

Joint West London/TfL visit to Vivarail

12 December 2017

1. BACKGROUND

Representatives from West London local government and Transport for London are working together to understand options and opportunities for the different modes of traction that might be suitable to operate on a prospective West London Orbital line. One particular option being explored is to make use of innovative battery-powered carriages (as opposed to than electrified or diesel). An emerging provider in this space is [Vivarail](#), who have been developing their "Class 230" trains for a number of years now and which are able to be fitted with Battery packs, the demonstration of which was the primary objective of a visit by representatives from West London and TfL on 12 December 2017.

The key points and actions set out below have been developed and agreed jointly by all attendees of the visit and are intended to act as a foundation for any future provider engagement with respect to battery-powered rolling stock.

2. NARRATIVE

Vivarail was established three years ago with the aim of developing trains that are for the passengers that use them, in the sense of being reliable, and for the operators who run them by being economical to maintain.

Vivarail bought 228 cars from London Underground when the D78 District Line stock was taken out of service. They are reusing the body shell which is aluminium and therefore does not corrode as well as the bogies which are only ten years old. LU replaced the original bogies as these were cracked caused by poor (twisted) track on the District Line. The new ones fitted are nearly identical to those found on S stock.

Vivarail have developed a diesel prototype consisting of three cars which has been approved for use on the passenger mainline. It took two years to gain approval. It is powered by diesel generator sets and uses a Ford engine (made in Bridgend).

There is also a battery test train that has 200 horsepower and can convert diesel to battery. The train starts off by using diesel electric and can then switch to battery electric. The two car battery train should be ready by late January 2018. It will inherit approvals from the diesel train but still requires approvals for battery on traction, however no standards currently exist. Vivarail will need to list the risks and how they intend to mitigate/remove them. The aim is to get approval to be able to run this train on the mainline for the end of March 2018.

For the West London orbital line, the third rail could be used to charge the battery along part of the route. The battery would likely be at 100% when leaving the section that has the third rail and would drop to around 70% along the section with no third rail. There would be no need for charging stations at either end of the line as the third rail can be relied upon to charge the battery. If the train battery failed and the train needed rescuing, it could be coupled to another train. This would be via adaptor coupling.

A toilet on board would require a stop at the depot but as it is unlikely trains on the West London orbital line would have toilets, this is not an issue. Sandboxes need to be topped up but this can be done when cleaning takes place.

Top speed of the trains would be 60mph – more than enough for the WLO. Air conditioning is provided as standard for the cab but can be added in the cars for passengers. It takes around 40mins to charge the battery but the battery is affected by temperature. The aim would be to finish the day with significant charge remaining, to be topped-up over night. The battery life is unknown but is expected to be greater than five years. The battery manufacturer says at least seven years with their warranty.

The seating inside is the same layout as was the case for the District Line trains but everything has been renewed/updated including lighting, seat fabrics, flooring, paintwork, windows and new open/close buttons for the doors to meet standards. Seating layouts however can be tailored to suit. Vivarail also showed a number of different types of seat options. There will be a control panel by the door which can be accessed by staff if needed. Space for a wheelchair/pushchair is provided which has required the removal of the pole in the central area. This should also make boarding easier.

3. TECHNICAL SUMMARY

The following points were covered at the meeting:

- The Vivarail train is based on the recently withdrawn D78 District Line train. It will use the existing LUL body shell and bogies, but refit most else else. Vivarail bought all the available D78 Drive cars from LUL when they were sold off, as well as enough trailers for the assembly of three car trains.
- They are offering a 30 year life for the refurbished trains. The bogies are relatively new – Only about ten years old, and are a compensated type similar to the more modern S Stock.
- The bogies as supplied had DC traction motors, but these are to be replaced with modern AC types.
- A variety of seating layouts can be provided as well as a toilet pod if required. Air conditioning is optional.
- A wheelchair space would be included in at least one car. As the floor height of LUL cars is less than that of NR trains, the location and design of platform humps would be non-standard, and this must be studied.
- The first Vivarail prototype is a diesel electric unit, using 200hp Ford Diesel motors sourced at Bridgend. This has its NR approvals and can be used on NR tracks.
- A new demonstrator is in the course of development, a two car battery unit. This has yet to gain its NR approvals and it is hoped to arrange this by March 2018 so that testing can take place. Following this, a one month period of testing would be necessary at Long Marston, allowing the trains to available for demonstration in May or June 2018.
- An outline system of charging has been developed. At terminal stations, the train will connect to a re-charging point resembling a short length of third rail with a conductor shoe. This is only live when a train is in dock.
- The train range on a full battery is 88 miles However, on the Dudding Hill Line, it could draw traction current from the third rail beyond Kew, and this would enable recharging whilst on the move. This would permit the train to complete a full day's work without docking. The train is designed to operate with 70% battery charge minimum. There might be problems if the route was terminated at Brentford or Kew

as the amount of third rail running would be curtailed. There is a slight reduction of battery power in cold weather which must be allowed for.

- Heavy maintenance is only needed every six months. At stabling points, only sanding top up is required. It is suggested that stabling sidings should be fitted with “Trickle” recharging points for overnight use. However, if required, the batteries can be recharged in about 40 minutes.
- The production trains might be fitted with a new type 167KwH battery. Battery life would be considerable – They will have a 7 year warranty. Consideration is also being given to the use of fuel cells in the electric trains rather than conventional batteries. This would give technical advantages, but the storage and use of hydrogen generating components would require some thought.
- When recharging, there might be power spikes when going on and off the third rail system. The on board software would be configured to deal with this.
- As the system is new, there would be commercial issues to resolve with NR concerning the recharging of the trains from their electrified track.
- Production, when it commences, would largely be at Long Marston, but some components would be outsourced to a plant at Seaham, near Sunderland County Durham

4. ACTIONS AND NEXT STEPS

- Vivarail offered to do some calculations if requested to ascertain whether, given the third rail, Vivarail trains could run continuously on the WLO without needing the physically stop to recharge. We can send them WLO route, station distances, travel times, gradients, 3rd rail stretches etc. at an appropriate time so they can do this work
- If the WLO project continues, Invite Vivarail to bring a carriage to London in summer 2018 – subject to them having the required safety certification.
- The group thought it would be useful to have a comparison of CO2 per mile from battery vs diesel traction. Will ask Vivarail to supply this information at an appropriate time.



Draft Mayor's Transport Strategy Consultation

WEST LONDON ALLIANCE RESPONSE

2 October 2017

THE CHALLENGE

1. London faces a number of growing challenges to the sustainability of its transport system. To re-examine the way people move about the city in the context of these challenges, it is important that they have been correctly identified.

- Please provide your views on the challenges outlined in the strategy, and describe any others you think should be considered.

During a time of such unprecedented growth in the capital's population it is more important than ever that we work together strategically to identify and respond to the most significant challenges we face and address them together and in a joined-up way. This approach will ensure that West London boroughs and London as a whole will be able to respond positively to these challenges and ensure they do not become a constraint on future growth.

We note the fact that the majority of future population growth will occur in Outer London. This will make it increasingly important that residents and businesses have access to well connected, fast and cost effective orbital public transport options that connect the capital's largest growth areas alongside the well-established radial network.

We note that there appears to have been an oversight by not considering growth in journey numbers on a larger geographical scale? For example, London's population will continue to grow well into the 2040s, as will the home counties, yet the plan indicates that there will be no increase in the number of trips from outside London from 2015 to 2041 (page 277). This does not appear to be a credible assumption. We would like to see a clearer rationale for such a fundamental assertion given the implications for Outer London.

There has been a data explosion over the last decade from individuals, local authorities, TfL/GLA, business and others. London, specifically the boroughs, GLA, London Councils and TfL, needs to better manage, share and coordinate the use of its data to promote advances in transport technology. It would be useful if the

final MTS could make stronger reference to this with indications on how it will compile and share this information.

THE VISION

2. The Mayor's vision is to create a future London that is not only home to more people, but is a better place for all of those people to live and work in. The aim is that, by 2041, 80 per cent of Londoners' trips will be made on foot, by cycle or using public transport.

- To what extent do you support or oppose this proposed vision and its central aim?

The ambition stated in the draft MTS for cars to comprise only 20% of journeys by 2041 is a challenging but welcome target and signals the scale of London's ambition to lead the way globally in mode shift and in the reconfiguration of cities around people rather than cars. We see that the largest changes in modal shift will need to come from Outer London as current car use into, through and within the Outer London area currently make up 43% of journeys. We note that Central and Inner London already meet the 20% target, suggesting Outer London faces a very significant challenge.

In order to achieve a shift of this scale, Londoners will need ready access to high volume travel options that reflect their travel patterns and are more attractive than private cars. The West London Orbital Proposal that West London boroughs have been working with TfL and the GLA on over the last year, tracks closely the route of one of the most congested roads in London, the North Circular/A406, and also connects some of London's most significant growth areas including Brent Cross, Wembley, OPDC and the Hounslow Opportunity Area. This line would give drivers a practical, accessible and, crucially, faster option for getting around North and West London than is currently possible, aiding the GLA to hit the 2041 target of 80% of trips being by foot, cycle or public transport.

There is a danger that without interim targets and milestones we will not commence the delivery of the MTS at the pace required to deliver the vision. We feel it is essential to include interim targets or milestones and would expect the final MTS to set these at appropriate intervals between now and 2041.

We welcome the new investment in cycle infrastructure and ask that Outer London receive an effective share of this, reflecting that it is here that the vast majority of current and future growth will be (MTS page 28). While Inner London may offer an 'immediate opportunity', the MTS targets are long term. Outer London faces far greater challenges, in terms of modal shift, than any other part of London. We

will welcome news on how the delivery of further measures and investment will unlock the 'huge untapped potential' Outer London has for cycling (MTS page 30).

3. To support this vision, the strategy proposes to pursue the following further aims:

- To what extent do you agree or disagree with the aims set out in this chapter?

- *by 2041, for all Londoners to do at least the 20 minutes of active travel they need to stay healthy each day;*
- *for no one to be killed in, or by, a London bus by 2030, and for deaths and serious injuries from all road collisions to be eliminated from our streets by 2041;*
- *for all buses to be zero emission by 2037, for all new road vehicles driven in London to be zero emission by 2040, and for London's entire transport system to be zero emission by 2050;*
- *by 2041, to reduce traffic volumes by about 6 million vehicle kilometres per day, including reductions in freight traffic at peak times, to help keep streets operating efficiently for essential business and the public;*
- *to open Crossrail 2 by 2033;*
- *to create a London suburban metro by the late 2020s, with suburban rail services being devolved to the Mayor;*
- *to improve the overall accessibility of the transport system including, by 2041, halving the average additional time taken to make a public transport journey on the step-free network compared with the full network;*
- *to apply the principles of good growth.*

In terms of London Suburban Metro, we support proposal 83, that the Mayor, through TfL and relevant boroughs, will examine the feasibility of delivering a new London Overground rail link between Hounslow and Old Oak, and assess options for an extension towards Cricklewood.

We also support more broadly the development of a cross-borough orbital suburban metro and strategic corridors that allow Londoners to get around the places they live and work (see answer to question 19)

We applaud the drive to further encourage active travel, particularly more walking and cycling. It would be of great assistance to the delivery of these ambitions if our Public Health colleagues could be engaged with more and brought into this agenda given the relationship between transport and the health of the population. There is an opportunity to align the work of these traditionally different areas to

both improve the way cities work, to help people get around and to improve the health and well-being of the population.

The emphasis of the Mayor on Healthy Streets is welcomed. If funding is directed to streets that can deliver all ten indicators, as opposed to streets that are more movement than place in function, and not all indicators can be delivered, we create polarisation. Nice places connected by poor quality, unsafe roads. We prefer to see the 10 indicators as aspirational and hope the scale of improvement towards the indicators is the winning factor for progressing schemes.

We are not convinced by the slightly artificial separation in the MTS of London Buses from other causes of road deaths, the aim should simply be for there to be no more road deaths irrespective of the cause.

In addition, we should be reducing all accidents - while labelled as 'slights' on an individual level, this could mean off work with a broken leg for six weeks. The MTS should recognise this more explicitly.

We consider that by 2041, all Londoners should do at least the 30 minutes of active travel they need to stay healthy each day, in line with the most current guidance from the chief medical officer, rather than the 20 minutes set out in the London Plan.

We are delighted to see that improvements to the overall accessibility of the transport system will continue but significant accessibility gaps remain in West London. We would welcome more details on the Mayor's delivery of this vision and what the interim milestones will be and how stations will be selected for step free access.

HEALTHY STREETS AND HEALTHY PEOPLE

4. Policy 1 and proposals 1-8 set out the Mayor's draft plans for improving walking and cycling environments (see pages 46 to 58).

- To what extent do you agree or disagree that these plans would achieve an improved environment for walking and cycling? Please also describe any other measures you think should be included.

We are supportive of Proposal 3 - a London wide cycle network, but note that the Strategic Cycling Analysis does not consider Outer London, where the majority of Londoners live and where most future growth will occur. This makes it difficult to see how the necessary mode shift from cars that will be required in Outer London will become a reality without significant investment in an Outer London cycle network.

The same issue is of relevance for the ambition to deliver a cycle route within 400m of 70% of Londoners. Currently, most Londoners live in Outer London, most of the population growth will be in Outer London yet Outer London cycle routes, especially orbital routes are poor quality and sparse. In order for boroughs and subregions to deliver the Mayor's ambitions in relation to model we would value additional emphasis on cycle paths in Outer London over the coming years.

5. Policy 2 and proposals 9-11 set out the Mayor's draft plans to reduce road danger and improve personal safety and security (see pages 62 to 67).

- To what extent do you agree or disagree that these plans would reduce road danger and improve personal safety and security? Please also describe any other measures you think should be included.

We support the ambitions of "Vision Zero", to reduce traffic deaths to zero. We feel that the only way that this will be achieved is through a change to the LIP guidance so that money can be spent on a wider number of projects rather than is currently allowed and in a more proactive way. We would welcome a more flexible approach that allows boroughs to make safety investments in the network based on more nuanced local intelligence that does not rely on accidents happening before any interventions can be taken.

London-wide support for lower speed limits is broadly welcomed given the clear relationship between speed and road safety and possibly air quality - driver behaviour being a significant factor for the latter. We also recognise however that different boroughs have different circumstances and so we would support an approach that allows individual boroughs to show local discretion in the application of speed limits in a way that is appropriate to local need and community support.

In terms of freight, we do not believe it realistic for operators to comply with the ULEZ and a direct vision standard at this time given the level of investment required from operators and the lead times from manufacturers for the delivery of new vehicles. This is further compounded, as the details of such a standard are still being developed. We do support the introduction of higher standards by the industry but until the standard is set and manufacturers are ready, we emphasise that the focus should be on behaviour change and education.

We believe it is essential to increase the riding standard of powered two wheelers (PTW) in London and welcome a motorcycle standard for London. We ask that the Mayor takes a stronger stance with the DfT following the CBT review in 2015 and pushes for more stringent licence regulation. Accident statistics are not collected for licence type but we can assume that the majority of PTW less than 125cc are ridden with Compulsory Basic Training (CBT) licences. This being the case, 68% of PTW accidents involve CBT riders.

We are unable to take a view on the use of motorcycles in bus lanes without further evidence on safety or the wider implications of this for the network.

We also note a lack of police presence on our roads. Fear of crime is a high priority for residents and business.

6. Policy 3 and proposals 12-14 set out the Mayor's draft plans to ensure that crime and the fear of crime remain low on London's streets and transport system (see pages 68 to 69).

- To what extent do you agree or disagree that these plans would ensure that crime and the fear of crime remain low on London's streets and transport system? Please also describe any other measures you think should be included.

We fully agree that addressing crime and the fear of crime should appropriately be a core element of the MTS, reflecting the fact that this is a top concern for Londoners, who need to feel safe whilst travelling if the city is to continue to prosper in the decades ahead.

Moped crime is a particular concern at the moment and we support the Mayor and police in taking appropriate steps to tackle.

References to bicycle theft are missing from the MTS. In addition a clear message of the provision of good quality parking would be welcomed.

7. Policy 4 and proposals 15-17 set out the Mayor's draft plans to prioritise space-efficient modes of transport to tackle congestion and improve the efficiency of streets for essential traffic, including freight (see pages 70 to 78).

- To what extent do you agree or disagree that these plans would tackle congestion and improve the efficiency of streets? Please also describe any other measures you think should be included.

We support and encourage the use of DSPs, not just for Central London but London-wide. Research shows that only 30% of businesses are interested in understanding their transport impacts but do not see delivery/servicing traffic as their concern. We would welcome greater communication between the Mayor and businesses, supporting businesses (not just central) to consider their transport impacts.

We support the use of consolidation centres but note that London already has several consolidation centres, some of which are even specific to the construction industry. We expect any new consolidation centres to be independently financially

viable unlike earlier attempts to develop borough led schemes. There is evidence that the logistics industry already operates efficiently as they work to respond their customers' demands - we suggest stronger engagement with business to consider the use of upstream consolidation and the implementation of DSPs.

We welcome a London Lorry Standard and look forward to working with the Mayor to develop one. We ask that the implementation of such a standard be carefully timed to allow operators and manufacturers time to comply.

8. *Proposals 18 and 19 set out the Mayor's proposed approach to road user charging (see pages 81 to 83).*

- To what extent do you agree or disagree with this proposed approach to road user charges? Please also describe any other measures you think should be included.

No View - Borough and London Wide issue

9. *Proposals 20 and 21 set out the Mayor's proposed approach to localised traffic reduction strategies (see page 83).*

- To what extent do you agree or disagree with this approach? Please also describe any other measures you think should be included.

We broadly support these proposals but believe TfL need to work collaboratively with the boroughs and include TfL roads too where appropriate.

We question which wards and boroughs will be the first to act on these proposals as they could influence the relocation of some businesses to those parts of London that have not chosen to implement the proposals?

10. *Policies 5 and 6 and proposals 22-40 set out the Mayor's draft plans to reduce emissions from road and rail transport, and other sources, to help London become a zero carbon city (see pages 86 to 103).*

- To what extent do you agree or disagree that these plans would help London become a zero carbon city? Please also describe any other measures you think should be included.

We note that a London-wide ULEZ is not part of the draft MTS. We are also concerned that the Inner London ULEZ may have a perverse impact on the air quality in Outer London, especially in the vicinity of the North and South Circulars. We ask what additional measures will be available to assist boroughs mitigate any

negative congestion or air quality impacts associated with a control London only ULEZ.

Proposal 31 is unclear and requires more detail before responding. We cannot take a view on this proposal at this time.

11. Policies 7 and 8 and proposals 41- 47 set out the Mayor's draft plans to protect the natural and built environment, to ensure transport resilience to climate change, and to minimise transport-related noise and vibration (see pages 104 to 111).

- To what extent do you agree or disagree that these plans would achieve this? Please also describe any other measures you think should be included.

We are pleased to see policy 7 supports the development of green spaces but feel the wording could be stronger than is currently the case. We ask for a more robust policy that will deliver more green space.

We appreciate the impact weather events, in particular flooding, can have on the transport network and look forward to resilience work; Policy 8 has the potential to cover a vast range of circumstances while proposal 45 suggests we have an unlimited budget. Can this be reworded to account for available resources?

A GOOD PUBLIC TRANSPORT EXPERIENCE

12. Policy 9 and proposal 48 set out the Mayor's draft plans to provide an attractive whole-journey experience that will encourage greater use of public transport, walking and cycling (see pages 118 to 119).

- To what extent do you agree or disagree that these plans would provide an attractive whole journey experience? Please also describe any other measures you think should be included.

We fully support the aims of the mayor to improve the transport experience for all travellers and to help them to keep moving as the population of the city approaches 10 million people in the years ahead.

We would be interested to have more detail about how improvements are to be measured for Healthy Streets and what the interim targets will be to deliver this. Proposal 48 aims to make improvements measured against the Healthy Street indicators - we would welcome assurance that funding for Healthy Streets will be based upon the improvement achieved rather than on any bureaucratic process. Otherwise, places with better natural factors will flourish at the expense of poorer quality streets.

13. Policies 10 and 11 and proposals 49 and 50 set out the Mayor's draft plans to ensure public transport is affordable and to improve customer service (see pages 121 to 125).

- To what extent do you agree or disagree that these plans would improve customer service and affordability of public transport? Please also describe any other measures you think should be included.

We support this - it is important that transport is affordable for everyone, including lower-wage and key workers.

14. Policy 12 and proposals 51 and 52 set out the Mayor's draft plans to improve the accessibility of the transport system, including an Accessibility Implementation Plan (see pages 127 to 129).

- To what extent do you agree or disagree that these plans would improve accessibility of the transport system? Please also describe any other measures you think should be included.

Work to improve station accessibility is welcome but additional detail relating to how the proposals will actually be delivered would have significant value to boroughs. For example, what will be the process for selecting some stations for improvement over others? We note that by 2041 many stations, including many in Outer London, will not have been upgraded - we ask that this additional detail be included in the final MTS.

15. Policy 13 and proposals 53 and 54 set out the Mayor's draft plans to transform the bus network; to ensure it offers faster, more reliable, comfortable and convenient travel where it is needed (see pages 133 to 137).

- To what extent do you agree or disagree that these plans would achieve this? Please also describe any other measures you think should be included.

Proposal 53 seems to omit the opinion of the boroughs and other stakeholders. It is also far too vague and requires a guarantee that essential users will still have access to a reliable service.

Proposal 54 implies that radial routes will take greater priority over other routes, including orbital, despite emphasis elsewhere in the strategy on the crucial role of improved orbital connectivity. We wish to remind the Mayor that in Outer London, orbital links are poor and buses are a major mode for many people, especially between town centres. There is also significant passenger demand for improved orbital rail routes. In the future as London continues to grow it will be these orbital routes that will need to be invested in order to have the greatest impact reducing car usage. We ask that this be reflected in the final MTS.

16. Policy 14 and proposals 55 to 67 set out the Mayor's draft plans to improve rail services by improving journey times and tackling crowding (see pages 140 to 166).

- To what extent do you agree or disagree that these plans would achieve this? Please also describe any other measures you think should be included.

We ask why Crossrail 2 does not stop at Imperial Wharf? We believe there is significant regeneration potential for it to be included.

There is an acute lack of orbital rail routes for Inner and Outer London. Given the commitment from West London's Leaders, we ask that the Mayor places a stronger focus on orbital routes and make a commitment to delivering a West London Orbital line from Hounslow to West Hampstead via the West London Orbital Line.

17. Policies 15 to 18 and proposals 68 to 74 set out the Mayor's draft plans to ensure river services, regional and national rail connections, coaches, and taxi and private hire contribute to the delivery of a fully inclusive and well-connected public transport system. The Mayor's policy to support the growing night-time economy is also set out in this section (see pages 176 to 187).

- To what extent do you agree or disagree that these plans would deliver a well-connected public transport system? Please also describe any other measures you think should be included.

We fully support policies 15 to 17 and proposals 68 to 74.

The suggestion that all taxi and private hire operators can 'flourish' is a strong statement. While they have a role to play we would like to see other modes flourish too.

NEW HOMES AND JOBS

18. Policy 19 and proposals 75 to 77 set out the Mayor's draft plans to ensure that new homes and jobs are delivered in line with the transport principles of 'good growth' (see pages 193 to 200).

- To what extent do you agree or disagree that these plans would achieve this? Please also describe any other measures you think should be included.

We fully support the principles of good growth set out in the draft MTS. It will be essential that these are fully integrated into the Local Plans and operational delivery of the MTS across a broad cross section of partners in both the public and the private sectors if they are to be realised.

One point to make in terms of converting the strategy into a reality is that a significant proportion of developers all too often ignore their transport and wider community commitments. For example, the West London “WestTrans” partnership of transport planning officers has recently inspected the cycle parking facilities at over 200 new developments and noted 17% of sites failed to provide any cycle parking at all and 56% provided less spaces than required. 92% of sites failed to provide good, reasonably spaced and safe cycle parking (<http://www.westtrans.org/WLA/wt2.nsf/pages/WT-218>).

We request then that London government and TfL take a more robust stance on enforcement in new developments, especially in terms of quality as defined in the West London Cycle Parking Guidance 2017. If people can’t store a bike, they won’t own one and are less likely to use one.

We are pleased to see DSPs in proposal 77 and have already begun work to engage with businesses. We ask that TfL assist the boroughs with the use of DSPs by communicating their importance to businesses all over London.

Good growth should also allow for brave and innovative schemes to be developed, we would like to see how waste could be managed here through a pipe network - reducing the need for waste vehicles in the development area.

19. Proposals 78 to 95 set out the Mayor’s draft plans to use transport to support and direct good growth, including delivering new rail links, extensions and new stations, improving existing public transport services, providing new river crossings, decking over roads and transport infrastructure and building homes on TfL land (see pages 202 to 246).

- To what extent do you agree or disagree that these plans would ensure that transport is used to support and direct good growth? Please also describe any other measures you think should be included.

We support proposal 83, that the Mayor, through TfL and relevant boroughs, will examine the feasibility of delivering a new London Overground rail link between Hounslow and Old Oak, and assess options for an extension towards Cricklewood. This scheme, named the “West London Orbital” line, makes use of existing underused twin-track freight lines and passenger lines along its entire length.

The line runs from West Hampstead and Hendon at one end and Hounslow at the other, and would connect the major regeneration areas of Brent Cross, Wembley, and Park Royal whilst supporting the unlocking of significant potential new housing intensification and regeneration opportunities around Neasden, the Golden Mile and potentially also Staples Corner. It would allow for housing intensification in places like Gladstone Park. The line would provide orbital travellers, who are



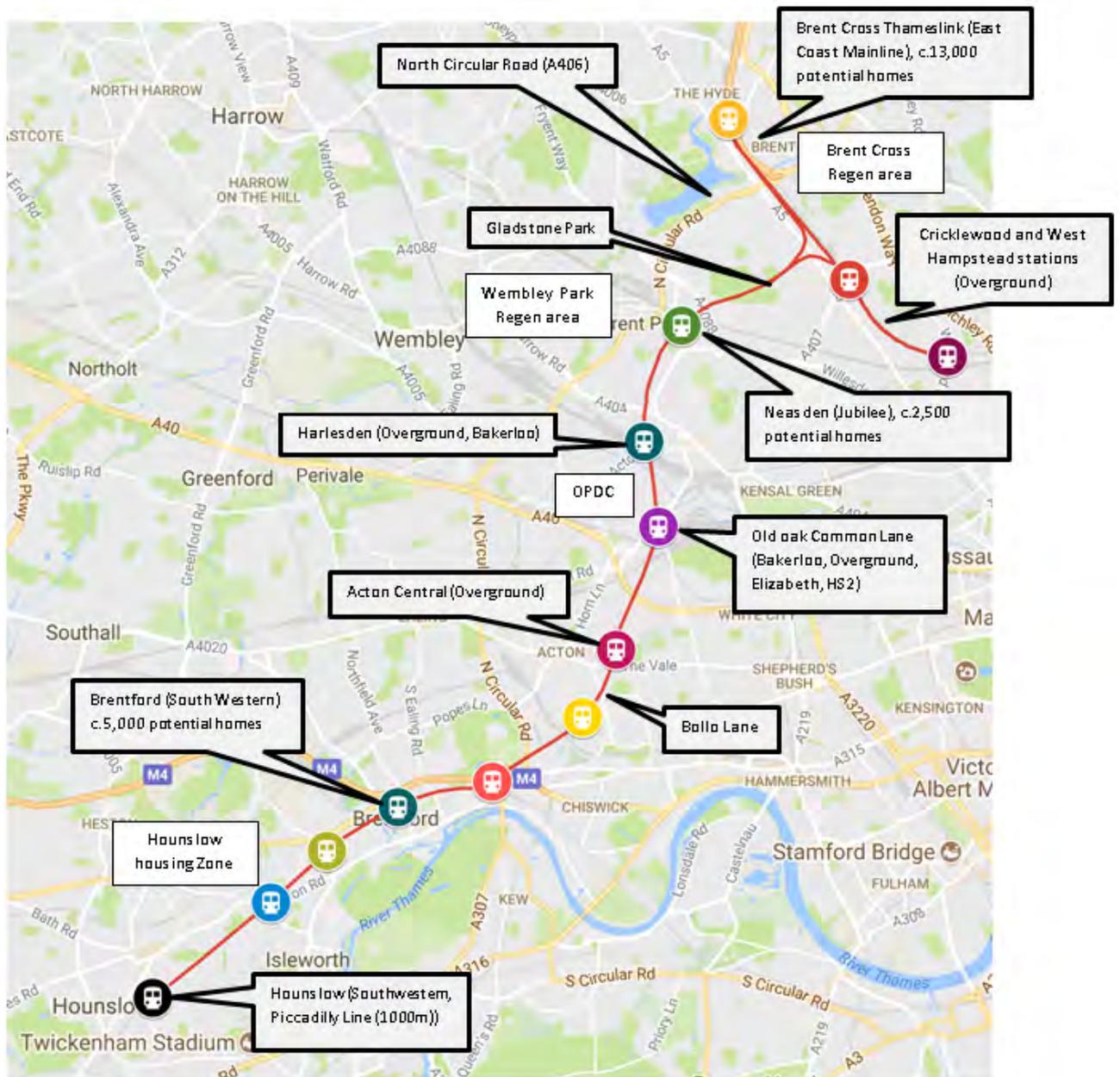
currently required to make orbital journeys using the heavily congested and polluted the A406 North Circular Road, with a significantly faster and more convenient alternative that improves their transport experience.

