans with evidence linking air pollution with a range of cancers\textsuperscript{16} (lung and bladder in particular). The fraction of particulate matter that is of concern to human health is shown in figure 12.

\textbf{Figure 12 - Particle size relative to human hair}

![Particle size relative to human hair](image)

PM\textsubscript{10} – coarse particles (smaller than 10 microns / 0.01mm)
PM\textsubscript{2.5} – fine particles (smaller than 2.5 microns / 0.0025mm)
PM\textsubscript{0.1} – ultra-fine particles (smaller than 0.1 microns / 0.0001mm)

SBC Public Health has looked at the likely health impact of air pollution in Slough to inform the development of the LES in 2015\textsuperscript{17}. The report looked at the prevalence of key ill-health indicators and pollution levels in Slough, particularly impacts arising from particulate

\textsuperscript{12} Pederson, Lancet, 2013
\textsuperscript{13} Takenoue, Paediatrics Int, 2012
\textsuperscript{14} Jordi Sunyer, CREAL, PRBB group leader, 18 June 2014
\textsuperscript{15} http://www.escapeproject.eu
\textsuperscript{16} http://www.iarc.fr/en/media-centre/iarcnews/pdf/pr221_E.pdf
\textsuperscript{17} Report on the likely health impact of air pollution in Slough to inform the LES, SBC, Public health, October 2015
pollution. It is expected that data on the impact of NO\textsubscript{2} in each local authority area will be published soon and we will update our assessment of the impact of air pollution on health. The impact of fine particulates (PM\textsubscript{2.5}) on the health of the residents of Slough is shown in table 2.

Table 2 - Baseline population, modelled population-weighted mean concentrations and estimated effects on annual mortality in 2010 of anthropogenic PM\textsubscript{2.5} air pollution\textsuperscript{18}

<table>
<thead>
<tr>
<th>Area</th>
<th>Population age 25+</th>
<th>Deaths age 25+</th>
<th>Mean annual PM\textsubscript{2.5} (µg/m\textsuperscript{3})</th>
<th>Attributable fraction</th>
<th>Attributable deaths age 25+</th>
<th>Associated life-years lost</th>
</tr>
</thead>
<tbody>
<tr>
<td>London</td>
<td>5,330,600</td>
<td>47,998</td>
<td>12.7</td>
<td>7.2</td>
<td>3,389</td>
<td>41,404</td>
</tr>
<tr>
<td>East Midlands</td>
<td>3,087,200</td>
<td>40,806</td>
<td>10.1</td>
<td>5.7</td>
<td>2,314</td>
<td>24,016</td>
</tr>
<tr>
<td>West Midlands</td>
<td>3,714,533</td>
<td>50,110</td>
<td>10</td>
<td>5.7</td>
<td>2,837</td>
<td>29,897</td>
</tr>
<tr>
<td>East</td>
<td>4,042,900</td>
<td>51,211</td>
<td>9.9</td>
<td>5.6</td>
<td>2,844</td>
<td>29,096</td>
</tr>
<tr>
<td>South East</td>
<td>5,884,600</td>
<td>74,124</td>
<td>9.7</td>
<td>5.5</td>
<td>4,034</td>
<td>41,729</td>
</tr>
<tr>
<td>Yorkshire and the Humber</td>
<td>3,584,267</td>
<td>48,534</td>
<td>9.3</td>
<td>5.3</td>
<td>2,567</td>
<td>26,636</td>
</tr>
<tr>
<td>North West</td>
<td>4,733,000</td>
<td>67,871</td>
<td>8.9</td>
<td>5.1</td>
<td>3,427</td>
<td>35,855</td>
</tr>
<tr>
<td>South West</td>
<td>3,705,633</td>
<td>52,000</td>
<td>8.2</td>
<td>4.7</td>
<td>2,389</td>
<td>23,779</td>
</tr>
<tr>
<td>North East</td>
<td>1,795,267</td>
<td>26,090</td>
<td>8.2</td>
<td>4.6</td>
<td>1,199</td>
<td>12,336</td>
</tr>
<tr>
<td>England</td>
<td>35,878,000</td>
<td>458,743</td>
<td>9.9</td>
<td>5.6</td>
<td>25,002</td>
<td>264,749</td>
</tr>
<tr>
<td>Slough Unitary Authority</td>
<td>84,700</td>
<td>744</td>
<td>12.1</td>
<td>6.8</td>
<td>51</td>
<td>714</td>
</tr>
</tbody>
</table>

The preliminary SBC report on the impact of air pollution on health assessed rates of morbidity and mortality for certain illnesses broken down at ward level (see ward boundaries in figure 13). Figures 14 and 15 show respiratory mortality and premature respiratory mortality in Slough respectively. Figures 16 and 17 show the standard mortality rates (SMR) for coronary heart disease (CHD) and premature cardiovascular mortality in Slough respectively.

Figure 13 - SBC Ward Boundaries for 2014

\textsuperscript{18} http://www.phoutcomes.info/public-health-outcomes-framework#page/3/gid/1000043/pat/6/par/E12000008/ati/102/are/E06000039/iid/30101/age/230/sex/4
Figure 14 - Respiratory mortality (all ages) 2008-2012, by MSOA (data source http://fingertips.phe.org.uk/)

Figure 15 - Premature respiratory mortality in Slough 2009-2013

Figure 16 - SMRs for CHD (all ages) 2008-2012, by MSOA (data source http://fingertips.phe.org.uk/)
The SBC Public Health Report states – “although above findings regarding air pollution and respiratory and cardiovascular health in Slough are suggestive of a general pattern of a disease surrounding areas with poor air quality, it is very difficult to draw direct inferences from these data alone. This is due to multiple confounding factors associated both with disease burden and with poor air quality, such as smoking prevalence, socioeconomic deprivation, etc.

However, given established evidence on the health effects of air pollution, the high levels of pollution in some localities and the wide disparity in cardiovascular and respiratory health across the borough, it is clear that improving air quality in the most affected areas could play an important role in increasing quality of life for people with respiratory disease and reducing Slough’s health inequalities in the long term. This may also offer important economic benefits, in terms of reduced hospital admissions and deaths prevented.

- Adverse health effects of air pollution, particularly those resulting from PM and NO₂, are well established both internationally and in the UK.
- Robust methods of quantifying the national and local impact of air pollution, and likely impact of reductions in air pollution, have been developed and implemented at a local level.
- Air quality in Slough is worse than the England average, with very high levels of pollutants concentrated around major roads and transport hubs. Several localities in the borough are exposed to levels of NO₂ and PM that far exceed levels recommended by the European Commission.
- Slough is disadvantaged by a poor respiratory and cardiovascular health profile, with a burden of disease that is higher than expected rates based on regional and national averages.
- Slough also is affected by large geographical inequalities in respiratory and cardiovascular health, which correlate roughly with areas of high air pollution.
- The proportion of overall deaths in Slough that can be attributed to particulate air pollution is estimated at 6.8%. This is higher than the South East region and England as a whole, and is more comparable to London.
- Reducing air pollution in the borough provides an important opportunity to reduce the attributable burden of disease and possibly to reduce health inequalities.
Established infrastructure for measuring air quality in Slough is an important asset that could facilitate research to evaluate the impact of the Low Emissions Strategy on air quality and health outcomes. This project may be possible with adequate academic and financial support in the medium to long term and would make an important contribution to the evidence base in this area.

While levels of particulate pollution across the region meet EU Limit Values, there are significant health benefits in reducing particle levels as low as possible. The Public Health Outcomes Framework\textsuperscript{15} includes fine particulates (PM$_{2.5}$) as an indicator for health and SBC is committed to working in partnership to reduce levels.

The mortality and morbidity effects of exposure to poor air quality can be translated into an economic cost to society. It is estimated that air pollution imposes a cost of £16 billion\textsuperscript{19} per year in the UK. HM Treasury together with DEFRA have developed guidance\textsuperscript{20} on how to quantify the economic impact that policies, plans and projects have on air quality. The guidance uses annual “damage costs” to quantify the impact of different pollutants from different sectors.

Transport accounts for the most significant economic impact on air quality with an average “cost” of £44,430 and £25,252 per tonne of emissions for particulate matter (PM) and Oxides of Nitrogen (NOx) respectively. This impact is even greater in urban areas, for example in urban conurbations the damage cost associated with transport rises to £107,965 and £61,365 per tonne for PM and NOx respectively.

The concept of damage costs associated with air quality is used later within this Strategy when considering “good growth” and particularly in relation to new developments and the role of the planning system to contribute to the achievement of sustainable development.

2.3 LEGAL COMPLIANCE

SBC has a legal duty under the Environment Act 1995\textsuperscript{21} to review and assess air quality in the Borough and designate any areas where there is relevant exposure to the public to air pollution that is likely to exceed the Government Air Quality Objectives (AQO) as Air Quality Management Areas (AQMA). SBC is required to produce an Air Quality Action Plan (AQAP) to show how we will pursue the achievement of the AQO. This LES forms part of the AQAP for Slough.

Limits on air quality concentrations are set by the EU and adopted by Member States. In the UK the EU Limit Values are the same as the AQO (see table 3). While local authorities have a duty to pursue Government Air Quality Objectives (AQO), there is no legal duty to meet the AQO, however, the reserve powers of the Localism Act 2011\textsuperscript{22} allow for any EU fines to be

\textsuperscript{19} https://www.gov.uk/guidance/air-quality-economic-analysis

\textsuperscript{20} Valuing impacts on air quality: Supplementary Green Book guidance, HM Treasury and DEFRA, May 2013

\textsuperscript{21} http://www.legislation.gov.uk/ukpga/1995/25/contents

\textsuperscript{22} http://www.legislation.gov.uk/ukpga/2011/20/contents/enacted
passed onto any public authority “whose act or omission” has contributed to the breach in EU law.

The EU has commenced infraction proceedings against the UK Government and Devolved Administrations for failing to meet the legally binding EU Limit Value for NO₂. As the UK has voted to leave the EU it is unclear at present whether the current Limit Values will be retained or whether sanctions will be imposed. It should be noted that the main driver to improve air quality is public health and that EU Limit Values are health based and correlate with the World Health Organisation (WHO) Air Quality Guideline Values for NO₂, while the WHO recommends lower concentrations for particulate matter than the EU Limit Values (see table 4).

**Table 3 - Limit Values & Target dates for NO₂ and PM compliance**

| Air Quality Directive 2008/50/EC - Limit Values and Target Dates for compliance for Nitrogen Dioxide and Particulate Matter |
|---|---|---|
| Nitrogen Dioxide | 40μg/m³ | 1st January 2010 |
| PM₁₀ | 40μg/m³ | 1st January 2005 |
| PM₂.₅ Stage 1 | 25μg/m³ | 1st January 2015 |
| Stage 2 | 20μg/m³ | 1st January 2020 |

**Table 4 - World Health Organisation (WHO) Air Quality Guideline Values**

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>WHO Guideline Values</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Nitrogen Dioxide (NO₂)</strong></td>
<td>Short Term Exposure: 200 μg/m³ (24hr)</td>
</tr>
<tr>
<td><strong>Particulate Matter (PM)</strong></td>
<td>PM₁₀: 50 μg/m³ (24hr)</td>
</tr>
<tr>
<td><strong>Sulphur Dioxide (SO₂)</strong></td>
<td>20 μg/m³ (24hr) 500 μg/m³ (10 min)</td>
</tr>
<tr>
<td><strong>Ozone (O₃)</strong></td>
<td>100 μg/m³ (24hr)</td>
</tr>
</tbody>
</table>
3. CREATING A LOW EMISSION FUTURE: LEADING BY EXAMPLE

SBC recognises that it cannot improve air quality alone. However, we do believe that we can ensure that all relevant Council policies are designed to influence and reduce road transport emissions as far as possible, enabling us to work in partnership with key stakeholders to tackle the problems we face. Slough is planning for major regeneration and sustainable economic growth and this LES has been developed to compliment key policy areas in line with our ambitions to transform the Borough.

