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# **Building Scotland's Low Emission Zones**

## A Consultation

## Ministerial Foreword



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We have progressively reduced air pollution in Scotland over recent years, but poor air quality – predominantly caused by road transport – remains an issue at a number of hotspots in our towns and cities. In the Cleaner Air for Scotland: The Road to a Healthier Future (CAFS) strategy, published in November 2015, we therefore committed to ensuring that Scotland's air quality will be the best in Europe.

Improving air quality must be at the centre of the Scottish Government's transport and placemaking decision making, to ensure we maximise the real and tangible health benefits associated with cleaner air. To support this, the Scottish Government has committed to:

- with local authorities, introduce Low Emission Zones (LEZs) into our four biggest cities between 2018 and 2020 and into all other Air Quality Management Areas by 2023 where the National Low Emission Framework (NLEF) appraisals advocate such mitigation
- introduce an Air Quality Fund to support local authorities with Air Quality Management Areas to deliver transport based mitigation as identified by the NLEF
- work with the commercial and bus sectors, the Energy Saving Trust and the Low Carbon Vehicle Partnership to introduce an Engine Retrofitting Centre in Scotland to support the delivery of LEZs, creating new jobs and with the goal of winning business from outwith Scotland

Following the May 2017 local elections, several local authorities in major Scottish cities have made positive statements around LEZs, and we are encouraged to see the strong political will across local government to support the building of Scotland's LEZs.

Local authorities have longstanding expert knowledge about their air pollution challenges, and are best placed to take the lead in addressing air pollution hotspots.

However, we also recognise there must be collaboration and partnerships between Government, its agencies, local authorities, regional transport partnerships, business and industry, non-governmental organisations and the general public to successfully deliver LEZs.

We look forward to receiving your views on our questions and proposals on Building Scotland's Low Emission Zones.

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## Abbreviations

Air Quality Management Area .....	AQMA
Automatic Number Plate Recognition.....	ANPR
Cleaner Air For Scotland.....	CAFS
Clean Vehicle Retrofit Accreditation Scheme.....	CVRAS
Gross Vehicle Weight.....	GVW
Heavy Goods Vehicle.....	HGV
Intelligent Transport Systems.....	ITS
Local Air Quality Management .....	LAQM
Low Emission Zone .....	LEZ
Member of the Scottish Parliament .....	MSP
National Low Emission Framework .....	NLEF
National Modelling Framework.....	NMF
Particulate Matter .....	PM
Regional Transport Partnership .....	RTP
Traffic Regulation Conditions .....	TRC
Traffic Regulation Order .....	TRO
Ultra-Low Emission Zone .....	ULEZ

## About this consultation

Consultation is an essential part of the policy making process. This consultation on Building Scotland's Low Emission Zones gives us the opportunity to seek your opinions on issues we believe are essential to deliver a national approach that ensures robust implementation of LEZs. There has been significant scrutiny of LEZs and air quality in recent years. This consultation provides an opportunity for stakeholders and the general public to offer their views on Scottish Government proposals on key aspects of establishing LEZs in Scotland.

After the consultation is closed, all responses will be analysed and used to inform the LEZ policy making process, helping to shape the guiding principles that the Scottish Government will adopt to design, establish, and operate Scottish LEZs. We will publish responses where we have been given permission to do so.

This consultation focuses on the proposals for LEZs to improve air quality; however we believe LEZs should also act as a means to improve road network operations and tackle congestion (in tandem with other transport policies), support modal shift to active travel and public transport, support climate change mitigation and support placemaking to improve town and city spaces.

This consultation is not about:

- The design or implementation of any individual town or city-specific LEZ. Further consultation on location-specific LEZ proposals will follow in due course.
- A full review around the next phase of actions for AQMAs, although Section 4 ask for views on the actions that local or central government should consider to work in tandem with LEZs to improve air quality.
- Zero-emission zones, that restrict road access to only zero emission vehicles, although the evolution of some European LEZs has seen zero-emission zones being considered.

## Deadline

This consultation will close at 23:59 on the 28 November 2017.

## How to respond

To encourage wide participation, the Scottish Government has created a number of ways for you to engage in the consultation. You can respond online, by email or by post. The consultation will also be available in alternative formats on request, including Large Print, Braille and Easy Read.

## Response methods

**Online** To respond online, please use the Scottish Government's consultation hub called Citizen Space. You can respond in English or British Sign Language. You can save and return to your response at any time while the consultation is open, but please ensure that your response is submitted before the consultation closes at 23:59 on the 28 November 2017.

You will be automatically emailed a copy of your response after you submit it. If you choose this method you will be directed to complete the Respondent Information Form (as shown in Section 8). The Respondent Information Form lets us know how you wish your response to be handled, and in particular whether you are happy for your response to be made public.

**Email** Send us an email to [lezconsultation@transport.gov.scot](mailto:lezconsultation@transport.gov.scot) with a copy of your response, along with the Respondent Information Form.

**Post** Send your responses (within the Respondent Information Form) in English to the following address:

Environment and Sustainability  
Trunk Road and Bus Operations  
Transport Scotland  
Buchanan House, 7th Floor  
58 Port Dundas Road  
GLASGOW G4 0HF

With each of these methods, you need to include your Respondent Information Form because this lets us know how you wish your response to be handled, and in particular whether you are happy for your response to be made public.

If you wish to comment on the consultation via Twitter, please use the hashtag #lezconsultation

## Next Steps

After the consultation has closed we will analyse all the responses received and use your feedback to help inform the development of future legislation and guidance on LEZs. Where permission has been given, we will make responses available to the public at <https://consult.scotland.gov.uk/>. We will aim to publish our response and analysis to the consultation within 20 working days of the consultation closing.

## Need Assistance?

If you need support in answering this consultation or alternatively have a query about the consultation process, or a complaint about how this consultation has been conducted, you can send your query to the email, postal address or Twitter hashtag shown above.

## 1. Introduction

### Cleaner Air for Scotland and Low Emission Zones

- 1.1 Cleaner Air for Scotland: The Road to a Healthier Future (CAFS), published in 2015, is Scotland's first distinct air quality strategy. CAFS sets out how the Scottish Government and its partners propose to reduce air pollution and fulfil Scotland's legal responsibilities as soon as possible. CAFS committed to:
- A nationally consistent approach to the appraisal, design and implementation of Low Emission Zones (LEZs) through the application of a National Low Emission Framework (NLEF) in conjunction with a National Modelling Framework (NMF)
  - '...significant progress towards the revocation of all Air Quality Management Areas' by 2020. LEZs have a clear role to play in this commitment
- 1.2 The Scottish Government's Programme for Government 2017 states that, in partnership with local authorities, we will:
- introduce Low Emission Zones (LEZ) into Scotland's four biggest cities between 2018 and 2020, and into all other Air Quality Management Areas (AQMAs) by 2023 where the National Low Emission Framework appraisals advocate such mitigation
  - introduce an Air Quality Fund to support local authorities with Air Quality Management Areas to deliver transport-based mitigation as identified by the National Low Emission Framework
  - work with the commercial and bus sectors, the Energy Saving Trust and the Low Carbon Vehicle Partnership to introduce an Engine Retrofitting Centre in Scotland to support the delivery of LEZs, creating new jobs and with the goal of winning business from outside Scotland
- 1.3 In addition, the draft Climate Change Plan has also stated that the 'Scottish Government will evaluate the scope for urban wide LEZs with a specific focus on CO<sub>2</sub> emissions, as well as air pollution'.
- 1.4 The development of LEZs will be supported by the Cleaner Air for Scotland Governance Group<sup>1</sup> (in tandem with a selection of stakeholders). LEZs will be designed in a manner consistent with the national discussion on the NLEF<sup>2</sup> and we will use the experience of putting in place the first LEZ to inform the NLEF, which is currently being prepared by the Scottish Government.

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<sup>1</sup> The CAFS governance group membership is outlined at <http://www.scottishairquality.co.uk/air-quality/CAFS>

<sup>2</sup> Noting that the first LEZ design may not fully reflect the eventual NLEF appraisal document guidance. The Scottish Government would not expect the first LEZ appraisal to be repeated once NLEF is published.

## **Purpose of this consultation**

- 1.5 This consultation paper sets out the proposed arrangements and options to deliver consistent, well-designed and managed LEZs. Local authorities will undoubtedly aim to work in partnership with a range of stakeholders including the Scottish Government and Regional Transport Partnerships – together with industry stakeholders across bus operators, freight transport companies and taxi associations - to make the key decisions on the size, shape and scope of LEZs, given the extensive local knowledge of air pollution challenges and transport solutions across such stakeholders.
- 1.6 Section 3 outlines the proposed guiding principles for building Scotland's LEZs to address hotspots of air pollution in our towns and cities, and seeks your views on a selection of issues such as Euro emission criteria, LEZ hours of operation, enforcement, lead-in times and exemptions.
- 1.7 Section 4 seeks your views on synergistic complementary measures that local, regional or central government - in tandem with commercial fleet and bus operators should consider in conjunction with LEZs to support congestion reduction, climate change mitigation and modal shift to active travel and public transport.
- 1.8 Section 5 seeks opinions on how the Scottish Government should pay due regard to impacts across equalities, business and regulation, privacy and environment.
- 1.9 The findings from the consultation will help inform the guiding principles for Scottish LEZs. They will also help guide the design of the NLEF, which will provide local authorities with a consistent national methodology to appraise, implement and operate a LEZ.
- 1.10 In developing our plans for LEZs, the Scottish Government have been, or will seek to, actively engage with relevant stakeholders, including but not limited to Convention of Scottish Local Authorities, local authorities, Regional Transport Partnerships (RTPs), Society of Chief Officers for Transportation in Scotland, Traffic Commissioner for Scotland, business organisations including Chamber of Commerce and Federation of Small Businesses, planning groups, non-governmental organisations, freight transportation organisations (such as the Freight Transport Association and Road Haulage Association) and bus sector organisations (including the Confederation for Passenger Transport). A number of these organisations will have roles to play in the governance and delivery of LEZs in Scotland, to ensure stakeholders are involved in the co-design of LEZs as early as practicably possible.
- 1.11 We hope that as many members of the public as possible will respond to this consultation. We appreciate that some of the more technical questions in this consultation are aimed at local authorities and businesses, but we would encourage everyone to respond to any or all of those areas where you feel you have a contribution to make.

