Overcoming ‘motonormativity’ and car dependency in Edinburgh’s historic city centre

How local access management of private cars can unlock street-space and improve outcomes for safety, public health and accessibility

Cars dominating space next to the National Museum in the heart of the World Heritage Site, Chambers Street, Edinburgh

Transport Planning Society 2024 Theme: "What is the role of the private car in society - how can we best influence it?"

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“If you are planning for ten years, plant trees; if you are planning for a hundred years plant men”

Confucius proverb, quoted in Edinburgh’s Civic Abercrombie Plan 1949

“As a doctor I’ve seen many people in hospital desperate to stop smoking because its killing them and yet they cannot – their choice has been removed”

On tobacco and smoking as a public health issue. Professor Chris Witty, Chief Medical Officer for England, 2024.

Disclaimer

All views presented are those of the author and do not necessarily represent the views of the City of Edinburgh Council or any other organisation mentioned herein. This paper has been written to support discussions on the topic and does not intend to provide definitive answers. The author welcomes critical and constructive challenge on all its contents.

Acknowledgements

Thank you to everyone who has helped me with this piece of work, which has come together through thoughts, ideas and challenging conversations of various kinds – personal and professional. You know who you are!

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Finally thank you to Roger Evans at the Transport Planning Society for supervising me patiently throughout – it's been greatly appreciated.

Executive Summary

Edinburgh's ambitious transport policies have accelerated over recent years towards better management of the private car, including a bold masterplan to remove through traffic from the majority of its city centre streets. However, it is not yet understood how the City will deliver its plans to overcome its ongoing car addiction.

This paper summarises tools available to historic cities seeking to better manage private car access to unlock street-space and compares approaches to implementation. It is hoped that Edinburgh - Scotland's Capital - can learn from best practice in the UK and other countries to adopt creative solutions focusing on safety, public health, accessibility and equity in their development and outcomes.

It is recommended that traffic is managed with lower cost measures in shorter delivery time frames to open up safer spaces for high volumes of pedestrians, and to realise benefits ahead of permanent public realm changes. In particular, pedestrian safety concerns and overall damage to public health from traffic, should justify immediate action.

Transport practitioners and decision makers must ensure that meaningful stakeholder engagement takes place during scheme development, which should seek more equitable solutions with tools currently available to them. Only then will Edinburgh make progress towards its 2030 targets, shaping streets for the benefit of its people, and not just cars.

Contents

Introduction

In 2024, elected members at the City of Edinburgh Council agreed to the 'Our Future Streets' masterplan and to remove intrusive through traffic from the Capital's centre. How it will be implemented is yet to be fully understood. This paper explores how actively managing cars and re-allocating street space can simultaneously re-shape social norms and historical urban environments. Edinburgh has an opportunity to take best practice forward in its own implementation and planning approaches. Hopefully the City can come together to focus on pragmatic solutions, with tangible positive impacts realised in short timeframes.

Motonormativity – addressing our collective car problem

'Motonormativity' represents the shared, and often unconscious, bias for cars above other modes despite actual negative impacts on individuals and society (Walker, Tapp, Davies, 2023, Milner et al. 2024, Walker and Brömmelstroet, 2025). Judgements made by people about cars can often ignore negative impacts such as fatalities, health impacts from air pollution and physical inactivity, while simultaneously overemphasising benefits. Such benefits may be perceived, such as convenience, safety and cost, and may be reinforced by systemic structures in society (e.g. fuel duty, inadequate public transport provision and public investment in road-building for traffic) (IPPR, 2024). Indeed, motonormativity can also be seen in collective inertia of governments to address national targets relating to car use, such as Scotland's 20 per cent car kilometre target (Audit Scotland, 2025).

This paper hypothesises that:

- motonormativity significantly impacts Edinburgh city centre and represents a major public health hazard there specifically;
- other cities have progressed further than Edinburgh in actively addressing motonormativity; and
- actively re-allocating street space – away from cars – can play a significant role in re-casting social norms locally while providing immediate benefits; and

Processes relating to street-space, including in Edinburgh, are iterative, never-ending, and can be summarised by the following 3 steps (see figure 1):

- *Re-habilitate* - 'motonormativity' dominates society and discourses. Today's urban environments continue to reinforce and normalise car dependency, reproducing negative outcomes. Successful street-space re-allocation projects shift attitudes towards accepting more equitable access arrangements for private cars, reducing dependency further (e.g. fewer fatalities, greater modal choice);
- *Re-imagine* – strong leadership and creative planning allows us to imagine transformed streets that are radically different from current layouts; and
- *Re-allocate, re-invent, restore* - creative solutions are adopted, restoring historic settings, with designs improving overall safety, public health and accessibility. Streets achieve their potential, improving peoples' well-being and reducing car dependency further.

- Reducing car dependency
- Reducing car harm
- Fewer people killed, injured or suffering health impacts
- Reducing inequalities
- More equitable and dynamic use of public space
- More liveable cities, thriving economy
- Protected and enhanced built heritage

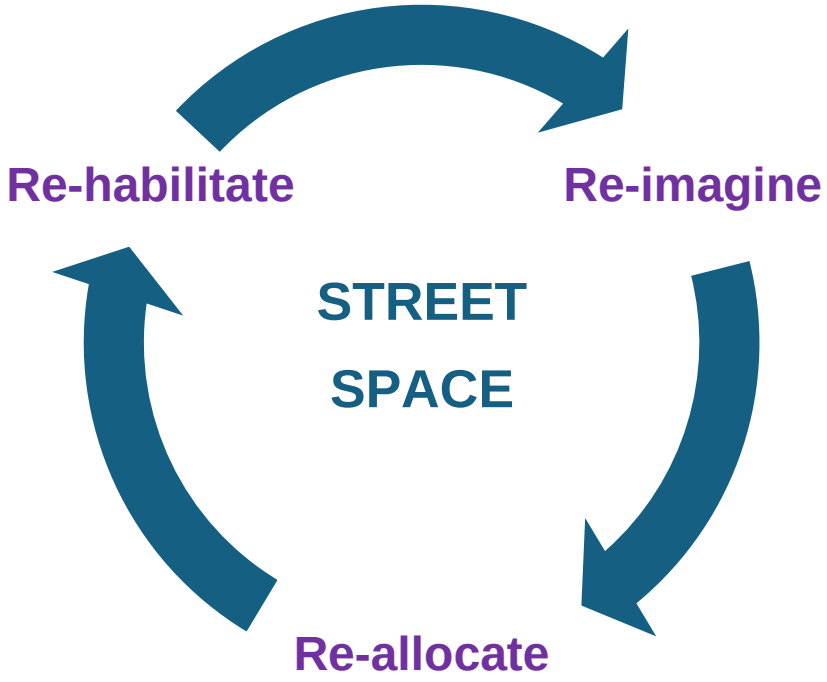


Figure 1. the never-ending cycle of street-space re-allocation. It can tackle motonormativity, car dependency and unlock a host of benefits for all, including for those who drive, simultaneously

Background

Edinburgh – a growing city, a growing car problem

As Scotland's Capital, Edinburgh plays a number of important roles as an historic urban centre, at various scales. Indeed, Edinburgh is not only a financial powerhouse in the UK and Europe, but also a popular destination for an increasing number of visitors for its numerous historical, cultural and environmental attractions. Many of these assets converge on its compact and historic city centre which was inscribed as a UNESCO World Heritage Site in 1995.

Edinburgh, naturally, continues to be an attractive place to live and work. A city of over half a million in 2024 (556,000) its resident population is projected to grow to over 600,000 by 2035.[1] Though much of the growth is not expected to happen within Edinburgh's historic city centre core, that area is under increasing pressure to accommodate increased and more vibrant economic and cultural activities. Regrettably, much of Edinburgh's peripheral low density housing developments continue to 'bake in' car dependency repeating the mistake of the 20th century.

On its current path, demand to visit, work, learn, do business and enjoy the streets and places within Edinburgh's city centre have never been higher, and will continue to rise.

An overview of recent history and city case studies helps to show how transport can play a transformative role in shaping the opportunities and fortunes of cities, including Edinburgh's.

Inducing car demand, creating car dependency

Imagining the car as the solution to Edinburgh's post-war challenges

In the early 1900s Edinburgh was characterised by walking, cycling, horse-drawn carriages and trams. With a burgeoning population, the need for an extensive tram network was developed rapidly, supplemented by a growing bus network. By 1948, public transport ridership peaked at over 275 million journeys per year for a population of around 467,000.[2]

During the same period the private car ownership was increasing exponentially, with levels of congestion and competition for street space were becoming unacceptable as early as the late 1930s (Abercrombie et al., 1949). Though traffic reduced temporarily during WWII, in the early post-war era it rebounded and was projected to grow.[3] Abercrombie's Plan, marked the dawn of the 'predict and provide' philosophy for the private car that dominated transport planning discourses throughout 20th century Britain. For Edinburgh it catalysed the rapid decline of sustainable modes and paved the way for the private car - literally.

Many European cities damaged during WWII used the opportunity to rebuild their cities around the car. Though spared by bombs – planners had a vision to destroy Edinburgh's urban fabric to make way for an inner-city centre motorway network, as outlined by Abercrombie in 1949 (figure 2). This idea proved very powerful throughout the 20th century, and future traffic growth quickly became the main focus, no matter the impacts (Hobbs, 2024). Streets were quickly

[1] Edinburgh, UK Metro Area Population 1950-2024 | MacroTrends
[2] 1951 census
[3] Similar comparisons can be made to the COVID pandemic lockdowns which saw traffic levels decline but rebounding to the pre-pandemic baseline.

transformed; already by 1956 Edinburgh's entire tram network had been fully removed precipitating a rapid decline in overall public transport patronage (Arthur 2024). Ironically, this re-allocation reduced user choice and drove demand for private cars; inducing further congestion and affecting the very bus network which the City now relied upon for the mass movement of its people. This single policy measure was key to establishing and reproducing motonormativity for the people of Edinburgh for the following decades.

