

Edinburgh Low Emission Zones - Options Appraisal

May 2021

Introduction

The indicative National Programme timeline is for LEZs to be implemented in the four largest Scottish Cities between February and May 2022. Most of the capital funding from Transport Scotland to facilitate enforcement of the scheme is available in the current financial year. At the implementation date, grace periods begin for each of the different vehicle types involved in the Scheme, to allow time to prepare. Grace periods can be a minimum of one year and maximum of four. Residents are allowed up to an additional two years. Enforcement of the LEZ begins after the grace periods expire.

Over the summer (2021) CEC will consult on the preferred scheme. Autumn and early winter will allow time for consideration of the consultation feedback and proceed through the new legal process to declare a LEZ, prior to the Local Authority or Scottish Ministers considering approval of the scheme. Both bodies have the power to call the scheme in for an *examination* which would mean the national timeline dates could not be achieved.

Appraisal Approach

The Edinburgh LEZ options appraisal described herein, has been undertaken with regard to the [National Low Emission Framework](#) (NLEF). NLEF is an **evidence-based** appraisal process developed to help local authorities consider transport related actions to improve local air quality.

The primary aim of the NLEF is to **improve local air quality** in areas where Scottish Air Quality Objectives (AQOs) are exceeded, or likely to be exceeded, and transport is identified as the key contributor. LEZ Schemes in Scotland are also mandated to reduce the contribution of traffic to local pollution.

Actions to improve air quality could potentially result in a reduction in CO₂ emissions due to vehicle owners switching to more sustainable modes of transport, hence as a secondary objective, local authorities are encouraged to consider whether actions identified through the NLEF appraisal process can help support reductions in emissions of CO₂ within their areas.

The National Modelling Framework (NMF) provides a significant proportion of the quantitative evidence required within the NLEF appraisal process. It links traffic modelling outputs with air quality modelling, to allow for consideration of the wider traffic management measures in the context of improving local air quality. SEPA have standardised data collection, analysis and presentation of model outputs for each of the four Scottish Cities delivering LEZ schemes, and have produced Air Quality Evidence reports and detailed analysis to this effect. These take account of traffic analysis from 2016, 2019 and 2020.

The Scottish Government's recently published LEZ regulations and emerging guidance is also considered as part of this appraisal.

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Key Principles and Objectives

A number of Key Principles (KPs) were considered to help develop high level outline appraisal and in further detail, the Primary and Secondary Objectives were assessed against strengths, weaknesses, opportunities, threats and related mitigations.

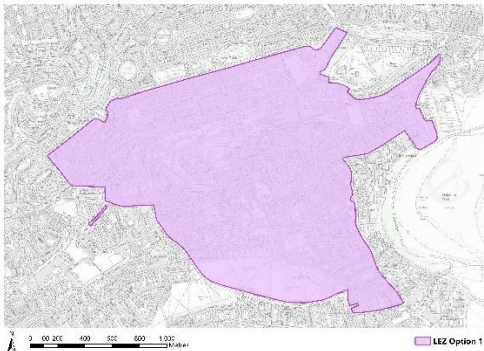
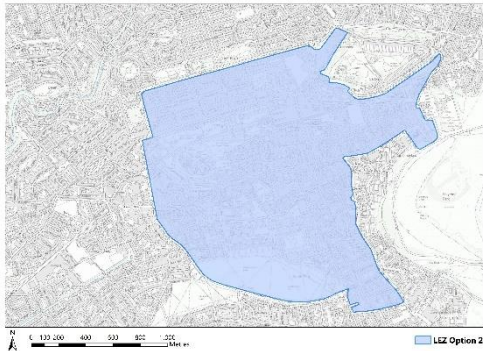
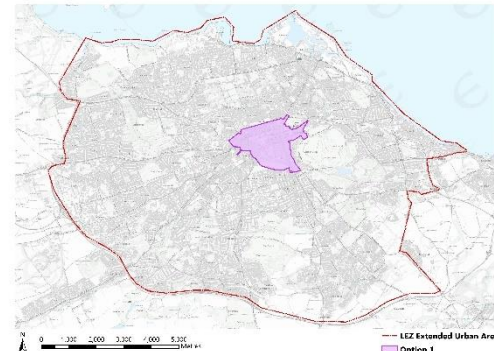
The Key Principles have been established using the NLEF process and the LEZ objectives in consultation through the governance structure of the Scheme Development – the Delivery Group which includes representatives from SEPA, Transport Scotland and SEStran.

The KPs and objectives consider LEZ impacts regarding air quality and traffic management in particular. Wider impacts are also considered (Feasibility and Deliverability) in the context of the geographical extent of the LEZ, the vehicles affected with each Option and the grace periods.

Options Appraised

This Appraisal examines the following **three options** for the LEZ scheme in Edinburgh in terms of the boundary, types of vehicles included, and the grace periods (see appendix for explanation of terms and definitions):

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	Option 1	Option 2	Option 3	
Scheme	City Centre LEZ	City Centre LEZ	Extended Urban Area LEZ with City Centre	
Description	Originally proposed City Centre boundary as presented in 2019 for consultation, with minor amendments. Grace period two years, which is different from the 2019 proposal, where one year was to be allowed for commercial-type vehicles (HGVs, LGVs, Minibus, Buses & Coaches and Taxis) and four years for cars.	Revised City Centre boundary - amended following NMF assessment of the traffic and air quality impacts.	Extended Urban Area (formally named 'Citywide boundary') is as presented in 2019 for consultation, plus either city centre option	
Boundary	<i>Original</i> 	<i>Revised</i> 	<i>Option 1 or 2</i>	<i>Extended Urban Area</i> 
Vehicle types included	<i>All</i>	<i>All</i>	<i>All</i>	<i>HGVs, LGVs, Minibus, Buses & Coaches and Taxis</i>
Grace Period (years)	<i>2</i>	<i>2</i>	<i>2</i>	<i>3</i>

2019 Consultation

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The Council ran a consultation from 27 May to 21 July 2019 regarding the proposed Low Emission Zones (LEZs) which focused on the proposed boundaries, vehicle types, grace periods and any unintended consequences. The proposed boundaries comprised a city centre boundary (referred to in this Appraisal as Option 1) and an extended urban area boundary formally referred to as the 'citywide' boundary (referred to in this Appraisal as Option 3). The consultation did not include the revised City Centre boundary (referred to as Option 2 in this Appraisal) - this has been explored in response to updated NMF assessment of traffic and air quality impacts.

Overall, findings from the consultation showed that cleaner air is important to all, but there were mixed views as to the suitability of the LEZ and to its specific aspects. General public and commercial audiences agree, albeit with differing priorities. For all however, vital questions to consider are the cost of LEZ compliance to them; the cost to life in Edinburgh (clean air, goods/services); and looking at a bigger, city and regional picture to tackle underlying issues (traffic flow, public transport, etc).

Summary of 2019 consultation responses	
City Centre LEZ (Option 1)	
Boundary	Mixed views: 54% agreed, 46% disagreed with boundary Most disagreement related to the LEZ overall – desiring a better approach, a better public transport offer, and voicing worries about the financial effect on businesses and individuals. Main issues included worry about increased traffic and pollution in neighbouring streets/parks; the desire to make the area larger; and to include New Town/up to Ferry Road.
Vehicle types	Most said each vehicle type should be included, comments were mainly about considering exemptions, like motorbikes/scooters, buses/public transport, private cars, deliveries/ tradesmen
Grace periods	Mixed views, with more acceptance for 1 year for buses and coaches and commercial vehicles, albeit only just over 50% saying 'about right' and evenly mixed views for 4 years for private cars and 5 years for city centre residents with cars.
Action taken	34% said their vehicle would comply, so no action was needed The Top 5 most mentioned actions as a result of the LEZ were: 30% use public transport more; 24% walk more; 20% bike more; 18% upgrade vehicle; and 16% change route.
Extended Urban Area with City Centre (formally referred to as 'Citywide' Boundary) (Option 3)	
Boundary	More in favour: 62% agreed, 37% disagreed with boundary Again, most comment regarding disagreement related to the LEZ and that it will negatively affect business/trade/deliveries. Main issues cited were that it should be smaller, should only be the City Centre, and should include the airport.
Vehicle types	Comments reflected the same exemptions as City Centre, but more felt all private cars should be included, 9% (v. 3% exempt)
Grace periods	Again, mixed views with an evenly mixed response for both 3 year periods between 'too short', 'about right' and 'too long'.

