Cycle Enfield - Enfield Town

LB Enfield

Preliminary Modelling Assessment

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1. Introduction

1.1 Purpose of report

1.1.1 This preliminary technical note describes some of the background to the Cycle Enfield proposals, analyses existing data on traffic in Enfield Town and reports on preliminary modelling of the changes proposed by the Cycle Enfield project in Enfield Town.

1.1.2 This preliminary work is based on static junction modelling using LINSIG and micro-simulation modelling using VISSIM to show how the junctions interact. The scheme will be subject to a Road Safety Audit and formal model audit by TfL, which may affect the design and modelling results reported below.

1.1.3 An increase in cycling is expected to support delivering the following benefits, as specified in TfL's summary report on 'Delivery of the benefits of cycling in outer London'[1]:

- improved air quality;
- reduced childhood obesity;
- improved quality of life;
- tackling health inequalities;
- strengthened local economies by boosting local journeys;
- address the climate change agenda;
- create liveable streets;
- reduced requirement for car parking spaces, freeing up valuable land.

1.1.4 The Cycle Enfield project aims to:

- Make places cycle-friendly and provide better streets and places for everyone;
- Make cycling a safe & enjoyable choice for local travel;
- Create better, healthier communities;
- Provide better travel choices for the 34% of Enfield households who have no access to a car and an alternative travel choice for the 66% that do;
- Transform cycling in Enfield;
- Encourage more people to cycle;
- Enable people to make short journeys by bike instead of by car.

1.2 Background to the Cycle Enfield proposals

1.2.1 Cycle Enfield is a core part of TfL's cycling portfolio and is one of the measures aimed at dealing with the huge growth in population and employment expected in London. There has been a growth of some 5m daily trips on London's transport networks since 1993. There is a recognition that the solution to this expected growth in travel and congestion is to offer better and more sustainable transport choices – cycling is a key element in this.

[1] http://content.tfl.gov.uk/benefits-of-cycling-summary.pdf

1.2.2 The investment in London over the last decade into better public transport, walking and cycling is changing travel behaviour - car travel is down 1m trips per day in a decade, even with a 20% population growth - people are shifting to public transport, walking and cycling. Last year was the first year when use of public transport, walking and cycling exceeded car use.

1.2.3 TfL's research into the potential for cycling estimated that a total of 4.3 million additional trips each day are potentially cycleable, with nearly two thirds of these currently made by car, with the remainder largely made by bus. Four in ten of these trips are made for shopping and leisure purposes and just under a quarter for work purposes -the greatest unmet potential for growth is within outer London, which has an estimated 54 per cent of these potentially cycleable trips.

1.2.4 Consequently the TfL's Cycling Portfolio was developed, and various measures were proposed, with the aim of reaching a target of 5% of London journeys by bike by 2026. There is strong evidence that this level of investment leads to changes in travel behaviour:

- Cycle hire – now has some 10m trips a year;
- Cycling to work in London has doubled in the last 10 years;
- Cycle Superhighways had a 47-83% increase in cycle use;
- The number of cyclists entering central London in the morning peak has increased by 177 per cent since 2001 on TLRN roads.
- In Central London, traffic has been dropping while cycling has been increasing, for example on the Embankment traffic is down 24%, on Farringdon Street it is down 44%.
- In the morning peak (2012) cycles accounted for 26 per cent of all vehicular traffic crossing the central London cordon inbound to central London and for 22 per cent of vehicular traffic heading out of central London in the evening peak – some roads had an even higher proportion of cyclists. While these increases are in central London, and lower changes are expected in outer London, they show the huge attraction of and potential for cycling in London.

1.3 Travel demand in Enfield Town and the Borough

1.3.1 The London Plan indicates that the 2011 population in the four north London boroughs of Enfield, Barnet, Haringey and Waltham Forest combined was 1.2m, and is projected to grow to 1.4m by 2031[2], an increase of 17%. Jobs in the four boroughs are forecast to rise from 390,000 to 430,000 over the same period, an increase of 10%.