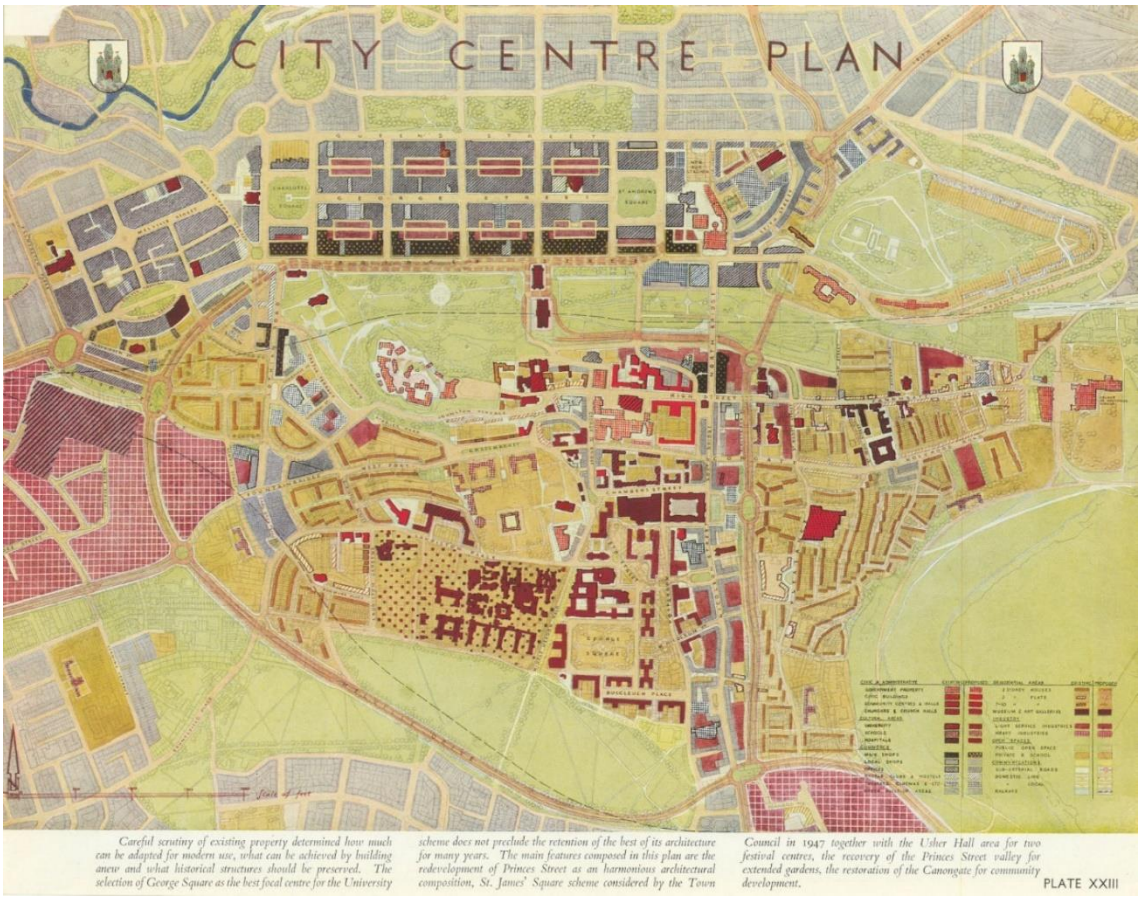


Figure 2. Abercrombie's 1949 City Centre Plan for Edinburgh imagines a rebuilt Princes Street, new developments in the West and new roads cutting through the heart of the historic core

Motorways at any cost? An increasing awareness of the impacts of car dependency

The drive for more traffic capacity in the city centre continued unabated through the second half of the 20th century, spearheaded by Buchanan who kept the prospect of an inner ring road alive (1971,1972). Yet, during this period there was an increasing understanding of negative externalities associated with road building including the destruction of built heritage, pollution and visual impacts. Ultimately, it was the sway of a small number of lobbyists who ensured proposals were not delivered (Joao, 2024). A stark contrast in this approach can be seen when seeing Glasgow's construction of the M8, which resulted in the demolition of swathes of historic buildings. Late revivals of the Edinburgh city centre motorway concept ended by 1990 with the construction of the West Approach Road. The only road-building proposal delivered completely as originally imagined in 1949, was the Outer Bypass completed in 1989.

Interestingly, both Ghent and Leuven in Belgium have city centre ring roads built in the post-war period. Edinburgh's Abercrombie and Buchanan Plans hypothesised that the full pedestrianisation of Princes Street and Bridges could be achieved by routing buses and cars on new roads. These roads were – to the joy of conservationists - never built (figures 3 and 4).

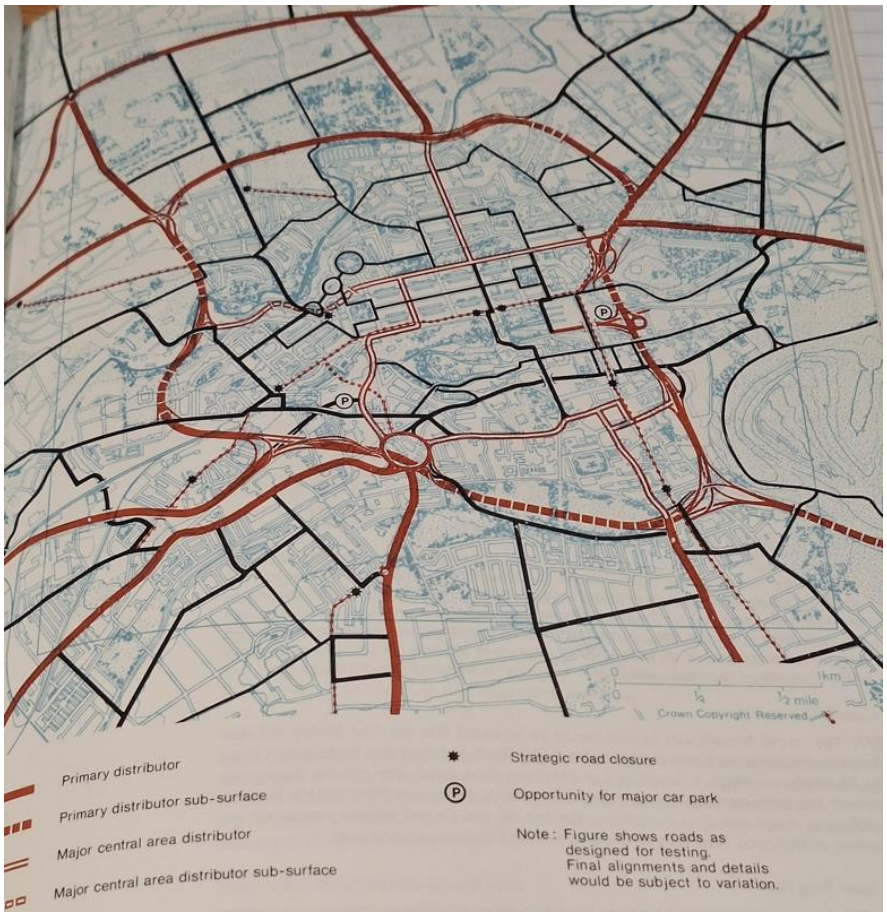


Figure 3. Buchanan's plans in the 1970s saw various routes for new inner motorways in Edinburgh destroying much of what later became a World Heritage Site

Figure 4. The 1960s and 70s saw 'moto-normativity' at its peak - Buchanan's motorway imaged in Edinburgh (left) and the destruction of Glasgow's West End to make way for the M8 (right). Source (right): The Herald.

A slow awakening – towards better management of the car

Uniquely, with national bus deregulation in the 1980s, Edinburgh held on to its municipally owned buses, retaining hope for the City's transport future. However, issues with reliability and journey times caused by congestion have been a problem since the 1930s and continue to this day.

Recognising the need to better manage car demand, by 1974 Edinburgh introduced its first Controlled Parking Zone (CPZ) covering the city centre. This was extended to adjacent residential areas soon after (Edinburgh, 2007), with parking removed on Princes Street in the 1980s and traffic removed from Rose Street – possibly the first pedestrianisation in Edinburgh.

Attempts to deliver a rapid transit system throughout this period were limited, with only a short section of a guided busway ever built (Arthur 2024). By the 1990s it had become more acceptable to re-allocate space away from cars, with attempts to create 'greenways' for on-street bus priority. Significantly, the ban on private car access to Princes Street starting in 1996 provided bus priority. During the mid-2000s, some local access changes took place in the First New Town too. However, these projects did not address through traffic on most city centre streets and some measures were even removed, most notably on George Street.

By 2005, proposals were made for congestion charging, to pay for a new tram and actively manage overall private car demand. These plans did not succeed politically and were bitterly divisive in public discourses. Elsewhere in the UK, such demand management levers have proven to catalyse mode shift, offering both carrots and sticks; most notably in London with congestion charge funding bus improvements and, in Nottingham, where a workplace parking levy paid for its tram expansions.

By 2018, Edinburgh successfully introduced a citywide 20mph speed limit, improving safety but with little impact on overall car demand. Indeed, without major policy levers in place Edinburgh has also struggled to implement a preferred rapid transit system. Despite delays and increasing costs, trams did return to the Capital's streets in 2014. The revival of the tram was an important step but left the management of cars in the city centre largely unresolved. Trams themselves also did not fundamentally address the issue of competition between 'place' and sustainable modes on its streets – see Leith Walk, below.

A policy gear shift? Steps towards effective demand management

Over the last five-years (2019-2024), multiple policies towards better private car demand management can be observed in the City's overall policy direction, including for its city centre:

- Vision Zero agreed in 2024 – target for zero fatalities on Edinburgh's roads by 2030;
- Climate Emergency declared in 2019, Nature Emergency declared in 2023;
- City Mobility Plan (CMP) agreed in 2021 – local transport strategy to 2030, including commitment to reduce car kilometres driven by 30% by 2030;
- City Centre Transformation (CCT) strategy agreed in 2019 - set the vision for a 'place' led approach to pedestrian priority in the city centre;

- Low Emission Zone introduced in 2022 – enforced in the city centre in June 2024 to improve air quality and protect public health by pricing motor vehicle access according to emissions;

- Tram serving the city centre - extended to Newhaven and Leith in June 2023;

- Significant lengths of segregated cycle track and footway improvements crossing the city centre, completed in 2024; and

- COVID-19 pandemic - lockdowns in 2020-21 saw reductions in traffic and 'pop-up' walking and cycling infrastructure installed.