3.1 OVER-ARCHING STRATEGIES for SLOUGH

Slough Borough Council Five-Year Plan 2017-2021

The Five Year plan is Slough’s new corporate strategy for 2017-2021. It sets the Council’s ambitions, challenges and how it will face these challenges. The ambition is for Slough to be:

“A place where people choose to live and work and where children can grow up to achieve their full potential

One of the most attractive places to do business in the country, with excellent communications, business accommodation and a skilled, and available workforce.”

Transport has a major role to play in helping to address the challenges we face. Better transport, and the improved connectivity and accessibility which results, combined with the promotion of a shift to sustainable transport modes and vehicle emission reductions, outlined in the LES, can support many of the important Five-Year Plan Outcomes identified, in particular:

• Slough being a premier location for businesses;
• more homes, and better quality homes;
• a vibrant, safe, town centre providing business, living, and cultural opportunities;
• healthy children and young people with positive life chances;
• maximised value of the council’s assets; and
• the Council as a leading digital transformation organisation.

As part of the Transport Strategy, the LES can help to capitalise on opportunities brought about through increased inward investment.

Wellbeing Strategy 2016-20

The Wellbeing Strategy is focussed on four key priorities for supporting the health and wellbeing of Slough’s residents:

• protecting vulnerable children;
• increasing life expectancy by focussing on inequalities;
• improving mental health and wellbeing; and
• improving housing quality and tenure mix.
By tackling air pollution through a co-ordinated programme of vehicle emission improvement measures, the LES seeks to reduce the impact of air quality on the health of local residents in line with the Wellbeing Strategy.

**Economic Development Plan for Growth 2014-18**

The Economic Development Plan for Growth (EDPG) aims to provide an environment in Slough which supports businesses to thrive and grow, create job opportunities, and which helps residents develop the skills they need.

The LES seeks to provide a platform for inward investment through the promotion of alternative vehicle emission technologies as part of the transition to a low emission economy. Alternative refuelling and electric vehicle charging infrastructure, new vehicle ownership and usage models, maintenance and ancillary support mechanisms and the development of SMART technologies to assist ultra-low emission vehicle (ULEV) take-up will require the development of new skills as part of the drive to put Slough at the forefront of creating low emission business opportunities.
3.2 TRANSPORT MANAGEMENT & TRAVEL PLANNING

SBC will:
- Promote modal shift away from cars to sustainable transport modes, including public transport, walking and cycling
- Undertake a Clean Air Zone (CAZ) feasibility study in line with the national Clean Air Zone Framework
- Promote the uptake of ultra-low emission vehicles (ULEV) in line with the Slough Electric Vehicle Plan

3.21 Transport is an essential part of our everyday lives and it will play an important role in growing the Slough economy through reducing travel costs, raising productivity through agglomeration effects and linking people to jobs and training opportunities.

Significant development growth is planned for Slough, with the Local Plan Review\(^\text{23}\) predicting the construction of over 900 dwellings per year until 2030. As part of the transport planning for such growth, SBC is in the process of updating the Local Transport Plan (LTP) 2012 and publishing a Transport Strategy\(^\text{24}\). SBC Transport Policy focuses on sustainable modal shift and acknowledges that additional measures to improve vehicle emissions are required.

The Transport Strategy outlines the key strategy themes, building on the outcomes from the Local Transport Plan (LTP3), details major infrastructure projects, including Slough Mass Rapid Transit (SMaRT), the Elizabeth Line (formerly known as Cross Rail), M4 Smart Motorway and the Western Rail Link to Heathrow (WRLtH) and discusses further investment needed to deliver a transport network that will facilitate ambitious growth plans. Figure 18 illustrates current and potential major transport infrastructure projects in the Borough, including the proposed Slough Transit Network. The strategy recognises the challenges and opportunities that may arise from the construction of a third runway at Heathrow.

The Transport Strategy has an aspiration for Slough to become a highly connected ‘outer London borough’ characterised by the following vision:

- **high capacity, integrated, affordable public transport system enabled by use of smart technology which is the mode of choice for longer journeys**;
- **reliable journey times by road and by public transport**;
- **community facilities, public spaces and connectivity which encourage people to live and work, learn or relax locally**;
- **efficient use of the scarce and valuable capacity on main roads, prioritising space for those journeys which are most important to Slough’s success**;

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\(^{23}\) Local Plan Review, Issues and Options Committee Report 2016
• high volumes of walking and cycling, also enabled by use of smart technology and the modes of choice for shorter journeys;
• high quality, safe, attractive urban environments which bring vibrancy to local communities and the town centre;
• enhanced Slough’s strategic road and rail connectivity to Heathrow, London, the Thames Valley and beyond to support businesses;
• better air quality through lower transport-related emissions, and generally lower impacts of travel on our communities;
• proactive asset management which properly balances the quality of service (e.g. road maintenance) against value for money considerations; and
• networks which are resilient to irregular incidents and which have the capacity for the future growth of Slough.

Figure 18 – Potential Slough Transit Network (shown in green)

Bike Hire Scheme – Montem Leisure Centre
3.22 Cycling

In recent years, delivery of our LTP3 Smarter Travel Strategy has been accelerated by additional funding through the government’s Local Sustainable Transport Fund (LSTF). Over the past five years, the Council and its partners have been delivering a £10 million programme of infrastructure, service and behavioural change measures intended to encourage a greater share of journeys to be made on foot, by bicycle or using public transport. Projects delivered or ongoing include:

- new off-road east-west cycle paths, such as through Salt Hill Park;
- on-road cycle route improvements, such as on Salt Hill Avenue;
- a bike hire scheme (additional docking stations and bicycles are planned);
- workplace business engagement and personalised travel planning including promotion of car clubs;
- an extensive way-finding programme;
- numerous improvements around schools to improve environments for pedestrians and cyclists (including a Safer Routes to School to aid pedestrians and cyclists);
- opening of a new cycle hub facility on Brunel Way close to Slough station;
- travel planning activities in schools (including Bike-It training);
- extensive use of travel plans as part of the development consent process for residential, commercial and educational uses;
- development of an east-west cycle route between Slough and Maidenhead (with Buckinghamshire CC).

Whilst LSTF funding is coming to an end, achieving modal shift away from private cars will remain a priority as we seek to accommodate a greater overall demand for travel in the borough.

Access Funding

Following a successful bid to the DfT Access Fund, SBC has been awarded £1.5m of revenue support to achieve our behaviour change goals. We will be beginning our campaign under the “Better By…” theme, including ambitious targets for sustainable modal shift. We will be committing to the following initiatives over the next 3 years:

- Engage with 30,000 employees across businesses and organisations in order to achieve mode shift in the borough
- Support 3,000 unemployed people access employment, education and training opportunities
- Encourage 15,000 pupils to take up sustainable modes of transport
- Engage residents across the borough and from areas with the highest health deprivation indices in Slough

The Sustainable Transport Team will be rolling out a number of sustainable travel events at key locations and within schools and businesses with more intense activity launching during Spring/Summer 2018.
This includes community engagement events and awareness campaigns such as;

- Cycle Training and Scooter Training for Children and Adults across the borough
- Group Cycle Rides on leisure and commuter routes around the borough
- Dr Bikes - free bicycle checks, minor repairs and maintenance advice for members of the public, school and employers
- Journey Planning for jobseekers, youths seeking education and training opportunities
- Bike Loans to disadvantaged families and community groups
- Cycling and Walking competitions, giveaways and competitive events
- Travel Planning advice for schools and businesses
- Targeted road safety awareness and advice
- Promoting mode-shift to car sharing, passenger transport and cycling and walking
- Advising businesses on implementing cycle to work schemes and achieving travel plan targets
- Providing matched funding to businesses to implement sustainable transport facilities such as cycle parking, shower facilities etc.
- Access to and promotion of the cycle hire scheme
- Production and distribution of information on our activities, infrastructure, routes and events
- Wayfinding totems to advise members of the public and highlight keys attractions in Slough

3.23 Clean Air Zones (CAZ)

The LES forms part of the Transport Strategy and provides further detail on key Strategy measures which have the potential to reduce emissions from road transport vehicles and accelerate the uptake of cleaner fuels and technologies. These include looking at the feasible implementation of Clean Air Zones (CAZ) and the promotion of ultra-low emission vehicles (ULEV).

In July 2017, the Government published its ‘UK plan for tackling roadside nitrogen dioxide concentrations’25. The plans set out the Government’s approach to improving air quality in the UK, reducing health impacts, and fulfilling its legal obligations. The plans include a framework for implementing Clean Air Zones (CAZ) in the UK26. The framework identifies towns and cities where NO2 concentrations are predicted to exceed the EU Limit Value in 2020 and five cities outside London, comprising Birmingham, Derby, Leeds, Nottingham and Southampton, will be legally required to introduce Clean Air Zones (CAZ) in the shortest possible time and by 2020 at the latest. London will be required to introduce an Ultra-Low Emission Zone in 2019 that will initially cover the Congestion Charging Area and then be expanded to the area bounded by the North and South Circular roads. The framework also identifies over 20 other towns and cities that will also be considered for mandated CAZ.

The aim of CAZ is to bring together local measures to deliver **immediate action** to improve air quality and health with **support for towns and cities to grow** while delivering sustained reductions in pollution and a **transition to a low emission economy**. Where there are the most persistent pollution problems, this is supported by restrictions to encourage only the cleanest vehicles to operate in the town or city.

Clean Air Zones fall into two categories:

- **Non-charging Clean Air Zones** – These are defined geographic areas used as a focus for action to improve air quality. This action can take a range of forms but does not include the use of charge based access restrictions. Emission standards for buses, coaches and taxis are required in addition to measures to promote the uptake of ULEVs.

- **Charging Clean Air Zones** – These are zones where, in addition to the above, vehicle owners are required to pay a charge to enter, or move within, a zone if they are driving a vehicle that does not meet the particular standard for their vehicle type in that class of zone. Clean Air Zone proposals are not required to include a charging zone. Certain exemptions may be granted for specialist vehicle types including emergency vehicles.

With current and predicted air quality levels in Slough, SBC will assess the feasibility of implementing a CAZ in the Borough, including non-charging and charging CAZ requirements. The type of zone envisaged would not include passenger vehicles.

**Further information can be found in Section 4 – Slough Clean Air Zone (CAZ) Framework.**
3.3 LAND-USE PLANNING & DEVELOPMENT MANAGEMENT

SBC will:
- Adopt Air Quality Planning Guidance to provide clarity to developers through the planning system
- Seek air quality mitigation to be integrated into development schemes at the design stage
- Require appropriate air quality mitigation, proportionate in scale and kind to development scheme impact, including off-set mitigation on major schemes
- Introduce standards for plug-in vehicle charging on new development schemes
- Adopt emission controls for non-road mobile machinery (NRMM)

3.31 Introduction

Local Planning Authorities have to weigh up the economic, social and environmental factors when deciding to grant or refuse planning permission or decide if conditions are required to achieve sustainable development.

Air quality is a material consideration that planners are required to take into account when making their plans and when taking planning decisions. A key objective of the Slough LES development is to produce technical guidance for the consideration of air quality through the land-use planning and development control system. The LES approach aims to simplify the consideration of air quality impacts associated with development schemes and focus on incorporation of mitigation at design stage, countering the cumulative impacts of aggregated developments, providing clarity to developers and defining of “sustainability” in air quality terms.

3.32 National Policy & Practice

National Planning Policy Framework

National planning policy is set by the National Planning Policy Framework (NPPF). The NPPF places a general presumption in favour of sustainable development, stressing the importance of local development plans. One of its 12 Core Planning Principles states that planning should:

“contribute to conserving and enhancing the natural environment and reducing pollution”, by: (paragraph 109) “preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability”.

It goes on to state (paragraphs 120 and 124) that:
“To prevent unacceptable risks from pollution and land instability, planning policies and decisions should ensure that new development is appropriate for its location. The effects (including cumulative effects) of pollution on health, the natural environment or general amenity and the potential sensitivity of the area or proposed development to adverse effects from pollution, should be taken into account.

Planning policies should sustain compliance with and contribute towards EU limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and the cumulative impacts on air quality from individual sites in local areas. Planning decisions should ensure that any new development in Air Quality Management Areas is consistent with local air quality action plans.