1.3.2 Enfield Council's Core Strategy document, published in 2010, refers to 2008 GLA growth projections, which predicted an increase in resident population in the borough from 285,100 in mid-2007 to between 293,500 and 303,800 by 2026 (growth of between 3% and 6.6%). Updated figures from the GLA released in 2014 now suggest that the population of the borough is already close to 325,000, and trend-based forecasts suggest it could rise as high as 360,000 over the next ten years (although forecasts linked to future development and land availability suggest more modest growth to over 330,000 during the same period)[3]. GLA employment projections released this year also indicate that total jobs in the borough are forecast to increase from 108,000 in 2011 to 115,000 by 2026[4].

1.3.3 The Enfield Core Strategy (2010) has a core objective to '*enhance traffic flow by the provision of appropriate infrastructure as well as the promotion of sustainable methods of transport and a pattern of development that reduces the need to travel*'.

[2] http://content.tfl.gov.uk/north-srtp-plan-update-2014.pdf - page 4
[3] http://data.london.gov.uk/dataset/2014-round-population-projections
[4] http://data.london.gov.uk/dataset/gla-employment-projections

1.3.4 Despite recent increases in population and employment in the borough, daily traffic volumes through and on the approaches to Enfield Town have fallen over the past 15 years. This trend is broadly in line with traffic volume trends evident across London as summarised in TfL's latest annual Travel in London report, published in 2014[5]. The report indicates that there are "*signs that traffic in London is growing again after a decade of falls, this being reflected in indicators of road network performance (delay and journey time reliability)*". The report goes on to state that "*both 2012 and 2013 saw growth in [traffic in] outer London*" and that "*indications for 2014 are that traffic volumes have grown across London as a whole, as the economy recovers from recession and population continues to grow rapidly. It is possible that London is now seeing a movement away from a long period of stability on the road network in terms of performance indicators such as delay and journey time reliability – this will become clearer over the coming year*".

1.3.5 The recent Roads Task force estimated that delay per kilometre would increase Outer London congestion by 15% by 2031, and in the Enfield area by 10%.

1.3.6 Despite the reduction in daily traffic volumes since 2000 described above, the Enfield Town network currently operates close to capacity during peak times, with degrees of saturation of 88-93% in the peak hours modelled. This is potentially due to a lower level of reduction in peak hour traffic when compared to daily trends, suggesting that the daily traffic profile through the network has become more peaked in recent years.

1.3.7 Any forecast growth in traffic volumes would result in a significant increase in congestion and delays, in the do-nothing scenario. In the context of the potential increases in traffic in outer London summarised above, it is therefore important that measures are implemented to reduce dependency on the car for people making journeys into and through the town centre.

1.3.8 The north London Sub-Regional Transport Plan (SRTP) summarises the public transport enhancements that will support a shift away from car use to some degree across the four boroughs in the sub-region (for example, London Overground capacity increases, rail enhancements in the Upper Lea Valley and the completion of the Thameslink Programme). However, these programmes are strategic in nature and are not focussed on the area around Enfield Town, as illustrated in the 2014 SRTP update summary of proposals[6].

1.3.9 In addition, DfT traffic count data suggests that goods vehicle traffic constitutes a relatively low level of overall volumes on the network. The latest data from 2014 indicates that goods vehicles made up 16% of all motorised vehicular at the count sites. The proportion of goods vehicles is important since these vehicles are typically making delivery or servicing trips and are therefore much more difficult to transfer to other modes than car or motorcycle trips.

[5] http://content.tfl.gov.uk/travel-in-london-report-7.pdf
[6] http://content.tfl.gov.uk/north-srtp-poster-2014-update.pdf

2. Preliminary junction modelling results

2.1 Methodology

2.1.1 This section of the report summarises the results of the preliminary traffic modelling in Enfield Town. It is based on a LINSIG and VISSIM modelling of the Enfield Town network.

2.1.2 The results are also preliminary as a Road Safety Audit and formal model audit by TfL are required, which may affect the design and modelling results reported below.

2.1.3 The aim of the Cycle Enfield proposals for the town centre is to improve the physical environment, reduce traffic speeds, with the aim of supporting the regeneration of the centre and encouraging shoppers to visit more and stay longer. Cycling access will be significantly improved, increasing the opportunity for shoppers and workers and users of the railway station to use bikes to visit the town centre.

