



A406 North Circular intervention at New Southgate

Strategic Outline Business Case



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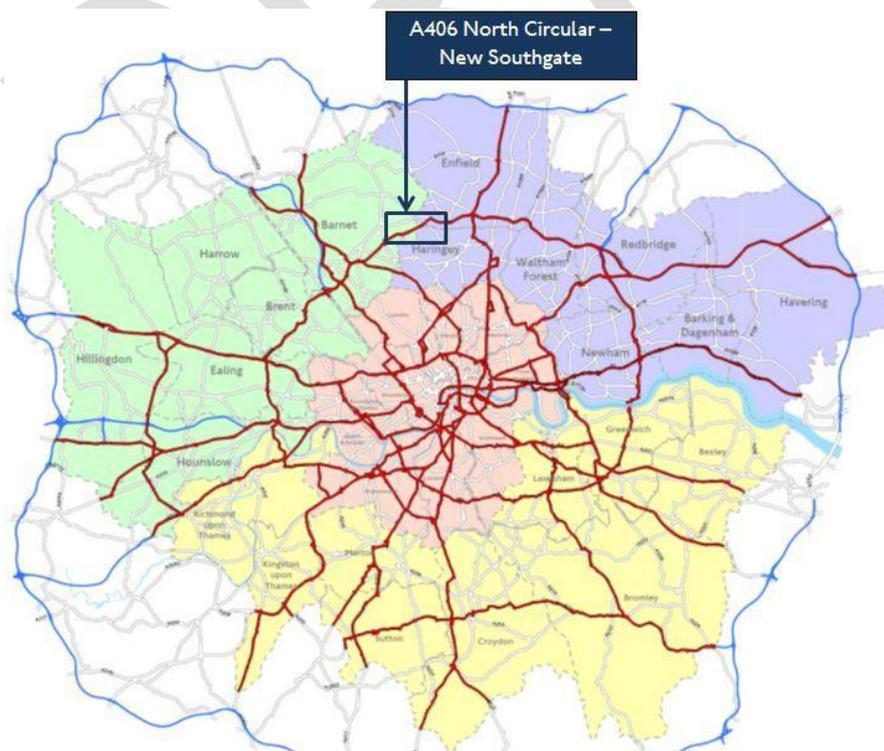
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1. Executive Summary

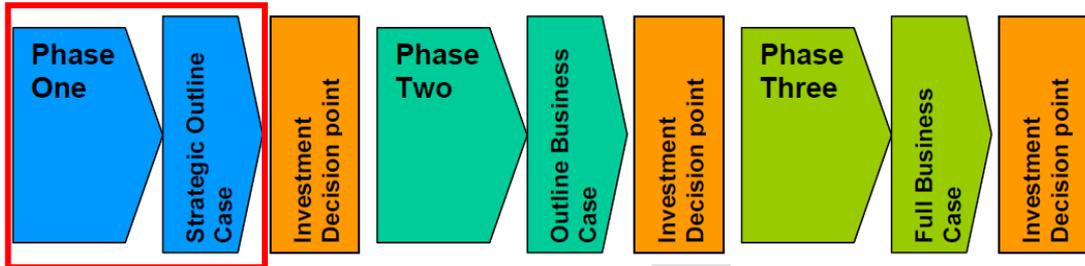
Purpose of this document

1. TfL is assessing interventions on the A406 to reduce the severance caused by the A406, unlock new land for development and enable greater densities in the New Southgate area. These interventions should also protect the strategic movement function of the A406.
2. Two options have been developed, a short decking of the A406 west of the East Coast Main Line rail corridor and a longer tunnel scheme between New Southgate and the A10.
3. The regional and local objectives for these interventions are as follow:
 - Support growth by creating jobs and accelerating housing delivery to help reaching the London Plan’s aim to building 49,000 new homes every year.
 - Maximise the housing potential of New Southgate, particularly in the context of the delivery of Crossrail 2.
 - Support economic growth at New Southgate by creating employment.
 - Secure the strategic function of the Transport for London Road Network (TLRN).
 - Maintain or improve the vital strategic movement function of the A406 and minimise the impact of future development.
 - Improve the quality of life of residents through more efficient transport networks and reduced negative externalities.
 - Enhance local residents’ quality of life by improving urban realm and reducing severance, noise and air pollution caused by the A406.

Figure 1: Location of Proposed improvements to A406 North Circular in the vicinity of New Southgate



4. This document is the Strategic Outline Business Case (SOBC), the first phase of the decision making process. The SOBC sets out the strategic fit for the scheme and scopes out the initial intervention proposal.



5. This SOBC is presented in accordance with the DfT's Business Case Guidance which stipulates a five case model to developing transport business cases which considers whether the scheme:
- is supported by a robust case for change that fits with wider public policy objectives – the 'strategic case';
 - demonstrates value for money – the 'economic case';
 - is commercially viable – the 'commercial case';
 - is financially affordable – the 'financial case'; and
 - is achievable- the 'management case'.

Policy framework

The Mayor's Roads Task Force (RTF) has set the vision for London's roads and streets

6. The RTF report, 'Vision for London's Roads and Streets' (2013) sets out three core aims:
- To enable people and vehicles to move more efficiently on London's streets and roads;
 - To transform the environment for cycling, walking and public transport; and
 - To improve the public realm and provide better and safer places for all the activities that take place on the city's streets, and provide an enhanced quality of life.
7. Particular objectives from the RTF report and of relevance to this business case include:
- Release land at the surface for development;
 - Improve the public realm;
 - Create new green space;
 - Provide better facilities for pedestrians, cyclists and public transport users;
 - Relieve congestion and improve journey time reliability;
 - Reduce severance;
 - Reduce the negative impacts of roads on noise and air quality.
8. Following the publication of the RTF report, TfL undertook a series of studies to identify opportunities for decking over or tunnelling under roads at a number of locations around London in order to unlock development opportunities.

9. The initial phase of work identified 70 potential locations, and sifting work identified 15 locations suitable for high level feasibility work. This feasibility work identified five of these locations with the potential to make a significant contribution to achieving the aims and objectives of the Roads Task Force. Further feasibility work was carried out for each of these five locations resulting in the production of a Strategic Outline Business Case for each scheme. These locations are:

- A406 New Southgate;
- A13 Barking Riverside;
- A4 Hammersmith;
- A316 Chalkers Corner;
- A3 Tolworth.

Overall, the proposed tunnel conforms to policy at all levels, helping to secure London and the UK's continued prosperity

10. Due to the role of the proposed A406 tunnel in addressing the challenges London faces, it makes a significant contribution to policy at all levels. At a National level the proposal strongly supports the intended outcomes in the DfT's priorities for the transport network. The tunnel would also support London-wide and local policy – in particular in the Mayor's Spatial Development Strategy (known as the London Plan), the Mayor's Transport Strategy (MTS), and London 2050 Infrastructure Plan.

The Strategic Case

11. The Strategic Case demonstrates the problems identified, the need for an intervention, and the possible solutions to the problems.

The future of the UK's economic performance lies in improving the performance of its cities.

12. Cities drive the UK economy – they are home to 54 per cent of the population, generating 60 per cent of its GVA, containing 53 per cent of all businesses and 72 per cent of all highly skilled workers¹ within just 9 per cent of the UK's land area. London contributes an estimated 21 per cent of total UK tax revenues².

13. London's rapidly growing population is linked to and necessary to its strong economic performance. Over the period 1991 to 2011, London's population increased by 1.4 million, enabling the number of jobs in the capital to increase by 900,000. London's population surpassed its 1939 peak of 8.6 million in early 2015 and is forecasted to reach 10.1 million by 2036.

14. Since 1994, on average, 29,700 new jobs a year have been created within London. This employment growth is expected to continue. London Plan forecasts suggest that the number of jobs in London is expected to grow by 1.4m between 2011 and 2036.

¹ Centre for Cities website, 'City by City', <http://www.centreforcities.org/cities/>

² Research Report: London's Finances and Revenues: City of London Corporation & CEBR (2014)

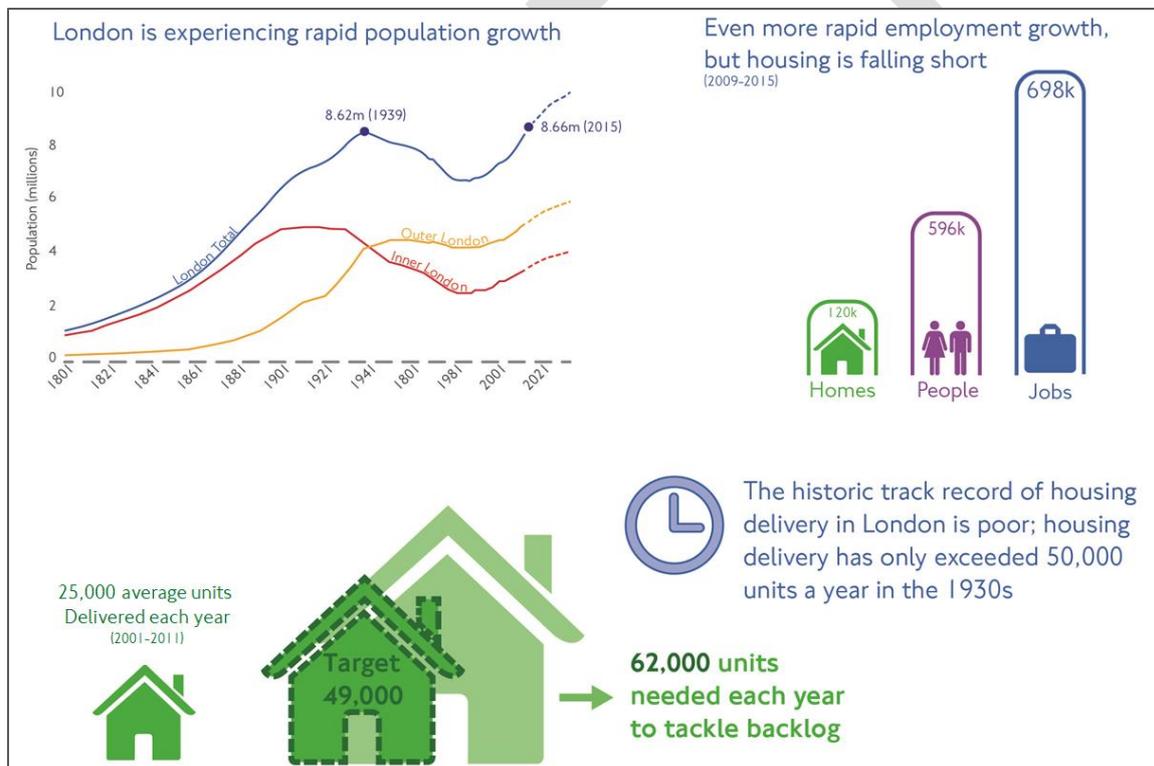
London is ranked alongside New York as the most competitive city in the world³; however, its success cannot be taken for granted

- Recent evidence suggests some deterioration in London’s international rankings, including cost of staff (a result of a high cost of living) and quality of life. The housing issues that lie behind these factors are fundamental to maintaining London’s competitiveness and will be exacerbated by continued population growth.

London’s future economic growth depends on having an increased housing availability supporting labour supply

- The scale of the projected employment and population growth provides both an opportunity for driving London and the UK’s economy, but also presents a considerable challenge. To reduce the gap between offer and demand and drive down high costs of living that undermined London’s competitiveness, the Greater London Authority (GLA) has set the aim to building 49,000 new units each year, although it is estimated that up to 62,000 new units per year would be required to meet the existing backlog.

Figure 2: London’s housing challenge at a glance



London must unlock new development opportunities to support delivery of new housing and jobs

- London’s supply of new land to support housing and jobs growth is limited and the development potential of brownfield land must be maximised. An innovative approach to unlocking this land to support new development is therefore urgently required if the Capital’s housing needs are to be met.

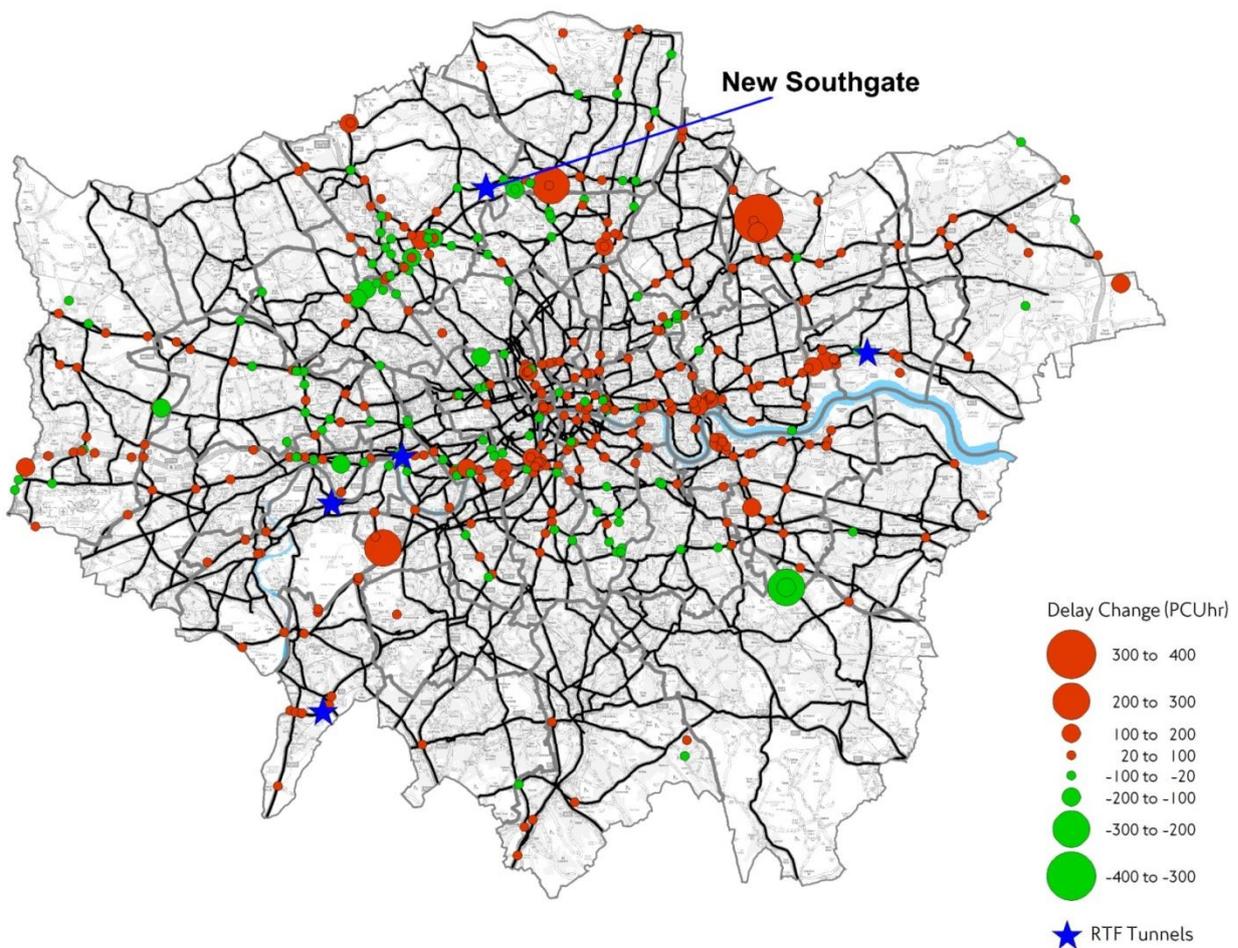
³ based on the Global Financial Competitive Index assembled by Longman Finance and the Qatar Financial Centre Authority, 2015

18. A number of key sites with potential to host high levels of housing growth, such as New Southgate, are currently under-utilised due to the negative impacts of busy roads and congestion on public realm, connectivity and environmental quality. By unlocking these areas, thousand of new homes and large numbers of jobs could be created.

It is critical to preserve the function and traffic capacity of the A406, which is a key part of the Transport for London Road Network

19. The Transport for London Road Network (TLRN) is network of strategic roads representing 4 per cent of London's road network but carrying 30 per cent of all traffic in London. The A406 North Circular is a key orbital road carrying high volumes of strategic, economically important traffic between Chiswick (west) to North Woolwich (east), connecting various suburbs en-route. It carries flows of 76,000 annual average daily traffic (AADT), of which 6 per cent are heavy goods vehicles.
20. Safeguarding this strategic movement function is vital to London's wider economic performance. As the population grows, the TLRN in this part of London is expected to face increasing travel demand, including from road-based freight.

Figure 3: Change in PCU hour delay on the TLRN, 2009 – 2031



New Southgate is an area of North London with regeneration potential, presenting an opportunity to deliver growth

21. New Southgate is situated across the boundaries of three boroughs in north London: London Borough (LB) Barnet, LB Enfield and LB Haringey.
22. New Southgate is well connected to other parts of London, including to central London thanks to the Great Northern rail services stopping at New Southgate train station.
23. The A406 North Circular road corridor running through New Southgate links a number of north London suburbs to central London and beyond. Nine bus routes service the area, two of which are 24 hour services.
24. Work is also under-way to further develop the future Crossrail 2 alignment and include a spur with a Crossrail 2 station at New Southgate.
25. Crossrail 2 is the proposed high-frequency, high-capacity rail line running through London and into Surrey and Hertfordshire. It will add capacity to the rail network in London and the south east, supporting economic regeneration by providing the infrastructure needed to build new homes and create more jobs.
26. With good public transport accessibility levels and underdeveloped land, New Southgate has a large potential for urban densification and housing development.

The A406 is a key link of the TLRN, but it hinders the development potential of New Southgate town centre and affects the quality of life of existing residents along its corridor

27. However, the A406 in its current form is constraining New Southgate's development potential. This major road corridor exerts a negative impact on the local area, creating local severance and causing negative noise, air quality and visual impacts. These negative externalities are detrimental to the quality of life of existing residents and are inhibiting the housing potential of New Southgate.

TfL has developed a tunnel proposal to increase the development potential of New Southgate, improve the quality of life of existing residents and reduce delays on the A406

28. The proposed tunnel to be built between New Southgate and the A10 will fulfil the strategic function of the existing A406, and improve the resilience of the TLRN.
29. The tunnel would improve capacity on the North Circular Road, and reduce congestion and delay. Between the M1 and A10 on the North Circular Road a 6-10 minute reduction in journey time is forecast.
30. The tunnel would achieve improvements to the quality of the public realm without removing highway capacity, addressing problems of severance, noise and air quality.
31. With strategic traffic relocated underground, the existing A406 corridor between New Southgate and the A10 would be downgraded to an urban boulevard, with more crossing opportunities for pedestrian and reallocation of space for both public transport and active transport. Existing communities along the A406 would also benefit from the reduction in traffic volumes with a reduction in noise and air pollution levels.

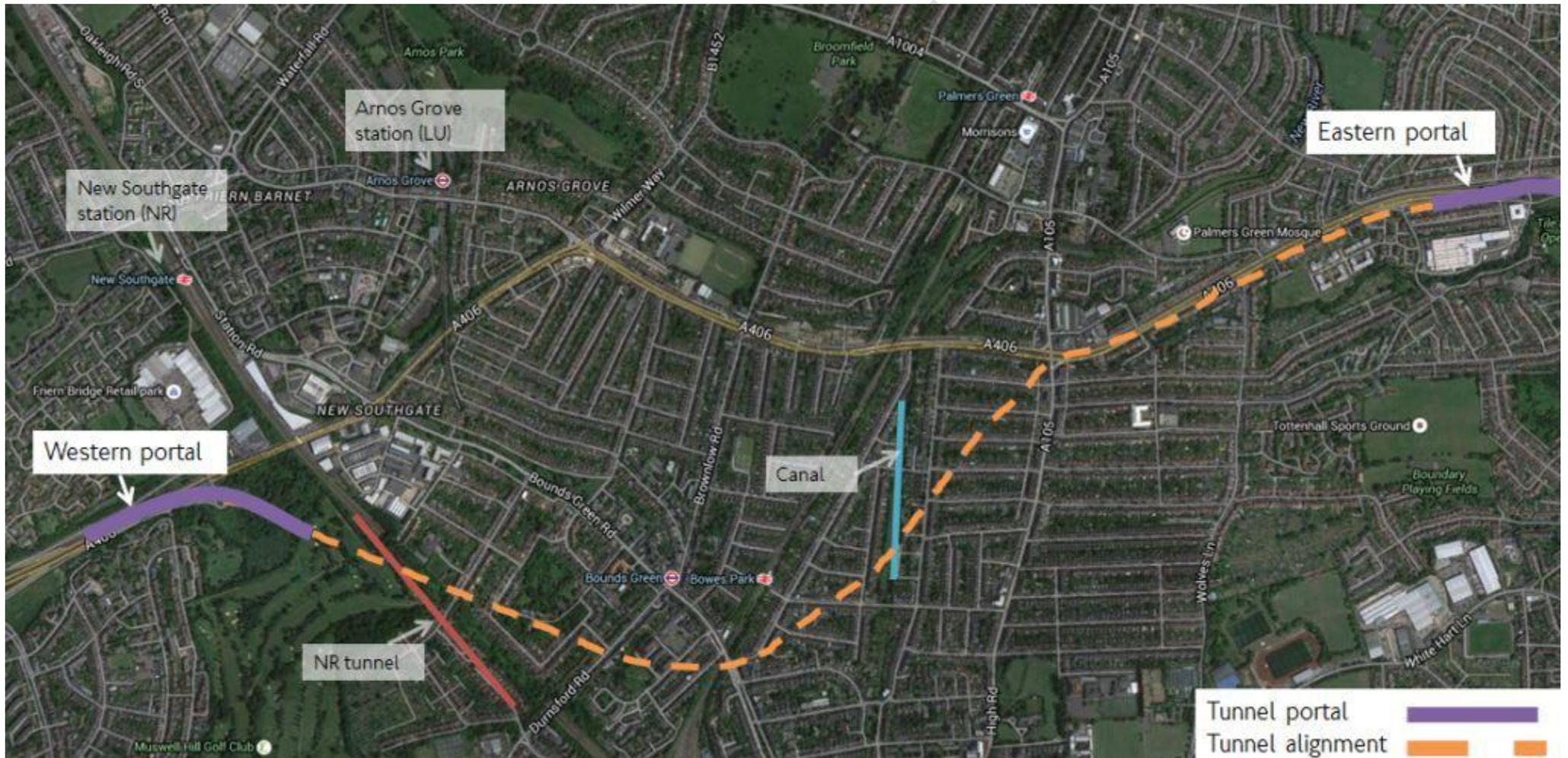
Masterplanning work for New Southgate town centre indicate that in conjunction with a new Crossrail 2 station, the tunnel would help deliver around 6,460 new homes in New Southgate (gross) and 558 net additional new jobs at the London level – with further growth attributable to Crossrail 2.

32. The improved connectivity provided by the removal of the strategic traffic link from the surface would ensure that the development opportunities presented by Crossrail 2 are maximised; allowing these sites to come forward at optimum densities as well as potentially having a more direct role in unlocking additional development parcels and providing necessary supporting infrastructure.

Figure 4: Visualisation of the development potential of New Southgate with the proposed tunnel and Crossrail 2 station.



Figure 5: Scheme location plan – showing proposed tunnel alignment between New Southgate and the A10.



An alternative decking option between the dumbbell interchange and the rail corridor was also considered

34. A 215m long deck covering the A406 between the dumbbell interchange and the rail corridor would reduce local severance and unlock land for development within the New Southgate town centre.
35. However, whilst enabling a comparable amount of new homes to the tunnel option, the decking of the A406 would not address the congestion issues faced by the TLRN. The A406 would remain in-situ.
36. The decking option would not enable the safeguarding of the TLRN strategic movement function, with level of congestion expected to increase with population and travel demand growth (including growth from the New Southgate development).
37. The benefits of the decking option in terms of severance, noise, and air pollution reduction would also be limited to the western area of the New Southgate town centre, with no benefits for existing residents.

Figure 6: Aerial picture of the proposed decking area:



Table 1: Comparison of the two options considered against the objectives of the scheme:

| Key measures of success | Western deck (with Crossrail 2 station and development) | Tunnel (with Crossrail 2 station and development) |
|---|---|--|
| <p>Supporting growth:</p> <p>Creation of new homes and jobs in the context of the delivery of Crossrail 2.</p> <p>Increase local economic outputs and employment figures following the regeneration of New Southgate.</p> | <p>Within the Masterplanning area:</p> <ul style="list-style-type: none"> ○ 6,675 units ○ 41,000 Sq m of non-residential space (including commercial) ○ 475 new net additional jobs (direct and indirect) | <p>Within the Masterplanning area:</p> <ul style="list-style-type: none"> ○ 6,460 units ○ 56,750 Sq m of non-residential space (including commercial) ○ 560 new net additional jobs (direct and indirect) <p>The tunnel is also likely to be a catalyst for smaller scale development along the A406 between New Southgate and the A10, although it has not been quantified.</p> |
| <p>TLRN resilience:</p> <p>Reduce delays and journey times for motorised traffic on the A406.</p> | <p>No capacity or reliability improvements. Delays expected to increase with growth in demand (including from development at New Southgate).</p> | <p>Reduction in travelled distance (7,200 pcu-kms) and reduction in travel times (1,130 pcu-hrs) across both peak periods.</p> <p>Lower traffic volumes on local roads, collectors and M25.</p> <p>Additional delays on surface roads near portals.</p> |
| <p>Severance and quality of life:</p> <p>Provision for safer and better connected cycling and walking routes with the creation of new surface links.</p> <p>Achievement of lower levels of air and noise pollution experienced on the surface.</p> | <p>Reduction in north-south severance between the dumbbell interchange and the rail corridor (the road is removed).</p> <p>Potential increase in east-west severance across the rail corridor (footpath of the decked A406 or new bridge over the railway).</p> <p>No reduction in severance in the eastern side of the Masterplanning area.</p> <p>No changes to the A406 corridors between New Southgate and the A10.</p> <p>Reduction in noise levels on Parcels E and F (currently green land and car show room).</p> <p>No changes to air quality.</p> | <p>Reduction in north-south severance between the dumbbell interchange and the rail corridor (the road is downgraded to an urban boulevard).</p> <p>Retained and enhanced at-grade pedestrian east-west connection across the rail corridor (the new urban boulevard).</p> <p>Existing A406 corridor downgraded to an urban boulevard easier to cross for pedestrians</p> <p>Reduction in north-south severance between New Southgate and the A10 with reduced traffic volumes and new crossing opportunities.</p> <p>Reduction in noise levels from 5 to 10db along the whole corridor (Masterplanning area and existing residential areas).</p> <p>Improved air quality along the whole downgraded section of the A406 (Masterplanning area and existing residential areas, Inc. two schools).</p> |

The proposed tunnel has the support of stakeholders

38. The proposed scheme has strong political support. Key stakeholders such as LB Barnet, LB Enfield and LB Haringey support the principle of the scheme and are working with TfL as the proposed option is assessed further.
39. The scheme would help address a number of challenges and opportunities identified locally by the boroughs including:
 - A poor quality environment and public realm along the A406 North Circular corridor at New Southgate;
 - The dominance and adverse impact of high traffic flows on the A406 North Circular for local residents and businesses: congestion, noise, air pollution, severance; and
 - The need to enable regeneration and ensure growth in the North Circular area.
40. In summary, the proposed tunnel would address the significant challenges that currently limit the development potential of New Southgate, unlocking the delivery of new homes and jobs, reducing these constraints on London's future productivity and competitiveness, helping to maintain its position as one of the leading global cities. By removing the main strategic traffic flow from the surface, the negative impacts of heavy traffic would be removed, reducing the overall impact on existing and future residents.

The Economic Case

41. In line with WebTAG guidance, cost-benefit analysis has been undertaken to assess the scheme's value for money. This has been undertaken using TUBA, a DfT compliant modelling appraisal tool.
42. Over the 60-year appraisal period, the tunnel (with development and TfL Values of Time) has a Net Present Value of £209m (2010 prices), with a Benefit Cost Ratio of 1.19, representing 'low' value for money. The BCR reduces to 0.89 if DfT's VoT are used.
43. However, these values do not take into account the substantial regeneration benefits of the scheme at a local and a London-wide level.
44. Although WebTag guidance requires the reporting of a Benefit to Cost Ratio (BCR) this is not an appropriate metric by which to solely judge the scheme. It is important to note that the scheme has an additional purpose: to address severance and deteriorating environmental quality, and by doing this it will unlock development potential in the New Southgate area, enabling regeneration and delivery of housing.

Tunnelling the A406 would help to deliver significant volumes of new housing, jobs and GVA within the New Southgate area

45. The results of the additionality approach in a scenario without and with Crossrail 2 are summarised in Table 2 below.
46. In the 'do-nothing' reference case (without the tunnel) 850 homes would be delivered as per LB Enfield's New Southgate Masterplan. The figures presented in Table 2 show the benefits to be delivered by the tunnel in addition to the 'do-nothing' scenario.

Table 2: Summary of additional impacts of A406 tunnel (at London level)

| <i>Development and regeneration benefits of the tunnel option</i> | <i>Growth enabled by tunnel in 'without Crossrail 2' scenario</i> | <i>Growth enabled by tunnel in 'with Crossrail 2' scenario</i> |
|---|---|--|
| Net Additional homes – London level | 886 | 780 |
| Net Additional jobs (direct and indirect) – London level | 613 | 558 |
| GVA generated by additional jobs (direct and indirect) (£m PV) | 370 | 314 |

*takes account of displacement effects

47. When deadweight, leakage and displacement effects are considered, the tunnel in a without Crossrail 2 scenario would enable delivery of 886 net additional dwellings at the London-level. When deadweight, displacement and multiplier effects are considered, the net additional employment that the tunnel would enable would be 613 jobs (direct and indirect). Alongside the indirect employment associated with this housing, this would generate a net additional GVA of £370m at the London level.
48. These are significant economic benefits that would strengthen London's economy and boost tax receipts.
49. If the tunnel were delivered together with a Crossrail 2 branch serving New Southgate, while this would increase development potential on the identified parcels of land, most of this would be attributable to Crossrail 2, and less would be supported by the tunnel. Under this scenario, the growth attributable to the tunnel would see a net additional 780 homes enabled at the London level. The net additional employment brought forward by the tunnel in a scenario with Crossrail 2 delivery would be slightly lower - seeing 558 new jobs created at the London level. The tunnel would generate a net additional GVA of £314m at the London level.
50. Realising this growth is dependent on more flexible planning policies being adopted that support higher densities. These benefits are contingent on a level of housing delivery that would require higher density development at sites in the vicinity of the existing A406 North Circular Road. However, they demonstrate potentially significant economic benefits for both the local area and for the London economy.

Other benefits could be quantified, such as improved quality of life, reduction in severance and improvements to the public realm

51. The scheme would also improve quality of life through an improved public realm and reduced severance and noise impacts, with additional associated economic impacts. These benefits will be quantified as part of the next stage of the appraisal process.
52. A high level WebTag compliant noise appraisal has been carried out to assess the benefits of the tunnel scheme for local residents. There are no existing residential properties that would be affected by the decking. The noise assessment concluded that the tunnel would have significant benefits in relation to reducing noise impacts on existing residents (by up to 10dB). This would have an NPV of around £18m.

With noise reduction benefits included, the BCR would mean it would generate a BCR of 1.21.

The Financial Case

Cost estimates suggest the tunnel scheme will cost £1.6bn to construct

53. The Financial Case sets out the project and ongoing operating costs and financing and funding arrangements to deliver the scheme.
54. The tunnel construction cost for the tunnel scheme is estimated to be £1.6bn. This cost is presented in 2015 prices, including 66 per cent optimism bias. This first cost estimate will be revised should the scheme progress further.
55. In addition to these construction costs land acquisition costs would be £25m. This figure includes land to be retained and land that would be surplus after the tunnel opening, which would be sold.
56. The operational and maintenance costs for the tunnel are estimated to be £8.9m per annum in 2015 prices, made up of routine and reactive maintenance and utility costs. This includes £3.5m to be spent on lifecycle costs every ten years.

A proportion of the funding for the tunnel could be met from non-grant funding sources

57. The following funding sources for this scheme have been considered:
 - Funding from taxes on new development (incremental Borough Community Infrastructure Levy, business rates and stamp duty);
 - Funding from developing land directly on the schemes and additional land purchased around them;
 - Funding from potential road user charges or taxation, building on TfL's congestion charge;
 - Funding from taxes on existing residential development (council tax).

Around 1.6 per cent of the construction cost could be funded through land value uplift capture.

58. Given the early stage of the scheme, sources of funding are only indicative at the moment. A funding package for the tunnel would need to come from a combination of sources.
59. TfL appointed Jones Lang LaSalle (JLL), the property consultants, to evaluate the possible funding that could be derived from the residual land value, borough CIL, incremental business rates and other possible developer contributions. However, some of these sources are not currently devolved from Central Government to the Mayor

TfL is seeking further powers and fiscal devolution to enable a proportion of the cost of construction to be raised from local funding sources

60. In addition to the funding options presented above, TfL has considered stamp duty as a possible funding source for this project, given the link between the tunnel scheme and the number of homes that this project could unlock. If the stamp duty revenue within a designated zone was devolved, or an equivalent earn-back arrangement created, then this

could provide a potential funding source for the A406 New Southgate decking or tunnel scheme.

61. Other funding sources that TfL could consider are road user charging and council tax precept. The feasibility of these funding options will be assessed at the next stage of the appraisal process.
62. Other means of covering the costs of the tunnel, such as partial government funding will also need to be considered.

The Commercial Case

63. This sets the commercial structure, the accounting treatment and procurement approach for the project.
64. The tunnel is being promoted by TfL. All potential suppliers will be required to consider the Mayor of London's Responsible Procurement Policy in their bid as part of any Invitation to Tender (ITT) for the design and build contract.

TfL has substantial experience of delivery of complex highway and tunnelling projects, which we will apply to the procurement, funding and financing of this scheme

65. TfL has significant experience in the procurement and construction of major infrastructure projects, including rail tunnels and highway improvements, on projects such as Crossrail, Docklands Light Railway extensions, and major station schemes such as King's Cross St Pancras. Examples of significant highway improvements delivered by TfL include the Chiswick Bridge refurbishment, and the Cycle Superhighways programme.
66. It is expected that the construction stage of the project would be led by TfL and where involving infrastructure owned by other stakeholders, will be delivered in partnership with these other organisations.

TfL can achieve efficiencies by delivering the New Southgate tunnel scheme within a wider programme of tunnel projects and linked into a wider highway capital investment programme

67. TfL is undertaking and proposing a range of large capital infrastructure projects that involve procurement of skills and services that will all be highly relevant to approaches that will need to be adopted for this scheme. For example, Crossrail and the Northern Line Extension have led to an increase in skills associated with deep bored tunnel design and construction procurement, whilst the Cycle Superhighways and Better Junctions programmes have led to an increase in skills associated with large-scale highway engineering and construction traffic management.
68. There is an opportunity to build on the experience TfL is developing through delivering the Silvertown Tunnel, applying this to other highway tunnelling projects, such as at New Southgate.
69. The A406 New Southgate scheme is being proposed as part of a wider programme of Roads Task Force (RTF) tunnels and decking over at a range of locations throughout London, arising from the 2013 recommendations published by the RTF. If these projects are progressed, some significant economies and efficiencies could be achieved through co-ordination of delivery with the scheme at New Southgate.

TfL utilises supply chains from across the UK – work for a tunnel would support jobs outside London

70. Although TfL undertakes procurement for projects implemented in the capital, the wider benefit to the UK is extensive, with over 60,000 jobs estimated to be supported by services TfL procures from outside of London. The construction of the New Southgate tunnel would add to the pipeline of capital investment that supports jobs across the UK.
71. The procurement strategy for this stage of the project will be refined and improved as the scheme is further developed.

The Management Case

72. The purpose of the Management Case is to assess whether a proposal is deliverable. It reviews evidence from similar projects, sets out the project planning, governance structure, risk management, communications and stakeholder management, benefits realisation and assurance.

TfL will make full use of best practice within the company and from industry

73. TfL has extensive experience in developing, promoting and implementing significant infrastructure projects. This ranges from modifications to existing infrastructure (such as repairs to the A4 Hammersmith flyover, modernisation of the London Underground, extensions to Tramlink and DLR) to major schemes such as Crossrail. TfL also has demonstrable experience in delivering major road junction improvements, pedestrian and cycle schemes, and wider public realm improvements. These projects share similarities to the A406 North Circular tunnel scheme, involving processes and aspects of design and construction which would be faced by a road tunnel. TfL will continue to actively incorporate best practice and experience from these schemes into the development of the A406 scheme.
74. The proposed A406 North Circular scheme at New Southgate is part of the wider Roads Task Force programme sponsored by the Managing Director of TfL Planning. There are a number of programme linkages with other schemes being taken forward as part of the RTF Key Corridor Interventions Programme, which will present opportunities to share best practice as these schemes progress.