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Since the 2019 consultation:

- The Draft Low Emission Zones (Scotland) Regulations 2021 were presented to Scottish Parliament in January 2021 and will become law in May 2021;
- The Council published its City Mobility Plan in February 2021 which sets out the strategic approach to the sustainable, safe and effective movement of people and goods and a strong commitment to meeting the net zero carbon target by 2030 including through behaviour change, infrastructure provision and network management tools. It confirms a commitment to developing a LEZ scheme along with many other related measures such as electric vehicle charging infrastructure, expansion of Controlled Parking Zones, Workplace Parking Levy, and a 'Pay as you Drive' scheme, if necessary, to tackle congestion and support cleaner air;
- COVID-19 pandemic has and continues to have a significant impact on travel behaviour and the economy;
- Air quality improvements across the City are being realised with natural fleet turnover and bus upgrades progressed to date;
- Funding from the Scottish Government has included;
 - £2.4 million from public transport (PTP) funding, used to implement bus priority measures.
 - Bus Emissions Abatement Retrofit (BEAR) Phases 1 and 2 were awarded to allow 130 vehicles to be retrofitted across Scotland. BEAR Phase 3 funding (£9.75 million) was fully subscribed in the 2020/21 financial year. Lothian Buses obtained funding 20/21 to retrofit 188 Euro V buses. Other buses and coaches that are likely to operate in Edinburgh will also be retrofitted.
 - Sept 20 – LEZ Mobility Fund announced - offering cash incentives (Support Fund) and Travel Better vouchers (encouraging the switch to more sustainable modes of transport). Funding awards for the 20/21 financial year since September included;
 - Low income households just over £80,000
 - Small/micro businesses £282,500
 - Retrofitting (nearly all taxis) £300,000
- The NMF air quality and traffic modelling that supported the 2019 consultation has been updated by SEPA to support this Appraisal, in terms of emission analysis and interim air dispersion modelling.

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Appraisal - Summary of Conclusions

Key Principles:

- The City Centre area has the greatest magnitude of traffic related pollution problems and breaches of **statutory Air Quality Objectives (AQOs)**. Options 1 and 2 support compliance with AQOs and are supported by a **strong evidence-base** which highlights the Central Air Quality Management Area (AQMA) as the focus for targeted interventions. SEPA recommends the Central AQMA as a priority for a LEZ scheme. This evidence-based approach lies at the centre of the appraisal and the resultant *Preferred Scheme* recommendation.
- Option 3 extended urban area plus city centre boundary is expected to have limited impact on air quality when taking into consideration current fleet composition and indicative trends - air quality improvements across the City are being realised with natural fleet turnover and bus upgrades progressed to date.
- Options 1 and 2 are the most feasible and deliverable taking account of the timescales for implementation and the funding available:
 - Option 3 is the least **deliverable** due to scale of proposals and limited timescale in which to deliver key infrastructure. Development of LEZ schemes are supported by grant funding from Transport Scotland, which must be spent in the financial year 21/22, to meet workstream objectives
 - Option 3 is the least **feasible** due to revenue budgetary implications for the Council in respect to operational costs. The penalty charge approach for Scottish LEZs could be offset by any revenue collected from penalty charges; however, this is likely to be limited due to the deterrent nature of the scheme. Option 1 and 2, with moderate infrastructure quantities, are preferred for minimising operational costs.
- Opportunities to **align with Edinburgh City Centre Transformation (ECCT)** are maximised in Options 1 and 2.
- Option 3 – extended urban area boundary has least impact on meeting this Appraisal's Key Principles and Objectives.

Primary Objective:

- Option 1 is preferred over Option 2 for delivering **air quality improvement** benefits since it includes a wider population and a larger portion of the City Centre, including **greater coverage of the Central AQMA**, highlighted by SEPA as LEZ priority. Future (NMF) scenarios analysis predicts any modelled air quality impacts, related to traffic displacement for Option 1, are short-lived.

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Secondary Objectives:

- Option 1 is preferred over options 2 and 3 to support positive **behaviour change (modal shift from private car)**, since it includes a wider population and a larger portion of the City Centre where interventions to **reduce car dominance will have the greatest cumulation of positive impacts**, in tandem with other measures (e.g. Controlled Parking Zone, Workplace Parking Levy, and other potential demand management initiatives, such as 'Pay as you Drive').
- Option 1 is preferred over options 2 and 3 for the **contribution towards net zero** greenhouse gases target which will predominantly occur as a result of a shift to sustainable travel modes, rather than from fleet compliance.
- All options will require the implementation of **network management mitigation measures**:
 - Localised traffic network impacts modelled for option 1, are short term, effect a smaller population and not present in the future year scenario.
 - However, pre-existing localised modelled exceedances are exacerbated, effect a larger population and continue to show exceedances in the long term if option 2 is selected.
 - Option 2 has the potential to conflict with development of the City Centre (CCWEL) strategic Active Travel corridor, with increase vehicular demand expected on same parts of the network.
- All option impacts can be limited via a 2-year grace period.

Preferred LEZ Scheme Recommendation:

Option 1 – City Centre (original boundary) is recommended as the preferred LEZ scheme boundary. It is also recommended that all vehicles be included in the Scheme and that a grace period of 2-years should apply.

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DETAILED APPRAISAL

Summary of Key Principles and Objectives

Key Principles (KPs)	
<p>KP1 Improve Air Quality</p> <ul style="list-style-type: none"> KP1.1. Compliance with statutory Air Quality Objectives KP1.2. AQ Improvement in Central AQMA KP1.3. AQ Improvement in other AQMA KP1.4. Complementary Measures KP1.5. General Fleet Compliance Trends 	<p>KP3: Feasibility and Deliverability</p> <ul style="list-style-type: none"> KP3.1 Impact Assessment <ul style="list-style-type: none"> KP3.1.1 Equality, Health and Wellbeing and Human Rights KP3.1.2 Economic including socio-economic disadvantage KP3.2 Costs <ul style="list-style-type: none"> KP3.2.1 Implementation costs KP3.2.2 Operational Costs KP3.2.3 Associated Cost KP3.4 Design principles <ul style="list-style-type: none"> KP3.4.1 Street clutter KP3.4.2 Heritage impact KP3.4.3 Enforcement system design KP3.4.4 COVID-19 impact KP3.5 Communications & Engagement <ul style="list-style-type: none"> KP3.5.1 Scheme complexity KP3.5.2 Public opinion
<p>KP2: Evidence-based, targeted approach</p> <ul style="list-style-type: none"> KP2.1. NMF Assessment KP2.2. NMF Reporting KP2.3. Detailed analysis with Spotfire software KP2.4. Taking account of COVID-19 impacts 	<p>KP4: Strategic Placemaking & Sustainable Travel</p> <ul style="list-style-type: none"> KP4.1 Placemaking KP4.2 Mobility & Transport KP4.3 Climate Change
Objectives	
<p>Primary Objective</p> <ul style="list-style-type: none"> P1. Improve Air Quality - Contribute towards reduction of NO_x emissions 	<p>Secondary Objectives</p> <ul style="list-style-type: none"> S1. Reduce Carbon Emissions S2. Network Management S3. Behaviour Change

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<p>KP1: Improve Air Quality</p> <p><i>KP1.1 Compliance with statutory Air Quality Objectives</i></p> <hr/> <p><i>KP1.2. AQ Improvement in Central AQMA</i></p>	<p>Air quality improvements across the City are being realised with natural fleet turnover and bus upgrades progressed to date (<i>Ref. CEC Air Quality Annual Progress Report (2021)</i>). However, the City Centre area has the greatest magnitude of traffic related pollution problems and breaches of the Air Quality Objectives (AQO). A targeted LEZ City Centre intervention is required. See Complementary measures KP1.4.</p> <hr/> <p>SEPA’s Initial Air Quality Evidence report (2019) supports development of a LEZ in Edinburgh (ref) to address breaches of the Air Quality Objectives. The report recommended a LEZ covering the Central AQMA be investigated further.</p> <p>The need to reduce harmful levels of air pollution as quickly as possible remains a priority (Ref. emerging LEZ guidance), therefore a City Centre LEZ should be progressed as a priority.</p>	<p>Air quality improvements have been realised across the whole of the City. (See left.)</p> <p>Amendment of Air Quality Management Area (AQMA) order for the St John’s Road AQMA is being progressed due to the <i>hourly</i> Air Quality Objective being met for the past four consecutive years.</p> <p>Revocation of the Inverleith Row (Ferry Road) and Great Junction Street AQMAs is also being considered due to compliance with the statutory AQO for the past two and three years respectively.</p> <hr/> <p>A LEZ for the City Centre must be included in an Edinburgh scheme. The addition of an Extended Urban Area LEZ that affects all vehicles except cars, will have limited added air quality benefit (see KP1.5).</p>	<p>Further improvement from Extended Urban Area LEZ on the Central AQMA will be limited due to geographical differences.</p> <p>Limited additional benefit from bus and coach sector as majority already impacted by the City Centre boundary. High percentage of HGV in traffic found on arterial routes.</p> <p><i>Note</i> Cars are not included in the Extended Urban Area boundary as only a marginal improvement in pollution is</p>

