Who are Low Traffic Neighborhoods Impacting?

Data-driven Exploration of Social Equity of Low Traffic Neighborhoods in London

Independent research inspired by transport planning internship
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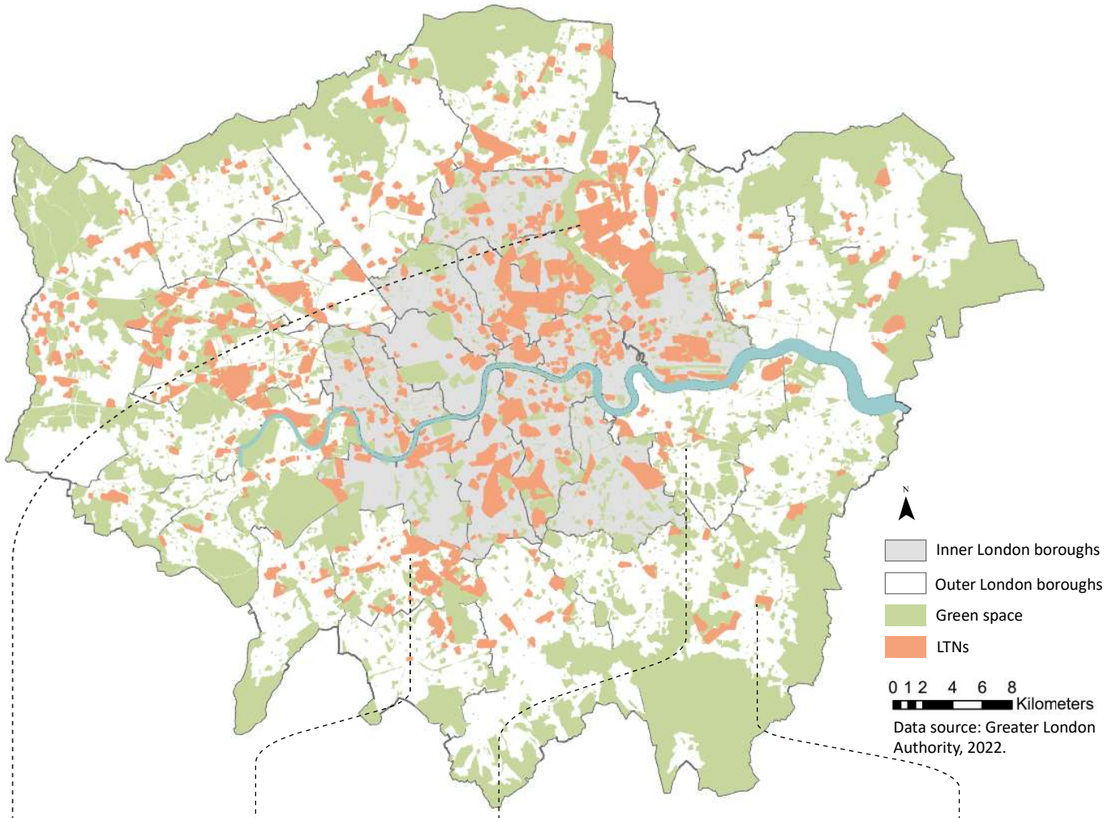
1. Research Background

During and after the COVID-19 pandemic, active travel schemes have become urgent and necessary to tackle the issues around public health and mobility (Dunning and Nurse, 2020). The pandemic has shifted increasing political and public attention to active travel and the geographical scale of neighbourhoods. Among those active travel schemes, Low Traffic Neighbourhoods (LTNs) have been widely implemented in London to encourage active travel since 2020. However, soon after the implementation, there are petitions from neighborhoods that arguing against the scheme. Although the immediate impacts of LTNs facilitate the increasing usage of bicycles and more opportunities for public space, some residents in London oppose the LTNs owing to the inconvenience brought by the road closures and the lack of public consultation (Shockley, 2020; Williams, 2020). There could be issues of spatial inequity of the LTN's implementation, which may impact the residents disproportionally. Therefore, beyond the immediate impacts of LTNs, this research aims to find out the people that are impacted by the LTNs in London from a socio-economic perspective to enhance the delivery of the LTNs.