Our Future Streets - a citywide masterplan for integrated planning

'Our Future Streets' seeks to unlock space for place and sustainable modes by providing intended street-space allocations and desired networks for all modes, including general traffic across Edinburgh (figure 5). Importantly, the framework requires planners to consider all modes simultaneously, their users, and seeks to reduce conflicts between modes. It also recognises opportunities in re-allocating space, such as reducing health inequalities (Public Health Scotland, 2022)

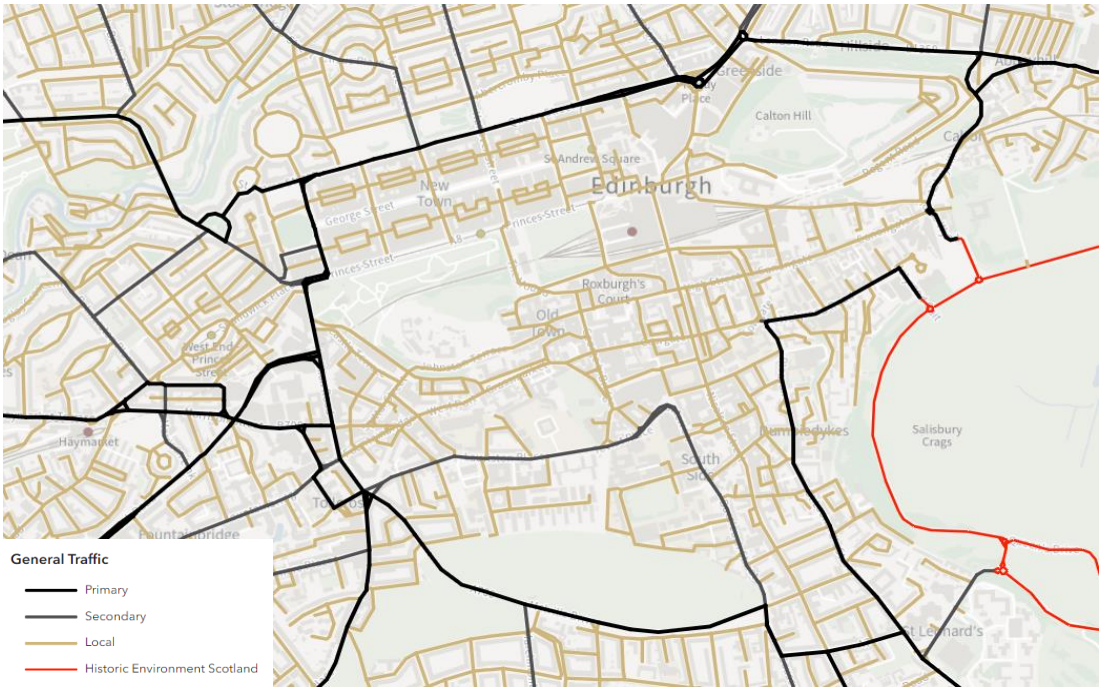


Figure 5. Edinburgh's agreed future network for cars, using the city's existing street-space. Managing access and capacity for cars will be key levers to realising desired outcomes (source: Edinburgh Council)

Most significantly, it included a masterplan for removing through-traffic from the city centre (requiring around 34 new traffic filters), better managing of kerbside space on corridors, and therefore providing significantly more space for placemaking and pedestrians, as envisaged by the original CCT strategy.

Arguably, this period marks the most significant shift in policy and transport planning in Edinburgh since the Buchanan era. Reflective of a wider shift in public discourses away from motonormativity, the ability to re-imagine and re-allocation street-space as become the most viable and acceptable route for demand management. Returning to the concepts of urban destruction to building new city centre roads in Edinburgh are - thankfully - unthinkable.

Equitable and accessible street-space allocation? Learning from the curious case of Leith Walk

Despite progress, there are still examples where re-allocation has led to damaging unintended consequences. Leith Walk saw full scale re-allocation of space to install a tram in 2023 but received widespread negative comments from community and interest groups on its designs.

Squeezing all modes together on a major high street, with significant pedestrian flows and placemaking requirements, resulted in unintended negative impacts. Despite the project's laudable aim to improve public transport provision, designs as built in certain locations, are compromised with ongoing conflicts between:

- Pedestrians, cycles and cars at continuous footways - see figure 6;
- Pedestrians, cycles on narrow footways with street furniture clutter;
- Pedestrians, cycles and limited space for dwelling/café seating, greenery and bins;
- Pedestrians, cycles and vehicles incorrectly loading/servicing on footways.
- Moving traffic and trams/bus;
- Buses and trams;
- Incorrectly parked vehicles and other modes - see figure 6;

Figure 6. A cyclist and car come into close contact at a continuous footway on Leith Walk. Meanwhile a car is seen incorrectly parked on the cycle/footway. In the distance a footway is narrowed to make space for parking and a bus stop (source: author)

Many of these issues could have been resolved with bolder approaches to removing car parking, stricter loading windows and reductions in through traffic on Leith Walk itself and neighbouring residential streets at the design stage (methods since promoted by Future Streets).

Regrettably, those disproportionately impacted by these conflicts are those with disabilities. Indeed, the case of Leith Walk has been cited by the Edinburgh Accessibility Commission as an example where communications, engagement and designs must always place accessibility at their heart.

Leith Walk represents a cautionary tale for street-space re-allocation. It highlights how efforts to address car dependency could be undermined if future buy-in cannot be reached for re-allocation projects.

All future re-allocation projects, including future tram, must carefully consider the needs for place, all modes, and accessibility simultaneously, while engaging stakeholders throughout the design process. Such projects must also address the challenging questions of through traffic, in particular, to maximise overall user safety and accessibility.

Methodology

Edinburgh is the centre of the study, with other cities used for comparisons including Aberdeen, Bath and Oxford in the UK, and Ghent and Leuven in Belgium. These represent small to medium sized cities, and generally with historic centres. Table 1, below highlights select historic cities with heritage, population and tourism pressures.

Table 1. A comparison of population and tourism pressures, between three historic cities with World Heritage Sites.

		Edinburgh	Bath	Ghent
Population	**2024**	559,000	111,000[4]	477,000[5]
	Growth by 2035 (%)	8.1% increase[6]	Unknown	3.8% increase [7]
City centre	**Geography**	3.1km2 [8] - 4.5km2[9]	~0.5km2	7.65km2 [10]
	World Heritage Sites[11]	4,500 buildings (75% listed) and the entire city centre (Old & New Towns)	Whole city, including city centre	2 monuments are UNESCO inscribed
	Tourism impact, 2023	Between 2.3 -5 million international visitors in 2023[12][13] World's largest performance arts Festival	Over 1 million[14]	1.3 million tourists a year[15]

Information and interpretation for this paper is drawn from recent meetings with various stakeholders from the following organisations.

Public sector organisations

- The City of Edinburgh Council
- Aberdeen City Council
- Public Health Scotland
- Bath & North East Somerset Council
- Oxford City Council Oxfordshire County Council
- City of Ghent, Belgium
- City of Leuven, Belgium

[4] Bath, United Kingdom Population 2024
[5] Gent, Belgium Metro Area Population 1950-2024 | MacroTrends
[6] Edinburgh, UK Metro Area Population 1950-2024 | MacroTrends
[7] Gent, Belgium Metro Area Population 1950-2024 | MacroTrends
[8] Edinburgh Low Emission Zone size
[9] Edinburgh World Heritage Site size
[10] Ghent inner ring road area
[11] UNESCO World Heritage Centre - World Heritage List
[12] Edinburgh Tourism Statistics - How Many Tourists Visit?
[13] Edinburgh & Lothians - Tourism Statistics | VisitScotland.org
[14] Roman Baths & Pump Room welcome one million visitors in 2023 - Visit West
[15] The Brussels Times

Others

- Edinburgh Accessibility Commission
- Stantec Ltd
- Sustrans
- SYSTRA
- Transport for All

Positionality statement

The author's positionality is a white, heterosexual, cisgender man, with no known disabilities affecting mobility, and they are currently in the ABC1 NRS social class.[16] The author is university educated and grew up in the countryside but now lives in Leith, near to Edinburgh city centre. The author is a regular pedestrian and cyclist, semi-regular bus/tram user and occasional private car driver across Edinburgh among other places. The author also recognises the daily impacts of motonormativity on their own experiences as a user of various modes of transport and of public spaces.

This statement of self-reflection is given to acknowledge that potential associated biases have been continually considered by the author while writing this paper but are unlikely to have been fully removed.

[16] Social Grade | National Readership Survey

Tools for managing cars

Appendix B summarises the full range of tools for managing kerbside parking and moving cars which are most effective when used in combination. This section compares approaches cities have taken for implementation.

Management at the kerbside

Consolidating parking 'off-street'

On street parking at the kerbside is not well-suited to historic streets as it represents a poor utilisation of public space that could be better used for place/dwelling, pedestrians, accessibility and economic and cultural activities (such as loading, servicing and civic events). Cars also have a significant visual impact in heritage settings. Critically, parking also drives unsustainable private car trips to city centres.

Acknowledging certain trips will always be made by car, many cities have ensured parking spaces are reserved for residents, blue badge holders and occasional trippers. Cities looking to reduce impacts tend to consolidate their city centre parking into multi-storey or 'off-street' car parks which represent better use of limited space, when compared to on-street bays. In

Figure 7. In Ghent, on-street parking was removed to reveal a historic waterway. Leuven have similar plans which would uncover a medieval bridge buried by parking (source: Reddit)

Leuven and Ghent, this consolidation has opened up huge amounts of space, allowing the restoration of waterways; providing new opportunities for access to nature and revitalised local economic activities (figure 7).

A comparison of off-street car park availability in different city centres is given in table 2. Edinburgh's city centre off-street car parks provide ample space to support the immediate removal of on-street parking based on comparisons with other cities. Peripheral Park & Rides (P&R) help cities consolidate commuting and in-bound car journeys before they reach city centres, reducing impacts further. Notably, Oxford has a similar level of overall provision to Edinburgh, but the former has a higher proportion of spaces at its P&R sites helping to remove inbound traffic to its city centre.

For future off-street parking demand, Edinburgh should focus on expanding its P&R capacity, especially with the growth of car dependent developments at its periphery. Future tram and bus priority projects should include improvements to P&R if their aims to increase ridership and reliability, also considering cost and convenience, are to be achieved.

Edinburgh should also expand the coverage of Controlled Parking Zones (CPZs) across all neighbourhoods and possibly at a low cost to residents. This would help to ensure commuting car traffic use P&Rs rather than parking in residential areas. P&Rs would benefit from car park occupancy tools such as that produced by Bath, to help drivers in reducing searching behaviour.