(Paragraph 152) Local planning authorities should seek opportunities to achieve each of the economic, social and environmental dimensions of sustainable development, and net gains across all three. Significant adverse impacts on any of these dimensions should be avoided and, wherever possible, alternative options which reduce or eliminate such impacts should be pursued. Where adverse impacts are unavoidable, measures to mitigate the impact should be considered. Where adequate mitigation measures are not possible, compensatory measures may be appropriate.”

National Planning Practice Guidance

National Planning Practice Guidance (NPPG) provides advice to planning authorities on implementing the NPPF, including guidance on how air quality can be considered as part of the planning process, stating that, “Local Plans may need to consider:
- the potential cumulative impact of a number of smaller developments on air quality as well as the effect of more substantial developments;
- the impact of point sources of air pollution (pollution that originates from one place); and,
- ways in which new development would be appropriate in locations where air quality is or likely to be a concern and not give rise to unacceptable risks from pollution. This could be through, for example, identifying measures for offsetting the impact on air quality arising from new development including supporting measures in an air quality action plan or low emissions strategy where applicable.

When deciding whether air quality is relevant to a planning application, considerations may include whether the development would:
- Significantly affect traffic in the immediate vicinity of the proposed development site or further afield. This could be by generating or increasing traffic congestion; significantly changing traffic volumes, vehicle speed or both; or significantly altering the traffic composition on local roads. Other matters to consider include whether the proposal involves the development of a bus station, coach or lorry park; adds to turnover in a large car park; or result in construction sites that would generate large Heavy Goods Vehicle flows over a period of a year or more.

• Introduce new point sources of air pollution. This could include furnaces which require prior notification to local authorities; or extraction systems (including chimneys) which require approval under pollution control legislation or biomass boilers or biomass-fuelled CHP plant; centralised boilers or CHP plant burning other fuels within or close to an air quality management area or introduce relevant combustion within a Smoke Control Area;
• Expose people to existing sources of air pollutants. This could be by building new homes, workplaces or other development in places with poor air quality.
• Give rise to potentially unacceptable impact (such as dust) during construction for nearby sensitive locations."

The NPPG states that where a planning proposal, including mitigation, prevents sustained compliance with EU Limit Values or National Objectives for air quality and cannot be made acceptable then refusal of planning permission should be considered.

3.33 Slough Local Plan

The Planning and Compulsory Purchase Act 2004, amended by the Localism Act 2011 requires planning authorities to prepare Local Plans. SBC is currently updating its Local Plan28 and consulting on issues and options. The Local Plan Update (2016 – 2036) seeks to address the challenges that Slough faces over the coming years, including:

Building new homes - The population of Slough is expected to grow by more than 15% in the next 20 years and we will require around 20,000 new homes to accommodate residents.

The economy and town centre – Slough has a diverse economy that has both local and national significance. Lots of skilled workers commute into Slough and it is estimated that 15,000 jobs could be created in the next 20 years.

Getting around Slough – Slough is well connected but the transport network is under pressure, especially from vehicle congestion, with new developments like Crossrail and Heathrow expected to put more strain on the road network. We need to encourage more people to walk, cycle and use public transport and also consider restricting some sorts of vehicle traffic through the town.

Good design and environmental standards – We need to ensure new developments are well designed, protecting our green space and also protecting against air, noise and soil pollution that could arise from population growth and Heathrow expansion. We need to encourage the development of low carbon technology, ‘green’ infrastructure and adapt to risks of flooding.

The Local Plan will take account of air quality issue in identifying areas for future development and include development policies relating to local air quality management that will fulfil the NPPF sustainable development criteria. The LES supports the

28 www.slough.gov.uk/localplan
implementation of the strategic and development policy framework provided by the Local Plan.

3.34 Development Classification, Assessment and Mitigation

The air quality assessment process follows a three stage process:
1. Determining the classification of the development proposal;
2. Assessing and quantifying the impact on local air quality;
3. Determining the level of a mitigation required by the proposal to make the scheme acceptable.

Stage 1 - Development Type Classification

The classification of developments is shown in tables 5 and 6. The assessment and mitigation of development proposals is shown in figure 19.

Table 5 – Air quality classification of developments

<table>
<thead>
<tr>
<th>Scheme Type</th>
<th>Minor</th>
<th>Medium</th>
<th>Major</th>
</tr>
</thead>
<tbody>
<tr>
<td>Threshold</td>
<td>Below SBC threshold criteria for a Travel Plan(^{29}) or Transport Assessment(^{29})</td>
<td>Meets SBC threshold criteria for a Transport Assessment(^{30}) or Travel Plan(^{30})</td>
<td>Medium type developments which also trigger any of the following criteria: i) Where development is within or adjacent(^{31}) to an AQMA or CAZ ii) Where development requires an EIA(^{32}) and air quality is to be considered iii) Where any of the criteria in Table 6 are triggered</td>
</tr>
<tr>
<td>Assessment</td>
<td>None (other than for exposure)</td>
<td>None (other than for exposure)</td>
<td>Air Quality Assessment required including an evaluation of changes in vehicle related emissions(^{33})</td>
</tr>
<tr>
<td>Mitigation</td>
<td>Type 1</td>
<td>Types 1 and 2</td>
<td>Types 1, 2 and 3</td>
</tr>
</tbody>
</table>

---

31 Where development has potential to impact on concentrations in AQMA or CAZ
33 Assessment includes monetisation of the impacts arising from emission changes in line with Defra IGCB Damage Costs
Table 6 – Additional Trigger Criteria for Major Developments

- Any development generating a net increase of 30 or more two-way vehicle movements in any hour
- Any developments generating a net increase of 100 or more two-way vehicle movements per day
- Any development proposing a net increase of 100 or more parking spaces
- Any development that could increase the existing traffic flows on roads of > 10,000 AADT* by 5% or more
- Any developments that could increase traffic flows by 5% or more in road canyons with > 5,000 AADT
- Proposals that could introduce or significantly alter congestion (DfT Congestion) and includes the introduction of substantial road infrastructure changes
- Proposals that reduce average speeds by more than 10 km per hour
- Proposals that include additional HGV movements by more than 10% of total trips
- Where significant demolition and construction works are proposed
- Where a proposal introduces a new road

*AADT = Annual Average Daily Traffic flows

Stage 2 - Air Quality Impact Assessment

MINOR and MEDIUM Classified Proposals

Smaller development proposals may not in themselves create an additional air quality problem but will add to local air pollution and potentially introduce more people likely to be exposed to existing levels of poor air quality. An assessment of the likelihood of introducing additional exposure will be determined using the following criteria:

- The proposal is adjacent to or within an AQMA;
- The proposal is in a location 20m from roads at or above the relevant national objective highlighted on the DEFRA GIS modelled maps - [http://uk-air.defra.gov.uk/data/gis-mapping](http://uk-air.defra.gov.uk/data/gis-mapping)
- The proposal is one of the Land Use types:
  - C1 to C3;
  - C4 (Homes of Multiple Occupation);
  - D1
  - and within 20m of roads with >10,000 AADT (Annual Average Daily Traffic)
  - within 100m from the M4
  - within 50m of the bus or rail station
  - within 50m of a busy junction

The outcome of the exposure assessment will determine the level of mitigation required make the development acceptable. Should there be no acceptable mitigation the recommendation may be to consider refusing the proposal on air quality grounds.
**Figure 19 – Classification, assessment & mitigation of new developments**

**Development Proposal**

- **Stage 1 – Development Classification**
  - Minor
  - Medium
  - Major

- **Stage 2 – Impact Assessment**
  - Health Exposure Test
  - Health Exposure Test
  - Detailed Air Quality Assessment

- **Stage 3 – Mitigation / Emissions Reduction**
  - Type 1 Mitigation
  - Type 1 + 2 Mitigation
  - Type 1 + 2 + 3 Mitigation

**Type 1 Mitigation:**
- Design to reduce exposure
- Charge points where practical (Slough Electric Vehicle Plan)
- Low NOx Boilers.
- Green infrastructure

**Type 2 Mitigation:**
- Monitored Travel Plan
- Commercial fleet emission standards
- Support for Slough Electric Vehicle Plan
- Construction emission control measures, including, NRMM controls

**Type 3 Mitigation:**
- Off-set mitigation to support:
  - Implementation of CAZ/ULEV standards for buses
  - Cycling hubs and routes
  - Support for Slough Electric Vehicle Plan
  - Support for SBC fleet emission reductions
MAJOR Classified Proposals

The scale and nature of this type of proposal is such that a detailed air quality assessment will be required to determine the impact on public health and the local environment. The assessment requires:
- The identification of the level of exposure through the change in pollutant concentrations including cumulative impacts arising from the proposal and other approved developments in the vicinity, during both demolition/construction operations and operational phases. Mitigation measures should be identified and modelled where practicable.
- The calculation of pollutant emissions costs from the development.

A. The methodology to be used for the determination of pollutant concentration change should meet the requirements of the Department for the Environment, Food and Rural Affairs (DEFRA) Technical Guidance Note LAQM TG. (16)\(^{34}\). Further details of the air quality assessment requirements can be obtained from the SBC Environmental Quality Team.

B. The pollutant emissions costs calculation will identify the health and environmental damage costs associated with the proposal and will assist SBC in assessing the overall impacts on air quality arising from major developments. SBC may use the damage costs in considering the appropriate scale and kind of mitigation that is required to make certain major schemes acceptable in terms of air quality. The overall benefit of the scheme will be taken into account in making the site acceptable. The calculation utilises the most recent DEFRA Emissions Factor Toolkit\(^{35}\) to estimate the additional pollutant emissions from a proposed development and the latest DEFRA IGCB Air Quality Damage Costs for the specific pollutant of interest, to calculate the resultant damage cost\(^{36}\). The calculation process includes:
  - Identifying the additional trip rates generated by the proposal (from the Transport Assessment);
  - The emissions calculated for the pollutants of concern (NOx and PM10) [from the Emissions Factor Toolkit];
  - The air quality damage costs calculation for the specific pollutant emissions (from DEFRA IGCB);
  - The result is totalled for a five-year period to enable mitigation implementation.

The calculation is summarised below. Further information can be obtained from the SBC Environmental Quality Team. **Should there be no net increase in trips arising from a development scheme then the damage costs are zero.**

\[
\text{Road Transport Emission Increase} = \\
\sum [\text{Estimated trip rate for 5 years} \times \text{Emission rate per 10 km per vehicle type} \times \text{Damage Costs}]
\]

---

\(^{34}\) https://laqm.defra.gov.uk/technical-guidance/


\(^{36}\) https://www.gov.uk/guidance/air-quality-economic-analysis
Stage 3 - Mitigation

Where mitigation is not integrated into a proposal, SBC will require this through planning conditions. The NPPF (paragraph 152) states that “where adequate mitigation measures are not possible, compensatory measures may be appropriate”. If on-site mitigation is not possible then SBC will seek compensation for the identified air quality impacts through a section 106 agreement or similar agreement.

Default mitigation measures are presented for each type of proposal that demonstrate a minimum requirement. This is not an exhaustive list and will be adapted for particular locations and needs identified by SBC and the scale of damage costs. SBC welcomes the opportunity to work with developers to devise innovative measures that will lead to improving local air quality. Type 1 mitigation is listed in table 9 and Types 2 and 3 are listed in tables 10 and 11 respectively.

Due to elevated concentrations of particulate matter in Slough, Medium and Major developments will be required to implement suitable abatement controls for the use of non-road mobile machinery (NRMM) – see table 11.

Type 1 Mitigation

Table 7 – Type 1 Mitigation

Plug-in Vehicle Re-Charging:

Residential:
1 charging point per unit (dwelling with dedicated parking) or 1 charging point per 10 spaces (unallocated parking) and ensure appropriate cabling is provided to enable increase in future provision

Commercial/Retail:
At least 10% of parking spaces (32 amp) which may be phased with 5% initial provision and the remainder at an agreed trigger level. At least 1 charging unit should be provided for every 10 disabled parking spaces. Where 50 parking spaces or more are provided then 1 rapid charging unit (43kW/50kW) per 50 spaces shall also be considered and parking time limited to a maximum of 1 hour.

