



**Edinburgh Low Emissions Zone Impacts -  
Progress Report**

October 2019

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## 1. Introduction

In 2015, the Scottish Government made a commitment to significantly improve Scotland’s air quality through the Cleaner Air for Scotland strategy; alongside this, the Programme for Government 2017-18 committed<sup>1</sup> to introduce LEZs in Aberdeen, Dundee, Edinburgh and Glasgow by 2020. In addition, the City of Edinburgh Council (CEC) committed<sup>2</sup> to improving the city’s air quality and health through the introduction of a LEZ.

The Scottish Government and Local Authorities must reduce NO<sub>2</sub> concentrations to below annual average NO<sub>2</sub> of 40 µgm-3, in order to comply with the legislation.<sup>34</sup> Edinburgh has five Air Quality Management Areas declared for exceedance of legal limits due to road traffic. A LEZ restricts entry to an area by setting an emission standard as a requirement, this means the LEZ can achieve a reduction in NO<sub>2</sub> concentrations by improving the Euro emission standard of vehicles that enter the area.

The Transport (Scotland) Bill was introduced to the Scottish Parliament in June 2018 and is currently progressing through the Parliamentary process. This will provide legislation that enables the creation and civil enforcement of LEZs. The Bill will allow the Scottish Government to set (through regulations) consistent national standards for key aspects of LEZs including emissions, penalties, certain exemptions and parameters for grace periods. Local Authorities will then have the powers to create, enforce, operate or revoke a LEZ, and to design the boundary and vehicle scope of their LEZ.<sup>5</sup>

The emission standards for Scotland LEZs are to be set through regulation, and are expected to be Euro 6/VI for diesel vehicles and Euro 4 for petrol vehicles. This is consistent with other cities such as London, Manchester, and Birmingham.

Between May and July 2019, the Council publicly consulted on LEZ proposals in Edinburgh including a city centre zone boundary applying to all vehicle types and a city-wide boundary applying to commercial vehicles (buses, coaches, taxi and private hire, light and heavy goods vehicles). The consultation also set out proposals for when enforcement would start, as set out in Table 1 below.

**Table 1: Edinburgh LEZ implementation timeline**

| <b>Edinburgh LEZ Scheme implemented by end of 2020</b> |                       |  |
|--|-----------------------|--|
| <b>Vehicle type</b>                                    | <b>Grace Period</b>   | <b>Extended Grace Period for residents</b> |
| <b>City centre boundary</b>                            |                       |  |
| Bus / coaches  | 1 year (End of 2021)  |  |
| Commercial vehicles                                    | 1 year (End of 2021)  |  |
| Cars   | 4 years (End of 2024) | 1 year (End of 2025)                       |
| <b>City wide boundary</b>                              |                       |  |
| Bus / coaches  | 3 years (End of 2023) |  |
| Commercial vehicles                                    | 3 years (End of 2023) |  |

The analysis sets out the impacts arising from the introduction of a LEZ as proposed for public consultation in 2019. The findings will inform further development of LEZ proposals in Edinburgh and wider mitigation measures.

<sup>1</sup> Scottish Government, 2017, <https://www.gov.scot/publications/nation-ambition-governments-programme-scotland-2017-18/>

<sup>2</sup> City of Edinburgh Council, 2018, [http://www.edinburgh.gov.uk/info/20141/council\\_pledges/694/deliver\\_a\\_sustainable\\_future](http://www.edinburgh.gov.uk/info/20141/council_pledges/694/deliver_a_sustainable_future)

<sup>3</sup> Department for Environment, Food & Rural Affairs, 2011, *Air Quality Strategy for England, Scotland, Wales and Northern Ireland – Local Air Quality Management*, <https://www.gov.uk/government/publications/the-air-quality-strategy-for-england-scotland-wales-and-northern-ireland-volume-1>

<sup>4</sup> Scottish Government, 2010, *The Air Quality Standards (Scotland) Regulations 2010*, <http://www.legislation.gov.uk/ssi/2010/204/schedule/2>

<sup>5</sup> <https://www.lowemissionzones.scot/development>

## 2. Approach to identifying the wider impacts of introducing a LEZ

A range of skills and expertise including transport modellers, economists, and integrated impact assessors have contributed to the identification of wider impacts of introducing a LEZ in Edinburgh. A number of data sets and analytical approaches have been used to identify the impacts set out in this report:

- Datasets
  - This was especially relevant for understanding the levels of compliance with emission standards, vehicle types, and numbers of vehicles which would be affected by the LEZ. Analysis used traffic data collected in November 2016 and June 2019 (collected as inputs to Edinburgh's Air Quality Model) for City Centre Boundary, DVLA data from 2018 for the City Wide Boundary.
- Modelling
  - Edinburgh-specific air quality model (run for CEC by the Scottish Environmental Protection Agency (SEPA)), in line with the National Modelling Framework<sup>6</sup>
  - Edinburgh specific transport modelling was carried out using CEC's strategic VISUM model suite of the city centre using a 2016 base year and two forecast years for 2022 and 2032. These have been generated from planning forecasts, agreed with CEC, and were last updated in summer 2017.
- Frameworks and guidance
  - Scottish Government's National Low Emission Framework<sup>7</sup> (NLEF), UK Government's Joint Air Quality Unit (JAQU) guidance<sup>8</sup>, NHS Lothian's integrated impact assessment (IIA) guidance<sup>9</sup>.
- Knowledge from similar projects across the UK
  - Experience from analysts' previous work on London, Manchester and Birmingham air quality interventions in identifying impacts Edinburgh's LEZ may have.
- Case studies
  - Discussing LEZs with businesses, care providers, residents and other organisations e.g. trade organisations provided insight into the potential impacts to be explored.

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<sup>6</sup> *Air Quality Evidence Report – November 2018 (SEPA)*  
[http://www.edinburgh.gov.uk/CET/downloads/file/3/air\\_quality\\_evidence\\_report\\_%E2%80%933\\_edinburgh](http://www.edinburgh.gov.uk/CET/downloads/file/3/air_quality_evidence_report_%E2%80%933_edinburgh)

<sup>7</sup> Scottish Government, 2019, *National Low Emission Framework*,  
<https://www.gov.scot/publications/national-low-emission-framework/>

<sup>8</sup> JAQU, 2017, *Clean Air Zone Framework*,  
[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/612592/clean-air-zone-framework.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/612592/clean-air-zone-framework.pdf)

<sup>9</sup> NHS Lothian, 2017, *Integrated Impact Assessment Guidance*,  
<https://www.nhslothian.scot.nhs.uk/YourRights/EqualityDiversity/IADocuments/IntegratedImpactAssessmentGuidance.pdf>

- Surveys
  - Survey of Edinburgh City Centre Business Improvement District Members – To ascertain awareness and preparedness of businesses for a possible LEZ.
  - Analysis of Transport Scotland's LEZ survey and consultation – including response to the 2017 public consultation on LEZ which sought to ascertain views on a number of aspects (including transport, emissions, and potential LEZ designs) from a variety of stakeholders<sup>10</sup> and survey work undertaken in 2019 to understand awareness and opinion of low emission zones.