A comprehensive and robust project management framework will be applied, helping to ensure scope, cost and benefits are controlled

75. TfL uses a number of mechanisms to improve the management of its major projects in order to help ensure the objectives and benefits of a scheme at inception are realised following implementation. TfL's project management framework, known as 'Pathway' provides consistency in approach and the tools required for planning and delivery teams, whilst retaining flexibility in its application to manage and control a project. Embedded into Pathway is a delivery assurance process using stage gates, upon which TfL utilises industry-leading external expertise to review and challenge all aspects of the project.

Rigorous assurance processes will provide close scrutiny and challenge of risk management and decision-making throughout the project

76. TfL also receives project review and assurance from the Independent Investment Programme Advisory Group (IIPAG), which report to the Mayor of London concerning TfL's

Investment Programme. This includes all maintenance, renewal, upgrades and major projects (excluding Crossrail).

77. TfL has the option of establishing an Independent Peer Review Group (IPRG). This approach has been followed for other major TfL projects, so given the scale of the proposed scheme, this could warrant a similar approach. If appropriate, an IPRG can be set up for the scheme if further development of the project is approved. Initially it could oversee the refinement of delivery sub-options and review engineering feasibility studies and scheme appraisal undertaken.
78. Stakeholder engagement has already been undertaken and there is strong support for the scheme from the LB Barnet, LB Enfield and LB Haringey. A future programme of stakeholder engagement as the scheme progresses has been developed.
79. The current anticipated key milestones for the project are shown in Table 3 below. Any changes to baseline scope, cost and schedule will be reviewed, impact assessed and approved following the change control process.

Table 3: Key project development milestones

| Milestone Description | Date ⁴ |
|--|-------------------|
| Planning, design, approval and procurement | 2016 - 2025 |
| Construction | 2025 - 2031 |

Conclusions

The A406 North Circular tunnel scheme would deliver strong regeneration and transport benefits for the New Southgate area and TfL should continue to progress and develop this scheme

80. The SOBC for improvements to the A406 North Circular at New Southgate demonstrates that across the Five Case Model:
 - There is a clear robust **case for change** for improving the A406 at New Southgate because it will support regeneration through enabling the delivery of significant volumes of new housing and commercial floorspace, helping to cater for the needs of future population and economic growth. This new development will generate additional Stamp Duty revenues and Corporation Tax and VAT revenues.
 - The tunnel scheme will address the issues of severance, noise, poor air quality and low grade public realm on the A406 North Circular Road. This 'strategic case' is aligned with national, London-wide and local policy objectives, including the London Plan and the Mayor's Transport Strategy. Additionally, the tunnel option would deliver transport benefits in the form of journey time savings and decongestion benefits.
 - The **economic case** demonstrates that the tunnel scheme would perform an important role in the regeneration of the New Southgate area. The tunnel on its own would enable 886 net additional dwellings and 613 net additional jobs, generating £370m of GVA. The scale of the regeneration opportunities deliverable at New Southgate would be greater were the Crossrail 2 project including a New Southgate

⁴ Subject to tender returns and TWAO/ DCO process.

branch to be delivered. Whilst the total overall growth would be higher, the share of net additional homes attributable to the tunnel would be 780, together with 558 net additional jobs excluding leakage effects and would generate £314m of GVA, The tunnel scheme would have an important role in facilitating wider development opportunities that might arise following the delivery of Crossrail 2.

If transport user benefits are considered on their own (without taking account of these considerable housing and employment benefits), then the tunnel scheme would represent low value for money – it has a BCR of 1.19 (with development) and a NPV of £209m. If DfT VoT are used then the BCR reduces to 0.89 (with development).

- is **financially affordable** – the ‘financial case’ analysis demonstrated that a portion of some costs may be recoverable from land value uplift and operating surplus, but would require significant further mechanisms for the Mayor and TfL to achieve this.
- is **commercially viable** – this business case sets out the procurement, commercial structure, and proposed allocation of risk and payment mechanisms for the project
- is **achievable** – the ‘management case’ sets out a clear governance, process and programme for the further development of the scheme by TfL, an authority with a very successful experience and record in major project delivery

Next Steps: It is suggested that further feasibility and scheme development work takes place to investigate the proposed tunnel option

81. While the Strategic Outline Business Case has reported on the majority of the likely impacts of the scheme, further work is required on the air quality, noise and social/distributional impacts in any future Outline and/ or Full Business Case. In addition this further work will elaborate on the potential commercial case and financial case. This work will be undertaken prior to any future statutory consultation. TfL will continue to liaise closely with LB Barnet, LB Enfield and LB Haringey as work progresses.

Given the strong case for the A406 New Southgate tunnel scheme, TfL is proposing the following to facilitate its delivery:

- A zonal trial of stamp duty devolution;
 - An extension of CPO powers to TfL for ‘transport-enabled’ development; and
 - Investigation of a loan facility to enable early land acquisition to secure value uplifts arising from a tunnel.
82. To capitalise on those the Mayor / TfL and GLA propose to:
- Commit to take risk on land values that accrue;
 - Use existing public land as far as possible to enhance and speed delivery of development;
 - Commit to use of CPO powers to ensure land for development is utilised to its full extent; and
 - Commit to ongoing use of the tunnelling expertise and supply chains which have been developed for other TfL projects to reduce infrastructure provision costs.

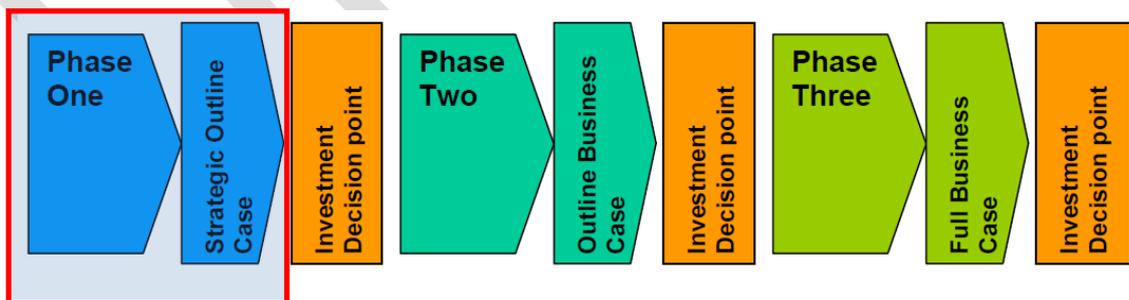
2. The Approach to the Business Case

The Five Case Model for Transport Appraisal

83. The purpose of a business case is to provide evidence-based information in relation to investment programmes. Guidance for the preparation of Business Cases for Transport Schemes has been published by the DfT⁵. This is based on H.M. Treasury's advice on evidence-based decision making as set out in the Green Book⁶ and uses the best practice five case model approach.
84. This approach assesses whether schemes:
- are supported by a robust case for change that fits with wider public policy objectives – the **'strategic case'**;
 - demonstrate value for money – the **'economic case'**;
 - are commercially viable – the **'commercial case'**;
 - are financially affordable – the **'financial case'**; and
 - are achievable – the **'management case'**.
85. The evidence gathered as part of the business case preparation process has been prepared using the tools and guidance provided by the DfT, notably WebTAG⁷. This approach ensures that the evidence produced is robust and consistent for all the options examined in detail. This applies equally to those options proposed for investment and those, which following assessment, are not to be developed further.

The decision making process

86. The decision making process, of which this Strategic Outline Business Case forms part, usually takes place in three phases. Each phase includes the preparation of a business case followed by an investment decision point. Each business case builds upon that previously prepared. Evidence is reviewed to ensure that it remains up to date, accurate and relevant. The current Strategic Outline Business Case is in Phase One of this iterative process, with two further future stages of development to follow, as shown below.



⁵ See https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/85930/dft-transport-business-case.pdf - accessed 5 September 2014

⁶

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/220541/green_book_complete.pdf accessed 5 September 2014

⁷ See <https://www.gov.uk/transport-analysis-guidance-webtag> accessed 5 September 2014

87. The current Phase **One** of this process focuses on articulating the need for the intervention and summarising the range of options developed and considered. This phase:
- is used to set out the strategic fit of the project with achieving relevant national and London Mayoral and TfL policy objectives;
 - confirms the strategic fit and the case for change;
 - scopes out the initial investment/intervention proposal; and
 - provides details of the project's overall balance of benefits and costs against objectives
88. In the next stage, Phase Two, TfL will reconfirm the conclusions from Phase One and will concentrate on a more detailed assessment of the options to find the best solution, culminating in the preparation of an Outline Business Case, which will build on the Strategic Outline Business Case.
89. The final phase in the process, **Phase Three**, will result in the production of the Full Business Case – this will accompany the required application for planning consent to build the scheme.

The role of the Mayor of London and TfL

90. This investment proposal is made by TfL acting as the body responsible for planning, organising and controlling and, in some instances, operating transport within London for the Mayor, who is charged with setting the policy and strategy for transport which he has done by the publication of the Mayor's Transport Strategy (MTS).
91. TfL is responsible for operating, maintaining and improving the strategic road network (the Transport for London Road Network (TLRN) in Greater London. The TLRN represents 4 per cent of London's road network, but carries 30 per cent of all traffic in London.
92. The business strategy of TfL is decided by the Mayor through the MTS. The MTS is the principal policy tool through which the Mayor exercises his responsibilities for the planning, management and development of transport in London, for both the movement of people and goods. It takes into account the policies in the London Plan and the Mayor's Economic Development Strategy (EDS). It provides the policy context for the more detailed plans of the various transport-related implementation bodies, particularly TfL and the London boroughs.
93. The legislative framework for the MTS is laid down by the Greater London Authority (GLA) Act 1999 as amended by the GLA Act 2007. The GLA Act 1999 sets out the general transport duties of the Mayor and the GLA. It specifies that the transport strategy must contain policies for 'the promotion and encouragement of safe, integrated, efficient and economic transport facilities and services to, from and within Greater London', and proposals for securing the transport facilities and services needed to implement the Mayor's policies over the lifetime of the MTS, with regard to the movement of people and goods. TfL is under a duty to use its powers to facilitate and implement the policies and proposals of the MTS.

3. The Strategic Case

Introduction

94. TfL is assessing interventions on the A406 to reduce the severance caused by the A406, unlock new land for development and enable greater densities in the New Southgate area. These interventions should also protect the strategic movement function of the A406.
95. Two options have been developed, a short decking of the A406 west of the East Coast Main Line rail corridor and a longer tunnel scheme between New Southgate and the A10.
96. This Strategic Case has been prepared by TfL, in close consultation with the LB Barnet, LB Enfield and LB Haringey, and with support from an independent Expert Group comprised of experts in economic appraisal of major transport infrastructure projects. It forms the first of the five cases forming the Transport Business Case. Its purpose is to set out the need for investment in the transport system at New Southgate.

Objectives for improvements to the A406 at New Southgate

97. The Strategic Case demonstrates how the proposed schemes respond to the following regional and local objectives:
 - Support growth by creating jobs and accelerating housing delivery to help reaching the London Plan's aim to building 49,000 new homes every year.
 - Maximise the housing potential of New Southgate, particularly in the context of the delivery of Crossrail 2.
 - Support economic growth at New Southgate by creating employment.
 - Secure the strategic function of the Transport for London Road Network (TLRN).
 - Maintain or improve the vital strategic movement function of the A406 and minimise the impact of future development.
 - Improve the quality of life of residents through more efficient transport networks and reduced negative externalities.
 - Enhance local residents' quality of life by improving urban realm and reducing severance, noise and air pollution caused by the A406.

The Strategic Case is structured into seven sections:

- **Part A:** Maximising the economic potential of London through supporting sustainable growth
- **Part B:** The role of housing supply and the strategic road network in supporting London's growth
- **Part C:** TfL's proposal to free-up road space for urban regeneration whilst maintaining the TLRN strategic movement function
- **Part D:** New Southgate and the A406, local context
- **Part E:** Objectives for the A406 intervention at New Southgate and options considered
- **Part F:** How the tunnel and decking options meet the objectives
- **Part G:** Strategic context and policy fit
- **Part H:** Strategic context

PART A: MAXIMISING THE ECONOMIC POTENTIAL OF LONDON THROUGH SUPPORTING SUSTAINABLE GROWTH

Section Summary:

1. London is the UK's powerhouse

- London makes a significant and growing contribution to the UK economy in employment, GVA and tax revenues.
- Employment levels in London are growing rapidly, helping to encourage population growth in response.

2. There are threats to the continued competitiveness of London

- Many of London's key economic activities are global, its businesses and workforce are increasingly footloose, and as a result London and the UK's success cannot be taken for granted.
- There has been some deterioration in London's international rankings, notably around cost of staff and quality of life⁸. Housing shortage and the associated worsening of housing affordability could constrain employment growth.

London is the UK's powerhouse

London makes a significant and growing contribution to the UK economy in employment, GVA and tax revenues

98. London is the UK's main engine of economic growth, contributing 22 per cent of total UK Gross Value Added (GVA) in 2013 and generating £56,687 GVA per worker compared to the UK average of £41,088.
99. The strength of London's economy makes it a vital contributor to the UK's finances. In 2013/14, an estimated £127 billion of tax revenue was estimated to have been generated through economic activity in London, comprising an estimated 21% of total UK tax revenue. Investing to support the growth of London is essential to build strong public finances.
100. Since 1994, on average, 29,700 new jobs a year have been created within London. The city's economic growth is forecast to be 4.2 per cent in 2014 and 3 per cent each year to 2020. This is faster than the projected UK growth rate overall, partly driven by forecast increases in population and the size of the workforce. The latest GLA employment forecasts suggest that on average, 41,000 new jobs a year in London will be created to 2036.

⁸ Global Liveable Cities Index

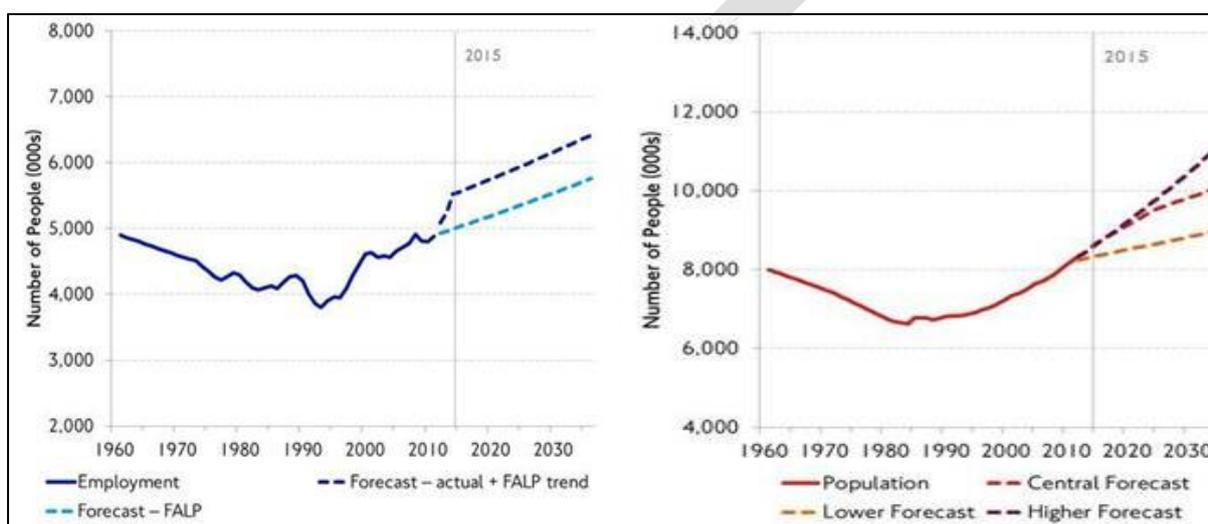
Key Finding:

The London economy makes a vital contribution to the success and competitiveness of the UK, and if London succeeds, the UK as a whole benefits.

Employment levels in London are growing rapidly, helping to encourage population growth in response

101. After reversing a steady period of decline London has been on a growth trajectory since the 1980s. These trends are shown in Figure 7.

Figure 7: Historic trends and projected growth in London's employment and population to 2036



102. Between 1991 and 2011, the number of jobs in London rose by 900,000 and over the same period, the population rose by 1.4m. The number of jobs in London is expected to grow by 1.4m between 2011 and 2036. As the left hand graph in Figure 2-1 above shows, a total of 650,000 of these jobs have already been created between 2012 and 2014⁹. Rapid employment growth in London has been driven by a range of factors including the UK's flexible labour markets, high skill levels and openness to Foreign Direct Investment. Employment growth has been felt most acutely within central London, where connectivity is highest.
103. The UK Office for National Statistics projections expect a 23 per cent rise London's Population between 2011 and 2031 which equates to a 1.9m increase, taking the population to 10.1m¹⁰ by 2036, as shown in the right hand graph in Figure 2-1. The London Infrastructure Plan predicts a 37 per cent increase in population between 2011 and 2050.

⁹ This trend is regarded as a short term phenomenon reflecting London's resilience to economic shocks in recent years and it is expected that job growth will revert to historic trend levels going forward.

¹⁰ FALP (2014) - GLA Population forecasts

There are threats to the continued competitiveness of London

Many of London's key economic activities are global, its businesses and workforce are increasingly footloose, and as a result London and the UK's success cannot be taken for granted.

104. The World Economic Forum Global Competitiveness Report for 2014-15 highlights that there are a number of factors businesses consider as problematic in the UK for doing business – with infrastructure and access to skilled and educated workforce amongst the top 6 factors.

There has been some deterioration in London's international rankings, notably around cost of staff and quality of life¹¹. Housing shortage and the associated worsening of housing affordability could constrain employment growth.

105. Addressing the housing supply and affordability issues that lie behind these factors is fundamental to London's future growth and competitiveness, and is a key part of the Government's Productivity Plan launched in July 2015.

¹¹ Global Liveable Cities Index

PART B: THE ROLE OF HOUSING SUPPLY AND THE STRATEGIC ROAD NETWORK IN SUPPORTING LONDON'S GROWTH

Section Summary:

1. London's housing supply is not keeping up with population growth

- London is delivering only 25,000 new homes a year, when it needs to deliver at least double this volume.
- London's growth is being constrained by a chronic shortage of housing which is driving up housing costs as a proportion of household income.
- Dense cities are the way to accommodate growth most sustainably and most efficiently.
- To meet housing targets, existing brownfield land must be unlocked.
- TfL can help unlock more land for urban regeneration and contribute to meeting London's housing targets.

2. The Transport for London's Road Network is vital to London's economy

- The strategic road network is vital for London, but as the city grows the level of congestion is forecast to grow, even with sustained investment in public transport capacity.
- The TLRN is not only critical to commuters from Outer London but also to strategic freight movements.
- A growing city population will travel more using different modes, resulting in more congestion and crowding, and poorer air quality, reducing the overall quality of life.

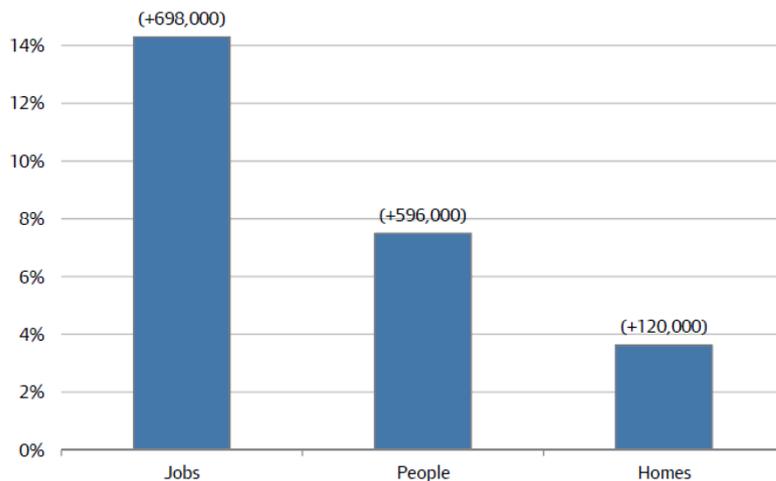
3. It is incredibly important to balance the sense of place and the movement function of the road network by mitigating severance effects

- Road corridors with a strong "movement" emphasis cause severance impacts that inhibit connectivity, sustainable transport modes and quality of life.
- Reducing the footprint of strategic roads can improve quality of place and unlock additional development, but this needs to be balanced against continued needs for movement.
- The Mayor's Transport Strategy and the 2013 Roads Task Force set the objectives for the TLRN corridors, which include the need to protect their movement function and unlock development.

London's housing supply is not keeping up with population growth

106. London's rapid population growth is driving the need for an additional 1.5m additional homes and a 50 per cent increase in public transport capacity over and above what is already planned¹².
107. As Figure 8 shows, in recent years, London's continued economic growth and competitiveness is increasingly being threatened by a constrained supply of housing.

Figure 8: Percentage change in jobs, people and homes in London 2009-2014



Key Finding:

London's population and employment levels are growing rapidly. This is due to the clustering of economic activity, particularly within central London. London's future economic success depends on its ability to continue to accommodate population and employment growth.

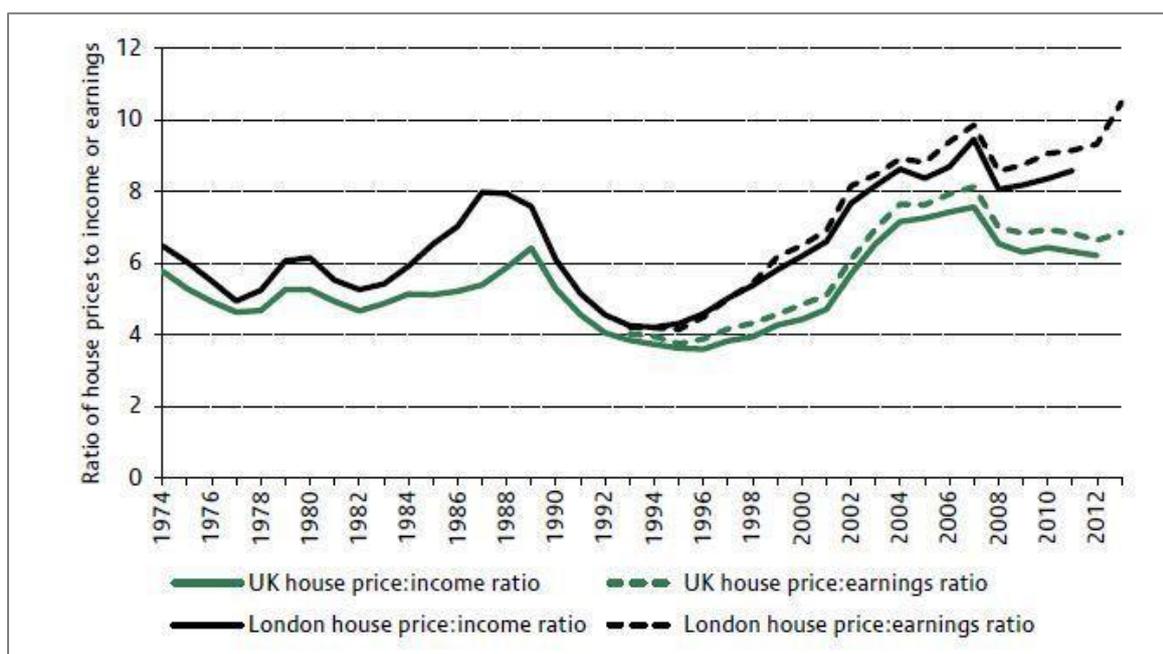
London is delivering only 25,000 new homes a year, when it needs to deliver at least double this volume.

108. Demand for new housing is outstripping supply by a factor of three to one. Over the decade when London's population grew by more than a million, its housing stock grew by less than 300,000.
109. As a result, house prices have spiralled, with the average house in inner London now costing over 13 times the average wage, and properties in some prime central London areas costing more than 30 times the average wage. The ratio of house prices to both income and earnings are shown in Figure 9 below for the UK and for London, showing how housing in London is significantly less affordable than in the rest of the UK. This is pricing many people on modest incomes out of large parts of the city and leading to longer, less sustainable commuting patterns.

¹² London Infrastructure Plan 2050

<https://www.london.gov.uk/sites/default/files/LIP%202050%20update%20presentation%20March%202015.pdf>

Figure 9 House price to income and earnings ratios for the UK and London



Source: Nationwide, Labour Force Survey, Family Expenditure Survey and Family Resources Survey

London's growth is being constrained by a chronic shortage of housing which is driving up housing costs as a proportion of household income.

- I 10. Providing sufficient housing to meet demand is essential to London's ability to attract and retain talented workers and in turn maintain the city's competitiveness. It is also critical to provide affordable housing in order to retain lower paid workers who are essential to the city's functioning.
- I 11. This shortage of housing is raising the cost of living and ultimately undermining London's and the UK's competitiveness.
- I 12. Providing sufficient – and sufficiently affordable – housing is also important if the city's communities are to remain cohesive and vibrant and avoid the problems associated with social polarisation.
- I 13. London needs to build 49,000¹³ new homes per year between 2015 and 2036 to house the growing population, around a 50 per cent increase compared with current levels of delivery.
- I 14. A total of 15 of the 32 London boroughs fell short of annual targets between 2010 and 2013¹⁴. Housebuilding targets are set by the Mayor but it is accepted that more incentives have to be put into place in order for boroughs to meet their targets¹⁵.

¹³ London Plan March 2015

<http://www.london.gov.uk/sites/default/files/London%20Plan%20March%202015%20%28FALP%29.pdf>

¹⁴ London First, Carrots and Sticks: a targets and incentives approach to getting more homes built in London (May 2015) http://londonfirst.co.uk/wp-content/uploads/2015/05/Carrots-and-Sticks-Report_Web.pdf

¹⁵ London First propose a London Housing Delivery Bonus (LHDB) scheme for boroughs and greater powers for the Mayor of London to determine planning of all applications for 50 homes or more

Dense cities are the way to accommodate growth most sustainably and most efficiently.

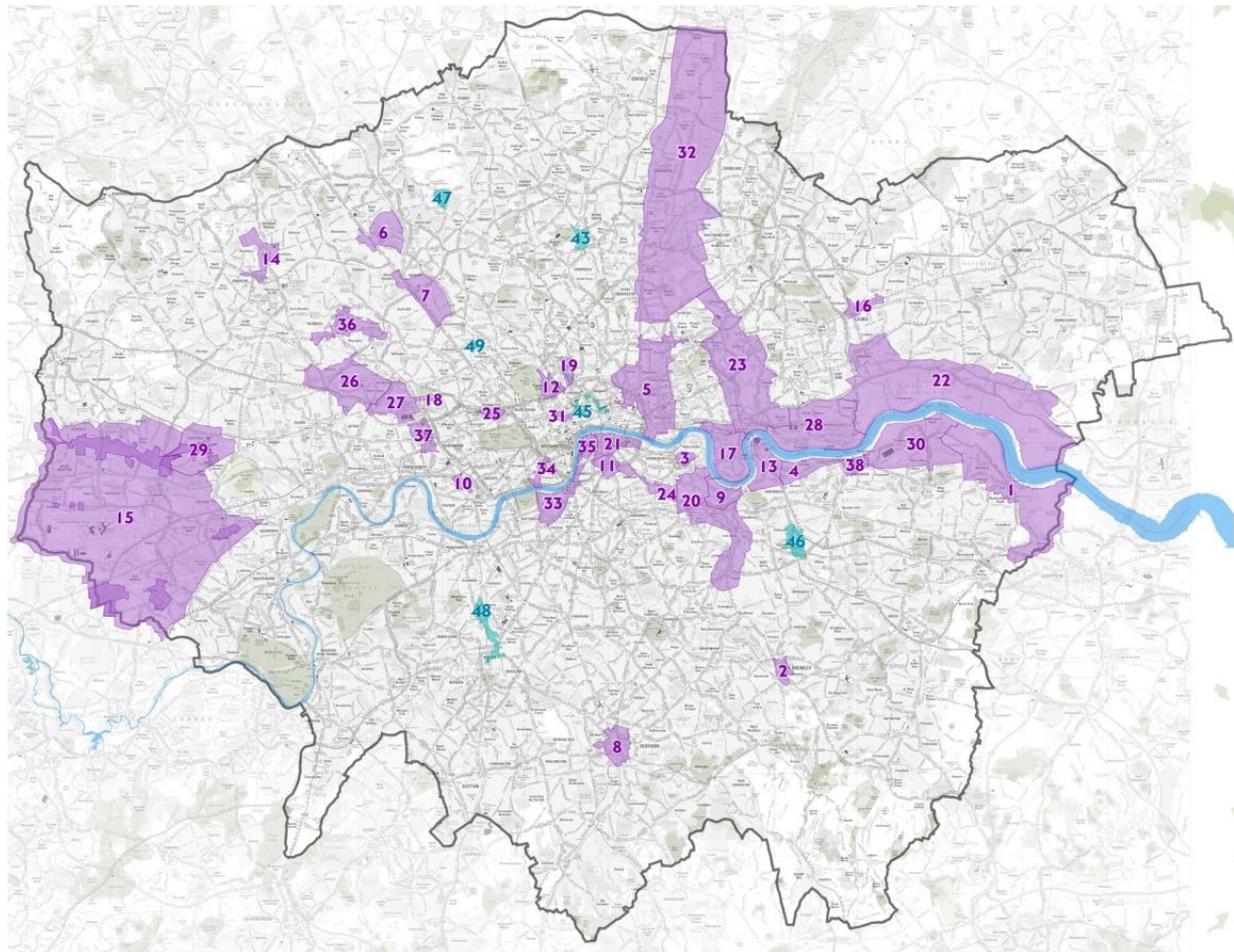
- I 15. Densification reduces the capital and operating costs of infrastructure as well as increasing agglomeration benefits. Within London, there are opportunities to increase the density of housing development and there are opportunities to create new sites for development, but these require co-ordinated investment.
- I 16. London has grown sustainably through densification and efficient recycling of redundant or under-utilised land. In the period 2001-10 London lost over 800 hectares of industrial land (10 per cent of its total stock) enabling this land to be recycled into other uses, predominantly residential.
- I 17. This densification has been made possible by increases to the capacity of the public transport network, to meet increased levels of travel demand from a growing population and enable higher density of development. Alongside growth in use of rail and bus networks, recent travel trends have seen increased levels of walking and cycling. Alongside this, the road network plays a vital role in the efficient functioning of the city.

To achieve housing targets, existing brownfield land must be unlocked.

- I 18. London has limited opportunities for accommodating large scale development. A range of suitable areas are identified in the Mayor's London Plan (March 2015), including 38 Opportunity Areas (as shown in Figure 10). London's 38 Opportunity Areas represent "London's major source of brownfield land with significant capacity for new housing, commercial and other development linked to existing or potential improvements to public transport accessibility¹⁶".

¹⁶ London opportunity areas for large-scale development
<https://www.london.gov.uk/priorities/planning/opportunity-areas>

Figure 10: London's Opportunity Areas



| Opportunity Areas | | Area of Intensification | |
|--------------------------------------|--------------------------------------|------------------------------------|-----------------------------------|
| 1 Bexley Riverside | 11 Elephant and Castle | 31 Tottenham Court Road | 42 Farringdon/Smithfield |
| 2 Bromley | 12 Euston | 32 Upper Lea Valley | 43 Haringey Heartlands/Wood Green |
| 3 Canada Water | 13 Greenwich Peninsular | 33 Vauxhall, Nine Elms & Battersea | 45 Holborn |
| 4 Charlton Riverside | 14 Harrow & Wealdstone | 34 Victoria | 46 Kidbrooke |
| 5 City Fringe/ Tech City | 15 Heathrow | 35 Waterloo | 47 Mill Hill East |
| 6 Colindale/Burnt Oak | 15 Heathrow Core | 36 Wembley | 48 South Wimbledon/Colliers Wood |
| 7 Cricklewood/Brent Cross | 16 Ilford | 37 White City | 49 West Hampstead Interchange |
| 8 Croydon | 17 Isle of Dogs | 38 Woolwich | |
| 9 Deptford Creek/Greenwich Riverside | 18 Kensal Canalside | | |
| 10 Earls Court | 19 King's Cross - St Pancras | | |
| | 20 Lewisham, Catford & New Cross | | |
| | 21 London Bridge, Borough & Bankside | | |
| | 22 London Riverside | | |
| | 23 Lower Lea Valley | | |
| | 24 Old Kent Road | | |
| | 25 Paddington | | |
| | 26 Park Royal | | |
| | 27 Old Oak Common | | |
| | 28 Royal Docks & Beckton Waterfront | | |
| | 29 Southall Hinterland | | |
| | 29 Southall Development Sites | | |
| | 30 Thamesmead & Abbey Wood | | |

Key Finding:

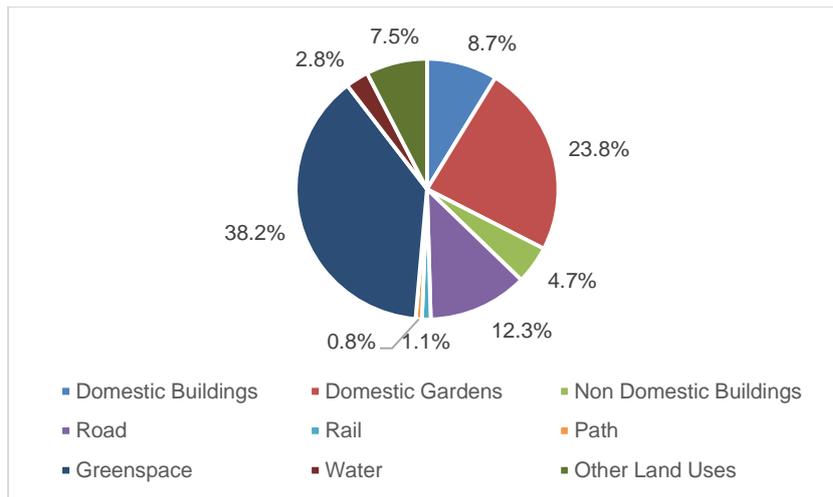
There is a need to maximise the housing development potential of brownfield sites, particularly those well serviced by transport networks.

- 119. If London is to meet its housing needs then it has to utilise its land as effectively as possible and be creative about assembling sites for development and identifying more usable space. Or as Policy 3.3E of the London Plan states: "Boroughs should identify and seek to enable additional development capacity to be brought forward to supplement these targets having regard to the other policies of this Plan and in particular the potential to realise brownfield housing capacity through the spatial structure it provides".
- 120. Infrastructure schemes can play a role in creating the right incentives for developers through boosting the attractiveness of locations through provision of enhanced transport accessibility and public realm improvements.

TfL can help unlock more land for urban regeneration and contribute to meeting London’s housing targets.

121. Figure 11 shows that in 2005, 12.3 per cent of the total area of London was taken up with roads, more than the amount of land occupied by domestic dwellings. Better use of road space is a potential source of development land that is worth exploring further. However, given the challenges of increasing congestion and the economic impacts of this, it needs to be done in such a way that also protects the function of key strategic road corridors.

Figure 11: London Area by Land Use



Source: Land Use Generalised Land Use Database 2005

Key Finding:

There is a need for innovative ways of unlocking housing potential within London’s boundaries. A better use of the TLRN, balancing the sense of place and its strategic movement function, could enable higher housing densities.

The Transport for London’s Road Network is vital to London’s economy

The strategic road network is vital for London, but as the city grows the level of congestion is forecast to grow, even with sustained investment in public transport capacity.

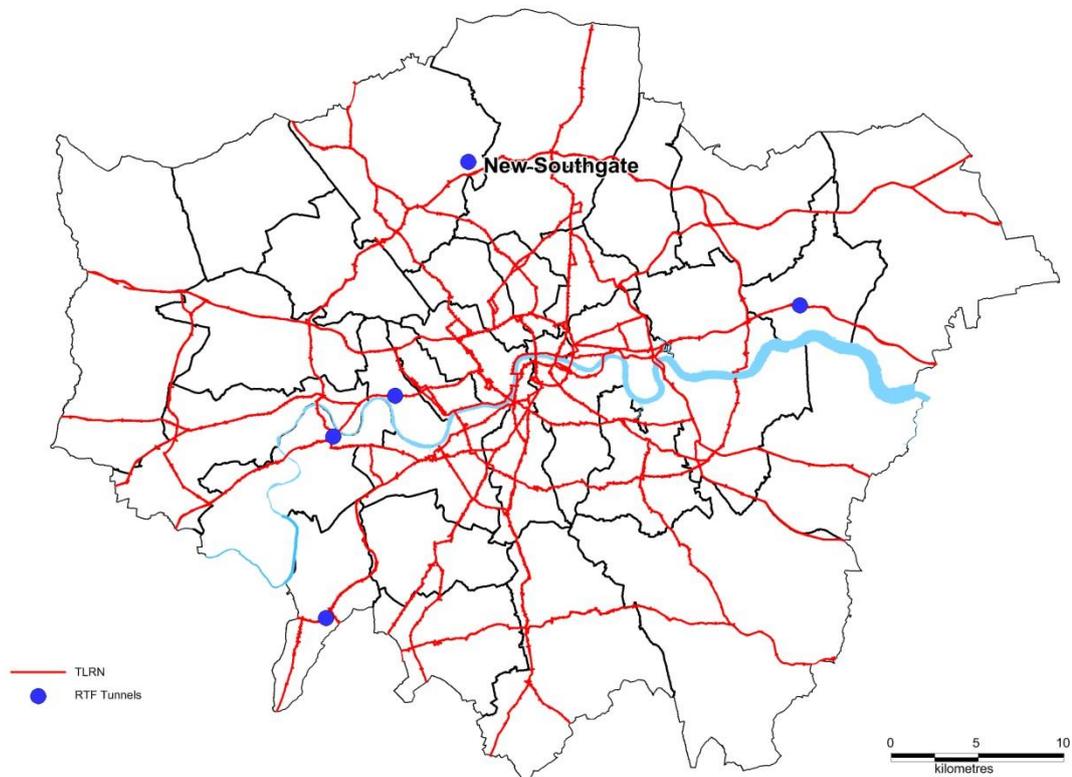
122. The Mayor’s 2020 Vision¹⁷ is for London to be the greatest city in the world to live, play, study, invest and do business.
123. Inevitably, this Vision is dependent on balancing the competing spatial demands for transport infrastructure, urban realm and housing – all of which are crucial to attracting skilled labour to work in London’s agglomeration clusters.
124. Whilst motorised traffic has fallen by 10 per cent in Greater London Area between 2000 and 2011, congestion has risen by about the same amount. In central London, this is partly due to an increase in construction activities disrupting the road network. It is also due to the reallocation of road space from private traffic to public transport, cycling and walking.