2.1.4 Despite the falls in traffic in Enfield Town over the last decade, there are still very high levels of through-traffic in the town centre. Surveys show that in the morning peak the volume of through-traffic in Enfield Town Centre is approximately 73%, with 67% in the evening peak hour while on a Saturday some 50% of the traffic is through-traffic. Clearly there is scope to reduce some of this through-traffic to improve conditions in the town centre.

2.1.5 The tests shown are based on existing traffic flows in the AM and PM peak. In the Saturday peak, the modelling is based on 10% reassignment of through traffic, with trips to the town centre remaining as existing. An assessment of the alternative routes taken by traffic is described later in the report. The modelling assessment is considered a worst case scenario, as it is based on no mode shift to cycling. The Cycle Enfield target is 5% of trips by cycle and it is anticipated that this mode shift will be concentrated on the routes with the highest level of facility, such as Enfield Town and experience elsewhere in London suggests that the effect in the peak hours may be higher.

2.1.6 These reductions assume that these changes will occur through a mix of responses:

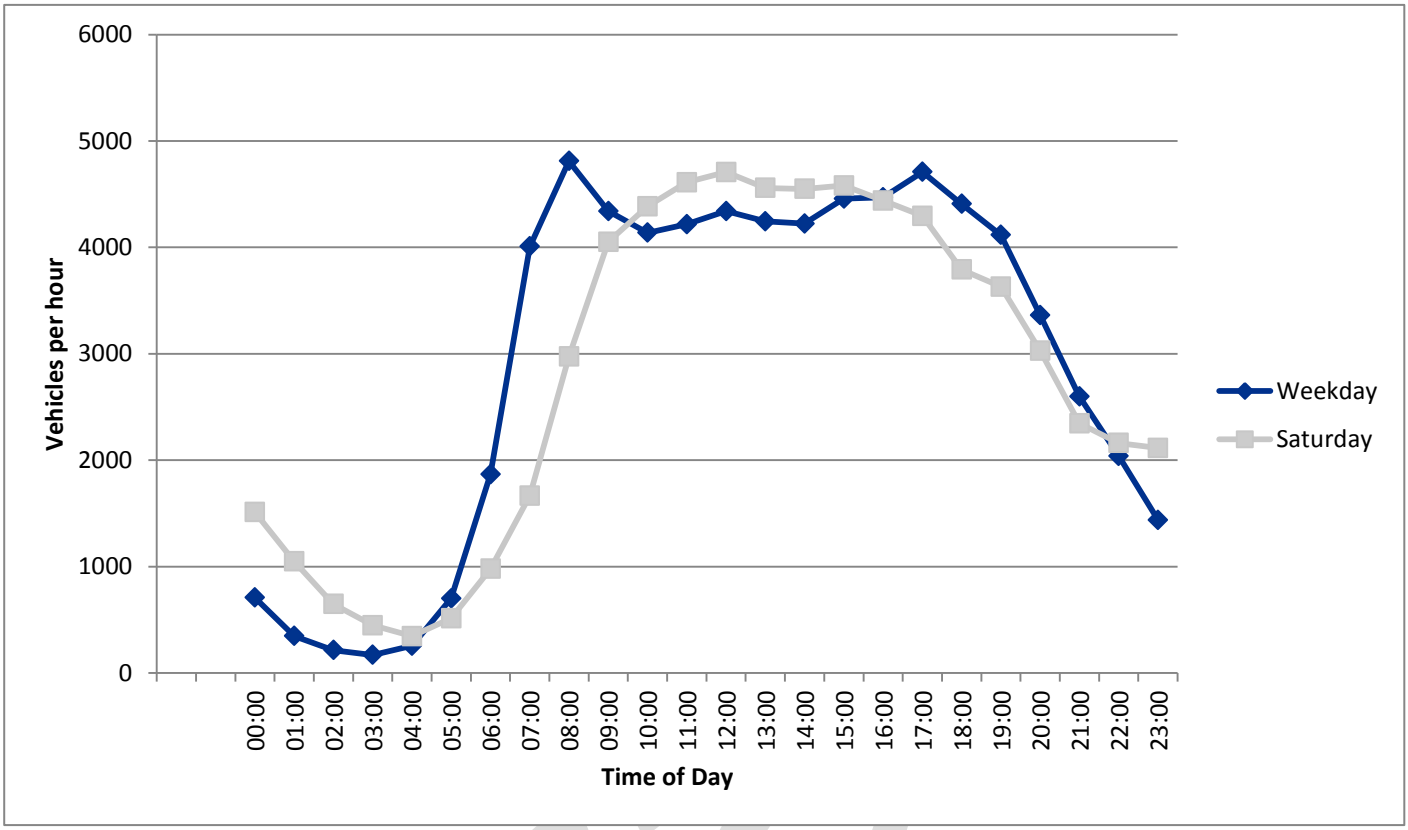
- The background London-wide shift to more public transport, walking and cycling trips and fewer car trips
- Reassignment of through-traffic to other routes
- Mode shift to cycling. Enfield Town connects the main Cycle Enfield routes of the A105 and A110 as well as linking to a number of north/south Quietways, and is a key ‘hub’ for local trips. It is therefore anticipated that Enfield Town has the greatest potential for mode shift to cycling and will achieve higher than average levels of cycle trips when compared to the Cycling Enfield borough-wide target of 5% of trips.