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			forecasted. This is predominately due to the Euro 6 performance - tighter emissions testing criteria for the newer Euro 6c and 6d vehicles are predicted to give more pollution reduction benefit, than early Euro 6's (<i>Ref, 2019 Initial Report</i>).
<p><i>KP1.3. AQ improvement in other AQMAs</i></p>	<p>A City Centre LEZ does not significantly change predicted pollution concentrations for AQMA's away from the City Centre (e.g. St John's Road, Glasgow Road (Newbridge), Inverleith Row/Ferry Road, Great Junction Street and Salamander Street) due to displaced traffic. No new exceedances are predicted in these areas. However, it is expected air quality will improve as 'cleaner' vehicles enter the fleet quicker than natural turnover and hence emissions are reduced over time.</p>		<p>Further improvement from Extended Urban Area LEZ expected to be limited taking into consideration the impact of current fleet composition and indicative trends (see KP1.5).</p> <p>Although there is uncertainty on what travel will look like post the COVID-19 pandemic (see KP3.4.4), there is also concern about the impact on LGV owners, in particular (KP3.1.2).</p>
<p><i>KP1.4 Complementary Measures</i></p>	<p>Despite the potential for improvement by vehicle fleet changes with a LEZ, it will be difficult to meet the statutory Air Quality Objectives in some areas of the Central AQMA (<i>REF 2019 SEPA Initial Report</i>). Busy narrow streets with tall buildings will be particularly challenging. In these locations, other measures to reduce emissions will be required. It will be important to align with the Councils strategic traffic and public realm improvement projects with the LEZ work (see KP4.1 & KP4.1).</p> <p>The Council is also committed to revising the Air Quality Action Plan in 2021-22.</p>		<p>The Council's revised Air Quality Action Plan will address traffic emissions across the City but can also include targeted interventions in the other AQMAs.</p> <p>Feasibility work has been undertaken for junction improvements that would reduce traffic queueing and pollution concentrations further in the St John's Road AQMA. Part-funding has been awarded from Scottish Government to progress this work in 2021/22.</p> <p>Glasgow Road (Newbridge) AQMA was scoped outside the Extended Urban Area boundary. Feasibility work through the AQAP process highlighted targeted interventions at this location, which has already seen</p>

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<p><i>KP1.5. General Fleet Compliance Trends</i></p>	<p>All vehicle types are included in scheme, increasing overall compliance rates and supporting AQ improvements in the Central AQMA.</p> <p>Current levels of vehicle compliance across the entire Edinburgh fleet is 68%. With LEZs design to ensure a faster turnover of fleet than the natural turnover, LEZs need to be implemented in a timely manner to realise effectiveness of such a scheme.</p> <p>A targeted City Centre scheme would support this principle.</p>		<p>improvements in air quality through the installation of an urban traffic control system (MOVA).</p> <p>Commercial fleet compliance data shows potential for limited air quality improvements across the wider City area, due to high percentage of complaint HGV's and buses & coaches, which are high-emitting vehicles. The effectiveness of the Extended Urban Area LEZ could be limited.</p> <p>Below is traffic survey data obtained February 2020 for Euro VI vehicles or better (compliant vehicles);</p> <ul style="list-style-type: none"> • HGVs: 76-95% Euro VI or better • Buses & coaches: 61% operators - excluding Lothian Buses Lothian Buses commitment to be 100% LEZ compliant by the end 2021. • LGV: 48% Euro VI or better (increase from 7% in 2016) <p>LGVs could be disproportionately affected with the Extended Urban Area LEZ taking account of the level of non-compliance and the economic impacts associated with the commercial-type vehicles sector (<i>KP3.1.2.</i>) in the Extended Urban Area LEZ, in particular.</p> <p><i>Notes.</i> Majority of buses and coaches will need to upgrade with City Centre option, in any case. Taxi and private hire car compliance will be met through licensing conditions.</p>

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<p>KP2: Evidence-based, targeted approach</p>	<p><i>KP2.1. NMF Assessment</i></p>	<p>SEPA National Modelling Framework Initial Air Quality Evidence Report (2018) recommends that LEZ should focus on City Centre to maximise AQ impacts. All vehicle types to be included.</p>	<p>SEPA NMF Initial Air Quality Evidence Report (2018) considered the impact of whole City improvements in fleet. However, report recommended targeted approach on City Centre.</p>
	<p><i>KP2.2. NMF Reporting</i></p>	<p>SEPA Interim Air Quality Evidence and Analysis Report (2021) focuses on AQ impact of the City Centre boundary Options, due to traffic displacement that might arise from manoeuvres to avoid the LEZ. Traffic modelling was undertaken to inform the air quality modelling.</p>	<p>Traffic modelling for the Extended Urban Area boundary was screened out - displacement of traffic is less of an issue for the Extended Urban Area boundary, as commercial vehicles are more likely to need to upgrade their vehicles in order to continue operations.</p>
	<p><i>KP2.3. Detailed analysis with Spotfire software</i></p>	<p>Detailed analysis using Spotfire software of traffic surveys in 2016, 2019 and 2020 was undertaken by SEPA. Analysis of the bus sector shows a general pattern to eradicate the older buses from the main operator’s fleet (Euro III) however the percentage composition of Euro classes in the fleet does tend to change on a year to year basis. A Low Emission Zone will be an important tool in setting consistent standards on the environmental performance of the bus fleet.</p>	<p>Detailed analysis using Spotfire software of traffic surveys in 2016, 2019 and 2020 was undertaken by SEPA. As per above in KP1.3. commercial fleet analysis shows increasing trend in compliance and hence likely limited impact of Extended Urban Area LEZ.</p>
	<p><i>KP2.4. Taking account of COVID-19 impacts</i></p>	<p>LEZ scheme development work was considered as a part of COVID-19 impact analysis by Transport Scotland. (REF) Four identified plausible futures (with varying traffic demand and vehicle compliance levels) were considered against the NMF model assessments. The assessment work was found to be robust to variations in network conditions that may occur in a post-pandemic world. The work also concludes LEZs are still</p>	<p>Post-COVID-19 impact uncertainty is greater with addition of a Extended Urban Area boundary due to increased scale of scheme.</p>

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	required to improve AQ and protect the City Centres.		
KP3: Feasibility and Deliverability	<i>KP3.1 Impact Assessment</i>	Funding was sought from Transport Scotland to undertake a detailed Impact Assessment Study. This coupled with the Council's Integrated Impact Assessment (IIA) approach, the following information is useful for the appraisal process. <i>Note.</i> The Environment and Sustainability aspects of the IIA are covered elsewhere as major features of the appraisal.	
	<i>KP3.1.1 Equality, Health and Wellbeing and Human Rights</i>	LEZs will reduce emissions and improve air quality and in turn have a positive effect on health on everyone, particularly of those most at risk of respiratory illness including older people and children (including unborn children). This is the most significant positive impact of the LEZ and will have health and wellbeing benefits for a large population of residents, workers, and visitors to the area over a long period of time; therefore, the magnitude of the effect is substantial.	
		An added indirect impact of the LEZ may be the resulting health benefits from a mode shift from private vehicle travel to active travel or public transport modes - relevant to the City Centre LEZ.	
		Certain sectors of society could be more adversely impacted by the City Centre LEZ due to increasing costs in public transport, should operators pass any costs in upgrading/replacing their fleet onto users. Transport related businesses could also see increased prices in this regard.	The Extended Urban Area LEZ will provide wider effect for LGVs that are minibuses providing community transport services (care providers, youth groups, school groups, elderly care providers). Any impacts experienced by those providing care support could adversely affect those receiving care, for example, if the cost of care is increased.
		Carers may also own a non-compliant and be restricted for journeys within the City Centre LEZ. These impacts can be part-offset with the available grants/financial support to assist vehicles owners replace or upgrade their vehicles or by	This can be part-offset with the available grants/financial support to assist vehicles owners replace or upgrade their vehicles or by encouraging more sustainable travel (financial support also available here see S3).