¹⁷ Mayor’s 2020 Vision <https://www.london.gov.uk/mayor-assembly/mayor/vision-2020>

This reflects existing trends in modal shift and TfL's vision for better quality public spaces and more sustainable transport.

- 125. In outer London where densities are lesser and public transport accessibility lower, road-based travel is still critical to local residents and businesses.
- 126. Motorised traffic remains critical to London, whether it is for deliveries, buses, taxis, emergency services or commuters, further investment in roads is required to keep London moving.
- 127. London's strategic road network (as shown in Figure 12) is relied upon by businesses and it provides residents with access to employment and services across the city. It forms the backbone for freight and servicing movements and the bus network. To compete as a world city, London needs to maintain an efficient road network.

Figure 12: Transport for London Road Network (TLRN)



- 128. Road congestion cost the London economy £5.4bn in 2013, accounting for 41 per cent of costs to all of UK's large urban areas¹⁸.
- 129. Around two-thirds of these costs accrue from delays in Outer London where car driver/passenger share within/to/from Outer London accounts for 48 per cent of modal share compared to 10 per cent in within/to/from Central London¹⁹.

¹⁸ The future economic and environmental costs of gridlock in 2030, Centre for Economics and Business Research/INRIX, July 2014 http://www.cebr.com/wp-content/uploads/2014/10/INRIX_costs-of-congestion_Cebr-report_v5_FINAL.pdf

¹⁹ Based on percentage of average daily trips in three year period 2007/8 to 2009/10

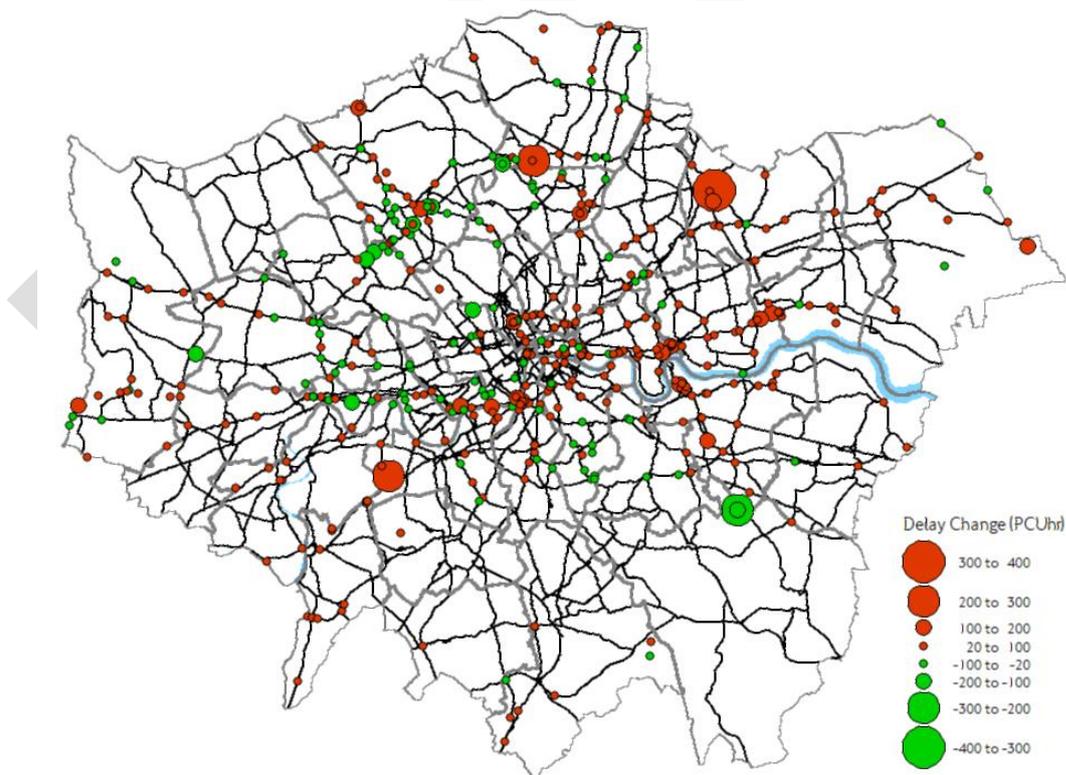
130. London's growing population, as well as supporting employment growth across the city, will strain TfL's strategic road network as car-dependency and meeting the needs of freight movements remains a key issue in Outer London. In particular, this will lead to significant increases in congestion on key strategic arterial roads into London.

Key finding:

London's road network remains critical to the region and the UK's productivity, particularly in Outer London and along major freight corridors.

131. The Government's National Infrastructure Plan 2014²⁰ clearly sets out the scale of investment required for the UK's Strategic Road Network (SRN), committing £15.2bn between 2015-16 and 2021-21 to transform the SRN – the biggest programme of investment since the 1970s with investment tripling from current levels by 2020.
132. However, the £15bn precludes any investments to improve the Transport for London Road Network (TLRN) – the Roads Task Force Vision states that at least £30bn of investment is required over the next 20 years on London's streets and roads.
133. Without significant investment to match that which is occurring outside the Capital, congestion and road traffic delay will grow in many areas as illustrated in Figure 13. Given the importance of London's strategic network to the UK economy, this is not just an issue for London but for the country as a whole.

Figure 13: Change in PCU hour delay, 2009 – 2031 (AM Peak)



²⁰ National Infrastructure Plan 2014

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/381884/2902895_NationalInfrastructurePlan2014_acc.pdf

134. A planned 70 per cent increase in rail capacity through Tube upgrades, Crossrail and Thameslink programmes is underway. This is likely to aid modal shift from private vehicles to rail but is not sufficient by itself to address London's road congestion issues.

Key finding:

The pressures on London's roads are growing and there is a critical need for a major investment programme to modernise the road network and address congestion.

The TLRN is not only critical to commuters from Outer London but also to strategic freight movements.

135. The Transport for London Road Network (TLRN) corridors play an important role in facilitating radial movements of buses, cars, coaches and HGVs from areas of outer London towards central London, and inter-Borough movements within outer London. 80% of trips overall within London make use of the road network, which is also heavily relied on for freight movements.
136. In 2011, 69% of households in outer London owned a car, compared to 43% of households living in central London. In 2011, 36% of outer London residents drive to work by car, compared to 13% in central London. Despite the prevalence of road-based travel, buses are not widely used in outer London: only around 20% of road-based travel-to-work journeys in Outer London are by bus, compared to 50% of road-based journeys in inner London.
137. As the population of London grows, congestion on the TLRN will increase.
- A growing city population will travel more using different modes, resulting in more congestion and crowding, and poorer air quality, reducing the overall quality of life.**
138. A higher employment base and higher population in London will result in increased demand for travel and for freight and servicing. This will generate a need for investment to accommodate the increasingly diverse demands being placed on strategic roads - such as more bus passengers, cyclists, pedestrians and growth in freight movements to service more people.
139. To enable the city to grow London will require investment to increase the capacity and efficiency of its road-based and rail, underground, DLR and tram systems.
140. If this investment is not forthcoming, congestion will worsen and levels of crowding on public transport systems will increase. This will lead to longer and less predictable journey times for London residents and in-commuters from the rest of the South East region.
141. These increases in travel times will result in longer commutes and increased risk of employees arriving late for work. A less efficient transport system will result in a more stressful and frustrating travel experience for its users. This will have an impact on the productivity of workers. Londoners and employees' quality of life will deteriorate.
142. This will result in some choosing to relocate to areas that offer a better quality of life or skilled workers choosing to work elsewhere, which would be detrimental to overall UK productivity given the agglomeration gains of dense cities.

Key Finding:

There is a need to maintain or increase the TLRN traffic capacity to mitigate increasing congestion levels due to employment and population growth.

It is incredibly important to balance the sense of place and the movement function of the road network by mitigating severance effects

Reducing the footprint of strategic roads can improve quality of place and unlock additional development, but this needs to be balanced against continued needs for movement.

- 143. The road network in London serves a wide range of functions. At one end of the scale, core roads and main corridors form the TLRN function as the principal routes for movement of vehicular traffic.
- 144. At the other end of the scale, streets with lower traffic flows often have a primary 'place' function. TfL and boroughs need to work together to find the appropriate balance between the movement and place demands on roads and streets.
- 145. The Roads Task Force (RTF) report²¹ identifies nine typologies of road corridors or streets that reflect their balance between a strategic or local movement or place function. These nine street types are shown in the matrix in Figure 14.

Figure 14: The RTF Street Types Matrix



- 146. Roads such as the A13, the A40 Westway and A406 North Circular have a strategic movement function, which takes priority over place functions, so have a “core road” typology. Other roads such as Kensington High Street have to balance a clear movement function with an equally important place function.
- 147. The higher traffic volumes become, the more the quality of the public realm can be adversely affected, and the less willing people would be to use the street to meet, interact with others, to shop, enjoy food or drink or take a break.

²¹ Roads Task Force Report (July 2013) - <https://tfl.gov.uk/corporate/publications-and-reports/roads-task-force>

- I 48. In some cases, the current typology of a road or street may not reflect a borough’s place-making aspirations or be conducive to achieving proposed land use changes in an area. Heavy traffic volumes in those typologies towards the top left of Figure 14 have the effect of discouraging new residential development and lowering property prices.
- I 49. With good planning, careful design and investment, more emphasis can be given to the place function of a particular TLRN road corridor without unduly compromising its strategic movement role. Such win-wins are increasingly important in a growing world city where the competing demands on places are ever increasing.

Key Finding:

Land in the vicinity of TLRN corridors has the potential to help accommodate new housing development to help meet some of London’s need but the current performance of the road network does not enable this.

Road corridors with a strong “movement” emphasis cause severance impacts that inhibit connectivity, sustainable transport modes and quality of life.

- I 50. Road corridors with a strong ‘movement’ function present barriers that inhibit crossing movements by cyclists and pedestrians. If there is not provision in the form of at-grade crossings or over-bridges or subways at sufficient intervals, this can act as a significant deterrent to movement by these modes.
- I 51. These severance impacts can also reduce the willingness of nearby residents to use public transport if the walking trip to access a station or bus stop is too circuitous or unpleasant.
- I 52. If streets on either side of a busy road are impermeable and no pedestrian and cycle friendly, and the busy road is difficult to cross, this can reduce the propensity to walk or cycle to access services or facilities by these modes.
- I 53. If people find it more convenient to drive to access shops or services, then this can also adversely affect the vitality of district or neighbourhood shopping areas and lead to their decline.
- I 54. Other severance effects such as high noise levels, poor air quality and negative visual impacts also affect the quality of life of residents and in turns reduce the area’s potential for housing development.

Key Finding:

A road corridor with strategic movement functions can cause severance reducing the area’s housing development potential.

The Mayor’s Transport Strategy and the 2013 Roads Task Force set the objectives for the TLRN corridors, which include the need to protect their movement function and unlock development.

- I 55. Any proposal seeking to strike a better balance between the movement and place function of a road must also comply with and seek to meet wider public policy objectives for the area.
- I 56. These arise from two key sources, the Mayor’s Transport Strategy and the 2013 Roads Task Force “Vision for London’s Roads and Streets”.
- I 57. The Mayor’s Transport Strategy (MTS) sets out six goals for transport in London:

- Support economic development and population growth;
- Enhance the quality of life for all Londoners;
- Improve the safety and security of all Londoners;
- Improve transport opportunities for all Londoners;
- Reduce transport's contribution to climate change, and improve its resilience; and
- Support delivery of the London 2012 Olympic Games and its legacy.

158. The Roads Task Force Vision sets out the following core objectives:

- To enable people and vehicles to move more effectively on London's streets and roads;
- To transform the environment for cycling, walking and public transport; and
- To improve the public realm and provide better and safer places for all the activities that take place on the city's streets, provide an enhanced quality of life and help to unlock development and deliver new homes.

DRAFT

PART C: TfL'S PROPOSAL TO FREE UP ROAD SPACE FOR URBAN REGENERATION WHILST MAINTAINING THE TLRN STRATEGIC MOVEMENT FUNCTION

Section Summary:

The Roads Task Force report 2013 recommends that TfL consider the delivery of major highway interventions on the TLRN, including tunnels, fly-unders and over-decking.

A process of prioritisation has been followed. A list of 70 locations was assessed using Multi-Criteria Analysis to identify if a tunnel, fly-under or decking intervention would deliver the greatest benefits for each location.

From a short list of 15 schemes, five have been taken forward as a first tranche of projects for further feasibility work. The A406 Tunnel scheme is one of these five.

A joined-up approach to planning and infrastructure investment by the GLA, TfL and Boroughs will help to unlock development in areas with high regeneration and growth potential.

159. Investment to enhance the attractiveness of locations both for businesses and also local residents and potential workers will stimulate regeneration of under-utilised land.
160. There is a clear role for public intervention in the form of targeted investment, enabling sites to maximise their development potential in areas of opportunity, such as in Barking. There are co-ordination/market failures that act as constraints on urban sites coming forward for development even in areas where the development gains are potentially quite high.
161. A package of measures at various scales and geographies will be required to ensure that land and potential sites for development within all parts of London are used efficiently to support sustainable growth.

In 2013, the Mayor of London's independent Roads Task Force (RTF) published a document setting out the strategic direction for London's roads.

162. The Roads Task Force comprised a diverse group of road users, developers, local authorities and other statutory highway authorities. The RTF vision is designed to tackle congestion, support a shift to more sustainable modes of travel and improve quality of life in London.
163. A key recommendation of the RTF report, published in July 2013, was that the potential of major highway interventions on the TLRN such as tunnels and 'fly-unders' should be investigated to determine the role they could play in achieving the vision for London's roads and streets across the strategic highway network.
164. In particular, whether major interventions at key locations could 'relocate or provide substitute capacity for motorised traffic to unlock surface space for 'living', more sustainable modes and development – enabling different use of space above and reducing impacts such as severance and noise, while maintaining network functioning'.
165. This view built on experience from other cities around the world such as Paris, Oslo and Boston, which have undertaken these kinds of ambitious projects and have seen dramatic results.

Since the publication of the RTF recommendations, TfL has conducted a number of strategic studies to understand opportunities for roofing over or tunnelling roads.

166. These studies were aimed at understanding the opportunities for roofing over or tunnelling under existing infrastructure at particular locations. Three main types of infrastructure were considered:

- Tunnels to release land at the surface for either development, green space, improved public realm or better facilities for pedestrians, cyclists and public transport users but also relieve congestion and improve journey time reliability (where relevant)
- Fly-unders to release land at the surface for either development, green space, improved public realm or better facilities for pedestrians, cyclists and public transport users but also relieve congestion and improve journey time reliability (where relevant)
- Decking of roads to provide public parks, reduce severance and the negative impacts of roads including noise and poor air quality and helping to bring forward development on neighbouring land especially where there is good existing or future public transport connectivity which can support high density development

167. To identify locations where tunnels, fly-unders or decking solutions would deliver strong potential benefits, a prioritisation process has been followed

From an initial list of approximately 70 locations, through a Multi-Criteria Analysis (MCA) a shortlist of fifteen sites was identified.

168. These sites were identified as having sufficient potential for initial feasibility studies. A combined score was developed from SAF²² and RTF appraisals. For each identified site, the following was also investigated:

- Potential intervention types;
- Engineering feasibility;
- Transport impact for all users including those travelling by car, foot, cycle and public transport;
- Local and strategic environmental impacts including on visual amenity, noise and air quality;
- Level and quality of enabled development;
- Likely programme;
- Route to consent; and
- Cost of delivery

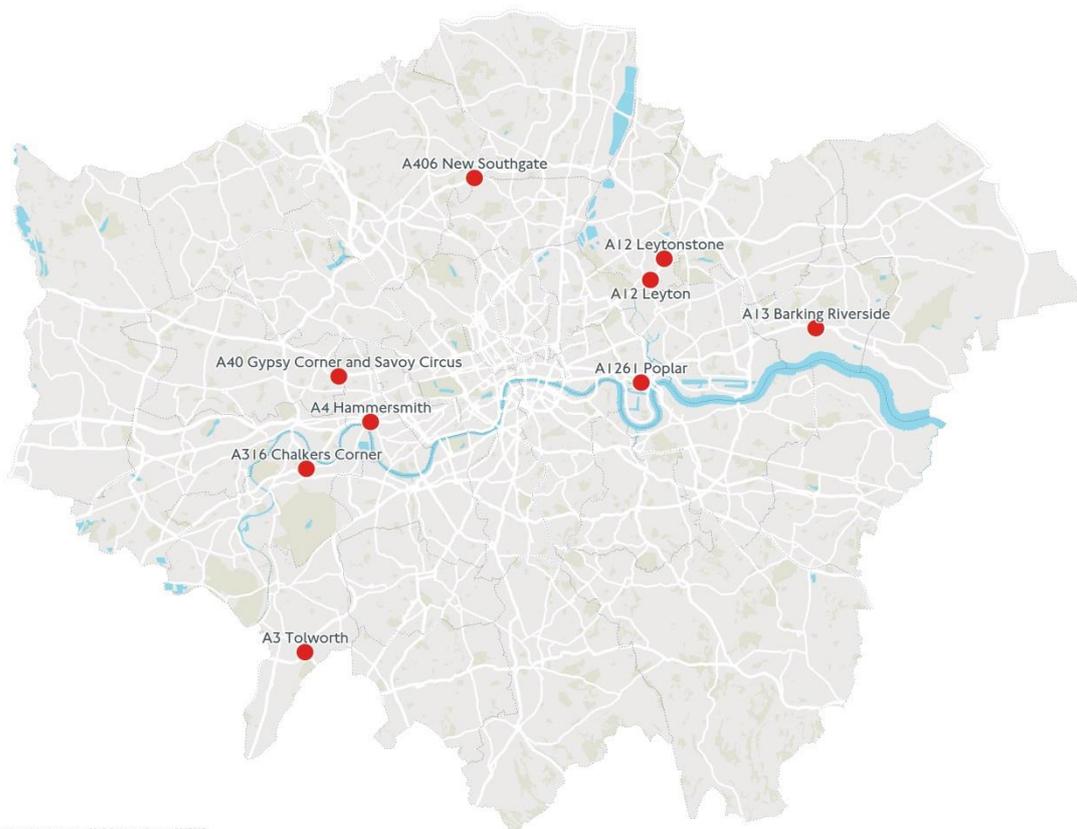
²² TfL Strategic Assessment Framework (SAF) is a tool that allows planners, managers and sponsors across Transport for London (TfL) to assess projects and programmes using a set of strategic criteria. SAF is used as part of the process of developing projects and programmes within TfL.

As part of a rolling feasibility assessment programme, the following five locations are being taken forward for further assessment (shown in Figure 15)

- A406 North Circular Road, New Southgate
- A13, Barking Riverside
- A316, Chalkers Corner
- A4, Hammersmith
- A3, Tolworth

169. TfL is now beginning to look at the options for the next tranche of schemes in further detail.

Figure 15: Locations being considered for tunnelling or decking schemes enabling development and/or reducing congestion (tranche 1 and 2).



The road tunnel schemes being considered are aimed at releasing the potential of specific areas for housing and wider development, while maintaining the vital movement function of strategic roads, thereby helping underpin London's growth more widely.

170. The scope to regenerate and develop land along busier TLRN corridors is currently reduced by the adverse impacts of traffic. High traffic volumes and severance, air quality and noise impacts can significantly limit the viability of development.
171. If nothing is done to reduce the impact of the road corridor, then it is unlikely that development will come forward, or it will come forward only at a significantly lower density, as new properties will be harder to sell or less profitable than alternative sites.

172. If these negative impacts can be reduced through improvements to 'place' and local connectivity, then redevelopment is likely to become a more attractive and viable commercial investment proposition. However, this needs to be done without undermining the movement function or there will be wider adverse economic impacts. Therefore the aim is for investment to improve quality of place that addresses these issues and enables significant quantities of new housing to be unlocked whilst maintaining or enhancing the TLRN's movement function.
173. Road tunnels and decking schemes will do this in the following ways:
- They will provide companies with access to a larger and higher quality workforce, customers and suppliers, supporting the agglomeration impacts arising from faster or more reliable journey times by road.
 - They will enable development of housing and employment on under-utilised land along the road corridor which might otherwise be constrained to a lower density or not take place at all.
 - They will provide a focus for regeneration and improvements in quality of life, including urban realm improvements, which can help drive investment and jobs in local economies through increased footfall or attracting new employers and residents.
174. Each tunnel or decking scheme will have a different mix or focus.
175. This is part of a major shift to needing to support greater growth in London and the changing role of town centres and the increasing importance of the quality of place in our city's success.
176. Figure 16 illustrates a number of visualisations of proposed public realm improvements for selected roads and streets associated with the decking-over, fly-under and tunnelling schemes. The top left shows a proposed fly-under at Chalkers Corner, which would help reduce traffic congestion and delays at a key traffic signal controlled crossroads and reduce severance for pedestrian and cycle movements. The top right shows a linear park that could be constructed above the A3 at Tolworth, enabling new high density residential development to come forward within a parcel of land that lies between the A3 and the railway station, if Crossrail 2 were to serve this rail corridor. The bottom left visualisation shows the eastern portal of the short Hammersmith tunnel option. It would enable the redevelopment plots of land on both sides of the tunnel for high density office and residential use, and would create new high-quality public spaces. The bottom right visualisation shows what urban forms could be achieved at New Southgate by tunnelling the A406 (see Part F of the Strategic Case for more details).

Figure 16: Urban realm improvements: Chalkers Corner (top left), Tolworth (top right), Hammersmith (bottom left) and New Southgate (bottom right)



Key Finding:

Investment in decking-over, tunnelling and fly-under schemes on London's road network will help to enable regeneration and economic growth

To retain London's competitiveness, further investments in transport links and the public realm are required to facilitate delivery of more successful places and new housing in areas adversely impacted by traffic.

- 177. Some of the most successful cities around the world have invested in improvements to the quality of the urban realm alongside investment in public transport and road network capacity. Providing cover over ring roads and building tunnels helps to maintain road network functioning while reducing traffic impacts, creating new spaces for city life and delivering high quality cycle and walk paths.
- 178. London's streets account for 80 per cent of public space in London and therefore schemes which are able to unlock spaces for living and working whilst not impeding network functioning are 'win-wins'.

179. Three important dimensions to helping ensure London's continued growth and competitiveness are: expanding the capacity of its transport network, releasing more land for housing and protecting and enhancing quality of place.
- Insufficient transport capacity to access jobs and enable reliable servicing or freight access across the city would hinder employment growth and agglomeration impacts. **Decking-over, tunnelling and flyunder schemes would address congestion pinchpoints on and around strategic corridors into London.**
 - Housing within or close to London is becoming increasingly unaffordable for many workers. The failure to supply new volumes of housing to meet increasing demand has resulted in rapid house price and rental inflation, reducing disposable income. **Decking-over, tunnelling and flyunder schemes would release land and enable higher density developments to be brought forward.**
 - A deteriorating quality of place and quality of life for Londoners and workers could make the city comparatively a less attractive place for footloose companies to be based. **Decking-over, tunnelling and flyunder schemes would reallocate road space on the surface to pedestrians and cyclists, reduce severance and noise impacts.**

Key Finding:

Solutions which continue to support the functioning of the strategic road network whilst reducing traffic impacts to communities around London's ring roads, gyratories and town centres and enhance conditions for pedestrians and cyclists must be found. Delivering 'win-win' solutions is increasingly important to London's continued success.

PART D: NEW SOUTHGATE AND THE A406, LOCAL CONTEXT

Section Summary:

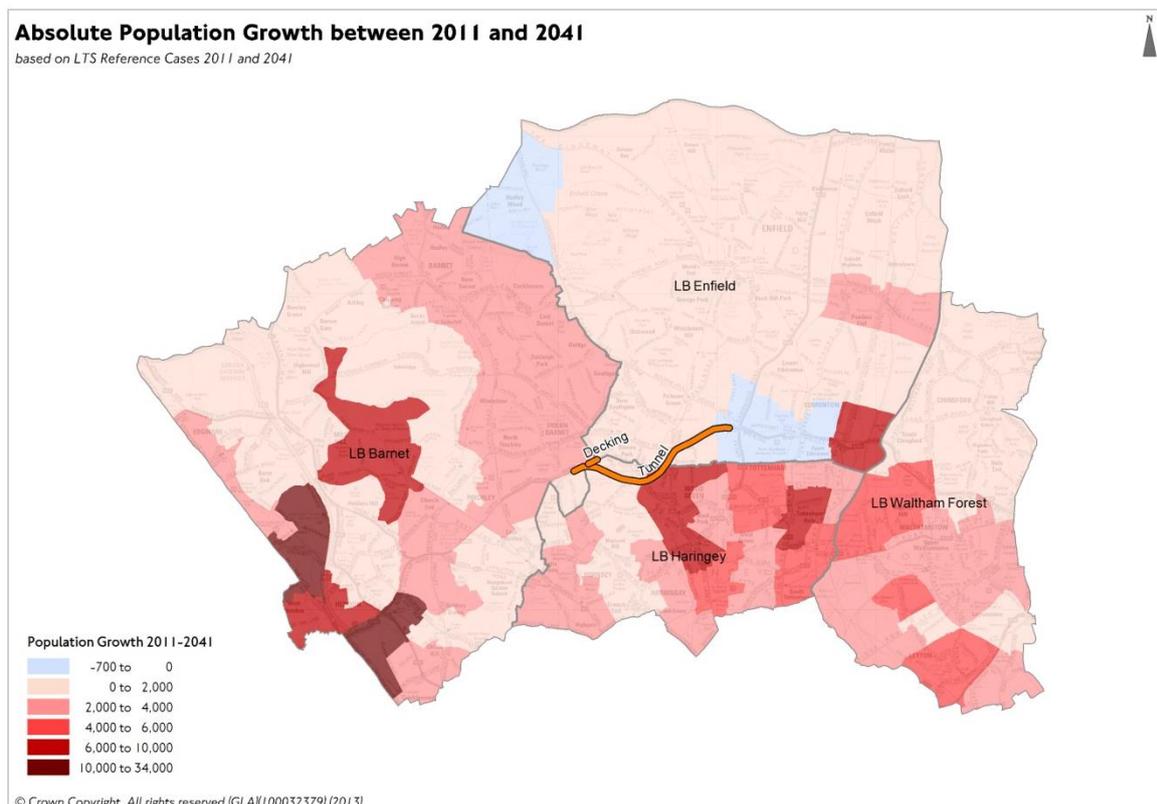
- 1. A growing population in the Boroughs of Enfield, Barnet and Haringey requires higher density residential development in accessible locations.**
 - The population in the Boroughs of Enfield, Barnet and Haringey is growing rapidly and this is projected to continue into the future.
 - Projected population growth in the three Boroughs is outstripping delivery of new homes.
- 2. The New Southgate area suffers from significant economic deprivation.**
 - Wards within Haringey and Enfield adjacent to the A406 experience significant levels of deprivation.
 - There is a need to create employment opportunities in LB Barnet, LB Haringey and LB Enfield to reverse current and forecast poor employment trends and to ensure the future economic success of the boroughs.
- 3. The A406 is a critical part of the road network.**
 - The A406 North Circular Road forms part of London's strategic road network and is a key orbital route for vehicular movements avoiding inner London.
 - The A406 has seen incremental capacity improvements but congestion remains a key issue.
 - Travel to work mode shares within the north London indicate that commuting by motorised vehicle remains the dominant choice of LB Barnet, LB Haringey and LB Enfield residents.
 - It is estimated that aside from east London, the north sub-region will see the highest car ownership growth by 2031.
- 4. Although the A406 is a strategic corridor, it negatively affects local residents' quality of life.**
 - The A406's physical structure, coupled with the presence of fast-moving vehicles, causes both physical and perceptual severance, limiting north-south connectivity.
 - Air and noise pollution along the A406 corridor is extremely high and affects local quality of life.
- 5. Crossrail 2 and other existing plans could transform New Southgate, but the A406 precludes these schemes from reaching their full potential.**
 - Crossrail 2 could be a game changer for the area, providing local residents with good access to public transport and London's employment areas.
 - The North Circular Area Action Plan aims to improve the sense of "place" in neighbourhoods along the A406.
 - The New Southgate Masterplan sets out the vision for a new centre supported by the existing rail station and improved urban realm.
 - Although there are plans and opportunities to improve the New Southgate area, some under-developed sites are still out of reach due to the A406 severance effects.

A growing population in the Boroughs of Enfield, Barnet and Haringey requires higher density residential development in accessible locations

The population in the Boroughs of Enfield, Barnet and Haringey is growing rapidly and this is projected to continue into the future

180. As set out in Part B of this Strategic Case, London's population is growing, placing an ever growing pressure on the city's infrastructure, housing stock, and road network. This pattern of population growth is reflected in the New Southgate area.
181. The A406 at New Southgate is at the boundary of LB Barnet, LB Haringey and LB Enfield. The population of these boroughs grew on average by approximately 15 per cent between 2001-2011²³. This exceeded the London average (14 per cent) and is 7 per cent higher than the rest of England. GLA population projections predict that 1,104,004 will reside in the LB Barnet, LB Haringey and LB Enfield by 2031.
182. Figure 17 details the growth in population projected in the area surrounding the developed A406 options between 2011-2041.

Figure 17: Absolute population growth between 2011 and 2041



183. This growing population will require provision of housing, employment and a high quality urban environment and public realm. Further development of currently underdeveloped areas – such as New Southgate – is required in order to help meet this growth.

²³ T7 – usual resident population, Census 2001 and KS101EW – usual resident population, 2011 Census.

Projected population growth in the three Boroughs is outstripping delivery of new homes

184. Within LB Barnet, LB Haringey and LB Enfield, if the levels of housing delivery from 2004 – 2014 were to continue, this would result in a shortfall of approximately 23,292 houses by 2025²⁴.
185. As Table 2-1 shows, a considerable increase in housing delivery is required across the three boroughs to meet the housing targets outlined in the London Plan. Over the same ten year period from 2015-2025, the population of these boroughs is projected to grow by just over 8,900 people.²⁵

Table 4: Projected housing shortfall

| Borough | Projected total shortfall, 2015-2025 ²⁶ |
|----------|--|
| Barnet | 13,265 |
| Haringey | 6,645 |
| Enfield | 3,382 |

186. Given the shortfall in homes compared to the projected rise in population, significant increases in house prices can be expected within the area in future, leading to increasing unaffordability of homes and widening social polarisation within the area.

Key finding:

The Boroughs of Barnet, Haringey and Enfield require a substantial increase in homes in order to prevent a future accommodation shortage and to stem further rises in housing prices.

The New Southgate area suffers from significant economic deprivation

Wards within Haringey and Enfield adjacent to the A406 experience significant levels of deprivation

187. The borough's surrounding the A406 present a mixed picture in terms of its deprivation and regeneration needs. This can be simply summarised by looking at the Indices of Deprivation scores (where 1=most deprived, 326=least deprived) of LB Barnet (176), LB Haringey (13) and LB Enfield (64)²⁷. Figure 18 highlights the most deprived areas on a ward level in the area considered.

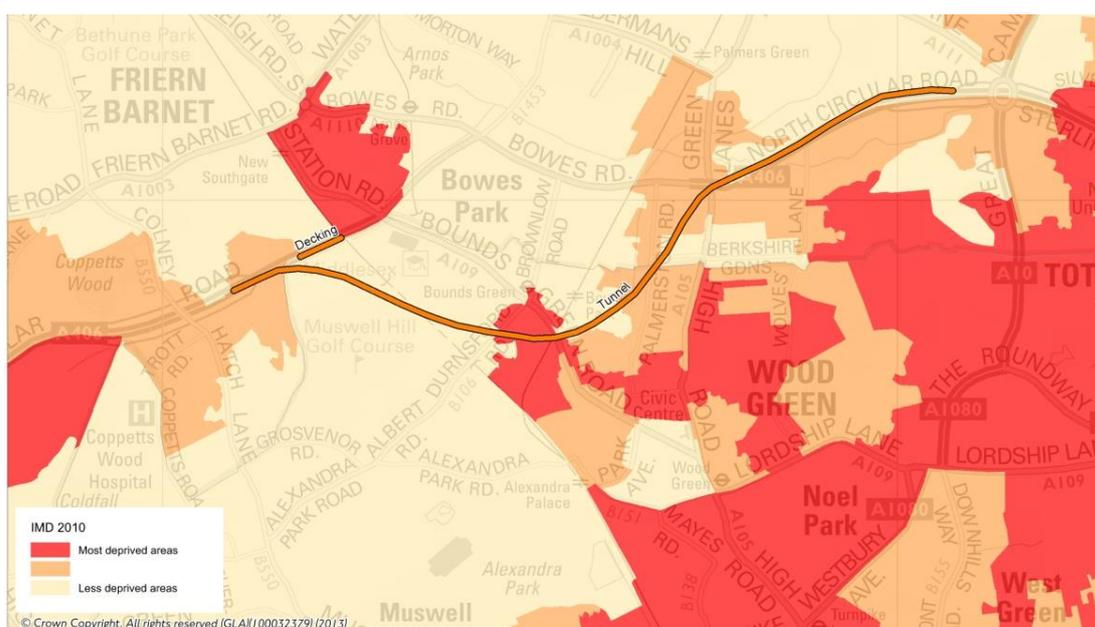
²⁴ London Plan Annual Monitoring Reports 1- 11 (2005 – 2015)

²⁵ GLA 2015 Round Trend-Based Population Projections – Long-term Migration Scenario (for 2015-2025 specifically).

²⁶Housing completions per annum, London Plan monitoring reports

²⁷ English indices of deprivation, 2010.

Figure 18: Index of Multiple Deprivation (2010)



188. LB Enfield's score overlooks the higher level of deprivation in the wards adjacent to the North Circular (known collectively as New Southgate) compared to the rest of the borough. Out of the 21 wards of LB Enfield, when ranked from most deprived to least deprived they score as follows: Bowes (11), Palmers Green (13) and Southgate Green (14).
189. There are also high levels of deprivation to the south of the North Circular, administered by LB Haringey. 30 per cent of LB Haringey's population live in the 10 per cent most deprived areas in the country. The bulk of this population is to the centre and east of the borough²⁸. The total mean annual household income in LB Haringey is approximately £5,000 behind the London average with higher unemployment rates²⁹.

There is a need to create employment opportunities in LB Barnet, LB Haringey and LB Enfield to reverse current and forecast poor employment trends and to ensure the future economic success of the boroughs.

