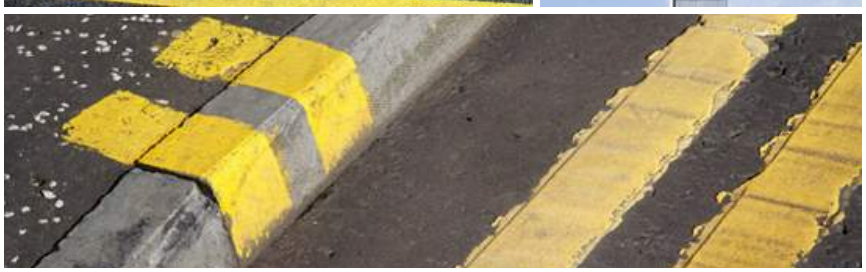
Barnet Car Parking Study

February 2019



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Application of Residential Parking Standards in the London Borough of Barnet

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1. Introduction

This paper provides evidence based suggestions on how the current maximum standards should be interpreted and applied. By defining car ownership by household type and by utilising PTAL data, this paper reinforces the Councils ability to set parking standards according to local circumstances.

'The current adopted London Plan 2016 (Consolidated with Alterations since 2011) and the proposed new Draft London Plan which is currently going through its Examination in Public, have set maximum residential parking standards that are intended to apply across London.' This does not prevent boroughs from adopting a variation to these standards as long as justification, based on local evidence, can be provided.

Barnet's Unitary Development Plan (UDP) adopted in May 2006 contains an approved departure from the previous 2004 London Plan for residential parking standards, which was subject to extensive scrutiny and challenge throughout the UDP adoption process.

In 2009 as part of a formal process of producing a new and more streamlined policy framework to replace the UDP the Council was required to justify which UDP policies should be saved. The Secretary of State agreed with Barnet's approach to more flexible parking provision and the UDP policy was saved.

In moving towards a replacement for the UDP the Council produced a 2011 report in support of the Local Plan – 'Development Management Policies; Residential Parking Standards'. The Report states 'in light of our experience to date of successfully applying the adopted 2006 UDP residential parking standards, the Council firmly believes that the UDP standards should continue to apply locally as they are proven to work in Barnet. The parking standards for 1 and 2 bed flats allow Barnet flexibility to vary provision according to all relevant local circumstances'. This evidence was subject to scrutiny at the Local Plan Examination in Public in December 2011.

Following examination, the Planning Inspectorate published in 2012 the Local Plan Inspector's Report. The Inspector endorsed Barnet's localist approach to adopting residential parking standards that differ from the London Plan. Citing paragraph 6.42 of the London Plan, 'London is a diverse city that requires a flexible approach to identifying appropriate levels of car parking provision across boundaries. This means ensuring a level of accessibility by private car consistent with the overall balance of the transport system at the local level', the Planning Inspectorate confirmed that the Council's approach generally conformed with the London Plan 2011 and, furthermore, it is supported by paragraph 39 of the National Planning Policy Framework.

Currently, the policy within the Borough is provision of residential parking potentially in excess of the London Plan, in relation to 1 and 2-bedroom units. Barnet's Local Plan Development Management Policies (September 2012) specifies within Policy DM17: Travel Impact and Parking Standards, that the Council will expect development:

'*to provide parking in accordance with the London Plan standards, except in the case of residential development, where the maximum standards will be:*

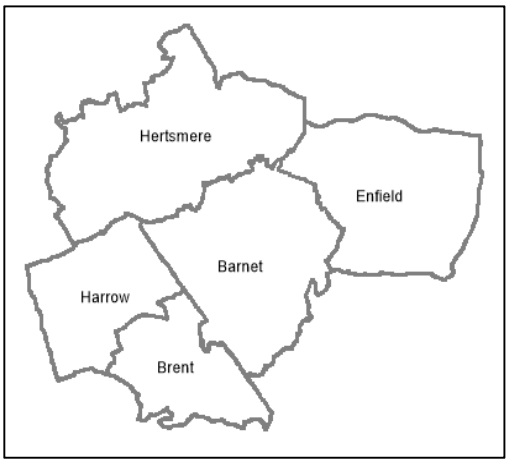
i. *2 to 1.5 spaces per unit for detached and semi-detached houses and flats (4 or more bedrooms);*
ii. *1.5 to 1 spaces per unit for terraced houses and flats (2 to 3 bedrooms); and*
iii. *1 to less than 1 space per unit for development consisting mainly of flats (1 bedroom).'*

Barnet's Local Plan is undergoing a review. A new single Local Plan document is expected to be adopted in 2020. This will look ahead to 2036 and integrate strategic policies, development management policies and site proposals in alignment with the new Mayor's London Plan as well as being consistent with national planning reforms.

To support this review and enable the Council to engage with the Mayor on the emerging London Plan a new examination of evidence will be required in due course. It is essential that an appropriate balance between promoting new development and preventing excessive car parking provision that can undermine cycling, walking and public transport use is required. With ongoing changes in the Borough, the finite capacity of the highway network and the increasing need to travel sustainably, a review of the London Borough of Barnet's parking standards based on local circumstances, has been undertaken.

This report does not seek to revise borough parking standards but does provide analysis of parking demand and car ownership for residential developments within the range set by the existing standards. The aim is to indicate the levels of car parking provision which might be appropriate in differing areas and for differing sizes of new properties.

2. Comparison with London Plan & Neighbouring Boroughs



The surrounding London Boroughs of Enfield and Harrow both have maximum parking standards very closely aligned with those set by the London Plan.

The London Borough of Brent is also similar but differentiates between areas of low and high PTAL. Residential parking is limited further for those sites which have a PTAL of at least 4.

In comparison, the District Borough of Hertsmere, which border Barnet to the North-West, allows a significantly higher number of vehicles per household for residential developments.

The most significant difference to the London Plan and neighbouring boroughs, is the standard for 2-bedroom dwellings, where instead of provision of a maximum of 0 to 1.5 spaces in Barnet, the London Plan and neighbouring boroughs limit provision to less than 1 space per unit, as illustrated in Table 2.1.

Table 2.1: Parking Standards compared with London Plan & neighbouring Boroughs

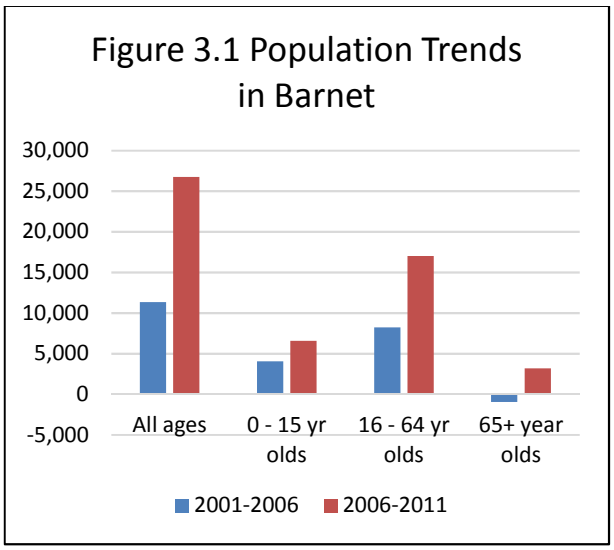
<table>
<tr><th rowspan="2">Bedrooms/ Household</th><th></th><th colspan="5">Maximum Vehicles/Household</th></tr>
<tr><th>London Plan</th><th>Barnet</th><th>Enfield</th><th>Harrow</th><th>Brent</th><th>Hertsmere</th></tr>
<tr><td>1</td><td rowspan="2">0 to 1</td><td>0 to 1</td><td rowspan="2">0 to 1</td><td rowspan="2">0 to 1</td><td rowspan="2">0 to 1 (PTAL 1–3)
0 to 0.75 (PTAL 4-6)</td><td>0 to 1.5</td></tr>
<tr><td>2</td><td rowspan="2">0 to 1.5</td><td>0 to 2</td></tr>
<tr><td>3</td><td>0 to 1.5</td><td rowspan="2">0 to 1.5</td><td rowspan="2">0 to 1.5</td><td>0 to 1.5 (PTAL 1–3)</td><td rowspan="2">0 to 3</td></tr>
<tr><td>4+</td><td>0 to 2 per</td><td>0 to 2</td><td>0 to 2</td><td>0 to 2</td><td>0 to 1.2 (PTAL 4–6)
0 to 2 (PTAL 1–3)
0 to 1.2 (PTAL 4–6)</td><td>0 to 4+</td></tr>
</table>

While the London Borough of Barnet applies maximum parking standards, the Borough accepts the need for restraint, however, there is no guidance with regards to its application to local circumstances e.g.

- The level of public transport accessibility (PTAL);
- Parking stress including the level of on-street parking control;
- The population density and parking ownership of surrounding areas;
- The location (i.e. is it in a town centre);
- Ease of access by cycling and walking; and
- Other relevant planning or highways considerations, such as to whether the proposal is a conversion of an existing use.

3. Factors that Influence Future Parking Needs

3.1 Population Growth



According to Office of National Statistics projections, Barnet is now the most populous borough in London.

Between 2001 – 2006 and 2006 – 2011 there has been a major increase in 0 – 15-year olds.

The 16 – 64-year old group are of particular interest, as many new households will come from this group and this group is likely to be the most economically active.

3.2 Housing Growth

Barnet has one of the highest housing targets in London. The draft London Plan 2017 sets a 10-year housing target of 31,340 new homes. Barnet is delivering against this target and the Authorities Monitoring Report (AMR) for 2016/17 highlights that the Borough aims to provide 28,000 additional homes by 2025/26. The AMR also highlights that since 2012, 78% of the 8,410 new additions to the housing stock have been 1-2-bedroom units.

3.3 Car Ownership

In 2011 there were a total of 144,717 vehicles recorded as being owned by residents of Barnet which equates to an average of 1.065 per household.

Table 3.1 shows that during the 10-year period between census data collections the number of households with no vehicles registered increased by 15.1%, which is more than double the percentage increase in the total number of households.

These figures demonstrate that there is an increasing number of households that do not own a vehicle.

Table 3.1: Car ownership change in Barnet (Source: ONS)

	Years	Total No. of Households	No Vehicles Households	1 Vehicle Household	2+ Vehicles Households
Total	2001	126,887	33,908	57,014	35,965
	2011	135,916	39,024	59,992	36,900
Increase	2001-2011	9,029 (7.1%)	5,117 (15.1%)	2,978 (5.2%)	935 (2.6%)

3.4 Existing Maximum Parking Standards Compared with Existing Demand

By securing a specially requested dataset from the 2011 census data it was possible to quantify the average number of vehicles per household by number of bedrooms in Barnet.

Table 3.2 shows that the current residential parking policy provision within the borough (DM17) exceeds both the London Plan and the existing average demand across the full range of property sizes.

Table 3.2: Parking Standards compared with existing demand in Barnet

Bedrooms/ Household	Vehicles/Household		Existing Barnet Average Vehicles/Household
	London PlanPolicy	Barnet DM17 Policy	
1	0 to 1	0 to 1	0.53
2		0 to 1.5	0.81
3	0 to 1.5	0 to 1.5	1.14
4	0 to 2	0 to 2	1.53
5+	0 to 2	0 to 2	1.76

For 2-bedroom properties, the existing average demand is 0.81 vehicles per household, whilst current LBB standards allow for up to a maximum of 1.5 vehicles per household.

4. Implications for the London Borough of Barnet

4.1 Character Zones

Barnet is a vibrant and thriving borough, with a diverse range of neighbourhoods. Consideration has been given to developing an approach to parking standards that reflects this diversity and the variety of demands it presents, by categorising the Borough into areas of similar characteristics. The London Plan categorises parking provision according to the density of neighbourhoods and the number of habitable rooms per household which allows a more flexible approach to parking provision. These current parking standards are under review and new recommendations are based solely on Public Transport Accessibility Levels, irrespective of the number of bedrooms per household (see Table 12.1).

Analysis of the 21 wards in Barnet was undertaken, at a Lower Super Output Area (LSOA) level, to determine whether there was any correlation between wards with similar demographics. The results showed that there was no evidence to suggest a relationship between household density or Controlled Parking Zones (CPZ) and car ownership.

The PTAL data available on the Transport for London (TfL) WebCAT tool shows that the variance between levels within each LSOA could vary from as little as 1 (Poor) to 6a (Excellent) which left finding a relationship within an area as small as an LSOA impossible.

4.2 Controlled Parking Zones (CPZ's)

CPZ's by their nature are introduced to attempt to control indiscriminate parking. Current policy allows new residents in a CPZ to purchase up to 4 parking permits per household. This allowance exceeds existing parking provision, as defined in DM17.

The CPZ network does not lend itself to a simple implementation of transparent parking standards that can easily be applied and understood as:

- Parking limitations within CPZ's vary across the borough in terms of hours and days;
- Controlled sections do not always apply to the whole street; and
- Parking demand is subject to daily, weekly and seasonal fluctuations.

Provision of residential parking permits across North London is mixed, although Barnet appears to administer a system similar to a number of neighbouring Boroughs, in that, Enfield, Harrow, Havering, Hillingdon and Waltham Forest all allow 3 plus permits per household.

Any new development in a CPZ area that allows parking for up to 4 vehicles per new household will only exacerbate any existing parking problems. Consequently, it is recommended that the current policy of applicants being required to enter into a legal agreement to restrict future occupiers from obtaining on street parking permits where there is insufficient capacity on street, is retained.

It is acknowledged that less than 1% of households actually apply for 4 parking permits, it is suggested that the current policy of issuing 4 permits per household to new residents in developments located in, or adjacent to, CPZ areas is reviewed.

5. Car Clubs

Car clubs can help unlock a new model of urban mobility for London by offering an alternative to private car ownership. London already has one of the largest car club markets in Europe. Joining a Car Club provides members with the convenience of owning a car without the costs or hassle of maintaining one. Car clubs now provide an established realistic alternative to car use, and their use is becoming more established.

Car clubs arrived in London in 2003, promoted by a consortium of boroughs, led by Camden, Islington, Kensington & Chelsea and Ealing. Since 2007, Carplus has worked with Transport for London (TfL) to deliver the Mayor's Car Club Strategy for London (TfL, 2008),

The Car Club Coalition which represents car club operators, London Councils, the Greater London Authority (GLA), Transport for London (TfL), The British Vehicle Rental and Leasing Association (BVRLA) and other key stakeholders, has developed a Car Club Strategy for London which sets out the actions required to achieve the target of one million car club members in London by 2025.

The Car Club Strategy will also help to address many challenges faced by London in the coming years, including population growth, congestion and environmental issues.

As illustrated by Table 5.1, there are 2,138 car club members in Barnet, according to the 2015 'A Car Club for London: Growing Car Clubs to Support London's Transport Future' report.

Table 5.1: Borough Breakdown January 2015

Borough	Off Street Bays	On Street Bays	Total Bays	Members
Barnet	13	0	13	2,138
Brent	10	122	132	3,704
Harrow	3	0	3	373
Enfield	1	8	9	1,011

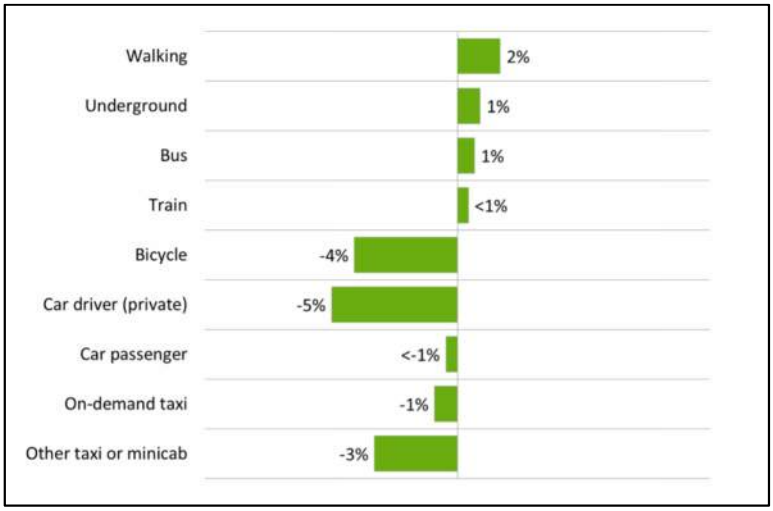
The 2013/14 Carplus Annual Survey calculated that for each round-trip car club vehicle in London, 5.8 cars were removed from the road as a result of car club members selling a car, equating to almost 13,000 vehicles fewer cars in London. A further 30% of survey respondents reported deferring the planned purchase of a car.

The Carplus Cost Saving Calculator estimates that new members could save up to £3,500 a year when switching from private ownership to a car club. Low income groups could benefit from increased mobility through access to car clubs in locations where accessibility levels to public transport are limited. The personal financial benefits of being able to give up owning a car could also be translated into local economic benefits through members having more disposable income as well as local employment.

Car clubs have an increasing role to play in Travel Planning, as they act as a mechanism to generate a positive modal shirt away from private car use. The 2015/6 Carplus Annual Survey suggests car club members significantly reduce their car ownership, which resulted in the following modal shift as illustrated in Figure 5.1. It is recommended that LBB support car clubs in on street locations and provide car club membership incentives in Residential Travel Plans which could consist of free membership of car clubs for 1 -2 years. For example, LB Hackney currently requires a 1 year free membership within its Travel Plans.

A Waltham Forest Case Study is also presented to give an insight into the actions been undertaken in a neighbouring London Borough in order to promote and develop Car Clubs.

Figure 5.1: Modal shift as a result of car club membership



Waltham Forest Car Club Case Study

Waltham Forest is working with suitably accredited car club organisations to expand the borough's car club offer from dedicated on-street bays. The new car club bays are due to be implemented in February/March 2018. It is then proposed that monitoring work will demonstrate the success of a multi-operator approach and of car club expansion, and funding is requested from the North London Transport Partnership to support this work.

Car Club expansion is supported by Waltham Forest and local boroughs as it enables more local residents and businesses to give up or defer purchases of private cars by providing an alternative option. Surveys show that car club members use public transport and active travel more often than typical car owners which is most likely due to the mindset change caused when payment is per journey rather than a lump sum cost. It is a more efficient use of a parking space as several residents will use one space.

In policy terms, TfL has a focus on reduced journeys in private vehicles to meet the Mayors Transport Strategy target of 80% of all journeys in London to be by walking, cycling and public transport by 2040. The sharing economy and car clubs will form an important part of meeting this target, especially in outer London.

The operation of car clubs is at no cost to the council and is usually slightly revenue positive in that operators may pay a yearly fee for a fixed bay.

There two types of car clubs operating in Waltham Forest - round-trip (or fixed bay-based) and one-way (or flexible).

The round-trip car club is offered by Zipcar. Car club cars and vans are parked on-street in their own designated bays. Vehicles need to be returned to their original parking bay when the resident or business have finished using them. There are 47 Zipcar car club vehicles in the Borough and 79 on street bays.

DriveNow is a flexible one-way car club owned by BMW. Members pay a one-off lifetime membership fee to access the fleet of cars including a number of electric vehicles. There are no designated parking bays and drivers can park in any residents' or pay and display bays within the Business Area.

The expansion of car clubs can help local residents and businesses by:

- Providing an easier alternative to owning a car as they don't have to organise tax, parking permits, insurance etc;
- Helping residents save money - if they drive less than a couple of times a week (6-8,000 miles per year), giving up a car and switching to a car club could save from £1,500 up to £3,500 a year;
- Helping to move home or carry heavy shopping if you don't own a car;
- Making more parking space for everyone – studies show that for every one car club vehicle introduced, 20 private vehicles are taken off the road;
- Reducing NOx and CO2 pollution thanks to new car share cars that are cleaner and more fuel efficient;
- Easing local traffic congestion – because residents and businesses are less reliant on private vehicles and use them more sparingly; and
- Giving people who cannot afford their own car access to vehicles when they need them.

6. On-Line Shopping

Across the United Kingdom, including London, online shopping is fast becoming the destination of choice for shoppers. Sales online across the sector, excluding food, have been outpacing in-store growth.

In London, recent years have seen a dramatic increase in online shopping. In 2016, the total amount spent online was £67 billion, a £14 billion increase from 2014. As such, this is beginning to impact the behaviour of individuals who travel around London. A report by the Greater London Authority (2015) identified that in London, online deliveries replaced trips that have traditionally been seen as trips that require a private vehicle such as grocery, garden, clothing and home furniture shopping.

A report by Transport for London (2017) highlighted that with increased reliance of convenient and affordable online deliveries, Londoners made on average 0.6 trips a day in 2015 for shopping and personal business. This is a considerable decline on the 0.8 trips a day recorded in 2005/6. The report also identified that the number of leisure trips has also decreased.

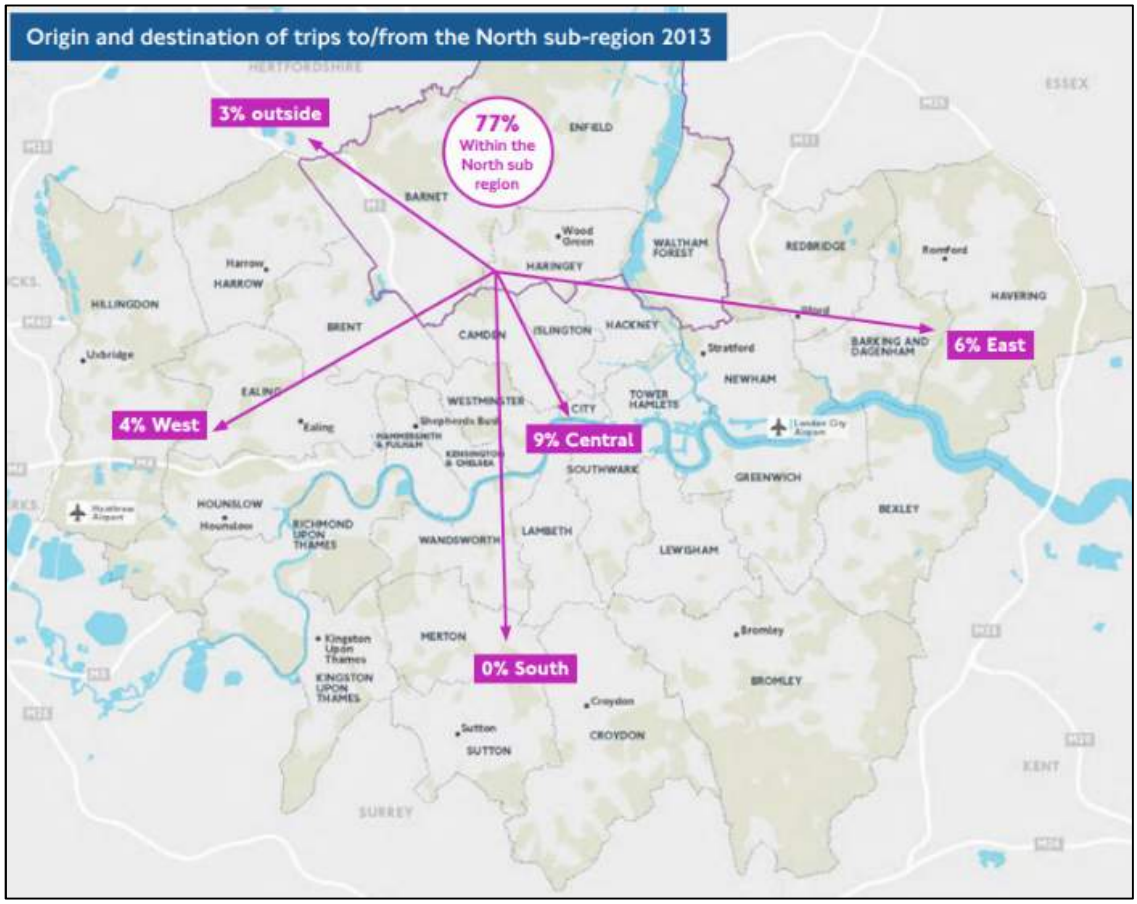
The delivery of infrastructure projects as well as improved information and communication technology is influencing shopping trends. The growth and convenience of same day on-line deliveries is reducing the need for people to make retail trips. People are relying less on access to a private motor vehicle to make retail trips, instead they are increasingly turning to on-line deliveries so that products are delivered to their door step.

7. Story of the North

The text and diagrams contained within this chapter are taken from the North London Sub-regional Transport Plan 2016 update and are included to provide context to travelling patterns and behaviour across North London.

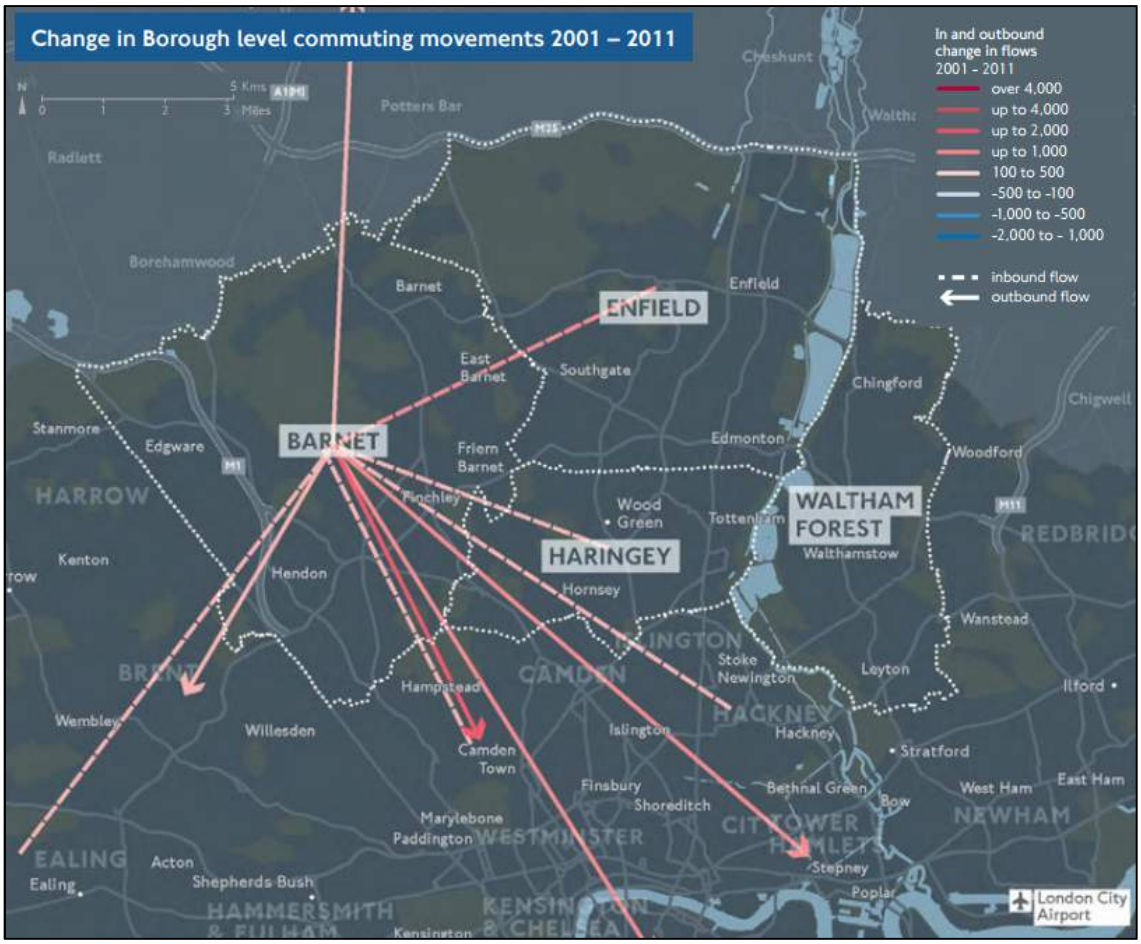
"Although residents of North London make trips to many areas within and outside London, the majority of trips have both their origin and destination within the sub-region. Commuting trips are the most likely to be made outside North London, particularly to central London, whilst education, shopping and leisure trips are all much more likely to be internal to the sub-region. This reinforces the need to ensure a well-functioning transport network that can support the huge range of local movements, particularly by bus, walking and cycling, as well as the need for a network that can support both orbital and radial movements. A relatively high proportion of trips to the East sub-region are made from the North, and strengthened orbital bus routes are needed to facilitate this movement."

Figure 7.1: Origin and destination of trips to/from North London Sub Region 2013



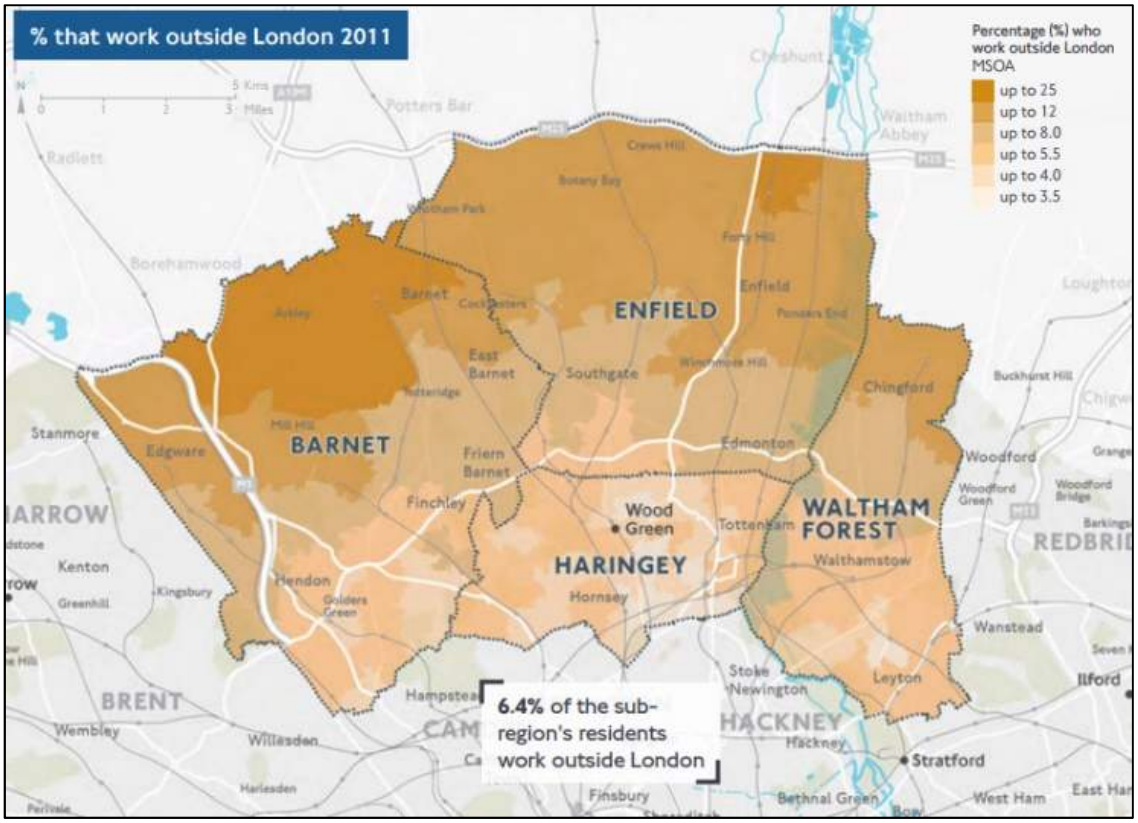
"More people are commuting into central and Inner Boroughs for work as employment has increased rapidly within central and inner London, and with lower levels of growth in Outer London, there has been an increase in people commuting towards more central areas. There has been an increase in commuting flows between some of the sub-region's Boroughs. Maintaining connectivity between the sub-region's Boroughs is vital to ensure continued access to local jobs, therefore supporting economic growth in North London."

Figure 7.2: Change in Borough level commuting movements 2001 – 2011



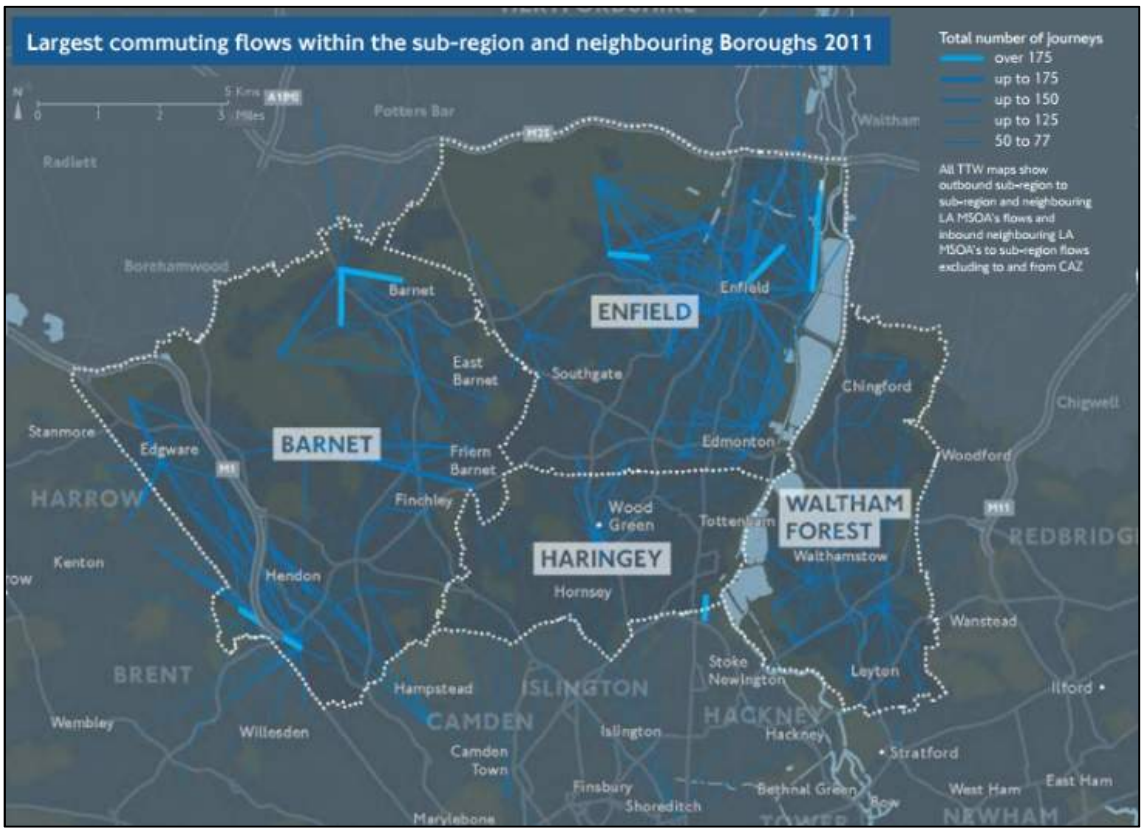
"Most residents work within the sub-region, although Central London is becoming more important. There is significant variation in where residents commute to work. Whilst 22% of the sub-region works in central London, the majority of people work locally. 50% of North London's labour force works within the sub-region. The sub-region as a whole is home to a high number of people who work within its town centres, with almost 30% of all employment located here."

Figure 7.3: % that work outside London



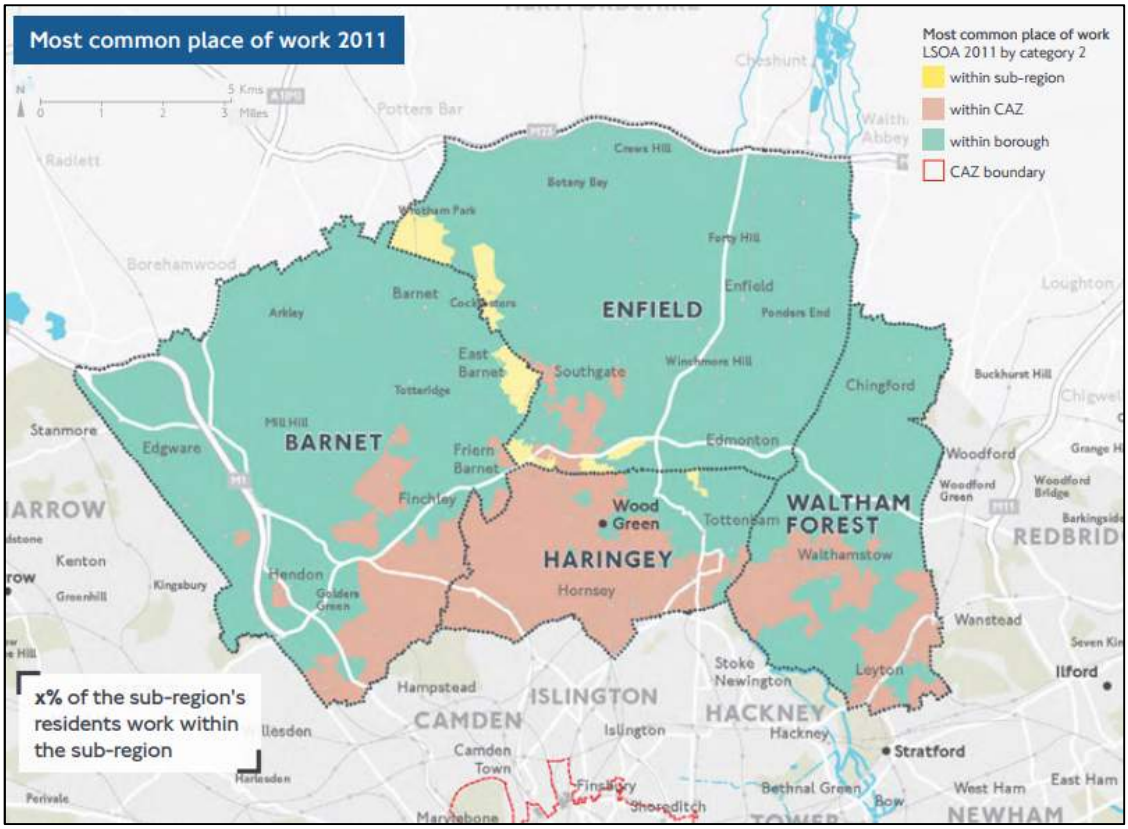
"6% of North London residents work outside London, particularly in Hertfordshire, whilst many residents from these locations also work in the sub-region. Whilst the bus plays a significant role in local commuting trips, it is the car which is still the dominant mode. Rail plays a relatively minor role in supporting commuting trips within the subregion, but it is hugely important in enabling the West's residents to access central London."

Figure 7.4: Largest commuting flows within sub region and neighbouring Boroughs 2011



"Car is still the dominant mode used to travel to work in the sub-region, although bus and train are playing a larger role. Most people travel to workplaces in North London by car. As residents of the sub-region often travel into central London for work, residence based mode shares are greater for rail, particularly within more central locations, but also close to Underground stations, where large numbers of people work in central London."