West London boroughs have jointly commissioned a feasibility study with the support of TfL into the operation of the line. The key points can be summarised as:

- The scheme is **technically feasible** including in relation to Acton Wells Junction and Bollo Lane level crossings, although further detailed work is now needed through the formal GRIP stages.
- Forecasts derived from TfL's modelling suite indicate **significant levels of passenger demand** for the scheme and benefits for passengers across the public transport network.
- **BCR of more than 2:1** according to DfT methodology.
- Analysis by boroughs has identified potential to unlock approximately **22,000 new homes** along the length of the line, including in the vicinity of a number of new stations. This would yield in the region of £200m of Community Infrastructure Levy.
- With WLO there will be **significant time savings for public transport users** and a competitive alternative to car use. The level of competitiveness would depend on when the car journey is being made, e.g. peak periods or off-peak.
- Stronger **integration of the OPDC area the communities that surround it**, helping to weave it into the wider London economy. The West London Orbital Line would allow orbital travellers to change to Crossrail and HS2 lines without needing to first travel in to London.
- **Strong strategic fit with the priorities set out in both the draft MTS and emerging London Plan** including 1) improving the transport experience, 2) New homes and new jobs, and 3) Healthy streets and healthy people. The Scheme is also consistent with the Mayor's focus on "Good Growth" as set out in the emerging London plan.
- The scheme **makes better use of under-utilised orbital freight lines**, sweating assets and maximising value from London's existing transport infrastructure and minimising any disruption to residents and businesses associated with major new schemes.

In addition, the West London Economic Prosperity Board (WLEPB), a formally constituted cross-party committee consisting of the leaders of six West London boroughs has made this scheme a standing item on its agenda and have given it formal cross-party political support. Through the Committee the West London boroughs have also agreed to incorporate the scheme in their Local Plans so that it now forms part of their integrated long-term strategic planning in the future, as suggested by the Deputy Mayor for Transport.

Figure 1: Route of the West London Orbital Line (including connections and new housing)

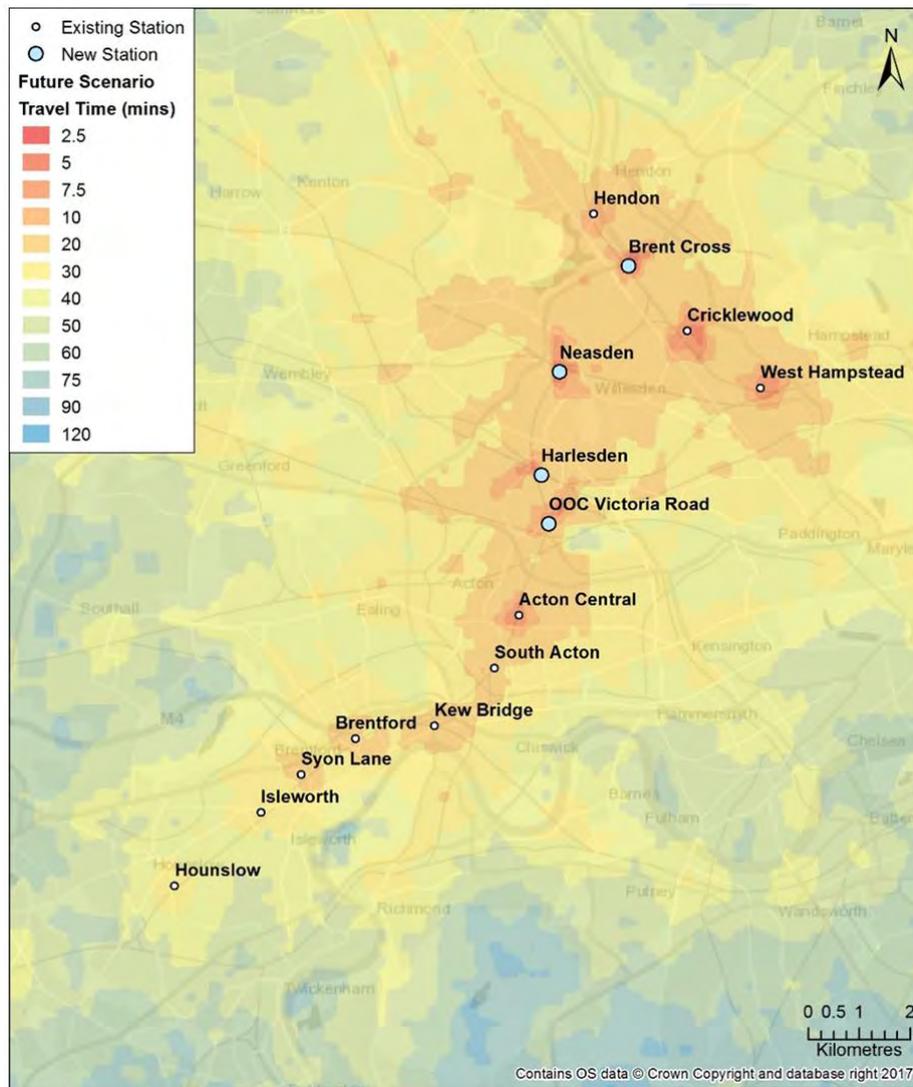


We note that suburban metropolitan rail schemes such as this will become increasingly essential in the years ahead if the Mayor is to meet the target of 80% of all journeys being by foot, bike or public transport by 2041, against the context of the population approaching 10m by the 2040s and the majority of population growth expected to occur in precisely the sorts of outer-London areas that the West London orbital connects. Schemes with strong cross-party support such as this are also more likely to prove successful.

As well as its technical deliverability, housing supply/regeneration benefits and good strategic fit the line has the potential to offer London an opportunity to test innovative new approaches to suburban-metro rail such as making use of Battery-powered rolling stock rather than polluting diesel units. It supports the principle of

“good growth” by making better use of what are currently notably under-used freight lines that happen to connect some of the most significant housing and employment growth areas in London including Brent Cross, Wembley, Park Royal, and the Golden Mile in Hounslow, significantly reducing journey times between these areas as shown in figure 2 below:

Figure 2: Travel time between West London Orbital stations, including new stations at Neasden, Harlesden and Old Oak Common Lane (from feasibility study)



The feasibility study has proved invaluable in identifying a general characteristic of orbital schemes and suburban metro-rail lines in London. This is that fares for orbital journeys, which by definition don't run across multiple fare zones, tend to be lower than for equivalent radial journeys into and out of central London that do cut across fare zones. This reduces the income generated per passenger for orbital journeys compared with an equivalent radial line and increases the likelihood of an operating subsidy being required.

Given the fact that the majority of future growth in London will be in outer-London this is an unsustainable position, and is not just an issue for the West London Orbital Line but for orbital lines more generally that will need to be addressed strategically if the GLA wants to meet its objective of mode shift away from the car. Many car journeys take place in outer London where the majority of Londoners live, and these drivers will need good quality public transport alternatives if they are to make the mode shift from their cars in the coming years.

There are a number of practical and achievable solutions for addressing any potential operating subsidy that could be implemented relatively easily. These include:

- 1) The use of modestly higher “premium” fares so that orbital rail journeys yield the same per passenger as the equivalent radial journey. Fares such as this are already successfully in use by the Channel Tunnel Rail Link or the Heathrow Express service.
- 2) Part of the line e.g. around the OPDC area could be re-designated as Zone 1 London, enabling higher fares and supporting further growth in the regeneration area which will increasingly become a core part of the central business district of London in the coming years.
- 3) Operating costs could be brought down significantly through greater use of technology that serves as a case study for innovation and best practice nationally e.g. battery-powered rolling stock.
- 4) Introduction of fare “segments” alongside the existing fare “zones”.

As well as operating costs, there are a number of viable options for meeting capital requirements associated with construction of the line itself based predominantly around capturing the uplift in land values associated with the line. These include through the development of new housing and employment space along the route of the line, a variety of external sources, and possibly Central Government, e.g. future rounds of Housing Infrastructure Funding (HIF2).

Furthermore, analysis by borough planning departments of the land that the line would pass through has identified capacity for approximately 22,000 new housing units and approximately £200m of CIL. We believe that, given the positive feasibility case, high value-for-money case, passenger demand numbers and strategic fit of the line there will be viable options for securing additional funding from a range of sources including government and the private sector.

Further, more detailed GRIP stages are now needed to explore the detailed specification of the line, and well as to develop a more focused funding package for its construction and subsequent operation building on the analysis described above.



We invite the Mayor and TfL to make this scheme a part of the story of transport in London through the Mayor's Transport Strategy and London Plan, and to continue to work with West London boroughs to bring this line to completion by the 2020's. Specifically, this includes incorporating the scheme into the final MTS so that there are sufficient hooks to move the project forward, and to support further detailed work on the line and on scheme funding through the GRIP stages. The leaders of the West London Economic Prosperity Board have already agreed to commission a more detailed scheme funding study that will sit alongside the technical feasibility/5-Case study and which will be completed before the publication of the final Mayor's Transport Strategy.

Other areas of interest:

We welcome the Mayor's decision to pilot new buses services in outer London. Given the wide geography of outer London, can the Mayor give any details on the operation of such a service? We very much see a demand response service filling the gaps in areas with the poorest connections.

We are encouraged to see the Mayor can consider decking over the A13 and has committed to looking at the feasibility. We ask the same for the A4 at Hammersmith, given the potential land values in Hammersmith and research provided by LBH&F, we expect this to be equally viable.

Figure 44 in the section, Focus On: New Homes and Jobs on Transport Land, must be a mistake - the Mayor must be aware that West London extends beyond old Oak Common? We expect this oversight to be rectified in the final draft.

We know Travel Plans can motivate businesses to think more about the facilities they offer and the mode their staff use to travel. Measures within travel plans already promote the Mayor's aims for Healthy Streets, active travel and modal shift. While we are pleased to see Travel Plan guidance will be updated, Proposal 94, it stops short of instructing new developments to employ them fully. We ask that this proposal be strengthened to: Developers are to ensure Travel Plans are employed at new developments to promote walking, cycling and public transport while discouraging the use of private cars, in-line with the Mayor's Transport Strategy. TfL's Travel Plan guidance will be updated to include the new policies in the MTS.

20. Policy 20 and proposal 96 set out the Mayor's proposed position on the expansion of Heathrow Airport (see pages 248 to 249).

- To what extent do you agree or disagree with this position? Is there anything else that the Mayor should consider when finalising his position?

No West London view.

DELIVERING THE VISION

21. Policy 21 and proposals 97 to 101 set out the Mayor's proposed approach to responding to changing technology, including new transport services, such as connected and autonomous vehicles (see pages 258 to 262).

- To what extent do you agree or disagree with this proposed approach? Is there anything else that the Mayor should consider when finalising his approach?

The proposals here are welcome and proportionate to the scale of the opportunity presented by changing technology. However, the section misses the wider point relating to big data sharing and the "smart cities" agenda, especially amongst the GLA, TfL, London Councils and the Local Authorities. Many of these organisations now hold spatial data on journeys, highways and other infrastructure, yet few of them use the same platforms, data labels or formats; making data sharing impossible. London needs to standardise its data storage, make more comprehensive, cross-cutting use of the GLA Datastore and engage with data users/app designers and start-ups to encourage better use of technology to solve many of our transport issues. If London as a whole can provide a complete and concise dataset, it will help it to become a destination for new transport technology and investment.

In terms of orbital connectivity there is an opportunity to trial world-leading battery powered train technology on the West London Orbital Line (proposal 83).

22. Policy 22 and proposal 102 set out the Mayor's proposed approach to ensuring that London's transport system is adequately and fairly funded to deliver the aims of the strategy (see pages 265 to 269).

- To what extent do you agree or disagree with this proposed approach? Is there anything else that the Mayor should consider when finalising his approach?

West London does not take a view on this (TBC).

23. Policies 23 and 24 and proposal 103 set out the proposed approach the boroughs will take to deliver the strategy locally, and the Mayor's approach to monitoring and reporting the outcomes of the strategy (see pages 275 to 283).

- To what extent do you agree or disagree with this proposed approach? Is there anything else that the Mayor should consider when finalising his approach?

We believe the new guidance and templates for the monitoring of LIPs to be overly detailed and as a result require significant bureaucratic capacity from borough officers to complete. We would greatly welcome the issuing of a streamlined LIP template by London government that will allow boroughs to focus on delivering excellent real-world outcomes for Londoners without being unduly caught up with administration.

24. Are there any other comments you would like to make on the draft Mayor's Transport Strategy?

The MTS describes a welcome vision for 2041. It is necessarily high level and strategic in nature, but says less about the interim milestones and targets that will be required along the way to deliver the ultimate ambition. We would strongly support the inclusion of material relating to the phasing and trajectory of various elements of the strategy so that we can, as a partnership, put the necessary mechanisms and resources in place to deliver the strategy at the necessary pace.

In terms of data and digital solutions to improving connectivity and boosting growth, it would be useful for there to be additional guidance on the use of new technology for monitoring, and for this to be reflected in the final version of the MTS.

The use of electric bicycles is absent from the strategy altogether and this feels like a significant omission. Electric bicycles have well-established health, wellbeing, environmental, congestion, noise, and air quality benefits that are all consistent with the objectives of the draft MTS. A notable body of evidence indicates that this mode will play a large and growing part in the future of our transport system and the MTS should be promoting their use.

KEY FACTS ABOUT THE LINE (October 2017)

- The route is **technically feasible** and runs for around 15 miles starting at either Brent Cross or Cricklewood before merging with existing mainline services at Acton Central and running to Hounslow. The Barnet–Acton Central stretch of line is approximately 4 miles long.
- Possible sites for new **stations and stabling identified at: Brent Cross/ Cricklewood, Neasden, Harlesden, and Old Oak Common Lane**. Existing stations used from Acton Central-Hounslow
- **Eight TPH in each direction**
- High Value for Money scheme with a “**Benefit-Cost Ratio**” (BCR) to the wider economy and society of **2.2:1**.
- Annual operating cost c.£15m per year. Currently subsidy is likely to be required, however there appears to be potential for this to be largely or entirely self-funding. **c.£265m build cost**.
- It would drastically **improve orbital travel times** around West London. For example a journey from Barnet to Park Royal (enabling a change on to CrossRail or HS2 services) would take approximately 12.5 minutes. A trip from Acton to Cricklewood/Brent Cross would take approximately 16.5 minutes. A journey along the whole line from Barnet to Hounslow would take approximately 39 minutes (times the same for reverse journeys).
- It would **connect town centres and regeneration areas, including the 45,000 new homes and 86,000 new jobs that will be created at Old Oak Common, Wembley and Brent Cross**, putting a greater number of jobs and homes within easy reach of one another and supporting intensification in growth areas.
- It would **remove a significant number of cars from the road, reducing congestion and improving journey times, particularly along the North Circular/A406**, as the population of the capital approaches 10 million over the next 20 years.
- It would allow passengers in outer London to access new services on Crossrail and High Speed Two via an interchange with the Dudding Hill Line at Park Royal.
- It would help to **reduce passenger demand for central London Stations** such as Kings Cross and Paddington for orbital journeys that currently require travellers to go into central London before then travelling back out to reach their destination.

FIGURE 1: Route of the West London Orbital Line



West London Orbital Operational Assessment

This is a very high level operational assessment, produced based on the WSP Outline Case and Technical Report 2017. It aims to assess whether the proposed infrastructure changes would be able to accommodate the preferred service option, along with the background traffic - London Overground services on the North London Line and freight trains.

Assumptions

- Proposed infrastructure changes as proposed in the WSP reports 2017, including
 - New stations and new platforms
 - Track layout modification
 - Resignalling
- Proposed Timetable Planning Rules
 - Planning headway value – 3 minutes as indicated in the WSP reports
 - Assumed junction margin – 3 minutes
 - Platform reoccupation time – 3 minutes
 - Minimum turnaround time for 4 car units – 4 minutes
- Preferred WLO timetable option is defined as follows
 - Phase 1: 4 trains per hour from West Hampstead to Hounslow.
 - Phase 2: additional 4 trains per hour from Hendon to Kew Bridge.Therefore, 8tph WLO services will be adopted in this assessment.
- London Overground services between South Acton and Acton Wells Jn as currently planned in the next timetable change.
 - Peak - 5tph
 - Off peak – 4tph
- Freight services

On average, about 3 freight train paths (through Acton Wells Jn) have been planned in the May 2018 WTT. However, it is noted that the number of freight paths varies significantly from time to time.

Initial findings

- Terminus capacity

Considering the minimum turnaround time of 4 minutes, platform reoccupation time of 3 minutes and a nominated performance allowance of 3 minutes, the reversing siding/bay platform proposed at Hounslow, Kew Bridge, West Hampstead and Hendon should be able to accommodate maximum 6 trains per hour. Therefore, the proposed train reversing facility at terminus stations will be sufficient to meet the operational requirements for the preferred service option - 4 trains per hour turnaround operations.

- Route capacity on the core between South Acton and Acton Wells Jn

This section will need to be shared by London Overground NLL services, freight trains and the proposed WLO shuttles. Given the planning headway of 3 minutes and a minute station dwell at Acton Central (as indicated in the current timetable planning rules), the core route would provide maximum capacity of 15tph, which is more than the total number of passenger

train paths required for the LO services (5tph in the peak and 4tph in the off peak) and WLO shuttles (8tph) and give 2-3 paths that can be allocated to freight services. Given what have been planned in the May 18 WTT for freight services, this route section would just be able to meet the current freight demand, but there will be no spare capacity to cope with the future freight growth in demand.

- Acton Wells Jn

Acton Wells Jn links various routes, including Dudding Hill Line, Great Western Main Line, South West Sidings (West London Line) and the North London Line. Junction remodelling has been proposed in the WSP reports, including a 4 track section.

The May 18 WTT indicates that the majority of freight movements will occur between GWML and WLL/DHL. On this basis, the proposed track layout would help to reduce the impact of freight movements (on the upper tracks) on the LO NLL train operations (on the lower tracks). Based on the assumed planning headway and junction margins, the modified track layout at Acton Wells Jn would be able to accommodate the proposed passenger services, freight train paths and associated crossing moves in principle.

However, the modified junction will be much bigger than the existing one and the conflict point will also increase from current 3 to 5. It is more likely that train crossing moves will need to be completed in clear runs (not be stopped in the middle of junction). If this is the case, junction margins might be greater than the assumed 3 minutes due to operational complexity and should be assessed based on the signalling scheme plans.

Moreover, the timetable structures on the NLL and Hounslow Loop and variations in freight paths may become another constraint for the proposed WLO shuttles.

Initial conclusions

In principle, the proposed infrastructure changes would be adequate to facilitate the preferred 8tph WLO shuttles. However, due to the more fluid nature of freight operations and the timetable structure for existing passenger services, a detailed timetable study should be conducted to determine the feasibility of operating 8tph WLO shuttles.



West London Alliance

WEST LONDON ORBITAL RAIL SERVICE

Outline Case





West London Alliance

WEST LONDON ORBITAL RAIL SERVICE

Outline Case

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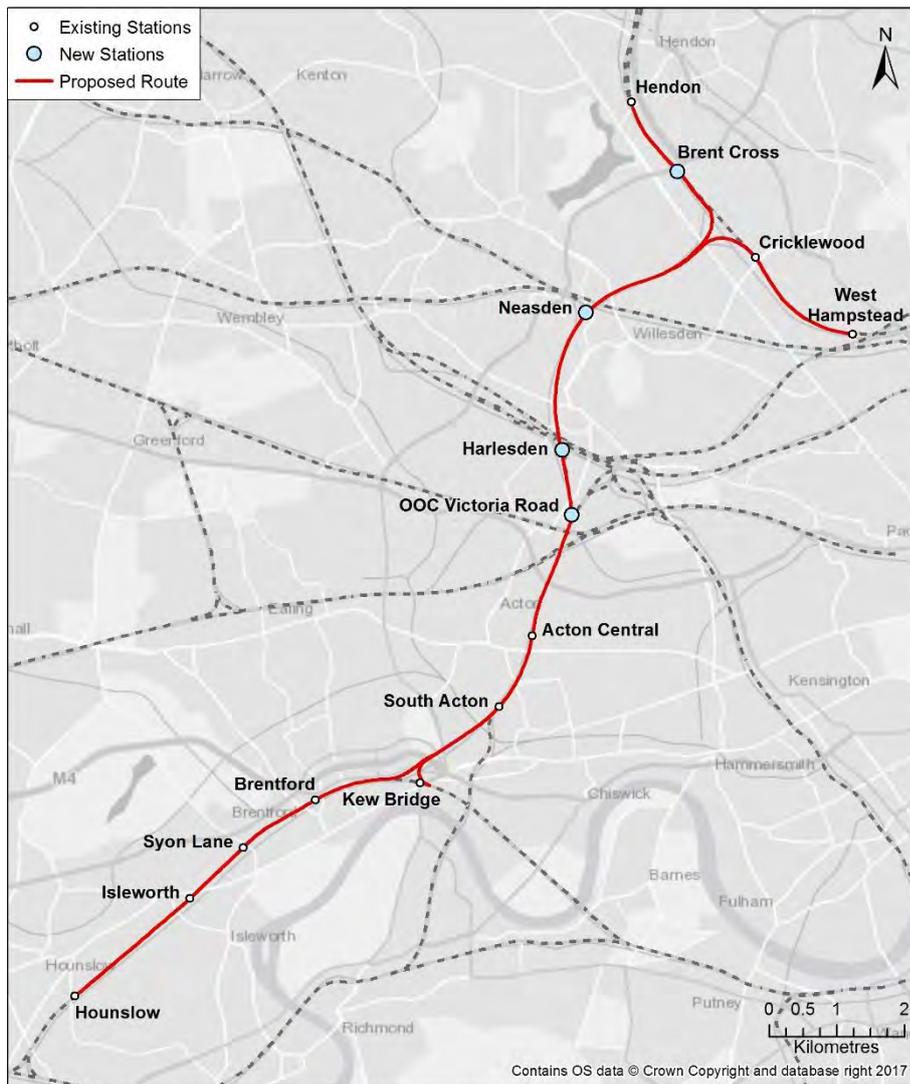
EXECUTIVE SUMMARY

BACKGROUND

The West London Alliance is currently investigating ways of accommodating the additional passenger demand resulting from the growth of population and employment in the area and across London as a whole. This includes substantial additional housing planned along much of the corridor between Hounslow and West Hampstead/Hendon. An option to serve these developments in a sustainable way, consistent with the draft Mayor’s Transport Strategy ambitions, is to restore rail passenger services on the Dudding Hill Line and the Kew – Acton link to provide a West London Orbital (WLO) rail service from Hounslow to West Hampstead and Hendon.

This business case presents the findings from a study of the feasibility of introducing a West London Orbital rail service and identification and assessment of a preferred service option.

Figure 1 – Proposed West London Orbital Railway

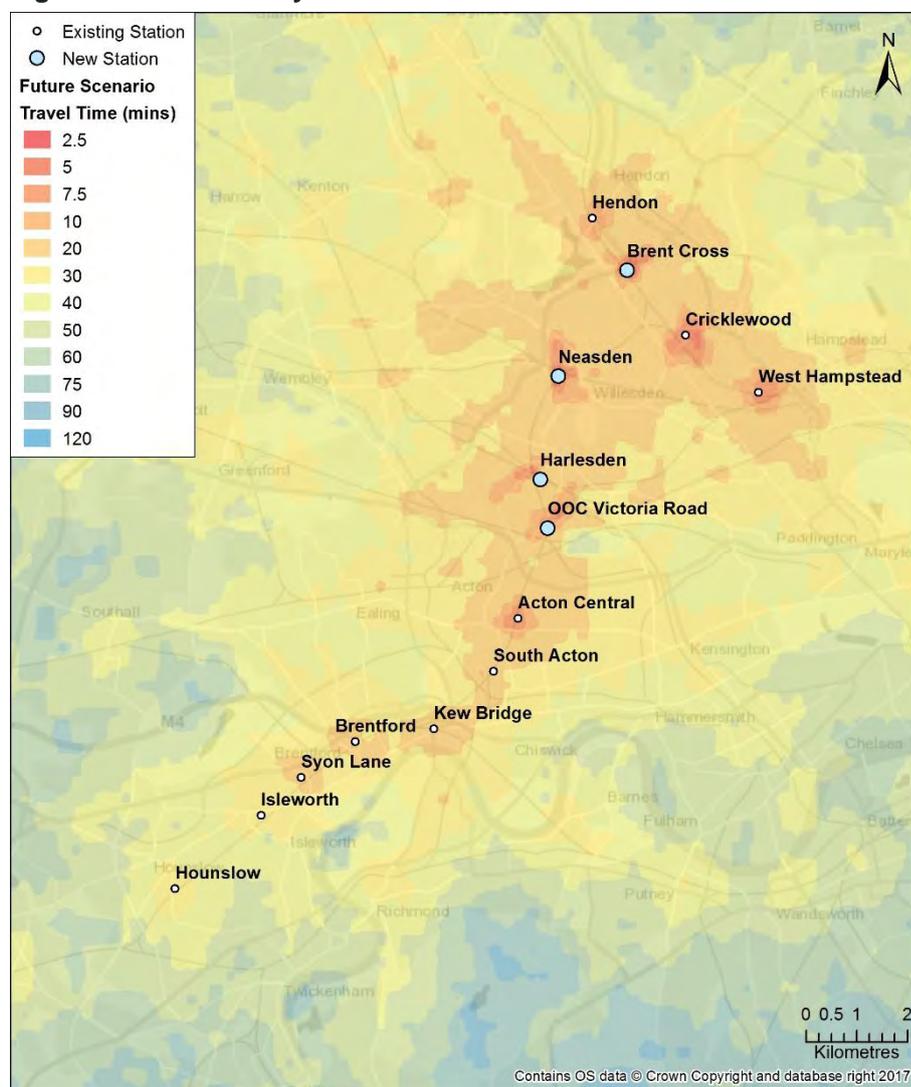


STRATEGIC CASE

The Strategic Case demonstrates the rationale for the development of a heavy rail solution for the Hounslow to West Hampstead/Hendon corridor given its existing role as a freight route and the opportunity to provide connectivity across the wider rail network. Retention of the heavy rail corridor on the Dudding Hill Line section will also permit integration of the WLO services into London Overground operations and to support the further success of this brand.

The introduction of a high quality orbital public transport service, integrated with the wider public transport network, will support the accommodation of forecast population and employment growth in West London in a manner consistent with the draft Mayor's Transport Strategy. The scheme will deliver significant connectivity and accessibility benefits by introducing new stations and new services. This will result in the attraction of existing public transport and highway users, as well as new users, contributing to relieving forecast crowding on LUL and national rail services, addressing highway congestion and supporting local environmental improvements. In doing so, it will play an important role supporting mode shift from car to more sustainable means of orbital transport for part of outer London that is currently heavily dependent on car use.

Figure 2 – Accessibility of new WLO stations



Within the areas benefitting from the significantly improved accessibility and connectivity are many sites and larger regeneration opportunities identified by boroughs. In addition to serving these sites and the associated

proposed housing and employment space, the introduction of WLO services will support an intensification of development facilitating increased numbers of housing units to be delivered on the sites.