Industrial:
At least 10% of parking spaces which may be phased with 5% initial provision and the remainder at an agreed trigger level. At least 1 charging unit should be provided for every 10 disabled parking spaces. Where 50 parking spaces or more are provided then 1 rapid charging unit (43kW/50kW) per 50 spaces shall also be considered and parking time limited to a maximum of 1 hour.

All charging unit shall be installed where practical.

Code of Construction Practice
Construction Environmental Management Plan (CEMP) to be incorporated into MEDIUM
and MAJOR developments and agreed with Council Officers. This shall include NRMM controls (see table 10)

**Green Infrastructure**
Where it can be shown that such infrastructure will reduce exposure from air pollution

**Heating**
All gas-fired boilers to meet a minimum standard of <40 mgNOx/kWh
All gas-fired CHP plant to meet minimum emission standards of:
Spark ignition engine 250 mgNOx/Nm³
Compression ignition engine 400 mgNOx/Nm

**Type 2 Mitigation**
Measures to be considered where appropriate

**Table 8 – Type 2 Mitigation**
- Monitored Travel Plan
- Measures to support public transport infrastructure and promote use
- Measures to support cycling and walking infrastructure
- Measures to support the Slough Electric Vehicle Plan
- Measures to integrate with electric car clubs
- Non-road mobile machinery (NRMM) controls (see table 10)
- Construction Environmental Management Plan (CEMP)

Commercial development specific:
- Use reasonable endeavors to use/require vehicle use complying with the latest European Emission Standard
- Provide a fleet emission reduction strategy, including low emission fuels and technologies, including ultra-low emission service vehicles

**Type 3 Mitigation**

**Table 9 – Type 3 Mitigation**

*Off-set mitigation to support:*
- Implementation and operation of Clean Air Zone (CAZ) and ULEV standards for buses
- Support for the Slough Electric Vehicle Plan
- Electric Car Clubs
- Cycling Hubs
- Plugged-in development and demonstration schemes
- Infrastructure for low emission, alternative fuels eg. refuse collection services etc

*SBC will prepare and publish a full Section 106 off-set mitigation programme as part of the final LES*

Further information on the suitability of mitigation for developments can be obtained from the SBC Environmental Quality Team and through pre-application discussions.
Table 10 – Non-Road Mobile Machinery (NRMM) Controls

NRMM of net power between 37kW and 560kW will be required to meet the standards based upon the engine emissions standards in EU Directive 97/68/EC and its subsequent amendments. This will apply to both variable and constant speed engines for both NOx and PM. These standards are:

(a) NRMM used on the site of any MEDIUM classified development will be required to meet Stage IIIA of the Directive as a minimum.
(b) NRMM used on any MAJOR classified development will be required to meet Stage IIIIB of the Directive as a minimum.

From 1 September 2020 the following changes will apply:

• (a) NRMM used on any construction or demolition site within the Slough urban area will be required to meet Stage IIIB of the Directive as a minimum.
• (b) NRMM used on any MEDIUM or MAJOR classified development will be required to meet Stage IV of the Directive as a minimum.

The requirements may be met using the following techniques;

(a) Reorganisation of NRMM fleet  (b) Replacing equipment (with new or second hand equipment which meets the policy)  (c) Retrofit abatement technologies  (d) Re-engining.

All eligible NRMM should meet the standards above unless it can be demonstrated that the machinery is not available or that a comprehensive retrofit to meet both PM and NOx emission standards is not feasible.

3.35 Non- Transport Related Emissions from Developments

While road transport vehicle emissions are a significant cause of elevated pollution levels in the Borough and the primary focus of this guidance, there is concern that the increased use of biomass, for heating and power, and the use of diesel generators for electricity has the potential to hinder the Council’s efforts to improve air quality.

It is considered that the un-mitigated combustion of biomass and use of large-scale diesel generators is not appropriate within the Slough urban area. Developments including the following will be subject to a full air quality assessment and planning approval resisted where there is a detrimental impact on air quality within the urban area:

• Use of biomass for heating or power
• Use of diesel generators for power
• Part A and B Processes prescribed under the Environmental Protection Act 1990
• Any other point source requiring an Environmental Impact Assessment (EIA)
3.4 PUBLIC SECTOR PROCUREMENT

SBC will:

- Require minimum vehicle emission standards as part of Social Value procurement processes where relevant
- Set emission standards for all major contracts eg maintenance etc, where vehicle use is inherent in the contract
- Use whole life costs (WLC) in the evaluation of vehicle procurement exercises, including the consideration of alternatives to diesel technology.
- Ensure the Waste and Recycling Fleet complies with the latest emission standards from 1st December 2017
- Seek to migrate the refuse collection vehicle (RCV) fleet to natural gas / biomethane as part of the next procurement cycle
- Review the SBC light commercial fleet and pursue opportunities to transfer to plug-in and natural gas/biomethane technologies where feasible
- SBC will comply with best practice laid down by the Government Buying Standards for Transport

3.41 Procurement is an essential process enabling the Council to fulfil its responsibility to provide cost effective and efficient services which deliver the Council’s priorities. The Council’s aim is to promote effective procurement across the whole organisation using innovative, sustainable and modern procurement practices, harnessing a culture of continuous improvement, whilst remaining flexible to a rapidly changing environment and new models of, and partnerships in, the delivery of services.

Recent legislation and guidance encourages the public sector to support the uptake and deployment of low emission vehicles through sustainable procurement decisions. The areas of procurement which can contribute to a reduction in vehicle emissions are:

a) Contracts relating to goods and services provided to public sector organisations

b) Procurement of vehicles by the public sector

3.42 Goods and Services Provided to the Public Sector:

Social Value

Public sector organisations are required to look at best value, rather than lowest cost, when making procurement decisions. The Public Services (Social Value) Act 2012 came into force on the 31st January 2013. The Act, for the first time, places a duty on public bodies to

37 http://www.legislation.gov.uk/ukpga/2012/3/enacted
consider social value, including environmental considerations, ahead of a procurement. The wording of the Act states that:

_The authority must consider—_

(a) how what is proposed to be procured might improve the economic, social and environmental well-being of the relevant area, and;

(b) how, in conducting the process of procurement, it might act with a view to securing that improvement.

While the requirements do not apply to all types of procurement The Act provides scope to include the consideration of vehicle emissions, arising from contract delivery and their impact on the health of the community, where the requirements do apply.

_Sustainable Award Criteria_

Sustainability should be one of the criteria which is considered in all procurement decisions. Vehicle emissions can be considered in award decisions as part of sustainable procurement practices. The extent to which organisations give weight to vehicle emissions will depend on circumstance and cost, however, all general contracts involving road vehicles, such as the delivery of goods to the Council, will include a standard clause relating to vehicle emissions – see figure 20.

**Figure 20 – Standard vehicle emission clause in relevant general contracts**

<table>
<thead>
<tr>
<th>All contractors using commercial goods vehicle/s in the delivery of a SBC contract shall use reasonable endeavors to ensure that diesel vehicle emissions comply with European Emission Standard VI/6 and Euro 6 c when introduced.</th>
</tr>
</thead>
<tbody>
<tr>
<td>In such cases, contractors shall supply an inventory of the vehicles to be used in the delivery of the contract and their European Emission Standards. SBC must be notified should any other vehicle not of the specified Standard be used in exceptional circumstances.</td>
</tr>
<tr>
<td>SBC will take into account vehicle emission standards that go beyond Euro VI/6, including the use of low emission alternative fuels (eg. Natural gas/biomethane/hydrogen) or zero emission capable vehicles, as part of tendering and evaluation processes.</td>
</tr>
</tbody>
</table>

There is potential for suppliers to gain a competitive advantage in tendering for public sector contracts through the consideration of the emissions of the vehicles they use.

With respect to the procurement of larger scale contract services, both in-house and external providers eg Environmental Services, Repairs, Maintenance and Investment (RMI contract), Community Transport Fleet Services and other major contracts with significant fleet profiles minimum vehicle emission requirements are specified in figure 21.
Figure 21 – Vehicle Emission Standards for large scale service contracts

- A Minimum standard of EURO VI/6 (fleet profile) – note EURO 6 for fleet defined as LDV (Vehicles below 3.5 tonnes) and EURO VI for fleet defined as HDV (Vehicles above 3.5 tonnes)
- A 10% uptake of Electric/hybrid/gas of the total fleet profile (by 2018) rising to 25% of the total fleet profile (by 2021)
- A 3% reduction per annum CO2 targets for fleet emissions (contractually obliged to commit to)
- A 3% reduction per annum of fuel saving targets fleet emissions (contractually obliged to commit to)
- Mandatory Environmental reporting requirement built into the specification (including Fleet Profile (make, model, size), annual mileage recorded, fuel type) – from this we can work out the carbon, NOx and particulate emissions assuming an average speed profile

3.43 Local Sourcing

Local sourcing is practiced widely by local authorities. Such initiatives have the potential to support the local economy while helping reduce overall mileage for deliveries and thereby reducing emissions from vehicles. Local sourcing offers the potential for lighter goods vehicles to be used in delivery.

3.44 Procurement of Public Sector Vehicles

The Cleaner Road Transport Vehicles Regulations 2011 (CRTV Regs) require public sector organisations to consider the energy use and environmental impact of vehicles they buy or lease. A key concept of the Regulations is the consideration of whole life costs whereby the operational costs over a vehicle life, including pollution damage costs, are taken into account rather than just the purchase price. This helps to redress the issue of low emission vehicles costing more than conventional vehicles, while potentially having lower operating costs that outweigh the purchase increment.

The Regulations state that any public sector contracting authority, entity or operator when purchasing or leasing road transport vehicles must take into account the operational lifetime energy and environmental impacts, in respect of vehicles purchased or leased, including:

- Energy consumption
- Carbon Dioxide emissions
- Emissions of Oxides of Nitrogen, Hydrocarbons and Particulate Matter
- Noise can also be taken into account

To satisfy the requirements of the Regulations, one of 3 options must be chosen:

1. The technical specification for energy and environmental performance is set out in the documentation for the purchase and leasing of road transport vehicles or services.
2. Energy and environmental performance is included as part of the contract award criteria.
3. A monetised whole life cost assessment, including the damage cost of lifetime emissions, is carried out as part of the tender evaluation.

Therefore, to carry out any vehicle or transport service procurement one of these three options MUST be included in the procurement process.

SBC has led by example and has implemented the requirements of the CVTR Regs in respect of the procurement and operation of the SBC Fleet. We will work with other public sector organisations, including the NHS, to promote best practice in vehicle procurement exercises.

3.45 **SBC Environmental Service Fleet Vehicles**

SBC is in the process of in-sourcing its waste collection and highways operation which will become operational from the 1st December 2017. As part of this process, SBC carried out an appraisal of the whole life costs and benefits associated with diesel refuse collection vehicles (RCV) and alternatives. The study was published by the Local Government Association as best practice. The study illustrated the emission and costs savings from alternatives to diesel RCVs (see figure 22 and table 11), and the feasibility of providing a biomethane refueling station at the Chalvey Depot (see figure 23).

While it isn’t possible to procure suitable Euro VI gas/biomethane RCVs until 2018, the Council will operate Euro VI diesel RCVs from the 1st December and has committed to transition the RCV fleet to natural gas/biomethane during the next procurement cycle completed by 2024.