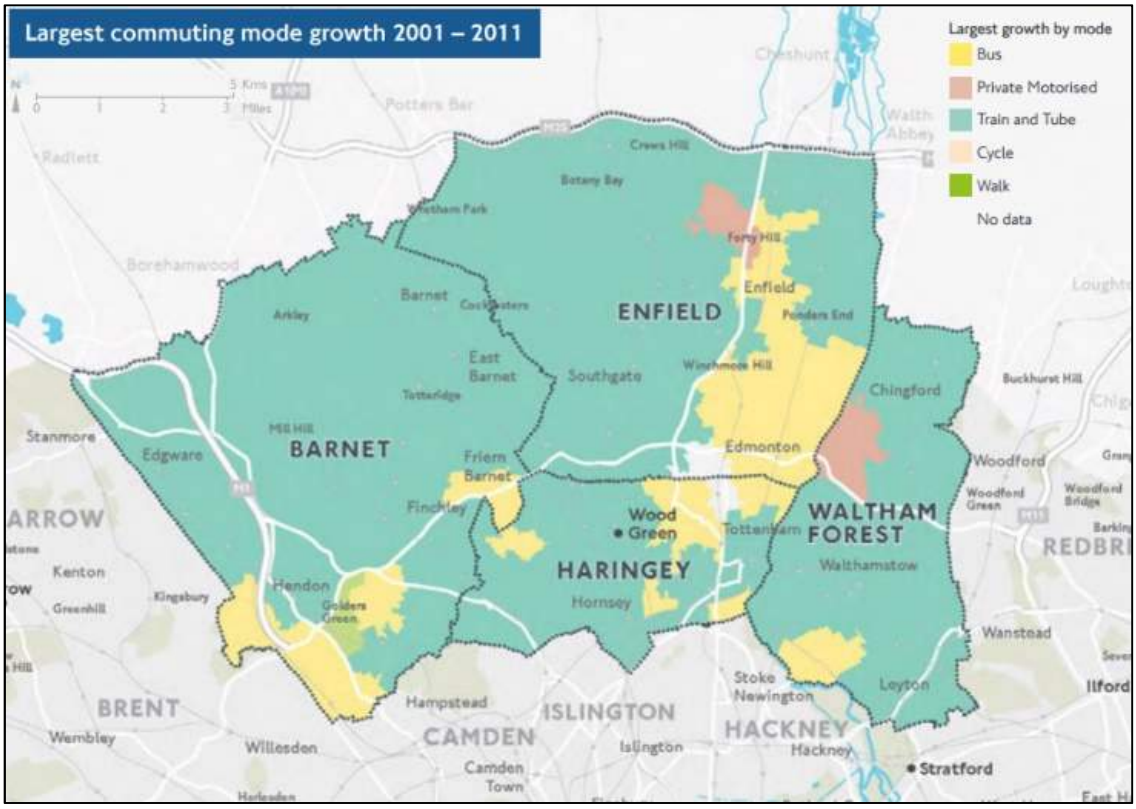
Figure 7.5: Most common place of work 2011



"There has been strong growth in the number of journeys to work by train and tube. There has also been a strong growth in bus journeys, particularly in the Upper Lea Valley, and between Hendon to Edgware. The number of commuting trips by car has decreased across parts of North London, although there has been growth in other parts, notable around Mill Hill."

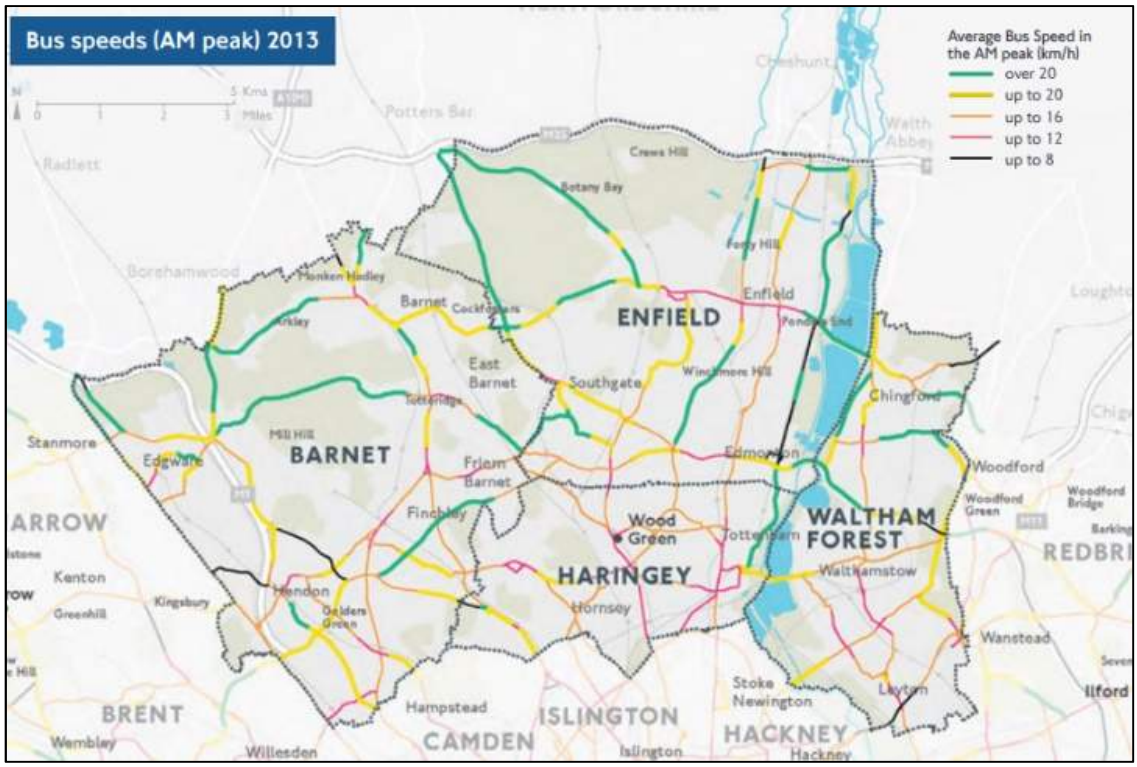
"Increasing congestion has decreased journey time reliability at key locations, and has increased bus wait times Highway delays and congestion are a significant problem across the sub-region and affect access to a number of key radial and orbital routes. This may constrain employment growth in these locations, as congestion and poor journey time reliability adds costs to business operations and restricts accessibility to potential customers and suppliers, strengthened orbital bus routes are needed to mitigate the impact of this congestion."

Figure 7.6: Largest commuting mode growth 2001 – 2011



"Over the past ten years excess wait time for high-frequency buses has continued to fall. Bus wait times have begun to increase during the past two years, largely as a result of congestion. Whilst bus speeds are lowest towards central London there are a number of orbital routes corridors in the North, particularly along the North Circular where they are also slow. As London continues to grow there is a need to ensure that appropriate measures are taken to maintain attractive and reliable bus services."

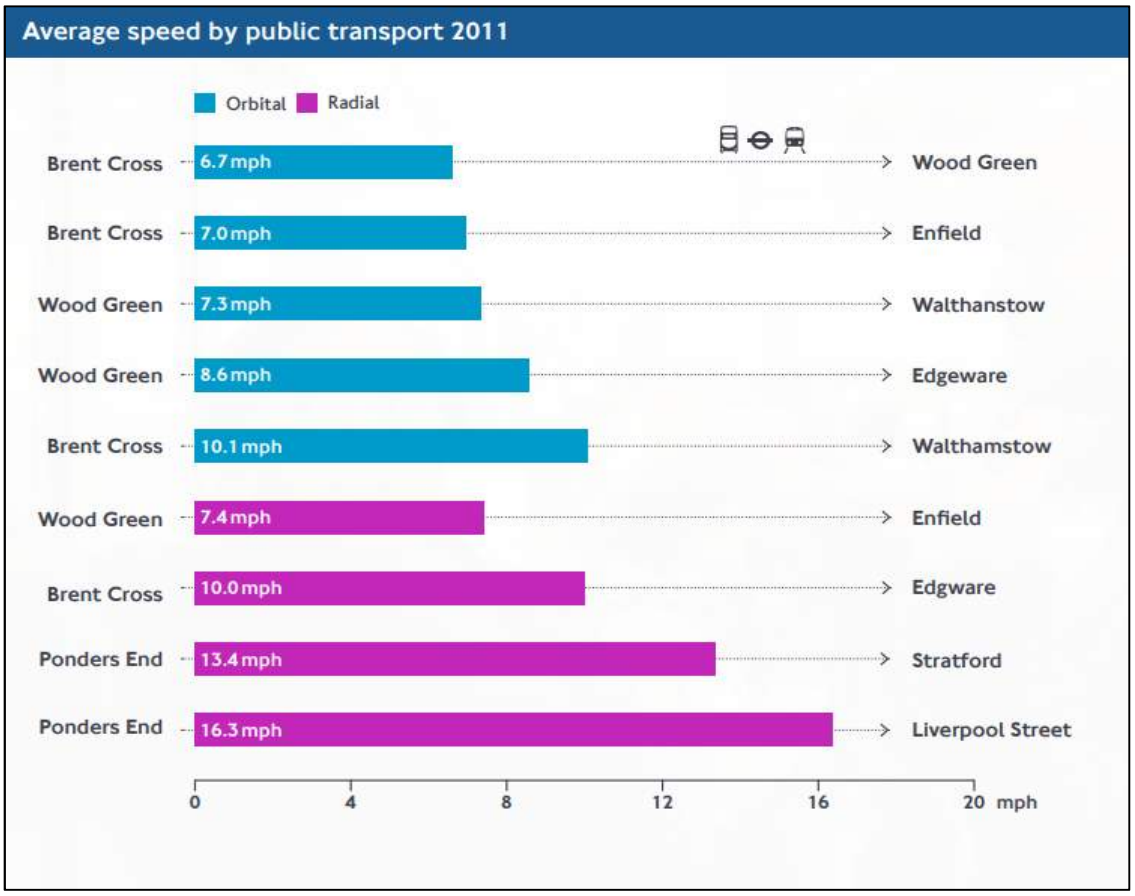
Figure 7.7: Bus Speeds (am Peak 2013)



"The extensive bus network plays a fundamental role in providing public transport connectivity throughout the sub-region, including orbital journeys and journeys to town centres, with rail supporting largely radial journeys. Poor accessibility levels are located throughout the region but are particularly prominent in parts of Barnet and Enfield, and these could be improved by strengthening orbital bus routes."

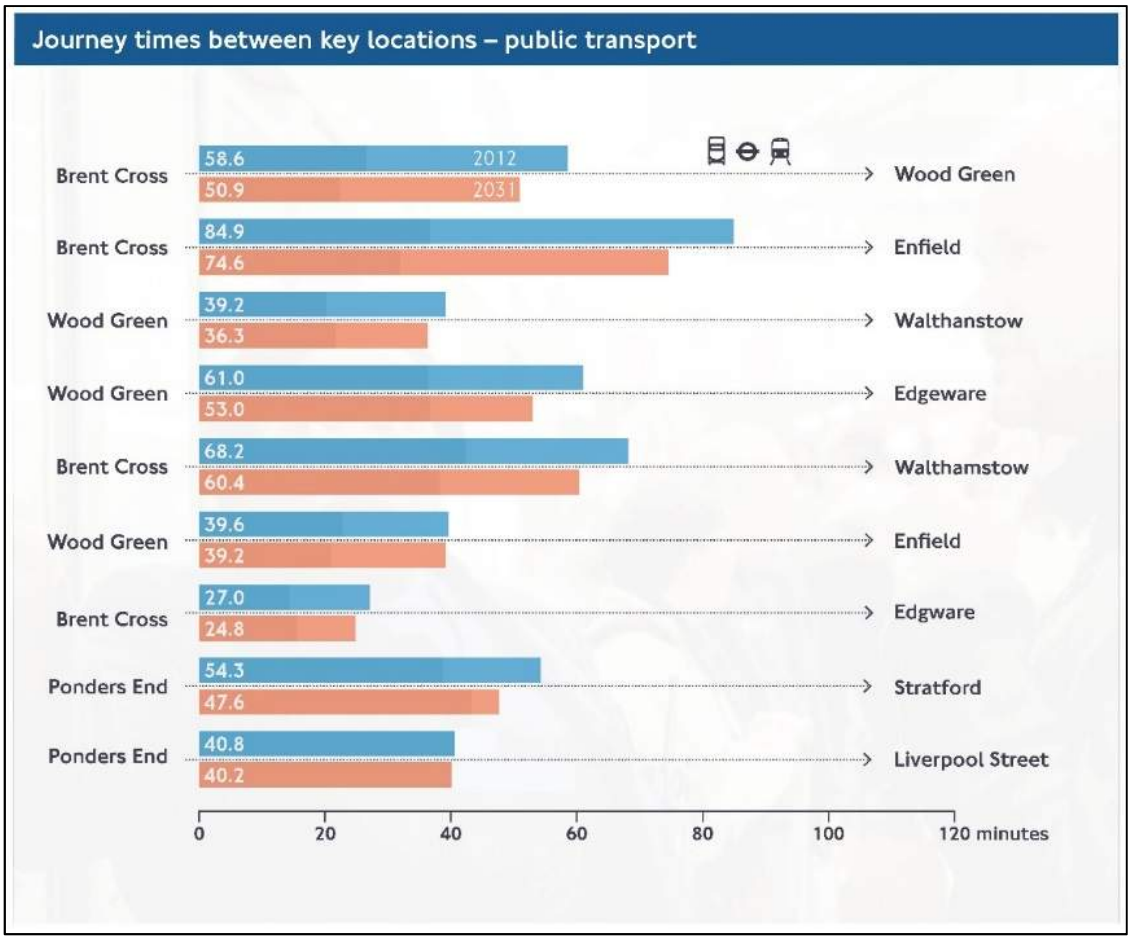
"There are some areas where total population and employment density is higher than would usually be expected for the PTAL level. These include parts of Colindale. There may be opportunities to enhance public transport accessibility here, to enable faster journeys for those that already use bus and rail, and to encourage further mode shift away from the car and reduce congestion."

Figure 7.8: Average speed by public transport 2011



"Radial public transport movements are typically rail based and quicker than orbital movements, with cars providing quicker journey times for this type of trip. Enhancing orbital connectivity, and connectivity between key centres in particular, will be key to ensuring the sub-region remains competitive and can support future employment growth." Table 7.9 illustrates compares journey times in 2011 to what those forecast in 2031, small reductions are forecast as a result of committed investment.

Figure 7.9: Journey times between key locations – public transport



8. Public Transport Accessibility Levels (PTAL)

Use of Public Transport Accessibility Levels (PTALs) is a standard methodology within London for assessing the public transport linkage to/from a site. London Borough of Barnet already make an allowance for PTAL levels when determining parking standards on a case by case basis. However, there is a case for aligning parking standards more closely to PTAL rating, as is the case in Brent, where lower parking standards apply in PTAL areas 1- 3, and higher standards are set in areas with the PTAL score of over 4.

It is proposed that PTAL levels influence parking standards as outlined in Table 8.1.

Table 8.1: PTAL & Parking Provision

PTAL	Parking Provision
0 (worst)	As per LBB standards
1a	As per LBB standards
1b	As per LBB standards
2	As per LBB standards
3	As per LBB standards
4	As per LBB standards
5	As per LBB standards but Car Free within a CPZ
6a	Car Free
6b (best)	Car Free

By defining demand, in terms of car ownership and using PTAL to evaluate accessibility to alternative transport, Table 8.2 reinforces the current maximum standards while allowing the Council the opportunity to set different standards based on demand and public transport accessibility that more accurately reflect social, environmental, strategic and policy changes since 2011.

Table 8.2: Proposed Recommended Target Residential Parking Standards for Barnet

Bedrooms/ Household	DM17 Maximum Parking Spaces per Unit	PTAL	Parking Spaces per Unit	
			2011 Barnet Average Vehicle Ownership	Recommended Target Standards
1	0 to 1	**1-3**	0.53	0 to 0.75
		4-5		0 to 0.5
2	0 to 1.5	**1-3**	0.81	0 to 1
		4-5		0 to 0.75
3	0 to 1.5	**1-3**	1.14	0 to 1.25
		4-5		0 to 1
4+	0 to 2	**1-3**	1.61	0 to 1.6
		4-5		0 to 1.25

9 Residential Car Parking in Growth Areas: Assessing Orbital and Radial Public Transport Provision

A good PTAL score might be achieved with good radial links only, yet still have poor orbital provision.

An assessment has therefore been undertaken separating orbital and radial services to provide a subset of orbital only PTALs with a view to determining a mechanism which developers can use to evaluate the orbital public transport provision at a given location.

To assess the functionality of the mechanism we have considered the provision of orbital public transport services at five locations:

- Highfield Avenue, Brent Cross;
- Grahame Park Estate, Colindale;
- Totteridge Lane, Totteridge;
- Aerodrome Road, Colindale; and
- Bittacy Hill, Mill Hill.

10. Directional Assessment of Routes

The PTALs are based on the frequency of services during the morning (08:15 - 09:15) weekday peak. They are calculated by summing the Access Index[1] for bus services within 640m and rail/underground services within 960m which is then converted to PTAL using specified bands. The AI is based on walking distance (at 4.8kph) to the public transport service, combined with the associated frequency and wait time.

To assess the orbital accessibility of a potential development public transport routes servicing the site need to be separated by their direction. If this mechanism is to form the basis of increased public transport provision, or amend car parking provision, the definition of orbital and radial routes needs to be clear to ensure consistency and objectivity. Such a methodology is not in use elsewhere within any London Borough.

In the London Borough of Barnet (LBB) rail and underground services can all be categorised as radial, heading into/out of London and so are not considered in this note. Determining the direction of bus routes is a more complicated process. Aside the fact that simply by navigating along the existing highway network a bus will undoubtedly be travelling in one direction only to turn at a junction and be following a route perpendicular to the previous road, some routes follow a general north/south direction for half their route but then move in an east/west direction for the remainder of their journey. It is quite straight forward to generalise over the direction of travel for some routes but easily more subjective for others.

As an example, Figure 10.1 shows that the no. 83 service, which travels between Alperton and Golders Green stations, has an orbital trend whilst in figure 10.2 the no. 240 service, which travels between Edgware and Golders Green stations has a radial trend. By comparison the no. 186 service, shown in figure 10.3, between St Mark's Hospital to Brent Cross Shopping Centre via Edgware makes a distinct 90^0 turn in its direction of travel at approximately the half way point.

Figure 10.1 No. 83 – Orbital route

Figure 10.2 No. 240 - Radial route

Figure 10.3 No. 186 – Mixed route

[1] **Access Index (AI):** This index is one of the stages in calculating PTAL values. An Access Index value is calculated for each transport service that the PTAL value is composed of (combining walk time and service wait time). The total Access Index for all services is used to derive the PTAL.

11. Orbital and Radial Access Index Calculations

The Transport for London (TfL) Web-based Connectivity Assessment Toolkit (WebCAT)[2] provides PTALs within the Greater London Area and enables the user to produce a report detailing the calculation parameters and data used[3]. This data has been collected for five locations within the London Borough of Barnet as stated in Chapter 9 (Appendix B). A directional assessment of each bus route referenced revealed the split between orbital and radial provision at each of these locations (Appendix C).

Logic suggests that as the directional links are split in two then the Access Index range should be halved for orbital and radial PTALs. Table 11.1 shows the relationship between the current Access Index and the proposed Orbital/Radial Access Index ranges. Orbital and radial Access Indexes have been calculated at each of the five test locations (Appendix D) and converted to their corresponding PTALs using the table below.

Table 11.1: PTAL - Access Index relationship

Access Index Range	PTAL	Proposed Orbital / Radial Access Index Range
0	0 (worst)	0
0.01 – 2.50	1a	0.01 – 1.25
2.51 – 5.0	1b	1.26 – 2.50
5.01 – 10.0	2	2.51 – 5.0
10.01 – 15.0	3	5.01 – 7.5
15.01 – 20.0	4	7.51 – 10.0
20.01 – 25.0	5	10.01 – 12.5
25.01 – 40.0	6a	12.51 – 20.0
40.01+	6b (best)	20.01+

- **Highfield Avenue, Brent Cross**

Highfield Avenue has a PTAL of 5 based on its Access Index of 20.88. Table 11.2 shows that four of the nine bus routes used to calculate this PTAL enable orbital connections. The remaining two bus routes and three underground services provide radial connections. Separating the public transport services by direction gives an Orbital PTAL of 4 and a corresponding Radial PTAL of 6a. This shows that Highfield Avenue is well served by both orbital and radial connections.

The anticipated advent of the Thames Link Station in 2021/22 will provide additional rail services in the vicinity of Brent Cross South. This will further enhance the radial PTAL to a score of 6 and further reinforce the proposition that car-free, or car-light, development can be achieved. In the mid to late 2020's the anticipated opening of a West London Orbital line, with potential

[2] https://tfl.gov.uk/info-for/urban-planning-and-construction/planning-with-webcat/webcat?intcmp=25932

[3] Details of the different tools used for connectivity assessment and the techniques they are based on can be found at http://content.tfl.gov.uk/connectivity-assessment-guide.pdf

connections to the Thameslink Station, will further enhance orbital services with the likeliness of achieving an orbital PTAL of 6 at this location in addition to the radial PTAL 6 score.

Table 11.2: Direction of Bus Route and Underground services at Highfield Avenue

Bus Route/ Underground Service	General Direction
232	Orbital
183	Orbital
83	Orbital
240	Radial
113	Radial
210	Orbital
Edgware-Morden	Radial
Morden-Edgware	Radial
Kennington-Edgware	Radial

- **Grahame Park Way, Colindale**

Grahame Park Way has PTALs ranging from 1a to 3 along its length. Lanacre Avenue has a PTAL of 3 (moderate) but this reduces going north. Table 11.3 shows that the only bus route used to calculate the overall PTAL at Grahame Park Estate has an overall radial direction. Separating the public transport services by direction gives an Orbital PTAL of 0 and a corresponding Radial PTAL of 1b. This shows that Grahame Park Estate is served better by radial connections.

It should be noted that planned bus route enhancements, such as the proposed extension of Service 125, which is being extended from Finchley Central to Colindale Station, will potentially result in an improved orbital PTAL for Grahame Park Estate.

Table 11.3: Direction of Bus Route and Underground services at Grahame Park Estate

Bus Route/ Underground Service	General Direction
303	Radial

- **Totteridge Lane, Totteridge**

Totteridge Lane has a PTAL of 3 based on its Access Index of 10.82. Table 11.4 shows that both bus routes used to calculate this PTAL enable orbital connections. The four underground services provide radial connections. Separating the public transport services by direction gives an Orbital PTAL of 3 and a corresponding Radial PTAL of 3. This shows that Totteridge Lane is served equally by moderate orbital and radial connections.

Table 11.4: Direction of Bus Route and Underground services at Totteridge Lane

Bus Route/ Underground Service	General Direction
251	Orbital
326	Orbital
Morden-High Barnet	Radial
High Barnet-Morden	Radial
High Barnet-Kennington	Radial
East Finch-High Barnet	Radial

- **Aerodrome Way, Colindale**

Aerodrome Way has a PTAL of 2 based on its Access Index of 8.27. Table 11.5 shows that only one of the three bus routes used to calculate this PTAL enable orbital connections. The remaining two bus routes and three underground services provide radial connections. Separating the public transport services by direction gives an Orbital PTAL of 1b and a corresponding Radial PTAL of 3. This shows that Aerodrome Way is served by moderate radial and poor orbital directions.

It should be noted that planned bus route enhancements, such as the proposed extension of Service 125, which is being extended from Finchley Central to Colindale Station, will potentially result in an improved orbital PTAL for Aerodrome Way.

Table 11.5: Direction of Bus Route and Underground services at Aerodrome Way

Bus Route/ Underground Service	General Direction
204	Orbital
303	Radial
186	Radial
Edgware-Morden	Radial
Morden-Edgware	Radial
Kennington-Edgware	Radial

- **Bittacy Hill, Mill Hill**

Bittacy Hill has a PTAL of 2 based on its Access Index of 9.99. Table 11.6 shows that two of the three bus routes used to calculate this PTAL enable orbital connections. The remaining bus route and four underground services provide radial connections. Separating the public transport services by direction gives an Orbital PTAL of 2 and a corresponding Radial PTAL of 3. This shows that Bittacy Hill is served by poor radial and moderate orbital connections.

Table 11.6: Direction of Bus Route and Underground services at Bittacy Hill

Bus Route/ Underground Service	General Direction
221	Orbital
240	Radial
382	Orbital
Morden-Mill Hill E	Radial
Mill Hill E-FinchCen	Radial
Mill Hill E-Morden	Radial
Mill Hill E-Kennington	Radial

12. Draft London Plan Implications

Previous chapters in this report were based on guidance from the 2016 London Plan. In December 2017 a new Draft London Plan was published for comment. Following the consultation period this was further updated and then published again in August 2018.

In contrast to the current 2016 London Plan, which defined maximum residential parking standards by the number of bedrooms in a property, in the Draft London Plan the Mayor of London has recommended standards based solely on Public Transport Accessibility Levels, irrespective of the number of bedrooms per household (Table 12.1).

Table 12.1 - The new Draft London Plan Proposed Maximum Parking Standards for Outer London

PTAL	Draft London Plan Outer London Spaces per unit
0	1.5*
1	1.5*
2	1
3	0.75
4	0.5
5	Car-free
6	Car-free

*Where small units (generally studios and one-bedroom flats) make up a proportion of a development, parking provision should reflect the resultant reduction in demand so that provision across the site is less than 1.5 spaces per unit.

This change in approach to parking standards means that, even where PTAL's are poor, the same number of parking spaces will be provided for all property sizes. Therefore, in a PTAL 2 location development a maximum of one car parking space will be allowed for both a 1-bedroom and a 5-bedroom property.

Table 12.2 shows that between 2015 and 2017 most of the residential developments completed were located in areas with poor public transport access. Approximately 78% of the 1,467 residential developments completed in the Borough were built where the PTAL is less than or equal to 3.

Table 12.2 - Residential completions 2015-2017 by PTAL (London Borough of Barnet Planning Team)

Completion Year	Public Transport Accessibility Level						
	0	1	2	3	4	5	6
2015	1	111	112	122	43	27	25
2016	0	125	142	158	80	22	21
2017	0	129	110	131	65	20	23
	0.1%	24.9%	24.8%	28.0%	12.8%	4.7%	4.7%

Table 12.3 gives a summary of the number of residential properties in Barnet in 2011 split into the number of bedrooms per household.

Table 12.3 Residential properties by number of bedrooms per household 2011 (Source: ONS)

	Number of bedrooms per household					
	≤1	2	3	4	≥5	Total
Total number of units	21,769	40,789	41,878	20,549	10,475	135,460
	16%	30%	31%	15%	8%	100%

Barnet has one of the greatest housing targets in London which, as set out in the London Plan (March 2016) sets a 10-year housing target of 2,349 new homes per year. Table 12.4 shows how, over the 5-year period between 2011/12 and 2016/17, 1- and 2-bedroom properties accounted for 78% of new residential properties.

Table 12.4 Residential completions 2011/12 – 2016/17 by housing type (London Borough of Barnet Planning Team)

	Number of bedrooms per household					
	1	2	3	4	5+	Total
Flats	2,749	3,706	1,031	49	4	7,539
Houses	53	56	349	315	98	871
Total number of units	2,802	3,762	1,380	364	102	8,410
	33%	45%	16%	4%	1%	100%

It is therefore reasonable to assume that most of the developments in areas of Barnet, where parking will not be accommodated by driveway provision, will be dominated by smaller properties with no more than two bedrooms. Developments with larger properties are likely to be scattered amongst larger developments of predominantly smaller properties.

A review of the 2011 census data in Barnet shows that the average number of vehicles per 2-bedroom household varies between wards from 0.62 to 0.96, with an average of 0.81. The highest vehicle ownership levels are in Mill Hill, Totteridge, High Barnet & Hale.

Table 12.5 shows that during the 10-year period between census data collections the number of households with no vehicles registered increased by 15.1%, which is more than double the percentage increase in the total number of households. These figures demonstrate that there is an increasing number of households that do not own a vehicle.

Table 12.5 Car ownership change in Barnet (Source: ONS)

	Years	No. of households	No. of vehicles per household		
			None	1	2+
Total	**2001**	126,887	33,908	57,014	35,965
	2011	135,916	39,024	59,992	36,900
Difference	**2001-2011**	9,029	5,117	2,978	935
		+7.1%	**+15.1%**	**+5.2%**	**+2.6%**

PTAL 0-1

The Draft London Plan maximum parking standards for Outer London for locations with a PTAL of less than or equal to 1 is up to 1.5 space per unit for all unit sizes. The current LBB existing standards are more stringent with only '*1 to less than 1 space per unit' allowed* for 1 bed properties. Table 3.2 shows that the average number of vehicles for 4-bedroom properties in 2011 was recorded as 1.53 per unit, this is only slightly higher than the Draft London Plan allowance of 1.5 per unit for PTAL 0-1 sites.

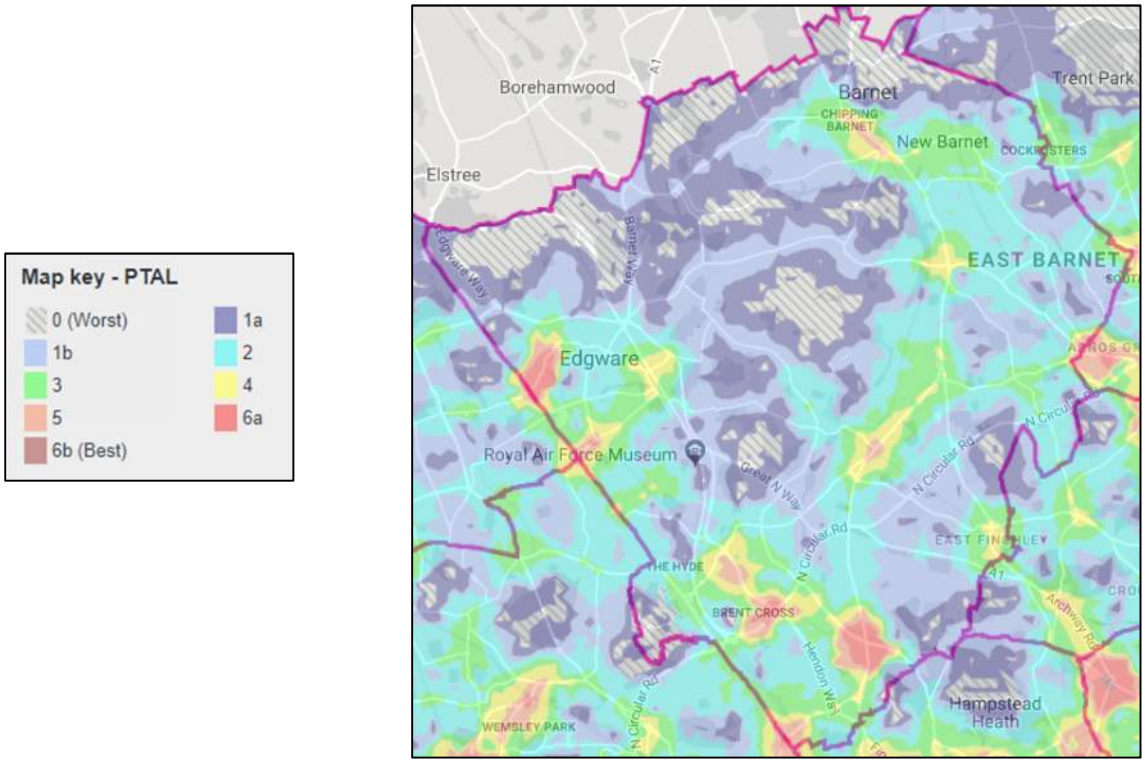
We recommend that a LBB proposed maximum standard of 1.25 space per unit for 1- and 2-bedroom properties is adequate for locations with a PTAL of less than or equal to 1. Where the residential development has a minimum of 25% properties with three or more bedrooms, parking provision should be increased by 0.25 spaces per unit to a maximum 1.5 spaces per unit. This additional capacity would allow developers the flexibility to offer one space for smaller properties and allocate additional spaces for larger properties.

PTAL 2

For locations with a PTAL of 2 the Draft London Plan allows up to 1 space per unit, which is greater than the 2011 vehicle ownership for 2-bedroom properties. A high proportion of LBB is located within a PTAL 2 area (Figure 12.1). Whilst the public transport accessibility in these areas is poor the allocation of one parking space per unit enables residents to have shared access to a vehicle within the household and will encourage car-sharing behaviour.

We recommend the Draft London Plan allowance of 1 space per unit for locations with a PTAL of 2 is adopted by the LBB. Where residential developments have a minimum of 25% properties with three or more bedrooms, maximum parking provision should be increased by 0.25 spaces per unit to 1.25 spaces per unit.

Figure 12.1 Public Transport Accessibility Levels across the London Borough of Barnet



PTAL 3

For locations with a PTAL of 3 the Draft London Plan allows up to 0.75 spaces per unit. This is only 0.06 less than the average 2011 vehicle ownership for 2-bedroom properties.

We recommend the Draft London Plan allowance of 0.75 spaces per unit for locations with a PTAL of 3 is adopted by the LBB. Where residential developments have a minimum of 25% properties with three or more bedrooms, maximum parking provision should be increased by 0.25 spaces per unit to 1 space per unit.

PTAL 4

For locations with a PTAL of 4 the Draft London Plan allows up to 0.5 spaces per unit. Phase 2 of this project highlighted that an area with a good PTAL does not necessarily provide adequate orbital public transport links. This limits access to employment and leisure opportunities across the borough.

We recommend the Draft London Plan allowance of 0.5 spaces per unit for locations with a PTAL of 4 is adopted by the LBB. Where residential developments have a minimum of 25% properties with three or more bedrooms, maximum parking provision should be increased by 0.25 spaces per unit to 0.75 spaces per unit.

PTAL 5

The Draft London Plan deems that locations with a PTAL of 5 should be car-free. It is worth noting that less than 2% of the London Borough of Barnet sits within a PTAL 5 location.

Where Controlled Parking Zones (CPZs) are in place and orbital PTAL is calculated to be more than or equal to 4, we recommend the Draft London Plan is adopted by the LBB and developments should be car-free. However, where these criteria are not met the parking standards should be increased to 0.5 spaces per unit to encourage movement around the borough, with developer contributions towards either extending the CPZ or subsidising additional bus services to improve the orbital accessibility of the site.

PTAL 6

The Draft London Plan deems that locations with a PTAL of 6 should be car-free. It is reasonable to assume that developments within these areas will attract residents because of their public transport accessibility. We recommend the Draft London Plan Car-Free policy for locations with a PTAL of 6 is adopted by the LBB.

A summary of the proposed maximum parking standards for the London Borough of Barnet, compared with the Draft London is shown in Table 12.6 below. The standards mirror the Draft London Plan closely with relaxations to the proposed LBB standards where larger properties are developed in areas of poor public transport accessibility.

Table 12.6 - Proposed Maximum Parking Standards for the London Borough of Barnet

PTAL	Maximum spaces per unit		
	Draft London Plan 2017 Outer London	LBB Proposed Parking Standards for 1/2 bed units	LBB Proposed Parking Standards for 3+ bed unit
0	1.5*	Up to 1.25	Up to 1.5
1	1.5*	Up to 1.25	Up to 1.5
2	1	Up to 1	Up to 1.25
3	0.75	Up to 0.75	Up to 1
4	0.5	Up to 0.5^	Up to 0.75^
5	Car-free	Car free - 0.5†	Car free - 0.5†
6	Car-free	Car free	Car free

*Where small units (generally studios and one-bedroom flats) make up a proportion of a development, parking provision should reflect the resultant reduction in demand so that provision across the site is less than 1.5 spaces per unit.

^Where orbital PTAL is calculated to be less than or equal to 3, developments should be applied flexibly within this range.

†Where CPZ's are in place and orbital PTAL is calculated to be greater than or equal to 4, development should be car-free.

13. Town Centres

Appendix E contains plans of each of the 15 town centres in the London Borough of Barnet. Each plan shows the location of bus stops and routes, train and underground stations, schools and hospitals within a 500m radius of the town centres and shows the Public Transport Accessibility Levels. The Controlled Parking Zones are currently being updated and although we have worked on the basis of existing information available, more accurate and precise information on CPZ boundaries is not currently available. This chapter includes a discussion on each of these town centres with a view to considering the viability introducing car-free residential developments within the town centres.

- Brent Street Town Centre

There are over 20 bus stops, which are serviced by bus route numbers 83, 240 & 683 offering both orbital and radial connections, and one underground station, Hendon Central providing access to the Northern line, within a 500m radius of Brent Street Town Centre. The area is well served with town centre shops, primary and secondary schools.

The extents of Brent Street Town Centre all fall within a PTAL of 2 and 3 which denotes poor public transport accessibility. The proposed maximum parking standards for residential developments in the London Borough of Barnet recommends that for areas with PTALs of 2 and 3 up to 1 and 0.75 parking spaces respectively should be provided for one and two-bedroom units.

While PTALs remain low LBB may be concerned car-free residential development within the town centre will impact negatively on residents' accessibility.

- Burnt Oak Town Centre

There are 18 bus stops, which are serviced by bus route numbers 142, 204, 302 & 606 offering both orbital and radial connections (although predominantly radial), and one underground station, Burnt Oak providing access to the Northern line, within a 500m radius of Burnt Oak Town Centre. The area is well served with town centre shops, has four primary and one secondary school and is within walking distance of Edgware Community Hospital.

All extents of Burnt Oak Town Centre have at least a PTAL of 4, good accessibility by public transport, with most of the area showing a PTAL of 5. The proposed maximum parking standards for residential developments in the London Borough of Barnet recommends that where the PTAL is 5 and 'CPZ's are in place and orbital PTAL is greater than or equal to 4, development should be car-free' for all unit sizes.

Development could be expected to contribute to the provision of a CPZ. There are sufficient services within walking distance that LBB could expect proposed residential developments to be car-free within the extents of the town centre.

- Chipping Barnet Town Centre

There are 27 bus stops, which are serviced by bus route numbers 184, 326, 384, 399, 606 & 626 offering both orbital and radial connections, and one underground station, High Barnet providing

access to the Northern line, within a 500m radius of Chipping Barnet Town Centre. The area is well served with town centre shops, has two primary and two secondary schools.