Restricting access to city centre streets and removing on-street parking would encourage drivers to use P&Rs, with the added benefit of retaining access to existing off-street car parks in the city centre. Though ideally these should remain less desirable (i.e. more costly) than P&R options. Many cities in the UK and beyond own their off-street car parks and this is something Edinburgh could explore further to offset revenue impacts and more closely manage demand.

Improving on-street car parking – an accessibility approach

In promoting off-street car parking, parking desirability should be considered in terms of safety, costs and for those with mobility and accessibility requirements. Ghent and Leuven do not permit blue badge parking within their centres, but do provide blue badge parking nearby. Similarly, in UK contexts, Aberdeen and Bath clearly advertise where blue badge parking is available at the edge of their city centre access schemes – see Appendix A.

Opportunities to improve blue badge parking provision can be explored when reducing number of pay and display bays, helping mitigate impacts relating to accessibility. Indeed, when removing on street parking, Ghent and Leuven added additional blue badge parking bays (figure 8) as part of their parking plans.

Figure 8. Dedicated blue badge bays installed in Leuven as part of a re-design of public realm space which was car parking removed (source: author)

Such opportunities can also protect resident provision and may improve overall accessibility, by reducing pressures. Overall, the over-provision of pay and display spaces, combined and ample off-street parking in and around Edinburgh city centre, offers opportunities for significant removal of general off-street parking for non-residents. This would also have accessibility

benefits for blue badge holders and residents. The promotion and improvement of Edinburgh's multiple Park & Rides located at the City Bypass, complements this approach.

Management of moving cars

Tools for managing moving cars (also known as 'traffic filters') can range from signage, priority changes, cameras and bollards, as summarised in Appendix B. A summary of the how moving tools are applied in cities, alongside their network characteristics, is summarised in table 2.

Automatic camera enforcement

Localisation of enforcement powers has taken place in England and Belgium, and to a lesser extent in Scotland, to allow camera enforcement for moving traffic offences by cities. Automatic Number Plate Recognition (ANPR) camera enforcement can be employed to effectively manage access without requiring the changing of street layouts beforehand.

In terms of how ANPR systems operate, Oxford and Belgian cities provide models for how access management can be applied flexibly. For example, Ghent's ANPR systems allow goods vehicles to access streets during certain times only or penalties will be issued. Oxford's proposed traffic filters have a broad range of categories that would allow varying range of access permits, based on the proportional impact and access requirement. Permit categories including resident passes, blue badge holders and hospital patients among other locally defined and agreed sub-categories.[17]

These models help maximise accessibility and represent a less strict approach to fully removing private cars, allowing for the design of balanced and proportional local schemes. Interestingly the permit categories and criteria in Oxford were agreed after significant engagement on a stricter scheme. This highlights how acceptability can improve if comments are meaningfully addressed during schemes' development.

Aberdeen's bus gate scheme is the least flexible of models presented, as permits or timed windows are not available. Instead, it bans all vehicles 24/7 with the exception of all goods vehicles and local taxis and private hire vehicles. Notably off-street parking access is unaffected for private cars, which lie out with the scheme. Figure 9 shows how ANPR schemes operate in Aberdeen and Belgian cities.

[17] Oxford traffic filters: How they will work | Oxfordshire County Council

Figure 9. Aberdeen's bus gates use ANPR, signage and road markings (top left source: BBC). In Leuven, ANPR is used with signage to open up space on pedestrian streets (right) and those with buses (bottom, left). ANPR can be applied very flexibly to streets (source: author)

Bollards and physical barriers

Physical barriers are often the only way to stop vehicles passing a certain point, allowing pedestrians and cycles to filter through safely. Cars and other vehicles generally cannot pass. The nature of physical barriers can vary from permanent static bollards in foundations, to removeable or retractable bollards. Planters, concrete blocks and other immoveable objects can be used to manage access and can add to placemaking or greening efforts, if applied sensitively.

Since the 2016 vehicle-borne terrorist attacks in France and Germany, other cities have taken a counter-terror approach to managing pedestrian spaces in city centres, as threats remain 'substantial' (Hess & Mandham, 2022, BBC 2017, UK Government 2024, Ready Scotland, 2024). Edinburgh (figure 10) and Bath both did so with temporary infrastructure initially. Bath has taken this approach to permanently securitising its city centre streets, aiming to meet heritage, accessibility and pedestrian safety requirements.[18] Similarly to Oxford, plans for Bath originally sought to remove all private car access on streets but this was not deemed acceptable locally, and plans were adjusted accordingly.

[18] Bath 'ring of steel' cost doubles to more than £7.4m - BBC News

Figure 10. 'Temporary' physical protection for pedestrians has been in place on Edinburgh's Royal Mile since 2017 (top). Hunter Square has pop-up infrastructure during the summer Fringe (left, source: Crowdguard) but is unmanaged during the rest of the year, despite continuous high pedestrian footfall (right, source: author December 2024)

Other ‘pop-up’ infrastructure at Victoria Street, High Street, Cockburn Street and Waverley Bridge in Edinburgh include low-cost planters and concrete bollards. These can unlock space to improve pedestrian safety for much the same effect as more expensive measures (figure 11).

Figure 11. Grassmarket (top, left), Victoria Street (top, right) and Waverley Bridge (bottom, source: Google) in Edinburgh are key pedestrian destinations. Planters and temporary barriers can be effective for protecting pedestrian safety especially when rising bollards are not properly maintained or operated.

ANPR and bollard access can be combined to provide automatic management, reducing human resource costs, but requiring other supporting measures such as traffic lights and clearly communicated protocols (Manchester City Council 2024). More complex systems, such as those using retractable bollards and ANPR systems tend to be more expensive to install and can be susceptible to damage and ongoing maintenance costs.

However, they have the added advantage of flexibility, compared to static barriers, which may allow cities to retain more equitable access arrangements and likely to provide better value overall.

Table 2. A comparison of cities by approximate numbers of tools, car parking capacity and network priorities for cars.

City centres		**Oxford**	**Ghent**	**Aberdeen**	**Edinburgh**	**Bath**
Current tools used to manage traffic access	ANPR locations	0 (6 proposed)	8	9	0	0
	Bollard/planter locations	~11	~100	Unknown	~8	~30
'Off-street' car parking spaces	City centre	~1700	~9000	Unknown	~5000	~2000
	Park & Ride	~7200	~1200	~2000	~4400	~2700
Network management	Purpose built inner distributer 'ring' road	No	Yes	No	No	No
	Purpose built outer distributer road	No	Yes	Yes	Yes	No
	Network hierarchy plan	No	Unknown	Yes	Yes	No

In terms of use of access management tools in city centres, table 2 highlights that Edinburgh has far fewer locations where tools for managing moving traffic are in place. This is particularly troubling as Edinburgh is also the largest of the five cities referenced, so might be expected to require more tools to address the scale of its traffic and population demand pressures.

To maximise pedestrian and overall safety considering streets' needs, a combination of these tools will be required in Edinburgh, as in other successful city cases.

Approaches to implementation

Network changes

Supporting policies

Cities seeking to remove through-traffic from their centres understand that re-defining network priorities can ease their implementation and improve driver understanding of the changes. Aberdeen, for example, undertook a hierarchy review of its entire road network and de-/re-classified many, before implementing its city centre bus gate scheme. This helped drivers to find alternative routes that do not pass through the city centre, supported by the installation of new signage. Similarly Amsterdam's Plusnet, Auckland's Future Connect and Edinburgh's Future Streets provide interactive masterplans for integrated transport systems, including the car and general traffic.

Table 2 highlights a distinction between historic cities in terms of the presence of inner distributer 'ring' roads. The lack of inner 'ring' roads for private car consolidation is common to all UK cities and in contrast with Belgian cities. Edinburgh and Aberdeen have the advantage of purpose-built outer distributer roads, which would complement revived Park and Ride and public transport priority strategies at their peripheries.

Levels of overall traffic may remain challenging when consolidating networks and would benefit from other major policy levers applied to cars citywide levels, such as road user charging, workplace parking levies and further parking controls.

Experiment, adapt, implement

Priority changes often require alterations of layouts, including at junctions, where traffic capacity can be most challenging to manage. In Ghent, they blocked off arms to junctions with temporary materials, to divert traffic away from pedestrian priority areas, as Edinburgh has done at the High Street and Lawnmarket. See appendix C, also.

Tools applied temporarily may be more effective for experimentation and offers opportunities for tweaking. For example, in Belgium and Edinburgh concrete blocks can be moved if other priorities want to be tested. Belgian cities follow the principle that changing priorities for car access should come first, with expensive re-allocation of space with permanent materials taking place later. Notably, in Edinburgh experimental measures have proven politically divisive; with some COVID-19 measures removed with others retained and generally received positively, despite not being perfect.

Consolidation of traffic may have unintended consequences such as re-routing of cars into residential areas, cited as a concern with Brussels 'Good Move' proposals and common to all cities making such changes. Oxford and Edinburgh benefit from other access management schemes including 'Liveable Neighbourhoods' which can remove through-traffic from residential and school streets. Experimental approaches and 'pop-up' infrastructure approaches in neighbourhoods surrounding city centres may help reduce potential displacement impacts and extend the realisation of benefits.

Communications and co-design

Implementing changes to car movements requires clear communications for drivers. Ghent provide an interactive online route planner which helps drivers understand rules and adjust to new routes. These changes were planned and prepared for over a two-year period as part of

a ‘circulation plan’, where Ghent removed over 2,500 relic signs while installing new signs and filters. These changes were launched in one day and unintended traffic impacts, both perceived and actual were short-lived. Similar comparisons could be made to Edinburgh’s recently installed Low Emission Zone and others in Scotland.

Across all of the comparator cities, maps have been published to improve understanding and awareness of access arrangements – see appendix A. These can help communicate complex arrangements including access timing, as well as where blue badge parking is located, with the advantage that they can be accessed online at all times.

On-street features including road signs and markings are also required to redetermine priorities and are relatively low cost compared with full scale re-allocation. In addition to road signs that clearly outline loading windows and access (see appendix B and figure 9) other physical measures can be used for communications. Indeed, in Leuven advisory ‘traffic lights’ give an indication for which modes are not permitted, depending on the time of day, helping to improve understanding of restrictions (figure 12).