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	encouraging more sustainable travel (financial support also available here see S3).		
	Low income householders, people with low literacy/numeracy, minority ethnic people (including non-English speakers) could be impacted if there is low awareness of the scheme's rules and receive a penalty charge. This is more so for car users that might be affected by the City Centre LEZ. It will be important to ensure effective communication of the scheme.		
	People with a disability who must use their car which is non-complaint may have forgone their journey to the City Centre adversely affecting opportunity to access community and leisure facilities negatively impacting on social activity. This impact is to be off-set with the financial grants available in addition to the proposal that Blue badge will be included in the list of national exemptions for LEZs across Scotland (emerging draft guidance).		
<p>KP3.1.2 Economic including socio-economic disadvantage</p>	<p>An estimation of potential economic impact was undertaken, looking at around 20,000 non-compliant vehicles in Edinburgh's travel to work area (as a reasonable near-future year projection) if all vehicles were affected. The estimated costs associated with upgrading this number of vehicles to be compliant is around £120m. This financial outlay will be significantly lower for two reasons: not every vehicle type will be subject to the LEZ, so fewer vehicles will be required to upgrade and some non-compliant vehicles will not interact with the LEZ in the first place therefore avoiding the need to be upgraded. In addition to the financial outlay required to purchase an upgraded vehicle, there are other potential economic costs associated with replacing a large number of vehicles such as consumer welfare loss and asset value loss which can be as much as £43m and £65m respectively. As before, it is unlikely that this full value will be realised but it is an impact assessment on the economy that was undertaken for the LEZ development work in Edinburgh.</p>		

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	<p>Increased economic activity for a number of sectors: second-hand car traders, vehicle scrappage, vehicle leasing operators, active-travel distributors/repairers, City car club and public transport operators through increased patronage. Although, some sectors and industries that are reliant on vehicles and have a fleet of non-compliant vehicles may be adversely affected by the LEZ and may be forced to reduce operations.</p>		
	<p>The IIA identified the potential economic costs of replacing vehicles. Private car owners will most likely be affected to a lesser degree as they are only included in the City Centre LEZ.</p>	<p>The IIA identified the potential economic costs of replacing vehicles a high priority. Commercial-type vehicles will be most significantly affected due to their inclusion in the Extended Urban Area LEZ.</p> <p>According to Federation of Small Businesses figures, Scottish SMEs are heavily reliant on cars, vans and lorries for their daily operations and travelling into work. The introduction of a LEZ would impact SMEs in different ways due to the varied nature of the businesses</p>	
	<p>The IIA also considered the reduction in the access and provision of goods/services and how businesses are impacted as they will face restrictions in how they can operate. Individuals are given fewer options as they either have to reconsider how they access the good/service or the good/service is no longer being offered. This will especially affect who are reliant on private vehicle transport but do not have access to finance to achieve compliance.</p>	<p>The wider Extended Urban Area LEZ will have more of an impact in this regard.</p> <p>Small enterprises represent over 90% of businesses in Edinburgh. Sixty three percent of companies rely upon vehicles, most likely LGVs, to deliver goods or drive to clients to provide a service, therefore, this sector where non-compliance rates are at 48% could be disproportionately affected by the Extended Urban Area LEZ.</p>	
	<p>Restricting non-compliant cars from the City Centre may cause certain members of society (lower income households) to be dissuaded from using or working in the City Centre. However, the LEZ scheme financial support funds and other</p>	<p>Vehicle users, especially LGV, bus, coach, minibus and HGV, have relatively long turnover periods, requiring users to change earlier than anticipated. The need to purchase compliant vehicles and sell/scrap their non-compliant vehicle means that the users could incur additional</p>	

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	wider council policies and support, encourage the shift to more sustainable forms of transport.		financial cost. This will also affect the City Centre LEZ, however the Extended Urban Area boundary is more extensive in geographic area.
	Through the changing environment of the city centre with less pollution, some people and businesses may be more attracted to the area, generating more economic activity.		
<i>KP3.2 Costs (see appendix)</i>	First principles are to ensure value for money in terms of capital spend and as low additional revenue cost to the Council as feasible, with a view to achieving the AQ objectives.		
<i>KP3.2.1 Implementation costs</i>	A high-level estimate of the implementation costs for enforcement infrastructure involved for a City Centre LEZ is £550k. It is expected that this cost is covered by Transport Scotland grant funding.		In addition to the costs mentioned left, a high-level estimate of the implementation costs for enforcement infrastructure involved for a Extended Urban Area LEZ is double – approximately £1m. It is also expected that this cost would be covered by Transport Scotland grant funding.
	Funding from Transport Scotland for capital investment for enforcement system is available in the 2021/22 financial year. Design, purchasing and installation would have to be receipted this financial year. The programme timeline is very challenging, with statutory consultation over the summer and legal processing towards the end of the year. Hence there are risks with the funding.		See left – in addition for the Extended Urban Area boundary, the added complication is with respect the infrastructure which would have to be installed but not operational for the longer grace period (3 years). This would incur maintenance costs, which would have to be met by the Council.
	There is ongoing dialogue with Transport Scotland on these timing issues, however targeting the City Centre LEZ may need to be a priority.		

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<p><i>KP3.2.2 Operational Costs</i></p>	<p>As Edinburgh currently has existing software and systems that could be used for enforcement of the LEZ, costs are estimated to be in the region of £400k to £700k per year.</p> <p>There will be budgetary implications for the Council in respect to these operational costs. They could be offset by any revenue collected from penalty charges; however, revenue is likely to be limited due to the deterrent nature of the scheme (see KP3.4.3). Additional or external funding support is not available to cover these costs.</p>		<p>See left. The addition of the Extended Urban Area boundary will mean increased operational costs, which will have further budgetary implications.</p>
<p><i>KP3.2.3 Associated Cost</i></p>	<p>Costs are also associated with boundary mitigation measures to deal with the potential for displaced traffic. This forms part of the Network Management Plan (<i>See Objective S2 below</i>). These would also have to be met by the Council.</p>		<p>In addition to the City Centre costs, it is expected there would be no major additional cost for the Extended Urban Area boundary in dealing with network mitigations measures. This is due to the fact that displaced traffic for Extended Urban Area LEZ would be limited due to the nature of the fleet (and the need for the majority of it to be upgraded). Also see S2 objective below. If any additional costs are identified through unintended consequences, these costs would have to be met by the Council.</p>
	<p>Other elements of the Network Management Plan will also incur costs, such as the signage and traffic signals strategy, including any scope for Intelligent Traffic Signals.</p> <p>Capital funding is expected from Transport Scotland for signage in 2022/23 financial year. Other costs will have to be met by the Council.</p>		<p>See left. Additional costs for the Extended Urban Area boundary in terms of signage are expected to be significantly higher due to the presence of the trunk road network on the Extended Urban Area boundary.</p> <p>Again, capital funding is expected from Transport Scotland for signage in 2022/23 financial year. Any other costs will have to be met by the Council.</p>

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<p><i>KP3.4 Design principles</i></p> <p><i>KP3.4.1 Street clutter</i></p> <p><i>KP3.4.2 Heritage impact</i></p> <p><i>KP3.4.3 Enforcement system design</i></p>	<p>Additional enforcement infrastructure e.g. ANPR camera in the urban realm will be minimised by use of existing poles or other infrastructure where possible. In addition, the preference to use mobile enforcement vehicles technology as an enforcement approach, reduces the need for multiple-camera infrastructure. The Edinburgh Design guidance will be adhered to.</p> <p>The World Heritage Site and conservation areas around the City Centre LEZ will be subject to the appropriate Planning considerations in relation to their design, context and impact. This may form part of a Planning Application and/or Environmental Impact Assessment.</p> <p>The (statutory) enforcement principle is to deter non-compliant vehicles. Therefore, the preferred enforcement approach is for ANPR cameras to cover main routes only, with other infringements detected by a mobile enforcement vehicle. This option ensures that financial resources are targeted where required the most (on the main routes) but provides the desired flexibility and an enhanced deterrent factor for the scheme, creating value for money.</p> <p>Financial operational burden can be mitigated through targeted approach with City Centre LEZ only.</p>	<p>Similar design principles could be applied to the enforcement of a Extended Urban Area LEZ to ensure costs are keep to a minimum. However, as air quality improvement are likely to be limited, the value of the scheme may also be limited (see KP1.5).</p>	<p>The additional implications for the Extended Urban Area boundary are limited due to lack of relevant sensitive designations in the vicinity of the boundary.</p> <p>Efficiencies in procurement and operation of new enforcement infrastructure can be considered for current projects in respect to CCTV upgrade, Smart Cities programme and bus lane enforcement work. Future proofing the use of the chosen enforcement technology provides valuable investment choice. Mobile enforcement vehicles can be used for a variety of other purposes and are easily re-deployable unlike fixed camera infrastructure.</p>