Chipping Barnet Town Centre has areas of very good (5) and very poor (1b) public transport accessibility levels. The proposed maximum parking standards for residential developments in the London Borough of Barnet recommends that where the PTAL is 5 and 'CPZ's are in place and orbital PTAL is greater than or equal to 4, development should be car-free' for all unit sizes and, for areas with very poor PTAL, 1.25 parking spaces should be provided.

Whilst the PTAL's remain low at the northern end of the town centre there are sufficient services within walking distance that LBB could expect proposed residential developments to be car-free within the extents of the town centre.

- Colindale – The Hyde Town Centre

There are only 6 bus stops, which are serviced by bus route numbers 83, 142, 204 & 324 offering both orbital and radial connections and no underground station within the Colindale- The Hyde Town Centre area. It is served by local shops and has only one primary and no secondary school within a 500m radius.

All extents of Colindale – The Hyde Town Centre have a PTAL of 2, denoting poor accessibility by public transport. The proposed maximum parking standards for residential developments in the London Borough of Barnet recommends that for areas with a PTAL of 2 up to 1 parking space should be provided for one and two-bedroom units.

While PTALs remain low LBB may be concerned car-free residential development within the town centre will impact negatively on residents' accessibility.

- Cricklewood Town Centre

There are 15 bus stops, which are serviced by bus route numbers C11, 198, 226, 245 & 260 offering both orbital radial connections (although predominantly orbital), and Cricklewood mainline station providing access to Luton to the north and Brighton in the south within Cricklewood Town Centre area. It is well served with town centre shops and has four primary but no secondary schools within a 500m radius.

All extents of Cricklewood Town Centre have at least a PTAL of 5 (very good) accessibility by public transport with some of the area showing a PTAL of 6a/6b. The proposed maximum parking standards for residential developments in the London Borough of Barnet recommends that where the PTAL is 5 and 'CPZ's are in place and orbital PTAL is greater than or equal to 4, development should be car-free' for all unit sizes.

Development could be expected to contribute to the provision of a CPZ. There are sufficient services within walking distance and that LBB could expect proposed residential developments to be car-free within the extents of the town centre.

- East Finchley Town Centre

There are 21 bus stops, which are serviced by bus route numbers H3, 102, 263 & 603 offering both orbital and radial connections, and one underground station, East Finchley providing access

to the Northern line, within East Finchley Town Centre area. It is well served with town centre shops and has two primary and one secondary schools within a 500m radius.

All extents of East Finchley Town Centre have at least a PTAL of 3 (fair) accessibility by public transport with most of the area showing a PTAL of 4 and part falling within a PTAL 5 zone. The proposed maximum parking standards for residential developments in the London Borough of Barnet recommends that for areas with PTALs of 3 and 4 up to 0.75 and 0.5 parking spaces respectively should be provided for one and two-bedroom units and where the PTAL is 5 and 'CPZ's are in place and orbital PTAL is greater than or equal to 4, development should be car-free' for all unit sizes.

There are sufficient services within walking distance that LBB could expect proposed residential developments to be car-free within the extents of the town centre.

- Edgware Town Centre

There are 22 bus stops, which are serviced by bus route numbers N113, 142, 340, 628, 642 & 688 offering both orbital and radial connections, and one underground station, Edgware providing access to the Northern line, within a 500m radius of Edgware Town Centre. The area is well served with town centre shops, has two primary and one secondary schools and is within walking distance of Edgware Community Hospital.

Almost all extents of Edgware Town Centre have a PTAL of 6a (best) accessibility by public transport. The proposed maximum parking standards for residential developments in the London Borough of Barnet recommends that where the PTAL is 6 all residential development should be car-free for all unit sizes.

There are sufficient services within walking distance and that LBB could expect proposed residential developments to be car-free within the extents of the town centre.

- Finchley Church End Town Centre

There are 29 bus stops, which are serviced by bus route numbers N13, 125, 143, 326 & 382 offering both orbital and radial connections, and two underground stations, Finchley Central and West Finchley providing access to the Northern line, within Finchley Church End Town Centre area. It is well served with town centre shops, has five primary and one secondary school within a 500m radius.

All extents of Finchley Church End Town Centre have at least a PTAL of 4 (good) accessibility by public transport with a large part of the area showing a PTAL of 5. The proposed maximum parking standards for residential developments in the London Borough of Barnet recommends that for areas with PTALs of 4 up to 0.5 parking spaces should be provided for one and two-bedroom units and where the PTAL is 5 and 'CPZ's are in place and orbital PTAL is greater than or equal to 4, development should be car-free' for all unit sizes.

Development could be expected to contribute to the provision of a CPZ. There are sufficient services within walking distance and that LBB could expect proposed residential developments to be car-free within the extents of the town centre.

- Golders Green Town Centre

There are 32 bus stops, which are serviced by bus route numbers H3, N13, 102, 210 & 226 offering both orbital and radial connections (although predominantly orbital), and one underground station, Golders Green providing access to the Northern line, within the Golders Green Town Centre area. It is well served with town centre shops and has three primary but no secondary schools within a 500m radius.

Almost all extents of Golders Green Town Centre have a PTAL of 6a (best) accessibility by public transport. The proposed maximum parking standards for residential developments in the London Borough of Barnet recommends that where the PTAL is 6 all residential development should be car-free for all unit sizes.

There are sufficient services within walking distance and that LBB could expect proposed residential developments to be car-free within the extents of the town centre.

- Hendon Central Town Centre

There are 23 bus stops, which are serviced by bus route numbers N113, 83 & 183 offering both orbital radial connections, and one underground station, Hendon Central providing access to the Northern line, within the Hendon Town Centre area. It is well served with town centre shops, has two primary and one secondary schools within a 500m radius.

All extents of Hendon Central Town Centre have at least a PTAL of 4 (good) accessibility by public transport with most of the area showing a PTAL of 5 (very good). The proposed maximum parking standards for residential developments in the London Borough of Barnet recommends that where the PTAL is 5 and 'CPZ's are in place and orbital PTAL is greater than or equal to 4, development should be car-free' for all unit sizes.

There are sufficient services within walking distance and that LBB could expect proposed residential developments to be car-free within the extents of the town centre.

- Mill Hill Town Centre

There are 28 bus stops, which are serviced by bus route numbers N113, 186, 221, 251, 642 & 688 offering both orbital and radial connections, and Mill Hill Broadway mainline station providing access to Luton to the north and Brighton in the south, within the Mill Hill Town Centre area. It is well served with town centre shops, has three primary and one secondary schools within a 500m radius.

All extents of Mill Hill Town Centre have a PTAL of 4 (good) accessibility by public transport. The proposed maximum parking standards for residential developments in the London Borough of Barnet recommends that for areas with PTALs of 4 up to 0.5 parking spaces should be provided for one and two-bedroom units

While PTALs remain low LBB may be concerned car-free residential development within the town centre will impact negatively on residents' accessibility.

- New Barnet Town Centre

There are 12 bus stops, which are serviced by bus route numbers 307, 384 & 626 offering both orbital and radial connections, and New Barnet mainline station providing access to Welwyn Garden City to the north and London Kings Cross, within the New Barnet Town Centre area. It is well served with town centre shops and has two primary but no secondary schools within a 500m radius.

The extents of New Barnet Town Centre all fall within a PTAL of 3 which denotes fair public transport accessibility. The proposed maximum parking standards for residential developments in the London Borough of Barnet recommends that for PTALs of 3 up to 0.75 parking spaces should be provided for one and two-bedroom units.

While PTALs remain low LBB may be concerned car-free residential development within the town centre will impact negatively on residents' accessibility.

- North Finchley Town Centre

There are 32 bus stops, which are serviced by bus route numbers N13, 221, 263, 382, 383, 611 & 626 offering both orbital and radial connections, and one underground station, Woodside Park providing access to the Northern line within the North Finchley Town Centre area. It is well served with town centre shops and has two primary but no secondary schools within a 500m radius. It is well served with town centre shops and has six primary and one secondary school within a 500m radius.

Most of the extents of North Finchley Town Centre fall within an area with a PTAL of 3 (fair) accessibility by public transport with pockets showing a PTAL of 4. The proposed maximum parking standards for residential developments in the London Borough of Barnet recommends that for areas with PTALs of 3 and 4 up to 0.75 and 0.5 parking spaces respectively should be provided for one and two-bedroom units.

While PTALs remain low LBB may be concerned car-free residential development within the town centre will impact negatively on residents' accessibility.

- Temple Fortune Town Centre

There are 18 bus stops, which are serviced by bus route numbers H2, H3, N13, 102, 210, 232 & 631 offering both orbital and radial connections and no underground station within the Temple Fortune Town Centre area. It is served by local shops and has two primary but no secondary schools within a 500m radius.

Most of the extents of Temple Fortune Town Centre have a PTAL of 2, denoting poor accessibility by public transport. The proposed maximum parking standards for residential developments in the London Borough of Barnet recommends that for areas with a PTAL of 2 up to 1 parking space should be provided for one and two-bedroom units.

While PTALs remain low LBB may be concerned car-free residential development within the town centre will impact negatively on residents' accessibility.

- Whetstone Town Centre

There are 25 bus stops, which are serviced by bus route numbers 326, 383, 626, 628 & 634 offering both orbital and radial connections (although predominantly radial), and one underground station, Totteridge & Whetstone providing access to the Northern line, within the Whetstone Town Centre area. It is served by local shops and has four primary but no secondary schools within a 500m radius.

Most of Whetstone Town Centre has a PTAL of 4 (good) accessibility by public transport with the northern end dropping to a PTAL of 3 (fair). The proposed maximum parking standards for residential developments in the London Borough of Barnet recommends that for areas with PTALs of 3 and 4 up to 0.75 and 0.5 parking spaces respectively should be provided for one and two-bedroom units

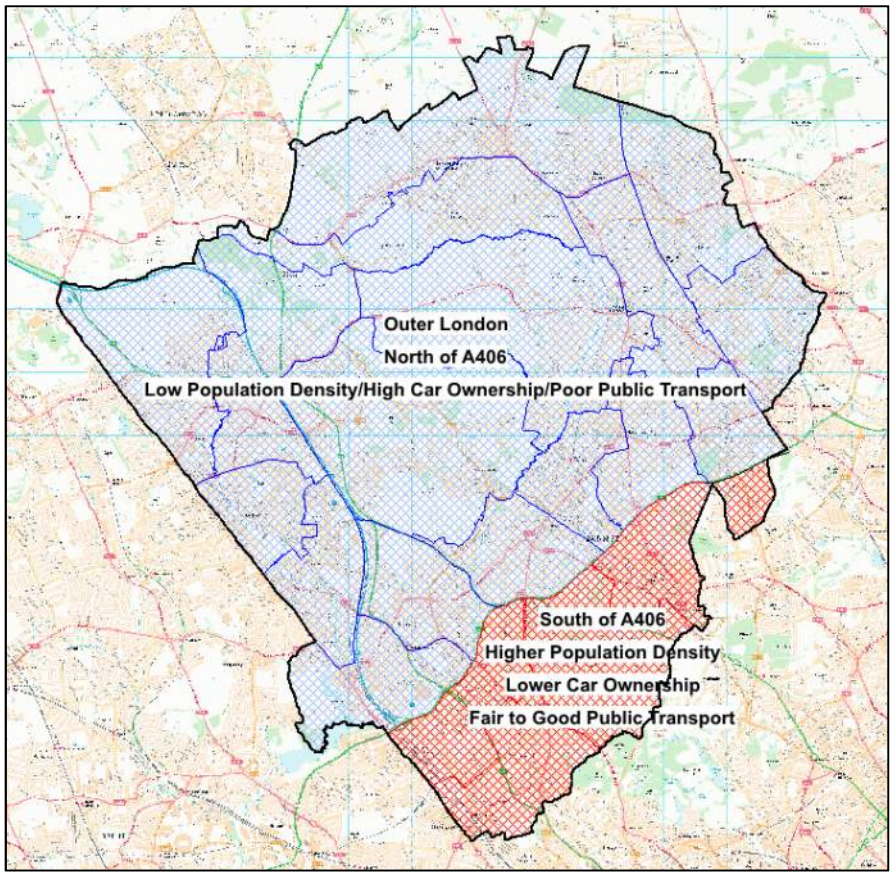
While PTALs remain low LBB may be concerned car-free residential development within the town centre will impact negatively on residents' accessibility.

14. Conclusions

This paper recommends that action be undertaken to reinforce and further refine residential parking standards in the London Borough of Barnet, so that they better reflect emerging policy and the diverse and thriving neighbourhoods within the Borough.

The Borough is large and has different public transport and accessibility characteristics but can broadly be characterised into the following types of area:

- Outer London & North of the A406, low density, high car ownership and poor public transport.
- More inner London, predominantly south of the A406 higher density and fair to good public transport provision and lower car ownership.



Any new development in a CPZ area that allows parking for up to 4 vehicles per new household will only exacerbate any existing parking problems. Consequently, it is recommended that the current policy of applicants being required to enter into a legal agreement to restrict future occupiers from obtaining on street parking permits where there is insufficient capacity on street, is retained.

It is also suggested that the current policy of issuing 4 permits per household to new residents in developments located in, or adjacent to, CPZ areas is reviewed.

The emergence of Car Clubs as an increasingly more established and mainstream alternative to private car ownership will have a growing impact of on residential parking needs. It is suggested

that Car Club membership incentives are provided through the Residential Travel Planning process.

This report highlights the importance of considering both the overall and orbital/radial Public Transport Accessibility Levels (PTAL), ascertained using the Transport for London connectivity assessment toolkit WebCAT, to evaluate accessibility by alternative transport and determine appropriate residential parking allowances.

As noted, in Chapter 12, work undertaken for Chapters 8 through to 11 followed the guidance set out in the current London Plan. As a result, the proposed a set of residential parking standards were dependent on both the number of bedrooms per household as well as PTALs in both orbital and radial directions.

Following the latest publication of the new Draft London Plan in August 2018, where recommended standards are based solely on PTALs irrespective of the number of bedrooms per household, the proposed standards were revisited.

A simple analysis of residential developments in LBB revealed that 1- and 2-bedroom properties accounted for 78% of those completed within the last five years. This report therefore recommends proposed maximum residential parking standards for 1- and 2-bedroom properties based initially on PTAL, with relaxations for developments of larger properties and consideration given to the directional split of PTALs.

The proposed maximum parking standards in Table 14.1 mirror the Draft London Plan closely. It also allows relaxations where larger properties are developed in areas of poor PTAL and where there is a predominant negative bias in orbital provision of public transport, which will enable the Council to set varying standards that more accurately reflect social, environmental, strategic and policy changes since 2011.

Table 14.1 - Proposed Maximum Residential Parking Standards for the London Borough of Barnet

PTAL	Draft London Plan 2017 Outer London	LBB Proposed Parking Standards for 1/2 bed units	LBB Proposed Parking Standards for 3+ bed unit
0	1.5*	Up to 1.25	Up to 1.5
1	1.5*	Up to 1.25	Up to 1.5
2	1	Up to 1	Up to 1.25
3	0.75	Up to 0.75	Up to 1
4	0.5	Up to 0.5^	Up to 0.75^
5	Car-free	Car free - 0.5†	Car free - 0.5†
6	Car-free	Car free	Car free

*Where small units (generally studios and one-bedroom flats) make up a proportion of a development, parking provision should reflect the resultant reduction in demand so that provision across the site is less than 1.5 spaces per unit.

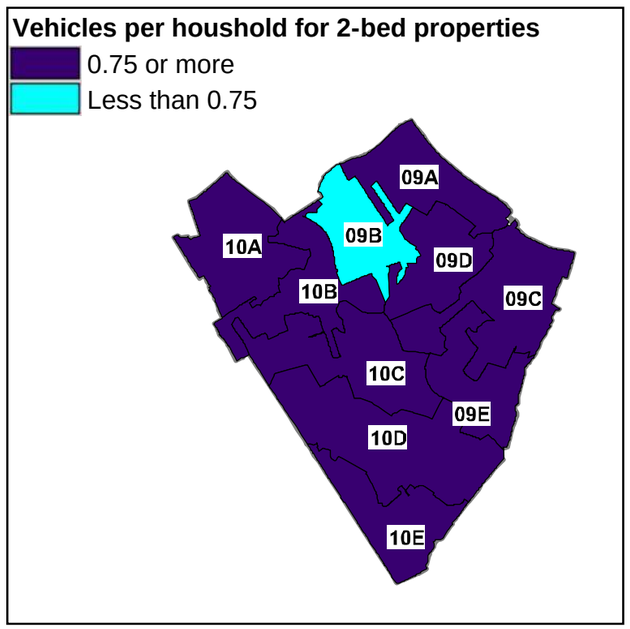
^Where orbital PTAL is calculated to be less than or equal to 3, developments should be applied flexibly within this range.

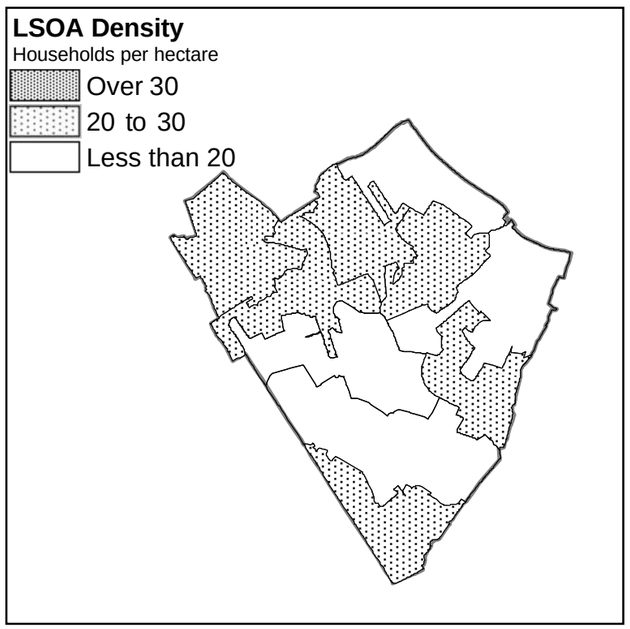
†Where CPZ's are in place and orbital PTAL is calculated to be greater than or equal to 4, development should be car-free.

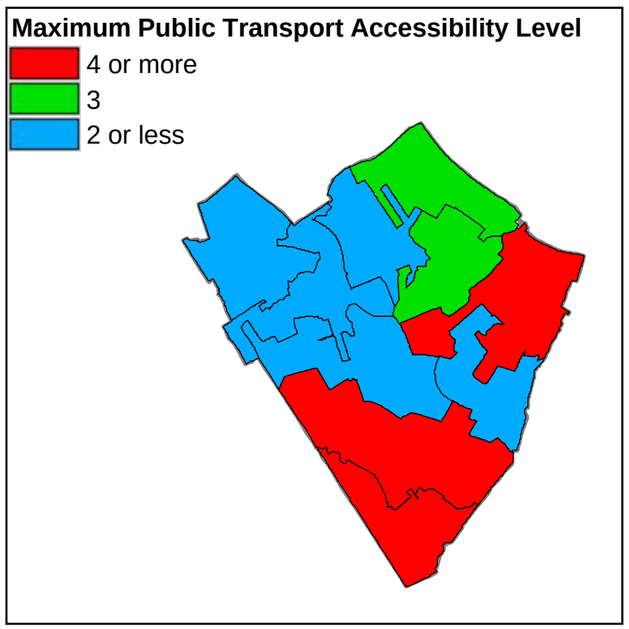
Finally, this report highlights the opportunities for LBB to require proposed residential developments to be car-free within the extents of Burnt Oak, Chipping Barnet, Cricklewood, East Finchley, Edgware, Finchley Church End, Golders Green and Hendon Town Centres, as there are sufficient services within walking distance.

Appendix A
Character Zones

Brunswick Park - Analysis of Vehicle Ownership, Density, Public Transport Accessibility Levels & Traffic Regulation Orders





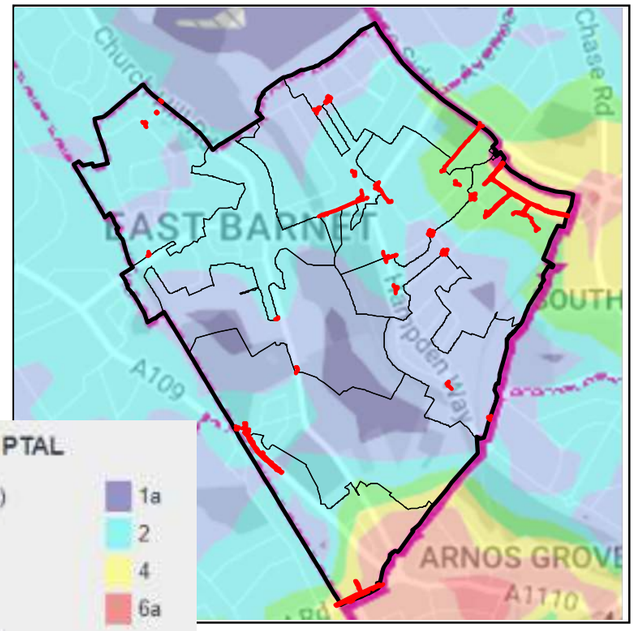


Vehicle ownership for 2-bed properties by LSOA

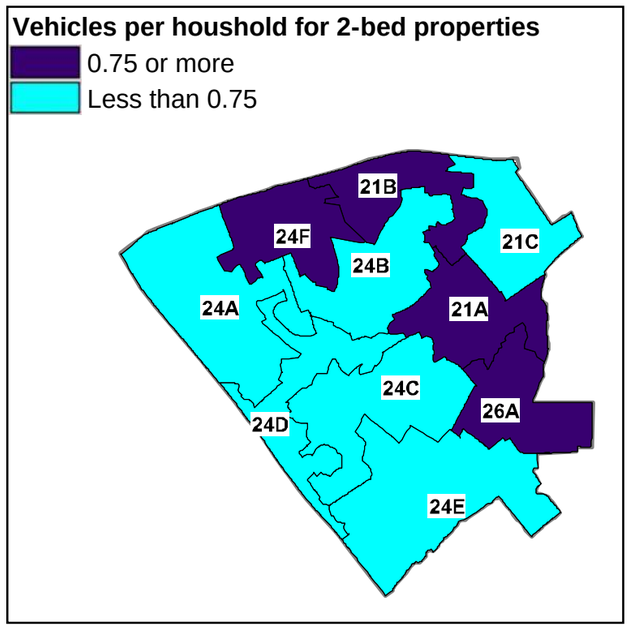
LSOA	Min. PTAL	Max. PTAL	Max. 1 vehicle/household	Min. 2 vehicles/household	Average Vehicles/household
Barnet 009A	1	3	9	3	1.00
Barnet 009B	1	2	27	2	0.69
Barnet 009C	1	4	51	16	1.01
Barnet 009D	1	3	19	5	1.00
Barnet 009E	1	1	28	5	0.88
Barnet 010A	1	2	235	39	0.87
Barnet 010B	1	2	97	23	0.90
Barnet 010C	1	2	149	32	0.86
Barnet 010D	1	4	168	33	0.93
Barnet 010E	1	5	227	29	0.75

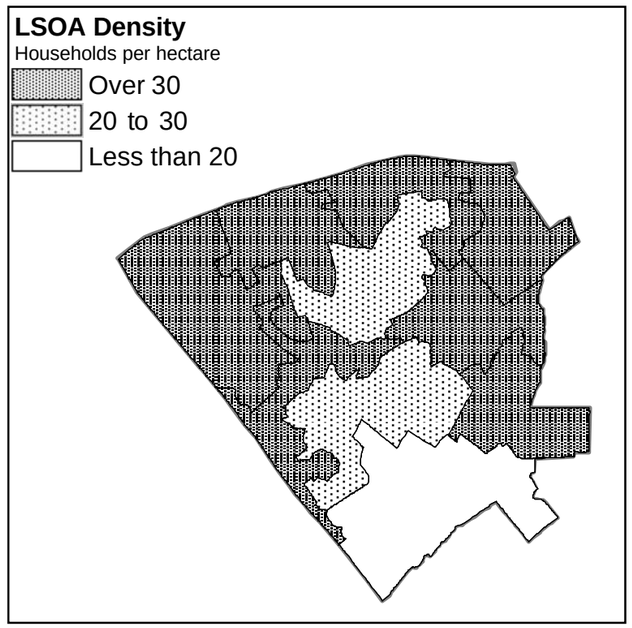
Traffic Regulation Orders & PTAL

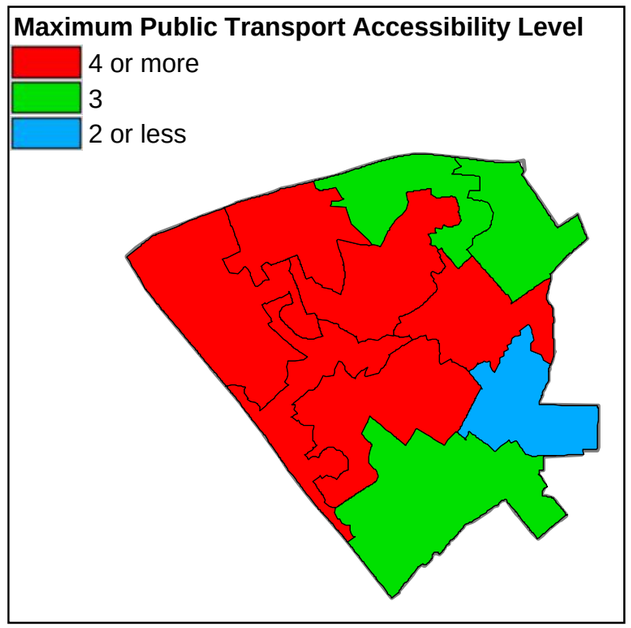
Waiting Restrictions



Burnt Oak - Analysis of Vehicle Ownership, Density, Public Transport Accessibility Levels & Traffic Regulation Orders





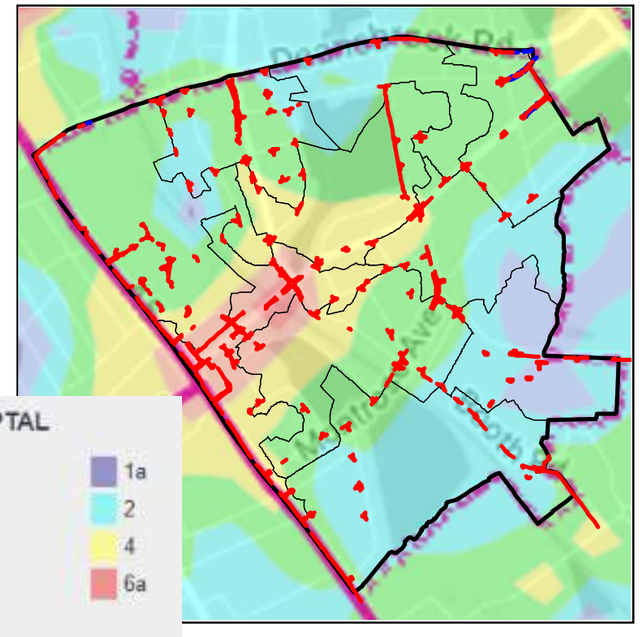


Vehicle ownership for 2-bed properties by LSOA

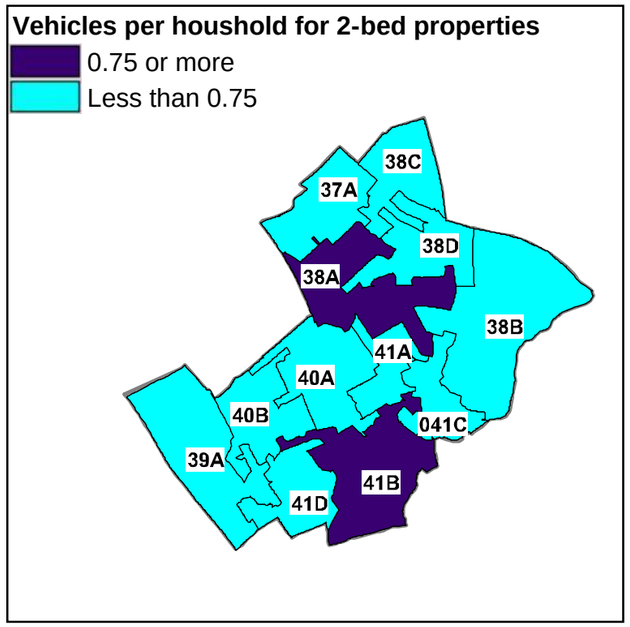
LSOA	Min. PTAL	Max. PTAL	Max. 1 vehicle/household	Min. 2 vehicles/household	Average Vehicles/household
Barnet 021A	1	4	191	45	0.88
Barnet 021B	2	3	195	26	0.75
Barnet 021C	2	3	166	24	0.71
Barnet 024A	1	5	406	41	0.73
Barnet 024B	3	4	184	29	0.68
Barnet 024C	2	6	218	31	0.73
Barnet 024D	2	6	237	13	0.52
Barnet 024E	2	3	153	22	0.74
Barnet 024F	2	4	214	32	0.75
Barnet 026A	1	2	205	32	0.82

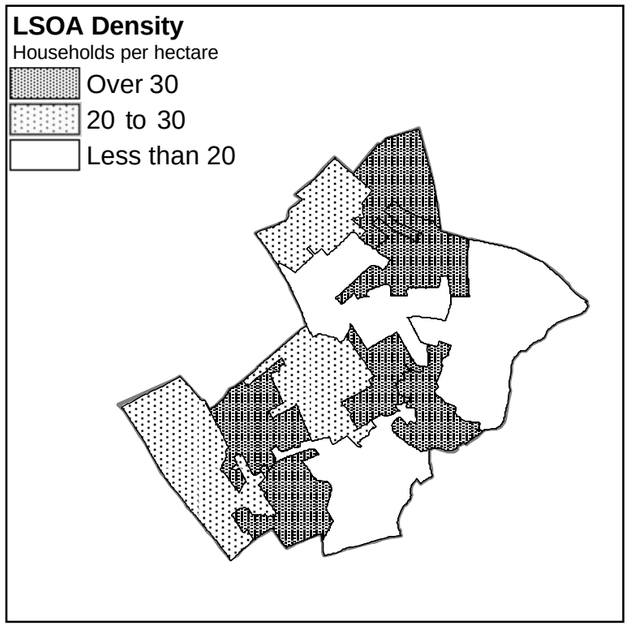
Traffic Regulation Orders & PTAL

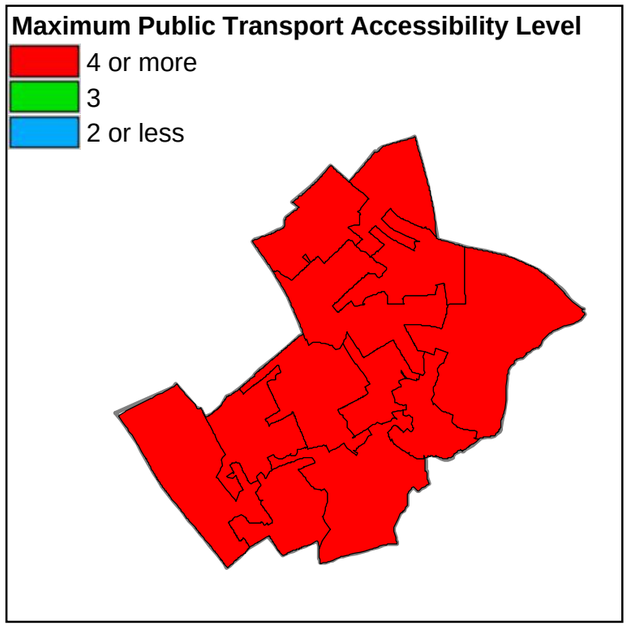
Waiting Restrictions
Resident Permit Holders



Childs Hill - Analysis of Vehicle Ownership, Density, Public Transport Accessibility Levels & Traffic Regulation Orders





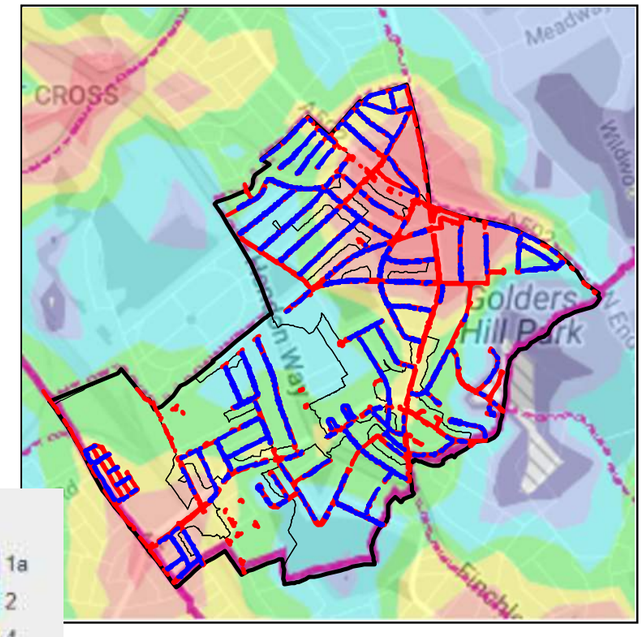


Vehicle ownership for 2-bed properties by LSOA

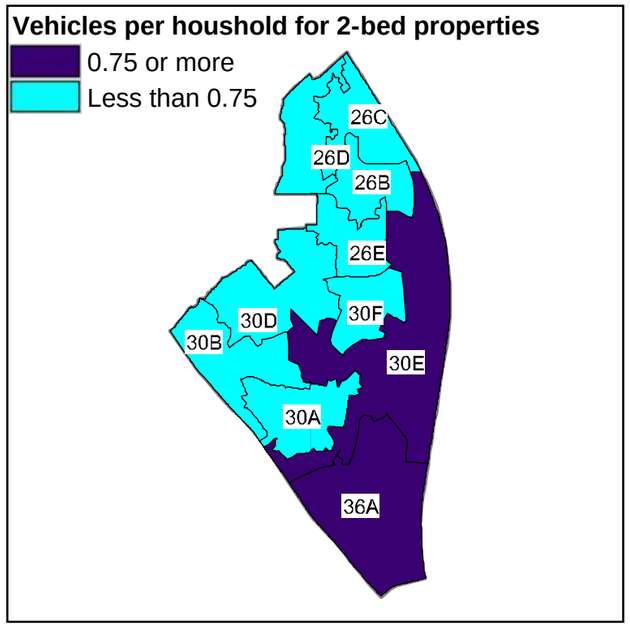
LSOA	Min. PTAL	Max. PTAL	Max. 1 vehicle/household	Min. 2 vehicles/household	Average Vehicles/household
Barnet 037A	2	4	43	4	0.64
Barnet 038A	2	6	95	14	0.79
Barnet 038B	1	6	84	13	0.74
Barnet 038C	4	6	147	11	0.59
Barnet 038D	5	6	156	7	0.47
Barnet 039A	3	6	299	29	0.60
Barnet 040A	2	4	98	15	0.69
Barnet 040B	2	6	253	23	0.65
Barnet 041A	2	4	315	15	0.53
Barnet 041B	2	4	169	26	0.77
Barnet 041C	3	4	245	17	0.51
Barnet 041D	1	6	193	11	0.47

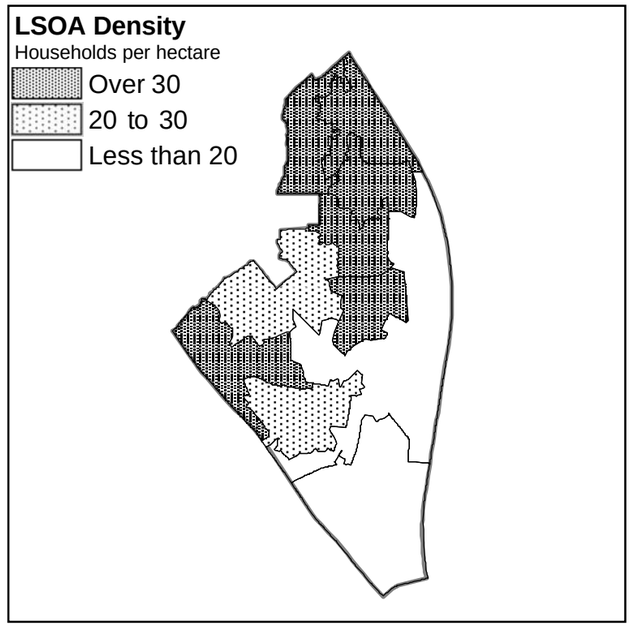
Traffic Regulation Orders & PTAL

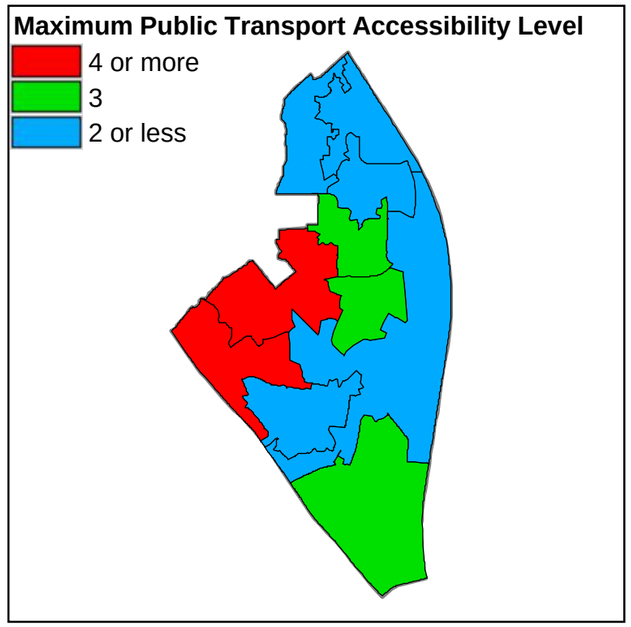
Waiting Restrictions
Resident Permit Holders



Colindale - Analysis of Vehicle Ownership, Density, Public Transport Accessibility Levels & Traffic Regulation Orders