Figure 12. ‘Traffic lights’ in Leuven communicate which modes are not permitted at that time and is updated during the day automatically (left, source: author). An interactive tool for engaging stakeholders with street-space allocation (right, source: Edinburgh)

When designing streets, it is important that co-design approaches are adopted, and planners meaningfully engage stakeholders. For example, many cities applied top-down approach to installing pop-up infrastructure during the COVID-19 pandemic. In Edinburgh this approach proved divisive, and it is recommended that participatory approaches to co-designing schemes can help achieve wider stakeholder and public buy-in. In 2023, Edinburgh engaged stakeholders across various groups simultaneously and asked them to re-design streets from the bottom-up. This helped stakeholders collaborate with one another, test options creatively, better understand constraints and navigate trade-offs. Ultimately, they were better able to reach more acceptable compromises for street-space allocation, than if they had been engaged individually or had not been engaged at all.

Conclusions & Recommendations

Edinburgh should take best practice forward to better manage private car access in its historic centre. A carefully designed city centre local access management scheme should be developed across the following core themes:

Safety and public health- *improve safety and public health, by reducing the number of fatalities and casualties associated with motorised traffic and car harm relating to health;*

- Bath took a 'safety first' approach and mitigating risk to pedestrian safety was central to its scheme design.
- Ongoing risks relating to pedestrian safety in Edinburgh are significant and must be at the heart of expedited plans to better manage vehicular access;
- A more holistic approach should see streets themselves recognised as a form of preventative medicine - unlocking immediate and longer-term public health benefits in Edinburgh.

Accessibility - *improve accessibility for all users, making careful consideration for those with disabilities affecting mobility, and actively engaging with them throughout the design process to ensure designs also maximise pedestrian safety;*

- Edinburgh can learn from Leith Walk and is showing leadership with its Accessibility Commission. Other cities (Ghent and Leuven) have dedicated human resource for accessibility and Edinburgh should adopt this model;

Liveability, equity & proportionality–*improve place-making to maximise pedestrian safety, help businesses thrive and reduce inequalities;*

- Belgian cities focus on the liveability of their city centres, putting place-making first and minimising overall allocation of space to movement. Providing safe space for high pedestrian flows can be accommodated if carefully managed and designed access systems (ANPR/bollards) are put into place.
- Edinburgh should actively plan for a high quality integrated and equitable system for managed access, and accept that this may take several years to develop and interim measures can be phased in the meantime to address known issues.

Engagement & acceptability of experimental approaches - *develop designs from the 'bottom up', co-designing with key stakeholders and communicate plans clearly to the public around the core theme of pedestrian safety.*

- Oxford and Bath changed scheme designs after stakeholder feedback and public comment. Meaningful engagement takes place before implementation and plans adjust accordingly. All cities, including Edinburgh, have used 'pop-up' infrastructure to experiment, learn and adapt to improve pedestrian safety, before installing permanent schemes;
- Edinburgh should re-engage stakeholders with experimental methods to help improve pedestrian safety in short time frames, maintaining its vision for an integrated and equitable management system. Edinburgh should employ co-design approaches and clearly communicate how changes will affect various user groups.

Next steps

Edinburgh should focus on implementing a local access management scheme with powers already available to it. Aberdeen's ANPR bus gate model provides useful learning for how Edinburgh could better manage its network, alongside discussing the suitability of other 'pop-up' measures, as explored in appendix C. Edinburgh should take an integrated approach to ANPR, bollard and access management with a single co-ordinated 'City Centre Local Access Management System'. Notably, Edinburgh can learn from others and its own experiences; removing through access can unlock space for early realisation of benefits **before** permanent measures are installed to reduce unintended consequences.

Transport practitioners and policy experts generally understand how managing local access can unlock city centres' potential. Above all, decision makers need to be bold and must tackle management of the private car head on. Working with the public and stakeholders to shape proposals creatively so they are acceptable, proportionate and result in more equitable outcomes than current arrangements focusing on accessibility for users. Finally, they must also communicate how street-space reallocation is a key tool to addressing immediate safety and public health issues. This could help increase buy-in for changes as both topics are critically important for the quality of life for everyone and this is fairly well recognised.

Final thoughts – beyond motonormativity in Edinburgh

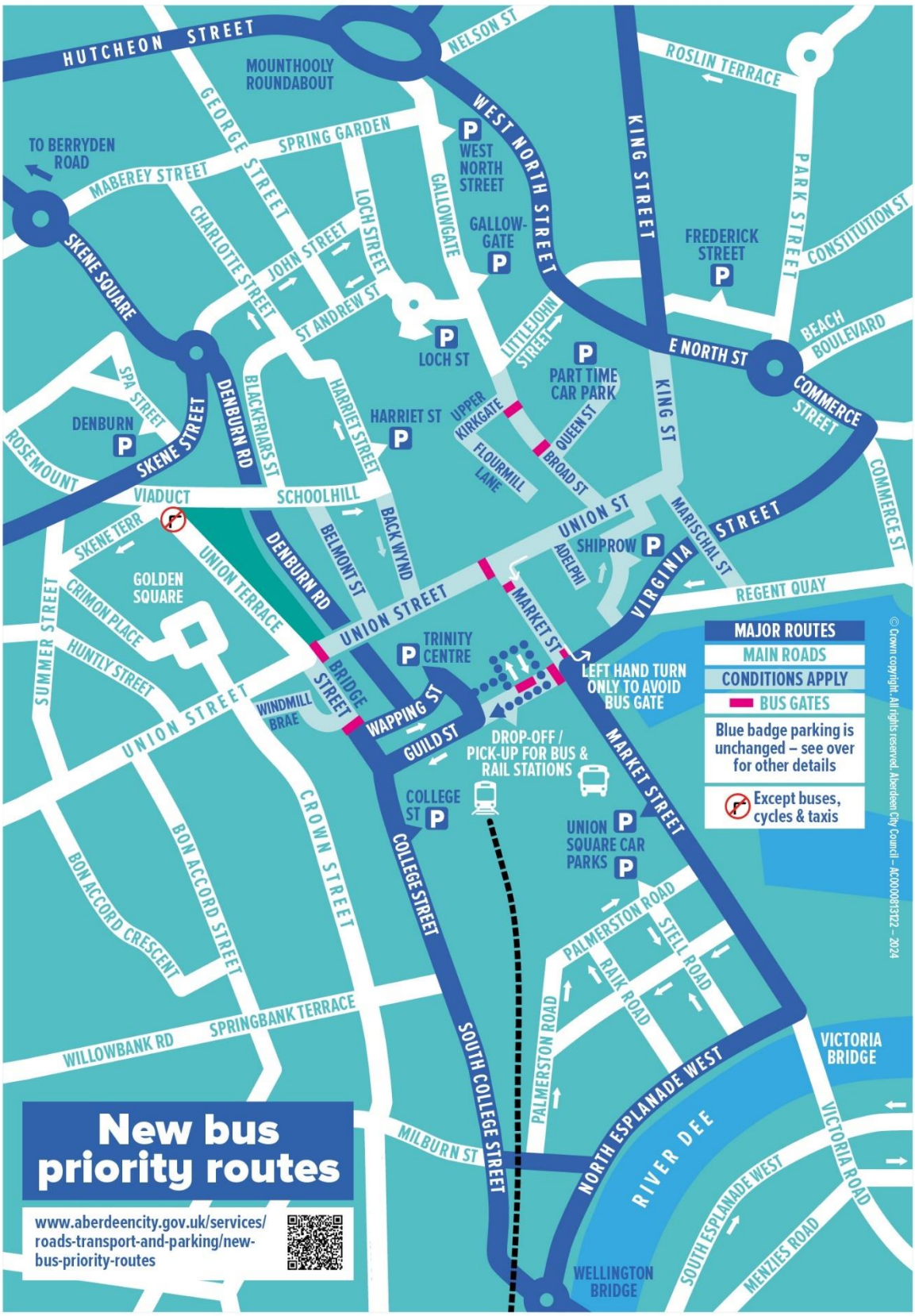
If the public, practitioners and decision makers can fulfil the vision of removing traffic from the city centre - future generations in Edinburgh might one day struggle to comprehend that its streets and people ever suffered from car dependency.

As it is now inconceivable to light a cigarette inside a cafe on the Royal Mile, it would also be wholly unacceptable to destroy that same cafe to build a motorway on top of it. But it is important to remember that, over time, social norms shift and not always in a linear direction; the thinkable can become unthinkable and the unthinkable can become thinkable.

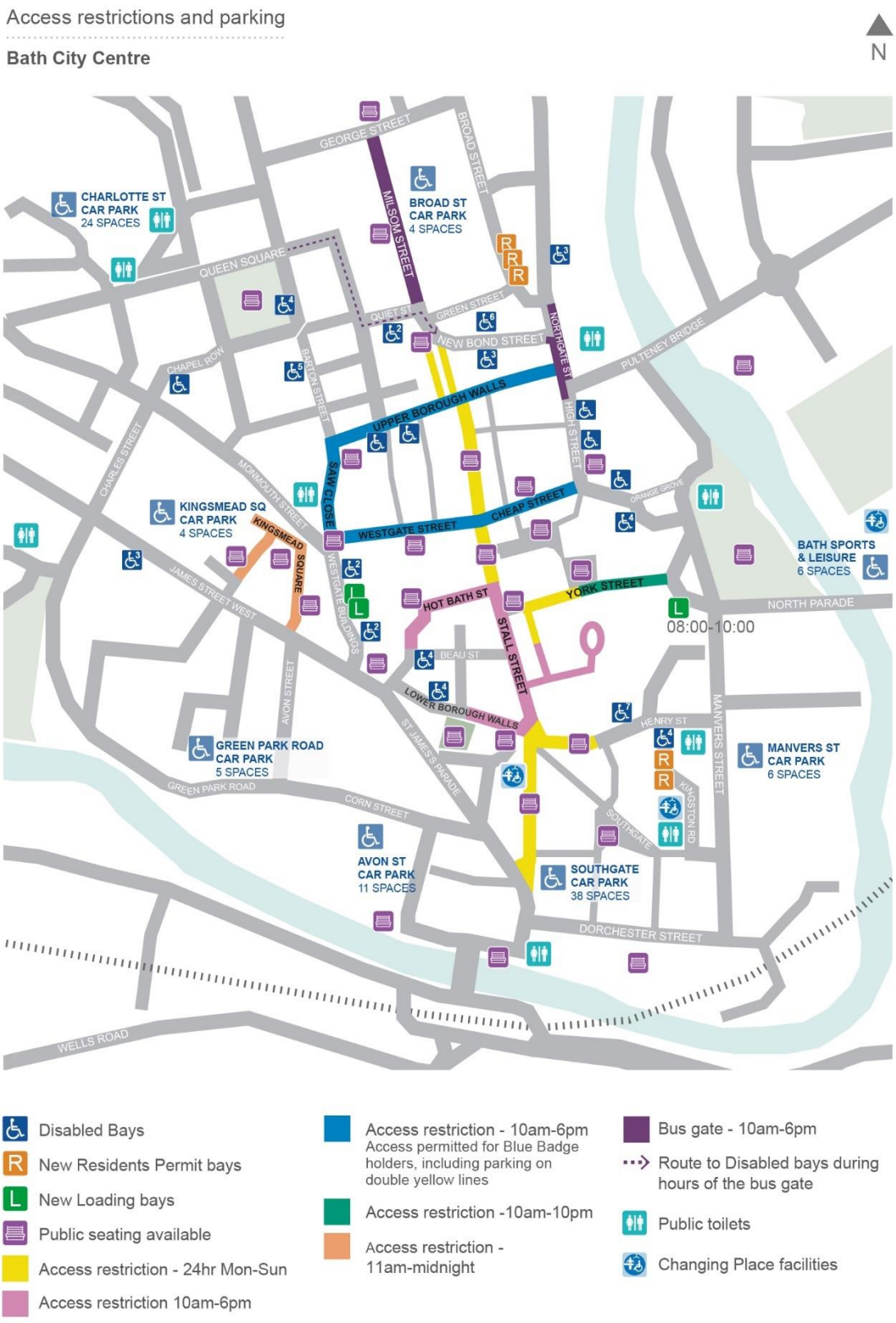
That leaves one final question. If motonormativity defined the last 70 years of transport planning in Edinburgh, will it take another 70 years to fully overcome it?