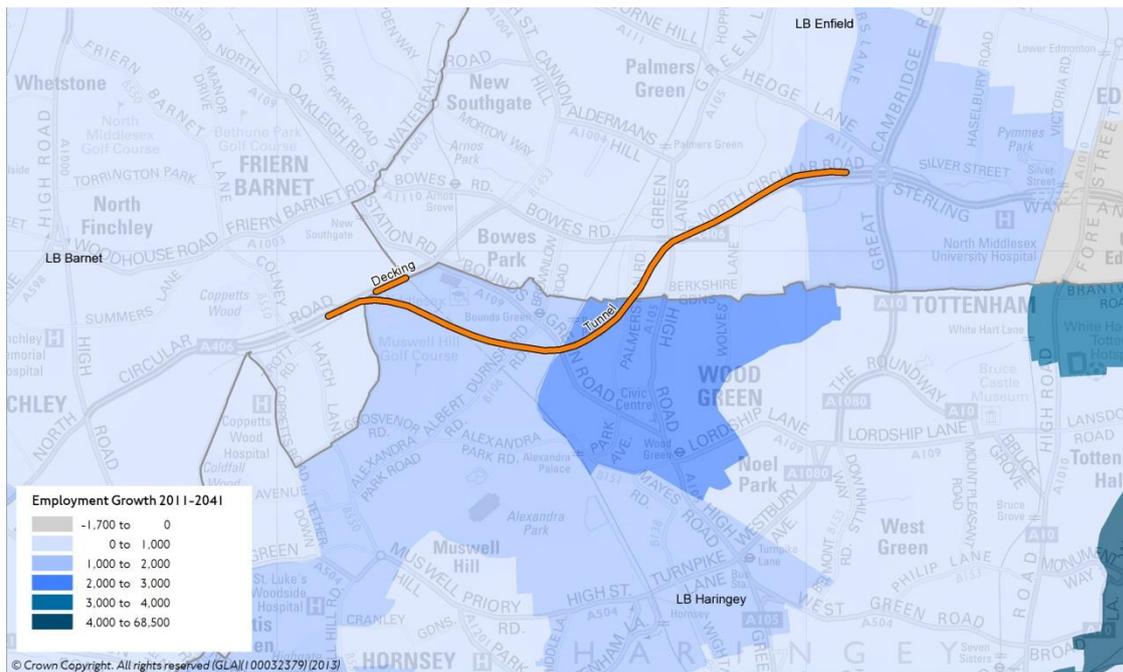
190. The three boroughs have a lower percentage of working age residents in employment (74.1 per cent) compared to the London average (76.7 per cent). These boroughs also had a higher average percentage of Job Seekers Allowance claimants (2.3 per cent) compared to the London average (2.1 per cent).
191. Further to this, the GLA project that whilst there will be more people working in LB Barnet (6,330), fewer will be working in LB Haringey (-3,900) and LB Enfield (-5,760) by 2036³⁰. Figure 17 Figure 19 details the growth in population projected in the area surrounding the A406 in New Southgate between 2011 and 2041.

²⁸ Local Plan: Strategic Policies, 2013-2026, LB Haringey, 2013, <http://www.haringey.gov.uk/housing-and-planning/planning/planning-policy/local-development-framework-ldf/local-plan-strategic-policies>

²⁹ Modelled household income estimates for small areas, London, 2011-2012, GLA. Employment and unemployment ONS annual population survey, Jan 2014-Dec 2014, ONS.

³⁰ Table A.5.6, London labour market projections, GLA, 2013.

Figure 19: Absolute Employment Growth between 2011 and 2041



Key finding:

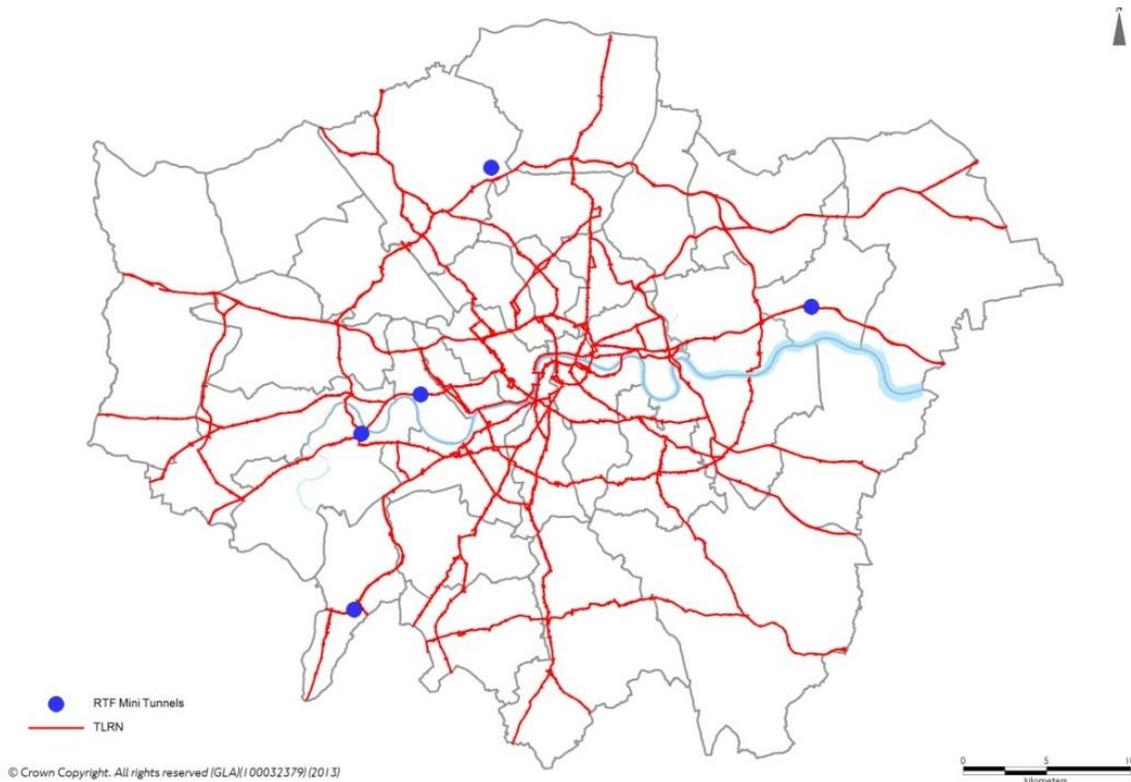
Potential development sites along the A406 corridor in New Southgate are suitable for delivery of new retail floorspace as part of higher density residential development, helping to provide goods and services locally for new residents.

The A406 is a critical part of the road network.

The A406 North Circular Road forms part of London’s strategic road network and is a key orbital route for vehicular movements avoiding inner London

- 192. The A406 runs from Chiswick (west) to Woolwich (east), connecting various suburbs en-route. The road was constructed in the 1920s-30s with the Piccadilly line. Together with the South Circular, it forms an outer London ring road. The road’s design varies from dual carriageway to single carriageway.
- 193. The A406 is part of the Transport for London Road Network (TLRN), the strategic London road network that is responsibility of TfL (Figure 20). The TLRN comprises only 4% of London’s road length but carries 30% of London’s traffic, and provides links to those sections of motorway and primary routes managed by the Highways Agency, which in turn connect the TLRN to the London’s orbital motorway the M25.

Figure 20: TLRN with RTF tunnels labelled



194. The A406 is a key link in this network: traffic data indicates the road consistently carries flows of around 76,000 annual average daily traffic (AADT), of which 6 per cent are heavy vehicles.

The A406 has seen incremental capacity improvements but congestion remains a key issue

195. Over time, a number of schemes have been proposed to alleviate congestion on the North Circular, particularly in the Enfield area. This has been necessary due to high car mode share in the north London sub-region (45 per cent of trips originating in the north sub-region are by car)³¹. Such schemes have varied from road widening to junction improvements. In recent years, the Bounds Green improvement scheme saw the creation of a two lane carriageway along the North Circular Road, with Bowes Road upgraded from a single to predominantly dual carriageway and a number of safety improvements. However, at New Southgate the A406 reduces from three lanes east of the railway line to two lanes under the railway and further east, causing delays (as depicted in Figure 21).

³¹ The north London sub-region consists of LB Barnet, LB Haringey, LB Enfield and LB Waltham Forest. Londoners' mode share by sub-region of trip origin, average day (seven-day week), LTDS 2012/13.

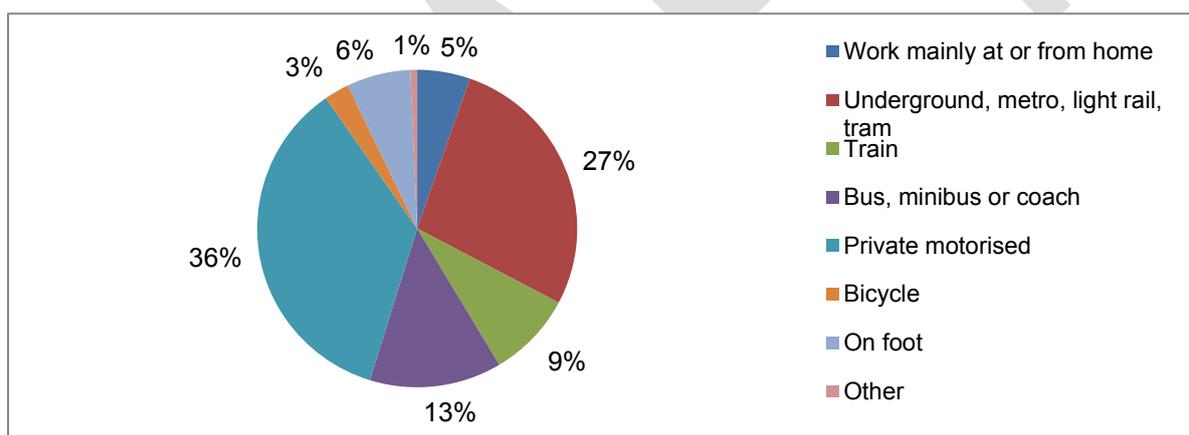
Figure 21: The A406 North Circular – a significant congestion bottleneck today



Travel to work mode shares within the north London indicate that commuting by motorised vehicle remains the dominant choice of LB Barnet, LB Haringey and LB Enfield residents.

196. Approximately 36 per cent of north sub-region residents travel to work via a private motorised mode, as demonstrated in Figure 22.³² This percentage increases further when LB Barnet (40 per cent) and LB Enfield (46 per cent) are considered separately.

Figure 22: North sub-region travel to work mode shares

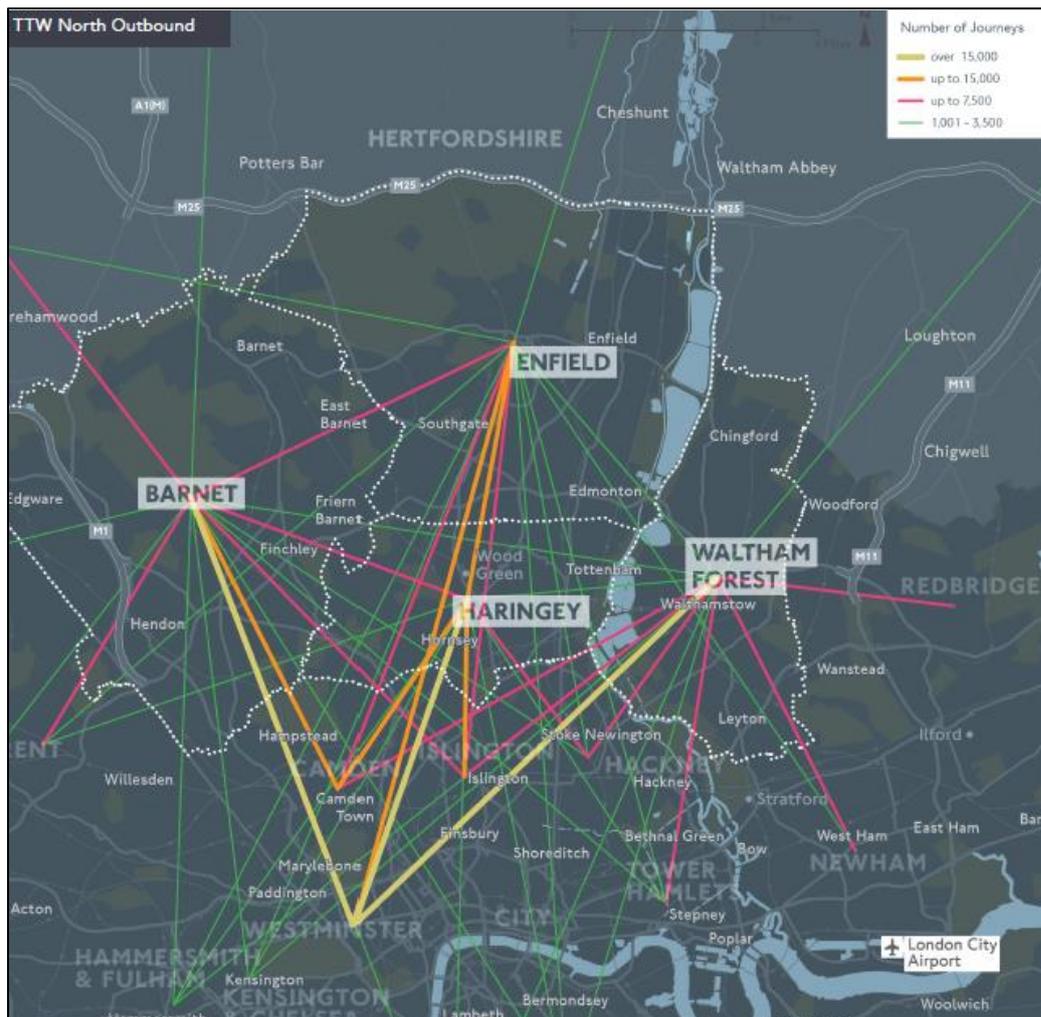


197. As less than half of residents work in their borough of residence – LB Barnet: 40 per cent, LB Haringey: 29 per cent and LB Enfield: 47 per cent – reliance on private motorised modes has a significant impact on congestion on key road corridors³³.
198. As Figure 23overleaf suggests, the direction of travel for driving residents in the north sub-region is largely into central London for work, as well as neighbouring boroughs.

³² QS701EW – Method of travel to work. Census 2011.

³³ WU03EW - Location of usual residence and place of work by method of travel to work (MSOA level), Census 2011.

Figure 23: Travel to Work North sub-region - Outbound



199. Other trips in the boroughs also contribute to congestion on key links such as the A406. Approximately 45 per cent of all trips are completed by car (in line with the outer London average) and the average trip rate is 2.6 per day (in line with the London average)³⁴.
200. The high level of car availability in the north sub-region facilitates the high number of car trips. In LB Barnet, access to cars is particularly high; 71 per cent of households have access to one or more car or van. In comparison, 68 per cent of households in Enfield and 48 per cent of households in Haringey have access to one or more van. Aside from LB Haringey, these figures are above the London average of 58 per cent access³⁵.

It is estimated that aside from east London, the north sub-region will see the highest car ownership growth by 2031.

³⁴ North London sub-regional plan update poster, TfL, 2014. North sub-regional plan, TfL, 2010.

³⁵ QS416EW - Car or van availability, Census 2011.

Key Finding:

It is clear that the A406 North Circular is a key route offering connections for the large number of residents who travel to work by car via the north sub-region.

- 201. It is important to note that although general London car mode share is declining, population and employment growth mean that the absolute number of trips is forecast to rise.
- 202. Figure 24 and Figure 25 show the existing and forecast level of congestion and delay experienced in the New Southgate study area

Figure 24: PCU Hour Delay in 2009 Base



Figure 25: PCU Hour Delay in 2031



203. As a result of continual and growing car use (attributed to population and employment growth), the demand for road travel is growing. Aside from exacerbating severance and the environmental issues experienced in New Southgate, increasing demand is having the following negative impacts:

- unreliable journey times affecting freight and commuter traffic;
- congestion on approach roads to the A406 affecting local residents and businesses;
- lack of road network resilience over a wide area, with recovery from conditions of severe congestion taking, on occasions, many hours to clear; and
- a considerable cost to the economy arising from drivers caught in congestion and goods taking (much) longer than planned to be delivered.
- Poor quality of life for residents and businesses located on the A406 corridor and other residents needing to cross the road

Although the A406 is a strategic corridor, it negatively affects local residents' quality of life.

The A406's physical structure, coupled with the presence of fast-moving vehicles, causes both physical and perceptual severance, limiting north-south connectivity.

204. As outer London boroughs, LB Barnet, LB Haringey and LB Enfield are often assumed to be greener and more attractive owing to their location. However, the A406 North Circular road at New Southgate is dominated by the movement function of the road. The road causes severance effects for communities along its length and a low quality public realm resulting in a lack of cohesion and little sense of "place" along the A406's corridor. Some of these issues are summarised on Figure 26 and Figure 27.

Figure 26: Location of crossing points on the A406 and key junctions and intersections

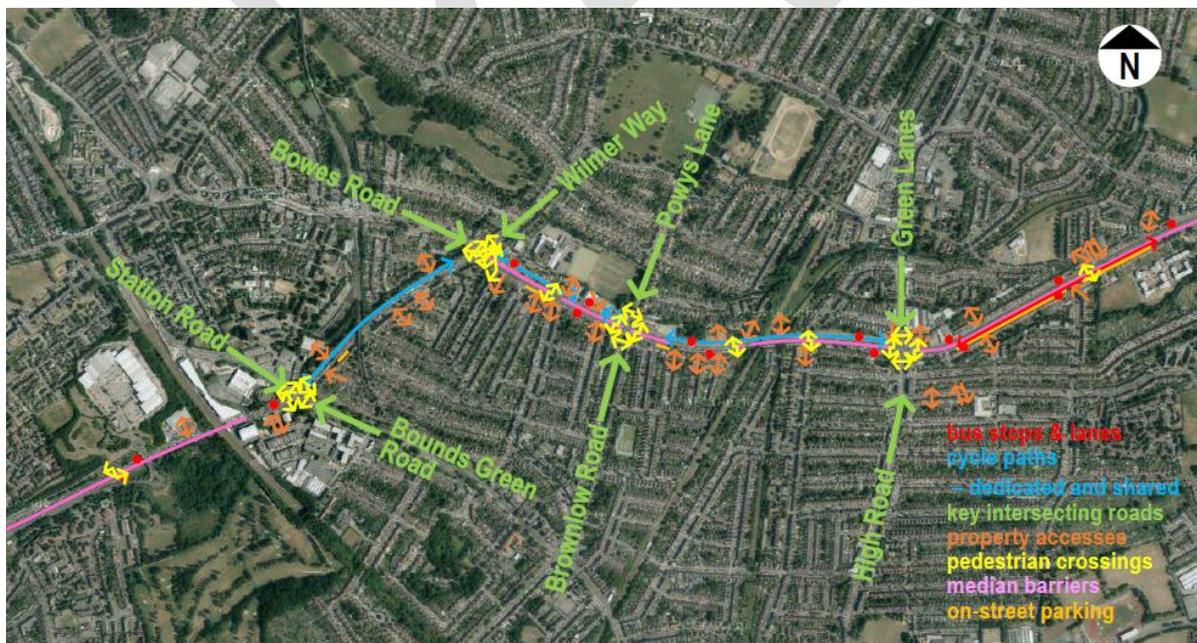


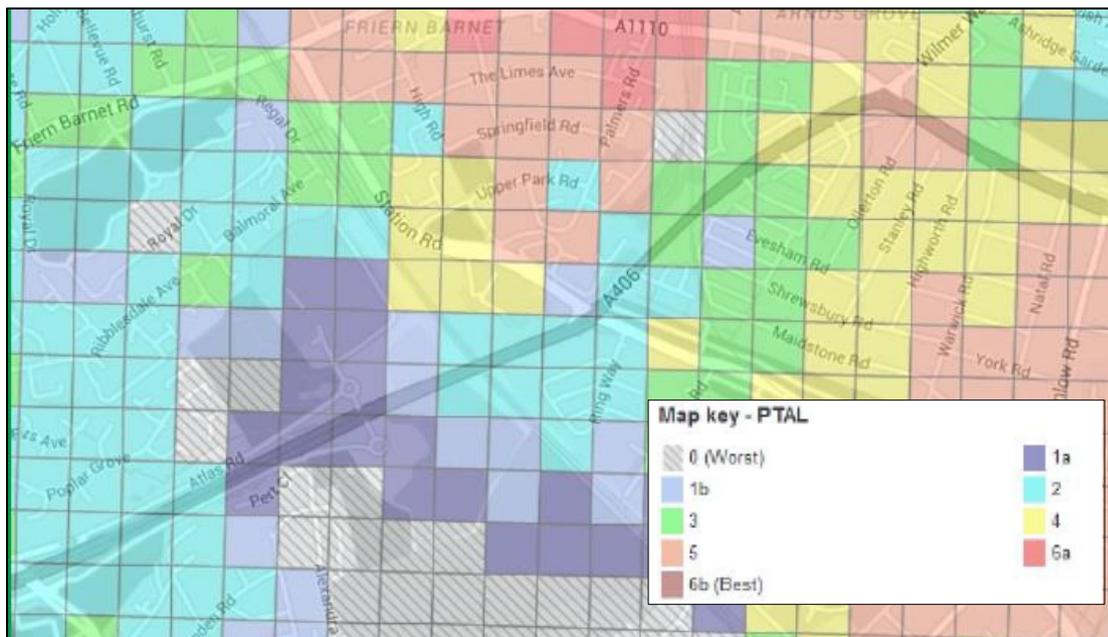
Figure 27 Location of four junctions on A406 where congestion occurs and where cycle and pedestrian crossing facilities entail long waits



205. There is little consistency along the A406, with the lack of connectivity at Bowes Lane surprising considering the existence of residential areas on both sides of the road. In comparison, some open areas of the road suggest a parkway feel. The route is currently incoherent and unappealing to users, with traffic creating a polluting and severing barrier.
206. The incoherent route makes the area surrounding the road unappealing to users. Efforts to counteract severance to date have included the introduction of high level bridge walkways to cross the North Circular at points along its route.
207. The physical and perceptual severance caused by the A406, coupled with the noise, air quality and visual impacts of 76,000 vehicles using the road a day (6 per cent heavy goods vehicles) means the public realm at New Southgate is of low quality. The quality of roads and public realm has a major impact on the way residents perceive and use the area. The area of New Southgate in the vicinity of the A406 is currently an unattractive and unappealing space, limiting the likelihood of securing social and economic investment in the area.
- The severance caused by the A406 in the vicinity of New Southgate train station is particularly relevant as it limits the potential of the area for regeneration developments.**
208. The A406 exerts a significant negative impact on local connectivity from New Southgate to Bounds Green for local residents, pedestrians and cyclists.
209. Between the dumbbell interchange and the East Coast Mainline it is currently impossible to cross the A406 as it is a dual carriage way with a high central reservation and large traffic volumes.
210. There is a narrow footbridge over the A406 to the west of the dumbbell interchange to provide a crossing point for non-motorised traffic. At present, to the west of the East Coast Mainline, there is industrial land to the north of the A406 and undeveloped land to the south. The current road layout appears to be a barrier for development south of the A406.

211. Therefore at present severance is described as moderate given the lack of demand for crossing the A406. The PTAL score assesses the transport connectivity of an area in terms of time to reach frequent transport connections. The latest PTAL score, published in 2011, is 2 as shown in Figure 28.
212. The PTAL score then reduces travelling west on the A406. Just to the south and north of the pedestrian bridge the PTAL rating drops to zero – the worst rank on the scale of nine.

Figure 28: Existing Public Transport Accessibility Index at New Southgate



213. Severance is a particular issue where the population affected are dependents: those being under the age of 16 or over the age of 65, given the vulnerability of this group of people. The New Southgate scheme crosses Alexandra ward in Haringey. There are three lower super output areas (LSOA) on the borders of Haringey and Barnet boroughs which surround the New Southgate A406 area. In the three LSOAs, in 2012, nearly 30 per cent (1,639 people) of the population are of dependent age. Overall up to 5,557 current residents will benefit from this scheme.

Key finding:

The A406 North Circular Road acts as a constraint on local residential development within New Southgate by exerting substantial negative impacts on the public realm and environment, and by occupying potentially developable land.

Air and noise pollution along the A406 corridor is extremely high and affects local quality of life

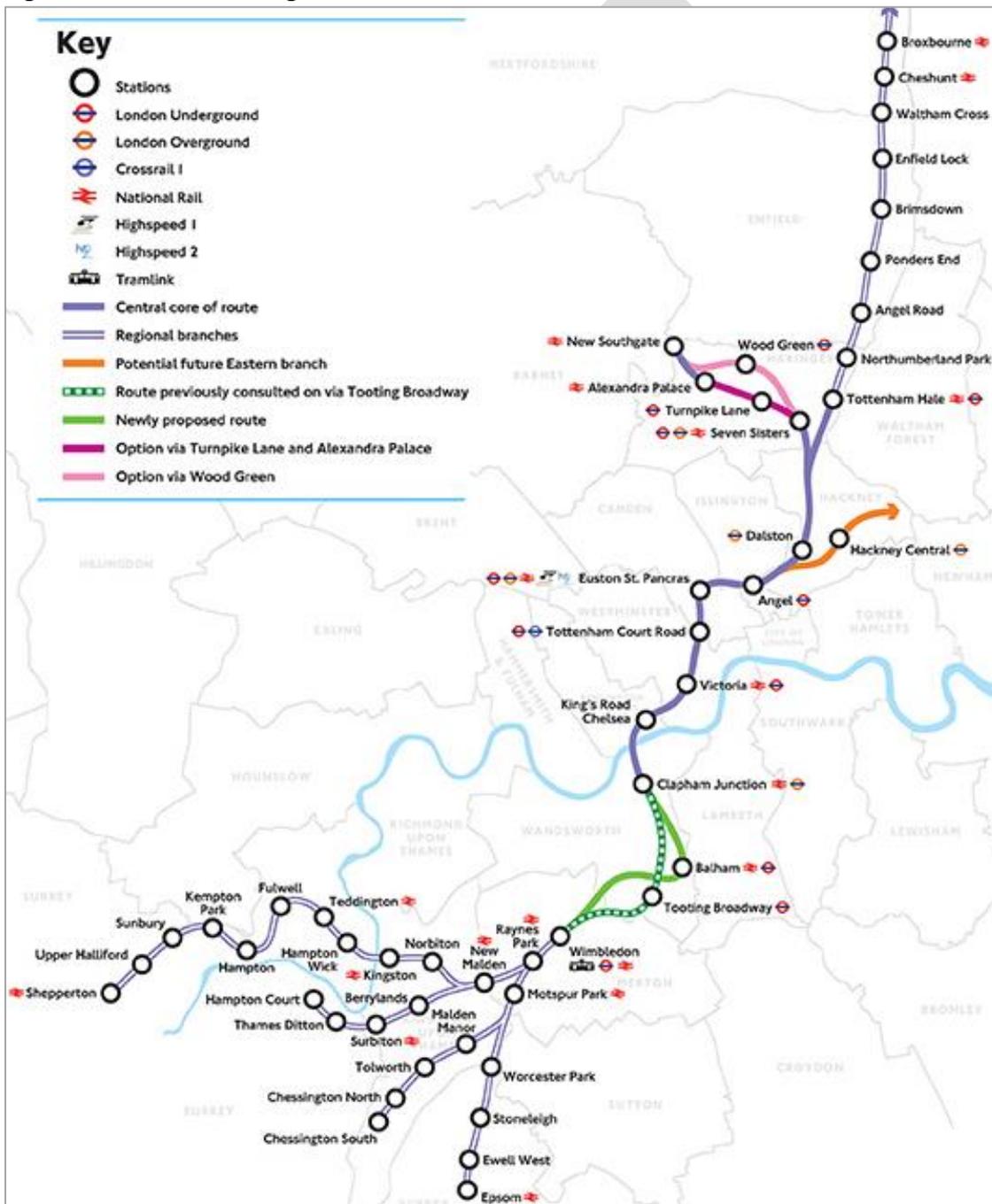
214. The A406 reaches the highest measured daily noise level for roads of 75+ decibels (Figure 29), whilst air pollution levels along the A406 are also high (Figure 30). This creates an unpleasant environment along the road and wider corridor, preventing further residential and business development as few want to live or work in such circumstances.

Crossrail 2 and other existing plans could transform New Southgate, but the A406 precludes these schemes from reaching their full potential.

Crossrail 2 could be a game changer for the area, providing local residents with good access to public transport and London’s employments areas.

- 215. Crossrail 2 is the proposed high-frequency, high-capacity rail line running through London and into Surrey and Hertfordshire. The proposed route is shown below in Figure 31. It will add capacity to the rail network in London and the south east, supporting economic regeneration by providing the capacity needed to build new homes and create more jobs.
- 216. Work is currently underway on a project led by Network Rail and TfL to further develop the scheme assessing the potential options and defining the scheme in more detail.

Figure 31: Crossrail 2 Regional Route:



217. This work will result in a preferred route alignment, station locations and designs, costings, surface transport interfaces as well as associated master planning and urban realm considerations. In addition a Business Case will be produced to assess the value of the scheme with the aim of securing further funding from Central Government.
218. As part of the development of the business case and masterplanning work, consideration is being given to the additional development potential that Crossrail 2 will release through enhanced accessibility and connectivity of sites in outer London.
219. New Southgate has been identified as a likely Crossrail 2 station and as such the basis of development being considered for this study has also taken on board emerging ideas from the Crossrail 2 work.
220. A Crossrail 2 station at New Southgate would significantly improve access to public transport and London-wide employment areas. As a result, the potential of the New Southgate area for regeneration and densification would be significantly enhanced.

The North Circular Area Action Plan aims to improve the sense of “place” in neighbourhoods along the A406.

221. As a result of the social and economic issues experienced in the New Southgate area – including poorer health crime and anti-social behaviour – LB Enfield has produced the North Circular Area Action Plan (NCAAP), setting a planning framework for the road corridor as a Place Shaping Priority Area. The regenerative vision is detailed below:
- “By 2026 the North Circular area will be transformed from one disconnected by an unforgiving road corridor and dominated by derelict housing to one characterised by strong and thriving local communities, high quality new and refurbished housing areas connected by streets better designed to meet the needs of all users and modes of transport. These local communities will be serviced by a network of vibrant local commercial centres and community facilities.”³⁸*
222. The NCAAP now forms part of Enfield’s Local Plan and policies within the document will be used alongside policies contained in the London Plan, the adopted Core Strategy, the adopted New Southgate Masterplan, and the emerging Development Management Document to determine planning applications in the area.
223. It sets out an aspiration to consolidate and improve the three neighbourhood places along the stretch of North Circular we are looking at:
- Arnos Grove/ New Southgate Neighbourhood Place,
 - Bowes Road Neighbourhood Place,
 - Green Lanes Neighbourhood Place.
224. Each of these will focus on a key node on the A406. The latter two are centred on local centres/retail parades actually on the A406: Bowes Lane fronting the A406 and Green Lanes crossing it.
225. The delivery of these policies would be transformative to this area, but would be significantly limited in their impact if the A406 were to remain in its current form.

³⁸ The North Circular Action Plan, LB Enfield, 2014.

The New Southgate Masterplan sets out the vision for a new centre supported by the existing rail station and improved urban realm.

- 226. Using the NCAAP policies and vision, the council has adopted the New Southgate Masterplan as a supplementary planning document. It identifies the number of opportunities for regeneration in this area. These centre on replacing the number of poor quality buildings located to the south of the area, with the aim of creating better homes for residents. The regeneration of the Ladderswood estate has already begun (March 2014) in line with the Masterplan. Once completed, the 161 homes built in 1970s will be replaced with 517 new properties, six commercial units, a hotel and a community centre.
- 227. If pursued as planned and without a Crossrail 2 station, the New Southgate Masterplan would result in around 850 new homes and 660 new jobs.
- 228. The masterplan makes sense in the current context; however the opportunity to connect to the south and optimise the possibilities of the coming change is significantly limited by the A406 in its current form.

Figure 32: New Southgate Illustrative Masterplan



Although there are plans and opportunities to improve the New Southgate area, some under-developed sites are still out of reach due to the A406 severance effects.

- 229. The urban densification made possible by the future Crossrail 2 station and, to a lesser extent, by the New Southgate Masterplan are focusing on the northern side on the A406.
- 230. To the east of the railway, there already is a reasonable access to the existing station and potential future Crossrail 2 station. To the west of the railway, a pedestrian bridge over the railway will significantly improve access to a future Crossrail 2 station. In both cases, the development potential is dictated by the level access to public transport.

231. However, to the south of the A406, the public transport accessibility is not expected to increase significantly due to the severance effect of the road corridor, hence the lack of development planned south of the A406 and west of the railway.

PART E: OBJECTIVES FOR THE A406 INTERVENTION AT NEW SOUTHGATE AND OPTIONS CONSIDERED

Table 5: Objectives and measures of success for interventions on the A406

| Strategic challenges | Objective for the A406 New Southgate | Measures of success |
|--|--|--|
| <p>Housing supply and employment growth:</p> <p>London’s housing supply is not keeping track with its rapid rises in population.</p> <p>London must unlock development opportunities to support delivery of new housing and jobs. There is a need to maximise the development potential of brownfield sites.</p> | <p>Facilitate growth and maximise the economic development potential of New Southgate particularly in the context of the delivery of Crossrail 2.</p> <p>Increase the potential of New Southgate as a regeneration area to develop new homes and create jobs for the local area to tackle deprivation.</p> | <p>Creation of new homes and jobs in the context of the delivery of Crossrail 2.</p> <p>Increase local economic outputs and employment figures following the regeneration of New Southgate.</p> |
| <p>TLRN capacity:</p> <p>Road congestion cost the London economy £5.4bn in 2013.</p> <p>With a sustained growth in population and employment, TLRN traffic levels will increase significantly in the future, worsening congestion and deteriorating the quality of life of surrounding residents and the experience of road users.</p> | <p>Maintain and improve the vital strategic movement function of the A406 at New Southgate.</p> <p>Improve resilience of the surrounding network.</p> | <p>Reduce delays and journey times for motorised traffic on the A406.</p> |
| <p>Severance & quality of life:</p> <p>In many cases, severance effects from major transport corridors results in local residence having a greater reliance on the private car.</p> <p>The potential of regeneration sites can be undermined by local severance effects from major transport corridors (e.g. poor air quality, limited surface access to surrounding areas, visual impact, noise levels).</p> | <p>To address the existing issues of severance, by improving connectivity between New Southgate’s main residential areas and key destinations.</p> <p>Reduce the air and noise pollution at the A406 New Southgate.</p> | <p>Provision for safer and better connected cycling and walking routes with the creation of new surface links.</p> <p>Achievement of lower levels of air and noise pollution experienced on the surface.</p> |

232. TfL commissioned CH2M to investigate the following potential intervention on the A406 at New Southgate.

- A decking over the A406 to the west and east of the East Coast Main Line.
- A longer tunnel option.
- Both a tunnel and a deck.

233. CH2M analysis resulted in two options to be assessed in this business case

Option 1 would create a new decked surface connecting currently separate and underdeveloped land on either side of the A406 at New Southgate.

234. The proposed deck would be 215m long over the A406 between the dumbbell interchange and the East Coast Main Line embankment, on the western side of the railway.

235. The original proposal was to deck over the A406 on both the west and the east side of the railway line. Upon further examination a deck to the east looked problematic. While to the west the topography (essentially a shallow valley) and existing context (large areas of open space and low-density development) lends itself to a decked solution, to the east it does not. The topography is flatter and the area is more developed. This is the point at which a key node is identified in the NCAAP and the effect of a deck would be to position an environmentally intrusive undercroft entry/ exit adjacent to this key node. There is also a strong likelihood of substituting a new form of severance: vertical severance between exiting streets at the lower level and new development on the deck above. For these reasons, it was decided to develop an option for a deck to the west of the railway only.

Figure 33: Option 1 - Proposed western deck over the A406:

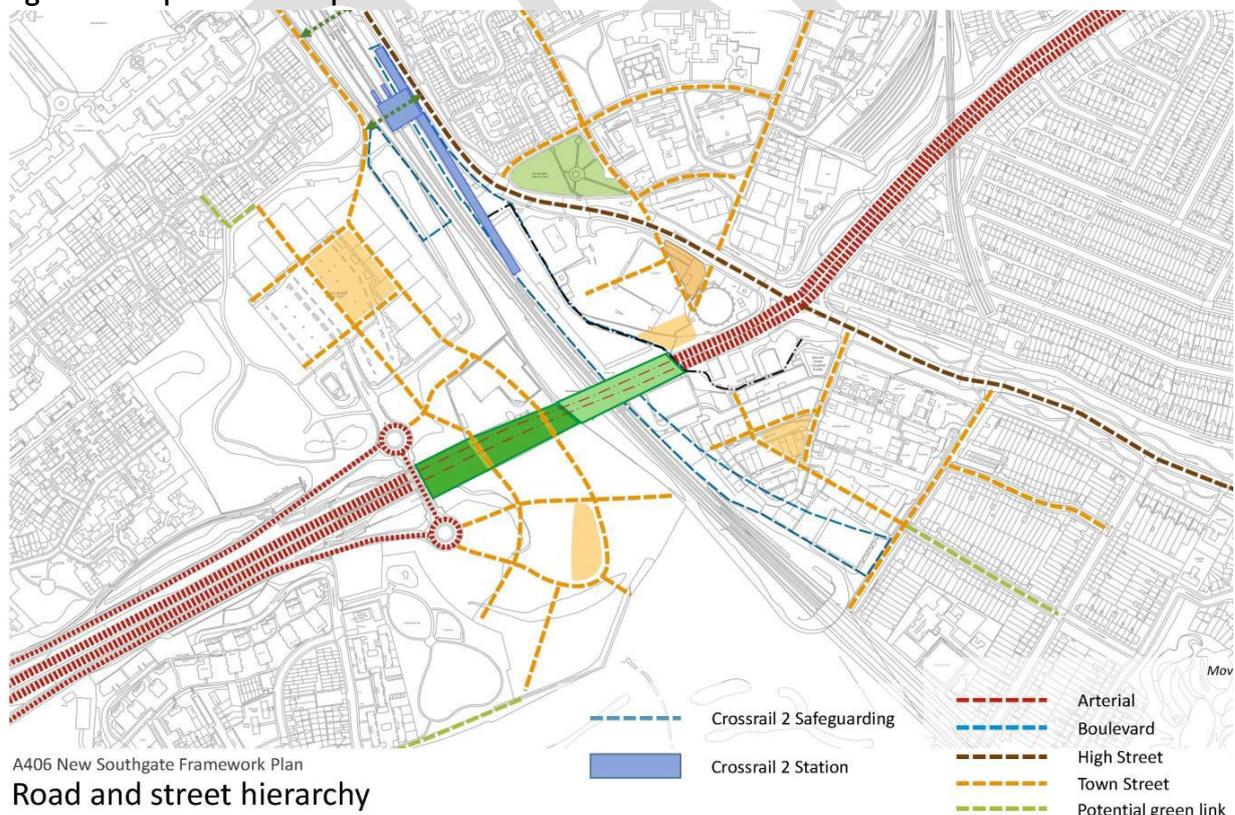


Figure 34: Aerial picture of the proposed decking area



Option 2 consists in building a new tunnel between New Southgate and the A10, reconnecting the land on either side of the A406 while increasing the TLRN capacity.