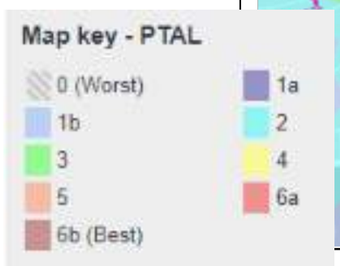


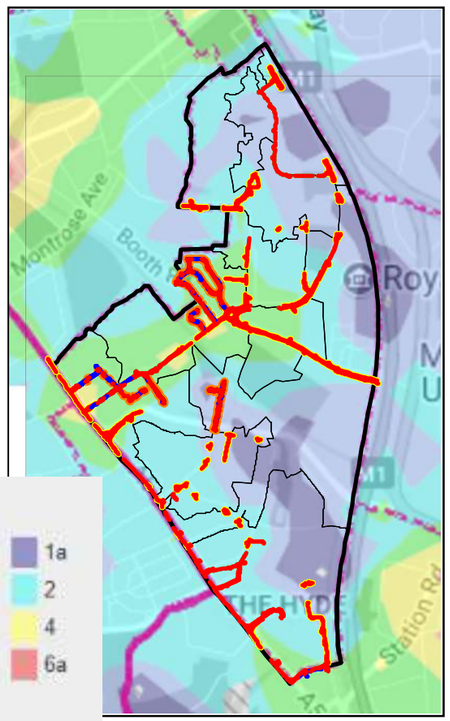




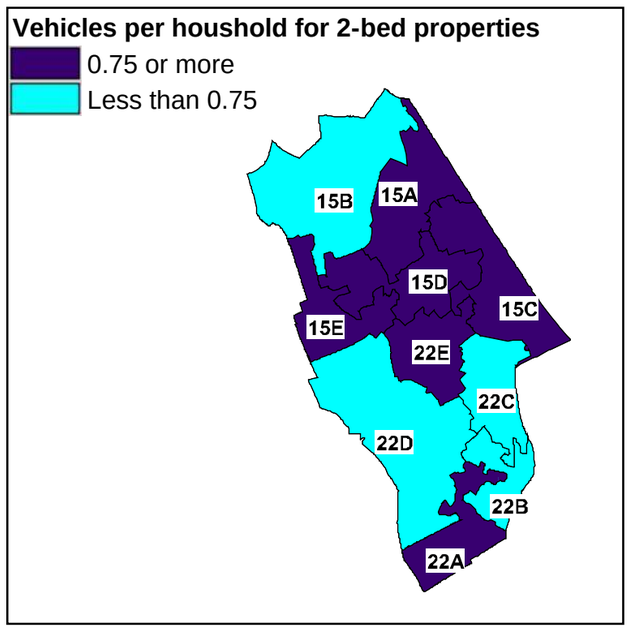
Vehicle ownership for 2-bed properties by LSOA

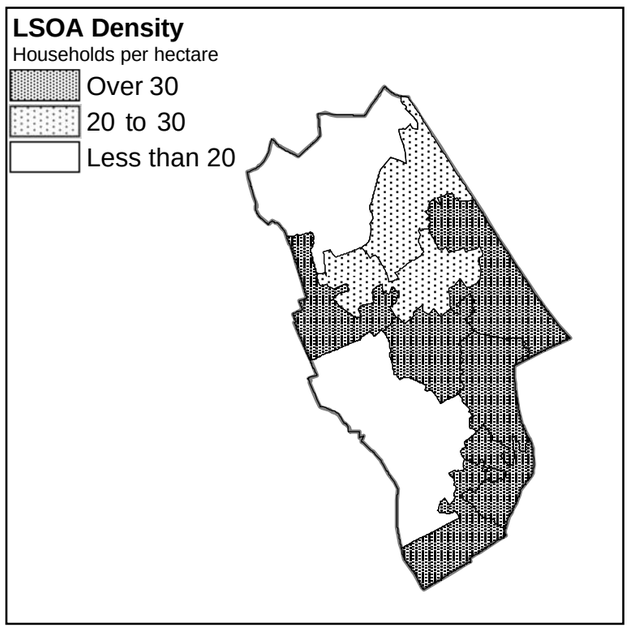
LSOA	Min. PTAL	Max. PTAL	Max. 1 vehicle/household	Min. 2 vehicles/household	Average Vehicles/household
Barnet 026B	1	2	231	11	0.48
Barnet 026C	1	2	317	28	0.65
Barnet 026D	1	2	208	28	0.71
Barnet 026E	1	3	144	15	0.62
Barnet 030A	1	2	49	3	0.67
Barnet 030B	1	4	182	21	0.63
Barnet 030D	2	4	299	36	0.69
Barnet 030E	1	2	132	22	0.84
Barnet 030F	2	3	227	23	0.68
Barnet 036A	1	3	149	30	0.85

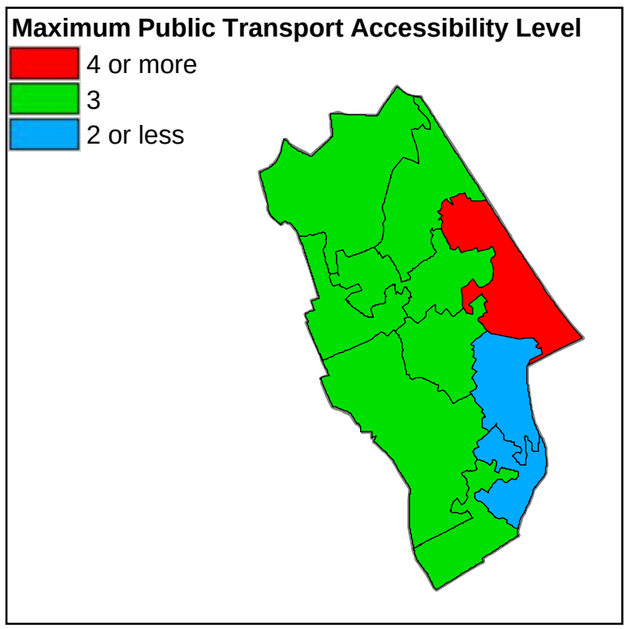




Coppetts - Analysis of Vehicle Ownership, Density, Public Transport Accessibility Levels & Traffic Regulation Orders

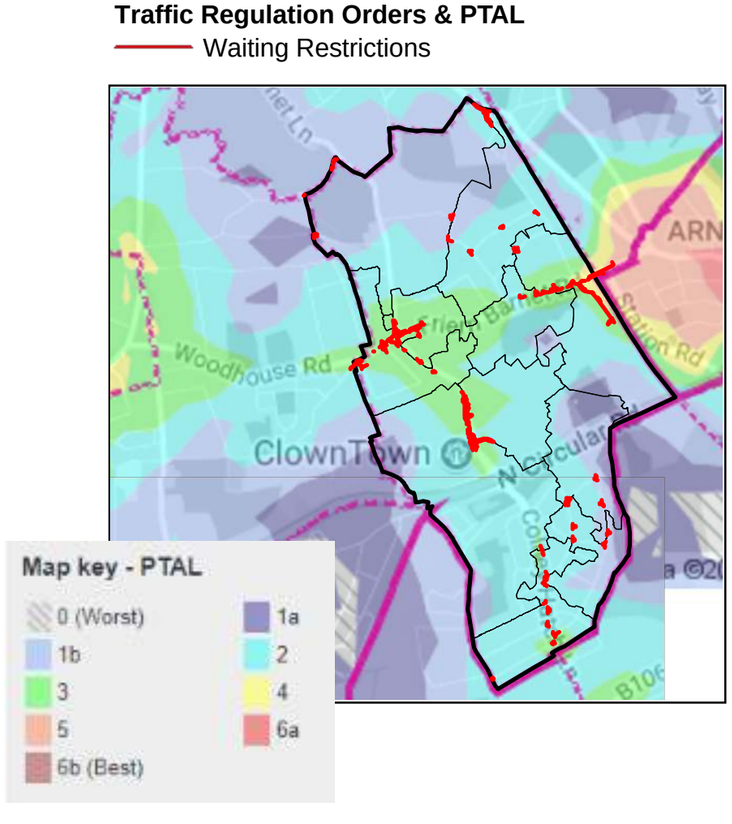




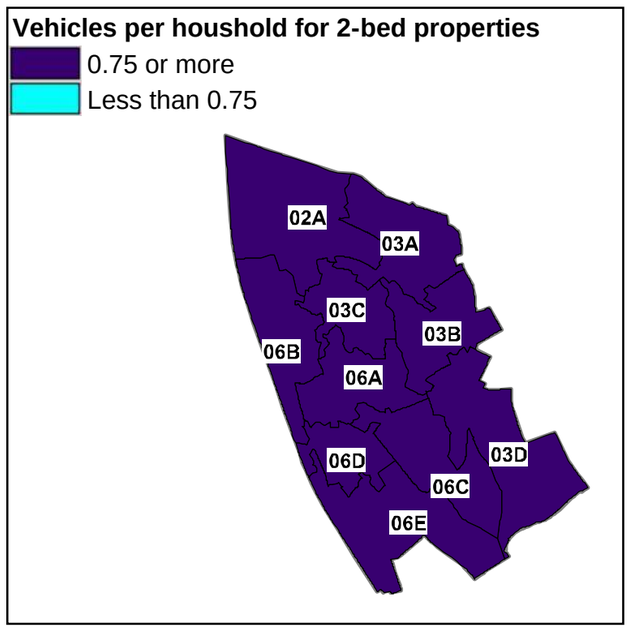


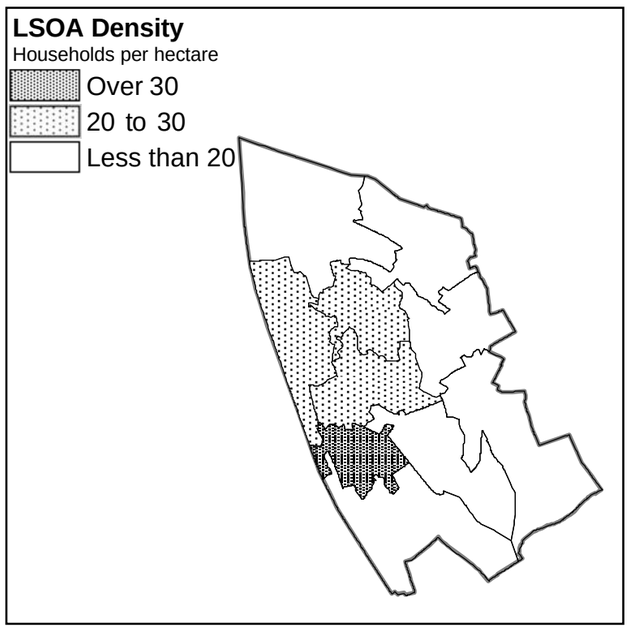
Vehicle ownership for 2-bed properties by LSOA

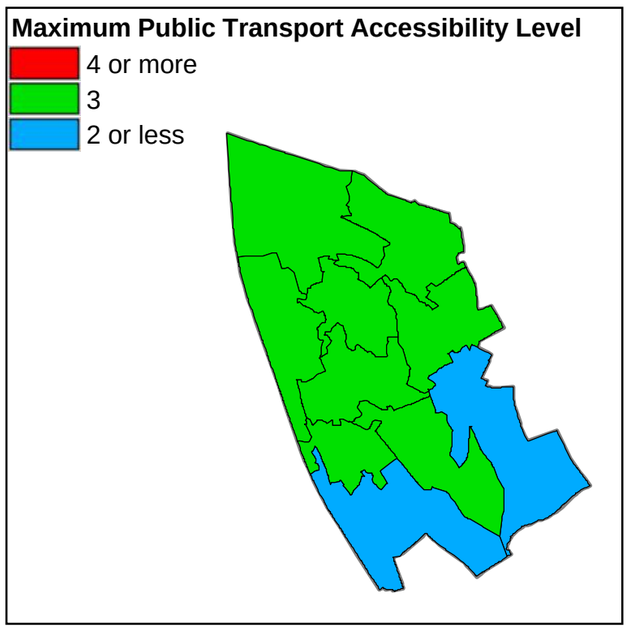
LSOA	Min. PTAL	Max. PTAL	Max. 1 vehicle/household	Min. 2 vehicles/household	Average Vehicles/household
Barnet 015A	1	3	146	22	0.82
Barnet 015B	1	3	132	20	0.72
Barnet 015C	1	4	328	59	0.95
Barnet 015D	1	3	245	44	0.83
Barnet 015E	1	3	91	11	0.81
Barnet 022A	2	3	240	41	0.80
Barnet 022B	2	1	305	29	0.68
Barnet 022C	1	2	306	26	0.63
Barnet 022D	1	3	167	30	0.68
Barnet 022E	1	3	209	37	0.93



East Barnet - Analysis of Vehicle Ownership, Density, Public Transport Accessibility Levels & Traffic Regulation Orders





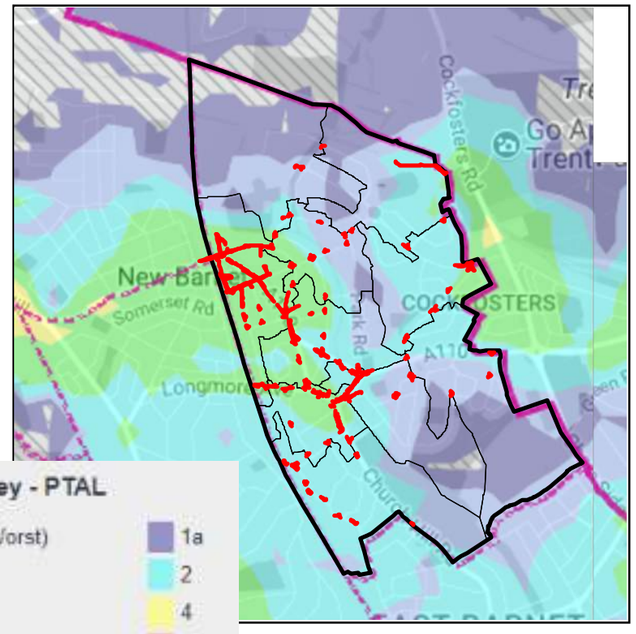


Vehicle ownership for 2-bed properties by LSOA

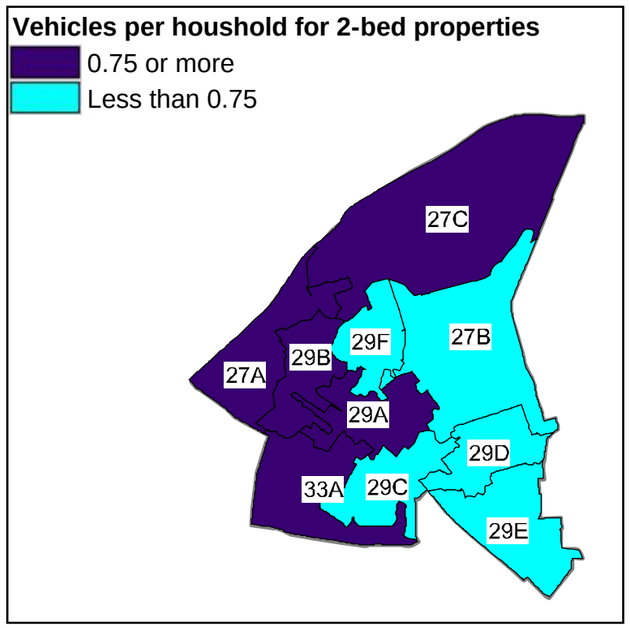
LSOA	Min. PTAL	Max. PTAL	Max. 1 vehicle/household	Min. 2 vehicles/household	Average Vehicles/household
Barnet 002A	0	3	162	49	0.94
Barnet 003A	1	3	164	42	1.03
Barnet 003B	1	3	62	10	0.92
Barnet 003C	1	3	152	34	0.95
Barnet 003D	1	2	97	22	0.99
Barnet 006A	1	3	152	34	0.90
Barnet 006B	1	3	378	54	0.75
Barnet 006C	0	3	82	9	0.76
Barnet 006D	2	3	258	40	0.81
Barnet 006E	1	2	103	23	0.92

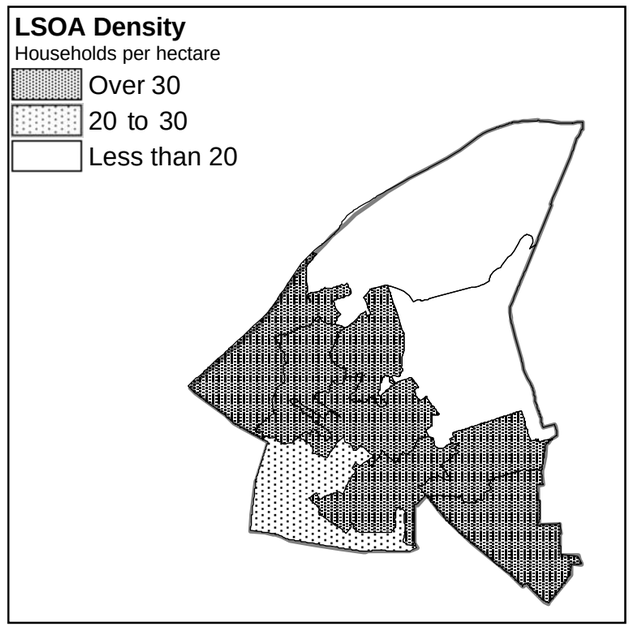
Traffic Regulation Orders & PTAL

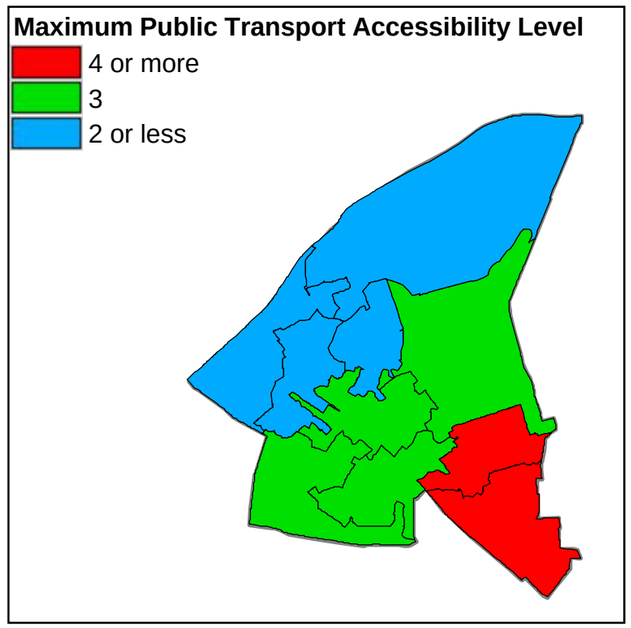
Waiting Restrictions



East Finchley - Analysis of Vehicle Ownership, Density, Public Transport Accessibility Levels & Traffic Regulation Orders





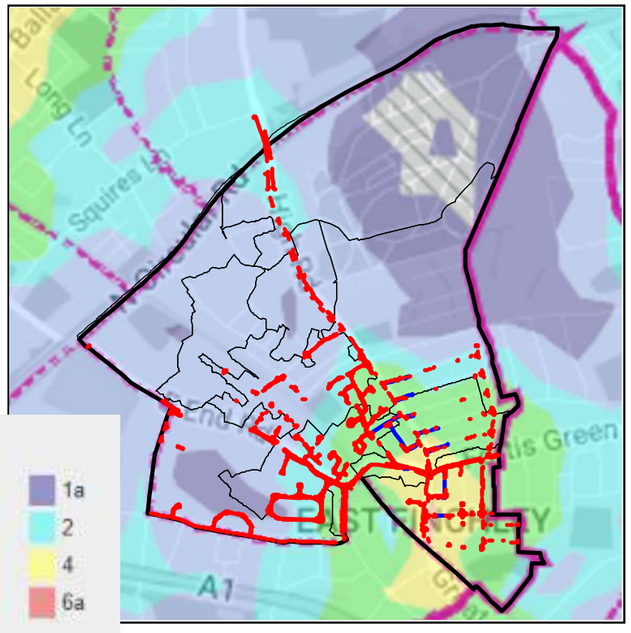


Vehicle ownership for 2-bed properties by LSOA

LSOA	Min. PTAL	Max. PTAL	Max. 1 vehicle/household	Min. 2 vehicles/household	Average Vehicles/household
Barnet 027A	1	2	186	25	0.76
Barnet 027B	0	3	157	10	0.60
Barnet 027C	0	2	112	22	0.75
Barnet 029A	1	3	278	21	0.75
Barnet 029B	1	1	294	33	0.80
Barnet 029C	1	3	217	21	0.65
Barnet 029D	3	4	147	7	0.58
Barnet 029E	4	5	177	18	0.59
Barnet 029F	1	1	205	17	0.63
Barnet 033A	1	3	199	31	0.77

Traffic Regulation Orders & PTAL

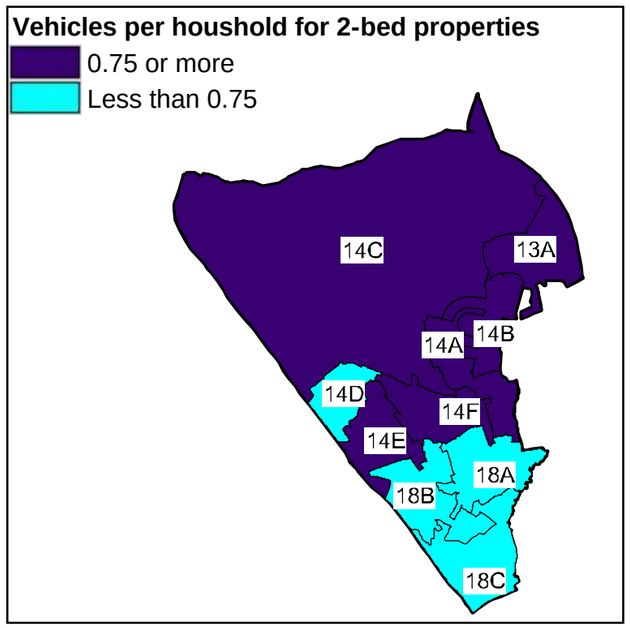
Waiting Restrictions
Resident Permit Holders

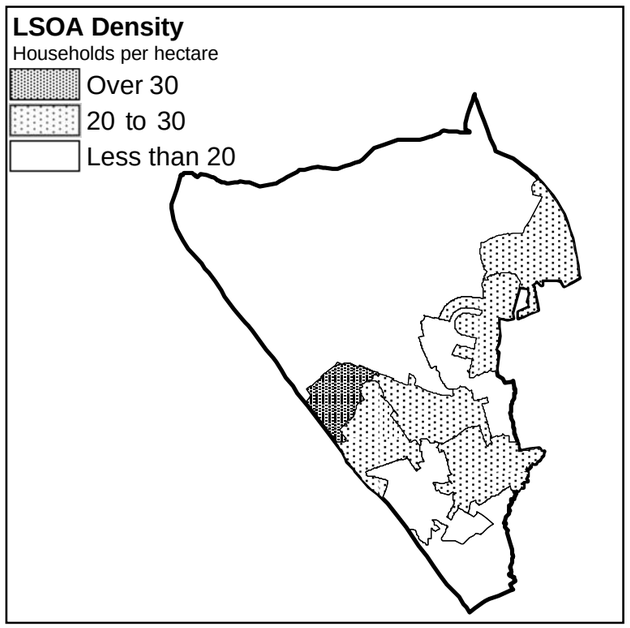


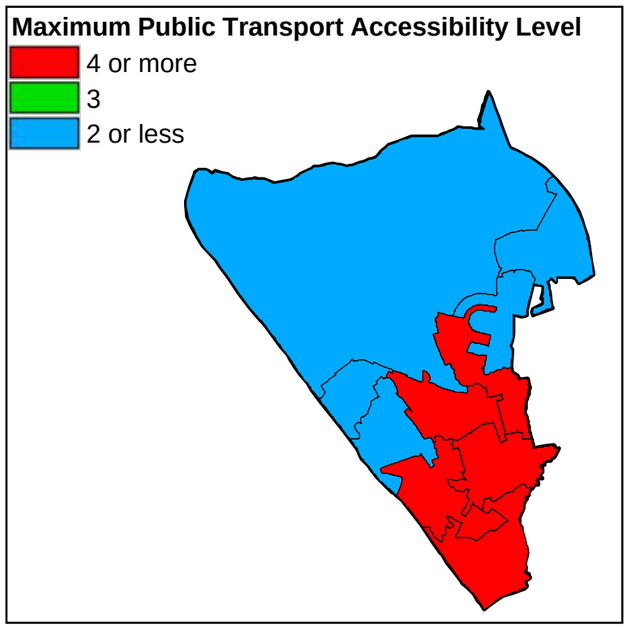
Map key - PTAL

0 (Worst)
1a
1b
2
3
4
5
6a
6b (Best)

Edgware - Analysis of Vehicle Ownership, Density, Public Transport Accessibility Levels & Traffic Regulation Orders





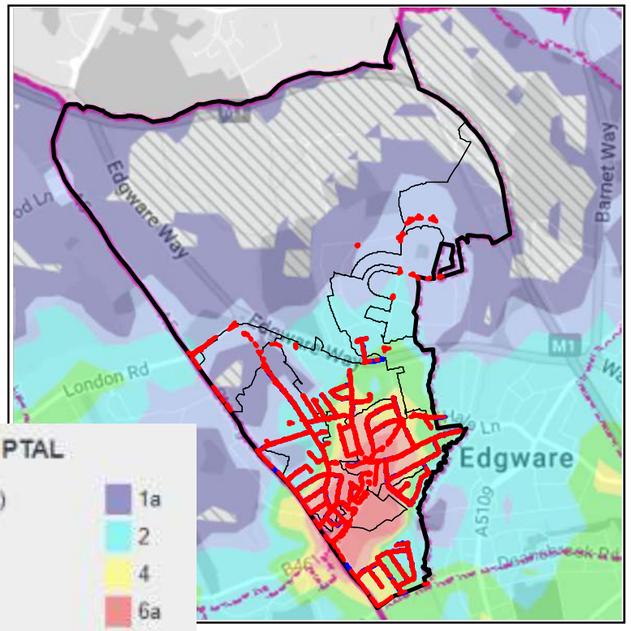


Vehicle ownership for 2-bed properties by LSOA

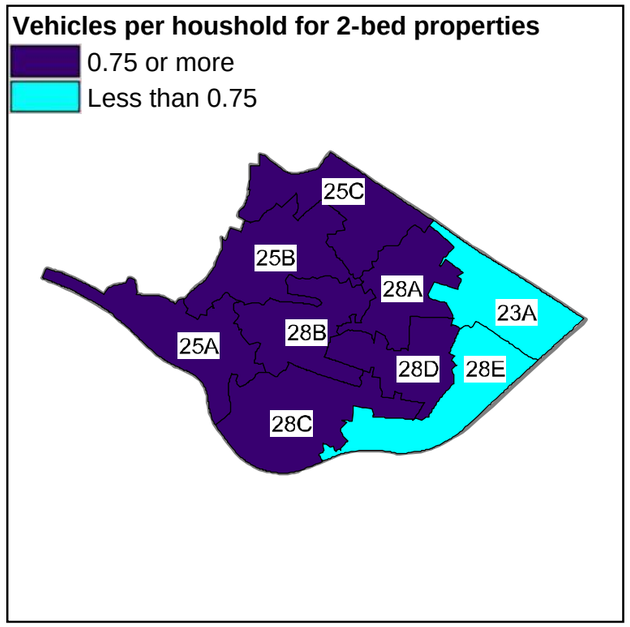
LSOA	Min. PTAL	Max. PTAL	Max. 1 vehicle/household	Min. 2 vehicles/household	Average Vehicles/household
Barnet 013A	0	1	180	21	0.76
Barnet 014A	1	4	20	5	1.04
Barnet 014B	1	2	87	16	0.83
Barnet 014C	0	2	29	9	1.11
Barnet 014D	0	1	325	22	0.56
Barnet 014E	1	2	86	11	0.76
Barnet 014F	1	5	97	21	0.97
Barnet 018A	2	6	206	19	0.68
Barnet 018B	1	6	119	18	0.67
Barnet 018C	1	6	151	13	0.62

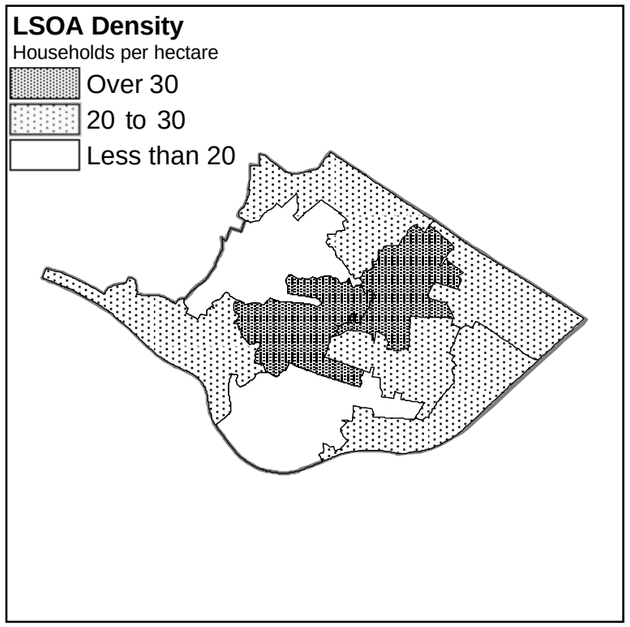
Traffic Regulation Orders & PTAL

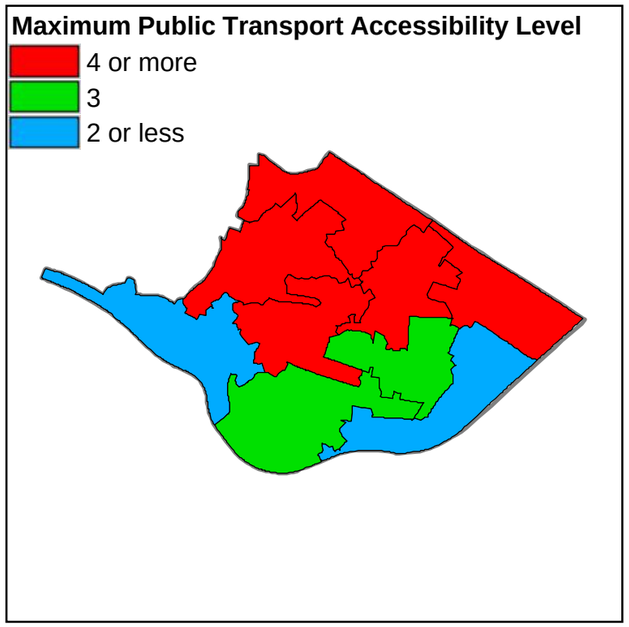
Waiting Restrictions
Resident Permit Holders



Finchley Church End - Analysis of Vehicle Ownership, Density, Public Transport Accessibility Levels & Traffic Regulation

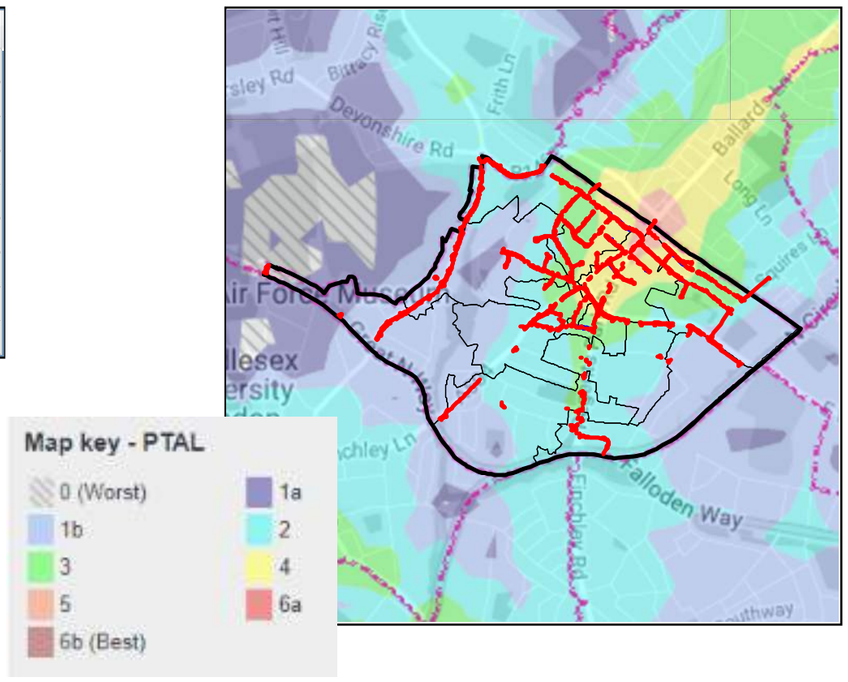




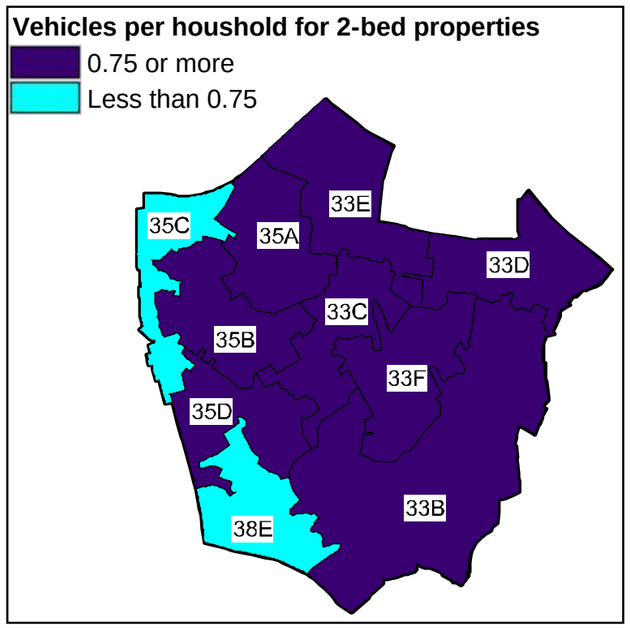


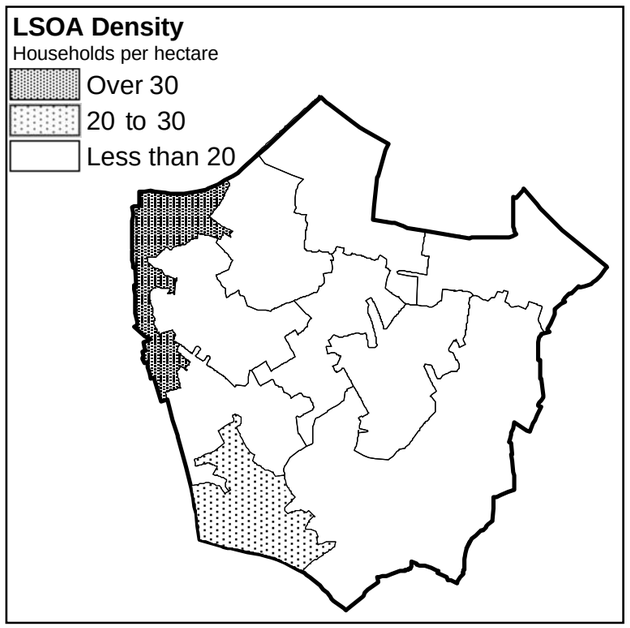
Vehicle ownership for 2-bed properties by LSOA

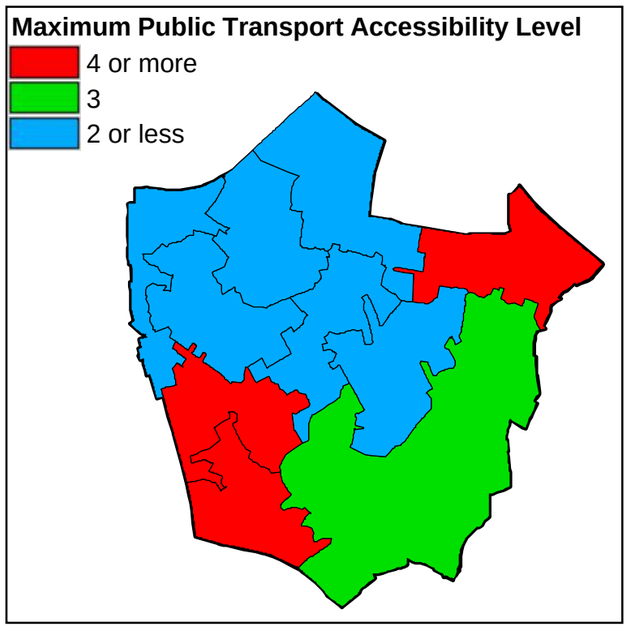
LSOA	Min. PTAL	Max. PTAL	Max. 1 vehicle/household	Min. 2 vehicles/household	Average Vehicles/household
Barnet 023A	1	5	136	22	0.70
Barnet 025A	0	1	157	34	1.01
Barnet 025B	1	4	182	51	1.03
Barnet 025C	1	5	142	40	1.02
Barnet 028A	2	5	402	66	0.78
Barnet 028B	1	4	302	43	0.86
Barnet 028C	1	3	82	31	1.02
Barnet 028D	1	3	150	30	0.79
Barnet 028E	1	2	246	15	0.60



Garden Suburb - Analysis of Vehicle Ownership, Density, Public Transport Accessibility Levels & Traffic Regulation Orders





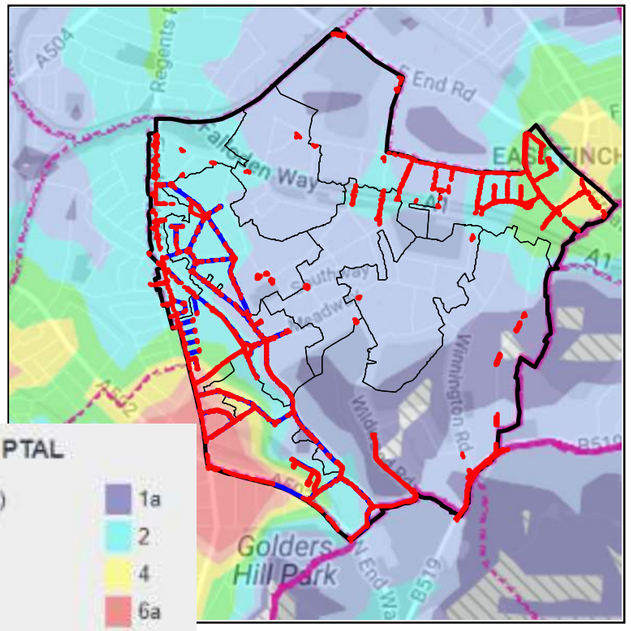


Vehicle ownership for 2-bed properties by LSOA

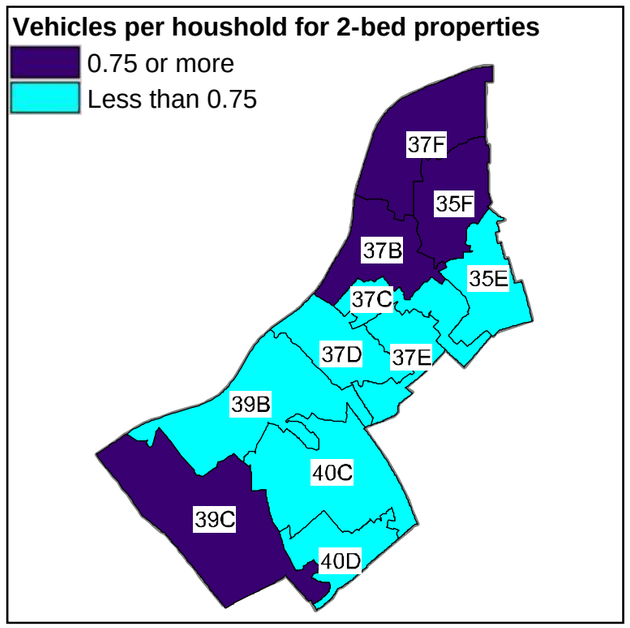
LSOA	Min. PTAL	Max. PTAL	Max. 1 vehicle/household	Min. 2 vehicles/household	Average Vehicles/household
Barnet 033B	0	3	70	12	1.02
Barnet 033C	1	2	145	12	0.77
Barnet 033D	1	4	163	35	0.92
Barnet 033E	1	2	151	29	0.86
Barnet 033F	1	1	17	6	0.91
Barnet 035A	1	2	153	25	0.93
Barnet 035B	1	2	151	38	0.97
Barnet 035C	1	2	305	33	0.68
Barnet 035D	1	6	64	12	0.82
Barnet 038E	1	6	212	23	0.74