Timeline of the development of LTNs in London



2016 — Pilot

The borough of Waltham Forest introduced LTNs as pilot schemes from 2016 (Waltham Forest Borough Council, 2022).

2020 — 72 LTNs

From late 2020, an increasing number of Londoners have signed petitions against LTNs, resulting in suspension of some LTNs in the boroughs of Ealing and Greenwich (Verlinghieri and Aldred, 2020).

2021 — Public Engagement

2022 has seen an increasing number of new LTNs being implemented and proposed, with a total of 775 LTNs in London. More LTNs have been initiated across the UK.

2016 — Pilot

2020 — 72 LTNs

In 2020, the Government and borouough councils rolled out 72 LTNs under emergency legislation and Emergency Active Travel Fund (EATF) during the COVID-19 outbreak. This wave of LTNs are mostly located in outer London (Bosetti et al., 2022).

2021 — Petitions & Suspension

2021 — Public Engagement

With the lift of COVID restrictions and more protests against LTNs, the local councils have taken more measures to engage the residents in LTNs' plan-making, including community workshop and public consultation.

2022 — 775 LTNs

Picture source: Waltham Forest Borough Council, 2022; Welsh, 2021; Walker, 2022.

2. LTNs as a Means to Reduce Non-local Traffic

Low traffic neighborhoods (LTNs) involve traffic filters, such as bollards and planters, that restrict non-local motor traffic in the local residential streets (Bosetti et al., 2022). The restriction has some exemptions of home and public service vehicles, including ambulances and delivery vehicles (Newham Council, 2020). LTNs represent the surge of government-funded projects implemented following the COVID-19 shutdown in 2020 (Bosetti et al., 2022). In 2022, there are 775 LTNs in London with new ones being proposed and promoted (Bosetti et al., 2022). While LTNs primarily serve the residents who live inside the LTNs, they also contribute to expanding and supplementing the current active transportation network of walking and cycling for other local inhabitants (Verlinghieri and Aldred, 2020). Similar approaches of traffic management have been adopted with different terms in other cities. For instance, the "Superblocks" program in Barcelona also aims to prioritize people above vehicles with an emphasis on accessibility and adhering to the rules of community engagement (Commission for Ecology, Urban Planning and Mobility, 2016).