**Figure 22 – Expected SBC lifetime emission costs of diesel RCVs and alternatives**

![Total emissions cost graph](http://www.local.gov.uk/sites/default/files/documents/sloughs-rcv-options-appra-d7c.pdf)
Table 11 – Costs of operating SBC RCVs on biomethane compared with diesel

<table>
<thead>
<tr>
<th>Fuel price scenario</th>
<th>High fuel cost difference</th>
<th>Low fuel cost difference</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Assumptions:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diesel price includes AdBlue, 4%, 35ppl</td>
<td>Diesel price: £1.17</td>
<td>Diesel price: £0.93</td>
</tr>
<tr>
<td>Gas price is includes electricity @ 5ppkg and biomethane certificate @ 2.8p</td>
<td>Gas price: £0.74</td>
<td>Gas price: £0.67</td>
</tr>
<tr>
<td></td>
<td>Difference: £0.42</td>
<td>Difference: £0.26</td>
</tr>
<tr>
<td><strong>Annual per vehicle saving:</strong></td>
<td>£6,503</td>
<td>£4,435</td>
</tr>
<tr>
<td>(range due to fuel efficiency in brackets)</td>
<td>(£5,626 - £7,380)</td>
<td>(£3,648 - £5,222)</td>
</tr>
<tr>
<td><strong>Total annual fleet saving:</strong></td>
<td>£130,055</td>
<td>£88,703</td>
</tr>
<tr>
<td>(range due to fuel efficiency in brackets)</td>
<td>(£112,514 - £147,596)</td>
<td>(£72,959 - £104,448)</td>
</tr>
</tbody>
</table>

Figure 23 – Map of gas pipe-lines in vicinity of the Chalvey Depot

3.46 SBC is currently carrying out a review of the fleet of the Council’s Community Transport Fleet and is committed to procuring ultra-low emission alternatives to diesel where feasible going forward. This work is being co-ordinated by a Fleet Challenge Team (FCT) that is authorised to develop, introduce and manage corporate transport related strategies and policies for the Council. The FCT is charged with supporting, monitoring and reporting that vehicles, including plant items where applicable, used by the Council are:

1. Where procured - are procured using whole life costing comparisons and sustainability.
2. Where hired - are hired based on lowest emissions available suitable for the task required.

3. Where used - are used in the most fuel efficient manner achievable.

The VAG is investigating viable alternative fuels and is working with departments who are procuring, hiring or using vehicles to establish formal evidence of:

1. Consideration of using Ultra Low Emissions Vehicles (ULEV)
2. Exploration and trialling of any fuel-saving or emission reducing technologies.

3.47 All SBC vehicle procurement activities comply with best practice under the Government Buying Standards for Transport\(^\text{39}\).
3.5 SBC FLEET CHALLENGE

SBC will:
- Implement a Travel Hierarchy providing access to alternatives to car use to avoid unnecessary journeys and increasing the use of electric pool cars and bikes
- Build on the successful ‘My Electric Avenue’ Project to increase the take-up of ULEVs, reduce emissions and save costs for both staff and the Council

3.51 Following an application by the Environmental Quality Team, Energy Saving Trust carried out a fleet review on SBC’s fleet and identified several opportunities for reducing the emissions of our ‘grey fleet’ ie vehicles owned and used by staff as part of their Council duties, and introduced the idea of a travel hierarchy and pool/car club models and hire car options. The SBC grey fleet has the largest environmental impact producing 401 tonnes of carbon dioxide in 2014/15 from staff driving 0.9 million business miles. The grey fleet is reimbursed at the HMRC rate of £0.45/mile also staff who exceed 1,000 business miles/annum can claim a £1,000 lump sum allowance this means the real rate of reimbursement is closer to £0.79/mile in 2014/15, excluding any cost or deferred income associated with the provision of staff parking places.

It is recommended that SBC adopts a policy of making the grey fleet the option of last resort with the objective of reducing grey fleet use to less than 10% of its current level by 2025. This can be achieved through the robust implementation of a Travel Hierarchy and providing easy access to alternatives such as conferencing systems (video, web and audio) in order to avoid unnecessary journeys, pool cars (EVs) for local visits within the Borough and neighbouring authorities, bus passes, travel warrants for trains, pool bikes or e-bikes, and requiring the mandatory use of hire cars for all business journeys that average over 90 miles/day.

The SBC Fleet Challenge was launched on the 22nd June 2017.

SBC Electric Pool Car and Bike
The council have been involved in a number of successful electric vehicle (EV) projects, use of community transport EV cars for school runs, purchase of EV car for Transport and Highways team for highway inspections, the ‘My Electric Avenue’ project where by nine staff and one Councillor took up the offer of a Nissan Leaf under the “My Electric Avenue” project. This project resulted in over 100,000 miles of zero carbon emissions from the tailpipe, as well as significant reductions in particulate and NOx emissions. The council had five EVs on the fleet in 2014/15 and at the end of the year (31st March 15) had four Nissan Leaf and a Peugeot Ion for departmental pool use on a request basis. The Council purchased three Renault Zoes and six e-bikes in June 2017 which are used exclusively as dedicated pool vehicles for all SBC staff to use.

The Fleet Challenge programme will enable SBC to:

- Decarbonise its fleet across the estate by increasing the number and use of EV pool cars and other ULEV technologies.
- adopt a travel hierarchy aimed at supporting and encouraging sustainable travel options
- significantly reduce the dependency on the use of grey fleet whilst reducing revenue spend (on mileage claims)
- set out emission specifications with our fleet contracts to reduce emissions
3.6 **TAXIS**

SBC will:

- Set minimum emission standards for both Hackney Carriages and private hire vehicles (PHV) that comply with CAZ requirements and also promote the use of ultra-low emission vehicles (ULEV)
- Install a network of dedicated, rapid charging units to support the growth in ULEV taxi take-up
- Develop SMART APPS for taxi drivers to connect with electric charging infrastructure and for customers to connect to ULEV taxis
- Facilitate ‘trade’ days for taxi drivers to meet with ULEV taxi manufacturers / retailers, infrastructure providers and other support organisations
- Promote the use of ULEV taxis for public sector taxi contracts

3.61 The Government expects local authorities to take a lead and use available powers to reduce vehicle emissions where possible, including controlling emissions from taxis. Taxis operate mainly in the urban area where air pollution is greatest and often leave their engines idling on taxi ranks where members of the public are often exposed.

3.62 SBC are looking at the feasibility of implementing a Clean Air Zone (CAZ) in the Borough (see section 4) that will seek to restrict access to the most polluting commercial vehicles whilst also seeking to promote an acceleration in the uptake of ultra-low emission vehicles (ULEVs). In line with the National Air Quality Plan, the introduction of a CAZ will also require minimum emission standards for taxis.

There are 715 licensed Hackney Carriages (HC) and Private Hire Vehicles (PHV) in Slough. Table 12 shows the breakdown of the taxi fleet by fuel type.

**Table 12 – Slough taxi fleet by fuel type**

<table>
<thead>
<tr>
<th></th>
<th><strong>HACKNEY CARRIAGE</strong></th>
<th><strong>PRIVATE HIRE</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total</strong></td>
<td>107</td>
<td>608</td>
</tr>
<tr>
<td>Diesel</td>
<td>99</td>
<td>525</td>
</tr>
<tr>
<td>Petrol</td>
<td>6</td>
<td>31</td>
</tr>
<tr>
<td>Hybrid Electric/Petrol</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Hybrid Electric/Diesel</td>
<td>1</td>
<td>51</td>
</tr>
</tbody>
</table>

SBC will:

- Set minimum emission standards for both Hackney Carriages and private hire vehicles (PHV) that comply with CAZ requirements and also promote the use of ultra-low emission vehicles (ULEV)
- Install a network of dedicated, rapid charging units to support the growth in ULEV taxi take-up
- Develop SMART APPS for taxi drivers to connect with electric charging infrastructure and for customers to connect to ULEV taxis
- Facilitate ‘trade’ days for taxi drivers to meet with ULEV taxi manufacturers / retailers, infrastructure providers and other support organisations
- Promote the use of ULEV taxis for public sector taxi contracts
The emission standards of the Slough taxi fleet (2016) is shown in figure 24.

**Figure 24 – Emission Standards of the Slough Taxi Fleet**

<table>
<thead>
<tr>
<th>Euro Standard</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Euro 3</td>
<td>2.4%</td>
</tr>
<tr>
<td>Euro 4</td>
<td>69.2%</td>
</tr>
<tr>
<td>Euro 5</td>
<td>28.1%</td>
</tr>
<tr>
<td>Euro 6</td>
<td>0.3%</td>
</tr>
</tbody>
</table>

SBC will seek to set emission standards for taxis. The proposed minimum emission standards for taxis in Slough are shown in table 13. These standards will be discussed by the Taxi Licensing Committee in February 2018. The Committee will also discuss incentives that can be introduced to promote the uptake of ULEV taxis.

**Table 13 – Proposed emission standard requirements for taxis**

<table>
<thead>
<tr>
<th>Compliance Dates &amp; Emission Standard</th>
<th>Vehicle to be Licensed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st September 2018 ULEV** Standard</td>
<td>All new vehicles to be licensed by new applicants on or after that date. ***</td>
</tr>
<tr>
<td>1st September 2020 CAZ Standard (Euro 6 diesel / Euro 5 petrol)</td>
<td>All licensing renewals i.e. renewals of currently licensed vehicles.</td>
</tr>
<tr>
<td>1st September 2020 CAZ Standard (Euro 6 diesel / Euro 5 petrol)</td>
<td>All new vehicles to be licensed by current licence holders i.e. where the current licensed vehicle needs to be replaced ***</td>
</tr>
<tr>
<td>ULEV from 2025</td>
<td>All licensing renewals i.e. renewals of current vehicles and all new vehicles to be licensed.</td>
</tr>
</tbody>
</table>

*Clean Air Zone

**A vehicle that uses low carbon technologies and emits less than 75g of CO2/km from the tailpipe and is capable of operating in zero tailpipe emission mode for a range of at least ten miles.

*** Any ULEV** Standard vehicle must only be replaced by another ULEV ** Standard vehicle.
3.63 Slough Ultra-Low Emission Taxi Feasibility Study

In 2016, SBC undertook an Ultra-Low Emission Taxi Feasibility Study\(^{40}\), a pre-requisite for Government funding to support the uptake of ultra-low emission taxis. The study showed that there is interest from the taxi trade in using plug-in vehicles and that at around 3p per mile to run, Slough taxi drivers could achieve significant cost savings by switching from their diesel vehicles. A key issue is the availability of dedicated rapid charging facilities for taxis.

Taxi drivers were surveyed on how they choose their vehicles and how they are operated. Figure 25 shows that 79% of taxi drivers responding to the survey said they would consider buying an electric vehicle as their next vehicle. Figure 26 shows that the majority of taxi drivers surveyed would be able to charge an electric vehicle at home overnight.\(^{52}\)

**Figure 25 – Taxi Survey: Would you consider an electric vehicle as your next vehicle?**

![Figure 25](image1.png)

**Figure 26 – Taxi Driver Survey: Where do you normally park your taxi overnight**

![Figure 26](image2.png)

\(^{40}\) SBC Ultra Low Emission Taxi Feasibility Study for OLEV (March 2016), LES Ltd/Mint Green Ltd

\(^{52}\)
The Study used data supplied by Slough taxi drivers to compare the current total cost of ownership (TCO) of running a diesel vehicle compared with a plug-in alternative. Figure 27 shows that a plug-in, disabled access Hackney could achieve savings of nearly £4,000 per annum, including vehicle depreciation and figure 28 shows than an electric PHV could achieve savings of nearly £3,000 per annum compared with a diesel saloon car.

Figure 29 shows examples of disabled access, plug-in taxis entering the market.

**Figure 27 – Total Cost of Ownership (TCO) of plug-in and diesel Hackney Carriages**

![Estimated total cost of ownership comparison](image)

The Metrocab is a new, disabled access, range extended electric black cab with a small petrol engine ([www.metrocab.com](http://www.metrocab.com)) *denotes use of vehicle in electric mode only. The performance is similar to the new plug-in London Taxi. The TX4 is a typical, disabled access, diesel black cab.

**Figure 28 – Total Cost of Ownership (TCO) of plug-in and diesel private hire vehicles**

![Estimated total cost of ownership comparison](image)

*denotes driven in mainly electric mode
The Study looked at the projected emission savings of NOx, Particulate Matter and CO2 that could accrue from switching from diesel taxis to plug-in vehicles. The analysis was broken down by disabled access taxi (black cab) and saloon type taxi (typical PHV) and looked at low, medium and high take-up of plug-in taxis. Figures 30 and 31 show the projected emissions savings of NOx for black cabs and saloon cars respectively. Figure 32 shows the projected emission savings of CO2e for black cabs.
3.64 Slough Ultra-Low Emission Taxi Funding

Following submission of the Slough Ultra-Low Emission Taxi Study to the Government, in March 2017, the Government awarded Slough £157,000 to install 7 rapid charging units for charging taxis. Ultra-Low Emission Taxi Funding was awarded to 9 authorities nationally.
These rapid chargers will be rolled out over the next 2 years (2018/19) at the following locations:

- Slough railway station – front entrance
- Slough Railway station – rear entrance
- Harrow Market, Langley
- Burnham Railway station
- The Grove car park, town centre
- Burlington car park, town centre
- Church Street, town centre

In order to facilitate a switch to ultra-low emission, plug-in taxis, it is proposed that licensing standards for ULEVs are introduced in line with table 14.