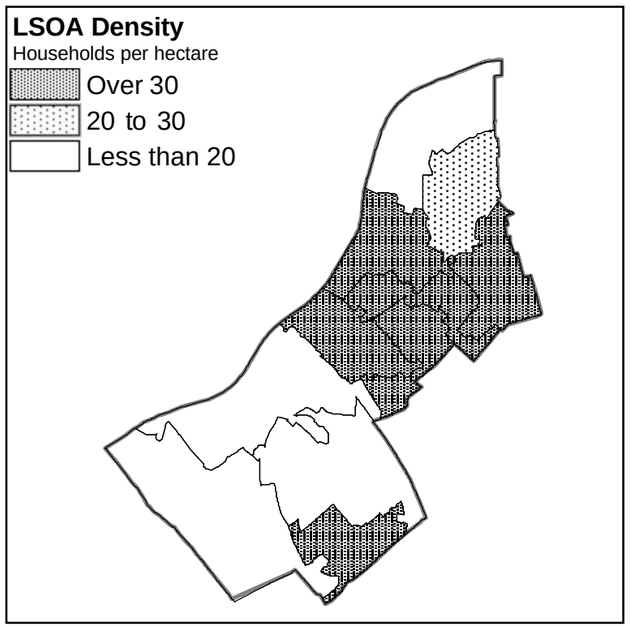
Traffic Regulation Orders & PTAL

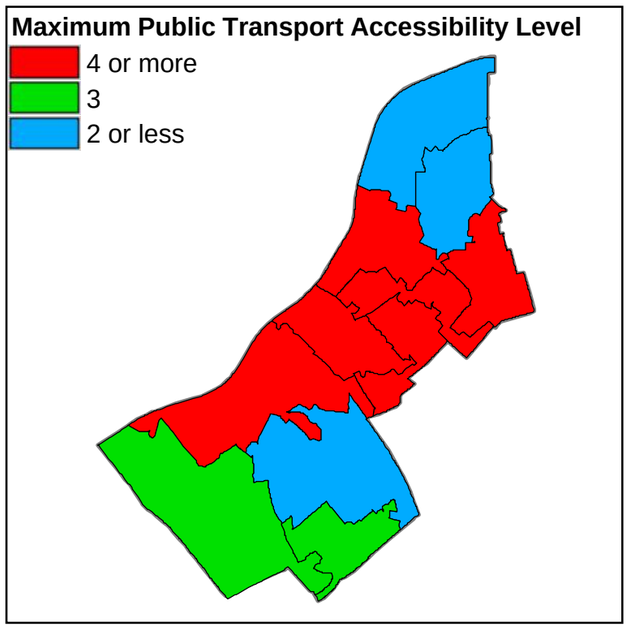
Waiting Restrictions
Resident Permit Holders



Golders Green - Analysis of Vehicle Ownership, Density, Public Transport Accessibility Levels & Traffic Regulation Orders





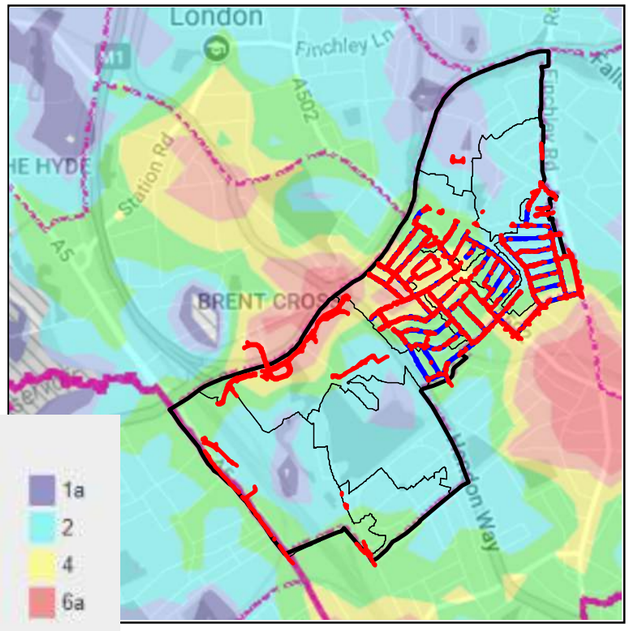


Vehicle ownership for 2-bed properties by LSOA

LSOA	Min. PTAL	Max. PTAL	Max. 1 vehicle/household	Min. 2 vehicles/household	Average Vehicles/household
Barnet 035E	2	4	116	15	0.73
Barnet 035F	1	2	75	14	0.94
Barnet 037B	2	4	126	20	0.81
Barnet 037C	2	4	113	8	0.62
Barnet 037D	2	6	102	11	0.68
Barnet 037E	2	4	125	7	0.54
Barnet 037F	1	2	43	10	0.94
Barnet 039B	1	6	209	18	0.61
Barnet 039C	1	3	118	16	0.81
Barnet 040C	1	2	41	4	0.53
Barnet 040D	2	3	50	5	0.73

Traffic Regulation Orders & PTAL

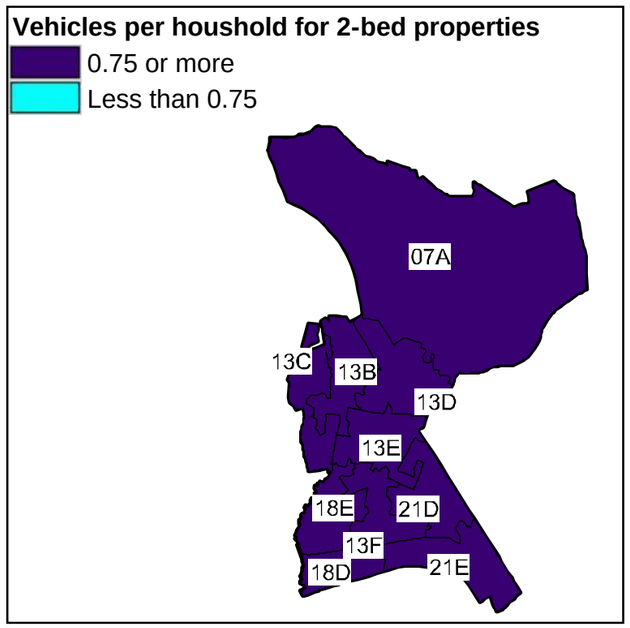
Waiting Restrictions
Resident Permit Holders

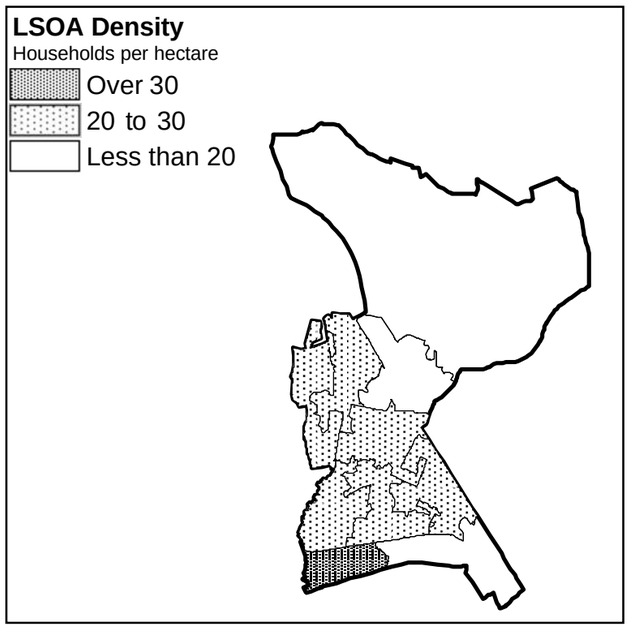


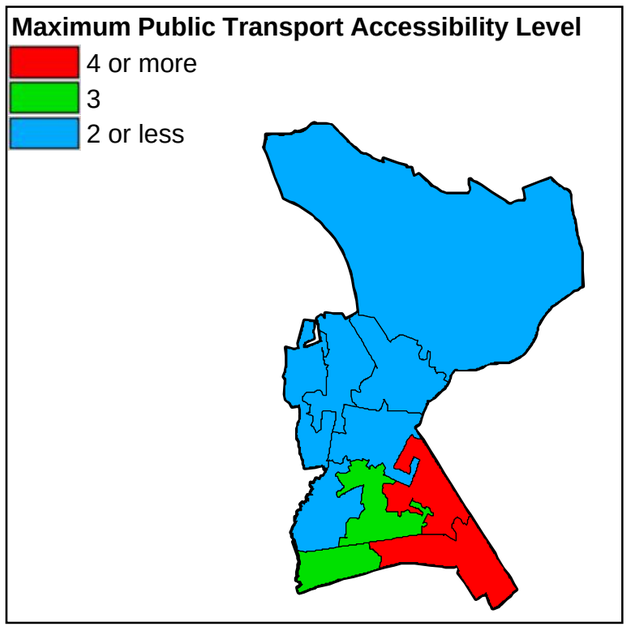
Map key - PTAL

0 (Worst)	1a
1b	2
3	4
5	6a
6b (Best)	

Hale - Analysis of Vehicle Ownership, Density, Public Transport Accessibility Levels & Traffic Regulation Orders





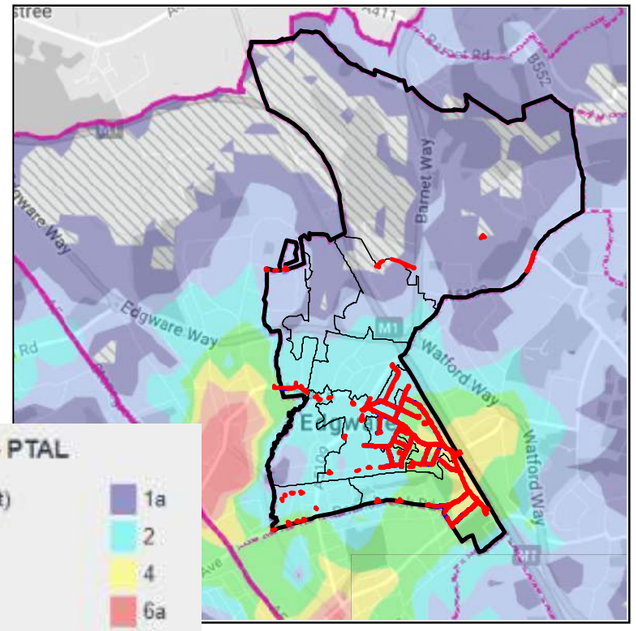


Vehicle ownership for 2-bed properties by LSOA

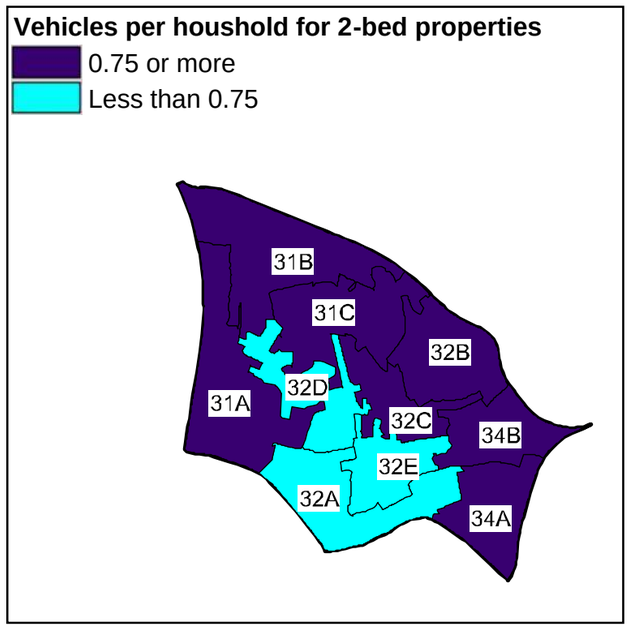
LSOA	Min. PTAL	Max. PTAL	Max. 1 vehicle/household	Min. 2 vehicles/household	Average Vehicles/household
Barnet 007A	0	1	45	13	0.95
Barnet 013B	1	2	193	35	0.82
Barnet 013C	1	2	167	34	0.87
Barnet 013D	1	2	174	55	1.02
Barnet 013E	1	2	129	38	1.01
Barnet 013F	1	3	105	21	0.96
Barnet 018D	1	3	196	43	0.85
Barnet 018E	1	2	40	13	1.08
Barnet 021D	2	4	157	34	0.94
Barnet 021E	2	4	143	28	0.81

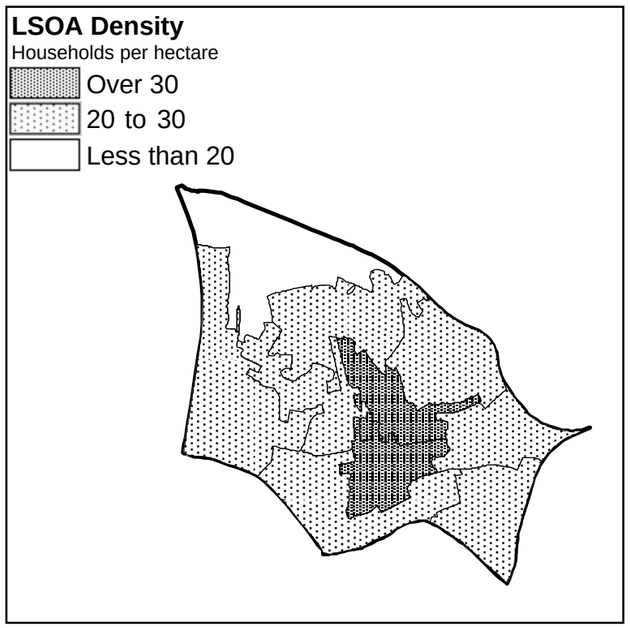
Traffic Regulation Orders & PTAL

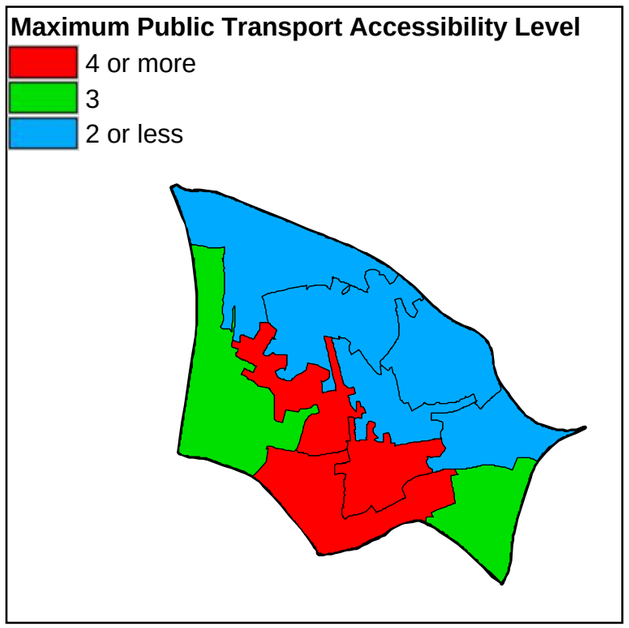
Waiting Restrictions
Resident Permit Holders



Hendon - Analysis of Vehicle Ownership, Density, Public Transport Accessibility Levels & Traffic Regulation Orders







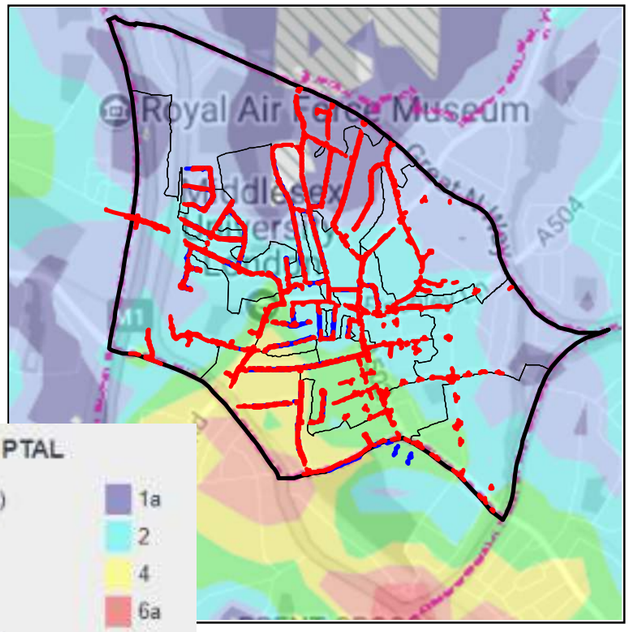
Vehicle ownership for 2-bed properties by LSOA

LSOA	Min. PTAL	Max. PTAL	Max. 1 vehicle/household	Min. 2 vehicles/household	Average vehicles/household
Barnet 031A	1	3	253	39	0.81
Barnet 031B	0	1	82	19	1.00
Barnet 031C	0	2	197	29	0.85
Barnet 032A	2	5	227	39	0.73
Barnet 032B	1	2	178	28	0.88
Barnet 032C	1	2	246	34	0.77
Barnet 032D	1	4	123	19	0.69
Barnet 032E	2	4	324	36	0.61
Barnet 034A	1	3	203	47	0.95
Barnet 034B	1	2	132	26	0.84

Traffic Regulation Orders & PTAL

Waiting Restrictions

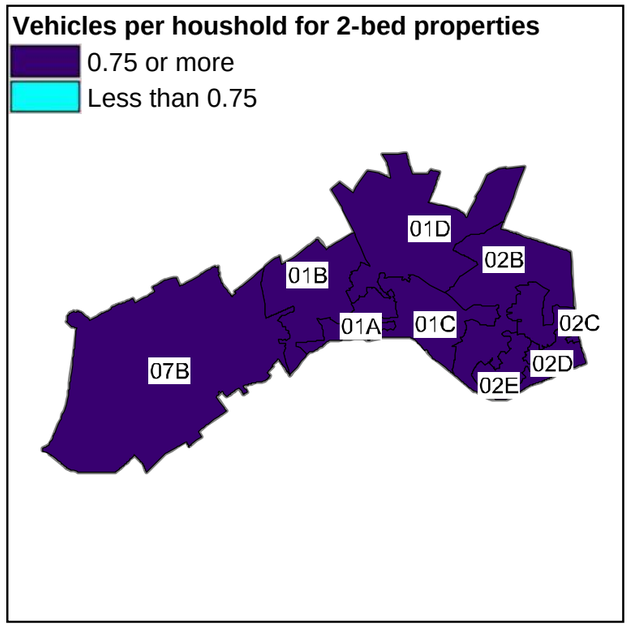
Resident Permit Holders

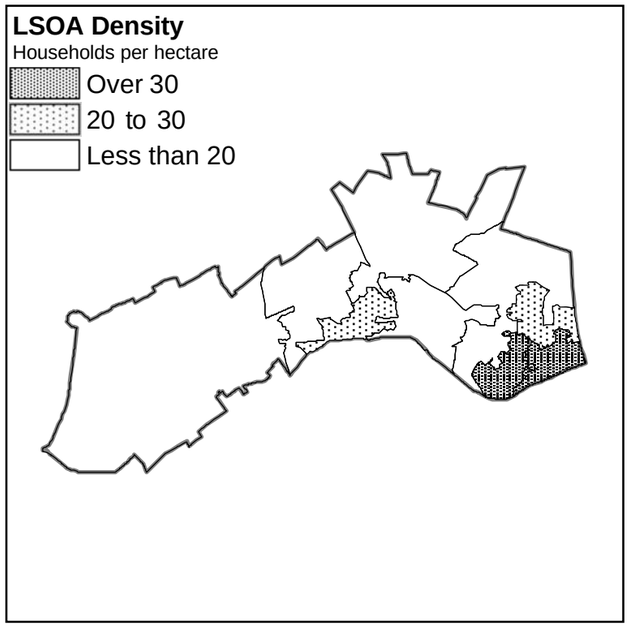


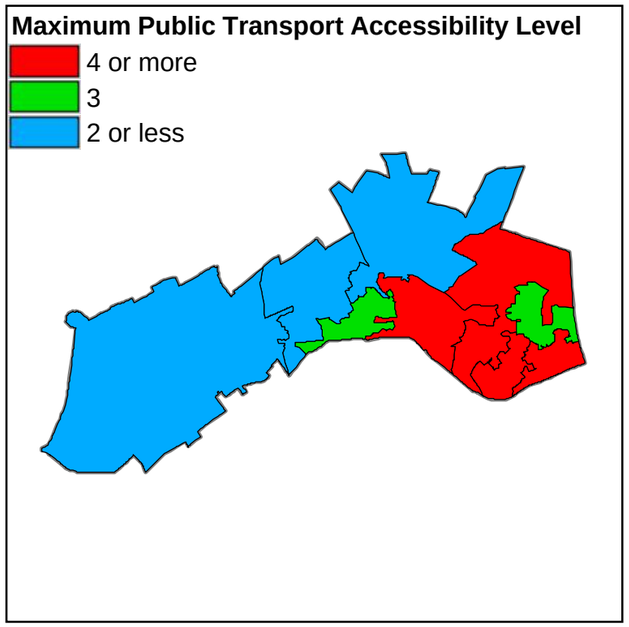
Map key - PTAL

0 (Worst) · 1a · 1b · 2 · 3 · 4 · 5 · 6a · 6b (Best)

High Barnet - Analysis of Vehicle Ownership, Density, Public Transport Accessibility Levels & Traffic Regulation Orders





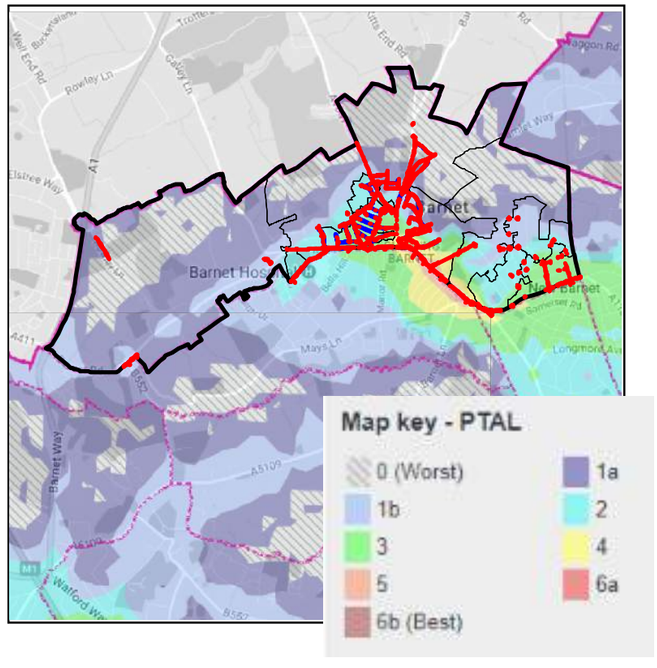


Vehicle ownership for 2-bed properties by LSOA

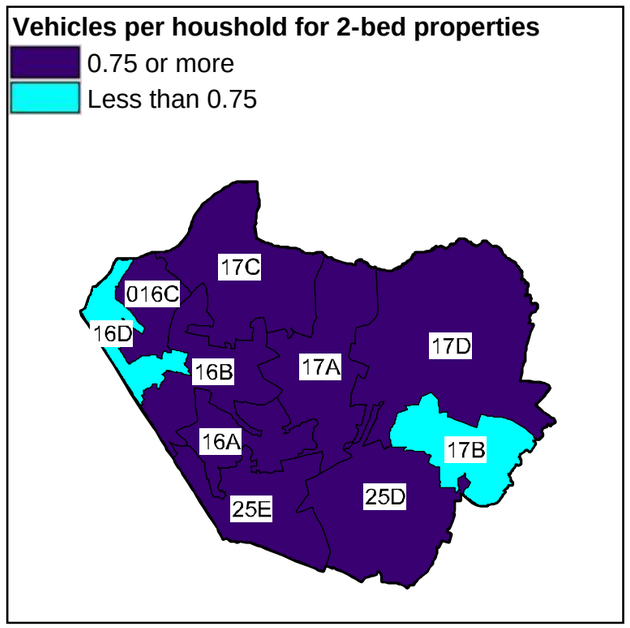
LSOA	Min. PTAL	Max. PTAL	Max. 1 vehicle/household	Min. 2 vehicles/household	Average Vehicles/household
Barnet 001A	2	3	189	33	0.89
Barnet 001B	0	2	83	23	1.01
Barnet 001C	1	5	252	43	0.84
Barnet 001D	0	2	141	30	1.01
Barnet 002B	0	4	207	34	0.91
Barnet 002C	1	3	216	31	0.91
Barnet 002D	2	4	335	64	0.86
Barnet 002E	1	4	226	55	0.94
Barnet 007B	0	2	48	13	1.11

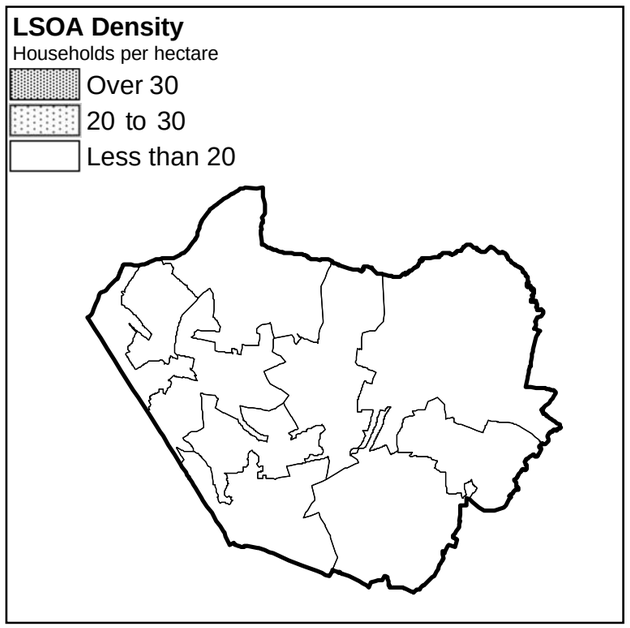
Traffic Regulation Orders & PTAL

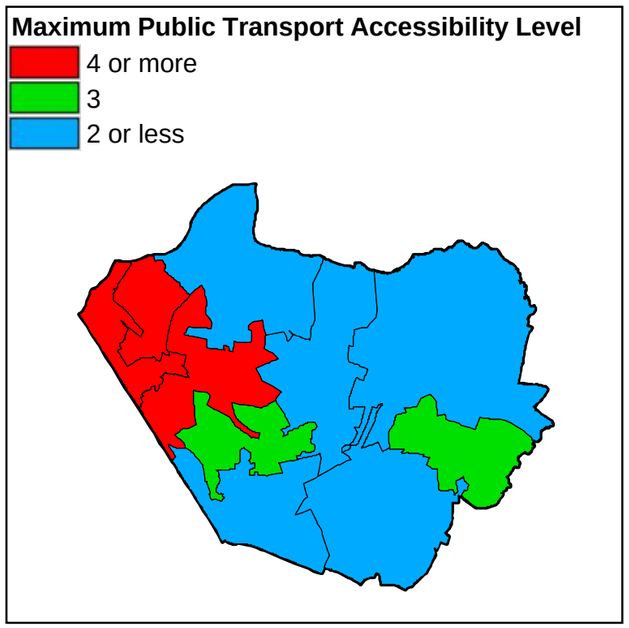
Waiting Restrictions
Resident Permit Holders



Mill Hill - Analysis of Vehicle Ownership, Density, Public Transport Accessibility Levels & Traffic Regulation Orders





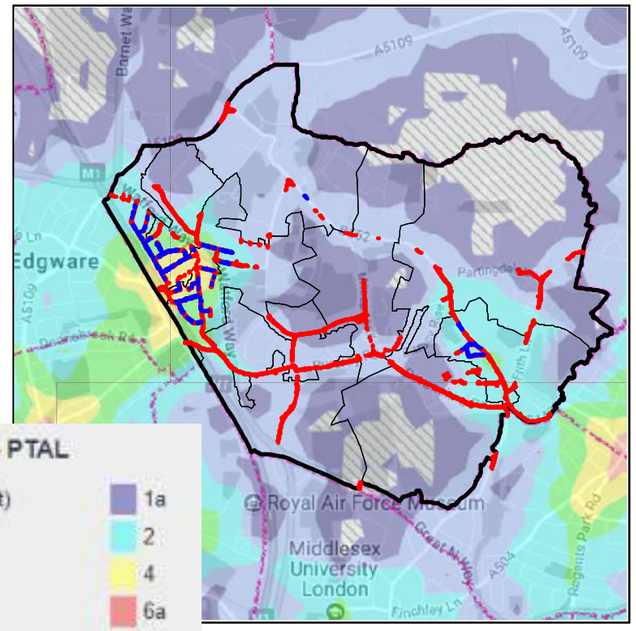


Vehicle ownership for 2-bed properties by LSOA

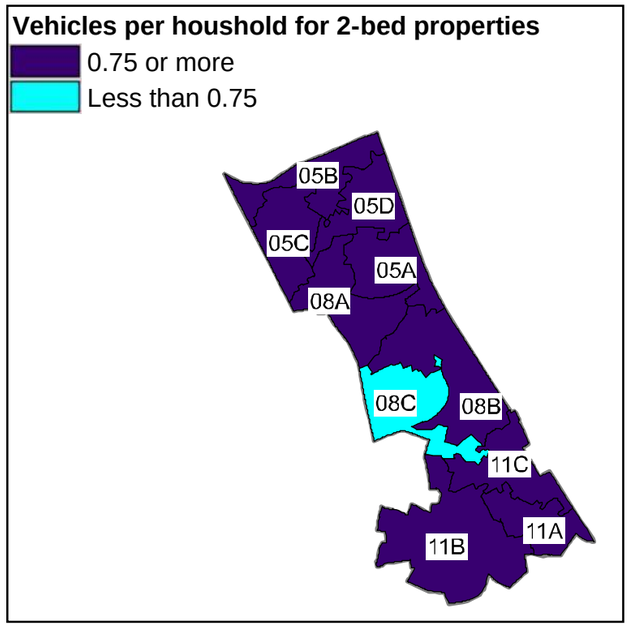
LSOA	Min. PTAL	Max. PTAL	Max. 1 vehicle/household	Min. 2 vehicles/household	Average vehicles/household
Barnet 016A	1	3	151	43	1.08
Barnet 016B	1	4	165	43	0.95
Barnet 016C	1	4	19	10	1.14
Barnet 016D	1	4	175	15	0.66
Barnet 017A	0	1	94	35	1.08
Barnet 017B	1	3	372	41	0.70
Barnet 017C	1	1	124	29	0.98
Barnet 017D	0	2	134	30	1.04
Barnet 025D	0	2	229	61	0.98
Barnet 025E	0	2	256	65	0.94

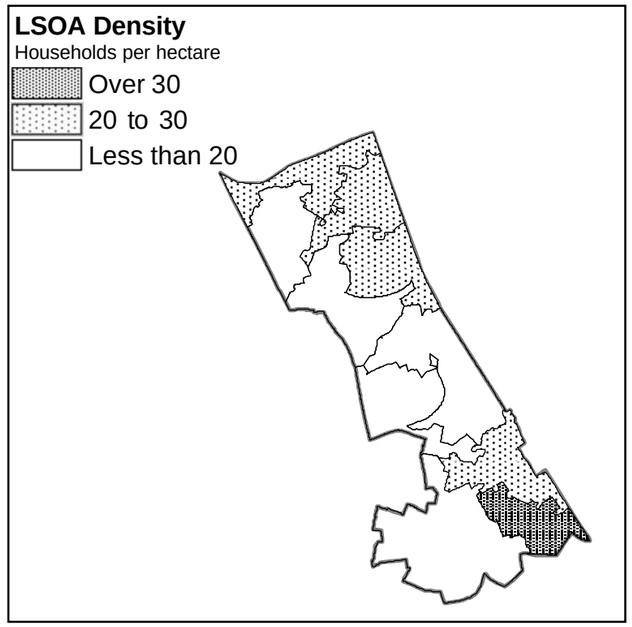
Traffic Regulation Orders & PTAL

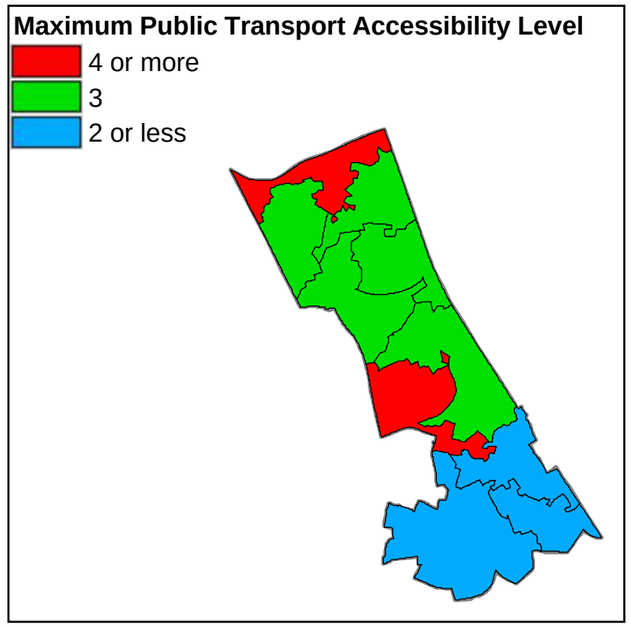
Waiting Restrictions
Resident Permit Holders



Oakleigh - Analysis of Vehicle Ownership, Density, Public Transport Accessibility Levels & Traffic Regulation Orders





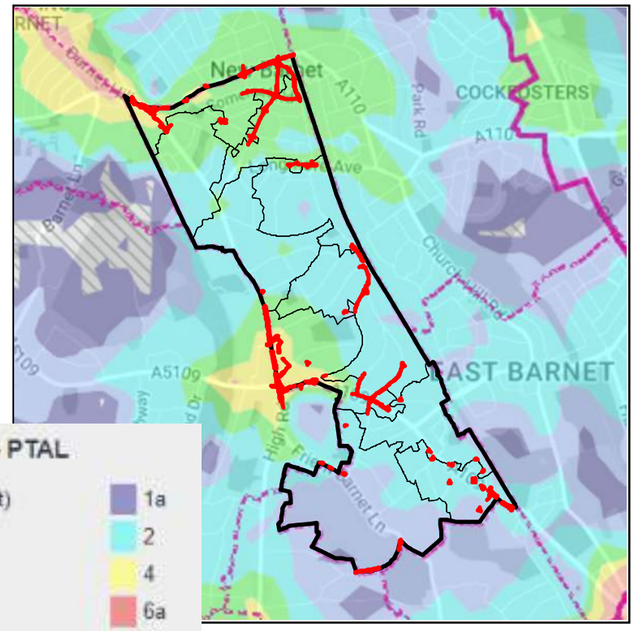


Vehicle ownership for 2-bed properties by LSOA

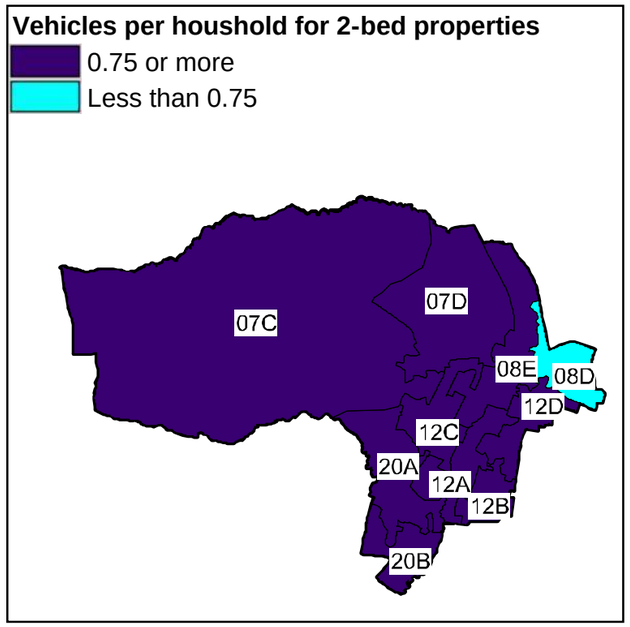
LSOA	Min. PTAL	Max. PTAL	Max 1. vehicle/household	Min. 2 vehicles/household	Average Vehicles/household
Barnet 005A	1	3	61	12	0.88
Barnet 005B	3	4	365	48	0.79
Barnet 005C	2	3	55	13	1.06
Barnet 005D	2	3	169	42	1.01
Barnet 008A	2	3	117	27	0.87
Barnet 008B	1	3	57	18	1.04
Barnet 008C	2	4	195	24	0.73
Barnet 011A	1	2	298	46	0.83
Barnet 011B	1	2	31	5	0.83
Barnet 011C	1	2	134	18	0.76