### 3. Integrated Impact Assessment

A draft IIA has been carried out with a primary focus on equality and human rights objectives. Stages 1 to 4 of the 7-stage process of assessment have been undertaken in accordance with NHS Lothian guidance<sup>11</sup> (Flow chart provided in Appendix A). Table 2: IIA summary provides a summary of the findings.

Key messages and findings from case studies, including the London Ultra Low Emissions Zone; stakeholder engagement workshop and targeted Community Transport Providers surveys were all used to assess potential impact of LEZ proposals. The IIA also has identified need for further work that is indicated in bold italics in Table 2. Further work on the IIA will be undertaken as the proposals are refined and to further understand the impact against the IIA objectives and the affected population groups<sup>12</sup>.

**Table 2: IIA summary**

| Item no | Objective: Equality and human rights  | Affected population   |
|---------|---|---|
|         | <b>Positive</b>   |   |
| 1       | The LEZ policy is likely to discourage the most polluting vehicles from entering the LEZ. This will reduce emissions and improve air quality and in turn have a positive effect on health of those most at risk of respiratory illness including the elderly and children, including unborn children. | Children, pregnant women and elderly – <i>affected under both city wide and city centre LEZ boundaries.</i> |
| 2       | The LEZ is likely to encourage a modal shift from cars to public transport and active travel which will have a positive impact on health.   |   |
|         | <b>Negative</b>   |   |
| 3       | Bus operators may increase the price of bus tickets as a result of the increased costs to their operations arising from the need to replace or upgrade buses, so they are compliant with the  | Young people in low paid jobs – <i>affected under both</i>  |

<sup>10</sup> Transport Scotland, 2017, *Building Scotland's Low Emission Zones*, <https://www.transport.gov.scot/media/39673/low-emission-zones-consultation.pdf>

<sup>11</sup> NHS Lothian Integrated Impact Assessment Guidance, 2017 <https://www.nhslothian.scot.nhs.uk/YourRights/EqualityDiversity/IADocuments/IntegratedImpactAssessmentGuidance.pdf>

<sup>12</sup> Affected populations: people with protected characteristics, those vulnerable to falling into poverty, staff, and geographical communities.

|   |   |   |
|---|---|---|
|   | <p>LEZ. For some bus passenger groups the increase in price may make the journey unaffordable and result in them foregoing their journey. This may affect people's ability to engage in activities. or will struggle to reallocate their resources which in turn will affect their wellbeing/ social activity. This effect will not be applicable to the elderly and disabled free travel pass holders.</p>   | <p><i>city wide and city centre LEZ boundaries.</i></p>   |
| 4 | <p>Bus operators may remove non-profitable routes in response to LEZ related costs to upgrade fleet.</p> <p><b>Further work/mitigation:</b> <i>To understand this potential impact, CEC should continue engagement with bus operators to determine their proposed reactions to the LEZ. If buses are going to raise their fares, the impact could be mitigated by designing a programme to support young people, those on benefits and accompanying adults (for disabled and elderly passengers) whose mobility may be impacted.</i></p>  | <p>Elderly, disabled, carers, pregnant women- <i>affected under both city wide and city centre LEZ boundaries.</i></p>      |
| 5 | <p>Impacts due to low awareness of LEZ being in place on people from low income households with a non-compliant car who are also non-English speaking to enter LEZ by mistake and enter into financial difficulty due to fine incurred and unable to pay.</p> <p><b>Mitigation:</b> <i>Impact could be mitigated by providing clear communications around the LEZ implementation across different media and in a range of languages used in Edinburgh.</i></p>  | <p>Low income householders, people of ethnic origin that is not white – <i>affected under the city centre boundary.</i></p> |
| 6 | <p>People with a disability who do not use public transport (due to the nature of their disability) but own a LEZ non-compliant vehicle and cannot afford to upgrade, may choose to forego their journey into the City Centre. This will potentially adversely affecting their opportunity to access community, leisure facilities and have a negative impact on their social activity.</p>   | <p>Disabled people- <i>affected under the city centre boundary.</i></p>   |
| 7 | <p>People who use their own cars that are fitted with adaptive features (such as swivel chairs) to access community and leisure facilities within the City Centre may not be able to afford the cost of transferring the adaptive features onto LEZ compliant cars as the costs range between £500 to £30,000. This in turn potentially can adversely affect their social activity/ day to day activity.</p> <p><b>Mitigation:</b> <i>Impact may be mitigated through funding to support transfer of adaptive features onto LEZ compliant cars for those most affected.</i></p> |   |
| 8 | <p>Community Transport Providers whose fleet renewal period typically runs between seven and ten years and are not aware of the funding options that are available to upgrade their non-compliant fleet may shift services to areas outside LEZ This has the potential to affect elderly, disabled and children who</p>   | <p>Elderly, Children and disabled children- <i>affected under the City centre and City wide boundaries</i></p>              |

|    |  |  |
|----|--|--|
|    | <p>are dependent on their service to undertake social activities related travel.</p> <p><b>Mitigation:</b> Any identified source of funding for vehicle upgrades or retrofitting should be clearly communicated to Community Transport Providers: such as the Energy Savings Trust's Scottish Bus Abatement Retrofit Programme<sup>13</sup> and Electric Vehicle Loans<sup>14</sup>. Electric Vehicle infrastructure will also benefit from funds such as Switched on Towns and Cities Challenge Fund and the Local Authority Installation Programme<sup>15</sup>.,. CEC should also engage with Community Transport Providers to effectively communicate LEZ proposals and on potential impact to help them prepare better for the change.</p>  |  |
| 9  | <p>Private Hire Vehicle and Taxi/ Black cab owners on the H2S (Home to School) contract with City of Edinburgh Council to transport school children with a non compliant LEZ vehicle may not be able to afford to upgrade their vehicle. This may impact on the H2S services offered by the council and potentially affect school children.</p> <p>CEC have an existing licensing regime to improve emissions standards of PHV and Taxi/Black cab which may help reduce the impact<sup>17</sup> but a residual negative impact on children is possible. CEC must ensure this regime is aligned with the LEZ correctly to ensure mitigation of potential impacts.</p> <p><b>Further work:</b> Analysis is required to capture and identify how LEZ may impose additional or compounding impacts on this sector and if required develop programme to offset impacts on specific populations.</p> | Children and disabled children- affected under the City centre and City wide boundaries. |
| 10 | <p>Community groups that engage with children, for example Beavers and Brownies, may use LGVs (such as minibuses) to transport children for various activities city wide and/ or to access a Scout Centre in the City Centre. Where these vehicles are owned or on a long-term lease there is a potential that activities provided by these groups are restricted until vehicle is changed.</p>  | Children- affected under the City wide and City centre boundaries.                       |