Additionally, incentives to promote the uptake of plug-in taxis will be considered, including:

- Dedicated ULEV taxi ranks at Slough, Burnham and Langley Railway Stations
- Dedicated SMART APP for taxi drivers to book charging facilities
- Discounted charging rates for early adopters
- ULEVs to be prioritised when SBC, and other public services, procure taxi services

SBC will be holding ‘Trade’ days when taxi drivers can meet with ULEV manufacturers and service providers to discuss opportunities.

The rapid charging unit installed in December 2014 on Brunel Way, opposite the Slough Railway Station taxi rank, currently experiences around 40 charging events per month and increasing at a rate of 100% year on year.

**Rapid charging unit on Brunel Way with Slough Station Taxi Rank opposite**

### 3.65 Public and Private Sector Taxi Contracts and Standards

SBC will work with other public and private sector stakeholders to promote the use of ULEV taxis as part of any taxi contract requirements.
4 Slough Clean Air Zone (CAZ) Framework

SBC will:
- Raise awareness of vehicle emissions and benefits of low and ultra-low emission vehicles
- Look at the feasible implementation of a Clean Air Zone (CAZ) in the Borough in consultation with key stakeholders
- Develop and implement the Slough Electric Vehicle Plan
- Work with bus operators to achieve continuing improvements in bus emissions and consider alternatives to diesel technology
- Work with key stakeholders to improve the emissions from freight vehicles
- Implement emission standards for taxis and promote the uptake of ultra-low emission taxis (see section 3.6)
- Lead by example in setting the highest possible emission standards for SBC fleet vehicles (see section 3.4) and reducing emissions from the ‘grey’ fleet through the Fleet Challenge (see section 3.5)
- Work in partnership with Highways England to reduce the impact of emissions from the M4 motorway

4.1 This section outlines the Slough Clean Air Zone (CAZ) Framework which will be delivered by SBC and key stakeholders in line with the Slough Transport Strategy 2016 – 2036 (draft). The CAZ Framework includes low and ultra-low emission vehicle specific measures that are being developed and implemented in Slough to accelerate the uptake of cleaner vehicles, including the provision of infrastructure to support growth. The Framework builds on the policy support mechanisms discussed in Section 3 – Creating a Low Emission Future: Leading by Example, including land-use planning, procurement and licensing measures and provides a delivery framework to support the uptake of low and ultra-low vehicles, including the pursuit of funding opportunities and mechanisms for monitoring and review.

What is a low or ultra-low emission vehicle?

We normally associate vehicles that either meet or go beyond the latest European Emission Standard (Euro Standard – see section 4.2) as achieving the low emission vehicle status. However, some vehicle emissions are far higher under real-world driving conditions than in official tests and this needs to be recognised when promoting emission standards. The Government defines a low emission bus as meeting Euro VI emission standards while reducing CO₂ emissions by 15% compared with Euro V buses. The Government defines light duty vehicles (cars and LGVs) as ultra-low emission if they emit less than 75 g/km of CO₂, irrespective of the Euro Standard.

41 European Emission Standards use normal numbering for light duty vehicles and Roman numerals for heavy duty vehicles
4.2 European Emission Standards (Euro Standards)

In order for manufactures to sell vehicles within EU Member States they must limit exhaust emissions to a level dictated by the latest Euro Standard, assessed during a standardised test cycle – see table 14. It can be seen that diesel cars emit significantly more NOx per vehicle than petrol cars. Emissions projections assume the Standards will not be met and there are plans to amend the Euro 6 regulations to use real world testing in the vehicle approval process with the introduction of Euro 6c in 2017 (ICCT 2014\textsuperscript{42}). Euro 6 and 5 diesel cars have had compliance issues especially with the NOx requirements. Figure 33 illustrates the difference between the test cycle emissions of Euro 5 and 6 diesel cars and their respective real world emissions. Further information on how to identify the real-world emissions of cars and vans can be found in section 4.32.

The European Emission Standards for heavy duty vehicles (buses and lorries) are more stringent for Euro VI vehicles compared with previous standards – see table 15. Evidence suggests that Euro VI vehicles are demonstrating significant improvements under real world driving conditions. Figure 34 shows the results of conformity tests carried out \textsuperscript{43} on heavy duty vehicles with different Euro Standards, including buses and trucks. Each dot represents a real world test. The ‘conformity factor’ is the ratio of the result to the standard limit, so a value of ‘2’ means the vehicle was emitting twice the amount of NOx compared with its Euro standard, and any value under ‘1’ would mean it was cleaner than the Euro standard.

Table 14 - European Emissions Standards (passenger cars)

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure33.png}
\caption{European Emissions Standards (passenger cars)}
\end{figure}

\begin{table}[h]
\centering
\begin{tabular}{|c|c|c|c|c|c|c|}
\hline
\textbf{Euro} & \textbf{(Jan ’93)} & \textbf{(Jan ’97)} & \textbf{(Jan ’01)} & \textbf{(Jan ’06)} & \textbf{(Jan ’11)} & \textbf{6 (Sept ’15)} \\
\hline
\textbf{Petrol NOx} & 300 & 200 & 100 & 50 & 25 & 10 \\
\hline
\textbf{Diesel NOx} & 800 & 600 & 400 & 200 & 100 & 50 \\
\hline
\textbf{Diesel PM} & 500 & 400 & 300 & 200 & 100 & 50 \\
\hline
\end{tabular}
\end{table}

\textsuperscript{42} \url{http://www.theicct.org/real-world-exhaust-emissions-modern-diesel-cars}

\textsuperscript{43} “Briefing: Comparison of real-world off-cycle NOx emissions control in Euro IV, V, and VI”, March 2015, \url{www.theicct.org}
Figure 33 - Real World NOx Emissions from Diesel Cars compared with Regulated Limits

Table 15 – European Emission Standards for Heavy Duty Engines

<table>
<thead>
<tr>
<th>Euro Standard</th>
<th>Year</th>
<th>Exceeding Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Euro I ('93)</td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>Euro II ('99)</td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>Euro III ('01)</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>Euro IV ('06)</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>Euro V ('09)</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>Euro VI ('15)</td>
<td></td>
<td>Yes</td>
</tr>
</tbody>
</table>
Figure 34 - Performance of heavy duty engines against Euro Standards (ICCT 2015)
Slough Clean Air Zone (CAZ) Framework

Vehicle Operators & Users

Slough Borough Council (SBC)

Policy, Communication, Engagement & Research

Passenger Cars
- Raise awareness of car emission issues and the benefits of clean vehicle technologies and fuels
- Implement a Slough EV Plan, including the roll-out of charge point infrastructure
- Ensure new developments provide charging points where practical
- Promote Car Clubs
- Support residential and commercial ULEV demonstration schemes
- Promote travel planning & active travel options

Clean Air Zones (CAZ)
- CAZ feasibility study with view to setting emission standards for buses, taxis and freight vehicles
- CAZ areas to be determined
- Enforcement mechanisms to be considered in line with national CAZ Framework
- Clean Air Partnerships/Awareness/Recognition Schemes
- Work with Highways England to reduce emissions from the M4 motorway

Buses
- Emission standards through Bus Partnerships to 2025
- Intermediate standard by 2018 and improved standards by 2020
- Promote ultra-low emission buses as part of SMaRT Project
- Joint work with Heathrow to promote & support ULEV Corridors
- Promote alternatives to diesel such as electric & biomethane
- Introduce emission standards for school and community buses

Freight
- Emission standards through Freight Partnerships
- Potential CAZ standards for lorries and vans by 2020
- ULEV delivery emission requirements through Social Value/CSR procurement criteria
- Emission standards for new commercial development schemes
- Infrastructure for electric, bio/methane & hydrogen
- Demonstration schemes via the Slough EV Plan

Taxis
- Raise awareness of cost & emission benefits of LEVs & ULEVs
- Licensing emission standards
- LEV/ULEV taxi ranks
- ULEV Hubs
- Recognition scheme for ULEV taxis
- CAZ standards
- Public sector procurement requirements for cleaner taxis

Lead by example:
- Euro VI waste & recycling vehicles by December 2017
- Consideration of alternatives to diesel vehicles, including Infrastructure, as part of SBC vehicle fleet replacement programmes
- Consider Whole Life Costs
- Comply with CAZ Standards
- Fleet Challenge to improve grey fleet emissions

Public Fleets

Monitoring & Review of Framework delivery, including opportunities for funding and mechanisms for review
4.3 Passenger Cars

SBC will:

* Raise awareness of car emission issues & benefits of alternative fuelled cars
* Promote & support the take-up of ultra low emission vehicles (ULEV) through the development and implementation of the Slough Electric Vehicle Plan
* Ensure new developments provide charging points where practical
* Support residential and commercial ULEV demonstration schemes

4.31 One of the key reasons that air quality has not improved in line with expectations is the significant increase in diesel car use in the UK. In 2000, around 20% of cars sold were diesel compared with around 60% today\(^{44}\). Diesel cars have been promoted as environmentally friendly with generally lower vehicle excise duty (VED)\(^ {45}\), however, not only are Euro Standards for diesel cars less stringent than for petrol cars but they are now known to emit far more NOx under real world driving conditions than their Euro Standard limit. Further action is needed by Government to look at the incentives provided for diesel cars and their suitability for use in urban areas needs to be questioned.

The Slough CAZ Framework seeks to raise awareness about the relative emissions of cars and also the total cost of ownership (TCO) of standard technologies compared with alternative fuelled models. Research\(^ {46}\), shows that over a 3 year period, including depreciation, electric and hybrid models are likely to cost the motorist less to own. As the volume of ULEV manufacture increases, purchase costs are likely to become similar to standard vehicle technologies, meaning that motorists will achieve noticeable cost benefits of buying and running an ULEV.

4.32 How can we know what emissions vehicles produce under real-world driving conditions?

The Mayors of London and Paris are launching an online ‘Clean Vehicle Checker’ in Autumn 2017. The Clean Vehicle Checker will show consumers how much toxic NOx new cars emit, helping them to choose and buy less polluting vehicles. It will provide an independent evaluation of the emissions of most, new cars and vans on our roads and on the showroom forecourt. By having ‘on the road’ testing the scheme will help motorists to make an informed choice and incentivise manufacturers to build cleaner vehicles sooner.

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\(^{44}\) [www.smmt.co.uk](http://www.smmt.co.uk)


\(^{46}\) West Midlands Low Emission Vehicle Strategy (WMLEVS), West Yorkshire Low Emission Strategy (WYLES)
The Clean Vehicle Checker will use real-world emission data provided by Emissions Analytics who have also launched the EQUA Index\(^47\), which provides free-to-access data on vehicles’ fuel consumption and NO\(_x\), CO\(_2\) and CO emissions. In terms of NO\(_x\), vehicles are rated from A to H against their real-world emission performance with A rated vehicles meeting the latest European Emission Standards and H rated vehicles emitting more than 12 times the latest Euro Standards.

Motorists can use these real-world emission tools when making future vehicle purchases. Please refer to the website link [http://equaindex.com/](http://equaindex.com/).

\(^{47}\) [http://equaindex.com/?utm_source=Emissions%20Analytics%20Newsletter&utm_campaign=2d0ac90392-EMAIL_CAMPAIGN_2017_03_31&utm_medium=email&utm_term=0_c35d8b9a1e-2d0ac90392-73487569](http://equaindex.com/?utm_source=Emissions%20Analytics%20Newsletter&utm_campaign=2d0ac90392-EMAIL_CAMPAIGN_2017_03_31&utm_medium=email&utm_term=0_c35d8b9a1e-2d0ac90392-73487569)
4.4 Slough Electric Vehicle Plan

By the end of March 2017 there were 98,918 plug-in vehicles registered in the UK, with 9,389 registered in Greater London. Slough has the 3rd highest registrations of plug-in vehicles per local authority with 3,457 with data indicating that this exponential growth trend is continuing\(^{48}\) (see table 16). The number of plug-in model available is increasing\(^{49}\) while costs are reducing.