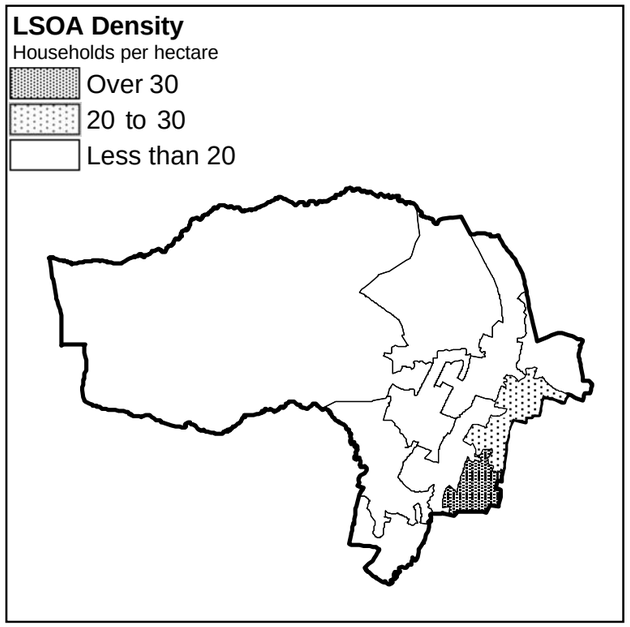
Traffic Regulation Orders & PTAL

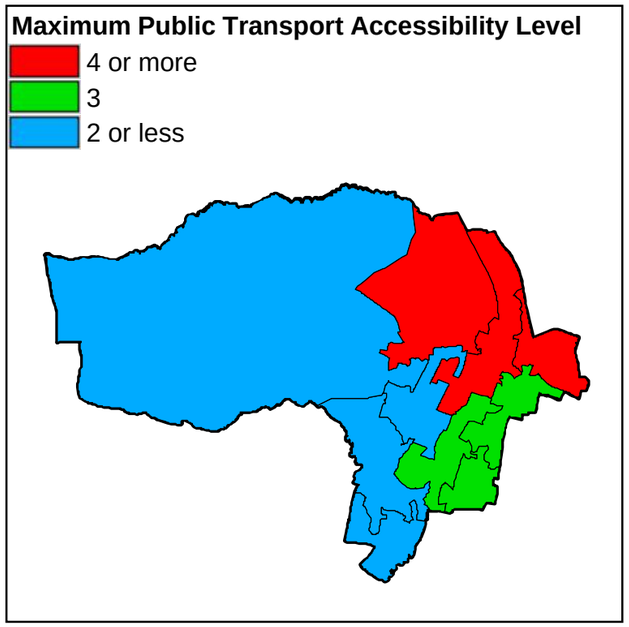
Waiting Restrictions
Resident Permit Holders



Totteridge - Analysis of Vehicle Ownership, Density, Public Transport Accessibility Levels & Traffic Regulation Orders





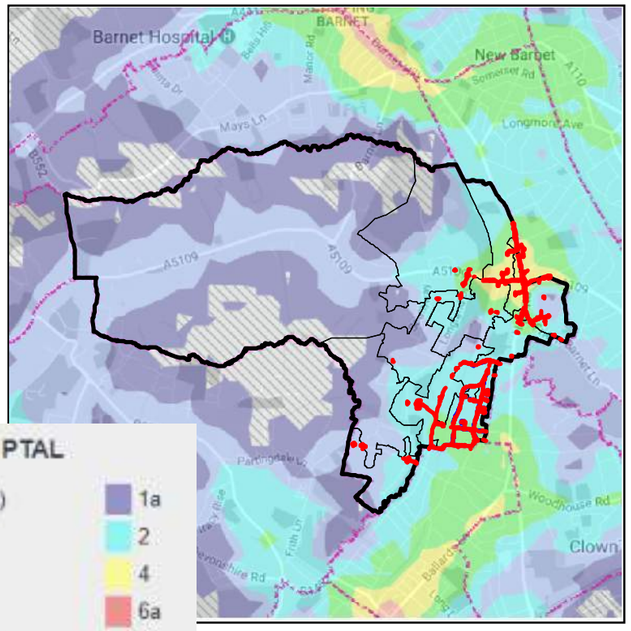


Vehicle ownership for 2-bed properties by LSOA

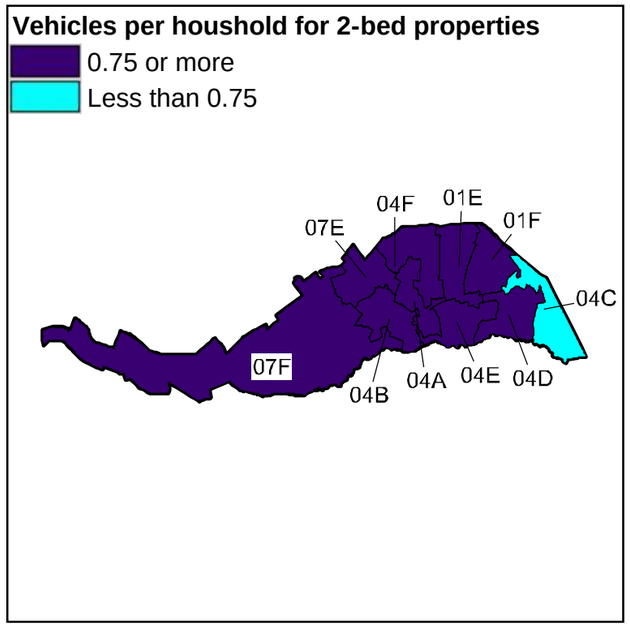
LSOA	Min. PTAL	Max. PTAL	Max. 1 vehicle/household	Min. 2 vehicles/household	Average Vehicles/household
Barnet 007C	0	1	53	31	1.32
Barnet 007D	0	4	34	14	1.08
Barnet 008D	1	4	172	15	0.66
Barnet 008E	1	5	103	17	0.92
Barnet 012A	1	3	207	35	0.90
Barnet 012B	2	3	317	40	0.78
Barnet 012C	1	2	21	6	1.15
Barnet 012D	1	3	337	49	0.83
Barnet 020A	0	2	19	3	1.00
Barnet 020B	1	2	22	1	0.87

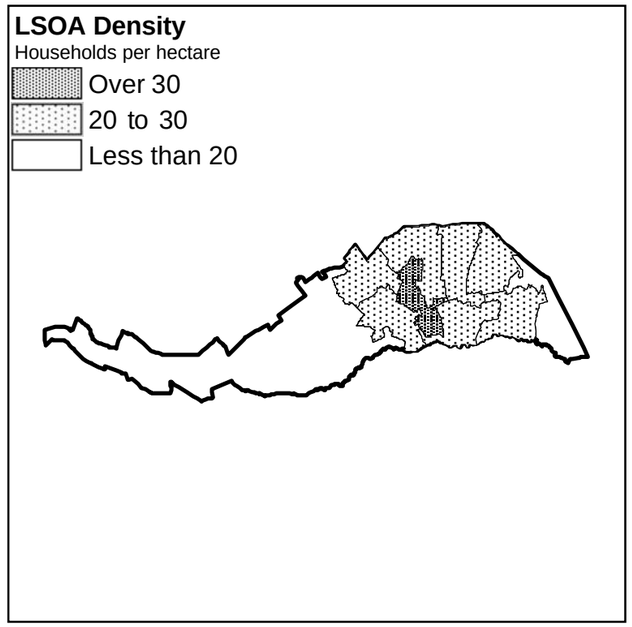
Traffic Regulation Orders & PTAL

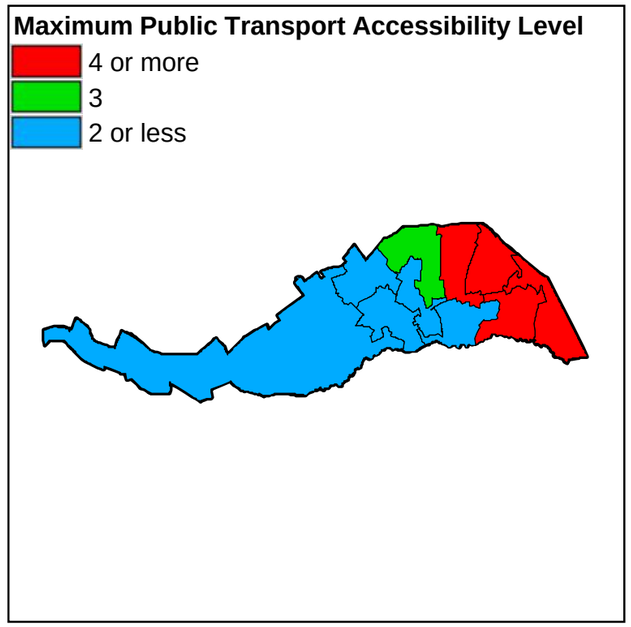
Waiting Restrictions
Resident Permit Holders



Underhill - Analysis of Vehicle Ownership, Density, Public Transport Accessibility Levels & Traffic Regulation Orders





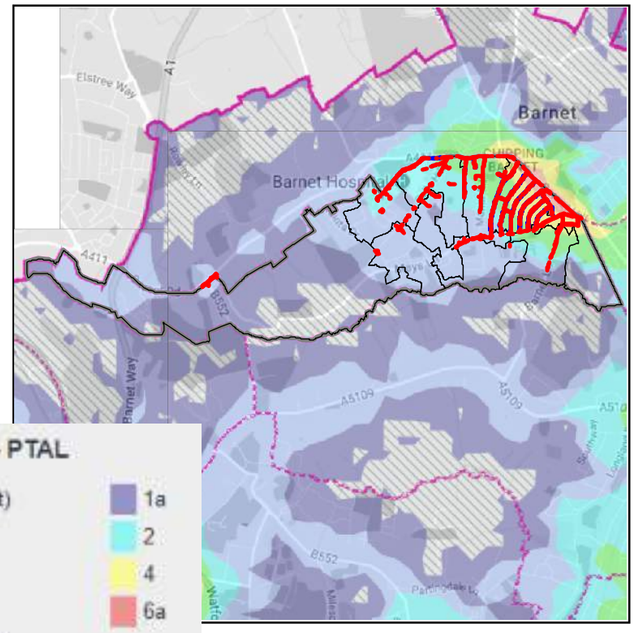


Vehicle ownership for 2-bed properties by LSOA

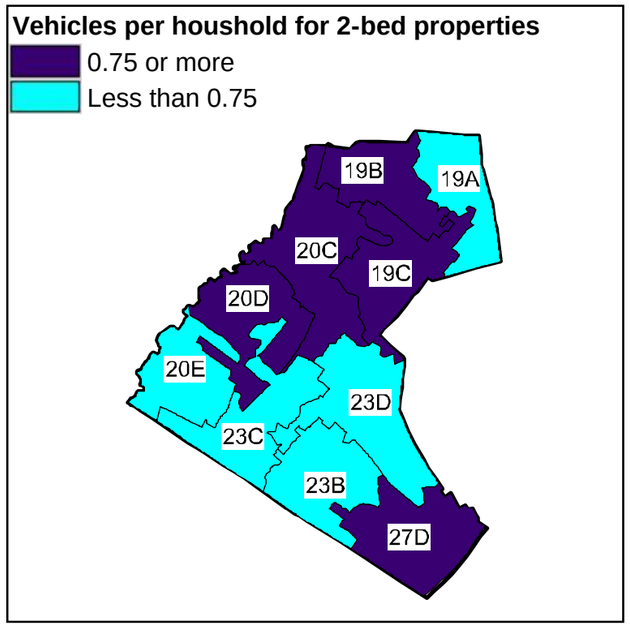
LSOA	Min. PTAL	Max. PTAL	Max. 1 vehicle/household	Min. 2 vehicles/household	Average Vehicles/household
Barnet 001E	1	4	129	29	0.93
Barnet 001F	1	5	109	18	0.84
Barnet 004A	1	2	159	39	1.03
Barnet 004B	1	1	190	39	0.83
Barnet 004C	0	5	42	5	0.68
Barnet 004D	1	4	124	17	0.76
Barnet 004E	1	2	195	26	0.81
Barnet 004F	1	3	175	21	0.78
Barnet 007E	1	2	256	46	0.86
Barnet 007F	0	1	137	35	0.94

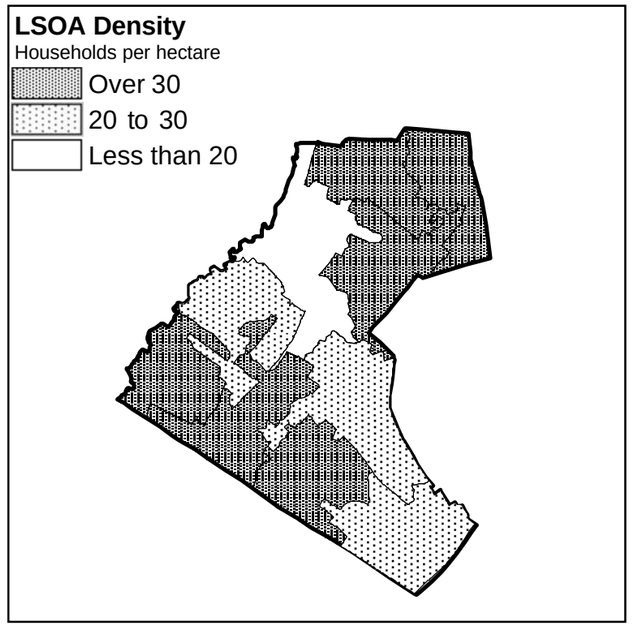
Traffic Regulation Orders & PTAL

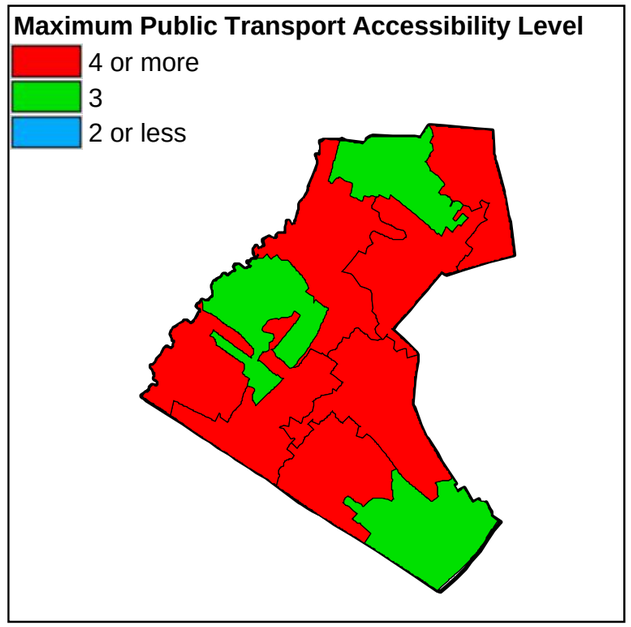
Waiting Restrictions
Resident Permit Holders



West Finchley - Analysis of Vehicle Ownership, Density, Public Transport Accessibility Levels & Traffic Regulation Orders





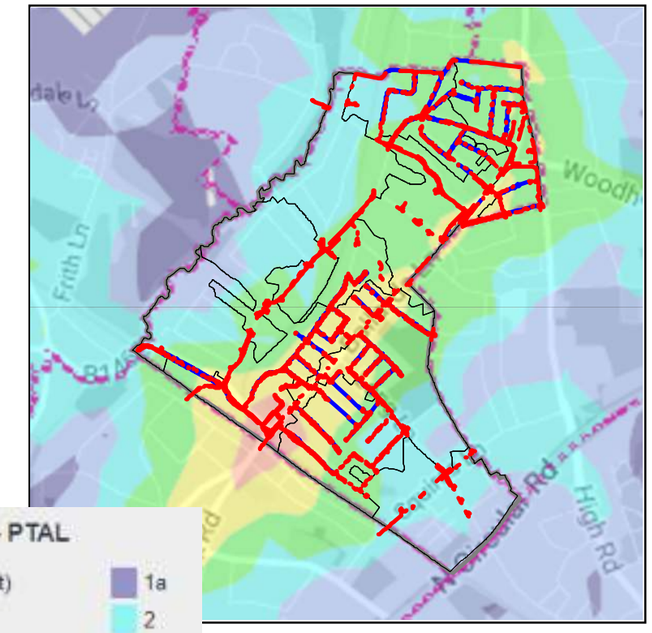


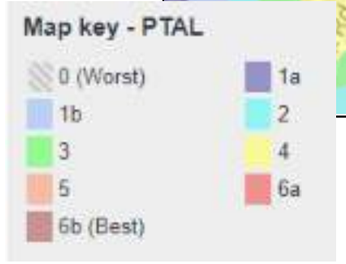
Vehicle ownership for 2-bed properties by LSOA

LSOA	Min. PTAL	Max. PTAL	Max. 1 vehicle/household	Min. 2 vehicles/houshold	Average Vehicles/houshold
Barnet 019A	2	4	286	29	0.74
Barnet 019B	2	3	177	27	0.81
Barnet 019C	3	4	327	41	0.75
Barnet 020C	2	4	64	21	1.04
Barnet 020D	1	3	81	16	0.89
Barnet 020E	1	4	217	25	0.70
Barnet 023B	2	5	167	19	0.67
Barnet 023C	2	5	315	32	0.71
Barnet 023D	1	4	246	26	0.72
Barnet 027D	1	3	154	19	0.79

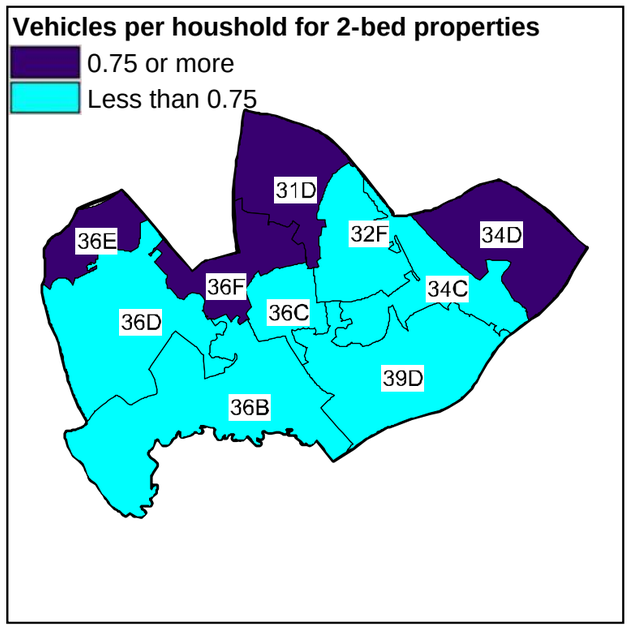
Traffic Regulation Orders & PTAL

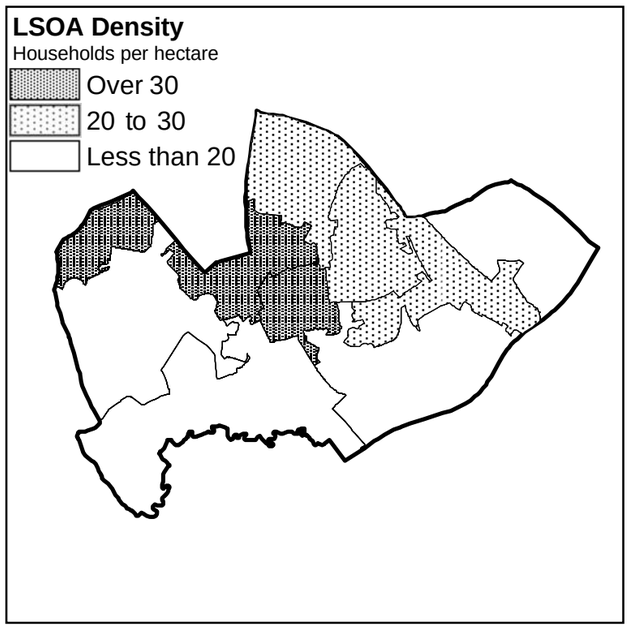
Waiting Restrictions
Resident Permit Holders

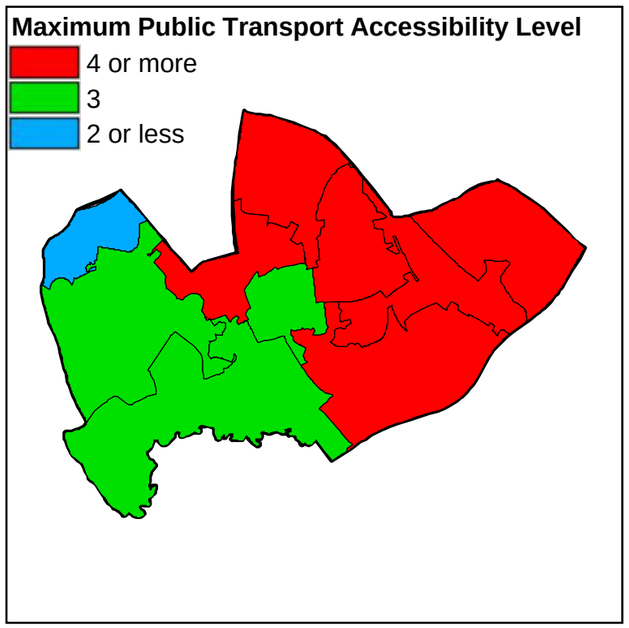




West Hendon - Analysis of Vehicle Ownership, Density, Public Transport Accessibility Levels & Traffic Regulation Orders





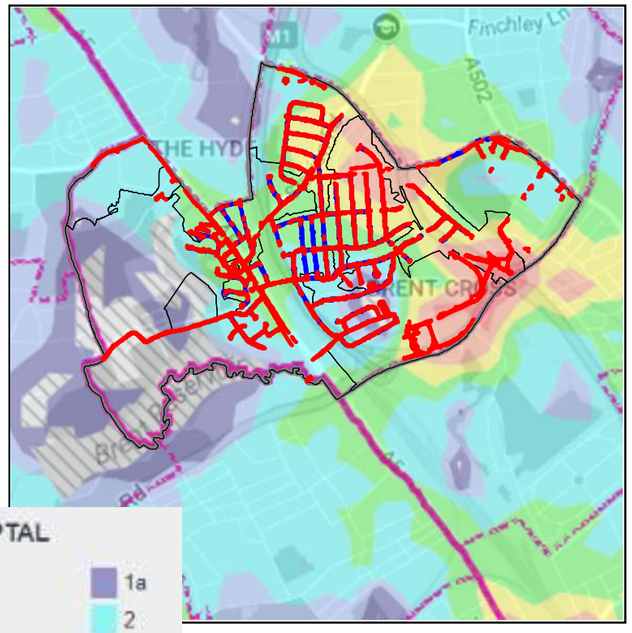


Vehicle ownership for 2-bed properties by LSOA

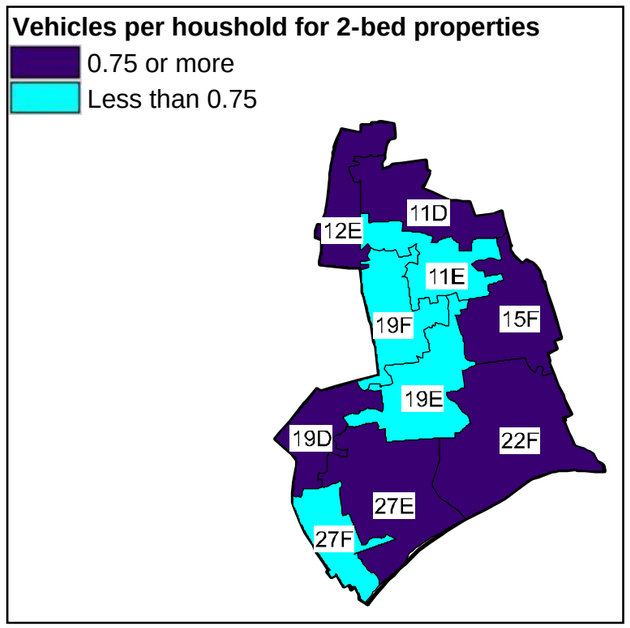
LSOA	Min. PTAL	Max. PTAL	Max. 1 vehicle/household	Min. 2 vehicles/household	Average Vehicles/household
Barnet 031D	1	5	193	25	0.83
Barnet 032F	3	5	164	14	0.66
Barnet 034C	0	6	142	15	0.56
Barnet 034D	1	5	52	7	0.86
Barnet 036B	0	3	224	27	0.62
Barnet 036C	2	3	144	9	0.65
Barnet 036D	0	3	268	38	0.68
Barnet 036E	1	2	204	38	0.88
Barnet 036F	2	4	243	31	0.75
Barnet 039D	0	6	85	9	0.63

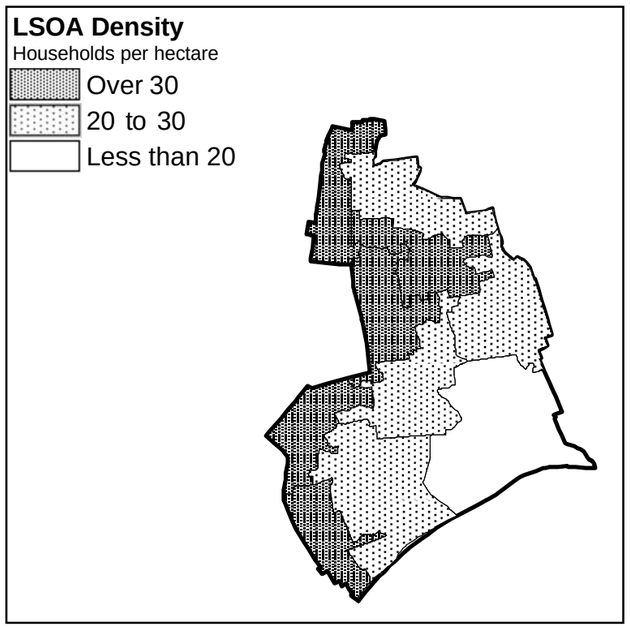
Traffic Regulation Orders & PTAL

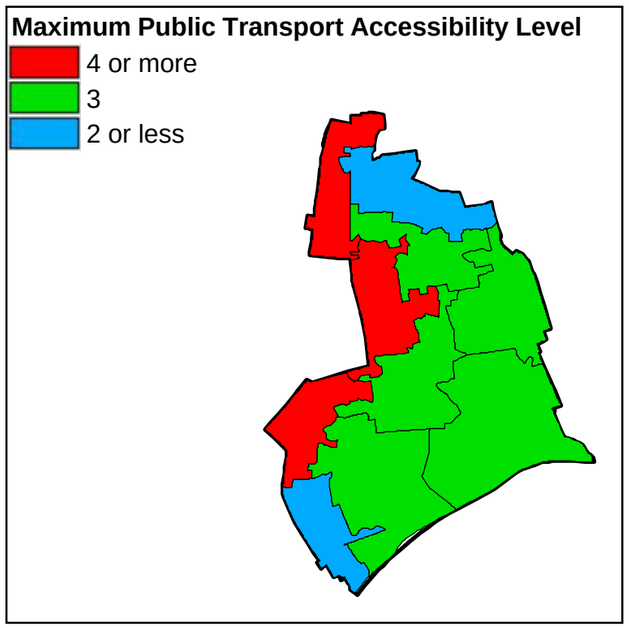
Waiting Restrictions
Resident Permit Holders



Woodhouse - Analysis of Vehicle Ownership, Density, Public Transport Accessibility Levels & Traffic Regulation Orders





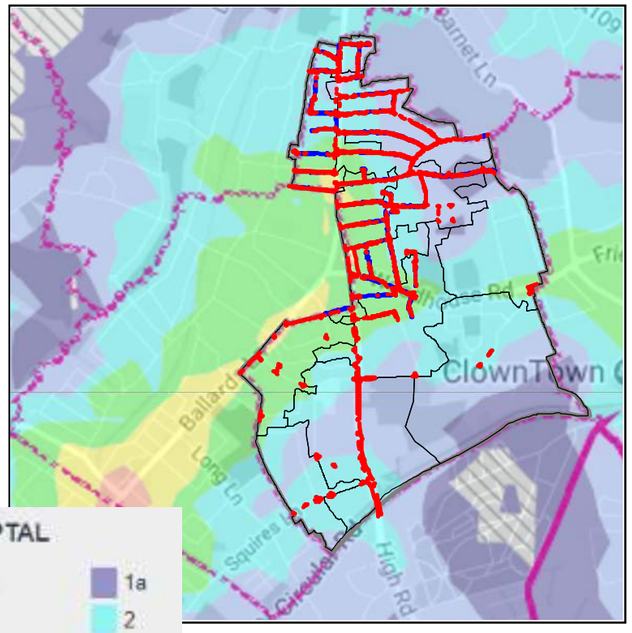


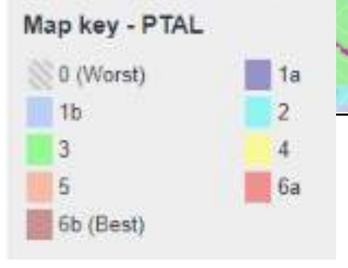
Vehicle ownership for 2-bed properties by LSOA

LSOA	Min. PTAL	Max. PTAL	Max. 1 vehicle/household	Min. 2 vehicles/household	Average Vehicles/household
Barnet 011D	1	2	124	19	0.78
Barnet 011E	1	3	375	44	0.73
Barnet 012E	1	4	252	28	0.75
Barnet 015F	1	3	133	23	0.81
Barnet 019D	2	4	214	20	0.75
Barnet 019E	1	3	87	7	0.66
Barnet 019F	1	4	265	23	0.68
Barnet 022F	1	3	164	28	0.79
Barnet 027E	1	3	292	36	0.76
Barnet 027F	1	2	97	6	0.71

Traffic Regulation Orders & PTAL

Waiting Restrictions
Resident Permit Holders





Appendix B
WebCAT Results

TRANSPORT FOR LONDON

PTAL output for Base Year
5

Highfield Avenue
Highfield Ave, London NW11 9EU, UK
Easting: 524039, Northing: 187959

Grid Cell: 120311

Report generated: 23/01/2018

Map key - PTAL

0 (Worst)	1a
1b	2
3	4
5	6a
6b (Best)	

Map layers

PTAL (cell size: 100m)

Calculation Parameters

Day of Week	M-F
Time Period	AM Peak
Walk Speed	4.8 kph
Bus Node Max. Walk Access Time (mins)	8
Bus Reliability Factor	2.0
LU Station Max. Walk Access Time (mins)	12
LU Reliability Factor	0.75
National Rail Station Max. Walk Access Time (mins)	12
National Rail Reliability Factor	0.75

Calculation data

Mode	Stop	Route	Distance (metres)	Frequency (vph)	Walk Time (mins)	SWT (mins)	TAT (mins)	EDF	Weight	AI
Bus	N CIR RD/GOLDERS GRN RD	232	598.36	4	7.48	9.5	16.98	1.77	0.5	0.88
Bus	GOLDERS G RD HIGHFIELD A	183	315.95	7.5	3.95	6	9.95	3.02	0.5	1.51
Bus	GOLDERS G RD HIGHFIELD A	83	315.95	7.5	3.95	6	9.95	3.02	0.5	1.51
Bus	GOLDERS G RD HIGHFIELD A	240	315.95	5	3.95	8	11.95	2.51	0.5	1.26
Bus	HENDON WAY NORTH CIRC RD	113	320.05	7	4	6.29	10.29	2.92	0.5	1.46
Bus	BRENT CROSS STATION	210	148.15	7.5	1.85	6	7.85	3.82	1	3.82
LUL	Brent Cross	'Edgware-Morden'	156.23	9	1.95	4.08	6.04	4.97	0.5	2.49
LUL	Brent Cross	'Morden-Edgware'	156.23	4.67	1.95	7.17	9.13	3.29	0.5	1.64
LUL	Brent Cross	'Kennington-Edgware'	156.23	14.67	1.95	2.79	4.75	6.32	1	6.32
									Total Grid Cell AI:	**20.88**

TRANSPORT FOR LONDON

PTAL output for Base Year
1a

Grahame Park Way
Grahame Park Way, London, UK
Easting: 521849, Northing: 190859

Grid Cell: 135899

Report generated: 26/01/2018

Map key - PTAL

0 (Worst)	1a
1b	2
3	4
5	6a
6b (Best)	

Map layers

PTAL (cell size: 100m)

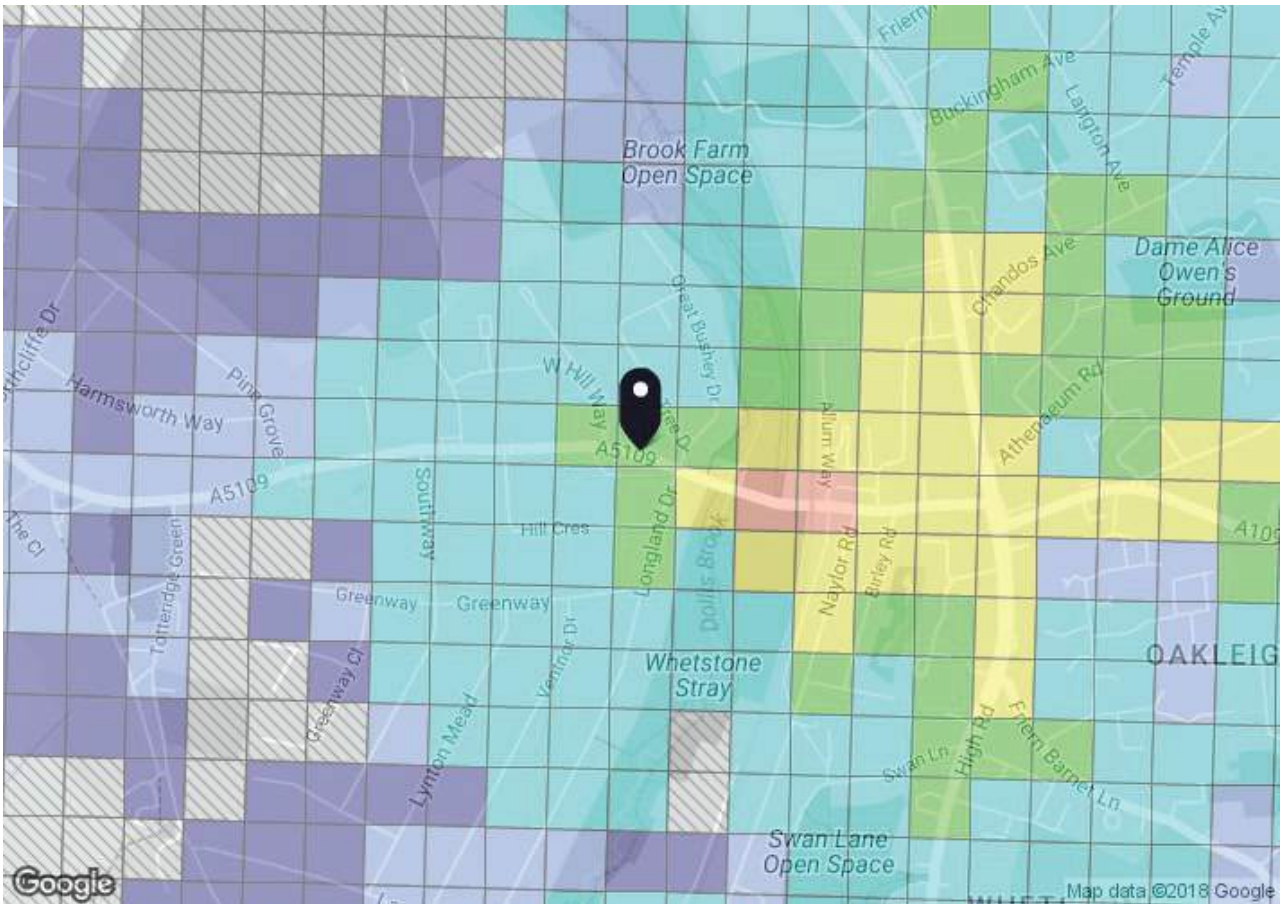
Calculation Parameters

Day of Week	M-F
Time Period	AM Peak
Walk Speed	4.8 kph
Bus Node Max. Walk Access Time (mins)	8
Bus Reliability Factor	2.0
LU Station Max. Walk Access Time (mins)	12
LU Reliability Factor	0.75
National Rail Station Max. Walk Access Time (mins)	12
National Rail Reliability Factor	0.75

Calculation data

Mode	Stop	Route	Distance (metres)	Frequency(vph)	Walk Time (mins)	SWT (mins)	TAT (mins)	EDF	Weight	AI
Bus	CORNER MEAD SOUTH MEAD	303	363.31	4	4.54	9.5	14.04	2.14	1	2.14
									Total Grid Cell AI:	**2.14**

TRANSPORT FOR LONDON



PTAL output for Base Year
3

Totteridge Lane
Totteridge Ln, London N20 0HD, UK
Easting: 525838, Northing: 194015

Grid Cell: 149655

Report generated: 26/01/2018

Map key - PTAL

0 (Worst)	1a
1b	2
3	4
5	6a
6b (Best)	

Map layers

PTAL (cell size: 100m)