Appendix A – city centre local access arrangements

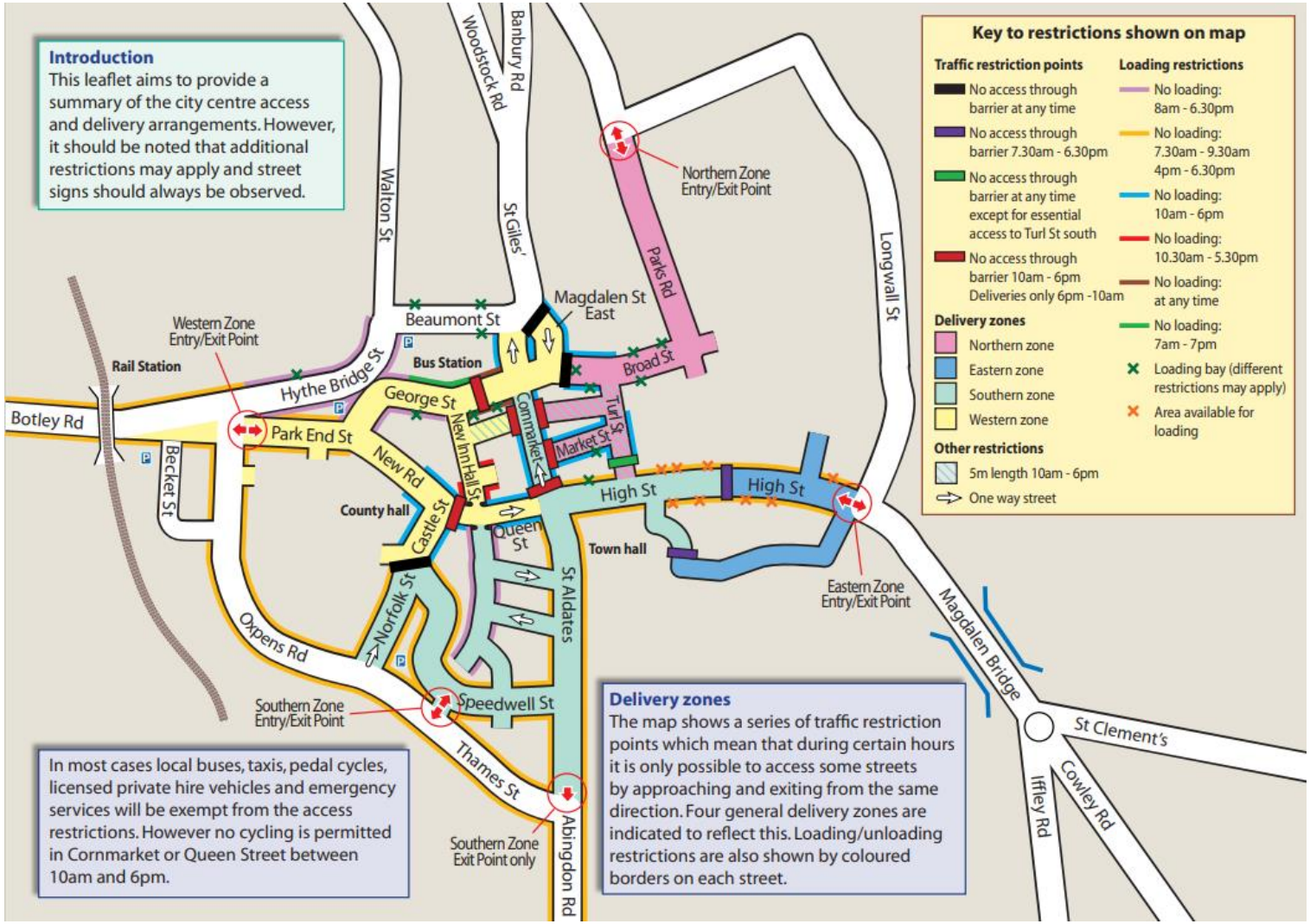
Aberdeen, Scotland/UK



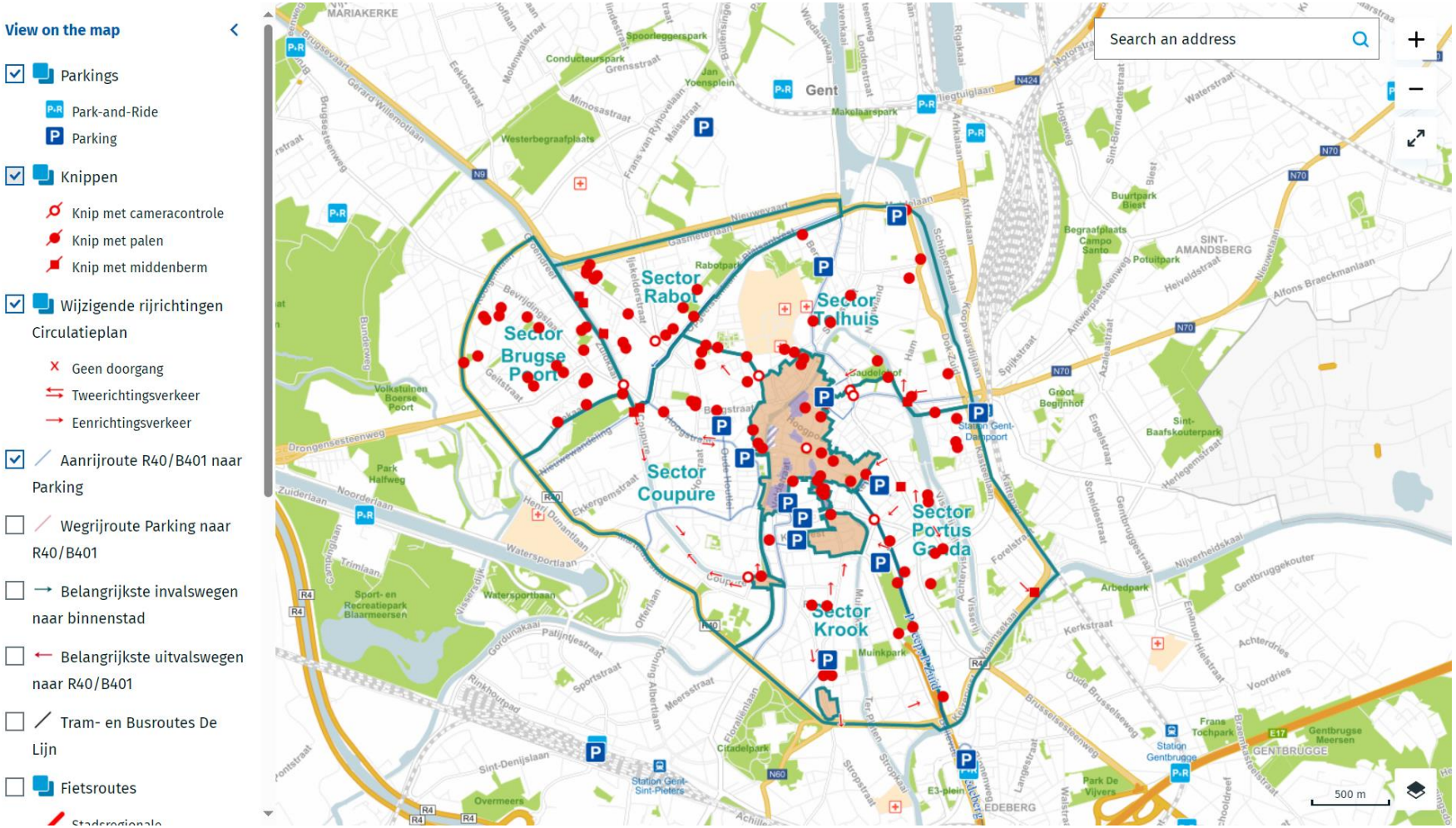
Bath, England/UK



Oxford, England/UK

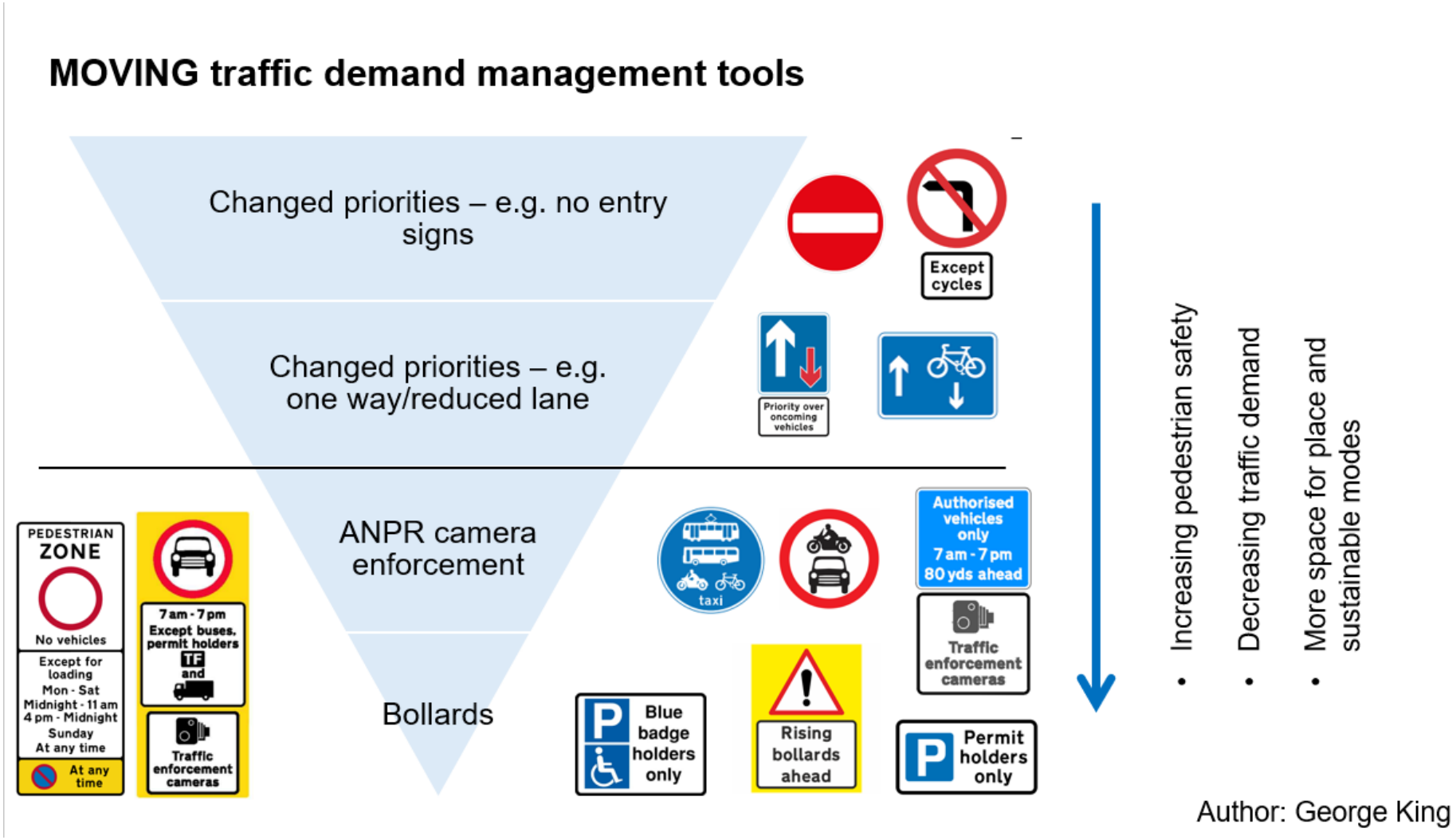


Ghent, Belgium



Leuven, Belgium

Appendix B – local demand management tools, by effectiveness in improving safety



STATIC traffic demand management tools

Neighbourhoods (Controlled Parking Zones)

Permitting of on street parking – residents, pay & display (P&D)

Corridors

Targeted reduction of P&D on street parking

City centre/high streets

Strict loading windows & no P&D on street by default (except BB/cargo bike)

Most sensitive/constrained street sections

No parking or loading at any time

- Increasing pedestrian safety
- Decreasing traffic demand
- More space for place and sustainable modes

Author: George King

Appendix C – re-inventing, restoring and reallocating space in Edinburgh city centre

Considering proportionality with pedestrian safety at its heart, Edinburgh could explore phased, experimental and lower cost measures (see below). The examples given are intended to be illustrative and how creative approaches can lead to benefits. Any implementation of changes to traffic requires careful coordination, planning and meaningful stakeholder engagement.

Bridges corridor

North and South Bridge form the 'Bridges corridor' crossing the heart of the city and the World Heritage Site. They are key routes for buses, pedestrian flows and generally have a high street function. Historically they hosted trams, but these were removed to make space for cars in the 1950s.

Neighbouring Chambers Street hosts the National Museum of Scotland – one of the nation's top attractions.