<sup>13</sup> Energy Savings Trust, 2019, Scottish Bus Abatement Retrofit Programme  
<https://www.energysavingtrust.org.uk/scotland/businesses-organisations/transport/scottish-bus-emissions-abatement-retrofit-programme>

<sup>14</sup> Energy Savings Trust, 2019, Electric Vehicle Loan,  
<https://www.energysavingtrust.org.uk/scotland/grants-loans/electric-vehicle-loan>

<sup>15</sup> Transport Scotland, 2019, Over £20 million to support electric vehicles across Scotland  
<https://www.transport.gov.scot/news/over-20-million-to-support-electric-vehicles-across-scotland/>

<sup>16</sup> City of Edinburgh Council, October 2018, Electric Vehicle Infrastructure Plan  
[http://www.edinburgh.gov.uk/news/article/2556/edinburgh\\_blazes\\_green\\_trail\\_with\\_new\\_electric\\_vehicle\\_infrastructure\\_plan](http://www.edinburgh.gov.uk/news/article/2556/edinburgh_blazes_green_trail_with_new_electric_vehicle_infrastructure_plan)

<sup>17</sup> [http://www.edinburgh.gov.uk/downloads/download/285/taxiprivate\\_hire\\_car\\_licence](http://www.edinburgh.gov.uk/downloads/download/285/taxiprivate_hire_car_licence)

|    |  |  |
|----|--|--|
|    | <b>Further work:</b> Analysis is required to identify the number of community groups that may be affected by the LEZ scheme and identify suitable mitigation measures.   |  |
| 11 | <p>There is a potential for people who currently use their own cars to access leisure facilities/night life to be negatively affected if they perceive there to be personal security concerns with public transport. As a result, passengers may forego their journey into the City Centre, particularly at night time.</p> <p><b>Further work:</b> This impact could be mitigated by understanding specific concerns and developing targeted measures that support specific population groups to feel safe using it.</p>  | Minority ethnic groups, disabled, Non-binary, Transgender, people with different religious belief/ faith- affected under the City Centre boundary.                       |
| 12 | <p>There are around 25 locations for religious congregation and places of worship that are located within the City Centre. If most of the visitors live outside City Centre and are reliant on cars (for example travel from rural areas), their activity may be adversely affected if they forego their journey.</p> <p><b>Further work:</b> Analysis is required to identify the population groups (such as religious groups) that may be affected by the LEZ scheme through observing behaviours such as vehicle usage and thereafter to identify suitable mitigation measures.</p> | People with different religious belief/ faith- affected under the City Centre boundary.th<br>different religious belief/ faith- affected under the City Centre boundary. |
| 13 | <p>Users of the Travellers site and Travelling Showman site in Edinburgh are likely to own non-compliant vehicles and therefore will face fines when entering the LEZ.</p> <p><b>Mitigation:</b> This may be mitigated if the Scottish Government decide to include showman's vehicles within the national exemption of the LEZ implementation. Ensure sufficient targeted engagement with the affected community.</p>   | Gypsy/Travellers- City wide boundary   |
|    | <b>Objective: Environment and sustainability</b>   | <b>Affected populations</b>  |
|    | <b>Positive</b>  |  |
| 14 | Implementing LEZ will improve vehicle standards which in turn will bring air quality improvements and health & wellbeing improvements.   | Children, elderly and pregnant women – both city centre and city wide  |
| 15 | Interventions that reduce local air pollution (NO <sub>2</sub> and PM <sub>2.5</sub> /PM <sub>10</sub> ) are also likely generate a positive effect on reducing factors contributing to climate change through reduced greenhouse gas emissions (measured in CO <sub>2</sub> equivalent tonnes).   | Children, elderly and pregnant women – both city centre and city wide  |
| 16 | LEZ is likely to promote sustainable forms of transport via modal shift from cars to buses, shared cars, bicycles or walking, which in turn will have positive impact on air quality. Dependent on what modes people shift to there may be   | Children, elderly and pregnant women – both city centre and city wide  |



|    |   |   |
|----|---|---|
|    | positive effects on the health and well-being of people due to physical activity (cycling/ walking) and exposure to outdoor spaces.   |   |
| 17 | Improvements to air quality can be directly linked to improvements to physical environment and to places.   | Children, elderly and pregnant women – <i>both city centre and city wide</i>      |
|    | <b>Negative</b>   |   |
| 18 | Depending on displacement of traffic there may be locations outside of the LEZ boundaries where air quality is made poorer by a change in the quantity and types of vehicles passing through. Initial transport modelling shows that roads outside the LEZ boundary are likely to see an increase in traffic volumes.<br><br><i>Further work: Analysis is required to determine the scale of these impacts on areas that see increases in traffic and the affected populations; appropriately designed mitigation will require similar investigation.</i>   | Children, elderly and pregnant women – <i>both city centre and city wide</i>      |
|    | <b>Objective: Economic</b>  | <b>Affected Populations</b>   |
|    | <b>Positive</b>   |   |
| 19 | Increased economic activity for a number of sectors: second hand car traders, vehicle scrappage, vehicle leasing operators, active-travel distributors/repairers, and public transport operators through increased patronage.   | Businesses community  |
| 20 | Decreased traffic and cleaner atmosphere in the city may lead to higher quality of public spaces in the city. This could lead to more opportunities for businesses as more people are attracted to the city/city centre.  | Business community.<br>People that work and visit areas within the LEZ boundaries |
|    | <b>Negative</b>   |   |
| 21 | People from low income households who use cars to enter the City centre for work on a regular basis may face financial difficulty to upgrade their vehicle.<br><br>Income inequality may increase as those on low incomes may take on credit to pay for vehicle changes that they would not otherwise have purchased. This increases the debt obligation for those on low incomes and decreases their disposable income. Those on higher incomes may have capital that allows them to access further capital at lower rates of interest.<br><br>This effect will also be felt by small business owners who have relocated further from the city centre due to increasing prices but rely on the city centre for business as they may not be able to find the finance required to change their vehicles. | Lower income households and lower income businesses                               |