## 2. Setting the Scene

### Air quality in Scotland

- 2.1 Levels of the main transport-related air pollutants are declining with cumulative emission from nitrogen oxides (NO<sub>x</sub>) having decreased by 39% and fine particulate matter (PM) by 2% between 2007 and 2014. However, we are not meeting European limit values or Scottish Air Quality objectives at a number of locations across towns and cities in Scotland, primarily as a result of transport emissions which contribute 39.1% of nitrogen oxides emissions<sup>3</sup>.
- 2.2 The Scottish Air Quality website provides a summary of the Scottish Air Quality objectives and standards - as set out in the Air Quality (Scotland) Regulations 2000 - along with the locations of Air Quality Management Areas and a short glossary description on both PM and oxides of nitrogen e.g. the relationship between NO<sub>x</sub> and NO<sub>2</sub>.

### Air pollution and health

- 2.3 Transport-related air pollution caused by fine particulate matter (PM<sub>2.5</sub> and PM<sub>10</sub>) and gases such as nitrogen oxides (NO<sub>x</sub>) impact on human health. Air pollution can have a particular impact on the very young and old, and those with existing respiratory and cardiovascular conditions, where air pollution can exacerbate existing health conditions (especially heart disease and respiratory illnesses) of vulnerable individuals. More detail on this topic can be found in Chapter 5 of Cleaner Air for Scotland.
- 2.4 Air pollution is a health inequalities and social justice issue, given that vulnerable groups are disproportionately affected. There is a positive relationship between air quality and social deprivation, with the most socially deprived communities more likely receive a disproportionate share of poor air quality (see Namdeo & Stringer, 2008; King & Healy, 2013; Mitchell, et al 2015)
- 2.5 In 2010, the UK Government Department of Health's expert advisory committee, the Committee on the Medical Effects of Air Pollution (COMEAP) produced estimates of the burden of added mortality associated with ambient fine particulate pollution at UK level. COMEAP estimate that poor air quality shortens average life expectancy in Scotland by 3-4 months (compared to 6-7 in England and Wales), although vulnerable groups are disproportionately affected (Health Protection Scotland, 2014).

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<sup>3</sup> Transport sector contributions are outlined in Table 1 of Cleaner Air for Scotland. The Scottish Transport Statistics can be found on the Transport Scotland website, to enable comparison between transport and emissions, with the latest data available at <https://www.transport.gov.scot/publication/scottish-transport-statistics-no-35-2016-edition/>

## **Responsibilities under air quality legislation**

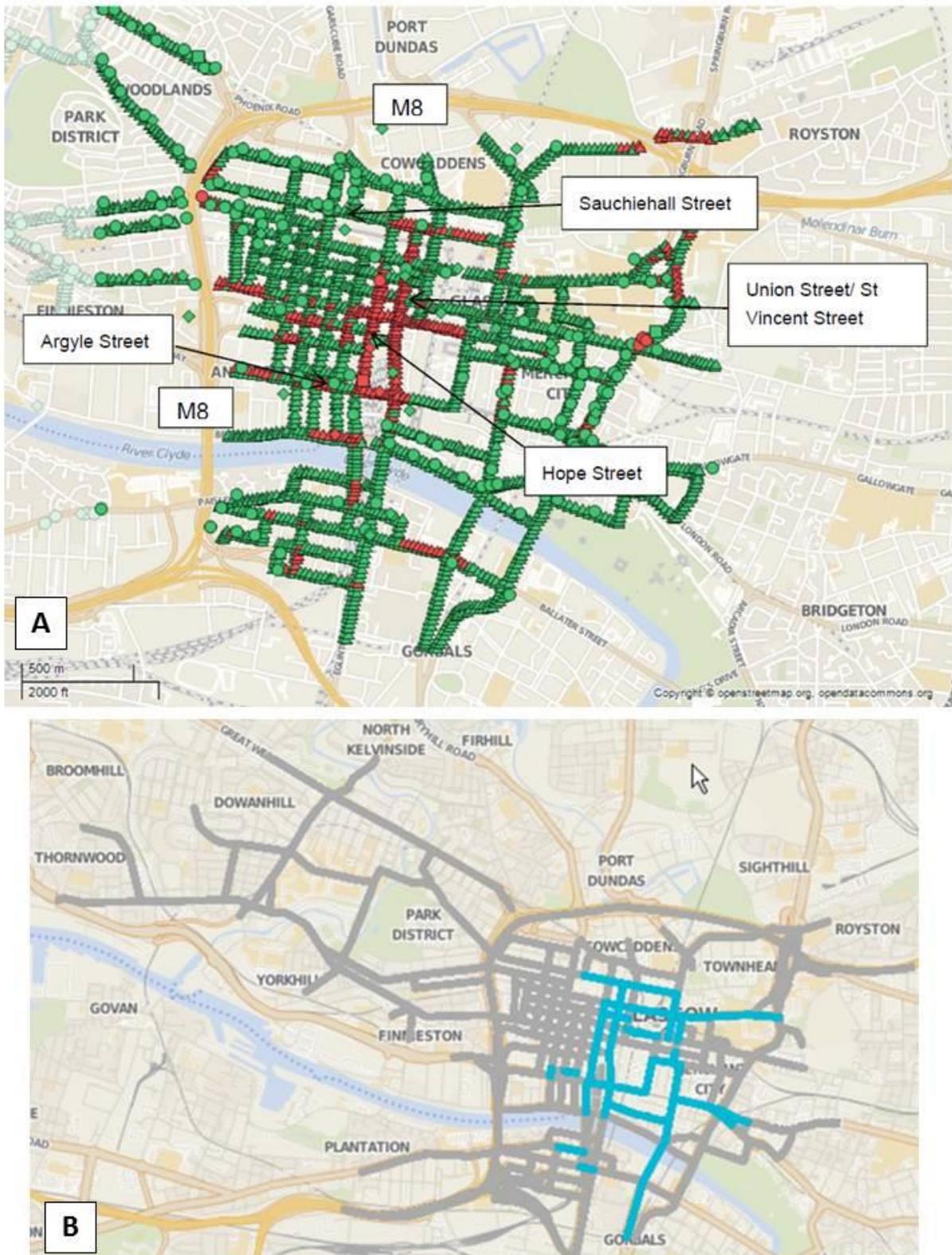
- 2.6 With respect to domestic legislation, the Environment Act 1995 and associated regulations require local authorities to review and assess air quality in their areas against objectives and standards for a range of averaging periods for a number of air pollutants.
- 2.7 Assessment of air quality is focused on locations where members of the public are regularly present and where there is exposure to the pollutant in question over the timescale for which the air quality objective is defined. Authorities are legally obliged to demonstrate that they are doing all that is reasonably possible to work towards the legal objective values. Authorities are expected to liaise with Transport Scotland, Scottish Environment Protection Agency and other relevant organisations when developing action plan measures.
- 2.8 With respect to European legislation, the Ambient Air Quality Directive 2008/50/EC requires the Scottish Government to secure compliance with the European Directive limit values, at locations where the public has access (but not including factory premises or industrial installations where legal provisions regarding health and safety at work apply, locations with no fixed habitation, and road carriageways) as soon as possible. The work of local authorities in relation to Local Air Quality Management (LAQM) makes an important contribution to actions being implemented by the Scottish Government.

## **Local Air Quality Management**

- 2.9 The LAQM system is detailed in the LAQM Policy Guidance PG(S)16 (Scottish Government, 2016). It sets out the policy framework for improving local air quality, with local authorities holding the responsibility to deliver LAQM objectives and Scottish air quality assessments.
- 2.10 A number of local authorities with Air Quality Management Areas (AQMAS) now have action plans, and the Scottish Government is working closely with these authorities, to help implement the plans and deliver air quality improvements. The majority of Air Quality Management Areas declared in Scotland are due to nitrogen dioxide (NO<sub>2</sub>) and/or particulate matter (PM) emissions from road traffic. For this reason, air quality mitigation related to transport has been a longstanding focus of AQMAS, including action on vehicle idling, traffic management (using Intelligent Transport Systems (ITS)), improved cycling uptake/active travel measures, introduction of cleaner low emission vehicles and parking policies. A number of local authorities have also outlined their interest in a LEZ (feasibility and appraisal) option within previous LAQM annual reports.
- 2.11 Scottish Government (2016) made reference to significant new component parts of the LAQM process, including the forthcoming National Low Emission Framework (NLEF) and the National Modelling Framework (NMF). The NMF, informed by robust local traffic data, will provide modelled kerbside pollution concentrations that can be assigned to emissions across the fleet. The NMF will inform traffic-related actions through the NLEF appraisal process to reduce

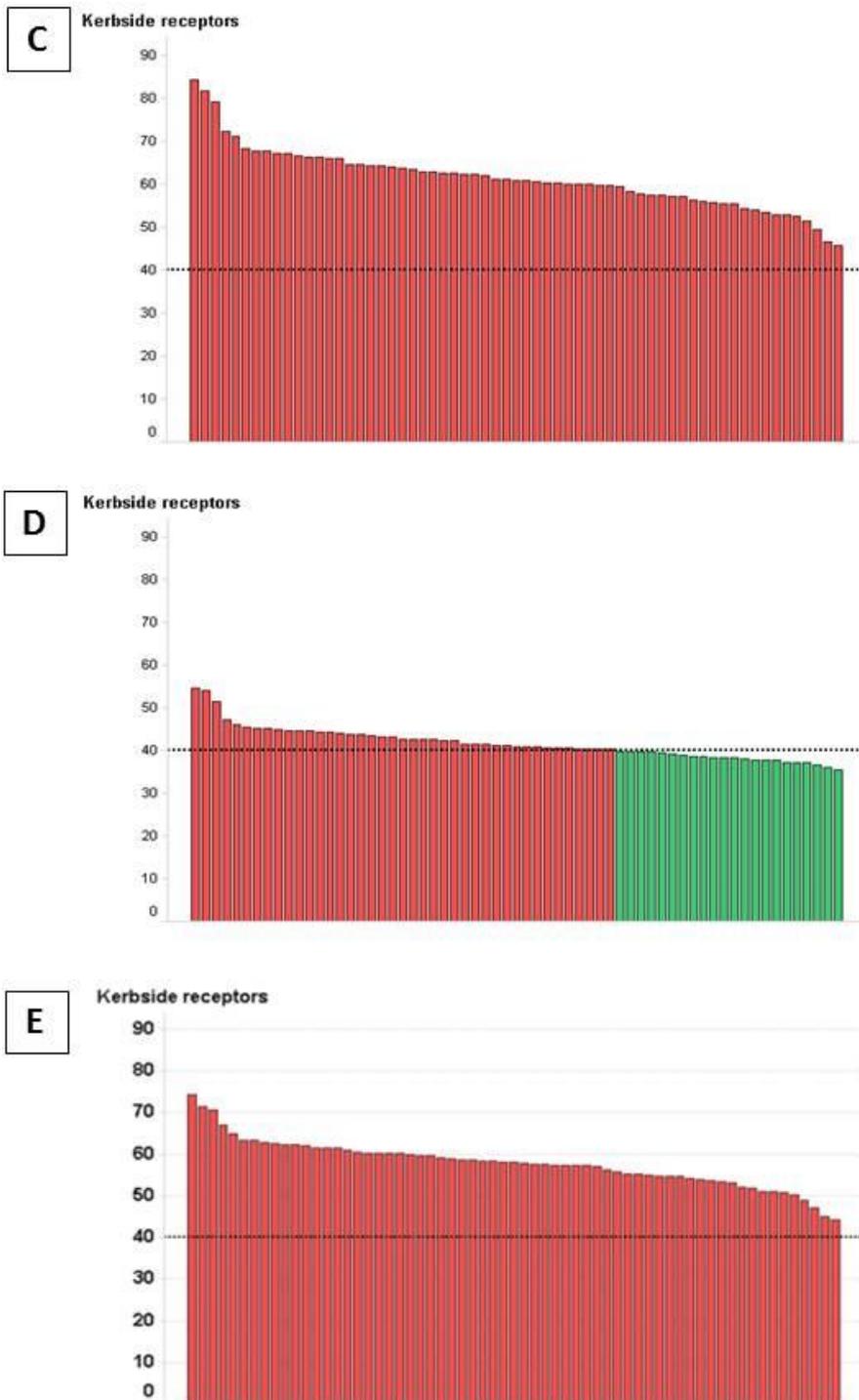
kerbside concentrations, and thus improve local air quality and minimise public exposure. As such, LEZs should be considered as an additional action to the current LAQM regime, with LEZs being put in place where NMF/NLEF evidence helps to determine both the exact extent and focus of the LEZ area, and the LEZ implementation towards achieving the LAQM objectives.