The junction is represented by major north-south pedestrian flows and there are ongoing conflicts between traffic and pedestrians.

At these locations footways are narrow, characterised by clutter, and are uncomfortable to walk along – accessibility and pedestrian safety are already an issue, especially during peaks such as the Festival.

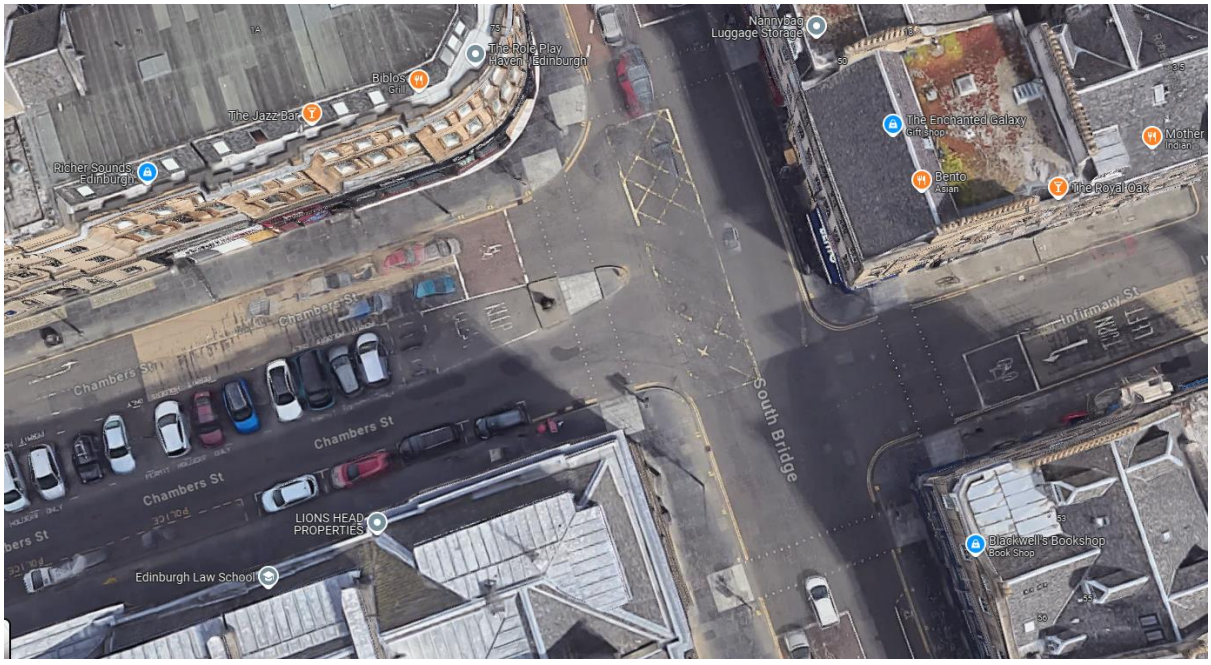


Figure 13. Junction of South Bridge, Infirmary Street and Chambers Street (source: Google)

An example of how lower cost tools could be installed experimentally at a single location are highlighted in figure 14. Features of this example include maintenance of access by car, via:

- a northbound ANPR bus gate with exemptions for buses, cycles, goods vehicles and taxis on South Bridge at the junction with Chambers Street – to reduce traffic impacts on South Bridge by around 50%;

- Infirmary Street made one way into South Bridge – to reduce dangerous conflicts between traffic coming from Chambers Street and pedestrians crossing Infirmary Street. Exiting traffic remains turn left only to reduce congestion/conflict impacts; and

- Chambers Street two-way access maintained, with targeted reduction in parking provision. New space is used for improved loading/servicing provision and/or blue badge parking. Open space can be used for pedestrians and civic activities.

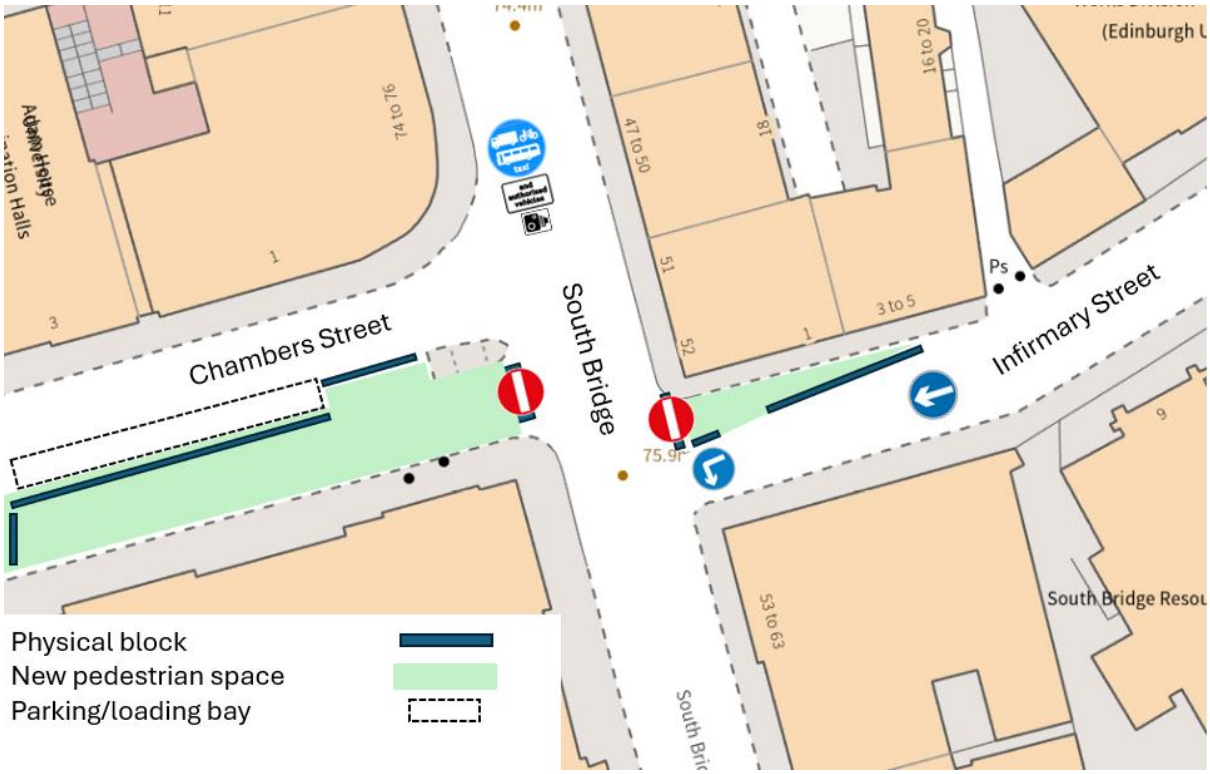


Figure 14. A possible change in priorities at South Bridge junction, focusing on managing cars

Questions relating to this idea:

- Would there be unintended consequences for traffic seeking new routes? Or would traffic evaporate as demand is reduced? Would these impacts be short-lived? How should impacts be measured?