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<p><i>KP3.4.4 COVID-19 impact</i></p>	<p>When approving a scheme Local Authorities and Scottish Minister will need to take account of COVID-19 impacts and their consideration in the design (and possibly operational) phase(s) of LEZ development (Ref. Emerging Transport Scotland LEZ guidance).</p> <p>A review and amendments of the initial (2019) LEZ proposals in Edinburgh has been undertaken, in respect to potential COVID-19 impacts.</p> <hr/> <p>A two-year grace period is being proposed in-part to account for the economic recovery coming out of the COVID-19 pandemic, for all vehicle types in the City Centre LEZ. This differs to the 2019 proposal which included a 1-year grace period for commercial-type vehicles and 4-years for cars. It should be noted that residents can get up to an additional two years extension to the chosen grace period.</p> <p>This approach also supports the LEZ programme implementation by ensuring sufficient time to develop network management mitigation measures to deal with traffic displacement at the boundary of the City Centre LEZ (See S2 Threats) and encourage modal shift with private car usage (S3).</p> <hr/> <p>The assessment work undertaken for the City Centre LEZ has taken accounted of a post-COVID uncertainties, around travel demand and fleet composition changes (See KP2.4).</p>		
			<p>The Extended Urban Area element of the Edinburgh 2019 scheme proposed a 3-year grace period. This approach was deemed reasonable to allow vehicle owners time to prepare for the LEZ. Should additional time be considered necessary having respect to COVID impacts. the maximum 4-years grace period could be applied; however, they may affect the effectiveness of the scheme due to the fact that enforcement would not begin until 2026.</p> <hr/> <p>The work predominately focused on the city centres of the four major Scottish Cities.</p>

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			<p>Post-COVID-19 impact uncertainty is greater with addition of an Extended Urban Area boundary due to increased scale of scheme.</p> <p>LGV fleet has the highest proportion of non-compliant vehicles (48% compliant in 2020). Increased risk of negative impacts disproportionately felt by microbusinesses/businesses operating across wider area (see IIA KP3.1.2).</p>
<i>KP3.5 Communications & Engagement</i>	<p>Communications and engagement planning will need to take account of the national strategy and campaigning. Air Quality and health messaging to be priority with communications.</p>		
<i>KP3.5.1 Scheme complexity</i>	<p>City Centre options lend themselves to clearer communication and engagement with public and stakeholders due to simplicity.</p> <p>Streamlining the complexity of the scheme can be achieved by presenting one grace period for all vehicles included in the LEZ. This differs from the 2019 proposal, where different vehicle types had different grace periods. (Commercial-type vehicles were given one year and cars four years.)</p>		<p>The addition of the Extended Urban Area LEZ, with different vehicle types affected and grace periods, adds a level of complication for public engagement and understanding.</p> <p>Buses, coaches, minibuses, HGVs, LGVs and taxis crossing Extended Urban Area and City Centre boundaries – adds complexity in enforcement and communication of scheme.</p>
<i>KP3.5.2 Public opinion</i>	<p>An evidence based, targeted air quality intervention with small geographical area, provides a step-change approach to emissions control from the public engagement point of view. It builds wider public/stakeholder support for future evidence-backed interventions.</p>		<p>A large geographical area intervention provides less of a step-change approach to emissions control, which might undermine key principles of LEZs.</p>
<i>KP4.1 Placemaking</i>	<p>The emerging City Plan 2030 (CP2030) will set out the city's spatial strategy to 2030. One of the aims will be to realise the lifelong health benefits of walking and cycling by creating streets and public spaces for people over</p>		

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<p>KP4: Strategic placemaking, sustainable travel</p>	<p>cars and improving and expanding sustainable public transport. It will also be supportive of rationalising freight movement across the city.</p>		
	<p>City Centre options align with following policy choices in Choices for CP2030 which aim to reduce car dominance:</p> <ul style="list-style-type: none"> Choice 6 – creating places that focus on people, not cars Choice 7 – supporting the reduction in car use (focusing on protecting against additional car parking in City Centre, encouraging uptake of P&R facilities) Choice 8 – delivering new walking and cycling routes (below) 	<p>Extended Urban Area boundary addition has limited impact due to the exclusion of cars, against choices 6,7 and 8 in City Plan 2030:</p> <ul style="list-style-type: none"> Choice 7 – Extended Urban Area boundary likely to have negligible impact on modal shift away from car use beyond City Centre options, since it only applies to commercial-type vehicles and buses 	
	<p>Choices for CP2030 (Choice 16) support the provision of city-wide and neighbourhood goods distribution hubs. This policy direction will help to rationalise freight operations and support good placemaking. All LEZ options would benefit from this policy direction.</p>		
	<p>The objectives of Edinburgh’s LEZ plans aligns with objectives the Edinburgh City Centre Transformation (ECCT) programme which aim to enhance public spaces to better support life in the city, by prioritising movement on foot, by bike and by public transport.</p>	<p>The Extended Urban Area LEZ aligns less with ECCT due to the geographical differences.</p>	
	<p>Decreasing traffic supported by the combination of the Councils strategic plans, with associated cleaner atmosphere in the City may lead to higher quality of public spaces in the City. This could lead to more opportunities for businesses (employment, expenditure, human capital development) as more people are attracted to the City.</p>		
<p>The LEZ plans will have a complementary benefit to noise control policies. Quieter new (especially alternatively fuelled) vehicles and reduced traffic flows caused by modal shift towards public transport and active travel, are</p>			

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	likely to lead to a reduction in inner-city background noise. Lower noise pollution is anticipated to have health and productivity benefits.						
<p><i>KP4.2 Mobility & Transport</i></p>	<p>The Council’s newly agreed City Mobility Plan (CMP) supports the implementation of a LEZ in the City.</p> <p>Active travel and integrated transport measures are maximised through the CMP, which can address equality and connectivity issues that may arise from LEZs.</p> <p>In turn, the LEZ principles and objectives support many of the CMP measures and overall direction.</p> <p>The CMP supports the provision of city-wide and neighbourhood goods distribution hubs. This policy direction, supported by a detailed operational plan, will help to rationalise freight operations. All LEZ options would benefit from this policy direction.</p> <hr/> <p>LEZs should be considered as one part of a range of actions to make our transport system cleaner, greener and healthier. The Edinburgh scheme includes broad high-level objectives (see P1 to S3 below) around issues such as decarbonising transport, road network management, encouraging behaviour change and freight rationalisation. Other area specific transport benefits are highlighted below.</p> <hr/> <table border="0" data-bbox="763 957 1982 1339"> <tr> <td data-bbox="763 957 1335 1117"> <p>A City Centre LEZ, that includes cars, can supporting further development of the public transport infrastructure (including park and ride facilities) that encourages modal shift from the car to more sustainable means of transport.</p> </td> <td data-bbox="1335 957 1982 1117"> <p>With the addition of the Extended Urban Area LEZ, which includes commercial-type vehicles, there is less support for infrastructure development associated with modal shift from cars to sustainable travel.</p> </td> </tr> <tr> <td colspan="2" data-bbox="763 1149 1982 1339"> <p>The City Centre LEZ will further contribute to the improvement of infrastructure and facilities (including, but not limited to, cycle lanes, pedestrian pathways and park-and-ride facilities), due to modal shift from car to sustainable travel.</p> </td> </tr> </table>			<p>A City Centre LEZ, that includes cars, can supporting further development of the public transport infrastructure (including park and ride facilities) that encourages modal shift from the car to more sustainable means of transport.</p>	<p>With the addition of the Extended Urban Area LEZ, which includes commercial-type vehicles, there is less support for infrastructure development associated with modal shift from cars to sustainable travel.</p>	<p>The City Centre LEZ will further contribute to the improvement of infrastructure and facilities (including, but not limited to, cycle lanes, pedestrian pathways and park-and-ride facilities), due to modal shift from car to sustainable travel.</p>	
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	<p>The CMP includes demand management measures to restrict traffic growth (e.g. controlled parking zones, explore Workplace Parking Levy etc). Synergies with these measures are more likely with the City Centre LEZ, which addresses all vehicles.</p>		<p>There are less synergies with demand management tools with the addition of the Extended Urban Area boundary as fleet replacement is more likely with HGVs or commercial vehicles as opposed to private cars.</p>
<p><i>KP4.3 Climate Change</i></p>	<p>Decarbonising transport can be achieved through 'system wide', place-centred policies and actions, that focus on changing behaviour, provision of infrastructure to support clean and sustainable travel, and network management such as the implementation of controlled parking zones, and Workplace Parking Levy/'Pay as you Drive' Scheme as needed/subject to consultation. LEZs should also be considered as one part of this system approach.</p> <p>The Council's commitment for Edinburgh to be a net zero carbon city by 2030 and declaration of a Climate Emergency has placed sustainability and climate change at the centre of strategic and policy discussions. This has also raised the profile of Edinburgh as one of the most ambitious cities seeking to tackle climate change to deliver a more sustainable and inclusive city. The LEZ regulations set a mandatory requirement to ensure the scheme contributes towards carbon reduction measures. This is covered in greater detail below (S1).</p>		

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Objectives

The LEZ regulations oblige local authorities to include two mandatory objectives in their LEZ Scheme that relate to contributing towards meeting the statutory air quality standards (P1) and carbon emission reductions (S1) – see below.