- 2.12 Early NMF outputs for a hypothetical LEZ in Glasgow are shown in Figures 1 to 3, to provide an indication of the impact that could result from a LEZ in relation to achieving the Scottish Air Quality Objective for nitrogen dioxide. The NMF outputs are based on the application of the proposed Euro emission standards (as described in Table 2), but are provided here for illustration only in relation to the topics outlined in Section 3. Whilst several scenarios in Figure 3 have focused on a hypothetical bus-only LEZ, **bus-only LEZs are not being proposed in this consultation for any location in Scotland**. Individual town or city-specific LEZs will be consulted upon in due course. As noted later in Section 4, LEZ implementation could play a key enabling role to tackle urban congestion and support the bus sector to increase patronage, by supporting actions to reduce both private car journey emissions and congestion caused by cars. The NMF modelling work, in tandem with traffic modelling, will be central to the analysis of future Scottish LEZs.



**Figure 1** – Map A shows NOx emissions within a hypothetical LEZ in Glasgow City Centre modelled for the year of 2015 using the NMF, based on 2015 observed traffic

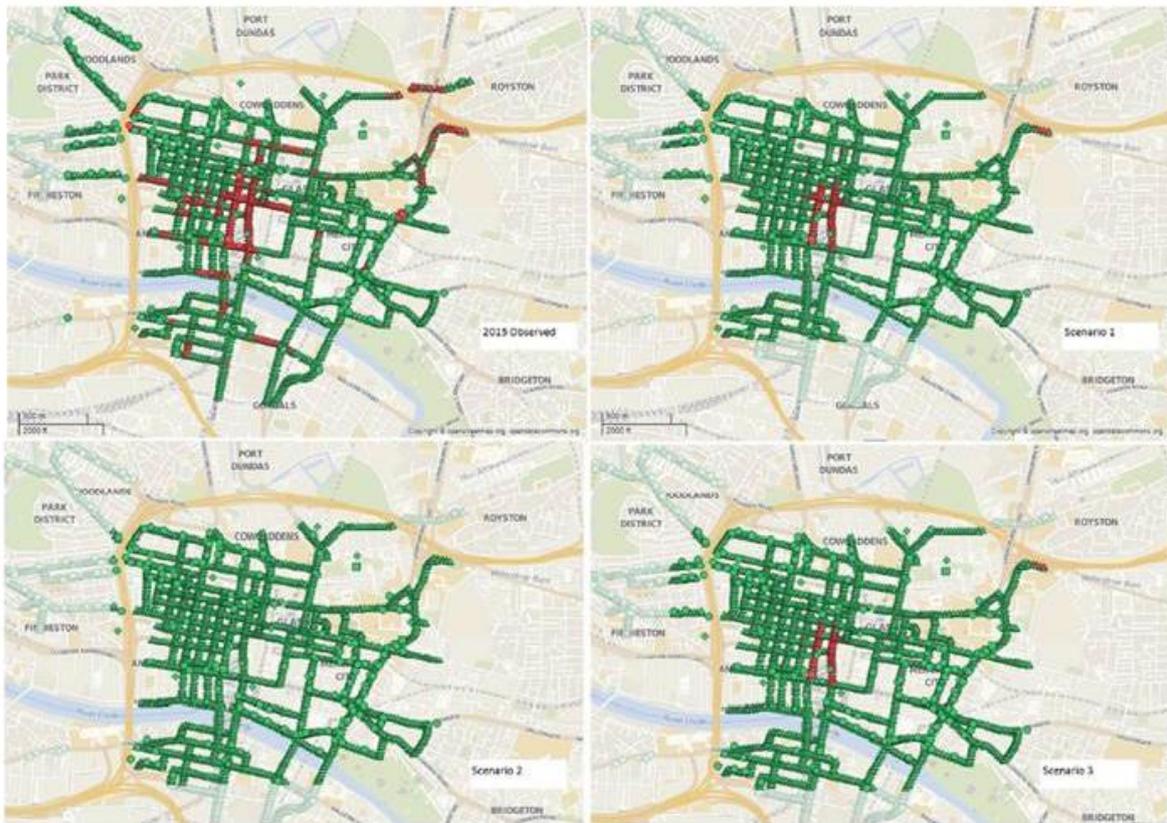
data e.g. before LEZ mitigation is put in place. The red colouring shows locations where NO<sub>x</sub> levels exceed a limit of 40 µg<sub>m</sub><sup>-3</sup>, whilst green colouring shows locations where these levels are below this limit. Map B shows the main sources of NO<sub>x</sub> emissions in Glasgow city centre. Roads shown in blue represent the locations where buses contribute more than 40% of the emissions. The roads shown in grey represent locations where private cars contribute more than 40% of the emissions. In summary, buses are the dominant source of road emissions on specific city centre streets, whilst private vehicles are the dominant source across the wider road network. Maps created using OpenStreetMap and published on OpenDataCommons. © OpenStreetMap.



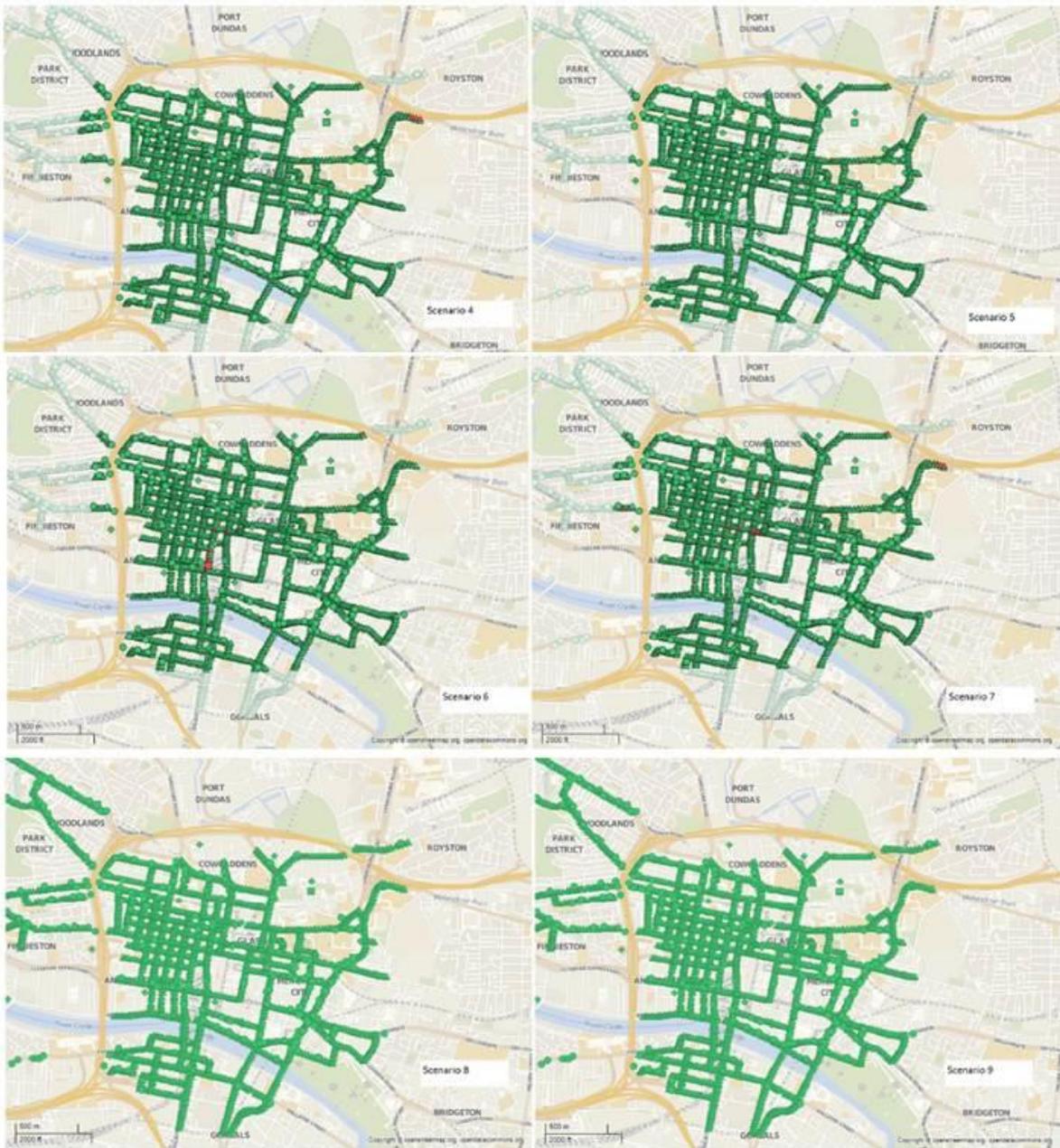
**Figure 2** – Examples of air quality impact on Renfield Street in Glasgow for a hypothetical LEZ at a number of kerbside locations, noting that altering the Euro

emission standard for various vehicle types for a specific street can result in variable outcomes. Upgrading the bus fleet only to Euro VI is predicted to reduce kerbside NO<sub>2</sub> concentrations by an average of 19 µg m<sup>-3</sup>, whilst upgrading the diesel car fleet only to Euro 6 on the same street would achieve more modest improvements in air quality, with average reduction in kerbside NO<sub>2</sub> concentrations of 3 µg m<sup>-3</sup>. Graph C represents kerbside receptor model predictions with no action; Graph D represents kerbside receptor model predictions with action focused only on buses; Graph E represents kerbside receptor model predictions with action focused only on diesel private cars. The dotted line in graphs C, D and E represent the 40 µgm-3 mean Scottish Air Quality Objective value.