- Would the materiality of temporary measures (planters etc.) be acceptable to stakeholders? If not, how could permanent measures be expedited?

- Would measures unintentionally impact negatively on accessibility, for example for a blind person crossing the junction with a new layout?

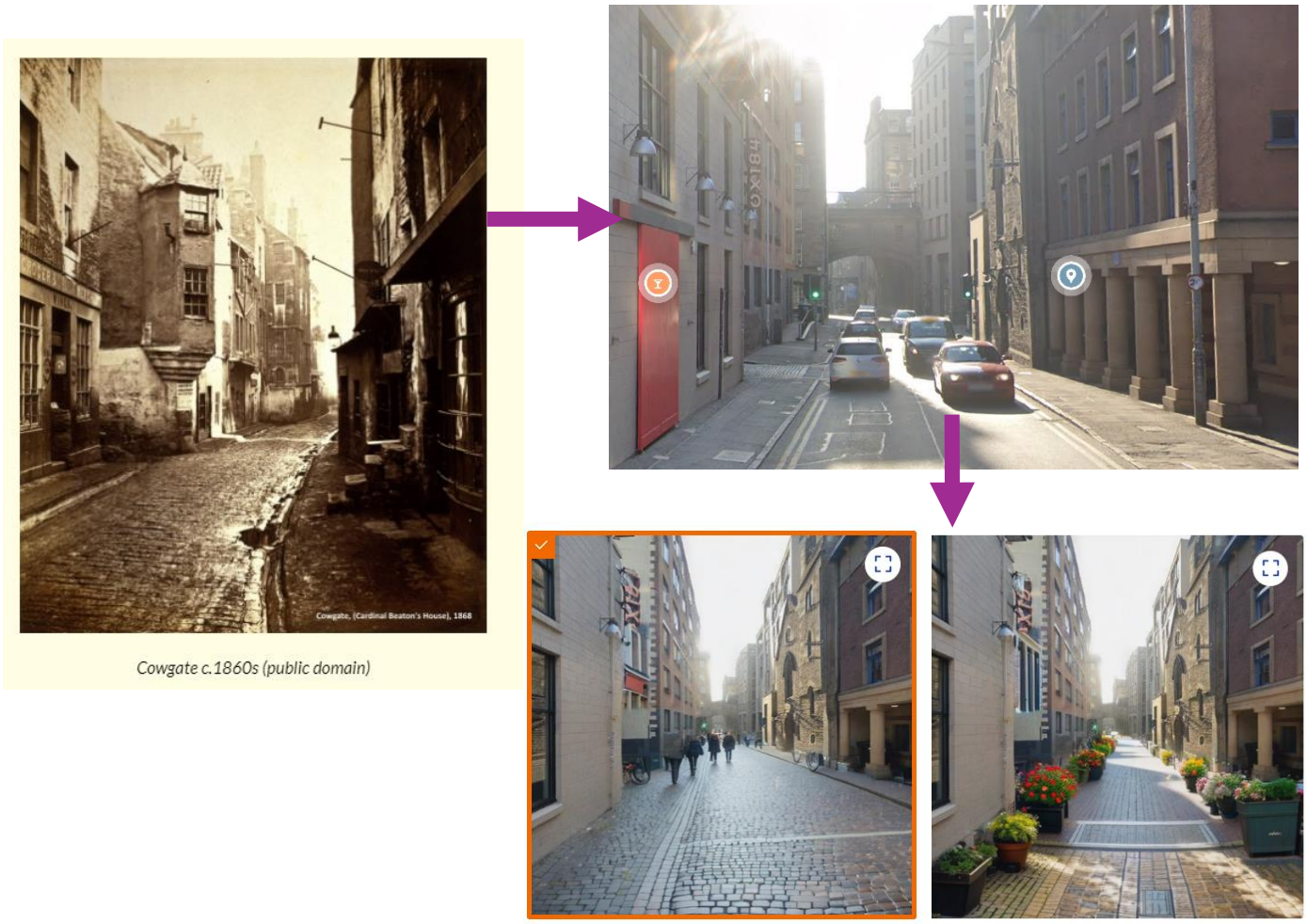
- How could the space be best used to ensure it improves the public realm, proving value against use as parking space?

Cowgate & Grassmarket

The Cowgate is a very narrow historic street wholly unsuitable for through vehicular traffic. Buses generally do not use this route but they are not prohibited, though they do have through-access at neighbouring Grassmarket and Candlemaker Row.

Though the layouts have widened since the 1860s, the Cowgate is particularly narrow at the places with the most significant pedestrian flows and dwelling areas. The night-time economy is a driver of activity raising concerns around personal safety and ongoing conflicts with traffic.

Figure 15 shows how imagination and taking inspiration from local heritage could transform a historic street.



Cowgate c.1860s (public domain)

Figure 15. Cowgate was transformed into a traffic through route in the 20th century. How will the City transform and restore this back to a safer pedestrian environment fit for the 21st century ? (sources: Google and "Add a touch of Dutch to your Street" generative AI tool

The Grassmarket similarly has significant pedestrian flows and has benefited from some pedestrianisation and safety measures (see figure 11.). However, the Grassmarket still operates as a through route for traffic, resulting in car harm.

As with many streets in Edinburgh, these streets operate as part of a wider system and should not be looked at in isolation, with coordinated approaches helping to result in more coherent designs.

For example, changes to the access of Cowgate could be managed by looking at Cowgatehead and re-inventing that space to remove through traffic (figure 16), but would require more holistic considerations for the wider network.

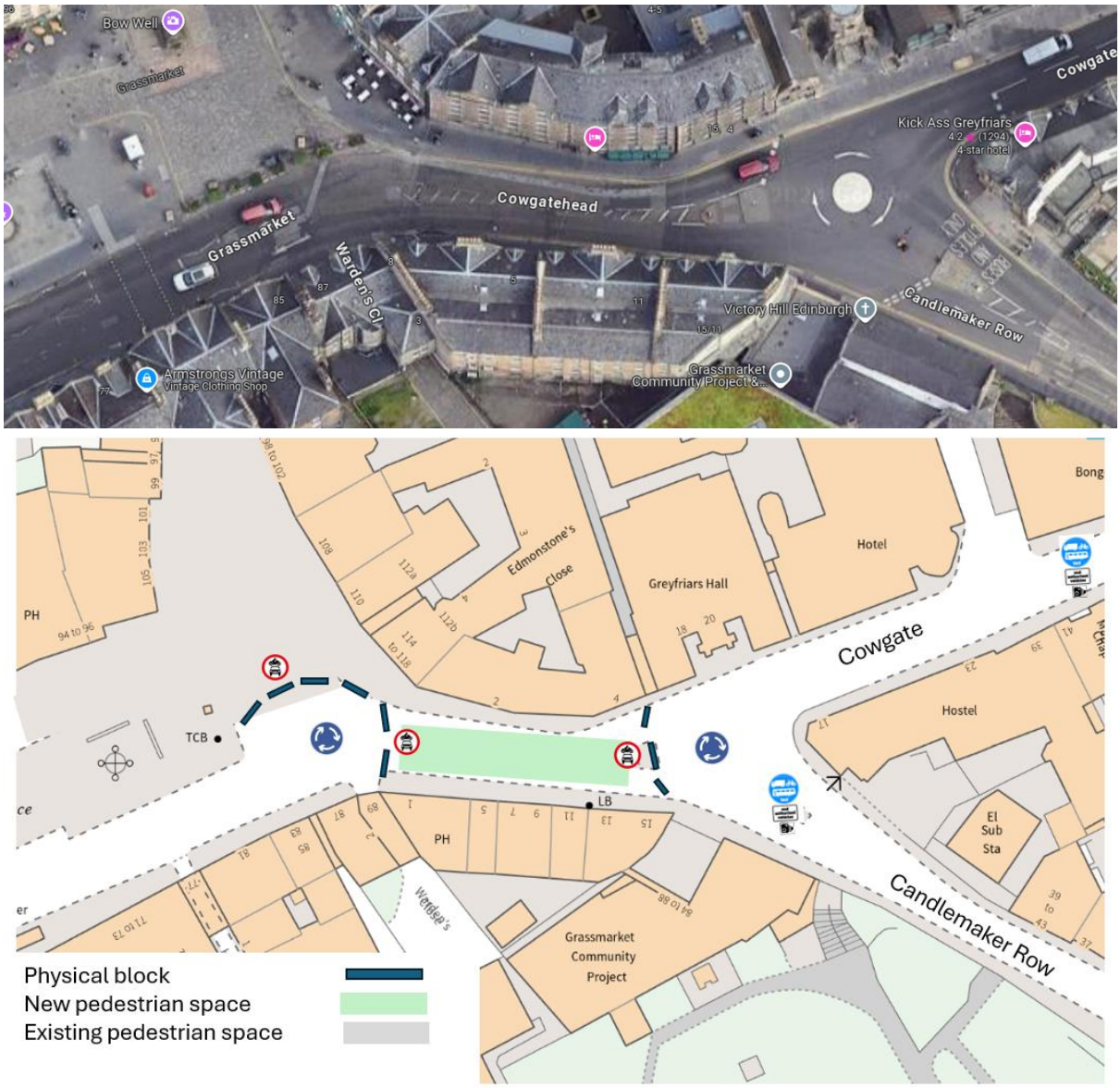


Figure 16. A few planters, ANPR cameras and signs could transform multiple streets at the same time. Cowgate, Candlemaker Row and Grassmarket are all key pedestrian destinations suffering from car dominance, but is this an equitable and acceptable solution?

Questions relating to this idea:

- Would it be deemed acceptable for tour buses and coaches to change their routes and not have access to the Grassmarket?

- Should HGVs and coaches be allowed to drive through the Cowgate or use Candlemaker Row, given there is already limited space for pedestrians?

- Could a more flexible use of ANPR enforcement reduce the need for physical blocks? Would the wider benefits for safety be met using this tool alone? What changes to legislation might be required?

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