|    |  |   |
|----|--|---|
|    | <p><b>Mitigation:</b> Impact may be mitigated by identifying funding mechanisms that help households with low income to afford an upgrade to a compliant vehicle.</p> <p>This impact could be mitigated by understanding specific concerns and developing targeted measures to address concerns for small businesses.</p> <p>Impact could be mitigated by providing clear communications around the LEZ implementation across different media to raise awareness and ensure people and businesses have sufficient time to prepare. The timing of LEZ introduction, operation, and grace periods for different vehicle types and residents may also mitigate some of the impacts on lower income households and businesses.</p> |   |
| 22 | <p>Vehicle users, especially LGV, bus, 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 will incur additional financial cost.</p> <p><b>Further work:</b> Analysis required to determine the scale of these impacts on small businesses and an appropriately designed mitigation.</p>   | <p>Lower income community Groups</p> <p>Business communities</p> <p>Low income groups</p> |
| 23 | <p>Shift workers and those who are employed in the evening and late-night economy may not be able to travel using public transport and have to use private vehicle transport. They will be forced to change non-compliant vehicles to maintain employment and may have limited access to affordable finance to replace their non-compliant vehicle as they are more likely to be on lower incomes. A potential reduction in those who are willing to work in these sectors may in turn, affect the availability of these services.</p>   | <p>Shift workers</p> <p>Lower income groups</p>   |
| 24 | <p>The issue of low income/low capital reserves applies to community/charitable organisations that use non-compliant minibuses. These organisations provide services for the elderly and others who may not otherwise be able to make the journey.</p>   | <p>Lower income community Groups</p>  |
| 25 | <p>Decrease in access to services as the LEZ restricts the ability of businesses to travel and bring services to the customer. For example, a plumber using a non-compliant van may no longer be able to operate in the city centre if the LEZ restricts LGVs from entering the area. If such service providers are unable to afford to change to a compliant vehicle this would potentially lead to a decrease in access to such services and/or an increase in the cost of providing these services.</p> <p><b>Further work:</b> Analysis is required to determine the scale of these impacts and an appropriately designed mitigation.</p>  | <p>Business communities</p>   |

|    |  |                      |
|----|--|----------------------|
| 26 | <p>The LEZ will negatively impact local businesses that use commercial vehicles. DVLA data indicates that at the end of 2018, 83% of LGVs in the Edinburgh Unitary Authority<sup>18</sup> are non-compliant and require replacing if they want to continue to be used. Local businesses may be negatively impacted by the introduction of a LEZ due to the increased cost of having to change their fleet to maintain operations within the city which will be essential to maintain the operations of their business. Businesses need to be able to access lines of credit to replace their fleet. It may decrease employment opportunities for those that cannot afford to change their vehicle to a compliant one.</p> <p><i>Further work: Analysis is required to determine the scale of these impacts on small businesses and an appropriately designed mitigation.</i></p> | Business communities |
|----|--|----------------------|

## 4. Transport Modelling of the LEZ Scheme

### 4.1 CEC Strategic Model

A series of transport modelling tests have been undertaken to assess the impact of the LEZ on travel patterns across the city. Outputs have been provided to SEPA who have then undertaken supporting air quality impact analysis.

This section of the report summarises the first phase of transport modelling. Further analysis is underway incorporating the feedback from public consultation undertaken and revised baseline fleet composition survey data collected in June 2019. The updated data highlights the change in actual fleet composition since 2016 and shows an increase in vehicle compliance with proposed LEZ standards.

All transport modelling has been undertaken using The City of Edinburgh Council's (CEC) strategic VISUM model suite. This was previously updated and recalibrated in spring 2017 to support the Edinburgh Tram Outline and Final Business cases. Models have a 2016 base year and include city centre count data previously collected on behalf of SEPA/CEC. Two forecast years are currently available for the years 2022 and 2032. These have been generated from planning forecasts, agreed with CEC, and were last updated in summer 2017.

For the purposes of this analysis, the 2022 model forecast has been used as a proxy for a 2023 assessment year, the year for which future Department for Transport (DfT) vehicle compliance estimates are available.

All LEZ model runs have been undertaken using VISUM Version 18 software.

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<sup>18</sup> Edinburgh Unitary Authority was defined in the DVLA dataset. This outline can be viewed here:

<https://www.ordnancesurvey.co.uk/business-government/products/boundaryline>

List of Scottish Unitary Authorities here: [https://www.lhc.gov.uk/globalassets/buyer-profile-docs/scottish-unitary-authoritiesjuly\\_15.pdf](https://www.lhc.gov.uk/globalassets/buyer-profile-docs/scottish-unitary-authoritiesjuly_15.pdf)

Further explanation here:

<https://www.ons.gov.uk/methodology/geography/ukgeographies/administrativegeography/scotland>

## 4.2 LEZ Boundary

The proposed LEZ boundary has been developed based on a detailed understanding of the air quality issues in Edinburgh from the air quality model. In addition, a key consideration has been the need to provide a clear, logical, and readily signposted diversion route for non-compliant vehicles.

### Rationale for proposed boundary

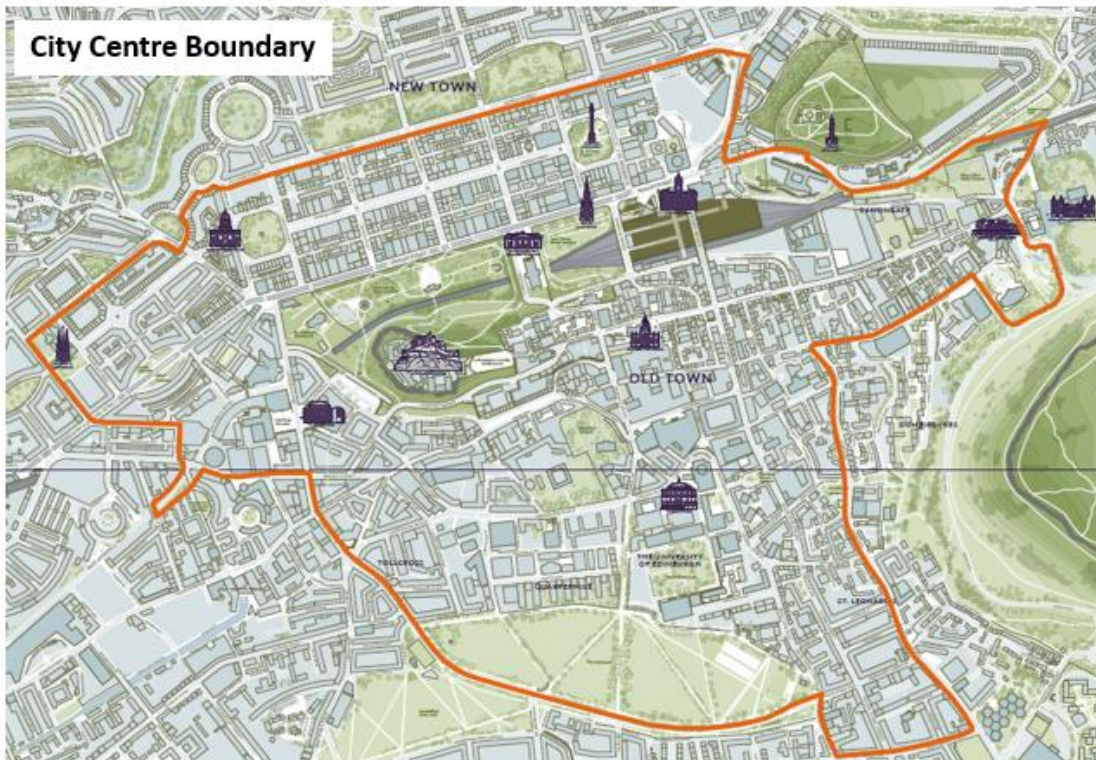
To the north, Queen Street is proposed to be excluded from the LEZ as it provides a suitable alternative route. If Queen Street were included this would encourage additional traffic through Stockbridge (via Hamilton Place / Henderson Row and Brandon Street / Eyre Place). Ferry Road as a further alternative was considered too far from the city centre.