Types of traffic filters in LTNs

Types of traffic filters in LTNs

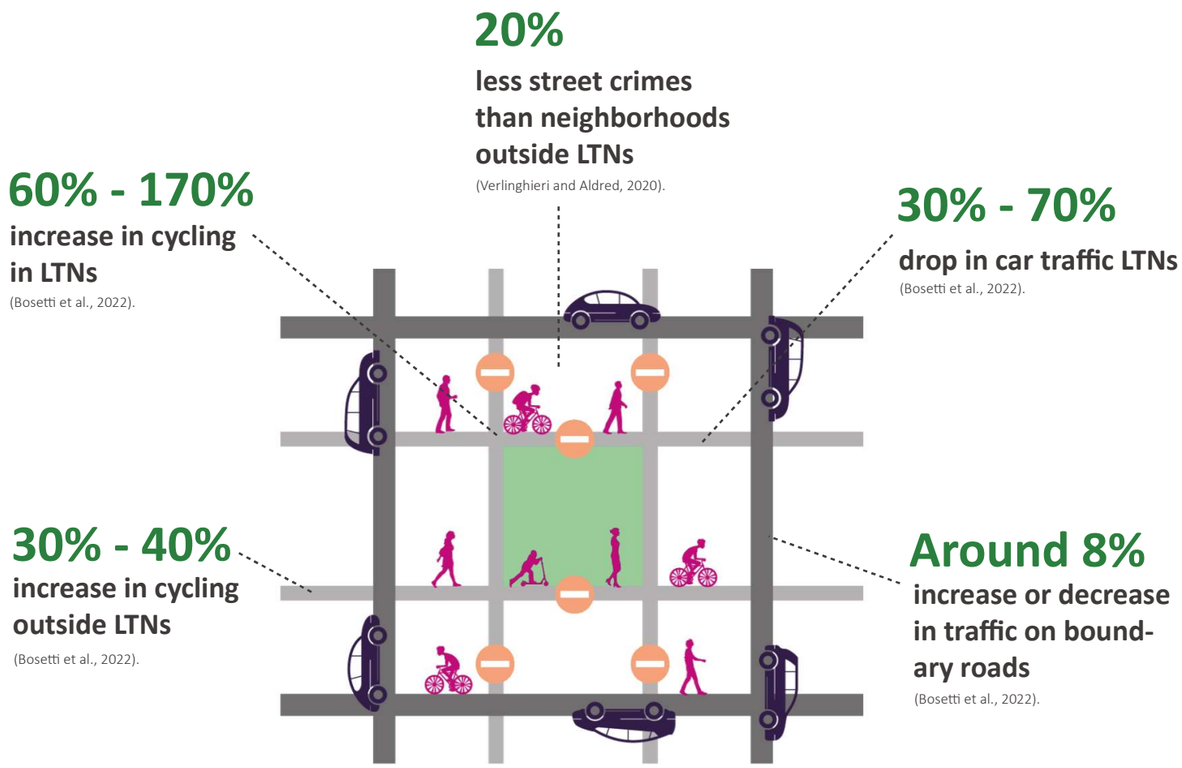
- Planters

- Bollards

- Cameras

Source: Bosetti et al., 2022; Transport for London, 2020; Sutton, 2021.

Impacts of LTNs on road traffic, travel modes and road safety



The main goal of LTNs is to create a safer environment for active travel and more open space for the neighborhood residents through cutting non-local motor traffic. Based on the policy goals, LTNs have had significant impacts on transport and social life of the residents over the last 2 years. The usage of active travel methods in LTNs has increased by 60% to 170%, while the car usage in LTNs has decreased by 30% to 70% (Bosetti et al., 2022). Compared with non-LTNs in London, there is a faster trend of car ownership decrease in LTNs (Goodman, Urban and Aldred, 2020). In addition, the road crimes in and adjacent to LTNs are at lower levels than other neighborhoods in London (Goodman and Rachel, 2021). Despite the progressive impacts brought by LTNs, some argue that LTNs have made it more difficult for people relying on private cars to travel by displacing cars outside LTNs, especially in areas without sufficient cycling infrastructure. Moreover, the LTNs could worsen the social segregation if alternative transport provision is not sufficient and efficient (Verlinghieri and Aldred, 2020).

3. LTNs Impact Mostly Lower Middle Class

To explore the socio-demographic identities of the residents in LTNs, I used the dataset from the English Index of Deprivation 2019. It measures the levels of deprivation in small areas or neighborhoods (Lower-layer Super Output Areas, LSOAs) by using multiple indicators, such as income, employment, education and crime. To have an insight of the LTNs' identities, I chose the data of income, employment as well as access to housing and services. Income and employment indicate the financial stability and prosperity, and access to services and housing affects the availability of essential resources, which can influence the overall quality of life in a neighborhood.

I first plotted the three citywide indicators, and it shows that the LTNs tend to cluster in more deprived areas across London (Figures 1-3). To compare the level of deprivation between LTNs and all neighborhoods in London, I then calculated the three indicators' scores of LTNs by doing spatial join between LTNs and LSOAs. If a LTN covers more than one LSOA, the score is the weighted mean of all the scores of LSOAs by the population in each covered area. Meanwhile, I split the scores of each indicator into 5 levels to compare the correlation of each two indicators in relation to the number of LTNs in each level.