A preferred rail service option has been identified based upon demand forecasting and operations and infrastructure analysis to support option development. The preferred option is:

- **Phase 1:** 4 trains per hour from West Hampstead to Hounslow, calling at West Hampstead, Cricklewood, Neasden, Harlesden, Old Oak Common (OOC) Victoria Road, Acton Central, South Acton, Brentford, Syon Lane, Isleworth, Hounslow
- **Phase 2:** additional 4 trains per hour from Hendon to Kew Bridge, calling at Hendon, Brent Cross, Neasden, Harlesden, OOC Victoria Road, Acton Central, South Acton, Kew Bridge

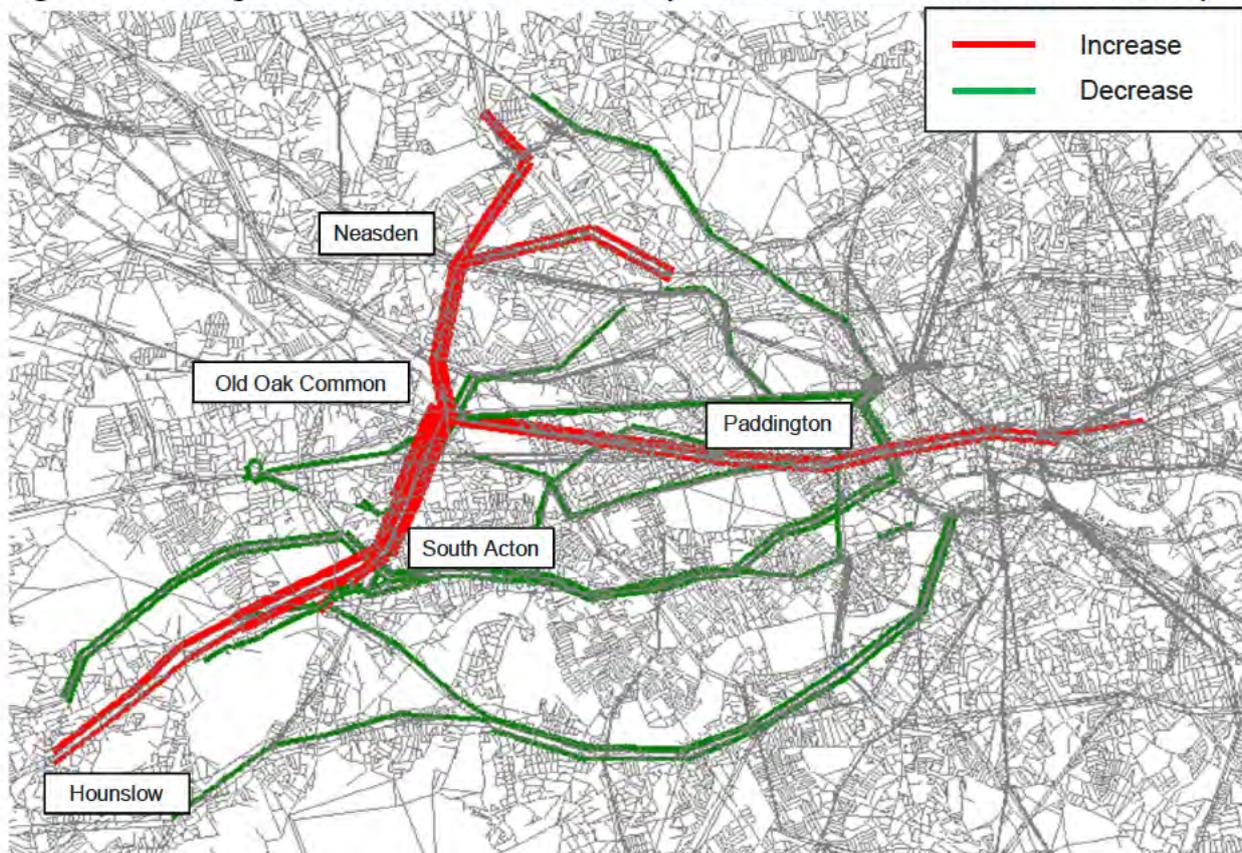
Phase 1 services are assumed to commence operation in 2026, with phase 2 services running from 2029.

ECONOMIC CASE

The Economic Case presents the economic appraisal of the value for money for the preferred option. The outputs from the preliminary demand modelling, along with capital and operating cost estimates, have been used as inputs for the economic appraisal. The appraisal has been undertaken in line with DfT guidance with the forecast benefits (from both quicker journey times and crowding relief in generalised time) for all London public transport users converted into monetary values (£47.77, £16.29 and £7.44 in 2041 prices for business, commuting and other trips respectively) to estimate the social benefits of the scheme.

The preferred option is forecast (as illustrated in Figure 3) to attract passengers from LUL lines such as the Northern, Jubilee, Central, District and Piccadilly as well as rail services currently operated by South West Trains and Great Western Railway. With the WLO passenger service operating these rail services are likely to witness lower levels of crowding, providing overall crowding relief to a broad range of other services. The direct connection between Old Oak Common Victoria Road station, which is considered as part of the WLO railway, and the main Old Oak Common station is estimated to attract additional passengers to the Elizabeth Line (Crossrail 1).

Figure 3 - Passenger flow difference for Preferred Option vs 2041 Maximum Growth Scenario (AM)



Given the significant levels of forecast passenger demand for the West London Orbital rail service (around 9,500 and 10,500 boarders in the AM and PM periods respectively in 2041) and the forecast journey time savings and crowding benefits across the wider public transport network (over 250,000 minutes and 600,000 minutes for the AM and PM periods respectively in 2041), the preliminary modelling suggests total social benefits exceeding £1.25bn PV over the 60-year appraisal period. Due to the constrained timescales of the study, it has not been possible to review base year LTS-PT model validation in the area of interest or undertake a detailed network audit. Therefore it is recommended that a thorough review and a possible improvement of the accuracy of the public transport model in line with TfL and DfT guidance in undertaken as part of future work.

The cost of delivering these benefits has been estimated for the capital and operating elements over the appraisal period. Together these amount to £596m PV (2010 prices). An annual revenue forecast of around £9m (current prices) for the WLO services has been estimated (as reported in the Financial Case), however for the purposes of this preliminary economic appraisal the revenue impact across the whole network is assumed to be neutral and is not included at the public transport network level. This is consistent with the results from the LTS-PT model, which is based on trip reassignment and hence largely a redistribution of revenue, e.g. from LUL to WLO. Further analysis of the operating position will be required.

The resulting indicative benefit to cost ratio (BCR) for the preferred WLO option is greater than 2:1, meeting the DfT's high value for money category. This strong BCR reflects the significant forecast benefits of the scheme to the wider economy and society through journey time savings and crowding benefits, and their realisation through better utilisation of existing infrastructure with selective capital investment, e.g. new platforms and four-tracking. Further analysis will be needed to refine this BCR.

Table 1 – Summary of Economic Appraisal Results

Item	60 year PV 2010
Journey time benefits	£684m
Crowding benefits	£614m
Total Benefits	£1,298m
Capital costs	£259m
Operating costs	£337m
Revenue	Assumed neutral at public transport network level
Net Financial Effect	£596m
Net Present Value	£703m
Benefit:Cost Ratio	2.2:1

Wider benefits are anticipated to accrue from additional demand resulting from the transfer of trips from road to rail (which is not captured in the demand modelling). This will benefit both those transferring and those who continue to use the roads, but experience less congestion. The reduction in congestion and vehicle-miles driven on the road will also provide environmental and social benefits, e.g. improved local air quality, reduction in road accidents.

FINANCIAL CASE

The Financial Case addresses the affordability of the delivery and operation of the proposed rail services. With a capital cost estimate of £263m (current prices, with 80% risk), significant funding will need to be secured to deliver the scheme. Initial analysis by the West London boroughs indicates that there is scope to derive a significant contribution towards this capital cost through funding from the Community Infrastructure Levy (CIL).

With potentially 15,000 to 20,000 new homes planned in West London the associated value of the CIL could approach around £150m-£200m.

As further scheme development is undertaken greater certainty will emerge over the level of funding required given the confirmation of infrastructure requirements, value engineering where appropriate and detailed quantified risk assessments. Further, through the identification of potential rail industry synergies, opportunities for cost efficiencies and rail industry funding can be explored.

It has been assumed that the proposed West London Orbital rail service will be operated as part of the London Overground network, with integration with the TfL fares and ticketing arrangements. Annual operating costs of around £15m (current prices) have been estimated for the proposed rail service. When set against the estimated annual farebox revenue of around £9m (current prices), based on the preliminary demand modelling results, this initial analysis suggests an operating subsidy would be required. Opportunities to meet the 'gap' will therefore need to be considered in order to confirm the affordability of West London Orbital rail service operations. This consideration should address:

- ┆ Future TfL fares' policy for orbital travel (e.g. premium fares), which is often lower than for equivalent radial journeys because they can be made without crossing fare boundaries
- ┆ Potential re-zoning of the London transport network, e.g. zoning Old Oak Common as Zone 1
- ┆ Opportunities to harness future technology for ticketing and fares to most effectively manage demand across the network and price fares appropriately
- ┆ Additional fare revenue received from demand transferring from road to rail, but not captured in the current demand forecasting (which is solely reassignment)
- ┆ Opportunities for commercial revenue streams through station and/or on-train commercial activities
- ┆ Future rolling stock choices, e.g. electric or battery, and implications for operating and whole-life costs
- ┆ Future operating practices, e.g. provision of ticket offices, staffing

COMMERCIAL & MANAGEMENT CASE

The Commercial & Management Case sets out the current thinking on the approach to manage and deliver the proposals for the West London Orbital rail service. To date, the project has been led by the West London Alliance, with representatives of the boroughs of Barnet, Brent, Ealing and Hounslow, along with Transport for London and Old Oak and Park Royal Development Corporation, represented on the project Steering Group.

With the demonstration in this business case of the robust strategic rationale for the scheme, its operational feasibility and the forecast significant social benefits that will result from the introduction of the West London Orbital rail service, further development of the project should be undertaken. The involvement of the entire rail industry will be necessary. Regardless of possible funding streams, the Department for Transport will need to be content with the proposal, and may suggest amendments to facilitate its implementation, in line with other network-wide schemes such as the Digital Railway. Network Rail will be a central player in the project management and delivery of the scheme, be it undertaking the work directly or with an asset protection role.

Given the current use of the route for freight, freight operators will be important parties to engage with and there will also be the interface with the South Western franchise's emerging service planning on the Hounslow loop to ensure that neither sets of plans are compromised. With its experience of planning and management of major transport investment in London and the synergy between the proposed West London Orbital service and the North and West London lines (London Overground), its role with many train operators in the London area and with the HS2 interface at Old Oak Common, Transport for London is best placed to provide project leadership as the scheme is progressed.

CONCLUSIONS

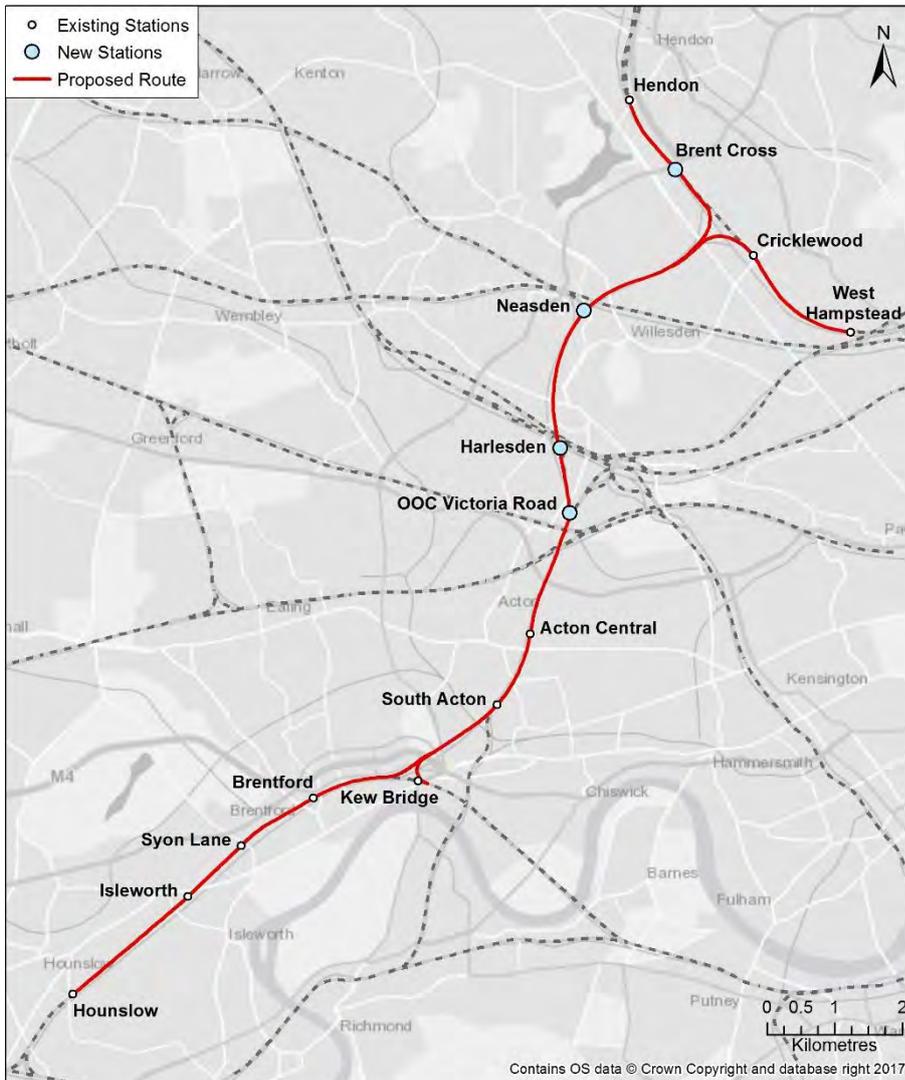
This business case demonstrates that significant economic, social and policy benefits will result from the introduction of WLO rail services due to the improved connectivity and accessibility provided on an important orbital route, as well as significant crowding relief on the wider public transport network. The delivery and operation of the services has been shown to be feasible with the key infrastructure challenges identified. These will require further work to confirm the identified solutions have stakeholder support and to refine the total level of funding required for the project. At this stage the study has identified plausible options for funding the construction of the line itself and for responding to any potential operating subsidy given its significant regeneration and economic benefits. These merit further more detailed technical analysis.

1 INTRODUCTION

1.1 BACKGROUND

- 1.1.1. The West London Alliance is currently investigating ways of accommodating the additional demand resulting from the growth of population and employment in the area and across London as a whole. This includes substantial additional housing planned along much of the corridor between Hounslow and West Hampstead/Hendon. An option to serve these developments in a sustainable way, consistent with the draft Mayor’s Transport Strategy ambitions, is to restore passenger services on the Dudding Hill Line and the Kew – Acton link to provide a West London Orbital rail service from Hounslow to West Hampstead and Hendon.
- 1.1.2. The Dudding Hill Line is an existing railway line in north-west London running from Acton to Cricklewood. The line itself has had no scheduled passenger service for over a century. It has no stations, no electrification and a 30 miles per hour (48 km/h) speed limit with semaphore signalling, and is lightly used by freight and very occasional passenger charter trains. It is roughly 4 miles (6.4 km) long. Near the site of Old Oak Common, trains would join the existing North London Line, and then further south at Acton, use the link down to the Hounslow Loop to reach Brentford and Hounslow. We refer to this set of routes as the West London Orbital railway.

Figure 4 – Proposed West London Orbital Railway



- 1.1.3. WSP was commissioned to carry out a feasibility study into the case for introducing a new passenger service using the West London Orbital railway. The study addressed the strategic options for the route, forecast passenger demand and undertook operational and infrastructure analysis. A series of technical notes were produced documenting the study approach and findings. These have been collated into a technical report – *'West London Orbital Rail: Technical Analysis and Conclusions'*.

1.2 FIVE-CASE BUSINESS CASE

- 1.2.1. This document is based on the work undertaken for the feasibility study. This document presents the study's findings against the five-case business case structure set out by HM Treasury (*'Green Book Supplementary Guidance'* (2013)) and the Department for Transport (*'The Transport Business Cases'* (2013)).
- 1.2.2. This business case focuses on the emerging strategic and economic case for the proposals, in line with WebTAG Stage 1 – Option Development. It presents the case for the intervention and the identification and assessment of options to identify the better performing one to be taken forward for further development and appraisal work. Given the early stage of the project and the associated uncertainty at this time regarding the affordability of the proposals and the delivery model to implement them, current emerging thinking is set out demonstrating the plausibility of successfully delivering the scheme, but recognising that further work is required.
- 1.2.3. The structure of this document follows the five-case business case model (with the Commercial and Management Cases combined):
- i Chapter 2 - The **Strategic Case**: setting out the context and the case for change, including the identification of the preferred option;
 - i Chapter 3 - The **Economic Case**: assessing the preferred option in terms of the scheme costs and the arising benefits to society (value for money);
 - i The **Financial Case**: identifying the scheme's affordability and potential funding arrangements over the lifespan of the project; and
 - i Chapter 4 - The **Commercial & Management Case**: considering the commercial viability of the scheme's delivery and operation and the proposed model for leading the project forward.

2 STRATEGIC CASE

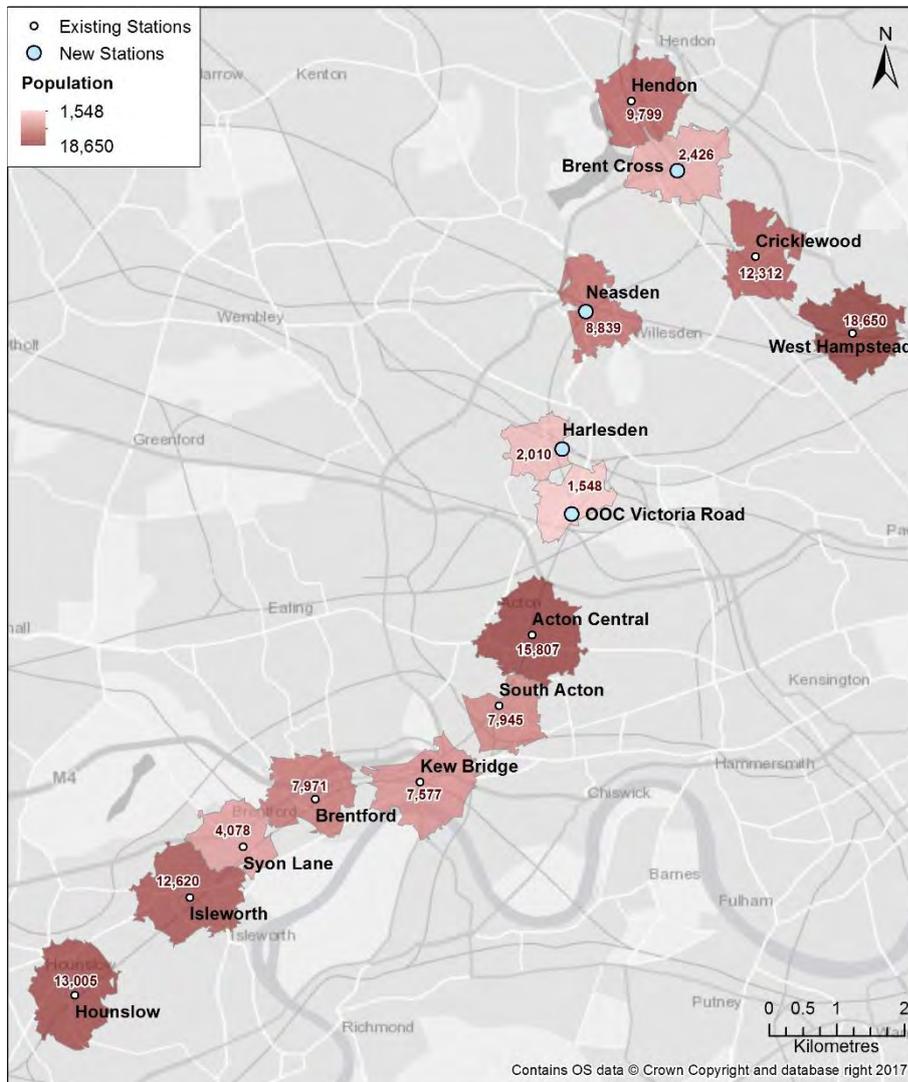
2.1 INTRODUCTION

2.1.1. The Strategic Case demonstrates the rationale for the development of a heavy rail solution for the Hounslow to West Hampstead/Hendon corridor. The proposed West London Orbital rail service will provide a high quality orbital public transport service, integrated with the wider public transport network. In doing so it will address a missing 'link' in the orbital rail network, support the accommodation of forecast population and employment growth in West London and align with the ambitions set out in the draft Mayor's Transport Strategy.

2.2 STRATEGIC RATIONALE

2.2.1. The West London Orbital rail service will deliver significant connectivity and accessibility benefits by introducing new stations and new services in West London along a currently under-utilised corridor. Figure 5 illustrates the current extent of the walk-in catchments and the population resident within the catchment who will benefit from the new service. These catchments will increase significantly with the forecast growth in population and housing in West London.

Figure 5 – Current Catchment Population along WLO Railway



2.2.2. Within the areas benefitting from the significantly improved accessibility and connectivity are many sites and larger regeneration opportunities identified by boroughs. In addition to serving these sites and the associated

proposed housing and employment sites, the introduction of WLO services will support an intensification of development facilitating increased numbers of housing units to be delivered on the sites

- 2.2.3. The resulting demand growth for both the public transport and highway network will impose increased costs on individuals and the economy, in terms of congestion and environmental and social dis-benefits in the absence of investment in additional capacity. The draft Mayor's Transport Strategy states that without action, by 2041 71% of travel in the morning peak on London Underground will be in crowded conditions. The respective figure for National Rail is 65%.
- 2.2.4. Delivery of the West London Orbital rail service will support the vision set out in the draft Mayor's Transport Strategy to reduce the need for car use (including taxis and private hire vehicles) in London to 20% by 2041 compared with 36% currently, which is largely due to the levels of car use in Outer London. The new rail service will also support sustainable development and provide the capacity required for the public transport network.

2.3 STRATEGIC OPTIONS

DUDDING HILL LINE

- 2.3.1. The Dudding Hill Line section of the West London Orbital railway is a 4-mile railway line between Cricklewood and Acton Wells. At the northern end connections are provided to the Midland Main Line, both to the north and south. At Acton Wells it joins the North London Line. From there, trains may proceed to the Great Western Main Line (Ealing), or continue along the North London Line towards Hounslow or Richmond. There are single-track link lines from the West Coast Main Line at Willesden and the Chiltern main line at Neasden.
- 2.3.2. The Dudding Hill Line is not an independent line: it links four main lines together, and by way of the North London Line, provides valuable links to the South Western network. It is an important freight artery, providing a means by which stone trains from the Mendips, for example, can operate to the West Coast or Midland Main Lines. While providing a corridor for freight, the Dudding Hill Line does not see any passenger services (either public transport or private vehicles). Passenger services last ran on the route in 1902.
- 2.3.3. The provision of passenger services would provide improved accessibility, support economic and housing growth along the corridor and relieve passenger demand on adjacent rail and highway networks. A high level consideration has been undertaken into the merit of seeking to utilise the existing heavy rail infrastructure or to replace the freight alignment with alternative transport facilities.

ASSESSMENT OF STRATEGIC OPTIONS

- 2.3.4. The strategic options considered for passenger services were: heavy rail, tram, tram-train, bus rapid transit and conversion to highway. Each of these was assessed against a multi-criteria sifting framework. The purpose of the framework was to support the differentiation between the options in order to inform the decision on the strategic option to proceed with. The framework was developed to enable a proportionate approach to be taken, cognisant of the information available and the stage of the project.
- 2.3.5. The framework addressed for each option, its:
 - ┆ Suitability: e.g. meeting the identified needs and objectives for the proposed scheme
 - ┆ Feasibility: e.g. delivery and operational issues
 - ┆ Acceptability: e.g. powers/consents, capital cost/affordability, stakeholder acceptability

- 2.3.6. Criteria for each of the above elements were determined and the performance of each option against them was assessed in comparison with the current situation as an improvement or detrimental and whether slight, moderate or significant.

ASSESSMENT FINDINGS

- 2.3.7. The findings of the high level assessment of the strategic options are summarised in the table below. The extent of the improvement or detriment has been assessed and illustrated with green indicating the greatest level of benefit and red the least (or a negative impact). The individual assessments are not additive, but should be considered on a comparative basis against other options and in the round for the overall assessment.

Table 2 – Summary of High Level Assessment of Passenger Service Strategic Options

	Heavy rail	Tram	Tram-train	Bus Rapid Transit	Conversion to road
Suitability					
Accommodation of additional demand	Green	Green	Green	Green	Green
Supporting housing agenda	Green	Yellow	Green	Yellow	Yellow
Supporting local economic growth	Green	Yellow	Green	Yellow	Yellow
Improved connectivity for West London	Green	Yellow	Green	Yellow	Green
Freight network performance	Yellow	Red	Yellow	Red	Red
Feasibility					
Construction	Green	Green	Green	Green	Green
Operational	Green	Green	Yellow	Green	Green
Acceptability					
Affordability	Yellow	Green	Yellow	Yellow	Yellow
Approvals	Green	Yellow	Yellow	Yellow	Red
Stakeholder acceptability	Green	Red	Yellow	Red	Red

- 2.3.8. While all the options, by enhancing the local transport network in West London, would contribute positively to the intent for the scheme, the greatest benefit is anticipated to arise from the heavy rail and tram-train options as they offer being part of the existing wider transport network (as does conversion to road), as well as providing the perceived permanency of fixed rails, which is attractive to developers, investors and the public due to the perceived greater value of these forms of public transport.
- 2.3.9. However, the most material differentiator between the heavy rail and tram-train options and the others is the ability of these passenger services to operate alongside the existing freight services on the line. With each of the other options freight movements could not take place on the line. The permanent diversion of freight services elsewhere does not appear feasible given geography and the utilisation of the rail network in the area. Constructing a new rail route for freight has been discounted due to deliverability and affordability challenges.
- 2.3.10. Freight trains under some very limited circumstances can share tracks with passenger trams, but there are onerous safety considerations to be addressed, which it may not be possible to satisfactorily overcome. A line not dissimilar to the Dudding Hill line in Paris, called the Tangentielle Nord line, has seen part of the former Grande Ceinture line re-used for trams. The French authorities have not closed the Grande Ceinture, which, like the North London Line, is an important freight artery, but have built a separate tram alignment next to it. A similar option for the Dudding Hill line might be possible, but it would require significant land-take, would be expensive and present engineering challenges (and therefore has not been assessed further).
- 2.3.11. The incompatibility between maintaining the existing freight services and introducing trams, bus rapid transit or a highway arguably indicates that none of these options is suitable for further consideration, notwithstanding that all the options are feasible in terms of construction and operation. The least confidence for operational feasibility relates to tram-train, which is still being trialled on the South Yorkshire rail network.
- 2.3.12. The findings for the assessment of acceptability reinforce the conclusions on suitability of the options. While introducing tram or tram-trains may provide a lower cost alternative to re-introducing heavy rail passenger services (and compared to having to remove the rails and lay a new carriageway for bus rapid transit or cars), their acceptability to stakeholders such as TfL, GLA, Network Rail, freight operators and local authorities is expected to be poor and hence achieving the necessary approvals would be very challenging. Similarly, given the policy context of the draft Mayor's Transport Strategy, the construction of a new road and transfer of freight from rail to road would be anticipated to also be opposed by key stakeholders.

- 2.3.13. In conclusion, having considered potential strategic options for the introduction of passenger services along the Dudding Hill Line, the findings from the high level assessment demonstrate that the line should remain part of the national rail network and not be a candidate for conversion to another mode. The retention of the Dudding Hill Line as a heavy rail line avoids the negative implications for freight and facilitates the realisation of benefits which the re-introduction of heavy rail passenger services has the potential to achieve, both in terms of transport connectivity and supporting the housing and economic growth agendas for the local areas. This conclusion was supported by the client group.

2.4 OPTION DEVELOPMENT

INTRODUCTION

- 2.4.1. Building on the conclusion of the strategic options assessment, a number of heavy rail passenger service options for the West London Orbital railway were defined. The option definitions were shaped by stakeholder contributions on the scheme requirements and priorities.
- 2.4.2. The three defined options were:
- ▮ **Option 1:** 4 trains per hour (tph) Hendon - Hounslow, calling at Hendon, Brent Cross, Neasden, Harlesden, Old Oak Common (OOC) Victoria Road, Acton Central, South Acton, Brentford, Syon Lane, Isleworth, Hounslow
 - ▮ **Option 2:** 4 tph West Hampstead - Hounslow, calling at West Hampstead, Cricklewood, Neasden, Harlesden, OOC Victoria Road, Acton Central, South Acton, Brentford, Syon Lane, Isleworth, Hounslow
 - ▮ **Option 3:** 4 tph West Hampstead - Hounslow and 4 tph Hendon - Hounslow, stops as above.
- 2.4.3. Consideration was given to the inclusion of a new station at Lionel Road, which is situated just east of Brentford and north of Kew Bridge stations. This proposal has been the subject of previous extensive work. This work suggests there is a good case for the station. However, we have excluded it from the options above because it is not integral to the re-opening of the line: the line could be re-opened and perform well without Lionel Road station. If the new station was constructed it would further increase the local regeneration benefits resulting from improved local rail services.
- 2.4.4. Demand forecasting, as described below, was undertaken for each of the options. A review of the infrastructure and operating requirements for introducing each of the options was also completed. The findings from both these analyses shaped the definition of the preferred option for further assessment.

DEMAND FORECASTING APPROACH

- 2.4.5. TfL's LTS-PT model was used to provide a preliminary forecast of the implications of the passenger service options. LTS-PT is a public transport model which covers the whole of London and predicts the demand by public transport mode (rail, underground, bus) and route that a person chooses to get to their destination, as well as the associated crowding impacts. The software platform for LTS-PT is Cube Voyager.
- 2.4.6. Travellers in London may respond in a number of different ways when they are faced with the introduction of a new passenger service including:
- ▮ Change their route to benefit from a faster and possibly less crowded passenger service;
 - ▮ Change the destination of some trips;
 - ▮ Change mode of travel, for example from road to rail; and
 - ▮ Change the number of trips (trip generation and trip suppression).
- 2.4.7. Some of these responses will be more profound than others and TfL has a suite of models (LTS, HAM, LTS-PT) to assess all the above mentioned responses. However, at this stage of the project and to provide an initial indication of the demand on the re-introduced service, only the re-routing response has been assessed. This is considered to be the strongest response to the introduction of a new passenger service in London.
- 2.4.8. As a reassignment model of public transport demand LTS-PT does not capture the transfer from private cars or induced demand growth, both of which we would expect to play a substantial role in a West London Orbital passenger service. As such, the results presented here are almost certainly underestimated.
- 2.4.9. Given the constrained timescales of the study, it was not possible to review base year LTS-PT model validation in the area of interest or undertake a detailed network audit. Therefore it is recommended that a thorough review and a possible improvement of the accuracy of the public transport model in line with TfL and DfT guidance in undertaken as part of future work.

