Rapid Evidence Assessment: Liveable and Low Traffic Neighbourhoods

15 March 2021

Bristol Advisory Committee on Climate Change

A note from the Bristol Advisory Committee on Climate Change

The Bristol Advisory Committee on Climate Change (BACCC) has produced this rapid assessment of policy proposals linked to the theme of 'Low Traffic Neighbourhoods' (LTC) and 'Liveable Neighbourhoods' (LN).

LNs became a part of mainstream policy discussion in the wake of the COVID-19 pandemic, as suggestions to increase pavement space and encourage active transport (i.e. cycling and walking) were justified with the need for social distancing measures.

However, the spirit of LNs is far from new – a range of adjacent design models have been present in the policy and public discussions for years, starting from city centre pedestrianisation, through liveable cities, 15-minute cities to resident parking schemes.

Ultimately, these concepts paint a vision of sustainable, pollution-free cities, where all residents, no matter of the ability, gender or age, feel safe to walk and cycle; and where key amenities and public transport are within a short walk distance.

In such cities, many people wouldn't need to drive a car to commute, shop or drop children at school, as the provision of alternatives would be sufficient and attractive. From a long-term governance perspective, such proposals are considered as means to contribute to climate strategies (such as Bristol's One City Climate Strategy and the UK Government's Clean Air Strategy.

As promising as these visions might be, the delivery of such proposals across cities has been patchy. Public consultations reveal a range of common objections: fear of negative impact on high street businesses, displacement of traffic elsewhere and middle-class bias. Meanwhile, research interviews with developers or civil servants shine a light on systemic barriers to joined-up urban design, for example: developers' perception of consumer demand for housing developments with good parking availability and conflicting policy goals of highways departments versus sustainable transport departments in local authorities (Design Council, 2018).

As a result, we end up in a situation where individual choices are entangled with systemic constraints and differentiating between evidence and rhetoric becomes a major challenge.

In a response to a request from Bristol One City Stakeholders, this rapid review aims to gather and assess the quality and quantity of evidence on LNs. Whenever possible, we will refer to policy proposals present in the local consultation documents and public support or objections with regards to these proposals.

We thank you for your consideration of this rapid assessment and are ready to provide technical advice and support on potential approaches to maximise the opportunities outlined.

Recommended communication strategy

Based on our detailed review (below) we have outlined six key recommendations to help planners and policy makers negotiate the rhetoric and move LN proposals forward successfully:

1. **Reassure** that the co-design process is taking place to deliver LNs. Emphasise the need for residents' input to ensure the scheme works for all while acknowledging the diversity of needs. Communicate that the recent consultations are only the beginning of the ongoing co-design process. The aim is that LNs will be built to work for all, while acknowledging that they will do so in different ways and we need citizens' input to figure out differences in impacts, preferences and considerations.

2. **Show compelling evidence** on: the benefits to health, safety as a result of better walking and cycling environment and lower traffic speed.

3. **Clarify misconceptions** about: potential traffic displacement, lack of accessibility for emergency services, lack of access for deliveries and blue badge holders, loss in customer footfall. There is emerging evidence that none of these issues will be realised due to LNs. However, in communications, these claims should not be dismissed. It is an appropriate communication response to say they are recognised as a potential risk and that appropriate action/mitigation and monitoring is in place.

4. **Acknowledge complexities** to do with the potential for short-term disruptions and the risk of gentrification. Emphasise that short term disruptions will be mitigated by communication and signage. Explore the potential to deliver LNs as a part of larger

planning intervention, i.e. in conjunction with social housing or upscaling the supply of affordable housing.

5. **Challenge sensationalist media reporting** by dispelling unverified claims, exposing exaggerated claims and monitoring the evolving conversation. Contribute to cooling the temperature of the discussion by frequent press releases and direct engagement with the local media.

6. Above all, set **out the narrative of LNs:**
   - We need to make positive changes: we cannot continue as now for the health and wellbeing of our communities and beyond. Where possible, use the language of inclusive and inviting cities.
   - Some disruption is inevitable, and we will try to mitigate this and work with those affected, though the benefits are real and important.
   - What will be delivered will improve the environment for local people – and help to address national and international ambitions. What we need now is common and concerted effort towards larger goals – safe and sustainable future for us and future generations.

Recommendations for LN implementation

- Develop **appropriate road signage** and communication to mitigate temporary disruptions to do with accessibility.

- Work with research partners to **document, monitor and evaluate impacts** on road safety, rat running and traffic displacement (minimum 1 year, ideally 3+ years).

- **Publicise the already existing data** in the proposed LN areas (i.e. road safety, traffic counts, air quality, socio-economic data).

- **Establish a knowledge exchange programme** with relevant city stakeholders, such as One City stakeholders in Bristol to gather and publicise multi-method evaluation of LNs.

- **Deliver LNs (and wider Transport Strategy) in conjunction** with housing supply and social cohesion policies.

Detailed Review

1. Health and safety

Benefits to health as a result of LNs and adjacent measures are well quantified and described. If LNs succeed at encouraging walking and cycling, they will decrease the rates of asthma, depression, diabetes and increase life expectancy. It is worth noting that studies show that macro-level interventions are the biggest determinants of walking (i.e. enabling better citywide connectivity rather than micro-level street trees or landscaping). Multiple reviews of London LNs showed success in encouraging walking and cycling.

Similarly, schemes designed to reduce the speed and volume of traffic have significant impact on road injuries and crime. This is crucial from the perspective of social justice, as children from the lowest socio-economic groups and Black, Asian and minority ethnic (BAME) people are far more likely to be injured on road.

There is no evidence supporting claims of LNs restricting access to emergency services. Nevertheless, these claims ought not to be dismissed. Local authorities should develop appropriate road signage and convey the message of the need for temporary adjustment period for the long-term benefit.