As is shown in the boxplot (Figures 4-6), LTNs have overall lower scores for all three indicators, which means LTNs are located in relatively more deprived areas. Moreover, Figures 7-9 illustrate the strong correlation among all three indicators. The majority of LTNs have lower to middle levels of quality of life. Based on the findings, LTNs have more impacts on people who have average and below average quality of life in London. It could result from two reasons. The LTNs target the more deprived areas to when the councils chose the locations to implement the transport scheme, with the aim to enhance spatial equity (Bosetti et al., 2022). Meanwhile, the other reason could be the stronger opposition from more affluent neighborhoods. The LTNs have been massively implemented from early 2020 during the COVID-19 lockdown. The plan-making process have little public consultation which has arisen more oppositions later in 2020 (Verlinghieri and Aldred, 2020). The vocal residents in rich neighborhoods tend to have more organized actions to express their oppositions against LTNs, which has resulted in some suspension of LTNs. Therefore, although LTNs are ambitious to address the issue of car usage, it has caused potential inconvenience for less affluent neighborhoods.

Residents in LTNs are generally more deprived than London average

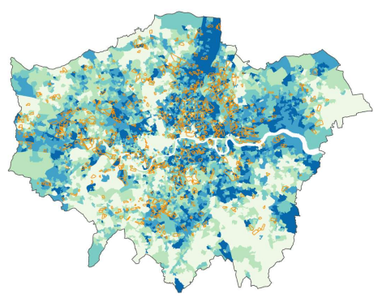


Figure 1: Spatial distribution of income level in London

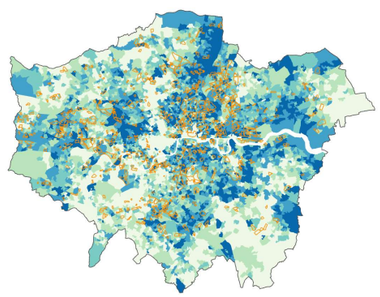
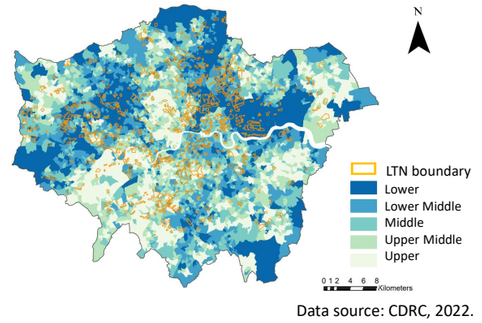


Figure 2: Spatial distribution of employment level in London



Data source: CDRC, 2022.

Figure 3: Spatial distribution of access to housing & services level in London

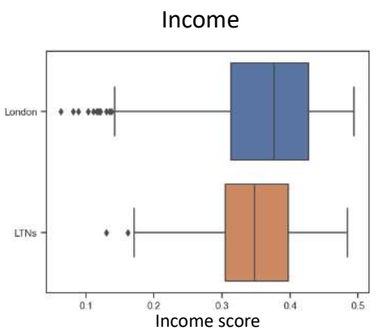


Figure 4: Comparison of income between LTNs and all London neighborhoods.

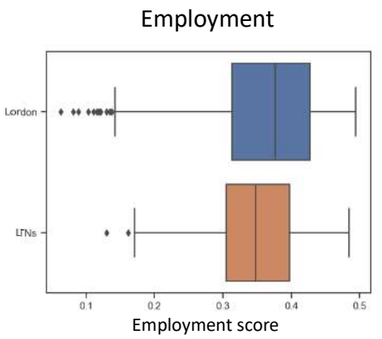
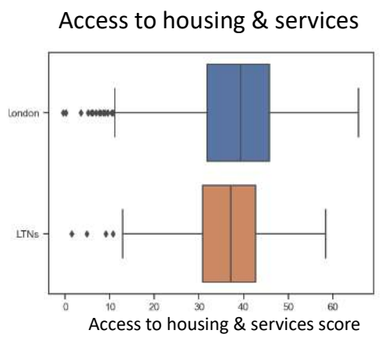


Figure 5: Comparison of employment between LTNs and all London neighborhoods.



Data source: CDRC, 2022.