- 2.4.10. The passenger service options were tested against the following baselines:
- Standard LTS-PT 2041 Reference Case Scenario (A141rc01a)
 - This scenario includes HS2, but not Old Oak Common (OOC) or Brent Cross development.
 - 2041 Maximum Growth Scenario without Crossrail 2 (A141rc20a)
 - This scenario includes HS2 and additional trips associated with OOC and Brent Cross development, as well as other additional development across London. Given the commitment to these developments (e.g. the planned breaking ground for Brent Cross next year) this is deemed more representative of the anticipated scenario for West London in 2041.
- 2.4.11. The 2041 Reference Case Scenario and 2041 Maximum Growth Scenario networks are the same, but the demand matrices are different. The assessment was undertaken for the AM (0700-1000) and PM (1600-1900).
- 2.4.12. The introduction of West London Orbital passenger services is forecast to result in an increase in passenger kilometres, passenger minutes and total passenger boardings on rail services (including WLO). The results for Option 1 and Option 2 are similar. However, Option 3 (8 tph rather than 4 tph) is forecast to make a more significant impact on the rail network with the changes almost double of those for Option 1 or Option 2. For example, against the Reference Case in 2041 AM Option 1 is forecast to result in 5,556 additional rail boardings, Option 2 – 5,002 boardings and Option 3 – 12,834 boardings.

DEMAND FORECASTS

- 2.4.13. Table 3 presents the summary statistics across all public transport modes in London for the incremental effect of the three options compared to the Reference Case.

Table 3 – Summary statistics: WLO Options versus 2041 Reference Case Scenario

Mode	Peak	Description	2041 TfL Ref Case	Change in user benefits		
				Scenario	A141rc01a	Option 1 minus Ref. Case
All PT	AM	Passenger Kms	85,795,810	-25,424	-22,445	-35,614
		Uncrowded Passenger Minutes	115,348,652	-88,989	-77,060	-178,966
		Crowded Passenger Minutes	154,400,839	-241,381	-210,768	-316,253
		Passenger Boardings	6,244,762	-1,957	-2,121	-1,605
	PM	Passenger Kms	89,635,043	-21,387	-17,409	-30,172
		Uncrowded Passenger Minutes	120,021,714	-82,387	-70,612	-147,691
		Crowded Passenger Minutes	154,108,212	-219,549	-190,719	-387,404
		Passenger Boardings	6,791,486	-2,268	-2,350	-1,779

- 2.4.14. The reduction in passenger kilometres, passenger minutes and total passenger boardings on LUL and buses indicates that the demand for the West London Orbital services is likely to be abstracted from LUL and bus services, providing crowding relief for them.
- 2.4.15. The WLO services are anticipated to improve connectivity and provide extra capacity on the public transport network in London resulting in lower levels of distance travelled, total boardings, journey times and crowding levels, most notably in the north-western and south-western quadrants of London. The impact of Option 1 and Option 2 is estimated to be very similar, with Option 3, which assumes double the number of trains on the core section, showing more significant changes.
- 2.4.16. When tested against the Maximum Growth scenario, the pattern of the results is similar as for the Reference Case scenario. However, the additional trip generation associated with the Maximum Growth Scenario means changes are greater, as summarised in Table 4.

Table 4 – Summary statistics: WLO Options versus 2041 Maximum Growth Scenario

Mode	Peak	Description	2041 Max Growth	Change in user benefits		
				Option 1 minus Max Growth	Option 2 minus Max Growth	Option 3 minus Max Growth
All PT	AM	Passenger Kms	88,152,748	-26,651	-23,275	-37,204
		Uncrowded Passenger Minutes	118,927,182	-90,796	-78,050	-155,426
		Crowded Passenger Minutes	160,705,541	-242,933	-212,086	-447,184
		Passenger Boardings	6,485,584	-2,108	-2,262	-1,831
	PM	Passenger Kms	92,436,014	-22,333	-18,018	-32,261
		Uncrowded Passenger Minutes	124,289,369	-88,546	-75,299	-155,144
		Crowded Passenger Minutes	162,352,074	-252,329	-218,843	-436,387
		Passenger Boardings	7,068,359	-2,352	-2,443	-1,971

- 2.4.17. The introduction of West London Orbital passenger services is forecast to attract passengers from LUL lines such as the Northern, Jubilee, Central, District and Piccadilly as well as rail services currently operated by South West Trains and Great Western Railway. With the WLO passenger services operating, these national

rail services are likely to witness lower levels of crowding, providing overall crowding relief to a broad range of other services.

2.4.18. The direct connection between Old Oak Common (OOC) Victoria Road station, which is considered as part of the WLO railway, and the main Old Oak Common station is estimated to attract additional passengers to the Elizabeth Line (Crossrail 1).

2.4.19. In terms of line loading, station boardings and alightings, the demand analysis shows the following:

Baseline: Standard LTS-PT 2041 Reference Case Scenario

- | In the AM (0700-1000) Option 1 is forecast to carry 6,064 passengers, Option 2 - 5,758 passengers and Option 3 - 12,646 passengers.
- | In the PM (1600-1900) Option 1 is forecast to carry 6,337 passengers, Option 2 - 6,146 passengers and Option 3 - 13,437 passengers.
- | The demand will vary by station with OOC Victoria Road being utilised the most. For example, in Option 1 in the AM 1,000 passengers are forecast to board the West London Orbital services and 2,823 to alight. In Option 2 these numbers are 952 and 2,479 passengers respectively and in Option 3 - 2,122 and 6,173 passengers.
- | In the PM OOC Victoria Road demand is: Option 1 - 2,036 boarders and 1,579 alighters, Option 2 - 1, 889 and 1,478, Option 3 - 4,984 and 3,346. The majority of these passengers are those interchanging from/to the Elizabeth Line (Crossrail 1).

Baseline: 2041 Maximum Growth Scenario without Crossrail 2

- | In the AM (0700-1000) Option 1 is forecast to carry 6,243 passengers, Option 2 - 5,920 passengers and Option 3 - 12,943 passengers.
- | In the PM (1600-1900) Option 1 is forecast to carry 6,659 passengers, Option 2 - 6,437 passengers and Option 3 - 13,992 passengers.
- | In the Maximum Growth Scenario WLO services are forecast to carry more passengers than in the Reference Case: on average 2.7% more in the AM and 4.6% in the PM.
- | The demand estimates vary by station with OOC Victoria Road being utilised the most. For example, in Option 1 in the AM 1,100 passengers are forecast to board West London Orbital services and 2,772 to alight. In Option 2 these numbers are 1,045 and 2,428 respectively and in Option 3 - 2,342 and 6,022.
- | In the PM OOC Victoria Road demand is: Option 1 - 2,036 boarders and 1,748 alighters, Option 2 - 1, 884 and 1,618, Option 3 - 4,936 and 3,671. The majority of these passengers are those interchanging from/to the Elizabeth Line (Crossrail 1).

2.5 OPERATIONS AND INFRASTRUCTURE ANALYSIS

2.5.1. The feasibility of delivering the rail services tested in the demand analysis was assessed, along with the associated capital cost implications. The analysis built upon previous work by TfL, Network Rail and WSP (and is reported in full in the *West London Orbital Rail: Technical Analysis and Conclusions* report). The principal issues include:

- | Construction of new stations at Harlesden and Neasden;
- | Construction of new platforms at Old Oak Common, Cricklewood, West Hampstead and Brent Cross;
- | Platform turnround capability at Hounslow;
- | Capacity between Hounslow and Key East junction given the proposed increased use of that route by the new South Western franchise;
- | Bollo Lane level crossings given the very substantial increase in use of the Kew - Acton line;
- | Capacity between Acton and Old Oak Common, especially around Acton Wells junction; and
- | Resignalling of Dudding Hill Line and Acton – Kew.

2.5.2. The conclusions of the analysis were that capacity could not be provided for eight trains an hour to Hounslow and therefore Option 3 would not be deliverable. While feasible the four-tracking around Acton Wells and identifying a satisfactory solution for the level crossings at Bollo Lane present the most significant challenges for implementation given the scheme requirements and the nature of the areas in which they will be constructed.

2.6 IDENTIFICATION OF PREFERRED SERVICE OPTION

- 2.6.1. Based on the demand forecasting and analysis of operational and infrastructure requirements for the three options, conclusions were drawn to inform the specification of the preferred option to be assessed. The conclusions were:
- i Option 3 (4 tph West Hampstead - Hounslow and 4 tph Hendon - Hounslow) attracts a higher level of demand and therefore higher total benefits (reduced passenger distance and passenger minutes) when compared with Option 1 (4 tph Hendon - Hounslow) and Option 2 (4 tph West Hampstead - Hounslow).
 - i Old Oak Common is central to the demand profile on the route, and it appears feasible to construct a station on the Dudding Hill lines at Brent Cross.
 - i With appropriate enhancements to the railway, which are assessed to be feasible, the assumed level of service can be accommodated, but providing in excess of 4 trains per hour to Hounslow, on top of the South West Trains service, is deemed prohibitively expensive.
 - i The preferred option should seek to deliver the benefits of option 3 (or as much of them as possible) for the most economical level of capital costs, e.g. a turnback at Kew Bridge and potentially with a phased introduction.
- 2.6.2. Based on these conclusions a preferred scenario was developed and agreed with the client group. The preferred option is specified as:
- i **Phase 1:** 4 trains per hour from West Hampstead to Hounslow.
 - i **Phase 2:** additional 4 trains per hour from Hendon to Kew Bridge.
- 2.6.3. Phase 1 services are assumed to commence operation in 2026, with phase 2 services running from 2029.

3 ECONOMIC CASE

3.1 INTRODUCTION

3.1.1. The Economic Case presents the economic appraisal of the value for money for the preferred option. The outputs from the demand modelling, along with the capital and operating cost estimates have been used as inputs for the economic appraisal. Alongside the quantified comparison of social benefits and the costs for the preferred option a qualitative consideration of wider benefits has been made.

3.2 DEMAND AND BENEFITS MODELLING

3.2.1. The LTS-PT model has been used to undertake preliminary demand and benefit forecasting for the preferred option, consistent with the initial options modelling.

Baseline: Standard LTS-PT 2041 Reference Case (A141rc01a)

3.2.2. The introduction of the new services is forecast to result in an increase in passenger kilometres, passenger minutes and total passenger boardings on rail services (including WLO) of 9,374 in the AM and 9,327 in the PM. A reduction in passenger kilometres, passenger minutes and total passenger boardings on LUL and buses indicates that the demand for the West London Orbital services is likely to be abstracted from LUL and bus services, providing crowding relief for them.

3.2.3. The new services are estimated to improve connectivity and provide extra capacity on the public transport network in London resulting in lower levels of distance travelled, total boardings, journey times and crowding levels, most notably in the north-western and south-western quadrants of London. The table below provides a summary across all public transport modes in London.

Table 5 – Summary statistics: WLO Preferred Option versus 2041 Reference Case Scenario

Mode	Peak	Description	2041 TfL Ref Case	Change in user benefits
		Scenario	A141rc01a	Preferred Option minus Reference Case
All PT	AM	Passenger Kms	85,795,810	-33,096
		Uncrowded Passenger Minutes	115,348,652	-140,143
		Crowded Passenger Minutes	154,400,839	-317,792
		Passenger Boardings	6,244,762	-1,827
	PM	Passenger Kms	89,635,043	-26,986
		Uncrowded Passenger Minutes	120,021,714	-119,500
		Crowded Passenger Minutes	154,108,212	-308,646
		Passenger Boardings	6,791,486	-1,913

Baseline: 2041 Maximum Growth Scenario without Crossrail 2

3.2.4. When tested against the Maximum Growth Scenario, the pattern of the results is similar as for the Reference Case Scenario. However, the additional trip generation associated with the Maximum Growth Scenario means changes are greater as summarised in Table 6.

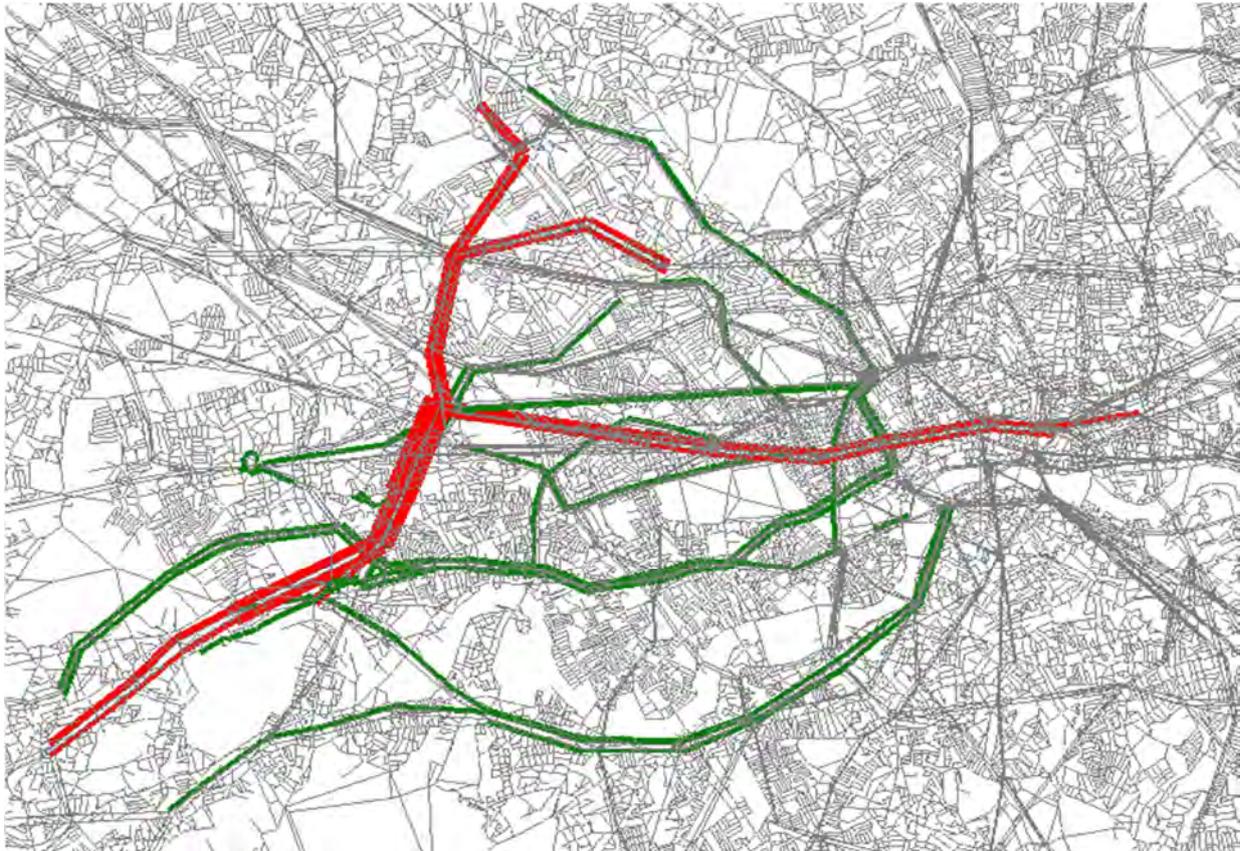
Table 6 – Summary statistics: WLO Preferred Option versus 2041 Maximum Growth Scenario

Mode	Peak	Description	2041 Max Growth	Change in user benefits
		Scenario	A141rc01a	Preferred Option minus Max Growth
All PT	AM	Passenger Kms	88,152,748	-34,613
		Uncrowded Passenger Minutes	118,927,182	-129,397
		Crowded Passenger Minutes	160,705,541	-370,356
		Passenger Boardings	6,485,584	-2,010
	PM	Passenger Kms	92,436,014	-28,444
		Uncrowded Passenger Minutes	124,289,369	-126,955
		Crowded Passenger Minutes	162,352,074	-351,499
		Passenger Boardings	7,068,359	-2,028

3.2.5. As with the initial options, the preferred option is forecast (as illustrated in Figure 6) to attract passengers from LUL lines such as the Northern, Jubilee, Central, District and Piccadilly as well as rail services currently operated by South West Trains and Great Western Railway. With the WLO passenger services operating these rail services are likely to witness lower levels of crowding, providing overall crowding relief to a broad range of other services.

3.2.6. The direct connection between Old Oak Common (OOC) Victoria Road station, which is considered as part of the WLO railway, and the main Old Oak Common station is estimated to attract additional passengers to the Elizabeth Line (Crossrail 1). However, the number of passengers transferring at OOC between the WLO services and the Elizabeth Line drops by around 25% in comparison with Option 3 as the WLO Hounslow-Hendon service gets truncated to Kew Bridge providing a less frequent connection to/from Hounslow.

Figure 6 – Passenger flow difference for Preferred Option vs Maximum Growth Scenario (AM)



3.2.7. In terms of line loading, station boardings and alightings, the demand analysis shows the following:

Baseline: Standard LTS-PT 2041 Reference Case (A141rc01a)

- ┆ The WLO services are forecast to carry 9,504 passengers In the AM (0700-1000) and 10,165 passengers in the PM (1600-1900).
- ┆ The demand will vary by station with OOC Victoria Road being utilised the most. For example, in the AM 1,537 passengers are forecast to board the West London Orbital services and 4,660 to alight. In the PM these numbers are 3,917 and 2,428 passengers respectively. The majority of these passengers are those interchanging from/to the Elizabeth Line (Crossrail 1).

Baseline: 2041 Maximum Growth Scenario without Crossrail 2

- ┆ The WLO services are forecast to carry 9,758 passengers In the AM (0700-1000) and 10,623 passengers in the PM (1600-1900).
- ┆ In the Maximum Growth Scenario WLO services are forecast to carry more passengers than in the Reference Case: on average 2.7% more in the AM and 4.5% in the PM.
- ┆ The demand will vary by station with OOC Victoria Road being utilised the most. For example, in the AM 1,682 passengers are forecast to board the WLO services and 4,593 to alight. In the PM these numbers are 3,916 and 2,669 passengers respectively. The majority of these passengers are those interchanging from/to the Elizabeth Line (Crossrail 1).

3.3 COST ESTIMATES

CAPITAL COST ESTIMATE

3.3.1. The capital cost estimate for the preferred option was developed following a review of a number of studies which have been completed over the last few years for sections of the West London Orbital railway, including those by TfL and Network Rail. The review considered both the assumptions made for the infrastructure requirements and the previously proposed costs.

Table 7 – Summary of Capital Cost Estimate

Item	Spot cost (2017 prices)
West Hampstead 2 new platforms (4-car)	£1m
Cricklewood 2 new platforms (4-car)	£5.5m
Hendon 2 new platforms (4-car)	£1m
Brent Cross new platforms (4-car)	£5m
Neasden new station (4-car)	£18m
Harlesden new station (4-car)	
OOO Victoria road new platforms (4-car)	
Re-signalling of Dudding Hill line and Acton - Kew	£8m
Quadrupling of Acton Wells Junction area	£45m
Bollo Lane level crossing replacement	£30m
Acton level crossing	£5m
Kew Bridge or Lionel Road turnback	£4m for each
Old Kew Junction doubling	£4.6m
Old Kew Junction flyover	£8.5m
Hounslow bay platform	£5.4m
Depot facilities	£5m
Total	£146m

OPERATING COST ESTIMATE

3.3.2. Forecast operating costs were estimated on the basis of consistency with standard industry assumptions. They are estimated to be (in current prices):

- £8.611m p.a. for Phase 1 from 2026
- £15.247m p.a. for the full service from 2029

3.4 ECONOMIC APPRAISAL (BCR)

3.4.1. The economic appraisal was undertaken in line with DfT guidance (WebTAG). The forecast benefits (from both quicker journey times and crowding relief in generalised time) for all London public transport users was converted into monetary values based upon DfT's values of time for rail users in work time (£47.77 in 2041), for commuting (£16.29) and other (7.44) journey purposes.

3.4.2. The forecast benefits were profiled over a 60-year appraisal period from 2026 to 2085. The profiling captures:

- Value of time growth (from WebTAG)
- Background demand growth to 2041 (from LTS-PT model)
- Build-up factor of 50% in years 2026-2028 prior to introduction of 8 tph services from 2029
- Discounting at 3.5% for next 30 years and then at 3%

- 3.4.3. Substantial benefits are forecast to arise from the journey time improvements provided by the new service, notably by accessing the Elizabeth Line at OOC Victoria Road and for journeys within the corridor which cannot currently be made directly (with travel time savings of up to 20 to 30 minutes). In total the preliminary value of the travel time benefits for the appraisal period exceed £680m PV (2010 prices) for both the Reference Case and Max Growth Scenario.
- 3.4.4. In addition, very significant benefits are forecast to be experienced not only by those using the WLO rail service, but by those experiencing less crowded travel conditions on other routes on the rail network. In total the preliminary value of the crowding relief benefits for the appraisal period exceed £600m PV (2010 prices) for the Max Growth Scenario and approach £500m PV (2010 prices) for the Reference Case.
- 3.4.5. Set against these social benefits (i.e. economic welfare) are the costs of the scheme, both capital and operating. In line with appraisal practice, an optimism bias uplift has been applied to the capital costs reflecting the early stage of scheme development. It is assumed that there will be real growth inflation on the capital costs of 1% per annum until scheme opening. This produces a discounted capital cost estimate for the appraisal of £259m PV (2010). For the operating costs 1% real growth inflation (in line with revenue) has been assumed. Over the life of the appraisal period the total operating cost is estimated to be £337m PV (2010).
- 3.4.6. An annual revenue forecast of around £9m (current prices) for the WLO services has been estimated (as reported in the Financial Case), however for the purposes of this preliminary economic appraisal the revenue impact across the whole network is assumed to be neutral and is not included at the public transport network level. This is consistent with the results from the LTS-PT model, which is based on trip reassignment and hence largely a redistribution of revenue, e.g. from LUL to WLO.
- 3.4.7. The resulting indicative benefit to cost ratio (BCR) for the preferred WLO option is greater than 2:1, meeting the DfT's high value for money category. This strong BCR reflects the significant forecast benefits of the scheme to the wider economy and society through journey time savings and crowding benefits, and their realisation through better utilisation of existing infrastructure with selective capital investment, e.g. new platforms and four-tracking. Further analysis will be needed to refine this BCR.

Table 8 – Summary of Economic Appraisal Results: Max Growth Scenario

Item	60 year PV 2010
Journey time benefits	£684m
Crowding benefits	£614m
Total Benefits	£1,298m
Capital costs	£259m
Operating costs	£337m
Revenue	Assumed neutral at public transport network level
Net Financial Effect	£596m
Net Present Value	£703m
Benefit:Cost Ratio	2.2:1
	<i>For the Reference Case the BCR is 2.0:1.</i>

3.5 WIDER BENEFITS

ACCESSIBILITY

- 3.5.1. Through the provision of new direct high quality public transport links and integration with the wider national rail network and LUL network, the introduction of the WLO rail service will deliver a step change in accessibility to and from the corridor between Hounslow and West Hampstead/Hendon.

- 3.5.2. Figures 7 and 8 illustrate the extent of the catchments for the new stations by time band in the 'with' and 'without' scenarios for the new service. As can be seen, the introduction of the WLO rail service significantly increases the areas accessible within 'reasonable' travel times (e.g. within 20 and 30 minutes) of these currently under-served locations.
- 3.5.3. Figure 9 shows the walk-in catchment for each of the stations served by the proposed services. It also presents the PTAL score for each station location in the absence of the scheme. The majority of the stations are scored as 3 or 4. (It should be noted that the baseline does not fully capture the large scale development around Old Oak Common, due to the forecast year available. It is therefore anticipated that the eventual baseline PTAL for the Old Oak Common (Victoria Road) will be considerably higher than shown in this analysis).
- 3.5.4. PTAL is a standardised measure used by TfL, which combines information about the proximity of public transport services and the morning peak frequencies. The PTAL scores have been produced from WebCAT PTAL output, which takes the closest point to the station. As this can be up to 100m from the platforms or station entrance, a manual adjustment was made. Figure 10 shows the effect on the PTAL score of introducing the scheme.