Please note, public health studies lend themselves to interpretation as "policy evidence" due to the abundance of quantifiable data, medical tradition of evidence hierarchy and possibility of experimental design (where you approximate a LN to a real-world lab trying to isolate whether a particular variable causes a phenomenon you're researching). Scientifically speaking, the most statistically robust evidence comes from a single location in London Waltham Forest or earlier LN interventions in Perth, Australia.

However, urban landscape is complex, multifaceted and cannot be reduced to a few metrics. Although the overall public health evidence is strong, it needs to be contextualised locally to stakeholders and residents. While some LN claims should be clarified (e.g. claims of emergency services accessibility), some other concerns of citizens should be seriously considered. For example, the neglect of a main roads as the expense of measures proposed on residential road is a social justice issue.

Case study - Easton, Bristol: The recent case of Bristol's St Marks Road proposals, which do not include the neighbouring Stapleton Road in scope, illustrates this tension well.

Although Stapleton Road is not suitable for a LN (it is a main A road), it suffers from high levels of pollution, speeding and litter. It is also a major dwelling location for BAME and low-income residents. Therefore, any LN scheme should be considerate of the neighbouring areas of deprivation and ask – what schemes are proposed in these locations to improve liveability, safety or reduce pollution?

In the absence of Bristol-specific data, there is an opportunity for thorough documentation and evaluation of the upcoming LN schemes. For example, the exploration of street safety and rat-running ought to be supported with traffic counts and co-design together with taxi companies, delivery companies and local residents. Similarly, Bristol City Council should widely share data on road safety over time in the proposed LN areas.
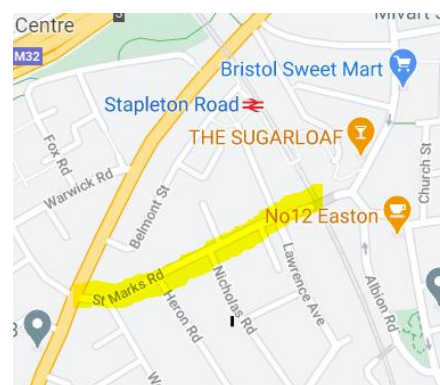
2. Traffic displacement, traffic evaporation and modal shift

There is a substantial body of evidence showing that reallocating road space from cars to active modes tends to reduce car use in the long term. With respect to LNs specifically, most of the recent evidence comes from a small number of studies in London. These show an increase in cycling in the short-term (1 year), and a decrease in car use and car ownership over the medium term (3 years). While there may be some immediate displacement of traffic to other areas, there is an overall reduction in traffic in the long term. The potential for short-term volatility and displacement should be acknowledged and mitigated through appropriate signage and local communications.

Since LN-specific evidence comes from handful of case studies in London, other cities should begin a thorough and comprehensive multi-method monitoring, analysis and public communication programme which would seek data on the effectiveness of LNs locally. This monitoring should continue for a period of more than a year (ideally 3+ years) to detect some of the gradual effects of LNs. If local authorities are already monitoring traffic counts and public perceptions of LNs, the data should be made available to local stakeholders (in the case of Bristol to BACCC, One City Stakeholders, university researchers and other relevant parties). BACCC recommends enquiring about current monitoring and data availability with local transport officers and making steps towards knowledge exchange.

A knowledge exchange project could be established between council officers responsible for open data, transport monitoring and local stakeholders (in the case of Bristol - One City Transport Board members, a member of BACCC and policy engagement officers at either of local universities). Such knowledge exchange would involve a series of meetings focusing on making the most of the available data and commissioning a series of time-bound data gathering activities to further evidence whether LNs are effective at reducing traffic.

3. Equity, accessibility and gentrification

Many of LN design ideas bring significant improvement to accessibility (benches, unobstructed pavements, signage, car parking for blue badge holders). Accessibility should be both a key design requirement of every LN design element and an argument used by the council to promote the idea. There is an opportunity to shift the language towards making the streetscape inclusive and inviting, rather than framing the changes as restrictions.

Nevertheless, certain transport restrictions (no access to private vehicles, limited delivery hours, one-way streets or removal of street parking) are likely to form an integral part of the proposals. They should be introduced so that the overall message is of sharing the space for everyone while preserving car access to those who genuinely need it. This could be achieved by explicitly giving information about blue badge holders parking, availability of customer parking or delivery hours. Appropriate communication would help to counter the claims of 'killing businesses' or 'making the city inaccessible for the disabled'.

Statistically, LNs make sense for the most marginalised groups (black people have the lowest car ownership rates of all ethnicities, 2/3 of job-seeker allowance claimants don't have access to car and children from the lowest socio-economic groups are 28 more likely to be killed on roads compared to the top socio-economic group).

While this is important to stress in the communication materials, we should be careful not to 'throw data at people' to challenge their own reality. We should recognise the complexity of the debate between transport-housing-class. When it comes to commuting, working class people face more restrictions: e.g., fewer local work opportunities, lack of affordable housing in well-connected areas, antisocial work hours. This can lead to reliance on cars for commuting, where public and active transport alternatives aren't yet feasible. In communications, we should be careful of emphasising covid-related shift to home working, as this excludes manual workers or those furloughed. At the same time, we should resist claims of cycling/walking improvements benefitting already privileged people, as it's been repeatedly shown that *safe* cycling and walking environment benefits everyone.

Above all, LN narratives should avoid taking a one-size-fits all approach. In conveying proposals and designs of LNs, we should identify specific mobility-related needs of disadvantaged groups (esp. in working class neighbourhoods, and for disabled people) and involve them in decision-making and scheme design. If not introduced carefully, LNs can lead to displacement (due to a potential for long term rent increases); therefore, each scheme needs to be designed with risk mitigation, affordability and social cohesion as the primary objectives.

4. Policy implementation and communication

Consistent with wider evidence on policy support, the limited evidence on LN communication indicates community engagement is critical to effective and acceptable roll-out. This should use diverse methods to ensure vulnerable groups are consulted and listened to. This will expose concerns which can be addressed in plans, but also inform communications to allay fears and highlight the diverse benefits of LNs (aligned to community members' values and concerns, e.g. air quality, safety, accessibility, attractive neighbourhood). Using trusted messengers here is key – for example, traders whose business has benefited from an LN and local community 'champions' who can frame benefits in locally meaningful ways.