Scenario	Description	Buses and Coaches	Taxis and Private Hire	HGVs	LGVs	Cars	Motorcycles
1	2018 do-nothing i.e. natural fleet renewal projection from 2015 to 2018 using Emit factors	Standard emit assumption at 2018					
2	2028 do-nothing i.e. natural fleet renewal projections from 2015 to 2028 using Emit factors	Standard emit assumption at 2028					
3	2018 hypothetical LEZ implementation based on Euro emission standards lower than those proposed in Table 2 (with no lead-in time and full enforcement immediately).	Euro IV	Euro 3 (diesel)	Euro 4	Euro 3 (diesel)	Euro 3 (diesel)	Euro 3
4	2018 hypothetical LEZ implementation based on Euro emission standards proposed in Table 2 for all vehicles (with no lead-in time and full enforcement immediately).	Euro VI	Euro 6 (diesel)	Euro VI	Euro 6 (diesel)	Euro 6 (diesel)	Euro 3
			Euro 4 (petrol)		Euro 4 (petrol)	Euro 4 (petrol)	
5	As scenario 4 but with hypothetical LEZ not introduced until 2023 in order to show impact of natural fleet renewal versus LEZ implementation	Euro VI	Euro 6 (diesel)	Euro VI	Euro 6 (diesel)	Euro 6 (diesel)	Euro 3
			Euro 4 (petrol)		Euro 4 (petrol)	Euro 4 (petrol)	
6	2018 hypothetical LEZ implementation based on Euro emission standards proposed in Table 2 for buses only. All other vehicle fleets renewed using emit factors to 2019	Euro VI	Standard emit assumption at 2019				
7	As scenario 4 but the LEZ is restricted to only Hope Street and Renfield/Union Street (only on section between Argyle Street and West Regent Street). EMIT factors for 2018 applied to vehicles in all other areas	Euro VI	Euro 6 (diesel)	Euro VI	Euro 6 (diesel)	Euro 6 (diesel)	Euro 3
			Euro 4 (petrol)		Euro 4 (petrol)	Euro 4 (petrol)	
8	As scenario 6 but with hypothetical LEZ for bus only not introduced until 2023 in order to show impact of natural fleet renewal versus LEZ implementation	Euro VI	Standard emit assumption at 2019				
9	As scenario 7 but with hypothetical LEZ not introduced until 2023 in order to show impact of natural fleet renewal versus LEZ implementation	Euro VI	Euro 6 (diesel)	Euro VI	Euro 6 (diesel)	Euro 6 (diesel)	Euro 3
			Euro 4 (petrol)		Euro 4 (petrol)	Euro 4 (petrol)	



**Figure 3a** – NMF outputs showing a variety of potential scenarios for a hypothetical Glasgow LEZ, based on work commissioned by Transport Scotland to estimate LEZ costs. The scenarios are shown in the table of page 11. The green areas represent locations where the NO<sub>x</sub> mean level would be lower than the 40 µg<sub>m</sub><sup>-3</sup> mean Scottish Air Quality Objective value if the scenario was implemented. Note that scenario 6 in Figure 3b (which focuses on buses) would still result some exceedance of the Scottish Air Quality Objective value on Hope Street and Argyle Street. The NMF calculations utilised EMIT, which is a comprehensive emissions inventory toolkit and included road traffic emissions factors from DfT and from Defra's Emission Factor Toolkit. Maps created using OpenStreetMap and published on OpenDataCommons. © OpenStreetMap.



**Figure 3b** - NMF outputs showing a variety of potential scenarios for a hypothetical Glasgow LEZ. Maps created using OpenStreetMap and published on OpenDataCommons. © OpenStreetMap.

## Transport strategy and air quality

- 2.13 The refreshed National Transport Strategy 2016 (NTS; see Transport Scotland 2016), reiterated the primacy of three Key Strategic Outcomes to be used as the guiding principles at national, regional, and local level when developing transport strategy and prioritising resources. One Key Strategic Outcome has a clear link to LEZs, which is to seek “Reduced emissions, to tackle climate change, air quality, health improvement”.
- 2.14 A full review of the National Transport Strategy is currently underway and will aim to set out an updated vision for what kind of transport system we want for the whole of Scotland over the next 20 years and how it can be delivered. The Review will seek to identify the most effective means of reducing transport’s local (air quality) and global (climate change) emissions.

## What is a LEZ?

- 2.15 LEZs were first introduced in 1996 in Sweden to improve air quality, and there are now over 250 LEZs across 15 European countries in either an operational or planning phase, as outlined in Table 1.
- 2.16 LEZs are a form of Vehicle Access Regulation Scheme which set an environmental limit on certain road spaces, to improve air quality by allowing access to only the cleanest vehicles, particularly at locations where there is public exposure. LEZs help to accelerate the move to lower emission vehicles and encourage earlier renewal of the fleet. LEZ can also act as a catalyst to the introduction of non-technological air quality mitigation, as outlined in more detail in Section 4.
- 2.17 European LEZs cover a variety of vehicle types, but there is no single model for determining which vehicles to include in a LEZ. Some European LEZs initially focus on heavier vehicles, such as HGVs, buses and coaches, before subsequently placing vehicle access restrictions on private cars. The key principles of a LEZ are outlined in Box 1.

Country	Number	Applicable vehicles	National Framework or legislation
<b>Implemented Schemes</b>			
Austria	7	HGVs	Yes
Belgium	1	All vehicles with 4 or more wheels	Yes
Denmark	4	HGVs	Yes
Finland	1	Buses and refuse trucks	-
France*	1	HGVs***	No
Germany	73	All vehicles with 4 or more wheels	Yes
Greece	1	All vehicles with 4 or more wheels	Yes
Italy	102**	Various	No
Netherlands	13	All vehicles with 4 or more wheels	Yes
Portugal	1	All vehicles with 4 or more wheels	No
Sweden	8	HGVs	Yes
England and Wales	5	Various	Yes****
<b>Planned Schemes</b>			<b>Implementation year</b>
Czech Republic	1	HGVs	2017
Norway	3	Unknown	Unknown
<b>Notes:</b>			
* The Mont Blanc Tunnel LEZ is between France and Italy but is included in Italy's LEZs. An odd-even number plate scheme restricts vehicles during high pollution events.			
** Lombardia Region LEZs, outside cities, are counted as a single LEZ.			
*** Expanded to all vehicles from 1 July 2016.			
**** Known as the Clean Air Zone Framework.			
HGVs = heavy goods vehicles, with a gross vehicle weight (GVW) > 3.5 tonnes. Where the restriction includes all vehicles > 3.5t it includes buses and coaches			

Table 1 - Summary of European Low Emission Zones, based on 2015 data from the Urban Access Regulations in Europe Website.

### Box 1 – Key principles of LEZs in Europe

The key design objectives of a LEZ are to accelerate the move to low emission vehicles, and encourage modal shift, thereby improving air quality in the area as soon as possible. The choice around vehicle restrictions is typically based on emissions per vehicle-kilometre, although Begg (2017) has recently highlighted the importance of emissions per passenger-kilometre.

A number of European LEZs have, over time, increased both the vehicle type, scope and Euro emission standard criteria (as described in Table 2) to ensure continual improvement. Key principles of European LEZ design are as follows:

- Emission modelling is required to quantify the potential impact, with some countries developing a national LEZ framework to provide a consistent approach
- Most LEZs have started with a restriction on heavy duty diesel vehicles, but over time their scope has widened to target a wider range of vehicles
- The LEZ area chosen depends on a number of factors including the magnitude of the contribution of traffic – and particular vehicle types - to the urban background, the city's road network and administrative boundaries

### **Do LEZs improve air quality?**

2.18 LEZs can be a viable option to improve air quality. The Airuse (2017) literature review found that LEZ outcomes are highly dependent on the scale, operational scope and traffic data robustness, along with the variable air quality issues that particular cities or countries are trying to address.

2.19 Gehrsitz (2017) found that German LEZs reduced average PM levels by about 4%. The Berlin LEZ was introduced over two stages, creating a 7-10% reduction in NO<sub>x</sub>, with traffic adjusted black carbon concentrations decreasing by 14-16% (Lutz, 2009; Airuse, 2017), whilst a 4% reduction in NO<sub>x</sub> concentrations was achieved across 17 German cities with LEZs. PM10 was reduced by 4% in Milan, 1-2% in Hanover, 2-4% in the Rhur area of Germany, with reductions in PM10 also detected at 22 out of 29 monitoring sites in Baden in 2008, albeit with meteorological factor contributions (derived from Sadler, 2011). However LEZs in 11 Dutch cities and London did not impact on NO<sub>2</sub> concentrations.

### **Scottish Parliament scrutiny of LEZs**

2.20 Air Quality and LEZs have been the focus of Questions, Committee discussions, and debates in the Scottish Parliament. During 2017, a Members' debate on the 14 June, led by the Scottish Green Party, highlighted the interlinkages between air quality and health as part of the National Clean Air Day 2017. The Environment, Climate Change and Land Reform (ECCLR) Committee subsequently heard evidence from cross-professional experts on the 2 May, which led to an ECCLR Committee Air Quality in Scotland Inquiry. The Inquiry received more than 50 written submissions<sup>4</sup>.

2.21 There is broad political consensus to maintain the joined-up approach across national government, local government and Regional Transport Partnerships – in tandem with commercial fleets and bus operators - to target the urban air pollution hotspots in Scotland's towns and cities.

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<sup>4</sup> <http://www.parliament.scot/parliamentarybusiness/CurrentCommittees/105527.aspx>

## Legislation, Orders and Conditions related to LEZs

2.22 There are currently three potential mechanisms that might support the creation of a LEZ:

- The Environment Act 1995 enables the Scottish Ministers to make Regulations prohibiting or restricting the access of vehicles or mobile equipment to areas prescribed in the Regulations
- The Road Traffic Regulation Act 1984 enables local authorities through the mechanism of making a Traffic Regulation Order (TRO) to prohibit or restrict the use of certain vehicles on certain roads for certain purposes including air quality management. Contravention of a TRO is a statutory criminal offence. Police Scotland lead on the enforcement of TROs (with the exception of decriminalised parking matters). The 1984 Act does not provide for enforcement of a TRO through a civil penalty
- Air quality related Traffic Regulation Conditions (TRCs) can be attached as licence conditions in respect of buses by the Traffic Commissioner for Scotland, on the application of the local authority.