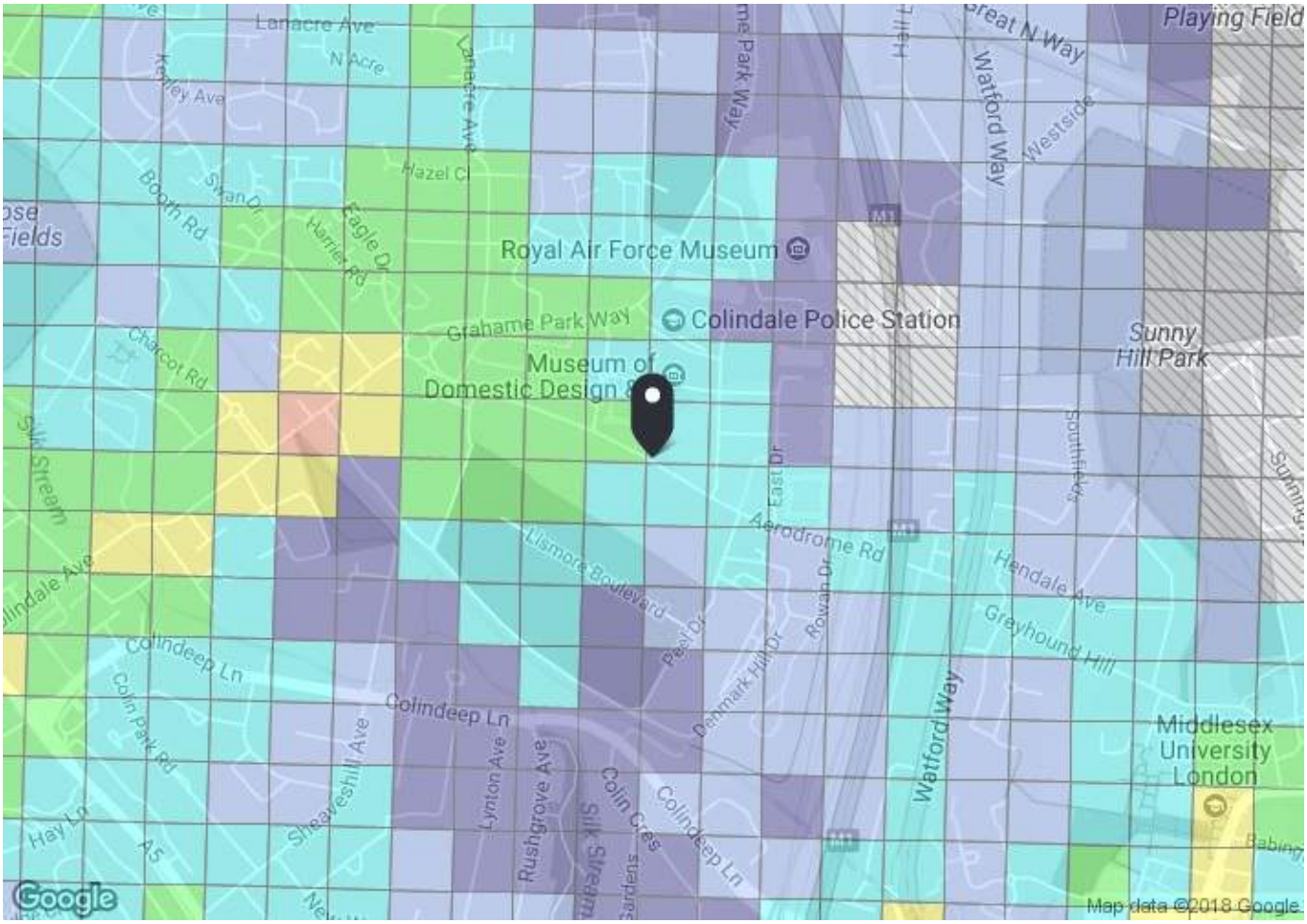
Calculation Parameters

Day of Week	M-F
Time Period	AM Peak
Walk Speed	4.8 kph
Bus Node Max. Walk Access Time (mins)	8
Bus Reliability Factor	2.0
LU Station Max. Walk Access Time (mins)	12
LU Reliability Factor	0.75
National Rail Station Max. Walk Access Time (mins)	12
National Rail Reliability Factor	0.75

Calculation data

Mode	Stop	Route	Distance (metres)	Frequency(vph)	Walk Time (mins)	SWT (mins)	TAT (mins)	EDF	Weight	AI
Bus	TOTTERIDGE L LONGLAND DR	251	91.18	6	1.14	7	8.14	3.69	1	3.69
Bus	LONGLAND DRIVE	326	231.12	5	2.89	8	10.89	2.76	0.5	1.38
LUL	Totteridge & Whetstone	'Morden-HighBarnet '	382.98	14.67	4.79	2.79	7.58	3.96	1	3.96
LUL	Totteridge & Whetstone	'HighBarnet-Morden '	382.98	0.33	4.79	91.66	96.45	0.31	0.5	0.16
LUL	Totteridge & Whetstone	'HighBarnet-Kenningt '	382.98	5.33	4.79	6.38	11.17	2.69	0.5	1.34
LUL	Totteridge & Whetstone	'EastFinch-HighBarnet'	382.98	0.67	4.79	45.53	50.31	0.6	0.5	0.3
									Total Grid Cell AI:	**10.82**

TRANSPORT FOR LONDON



PTAL output for Base Year
2

Aerodrome Road
Aerodrome Rd, London NW9, UK
Easting: 521906, Northing: 189897

Grid Cell: 131101

Report generated: 23/01/2018

Map key - PTAL

0 (Worst)	1a
1b	2
3	4
5	6a
6b (Best)	

Map layers

PTAL (cell size: 100m)

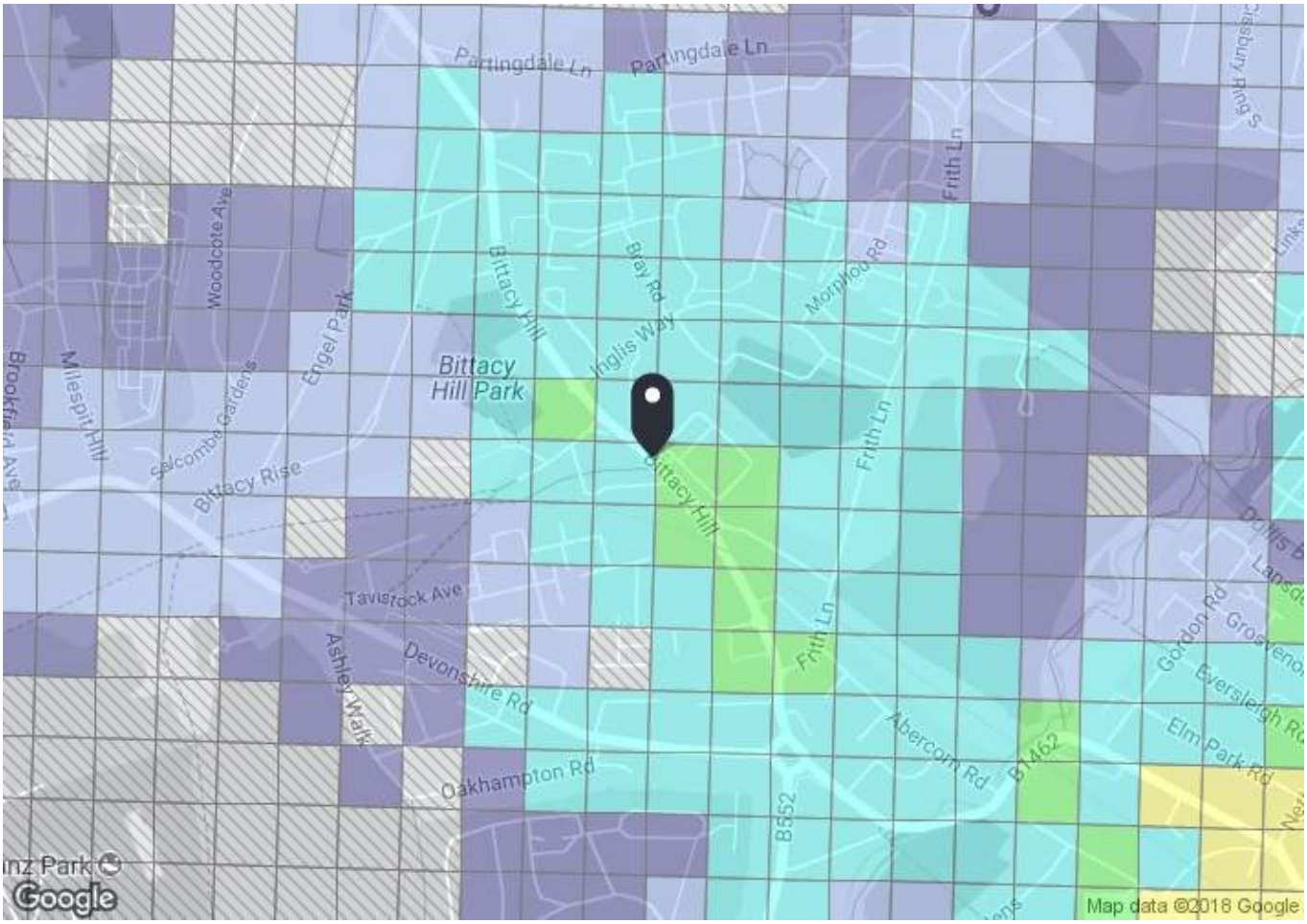
Calculation Parameters

Day of Week	M-F
Time Period	AM Peak
Walk Speed	4.8 kph
Bus Node Max. Walk Access Time (mins)	8
Bus Reliability Factor	2.0
LU Station Max. Walk Access Time (mins)	12
LU Reliability Factor	0.75
National Rail Station Max. Walk Access Time (mins)	12
National Rail Reliability Factor	0.75

Calculation data

Mode	Stop	Route	Distance (metres)	Frequency (vph)	Walk Time (mins)	SWT (mins)	TAT (mins)	EDF	Weight	AI
Bus	LANACRE AVE SOUTH ACRE	204	618.87	6	7.74	7	14.74	2.04	0.5	1.02
Bus	GRAHAME PK W	303	379.84	4	4.75	9.5	14.25	2.11	1	2.11
Bus	AERODROME RD CHANCELLOR PL	186	594.72	5	7.43	8	15.43	1.94	0.5	0.97
LUL	Colindale	'Edgware-Morden'	830.74	9	10.38	4.08	14.47	2.07	0.5	1.04
LUL	Colindale	'Morden-Edgware'	830.74	4.67	10.38	7.17	17.56	1.71	0.5	0.85
LUL	Colindale	'Kennington-Edgware'	830.74	14.67	10.38	2.79	13.18	2.28	1	2.28
									Total Grid Cell AI:	**8.27**

TRANSPORT FOR LONDON



PTAL output for Base Year
2

Bittacy Hill
Bittacy Hill, London NW7 1LB, UK
Easting: 523995, Northing: 191563

Grid Cell: 139639

Report generated: 23/01/2018

Map key - PTAL

0 (Worst)	1a
1b	2
3	4
5	6a
6b (Best)	

Map layers

PTAL (cell size: 100m)

Calculation Parameters

Day of Week	M-F
Time Period	AM Peak
Walk Speed	4.8 kph
Bus Node Max. Walk Access Time (mins)	8
Bus Reliability Factor	2.0
LU Station Max. Walk Access Time (mins)	12
LU Reliability Factor	0.75
National Rail Station Max. Walk Access Time (mins)	12
National Rail Reliability Factor	0.75

Calculation data

Mode	Stop	Route	Distance (metres)	Frequency(vph)	Walk Time (mins)	SWT (mins)	TAT (mins)	EDF	Weight	AI
Bus	MILL HILL EAST STATION	221	190.91	5	2.39	8	10.39	2.89	1	2.89
Bus	MILL HILL EAST STATION	240	190.91	5	2.39	8	10.39	2.89	0.5	1.44
Bus	MILL HILL EAST STATION	382	190.91	4	2.39	9.5	11.89	2.52	0.5	1.26
LUL	Mill Hill East	'Morden-MillHillE'	190.49	4	2.38	8.25	10.63	2.82	1	2.82
LUL	Mill Hill East	'MillHillE-FinchCen'	190.49	0.33	2.38	91.66	94.04	0.32	0.5	0.16
LUL	Mill Hill East	'MillHill-Morden'	190.49	1.67	2.38	18.71	21.1	1.42	0.5	0.71
LUL	Mill Hill East	'MillHillE-Kenningt'	190.49	1.67	2.38	18.71	21.1	1.42	0.5	0.71
									Total Grid Cell AI:	**9.99**

Appendix C
Orbital and Radial Provision

This appendix shows the bus routes which have been identified in the WebCAT reports in Appendix B.

The plans have been produced using the Transport for London (TfL) website[4].

The following criteria has been adopted in assessing the direction of bus routes for the five test sites:

- Full length of bus route considered – focussing on a restricted length of a route may influence the determination of its direction and is open to subjective views;
- The A5 used as a basis for radial direction of travel;
- Route identified as orbital where ≥65% length is orbital;
- Route identified as radial where ≥65% length is radial;
- Route identified as mixed where >35% but <65% length is either orbital or radial;
- Where a route is defined as mixed consideration is given to the direction of the route at the specific location and the orbital and radial gain of the route as a whole.

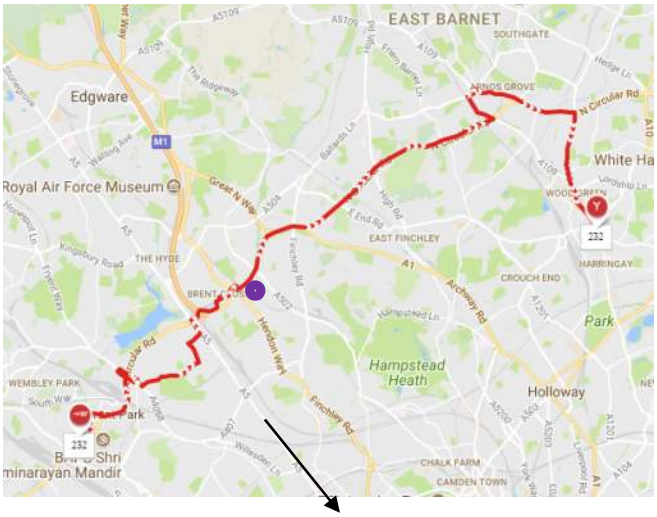
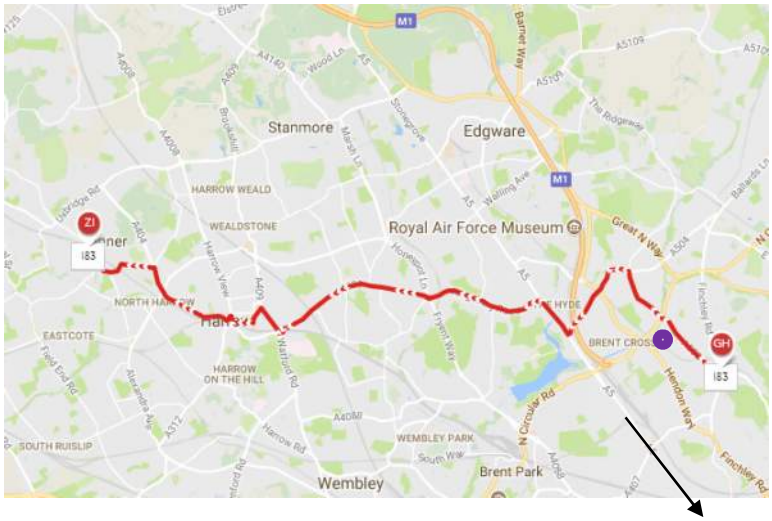
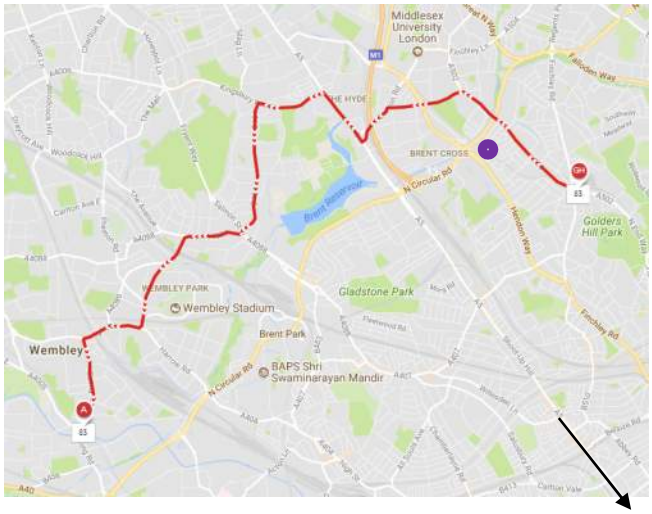
The following symbols have been added to each plan to identify the location of the site being considered and the approximate radial directional link.

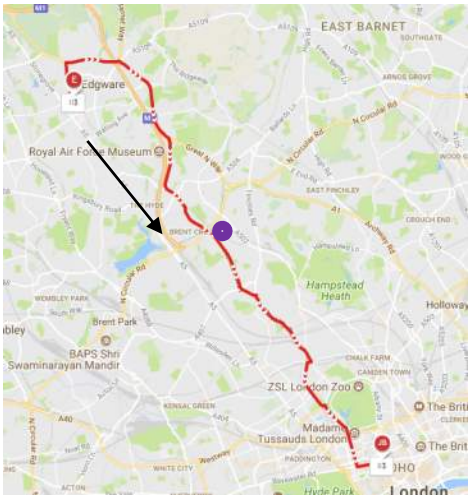
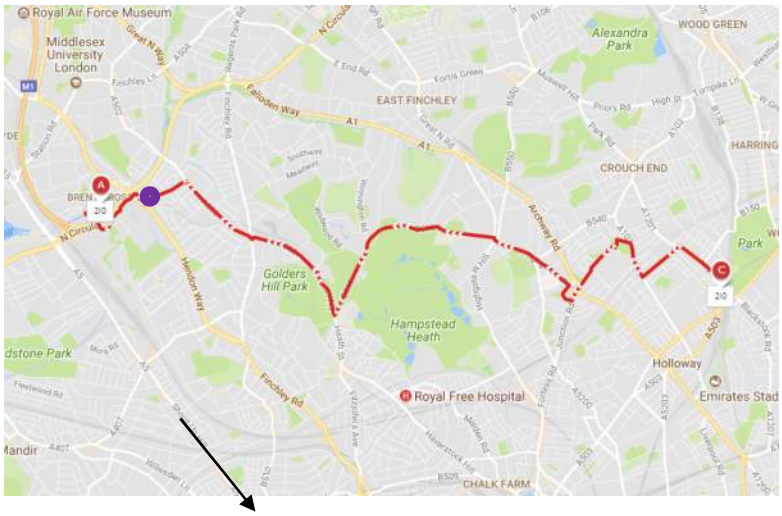
Approximate location of test site

Approximate direction towards London

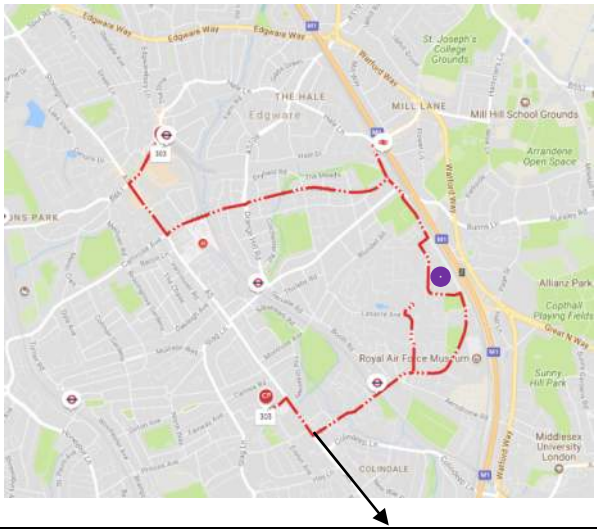
[4] https://tfl.gov.uk/maps/bus

Highfield Avenue, Brent Cross

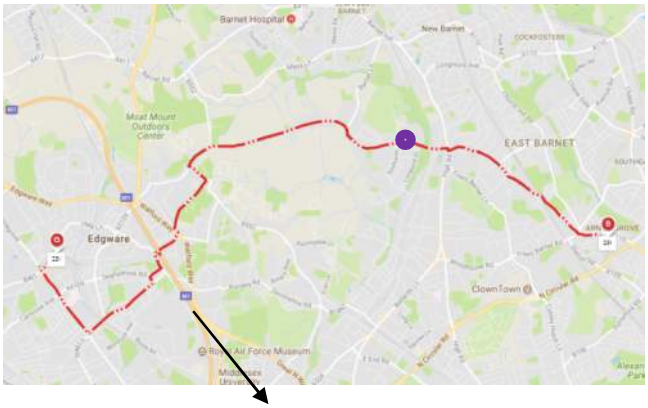
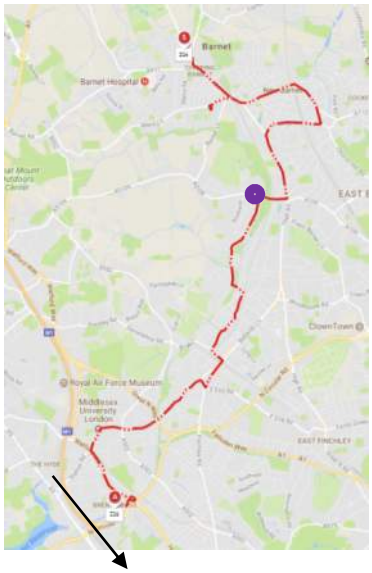
Bus Route 232 	Direction: Orbital Reasoning: >65% of route travelled in orbital direction.
Bus Route 183 	Direction: Orbital Reasoning: >65% of route travelled in orbital direction.
Bus Route 83 	Direction: Orbital Reasoning: >65% of route travelled in orbital direction.

Bus Route 240 	Direction: Radial Reasoning: >65% of route travelled in radial direction.
Bus Route 113 	Direction: Radial Reasoning: >65% of route travelled in radial direction.
Bus Route 210 	Direction: Orbital Reasoning: >65% of route travelled in orbital direction.

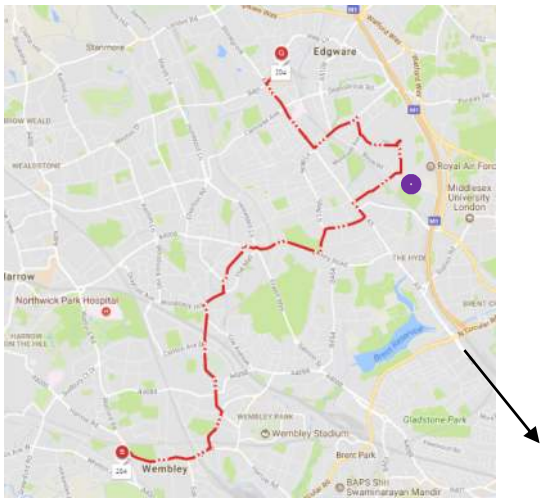
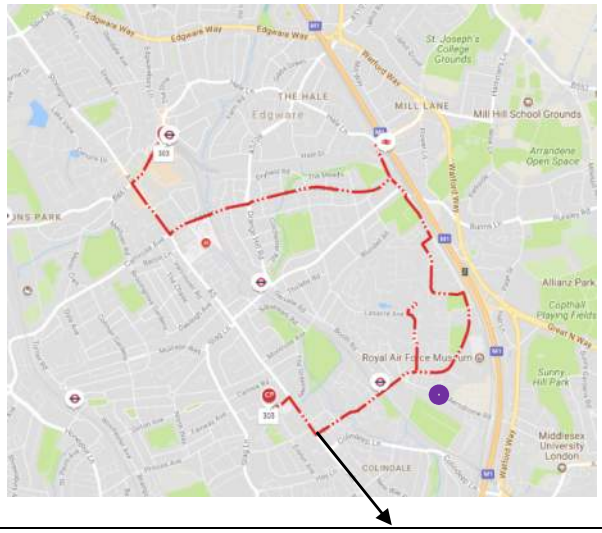
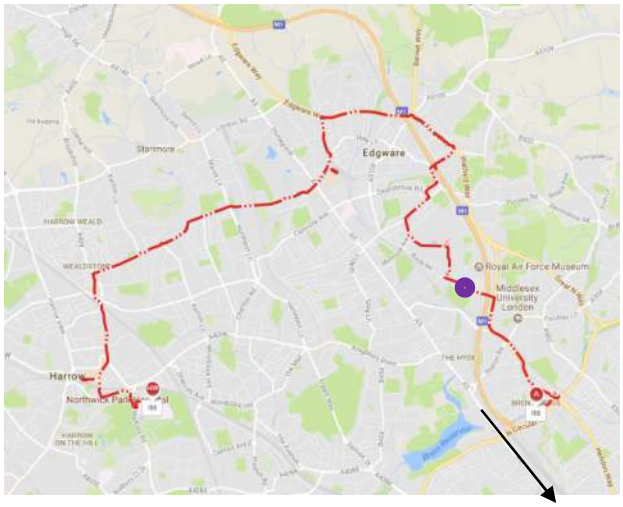
Grahame Park Estate, Colindale

Bus Route 303  	Direction: Mixed - Radial Reasoning: the no. 303 is split approximately 50/50 between orbital and radial directions. The site in question is closest to a radial section and the overall distance gained radially along the whole route is greater than the overall distance gained orbitally along the whole route.

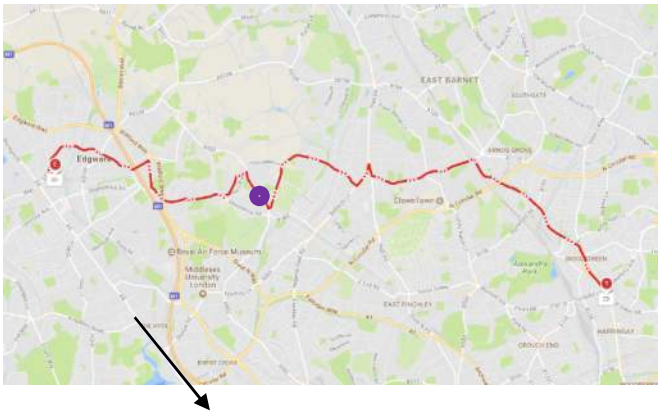
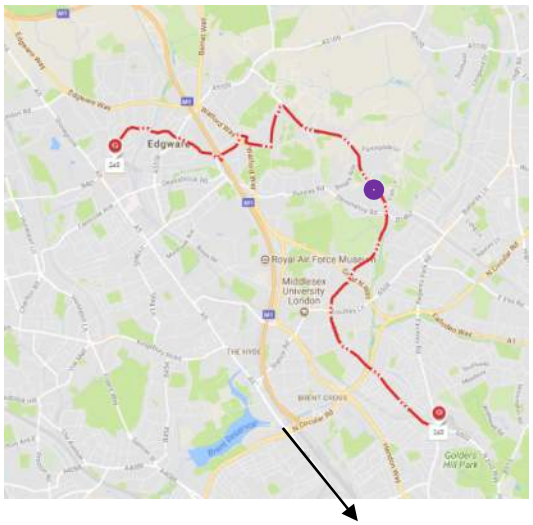
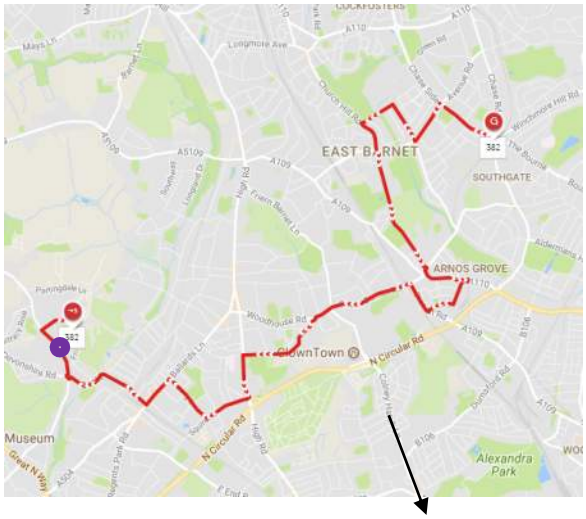
Totteridge Lane, Totteridge

Bus Route 251 	Direction: Orbital Reasoning: Approximately 65% of route travelled in orbital direction.
Bus Route 326 	Direction: Orbital Reasoning: Approximately 65% of route travelled in orbital direction.

Aerodrome Road, Colindale

Bus Route 204 	Direction: Orbital Reasoning: Approximately 65% of route travelled in orbital direction.
Bus Route 303 	Direction: Mixed - Radial Reasoning: the no. 303 is split approximately 50/50 between orbital and radial directions. Whilst the site in question is closest to an orbital section, the overall distance gained radially along the whole route is greater than the overall distance gained orbitally along the whole route.
Bus Route 186 	Direction: Mixed - Radial Reasoning: The no. 186 is split approximately 50/50 between orbital and radial directions. However, the site in question is midway along the 50% which is travelling radially and as such the majority of users at this point are likely to travel in a radial direction.

Bittacy Hill, Mill Hill

Bus Route 221 	Direction: Orbital Reasoning: >65% of route travelled in orbital direction.
Bus Route 240 	Direction: Radial Reasoning: >65% of route travelled in radial direction.
Bus Route 382 	Direction: Orbital Reasoning: >65% of route travelled in orbital direction.

Appendix D
Orbital and Radial Access Indexes

Table 1: Orbital Access Index calculation for Highfield Avenue, Brent Cross

Bus Route/ LUL Service	Direction	Equivalent Doorstop Frequency (minutes)	Weight	Access Index
232	Orbital	1.7	0.5	0.88
183	Orbital	3.02	0.5	1.51
83	Orbital	3.02	0.5	1.51
210	Orbital	3.82	1	3.82

Orbital Access Index = 7.72

Table 2: Radial Access Index calculation for Highfield Avenue, Brent Cross

Bus Route/ LUL Service	Direction	Equivalent Doorstop Frequency (minutes)	Weight	AI
240	Radial	2.51	0.5	1.26
113	Radial	2.92	1	2.92
Edgware-Morden	Radial	4.97	0.5	2.49
Morden-Edgware	Radial	3.29	0.5	1.63
Kennington-Edgware	Radial	6.32	1	6.32

Radial Access Index = 14.62

Table 3: Orbital Access Index calculation for Grahame Park Estate, Colindale

Bus Route/ LUL Service	Direction	Equivalent Doorstop Frequency (minutes)	Weight	AI
-	-	-	-	-

Orbital Access Index = 0

Table 4: Radial Access Index calculation for Grahame Park Estate, Colindale

Bus Route/ LUL Service	Direction	Equivalent Doorstop Frequency (minutes)	Weight	AI
303	Mixed	2.14	1	2.4

Radial Access Index = 2.4

Table 5: Orbital Access Index calculation for Totteridge Lane, Totteridge

Bus Route/ LUL Service	Direction	Equivalent Doorstop Frequency (minutes)	Weight	AI
251	Orbital	3.69	1	3.69
326	Orbital	2.76	0.5	1.38

Orbital Access Index = 5.07

Table 6: Radial Access Index calculation for Totteridge Lane, Totteridge

Bus Route/ LUL Service	Direction	Equivalent Doorstop Frequency (minutes)	Weight	AI
Morden-High Barnet	Radial	3.96	1	3.96
High Barnet-Morden	Radial	0.31	0.5	0.16
High Barnet-Kennington	Radial	2.69	0.5	1.34
East Finch-High Barnet	Radial	0.6	0.5	0.3

Radial Access Index = 5.76

Table 7: Orbital Access Index calculation for Aerodrome Way, Colindale

Bus Route/ LUL Service	Direction	Equivalent Doorstop Frequency (minutes)	Weight	AI
204	Orbital	2.04	1	2.04

Orbital Access Index = 2.04

Table 8: Radial Access Index calculation for Aerodrome Way, Colindale

Bus Route/ LUL Service	Direction	Equivalent Doorstop Frequency (minutes)	Weight	AI
303	Mixed	2.11	1	2.11
186	Mixed	1.94	0.5	0.97
Edgware-Morden	Radial	2.07	0.5	1.04
Morden-Edgware	Radial	1.71	0.5	0.86
Kennington-Edgware	Radial	2.28	1	2.28

Radial Access Index = 7.25

Table 9: Orbital Access Index calculation for Bittacy Hill, Mill Hill

Bus Route/ LUL Service	Direction	Equivalent Doorstop Frequency (minutes)	Weight	AI
221	Orbital	2.89	1	2.89
382	Orbital	2.52	0.5	1.26

Orbital Access Index = 4.15

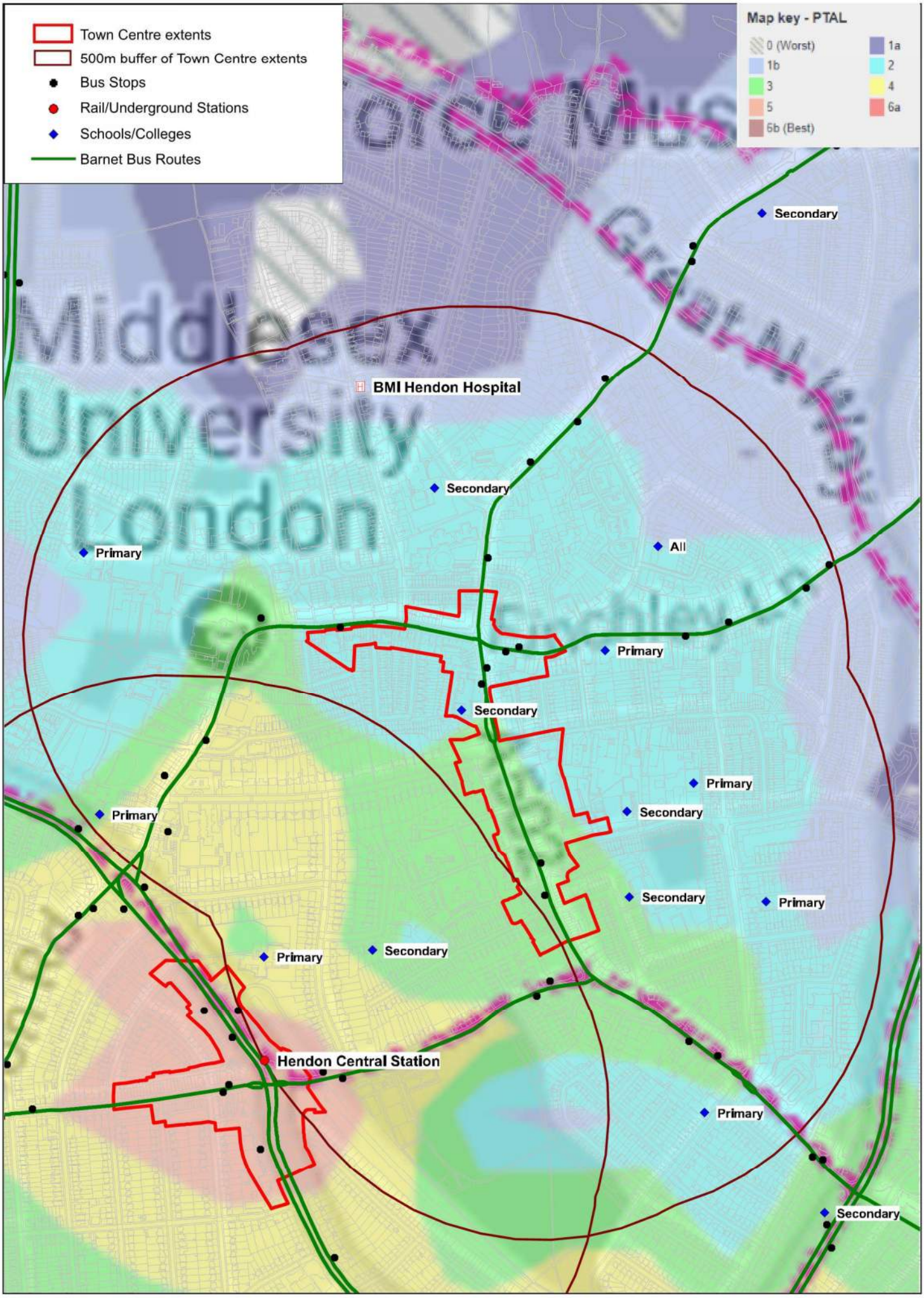
Table 10: Radial Access Index calculation for Bittacy Hill, Mill Hill

Bus Route/ LUL Service	Direction	Equivalent Doorstop Frequency (minutes)	Weight	AI
240	Radial	2.89	1	2.89
Morden-Mill Hill E	Radial	2.82	1	2.82
Mill Hill E-FinchCen	Radial	0.32	0.5	0.16
Mill Hill E-Morden	Radial	1.42	0.5	0.71
Mill Hill E-Kennington	Radial	1.42	0.5	0.71