Policy implementation and external communications ought to follow the same vision outlined in local multi-stakeholder citywide plans, for example, the Bristol One City Plan. Tensions are normal and expected part of policymaking. However, if these tensions remain unaddressed, we risk conflicting external communications and ineffective policy implementation. Early and ongoing engagement with communities is critical; as is using diverse engagement methods and local champions as trusted messengers.

We recommend that local authorities organise a joint meeting between departments responsible for delivery of LNs and citizens who are impacted by this policy. Such a meeting could encourage vocalising potential policy tensions and agreement on a way forward, including draft communications plans. Sustrans have considerable expertise in engagement for LNs so should be consulted/involved.

5. Public support and dissent

There are numerous UK-based polls on LNs, most of them based on a decent sample size, taken at intervals during 2020. The overview of the polls would suggest that the majority of residents are supportive of the high-level idea of LNs. The diversity of sources (government reports, academic and campaign groups) further validates the results.

However, most of empirical data pertains to locations outside Bristol, rather than specific areas proposed for LNs within Bristol. There is not enough data to claim a shift in public perception over time. Public acceptability surveys might suffer from not-in-my-back-yard ('NIMBY') bias or belief-action gaps, where residents are in favour of the measures in theory, but oppose traffic reduction proposals, if they impact them personally. On the other hand, experiences of temporary street closures led to strong public support for permanent closure in Christchurch (NZ). This suggests that even despite the initial scepticism, LNs might prove successful in the long term if the implementation and communication is done well.

6. Impact on businesses

The evidence reviewed indicates that LNs have no significant negative impact on business and retail. In fact, there is mounting evidence of positive effects on retail sales, rental value, tax revenue. There is evidence that retailers tend to overestimate the importance of customers arriving by car, which could lead to opposition to LNs in Bristol.

Evidence also shows that criticisms to LNs could be addressed by ensuring clarity of information and easy access to information, as well as combining LNs with other interventions that could mitigate negative impacts, particularly increased public transport or freight consolidation approaches. Potentially, temporary closures or closures on certain days (e.g. weekends) could smooth the transition to more permanent LNs and re-balance perceptions of the importance of driving customers vs customers who walk or cycle.

7. Air quality and carbon emissions

Evidence suggests that LNs lead to a reduction in exposure to air pollution but some concerns regarding traffic displacement remain in the public discourse, which can be addressed with appropriate design and traffic management interventions. There is evidence that LNs lead to a reduction in private car ownership, which can be linked to a reduction of key traffic-related pollutants (e.g. of Danish or Dutch cities, e.g. Groningen).

Authors

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About the Bristol Advisory Committee on Climate Change

The Bristol Advisory Committee on Climate Change (BACCC) acts as an independent technical committee to advise the Bristol City Office, the six One City thematic boards, Bristol City Council and other stakeholders on mitigating greenhouse gas emissions and adapting to climate change. The committee's terms of reference are available online.

Through its actions, the Committee will seek to accelerate Bristol City's progress to achieving net zero by 2030 and to adapt to climate change in an effective, efficient, inclusive, and just manner.

Bristol Green Capital Partnership provides secretariat services to the BACCC. To contact the committee for further information, or to discuss this briefing, please contact contact@bristolgreencapital.org.

Technical Annex: evidence review

Below are references and links to evidence and case studies used as a basis for the rapid assessment:

1. **Evidence on safety and health**

- 66% of respondents in the National Travel Attitudes Study (2019) agreed that "It is too dangerous for me to cycle on the roads". (NTAS, 2019,UK Govt data) SAFETY

- Rat-running is a frequent topic of debates in the public media (e.g. The Guardian, 2020). In particular, the potential connection between real time navigating apps and rat running deserve further attention. There is some emerging empirical data to support this thesis (Kojima et al. 2014). Furthermore, there is mathematical modelling supports the association between smart navigation app and rat running (Thai et al. 2016; Cabannes et al, 2018), SAFETY

- Appleyard (2017) conducted focus groups with schools children to explore the effects of traffic on children's cognitive developments (n=36). The results show that without adequate pedestrian and bicycle facilities, children are overcome by the negative senses of danger and dislike. In contrast, this study finds that children allowed to have higher levels of interaction with the environment, through independent, active travel modes improve their spatial knowledge development. SAFETY/HEALTH

- Feng and Astell-Burt (2017) conducted statistical analysis on medical and socio-economic records of Australian children (n=4447) and found strong association between high exposure to traffic, lack of green space and asthma. In contrast, the association between heavy traffic and asthma was significantly lower in areas with over 40% green coverage. HEALTH

- Ige et al. (2020) conducted systematic review of the impact of neighbourhood design on health and wellbeing (n= 39 studies). There is emerging statistical and empirical evidence of positive associations of green spaces and reduced risk for cardiovascular diseases, diabetes and respiratory diseases. Similarly, there is a significant positive association between walkability and reduced risk of depression and diabetes. HEALTH

- Hwang et al (2017) examined the impact of built environment around schools on child pedestrian crashes (using govt data from Texas and statistical analysis). Missing pavements, crosswalk densities, and land uses are significantly related with child pedestrian crashes (I.e., commercial segments saw more car crashes). SAFETY

- Nguyen et al (2018) conducted multi-method (GPS data and parent questionnaire) study examining the associations between objective and subjective measures of neighbourhood pedestrian safety for outdoor child play. The study suggested that parents' perceived safety was not associated with outdoor play. This suggests that interventions that target perceptions of pedestrian traffic safety would likely not lead to a meaningful increase in outdoor active play

- Goodman et al (2020) used London Fire Brigade Data to explore whether emergency services response time were affected by traffic calming measures Waltham Forest LTN. The study found no statistical evidence for this claim. SAFETY