### Question 1

Do you support the principle of LEZs to help improve Scottish air quality? Please be as specific as possible in your reasoning.

### 3. Building Scotland's LEZs

#### Primary LEZ objective

- 3.1 Air Quality objectives adopted in Scotland for the purpose of LAQM can be found on the Scottish Air Quality website, as noted in Section 2. The CAFS strategy also targets significant progress towards the revocation of all AQMAs by 2020, under the Scottish Air Quality objectives. Full compliance with the Ambient Air Quality Directive 2008/50/EC by 2020 will be based around the collective actions of CAFS, including the introduction of LEZs.
- 3.2 **The Scottish Government is proposing that the primary objective of LEZs in Scotland will be to support the achievement of Scottish Air Quality Objectives that focus on nitrogen dioxide and particulate matter.** As our learning around LEZs matures, the focus could widen to incorporate additional Scottish Air Quality Objectives pollutants and support the reduction of greenhouse gas emissions.

#### Question 2

Do you agree that the primary objective of LEZs should be to support the achievement of Scottish Air Quality Objectives?

If not, why not?



### **LEZ Euro emission standard criteria and vehicle scope**

- 3.3 Most European LEZs adopt the Euro-emission engine classification (known as Euro emission standards<sup>5</sup>) to set out minimum mandatory standards that some, or all, vehicle types must comply with, depending on the LEZ scope e.g. entry into the LEZ is based on the type approval emission rating of a vehicle. These vehicle standards were introduced in 1992 with Euro Class 1, with a subsequent reduction in allowable emission each time a new class was introduced, with the Euro Class 6 for cars introduced in 2015; the Euro VI for vehicles over 3.5 tonnes was introduced in 2013. The classes define emission limits for a range of pollutants, and for air quality there are limits for NO<sub>x</sub> and PM. Vehicles manufactured in 2017 must meet the Euro VI/6 standard, and the new Real Driving Emissions test procedure will enhance the Euro emission standard credibility, although LEZ entry will still be based on the Euro emission standard of a vehicle.
- 3.4 **The Scottish Government proposals for the minimum mandatory Euro emission standards for Scottish LEZs across all vehicle types are outlined in Table 2.**
- 3.5 Informed by the NMF methodology and the NLEF appraisal findings, the Scottish Government will seek to work in partnership with local authorities to complete the following, as part of a LEZ design:
- Justify and confirm the vehicle types to be included within the scope of any LEZ (from 2018 onwards), as outlined in Table 2, based on the NMF outputs in tandem with decision making on a suite of issues including exemptions and LEZ geographical area coverage, and thereafter
  - Consider the potential for a phased evolution of any LEZ vehicle scope to tighten over time, to continually improve air quality beyond the current Scottish legal objective values.
- 3.6 The Scottish Government are not proposing to define specific vehicle types to be included in a LEZ. Rather, the decision on all vehicle types to be included in a LEZ should only be decided once (i) an air quality model - that follows the NMF methodology - has been completed, to inform the development of (ii) compelling reasons for certain vehicle types to be included in a LEZ via the NLEF.
- 3.7 Emission sources which are not yet included in the LEZ scope include construction machinery and refrigerated units on large and small vans, noting that the latter are an unregulated source and are not classed in the same way as vehicle exhaust emissions that relate directly to Euro emission standards.

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<sup>5</sup> The Euro-emissions are based on Nitrogen Dioxide emissions, and use Arabic (Euro 5, Euro 6 for cars) and Roman (Euro V, Euro VI for commercial vehicles) numbering to classify the emission standard (Holman et al 2015).

Vehicle Type	Euro Category	Euro Emission Standard
Bus	M3 (GVW over 5000 kg and more than 8 seats in addition to the driver) M2 (GVW not exceeding 5000 kg, ref mass exceeding 2610 kg and more than 8 seats in addition to the driver)	Euro VI (with retrofitted diesel engines meeting Euro VI by using the Clean Vehicle Retrofit Accreditation Scheme (CVRAS))
Coach		Euro VI (once retrofitting technology becomes available and is certified by CVRAS, possibly by end of 2018). Euro IV is acceptable until CVRAS approved technology becomes available.
Minibus	M2 (GVW not exceeding 5000 kg, ref. mass not exceeding 2840 kg and more than 8 seats in addition to the driver)	Euro 6 (diesel) Euro 4 (petrol)
Taxi and Private Hire	Passenger vehicle with up to 8 seats in addition to the driver	Euro 6 (diesel) Euro 4 (petrol)
HGV	N2 (GVW over 3500 kg and ref. mass over 2610 kg) N3 (GVW over 5000kg)	Euro VI (with retrofitted diesel engines meeting Euro VI by using the CVRAS)
Large van	N1 (GVW not exceeding 3500 kg and ref. mass over 1305 kg but not exceeding 2840 kg) N2 (GVW over 3500 kg and ref. mass not exceeding 2840 kg)	Euro 6 (diesel) Euro 4 (petrol)
Small van and light commercial	N1 (GVW not exceeding 3500 kg and ref. mass not exceeding 1305 kg)	Euro 6 (diesel) Euro 4 (petrol)
Cars	Passenger vehicle with up to 8 seats in addition to the driver	Euro 6 (diesel)* Euro 4 (petrol)
Motorcycles and mopeds	Not applicable	Euro 3

Table 2 – Minimum mandatory Euro emission standards for all vehicle types in relation to LEZs. Note that the vehicle types to be included in the LEZ scope will be determined by the local authority in partnership with the Scottish Government once the air quality modelling - following the NMF methodology - has been undertaken. Details on the CVRAS can be found in Section 3. \*The Vehicle Emission Testing

Programme<sup>6</sup> from April 2016 found that a gap exists between the regulated nitrogen oxide (NOx) emissions measured under controlled laboratory conditions and on-the-road performance. The forthcoming new tests and indexes such as the Realworld Driving Emission (RDE) test for Euro 6 diesel cars will have a role to play in informing future LEZ policy.

### **Question 3a**

Do you agree with the proposed minimum mandatory Euro emission criteria for Scottish LEZs?

### **Question 3b**

Do you agree with the proposal to use the NMF modelling in tandem with the NLEF appraisal to identify the vehicle types for inclusion within a LEZ?

### **Question 3c**

Should emission sources from construction machinery and/or large or small van refrigerated units be included in the LEZ scope, and if so should their inclusion be immediate or after a period of time?

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<sup>6</sup> [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/548148/vehicle-emissions-testing-programme-web.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/548148/vehicle-emissions-testing-programme-web.pdf)



### LEZ scheme founding principle: Charging versus Penalty

3.8 LEZs across Europe typically adopt one of the following founding principles:

- Road Charging Scheme<sup>7</sup> – where vehicles that do not meet LEZ Euro emission standards (and do not meet any LEZ exemption) are allowed to enter a LEZ, but must pay a moderate daily charge, which is typically less than £20 per day
- Road Access Restriction Scheme - where vehicles that do not meet LEZ Euro emission standards (and do not meet any LEZ exemptions) are not allowed to enter a LEZ, and are subject to a penalty if they enter the LEZ, where the penalty is proportionally higher than a daily charge as noted above to incentivise compliance with the LEZ

3.9 A road charging scheme approach has recently been noted by the UK Government (2017) as one – albeit the last - option for proposed 'Clean Air Zones' in England only (see UK Government. 2017). The proposed London Ultra Low Emission Zone (ULEZ) will also require all applicable vehicles to either meet exhaust Euro-emission standards, or pay a daily charge, when travelling in central London.

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<sup>7</sup> Also known as 'road pricing'.

- 3.10 The Transport (Scotland) Act 2001 provides the legal basis for road charging, and allows local authorities, with the approval of Scottish Ministers, to establish road charging schemes. **It is not Scottish Government policy to adopt road charging and we are not proposing road charging for LEZs.**
- 3.11 In light of this, our focus is on creating a national penalty scheme for LEZs, which could be set at a standard rate for all vehicles, or a variable rate depending on vehicle class. Penalties could be set within bands with upper and lower limits, and could vary across different classes of vehicles as outlined in Table 2. An additional element to consider would be the ability to vary the penalties across local or regional areas, depending on the scale of the emission challenge.
- 3.12 A national penalty regime could also be designed to vary with time. For example, a non-compliant vehicle which is issued with a notice could be required to pay the penalty within a set number of days, with the penalty increasing in amount after a defined period e.g. akin to the approach adopted for parking charges.
- 3.13 The public body recipient of monies generated by penalties has still to be confirmed. Only a decriminalised penalty regime would allow penalties to return back to Scottish public bodies directly.
- 3.14 **The Scottish Government's preference would be a road access restriction scheme for LEZs.**

#### Question 4

What are your views on adopting a national road access restriction scheme for LEZs across different classes of vehicles?

#### LEZ hours of operation

- 3.15 The majority of European LEZs operate continuously, 24 hours a day, seven days a week, all year round, although some operate non-continuously (across set times, or only on specific days or months<sup>8</sup>). Where hours of operation are non-continuous, the timings chosen are based on evidence from local air pollution and socio-economic factors. Operating 24 hours a day, seven days a week, all year round, would maximise air quality improvement, particularly with respect to the achievement of the annual air quality objective.
- 3.16 TROs are typically limited to a maximum of 8 hours per day, unless amenity value is proven to extend the TRO up to 24 hours per day.
- 3.17 A key consideration is whether local authorities should have discretion to vary LEZ operating times to suit local conditions, or whether Scotland-wide LEZ operating times would be consistent. **The Scottish Government preference**

<sup>8</sup> See <http://urbanaccessregulations.eu/overview-of-lezs> or the Airuse (2017) report for more information on LEZ hours of operation.

would be for LEZs to operate continuously, 24 hours a day, seven days a week, all year round.

### Question 5

What are your views on the proposed LEZ hours of operation, in particular whether local authorities should be able to decide on LEZ hours of operation for their own LEZs?