The proposed eastern boundary of the LEZ is defined by Abbeyhill, Holyrood Road, Pleasance and St Leonard's Street. These all lie outside areas with high pollutant concentrations area and provide a suitable diversion. Queen's Drive is not an acceptable diversion as it is closed to general traffic on a Sunday (and at all times for some vehicles).

The proposed western LEZ boundary is complex to define and runs along Earl Grey Street, Morrison Street, West Approach Road and Torphichen Street. Including Haymarket within the zone would result in non-compliant traffic routing via Murieston Place / Murieston Crescent / Russell Road – these narrow residential streets are not a suitable alternative. The next possible boundary would be at Hutchison Crossway / Balgreen Road and was considered to extend too far into the west.

The proposed southern boundary utilises East and West Preston Street and Melville Drive. This provides a relatively straightforward diversion, avoiding the city centre.

**Figure 1: City Centre LEZ boundary**



## 4.3 Model Scenarios and Options

A core scenario has been defined for the LEZ, with three options tested within this. The principal assumption is that, upon implementation of the Edinburgh city centre LEZ, all cars, light goods vehicles (LGVs) and heavy goods vehicles (HGVs) which start or end within the city centre LEZ boundary will be compliant with the scheme. This means that there is no reduction in travel demand as a result of the scheme.

The three Options considered are:

- Option 1 – no LEZ in place and Bank Street open (representing the Base situation);
- Option 2 – no LEZ in place and Bank Street closed; and
- Option 3 – LEZ in place and Bank Street closed

Options 2 and 3 reflect the assumption that the Meadows to George St scheme, including the Bank St closure, will be in place before the LEZ scheme is implemented. This is a core element of the City Centre Transformation (CCT) Project and the most significant closure to general traffic. Further modelling will include phased elements of the recently approved CCT Strategy.

All models have been assigned for morning peak, interpeak and evening peak time periods for 2016 Base and 2022 forecast years. Time periods are:

- AM – 07:00-09:00
- IP – 10:00-12:00
- PM – 16:00-18:00

## 4.4 Model Enhancements

A number of enhancements have been made to the VISUM models in order to assess the impact of the proposed LEZ options. Most importantly, Car, LGV and HGV demand has been disaggregated into compliant and non-compliant vehicle types for base and forecast years. Model attributes and procedures have been updated to reflect this change.

Compliant and non-compliant fleet composition data has been provided by the Scottish Environment Protection Agency (SEPA). Base year compliance is from 2016 ANPR surveys undertaken in Edinburgh, forecast year values are based on 2023 DfT estimates<sup>19</sup>.

Given the binary nature of the model, no non-compliant vehicles will enter the LEZ area. This potentially represents a worst-case scenario (in terms of impact on diversion routes) although, in practice, the proposed plan for high-deterrent penalties is likely to result in few non-compliant vehicles deliberately entering the city centre.

## 4.5 Model Results

Only the model results for Option 1 (Base) and Option 3 have been reported as they are most relevant to key LEZ development decisions at this stage.

In the 2016 Base model, approximately 60% of cars are assumed to be compliant across all links, based on the fleet compositions provided. Only around 7% and 50% of LGVs and HGVs respectively are compliant. In this model, total vehicle compliance varies from approximately 45% on York Place to 55% on Queen's Drive (where HGVs are prohibited).

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<sup>19</sup> Department for Transport estimates obtained by SEPA and sent to Jacobs via A. McDonald 18/12/18

In the 2016 Option 3 model, with the LEZ in place, the percentage of modelled compliance is nearly 100% within the city centre but non-compliant vehicles now use the diversion route around the boundary.

As shown in the Figure 2 and 3 below, a number of streets are particularly affected including Palmerston Place, Chester Street, Randolph Crescent and St Colme Street. Dalry Road is also impacted as the Western Approach Road lies within the LEZ boundary, east of Morrison Link meaning some traffic diverts into the Gorgie / Dalry area in order to avoid the restriction. It should be noted that not all roads outside the boundary are affected by increased traffic volumes and some remain consistent or decrease.

The number of non-compliant vehicles is lower in the 2022 model forecast than in the Base model, across all links analysed. This includes links just outside the proposed LEZ boundary, where non-compliant vehicle numbers are highest. By the future model forecast year of 2022, a cleaner fleet means that the number of vehicles which do not meet the LEZ requirements is lower than in the Base year. This is shown in model outputs where an improvement is seen across all modelled links including links outside the boundary where non-compliant vehicles numbers are the highest (as shown in Figure 2 and Figure 3 below).

Despite a general improvement in compliance, displaced traffic into some areas of the city remains a concern and supporting air quality analysis will quantify the air quality impact and guide further decisions on the proposed boundary. Further mitigation may be required.

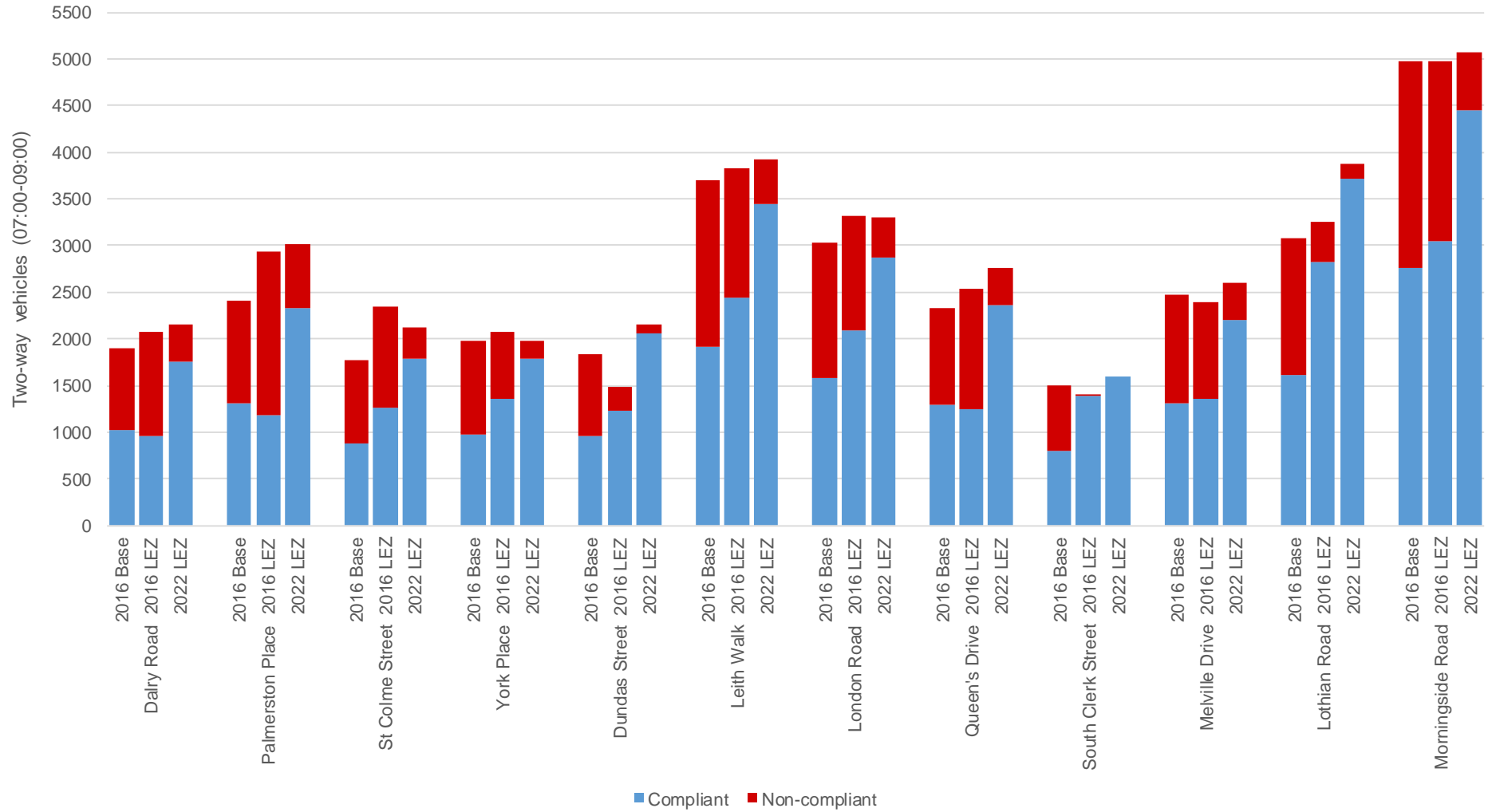
Figures 2 and 3 below summarise total vehicle demand and compliance in morning and evening peaks, under baseline and LEZ scenarios. They show how the number of compliant vehicles varies and the overall improvement over time.