2.2 Daily variation in traffic flow

2.2.1 Figure 1 shows the daily profile of traffic in Enfield Town on a weekday and Saturday. This shows that the weekday morning peak hour traffic flow reduces by up to 15% in the interpeak, while the Saturday peak is lower than the weekday AM peak but is reasonably constant across the middle of the day.

2.2.2 The modelling tests reported here for the weekday morning and evening peak hours will therefore overstate the impact across the day, while the Saturday peak is reasonably representative of conditions in the middle of the day.

Figure 1: Enfield Town Traffic Volumes.

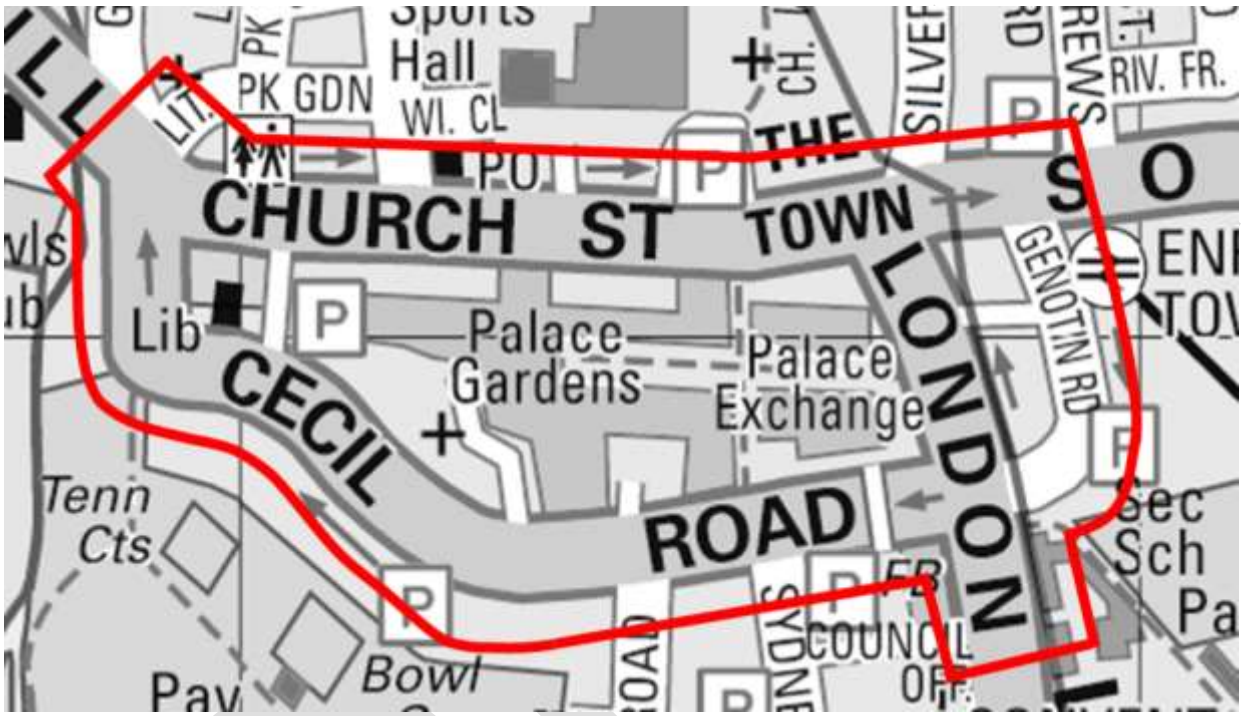


Surveys undertaken on London Road, Silver Street, Southbury Road and Church Street west of Little Park Gardens in July 2014.

2.3 Junction arrangements at the proposed signalised junctions

2.3.1 The modelled network for Enfield Town covers the area shown in the figure below. These junctions have been modelled using standard traffic engineering software packages and TfL procedures, with base models audited and signed off by TfL. The finalised proposed modelling will also be audited by TfL.

Figure 2: Enfield Town Model Extent



2.4 Degree of saturation on the network

2.4.1 Table 1 shows the estimated degree of saturation (DoS) at the junctions, for the proposed option. A DoS of over 100% indicates that a junction is overcapacity; a DoS of 90% is regarded as acceptable in congested urban locations.

Table 1: Option 1 - Preliminary Estimates of Degree of Saturation at Key Junctions in Enfield Town

Junction	AM Peak No Reassignment		PM Peak No Reassignment		Sat Peak 10% Reassignment	
	Base (DoS)	Proposed (DoS)	Base (DoS)	Proposed (DoS)	Base (DoS)	Proposed (DoS)