#### Enforcement and Vehicle Detection

- 3.18 European LEZs use either automatic or manual enforcement regimes to detect compliance with the LEZ emission criteria. Automatic detection would utilise Automatic Number Plate Recognition (ANPR) cameras linked to a national vehicle licencing database to monitor vehicles entering a LEZ, and automatically detect vehicles which do not comply with Euro emission standards (as outlined in Table 2). Manual detection would rely on police officers or traffic wardens to check colour-coded windscreen stickers or permits.
- 3.19 An automatic detection enforcement regime using ANPR cameras would be more rigorous and effective than a manual detection approach, offer a higher detection rate of non-compliant vehicles, require fewer physical resources to operate, and would mirror existing practices already utilised in Scotland to enforce bus lanes.
- 3.20 **The Scottish Government's preference would be that ANPR cameras would be utilised as the primary basis for monitoring and enforcing LEZs.**

### Question 6

What are your views on Automatic Number Plate Recognition enforcement of LEZs?

#### Exemptions

- 3.21 Certain vehicle types and classes could be exempt from the LEZ emission criteria across all Scottish LEZs in a consistent manner, once a lead-in period or sunset period has passed. Exemptions might be influenced by some of the following considerations:
- the contribution of the vehicle journey to wider society where the exemption is linked to the use of the vehicle rather than just the vehicle type (including, but not limited to, emergency service vehicles, NHS vehicles, refuse vehicles or social care)
  - whether the vehicle is operated by a blue badge holder

- historic and specialist vehicles as defined by a 'historic' vehicle tax class
  - whether the vehicle is a military vehicle
  - specific commercial vehicle types with low frequency movements within a LEZ (including, but not limited to a snow plough or accredited breakdown and roadside recovery vehicle)
  - agricultural or construction mobile machinery with low frequency movements within a LEZ
  - the relatively low distances travelled within a LEZ for buses, coaches and commercial vehicles, compared to distances travelled out-with a LEZ
  - the unintended or unavoidable movement of non-compliant vehicles into a LEZ due to traffic diversions or road closures, where these vehicles do not normally operate within a proposed LEZ
  - Demonstration by the vehicle owner that that they would be severely financially affected by changing their vehicle to meet the LEZ minimum emission criteria, only where the vehicle operates predominantly in a LEZ (known as a 'hardship exemption' in Germany and the Netherlands, with evidence based on financial data for companies and income support levels for private persons)
  - An 'out of hours' exemption tied specifically to times when public transport is closed, to enable people to travel to late-night shift employment. This would require evidence from the vehicle owner that no alternative public transport options exist
- 3.22 Determining the exemption rules would require consideration of equality and socio-economic factors, to ensure that LEZs do not create unintended negative consequences for society.
- 3.23 The successful management of exemptions is reliant on ensuring the vehicle database used for the ANPR enforcement regime includes a list of all exempt vehicles, so that a penalty is not issued. The ability to cross reference certain specific vehicle uses or critical functions would also be important.
- 3.24 In creating rules for LEZ exemptions, a number of complex issues must be taken account of:
- The length of time that exemptions last for, so that exemptions are not open ended without periodic review of their appropriateness and applicability
  - The ability to cross reference a specific vehicle use or critical function with the ANPR enforcement (which identifies a vehicle type and Euro emission standard)
- 3.25 The Scottish Government will consider views and options to enable robust exemptions to be identified** that enable LEZs to operate in harmony with private and commercial vehicle owner needs, whilst still contributing to the achievement of Scottish Air Quality objectives. A key variation here is the

extent to which local authorities should have the discretion to identify and apply LEZ exemptions.

### Question 7a

What exemptions should be applied to allow LEZs to operate robustly? Please be as specific as possible in your reasoning.

### Question 7b

Should exemptions be consistent across all Scottish local authorities?

### Lead-in time and sunset period

3.26 The design, implementation and operation of LEZs in Europe are often associated with a lead-in time and sunset period. A lead-in time would allow commercial fleet operators and private vehicle owners time to prepare - prior to LEZ operational enforcement starting - for LEZ Euro emission standards that are shown in Table 2 that may be stricter than the Euro emission standard of their current vehicle(s). Key principles of LEZ lead-in times are outlined in Box 2.

### Box 2 – Lead in Times and Sunset Periods for LEZs in Europe

Key principles of lead-in times and sunset periods are as follows:

- Awareness raising at the policy stage is essential, with strong engagement required across all road users.
- During the operational period, prior to enforcement, a range of awareness raising measures must be implemented.
- National frameworks can support consistency of approach (the NLEF will be the Scottish approach on this issue).

3.27 The association between lead in times and sunset periods, with policy development and enforcement is shown in Figure 4, noting that the first LEZ will be put in place by 2018. In summary, the lead-in time would commence once a specific LEZ design was published and declared by a local authority.

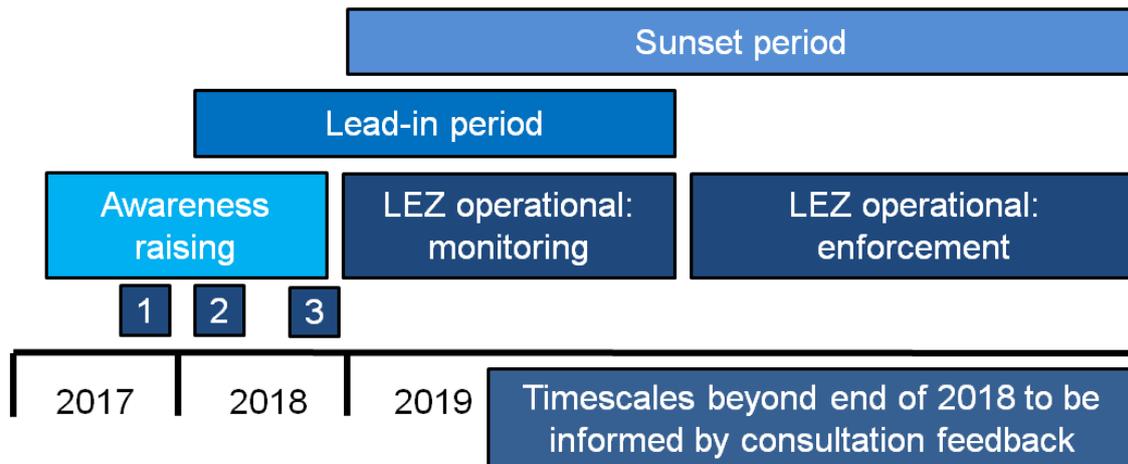


Figure 4 – Potential lead-in time and sunset period timeline. 1 = Building Scotland's LEZ's consultation; 2 = First LEZ declared by a local authority; 3 = First LEZ put in place.

3.28 European LEZ lead-in times can vary significantly. LEZs in Belgium and France sought to update their existing LEZ standards and adopted a 4 year lead-in time for this task<sup>9</sup>. A similar timeframe was also adopted for UK LEZ's, as outlined in Box 3.

**Box 3 – European city LEZ lead-in times**

The Antwerp LEZ<sup>10</sup> was developed using the Belgian national LEZ framework. In terms of key milestones, a feasibility study was produced in 2012, a council decision was made in 2013, with awareness raising starting in 2014 before the LEZ became operational in February 2017 (4 year lead-in time between 2013 and 2017).

The London ULEZ final plan launch date was March 2015<sup>11</sup> with a goal to implement the ULEZ in September 2020, which equates to a 5.5 year lead-in time. However, the lead-in time frame was subsequently reduced to 4.5 years following a change in Mayor<sup>12</sup>.

The Brighton and Hove's bus-only LEZ adopted a 4 year lead-in period from the date that the LEZ was put in place.

<sup>9</sup> An indication of lead-in time trends are sourced from <http://urbanaccessregulations.eu>. LEZ criteria can vary across cities, countries, and classes of vehicle, with outline details of LEZ schemes sometimes being revealed prior to the lead-in time starting.

<sup>10</sup>

[http://www.joaquin.eu/03/MyDocuments/Yperman\\_Introducing\\_low\\_emission\\_zone\\_in\\_the\\_city\\_of\\_Antwerp.pdf](http://www.joaquin.eu/03/MyDocuments/Yperman_Introducing_low_emission_zone_in_the_city_of_Antwerp.pdf)

<sup>11</sup> <http://www.airqualitynews.com/2015/03/26/london-ulez-plans-confirmed-for-2020/>

<sup>12</sup> <http://www.airqualitynews.com/2016/07/05/mayor-london-launches-ambitious-air-quality-plan/>

- 3.29 Preparation prior to and during a lead-in time may encompass retrofitting existing vehicles, purchase of new vehicles to replace older non-compliant vehicles, or altering the journey type or mode. It is worth noting that vehicle improvements will require an engineering or manufacturing solution that may be limited nationally by resource and equipment supply. This is where the policy development around the Programme for Government commitment to a National Retrofitting Centre will focus. Commercial businesses would also need to factor in fleet upgrades into their existing investment cycles.
- 3.30 During a lead-in period, ANPR cameras might be used to monitor the expected change in vehicle fleet Euro-standard classification. A communications plan would also be created prior to and during the lead-in period, to help inform vehicle owners that a LEZ was about to be put in place.
- 3.31 Lead-in periods would be set in a manner which did not disincentivise a fleet operator from adopting ultra-low carbon (or zero) emission vehicle.
- 3.32 Sunset periods offer a period of time (the sunset period) for vehicles operating from a commercial base or residential property within a LEZ boundary to ensure that their vehicle complies with the suggested LEZ Euro emission standards (as shown in Table 2)<sup>13</sup>. The sunset period would only apply to vehicles identified by a local authority as being within the scope of a LEZ. For example, if private cars were included in a LEZ scope, then private car owners living within a LEZ boundary with a car that did not meet the proposed Euro emission standards would be applicable for a sunset period. Typically, this would mean replacing the vehicle by the end of the sunset period. As a guide, the London ULEZ proposed a 3 year sunset period for residents living within the ULEZ boundary.
- 3.33 A consistent national standard for both lead-in periods and sunset periods (as applicable to all vehicle type shown in Table 2) would be the Scottish Governments preferred option. **The Scottish Government are seeking views and options that would enable robust lead-in periods and sunset periods to be identified**, noting that we are seeking to address air pollution in the quickest possible time.

## Question 8

What are your views on LEZ lead-in times and sunset periods for vehicle types shown in Table 2?

<sup>13</sup> London's ULEZ has suggested implementing a 3 year sunset period from the date when the ULEZ goes live for residents living in the ULEZ.