Figure 7 – Accessibility in Without WLO Rail Service Scenario

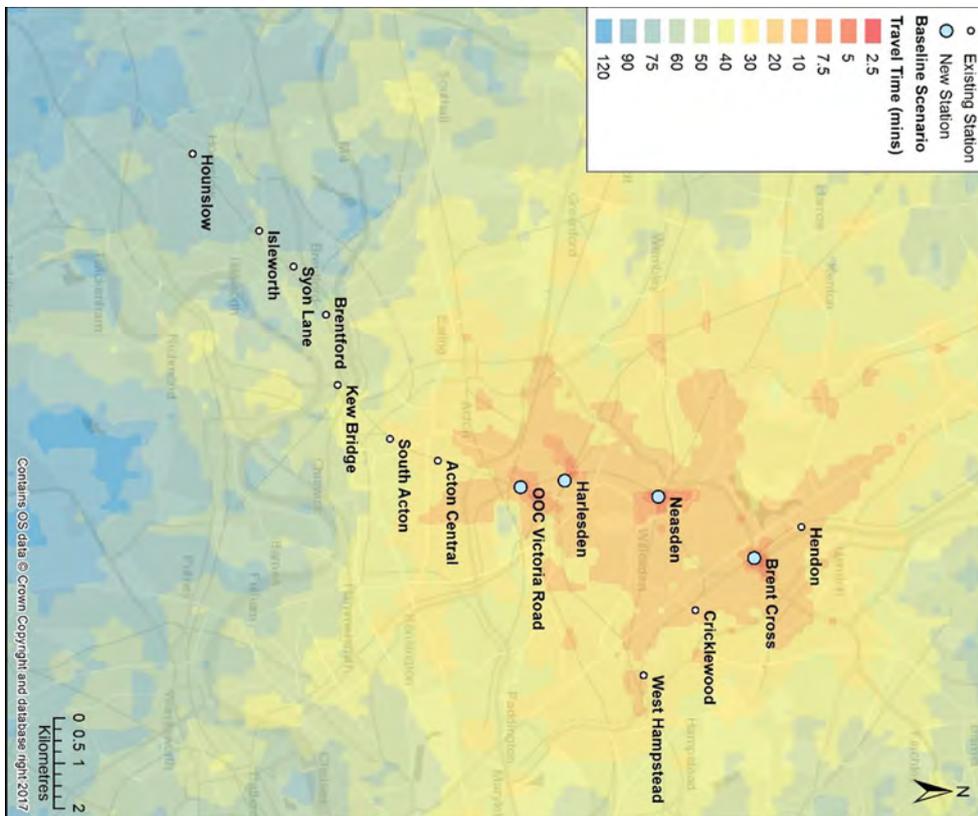


Figure 8 – Accessibility in With WLO Rail Service Scenario

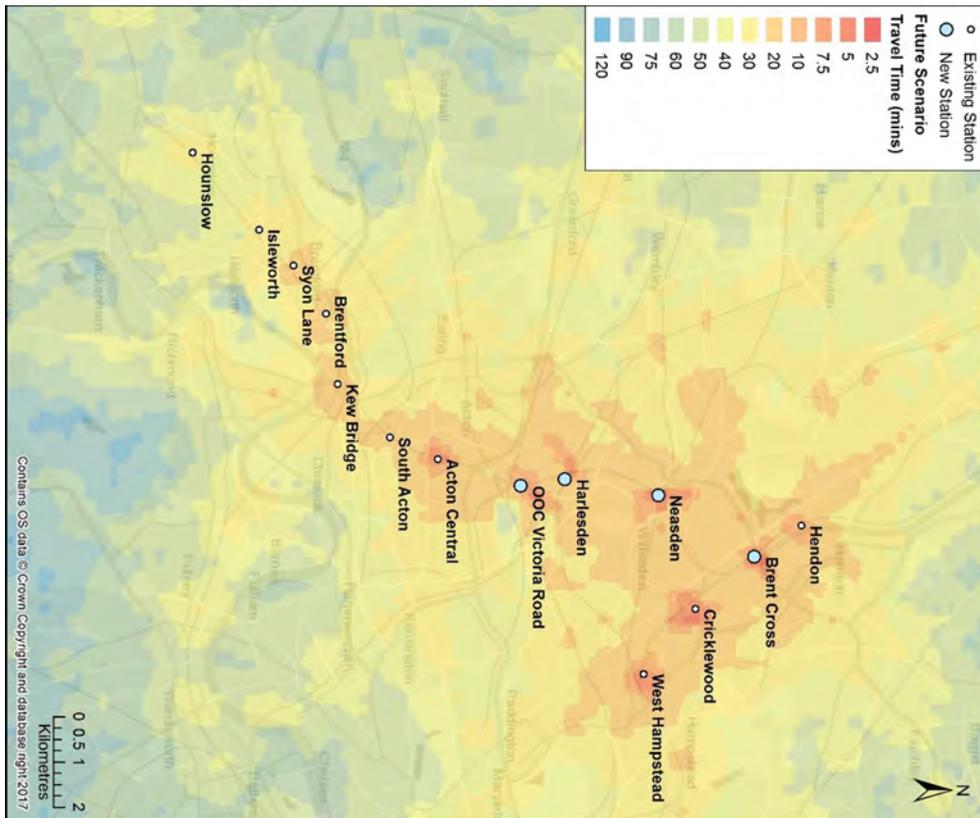


Figure 9 – PTAL Scores Without WLO Rail Service

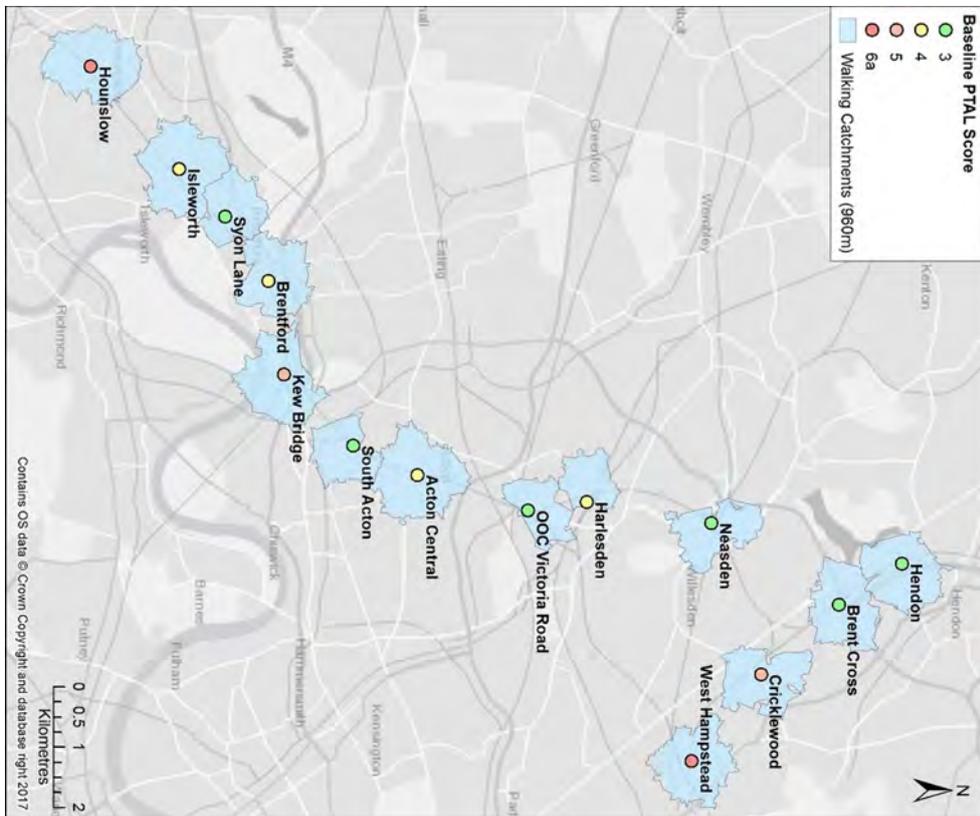
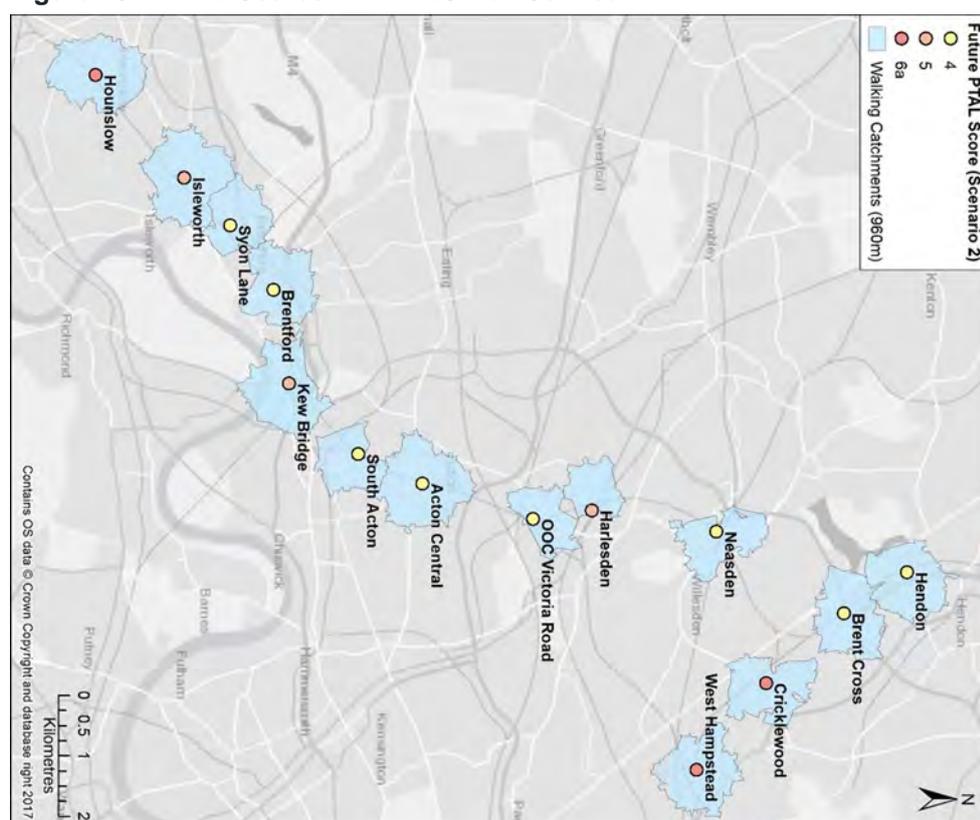


Figure 10 – PTAL Scores With WLO Rail Service



3.5.5. The results of the PTAL analysis illustrated in Figures 9 and 10 demonstrate an increase in score for nine of the 14 stations. All six of the stations with a score of 3 without WLO rail services gain a score of 4 after its introduction. Both Isleworth and Harlesden stations are promoted to a score of 5.

TACKLING HIGHWAY CONGESTION

3.5.6. The significant improvement in accessibility within and to and from the corridor will attract users from both the existing public transport network and the highway network. While at this stage of scheme development the demand modelling has not considered mode transfer, it is anticipated that given much greater journey time competitiveness with highway trips and potential journey time savings, particularly in the peak period, this will be significant. This will contribute to addressing current congestion on both orbital routes such as the A406 North Circular, A5 and Hendon Way and, given the attractiveness of the interchange at OOC Victoria Road with the Elizabeth Line, for radial routes such as the Westway and A4.

3.5.7. The provision of an attractive high quality public transport alternative to highway trips will also support the Mayor's ambition to reduce total traffic in London by 10-15% by 2041, as part of the Healthy Streets agenda, which includes addressing noise and air pollution and delivering local economic benefits.

SUPPORTING GROWTH

3.5.8. The demand forecasting and economic appraisal demonstrate the very significant benefits to the forecast public transport users in 2041, based on TfL's current assumptions. In West London there are ambitions to deliver additional significant housing and the provision of high quality public transport and good accessibility is seen as providing an opportunity to increase the density of developments and potentially open up new sites.

3.5.9. PTAL scores are used in the Housing Density Matrix in the London Plan to set out recommended housing densities for developments. As indicated in the extract from the London Plan below, (and assuming 'Urban' setting for West London), the range of expected densities around the stations served by the scheme (as shown in Figure 11) would increase to up to 700 habitable rooms per hectare and up to 260 units per hectare in the most accessible locations.

Figure 11 – Recommended Housing Densities in the London Plan

Setting	Public Transport Accessibility Level (PTAL)		
	0 to 1	2 to 3	4 to 6
Suburban	150-200 hr/ha	150-250 hr/ha	200-350 hr/ha
3.8-4.6 hr/unit	35-55 u/ha	35-65 u/ha	45-90 u/ha
3.1-3.7 hr/unit	40-65 u/ha	40-80 u/ha	55-115 u/ha
2.7-3.0 hr/unit	50-75 u/ha	50-95 u/ha	70-130 u/ha
Urban	150-250 hr/ha	200-450 hr/ha	200-700 hr/ha
3.8-4.6 hr/unit	35-65 u/ha	45-120 u/ha	45-185 u/ha
3.1-3.7 hr/unit	40-80 u/ha	55-145 u/ha	55-225 u/ha
2.7-3.0 hr/unit	50-95 u/ha	70-170 u/ha	70-260 u/ha
Central	150-300 hr/ha	300-650 hr/ha	650-1100 hr/ha
3.8-4.6 hr/unit	35-80 u/ha	65-170 u/ha	140-290 u/ha
3.1-3.7 hr/unit	40-100 u/ha	80-210 u/ha	175-355 u/ha
2.7-3.0 hr/unit	50-110 u/ha	100-240 u/ha	215-405 u/ha

Figure 2.1: Recommended housing densities in the London Plan

hr = habitable rooms
u = a dwelling unit, i.e. a flat or a house
ha = hectare

- 3.5.10. Assuming an increase in density around the stations where the PTAL score increased to 4 or above in the with WLO rail service scenario, the recommended increase in the number of units within the walk-in catchments of the stations could be around 200 units on the basis of the London Plan guidance. If the effect of the improved accessibility is extended to a one mile radius, the result could be over 300 additional units.
- 3.5.11. These indicative estimates however, are likely to be very conservative and developers will be keen to exploit the full commercial potential of the sites and seek to provide the highest densities they can. If this was to produce densities at some locations consistent with the 'Central' setting the level of additional units could approach around 1,000 units.
- 3.5.12. The above estimates are purely illustrative and do not reflect the current usage and densities in the areas which would benefit from the WLO rail service. Based on the emerging Strategic Housing Land Availability Assessments for the West London boroughs many identified sites will benefit from the introduction of the WLO rail service. This could potentially, subject to finalisation of site identification, developer appetite and local policies enable the intensification of housing development to potentially deliver 15,000 to 20,000 units in total.
- 3.5.13. The results of the demand forecasting indicate that in 2041 the WLO rail service will provide sufficient capacity to accommodate further significant growth in rail demand arising from further housing and employment development along the corridor.

4 FINANCIAL CASE

4.1 INTRODUCTION

4.1.1. The Financial Case addresses the affordability of the delivery and operation of the proposed rail services. At this stage plausible sources of funding to ensure the affordability of the scheme have been identified for further investigation.

4.2 FUNDING THE SCHEME CIL CONTRIBUTION

4.2.1. With a capital cost estimate of £263m (current prices, with 80% risk), significant funding will need to be secured to deliver the scheme. Initial analysis by the West London boroughs indicates that there is scope to derive a significant contribution towards this capital cost through funding from the Community Infrastructure Levy (CIL). With potentially 15,000 to 20,000 new homes planned in West London the associated value of the CIL could approach around £150m-£200m.

OPPORTUNITIES FOR OVER-SITE DEVELOPMENT

4.2.2. One potential way to support both the densification of development in the corridor and to raise funding to assist in addressing the scheme affordability is to pursue opportunities for over-site development (OSD) at the West London Orbital railway stations, which themselves are only likely to be cost effective if constructed to a material density.

4.2.3. A new station at OOC Victoria Road provides a good opportunity for a relatively dense OSD structure, along with increased public space and thoroughfare provision. This could complement the OPDC development masterplan. There may be opportunities at other stations, for example the new station at Harlesden offers limited potential for OSD, given its low density surroundings and lack of immediate proximity to an employment centre, but there is some space in the local area to enable a more ambitious vision when the future OPDC starts to regenerate the adjacent surroundings, so a longer-term masterplan could enable viable OSD.

4.2.4. The likely timescale for the delivery and operation of the WLO rail service, combined with TfL's ambitions for development of its sites via its Property Partnership Framework, would provide the ideal timing and climate in which to bring forward plans for new transport-oriented development and new or rejuvenated local centres.

RAIL INDUSTRY CONTRIBUTION

4.2.5. As further scheme development is undertaken greater certainty will emerge over the level of funding required given the confirmation of infrastructure requirements, value engineering where appropriate and detailed quantified risk assessments. Further, through the identification of potential rail industry synergies, opportunities for cost efficiencies and rail industry funding can be explored.

4.3 OPERATIONS AFFORDABILITY

4.3.1. For the purposes of this study it has been assumed that the WLO rail service would be operated as a London Overground concession. Indicative revenue has been estimated on the basis of assuming that all additional rail boarders forecast in LTS-PT provide a yield of £1 for WLO rail services recognising that many trips are likely to be 'discounted' due to the use of travelcards, season tickets, capped fares etc. and as legs of multi-legged journeys. This produces an estimated revenue when the 8 tph service has commenced operation of around £9m (in current prices). This compares to an operating cost estimate of around £15m.

4.3.2. The requirement for an operating subsidy is standard for much of the rail network, but further consideration of means to meet the 'gap' between the forecast revenue and operating cost will need to be considered in order to confirm the affordability of WLO rail service operations. This consideration should address:

- i Future TfL fares' policy for orbital travel (e.g. premium fares) which is often lower than for equivalent radial journeys because they can be made without crossing fare boundaries
- i Potential re-zoning of the London transport network, e.g. zoning Old Oak Common as Zone 1
- i Opportunities to harness future technology for ticketing and fares to most effectively manage demand across the network and price fares appropriately
- i Additional fare revenue received from demand transferring from road to rail, but not captured in the current demand forecasting (which is solely reassignment)
- i Opportunities for commercial revenue streams through station and/or on-train commercial activities



- | Future rolling stock choices, e.g. electric or battery, and implications for operating and whole-life costs
- | Future operating practices, e.g. provision of ticket offices, staffing

5 COMMERCIAL & MANAGEMENT CASE

5.1 INTRODUCTION

- 5.1.1. The Commercial & Management Case addresses the commercial viability of the proposals, namely their deliverability (beyond affordability, which is addressed in the Financial Case) and the associated approach to manage the project to successful completion. To date, the project has been led by the West London Alliance, with representatives of the boroughs of Barnet, Brent, Ealing and Hounslow, along with Transport for London (TfL) and Old Oak and Park Royal Development Corporation, represented on the project Steering Group.
- 5.1.2. With the demonstration in this business case of the robust strategic rationale for the scheme, its operational feasibility and the forecast significant social benefits that will result from the introduction of the West London Orbital rail service, further development of the project should be undertaken.

5.2 DELIVERING THE PROJECT

- 5.2.1. The involvement of the entire rail industry will be necessary to support the introduction of the West London Orbital rail service. Regardless of possible funding streams, the Department for Transport will need to be content with the scheme proposal and may suggest amendments to facilitate its implementation, in line with other network-wide schemes such as the Digital Railway.
- 5.2.2. Network Rail will be a central player in the project management and delivery of the scheme, be it undertaking the work directly or with an asset protection role. It is anticipated that the most challenging part of the programme is the 4-tracking of the Acton Wells area, and all parties will need to ensure that the design of the enhancement meets everybody's requirements (passenger and freight). Indeed, it may well prove beneficial to combine other works planned for the area into one programme. This will minimise disruption and potentially deliver financial savings.
- 5.2.3. Given the current use of the route for freight, freight operators will be important parties to engage with and there will also be the interface with the South Western franchise's emerging service planning on the Hounslow loop to ensure that neither sets of plans are compromised. Identifying an acceptable solution for Bollo Lane will also require effective rail industry and local authority working.
- 5.2.4. At this stage it appears that TfL is best placed to provide project leadership as the scheme is progressed. TfL has experience of planning and management of major transport investment in London and can realise the benefits from the synergies between the proposed West London Orbital service and the North and West London lines (London Overground), its role with many train operators in the London area and with the HS2 interface at Old Oak Common.



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West London Orbital

*Update, next steps,
programme plan, delivery*

Growth Directors Board, 29 March 2018

Chris Porter, TfL and Luke Ward, WLA



1. Mayor's Transport Strategy
2. Delivery approach
3. Programme Plan
4. What do we need to do?
5. Key Risks
6. Immediate next steps

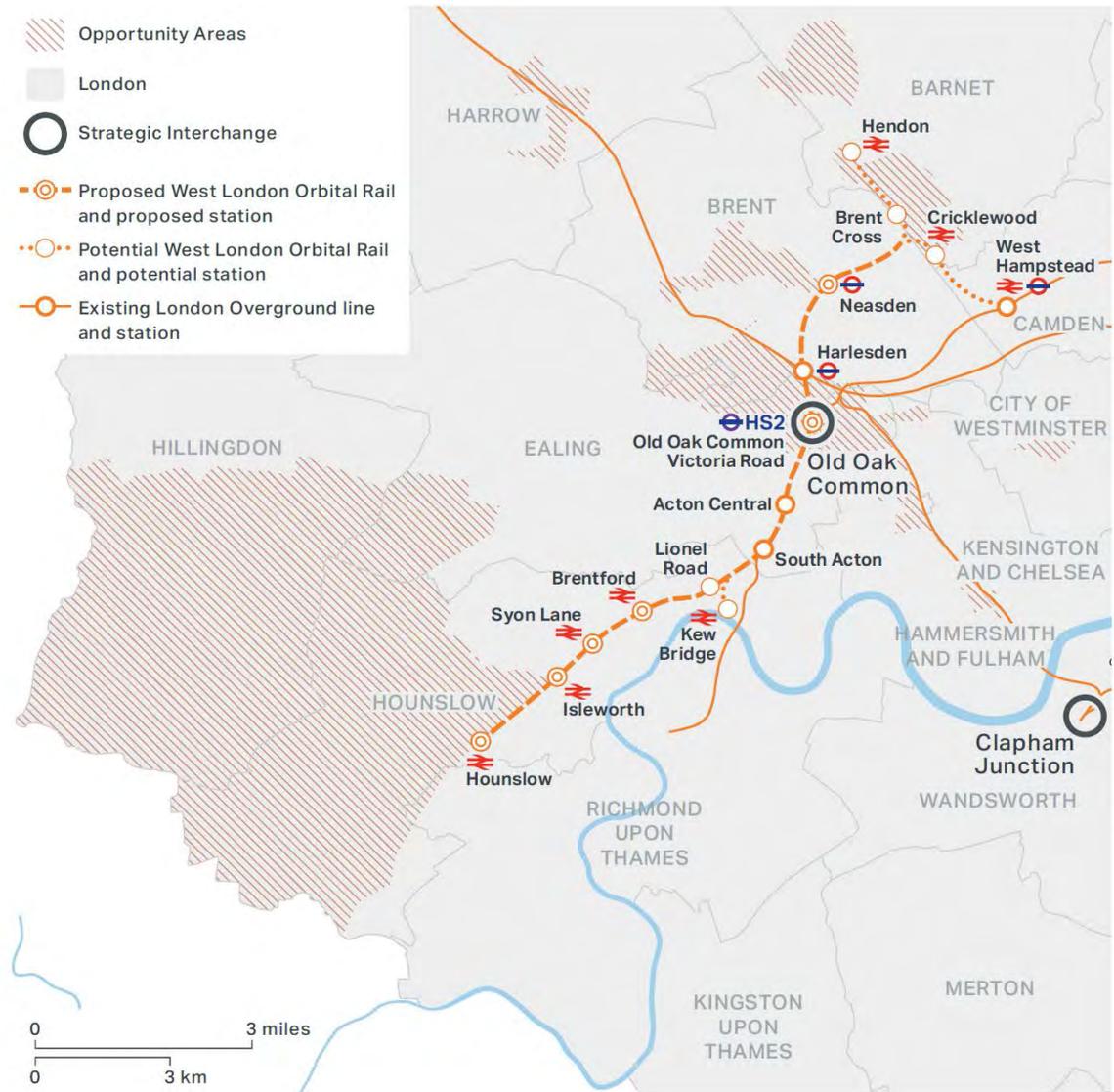
Mayor's Transport Strategy 2018

Proposal 88

The Mayor, through TfL, the West London Alliance boroughs and Network Rail, will work towards the delivery of a new London Overground 'West London Orbital' line connecting Hounslow with Cricklewood and Hendon via Old Oak, Neasden and Brent Cross.

Possible connections to:

- Thameslink
- Jubilee Line
- Bakerloo Line
- Elizabeth Line
- Metropolitan Line
- Overground at West Hampstead, Harlesden
- National Rail at Brent Cross West(TBC), Brentford to Hounslow



Wide ranging public and political support

- Cross borough (and party) support across west London
- Mayor and deputy mayor support as demonstrate by the letter to the borough leaders and MTS press release
- Very positive local and regional press coverage
- Strong support with local residents
- Ongoing liaison, consultation and engagement will be necessary to ensure continued support



How might this be delivered?

Joined up working will be key

Three emerging strands:

1. Rail project (TfL led, significant council involvement)
2. Regeneration, place-making, complementary measures (council led, TfL support)
3. Funding development for preparatory planning (jointly led)



Governance: Project to be overseen by a cross-organisation programme board, with delivery led by a cross-agency delivery team

Phasing and timeline (provisional)

Local Government Programme		TfL Programme		Joint Programme	
Phase 1: Local Plan alignment and embedding. - Local Plan requirement definition, including Reg 18 and Reg 19 consultation questions - Agreement of shared approach and timelines	6 months (by Aug 2018)	Phase 1: Review and update - Review of feasibility work - Further demand modelling - Timetabling - Update business case - Confirm consents route	6 months (c.Aug 2018)	Governance and project arrangements - Convene board and delivery group - Secure capacity (TfL and borough) - Agree project timeline and required decisions	2 months by May 2018
Phase 2a: Local Plan consultations and development - Reg 18 and 19 consultation - Site allocation and safeguarding - Incorporate development boundaries for CIL capture into LPs. - Alignment of funding and development routes	18 Months (by March 2019)	Phase 2: Further design work, GRIP 2 - Multi-disciplinary design study - Environmental assessment - Operational assessment - Cost estimates - SOBC - Develop GRIP 3 and 4 requirements	9-12 months (c.September 2019)	Funding and land assembly: - Define WLO development areas - Agree appropriate link to local plans - Link funding study outputs and local plans via West London EPB	9 months (by December 2018)
Phase 2b - Commissioning of evidence bases required to bring scheme forward e.g. employment land, land availability, housing need	2 years (all completed by 2020)	Stage 3 – Single preferred option (GRIP 3 and 4) - Undertake GRIP 3 (Single Option Selection) and GRIP 4 (Concept Design & Approval in Principle) design studies. - Second public consultation	18 – 24 months (c.September 2021)	Funding package agreed	TBC
Phase 3: Local plans adopted between 2019 and early 2021	All plans adopted by 2021	Stage 4 – Transport & Work Act Order - Evidence base (environmental and transport assessment) - Confirm funding - SOBC update	12 – 18 months (c.March 2023)		
Delivery					

Immediate deliverables

- Phase 1: 6-9 months work to review and update and develop current studies.
- TfL commitment of c£230k to carry out this work
- Key deliverables:
 - Updated Business Case
 - Updated transport modelling and demand forecasting report
 - Baseline technical report (including timetabling)
 - Network Rail GRIP 1: Output definition report
 - Funding and Financing study
 - Land assembly report
 - Consents strategy
 - Development capacity study
 - Communications and engagement plan
- Delivered by TfL in liaison with local authorities

Key Risks

- Identifying funding for scheme development and construction (CIL, MCIL, TfL, GLA, DfT, Planning Delivery Fund, HIF 2 etc)
- Level crossings at Bollo Lane, Acton Wells 4-tracking, congestion along southern half of scheme
- Unlocking SIL intensification in discussion with GLA
- Reducing any operating subsidy that is a characteristic of orbital infrastructure that does not cut across fare zones.

All have possible ways forward – no show-stoppers identified to date

What do councils now need to consider/do?

1. Continue to **embed into Local Plans**. Specifically:
 - Reg 18 and 19 consultations
 - Strategic narrative and vision/master planning around stations
 - Complementary measures

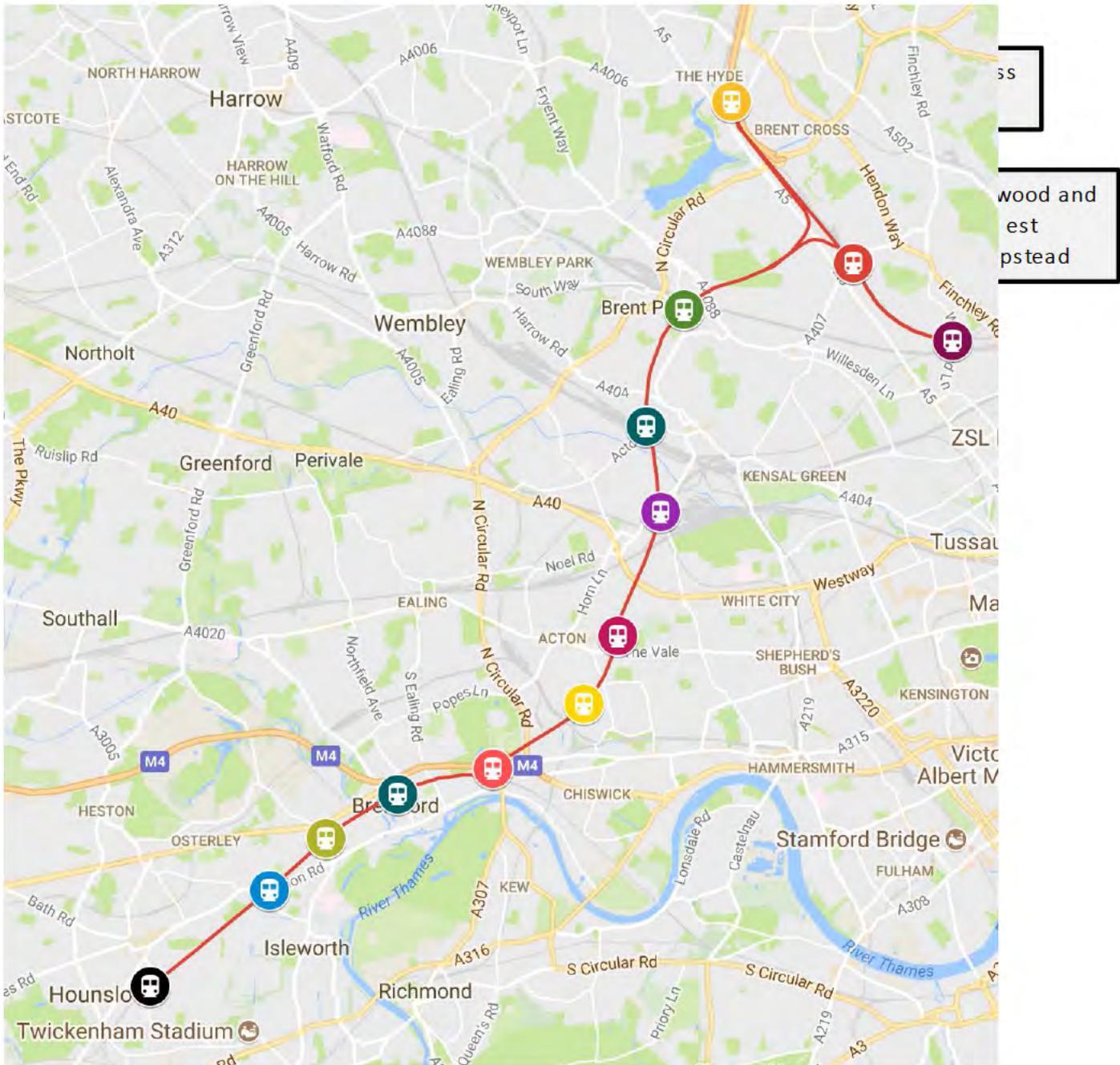
1. Work with GLA to **secure MCIL contribution and/or HIF 2** funding when announced later in 2018.
2. Incorporate into **Corporate Plans and MTFS**
3. Commence **work on land assembly** along the line – to be led by consultants via funding study (match funding from TfL being sought)
4. Be ready to contribute **strategic input** (officer time) via WLO Board and project group
5. Prepare our planning and transport functions for WLO-related applications and activity
6. Strategic housing delivery model(?)