#### **4.6 Further Work**

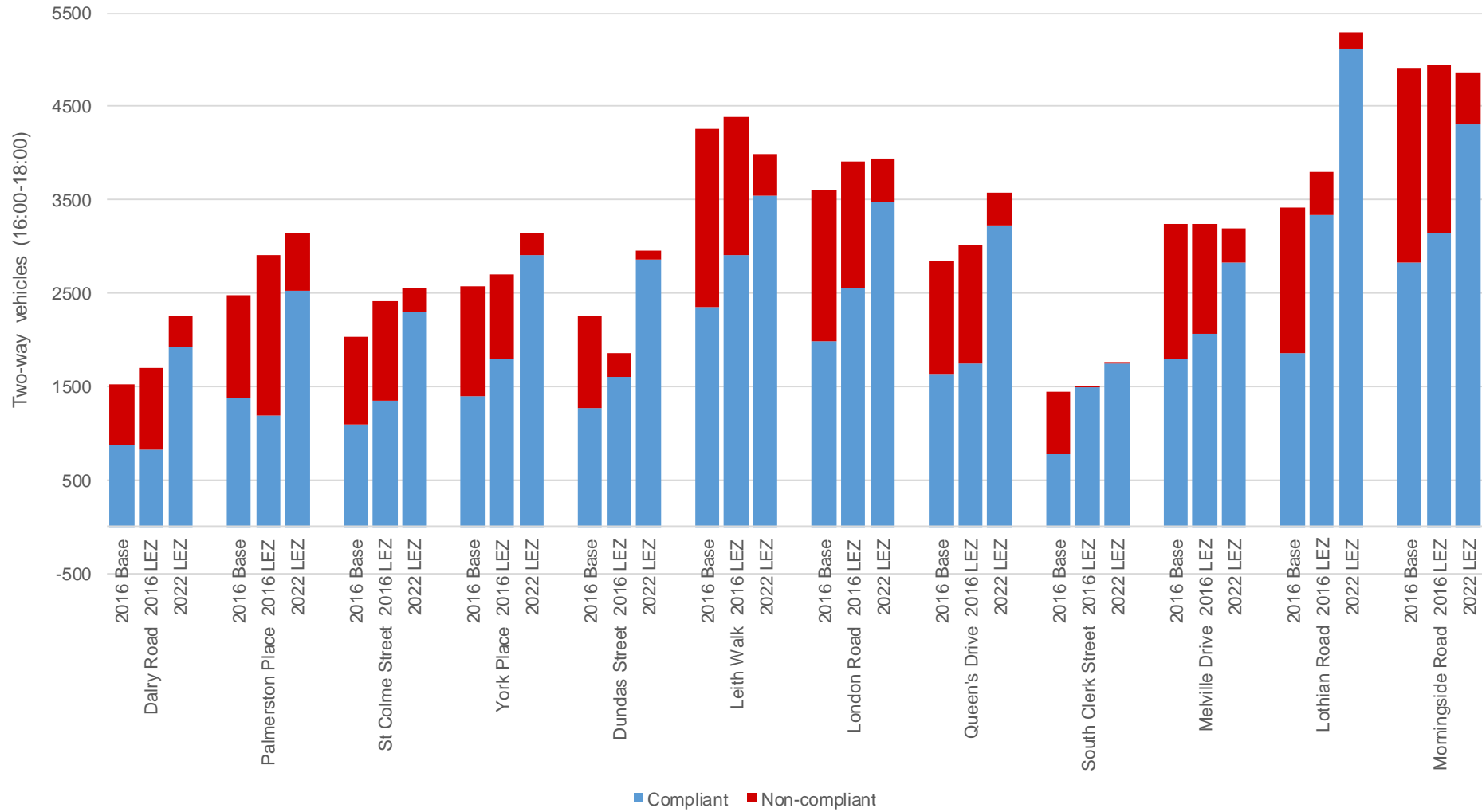
The above modelling was undertaken using Base 2016 Observed and 2023 DfT Forecast compliance levels. All further work will be undertaken using recently surveyed 2019 Edinburgh fleet data and will be used to inform updated future compliance forecasts.

Existing analysis has focused on the implementation end point of 2024; further work will take into account the phasing of LEZ proposals. The implications of the city-wide LEZ boundary will also be considered as part of the next stage.

**Figure 2: AM comparison of compliant and non-compliant vehicles by diversion route street and assessment year**



**Figure 3: PM comparison of compliant and non-compliant vehicles by diversion route street and assessment year**





## 5. Impacts

This analysis presents impacts in four different sections: number of vehicles affected, businesses, people & communities, and costs of vehicle replacement. Mitigation has also been highlighted throughout the impact analysis and in the final “Recommendations and mitigation” section. These impacts are discussed in this section briefly as for this interim stage of analysis it was key to focus on the areas where impacts would be significant, such as businesses and people & communities.