236. Option 2 would, through constructing a 3.8km long twin-bored tunnel for the A406, remove a key strategic road from the surface. The tunnel will accommodate four traffic lanes (two each way). On the surface, the existing section of the A406 would be downgraded to an urban boulevard, potentially with better bus priority and cycling facilities.
237. A number of surface highway options have been considered to identify the best location for a tunnel. The decision of where best to locate the tunnel portals has been determined by the desire to bring maximum benefits to the local area with minimal negative impacts.
238. The alignment of the tunnel was determined by the location of the portals. The proposed western portal has an off-line alignment to the south of the A406 to minimise traffic disruption during construction, while the eastern portal can be built on-line with minimal traffic disruption. Other factors affecting the alignment of the proposed tunnel include obstructions the tunnel must clear (e.g. Pymmes Brook to the east, National Rail embankment and Piccadilly Line tunnel to the west), horizontal alignment standards and constraints and data uncertainties.
239. The alignment shown on Figure 35 is “feasibility-level” in nature and might be subject to changes following more detailed investigation.

Figure 35: Proposed tunnel from New Southgate to the A10 (option2).

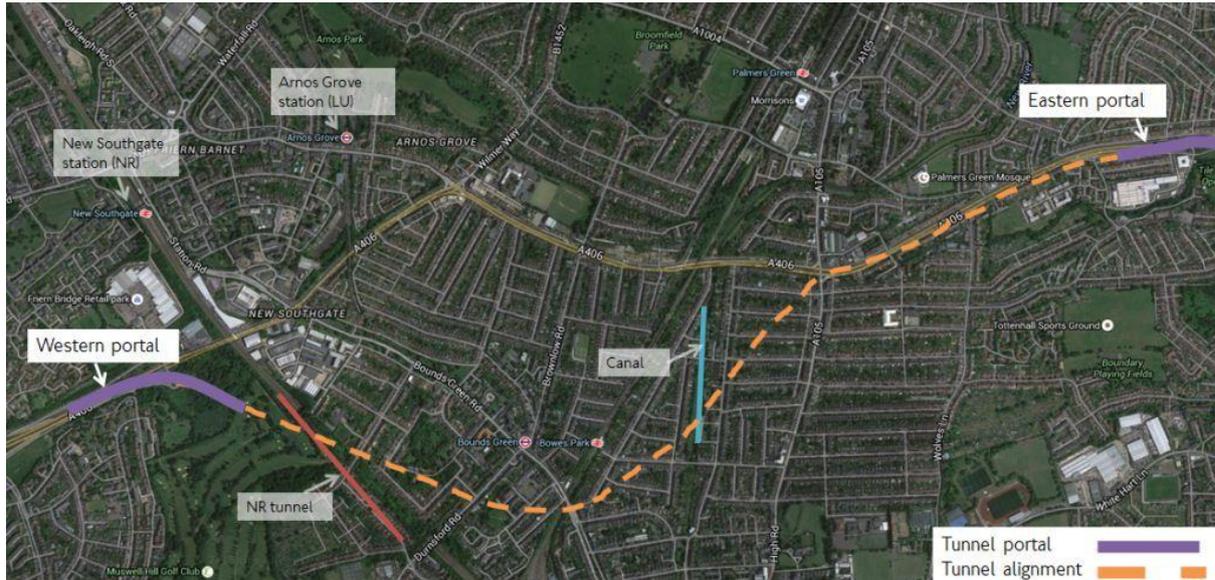
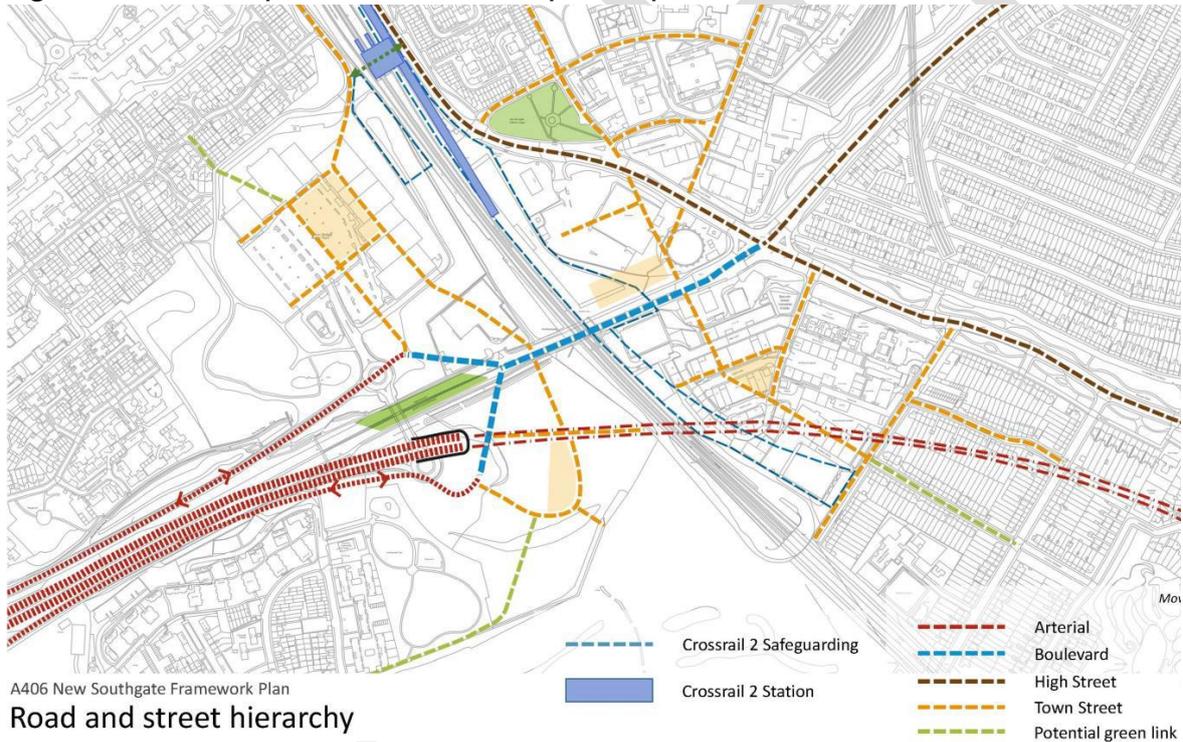


Figure 36: Western portal of the tunnel option (option2):



Building both a deck and a tunnel does not bring more development opportunity than either option on its own.

240. The proposal to construct both a tunnel and deck was suggested to reduce north-south severance to a minimum while delivering a capacity uplift to the A406.
241. However, building both the tunnel and the deck would not bring forward more development opportunities than the individual schemes on their own, nor would it reduce the severance effects to a lower level.

242. With no additional benefits in terms of development opportunity, severance or traffic movement, the level of capital investment required to build both the tunnel and the deck could not be justified.

Key finding:

The outcome of this optioneering conducted by CH2M on behalf of TfL has been to identify two options that are subject to further appraisal as part of this business case:

- Option 1 – decking of the A406 to the west of the railway.
- Option 2 – a tunnel replacing the A406 from New Southgate to the A10.

Option risks and mitigation

243. The enclosed nature of a tunnel option introduces additional safety risks not associated with surface roads or bridges, such as smoke inhalation in the event of a fire, or the risks associated with a toxic spillage in an enclosed space. Tunnels also require additional mechanical and electrical equipment, such as ventilation and lighting technology. Periodic overnight closures of tunnel bores for maintenance would be required, potentially causing disruption to traffic.

In the event of a tunnel option being pursued, TfL would provide mitigation measures to address risks associated with tunnels through a number of measures.

244. TfL has a highly experienced and dedicated 24 hour London Street Tunnel Operations Centre (LSTOC) that currently serves all 12 tunnels on the TLRN, and which maintains working relationships with emergency responders, including to create and rehearse multi-agency incident response and recovery plans. Any new tunnel would be operated by LSTOC, and would have the ability to be closed remotely to traffic using signals and barriers. Resulting traffic impacts would be managed by live adjustments to traffic signals, coordinated from within LSTOC.
245. Any necessary two-way operation during periods of bore closure would be managed in accordance with the EU Directive on Road Tunnel Safety Regulation.

PART F: HOW THE TUNNEL AND DECKING OPTIONS MEET THE OBJECTIVES

Section summary:

Masterplanning work has been undertaken to assess the potential of both Option 1 (decking) and Option 2 (tunnel) in delivering new homes and jobs while improving the local environment.

- The options without Crossrail 2 build on a base case that assumes the LB Enfield's New Southgate masterplan would continue as planned, resulting in approximately 848 new homes and 657 new jobs. While the options with Crossrail 2 build on a base case that assumes Crossrail 2 would bring 4,900 new homes and 2,350 new jobs.

Option 1 – decking over the A406 on the western side of the railway.

- The decking option would unlock new parcels for development to the south of the decking and west of the railway by improving access to the existing train station and potential Crossrail 2 station.
- The decking option would contribute to the delivery of around 1,850 new homes in New Southgate, but if a Crossrail 2 station was built in addition to the deck, up to 6,675 new homes could be delivered (gross figures not accounting for displacement). In addition to residential developments, the decking option without and with Crossrail 2 would deliver respectively 24,000 and 41,000 sq m of commercial, civic, community & leisure uses land.
- The decking option would not address congestions relief on A406 and development would generate additional traffic which could increase journey times.
- The deck would reduce north/south severance at New Southgate but would not resolve the east-west severance effect from the Railway or the north/south severance caused by the A406 between New Southgate and the A10.
- The deck would make no impact to the noise and pollution caused by the A406 in New Southgate, as the road would remain in situ. There would be no change to noise and pollution nuisance for existing residents.

Option 2 – Longer tunnelled option

- Similarly to the decking option, a tunnel would unlock new parcels for development to the south of the decking and west of the railway by improving access to the existing train station and potential Crossrail 2 station.
- The tunnel would contribute to the delivery of around 2,620 new homes in New Southgate, but if a Crossrail 2 station was built in addition to the deck, up to 6,460 new homes could be delivered (both gross figures not accounting for displacement). In addition, the tunnel option without and with Crossrail 2 would respectively deliver 27,050 and 56,750 sq m of commercial, civic, community & leisure uses land.
- The tunnel option would provide congestion relief to the A406 at New Southgate and in the surrounding area, reducing journey times even after additional development related car trips have been accounted for.
- The tunnel option would reduce severance in New Southgate and between New Southgate, enabling new developments and offering the opportunity to reconnect the

north and south of the A406.

- The tunnel would result in significantly lower levels of noise and pollution between New Southgate and the A10, improving the quality of life of thousands of existing residents.

Impact of Not Changing

- Retaining the current layout for the A406 at New Southgate would prevent this area from meeting its full potential as a location for housing and employment growth.

Comparison of options:

- With Crossrail 2, the decking option would deliver 200 more homes than the tunnel option. However, the tunnel option would better perform towards jobs creation, severance reduction and the safeguarding of the A406 movement function.

Masterplanning work has been undertaken to assess the potential of both Option 1 (decking) and Option 2 (tunnel) in delivering new homes and jobs while improving the local environment.

246. Both the tunnelled and decked options would provide benefits to the wider area by improving the amenity of residential and commercial properties and encouraging redevelopment. Masterplanning works undertaken by CH2M focused on delivering additional homes and jobs on currently under-developed land surrounding the A406. In doing so, it sought to reduce severance and improve local environment.
247. Masterplanning work has focused on the New Southgate area (see Figure 2-30), where the potential for regeneration is the greatest. However, it is likely that the tunnel (option 2) would have a catalytic effect on stimulating property investment along the current A406 alignment between New Southgate and the A10.
248. Masterplanning for both developed options has also considered the following:
 - **Crossrail 2 station:** This will increase the PTAL of this area and in line with the London Plan, development densities should increase according. The following analysis assumes that the Crossrail 2 station would be built at the northern end of the Masterplanning area shown in Figure 37. However, the location of the Crossrail 2 station is currently being revised and could be moved further south along the rail corridor, closer to the existing A406. If this new location were confirmed, the PTAL of the Masterplanning area would further increase and enable higher development densities, including on the land unlocked by the decking/tunnel scheme. Should the new Crossrail 2 station location be confirmed, the Masterplanning work would be updated to reflect changes in PTAL.
 - **Density:** A range of densities were considered. Although the area is largely suburban in character, the arrival of Crossrail will stimulate greater growth.
 - **Height:** The general approach has been to create street architecture. Taller buildings have been included to avoid the development of an oppressive space.
 - **Land use:** The primary land use envisioned is residential in order to provide the homes required by the London Plan. To achieve the proposed densities, access to a town centre is required; as a result, retail, office, civic and community space has been included.

Figure 37: Masterplanning boundary line



249. Masterplanning carried out to date reveals different development capacities depending on the road intervention and construction of Crossrail 2.

Key finding:

The options without Crossrail 2 scenarios build on a base case that assumes the LB Enfield's New Southgate masterplan would continue as planned, resulting in approximately 848 new homes and 657 new jobs. While the options with Crossrail 2 build on a base case that assumes Crossrail 2 would bring 4,900 new homes and 2,350 new jobs.

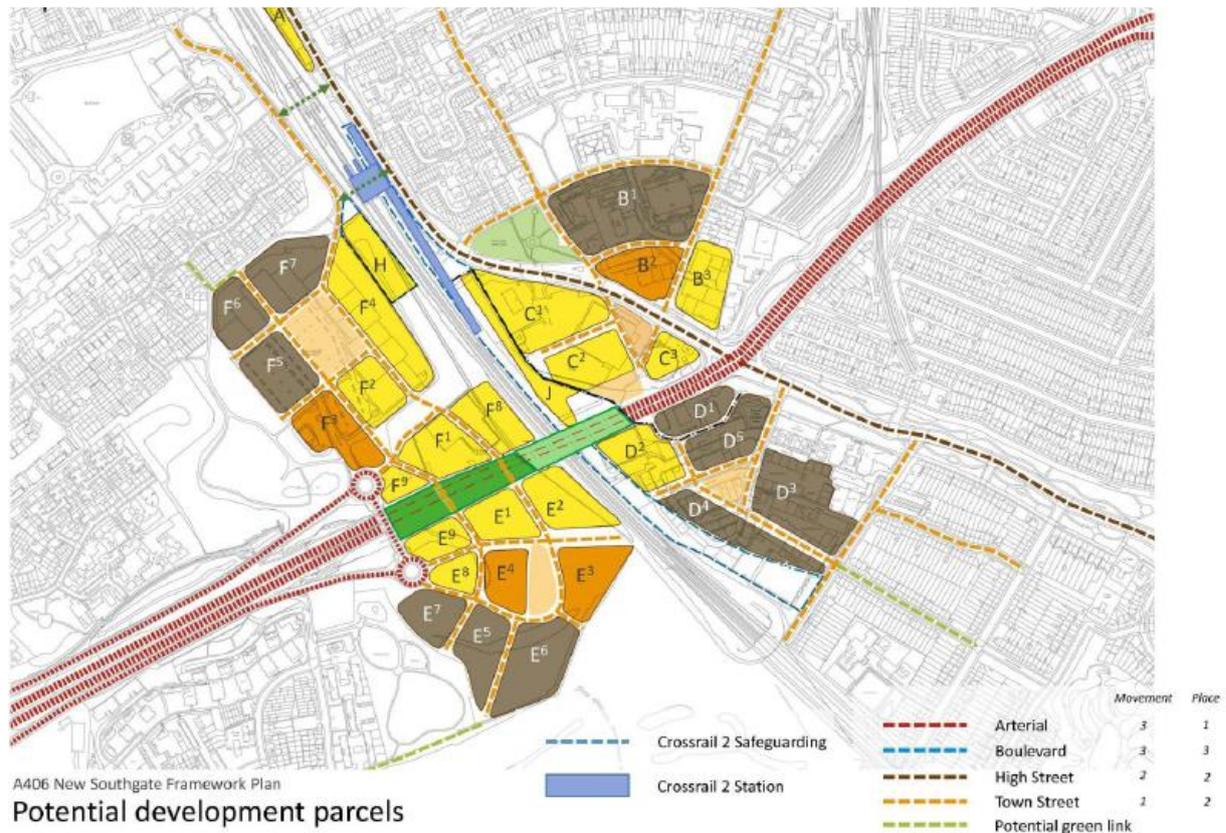
250. In identifying parcels, attention has been paid to local planning policy and has avoided, where possible impacting open space and existing amenities.

Option 1 – Decking over A406 on the western side of the railway.

The decking option would unlock new parcels for development to the south of the decking and west of the railway by improving access to the existing train station and potential Crossrail 2 station.

251. In the event of the construction of a decking between the dumbbell interchange and the East Coast Main Line, Masterplanning works conducted by CH2M resulted in the parcel divisions in the New Southgate area as shown in Figure 38.

Figure 38: Option I (decking) development parcels



252. The existing land use of the parcels identified in Figure 38 are as follow:

- A:** Land adjacent to New Southgate station (0.28 Ha) – this land is currently a used car dealership and identified as a regeneration site in the New Southgate Masterplan (residential and shops)
- B:** Ladderswood Estate site (3 Ha) – demolition of this previously housing and wholesale retail site has already begun. This is identified as a regeneration site in the New Southgate Masterplan for residential employment and community uses.
- C:** Land identified as the Western Gateway (3.6 Ha). In the New Southgate Masterplan, residential, employment and community uses are set to replace this currently bulky good site.
- D:** Bounds Green industrial estate (5.2 Ha). This is currently wholesale and bulky goods retail and is categorised as employment land in LB Haringey’s Core Strategy.
- E:** Land north of Muswell Park Golf Course (4.6 Ha). This land is currently unoccupied and categorised as employment land in B Haringey’s Core Strategy.
- F:** Friend Bridge Retail Park & Car Showroom (6.7 Ha). This is a lower order retail centre in the LB Barnet retail strategy.
- H:** Land safeguard for Crossrail 2 surface car park.
- J:** A safeguarded work site (not permanent structure – could be redeveloped once Crossrail is complete).

253. The redevelopment potential of each of these parcels is detailed in Table 6 and Table 7 below where Table 7 includes the construction of a Crossrail 2 station, therefore resulting in higher densities. The quantum of dwelling units in these tables are gross figures (does not account for displacement).

Table 6: Development potential at New Southgate with the western deck.

| New Southgate / A406 Deck | | | | |
|----------------------------------|-------------------------------|---|-----------------------|---|
| Crossrail 2 not included | | | | |
| Decking of A406 included | | | | |
| Parcel | Parcel Area (hectares) | Development Density (du/hectare) | Dwelling Units | Commercial, Civic, Community & Leisure Uses (sq m) |
| A | 0.3 | 300 | 84 | 790 |
| B | 2.7 | 148 | 400 | 3,300 |
| C | 2.5 | 146 | 364 | 4,535 |
| D | | - | - | - |
| E | 6.3 | 50 | 315 | 9,990 |
| F | 7.5 | 80 | 600 | 5,430 |
| G | | - | - | - |
| H | | - | - | - |
| J | 0.6 | 146 | 88 | - |
| TOTALS | 19.9 | | 1,851 | 24,045 |

Table 7: Development potential at New Southgate with the western gate and a Crossrail 2 station

| New Southgate / A406: Deck + Crossrail 2 | | | | |
|---|-------------------------------|---|-----------------------|---|
| Crossrail 2 included | | | | |
| Decking of A406 included | | | | |
| Parcel | Parcel Area (hectares) | Development Density (du/hectare) | Dwelling Units | Commercial, Civic, Community & Leisure Uses (sq m) |
| A | 0.3 | 300 | 84 | 790 |
| B | 2.7 | 148 | 400 | 3,300 |
| C | 2.5 | 355 | 888 | 15,435 |
| D | 3.7 | 225 | 833 | 5,000 |
| E | 6.3 | 225 | 1,418 | 1,500 |
| F | 7.5 | 355 | 2,663 | 13,895 |
| G | | | - | |
| H | 0.5 | 355 | 178 | - |
| J | 0.6 | 355 | 213 | 1,080 |
| TOTALS | 24.1 | | 6,675 | 41,000 |

254. To the west of the railway line, the decking option would reduce severance across the A406. However, the height of the land means the deck must be built in line with the current railway line, and would therefore continue to be a cause of severance. With poor connections in all directions except to the north, parcel E would come forward for development, but at a lower density.

The decking option would contribute to the delivery of around 1,850 new homes in New Southgate. If a Crossrail 2 station was built in addition to the deck, up to 6,675 new homes could be delivered (gross figures not accounting for displacement). In addition to residential developments, the decking option without and with Crossrail 2 would deliver respectively 24,000 and 41,000 sqm of commercial, civic, community & leisure uses land.

255. The additional jobs enabled by the decking scheme would help to address the significant levels of deprivation in wards within Haringey and Enfield adjacent to the A406.

The decking option would not address congestions relief on A406.

256. The decked option will not relieve congestion or improve reliability of journey times on the A406 at New Southgate. It is an extension of an existing deck over an existing road and would not offer a new through route or additional highway capacity to reduce delays.

257. Table 8 shows how the decking option will affect travel times. The detrimental impact on journey times is due to additional development-related trips without increases in capacity on the A406.

Table 8: Distribution of time saving by user class - decking with development option

| Decking and development | Time benefits £'000s | | | | | |
|-------------------------|----------------------|----------------|-----------------|---------------------|---------------|---------------|
| | <-5 mins | -5 to -2 mins | -2 to 0 mins | 0 to 2 mins | 2 to 5 mins | >5 mins |
| Car- business | -81,620 | -40,583 | -180,304 | 122,589 | 38,593 | 39,288 |
| Car – commuting | -1,906 | -10,148 | -65,909 | 52,615 | 6,134 | 819 |
| Car – other | -2,139 | -11,433 | -74,348 | 61,019 | 7,283 | 834 |
| LGV | -13,976 | -21,629 | -77,458 | 59,111 | 7,040 | 6,832 |
| OGV | -4,112 | -7,629 | -18,319 | 14,893 | 1,265 | 2,098 |
| Total | -103,753 | -91,422 | -416,338 | 310,227 | 60,315 | 49,871 |
| Percentage of total | 17% | 15% | 68% | 74% | 14% | 12% |
| | 100% (of increase) | | | 100% (of reduction) | | |

258. The decking option has a limited capacity to improve network resilience specifically along the A406, as it does not address the bottleneck currently experience by road users.

The deck would reduce north/south severance at New Southgate but would not resolve the east-west severance effect from the Railway or the north/south severance caused by the A406 between New Southgate and the A10.

259. It is currently impossible for motorised vehicles, pedestrians or cyclists to cross the A406 between the dumbbell interchange and the railway. By decking over this section of the road, the severance between parcels on either side of the road would be significantly reduced with new streets on surface level enabling motorised vehicle and safe active transport access.

260. However, given the fact that decking would be an extension of the existing railway deck to the dumbbell interchange only, it would not resolve the degree of severance experienced

on the eastern side of the railway or further along the A406 between New Southgate and the A10.

- 261. The severance effect of the railway would potentially increase as the A406 footpath is currently the only pedestrian link crossing the rail corridor. An extension of the railway deck to the dumbbell interchange would make the existing footpath along the A406 even less appealing for pedestrians, who would have to walk along about 250m of the decked and heavily trafficked A406.
- 262. To mitigate the increased east/west severance effect, a land bridge could be built on top of the decking and over the rail corridor. However, this would result in relatively important graded difference between the land bridge and the A406 footpath on the eastern side of the railway. The grade difference and the heavy traffic volumes of the A406 would still cause significant east-west severance.

Figure 39: Existing pedestrian link across the rail corridor, looking east.



The deck would make no impact to the noise and pollution caused by the A406 in New Southgate, as the road would remain in situ. There would be no change to noise and pollution nuisance for existing residents.

- 263. While the deck would reduce noise levels and air pollution on the currently non-developed land (parcels E), it would not deliver any noise reduction on other sections of the A406.

Key finding:

The decking option would unlock additional land for development and would in parts reduce north-south severance within the Masterplanning area. However, it would not address congestion on the A406, nor would it improve air quality or reduce severance along the A406 beyond New Southgate.

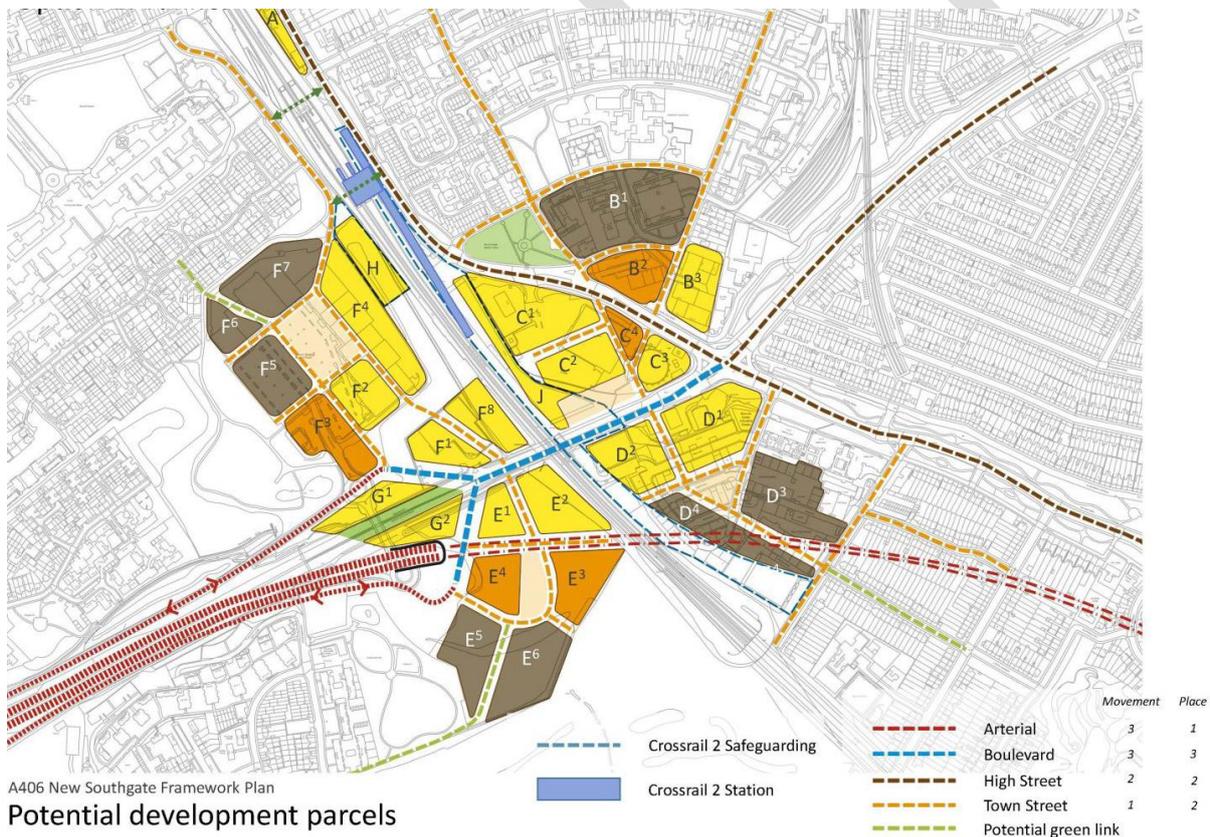
Option 2 – Longer tunnelled option

Similarly to the decking option, a tunnel would unlock new parcels for development to the south of the A406 and west of the railway by improving access to the existing train station and potential Crossrail 2 station.

264. Further to the parcels identified in the potential Option 1 masterplan, a further parcel (G) has been additionally identified for Option 2 (as shown in Figure 2-33):

G: Land adjacent to redundant North Circular (1.1 Ha)

Figure 40: Option 2 (tunnel) development parcels



A406 New Southgate Framework Plan
Potential development parcels

265. Similarly to the decking option, the combination of the construction of Crossrail 2 at New Southgate and the reduction in severance from the A406 resulting from a tunnel would enable higher densities in the surrounding redevelopment and new parcels to be developed.

266. In an instance where a tunnel was built without Crossrail 2, the tunnel would remove the severance and negative impacts of the A406 on a large area. All the development parcels identified would come forward, but at relatively low densities based on current PTALs. Whilst PTALs close to New Southgate station are high (4-5), to the south of the road they are as low as one (parcel E).

267. In a scenario where the tunnel was implemented with Crossrail 2, the greatest benefits may be brought. Once built, there would be a significant reduction in surface traffic, transforming the character of the road corridor between the western and eastern portals into a Boulevard/City hub as per RTF definitions. There is an opportunity to have active frontage, generous footways, and segregated bus and cycle lanes. In this scenario, all development parcels identified would come forward for development, with the highest densities to the north side in close proximity to the station. The boulevard would play a pivotal role in linking all development sites together.

Figure 41: Option 2 massing visualisation – Tunnel with Crossrail 2 station.



268. The redevelopment potential of each parcel is detailed in the tables below where Table 2-6 includes the construction of a Crossrail 2 station, therefore resulting in higher densities. The quantum of dwelling units in these tables are gross figures (does not account for displacement).

Table 9: Development potential at New Southgate with the tunnel and without Crossrail 2.

| New Southgate / A406 Tunnel | | | | |
|------------------------------------|------------------------|----------------------------------|----------------|--|
| Crossrail 2 not included | | | | |
| A406 Tunnel included | | | | |
| Parcel | Parcel Area (hectares) | Development Density (du/hectare) | Dwelling Units | Commercial, Civic, Community & Leisure Uses (sq m) |
| A | 0.3 | 300 | 84 | 790 |
| B | 2.7 | 148 | 400 | 3,300 |
| C | 2.5 | 146 | 364 | 4,535 |
| D | 3.7 | 145 | 536.5 | 5,210 |
| E | 4.6 | 80 | 368 | 4,780 |
| F | 6.7 | 100 | 670 | 5,430 |
| G | 1.1 | 100 | 110 | 3,007 |
| H | 0.5 | - | 0 | - |
| J | 0.6 | 146 | 88 | - |
| TOTALS | 22.7 | | 2,620 | 27,051 |

Table 10: Development potential at New Southgate with the tunnel and a Crossrail 2 station.

| New Southgate / A406: Tunnel + Crossrail 2 | | | | |
|---|------------------------|----------------------------------|----------------|--|
| Crossrail 2 included | | | | |
| A406 Tunnel | | | | |
| Parcel | Parcel Area (hectares) | Development Density (du/hectare) | Dwelling Units | Commercial, Civic, Community & Leisure Uses (sq m) |
| A | 0.3 | 300 | 84 | 790 |
| B | 2.7 | 148 | 400 | 3,300 |
| C | 2.5 | 356 | 889 | 15,435 |
| D | 3.7 | 229 | 848 | 13,175 |
| E | 4.6 | 226 | 1,038 | 4,780 |
| F | 6.7 | 359 | 2,404 | 13,895 |
| G | 1.1 | 363 | 400 | 4,295 |
| H | 0.5 | 371 | 186 | - |
| J | 0.6 | 355 | 213 | 1,080 |
| TOTALS | 22.7 | | 6,461 | 56,750 |

The tunnel would contribute to the delivery of around 2,620 new homes in New Southgate, but if a station of Crossrail 2 was built in addition to the deck, up to 6,460 new homes could be delivered (gross figures not accounting for displacement).

269. The combined tunnel & Crossrail 2 station option delivers around 200 less new homes than the decking & Crossrail 2 station option. This is due to the footprint of the tunnel's western portal which reduces the amount of land available for development (there is 1.4 Ha of additional developable land in the decking option).
270. The tunnel would also improve the public realm beyond New Southgate along the existing alignment of the A406 with strategic traffic flows removed and replaced by local traffic on a surface level. The removal of large traffic volumes and improved public realm is likely to affect property value. However, no investigation in property value uplift or potential densification has been conducted for the A406 corridor beyond the New Southgate area.
271. The existing A406 on surface would be downgraded to an urban boulevard to the east and west of the railway, with more space allocated to pedestrians and cyclists. With reduced traffic volumes, improved urban realm and higher densities, this boulevard would have the potential to attract retail and other commercial investments.

The tunnel & Crossrail 2 option would enable the delivery of around 56,700 sq of non-residential space (including commercial). This is around 15,000 sq m more than with the decking option. This difference can be explained by the improved urban realm in parcels D and E.

272. Not accounted for in this analysis, the reduction in journey times on the A406 enabled by the tunnel would open up new employment opportunities in other parts of London that are currently not within a reasonable commuting time. This would help economic growth, enabling better matching of skilled workers and vacancies.
273. Similarly, the tunnel scheme would enable a number of bus services that currently operate through the New Southgate area to be reconfigured, to make use of the new or less congested surface level access routes as well as enable new bus routes to operate. The tunnel also would provide better opportunities for local trips by sustainable travel modes. Taken together with the improved connectivity offered by Crossrail 2, this would open up employment opportunities in the local vicinity for sustainable mode users and further afield for bus users and Crossrail 2.
274. The additional jobs enabled by the tunnelling of the A406 would go further to address the significant levels of deprivation experienced in Haringey and Enfield wards adjacent to the A406.

The tunnel option would provide congestion relief to the A406 at New Southgate and in the surrounding area.

275. On the A406 between the M11 and A10 a 6-10 minute reduction in journey time is forecast, with the most significant improvement noticeable in the eastbound PM peak. In total, the tunnel would result in a reduction of 8,300 pcu-kms and 1,320 pc-hrs for the AM and PM peaks combined.
276. The volume of traffic on local roads and collectors is predicted to decline, with delay reducing accordingly. In addition, the scheme would reduce traffic on the M25 (circa 600-700 PCUs in both directions).
277. Despite these congestion benefits, it is important to note that the tunnel would also attract traffic, as far west as Henlys Corner and as far east as the M11. It is forecast that the tunnel would carry 6,500 PCUs (two-way) in both peak periods as a result of this attraction. On the A406 to the east of the portals, there is a circa 2,300 PCU increase and approximately a 700 PCU increase to the west.

278. As a result of increased traffic, the scheme would result in delays either side of the tunnel. Delays would also increase at the Coney Hatch interchange and the A10 interchange (the result of additional demand and the necessity of routing surface traffic through these junctions due to space constraints at the portal locations).
279. The modelling results described do not consider the proposed development of 2,600 homes and 13,000sqm office space. When this model was run, generally modest increases as a result of additional traffic were identified; the total distance travelled and total travel time benefits fall to 7,200 pcu-kms and 1,130 pcu-hrs across both peak periods respectively.

The tunnel option would reduce severance in New Southgate and between New Southgate and the A10, enabling new developments and offering the opportunity to reconnect the north and south of the A406.

280. Within the Masterplanning area, the tunnel would provide the opportunity to downgrade the A406 to an urban boulevard, reducing north-south severance between the dumbbell interchange and the rail corridor. Similarly to the decking option, it would enable the development of Parcels E (although, as mentioned earlier, the parcels would be smaller than with the decking option due to the footprint of the tunnel's portal).
281. The tunnel would also reduce the north-south severance to the east of the rail corridor. The reduction in traffic volumes would enable the provision of better facilities for pedestrians, cyclists and bus services. As previously mentioned, the public realm improvement and reduction in severance would encourage active frontage and the take up of retail. This is reflected in the Masterplanning work with the amount of commercial space that could be delivered by the tunnel option (Table 2-5 and 2-6).
282. The tunnel would also retain and enhance the at-grade east-west link across the railway for both local traffic and active transport.
283. With a Core Road placed underground along a different alignment to the present A406, the tunnel provides the opportunity to increase the "sense of place" along the existing A406 corridor beyond the Masterplanning area. Following the principals of the Roads Task Force report the existing A406 (Core Road) would become a High Street type corridor.
284. With the removal of large volumes of traffic and the re-allocation of space to pedestrians, cyclists and public transport users, connectivity would be re-established between the two communities to the north and south of the existing A406 corridor between New Southgate and the A10.

The tunnel would result in significantly lower levels of noise and pollution between New Southgate and the A10, improving the quality of life of thousands of existing residents.

285. The tunnel would have a considerable impact if pursued. With the strategic traffic movements relocated underground, the bulk of air pollution would be removed from the surface, offering a cleaner environment for thousands of existing residents and the two schools along the A406 (Bowes Primary School and Broomfield Secondary School).
286. With lower traffic volumes, it is also expected that noise would be lower by 5 to 10 db.