Radial Access Index = 7.29

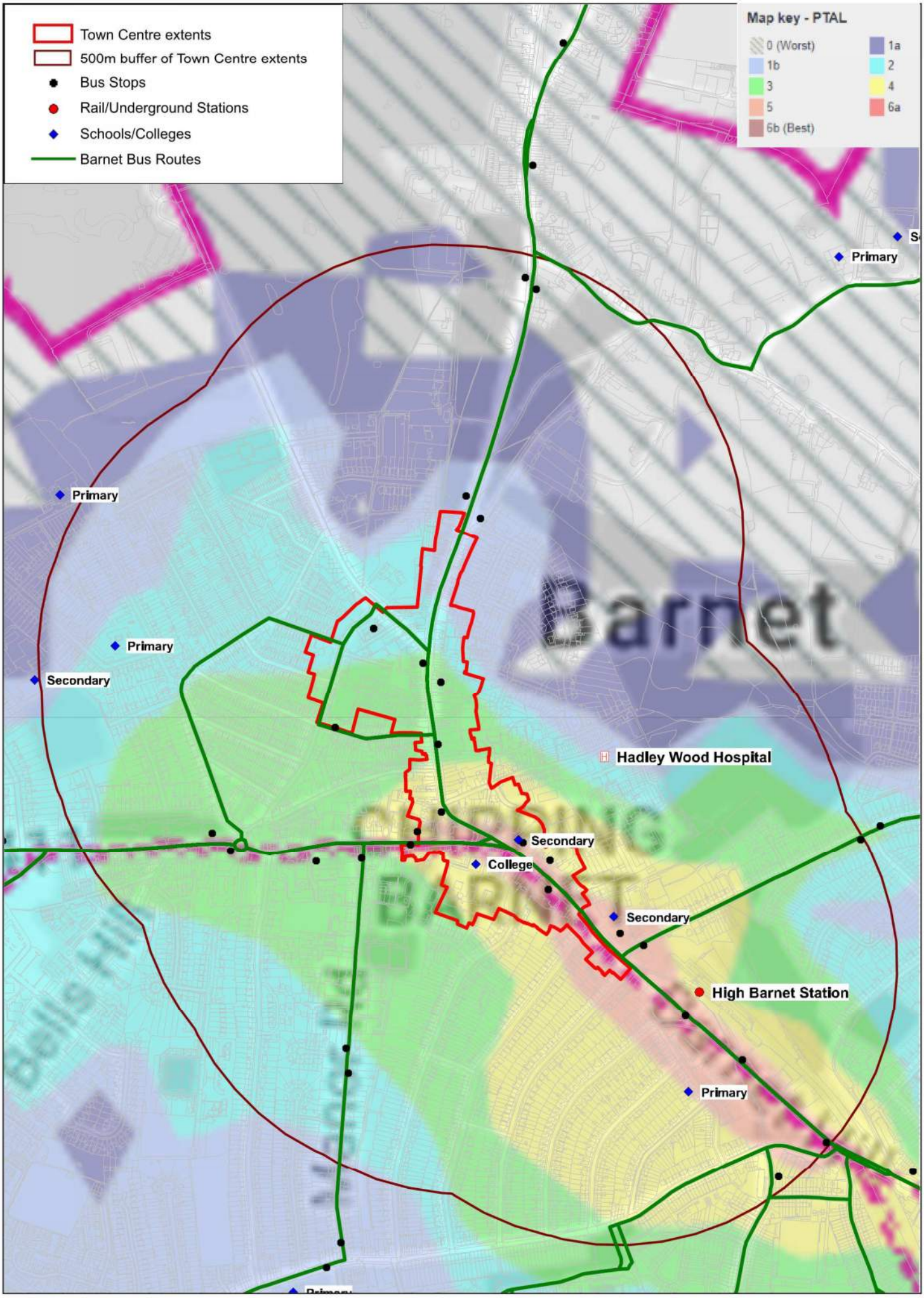
Appendix E
Town Centre Plans

Brent Street Town Centre



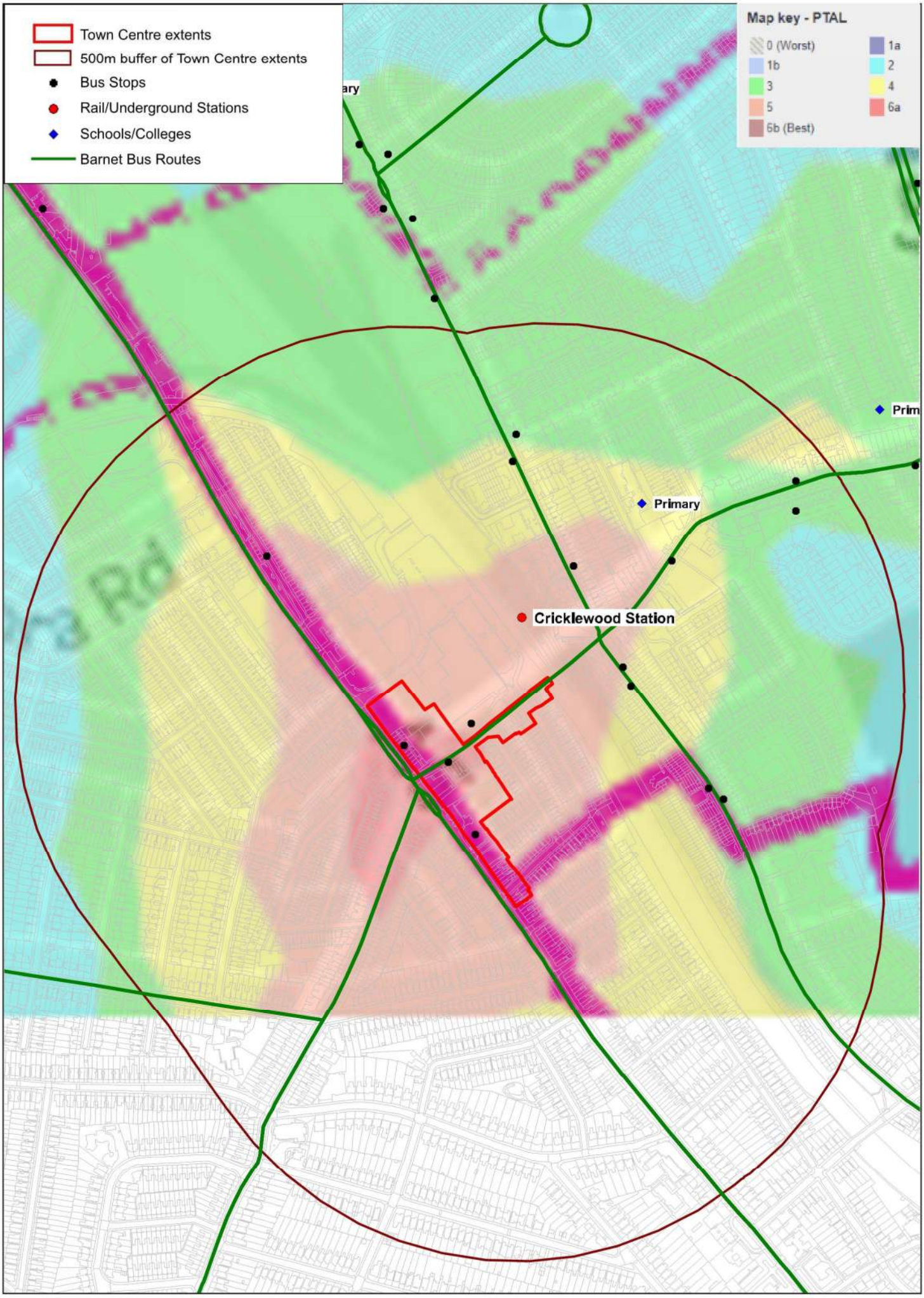
Burnt Oak Town Centre

Chipping Barnet Town Centre



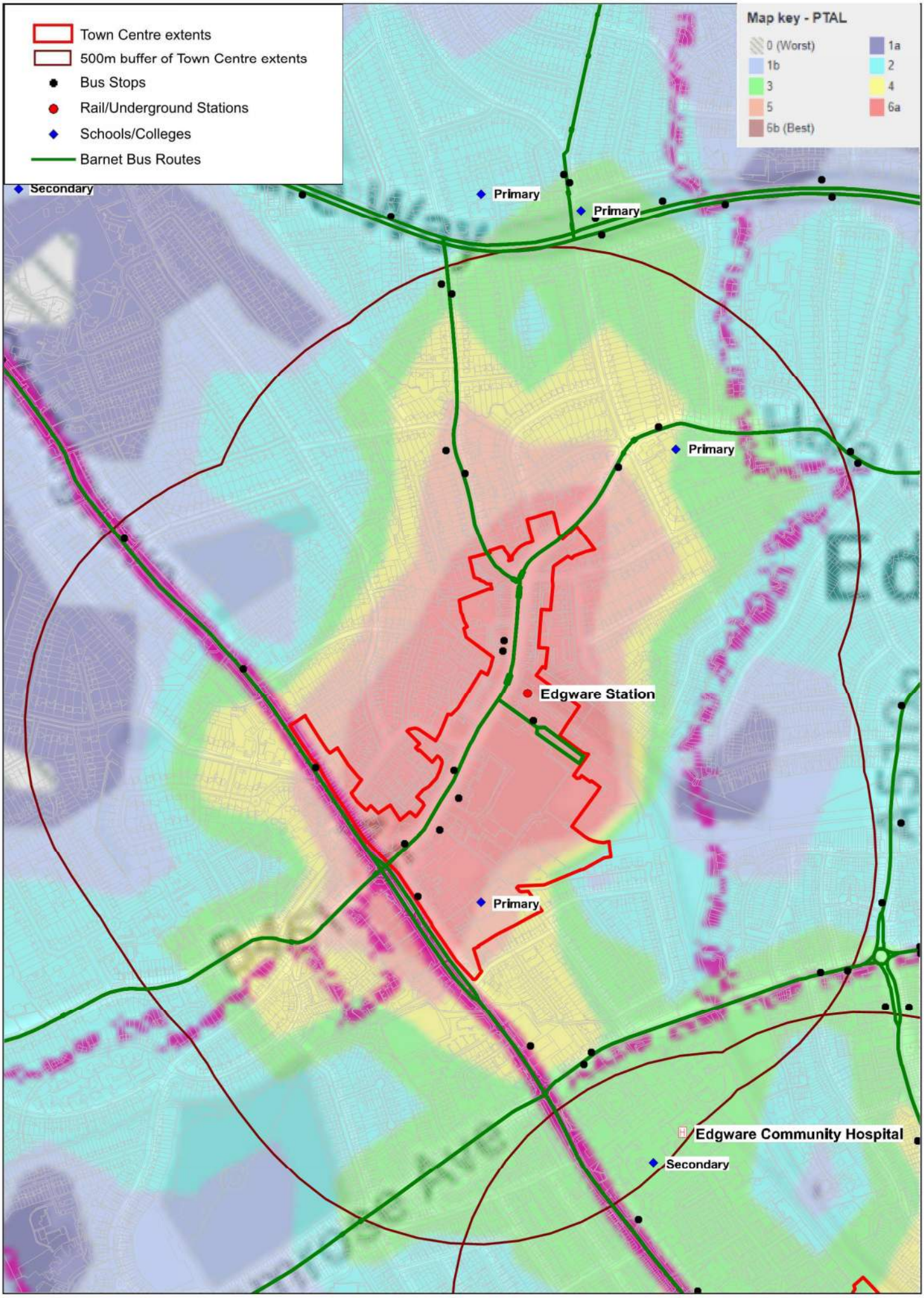
Colindale - The Hyde Town Centre

Cricklewood Town Centre

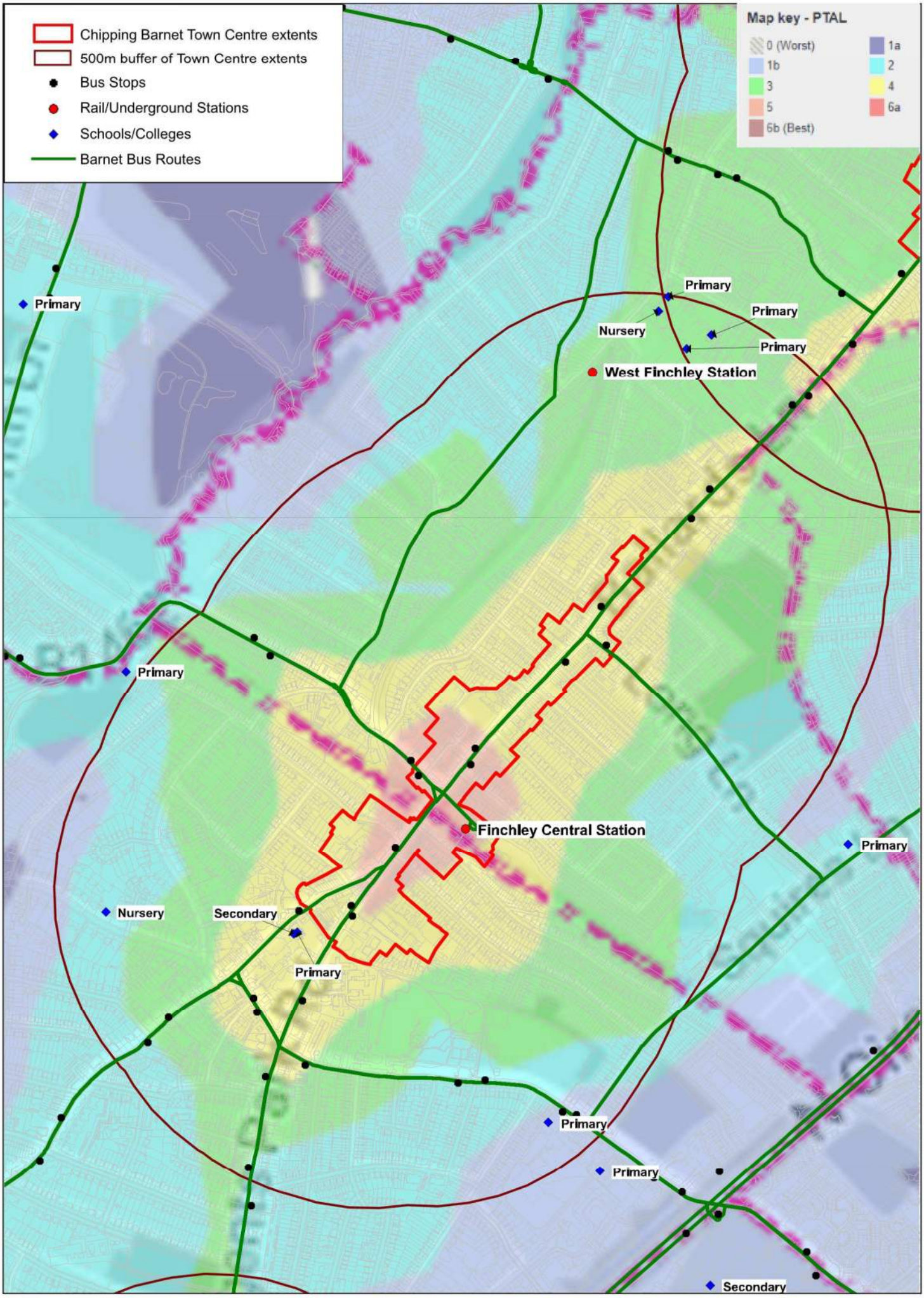


East Finchley Town Centre

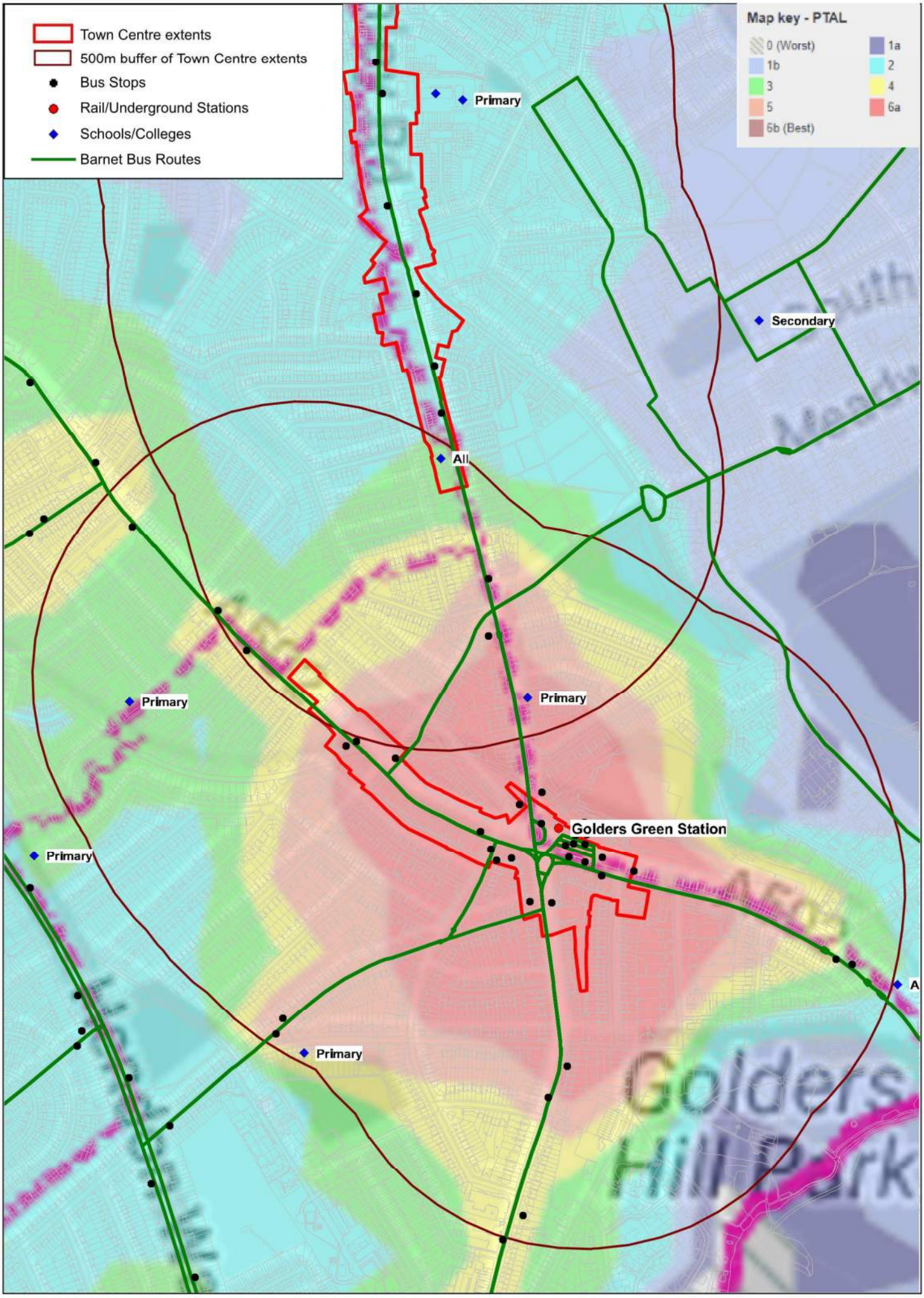
Edgware Town Centre



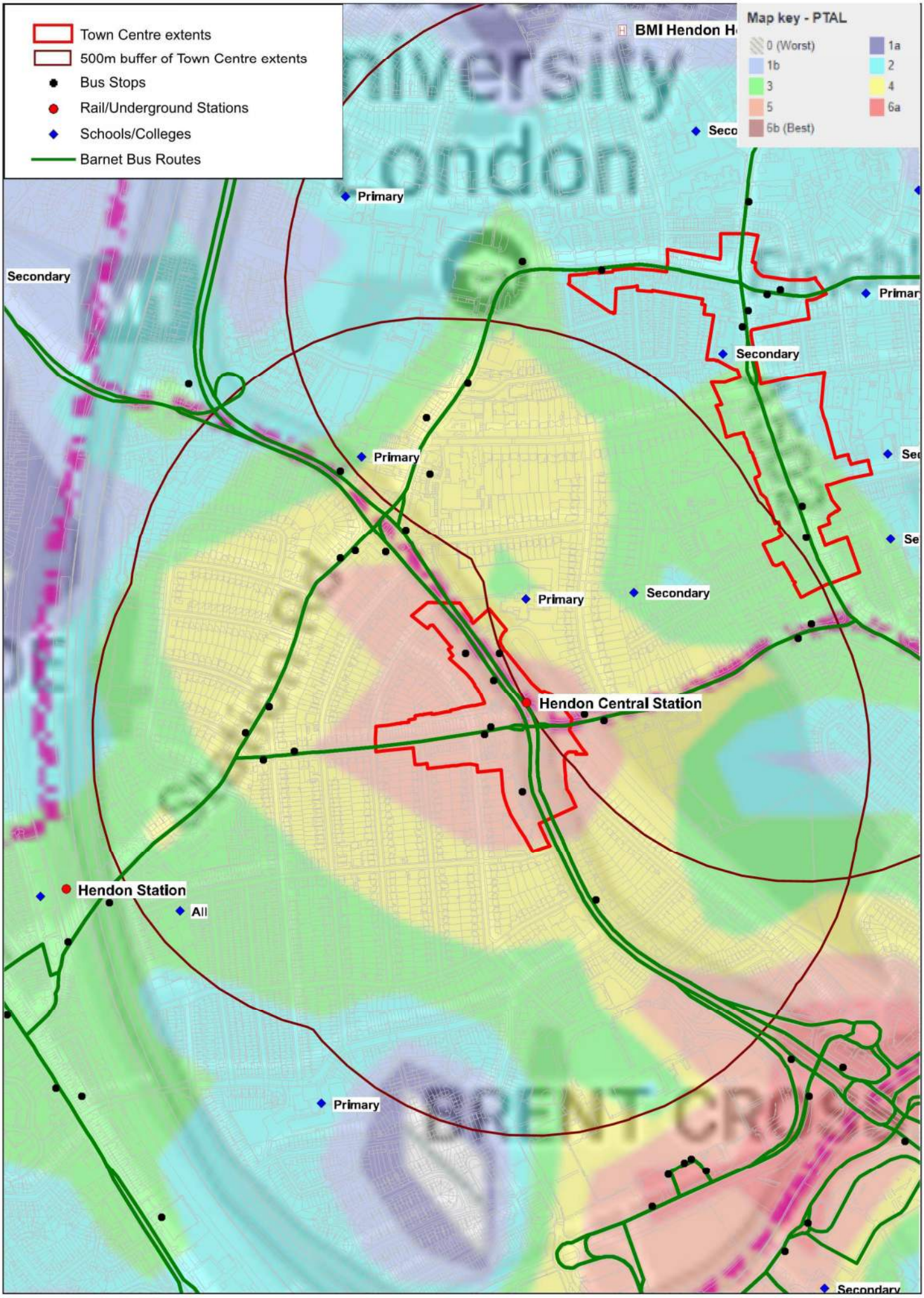
Finchley Church End Town Centre



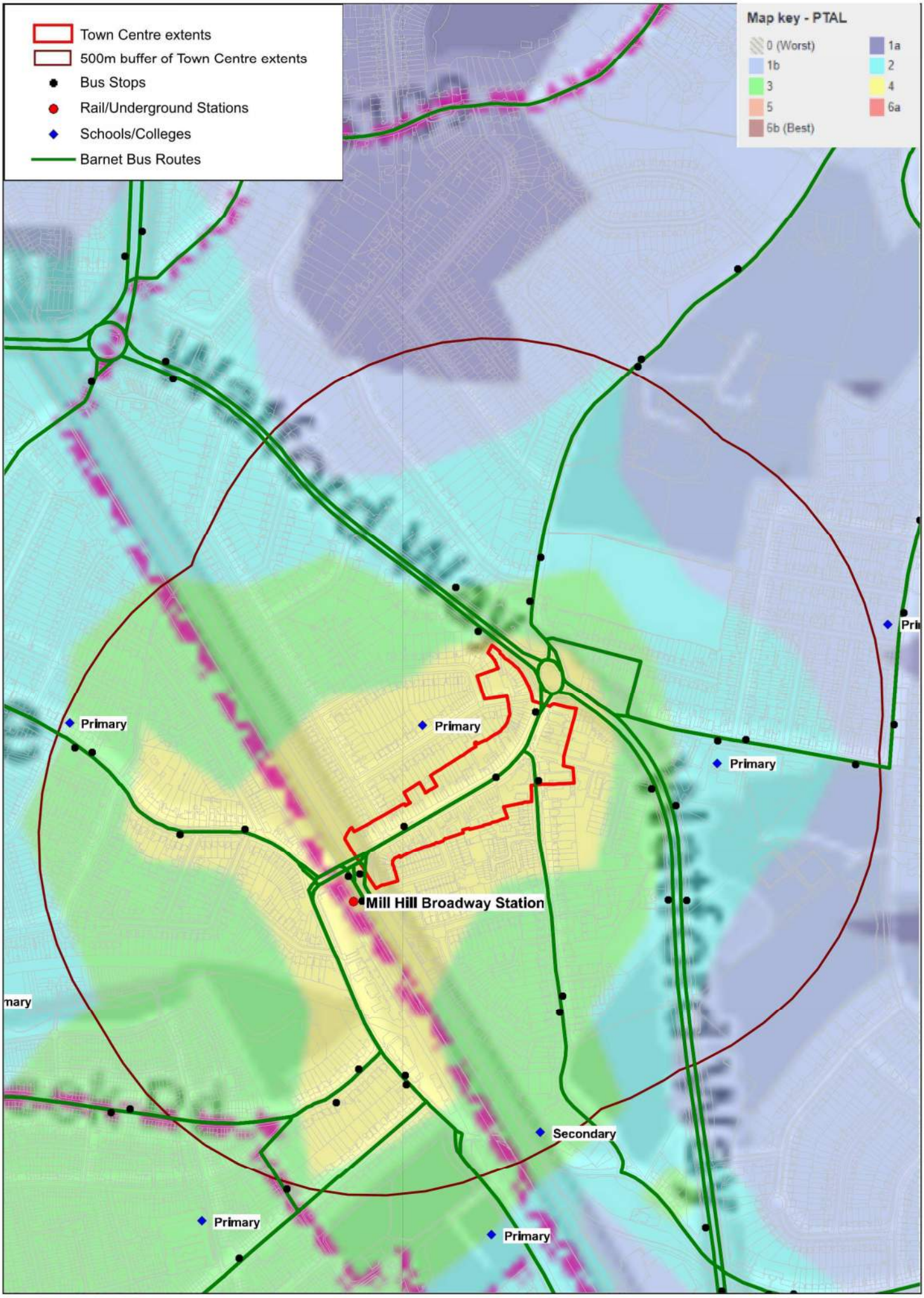
Golders Green Town Centre



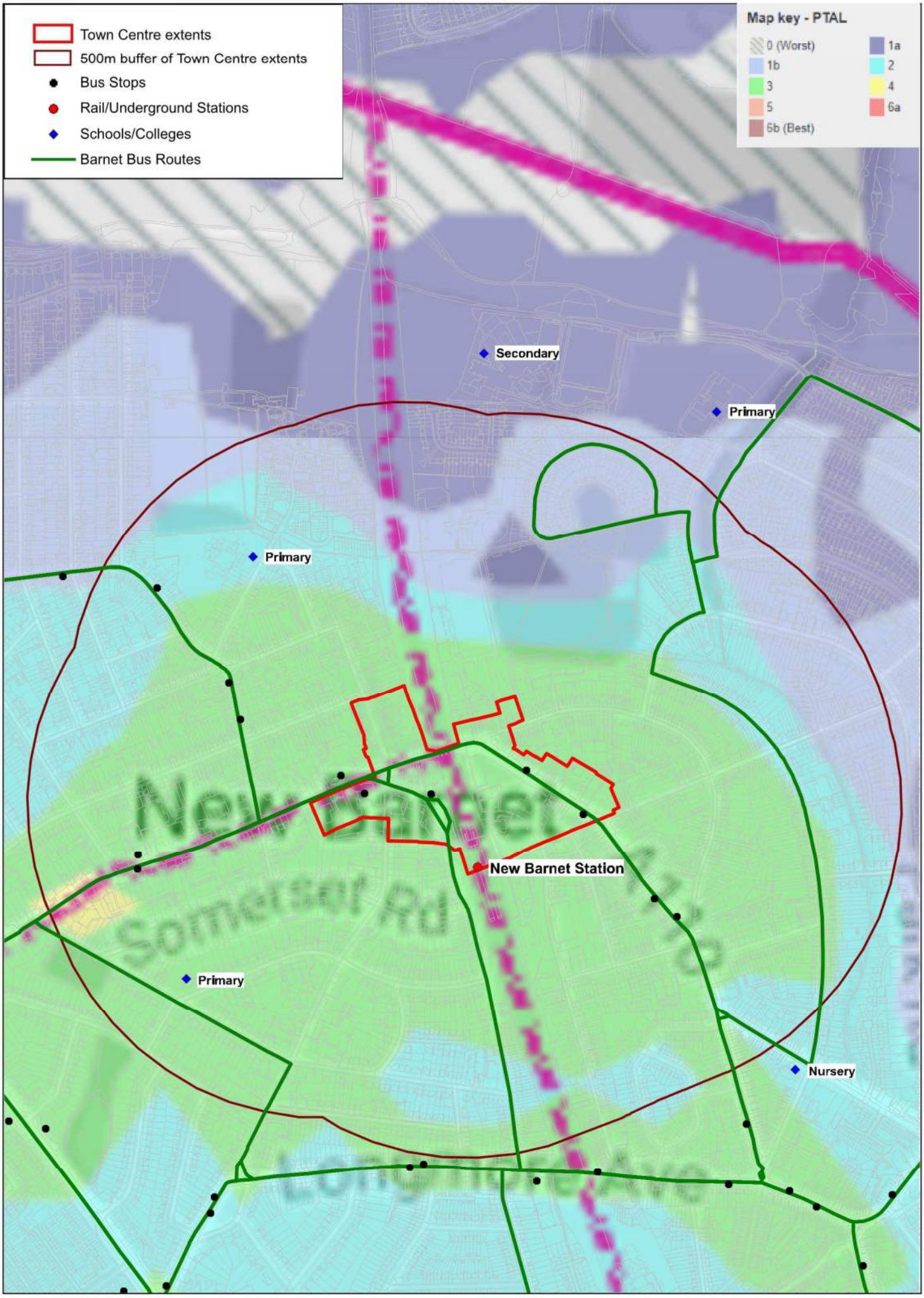
Hendon Central Town Centre



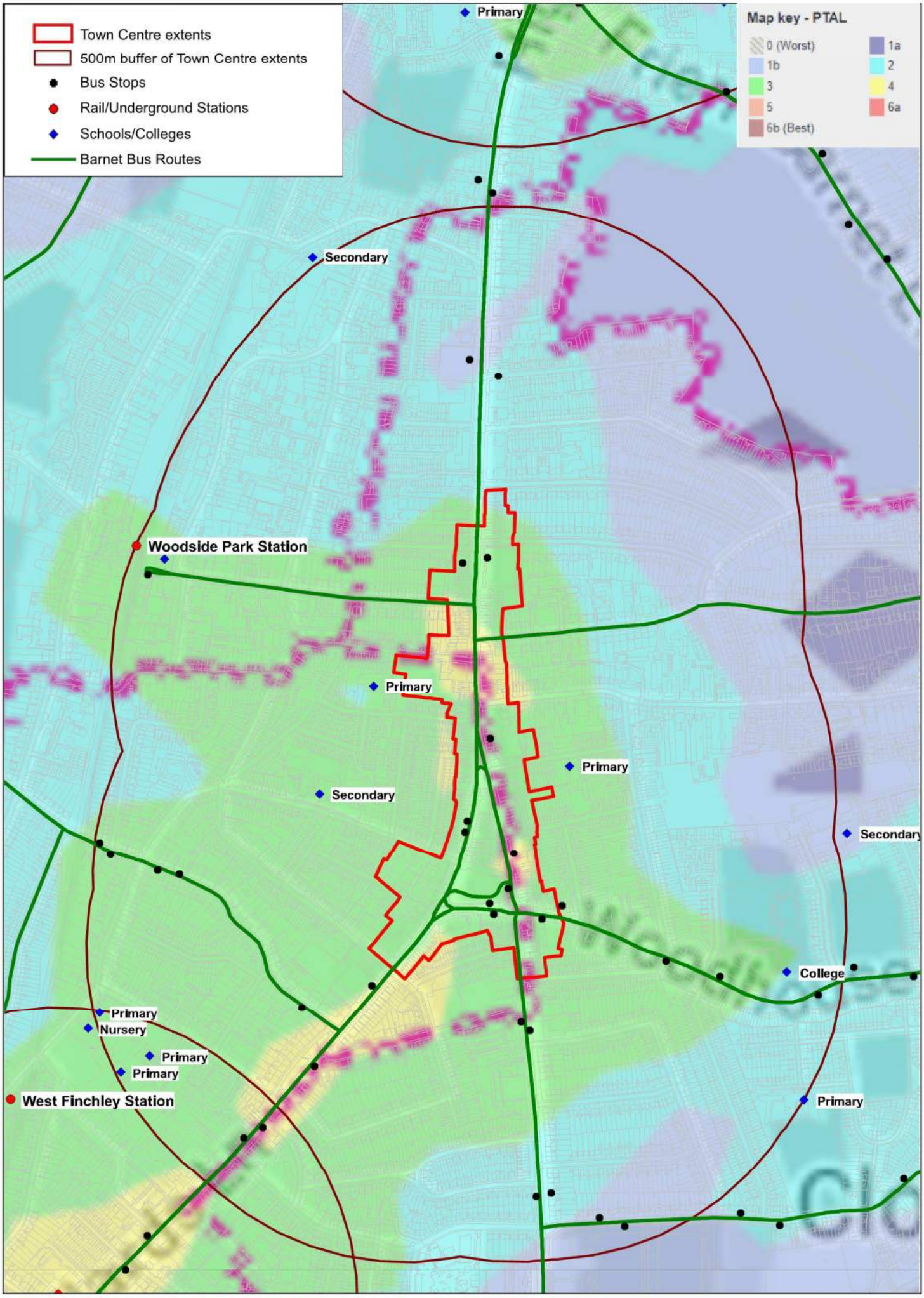
Mill Hill Town Centre



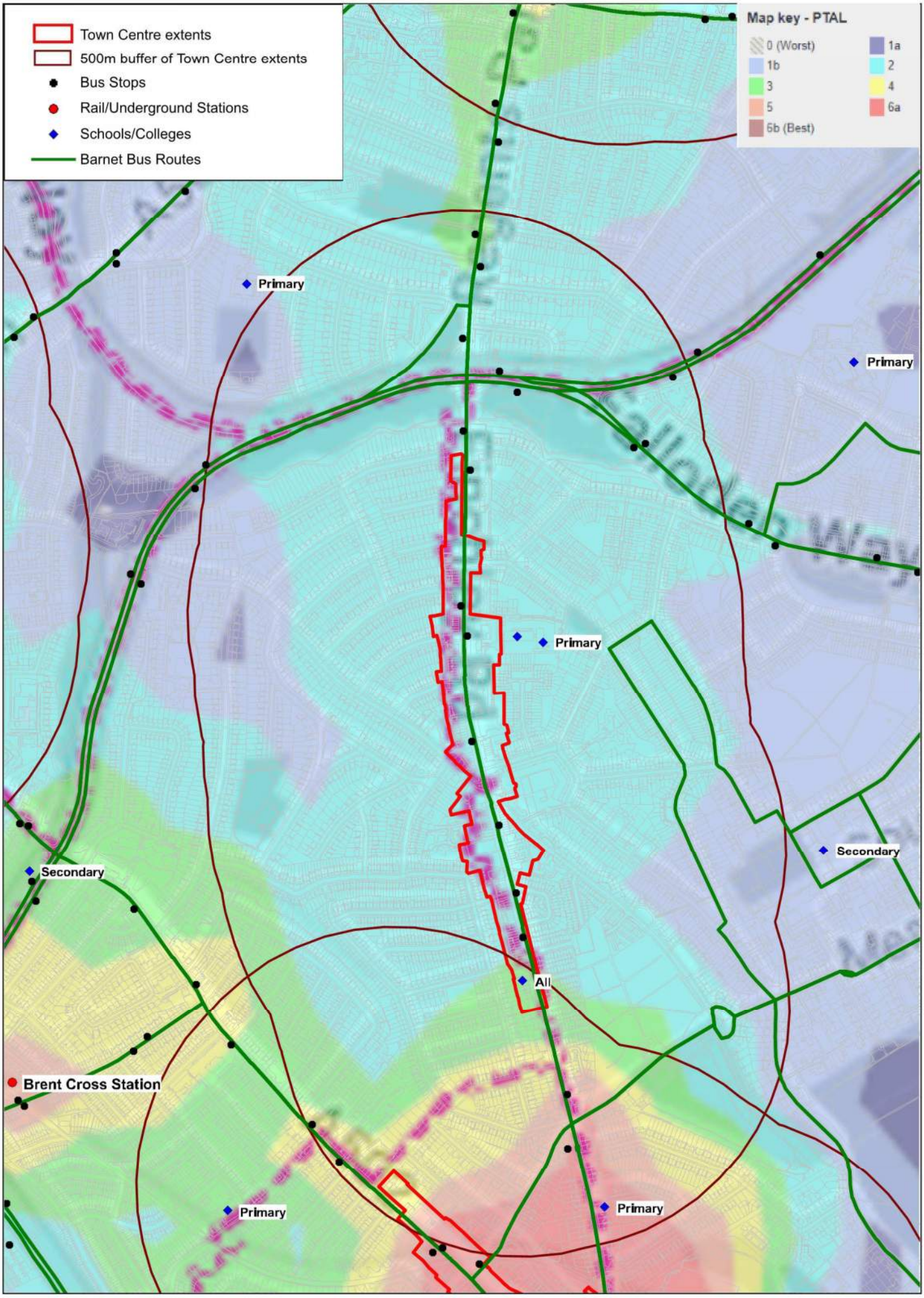
New Barnet Town Centre



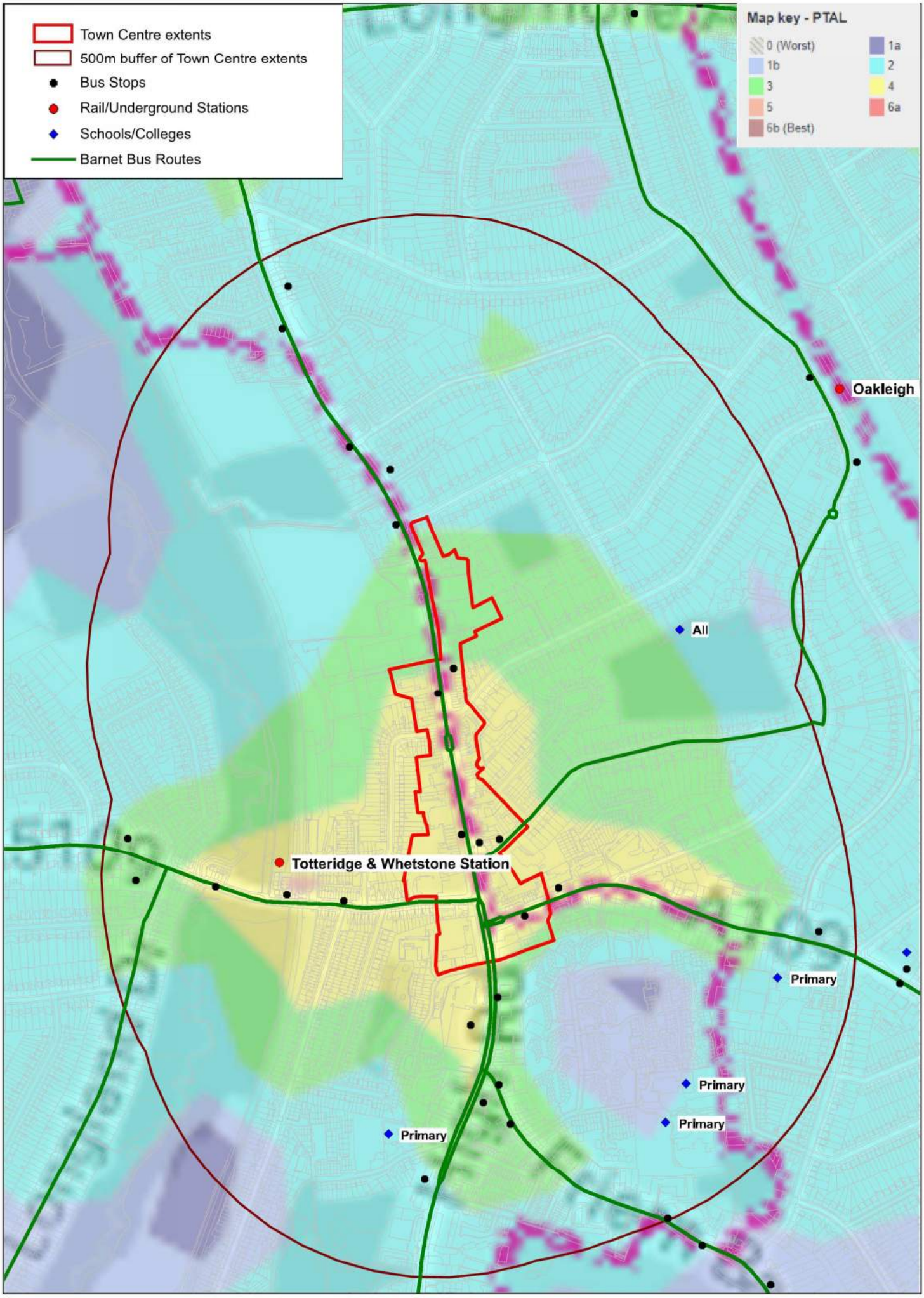
North Finchley Town Centre



Temple Fortune Town Centre



Whetstone Town Centre



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