Southbury Rd/Genotin Rd	85.9%	94.5%	78.8%	87.3%	77.3%	85.1%
The Town/Southbury Road/London Road	89.6%	95.4%	88.0%	95.5%	87.3%	85.7%
London Road/Genotin Road	79.1%	94.1%	83.3%	90.1%	93.4%	84.6%
Cecil Road/Sydney Road	44.4%	76.7%	43.9%	76.0%	61.4%	69.1%
Sarnesfield Rd/Cecil Road	44.5%	41.2%	52.5%	48.7%	55.9%	37.2%
Church St/Little Pk Gdns	43.2%	98.8%	42.4%	91.5%	45.0%	89.0%
London Road/Car Park Exit	85.6%	86.8%	83.4%	73.3%	80.0%	78.0%

2.4.2 More detailed LINSIG modelling results are shown in Appendix A.

2.5 Journey Times

2.5.1 The modelling results show the following estimated impact on buses as a result of the proposed scheme. The results are shown in minutes for both directions of each route.

Table 2: Estimates of Change in Bus Journey Times

Route	Estimated Change in Journey Time Per Route (Mins)		
	AM	PM	Sat
W9 Eastbound	0.5 to 1.5	-1 to 0	0.5 to 1.5
W9 Westbound	2.5 to 3.5	1 to 2	0.5 to 1.5
231/121/191/307 Eastbound	-0.5 to 0.5	-1.5 to -0.5	0 to 1
231/121/191/307 Westbound	3 to 4	2 to 3	0.5 to 1.5
192/317 Eastbound	-1 to 0	-1.5 to -0.5	1 to 2
192/317 Westbound	3.5 to 4.5	3 to 4	1 to 2
377 Southbound	0.5 to 1.5	-0.5 to 0.5	-0.5 to 0.5
377 Westbound	1 to 2	2 to 3	1 to 2
329 Southbound	0 to 1	0.5 to 1.5	0 to 1
329 Northbound	1.5 to 2.5	2 to 3	1.5 to 2.5
W8 Southbound	0.5 to 1.5	-1 to 0	-1 to 0
W8 Northbound	-0.5 to 0.5	0.5 to 1.5	0 to 1

2.5.2 The above estimated journey times equate to an average delay per bus of approximately 1 to 2 mins in the AM, and 0.5 to 1.5 mins in the PM and Saturday peak. To mitigate the impact of these delays, LB Enfield are investigating bus priority measures on sections of the routes outside the Enfield Town study area, to improve the impact on overall bus journey times.