In accordance with the draft LEZ guidance improving local air quality should be considered the primary objective.

The Council has taken on-board guidance to integrate discretionary objectives for the Edinburgh Scheme to ensure successful delivery and operation. These include Network Management (S2) and Behaviour Change (S3) matters.

Primary Objective (P1)	P1. Improve Air Quality (AQ)	<i>Contribute towards reduction of NOx emissions</i>
Secondary Objectives (S1, S2, S3)	S1. Reduce Carbon Emissions	<i>Contribute towards reduction of greenhouse gas emissions</i>
	S2. Network Management	<ul style="list-style-type: none"> - <i>Minimise the impact from traffic displacement across network</i> - <i>Complementary/mitigation measures linking with S3 (below)</i>
	S3. Behaviour Change	<i>Strategically align with sustainable transport, active travel and placemaking objectives</i>

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Appraisal – Primary Objective

P1: Improve Air Quality (AQ) *Contribute towards reduction of NO_x emissions*

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Strengths	Option 1 will improve air quality over a larger geographical area of the City Centre than the option 2. ¹	Option 2 will improve air quality over a smaller geographical area of the City Centre than the option 1. ¹	Emissions reductions over a wide geographic area
	<p>If option 1 was selected in preference to option 2, there are new exceedances predicted from modelling on the boundary (diversion route) at Chester Street/Palmerston Place in the short-term. However, in the long term (future year scenario) they are not predicted.¹</p> <p>This is due to less non-compliant traffic now needing to use the diversion route and improvements made with natural fleet turnover.</p>	<p>If Option 2 was selected in preference to Option 1, the impact on Palmerston Place and Chester Street is lower, however existing modelled exceedances are exacerbated on Lothian Road and continue show exceedances in the long term.¹ See below Weaknesses.</p>	<p>Displacement of traffic is less of an issue for the Extended Urban Area boundary, as commercial vehicles are more likely to need to upgrade their vehicles in order to continue operations.</p>
	<p>Population exposure to local air pollution can be assumed by considering the residential population of an Area. An analysis utilising data from the Council Address Gazetteer (CAG) was undertaken. The number of residential addresses was considered. Commercial addresses are also included and from a retail survey, shops are identified separately which may give an indication of exposure on the street. Details are shown below/overleaf;</p>		<p>Arterial routes are predominantly affected by this commercial type of vehicular traffic.</p>

¹ SEPA Air Modelling Interim (April 2021)

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	<p>No. of addresses;</p> <table border="1" data-bbox="412 357 781 480"> <tr> <td>Residential</td> <td>12,536</td> </tr> <tr> <td>Commercial</td> <td>4,262</td> </tr> <tr> <td>Shops*</td> <td>1,923</td> </tr> </table> <p>*included in commercial count</p> <p>The Original City Centre boundary includes a wider geographical area and greater number of residential addresses compared to the Revised boundary.</p>	Residential	12,536	Commercial	4,262	Shops*	1,923	<p>No. of addresses;</p> <table border="1" data-bbox="987 357 1317 485"> <tr> <td>Residential</td> <td>11,586</td> </tr> <tr> <td>Commercial</td> <td>3,309</td> </tr> <tr> <td>Shops*</td> <td>1,732</td> </tr> </table>	Residential	11,586	Commercial	3,309	Shops*	1,732	
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Weaknesses	<p>Likely significant increase in pollution concentrations and new model exceedances (see Appendix) on boundary/diversion route locations at Palmerston Place and Chester Street. However, the future scenario suggests these new model exceedances are not long term.¹</p> <p>Model exceedances are also predicted along Cowgate and Abbeyhill, however, concentrations are only slightly higher than Option 2.¹</p> <p>To the east and south east of the boundary there are also impacts around Queens Drive and Hope Park Terrace.¹ See S2 Network Management mitigation measures.</p>	<p>Significantly higher concentrations predicted on Earl Grey Street, Lothian Road, Princes Street (west end), South Charlotte Street, when compared to the option 1, however, these are not new exceedances. There are existing model exceedances, especially on Lothian Road and these are still present in the future scenario. Therefore, they will take longer to resolve.¹</p> <p>Continued model exceedances are predicted along West Port/South Bridge/Leith Street, although concentrations are only slightly higher than Option 1.¹</p>	Displacement of traffic is less of an issue for the Extended Urban Area boundary, as commercial vehicles are more likely to need to upgrade their vehicles in order to continue operations.												
	The number and types of addresses from CAG (Council Address Gazetteer) were analysed for the streets most impacted from displaced traffic, following implementation of the City Centre LEZ. Details are shown below/overleaf;														

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Opportunities	<p>If Option 2 boundary chosen over Option 1, the boundary could be expanded in the future, if AQ evidence base supports the need. Also applies to option 1, where boundary could be reduced if necessary.</p> <p>Arterial routes will also see AQ improvements as vehicles travelling to the City Centre become complaint faster than natural turnover of the fleet.</p> <p>Buses are a major contributor to emissions due to their repeat trip nature and high-emitting vehicle. The majority of regular buses on the road network operate in the City Centre LEZ and will therefore be brought up to a complaint standard, across the City.</p>		<p>Extended Urban Area boundary unlikely to change since bypass already geographically discrete.</p> <p>Buses are a factor to air quality issues on arterial routes, however as the majority of buses will upgrade/be retrofitted due to the City Centre LEZ, improvements will be likely, in any case.</p> <p>Notwithstanding this, if required Traffic Regulation Conditions (TRC) on operator's license could be applied, without cost to infrastructure and operation of Extended Urban Area LEZ.</p>																																

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	At the beginning of 2020 the Transport Scotland consulted on the potential for making a transformative shift to zero or ultra-low emission City Centres. This type of policy development could allow for exploration of the future use of the City Centre boundary zone. However, policy and regulations development would be needed.		Extended Urban Area Zero or Ultra Low Emission Zones more difficult to achieve without major national policy change. Cumulative scale of negative impacts could be significant.
Threats <i>(Mitigation)</i>	<p>If longer grace periods introduced, scheme effect is limited as the fleet will continue to renew naturally, albeit there is some uncertainty from the impact of the COVID-19 pandemic (see KP3.4.4.).</p> <p>The emerging LEZ guidance from Transport Scotland says that given that air quality should be improved in the quickest time possible, application of the minimum grace period (i.e. 1 year) should be regarded as the default unless a rationale can be provided to go beyond this.</p> <p>Mitigation</p> <ul style="list-style-type: none"> - An additional one year is deemed acceptable taking account of the COVID impact. - <i>Note - Up to two additional years of grace can also be given to residents (see Appendix).</i> 		<p>The wide geographical area and greater impact that is indicated with the Extended Urban Area LEZ, requires longer Grace Periods for sector to prepare. However, if longer grace periods introduced, scheme effect is limited as the fleet will continue to renew naturally, as seen above with the fleet compliance trends (KP1.5).</p> <p>There is added complexity with presenting the scheme with different grace periods between City Centre and Extended Urban Area boundaries, which differ for certain vehicles too.</p>
	Grace periods too short for vehicle owners to prepare for LEZ. The City Centre LEZ includes all vehicles. <i>Mitigation – a reasonable period of grace should be given taking cognises of COVID-19 impact.</i>		Considering a longer grace period for the commercial-type vehicles means the effectiveness of the LEZ is less, as vehicles are likely to continue to renew naturally.
	Scheme complexity low in comparison to Option 3, especially if grace periods are aligned for all vehicles. <i>Mitigation</i>		Scheme complexity high due to the two boundaries, different vehicle types affected with different grace periods.
	<ul style="list-style-type: none"> - <i>Align Grace Periods for all vehicles</i> 		Not able to align Grace Periods as longer grace period needed due to wider impact
	Communications and engagement regarding case for change could be complicated should targeted air quality interventions not be progressed.		Extended Urban Area boundary as a wider intervention, risks delegitimising whole LEZ