Figure 6: Comparison of access to housing and services between LTNs and all neighborhoods

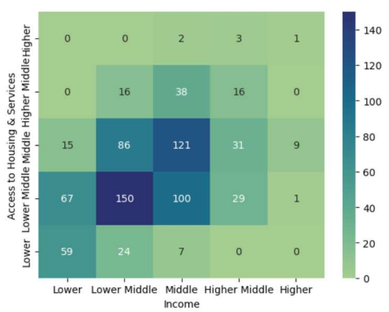


Figure 7: Heatmap of the number of LTNs in relation to income and access to housing and services.

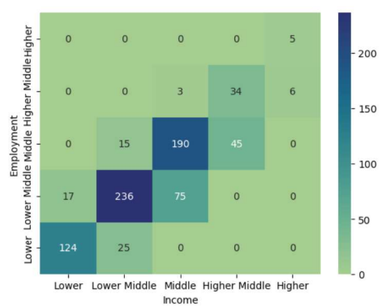
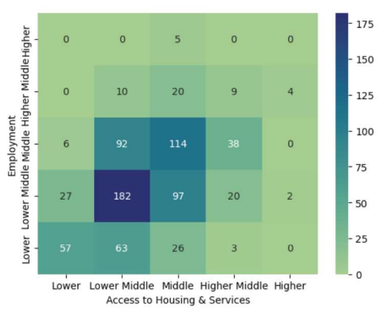


Figure 8: Heatmap of the number of LTNs in relation to income and employment.



Data source: CDRC, 2022.

Figure 9: Heatmap of the number of LTNs in relation to access to housing & services and employment.

4. LTNs' Residents Have Low Access to Local Green Space

In the objectives of LTNs, creating new public space and increasing social interactions have been two significant targets. However, only by decreasing though-traffic does not naturally make great public and accessible space for the people. The vibrant urban public space requires its own infrastructure to support the continuous and active use of space. Meanwhile, green space is an essential use of land that improves the quality of life for the residents. Although 33% of the land in London is accessible green space, especially the large "Green Belt" in outer London, the neighborhood level green space is the engine that drives the local interactions and the sense of community. Therefore, I take local green space as an example to further explore the accessibility of LTNs' residents to green space in the neighborhoods.

To find out, I used and transferred the standards for analyzing urban green space by Herzele and Wiedemann (2003). The green space within walkable distance from home is classified into 2 types based on their minimum sizes: residential & neighborhood green (1 ha), quarter green (10 ha). Each type of green space has a buffer distance, which demonstrates the possible area it can provide access to. Residential & neighborhood green offers 300m buffer while quarter green offers 800m buffer. Based on this theory, I classified the green space in London and calculated the LTNs that have access to each type of green space.

The findings have shown that the residential & neighborhood green and quarter green are only accessible to less than 20% LTNs (Figures 10-13). Consequently, the green space within walkable distance is in extreme shortage for a good quality of urban life. Study shows that 35% of the less affluent residents go to green space less than once every month because of the lack of green space in more deprived areas (Greater London Authority, 2019). With most LTNs located in more socio-economic deprived areas, most LTNs' residents are also deprived in provision of accessible green and public space within walkable distance.