West London Orbital Rail Line

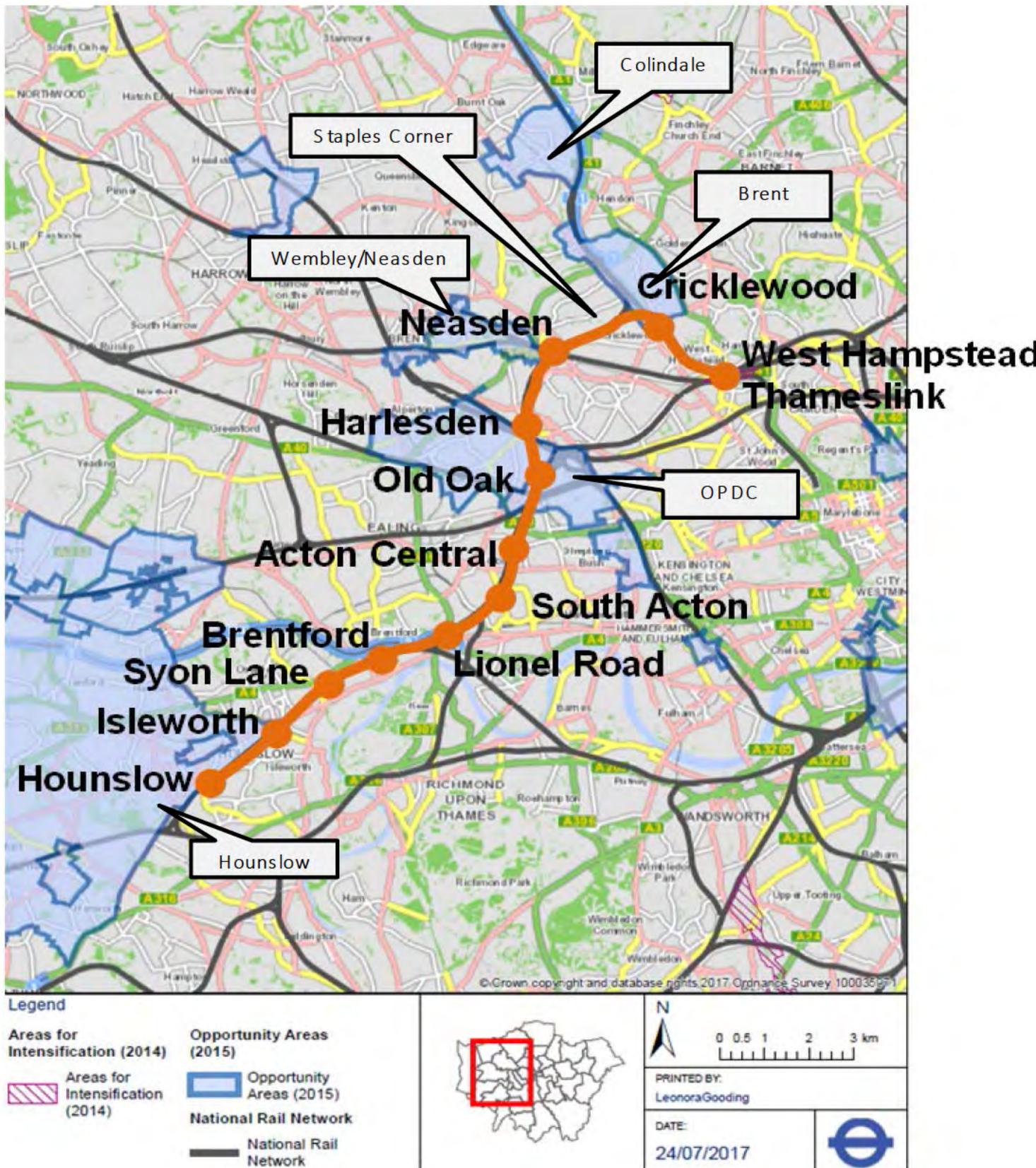
TOUR

29 September 2017 – meeting at 12:00 noon – Cricklewood Station

1. Map of proposed line and stations (Please see from page three of this pack for more detailed maps of development opportunities at each stop)

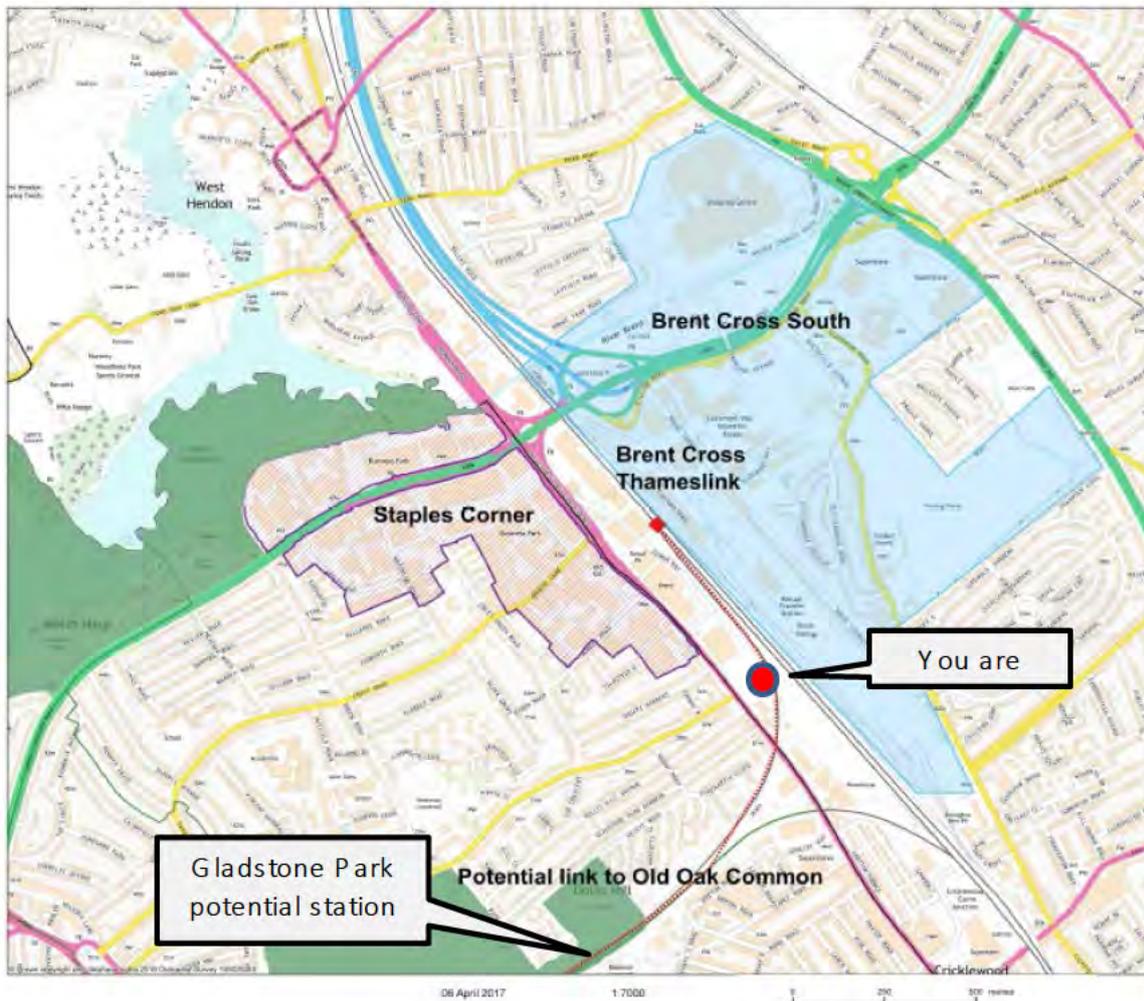


2. Map of regen and opportunity areas alongside reactivated rail



Stop 1: Brent Cross/Staples Corner

At the meeting point of Brent Cross, Cricklewood and Staples' Corner, there is a significant mix of commercial, light industrial and housing redevelopment and regeneration land. A number of significant housing and employment land opportunities as part of strategic local planning.



Key

points:

- Potential for c.7,000 new homes on Staples Corner and 6,170 new homes in Barnet (excluding Brent Cross). Opportunity to work with London government to find innovative ways to maximise both housing and employment land.
- This would equate to approximately £120m of Community Infrastructure Levy (CIL)
- These sites would all benefit from the new Brent Cross Thameslink station, Cricklewood Station and Hendon station. Improvement in PTALs at all stations.
- Brent Cross and Cricklewood Stations would be 2.5 minutes from Neasden, 12.5 minutes from Old Oak Common lane (allowing change to Crossrail and HS 2), 23 minutes to Brentford and 37 minutes to Hounslow (times the same if reversed). These are all significantly faster than the equivalent car journey.

Stop 2: Gladstone Park

At Gladstone Park, there are views of Dudding Hill Junction, where the Hendon and Hampstead branches meet before moving on to the Neasden and Park Royal. This is the site

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of the 19th century passenger station from before the line was converted exclusively to freight use.

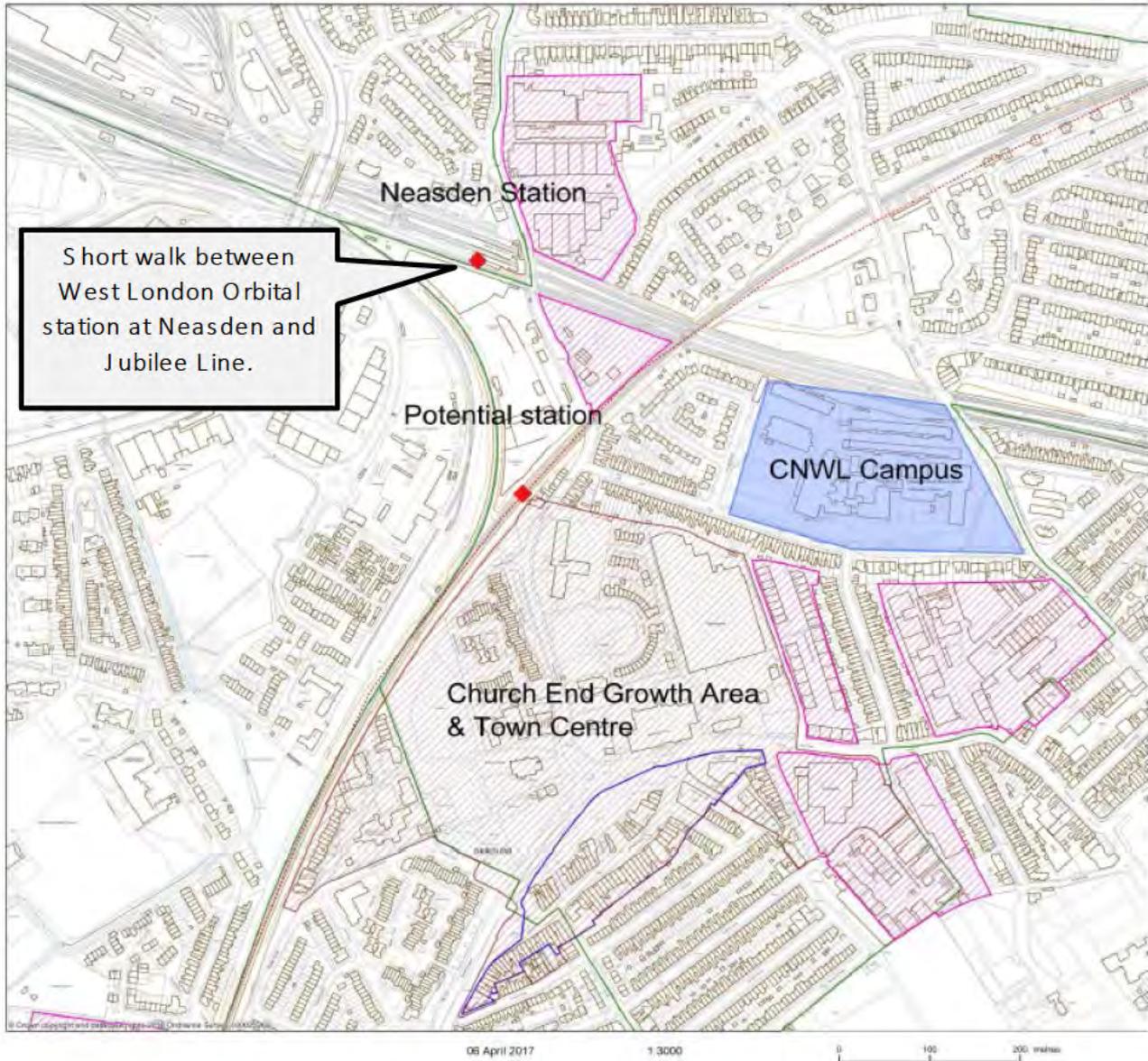


Key Points:

- Possible housing intensification opportunity
- Note twin-track configuration allowing trains to travel in both directions on both branches
- Tracks to the right: Cricklewood (<2 mins) and West Hampstead (3.5 mins)
- Tracks to the left: Brent Cross Thameslink and Hendon
- Behind: Wembley, Neasden (<2 mins), OPDC (c. 10 mins), Acton (c.16 mins), Hounslow (c.37 mins).

Stop 3: Neasden (site of potential new station)

Connecting with the adjoining Wembley Housing Zone and nearby tube and overground lines, the Neasden area has real potential for significant growth in both housing and employment uses.

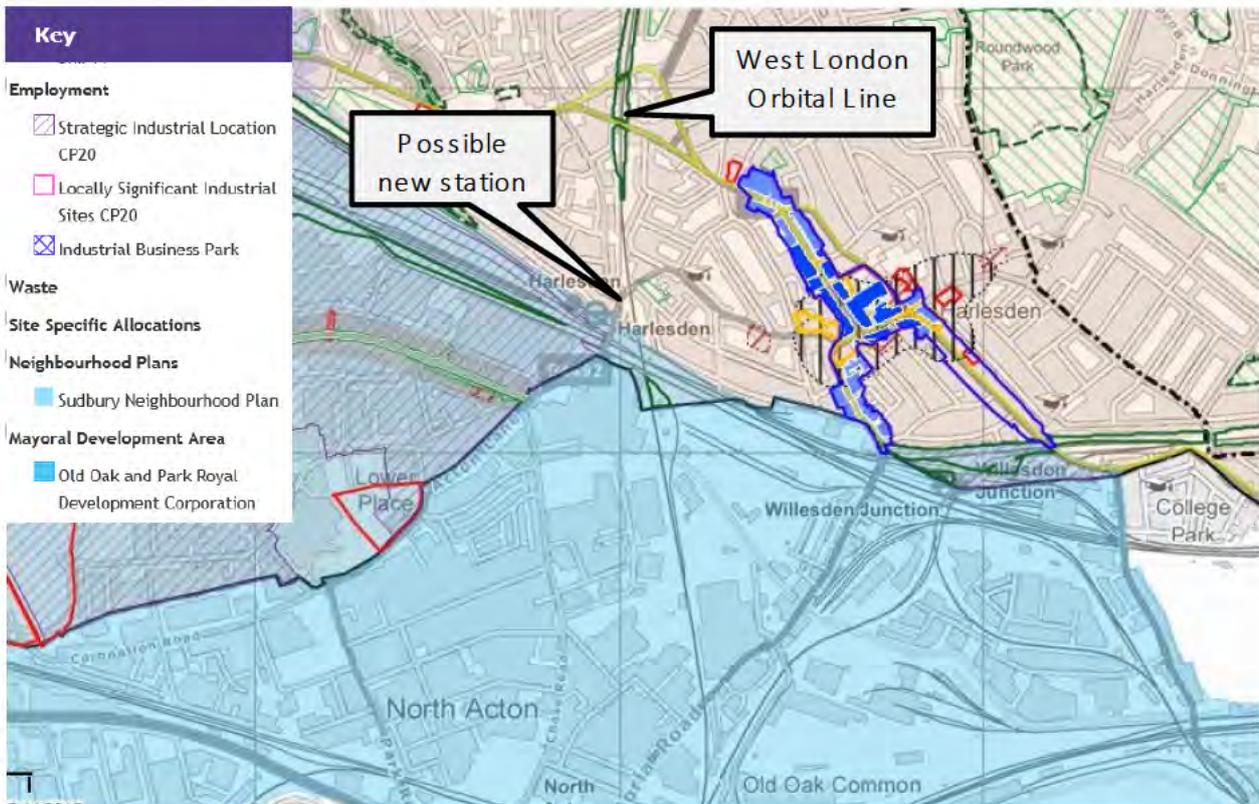


Key Points:

- Potential for significant new housing growth in this area (2,500 homes) resulting in c£20m of CIL
- New station would allow travellers to change to the Jubilee Line and then onwards to either Wembley or to central London,
- 3 minutes to Brent Cross, 12 minutes to Park Royal, 20 minutes to Brentford
- Town Centre regeneration opportunity.
- Improvement in PTAL from 3 to 4.

Stop 4: Harlesden (site of potential new station)

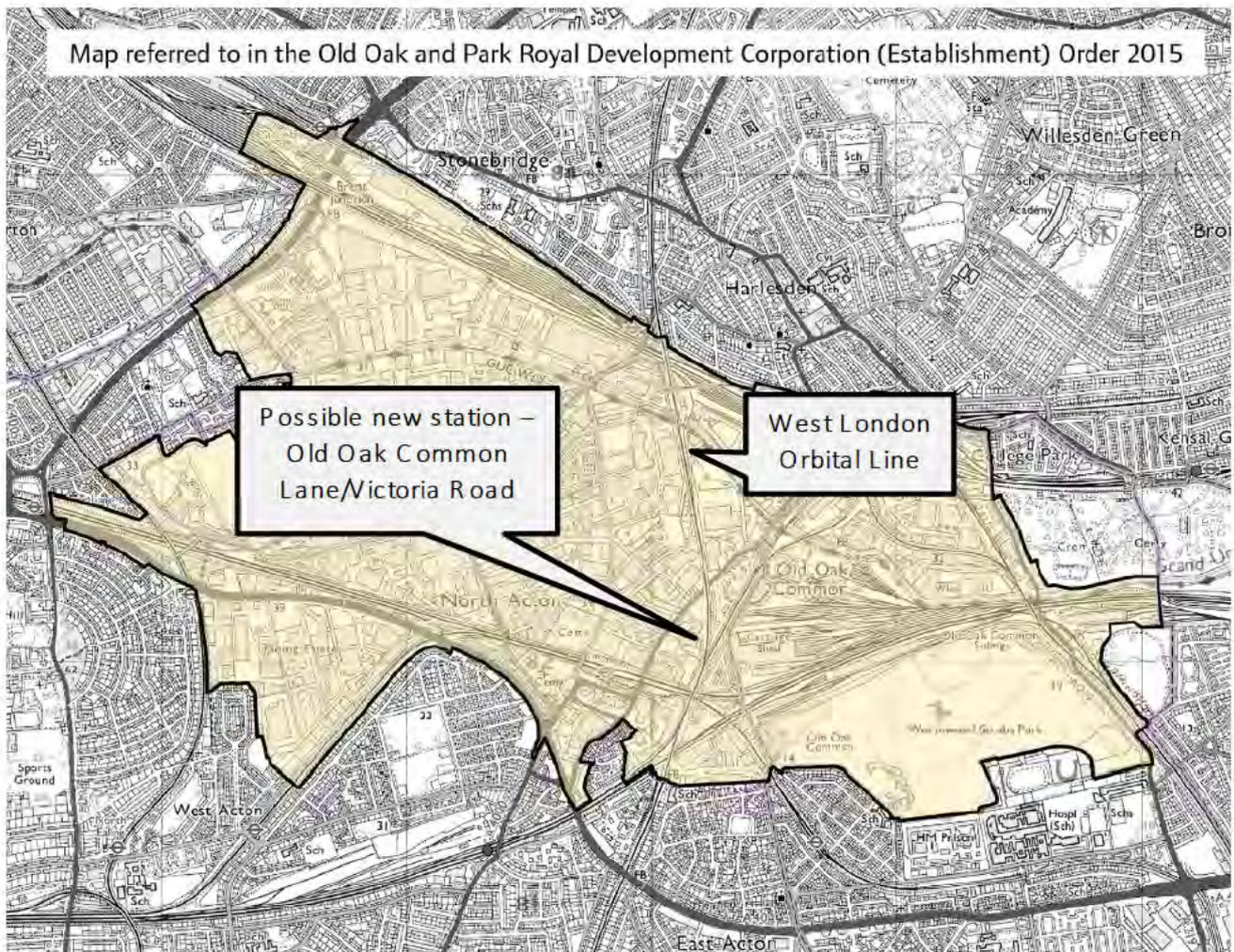
On the fringe of the Park Royal Strategic Industrial Location, Old Oak Common Opportunity Area and adjacent to Harlesden Town Centre.



Key Points:

- Significant increase in PTAL from 3 to 5, enabling a much greater volume of housing to be supported alongside significant employment sites and transport connections.
- The WLO here would connect the areas north of Park Royal with the large scale regeneration and jobs that will be created there in the years ahead. Residents will be a short car-free train ride away from Crossrail and HS2 interchange.
- Five minutes to Brent Cross, seven minutes to Old Oak Common Lane, 11 minutes to Acton, 17 minutes to Brentford.
- Town Centre regeneration opportunity in Harlesden.

Stop 5: Old Oak Common Lane /Victoria Road

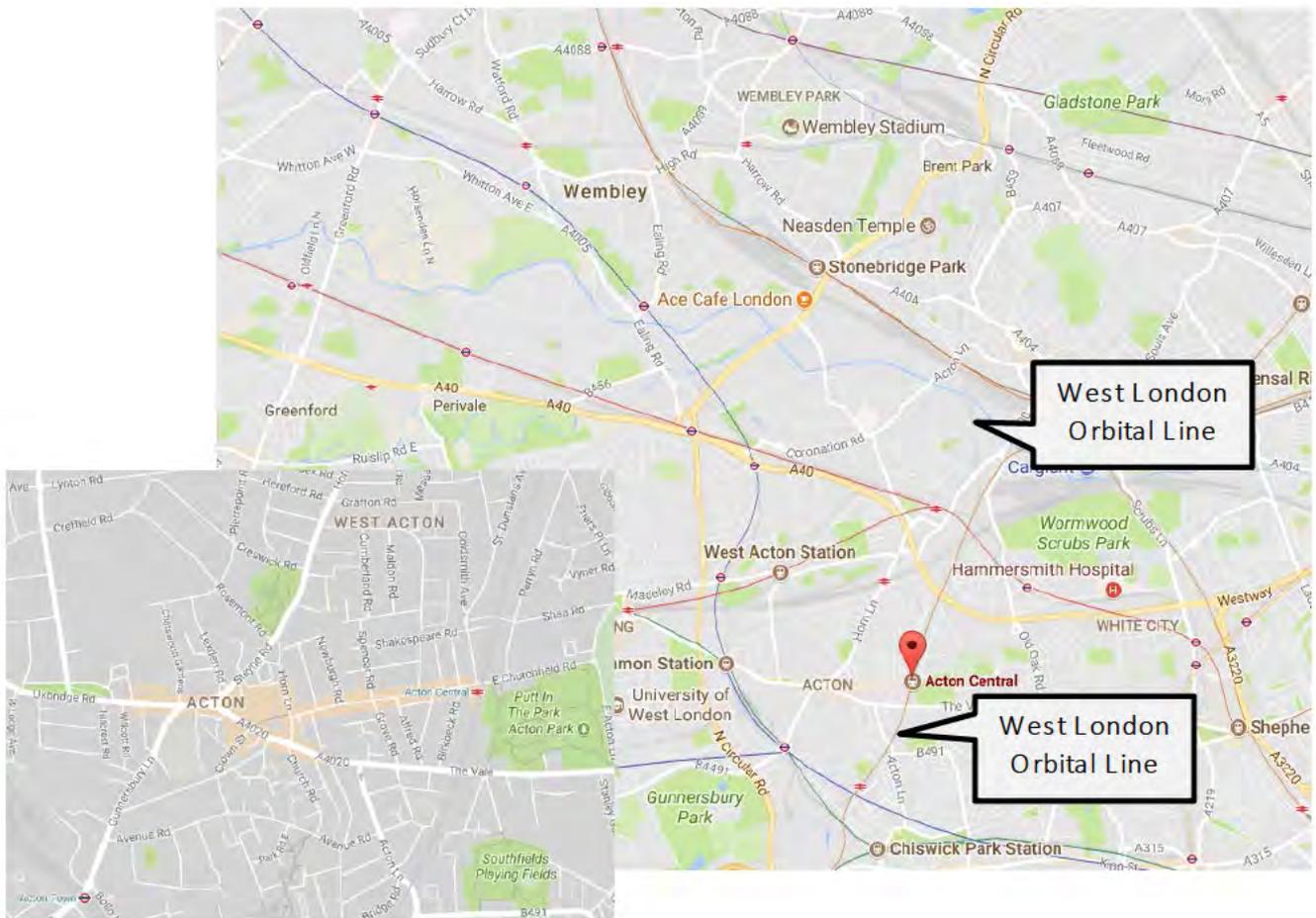


Key points:

- Improved orbital integration of the OPDC area with the rest of London.
- The station here would enable changes to radial connections (Crossrail and HS2) at the new station in OPDC. It would also help to tie the OPDC area in with the wider West London economy and communities in its immediate vicinity, in line with principles of Good Growth.
- Allow access to the rest of the country and Heathrow for people in suburban areas of West and North London without needing to travel into central London first. Passengers would be required to make a short walk to the new interchange.
- Reduce congestion on North Circular.
- Air quality benefits associated with lower car usage.

Stop 6: Acton Central

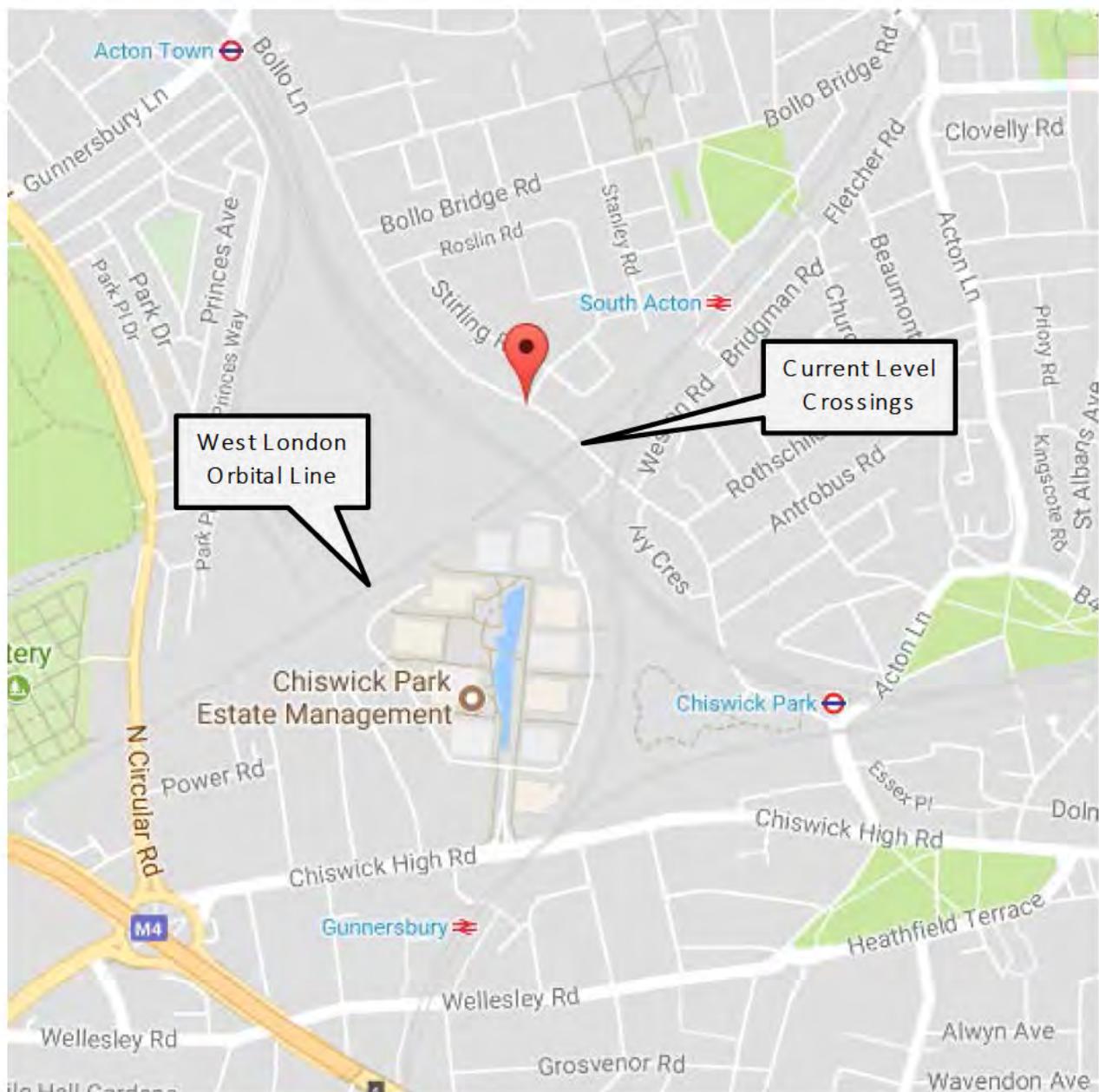
Integrating the line with the Overground at Acton Central, the opportunity exists for linkages with one of Ealing's leading town centres and surrounding densely populated neighbourhoods.



Key points:

- It is in this stretch of the line that the Dudding Hill element of the West London Orbital Line connects with the busy Acton Wells Junction
- The existing Level Crossing at one end of the high street provides an opportunity to support place making and good growth, and also to improve the connectivity of Acton Central station.