- Laverty et al 2020 (preprint, not peer reviewed) found 3-fold decline in the number of traffic injuries inside London Waltham Forest LTN. The study found no negative impact at the boundary roads. SAFETY

- Foster et al (2016) conducted policy evaluation of 36 LN housing developments in Perth, AUS. The conducted a survey of n=604 residents asking about crime reporting (whether by themselves or others' in the community). For each 10% increase in 'compliance' (number and quality of LN measures implemented such as community design, movement network, public parkland) self-reporting of crime fell by 40%. SAFETY

- Hooper et al (2015) identified design features with the strongest associations to walking behaviours, using a case study of 36 new housing developments LN in Perth, AUS (survey of n=664 residents using self-reported walking behaviours). The study suggested that the implementation of macro features (street connectivity, residential density rather than micro design like landscaping or street trees) are the biggest determinants of walking. HEALTH

- Khomenko et al (2020) investigated relationships between liveability, health and environmental justice using an example of Vienna (no 1 liveable city worldwide in 2018/19 Global Liveability Index) and relationships between premature mortality, physical activity, pollution, traffic noise, green space and socio-econ status. 8% of premature mortality in the city was attributed to health and env factors above. Residents of lower socio-econ background faced higher risk of premature mortality due to expose to NO2, traffic and less green space. This suggests that the liveable neighbourhood agenda did not reach the socially deprived areas to the same extent as well-off areas. HEALTH

- Badland and Pearce (2019) reviewed the urban liveability agenda through the lens of environmental justice. They conclude that it is still unclear how the agenda could mitigate health inequalities due to the complexity of urban systems. The potential of LNs to impact

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health is not only about street furniture but also larger projects, like proximity of employment, fast-food outlets, high quality education facilities. HEALTH

- Grundy et al (2008) conducted a review of 20mph zones in London, based on the analysis of traffic collision data. On average, there has been a 1.7% decline in all casualties on London's road each year (1987-2006), est. 42% reduction of casualties within 20mph compared with other areas. The largest effect was found for casualties under 15yo killed or seriously injured. SAFETY

- Bornioli et al (2020) conducted a review of 20mph zones in Bristol, using natural experiment design. 20mph was associated with city-level reduction of fatal injuries by 63% SAFETY

- Aldred et al, (2021) conducted a 3-year follow up review of active travel interventions in London (mini Hollands in Walthamstow Forest) (surveys with n=3000 residents as a baselines and 1400 as a follow up, natural experiment design). The results are consistent increases of walking and cycling, 41-44min more, compared to a control group (without active travel interventions). The estimated health-economic benefits from three years of interventions (costing 80mln) are 724 million. HEALTH

- Dajnak and Walton (2018; report) calculated health benefits following Waltham Forest active transport interventions, based on London Travel Demand Survey data (number and duration of cycling and walking trips) and demographic data on life expectancy. On average, WF residents are expected to gain 7-9 months life expectancy as a result of active travel increase. Limitations: dataset from a single day, health benefits are the biggest to those previously inactive. HEALTH

- Goodman and Aldred (2021; pre-print) examined the impact on street-level crime using police data (2012-2019) in Waltham Forest. The introduction of LTN was associated with 10% decrease in street crime (90% CI; 7-13%); with a greater effect time (18% decrease after 3 years). The largest reduction was observed for violence and sexual offence while bike theft increased. SAFETY

2. **Evidence on traffic displacement, traffic reduction and modal shift**

- Walthanstow Forest Council (2016) found some evidence of traffic reduction. LTN implementation in Walthamstow Village (London): 2.6%, 11.1% and 28.3% change in vehicle count between in streets adjacent to Walthamstow traffic reduction scheme (between 2014

and 2016). However, the same research found preliminary evidence of 50% traffic reduction within the scheme boundary.

- Aldred & Goodman (2020) analysed active travel interventions in Outer London, and find stronger effects (decreased car ownership and use, increased active travel) in LTN areas. Decreased car ownership and use was *only* found in such areas, although the study had small sample sizes. MODAL SHIFT

- Aldred et al (2019) conducted a longitudinal study of Walthamstow Village (WV) scheme (residents survey on attitudes and behaviours + control group of residents without traffic calming measures; n= 1712). Study found no evidence of decreased car usage. WV residents were 24% more likely to cycle compared to the control group. MODAL SHIFT

- Cairns et al (2001) analysed policy documents covering 70 case studies and survey data from over 200 transport professionals. Overall, they found that public fears of potential negative impacts were overly pessimistic. Once implemented, the schemes rarely introduced the deterioration of the streetscape. The study found some evidence for overall traffic reduction (median −10.6%). The authors warn that the figure shouldn't be taken as a gospel; there was a significant variation between case studies suggesting the importance of policy implementation and monitoring.

- Parkhurt (2003) reported results of pedestrianisation scheme in Oxford which saw 17% traffic reduction of car trips to city centre while maintaining the number of visitors to the city centre. The paper reports on a period of economic difficulty around the times of implementation which was offset after 4 years.

- Goodwin et al (1998) conducted a seminal empirical study on reducing road capacity in over 100 locations worldwide. Reducing capacity for motor traffic can help cut the overall amount of motor traffic. Removing a lane, or blocking a rat run, doesn't just redistribute motor traffic. Some of those trips will change destination, change mode, or simply not happen at all. Report suggests that the first 1-3 years of low traffic schemes are volatile, sometimes experiencing bad congestion. The report recommends patience when evaluating such schemes. Appendices in the cited paper link to particular case studies from the UK (London, Cambridge, York) and elsewhere. TRAFFIC REDUCTION / TRAFFIC DISPLACEMENT

- Looking at the issue of capacity from the opposite perspective, the Campaign for the Protection of Rural England (CPRE) commissioned a study by Transport for Quality of Life (TfQL) (2017) examining the impacts of road building and increases in road capacity. The research examined 13 case studies, reviewed in detail for traffic impacts, and concluded that

road schemes generate more traffic. On average, traffic grew 47% more than background levels, with one scheme more than doubling traffic within 20 years. This further demonstrates the established links between road capacity and levels of traffic. If capacity is reduced, traffic reduces. TRAFFIC REDUCTION