### **Alternative engine technology and retrofitting**

- 3.34 The Scottish Government provides a wide range of support related to the purchase of new low emission vehicles<sup>14</sup>, and the Switched On Scotland Phase 2 action plan roadmap was recently published by Transport Scotland in 2017.
- 3.35 The United Kingdom engine retrofitting industry tends to focus on upgrading commercial vehicles to a higher Euro emission standard. The Low Carbon Vehicle Partnership<sup>15</sup> and Energy Saving Trust<sup>16</sup> have jointly launched the 'Clean Vehicle Retrofit Accreditation Scheme (CVRAS)' '...to provide independent evidence that a vehicle retrofit technology will deliver the expected emissions reductions and air quality benefits' thus providing confidence to vehicle owners that accredited technologies provide the appropriate emissions reductions for entry to LEZs' (UK Government, 2017).
- 3.36 The Engine Retrofitting Centre in Scotland policy centres around support from the Scottish Government to facilitate the creation of new jobs in the retrofitting

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<sup>14</sup> <http://www.greenerscotland.org/greener-travel/greener-driving/grants-and-funding>

<sup>15</sup> [http://www.lowcvp.org.uk/news,solving-the-clean-air-zone-conundrum-clean-vehicle-retrofit-scheme-provides-key-component-of-defras-aq-plan\\_3674.htm](http://www.lowcvp.org.uk/news,solving-the-clean-air-zone-conundrum-clean-vehicle-retrofit-scheme-provides-key-component-of-defras-aq-plan_3674.htm)

<sup>16</sup> [http://www.energysavingtrust.org.uk/business/transport/clean-vehicle-retrofit-accreditation-scheme-cvras?utm\\_medium=pr&utm\\_source=Energy%20Saving%20Trust&utm\\_campaign=pr&utm\\_term=CVRAS](http://www.energysavingtrust.org.uk/business/transport/clean-vehicle-retrofit-accreditation-scheme-cvras?utm_medium=pr&utm_source=Energy%20Saving%20Trust&utm_campaign=pr&utm_term=CVRAS)

industry, with the goal of winning business from outside Scotland. The Engine Retrofitting Centre may be located at one specific location or within existing bus operator depots.

- 3.37 The Scottish Government proposal is to utilise the CVRA Scheme to inform any future retrofitting grant programme for commercial vehicles associated with Scottish LEZs and to introduce an Engine Retrofitting Centre in Scotland to support the delivery of LEZs.**

### Question 9

What are your views about retrofitting technology and an Engine Retrofitting Centre to upgrade commercial vehicles to cleaner engines, in order to meet the minimum mandatory Euro emission criteria for Scottish LEZs?

### Funding

- 3.38 Local authorities, Non-Governmental Organisations and fleet operators have advocated that Government should provide significant financial support toward both the design, construction and operation of LEZs, and the upgrading of commercial fleet – but not necessarily the upgrading of private cars - to meet LEZ emission criteria (as outlined in Table 2).
- 3.39 Transport Scotland commissioned an estimate of costs for a small, medium and large LEZ, based on traffic data in Glasgow collected by Transport Scotland, in tandem with bus fleet data provided by Strathclyde Partnership for Transport (SPT). A LEZ may cost approximately £3.4m for a small LEZ of 0.5 km<sup>2</sup> in size, and up to £14.9m for a large LEZ of 3.0 km<sup>2</sup> in size in year 1 to design and build. The estimated costs vary depending on the LEZ size and the provision of a hypothetical Scottish Government grant-scenario for retrofitting and scrapping of buses.
- 3.40 Specific LEZs costs per town and city would be calculated by local authorities as part of their LEZ-specific scheme NLEF appraisal.
- 3.41 The Scottish Government already provides local authorities with grant funding up to £3 million per year to cover air quality monitoring, management, annual reporting and small scale mitigation, but this funding is not associated with LEZ delivery. Funding to encourage the uptake of low emission vehicles is also already provided via the Green Bus Fund, which will be extended in 2018.
- 3.42 The Scottish Government will be considering the required level of new funding for LEZs during the 2018/19 Spending Review budget process.**

### Question 10

How can the Scottish Government best target any funding to support LEZ implementation?

### Measuring LEZ effectiveness

- 3.43 Local authorities already undertake monitoring and assessment of air quality through a network of automatic monitoring stations and diffusion tubes for both NO<sub>x</sub> and PM, with detailed requirements set out in the LAQM Technical Guidance (TG16). The development of the NMF regional and local models has also created a dense network of roadside and kerbside modelled data points.
- 3.44 **The Scottish Government proposal is to utilise the existing network of air quality sensors and diffusion tubes, in tandem with the NMF model datapoints, to evaluate the effectiveness of LEZ actions.**
- 3.45 The issue of monitoring metrics will also be considered. Measuring emissions per vehicle-kilometre is fairly typical, but the recent observation by Begg (2017) to measure emissions per passenger-kilometre is also worth considering, if robust data could be collected to underpin such a metric.
- 3.46 Monitoring and evaluating the effectiveness of LEZs in relation to the issues noted in Section 5 will also be taken into account by the Scottish Government. Collection of data to monitor fleet changes and traffic data (such as annual average daily traffic) to underpin and verify modelling work will also be important.

### Question 11

What criteria should the Scottish Government use to measure and assess LEZ effectiveness?

### Communications

- 3.47 Both private and commercial vehicle owners must be provided with sufficient information prior to a LEZ being put in place, during the lead-in time and once enforcement commences. A LEZ public awareness campaign is essential. **The Scottish Government proposal is to use the Scottish Air Quality website as the central repository for information related to LEZs**, with links to existing services such as Traffic Scotland, Traveline Scotland and local authority/RTP websites. The Scottish Air Quality website could operate in tandem with Facebook, Twitter, traditional press and radio advertising, school education campaigns and periodic conference, seminar and workshop events to ensure that vehicle owners are informed about LEZs.
- 3.48 Information provision would centre around the criteria outlined in Section 3 of this consultation, in tandem with advice on issues such as LEZ locations and geographical boundaries. A simple tool to check a vehicle's applicability to a LEZ would also be considered<sup>17</sup>. The Scottish Air Quality website could also

<sup>17</sup> See the Transport for London LEZ portal as a good practice example:  
<https://tfl.gov.uk/modes/driving/low-emission-zone/check-if-your-vehicle-is-affected?intcmp=2266>

provide advice on links to existing information on, low emission vehicle purchases, public transport, active modes of travel<sup>18</sup>, and opportunities to either forego car ownership in certain areas or access shared mobility schemes<sup>19</sup>.

- 3.49 Once LEZs are put in place, roadside signage will be required at the entry points. New roadside signage would be created by the Scottish Government, in conjunction with the Low Carbon Vehicle Partnership, with the goal of utilising consistent images and wording across and beyond Scotland.

## **Question 12**

What information should the Scottish Government provide to vehicle owners before a LEZ is put in place, during a lead-in time and once LEZ enforcement starts?

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<sup>18</sup> <http://www.greenerscotland.org/greener-travel/active-travel>

<sup>19</sup> <http://www.sestran.gov.uk/projects/tripshare/>

## 4. Complementary measures to LEZs

### Multiple benefits associated with improvements to air quality

- 4.1 LEZs must not operate in isolation to address traffic-based air pollution, but rather should operate in a partnership with the suite of transport-focused mitigation already set out in LAQM Air Quality action plans, along with new mitigation identified from NLEF assessments. Combined, these actions should represent the next phase of actions for AQMAs in relation to the CAFS 2020 compliance target and beyond.
- 4.2 LEZ design must be informed by, and seek to work in tandem with, the following:
- Transport policies including freight logistic planning of consolidation centres, the Switched On Scotland programme to increase low emission vehicle uptake and modal shift to active travel and cycling
  - The new ITS Strategy, to be published soon by Transport Scotland
  - bus policy funding streams such as the Green Bus Fund and the Bus Service Operators Grant
  - Current public transport provision, with potential for links and incorporation into contractual or licence agreements for public transport operations
  - Local development plans and local transport plans, that may be collectively seeking transport integration and reprioritisation, and modal shift away from cars into public transport and active travel<sup>20</sup>
  - Climate change mitigation policies and proposals outlined in the draft Climate Change Plan. There is a suite of ongoing actions to decarbonise our transport networks, including the current policy of switching to low-emission vehicles
  - Placemaking policies, as outlined in Scotland's Third National Planning Framework
  - Local Air Quality Management policy
- 4.3 It may be the case that revision of the LAQM action plans is required to ensure that the transport policies noted above work in tandem with, and complement, LEZ operations.
- 4.4 LEZs can also be a catalyst for improvements to transport operations in our towns and cities, in order to help address significant topical issues such as congestion and climate change. As noted in Section 2, delivering LEZ which practically address both air pollution and congestion will be a key element in the approval of new TRCs. Paragraphs 4.10 to 4.12 provide more information on the interlinkages between air pollution and congestion.

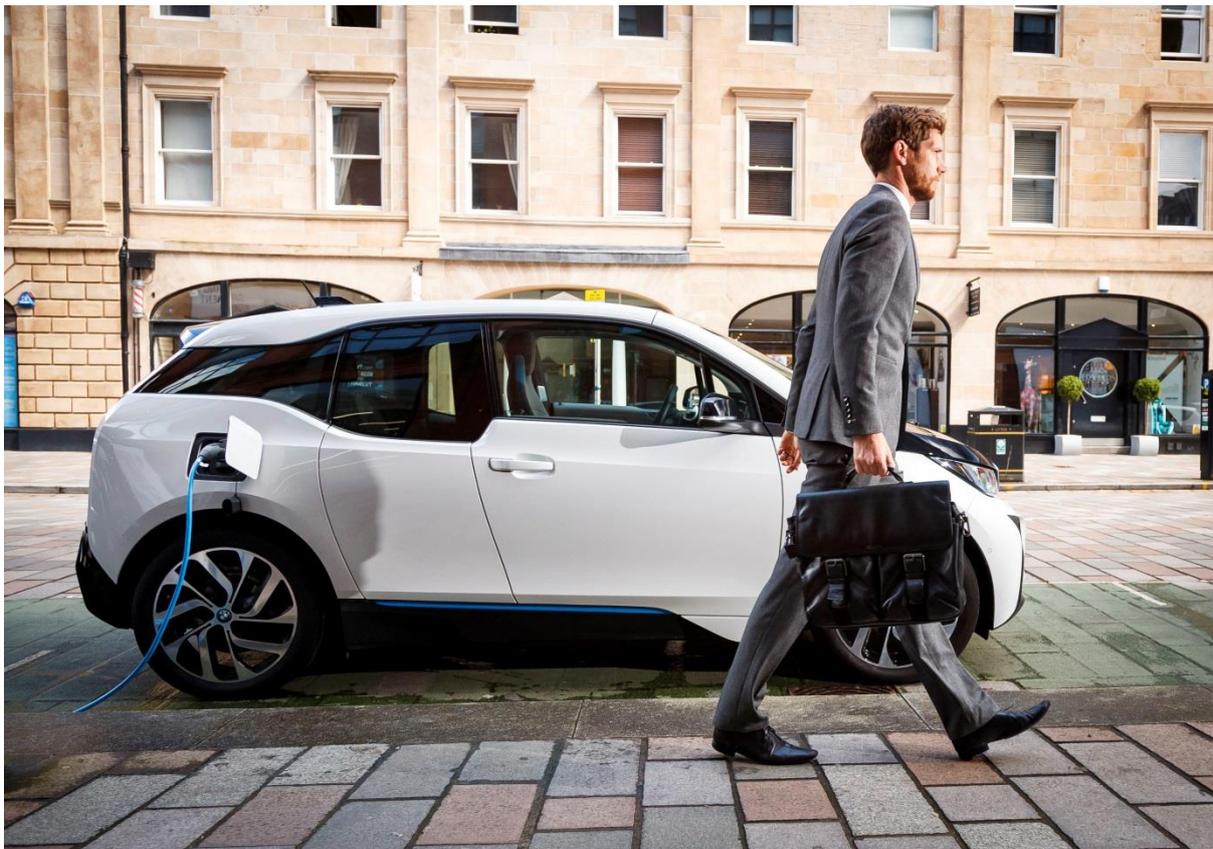
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<sup>20</sup> Noting the observations in Begg and Haigh (2017) around faster bus running speeds achieving emission reduction and supporting bus attractiveness to increase patronage