Key finding:

The tunnel option would unlock additional land for development and deliver journey time savings on the A406. It would also reduce severance, noise and air pollution within and beyond the Masterplanning area.

Impact of Not Changing

Retaining the current layout for the A406 at New Southgate would prevent this area from meeting its full potential as a location for housing and employment growth.

287. A decision not to progress Option 1 or 2 would mean:

- The A406 corridor at New Southgate would not be able to deliver a high quantum of new residential units and would make a lower contribution towards addressing London's housing need generated by strong employment and population growth
- Worsening affordability of housing within the three Boroughs of Barnet, Haringey and Enfield
- A deterioration of the quality of the urban realm and environmental quality as traffic volumes increase and air quality and noise worsen
- Severance impacts are not addressed
- Footfall and retail spend in the area along the A406 is static or declines
- Trends of declining local employment would be more likely to continue.
- Productivity and GVA levels and tax receipts would be lower.

Comparison of options:

288. Both the decking and the tunnel option have been assessed against the key measures of success identified in Part E of this document. Table 11 summarises the key points.

With Crossrail 2, the decking option would deliver 200 more homes than the tunnel option. However, the tunnel option would better perform towards jobs creation, severance reduction and the safeguarding of the A406 movement function.

289. Both options would offer significant re-generation benefits for the Masterplanning area. The tunnel would contribute to the delivery of about 200 less homes than the decking option but would deliver more jobs and non-residential spaces. The tunnel would also offer significant decongestion and travel time benefits on the A406, a key part of the TLRN. In terms of severance and quality of life, the tunnel would enable significant improvement with re-established links, lower noise levels and improved air quality.

290. Although the decking option has been fully assessed, the economic case of this business case will focus on the tunnel option.

Table 11: Comparison of option 1 and option 2 against key measures of success

| Key measures of success | Option 1 – Western deck (with Crossrail 2 station and development) | Option 2 – Tunnel (with Crossrail 2 station and development) |
|---|---|---|
| <p>Supporting growth:</p> <p>Creation of new homes and jobs in the context of the delivery of Crossrail 2.</p> <p>Increase local economic outputs and employment figures following the regeneration of New Southgate.</p> | <p>Within the Masterplanning area:</p> <ul style="list-style-type: none"> ○ 6,675 units in New Southgate (gross) ○ 41,000 Sq m of non-residential space (including commercial) ○ 2,481 new jobs (gross direct and indirect) | <p>Within the Masterplanning area:</p> <ul style="list-style-type: none"> ○ 6,460 units in New Southgate (gross) ○ 56,750 Sq m of non-residential space (including commercial) ○ 3,403 new jobs (gross direct and indirect) <p>The tunnel is also likely to be a catalyst for smaller scale development along the A406 between New Southgate and the A10, although it has not been quantified.</p> |
| <p>TLRN resilience:</p> <p>Reduce delays and journey times for motorised traffic on the A406.</p> | <p>No capacity or reliability improvements. Delays expected to increase with growth in demand (including from development at New Southgate).</p> | <p>Reduction in travelled distance (7,200 pcu-kms) and reduction in travel times (1,130 pcu-hrs) across both peak periods.</p> <p>Lower traffic volumes on local roads, collectors and M25.</p> <p>Additional delays on surface roads near portals.</p> |
| <p>Severance and quality of life:</p> <p>Provision for safer and better connected cycling and walking routes with the creation of new surface links.</p> <p>Achievement of lower levels of air and noise pollution experienced on the surface.</p> | <p>Reduction in north-south severance between the dumbbell interchange and the rail corridor (the A406 is decked over).</p> <p>Potential increase in east-west severance across the rail corridor (the only access would be the footpath of the decked A406).</p> <p>No reduction in severance in the eastern side of the Masterplanning area.</p> <p>No changes to the A406 corridors between New Southgate and the A10.</p> <p>Reduction in noise levels on Parcels E and F (currently green land and car show room).</p> <p>No changes to air quality.</p> | <p>Reduction in north-south severance between the dumbbell interchange and the rail corridor (the road is downgraded to an urban boulevard with crossing facilities and reduced traffic).</p> <p>Retained and enhanced at-grade pedestrian east-west connection across the rail corridor (the new urban boulevard).</p> <p>Existing A406 corridor downgraded to an urban boulevard easier to cross for pedestrians and improving the cycling environment</p> <p>Reduction in north-south severance between New Southgate and the A10 with reduced traffic volumes and new crossing opportunities.</p> <p>Reduction in noise levels from 5 to 10db along the whole corridor (Masterplanning area and existing residential areas).</p> <p>Improved air quality along the whole downgraded section of the A406 (Masterplanning area and existing residential areas, Inc. two schools).</p> |

PART G: STRATEGIC CONTEXT

Section Summary:

This section describes how the A406 New Southgate tunnel is supported by policies at all spatial scales.

Existing national, regional and local policies give general and specific support to tunnelling of the A406 to address strategic and local needs and unlock land for development, reduce severance, improve public realm and local connectivity, and promote walking and cycling.

National policy context

291. The Department for Transport's nine priorities for the transport network are:

1. continuing to develop and lead the preparations for a high speed rail network
2. improving the existing rail network and creating new capacity to improve services for passengers
3. **tackling congestion on our roads**
4. **continuing to improve road safety**
5. **encouraging sustainable local travel**
6. **promoting lower carbon transport, such as walking and cycling as well as introducing more environmentally-friendly buses and trains**
7. supporting the development of the market for electric and other ultra-low emission vehicles
8. supporting the development of aviation, improving passenger experience at airports
9. maintaining high standards of safety and security for passengers and freight

The proposed options would contribute towards DfT policy priorities 4, 5 and 6. The tunnelled option also contributes to DfT policy priority 3.

292. Both projects would improve the safety of pedestrians and cyclists by reducing the severance effects of the A406 and would encourage greater use of these lower carbon modes by improving the public realm and improving provision for walking and cycling.
293. The National Planning Policy Framework (NPPF) published in 2010 sets out a policy framework for how the land-use planning system should function.

A decked or tunnelled option on the A406 between New Southgate and the A10 would support NPPF aims of improving economic vitality, quality place-making and supporting sustainable transport modes through unlocking regeneration, reducing severance and delivering public realm improvements

294. The NPPF seeks to secure economic growth to create jobs and prosperity. The Government is committed to ensuring that the planning system does everything it can to support sustainable economic growth and a competitive economy and so significant weight should be placed on the need to support economic growth through the planning system. The NPPF positively promotes competitive town centre environments and contains a 'town centre first' policy.
295. The NPPF states that the transport system needs to be balanced in favour of sustainable transport modes, giving people a real choice about how they travel. Encouragement should

be given to solutions which support reductions in greenhouse gas emissions and reduce congestion.

296. The NPPF states that planning plays a key role in helping shape places to secure radical reductions in greenhouse gas emissions, minimising vulnerability and providing resilience to the impacts of climate change, and supporting the delivery of renewable and low carbon energy and associated infrastructure.
297. The NPPF says that the planning system should contribute to and enhance the natural, local and historic environment.
298. The decked or tunnelled option would contribute towards each of these objectives.
299. The National Policy Statement (NPS) for the National Road and Rail Networks published in December 2014 states “The national road and rail networks that connect our cities, regions and international gateways play a significant part in supporting economic growth, as well as existing economic activity and productivity and in facilitating passenger, business and leisure journeys across the country. Well-connected and high-performing networks with sufficient capacity are vital to meet the country’s long-term needs and support a prosperous economy.”
300. The NPS states that: “Improved and new transport links can facilitate economic growth by bringing businesses closer to their workers, their markets and each other.” By inference there is a risk that insufficient investment in these transport connections and not increasing capacity of road and rail networks will acts as a major barrier to and brake on economic growth.
301. The pressure on the road network is forecast to increase with economic growth, substantial increases in population and a fall in the cost of car travel from fuel efficiency improvements. The NPS states that 2014 DfT traffic forecasts predict that by 2040, a quarter of travel time will be spent delayed in traffic.
302. It suggests that without improving national road networks, including its performance, it will be difficult to support further economic development, employment and housing and this will impede economic growth and reduce people's quality of life. It is reasonable to argue that the same rationale applies to the TfL Road Network.

Key finding:

The decked and tunnelled options on the A406 North Circular Road at New Southgate demonstrate a close fit with national policy goals, including the DfT’s nine transport priorities, the NPPD, and the NPS for the National Road and Rail Networks.

Regional and Sub-Regional policy context

The Mayor’s Transport Strategy (MTS seeks to better integrate land-use and transport planning within London.

303. The MTS, published in 2010 by the Greater London Authority, sets out the following vision for travel and transport in London:
304. ‘London’s transport system should excel among those of world cities, providing access to opportunities for all its people and enterprises, achieving the highest environmental standards and leading the world in its approach to tackling urban transport challenges of the 21st century.’

305. Alongside this vision, the MTS identifies six strategic goals for London:

1. Supporting economic development and population growth
2. Enhancing the quality of life of all Londoners
3. Improving the safety and security of all Londoners
4. Improving transport opportunities for all Londoners
5. Reducing transport's contribution to climate change and improving its resilience
6. Support delivery of the London 2012 Olympic and Paralympic Games and its legacy

306. The A406 New Southgate decked or tunnelled option would contribute to these goals through unlocking development sites, improving the public realm and conditions for the sustainable modes of walking and cycling. It would also improve access to both tube and bus stations.

Key finding:

The A406 decked and tunnelled options at New Southgate contribute towards MTS goals 1-5

307. London's road network acts as arteries for the movement of people and goods to help Londoners and those from surrounding areas to access employment, education, retail, and leisure opportunities. A well-functioning and efficient highway network is essential for the proper functioning of the London economy and to maintain the quality of life of the residents of the city. Improvements to streetscapes and the public realm will help to create safer, more walkable neighbourhoods, support place-shaping and regeneration and attract investment. Improvements to traffic management will help to make the TfL and borough road network more resilient.

The MTS also contains proposals for improving transport networks in London. New road schemes will be considered under the MTS where there is an overall net benefit against specific criteria

308. This includes a contribution to improved connectivity, and contribution to improvements in conditions for pedestrians and cyclists.

309. Table 12 sets out how the A406 New Southgate decked and tunnelled scheme options conform to relevant MTS policies.

Table 12: How the decked or tunnelled scheme supports Mayor’s Transport Strategy policies

| MTS Policy no. | Policy description | How the A406 New Southgate decking and tunnel options conform with the policy |
|----------------|--|--|
| 1 | The Mayor, through TfL, will seek to develop London’s transport system in order to accommodate sustainable population and employment growth. | The scheme would help unlock housing and new employment by enabling higher density of development. |
| 2 | The Mayor, through TfL, and working with the DfT, government agencies, Network Rail, train operating companies, London boroughs, coach operators and other transport stakeholders, will support sustainable capacity enhancements to interregional, national and international rail and coach services, high-speed rail hubs and the strategic road network serving London. | The A406 tunnel scheme would provide a sustainable enhancement to the strategic road network at New Southgate, relieving congestion by providing a through strategic route |
| 3 | The Mayor, through TfL, and working with the DfT, Network Rail, train operating companies, London boroughs and other stakeholders, will seek to improve public transport accessibility and conditions for cycling and walking in areas of lower PTAL, where there is an identified need for improving accessibility; and to improve access to economic and social opportunities and services for all Londoners. | Conditions for pedestrian and cycle movements from north to south across the A406 corridor would be made easier, as a result of reduced severance effects, improving access to opportunities and services for residents. |
| 4 | The Mayor, through TfL, will seek to improve people’s access to jobs, business’ access to employment markets, business to business access, and freight access by seeking to ensure appropriate transport capacity and connectivity is provided on radial corridors into central London. | Both the tunnelled and decked schemes would improve access to employment, increase overall public transport capacity and connectivity. |
| 5 | The Mayor, through TfL, and working with the DfT, Network Rail, train operating companies, London boroughs and other stakeholders, will seek to ensure efficient and effective access for people and goods within central London through providing improved central London connectivity and appropriate capacity. This will include improving access to major public transport interchanges for pedestrians, cyclists and by public transport. | Both the tunnelled and decked schemes would improve access to New Southgate railway station from areas on the southern side of the A406 for pedestrians and cyclists, improving local connectivity. |
| 6 | The Mayor, through TfL, and working with the DfT, Network Rail, train operating companies, London boroughs and other transport stakeholders, will seek to provide appropriate connectivity and capacity on radial transport corridors into current and potential metropolitan town centres and to Strategic Outer London Development Centres. | The tunnel would relieve congestion on the A406 corridor and would provide enhanced connectivity for road users by providing a direct route underground and less congested local roads on the surface. |

| MTS Policy no. | Policy description | How the A406 New Southgate decking and tunnel options conform with the policy |
|----------------|--|---|
| 9 | <p>The Mayor, through TfL, and working with the DfT, Network Rail, train operating companies, London boroughs and other transport stakeholders, will use the local and strategic development control processes to seek to ensure that:</p> <ol style="list-style-type: none"> 1. All high trip generating developments are located in areas of high public transport accessibility, connectivity and capacity (either currently or where new transport schemes are committed) 2. The design and layout of development sites maximise access on foot, cycle and to public transport facilities, for example, via safe walking and cycling routes and provision of secure cycle parking 3. Access for deliveries and servicing, maximise the opportunities for sustainable freight distribution where possible 4. Land for transport use is safeguarded in line with London Plan policy and Supplementary Planning Guidance 5. Planning contributions are sought for transport improvements where appropriate | <p>The level of development at New Southgate proposed in both options would be shaped by the improvement in capacity, connectivity and accessibility it brings forward.</p> <p>Masterplanning of new development at New Southgate would maximise access on foot, cycle and public transport where possible and has been developed in line with London Plan policy and Supplementary Planning Guidance.</p> <p>The tunnel scheme would reduce local severance and traffic volumes, creating safer walking and cycling routes to and from new developments.</p> |
| 11 | <p>The Mayor, through TfL, will seek to reduce the need to travel, encourage the use of more sustainable, less congesting modes of transport (public transport, cycling, walking and the Blue Ribbon Network), set appropriate parking standards, and through investment in infrastructure, service improvements, promotion of smarter travel initiatives and further demand management measures as appropriate, aim to increase public transport, walking and cycling mode share.</p> | <p>Both the tunnel and decking schemes would encourage additional cycle/pedestrian movements.</p> |
| 13 | <p>The Mayor, through TfL, and working with the DfT, Network Rail, train operating companies, London boroughs and other stakeholders, will expand the capacity and quality of public transport services, improve passenger comfort and customer satisfaction, reduce crowding, and improve road user satisfaction.</p> | <p>The tunnel scheme would improve road user satisfaction by reducing congestion and delay on the A406.</p> |
| 14 | <p>The Mayor, through TfL, and working with the DfT, Network Rail, train operating companies, London boroughs and other stakeholders, will seek to improve transport's contribution to the built and natural environment.</p> | <p>The tunnel scheme would improve the public realm and environment along the current A406 North Circular corridor, by placing strategic traffic movements underground, removing visual intrusion, improving air quality and local connectivity,</p> |

| MTS Policy no. | Policy description | How the A406 New Southgate decking and tunnel options conform with the policy |
|----------------|---|---|
| 16 | The Mayor, through TfL, and working with the DfT, Network Rail, train operating companies, freight operators, London boroughs and other stakeholders, will seek to reduce noise impacts from transport. | The tunnel would reduce the number of residents impacted by transport noise in the surrounding area. This reduction is greater along the length of the tunnel (compared to at the portals) |
| 17 | The Mayor, through TfL, and working with the DfT and other government agencies, the London boroughs, health authorities and other stakeholders, will promote healthy travel options such as walking and cycling. | The tunnel scheme would reduce severance, and improve public realm and environmental quality, creating a more welcoming environment for pedestrians and cyclists |
| 22 | The Mayor, through TfL, and working with the LDA, DfT, Network Rail, train operating companies, London boroughs and other stakeholders, will seek to enhance connectivity, reduce community severance, promote community safety, enhance the urban realm and improve access to jobs and services in deprived areas. | The tunnel scheme would reduce community severance by placing the busy A406 underground. The urban realm would be enhanced by removing a visually intrusive strategic road from the surface and creating new public spaces. Better connections in the area would improve access to jobs and services for residents. |
| 30 | The Mayor, and TfL, will make the case to Government for long-term investment in the transport network to secure the outcomes set out in this strategy. | This business case sets out the case for investment in improving part of the strategic road network. |
| 36 | The Mayor, and TfL, will work with the London boroughs and other stakeholders, to seek to secure further investment from a variety of sources that help improve the quality and range of transport services available to Londoners. | The Financial Case for this project has considered a range of sources of funding that could be utilised to enable the delivery of the scheme. |

The London Plan (updated in March 2015), sets out the strategic spatial planning framework for London as a whole

310. The London Plan sets out the following vision for London:

‘Over the years to 2036 – and beyond, London should:

Excel among global cities – expanding opportunities for all its people and enterprises, achieving the highest environmental standards and quality of life and leading the world in its approach to tackling the urban challenges of the 21st century, particularly that of climate change.’

311. This high level, over-arching vision is supported by six detailed objectives that will inform place-making and land-use planning for new development, all of which are in some way relevant to this business case:

- A city that meets the challenges of economic and population growth;
- An internationally competitive and successful city;
- A city of diverse, strong, secure and accessible neighbourhoods;
- A city that delights the senses;
- A city that becomes a world leader in improving the environment;
- A city where it is easy, safe and convenient for everyone to access jobs, opportunities and facilities.

The proposed road decking or tunnel at New Southgate would help to support the London Plan objectives by acting as a catalyst for development and investment in improving the public realm

312. The tunnel and decking options would free up land for additional growth in jobs and homes, meaning that growth above these levels may be possible.

313. These schemes would help to support the wider London economy by acting as a catalyst for investment in improving the public realm, thereby opening up redevelopment opportunities for denser development. By enabling new housing and office development, this would help London to retain its status as a competitive global city.

314. A better, more walkable public realm with reduced severance would improve safety for Londoners of all ages and backgrounds and enhance the setting of landmark buildings. Both schemes would result in environmental improvements through supporting modal shift from the private car towards public transport, cycling and walking, with positive impacts on air quality, noise and townscape. As a result, the neighbourhood around the project would be more permeable and easier to navigate around for pedestrians and by bicycle.

Key finding:

Both the A406 decked and tunnelled options contribute towards London Plan objectives 1-6 by enabling growth and improving quality of place.

The Roads Task Force (RTF) is an independent body, with a remit to tackle the challenges facing London's streets and roads.

315. This body, which was set up by the Mayor of London in 2012 brings together a wide range of interests and expertise, united in the belief that the Capital needs a long-term strategy for roads and a commitment to major investment in street management and urban design.

316. The RTF report, published in July 2013, focuses on three core aims:

- To enable people and vehicles to move more efficiently on London's streets and roads
- To transform the environment for cycling, walking and public transport
- To improve the public realm and provide better and safer places for all the activities that take place on the city's streets, and provide an enhanced quality of life

317. The RTF's highlights 'unlocking major growth and regeneration' as key parts of its vision for the city. The report notes that the potential of many areas to deliver growth is constrained

because of a lack of connectivity, and/or the impact of roads on ‘place value’, and cites mitigation of noise and severance as key to unlocking this potential growth.

Annex 3 of the RTF report cites the A406 North Circular Road as a congested highway corridor experiencing problems of local severance, poor air quality and noise

- 318. The RTF proposes a clear strategy for the A406 to provide reliable and acceptable journey times through measures that will also improve the quality of life for neighbouring residents. It proposes junction improvements or using techniques that free space for local transport, community uses or development.
- 319. The report states that alternative tunnelled routes for traffic should be explored in order to improve local quality of life and provide ‘transformative effects’ to the town centre.

Key finding:

The A406 New Southgate decked and tunnelled options contribute to all 3 core aims of the RTF, and is a key area identified in the report

The TfL Surface Transport Plan 2015/16 sets out the approach towards managing the organisation’s transport networks

- 320. This includes TfL’s bus, taxi, coach and river networks, freight deliveries, the Santander cycle hire, Congestion Charge and Low Emission Zone schemes and the approach towards the management of the TfL Road Network (TLRN).
- 321. The Plan sets out a goal: ‘to keep London working, growing and to make life in London better’. Alongside this goal, the Plan has an ambition: ‘to provide, manage and improve the services, streets and places that connect London for all, sustaining its position as a world leading city’. The Plan has identified ten outcomes for surface transport in London (Table 13).

Table 13: Surface Outcomes supported by the A406 New Southgate decking or tunnel scheme

| Surface Outcome | How this project contributes towards the outcome |
|--|---|
| Reliable roads: Ensuring a reliable and resilient road network for all of London by managing congestion and improving connectivity. | The tunnel would relieve congestion on the A406, as traffic would follow a direct through route. |
| Improving the environment: Continuing to deliver environmental improvements, by reducing pollutants from ground based transport and enhancing the natural environment. | The tunnel would result in improved air quality at surface level, due to fewer vehicles. |
| Better places to walk: Creating and supporting safe attractive, accessible streets and places that people can use, enjoy and choose to walk more. | By placing the road in a tunnel, severance would be considerably reduced from New Southgate to the A10. This would improve the pedestrian environment and provide a higher quality public realm, generating more walking trips. |
| Reduced casualties: Continuing the downward trend in casualties on London’s roads and public transport networks | Placing the busy and congested A406 in a tunnel would improve pedestrian and cycling safety on the surface. |

| Surface Outcome | How this project contributes towards the outcome |
|---|---|
| Reduced crime: Continuing the downward trend in crime, antisocial behaviour and fear of crime on London's transport networks. | A more attractive public realm and higher pedestrian flows would help reduce the fear of crime. |

Key finding:

The A406 New Southgate decked and tunnelled options contribute to five of the ten Surface Outcomes.

The London Infrastructure Plan 2050 sets out the Mayor's long-term aspirations for the infrastructure to support London's future growth

322. The London Infrastructure Plan 2050 was published in 2015 following consultation in 2014³⁹. It sets out the infrastructure needs for a city set to surpass a population of 11 million in 2050.
323. The central projection is a 37 per cent increase in population from 2011 to 2050. It notes that the road network caters for 80 per cent of people's journeys and 90 per cent of freight journeys and is vital for the continued economic success and functioning of the city.
324. The Transport Supporting Paper of the London Infrastructure Plan 2050 sets out the Capital's infrastructure requirements and how best to deliver them. The document sets out the following transport requirements that are relevant to this business case:
- 12: A new inner orbital tolled tunnel and a series of other smaller tunnels and decking over to help transform places across the city.
 - 23: A comprehensive network of high quality cycle and pedestrian routes

³⁹ London Infrastructure Plan - <https://www.london.gov.uk/sites/default/files/London%20Infrastructure%20Plan%202050%20%E2%80%93%20consultation%20document.pdf>

Key finding:

The A406 New Southgate decked and tunnelled schemes conform to the 2050 Infrastructure Plan.

325. The North London Sub-Regional Transport Plan (SRTP), updated in 2014, identifies an A406 road study and the investigation of long term solutions to address highway congestion and enable more efficient use of the road network as a priority work area. The developed options for the A406 at New Southgate would enable this priority to be met.

Local policy context

326. References to road improvements in local planning documents and transport policy from LB Enfield, LB Haringey and LB Barnet are summarised in Table 14.

Table 14: Local policy context

| Local authority document | Policy |
|----------------------------------|--|
| LB Enfield | |
| Core strategy 2010 ⁴⁰ | Strategic objective 8 provides support to enhance traffic flow by the provision of appropriate infrastructure, focusing particularly on road and public transport orbital connections, improving east-west movement through the Borough. |
| | Core policy 1 states that the council will focus future growth and development on four specific areas, one of which is the New Southgate. |
| | Core policy 24 promotes the Council working with partners to deliver improvements to Enfield's road network, enabling economic regeneration and development, support businesses, improve safety and environmental quality, reduce congestion, and provide additional capacity where needed. There is a focus on the operation and capacity of the A406 from Green Lanes and Bounds Green Road based on long standing concerns of businesses and residents |
| | Core policy 44 states that the council will promote environmental and housing improvements in the North Circular area. |
| | Core policy 45 states that the council will work to improve New Southgate as a place, emphasising the importance of a holistic integrated approach to development. This includes pursuing an integrated approach to development considering the Western Gateway site, the Ladderswood Estate and the New Southgate Industrial Estate. Solutions which integrate with a wider area by a network of green spaces and better links for pedestrians and cyclists are being promoted. |
| Local | Policy T1 provides Council commitment to the establishment and |

⁴⁰ Core Strategy, LB Enfield, 2010, http://www.enfield.gov.uk/download/downloads/id/6928/enfield_core_strategy

| Local authority document | Policy |
|--|---|
| Implementation plan ⁴¹ | maintenance of a road network that caters for all appropriate movements and efficient use of that network |
| | Policy T2 outlines a commitment to improving facilities and conditions for all road users |
| | Policy T6 states the council will work to improve accessibility to desired destinations through land use policies and by development of infrastructure where required. |
| | Policy T9 provides commitment to secure environmental improvements where possible when implementing highway schemes through enhanced design. |
| North Circular Area Action Plan (NCAAP) adopted October 2014 ⁴² | Policy 1 states that The North Circular Area will comprise of attractive neighbourhoods where people will choose to live in communities with a high quality environment, homes and excellent transport links. Three neighbourhood places identified, all of which straddle the A406: Arnos Grove/New Southgate, Bowes Road, Green Lanes |
| | Policy 2 identifies sites within the NCAAP to deliver approximately 1,400 new homes by 2026. Existing vacant housing along the corridor. |
| | Policy 3 promotes jobs creation and protection in the AAP via the redevelopment of sites. |
| | Policy 8 states that the council will work closely with TfL on assessing the efficiency of the strategic road network in the area and the traffic impact of the A406 on the immediate and nearby secondary road network. |
| | Policy 15 identifies the New Southgate station area as one with a poor relationship with its hinterland and redevelopment of the sites around the station has the potential to address this. The relationship could particularly be improved between the station and local commercial parade along Friern Barnet Road. |
| New Southgate Masterplan ⁴³ | This document focuses on how the council will implement Core policy 45: improving New Southgate as a place. The masterplan package includes: <ul style="list-style-type: none"> • Helping new/existing business in area by creating clusters of new development • Opening new pedestrian and cycling routes through the area • Improving existing housing, industry and shopping areas |
| LB Haringey | |
| Local Plan: | SP2 states the councils aim to deliver homes to meet housing needs, |

⁴¹ Local Implementation Plan, LB Enfield,

http://www.enfield.gov.uk/downloads/download/162/local_implementation_plan

⁴² North Circular Area Action Plan, LB Enfield, 2014,

http://www.enfield.gov.uk/download/downloads/id/10320/ncaap_adoption_version_2014

⁴³New Southgate Master Plan, LB Enfield,

http://www.enfield.gov.uk/download/downloads/id/6885/final_masterplan_new_southgate

| Local authority document | Policy |
|---|--|
| Strategic Policies, 2013-2026 ⁴⁴ | making full use of the boroughs capacity. |
| | SP7 states that the Council will work with its partners to promote key infrastructure proposals to support Haringey's regeneration, local and strategic access to London, employment areas and local services. |
| Local Implementation Plan, 2011-2014 ⁴⁵ | Objective 1 sets out the council's commitment to ensuring the transport network can accommodate increases in travel demand by tackling congestion, increasing sustainable transport capacity, encouraging modal shift and reducing the need to travel. |
| | Objective 3 states that the council will facilitate an increase in walking and cycling to improve the health and wellbeing of residents. |
| | Objective 9 states the council will improve the conditions of principle roads, cycle paths and footways within the borough, having regard for the public realm and increase satisfaction with the condition of the network. |
| Woodside, Noel Park and Bounds Green Area Forum and Committee Area Plan ⁴⁶ | This plan seeks to reduce high deprivation in the area south of the A406 in a number of ways, including improving the public realm, regenerating local developments and improving community safety. |
| LB Barnet | |
| Local Plan: Core Strategy, 2012 ⁴⁷ | Core policy 3 and 4 states that the borough will promote further housing development, seeking to maximise housing density to reflect local context, public transport, accessibility and the provision of social infrastructure. |
| | Core policy 9 promotes the delivery of appropriate transport infrastructure to support growth and relieve pressure. The borough commits to ensuring more efficient use of the road network is a priority to reduce congestion, promoting major network improvements to the strategic road network especially the A406. |
| | The 2010 public satisfaction survey indicated that the condition of roads and pavements, traffic congestion and road safety are the most significant transport concerns for Barnet residents, achieving low satisfaction scores. |
| Local Implementation | The Local Implementation Plan identifies the priority the borough places on ensuring more efficient use of the local road network. |

⁴⁴ Local Plan: Strategic Policies, 2013-2026, LB Haringey, 2013, <http://www.haringey.gov.uk/housing-and-planning/planning/planning-policy/local-development-framework-ldf/local-plan-strategic-policies>

⁴⁵ Local Implementation Plan, LB Haringey, 2011-2014, http://www.haringey.gov.uk/sites/haringeygovuk/files/haringey_s_final_lip.pdf

⁴⁶ Local Plan: Strategic Policies, 2013-2026, LB Haringey, 2013, <http://www.haringey.gov.uk/housing-and-planning/planning/planning-policy/local-development-framework-ldf/local-plan-strategic-policies>

⁴⁷ Local Plan: Core Strategy, LB Barnet, 2012, https://www.barnet.gov.uk/dam/jcr:43346e1d-456d-4de4-b5b9-2d541ad1bb2e/Barnet_Core_Strategy_v5_latest.pdf

| Local authority document | Policy |
|--------------------------|--|
| Plan ⁴⁸ | The council outlines four key ways it seeks to do so under Objective 1: a. Reduce congestion b. Improve the condition of roads and footpaths c. Improve the bus network d. Make travel safer and more attractive |
| | Objective 3 outlines the borough's aim to deliver high quality transport solutions in regeneration areas. Pursuing major improvements to the strategic road network (c) and comprehensive transport solutions in major development areas (a) are described as methods to achieve this. |
| | Objective 4 outlines support for the development of more environmentally friendly transport networks, via investment in mixed use development to reduce the need to travel (b) and making cycling and walking more attractive modes (c). |

Key finding:

All local boroughs are supportive of the principle of delivering improvements to the A406 North Circular road, subject to concerns about local impacts.

327. Existing national, regional and local policies thus give both general and specific support to the developed road interventions for the A406 North Circular Road at New Southgate to address strategic and local needs for congestion relief. A number of the national and regional policy documents contain 'criteria' that will be taken into account in the assessment of both developed options, while local planning documents also set out some concerns about local impacts.

External Drivers of Change

328. As discussed in Part A, there is a need to improve productivity in the UK, following weak growth since the end of the 2007 financial crisis. Whole-economy output per hour in the fourth quarter of 2014 was 1.7 per cent lower than the peak reached in 2008⁴⁹.
329. London generates significantly more GDP per workforce job than the rest of the UK. The average GDP per workforce job in London was £56,687 in 2012 compared to £37,281 for the rest of the UK⁵⁰. As such, London contributes significantly to the Exchequer's tax revenues and provides an effective net subsidy (net of tax revenues and public spending) of 20.3 per cent of its GDP to the UK regions⁵¹.

⁴⁸ Local Implementation Plan, LB Barnet, 2013.

⁴⁹ Office for National Statistics Labour Productivity Q4 2014 <http://www.ons.gov.uk/ons/publications/reference-tables.html?edition=tcm%3A77-383478>

⁵⁰ GLA Economics Gross Value Added per Workforce Job <http://www.london.gov.uk/sites/default/files/GLAE%20Working%20Paper%20-%20GVA%20per%20Workforce%20Job%20in%20London%20and%20the%20UK%20-%20February%202015%20-%20FINAL.pdf>

⁵¹ Centre for Economics and Business Research, How money in some regions subsidises others <http://www.cebr.com/reports/how-money-in-some-regions-subsidises-others/>

330. For London to stay competitive the quality of its transport infrastructure and public realm must be improved. A successful London which continues to attract businesses and high-skilled labour can contribute surpluses to the government budget balance in the long-term.

Stakeholders

331. Table 15 outlines the main stakeholder groups that will be involved with or interested in the project.

Table 15: Stakeholders

| Stakeholder | Description |
|---|---|
| Affected boroughs: LB of Barnet LB Haringey LB Enfield | <ul style="list-style-type: none"> Local authority, protecting interests of residents and local businesses Responsible for design review/approvals, and reviewing the impact on local residents |
| Borough councillors and MPs | <ul style="list-style-type: none"> Protecting policy and constituent interests |
| GLA | <ul style="list-style-type: none"> Statutory planning authority, protecting interests of Londoners and policy interest |
| Deputy Mayor for Transport | <ul style="list-style-type: none"> Providing policy advice and direction, setting priorities and taking decisions relating to transport issues on behalf of the Mayor |
| HM Treasury | <ul style="list-style-type: none"> Maintaining control over public spending, setting the direction of economic policy |
| Department for Transport (DfT) | <ul style="list-style-type: none"> Setting national policy for transport |

332. There will be ongoing liaison with these stakeholders in relation to the project, and mapping of views and requirements and where these may conflict. Affected boroughs will continue to be updated regularly by the programme team.
333. As the programme advances, the stakeholders engaged are likely to expand considerably, including the public. Accordingly, the Stakeholder Management Plan is subject to ongoing review (once it has been signed off, this will be added to an Appendix in a subsequent version of this business case).

Constraints

334. There are a number of constraints which could affect either the decking option (Table 16) or the proposed longer tunnel scheme (Table 17) at New Southgate.
335. Suitable mitigation measures have been identified for each constraint and in some cases have been resolved. None of the constraints represent an insurmountable challenge. TfL is confident that they could be sufficiently addressed through design.

Table 16: Option 1 constraints

| Constraint | Type of constraint | Description / issue | Potential mitigation |
|--|--------------------|---|---|
| Disruption to operational railway during construction | Construction | Decking would be adjacent to operational railway. There is a risk of disruption to East Coast Mainline operation during construction. | To be designed out through further analysis. |
| Acquisition of properties | Land take | Scheme would involve temporary and permanent acquisition of residential and commercial properties. | Working closely with LB Barnet, LB Haringey and LB Enfield to minimise impact on residents and those affected by the scheme |
| Unmanageable construction traffic | Construction | Risk that disruption to traffic during construction is unmanageable | Use best practice to understand innovative construction techniques. Careful traffic management would be required to ensure delays and disruption are minimised. |
| Proposed masterplan layout | Planning | No formal consent for number of dwellings/construction as outlined in masterplan. | Working closely with LB Barnet, LB Haringey and LB Enfield to agree way forward. |

Table 17: Option 2 constraints

| Constraint | Type of constraint | Description / issue | Potential mitigation |
|--|--------------------|---|--|
| Disruption to operational railway during construction | Construction | Decking would be adjacent to operational railway. There is a risk of disruption to East Coast Mainline operation during construction. | To be designed out through further analysis. |
| Land required for construction sites | Construction | Land would be required for work sites, requiring further demolition. | The tunnel would be constructed from the west at the Dumbell interchange to minimise amount of demolition. |
| Speed limits | Geometry | Existing speed limit through the section is 50-60mph. Risk that scheme could lead to a lower speed limit to allow for decking/tunnel. | Scheme has been designed with assumed mainline speed of 50mph and an assumed a 30mph slip |

| Constraint | Type of constraint | Description / issue | Potential mitigation |
|--|--------------------|--|---|
| | | | road design speed. |
| Tunnel Boring Machines (TBM) would run below residential properties | Construction | It is anticipated that the proposed twin bored tunnels would run under large residential areas, resulting in minor settlement effects. | Advise residents and use best practice and innovative construction techniques to minimise. |
| Acquisition of properties | Land take | Scheme would involve temporary and permanent acquisition of residential and commercial properties. | Working closely with LB Barnet, LB Haringey and LB Enfield to minimise impact on residents and those affected by the scheme |
| Proposed masterplan layout | Planning | No formal consent for number of dwellings/construction as outlined in masterplan. | Working closely with LB Barnet, LB Haringey and LB Enfield to agree way forward. |
| Unmanageable construction traffic | Construction | Risk that disruption to traffic during construction is unmanageable | Use best practice to understand innovative construction techniques. Careful traffic management would be required to ensure delays and disruption are minimised. |

Inter-dependencies

336. There are a number of dependencies with other work streams that may affect the timely delivery of decking or tunnelling at New Southgate. These include:
337. There is a potential synergy between the construction of a new Crossrail 2 station at New Southgate and the proposed tunnel or decking solution on the neighbouring A406. The simultaneous completion of both projects would elevate the development potential (residential and commercial) in the area substantially.
338. There is a potential synergy between the developed options and existing Area Action Plans. Road infrastructure improvements would enable the boroughs to maximise the proposed redevelopment in the New Southgate area.
339. Despite this potential uplift in development, one must consider the disruptive nature of attempting to construct two large infrastructure projects simultaneously or under close timescales. The congestion impacts are likely to be significant, especially with the additional construction traffic and potential temporary road closures. Such construction

traffic is likely to stretch beyond the infrastructure construction if the development potential assumed in the area is realised.