- Meurs and Haaijer (2001) show that effect of demand reduction measures, like traffic calming and bike lanes, was greater for people who had recently moved house than for non-movers (who had more entrenched habits). MODAL SHIFT

- In an analogous piece of research, Melia and Clark (2018) examined what happened when parking restrictions were introduced for undergraduates travelling to a university campus. The intervention reduced car ownership, license-holding, and travel for other purposes, whilst access was maintained via modal shift to public transport and active travel. MODAL SHIFT

- Laverty et al 2020 (preprint, not peer reviewed) found 3-fold decline in the number of traffic injuries inside London Waltham Forest LTN. The study found no negative impact at the boundary roads. TRAFFIC DISPLACEMENT

3. Evidence on equity, accessibility and gentrification

- Gant (2010) evaluated satisfaction of elderly and disabled residents of post-war pedestrianisation scheme Kingston, UK (n=486). Over 85% agreed that the streetscape improved accessibility after the scheme was introduced. A few insufficient features were mentioned: lack of adequate toilet facilities, improper signage, not enough sitting areas.

- Lam (2017) challenges the narrative of Hackney as a cycling borough in her analysis of spatial interventions (filtered permeability, speed humps). By privileging the above spatial interventions instead of segregated cycle lanes, the neighbourhood raised the profile of already active cyclists (able bodied, confident cyclists) at the expense of other users (e.g. less confident cyclists, those who use bicycles as economic necessity rather than a life style choice). The article recommends safety-first approach to cycle interventions (penalising rat running, enforceable speed limits) EQUITY

- Baldwin and Stafford (2018) conducted a qualitative study with disabled and elderly residents on an Australian region to yield lessons for inclusive co-design of accessible and liveable communities. Their findings suggest that inclusion should be a central focus of liveability along with co-design processes targeted at marginalised members of the community. Their research focused on urban design details rather than master planning, e.g. the need for wide

and unobstructed footpaths (I.e. without pavement parking or bins), ramps across curbing (for wheelchairs), seating and shelter in shade, avoiding cobblestones (trip hazard). Elderly people also stressed the importance of accessible car parking, hinting at aligning their needs with blue-badge holders.

- [Sustainable Development Commission](#) (2011) conducted a review on fairness and equity in the UK transport system. They found that children of the lowest socio-econ groups are 28 times more likely to be killed on roads comparing to the top socio-econ groups. The most common cause of death for children is being hit by a vehicle. Black people have the lowest car ownership rates while they're 30% more likely to be injured on the road compared to other ethnicities (London data). People in top income quintile travel 2.5 times as far as those in the bottom income quintile. 2/3 of people claiming job seekers allowance don't have access to car.

- [Transport for London](#) (2019) reviewed barriers to public transport for diverse communities in London. Cost of travel and slow journey times most commonly mentioned across equality groups (esp. for BAME people and under 25yo). EQUITY

- [Possible charity](#) (2020; report by Aldred and Verlinghieri) examined the implementation of LTN in London over 2020 against the impacts on 4 equality groups (age, income, ethnicity, disability). They suggest to communicate positive impacts of LTNs on equity as: reducing inequality in traffic injury (currently skewed towards BME, children and low-income groups), improving the quality for walking trips (school runs, leisure, shopping) - used more by women. There is an equity issue emerging, as many marginalised groups (e.g. low income) live on main streets, which aren't suitable for LTNs. There is a need to consider other street improvement measures on main streets to accompany LTNs. They recommend greater attention to detail during LTN implementation and consultation – although the broad public support is there, controversies exist over specific measures and places (e.g. placement of planters not appropriate for wheelchair users or cargo bikes). They also recommend embed LTNs in the long-term transport/climate strategies and quantify how they'd contribute to net zero goals (e.g. early evidence suggests 20% reduction in car use) EQUITY

- [Transport for All](#) (2021) disability charity report on LTNs conducted qualitative interviews with 84 disabled people in London and elsewhere in the UK where LTNs have been implemented. They found 75% criticised how changes were communicated to them; many did not feel involved in decision-making. As a result, while they were positive about some aspects of LTNs (easier or more pleasant journeys; more independence; reduced traffic

danger; benefits to physical and mental health), they identified problems such as travel becoming more exhausting, expensive, complicated or difficult for them and carers, and problems (e.g., obstacles) in the new streetscapes. ACCESSIBILITY

- Uitermark and Duyvendak (2007) analyse the Dutch government narrative of liveable neighbourhood as an example of gentrification. They suggest that the driving force of gentrification isn't local govt's need to raise taxes, or meet middle-class housing demand. Instead, state-induced gentrification is seen as an attempt to generate social order in disadvantaged neighbourhoods. However, gentrification fuels divides between middle-class and working-class residents as well as renters and owners. Thus, gentrification undermines social cohesion and likelihood residents will be able/willing to resolve tensions occurring locally. (based on a survey of long-term residents, n =216)

- Lees (2000), in her conceptual lit review of gentrification, argues that it has been given a 'green face' by renaming it as liveability and sustainable design. There is a risk of a one-size-fits all vision, where working class residents will ultimately be priced out OR high streets will be abandoned.

- Tolfo (2019) conducted MSc research in the intersection between liveability and gentrification in public and policy discourses (based in Vancouver, Canada). He argues that gentrification remains a model for economic development of places, despite associations with displacement. Policy discourses mark these consequences to make gentrification palatable. He recommends that planners should acknowledge risks to displacement and minimise such risks as a primary policy objective. Tolfo critiques the policy discourses of liveability by arguing they only raise questions of how cities should look like and avoid the questions of for whom/who is excluded?

4. Evidence on policy implementation and communication

- Design Council (2018) interviewed 30 and surveyed 653 urban design practitioners about best practices and barriers to the implementation of healthy placemaking. One major theme coming out was an internal tension between sustainable transport, planning and highways departments. In particular, the enforcement of Highways Act is seen as a barrier to healthy places.