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SWOT	3. City Centre – Original <i>All vehicle types</i>	2. City Centre – Revised <i>All vehicle types</i>	3. City Centre + Extended Urban Area <i>City Centre (All vehicles) + Extended Urban Area (HGVs, LGVs, Minibus, Buses & Coaches and Taxis)</i>
	<p><i>Mitigation</i></p> <ul style="list-style-type: none"> - <i>City Centre LEZ boundary progressed as a matter of priority the formal Edinburgh Scheme option</i> 		<p>Scheme, which would have negative effect on progressing the City Centre LEZ, where timely action required. <i>Mitigation limited</i></p>
	<p>Annual monitoring of the LEZ’s objectives, can steer further interventions within and outwith City Centre LEZ boundary.</p> <p><i>Mitigation</i></p> <ul style="list-style-type: none"> - <i>Good alignment with the Local Air Quality Management regime to ensure continued improvement in air quality.</i> - <i>Ensure a robust monitoring programme in relation to the LEZ objectives</i> 		<p>Annual monitoring of the LEZ’s objectives, can steer further interventions across the City. <i>Mitigation</i></p> <ul style="list-style-type: none"> - <i>Same to those identified left.</i> - <i>The LAQM process is designed to review and assess air quality in the administration and devise an Air Quality Action Plan where exceedances of the Air Quality Objectives are breached or likely to be breached.</i>
	<p>Emissions controls on buses could be achieved through Traffic Regulation Conditions on bus operator’s licenses. However, as other vehicles are required to be addressed in the City Centre, a LEZ-specific route is deemed more appropriate.</p>		<p>Emissions controls on buses could be achieved through Traffic Regulation Conditions (TRCs) on bus operator’s licenses, if deemed necessary to control Extended Urban Area emissions in future. This option can be progressed with the Traffic Commissioner, negating the need for specific enforcement system infrastructure.</p> <p>This lessens any risk from reputational damage and low return on investment from high capital cost for underutilised infrastructure., although HGVs and LGVs can not be addressed with TRC process.</p>
	<p>Displacement of traffic around boundaries has potential for AQ increases and/or modelled exceedances. <i>Mitigation</i></p>		<p>See left. Also, as mentioned above, displacement of traffic around the boundary less of a threat in Extended Urban Area LEZ. As only commercial type vehicles affected, it is expected</p>

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SWOT	3. City Centre – Original <i>All vehicle types</i>	2. City Centre – Revised <i>All vehicle types</i>	3. City Centre + Extended Urban Area <i>City Centre (All vehicles) + Extended Urban Area (HGVs, LGVs, Minibus, Buses & Coaches and Taxis)</i>
	<p>- A Network Management Strategy will include a number of elements including a signage plan, TRO/restrictions, traffic signals strategy and junction road layout changes. See S2 below</p> <p>- Continued AQ monitoring around the LEZ boundary and across the City Centre. Potential for development of new real time monitoring site on the boundary itself.</p>		<p>that the majority of this sector will need to upgrade/renew due to the essential nature of the sector and the deterrent nature of the schemes in Scotland.</p>

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Appraisal – Secondary Objectives (S)

S1: Reduce carbon emissions <i>Contribute towards reduction of greenhouse gas emissions</i>			
SWOT	3. City Centre – Original <i>All vehicle types</i>	2. City Centre – Revised <i>All vehicle types</i>	3. City Centre + Extended Urban Area <i>City Centre (All vehicles) + Extended Urban Area (HGVs, LGVs, Minibus, Buses & Coaches and Taxis)</i>
Strengths	The LEZ scheme as a whole supports the local authority’s desire to achieve net-zero carbon.		
	Interventions that reduce local air pollution (NO2 and PM2.5/PM10) are also likely generate a positive effect on reducing factors contributing to climate change through reduced greenhouse gas emissions (measured in CO2 equivalent tonnes).		
	Modal shift from fossil-fuelled vehicles to zero emission (and active) travel will achieve the most significant carbon reductions. Although not a strict requirement of the LEZ schemes in Scotland, the Council will continue to promote and encourage this type of shift by aligning the LEZ principles with the CMP.		
	The City Centre LEZ supports modal shift objectives due to the fact that cars are included in the scheme. The support grants for people to dispose of non-compliant cars, also offers Travel Better vouchers, which provides financial benefit to encourage the transition from the private car to more sustainable forms of transport (modal shift) to certain sectors of society.	With addition of the Extended Urban Area boundary modal shift is less supported as cars are not included in the boundary.	
Weaknesses	The regulations set minimum petrol and diesel vehicle emission standards for the LEZs - Euro 4 Petrol and Euro 6/VI – because the primary objective is to improve local air quality. Carbon reduction is a limited secondary benefit as fossil-fuels continued to be allowed.		
	Encouraging wide uptake of fossil-fuelled LEZ compliant vehicles has some medium-term implications in working towards net-zero carbon targets for 2030, due to the fuel type minimum standards.		
Opportunities	Future management of vehicles based on zero emissions is an opportunity. See P1 above. Emission standards could be improved through changes to regulations in the future.		Due to the large geographical area, the feasibility of a potential zero emissions zone is low.
Threats (Mitigation)	Limited reduction of carbon related emissions, with non-fossil-fuelled vehicles not specifically encouraged. <i>Mitigation – LEZ must be considered as part of ‘system wide’ place-centred policies and actions to decarbonise transport, that focus on demand and behaviour first, including programmes to support a shift to sustainable modes of travel such as spaces for people (and other road space reprioritisation plans).</i>		

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S2: Network Management <i>Minimise the impact from traffic displacement across network</i>			
SWOT	3. City Centre – Original <i>All vehicle types</i>	2. City Centre – Revised <i>All vehicle types</i>	3. City Centre + Extended Urban Area <i>City Centre (All vehicles) + Extended Urban Area (HGVs, LGVs, Minibus, Buses & Coaches and Taxis)</i>
Strengths	A major consideration of a LEZ scheme is to allow a diversion route around the LEZ to provide motorists with instructions on how to avoid the LEZ. Diversion signs should be considered as an essential requirement. This will form one aspect of a Network Management plan brought forward to manage the impact of the LEZ on traffic.		
	Development of a network Management Strategy will also incorporate Traffic Regulations Order considerations, traffic signals strategy and any changes that might be necessary to junctions or road layout, without necessarily creating additional demand in the network.		Diversions around the Extended Urban Area boundary is less of a consideration, as commercial type vehicles are more likely to need to upgrade their vehicles in order to continue operations.
	There is potential to facilitate strategic transport and public realm infrastructure projects to complement LEZ implementation. Especially with regard to the City Centre Transformation programme.		
Weaknesses	<p>Increases in traffic at boundary in the compared to no LEZ scenario;</p> <ul style="list-style-type: none"> West End: 19–50%; Palmerston Place, 9–22% Chester Street. East End: 15-20% Abbeyhill; 5-10% London Road 	<p>Increases in traffic at boundary, when compared with Option 1;</p> <ul style="list-style-type: none"> Charlotte Square/North/South Street Lothian Road Earl Grey Street. <p>This could have a negative impact on the strategic CCWEL Active Travel infrastructure project.</p>	
Opportunities	Support prioritisation of strategic transport and public realm infrastructure improvement project at Toll Cross (both boundary options).		Limited ability to support Extended Urban Area infrastructure projects.
Threats (Mitigation)	<p>Low risk of buses and coaches not upgrading/renewing vehicles and turnaround at LEZ boundary.</p> <p><i>Mitigation – major bus company, Lothian Buses already committed 100% LEZ compliant standards by end of 2021. Opportunity to align bus network review (CMP). Continue to work</i></p>		