### 5.1 Number of vehicles affected

By showing the number of trips taken into the city centre and city wide by different types of vehicles and how compliant they are with the proposed emission standard, the number of trips that would no longer be permitted and where individuals and businesses need to make some sort of change can be observed. This change could be altering a route, cancelling the trip, changing mode of transport, or upgrading vehicle. The Scottish Government LEZ will be penalty based<sup>20</sup> which will contribute to a higher compliance rate than other cities in the UK but foregoes the possibility of ongoing revenues being generated from the LEZ.

The table below presents a summary of compliance rates for both LEZ boundaries. This is based on the November 2016 traffic data survey for the city centre boundary and DVLA vehicle registration data from 2018 for the city wide boundary.

**Table 3: Number of non-compliant vehicles as a percentage of each vehicle type, by LEZ boundary**

| LEZ boundary       | HGV   | LGV   | Car   |
|--------------------|-------|-------|-------|
| City centre (2016) | 62.1% | 93.4% | 39.5% |
| City wide (2018)   | 62.9% | 83.3% | 33.7% |

### 5.2 Businesses

Businesses are one of the main groups affected by the LEZ and some sectors will be affected more than others due to differing levels of reliance on transport and ability to replace vehicles: for example, a painter/decorator that operates as a sole trader will be heavily reliant on their LGV to collect and store materials and travel to a client.

Small businesses will be less able to replace a non-compliant second hand LGV purchased recently with a compliant vehicle than a larger business that has access to cheaper finance and more able to alter plans to upgrade earlier than expected. Some businesses will be able to invest in new vehicles or adapt to a LEZ to continue operations but others may be no longer be able to operate therefore reducing economic activity. Given that 91% of businesses in Edinburgh are micro/small<sup>21</sup>, their role within the economy and society is significant. Transport Scotland’s LEZ survey results, case studies, and discussions with industry bodies confirmed that businesses are concerned by the LEZ for a number of reasons: increase in costs, maintaining operations, replacing/retrofitting vehicles, and staff travel at atypical times.

Edinburgh’s role as an economic hub is also highlighted by the fact that 51 percent of businesses that responded to Transport Scotland’s LEZ survey visit Edinburgh’s city centre at least once a week. There are a range of opportunities for mitigation of negative impact on small business activity through effective communications and awareness raising, providing links to programmes that can assist

<sup>20</sup> The Transport Bill indicates that driving in contravention of the LEZ’s emission standards will incur a penalty charge: 1 (2)

[https://www.parliament.scot/S5\\_Bills/Transport%20\(Scotland\)%20Bill/SPBill33AS052019.pdf](https://www.parliament.scot/S5_Bills/Transport%20(Scotland)%20Bill/SPBill33AS052019.pdf)

<sup>21</sup> City of Edinburgh Council, 2019, *Edinburgh by Number 2018*,

[http://www.edinburgh.gov.uk/info/20247/edinburgh\\_by\\_numbers/1012/edinburgh\\_by\\_numbers](http://www.edinburgh.gov.uk/info/20247/edinburgh_by_numbers/1012/edinburgh_by_numbers)

businesses to change their vehicles through rental, lease or electric vehicles, as well as the provision of financial support.

Delays to retrofitting vehicles and the availability of compliant vehicles are concerns for commercial fleet operators (LGV, HGV, bus and coach) in a number of sectors: public transport provision, freight, waste collection, and construction. The Scottish Government is providing certification of approved retrofit and increasing capacity of retrofit, but to date only covers a limited range of vehicles. According to key stakeholders in the sector, there is opportunity for market expansion in the vehicle rental and lease business which would also present a solution to both businesses and people alike.

### **5.3 People & Communities**

When a LEZ is introduced, individuals who have a non-compliant vehicle need to make a decision: shift to a different mode of travel, change their vehicle, change the trip destination or cancel the trip. Similar to businesses, for some people this will not be an issue and they will change their behaviour without significant impact on their daily lives. Certain groups will be disproportionately affected by a LEZ because of their characteristics, for example, if they are mobility impaired. This is addressed in more detail in section 3 of this report.

The LEZ will have positive impacts on people's health through improved air quality. This is currently being assessed with further benefits from the LEZ including increases in active travel and improvements to the quality of public space as traffic and noise pollution decrease.

### **5.4 Cost of vehicle replacement**

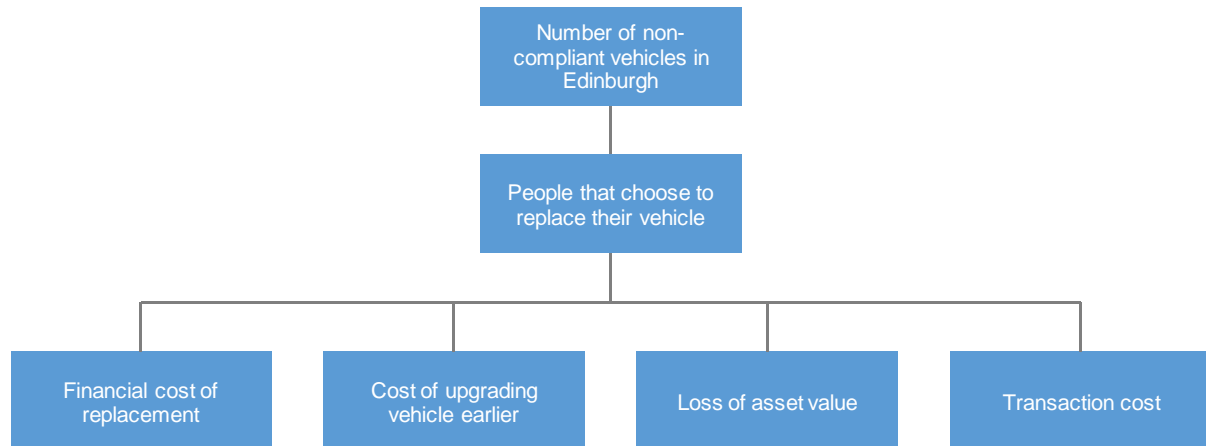
This section sets out the financial and economic cost associated with replacing non-compliant vehicles as a result of implementing a LEZ.

At the heart of the LEZ implementation is a desire for people to be driving cleaner vehicles. LEZs in Edinburgh have been developed and will be implemented alongside a range of wider policy interventions that work to change people's behaviours and encourage the use of sustainable travel modes and where vehicles are used, for them to be as low emission as possible. These policy interventions include the City Centre Transformation and the City Mobility Plan, Electric Vehicle Action Plan, and parking policies.

However, as a result of LEZ implementation, it will mean that for some businesses and people, money will be spent on changing vehicles that otherwise would not have been spent (but would be spent in future years when existing vehicles come to the end of the use). Vehicles will be replaced earlier than expected meaning its operational life is cut short and an asset value is reduced or lost, and people will have to spent time and effort changing their vehicles.

Figure 4 below summarises the different costs of replacing non-compliant vehicles as part of the ongoing analysis.

**Figure 4: Cost of replacing non-compliant vehicles**



## 6. Mitigation options

This section of the report sets out options to mitigate the negative impacts of the LEZ and work towards an improved outcome.