- Lowe et al (2019) conducted a literature review on practices of translating health research into urban policy and planning (with two Australian case studies). They argue that despite

compelling body of evidence on associations between health and urban design, the studies have not been communicated to policy practice. Paper recommends establishing links between urban policymakers and health researchers. Gives example of 2 policy frameworks to use: multiple streams theory (focuses on the need to set the agenda and aligning interests of different groups) and narrative policy framework (focuses on storytelling – characters, plot, moral of the story etc).

- Wong et al (2020) propose a methodology of city co-design workshops with children and young people as a method of gaining public support and empowering residents to become active citizens IMPLEMENTATION
- Transport for All (2021) - see above – found LTNs implemented with insufficient consultation with disabled people, resulting in suboptimal design and criticisms by disabled residents.
- Sustrans (2020) argue that the most important element in developing an LTN is extensive community engagement, co-creating LTNs with community members who are experts on their area. Engagement methods can include drop-in workshops, pop-up events, leaflets and posters, online engagement, and community walkabouts. This diversity of methods is key to reaching more marginalised and disadvantaged groups, who might not actively voice their opinion. *"A good community engagement process will help identify local champions and dispel misinformation or fears associated with the proposed changes."* IMPLEMENTATION
- Future Fox (2020) similarly argue that community engagement is key to scheme acceptability and effectiveness. In a case study of Lewisham, over 700 community members collected data on traffic and rat-running to inform the largest LTN development to date, with local public support. IMPLEMENTATION
- Boys Smith and Toms (2018) conducted a world-wide literature review on NIMBY-ism (with a focus on the UK). They point out the unique element of British planning system – it is not a rules-based system, but rather, it takes a discretionary case-by-case approach with a low level of clarity on what's acceptable. Therefore, NIMBY controversies lie at the scale of individual projects rather than strategic plans. This is likely due to an unintentional alliance between planners (wanting to preserve their profession) and supporters of free markets (sceptical of all regs). This situation increases planning risk, pushes up land prices, when planning is secured, acts as a major barrier to entry (above all for self-build and small developers) and lowers public support for new building, by increasing risk over what will be built (which is crucial in understanding why people oppose new homes). // Why are people

NIMBYs: fear of lowering of house values (owners), fear of rising house values (renters), emotional impact on sense of place, uncertainty to do with mobility. // Ways to minimise opposition to NIMBY: give people sense of certainty about the design popularity of suggested options, ensure people feel that they had a meaningful opportunity to be consulted, give people confidence that there will be accompanied improvement in infrastructure and local services, ensure residents won't be priced out of the area, give people confidence that local greenery will be enhanced. (Case study from Cornwall to illustrate how to make co-design process popular). IMPLEMENTATION / COMMUNICATION

- One of the authors of this review attended Bristol Transport Board meeting 19th Feb. The attendees (transport practitioners) expressed the need for improved communication: 1) language of opening up the city rather than road closures 2) avoid speaking through narrow project language – I.e. even if quantifiable benefits of LTN to carbon emissions are negligible in short term, LTNs should be considered as a part of wider opportunities to redesign the city for the future 3) there were queries about the required level of modal shift and traffic evaporation to reach net zero – do we have any good data on this and how LTNs could fit in that message? 4) we need to give better *qualitative* attention to class issues in communication. Even if statistically people on the lowest income are less likely to own a car, there is still a substantial number of people currently relying on driving to their manual jobs or large families relying on car shopping trips. We need to design communication reaching this segment of the population properly. 5) there were comments about balancing the scale of sceptical claims with the proposals - I.e. exaggerated claims about closing of cities completely and making it 'impossible' to drive vs relatively modest proposals about introducing modal filters and planters in a few selected areas. How can we lower the temperature of the debate?

5. Evidence on dissent and support (and mixed picture)

- Transport for London, 2020 (n=1000): 51% support; 16% object (data on London) SUPPORT
- Redfield and Wilton, 2020 (n = 2000): 52% support, 19% object (data on London) SUPPORT
- England's National Travel Attitude Survey, Jan 2020 (n= 1384): 34% in favour of closing local streets to motor traffic, 32% against. MIXED

- YouGov poll, Oct 2020: 57% support/tend to support, 16% oppose/tend to oppose. When asked about transport improvements, 48% supported fixing potholes, 34% reduced road traffic and 21% building cycle routes. SUPPORT
- YouGov poll for Greenpeace, May 2020 (n= 1679; % for support: oppose: undecided): introducing cycling on all main roads 58:20:23 SUPPORT; removal of all parking from main roads 32:36:32; MIXED
- Barnes et al. (2019) conducted a mixed-method study (surveys and workshops) with Bristol residents. Out of 441 surveyed, 29% drive to work and 54% uses public or active transport. When asked about their preferences, 74% want to use active and public transport, while 13% wants to drive (not incl. Mixed modal choices). When asked about popularity of policy options, bus improvements and segregated cycle lanes were at the top, where scrapping bus lanes and scrapping cycle lanes were the least popular. SUPPORT
- Tapsuwan et al (2018) conducted a survey of 300 residents in Canberra aiming to gather their preferences on liveable design features. The most desirable neighbourhood features (across socio-econ groups) are affordability, low crime rate, good quality road surface, and cleanliness (ranked app. 6/10). The 'least important' features were green facades and communal bins (ranked app 3/10). It's important to notice that there were no clear preferences due to variety of opinions and no feature scored as "unimportant". These findings might be context-specific with limited generalisability to Bristol. However, they point at the potential complexity of the debate. MIXED
- While seeking to understand public support for LNs, we should not ignore the power of local networks and influential organisations. For example, although this petition supporting of LN in Bristol has over 1700+ signatures and a petition to create a LN around St Marks Rd has nearly 400 signatures, the counter petition, expressing dissent to St Marks road pedestrianisation, has nearly 1800+ signatures. We recommend that BCC engages with the sceptics and co-designs fully-supported, yet ambitious plan in collaboration. This news article from ITV claims that over
- BCC (2020) deliberative democracy project "Your City Our Future" - survey in Aug 2020 to understand issues most important to local citizens (n = 6535). Key things people liked about lockdown (relevant to LTN): less traffic, cleaner air, more active transport, more flexibility about when to work, less noise. Key priorities (relevant to LTNs): public transport access to hospitals (high importance 79%), improve transport and destination accessibility (high importance 76%, particularly in deprived areas), clean air (v high importance 86%, more