- 4.5 Delivery of LEZs will require integration into planning (placemaking) decision making. Planning professionals have a key role to play in the location, design and successful operation of LEZs. Use of the Place Standard Tool will help facilitate community engagement, and create a qualitative benchmark for improving a town or city space through the creation of a LEZ.
- 4.6 LEZs could also benefit local economies by improving air quality within towns and cities, making them more attractive places for living, working, and enjoying recreation.
- 4.7 **The Scottish Government proposal is to ensure that LEZs operate in a complementary manner with existing and future transport and placemaking policies and action plans, in order to support delivery of the CAFS 2020 compliance target.**

### Question 13

What actions should local or central government consider in tandem with LEZs to address air pollution?



### Air pollution and climate change

- 4.8 Interlinkages exist between air quality and climate change policy (for example see UK Health Alliance on Climate Change, 2016), where integrated strategies can lead to greater benefits to health, environment and the economy.
- 4.9 The Scottish Government published the draft Climate Change Plan in January 2017. **The Scottish Government proposal is to work with local authorities, regional transport partnerships and other partners and stakeholders to evaluate the scope for urban-wide low emission zones with a specific focus on climate change (CO<sub>2</sub>) emissions, as well as air pollution more generally.**

### Question 14

How can LEZs help to tackle climate change, by reducing CO<sub>2</sub> emissions in tandem with air pollution emissions?

### Air pollution and congestion

- 4.10 Interlinkages between emissions and congestion centre around improving the vehicle fleet emission profile (the technology solution) in tandem with actions to reduce congestion, increase urban traffic speeds and make bus travel in particular more attractive<sup>21</sup> (non-technology solutions). It is worth noting that a halving of average city traffic speeds leads to a 50% increase in NO<sub>x</sub> emissions from larger vehicles (Begg, 2016; Begg, 2017; Begg and Haigh, 2017). Stakeholders such as the Traffic Commissioner for Scotland and Confederation for Passenger Transport have already highlighted this view to the Scottish Government during preparation of the National Low Emission Framework.
- 4.11 Demand management measures are specific interventions or strategies that are intended to result in more efficient use of transportation networks and resources. They could reduce traffic levels in town and city roads by introducing measures to reduce the number of vehicle trips, remove the need to travel or increase the desire to use either public transport or active travel; all of which help to reduce emissions. However, transport practitioners acknowledge that attitudes and habits of travel can be deep-rooted and hard to change (RAC Foundation, 2014; Begg and Haigh, 2017).
- 4.12 **The Scottish Government proposal is to incorporate congestion management into all stages of LEZ design and operation.**

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<sup>21</sup> An additional option here is to make car travel less attractive, by reviewing the approach to parking provision in our towns and cities

**Question 15**

What measures (including LEZs) would make a difference in addressing both road congestion and air pollution emissions at the same time?

**Question 16**

Do you have any other comments that you would like to add on the Scottish Government's proposals for LEZs?

## 5. Assessing Impact

### Equality

- 5.1 In creating a consistent approach to LEZs in Scotland, the public sector equality duty requires the Scottish Government to pay due regard to the need to the following:
- Eliminate discrimination, victimisation, harassment or other unlawful conduct that is prohibited under the Equality Act 2010
  - Advance equality opportunity between people who share a protected characteristic and those who do not and
  - Foster good relations between people who share a relevant protected characteristic
- 5.2 These three requirements apply across the 'protected characteristics' of age, disability, gender reassignment, marriage and civil partnership, pregnancy and maternity, race, religion and belief, and sex and sexual orientation. The Scottish Government must also include consideration of the very young and old too, given the point raised in Section 2 about air pollution and exacerbation of existing health conditions.
- 5.3 At this early stage in our planning for LEZs in Scotland, it is difficult to determine whether significant effects are likely to arise and the aim of the Scottish Government is to use this consultation process as a means to explore the likely equality effects, including the impact on children and young people. It is also possible that LEZs could lead to positive equality outcomes, by addressing air pollution impacts in the most socially deprived communities, as noted in Section 2.
- 5.4 The Scottish Government will consider the responses from the consultation process in determining any actions needed to meet its statutory obligations. Your comments will be considered in a full Equality Impact Assessment to determine if any further work in this area is needed.

### Question 17

What impacts do you think LEZs may have on particular groups of people, with particular reference to the 'protected characteristics' listed in Paragraph 5.2? Please be as specific as possible in your reasoning.

### Business and Regulation

- 5.5 In our work to put in place the first LEZ, a Business and Regulatory Impact Assessment will analyse whether the policy is likely to increase or reduce the costs and burdens placed on businesses, the public sector and voluntary and community organisations.

- 5.6 The Urban Access Regulations in Europe Website states that the Copenhagen LEZ found only a 'few reported negative business impacts'. The most comprehensive published study on LEZs and business is the London ULEZ Economic and Business Impact Assessment, which found that 'any negative impact on London's economy as a result of the ULEZ would be minor to moderate in the short to medium term (predominantly in the first year), ...and by 2025 the cost to London's economy would reduce to virtually zero...with minor to moderate positive long term effects on London's economic competitiveness' (TfL 2014a, 2014b).

### Question 18

Do you think the LEZ proposals contained in this consultation are likely to increase or reduce the costs and burdens placed on any sector? Please be as specific as possible in your reasoning.

### Privacy

- 5.7 A full Privacy Impact Assessment will be conducted to ascertain whether our proposals on delivering a consistent approach to LEZs in Scotland may have an impact on the privacy of individuals. At this early stage in our planning for LEZs, it is difficult to determine whether significant privacy effects are likely to arise and the aim of the Scottish Government is to use this consultation process as a means to fully explore the likely privacy effects.

### Question 19

What impacts do you think LEZs may have on the privacy of individuals? Please be as specific as possible in your reasoning.

### Environment

- 5.8 In relation to our plans for delivering a consistent approach to LEZs, the Environmental Assessment (Scotland) Act 2005 ensures those public plans that are likely to have a significant impact on the environment are assessed and measures to prevent or reduce adverse effects are sought, where possible, prior to implementation. At this early stage in our planning for LEZs, it is difficult to determine whether significant environmental effects are likely to arise and the aim of the Scottish Government is to use this consultation process to help explore the potential environmental effects.

**Question 20**

Are there any likely impacts the proposals contained in this consultation may have upon the environment? Please be as specific as possible in your reasoning.

## 6. Consultation Questions

Number	Consultation Question
1	Do you support the principle of LEZs to help improve Scottish air quality? Please be as specific as possible in your reasoning.
2	Do you agree that the primary objective of LEZs should be to support the achievement of Scottish Air Quality Objectives? If not, why not?
3a	Do you agree with the proposed minimum mandatory Euro emission criteria for Scottish LEZs?
3b	Do you agree with the proposal to use the NMF modelling in tandem with the NLEF appraisal to identify the vehicle types for inclusion within a LEZ?
3c	Should emission sources from construction machinery and/or large or small van refrigerated units be included in the LEZ scope, and if so should their inclusion be immediate or after a period of time?
4	What are your views on adopting a national road access restriction scheme for LEZs across different classes of vehicles?
5	What are your views on the proposed LEZ hours of operation, in particular whether local authorities should be able to decide on LEZ hours of operation for their own LEZs?
6	What are your views on Automatic Number Plate Recognition enforcement of LEZs?
7a	What exemptions should be applied to allow LEZ to operate robustly? Please be as specific as possible in your reasoning.
7b	Should exemptions be consistent across all Scottish local authorities?
8	What are your views on LEZ lead-in times and sunset periods for vehicle types shown in Table 2?
9	What are your views about retrofitting technology and an Engine Retrofitting Centre to upgrade commercial vehicles to cleaner engines, in order to meet the minimum mandatory Euro emission criteria for Scottish LEZs?
10	How can the Scottish Government best target any funding to support LEZ

	implementation?
11	What criteria should the Scottish Government use to measure and assess LEZ effectiveness?
12	What information should the Scottish Government provide to vehicle owners before a LEZ is put in place, during a lead-in time and once LEZ enforcement starts?
13	What actions should local or central government consider in tandem with LEZs to address air pollution?
14	How can LEZs help to tackle climate change, by reducing CO2 emissions in tandem with air pollution emissions?
15	What measures (including LEZs) would make a difference in addressing both road congestion and air pollution emissions at the same time?
16	Do you have any other comments that you would like to add on the Scottish Government's proposals for LEZs
17	What impacts do you think LEZs may have on particular groups of people, with particular reference to the 'protected characteristics' listed in paragraph 5.2? Please be as specific as possible in your reasoning.
18	Do you think the LEZ proposals contained in this consultation are likely to increase or reduce the costs and burdens placed on any sector? Please be as specific as possible in your reasoning.
19	What impacts do you think LEZs may have on the privacy of individuals? Please be as specific as possible in your reasoning.
20	Are there any likely impacts the proposals contained in this consultation may have upon the environment? Please be as specific as possible in your reasoning.

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## 8. Respondent Information Form

**Please Note** this form **must** be returned with your response.

Are you responding as an individual or an organisation?

Individual

Organisation

Full name or organisation's name.

Phone number.....

Address.....

Postcode.....

Email.....

The Scottish Government would like your permission to publish your consultation response. Please indicate your publishing preference:

Publish response with name

Publish response only (anonymous)

Do not publish response

We will share your response internally with other Scottish Government policy teams who may be addressing the issues you discuss. They may wish to contact you again in the future, but we require your permission to do so. Are you content for Scottish Government to contact you again in relation to this consultation exercise?

Yes

No



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