### 6.1 Communications

Interviews, case studies, and surveys conducted in relation to the LEZ highlight the need for communications about the LEZ scheme to be widespread and easily understood. CEC should ensure it has a substantial awareness campaign to ensure that people and organisations are prepared for the LEZ. This will prevent people from being caught out by the LEZ and their usual routines being negatively disrupted.

Communications must be accessible to all including non-English speaking communities, groups that have a low awareness of LEZs, people that are most likely to be impacted (such as those identified as affected populations through the IIA). Communications will need to extend regionally and link in with wider Scottish Government Communication to ensure comprehensive and consistent messaging.

### 6.2 Hardship fund for SMEs and specific households

The IIA shows that certain groups within society should be protected from the negative effects of a LEZ because they are being disproportionately affected by it and have limited ability to avoid the impacts. CEC and the SG should work together to ensure effective delivery of available funding to support these groups.

### 6.3 Extension of grace periods

In the current draft of legislation<sup>22</sup>, grace periods are currently defined as being between 1-4 years. Grace periods are one of the factors that can help to offset some of the greatest negative impacts on people and businesses. CEC could consider applying longer grace periods to help offset the impacts of LEZs.

<sup>22</sup> Scottish Government, 2019, *Transport (Scotland) Bill*, [https://www.parliament.scot/S5\\_Bills/Transport%20\(Scotland\)%20Bill/SPBill33AS052019.pdf](https://www.parliament.scot/S5_Bills/Transport%20(Scotland)%20Bill/SPBill33AS052019.pdf)

## 6.4 Changing the operational time of the LEZ

While the proposals are for CEC to run the LEZ 24 hours a day, 7 days a week, Section 13 (1) of the Transport Bill<sup>23</sup> allows the scheme to run at different hours of the day.

Issues have been raised in relation to vehicle availability and retrofit capacity. One way to offset the impact on operations affected by this constraint may be to consider whether there is a case to consider varied hours of operation.

## 6.5 Further research

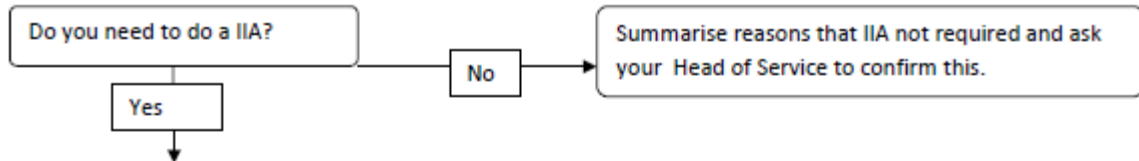
Analysis the 2019 fleet data and further transport and air quality testing will allow more robust conclusions to be reached about the impact of the LEZ. Modelling of the implementation and operational costs of the LEZ will also feed into the design and enforcement of the LEZ and will be informed as the rest of the regulatory regime is developed by Scottish Government.

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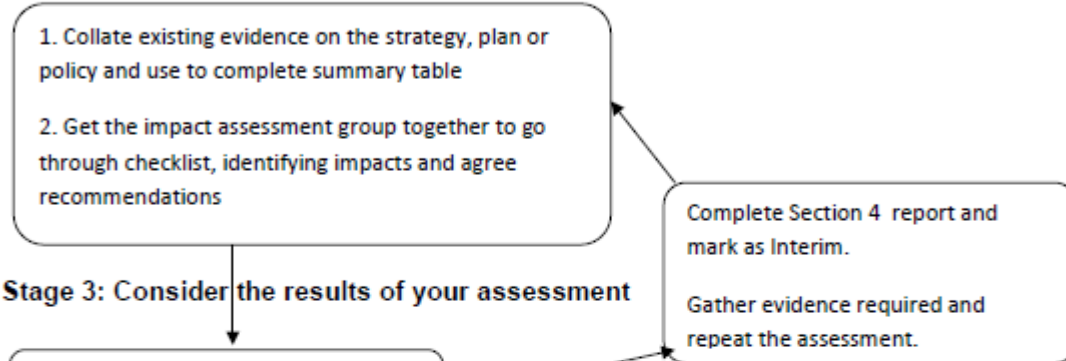
<sup>23</sup> See section 13 (1) of [https://www.parliament.scot/S5\\_Bills/Transport%20\(Scotland\)%20Bill/SPBill33AS052019.pdf](https://www.parliament.scot/S5_Bills/Transport%20(Scotland)%20Bill/SPBill33AS052019.pdf)

## Appendix A NHS Lothian Integrated Impacts Assessment Flow Chart

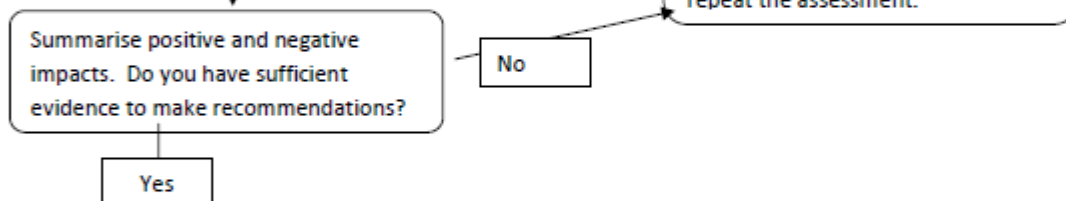
### Stage 1: Identify if an Integrated Impact Assessment is needed



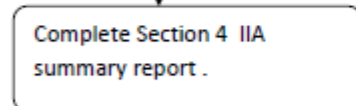
### Stage 2: Undertake Integrated Impact Assessment



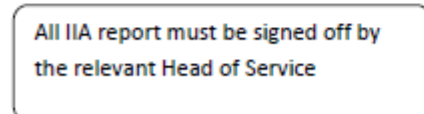
### Stage 3: Consider the results of your assessment



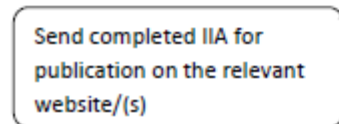
### Stage 4: Report the IIA findings



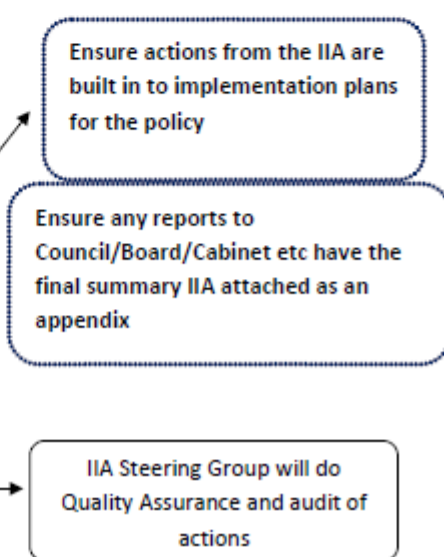
### Stage 5: Sign Off



### Stage 6: Publication



### Stage 7: Act on the IIA



Source: NHS Lothian Integrated Impact Assessment Guidance, November 2017