so in less deprived areas), everyone able to travel easily around Bristol w/o using a car (v important, 86%), less traffic (important, 79%), more space for walking (important 78%), more frequent buses (important 76%, , children safe to play in the neighbourhood (important 76%), action to tackle unsafe driving (important 74%), less traffic in residential streets (71%, less important for residents of deprived areas). Actions marked as 'somehow important/mixed': space for cycling (68%, less important for people in deprived areas), parking prioritised for the disabled (61%), road space removed to widen pavements or provide outside seating for pubs (57%, less important for people in deprived areas). Interestingly, actions marked as 'low priority/not relevant' (note: this doesn't exactly indicate the lack of public support!): residents parking scheme in my neighbourhood (37%), less parking in the city centre (29%), more parking in the city centre (19%), everyone can drive where and when they want (19%). MIXED

- [CAST](#) (2020) surveyed the UK public on attitudes to climate change measures and found overwhelming (91.2%) agreement that we should walk, cycle, or use public transport more instead of using cars. This is higher support than that shown in earlier surveys (although question wording was not consistent). SUPPORT

- [Climate Assembly UK](#) (2020) found that while generally participants (n=36) wanted to limit restrictions on travel, they were largely supportive of closing roads to cars; indeed, this was one of the most popular measures amongst the travel demand reduction measures considered, albeit there were concerns about possible adverse effects on some groups, notably disabled people. Reducing parking space (including in residential areas) was much less popular, attracting mostly opposition, however, due to concerns about displaced parking and impacts on certain groups. MIXED

- [Redfield and Wilton](#) (2020) found inconclusive that the public support with regards to the effectiveness of LTNs and traffic reductions. 36% consider that the schemes have been ineffective at reducing the number of cars on the road in London. 29% say that LTNs are effective, while 35% don't know. (n=2000) MIXED

- Kingham et al (2020) in Christchurch (NZ) found that a temporary street closure to traffic enabled residents to use the space as a place for recreation and reported that they got to know their area better, felt that the street was more pleasant. Participants overwhelmingly supported a permanent closure of the street highlighting that the value of community benefits and wellbeing outweigh the inconvenience. SUPPORT

- Barbarossa (2020) reviewed Sustainable Urban Mobility strategies post Covid-19 lockdowns in 10 Italian cities, including street closures to traffic and traffic calming measures. While the paper does not report on public support towards street closures, it points to how street closures to through traffic measures are part of a broad mix of interventions (increased public transport; increased cycle lanes, etc.) that could probably help to mitigate the negative effects of street closures on individuals. MIXED

6. Evidence on business impact

- Kumar and Ross (2006) surveyed 365 businesses located on a pedestrianised area in Bangkok. 47% of respondents reported increase in sales volume, 18% decrease, while 36% reported no change. Retailers' opinions on pedestrianisation were as follows (before:after) indifferent 50%:5%; support 20%:85%;   disagreement 30%:10%
- Ozdermir and Selcuk (2017) surveyed 100 retailers and 398 pedestrian shoppers in Kadikoy, Turkey together with conducting land use analysis (before and 10 years after revitalisation). 56% shopkeepers agreed that there was an increase in customers and 16% disagreed. 42% agreed that the volumes of sale increased while 31% disagreed. Increasing rent and a subsequent risk of closure were reported as the biggest concern, with 53% of customers and 63% of shopkeepers noticing closures.
- Yuen Han (2009; thesis) did an empirical study of pedestrianisation impacts on retail rent values in Hong Kong using economic modelling. The study found 52% increase in rent values.
- Sustrans (2006) conducted surveys of real Vs perceived travel behaviours on Gloucester Rd and Church Rd Bristol. They interviewed both traders and customers. The study reported that the importance of car borne customers is overestimated by retailers.
- Transport for London (nd) summarise figures on economic benefits to walking and cycling. People who are physically active take 27% fewer sick days each year than their colleagues. Walking and cycling improvements can increase retail spend by up to 30%. Cycle parking delivers 5x the retail spend per square metre than the same area of car parking. Over a month, people who walk to the high street spend up to 40% more than people who drive to the high streets. Retail vacancy was 17% lower after high street and town centre improvements and retail rental values rose by 7.5%. Global evidence presented here also shows that business tend to overestimate how many customers drive and underestimate how many cycle (e.g. 2 shopping streets in Dublin, O' Connor et al. 2011).

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- [Brettmo and Browne](#) (2020) conducted a qualitative interview study of 8 Business Improvement Districts (BIDs) in the UK and aboard. They recommended that local authorities should seek BIDs' inputs on urban freight, consolidated deliveries, cycle deliveries, consolidates deliveries (using fewer providers), joint procurement and collaborative waste management. BIDs can influence planning process by uniting small businesses, facilitating dialogue, linking cost-reduction to env opportunities.
- [Paddeu et al. (2014)](#) ("*Reduced Urban Traffic and Emissions within Urban Consolidation Centre Schemes: The Case of Bristol.*") An analysis of the Bristol-Bath freight consolidation centre (BBFCC). The BBFCC was established in 2002 to serve Bristol city centre and extended in 2011 to cover Bath, each served by electric lorries. The study analysed data about the number of deliveries made by heavy goods vehicles (HGVs) of different types to the BBFCC, and the number of deliveries made from the BBFCC to the two shopping centres covering a period of 17 months. The study found that a freight consolidation approach such as this conducted at a large scale could yield an average 75.5% reduction in HGV movements in an urban centre, and the associated significant reductions in emissions. However, the authors note that the BBFCC case study scheme impact was limited by its small scale.
- [Confcommercio (2019](#)) conducted a research on tourist operators and their support for low traffic areas (ZTL) in Italy. The results indicated a critical view on some logistical and functional aspects of the ZTLs, with references to lack of clarity for tourists and difficulties in providing information. Among the benefits, 49.75% highlighted increased access to historical centres and sites, walkability for tourists. Moreover, 56.78% of respondents stated that they would keep the ZTL with some modifications, 27.14% said that they would keep the ZTL as it is; 16.08% said that they would scrap the ZTL altogether.