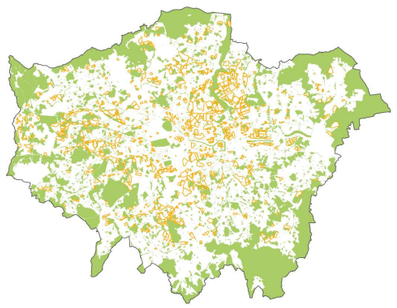


Figure 10: Green space distribution in London

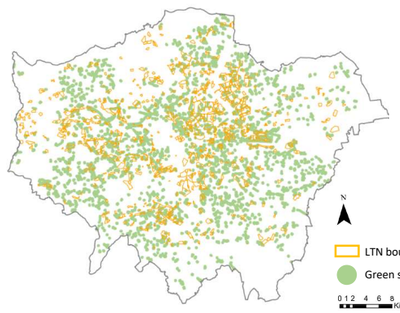
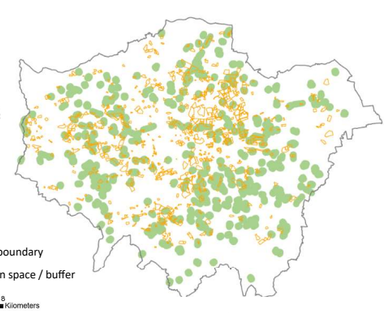
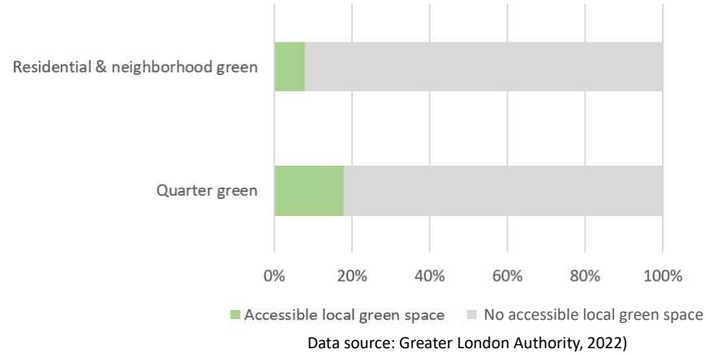


Figure 11: Buffer areas of residential & Neighborhood Green (300m)



Data source: Greater London Authority, 2022.

Figure 12: Buffer areas of Quarter Green (800m)



Data source: Greater London Authority, 2022)

Figure 13: Percentage of accessible local green space for LTNs

5. Residents Affected by Insufficient Cycling Infrastructure

In order to encourage active travel, the cycling infrastructure is the foundation to create a safer and convenient cycling experience for residents live in LTNs. The provision of cycle lanes and cycle parking space can impact the residents' willingness to choose active travel. To find out the accessibility of LTNs' residents to cycling infrastructure, I first visualize the provision of cycle lanes and public cycle parking points (with at least 5 parking space) using Kernel Density Estimation. For each LTN, I calculated the number of cycle lanes that has immediate connection to LTNs, as well as the number of cycle parking points within and on the boundary roads of LTNs.

Figures 15-16 show that there are highly connective cycle lanes in London that mostly link the inner London with outer London. The cycle parking space is generally concentrated in the central part of London.

Connective cycle lanes with centralized public cycle parking provision

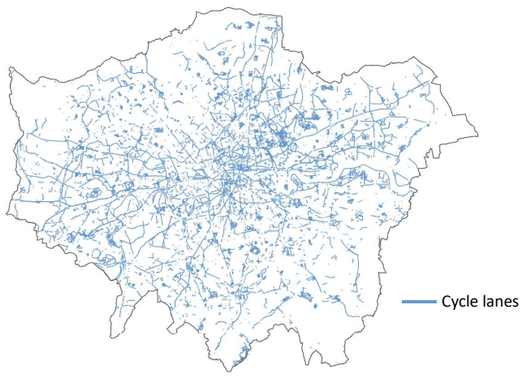
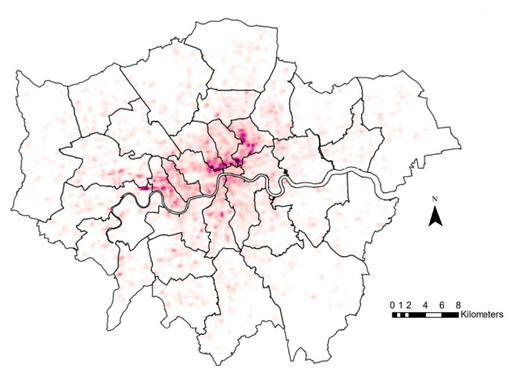


Figure 14: Distribution of cycle lanes in London



Data source: Transport for London, 2021

Figure 15: Density of public cycle parking points in London

As is illustrated in the maps and pie charts, (Figures 16-19), all 775 LTNs have immediate connection with designated cycle lanes, but most only have one. The cycle parking points are not well provided as cycle lanes, with most LTNs having no public cycle parking. Both cycle lanes and parking provision are generally located in inner London, with several LTNs having a well-connected network of cycle lanes and large amount of parking points. This could arise from the centralization of city development that requires commuters travelling between the city center and outer part of the city.