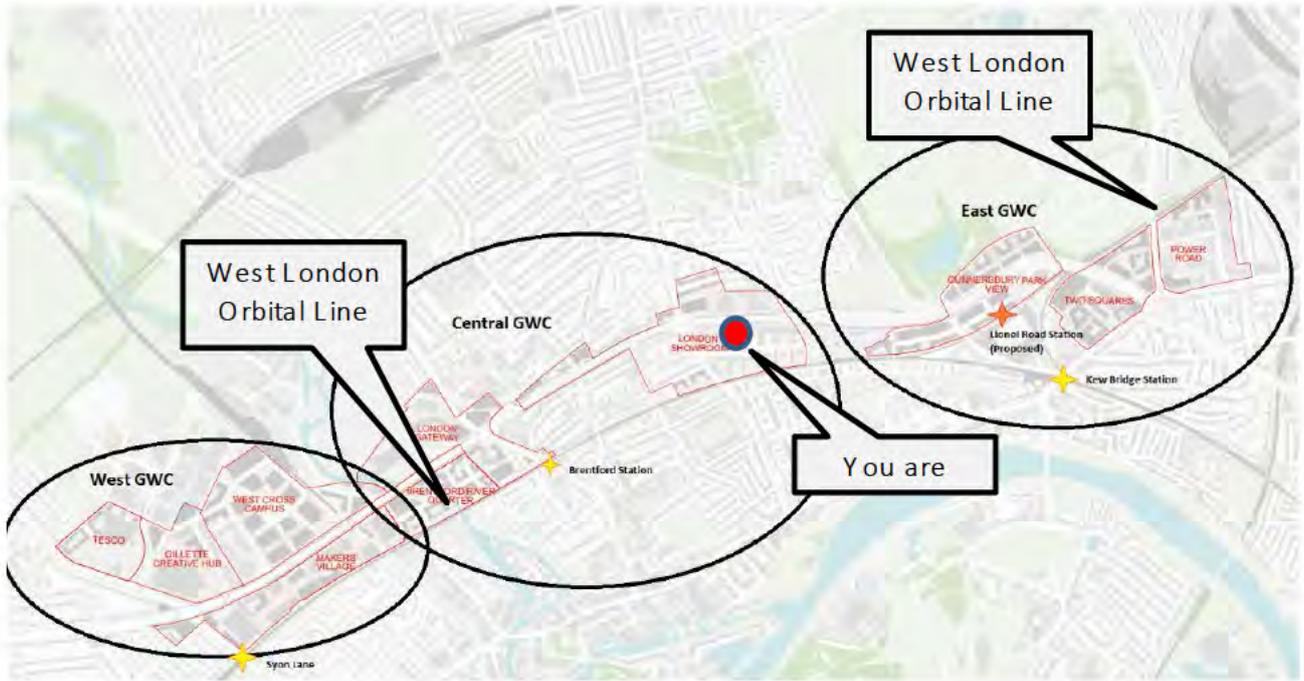
Stop 7: Bollo lane



Key points:

- West London orbital crosses Bollo Lane via a level crossing.
- There is another level crossing to the southwest of the West London Orbital One.
- Opportunity to unlock significant rail capacity by investing in alternatives to these level crossings.

Stop 8: Brentford with views to Hounslow and Brent Cross



Key Points:

- This is the final stop on the route and will involve visiting the top of the new Barratts Town close to the busy Brentford station on the line.
- This vantage point allows views along the whole southern part of the West London Orbital Route and also gives a sense of how it relates to infrastructure in London more broadly.
- Potential for approximately 5,000 new homes and c.£55m of CIL.
- Allows excellent connections to the Golden Mile and also supports the activation of other under-used suburban freight lines including the Brentford-Southall Line.

TOUR ENDS

Lift on the coach available back to Brentford, Acton, Neasden and Cricklewood

3. a table of stations, distances and times to travel between stations

Station		distance (miles)	time between stops (mins)
West Hampstead	depart	11.68	0
Cricklewood	arrive		2.0
	depart	10.48	2.5
Neasden (new station)	arrive		4.5
	depart	8.86	5.0
Harlesden (new station)	arrive		7.5
	depart	7.50	8.0
Old Oak Common / Victoria Road (new station)	arrive		15.0
	depart	6.71	15.5
Acton Central	arrive		18.5
	depart	5.5	19.0
South Acton	arrive		22.0
	depart	4.81	22.5
Brentford	arrive		25.5
	depart	2.85	26.0
Syon Lane	arrive		29.0
	depart	2.08	29.5
Isleworth	arrive		36.5
	depart	1.38	37.0
Hounslow	arrive	0	39.0

(WSP technical analysis, Sep 2017)

Note: Possible stations also located at Syon Lane (Hounslow) and Gladstone Park (Brent)

TOUR ITINERARY – 29 September 2017

Following the proposed line by road and starting at Cricklewood Station entrance, the tour will stop or drive through the following places of interest intended to give guests an overview and a sense of place and potential for the connecting line. Exact timings will be somewhat dependant on traffic conditions on the day.

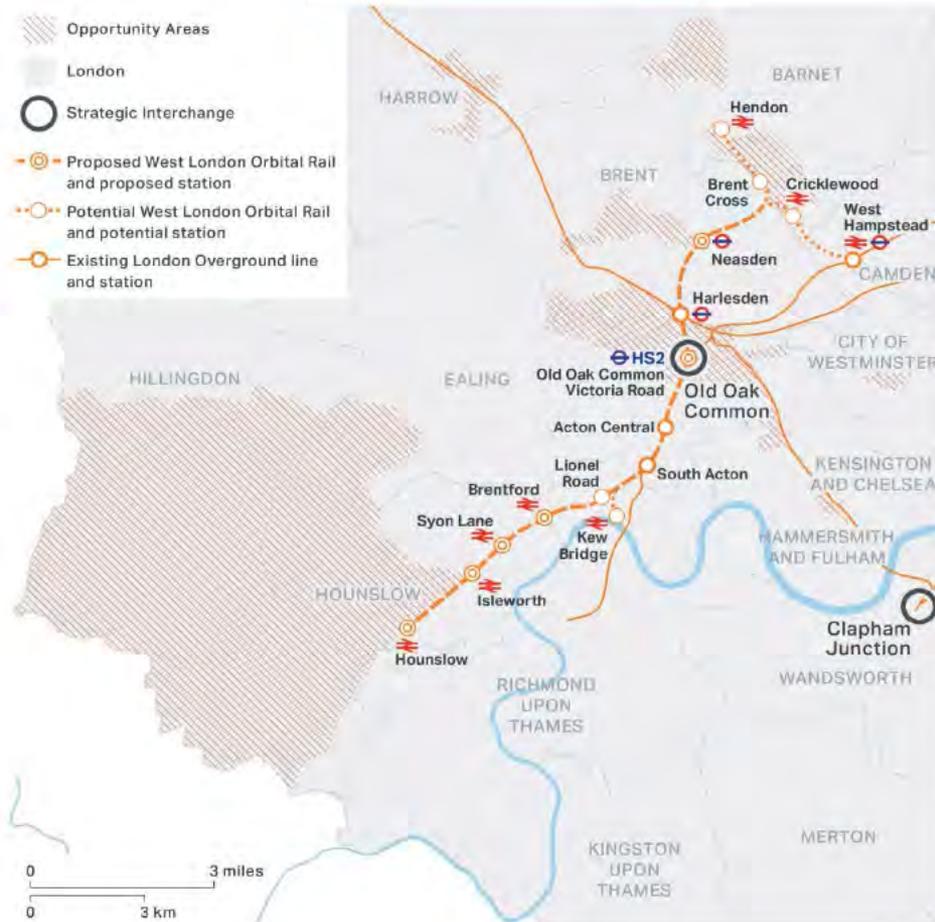
<i>Location</i>	<i>Activity</i>	<i>Time</i>	<i>Comments</i>
Cricklewood Station entrance	Pickup outside station entrance	1200 - 1215	Guests to be met at Cricklewood Station entrance and escorted to the coach.
Geron Way development site, Staples Corner	Rooftop view of the line and stations.	1220 - 1315	Guests will need to wear safety equipment to access the site. This is being provided by the developer.
Gladstone Park	Review of junction	1330 - 1340	Guests will alight Bus to view the main junction and local development opportunities, and to understand the historical context.
Neasden	Drive-by view of station location	1350	Note location of station and development opportunities.
Harlesden	Drive-by view of station location	1400	Note location of station and development opportunities.
Old Oak Common Lane	Drive-by view of station location	1410	Note location of station and development opportunities.
Acton Central and Bollo Lane	Drive-by view of level-crossing	1420	Note location of station and development opportunities. Link with level crossing. Close to Bollo Lane level crossings.
Barratt's Tower, Brentford	Rooftop visit, end of tour	1440 - 1500	Review length of site. Refreshments will be provided
Depart	Bus back to Brentford Station if	1500	End

	needed		
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The West London Orbital line could potentially support the delivery of an additional 20,000 homes, as well as employment growth in west London

- New orbital connectivity between town centres and Opportunity Areas across the sub-region
- Links to Elizabeth Line and Thameslink
- TfL now reviewing the work done to date and beginning the necessary feasibility work to take this scheme forward
- Important role for boroughs
 - Identifying suitable ways to support scheme delivery (e.g. developer contributions)
 - Coordinating delivery of new homes
 - Delivering complementary measures
- Joint approach with West London Alliance has helped move scheme forward

MTS Proposal 88



The West London Orbital line could potentially support the delivery of an additional 20,000 homes, as well as employment growth in west London

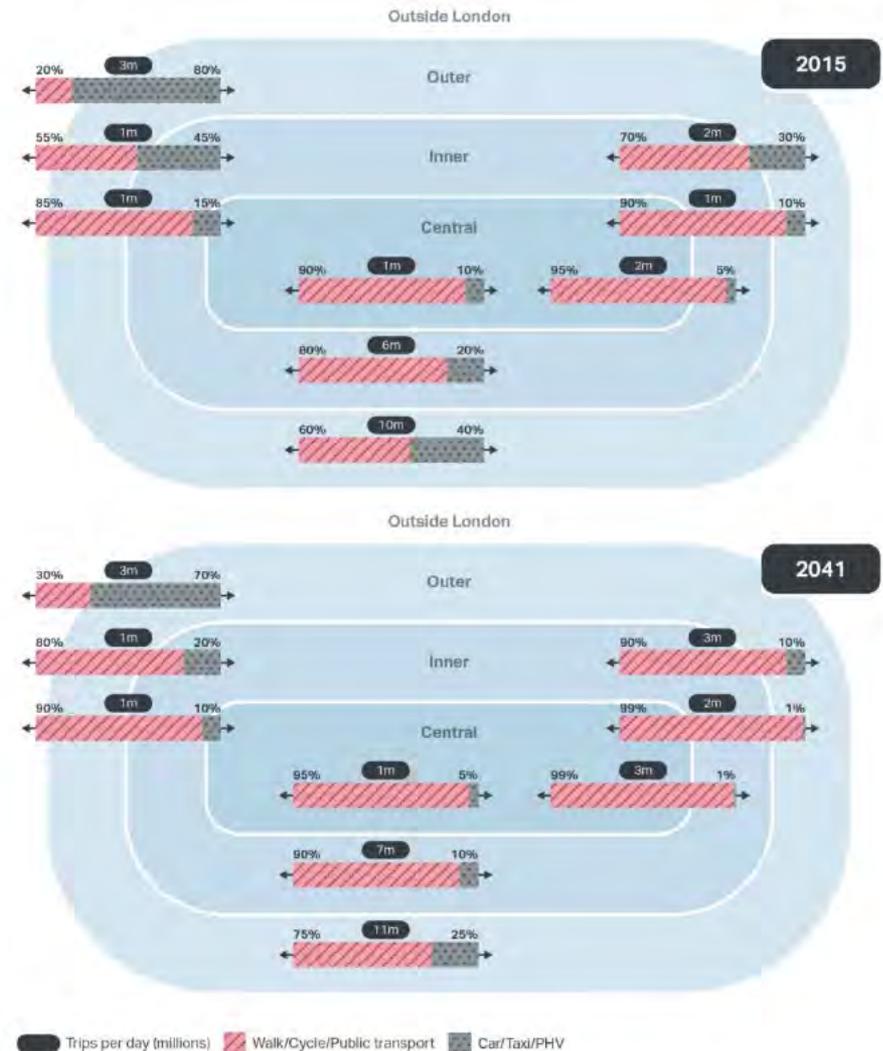
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MTS Proposal 88



We are now developing the strategic case for the scheme

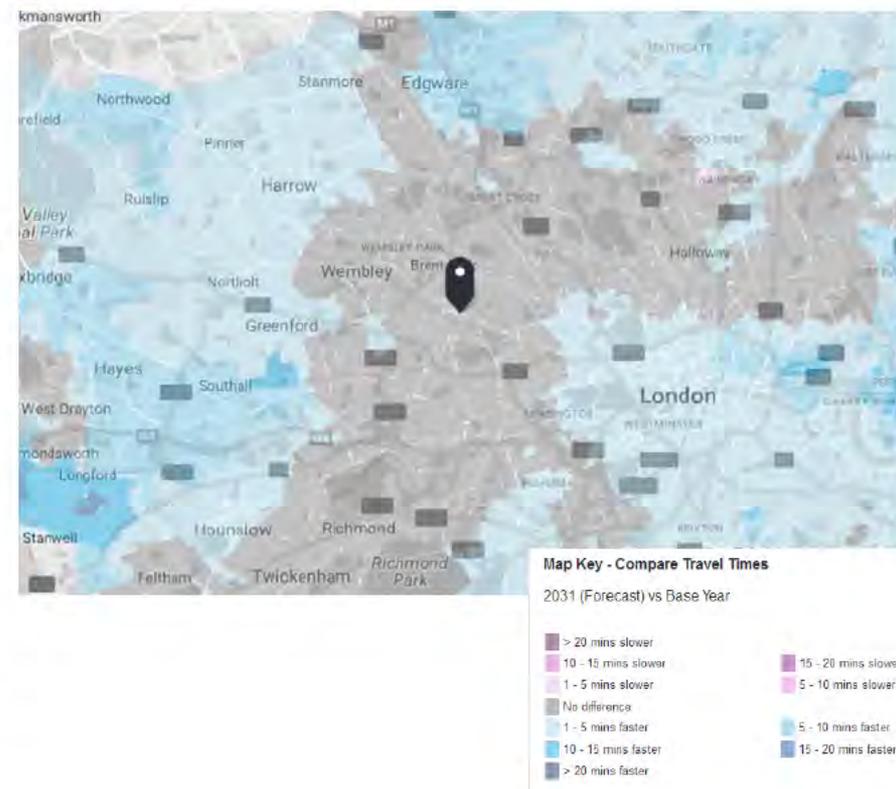
- London is growing
 - London is the engine of the UK economy, generating 23 per cent of GVA and 25 per cent of national tax revenues
 - London's success means that people want to live and work here in greater numbers
 - Population is forecast to grow from 8.7 million today to 10.8 million by 2041
 - These challenges drive the mode share aims of the Mayor's Transport Strategy
- Action is needed on public transport connectivity in outer London
 - Outer London is where the mode shift challenge is greatest
 - Outer London is where potential for growth is highest



We are now developing the strategic case for the scheme

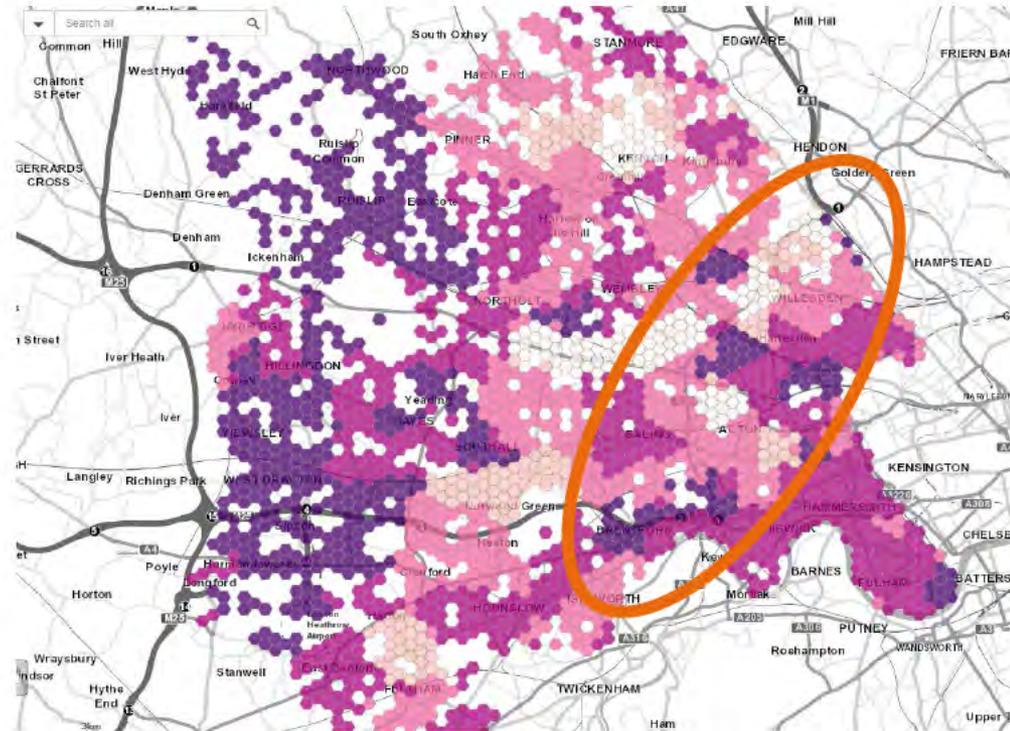
- Active, efficient and sustainable mode share in west London ranks fourth out of the five London sub-regions
- In west London, orbital connectivity is a constraint on mode shift
 - Elizabeth line will bring about a step-change improvement in radial connectivity and overall connectivity within the sub-region, but district centres along WLO corridor will not see improvements in north-south connectivity
 - Poor orbital options limit step-free connectivity within the region
 - A consequence of this is high levels of congestion – average vehicle delay on main roads running north-south is high

Sub-region	Active, efficient and sustainable mode share
Central	83%
East	63%
North	58%
West	57%
South	54%



We are now developing the strategic case for the scheme

- In west London, improved public transport provision will enable denser development and employment growth
 - There is an arc of opportunity areas running from Brent Cross to Great West Corridor
- The West London Orbital is a key component of the Old Oak Strategic Interchange
- The West London Orbital is a deliverable way to address these strategic problems
 - Technically feasible
 - Operationally feasible
 - Deliverable
- The West London Orbital scheme aligns strongly with London and local policy



We also need to develop the economic, financial, commercial and management cases

- Economic case
 - Project costs (London Overground)
 - Demand and revenue forecasts (Strategic Analysis)
 - Wider economic benefits, including development potential study (Spatial Planning)
 - Economic appraisal
- Financial case
 - Operating costs (London Overground/Commercial Finance)
 - Funding study
- Commercial case
- Management case

West London Orbital Programme Plan

w/c 1st April w/c 29th April w/c 27th May w/c 26th June w/c 22nd July w/c 19th August w/c 16th September w/c 14th October w/c 11th November w/c 9th December

Process	Final Output	Notes/Duration/ End date	FY 18/19												
			P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13
Specifying route options and scenario assumptions	Route options	Completed	[Dark purple bar from P1 to P4]												
Technical Options Assessment	Baseline Report		[Purple bar from P1 to P8, ends with orange tick]												
Modelling	Model Outputs		[Purple bar from P3 to P7, ends with orange tick]												
Demand Forecasting	Demand Forecasting Outputs	h ok A1	[Red box from P5 to P6]												
Output definition Study	Initial Proposition Document	Draft report ready end of August	[Purple bar from P6 to P7, ends with orange tick]												
Estimated Cost	Cost report/Review	a review of the costs produced by others will be in the baseline report	[Purple bar from P3 to P7, ends with orange tick]												
Consents Study	Consents Strategy		[Red box from P4 to P7]												
Funding study	Funding (and Finance) Report	Mid October completion	[Purple bar from P4 to P8, ends with orange tick]												
Development Capacity Study	Development Capacity Report	Mind- end of August completion	[Purple bar from P3 to P7, ends with orange tick]												
Business Case Production	High Level Business Case		[Purple bar from P1 to P8, ends with orange tick]												
	Summary Update Report to Deputy Mayor		[Orange tick at P9]												

- Work Process
- Report Output/Milestone
- Completed
- TBC following other outputs/Currently Awaiting dates

West London Orbital Programme Works

Work area	Owner	Details of work	Current Status (i.e completed, active)	Date for completion
1. Technical Options Assessment - Engineering	London Overground - David Buttigieg + Jonathan Small	Feasibility and costs - focusing on core area and whether 8tph is feasible. This work will also include a baseline report	active	Sep-18
2. Technical Options Assessment - operational		Review operational assessment - high level assessment of constraints of the scheme	active	Sep-18
3. Output Definition Study	Seyram Kumapley		active	End of August
4. Modelling and 5. Demand Forecasting	Amanda Cadwell	Amanda currently checking modelling to see what outputs we already have - GWC. Specifications being decided prior to runs	active	tbc
		Amanda to check when modelling can be done with contractors	active	July
6. Estimated Costs	London Overground - David Buttigieg	Assumptions around WLA costs, assume different service patterns. However, reliant on the output from options assessment	active	Sep-18
7. Consents Study	Neil Chester	Strategy to explore consents routes and high level planning constraints - information required on mode, alignment corridor and any ancillary development (e.g. depot)	To begin once they have all of the info on the two options to be looked at	Sep-18
8. Funding Study	Aitor Veiga	Funding study to take place - report due 10th September Currently being prepared for ITT	Active	Mid October 2018
9. Development Capacity Study	Kirsty Maclean/Imogen Thompson	Results due August 2018 Awaiting bids for scoring	active	End of August
10. Business Case	Colin Brady	Ongoing	active	Autumn 2018
11. Summary Update Report			Not active	Following completion of Business Case
Further feasibility study covering whole route required	Network Rail		Not active	N/A

TRANSPORT FOR LONDON

PROJECT INITIATION DOCUMENT & FUNDING REQUEST

CITY PLANNING

Subject: West London Orbital Railway (MTS Proposal 88)

Date: 05 March 2018

Funding: Pipeline

Ref. No:

1 Purpose

- 1.1 This paper sets the proposed work, costs and governance to deliver Stage One of the West London Orbital (WLO) Railway project (Proposal 88 of the Mayor's Transport Strategy (MTS)) as agreed at CPLT on the 4th of December 2017. The scheme has thus far been developed by the West London Alliance (WLA), comprising seven Boroughs in west and north London; Barnet; Brent; Ealing; Hammersmith & Fulham; Harrow; Hillingdon and; Hounslow. A map of the proposed route of the WLO is included at Appendix A.
- 1.2 This paper seeks authorisation to spend £232,000 to initiate and progress work for Stage One of the project. Subject to the outcome of Stage One, further funding may be needed to progress the project through further stages. If required, this would form a future request for funding from CPLT. A breakdown of the proposed stages of work is included at appendix B.

2 Background & work to date

- 2.1 The scheme was identified as a priority in stakeholder responses to the draft MTS consultation. As a consequence proposal 88 in the MTS now states that:

'The Mayor, through TfL, the West London Alliance boroughs and Network Rail, will work towards the delivery of a new London Overground 'West London Orbital' line connecting Hounslow with Cricklewood and Hendon via Old Oak, Neasden and Brent Cross.'
- 2.2 The justification for the proposed scheme is that the WLO will support and drive housing and employment growth throughout the corridor, as well as delivering significant journey time, connectivity and accessibility benefits for those making orbital journeys.
- 2.3 Work to date has been led by the WLA, with support and advice from TfL and Network Rail and includes:

- a) Scheme options assessment
 - b) Railplan modelling
 - c) Initial technical feasibility work
 - d) High level business case development
 - e) Early consideration of funding options
- 2.4 The work commissioned by the WLA (but not yet assured by TfL or Network Rail) estimates the capital cost of the full WLO scheme to be approximately £265m at current prices, including 80% risk. Annual operating costs were calculated to be approximately £15m set against estimated annual fares income of around £9m.
- 2.5 Potential sources for funding delivery of the scheme include (but are not limited to) Business Plan, Growth Fund, CIL, capturing uplifts in business rates and parking fares associated with new development, external funding from central government, external funding pots (e.g. Housing Infrastructure Fund round 2) and private sector sponsorship. Funding for future years will be considered in the funding study.
- 2.6 Further background to the project (as provided at CPLT on the 4th of December 2017) is outlined in Appendix C.
- 2.7 The Deputy Mayor for Transport undertook a tour of the proposed WLO route on 29 September 2017. Subsequent to this tour she asked TfL, working with the WLA to further develop the proposed scheme.
- 2.8 It was agreed at CPLT on the 4th of December 2017 that a virtual team would be created to progress this proposal and introductory meetings have been held with the West London Alliance in December 2017 and January 2018.
- 2.9 A letter from the Deputy Mayor for Transport to the respective Leader's of the WLA boroughs confirming TfL's role in further developing the scheme was sent on 23 January and is included at Appendix D.
- 2.10 This paper has been developed by the Projects & Consents team within City Planning, in consultation with Transport Strategy, Spatial Planning, Strategic Analysis (all City Planning), London Overground – Project Development, Public Transport Service Planning, Corporate Finance, Operational Property and Stakeholder Comms, as well as the WLA and Network Rail.

3 Scope of work

- 3.1 The overall work programme will be managed by the Projects & Consents team within City Planning, with support from Transport Strategy, Spatial Planning, Strategic Analysis (all City Planning), London Overground – Project Development, Public Transport Service Planning, Corporate Finance, Operational Property and Stakeholder Comms. The core areas of work for this phase of work will be:

Review and update the high level business case work undertaken by the WLA

- 3.2 The output of this work area will be an updated high level business case and BCR incorporating additional demand analysis and cost information (see below)

Conduct demand analysis for the scheme

- 3.3 The output of this work area will be a series of LTS and Railplan model run(s) for the scheme. The current case considers trip reassignment only, and there has been no LTS modelling conducted. A demand forecasting report will be produced which will support the high level business case.

Review of technical feasibility and scheme costs

- 3.4 This area of work will involve a detailed technical options assessment of work previously completed by West London Line Alliance and others to identify potential operational constraints. It will deliver a Project Development Baseline and Network Rail GRIP 1 Output Definition report as well as cost report confirming TfL's view of the likely scheme cost at this stage of design.

Conduct funding study to examine options for securing funding for both the construction of the line and its ongoing operation

- 3.5 This area of work will investigate the full range of potential sources for securing funding for the line and develop a funding methodology, setting out a range of options and opportunities for securing external funding from a range of sources. The output will be funding and financing study.

Review likely land and property impacts and confirm likely consents routes.

- 3.6 The output from this stage of work will be a consents strategy setting out the preferred consents route for the scheme. This will be informed by a high level review of likely property impacts resulting from the scheme.

Ensure that the scheme is considered in relation to all applicable growth area studies

- 3.7 This workstream will ensure that the scheme is included as an intervention option in all existing (Old Oak/Park Royal and Great West Corridor) and planned growth area studies as appropriate. It will also involve the development of a development capacity study to confirm high level growth and regeneration opportunities along the route to inform the case for the scheme

4 Spend to date

- 4.1 Beyond limited staff time, there has been no substantive spend to date on this project.
- 4.2 There is no funding allocated to specifically to this project in the TfL Business Plan approved in December 2017. As the project is at initiation stage, and could deliver significant housing and growth benefits, it is appropriate to consider Pipeline funding to progress the scheme at this stage.

5 Costs

5.1 The anticipated cost of this phase of work is £232,000 of which £40,000 is to be provided by the West London Alliance to support the funding and financing study. This is made up of:

- a) £22,000 for the technical and cost review to be undertaken by London Overground Project Development team
- b) £60,000 for the transport modelling to be carried out as a variation to the work already commissioned for the Great West Corridor study
- c) £50,000 for a development capacity study
- d) £100,000 for a funding and financing study – WLA have committed to provide £40,000 towards this piece of work, so our expenditure would be £60,000

5.2 A breakdown of anticipated spend by period is set out below.

	2017/18	2018/19					
Work Area	P13	P1	P2	P3	P4	P5	P6
Technical and cost review	8	9	5				
Transport modelling	5	5	10	10	10	20	
Development capacity study		10	10	10	10	10	
Funding study		20	20	20	20	20	

6 Next steps and proposed key milestones

6.1 Stage 1 of the project will take approximately 6 months (up to August 2018).

7 Governance and key stakeholders

- 7.1 Within TfL the budget would be held by the overall budget would be held by the Projects & Consents Team. The SRO for the project is Chris Porter, with day to day project management being carried out by Colin Brady.
- 7.2 Given the genesis of the project with the WLA, a twin-level governance structure is proposed, with an internal TfL steering group sitting alongside a wider external group that includes representatives from the impacted Boroughs and other key stakeholders. The internal TfL group would ensure consistency with related projects such as the North and West London Capacity Improvement Study and Old Oak Common stations.