2.5.3 The table below shows the impact on vehicle journey times as a result of the scheme based on no reduction in traffic volumes in the AM and PM Peak hours and 10% of through traffic in the Saturday Peak. The routes compare through routes and also key routes into the town centre are from the west to the Palace Gardens car park and from the south to Palace Exchange car park.

Table 3: Estimates of Change in Vehicle Journey Time for Through Routes

Route		Additional Delay Per Movement (Secs)		
		AM	PM	Sat
Through Trips	West to East	0 to 1	0.5 to 1.5	0.5 to 1.5
	East to West	3.5 to 4.5	2.5 to 3.5	1 to 2
	South to North	0 to 1	0.5 to 1.5	0.5 to 1.5
	North to South	0.5 to 1.5	-1 to 0	-1 to 0
Car Park Trips	West to Palace Gardens	0.5 to 1.5	0 to 1	0.5 to 1.5
	Palace Gardens to West	0 to 1	1 to 2	0.5 to 1.5
	South to Palace Exchange	0.5 to 1.5	0.5 to 1.5	0 to 1
	Palace Exchange to South	0.5 to 1.5	2.5 to 3.5	2 to 3

2.5.4 The results show that the east to west route is most heavily affected by the scheme for through routes and the two-way trip between the South and Palace Exchange, for the key routes into the town centre.

2.5.5 Based on the number of vehicles undertaking the through routes shown in the above table, the average increase in journey per through movement is approximately 0.5 to 1.5 mins.

2.6 Reassignment assessment

Identification of alternative routes

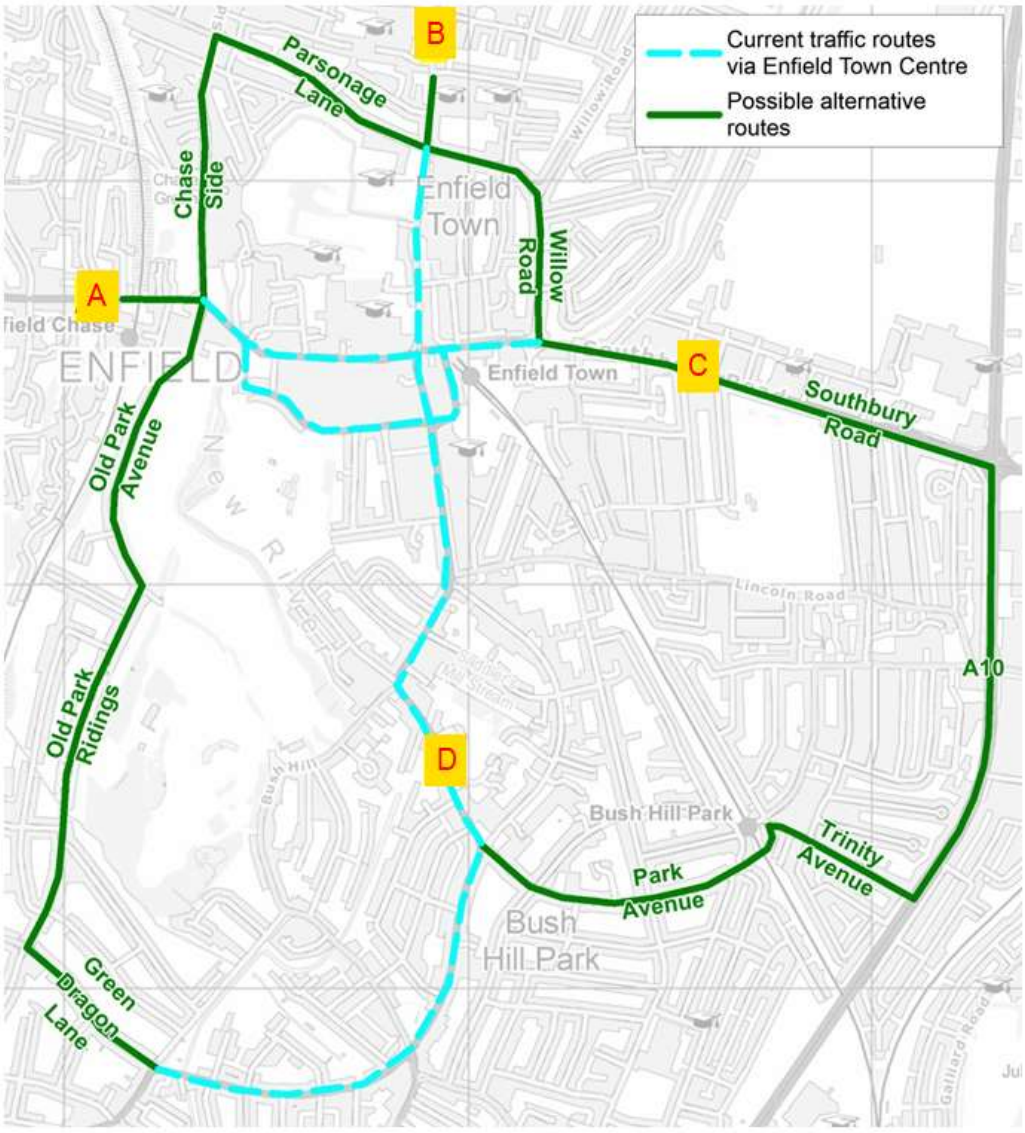
2.6.1 Traffic re-assigning away from the town centre as a result of the Cycle Enfield proposals is likely to take a wide range of alternative routes depending on the nature of the journey. For example, Figure 3 indicates that strategic through-traffic has the option of using alternative routes such as the M25, the A10 and the A111 to avoid the town centre.