7. Evidence on air quality and carbon emissions

- [Mendoza et al., 2020](#) (preprint) found that wealthier and whiter zip codes experienced a greater reduction in traffic and air pollution during the lockdown periods (data from Utah, the US; between Feb and June 2020). However, air quality did not necessarily follow traffic volumes in every case due to the complexity of interactions between emissions and meteorology. They also found a strong relationship between lower socioeconomic status and positive COVID-19 rates.

- [Air Quality Consultants](#) (2018) carried out dispersion modelling to determine NO2 in Waltham Forest, comparing 2017 and 2017. Air quality has significantly improved over 10 year with properties (households and commercial buildings) exposed to high levels of NO_2 (here defined as above 40 μg/m^3) falling from 61,316 to 6,377.

- [Dajnak et al](#) (2020) modelled air quality in Waltham Forest during school runs and active travel. For the school run in 2020, the most effective modal shift scenario (from car journeys to bicycles, walking and public transport) was estimated to result in a 7% reduction in NOx, PM10 and PM2.5 emissions from cars from 8-9 am, relative to leaving the mode share at the same level as in 2013 (before the implementation of LNs). Waltham Forest's interventions, such as the Mini-Holland scheme and additional infrastructure, accounted for two thirds of the reduction, with one third from the current trends in modal shift between 2013 and 2020.

- [Collivignarelli et al. (2020)](#) studied the effect of lockdown in Milan and found that its lockdown determined significant reduction of key traffic-related air pollutants, including a significant decrease in NO_2 and a partial ozone increase probably due to lower NO

8. Anticipating response and backlash from the media

- Daily Mail, 3rd Feb 2021: Grant Shapps will press ahead with widely-hated cycle-friendly road schemes as he tells MPs 'the vast majority were very good'. Almost 140 schemes have been completed, with 13 scrapped and 25 altered over backlash. (...) But the controversial programme has also sparked fury, especially among Londoners, with reports of emergency service vehicles trapped in traffic, increased rush-hour gridlock and residents saying they were not consulted on plans.

- [The Guardian, 16th Nov 2020](#), Letter: States that their earlier myth busting article presents an idyllic and unrealistic picture. The author of the letter lives on a street 'blocked off by planters and bollards', which has never been subjected to rat runs. The author claims that people get lost in the gridlock of roads and missing their postal deliveries of hospital appointments. Boundary roads are clogged with idling cars.

- [Bristol Post,](#) 7th Feb 2021: Article on controversies on Perry Rd changes. Areas adjacent to the recent changes (Upper Maulding St) are noisy and fumy and the recent scheme is halfhearted. Changes need to be implemented with 'proper consultation'. Ani Stafford

Townsend advocates for the introduction of delivery bay on Perry rd to mitigate drivers parking on the new temporary cycle lanes.

- [Bristol Post,](#) 30th Jan 2021: local trader on Perry Rd believes that making city centre less accessible to drives destroys shopping options. The trader claims that we need better parking options for customers visiting specialist shops (his shop sells heavy tools, for example, and attracts visitors from a wide range of locations)

- [BBC, 19th Jan 2021](#): St Mark's Road traders threaten council with legal action. The St Mark's traders set up a community kiosk with a computer to help local residents to respond to Bristol Council's survey on 29 December, but that was closed after a week because of lockdown. Their letter to the council says "IT support is critical for many if they are to complete the survey. Lack of English as a first language...disproportionately impacts BAME (black and minority ethnic) residents. The Council has failed in their legal duty toward their citizens, and we will be seeking legal advice on challenging the continued ignorance in this regard".

- [Bristol Post](#), 7th Aug 2020: an article outlining support for pedestrianizing Cotham Hill across a variety of local businesses

- [Bristol Post,](#) 18th Sept 2020; businesses opposing pedestrianization of St Marks rd set up a community "Easton Energiser" and want to be recognized as "Easton Neighborhood Forum", which under the Localism Act 2011 would allow them to design a neighbourhood plan. [The 'Easton Energiser'](#) plan would be adopted if it is backed by at least half the voters in a local referendum, and if it fits with planning policy and local strategy. The [group advocates for](#): improved access for emergency services, better footpath, improved signage, parking for disabled, better provision for funerals, provision of adequate loading bays, shoppers parking.

- [Easton's Voice](#) (blog post expressing objections to 2018 Easton Safer Streets initiative) This article claims opposition to the initiative for the following reason: middle-class bias of the proposals, proposals making it difficult for working class people to commute by car, making place inaccessible for the disabled people, displacing (rather than reducing) traffic to other roads, causing delays at pinch points, enforcing divisions within the community due to poor connectivity (by car), delaying emergency services, not consulting properly (e.g. during Ramadan), spending too much money on consultations. They ask for evidence on traffic reduction, modal shift and devolving decisions to the public with regards to pavement parking and parking restrictions.

- [Air Quality in Easton](#) –data from local activist group RADE showing that air pollution is worse on Stapleton Rd and M32 rather than around the residential streets. The post is calling

for evidence on LN and air quality and urges for restrictions on wood burning stoves instead of traffic restrictions.

- [Daily Express](#) (19th Feb 2021) Horfield councillor calls for introduction of LN in Horfield as they fear Clean Air Zone (CAZ) will cause parking displacement in their neighbourhood.