8 Resources

8.1 The following individuals will be involved in this phase of work:

Name(s)	Team	Activity
Chris Porter Natalie Lister	Projects & Consents	<ul style="list-style-type: none"> • Day-to-day project management • Engagement with WLEPB and Boroughs • Review strategic business case work undertaken by WSP • Manage external consultants where necessary for bespoke studies
Colin Brady	Transport Strategy	<ul style="list-style-type: none"> • Day-to-day project management • Engagement with WLEPB and Boroughs • Review strategic business case work undertaken by WSP • Manage external consultants where necessary for bespoke studies
Amanda Cadwell	Strategic Analysis	<ul style="list-style-type: none"> • Conduct demand analysis for WLO scheme
Karin Derstroff Martin Tedder Kirsty Maclean	Spatial Planning	<ul style="list-style-type: none"> • Investigate regeneration and growth opportunities • Engagement with Boroughs
Jonathan Small Chris Round Max Henn	London Overground Project Development	<ul style="list-style-type: none"> • Review operational assumptions • Review cost assumptions
Stephen Miles	Public Transport Service Planning Rail Development	<ul style="list-style-type: none"> • Review operational assumptions • Review cost assumptions
Neil Chester Mathew Seamons	Projects & Consents	<ul style="list-style-type: none"> • Review land and property impacts and consents routes • Develop consents strategy
Aitor Veiga	Corporate Finance	<ul style="list-style-type: none"> • Develop a funding and financing study

8.2 The following key stakeholders will be involved in this phase of work:

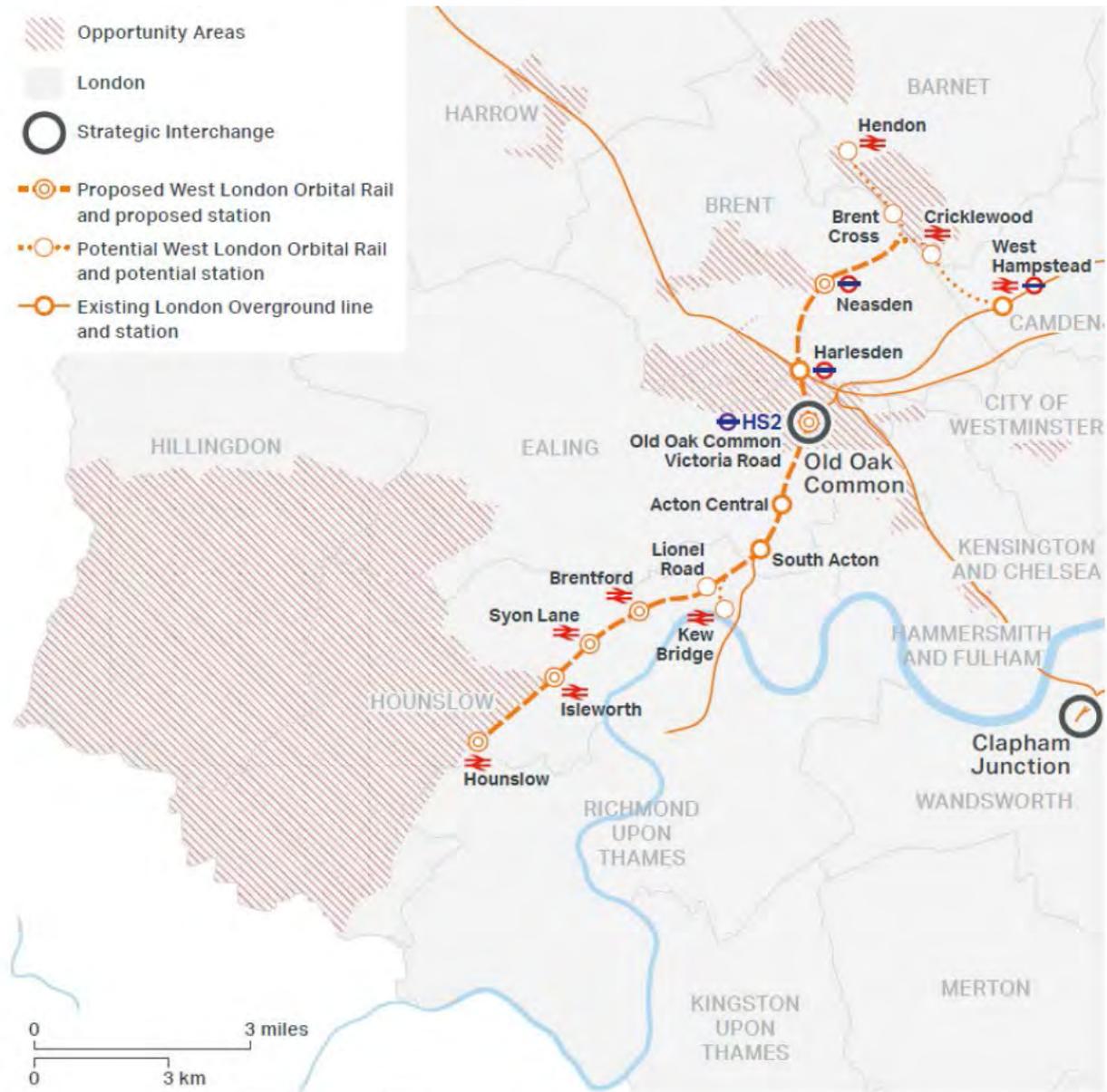
Name(s)	Organisation	Activity
Luke Ward	West London Alliance	<ul style="list-style-type: none"> • Key contact within the West London alliance, managing all WLA and borough inputs into the work programme
Toby Saint-Clair	Network Rail Capacity Planning	<ul style="list-style-type: none"> • Network rail assurance - Progressive assurance of timetable analysis
Joseph Chroston-Bell	Network Rail System Operator	<ul style="list-style-type: none"> • Network rail assurance - Network Rail Route and Strategy engagement

Contact

Contact: Chris Porter

Number: [REDACTED]

Appendix A – Proposed route of the WLO



Appendix B Proposed stages of work

1. In common with other recent similar major projects such as the Barking Riverside extension and Old Oak Overground stations, a multi stage process of scheme development is proposed. Progress between the stages would be subject to the conclusion from the previous stage of work, Mayoral support, political agreement and funding availability, and would take the scheme through to a possible powers application. These stages are as follows:
2. Stage One – review and update of existing work (6 months) – the subject of this paper
 - a) Review work undertaken to date including the published business case, technical feasibility and cost estimates and update as appropriate.
 - (i) Undertake a technical options assessment of work previously completed by West London Line Alliance and others.
 - (ii) Carry out additional transport modelling including LTS and Railplan modelling
 - (iii) Update the high level business case
 - (iv) Identify potential operational constraints and complete qualitative assessment of the WLO.
 - (v) Review the Strategic Option selection for the scheme, as a possible intervention in relevant growth studies
 - (vi) Carry out initial funding study including an assessment of land value uplift
 - (vii) Confirm consents route
 - (viii) Complete a Project Development Baseline Report (Documents the maturity of design/decisions) and Network Rail GRIP 1 Output Definition (High-Level Requirements and focus of next stage).
3. Stage Two – Further design work (9-12 months)
 - a) Undertake GRIP2 design study
 - (i) Develop multi-disciplinary option designs to GRIP 2 level
 - (ii) Complete initial Environmental Appraisal and Assessment
 - (iii) Complete full operational assessment of the WLO, including Timetable Modelling
 - (iv) Develop Operational Concept (Rolling Stock/Stabling and Maintenance requirements)
 - (v) Develop cost estimates
 - (vi) Develop Strategic Outline Business Case
 - (vii) Develop GRIP 3/4 requirements

- b) Agree train route and frequency that meets business/stakeholder objective.
 - c) Produce a full strategic outline business case
 - d) Carry out an initial public consultation on the principle of the WLO scheme
 - e) IAR gate one
4. Stage Three – scheme development to single preferred option (18-24 months)
- a) Undertake GRIP 3 (Single Option Selection) and GRIP 4 (Concept Design & Approval in Principle) design studies.
 - b) Update strategic outline business case
 - c) Second public consultation based on single preferred option
 - d) IAR gate two
5. Stage Four – Transport & Works Act Order (or similar) preparation (12-18 months)
- a) Preparation of TWAO evidence including an Environmental Statement and Transport Assessment
 - b) Minor amendments to the design based on consultation responses
 - c) At least one further (wrap up) public consultation
 - d) Confirmation of funding
 - e) Outline business case

Appendix C – Project background and description

1. The Dudding Hill line is a lightly used freight-only section of railway infrastructure in north-west London. Running approximately four miles from Acton to Cricklewood, it has carried no scheduled passenger services for over a century and still retains semaphore signalling. The line is not electrified and has a speed limit of just 30 miles per hour.
2. The WLO scheme seeks to utilise the Dudding Hill line as the core of a new London Overground rail service between Hounslow and West Hampstead Thameslink via Old Oak Common Lane. Commencing from a new reversing facility at Hounslow station, trains would use the existing Hounslow Loop before proceeding along the North London Line via Acton Central. After traversing the Dudding Hill line, services would operate on the relief lines to the west of the Thameslink route.
3. As currently proposed new stations would be provided at Harlesden, Neasden and Lionel Road. Additional platforms would also be required close to the North London Line station at Old Oak Common Lane and adjacent to the existing stations at Cricklewood and West Hampstead Thameslink. Interchange with Elizabeth Line and HS2 services would be available at Old Oak Common Lane subject to the delivery of this station.
4. As currently proposed, four trains per hour would initially run between Hounslow and West Hampstead Thameslink. Later phases could see an additional four trains per hour operating across the central section of the route to Brent Cross and Hendon in the north.
5. In addition to enhancing the public transport experience for those making orbital journeys and providing direct interchange with the Elizabeth Line and HS2 at Old Oak Common Lane, the WLO also meets the MTS objective of supporting and driving good growth through transport investment.
6. The route of the WLO passes through or close to Opportunity Areas in Hounslow, Old Oak Common, Park Royal, Harlesden, Cricklewood and Brent Cross as well as directly serving LB Hounslow's Great West Corridor where significant jobs growth is anticipated. Lionel Road station will also be adjacent to Brentford FC's new ground.
7. In the Old Oak Common and Park Royal areas alone, around 25,000 new homes and 65,000 new jobs are targeted, while the Great West Corridor, a future Opportunity Area candidate and already home to employers such as Sky and GlaxoSmithKline, could see up to 14,000 additional jobs.
8. Early and ongoing engagement with Network Rail, the Freight Operating Companies and South Western Railway will be essential to progress the WLO scheme. While some basic timetable analysis has been carried out indicating the proposal is technically viable, adding additional services to an already congested network can impact performance.
9. Acton Wells Junction has also been identified as a location which may require some form of intervention, due to the relatively large number of freight trains that are scheduled to travel this way to and from the Great Western Main Line.

10. It is anticipated that services on the WLO could commence in the mid-2020s using diesel multiple units or battery / bi-mode rolling stock. Electrification of the Dudding Hill line, at least initially, is not being considered.

DRAFT

Appendix D Deputy Mayor's letter to the respective Leader's of the WLA

DRAFT

Appendix E – Detailed Phase One work breakdown

1. The overall work programme will be managed by the Planning & Consents team within City Planning, with support from Transport Strategy, Spatial Planning, Strategic Analysis (all City Planning), London Overground – Project Development, Public Transport Service Planning, Corporate Finance, Operational Property and Stakeholder Comms. The work packages are outlined below.

Review and update the high level business case work undertaken by the WLA

1. Review the inputs and methodology used in the strategic assessment, including a review of the options in the context of the final Mayor's Transport Strategy due to be published in Spring 2018 and draft London Plan
2. Review the alternatives to the WLO scheme as specified in the current outline case.
3. Assess whether further work is needed on the strategic case and/or optioneering.
4. Update the Strategic Outline Business Case and BCR as necessary to incorporate additional demand analysis (see below)
5. Update Strategic Outline Business Case where operational assumptions have changed (see below)

The output of this package of work will be an agreed updated High Level Business Case for the WLO proposal. The work will be led by Planning & Consents with input from Transport Strategy, Spatial Planning, Strategic Analysis), London Overground – Project Development and Corporate Finance.

Conduct demand analysis for the scheme

- a) Complete an LTS model run(s) for the scheme. The WSP outline case considered trip reassignment only. There has been no LTS modelling conducted on this scheme
- b) (Re) run the Railplan assignment model in the context of the new LTS runs
2. The output of this work will be updated model outputs that will form an input into the updated Strategic Outline Business Case as described above. A supporting technical demand forecasting report will also be produced. This work will be led by Strategic Analysis.
3. The estimated external cost for this work package is £60k. This work will be done through an extension to the existing modelling contract for the Great West Corridor OA, to ensure consistency with this work.

Review of technical feasibility and scheme costs

- a) Review the technical feasibility of the scheme, including construction and operational assumptions as specified in the current outline case
 - b) Review infrastructure requirements as specified in current outline case
 - c) Review cost assumptions for construction
 - d) Review cost assumptions for running costs
4. The outputs of this work will be confirmation of TfL's position on the operational viability of the scheme, and any required new infrastructure and confirmation of TfL's position on cost estimates, that will form an input into the updated High Level Business Case as described above. A supporting technical report will also be produced.
 5. This work will be led by London Overground - Project Development with support from Public Transport Service Planning.
 6. This work will be carried in house. The estimated cost for this work package is £22,000.

Conduct funding study to examine options for securing funding for both the construction of the line and its ongoing operation

- a) Describe the full range of potential sources for securing funding for the line
 - b) Identify the potential solutions for funding line construction in a quantitative way
 - c) Set out a notional funding methodology, profiling and project plan for securing and spending construction resource
 - d) Set out the range of realistic options and opportunities for securing external funding from a range of sources
7. The output of this work will be a report setting out key findings, and a technical financial analysis report showing calculations and detailed working. This work will be managed by Corporate Finance.
 8. The estimated external cost for this work package is £100,000, of which £40,000 is available from the West London Alliance.

Review likely land and property impacts and confirm likely consents routes.

- a) Carry out a high level review of likely property impacts resulting from the scheme
 - b) Confirm the preferred consents route and develop a consents strategy.
9. The output of this work will be a consents plan for the scheme, supported by an assessment of likely property impacts. This work will be conducted internally by Projects & Consents with input from Operational Property.

Ensure that the scheme is considered in relation to all applicable growth area studies

- a) Include the scheme as an intervention option in all existing (Old Oak/Park Royal and Great West Corridor) and planned growth area studies where appropriate
 - b) Confirm high level regeneration opportunities and potential levels of housing and employment growth along the route to inform the case for the scheme
 - a) The output of this work will be confirmation that the correct regeneration opportunities are being considered
10. The output of this work will be technical report that will form an input into the updated Strategic Outline Business Case as described above. Separately the individual growth area studies along the route of the WLO will include an assessment of the proposed scheme. This work will be led by Projects & Consents and Spatial Planning.
11. The estimated external cost for this work package is £50,000.
12. In all, the final deliverables of the of this phase of work will be:
- a) An agreed Strategic Outline Business Case
 - b) Demand Forecasting Report
 - c) Technical feasibility review report
 - d) Cost report
 - e) Funding and financing study
 - f) Consents plan
 - g) Development capacity study

Asaas Sarah

From: Smart Alan
Sent: 06 April 2018 16:16
To: Smales Carol; Miles Stephen; Salvato Loredana
Cc: Porter Chris; Round Chris; Small Jonathan; Buttigieg David (LO)
Subject: West London Orbital progress meeting

Dear All,

I attended the West London Orbital progress meeting on 6th April. The key points arising from this were as follows:

Funding

£240k has been allocated to the project by the TPLT meeting.

Phasing of work

Four phases of work are currently anticipated:

1. Outcome definition;
2. Concept design;
3. Detailed design;
4. Development of Transport and Works Act Order for the project, to be followed by project delivery.

The funding awarded will be used to progress the first phase of work which will last for six months and complete the following activities:

- Update the transport modelling undertaken previously. LTS will be used to ensure that the full impact on the transport network is captured, with Railplan being used to review the various options for different service levels;
- A study of the development generated by the new route will be undertaken. This will distinguish between development driven by the rail transport links to central London and that driven by the improved orbital transport provision. This work will involve liaison with the Boroughs concerned to understand their plans for locating the additional housing proposed under the London Plan;
- A study of funding opportunities arising from planned development along the route and other available funding sources including Borough CIL;
- Development of a consents strategy for the powers required to construct the route;
- Further consideration of the operational constraints affecting the route and service frequency offered, including the impact of current timetable planning rules and services provided by other operators. The presence of numerous level crossings at the southern end of the route is a particular concern as these are located in constrained sites and will be difficult to replace with new over or under bridges. The power source of the trains to be used is also an issue given the variety of power sources currently available on the route. Options could include the use of a battery trains such as those manufactured by Vivarail. The need for renewal of signalling on the Dudding Hill route will be considered.

Network Rail consider that the timetabling and scheduling issues should be subject to a detailed review funded by the project at the outcome definition stage to demonstrate clearly the feasibility (or not) of the project. TfL does not intend to undertake this level of activity before the value of the proposal is understood in more detail.

Once the outcome definition stage is completed the results will be summarised in Strategic Business Case format and passed to the GLA with a recommendation as to whether the project should be progressed to the next phase or not. The GLA will then take the final decision as to whether or not the project is developed further.

The West London Alliance (WLA) have been pushing for regular project update meetings with director level involvement. TfL have been pushing back against this as it is not appropriate for a project at such an early stage of development. Working level meetings between the various parties are therefore the preferred way forward. A workshop is planned to be held in May 2018 to review the issues that require consideration at the outcome definition stage.

Network Rail suggested that the proposal should be covered at their forthcoming Route meetings for Anglia, LNW and Wessex who would all be affected by the proposal.

Alan Smart

Principal Planner | Public Transport Service Planning

[Redacted contact information]



Asaas Sarah

From: Smart Alan
Sent: 28 August 2018 10:18
To: Kumapley Seyram
Cc: Miles Stephen
Subject: RE: Data for funding study

Sensitivity: Confidential

Seyram,

I can make TfL's Moira model available for the use of Motts as well as the data within it. They will need to give a written undertaking that the model and its data will be used only for the WLO study and no other purpose, and that any model supplied will be deleted once the study is completed.

Regards,

Alan Smart

Principal Transport Planner | Public Transport Service Planning

[Redacted]
[Redacted]
[Redacted]



From: Miles Stephen
Sent: 24 August 2018 17:11
To: Kumapley Seyram; Small Jonathan; Buttigieg David (LO)
Cc: Veiga Aitor; Smart Alan; Salvato Loredana
Subject: RE: Data for funding study
Sensitivity: Confidential

Hi Seyram,

Alan is our gatekeeper for all things Moira, so he'll be able to give you an indication as to what can be provided next week. We can provide class 378 train loading information from the Loadweigh system.

Kind regards

Steve

From: Kumapley Seyram
Sent: 24 August 2018 11:31
To: Miles Stephen; Small Jonathan; Buttigieg David (LO)
Cc: Veiga Aitor

Subject: Data for funding study
Sensitivity: Confidential

Dear all,

The Funding study for the WLO has been awarded to Motts and we had an inception meeting last week.

Motts have requested for LO's MOIRA model and line loading data for use for this study (please see highlighted paragraph in email below). Could you please advise if they can have access to this and any procedures required by Motts for access? Or if this is provided by another team, could you please let me know?

Many thanks.

Seyram

From: [REDACTED] mottmac.com]
Sent: 17 August 2018 07:59
To: Kumapley Seyram; Veiga Aitor
Cc: Steele, Oliver C; [REDACTED]; Porter Chris; [REDACTED] ealing.gov.uk
Subject: RE: TfL 91306 / Task 132_inception meeting Agenda
Sensitivity: Confidential

Hi Seyram and Aitor

Good to meet with you earlier this week to kick off the WLO funding study. I can confirm that we have now exchanged signed contracts.

As discussed, I will act as the main single point of contact – with key support from Oliver, Oliver and Cleo.

We will update our work programme, but if possible as an input to this I would like an assumption for the likely timescale for outputs from (a) the new Railplan model scenarios, and (b) the Atkins development scenarios work. These are key to our two workstreams, respectively the operational subsidy review and construction funding study, and the majority of work will pivot from these.

In terms of other data requirements and interfaces, we note the following:

- Railplan outputs will be a starting point for revenue / subsidy analysis. Given final modelling is not yet available, we see value in considering model outputs already available to explore our method and understand the baseline. To this end, please could provide:
 - Access to models or existing outputs that underpin the WSP work and specifically (if possible) the basis for the £9m per annum revenue calculation
 - Permission to use the existing WLO model scenarios / outputs as part of the GWC work (I understand 2 variants of WLO have been modelled, albeit not including trip generation from LTS)
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- To enable consideration of operating costs – access to the assumptions that underpin the £15m p.a. estimate cost. I suggest a call or meeting with TfL on this topic to understand the existing work in this area that is underway.
- Further detail (if available) on the breakdown of capital costs and basis for inclusion of contingency or optimism bias.
- Output from the Atkins study, which we understand from our conversation will set out quantum, use, phasing and ideally development valuations for a “do something” (ie with WLO) scenario and a “do nothing” scenario (ie without WLO)
- Rateable values for each local authority along the route of the line (if not publicly available – we are checking)

During our meeting it was explained that our workstream (the Funding Study) is being completed alongside strategic demand modelling (Railplan), the Atkins study, and work by TfL to further explore technical

feasibility. These elements are due to come together to inform an SOBC in November, prior to a recommendation to the Mayor.

Our proposal includes input from Savills to assist with land valuation and development scenarios (circa £10k of our overall fee). We think this is valuable input, but intend to await review of the output from the Atkins study before confirming the scope of this input.

Finally, we discussed the fares analysis required to inform consideration of options such as re-zoning or premium fares. It was agreed that the focus of this element of the work should be demonstrating the potential or otherwise of these options as part of the overall narrative, noting the practical barriers to implementation and including quantification of impacts were proportionate, rather than detailed fares modelling.

Happy to discuss further and we look forward to progressing this work.

Regards

[Redacted]

[Redacted]
Projects Director, Rail Planning

[Redacted]

From: Kumapley Seyram [Redacted]
Sent: 09 August 2018 08:46
To: [Redacted] <[Redacted]@mottmac.com>; [Redacted] <[Redacted]@ealing.gov.uk>; Veiga Aitor [Redacted] <[Redacted]@mottmac.com>; Porter Chris [Redacted] <[Redacted]@mottmac.com>; Steele, [Redacted] <[Redacted]@mottmac.com>; Haycock, [Redacted] <[Redacted]@mottmac.com>
Subject: TfL 91306 / Task 132_inception meeting Agenda
Sensitivity: Confidential

Hello,

Please see attached for the proposed agenda for Tuesday's meeting. Please let me know if I've missed anything.

When you arrive at reception, please ask for me (Seyram Kumapley).

See you all soon.

Regards,

Seyram

-----Original Appointment-----

From: Kumapley Seyram
Sent: 02 August 2018 16:26
To: Kumapley Seyram; Alexander, [Redacted] Luke Ward; Veiga Aitor; [Redacted]; Porter Chris
Cc: Ahmed Tufail; [Redacted] Dave, Amar
Subject: TfL 91306 / Task 132_inception meeting
When: 14 August 2018 11:00-12:30 (UTC+00:00) Dublin, Edinburgh, Lisbon, London.

Where: Palestra - 5th (5BM1) Piccadilly Line
Sensitivity: Confidential

Hi all,

Thank you for confirming your availability. An agenda would be circulated ahead of the meeting.

Regards,

Seyram

From: [REDACTED] [mottmac.com]
Sent: 02 August 2018 15:59
To: Kumapley Seyram
Cc: Porter Chris; Veiga Aitor; [REDACTED]
Subject: RE: TfL 91306 / Task 132_inception meeting
Sensitivity: Confidential

Hi Seyram

Good to talk earlier and we look forward to starting on this project. We will take a look at the WSP report and have a think about further data requirements.

Availability for an inception meeting for w/c 13/08 includes:

- Tuesday morning
- Wednesday afternoon
- Friday afternoon (to be confirmed)

Does one of these work?

Thanks

From: Kumapley Seyram [REDACTED]
Sent: 02 August 2018 14:56
To: [REDACTED] [mottmac.com]
Cc: Porter Chris [REDACTED]; Veiga Aitor [REDACTED]
Subject: RE: TfL 91306 / Task 132_inception meeting
Sensitivity: Confidential

Hello [REDACTED]

Thank you for returning my call. To follow up on our earlier conversation, I attach a copy of the WSP report discussed to this email.

As discussed, please confirm your availability for the Inception meeting and let me know if there's any data/documents we can provide ahead of the meeting to get you started.

Regards,

Seyram

From: Ahmed Tufail
Sent: 02 August 2018 10:59

To: [redacted]mottmac.com'
Cc: Kumapley Seyram; Porter Chris; Parr Alison
Subject: Tfl 91306 / Task 132_inception meeting

Good morning [redacted]

We are pleased to inform you that you have been awarded this tender, subject to contract. This will be issued over the next week.

We had initially arranged an inception meeting for 7th August 2018 however we have been informed that key members are unavailable.

Seyram, [redacted] if I could ask you both to liaise and arrange a suitable date as soon as possible

[redacted]

Seyram Kumapley
[redacted]

Kind regards
Tufail

Tufail Ahmed | Assistant Commercial Manager – Professional Services Frameworks
Commercial, Corporate Services - GLA Collaborative Procurement Team (CPT)
Transport for London

[redacted]

Website: [Buying Professional Services](#)

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Asaas Sarah

From: Smart Alan
Sent: 31 August 2018 14:11
To: [REDACTED]
Cc: Kumapley Seyram
Subject: Re: Data for funding study

Sensitivity: Confidential

[REDACTED]

That is fine. Seyram - please ensure this email is retained in the project files as evidence of the commitment that Motts have made.

[REDACTED] - Please contact me so we can arrange handover of TfL's version of the model. I have the files on a memory stick. I can upload them to a file sharing site if you can specify one.

Regards,

Alan Smart.

Sent from my BlackBerry 10 smartphone on the O2 network.

From: [REDACTED]
Sent: Friday, 31 August 2018 13:06
To: Kumapley Seyram; Smart Alan
Cc: Miles Stephen; Veiga Aitor; [REDACTED]
Subject: RE: Data for funding study

Hi Alan

I am happy to confirm that any use of MOIRA and its data would only be for the purpose of the WLO study. We will only make the model and any associated data available to the nominated study team, and will delete the model after completion of the project.

Let me know if you need any further info or if you would like me to put this into a short letter.

Thanks

[REDACTED]

Projects Director, Rail Planning

[REDACTED]



Mott MacDonald
10 Fleet Place
London
EC4M 7RB
United Kingdom

[Website](#) | [Twitter](#) | [LinkedIn](#) | [Facebook](#) | [YouTube](#)

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2EE, United Kingdom

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From: Kumapley Seyram

Sent: 28 August 2018 10:25

To: Smart Alan ; [REDACTED]

Cc: Miles Stephen ; Veiga Aitor ; Steele, Oliver C ; [REDACTED]

Subject: RE: Data for funding study

Sensitivity: Confidential

Thanks Alan,

[REDACTED] could you please provide a written undertaking addressed to Alan confirming details in the email below so access to MOIRA can be arranged?

Many thanks.

Seyram

From: Smart Alan

Sent: 28 August 2018 10:18

To: Kumapley Seyram

Cc: Miles Stephen

Subject: RE: Data for funding study

Sensitivity: Confidential

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Regards,

Alan Smart

Principal Transport Planner | Public Transport Service Planning

[REDACTED]
[REDACTED]
[REDACTED]



From: Miles Stephen

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Cc: Veiga Aitor; Smart Alan; Salvato Loredana

Subject: RE: Data for funding study

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Many thanks.

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From: [REDACTED] [mottmac.com]

Sent: 17 August 2018 07:59

To: Kumapley Seyram; Veiga Aitor

Cc: Steele, Oliver C; [REDACTED]; [REDACTED] Porter Chris; [REDACTED] [ealing.gov.uk](mailto:[REDACTED]@ealing.gov.uk)

Subject: RE: TfL 91306 / Task 132_inception meeting Agenda

Sensitivity: Confidential

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[REDACTED]
Projects Director, Rail Planning

[REDACTED]

From: Kumapley Seyram [REDACTED]
Sent: 09 August 2018 08:46
To: [REDACTED] <[REDACTED]@mottmac.com>; 'Luke Ward' [REDACTED]; Veiga Aitor [REDACTED] Heath-Brook, [REDACTED] <[REDACTED]@mottmac.com>; Porter Chris [REDACTED] <[REDACTED]@mottmac.com>

Subject: TfL 91306 / Task 132_inception meeting Agenda
Sensitivity: Confidential

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When you arrive at reception, please ask for me (Seyram Kumapley).
See you all soon.
Regards,
Seyram

-----Original Appointment-----

From: Kumapley Seyram
Sent: 02 August 2018 16:26
To: Kumapley Seyram; [REDACTED]; Luke Ward; Veiga Aitor; [REDACTED]; Porter Chris
Cc: Ahmed Tufail; [REDACTED] Dave, Amar
Subject: TfL 91306 / Task 132_inception meeting
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[REDACTED]

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[REDACTED]
Seyram Kumapley
[REDACTED]

Kind regards
Tufail
Tufail Ahmed | Assistant Commercial Manager – Professional Services Frameworks
Commercial, Corporate Services - GLA Collaborative Procurement Team (CPT)

Transport for London
[REDACTED]

Website: [Buying Professional Services](#)

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Asaas Sarah

From: Chester Neil
Sent: 11 September 2018 06:40
To: Brady Colin
Cc: Kumapley Seyram
Subject: Apologies for WLO working group

Sorry but I have an unavoidable clash today.

Neil

Sent from my iPhone