STRATEGIC CASE SUMMARY

The key points arising from the Strategic Case can be summarised as:

- London is a key driver of the UK's economic growth. Its success benefits the UK as a whole, but this cannot be taken for granted
- Central London's future employment growth depends on having an increased labour supply, but the city faces significant housing and space pressures, exacerbated by a growing population,
- London must unlock brownfield land to support delivery of new housing and jobs
- There is a case in particular for constructing new road tunnels at key locations within London to unlock development without incurring the high congestion costs associated with losing surface road space
- The New Southgate A406 decking or tunnel scheme can both support the delivery of new homes and jobs but the tunnel option performs better in terms of decongestion on the TLRN, reduction in severance and reduction of noise and pollution levels.

4. The Economic Case

Section summary:

This section outlines the economic analysis of Option 2 (the tunnel scheme between New Southgate and the A10). The Strategic Case identified that both options could enable growth and regeneration. However, only the tunnel option would deliver decongestion benefits on the TLRN. The tunnel would also further reduce severance, air pollution and noise levels along the A406 corridor.

Although both options have been subject to economic analysis, only the economic analysis of the tunnel option is detailed in this section. The tunnel option is the only one that would deliver transport user benefits. The Benefit Cost Ratio (BCR) of the decking scheme with development was estimated at -7.71. This is considered 'poor' value for money.

The BCR of the tunnel scheme with development is estimated at 1.19. With the noise appraisal included, the BCR of the tunnel scheme would increase to 1.21. A more detailed assessment of the urban realm benefits is expected to be undertaken should the scheme progress to the next stage of development.

As stated in the Strategic Case, although the traditional WebTAG transport benefits have been quantified, the delivery of a decking option or tunnel option is justified based on urban regeneration and housing development enabled, rather than only on the impacts on transport users. Therefore it is against these wider regeneration criteria that the scheme should be judged rather than solely on the conventional appraisal method of the benefit-cost ratio (BCR) alone.

In regeneration terms the both the A406 decking and tunnel options perform very strongly, unlocking significant economic benefits for London in the form of large numbers of new jobs and much needed housing. In purely transport terms, the decking would represent poor value for money and the tunnel low value for money.

This economic case looks to appraise the tunnel option for the A406 corridor in the vicinity of New Southgate.

340. The Economic Case for the tunnel scheme outlined in the report has been prepared following the guidance set out in the DfT's WebTAG documents.⁵² WebTAG sets out, for transport schemes, the requirements of HM Treasury's Green Book (A Guide to Investment Appraisal in the Public Sector).⁵³

Modelling Approach & Assumptions

DfT transport appraisal guidance (WebTAG) has been followed for all sections of this report.

341. A cost-benefit analysis has been undertaken to assess the value for money of the tunnel. That is, the monetised benefits are weighed against the costs of the scheme to form a

⁵² WebTAG – Web (internet) base Transport Appraisal Guidance – <https://www.gov.uk/transport-analysis-guidance-webtag> accessed 5 September 2014

⁵³ <https://www.gov.uk/government/publications/the-green-book-appraisal-and-evaluation-in-central-government> accessed 5 September 2014

Benefit Cost Ratio (BCR) which quantifies the benefit for each £1 of cost. Therefore a BCR of greater than one suggests the scheme represents value for money.

342. TUBA is a DfT modelling appraisal tool used to appraise road transport schemes. Comparing the base (or do nothing scenario) to the scheme, TUBA assesses the difference in costs and travel time by journey purpose as well as change in fuel costs and CO2 emissions. TUBA summary analysis forms a benefit-cost ratio which quantifies the benefit received to the economy for every £1 invested in the scheme. The demand matrices used for this analysis are consistent with the LTS forecasts of transport growth, which assume low car growth on the road network.
343. WebTAG also outlines approaches to social and environmental aspects of appraisal. This includes severance, noise, and air quality. After assessing the transport user benefits, regeneration and housing benefits of the A406 improvements, this economic case appraises the severance and noise reduction associated with the New Southgate tunnel option.

TUBA Transport User Benefit analysis

344. This section explores both road user and non-road user benefits in terms of travel time savings. TUBA is the main economic appraisal software for transport schemes. It is compliant with DfT's WebTAG by implementing a willingness-to-pay approach to economic appraisal for multi-modal schemes with a fixed or variable demand.
345. General assumptions for the New Southgate A406 tunnel scheme (Option 2) are as follows
- Scheme opening year: 2030.
 - Appraisal period: 60 years.
 - Model years: 2031 and 2041.
 - Modelled time periods: AM and PM peak and Inter Peak period.
 - Price base and base year for discounting: 2010.
 - Discount rate 3.5 per cent for 30 years from current year, then 3 per cent thereafter.
 - 2031 demand matrix held constant in 2041.
 - Road demand growth: 0 per cent in line with the LTS low growth scenario.
 - Development scenario (without Crossrail 2): 2,620 new homes and 27,051 m² of commercial civic and leisure floorspace is provided.
 - Construction start date: 2026.
346. The costs of the scheme used for the present value for costs (PVC) in the tables below include construction costs and land acquisition costs which are assumed to occur in the year before the start of construction.
347. The CPO land take is for the area required for the western and eastern portals and also cover the cost of acquiring land temporarily. The impact of construction has not been taken into account in terms of disruption costs.
348. The results of the TUBA analysis for the tunnel option with and without development are shown in Table 18 and **Table 19**. A BCR of one would show 'break-even' point where for every £1 invested in the scheme, there are £1 worth of benefits received. Therefore any BCR above one shows value for money in terms of receiving higher benefit for every £1 of invested cost.

349. Two separate Values of Time (VoT) have been used to calculate the monetary benefits of time savings, the TfL London VoT (Table 3-1) and the national DfT VoT (Table 3-2).

The tunnel represents low value for money when using TfL VoT and poor value for money when using DfT VoT.

350. Table 18 summarises the benefits and costs of the tunnel option with and without development using TfL VoT which applies guidance from the TfL BCDM⁵⁴. As the purpose of the scheme is to enable development in New Southgate, the 'tunnel without development' option is less likely to be delivered.

Table 18: TUBA Headline results for the tunnel option using TfL VoT

| 2010 prices and values (£'000s) | Tunnel and no development option | Tunnel and development option |
|---|----------------------------------|-------------------------------|
| Economic efficiency: Consumer users (commuting) | 179,473 | 165,488 |
| Economic efficiency: Consumer users (other) | 383,237 | 350,436 |
| Economic efficiency: Business users & providers | 944,523 | 795,897 |
| Wider public finances | -33,994 | -29,322 |
| Present Value Benefits (PVB) | 1,473,239 | 1,282,499 |
| Present Value Costs (PVC) | 1,073,257 | 1,073,257 |
| Net Present Value (NPV) | 399,982 | 209,242 |
| Benefit Cost Ratio (BCR) | 1.37 | 1.19 |

351. The tunnel option with development with TfL VoT has a PVB of £1.28bn, an NPV of £209m and a BCR of 1.19, suggesting that in transport terms this option represents 'low' value for money.

352. Table 19 summarises the benefits and costs of the tunnel options using national DfT VoT as set out in DfT WebTag guidance.

Table 19: TUBA headline results for the tunnel option using DfT VoT

| 2010 prices and values (£'000s) | Tunnel and no development option | Tunnel and development option |
|---|----------------------------------|-------------------------------|
| Economic efficiency: Consumer users (commuting) | 133,683 | 123,065 |
| Economic efficiency: Consumer users (other) | 302,465 | 276,457 |
| Economic efficiency: Business users & providers | 696,215 | 588,298 |
| Wider public finances | -33,994 | -29,322 |
| Present Value Benefits (PVB) ⁵⁵ | 1,098,369 | 958,498 |
| Present Value Costs (PVC) | 1,073,257 | 1,073,257 |
| Net Present Value (NPV) | 25,112 | -114,759 |
| Benefit Cost Ratio (BCR) | 1.02 | 0.89 |

⁵⁴ TfL London Values of Time (VoT) apply a 39.1% uplift to DfT WebTAG VoTs for all work time purposes (including LGV/OGV) and a 29.3% uplift to all out-of-work time purposes.

⁵⁵ Greenhouse gas emission benefits and costs have been excluded from the PVB as WEBTAG Unit A3. Environmental Impact Appraisal requires that all 8760 hours of the year are represented in the analysis. The traffic modelling undertaken models a one hour time slice in each of the AM and PM weekday peak periods.

353. The tunnel option with development with DfT VoT, has a PVB of £958m, an NPV of -£114m and a BCR of 0.89, representing 'poor' value for money.
354. Given the high cost of the tunnel, it would be difficult to achieve a BCR greater than 1.5, which would be needed for the scheme to be considered 'good' value for money.
355. TUBA results can be analysed in terms of the distribution of time saved. The distribution of time savings by time saved per trip is displayed in Table 20 and Table 21.

Table 20: Distribution of Time Savings by User Class, tunnel without development option

| Tunnel and no development | Time benefits £'000s | | | | | |
|---------------------------|----------------------|-----------------|-----------------|---------------------|----------------|----------------|
| | <-5 mins | -5 to -2 mins | -2 to 0 mins | 0 to 2 mins | 2 to 5 mins | >5 mins |
| Car- business | -11,183 | -64,423 | -270,336 | 340,621 | 118,260 | 142,456 |
| Car – commuting | -7,276 | -34,860 | -132,992 | 166,605 | 56,956 | 92,821 |
| Car – other | -7,925 | -39,974 | -152,511 | 188,686 | 63,140 | 103,999 |
| LGV | -13,099 | -34,065 | -130,027 | 166,647 | 49,535 | 127,743 |
| OGV | -710 | -9,294 | -30,751 | 45,922 | 8,596 | 25,646 |
| Total | -40,193 | -182,616 | -716,617 | 908,481 | 296,487 | 492,665 |
| Percentage of total | 4% | 19% | 76% | 54% | 17% | 29% |
| | 100% (of increase) | | | 100% (of reduction) | | |

Table 21: Distribution of Time Savings by User Class, tunnel with development option

| Tunnel and development | Time benefits £'000s | | | | | |
|------------------------|----------------------|-----------------|-----------------|---------------------|----------------|----------------|
| | <-5 mins | -5 to -2 mins | -2 to 0 mins | 0 to 2 mins | 2 to 5 mins | >5 mins |
| Car- business | -9,691 | -67,923 | -257,365 | 374,726 | 141,843 | 150,001 |
| Car – commuting | -6,395 | -34,449 | -129,489 | 175,791 | 70,352 | 96,371 |
| Car – other | -7,509 | -39,353 | -148,835 | 201,395 | 81,552 | 107,998 |
| LGV | -12,780 | -33,767 | -129,350 | 178,890 | 62,626 | 127,701 |
| OGV | -2,591 | -12,398 | -31,526 | 47,110 | 11,174 | 25,384 |
| Total | -38,966 | -187,890 | -696,565 | 977,912 | 367,547 | 507,455 |
| Percentage of total | 4% | 20% | 75% | 53% | 20% | 27% |
| | 100% (of increase) | | | 100% (of reduction) | | |

356. The tunnel option (for both the without and with development scenarios) would result in journey time savings overall. Over a quarter of those experiencing time savings, save more than 5 minutes of journey times. Of those who have an increase in journey times (negative numbers), the majority lose up to 2 minutes with fewer than 5% experiencing an increase of more than 5 minutes.
357. Table 22 and Table 23 below show the distribution of benefits by distance travelled by user class, where the proportions are of the total positive figures (i.e. benefits of the scheme).

Table 22: Distribution of time savings by distance travelled and user class, tunnel option – 'without development'

| Tunnel and no development | Time benefits £'000s | | | | | | | |
|---------------------------|----------------------|--------|--------|---------|---------|---------|----------|--------|
| | <1km | 1-5km | 5-10km | 10-15km | 15-20km | 20-50km | 50-100km | >100km |
| Car- business | -3 | 43,048 | 32,642 | 23,804 | 21,819 | 90,140 | 21,507 | 12,435 |
| Car – commuting | 1,776 | 10,204 | 11,824 | 15,205 | 14,709 | 59,277 | 10,657 | 7,604 |
| Car – other | 1,641 | 8,781 | 11,771 | 16,758 | 16,471 | 67,709 | 13,557 | 8,725 |
| LGV | 773 | 8,927 | 10,952 | 12,202 | 10,824 | 84,270 | 14,971 | 13,815 |

| | | | | | | | | |
|------------|-------|--------|--------|--------|--------|---------|--------|--------|
| OGV | -271 | 2,647 | -19 | 2,312 | 3,395 | 19,585 | 3,827 | 7,931 |
| Total | 3,916 | 73,607 | 67,170 | 70,281 | 67,218 | 320,981 | 64,519 | 50,510 |
| Proportion | 1% | 10% | 9% | 10% | 9% | 45% | 9% | 7% |

Table 23: Distribution of time savings by distance travelled and user class, tunnel option – ‘with development’

| Tunnel and development | Time benefits £'000s | | | | | | | |
|------------------------|----------------------|---------|--------|---------|---------|---------|----------|--------|
| | <1km | 1-5km | 5-10km | 10-15km | 15-20km | 20-50km | 50-100km | >100km |
| Car- business | 2,802 | 69,684 | 33,213 | 37,565 | 26,229 | 94,063 | 23,059 | 14,975 |
| Car – commuting | 2,226 | 21,804 | 10,881 | 19,498 | 16,448 | 60,242 | 11,618 | 9,462 |
| Car – other | 2,402 | 23,624 | 13,531 | 22,204 | 18,578 | 68,878 | 14,783 | 11,249 |
| LGV | 585 | 12,891 | 11,085 | 17,918 | 14,333 | 85,602 | 17,267 | 13,641 |
| OGV | -365 | 1,191 | -1,010 | 3,165 | 3,361 | 19,213 | 3,830 | 7,770 |
| Total | 7,650 | 129,194 | 67,700 | 100,350 | 78,949 | 327,998 | 70,557 | 57,097 |
| Proportion | 1% | 15% | 8% | 12% | 9% | 39% | 8% | 7% |

358. Those travelling longer distances would gain a substantial share of benefits with around 60% of benefits going to those travelling over 20km. Given the tunnel scheme alters an alignment of a major strategic route, these results fit with the scheme’s intentions.
359. For those highway trips travelling less than a kilometre, journey times are increased by the tunnel scheme. Again this fits with the aim of the scheme as downgraded surface roads along the current alignment of the A406 would carry higher volumes of local traffic.

Summary of TUBA benefit analysis

The poor or low value for money BCRs for the tunnel option only reflects the transport user impacts and do not reflect the beneficial growth and regeneration impacts of the scheme.

360. The provision of a tunnel without development results in a PVB of £1,098m (£1,473m using TfL VoTs) where 26% of the time saving benefits relate to time savings of greater than 5 minutes. The provision of the tunnel means that through A406 traffic does not have to pass through major junctions that currently intersect with the A406 and is on an alternative alignment to the existing surface road which provides for a more direct route and shorter distances to travel.
361. Table 24 summarises the impacts of the A406 New Southgate tunnel option in the with development scenario. The tunnel with a development scenario including provision of 2,620 new dwellings and 27,051 sqm of commercial, civic and leisure floorspace, sees the PVB decrease to £958m (£1,282m using TfL VoT). The resulting BCR is 1.19 (using TfL Values of Time) which is ‘low’ value for money according to DfT VfM assessment criteria. However, this BCR does not include the regeneration and wider impacts of changes in land use and mixed use development brought forward by the scheme.

Key finding:

If traditional transport user benefits were considered in isolation, the tunnel option would offer ‘poor’ or ‘low’ value for money depending on the VoT used. However, given that the main focus of the tunnel is about unlocking regeneration, the BCR alone is not an appropriate metric by which to judge the scheme.

Appraisal Summary Tables

Table 24: Appraisal Summary Table for tunnel option (with development)

| Description of scheme: | | Putting the A406 to a tunnel on an alternative alignment to the current layout allowing strategic traffic to by-pass several junctions along the A406 | | | Organisation | TfL | | | |
|------------------------|---|---|--|---|---|--------------------|---|------------|--|
| | | | | | Role | Promoter/Official | | | |
| Impacts | Summary of key impacts | Assessment | | | | | | | |
| | | Quantitative | | | Qualitative | Monetary £(NPV) | Distributional 7-pt scale/ vulnerable grp | | |
| Economy | Business users & transport providers | Business users see a large impact to travel time savings. Most of the time saving is larger than 5 minutes. The numbers shown here relate to the option with development | | | Value of journey time changes(£) | £530,942,000 | 588,298,000 | | |
| | | | | Net journey time changes (£) | | | | | |
| | | | | 0 to 2min | 2 to 5min | > 5min | | | |
| | | | | 192,652,000 | 54,226,000 | 284,064,000 | | | |
| | Reliability impact on Business users | Reliability should increase with the tunnel option given that several major and minor junctions are removed, allowing for a free flow of traffic over the stretch of several kilometers. This will avoid the stop-start queuing at these junctions increasing journey time reliability | | | | slight beneficial | N/A | | |
| | Regeneration | Tunnel reduces severance and releases land for development | | | Net additional jobs of 749 and homes of 501 at London level; GVA of £474m under central case. Under Crossrail 2 scenario; 703 net additional jobs and 886 homes; GVA of £432m | | | N/A | |
| | Wider Impacts | | | | | | N/A | | |
| Environmental | Noise | The tunnel option will have slight beneficial results in terms of noise pollution. The impact of the noise level has been estimated using a basic noise level calculation. The reduction in noise provided by the tunnel is considered to be 10dB for dwellings close to the A4 and 5dB for dwellings further away. | | | The scheme will lead to a reduction in noise from traffic (including HGVs) Long tunnel: £17,960,174 | | slight beneficial | 17,960,174 | |
| | Air Quality | An environmental assessment has not been carried out, however, the scheme is expected to improve air quality where the tunnel lies but this may be at the detriment of reduced air quality at each tunnel portal where vehicle emissions can escape. | | | | neutral | N/A | | |
| | Greenhouse gases | Not able to estimate as TUBA is only run for peak periods and not for all 8760 hours of the year. The scheme is not likely to affect greenhouse gas emissions | | | Change in non-traded carbon over 60y | | neutral | N/A | |
| | | | | Change in traded carbon over 60y (CO2e) | | | | | |
| | Landscape | The scheme will complement the current pattern of the landscape, being an urban strategic route. It incorporates measures to ensure the scheme is not visually intrusive and will bring moderately positive benefits to the current level of tranquility | | | | slight beneficial | N/A | | |
| | Townscape | The scheme fits well with the current layout and appearance of the townscape at New Southgate. The scheme incorporates environmental design measures. | | | | slight beneficial | N/A | | |
| | Historic Environment | The scheme does not impact on historic landscape | | | | neutral | N/A | | |
| | Biodiversity | The scheme is not expected to impact biodiversity | | | | neutral | N/A | | |
| Water Environment | This scheme does not impact the water environment | | | | neutral | N/A | | | |
| Social | Commuting and Other users | Commuting and other users see a large impact to travel time savings. Most of the time saving is larger than 5 minutes. The numbers shown here relate to the option with development | | | Value of journey time changes(£) | £360,987,000 | 399,522,000 | | |
| | | | | Net journey time changes (£) | | | | | |
| | | | | 0 to 2min | 2 to 5min | > 5min | | | |
| | | | | 99,458,000 | 62,546,000 | 198,983,000 | | | |
| | | Reliability impact on Commuting and Other users | The tunnel option, being more a strategic link will bypass several junctions along the A406 with a different alignment to the current layout. This is expected to improve reliability given traffic will have fewer stop-start queuing time at peak hours | | | | slight beneficial | | |
| | | Physical activity | It is unlikely the scheme will impact significantly on physical activity for both the decking and the tunnel option | | | | neutral | N/A | |
| | | Journey quality | The scheme is expected to enhance journey quality. With the long tunnel with a free flow of traffic through the New Southgate area driver stress is likely to decrease. | | | | slight beneficial | N/A | |
| | | Accidents | The tunnel option will potentially have an effect by bypassing three large junctions and several small junctions along the A406. This results in a freer flow of traffic, avoiding stop-start queuing at junctions, which in turn has the potential to reduce accidents. On the other hand, local roads may suffer more traffic and with less capacity there may be an increase in accidents | | | | slight beneficial | N/A | |
| | | Security | This scheme is not expected to have security impacts | | | | neutral | N/A | |
| | | Access to services | The scheme is not expected to improve access to services significantly. | | | | neutral | N/A | |
| | Affordability | This scheme is not expected to have affordability impacts | | | | neutral | N/A | | |
| | Severance | Due to the lack of development to the south of the A406, there is a lack of demand to cross this road. The tunnel scheme is expected to have slight positive impacts on severance. Severance is a particular issue where the population affected are dependents: those being under the age of 16 or over the age of 65. The total population who live around New Southgate and who will see a reducing in severance is 5,557, of which 29% are of dependent age | | | 5,557 residents located in and around New Southgate are expected to experience reduced severance, of which 485 are of dependent age. | | slight beneficial | N/A | |
| | Option and non-use values | This scheme is not expected to have option & non-use value impacts | | | | neutral | N/A | | |
| Public Accounts | Cost to Broad Transport Budget | | | | | | 1,070,887,000 | | |
| | Indirect Tax Revenues | | | | | | -29,322,000 | | |

Supplementary Analysis - Net Additional Homes, Jobs and GVA unlocked

Purpose of this Section:

This section sets out the methodology and results of an approach which has been developed by TfL to assess the value of the additional jobs and houses unlocked by the tunnel option.

362. This section presents an overview of the additionality approach and its results. In order to maintain clarity, technical details are omitted. An additional **Technical Appendix** presents further information on various aspects: methodology, factors, assumptions, data sources, and detailed results.

This approach has been developed to address a number of recommendations made in the TIEP report

363. This approach has been developed in light of emerging research, advice and discussion on the economic impacts of transport schemes, and in particular to fulfil some of the recommendations of the “Transport investment and economic performance” (TIEP)⁵⁶ report, commissioned by the Department for Transport (DfT) and published in October 2014.
364. The authors of the TIEP report sought to examine the “impacts of transport investments on economic performance with a view to informing the appraisal techniques that are used in project selection.”⁵⁷ Their final recommendations will inform future revisions of the DfT WebTAG appraisal guidelines.⁵⁸
365. TfL has developed this approach to specifically address 3 of the 7 recommendations of the TIEP report⁵⁹:
- 1) Appraisal of larger projects should direct more attention to impacts on private sector investment decisions and associated changes in employment and economic activity.
 - 2) Land-use change (and more general changes in the level and spatial distribution of private investment) should be estimated and reported in a wider range of projects.
 - 3) In some circumstances it will be appropriate to produce estimates for a range of different scenarios concerning private sector responses and related government policies.

The approach to calculation of net additional homes and jobs and GVA impacts is in line with Government guidance

366. As a framework, this approach follows published guidance⁶⁰ from the Homes and Communities Agency (HCA), and is consistent with both the HM Treasury ‘Green Book’⁶¹

⁵⁶ ‘Transport investment and economic performance’, Venables, Laird & Overman (2014). URL: <https://www.gov.uk/government/publications/transport-investment-and-economic-performance-tiep-report>

⁵⁷ Ibid, p. 9

⁵⁸ As outlined in ‘Understanding and valuing the impacts of transport investment: progress report (Dec 2014)’, Department for Transport (2014). URL: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/389960/understanding-and-valuing-the-impacts-of-transport-investment-progress-report-2014.pdf

⁵⁹ Venables et al. (2014): pp. 62-63

and the '3Rs'⁶² guidance published by the Department for Communities and Local Government (DCLG). In addition, Professor Peter Tyler, lead author of research into additionality for DCLG⁶³ and the Department of Business, Innovation and Skills (BIS)⁶⁴, has advised TfL throughout the development process.

367. Additionality is defined as “the net changes that are brought about over and above what would take place anyway.”⁶⁵

368. This approach has been developed to estimate:

- **Jobs** – the number of additional jobs unlocked by the scheme
- **Homes** - the number of additional homes unlocked by the scheme
- **GVA** - the value of the additional jobs unlocked by the scheme, in Gross Value Added (GVA) to London

369. It is important to note that the estimates presented in this section are assessments of additional impact at the regional (London) level. They represent the additional impact of the scheme across London; although it is important to consider possible scheme impacts outside London, they have not been included in the additionality results.

370. The key components of the methodology include the following:

Direct effects – an estimate of the overall impact of implementing a scheme, including immediate, consequential, and induced effects

Leakage effects – an estimate of the effects on those outside of the target area. These should be deducted from the direct effects at the assumed proportion of leakage for each case.

Displacement effects – an estimate of those impacts that are transferred from elsewhere within the target area. These should be deducted from the direct effects at the assumed proportion of displacement for each case.

Multiplier effects – activity associated with additional local income, local supplier purchases and longer term development, such as through supply chains and expenditure on other activity. These need to be added to the direct effects.

⁶⁰ 'Additionality Guide' 4th ed., Homes and Communities Agency (2014). URL:

https://cfg.homesandcommunities.co.uk/sites/default/files/aboutus/additionality_guide_2014_full.pdf

⁶¹ 'The Green Book: appraisal and evaluation in central government', HM Treasury (2003, updated 2013). URL:

<https://www.gov.uk/government/publications/the-green-book-appraisal-and-evaluation-in-central-government>

⁶² 'Assessing the impacts of spatial interventions: regeneration, renewal and regional development', Office of the Deputy Prime Minister (2004). URL:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/191509/Regeneration_renewal_and_regional_development.pdf

⁶³ 'Valuing the benefits of regeneration', Tyler et al. (2010). URL:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/6382/1795633.pdf

⁶⁴ 'Research to improve the assessment of additionality', Tyler et al. (2009). URL:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/191512/Research_to_improve_the_assessment_of_additionality.pdf

⁶⁵ HCA (2014): p. 3

371. For the A406 North Circular Road at New Southgate, the following options were assessed for additional impact (although assessed, the decking option is not detailed in this document as the Tunnel option has been identified as the preferred option):

- Reference case (or 'deadweight') - development consistent with Local Plan - no decking or tunnel for the A406 at New Southgate
- Intervention Case (Option 1) – The decking option, plus redevelopment of the parcels of land as summarised in Part F of the Strategic Case
- Intervention Case (Option 2) – The long tunnel option, plus redevelopment of the parcels of land as summarised in Part F of the Strategic Case

372. These intervention options assume a scheme opening year of 2031.

373. The employment impacts of a scheme are the sum of direct and indirect effects. Indirect employment effects, a product of the additional housing unlocked by the scheme, can be identified through two separate effects:

Enhanced connectivity - In areas where there is a relatively high demand for housing – e.g. most of London – the lack of new housing constrains the ability to generate higher employment densities than currently available. Therefore additional housing unlocked by a transport scheme provides dynamic benefits by enabling households to relocate closer to employment centres, or to enhanced transport links to access jobs. In line with research undertaken for DCLG⁶⁶, it is assumed that 25% of additional housing generates additional indirect employment. For London, this is probably a conservative assumption.

Increased local household spending - Additional housing generates indirect jobs as a result of new households' spending on community, leisure and retail services in the local economy. Based on research by GLA Economics in 2015, it is assumed that 171 jobs are created for every 1,000 additional homes provided.

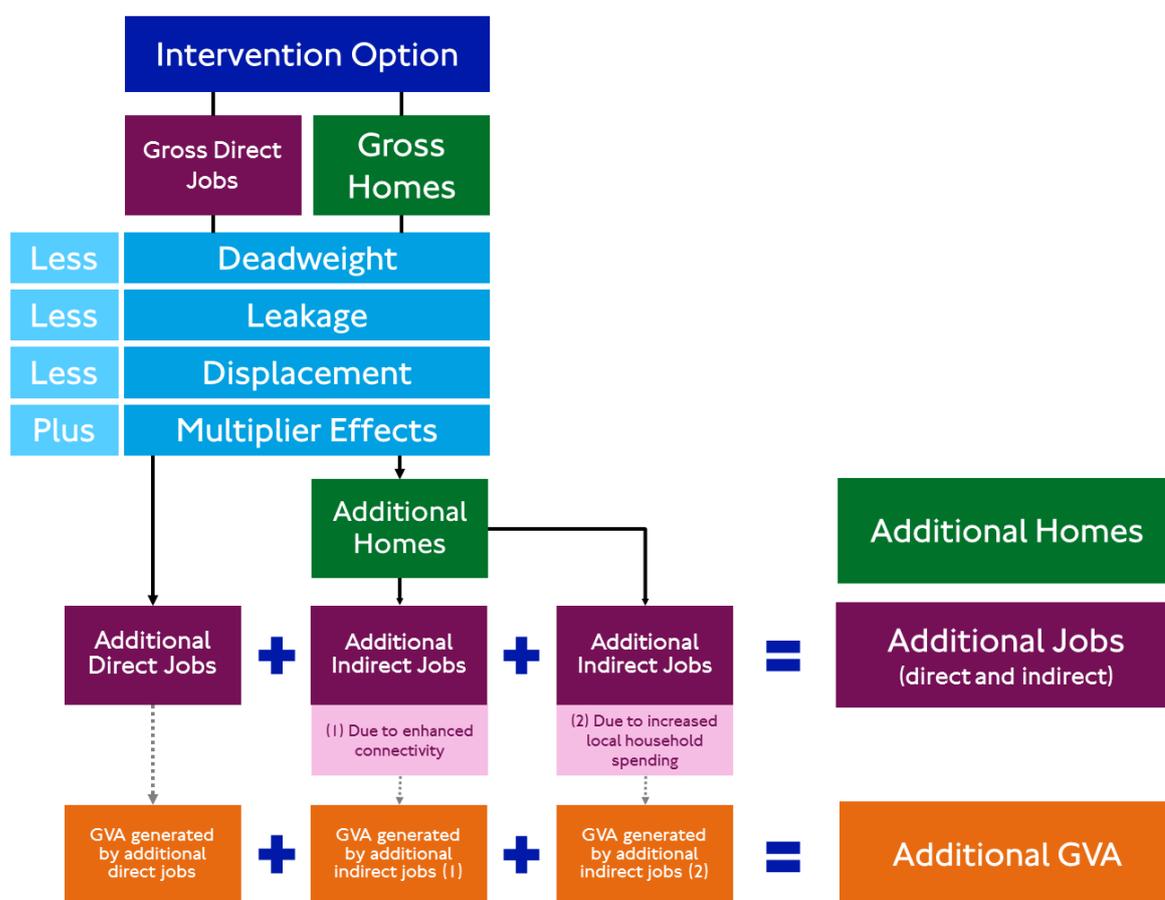
374. The value of the additional jobs unlocked by the scheme is assessed individually for each type of employment effect:

- GVA generated by additional **direct** jobs
- GVA generated by additional **indirect** jobs sustained by additional housing (due to **enhanced connectivity**)
- GVA generated by additional **indirect** jobs sustained by additional housing (due to **increased local household spending**)

375. The overall methodology of the approach is summarised in Figure 42.

⁶⁶ Tyler et al. (2010)

Figure 42: Summary of TfL Additionality Approach



Tunnelling the A406 would help to deliver significant volumes of new housing, jobs and GVA within the New Southgate area

- 376. The results of the additionality approach in a scenario without and with Crossrail 2 are summarised in Table 25 below.
- 377. In the ‘do-nothing’ reference case (without the tunnel) 850 homes would be delivered as per LB Enfield’s New Southgate Masterplan. The figures presented in Table 25 show benefits to be delivered in addition to the ‘do-nothing’ scenario.

Table 25: Summary of additional impacts of A406 tunnel (at London level)

| <i>Development and regeneration benefits of the tunnel option</i> | <i>Growth enabled by tunnel in ‘without Crossrail 2’ scenario</i> | <i>Growth enabled by tunnel in ‘with Crossrail 2’ scenario</i> |
|---|---|--|
| Net additional homes – London level | 886 | 780 |
| Net additional jobs (direct and indirect) – London level | 613 | 558 |
| GVA generated by net additional jobs (direct and indirect) (£m PV) | 370 | 314 |

*takes account of displacement effects

378. When deadweight, leakage and displacement effects are considered, the tunnel would enable delivery of 886 net additional dwellings at the London-level. When deadweight, displacement and multiplier effects are considered, the net additional employment that the tunnel would enable would be 613 jobs (direct and indirect). Alongside the indirect employment associated with this housing, this would generate a net additional GVA of £370m at the London level.
379. If the tunnel were delivered together with a Crossrail 2 branch serving New Southgate, while this would increase development potential on the identified parcels of land, most of this would be attributable to Crossrail 2, and less would be supported by the tunnel. Under this scenario, the tunnel would then bring forward a net additional 780 homes at the London level. The net additional employment brought forward by the tunnel in a scenario with Crossrail 2 delivery would be slightly lower - seeing 558 new jobs created at the London level. This would generate a net additional GVA of £314m at the London level.
380. Realising this growth is dependent on more flexible planning policies being adopted that support higher densities. These benefits are contingent on a level of housing delivery that would require higher density development at sites in the vicinity of the existing A406 North Circular Road. However, they demonstrate potentially significant economic benefits for both the local area and for the London economy.

Public realm

The tunnel option would deliver significant Public Realm benefits, which can be quantified

381. The core aims of the Road Task Force (RTF) seek to improve the quality of the city's public realm and transform the environment for cycling, walking and public transport. In recent years, exciting new places for city life have been created that deliver high quality cycling networks and re-imagined iconic streets with a safer, cleaner and greener walking environment. Public realm investments can enhance connectivity, attract more tourism and reduce severance amongst communities. Making cities more walkable reduces reliance on car, contributes to better health and stimulates more spending in district town centres

TfL has applied a robust approach to quantifying the value of urban realm improvements

382. The monetary benefits of better open spaces for walking and cycling can be uncovered by analysing the traded prices of goods linked to public realm improvements (e.g. house prices, retail rents or Gross Value Added) or undertaking stated preference-based surveys which uncover the willingness to pay of non-traded goods (e.g. the value of better experiences on streets and in places).
383. Table 26 illustrates some of the potential mechanisms through which better quality public realm is realised.

Table 26: Mechanisms that capture benefits realization of public realm improvements

| Benefit | Valuation technique |
|--|--|
| Tourism, retail activity and inward investment | Higher tourism footfall, retail spending and inward investment in town centre |
| Walk/cycling time savings from improved local connectivity | Pedestrian time savings gained from reduced severance and increased permeability of surroundings |
| Health-related productivity benefits through reduced absenteeism | Valuation of net GVA gained through reduced absenteeism |
| Residential property prices and retail rents | Boost in prices observed in residential and commercial property markets |
| Reduced accidents and crime | Gain in welfare, economic output and decrease in medical, healthcare costs |
| Modal shift from car to public transport/cycling and walking | Reduction in fuel consumption, CO2 emissions and improved air quality from shift from private car to other modes |
| Noise reduction | Gain in social benefit modelled through revealed preferences techniques drawing on house price data |
| User experience | Gain in social benefit modelled through willingness-to-pay surveys for higher quality public realm |

384. It is important to note that double-counting could arise if each of these benefits were added together. For example, a boost to house prices due to provision of quieter, safer open space would also partly capture the social benefits uncovered by a noise or accident assessment. A distinction can be made between aspects of better public space which result in a *welfare* gain as captured by time savings, higher house prices, enhanced user experience) and those which result in changes in *economic output* (higher investment and productivity).

Further work using the TfL Valuing Urban Realm Toolkit as a basis for further assessment of public realm enhancements will be carried out as this business case is developed

385. For this study, it is proposed that future phases of work will quantify the benefits of greater quality public realm through use of the Valuing Urban Realm Toolkit (VURT)⁶⁷ developed by TfL. This tool provides objective, evidence-based monetization techniques for less tangible benefits of better streets and spaces. The outputs of the VUR toolkit are as follows:

- User Benefits (the values people say they give to changes in urban realm quality)
- Property benefits (increases in residential prices and retail rents)

386. The VURT derives monetized urban realm value of a scheme using the Pedestrian Environment Review System (PERS) which assesses the quality of the existing and proposed streetscape through a seven-point quality scale from -3 to +3. Research has been undertaken to derive robust 'Willingness-to-Pay' values for every minute spent in the urban environment for different levels of streetscape quality, as measured using PERS. Similar research has been undertaken to derive the impacts of a change in quality of streetscape on residential property prices and retail rents. However, the two measures should be reported

⁶⁷ TfL's Business Case Development Manual now recognises the VURT toolkit as the approved means of producing values for the User Experience of Public Realm

separately as there would be ‘double-counting’ as enhanced experiences for local residents could also filter through into higher house prices and retail rents.

387. The VURT toolkit methodology follows a two-stage approach:

1) **Pedestrian counts:** an initial day long count of pedestrian activity in the scheme area is undertaken to determine the peak period taken forward for analysis. Further PERS assessments and pedestrian activity counts are undertaken at a more local level to acknowledge the diverse character of streetscapes and footways within schemes. Counts are obtained for people walking and staying in public places (e.g. public seating, café tables etc.).