The Slough CAZ Framework will seek to continue support for the take up of ultra-low emission vehicles (ULEV) with the development and implementation of the Slough Electric Vehicle Plan (see section 4.4).

The Government has pledged that almost all new car and light goods vehicle sales will be zero emission by 2050\(^ {50}\) and will continue to provide a grant of up to £4,500 towards the purchase of ultra low emission cars, including plug-in vehicles\(^ {51}\) and also provide support for rolling out the charging infrastructure needed to enable take-up, including home charging\(^ {52}\)\(^ {53}\).

Table 16 – Quarterly EV registration figures in Slough - 2011 to 2016

\[\text{Quarterly EV registration figures in Slough - 2011 to 2016}\]

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\(^{48}\) DfT Vehicle Statistics


\(^{50}\) https://www.gov.uk/plug-in-car-van-grants


\(^{52}\) https://www.gov.uk/government/publications/workplace-charging-scheme-guidance-for-applicants-installers-and-manufacturers
In order to promote and support the take-up of ultra-low emission plug-in vehicles, including cars, taxis and commercial vehicles, we will develop and implement a **Slough Electric Vehicle Plan** with the following objectives:

1) Support home and workplace charging as the primary charging location utilising the local planning process, business support and private sector investment;
2) Creation of a strategic Slough public charge point network that ensures electric car users reach their destination through a simplistic access, usage and payment model (see figure 35);
3) Ensure charging opportunities are available for residents with and without private driveways;
4) In line with our Air Quality & Planning Guidance (see section 3.3) we will work with developers to provide practical charging solutions and support plug-in vehicle demonstration schemes on new residential and commercial developments;
5) Work with bus operators to develop ultra-low emission corridors, including potential for the Slough Mass Rapid Transit (SMaRT) Scheme
6) Install a network of rapid charging hubs to facilitate a high growth rate in plug-in taxis and the use of smart technology to link taxi operators with charging infrastructure and customers;
7) Develop an Electric Car Club across the Borough
8) Link and compliment with a potential Ultra-Low Emission Zone at Heathrow
9) Tackle the perceived and actual barriers to EV ownership through targeted marketing, promotion and information;
10) Work with the Thames Valley Berkshire Local Enterprise Partnership to help businesses achieve resource efficiency savings and to attract investment in ULEV technology and infrastructure;
11) Deliver an exemplary public sector ULEV operation – demonstrating to employees, business and the wider community the benefits and savings of ULEV vehicles and related air quality improvements through the SBC Fleet Challenge;
12) Seek opportunities for small-scale renewable energy generation to power ULEVs and two-way energy delivery from ULEVs to power homes when appropriate, reducing domestic bills and energy demands on the national grid;
13) Support the freight industry to invest in ULEV vehicles, especially in relation to last-mile delivery operations and help with infrastructure installation where possible.

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54 [http://thamesvalleyberkshire.co.uk](http://thamesvalleyberkshire.co.uk)
Map of current and proposed electric vehicle charge-points and proposed electric car club locations
4.5 Clean Air Zones (CAZ)

In July 2017, the Government published its ‘UK plan for tackling roadside nitrogen dioxide concentrations’. The Plan sets out an approach for meeting these goals by implementing a programme of Clean Air Zones in line with a national Clean Air Zone Framework.

As a minimum any Clean Air Zone is expected to:

- be in response to a clearly defined air quality problem, seek to address and continually improve it, and ensure this is understood locally;
- have signs in place along major access routes to clearly delineate the zone;
- be identified in local strategies including (but not limited to) local land use plans and policies and local transport plans at the earliest opportunity to ensure consistency with local ambition;
- provide active support for ultra low emission vehicle (ULEV) take up through facilitating their use;
- include a programme of awareness raising and data sharing;
- include local authorities taking a lead in terms of their own and contractor vehicle operations and procurement in line with this framework;
- ensure bus, taxi and private hire vehicle emission standards (where they do not already) are improved to meet Clean Air Zone standards using licensing, franchising or partnership approaches as appropriate; and
- support healthy, active travel.

SBC will undertake a feasibility study in 2018/19 which will address the issues above and also include widespread consultation with key stakeholders. It is proposed that the study will look at the feasibility of implementing ‘charging’ or ‘non-charging’ CAZ in the Borough.

SBC will look at the feasibility of implementing a Class B or C CAZ (see table 17) where the emission standards applied are shown in table 18. Existing powers may be used to set emission standards for buses and taxis, while automatic number plate recognition cameras (ANPR) could be used to identify CAZ compliance of lorries and vans, whereby non-compliant lorries and vans would be subject to a daily charge set by the Government.

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As part of the process of implementing a CAZ in Slough, SBC will be:

- working with SMEs and other businesses to help them understand their options for adapting to a Clean Air Zone, and the support available to them.
- engaging business participation in environmental sustainability and training programmes, for example to improve driver behaviour, and campaigns to raise employee awareness.
- working with local employers to increase awareness in their staff about local public transport choices and alternatives, and initiatives such as car clubs and car sharing.
- encouraging businesses to commit to use only their cleanest vehicles in a Clean Air Zone.
- encouraging businesses to commit, when buying new vehicles, to purchase those in line with or higher than Clean Air Zone standards.
- encouraging businesses to adopt approaches to operations that can support a Clean Air Zone.
- encouraging large taxi or private hire users, such as universities and hospitals, to require ultra low emission vehicles within their contracts and promote travel planning to minimise use.
- encouraging the uptake of low and ultra-low emission business recognition schemes
- encouraging delivery service plans with local businesses and public sector organisations.

Should the study clearly demonstrate that it is necessary, feasible and economically viable to implement a ‘charging’ CAZ in Slough, SBC will make an application to the Secretary of State for the powers to introduce a ‘charging’ CAZ by 2020. SBC has the ability to implement a ‘non-charging’ CAZ without the need for prior approval from the Secretary of State.

**Table 17 - Clean Air Zone Classes**

<table>
<thead>
<tr>
<th>Clean Air Zone class</th>
<th>Vehicles included</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Buses, coaches and taxis (including private hire)</td>
</tr>
<tr>
<td>B</td>
<td>Buses, coaches, taxis, and heavy goods vehicles (HGVs)</td>
</tr>
<tr>
<td>C</td>
<td>Buses, coaches, taxis, HGVs and light goods vehicles (LGVs)</td>
</tr>
<tr>
<td>D</td>
<td>Buses, coaches, taxis, HGVs, LGVs and cars</td>
</tr>
</tbody>
</table>

**Table 18 - Clean Air Zone emission standards for vehicle types**

<table>
<thead>
<tr>
<th>Vehicle type</th>
<th>NOx emissions limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bus/coaches</td>
<td>Euro VI</td>
</tr>
<tr>
<td>HGV</td>
<td>Euro VI</td>
</tr>
<tr>
<td>Car/light commercial (up to 1305kg)</td>
<td>Euro 6 (diesel) Euro 4 (petrol)</td>
</tr>
</tbody>
</table>
4.6 **Buses**

**SBC will:**
- Work in partnership with bus and coach operators to identify an emission reduction pathway to 2025
- Require a minimum Euro IV emission standard for commercial bus services by September 2018
- Look at potential Euro VI CAZ standard
- Promote ultra-low emission buses through the Slough Electric Vehicle Plan
- Promote ultra-low emission corridors as part of the Slough Mass Rapid Transit (SMaRT)
- Promote alternatives to heavy diesel such as methane/biomethane and electric

### 4.6.1
We recognize the vital role that public transport plays in our everyday lives and buses provide efficient transport modes and an alternative to private vehicle use and potential for reducing congestion. We also understand that older buses can cause significant emissions.

Tables 19 and 20 show the relative emissions of buses, by Euro Standard, travelling at urban speeds. It can be seen that Euro V buses tend to emit more NOx than Euro IV buses due to the ineffective operation of their NOx catalysts not working properly at low speeds when the exhaust temperature is insufficient. This can be addressed by fitting thermal management technology.

Table 21 illustrates the greenhouse gas emissions of diesel and alternative fuelled buses.

**Table 19 - NOx emissions of buses by Euro Standard and fuel type**
Table 20 – PM emissions of buses by Euro Standard and fuel type

Table 21 – Green House Gas (Well to Wheel) emissions of buses by Euro Standard and fuel type

4.62 Emission Standards for Buses

57 Euro VI hybrid figures are for the Volvo full hybrid, LowCVP 2016
Many bus operators will look to run a bus for at least 15 years on commercial routes meaning that around 7% of the bus fleet is replaced each year under normal circumstances. While the newest buses (Euro VI) are showing significant emission reductions over previous Euro Standards, the natural turnover of the bus fleet will be insufficient to tackle air quality issues in the short to medium term. It is acknowledged that bus operators cascade buses around the country according to operational needs, including the introduction of emission standards. Further pressures are faced by the bus operators in seeking to comply with CAZ standards that are being introduced around the country, requiring the use of Euro VI buses, which may restrict the ability of bus companies to invest in the cleanest buses in non-CAZ areas.

SBC has a partnership with First Bus and we will be working together to look at available technologies, investment and funding opportunities and develop an emission reduction strategy to 2025.

We will be consulting with all local bus and coach operators as part of the Slough CAZ feasibility study. In the interim, we believe it is feasible to set an emission target for local bus services by 2019. Table 22 shows the yearly emissions of a bus per Euro Standard, including the real-world emissions of a Euro III bus retrofitted with selective catalytic reduction technology (SCRT) under the Clean Vehicle Technology Fund (CVTF, DfT). We believe it is feasible for bus operators to cost effectively reduce the emissions of older buses, including Euro IV and V, by using retrofit technology and propose that all commercial bus services comply with a Euro IV Standard by 2019. Euro III buses fitted with approved retrofit technology will be permitted. Euro II and older buses will not be permitted as they will be older than 15 years.

Further emission improvements may be required if it is feasible to introduce a CAZ in Slough. SBC will look at best technology as part of the Slough Mass Rapid Transit (SMaRT) scheme, which will require a Euro VI Standard from the outset.

Table 22 – Retrofit (SCRT) emission reductions for NOx and PM per bus
3.63 Ultra-low Emission Pathways

While we will continue to work with bus operators to progressively reduce harmful emissions from buses we will also seek to promote the greenhouse gas benefits of moving away from diesel to alternatively fuelled buses such as biomethane and electric technologies.

We will build on the experience of other towns and cities in supporting diesel alternatives. Biomethane buses have been successfully rolled out in Sunderland, Darlington, Reading, Beccles, Runcorn and Bristol and both Bristol and Nottingham, 2 of the 4 Ultra Low Emission Cities in the UK have plans for significant growth in biomethane buses.

Cities such as London, Nottingham, Milton Keynes and Coventry have successfully introduced electric buses. While the capital cost of these buses is higher than standard diesel buses, there can be significant fuel and maintenance savings provide overall savings to operators. The benefits of both these technologies are highlighted below:

**Biomethane Buses**

- Runs on compressed gas
- Spark ignition engine
- Very high GHG savings & very low PM emissions
- No range limitation
- Filling station required, economies of scale favour larger projects
- Significant operational savings

ADL/Scania, Nottingham

**Electric Buses**

- All electric operation
- Zero tailpipe emissions
- Limited range – more suited to urban routes
- Operational savings
- Choice of infrastructure – overnight charging to inductive and/or rapid charging

Milton Keynes
4.7 Freight

SBC will:
* Look at the feasible implementation of CAZ standards for lorries and vans in the Borough
* Promote ULEV deliveries through Social Value / Corporate Social Responsibility (CSR) procurement criteria and delivery service plans
* Work with Highways England to support vehicle emission reductions for freight vehicles interacting with the M4 and the Slough road transport network
* Look at infrastructure to support ultra-low emission freight through the Slough Electric Vehicle Plan
* Recommend emission standards for new commercial developments
* Promote alternative fuelling facilities such as gas & biomethane
* Support ULEV freight demonstration schemes

4.71 Freight transport is a key aspect of the Slough road transport network and contributes to the local economy. Slough is home to the largest private industrial estate in Europe (Slough Industrial Estate).