Although some may argue that it is not safe to park outside or the residents can park in their homes, the lack of public cycle parking provision could narrow down the cyclists' choices of where to go and how long to stay outside. In LTNs, the road closure has created great opportunities for more active travel, but the available infrastructure cannot sustain and satisfy the growth of active travel in the long term. This demonstrates the lack of coordination and cooperation between LTNs and other city planning policies.

Unbalanced provision of cycle lanes and parking space

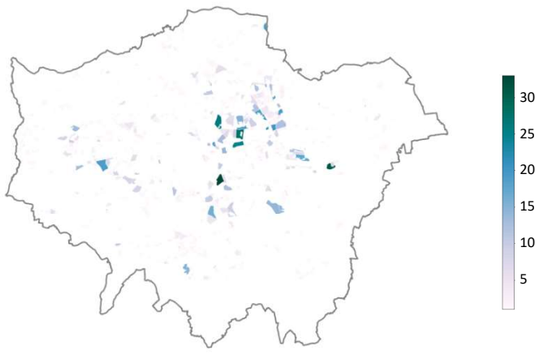
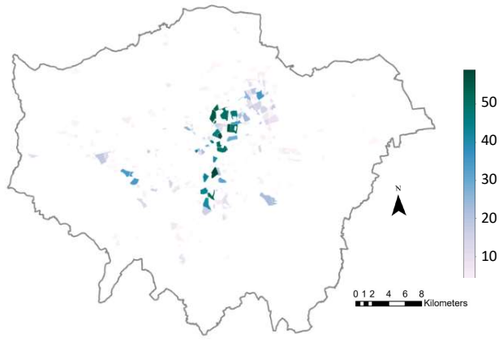


Figure 16: The number of cycle lanes with immediate connection with LTNs



Data source: Transport for London, 2021

Figure 17: The number of cycle parking points within and on the boundary roads of LTNs

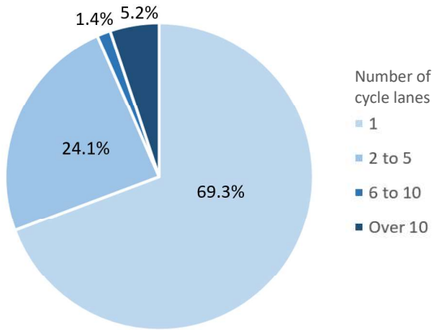
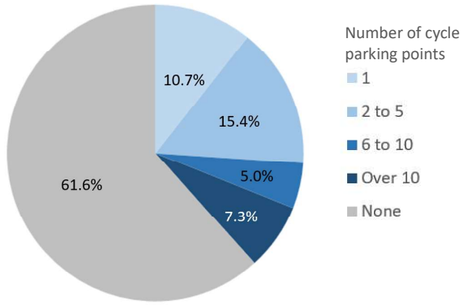


Figure 18: The percentage of LTNs with cycle lanes in immediate connection with LTNs



Data source: Transport for London, 2021

Figure 19: The percentage of LTNs with cycle parking points within or on the boundary roads of LTNs

6. Conclusion

In general, LTNs mostly impact the residents who have less income, less opportunities for employment and less access to services and housing. This could result from the policymakers' intention to level up more deprived groups of people, and the lack of public consultation as the less affluent people in London could be less vocal against LTNs. Although LTNs are ambitious to create active and people-friendly neighborhoods, the residents living inside suffer from inadequate local green space and cycling infrastructure which are necessary to ensure the long-term support for active travel and public interactions in the neighborhoods. The current policy of LTNs mainly focuses on cutting non-local traffic without improving other necessary facilities after the removal of external vehicles in the neighborhoods. Therefore, it is suggested that the local councils need to coordinate the LTNs with relevant planning policies to enhance the provision of local green space and cycling facilities. Meanwhile, the long-term monitoring of LTNs is needed to engage the residents and relevant stakeholders to continuously revise the plan.

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