2) **Baseline and forecast PERS assessment:** the forecast scenario will have to be understood in sufficient level of detail to enable changes in certain dimensions to be accurately measured and for there to be clarity about, for example, the proposed location of street furniture, crossing points, light etc. Realistic scheme visualizations will also enable a rational assessment of some of the less tangible scheme attributes such as Personal Security and Quality of Environment.

388. The forecast scenario requires an assessment of the likely number of people using the urban environment under the scheme. TfL’s London Walkability Model can be utilized as a tool to forecast changes in pedestrian density as a result of reduced severance.

TfL’s Better Junctions and Cycle Superhighways Study has shown there is significant benefits in improving public realm

389. For example, an East-West ‘Bike Crossrail’ for a sample section of Victoria Embankment between Northumberland Avenue and Savoy Street/Place was shown to generate £1.1m- £1.9m of user experience benefits over the lifetime of the scheme.

390. Table 27 illustrates the magnitude of social benefits that can be achieved from schemes which have similar public realm improvements.

Table 27: Better Junctions and Cycle superhighways VUR modelled user experience benefits

| Scheme | Present Value of User benefits (£m) |
|--|-------------------------------------|
| Victoria Embankment East-West ‘Bike Crossrail’ | 1.1-1.9 |
| Old Street Superhighway City Hub | 7.0-26.5 |
| Ludgate Circus North-South ‘Bike Crossrail’ | 0.3-0.5 |

391. The above estimates illustrate the scale of user experience benefits as modelled by the VUR toolkit – the change in PERS attributes and the predicted volume of pedestrian activity over the lifetime of the scheme are the underlying drivers for the calculations.

A more detailed assessment of the urban realm benefits is expected to be undertaken should the scheme progress to the next stage of development

392. Understanding the relative values of different PERS attributes can help direct design development in latter stages of the scheme. The Willingness-to-Pay values for different attributes are a reflection of the benefits that people appreciate, it is reasonable to focus on improving attributes that people value more highly than others.

393. The benefits of quality public realm can be monitored against policy objectives over the longer term, for example through performance indicators such as crime/accident

statistics, London Travel Demand Survey (LTDS), town centre performance indicators, permanent pedestrian counter installations.

The New Southgate tunnel option could potentially deliver a number of public realm benefits which will be monetised as part of the next stage of development of this business case

394. The A406 is causing significant severance effect (see Part D). Some of the potential benefits of the tunnel option are summarised in Table 28 below.

Table 28: PERS attributes affected by the scheme

| Link | Description | Scheme impact |
|--------------------------|---|---|
| Effective Width | The space available for pedestrian movement | Removal of A406 strategic traffic and placing this in a new bored tunnel would allow for creation of pedestrian streets and downgraded roads |
| Permeability | Extent to which pedestrians can make their own informal movements rather than rely on designated crossings | Eliminating the need to use designated crossing points, overbridges and subways provides freer pedestrian movements |
| Legibility | Way in which the pedestrian environments' built form may assist the user to navigate them within the space | A clearer and greater series of north to south routes and linkages would be available for pedestrians |
| Personal security | Environmental features that relate to individual pedestrians' vulnerability to, or fear of, crime | Creates a safer environment to cross the existing route of the A406 compared to existing overbridges and crossings |
| Surface quality | Poor surfaces can create trip hazards, reduce comfort and cause route severance for the mobility-impaired | Investment and maintenance regime would directly improve surface quality |
| Space | Description | Scheme impact |
| User conflict | Hazards to pedestrians as a result of making conflicting movements with other users (e.g. cyclists, road users) | Less conflict between road users travelling west-east and pedestrians and cyclists travelling north-south |
| Quality of Environment | The general ambience of the streetscape | Introduction of pedestrian links and east-west boulevard on current route of A406 provide high quality access routes whilst reduced surface traffic would mitigate noise and severance issues |
| Sense of place | The aesthetics and quality of the environment | The scheme improves the quality of the local environment along the current A406 corridor |
| Opportunity for activity | A public space can have many functions and can provide a facility for a variety of needs | Removal of strategic traffic would provide more opportunities for social interaction and recreation. |

Key finding:

A tunnel at New Southgate would reduce severance impacts for current residents in the immediate area in and around the A406 North Circular Road. These benefits are quantifiable and will be subject to an economic analysis as part of the next stage of development of this business case.

Noise

The tunnel option would deliver a reduction in traffic noise, affecting around 440 people

395. A high level WebTAG compliant noise appraisal has been carried out to assess the benefits of the tunnel option only on the existing local residents.
396. The noise levels have been calculated from a Basic Noise Level (BNL) as described in the Calculation of Road Traffic Noise (CRTN) and the calculated noise levels have been corrected for distance, angle of view and screening. The angle of view correction has been based on the percentage of the route that has been covered by the tunnel (for the 'with scheme' scenario only).
397. Only dwellings within 100m of the tunnel and A406 are considered for this analysis. Only the traffic using the A406 was considered as the noise source and the same flow of traffic has been assumed for the opening and 15th year.
398. The noise analysis concluded that the covered area of the road network would cause a slight reduction in noise for those dwellings immediately alongside the A406. The reduction in noise provided by the covered area is considered to be 10dB for dwellings close to the A406 and 5dB for dwellings further from the A406. Quantified results are shown in Table 29.

Table 29: Estimated noise appraisal results for the tunnel option

| Parameter | Value |
|--|-------------|
| Estimated population annoyed (base) | 1,927 |
| Estimate population annoyed (with-scheme) | 1,488 |
| Net noise annoyance change in 15 th year after opening (number of people) | -439 |
| Net present value (60 year period) | £17,960,174 |

399. Overall the scheme is expected to reduce the number of people annoyed by around 440 people, producing a net present value of roughly £18 million (discounted 2010 prices⁶⁸).

With the noise appraisal included, the BCR of the tunnel with development option would increase from 1.19 to 1.21.

400. For dwellings further away and those near the portals, there would be some reduction in noise although not to the same degree as those residing near the tunnel. It is expected that night-time changes in noise would be similar to that of the daytime.

Key finding:

The tunnel would deliver significant noise benefits to around 440 current residents on the existing A406 corridor, quantified at a net present value of £18m.

⁶⁸ Please note the NPV from the noise appraisal WebTAG spreadsheet has been adjusted to incorporate income (GDHI) differences between the UK and LB Enfield, as outlined on page 11 of WebTAG Unit A3

ECONOMIC CASE SUMMARY

The key points arising from the Economic Case can therefore be summarised as:

- In regeneration terms, the tunnel scheme at New Southgate would perform very strongly, unlocking significant economic benefits for London, including large numbers of new jobs (615 without Crossrail 2; 560 with Crossrail 2) and much needed housing (840 net additional without Crossrail 2; 740 with Crossrail 2).
- WebTAG guidance requires the reporting of traditional transport BCRs. If traditional transport user benefits were to be considered in isolation, then the tunnel option would offer 'low' value for money applying TfL values of time or 'poor' value for money applying DfT values of time. The BCR of 1.19 for the tunnel reflects the journey time savings and decongestion benefits that it delivers in the 'with development' scenario.
- However, given that the focus of the scheme is on unlocking regeneration then the BCR alone is not an appropriate metric by which to judge the decking and tunnel options for the A406 North Circular at New Southgate.
- The tunnel would also deliver significant benefits in terms of reduction in severance, and noise that are not included in the WebTAG calculations.

5. The Financial Case

Section summary:

The Financial Case sets out the project construction and ongoing operating costs, together with sources of possible financing and funding.

Due to the early stage of the project it is not possible to present an Estimated Final Cost (EFC) at this stage.

Latest cost estimates suggest the tunnel option would cost approximately £1,625m (2015 prices). This includes land costs of £25m (2015 prices).

It is not considered at present that a significant proportion of the funding for a tunnel could be met from non-grant funding sources. Funding from associated development sources could cover around 1.6 per cent of the cost of the tunnelling option.

If development was to take place at a different time to the proposed tunnelling, there is likely to be no opportunity for value capture.

Project costs

401. Indicative cost estimates (capital and operational) have been produced for both potential options (the cost of the decking option was estimated at £34m). However, this section only details the tunnel option.
402. The cost estimates set out below were developed by CH2M based on engineering assessments.
403. Due to the early stage of the project, and the fact that some costs (such as for powers and procurement) remain unknown, it is not possible at this stage to present an Estimated Final Cost for the project.
404. All prices shown are in 2015 prices by applying an 'ALLCON - All Construction Tender Price Index' conversion⁶⁹.

Cost estimates suggest the tunnel scheme would cost around £1.6bn to construct

405. The total construction cost for the tunnel, including 66 percent optimism bias, is approximately £1.6bn in 2015 prices, although further design work undertaken in future may see this figure revised. This figure includes design and supervision of works, concrete structures, excavation, traffic management and TBM costs. It also includes a risk allowance of 15 per cent risk for ramps and cut and cover, and 20 per cent for tunnel works. There would be additional costs of around £25m for land acquisition. With this included, the total cost of the tunnel is around £1,625m.
406. The operational cost is estimated to be £8.9m per annum in 2015 prices, made up of routine and reactive maintenance and utility costs. It should be noted that this includes £3.5m to be spent on lifecycle costs only every 10 years.

⁶⁹ Note that 2014/15 indexes are not yet available

Risk Allowance and Optimism Bias

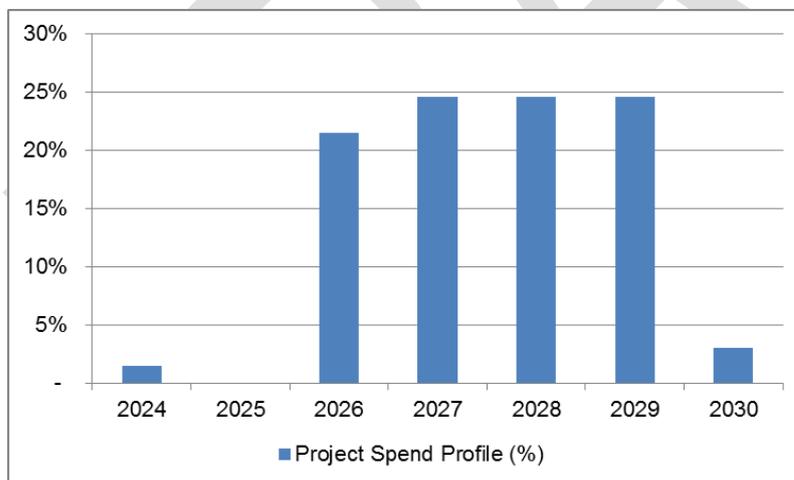
Engineering assessments have informed the development of both options considered

407. An engineering assessment has informed the development of the tunnel option. The costs presented outline an estimate for construction including concrete structures, road works, excavation and utilities. Fifteen per cent of total works and design and supervision costs is allocated as a risk contingency.
408. Optimism Bias has been applied to all constructions costs at a rate of 66 per cent given the early stage of project development. This rate is expected to reduce as the schemes are taken forward and become better defined.
409. Detailed cost estimates will follow in future stages of the project once the final preferred option is decided and more detailed modelling and engineering work has been undertaken.

Spend Profile

410. The spend profile of the tunnelling option is shown in Figure 43. As the project develops further, a more detailed estimate of construction programme and spend profile, to be used in future business case work, will be prepared.
411. At this stage of the project's planning, these costs are assumed to be borne directly by TfL, with funding to cover them having to come from a variety of sources. It is assumed that land costs would arise one year before commencement of construction.

Figure 43: New Southgate Tunnel Construction Spend Profile



Funding

412. The following funding sources for this scheme have been considered:
- Funding from taxes on new development (incremental Borough Community Infrastructure Levy, business rates and stamp duty);
 - Funding from developing land directly on the schemes and additional land purchased around them;
 - Funding from potential road user charges or taxation, building on TfL's congestion charge;
 - Funding from taxes on existing residential development (council tax).

413. Given the early stage of the scheme, sources of funding are only indicative at the moment. However, a funding package for the tunnel would need to come from a combination of sources.
414. TfL appointed Jones Lang LaSalle (JLL), property consultants, to evaluate the possible funding that could be derived from the residual land value on the land to be acquired for the tunnel delivery, borough CIL, incremental business rates and other possible developer contributions and stamp duty.
415. The analysis has shown that there would be no significant land take for the tunnel construction and no land that could subsequently be sold off by the public sector for redevelopment. It is considered therefore that there would be no scope for capturing funding for the project through residual land value.
416. JLL considers that if market conditions are favourable and area redevelopment is undertaken at a time when value capture mechanisms are in place there could be some scope for extracting funding from new development for the project.
417. Borough CIL would present the primary source of local contribution, however due to a small net increase in CIL-able floorspace, the amount of CIL that could be raised is estimated to be small. The actual amount would depend on factors such as the percentage of affordable housing provided and the borough's other infrastructure expenditure needs. Directing CIL towards the project would require borough support.
418. JLL consider that there may be scope for asking developers to make voluntary contributions towards the scheme. The amount that could be raised is likely to be small, given that a high contribution ask is unlikely to be welcomed by the developers on a voluntary basis.
419. Under the current Matsterplan redevelopment proposal, there will be a net increase in commercial floorspace across the development site. Therefore, there may be scope for incremental business rates capture.
420. JLL have also provided initial evaluation of the amount of additional stamp duty that the central Government would receive as a result of the redevelopment supported by the project.
421. Stamp duty land tax (SDLT) is currently payable on the purchase of property above £125,000. This is a national tax and there are no current plans of devolving it to local authorities. If the stamp duty revenue within designated zones or corridors was devolved, or an equivalent earnback arrangement created, then this could provide a potential funding source for strategic infrastructure projects, which could include the New Southgate tunnelling project. It is worth noting that financing against stamp duty would be difficult, given the uncertain nature of property sales transactions. A direct Government contribution, reflective of the size of the stamp duty receipts the new development could yield over time, would be more desirable.
422. The summary table in Table 30: Summary of funding sources explored below presents current estimates of the amount of funding as % of the project construction cost for both the decking and the tunnelling options.

Funding raised for the project from local sources is estimated to cover around 0.9% of the tunnel construction costs. Devolved stamp duty, or equivalent Government grant, would increase the local contribution to around 1.6% for the tunnelling costs.

Table 30: Summary of funding sources explored for the tunnel scheme

| Availability | Option (based on 25% Affordable Housing) | £ m (NPV 2015/16) | % of Total Cost of £1,625m (2015/16 prices) |
|--------------|--|-------------------|---|
| | Borough CIL | 14.3 | 0.9% |
| | Voluntary Development Contributions | 0.8 | 0% |
| | Stamp Duty from new development | 11 | 0.7% |
| | Total Funding from Development | 26.1 | 1.6% |

| | | | |
|--|---|--|--|
| | Funding option that could make contribution, subject to borough approval and relevant central Government policies carrying on | | Funding options that could make contribution, but require central Government support and/or face some implementation challenge |
|--|---|--|--|

Key finding:

The identified sources of funding could cover around 1.6% of the tunnel costs.

Funding sources presented above are examples of how a funding package could look and are dependent on central Government and borough support.

423. If the proposed Masterplan redevelopment does not progress or progresses at a slower rate, there would be a knock-on effect on whether/when the funding would become available. It is considered therefore that there is some degree of risk associated with these funding sources and they are unlikely to present a feasible funding stream to borrow against.

TfL is seeking further powers and fiscal devolution to enable a higher proportion of the cost of construction to be raised from local funding sources.

424. Other funding sources that TfL could consider are road user charging and council tax precept. The feasibility of these funding options will be assessed at the next stage of the appraisal process.

Given the limited funding sources, other means of covering tunnel costs such as partial government funding would need to be considered.

FINANCIAL CASE SUMMARY

The key points arising from the Financial Case can therefore be summarised as:

- Cost estimates suggest the New Southgate tunnelling option would cost around £1,6b (2015 prices) with a further £25m of land costs.
- TfL is seeking further powers and fiscal devolution to enable a significant proportion of the cost of construction to be raised from local funding sources

6. The Commercial Case

Section summary:

The Commercial Case provides details on the commercial structure, procurement approach, and accounting implications of the project.

TfL would apply its substantial experience of delivering complex highway and tunnelling projects to the procurement, funding and financing of the A406 New Southgate to the A10 decking or tunnel. TfL could also achieve efficiencies by delivering the A406 New Southgate scheme within a wider programme of highway and tunnel projects. The decking or tunnel project would support many jobs outside of London.

Procurement Strategy and Sourcing Options

Design

426. The scheme is being promoted by TfL and would be developed through close working with the LBs of Barnet Haringey and Enfield who are closely engaged with the project.
427. TfL is responsible for the Transport for London Road Network (TLRN), which the A406 North Circular is part of. Changes to this key part of the road network could have an impact on the surrounding road network for which the local borough is the Highway Authority.
428. It is expected that the construction stage of the project would be led by TfL and where involving infrastructure owned by other parties, such as the Boroughs, would be delivered in partnership with these other organisations.

TfL has substantial experience of delivery of complex highway and tunnelling projects, which we would apply to the procurement, funding and financing of the A406 New Southgate to the A10 tunnel

429. TfL is an experienced organisation, with a successful track record on procuring and managing highways improvement works (such as the recent completion of life extension works to the Hammersmith fly-over, the Cycle Superhighways programme, and the Chiswick Bridge refurbishment).
430. The procurement and construction of major infrastructure projects, including rail tunnels, is also an area TfL has extensive experience in, with sub-surface construction works having been undertaken across a multitude of projects in constrained and heavily populated areas of London, such as Crossrail, DLR extensions, major station schemes such as King's Cross St Pancras and Green Park. All potential suppliers would be required to consider the Mayor of London's Responsible Procurement Policy in their bid as part of any Invitation to Tender (ITT) for the design and build contract.

TfL can achieve efficiencies by delivering the A406 tunnel scheme within a wider programme of tunnel projects and link into a wider highway capital investment programme

431. TfL is undertaking and proposing a range of large capital infrastructure projects that involve procurement of skills and services that would all be highly relevant to approaches that would need to be adopted for the A406 tunnel. For example, Crossrail and the Northern Line Extension have led to an increase in skills associated with deep bored tunnel design and construction procurement, whilst the Cycle Superhighways and Better Junctions

programmes have led to an increase in skills associated with large-scale highway engineering and construction traffic management.

432. There is an opportunity to build on the experience TfL is developing through delivering the Silvertown Tunnel, applying this to other potential highway tunnelling projects such as the New Southgate tunnel scheme.
433. The A406 New Southgate tunnel is being proposed as part of a wider programme of Roads Task Force (RTF) tunnels and decking over at a range of locations throughout London, arising from the 2013 recommendations published by the RTF. If these projects are progressed, some significant economies and efficiencies could be achieved through co-ordination of delivery with the A406 decking or tunnel.
434. TfL would also seek to incorporate best practice from Highways England's own highways works and approaches to procurement given the larger volume of capital infrastructure works the agency undertakes across the country.

In addition to internal staff, consultancy support would be required to support future scheme development and consents process

435. It is anticipated that consultancy support will be required in the following areas:
 - Legal
 - Environmental Impact Assessment
 - Engineering
 - Transport Planning
 - Planning and Socio Economics
 - Architecture and Urban Design
 - Cost Estimating
 - Property Surveyors/Land referencing

Construction and Operations

436. As the scheme progresses and further details concerning the design of the tunnel are determined (i.e. cut and cover or bored tunnel construction), a procurement strategy will be developed which can incorporate the necessary design aspects, the operation and management approach, and the funding and financing approach to the scheme given the potential sources of funding as covered in the Financial Case. The risks associated with each element will be a consideration in the approach taken to procuring both construction and operational and maintenance of the new tunnel.
437. The Silvertown tunnel river crossing project will have provided a contemporary example of a tunnelled road scheme in inner London, and hence will provide an important benchmark that TfL and the market can use to determine that the risks are tolerable and generate appetite from the market. Capacity of the market will need to be monitored given there are other potential tunnelled road schemes, such as the Lower Thames Crossing, that may overlap.
438. Dependent on the form of contract, an assessment of the likely accounting treatment of any commercial structure under ESA95/10 would need to be undertaken to determine whether the project is likely to be treated as "off budget" and therefore whether liabilities would score towards TfL's borrowing.

Methods for the mitigation of construction impacts will be investigated

439. TfL has extensive experience of developing and delivering Traffic Management Plans. As part of the TLRN, the A406 would continue to ultimately be managed by TfL, acting as the client on any subsequent procurement of operations and maintenance contracts that could be let.
440. Further consideration will need to be given to the management of the existing A406 alignment, the day to day management of which could be passed to the relevant boroughs.
441. An EU-compliant procurement route following the Competitive Dialogue procedure, under the Public Contracts Regulations 2006, can be adopted to enable TfL to obtain certainty that the Contractor is capable of developing a compliant design.
442. Throughout a procurement process for both construction and operations / maintenance, TfL would undertake bi-lateral discussions with selected Contractors to seek views on the proposed procurement route, contract form and risk allocation. In addition, legal resource would be procured to provide commercial advice and contract drafting support, whilst Insurance advice would enable determination of the most cost-effective means of insuring risk during construction and operations.
443. As a public body, TfL has to meet the requirements of the Mayor of London's Responsible Procurement Policy consisting of the following themes:
- Environmental Sustainability
 - Supplier Diversity
 - Community Benefits
 - Skills and Employment
 - Sustainable Freight
 - Fair Employment
 - Ethical Sourcing
444. In compliance with the Mayor's responsible procurement policy, all potential suppliers would be asked to consider these elements in their bid as part of the Invitation to Tender (ITT) for any future project support or the design and build contract. Each appointed consultant or contractor would be subject to a supplier performance plan.

TfL utilises supply chains from across the UK – work for a deck or tunnel would support many jobs outside of London

445. Although TfL undertakes procurement for projects implemented in the capital, the wider benefit to the UK is extensive, with over 60,000 jobs estimated to be supported by services TfL procures from outside of London. The construction of the A406 New Southgate to the A10 tunnel would add to the pipeline of capital investment that supports jobs across the UK.
446. The procurement strategy for this stage of the project would be refined and improved as the scheme is further developed.

COMMERCIAL CASE SUMMARY

The key points arising from the Commercial Case can therefore be summarised as:

- TfL has substantial experience of delivery of complex highway and tunnelling projects, which we would apply to the procurement, funding and financing of the tunnel between New Southgate and the A10.
- TfL can achieve efficiencies by delivering the A406 tunnel scheme within a wider programme of tunnel projects and link into a wider highway capital investment programme.
- TfL utilises supply chains from across the UK – works for a tunnel would support many jobs outside of London.

DRAFT

7. The Management Case

Section summary:

The purpose of the Management Case is to assess whether a proposal is deliverable. It reviews evidence from similar projects, sets out the project planning, governance structure, risk management, communications and stakeholder management, benefits realisation and assurance.

Evidence of similar projects

TfL would make full use of best practice within the company and from industry

448. TfL has extensive experience in developing, promoting and implementing significant infrastructure projects and securing necessary consents required.
449. This ranges from modifications to existing infrastructure (such as repairs to the A4 Hammersmith flyover, modernisation of the London Underground, extensions to Tramlink and DLR) to major schemes such as Crossrail. TfL also has demonstrable experience in delivering major road junction improvements, pedestrian and cycle schemes, and wider public realm improvements. These projects share similarities to the proposed A406 tunnel scheme, involving processes and aspects of design and construction which would be faced by a road tunnel. TfL would continue to actively incorporate best practice and experience from these schemes into the development of the A406 New Southgate tunnel scheme.
450. With a range of highway and public realm improvements identified within the current Business Plan, this experience will have been furthered by the time consent stage for the project is reached and would be transferrable to this scheme. If necessary, additional support and advice from experienced promoters of major highway schemes and operators of similar projects can be sought. This could include for example Highways England and other urban transport agencies.
451. The New Southgate tunnel scheme is part of the wider Roads Task Force programme sponsored by the Managing Director of TfL Planning. There are a number of programme linkages with other schemes being taken forward as part of the RTF Key Corridor Interventions Programme, which would present opportunities to share best practice as these schemes progress.

Linkages

The A406 New Southgate scheme has a strong link with the delivery of the proposed Crossrail 2 branch to New Southgate.

452. The projects are not interdependent and would need to be taken forward separately, but in order to avoid abortive or unnecessary work and to ensure the programmes complement one another, close coordination is required between the relevant business areas within TfL.

Key project assumptions

453. It is currently assumed that sufficient funding is available to support the planning and development stages of the project up to securing the necessary powers. TfL does not have a budget for the main design and build costs. As identified in the Financial Case, only limited funding has been identified for the scheme. Further work is required to identify potential funding options.

454. It is assumed that the land for the proposed route can be acquired through the Planning and Compulsory Purchase Act (2004).

Project risk

455. As the scheme is further developed, more detailed plans will be developed and will be subject to further assurance and project controls, including a Quantified Risk Assessment to further improve forecast costs and the economic appraisal.
456. At this early stage of design, some aspects carry a high risk and hence the optimism bias of 66% for a non-standard civil engineering project has been applied. A quantified risk assessment (QRA) will be undertaken should the scheme be progressed, in order to provide more certainty on costs. Following submission of this business case in 2016, TfL will liaise with the Treasury / DfT to update the forecast costs following the completion of the QRA, and to agree a new working assumption on the level of optimism bias to continue to apply in future scheme appraisal.

In general, TfL considers the scheme relatively standard given the company's extensive experience

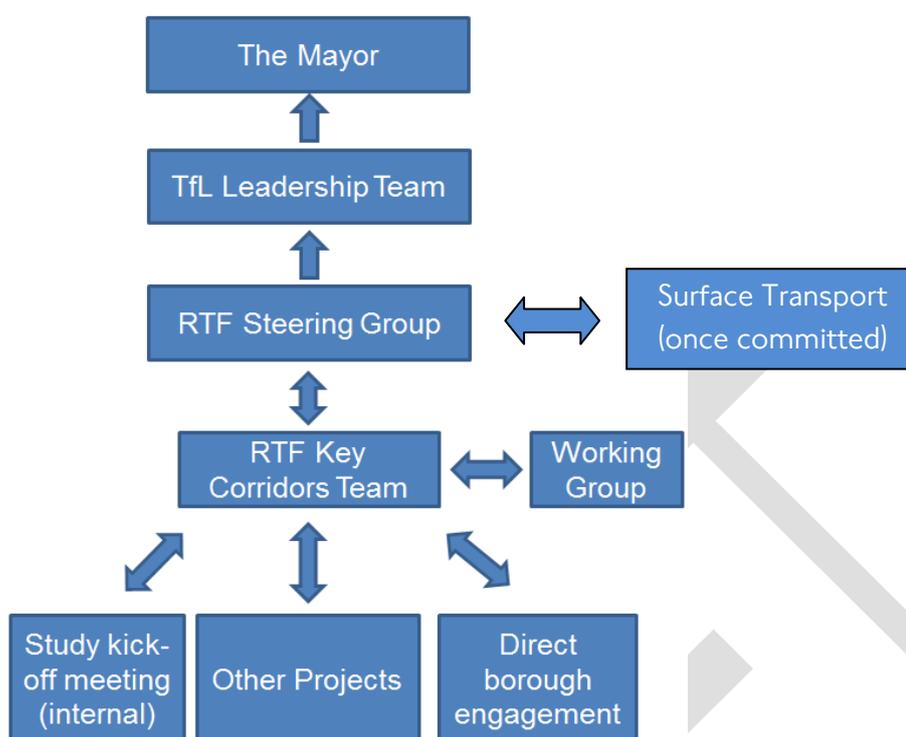
457. This experience includes planning, procuring and constructing large-scale infrastructure projects, such as the Cycle Superhighways, the Northern line extension and Crossrail. The design and construction of these schemes has provided a wealth of contemporary and relevant comparators against which to benchmark, helping to guide proposed construction approaches for the A406 tunnel scheme.

Governance, organisational structure and roles

Internal governance

458. Tunnelling of the A406 North Circular Road between New Southgate and the A10 is part of the Roads Task Force Key Corridor Intervention Programme (Figure 44). The programme is overseen by the RTF Steering Group, which is made up of representatives from across the organisation and the TfL Leadership Team. Once the scheme is finalised and becomes committed, responsibility for its delivery would be overseen by TfL Surface Transport.
459. As part of future scheme development, an Independent Peer Review Group (IPRG) may be established to provide independent expert scrutiny of the A406 New Southgate tunnel scheme. An IPRG would remain in place to undertake reviews on technical and engineering matters at key stages during the design, procurement and delivery of the project.

Figure 44: RTF tunnel and decking schemes - Internal Governance Structure



Independent Peer Review Group

Programme/Project Plan

460. Some key future milestones for the project are shown in Table 31 below.

Table 31: Key future project milestones

| Milestone Description | Date ⁷⁰ |
|--|--------------------|
| Planning, design, approval and procurement | 2016 - 2025 |
| Construction | 2025 - 2031 |

Assurance and approvals plan

A comprehensive and robust project management framework would be applied, helping to ensure scope, cost and benefits are controlled

- 461. The assurance and approvals process would follow TfL’s established project assurance procedures which include assurance at three levels: internal, Programme Management Office (PMO) and external.
- 462. TfL uses a number of mechanisms to improve the management of its major projects in order to help ensure the objectives and benefits of a scheme at inception are realised following implementation. TfL’s project management framework, known as ‘Pathway’ provides consistency in approach and the tools required for planning and delivery teams, whilst retaining flexibility in its application to manage and control a project. Embedded into

⁷⁰ Subject to tender returns and TWAO/ DCO process.

Pathway is a delivery assurance process using stage gates, upon which TfL utilises industry-leading external expertise to review and challenge all aspects of the project.

463. The number and timing of the stage gates are established by the delivery organisation, based on guidance in Pathway, and informed by a characterisation tool that considers such things as scale, complexity, novelty, project team experience and the strategic importance of the project. A number of Products are required to be completed to provide evidence at the stage gate that the project is fit to proceed to the next stage.
464. Products are outputs that are signed off by authorised individuals, and include such documents as project execution plans, risk management plans, project estimates and design compliance certificates
465. Underlying these stage gates are a number of assurance activities conducted by both TfL and the suppliers and include activities such as design reviews, safety assessments, risk reviews, commercial assessments, estimate validation, material testing, site inspections and product testing.

Rigorous assurance processes would provide close scrutiny and challenge of risk management and decision-making throughout the project

466. The PMO is part of TfL but is not accountable for delivery. These reviews are typically Integrated Assurance Reviews (IAR), staffed by a combination of PMO staff, consultant external experts (EE) or peer groups from outside the delivery organisation.
467. The EEs are selected on the basis of their relevant experience and suitability to the project under review. Each review is covered by a Terms of Reference that sets the scope and the brief to the EE, who is procured from a TfL consultancy framework. The Terms of Reference is based on the Pathway IAR Lines of Enquiry, aimed at generating a comprehensive review. Each Line of Enquiry includes up to 20 detailed challenges, devised to match the maturity of the project at its particular point in its lifecycle.
468. The Lines of Enquiry were developed as part of the Corporate Gateway Approval Process (CGAP) in 2008, following a comprehensive benchmarking process that assessed the assurance regimes in other organisations and the Office of 3 Government Commerce who produced gateway processes and guidance (now part of the Cabinet Office). Some additions have been made since 2008, including more explicit challenges covering cost benchmarking following consultation with IIPAG.
469. The IAR report is considered by appropriate bodies prior to seeking authorisation. For projects over £50m the Finance and Policy Committee and Board are informed of the assurance reviews carried out.
470. IARs are conducted at key stages of the project:
 - initiation;
 - option selection;
 - pre-tender;
 - contract award;
 - project close out;
 - benefits delivery; and
 - annual review (where no other IAR would happen within 12 months).

471. TfL also receives project review and assurance from the Independent Investment Programme Advisory Group (IIPAG), which report to the Mayor of London concerning TfL's Investment Programme. This includes all maintenance, renewal, upgrades and major projects (excluding Crossrail).
472. The involvement of the IIPAG is determined on both a risk based approach and a project value threshold. The IIPAG reviews are normally commissioned on projects with a value of £50m or more. The IAR process is as detailed above and the IIPAG then attends the Gate Review Meeting once the EE Interim Report has been produced. The IIPAG then produces its own reports, which are submitted at the relevant approval meetings alongside the PMO Report, based on its review of the IAR material and discussions at the final Gate Review Meeting.
473. TfL has the option of establishing an Independent Peer Review Group (IPRG). This approach has been followed for other major TfL projects, so given the scale of the proposed A406 tunnel, this could warrant a similar approach. If appropriate, an IPRG can be set up for the scheme if further development of the project is approved. Initially it could oversee the refinement of delivery sub-options and review engineering feasibility studies and scheme appraisal undertaken.

Communications and stakeholder management

474. The RTF Key Corridors Team is responsible for keeping internal and external stakeholders appropriately engaged and informed. In accordance, formal, minuted meetings with set agendas and actions have been arranged with all stakeholders. There are a number of internal working groups and external stakeholder meetings are held on a regular basis.

A Stakeholder Management Plan has been prepared for the project

475. This Stakeholder Management Plan provides a brief on the objectives of the stakeholder engagement, target audience and methodology. This plan is under ongoing review and will be updated/expanded as necessary.
476. Stakeholder engagement has already been undertaken and there is strong support for the scheme from the London Boroughs of Barnet, Haringey and Enfield. A future programme of stakeholder engagement as the scheme progresses has been developed.
477. The external stakeholders identified are summarised below:
- Boroughs
 - Political Stakeholders
 - Statutory Stakeholders
 - Local Communities

Programme/Project Reporting

TfL will develop programme controls supported by robust reporting processes

478. These will align with the Project governance framework, integrating key stakeholder requirements, facilitating continuous monitoring, and incorporating accurate performance measurement. The purpose is to provide accurate project information in a timely way to ensure well informed decisions are made and appropriate action is taken.
479. The project management model would be designed to deliver a robust reporting regime, including:
- Governance meetings which form part of the reporting process as the forum where performance issues are raised, possible mitigation is discussed and key decisions required are made; and
 - Project reporting requirements would be fully defined, together with content requirements, target audience and timing.

MANAGEMENT CASE SUMMARY

The key points arising from the Management Case can therefore be summarised as:

- TfL would make full use of best practice within the company and from industry
- A comprehensive and robust project management framework would be applied, helping to ensure scope, cost and benefits are controlled
- Rigorous assurance processes would provide close scrutiny and challenge of risk management and decision-making throughout the project

8. Conclusions

Tunnelling the A406 North Circular from New Southgate to the A10 would deliver strong regeneration (housing) and employment benefits in the New Southgate area. It would maximise the economic output of Crossrail 2, deliver transport journey time and decongestion benefits and reduce severance, noise and air pollution levels along the A406 corridor.

481. The A406 New Southgate tunnel scheme SOBC demonstrates that across the Five Case Model:

- There is a clear robust **case for change** for improvements to the A406 North Circular at New Southgate. Both the decking and tunnelling options would support the delivery of new housing and employment floorspace and would address issues of severance, public realm and poor environmental quality associated with the A406 North Circular Road corridor. This 'strategic case' is fully aligned with national, London-wide and local policy objectives, including the London Plan and the Mayor's Transport Strategy. In addition, the tunnel option would deliver journey time savings and decongestion benefits, even with trips generated by new development. The tunnel would also reduce severance, noise and air pollution along the A406.
- The **economic case** demonstrates that the tunnel scheme would perform an important role in regenerating of the New Southgate area.
 - The tunnel option without Crossrail 2 would enable the construction of 2,620 new homes in New Southgate and the creation of 613 new jobs at the London level. With Crossrail 2, the tunnel would enable the construction of 6,460 new homes in New Southgate and the creation of 558 jobs at the London level. The delivery of either the decking or tunnel options would have an important role in facilitating wider development opportunities that might arise following the delivery of Crossrail 2.
 - With Crossrail 2 the new employment enabled by the tunnel scheme would generate £314m of GVA (compared to £370m of GVA without a Crossrail 2 branch and station).

If transport user benefits are considered on their own (without taking account of these housing and employment benefits), then the tunnel scheme with development would represent low value for money – it has a BCR of 1.19 (with development). Using DfT VoT instead of TfL VoT further reduces the BCR to 0.89 (with development).

- **Financially affordability** – the 'financial case' analysis demonstrated that a small proportion of the costs may be recoverable from local funding sources.
- **Commercial viability** – this business case sets out the procurement, commercial structure, and proposed allocation of risk and payment mechanisms for the project
- **Achievability** - the 'management case' sets out a clear governance, process and programme for the further development of the scheme by TfL, an authority with a very successful experience and record in major project delivery.

It is suggested that further feasibility and scheme development work takes place to investigate the tunnel option.

482. While the Strategic Outline Business Case has reported on the majority of the likely impacts of the scheme, further work is required on the air quality, noise and social/distributional impacts in any future Outline and/ or Full Business Case. In addition this further work will elaborate on the potential commercial case and charging policy and various sensitivity tests.
483. Further work will also be required to identify potential funding sources and ways of securing grants.
484. This work will be undertaken prior to any future statutory consultation. TfL will continue to liaise closely with the London Boroughs of Barnet, Haringey and Enfield during any further work.

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