Heavy goods vehicle (HGV) mileage driven in Slough in 2016 is at similar levels to 2000, however, light goods vehicle (LGV eg. vans) mileage has increased by almost a third over the same period due to the growth in dot.com / home delivery businesses\(^58\).

While HGV emissions for the latest, Euro VI, vehicles are demonstrating significant emission improvements over previous Euro Standards (see figure 34), there has been an underestimation of the emissions caused by vans, with the latest Euro Standard vehicles only recently entering the market.

Many commercial fleet operators have strategies in place to reduce emissions through their corporate social responsibility (CSR) agendas and due to high annual mileages, many blue chip companies will keep their HGVs for only 3 to 5 years\(^59\) meaning that the cleanest, Euro VI HGVs already provide a significant share of the total HGV fleet.

Several freight companies have been successfully trialling natural gas and biomethane as an alternative to diesel. With more dedicated gas trucks entering the market, companies have found that there are significant operational cost savings from using gas and reductions in the emissions of both air pollutants and noise. John Lewis Partnership has stated that within 7 years their trunking fleet will be entirely gas\(^60\). The Government has set a reduced fuel duty rate for methane and biomethane until 2024 and also permits the emission savings from using biomethane to be included in CSR reporting. However, further work is needed to expand the refueling infrastructure available.

\(^58\) http://www.dft.gov.uk/traffic-counts/area.php?region=South+East&la=Slough
\(^59\) Freight Transport Association (FTA)
\(^60\) Presentation, ADBA, 2017
Many organizations are finding that the use of plug-in car derived vans can be cost effective, however, while there are several gas alternatives available in the LGV market, the availability of plug-in LGV models is still limited and needs encouragement to grow this market.

4.72 SBC will work in partnership with the freight industry to reduce vehicle emissions where feasible, including:

- Assess the feasibility of introducing a CAZ in the Borough for lorries and vans
- Seeking opportunities to increase the take-up of alternative fuels and technologies by HGV and LGV operators by supporting projects for alternative refueling infrastructure such as natural gas and biomethane.
- Promote electric delivery vehicles and infrastructure through the Slough Electric Vehicle Plan
- Promote sustainable emission criteria in public sector purchasing decisions
- Using the Air Quality & Planning Technical Guidance to ensure new commercial developments incorporate facilities for ultra-low emission vehicles, such as electric charging points and minimum Euro emission standards for fleet vehicles
- Working with Highways England to support freight emission reduction initiatives
- Working with commercial fleet operators to use whole-life costing during vehicle procurement to promote the economic as well as environmental and health benefits from low emission HGVs and LGVs.
- Work with freight organizations to look at alternatives to diesel powered refrigeration units
- Encourage both the public and private sector to consider freight vehicle movements through Delivery Service Plans.
- Look at HGV routing to avoid AQMAs
- Encourage more freight to be transported by rail for long-haul journeys.
4.8 M4 Motorway

4.81 Highways England is the government company charged with operating, maintaining and improving England’s motorways and major A roads (‘the Strategic Road Network’) including the M4 motorway. Through the Road Investment Strategy, the UK government has allocated a ringfenced £100 million for an Air Quality Fund available through to 2021 for Highways England to help improve air quality on its network. This is to meet the dual vision of the Road Investment Strategy of not only protecting the environment but also improving it, including air quality.

4.82 SBC has designated an AQMA along the M4 corridor and will be working in partnership with Highways England to implement measures to reduce the impact of emissions from the motorway traffic on the affected communities.
5 Delivery & Communications Plan

SBC will:

- Produce an integrated Delivery Plan as part of the final LES, identifying key roles and responsibilities and timescales
- Produce an up to date Air Quality Action Plan (AQAP) for all Slough AQMAs by 2019
- Produce an effective Communication Plan in partnership with Public Health to promote key messages and measures in the LES
- Monitor the implementation of measures and their success based on appropriate ‘success’ criteria
- Review the measures in the LES on an annual basis
- Keep appraised of current and upcoming funding opportunities to support LES

5.1 Delivery Plan

As part of the final LES, SBC will develop and implement a detailed Delivery Plan, outlining key roles and responsibilities for delivering measures and the timescales for delivery.

We will also update our Air Quality Action Plan (AQAP) by 2019 to cover all Slough AQMA and include specific low emission measures outlined in the LES within the update AQAP.

5.2 Communication Plan

5.21 SBC believe that it is essential to raise awareness of the impacts of air pollution, including vehicle emissions, on health and also measures that can help reduce emissions and improve air quality. In partnership with Public health we will produce a Communication Plan to accompany the LES, highlighting key messages and measures that will be delivered. The Communication Plan will be informed by guidance on this issue, including NICE Guidelines – ‘Air pollution: outdoor air quality and health’\textsuperscript{61} and DEFRA guidance – ‘Air Quality: A Briefing for Directors of Public Health’.\textsuperscript{62}

5.22 Enabling SBC to adopt a robust and effective local approach that will complement the national strategy from the government is the key aim of the communication plan.

The communication plan will focus on both short term and immediate messaging for peaks in air pollution, as well as longer term engagement strategies to amalgamate the local community. It will also tie in with key local and national campaigns which both directly and indirectly lead to a reduction in congestion and emissions. For example nation walk to work day, cycle to work day, Slough half marathon and national clean air day.

\textsuperscript{61} \url{https://www.nice.org.uk/guidance/ng70/chapter/Recommendations#awareness-raising}
\textsuperscript{62} \url{https://laqm.defra.gov.uk/assets/63091defrairqualityguide9web.pdf}
As part of the customer facing communication work we will also be integrating an air quality section to the new Slough Public Health ‘One You’ website. This page will serve to be the community facing source of information for everything to do with air quality. This will include keys facts and information, alerts, downloadable resources and campaign related information. It can also be used to inform vehicle users of the measures they can take to reduce their emissions by travel planning and vehicle choice.

Short term and immediate public health messages will enable the public to reduce their personal exposure by avoiding areas of higher pollution; this is beneficial for the general population and those with existing health conditions. Examples of successful implementation of health communication include air quality services such as airTEXT, airALERT and ‘Know and Respond’. All of these services provide free information about the quality of outdoor air they breathe. The consideration of measures that foster awareness of the effects of air pollution in the local population can enable local residents to make informed decisions on how to reduce their exposure and if required, to better manage their health conditions.

The communication plan within the Slough strategy will follow the six principles for public communication about air pollution based on qualitative research in 2013 for Defra.

A. Explaining what air pollution is: Using information about what particulate matter and other air pollutants are made of and where they can go to get air pollution onto the local agenda – not statistics about health consequences.
B. Helping people understand how they can protect themselves: Without raising public concern about air pollution unless there is clear and ample information to satisfy people’s desire to do something to reduce their exposure.
C. Explaining the health impacts: Focusing on what is known for certain about the health consequences of air pollution.
D. Making it local: Talking about air pollution as a problem linked to specific places within Slough, not just as a general problem of the atmosphere.
E. Explaining how individuals can make a difference: Keeping the focus on practical improvements – not long-term solutions.
F. Demonstrating leadership and empower communities, instead of simply expecting individuals to change their behaviour. Utilising the council, as an exemplar organisation to support others to follow in our steps.

We will also investigate the potential of running a Clean Air Recognition Scheme to help amalgamate local groups, organisations and businesses. This scheme will allow us to recognise and reward positive local community efforts of improving air quality and reducing emissions. It will also enable us to provide technical support and advice and provide a measure to gauge their efforts and impact.

This strategic partnership approach to the communication plan will prove vital when attempting to reach the widest audience possible. These local groups, organisations and businesses have an important role to play by introducing incentives for staff to walk or cycle to work, take up car sharing or work from home, or spreading key messages within the community. This element could form a Clean Air Partnership for Slough.
Everyone will need to take some action if we are to significantly improve air quality. While the impact of the individual household or business may be small, the combined impact of actions taken by the local authority, large and small businesses and individuals could be great.

**Clean Air Recognition Scheme**

SBC will seek to work with key stakeholder partners to develop a Clean Air Recognition Scheme to promote and recognise community activity to reduce road transport emissions. The scheme will look at categories, including schools, taxi driver, public transport operators, freight operators, business and local communities, and set criteria to achieve Clean Air Status. Subject to funding, this scheme will be outlined in detail in the final LES.

**5.3 Monitoring & Review**

The LES details policies and measures that will be implemented up until 2025. As part of the Delivery Plan we will develop ‘success criteria’ which will be used to monitor and measure progress on delivering the LES. This information and any changes in our understanding of air quality and health, national policy and legislation and effective emission reduction mechanisms will be used to review the LES at appropriate intervals and update the LES accordingly.

**5.4 Funding Opportunities**

SBC will ‘horizon scan’ in partnership with key stakeholders to identify suitable funding opportunities that will help support the delivery of the LES.
**Glossary of Terms**

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>AQMA</td>
<td>Air Quality Management Area</td>
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<td>AQAP</td>
<td>Air Quality Action Plan</td>
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<tr>
<td>CAZ</td>
<td>Clean Air Zone</td>
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<tr>
<td>CDV</td>
<td>Car derived van</td>
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<tr>
<td>CO2</td>
<td>Carbon Dioxide</td>
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<tr>
<td>CVTF</td>
<td>Clean Vehicle Technology Fund</td>
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<tr>
<td>DEFRA</td>
<td>Department for the Environment, Food and Rural Affairs</td>
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<td>DfT</td>
<td>Department for Transport</td>
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<tr>
<td>DPF</td>
<td>Diesel Particulate Filter</td>
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<tr>
<td>EEV</td>
<td>Environmentally Enhanced Vehicle</td>
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<tr>
<td>EU</td>
<td>European Union</td>
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<tr>
<td>Euro Standard</td>
<td>European Emission Standard</td>
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<tr>
<td>FTA</td>
<td>Freight Transport Association</td>
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<tr>
<td>HC</td>
<td>Hackney Carriage</td>
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<tr>
<td>HDV</td>
<td>Heavy Duty Vehicle ie bus or lorry</td>
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<tr>
<td>HGV</td>
<td>Heavy Goods Vehicle ie lorry</td>
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<tr>
<td>LES</td>
<td>Low Emission Strategy</td>
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<td>LEZ</td>
<td>Low Emission Zone</td>
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<tr>
<td>LGV</td>
<td>Light Goods Vehicle</td>
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<tr>
<td>NHS</td>
<td>National Health Service</td>
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<td>NICE</td>
<td>National Institute for Clinical Excellence</td>
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<tr>
<td>NO2</td>
<td>Nitrogen Dioxide</td>
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<tr>
<td>NOx</td>
<td>Oxides of Nitrogen ie a mixture of Nitrogen Dioxide, Nitric Oxide and Nitrous Oxide</td>
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<tr>
<td>OLEV</td>
<td>Office for Low Emission Vehicles</td>
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<td>PHE</td>
<td>Public Health England</td>
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<tr>
<td>PHV</td>
<td>Private Hire vehicle</td>
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<tr>
<td>PM</td>
<td>Particulate Matter</td>
</tr>
<tr>
<td>PM10</td>
<td>Particulate Matter less than 10 microns in size</td>
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<tr>
<td>PM2.5</td>
<td>Particulate Matter less than 2.5 microns in size</td>
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<tr>
<td>RCV</td>
<td>Refuse Collection Vehicle</td>
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<tr>
<td>RHA</td>
<td>Road Haulage Association</td>
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<tr>
<td>SCRT</td>
<td>Selective Catalytic Reduction Technology</td>
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<tr>
<td>TCO2</td>
<td>Total Cost of Ownership</td>
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<tr>
<td>ug/m³</td>
<td>micrograms per metre cubed</td>
</tr>
<tr>
<td>ULEV</td>
<td>Ultra Low Emission Vehicle ie below 75 g/km CO2</td>
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<tr>
<td>ULEZ</td>
<td>Ultra Low Emission Zone</td>
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<tr>
<td>WHO</td>
<td>World Health Organisation</td>
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<tr>
<td>WLC</td>
<td>Whole Life Costs</td>
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