2.6.2 In addition, east-west links within the area defined by these strategic routes (for example East Lodge Lane, Cattlegate Road, Whitewebbs Road, Clay Hill, Lavender Hill, Carterhatch Lane etc) are also likely to absorb a small volume of re-assigning traffic.

Figure 3: Strategic traffic routes around Enfield Town Centre

2.6.3 Local through-traffic in the town centre is conversely likely to use local alternative routes, examples of which are illustrated in Figure 4.

Figure 4: Possible local alternative routes around Enfield Town Centre



2.6.4 It should be noted that the routes shown on the plan above have been identified as obvious local alternatives for the purpose of this assessment, but are not the only local alternative routes that will be used. Local traffic origins and destinations will cover a wide range of areas around the town centre, and will therefore disperse along a greater number of roads than those identified on the plan, reducing the traffic impact on any particular route.

2.7 Impact of re-assignment

2.7.1 As described earlier, the modelled scenarios assume no reduction in traffic volumes in the AM and PM Peak hours and 10% of through traffic in the Saturday Peak for the network to operate without exceeding capacity.

2.7.2 When considering the wider impact of the traffic reduction in the Saturday Peak, a worst case scenario has been assumed, with no reduction related to cycling mode shift and all traffic re-assigns onto local alternative routes.

2.7.3 Traffic re-assignment from specific through-routes was estimated based on origin and destination surveys. In each case, total re-assignment was allocated to through-routes in proportion to the overall reduction expected on each route between the base and proposed scenarios.

2.7.4 The result of these calculations are based on origin and destination surveys calculation and are summarised in Table 4, indicating that the most significant re-assignment is assumed to occur on the Willow Road, with 91 PCUs (two-way flow) transferring to the alternative route in the peak hour.

Table 4: Assumed re-assignment of two-way traffic flows (PCUs) from town centre through-routes

Local Diversion Route	Hourly Increase (Two-way)
Chase Side/Parsonage Lane	45
Willow Road	91
A10/ Trinity Avenue/Park Avenue	75
Green Dragons Lane/ Old Park Ridings	29

2.8 Further work

2.8.1 Once the designs and modelling have been finalised they will be subject to a formal audit by TfL to verify the results. The base modelling has already been through this process and has been used to develop the proposed models to date.

Appendix A. Preliminary LINSIG Modelling Outputs