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SWOT	3. City Centre – Original <i>All vehicle types</i>	2. City Centre – Revised <i>All vehicle types</i>	3. City Centre + Extended Urban Area City Centre (All vehicles) + Extended Urban Area (HGVs, LGVs, Minibus, Buses & Coaches and Taxis)
	with bus stakeholders, SEPA and Transport Scotland to consider if any further regulation would be necessary (potential TRC) (see P1 Threats).		
	<p>Traffic displacement on the road network boundary.</p> <p><i>Mitigation</i></p> <ul style="list-style-type: none"> - <i>Mitigation measure will be brought forward through the network management strategy and may include junction reconfiguration (Toll cross, Pleasance/Holyrood/St Mary's Street), road changes (two way on Morrison Street, removal of parking bays (Palmerston Place), optimised signal staging (Palmerston Place/Chester Street, Easter Road/Abbey mount, Abbeyhill), improved signing, overnight lorry ban (Great Stuart Street/Ainslie Place) and rationalisation of pedestrian crossings or link to Urban Traffic Control (Pleasance).</i> - <i>Junction improvements are already being developed for Drumsheugh Gardens / Lynedoch Place / Randolph Crescent and Lothian Road. These need to be reviewed to ensure LEZ demand is accommodated.</i> - <i>A robust monitoring regime will also form part of the network management strategy and may cover public transport journey times, traffic surveys and public opinion surveys.</i> 		
	<p>Specific impacts caused by option 1:</p> <ul style="list-style-type: none"> • Increase in traffic demand on Palmerston Place and Chester Street 	<p>Specific impacts caused by option 2:</p> <ul style="list-style-type: none"> • Conflicts with the CCWEL active travel corridor on South Charlotte Street due to increase traffic demand 	
	<p>Higher risk of network management mitigation measures not being developed in time, due to the likelihood of Traffic Regulation Orders being required for the Original boundary.</p> <p><i>Mitigation: A longer grace period would support implementation of the required measures (see also P1 Threats)</i></p>	<p>The Revised boundary follows the main City Centre trafficked route of Lothian Road to Queen Street, therefore the mitigation measures required to implement the boundary are not as significant as the Original boundary.</p>	

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S3: Behaviour Change *Strategically align with sustainable transport, active travel and placemaking objectives*

SWOT	3. City Centre – Original <i>All vehicle types</i>	2. City Centre – Revised <i>All vehicle types</i>	3. City Centre + Extended Urban Area <i>City Centre (All vehicles) + Extended Urban Area (HGVs, LGVs, Minibus, Buses & Coaches and Taxis)</i>
Strengths	<p>Support and complement other strategic transport and placemaking projects in the City Centre areas, at or near to the boundary or within the LEZ. Such projects include;</p> <ul style="list-style-type: none"> • Edinburgh City Centre Transformation (ECCT) and other strategic projects: <ul style="list-style-type: none"> ○ Meadows to George Street ○ City Centre East-West Link ○ Princes Street/Waverley Bridge ○ Cockburn Street/Victoria Street/High Street ○ Lothian Road • Spaces for People • Trams to Newhaven • Controlled Parking Zone (CPZ) review 		<p>A Extended Urban Area LEZ including commercial-type vehicles could support the development of a comprehensive city freight and servicing operations system planned, including neighbourhood delivery hubs. Some consideration would need to be given to the timing of implementation.</p>
	<p>The benefits and learnings from the Spaces for People programme introduced in 2020/21 been considered within the LEZ scheme as part of a green recovery transformation, especially where they can be complemented around the boundary areas.</p>		
	<p>The LEZ will encourage a modal shift from cars to public transport and active travel. This will result in public health, air quality improvements, as well as benefitting the health of individuals from increased activity levels.</p>		
	<p>Low Emission Support Fund encouraging modal shift though financial benefit received for disposal of non-compliant car or vehicle and change to more sustainable transport - Travel Better vouchers. This includes money towards a bike, e-bike or public transport. See S1 Strength.</p>		<p>Inclusion of buses/commercial type vehicles does not nudge towards positive modal shift. Therefore, added benefit of Extended Urban Area boundary in terms of modal shift is considered low.</p>
	<p>Any reduction in vehicles within the boundary may improve access to services for those travelling by modes other than private car, including public transport or active travel. This would make sustainable forms of transport more attractive.</p>		

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SWOT	3. City Centre – Original <i>All vehicle types</i>	2. City Centre – Revised <i>All vehicle types</i>	3. City Centre + Extended Urban Area <i>City Centre (All vehicles) + Extended Urban Area (HGVs, LGVs, Minibus, Buses & Coaches and Taxis)</i>
	There is more scope for Option 1 to encourage behaviour change (vehicle upgrades/renewal or modal shift) as it covers a wider geographic area with more complex diversion route.	Option 2 diversion route is a key City Centre road, which if used as a boundary is less likely to incentivise behavioural change in terms of fleet upgrade/renewal, or modal shift.	
Weaknesses	None identified		Extended Urban Area boundary has limited positive knock on behaviour change impacts: <ul style="list-style-type: none"> • e.g. P&R is not necessarily encouraged since Extended Urban Area boundary does not include cars
Opportunities	Complement future behavioural change strategies and plans including; <ul style="list-style-type: none"> • Workplace Parking Levy • 20-minute neighbourhoods 		
Threats (Mitigation)	Communications needs to be clear that LEZ forms part of a ‘system wide’ place-centred strategy to decarbonise transport, that focus on demand and behaviour change. <i>Mitigations</i> <ul style="list-style-type: none"> - <i>An effective communication campaign shall include the system wide changes that are needed to support LEZ and encourage a decarbonised transport structure fit for the future.</i> 		

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Appendix

Acronyms, terms and definitions

Term/Acronym	Definition
AQAP	Air Quality Action Plan - Every local authority that has an active Air Quality Management Area (AQMA), is required under Part IV of the Environment Act 1995 to provide an Air Quality Action Plan (AQAP) as a means to address the areas of poor air quality.
AQMA	Air Quality Management Area - Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely exceedance of an air quality objective (AQO).
AQO	Air Quality Objectives Statutory
ANPR camera	Automatic Number Plate Recognition camera
Emission Standards	Mandatory nationally consistent emission standards for Scottish LEZs have been set for virtually all petrol and diesel vehicle classifications (e.g. buses, taxis, vans, HGVs, cars, motorcycles) within the Low Emission Zones (Emission Standards, Exemptions and Enforcement) (Scotland) Regulations 2021.
Euro Standards	The Euro standards are defined in a set of European Union directives and provide a list of acceptable limits for exhaust emissions of all new vehicles that are sold in the EU. They cover oxides of nitrogen (NOX), hydrocarbons (HC), carbon monoxide (CO) and particulate matter (PM) emissions. The Euro emission standards are based on Nitrogen Dioxide emissions, and use Arabic (Euro 5, Euro 6 for cars) and Roman (Euro V, Euro VI for heavy-duty vehicles) numbering to classify the emission standard (Holman et al 201520).
Grace Period	The purpose of a grace period is to provide the registered keeper of the vehicle with time to prepare and plan ahead before a LEZ enforcement regime starts, so that their vehicle or vehicles are compliant with the LEZ emission standards, or they are able to source an alternative mode of travel into the LEZ. A grace period applies to both individuals who are: <ul style="list-style-type: none"> • Non-residents – individuals whose registered address is not within the zone. This categorisation applies to both residents and businesses. Essentially, this element covers all registered keepers of vehicles • Residents – individuals whose registered address in respect of the vehicle is a residential property within the zone A grace period begins 'on the day the LEZ comes into effect' and means that emission standards are not contravened until the grace period has expired.
HGV	Heavy Goods Vehicle
LAQM	Local Air Quality Management Regime as defined by the Environment Act 1995
LGV	Light Goods Vehicle
Local time-limited exemptions	Exemptions which can be applied at the discretion of local authorities to individual LEZs, to cover any vehicle type that is not covered by the national exemption. Different LEZs could have different local time-limited exemptions.

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Term/Acronym	Definition
National exemptions	Exemptions which apply consistently across all Scottish LEZs, as set out in Regulations. Local Authorities must apply these exemptions to their LEZ at all times; they cannot be revoked.
New modelled exceedance	The NMF modelling work predicts future concentrations of 40ug/m-3 annual mean (NO2) at the roadside, which has not been predicted in the baseline scenario. <i>Note</i> the location assessment differs to that required for assessment of statutory Air Quality Objectives, where is in necessary to consider 'relevant receptors'.
NMF	National Modelling Framework
NLEF	National Low Emission Framework
MOVA	Microprocessor Optimised Vehicle Actuation (MOVA) – traffic management system.
TRCs	Traffic Regulation Condition – On licenses for buses there is The Public Service Vehicles (Traffic Regulation Conditions) Amendment (Scotland) Regulations 2008 which allow for emission standards to be put in place.