

## ORBITAL RAIL AND OUTER LONDON

East London Line Group, May 2009

### *Background – creating a London ‘Outer Circle’*

The East London Line Group (ELLG) is a consortium of London Boroughs and regeneration partnerships across London which has been campaigning for the creation of an effective orbital rail network, particularly by making the most of an extended East London Line (ELL). It has worked to secure authorisation and funding for the extensions in North, East and South London, for spatial and economic development gains as well as transport benefits. Boroughs’ own estimates in 2002 showed a £10bn regeneration gain with a full range of extensions.

The extensions create an orbital rail ‘Outer Circle’ network for London, along with the North and West London Lines which are now part of the new London Overground network overseen by Transport for London. Over £1 billion has been allocated by Transport for London towards the ELL extensions, which are under construction and will open fully in 2010-12. **Annex A** shows maps of London Overground in 2012.

### *Orbital rail benefits for Outer London*

The immediate benefits and opportunities arising for Outer London with the new rail network are:

- the ability of orbital rail by 2012 to make an important contribution to people getting around London’s suburbs without crossing congested Central London
- support for spatial and economic changes, with higher accessibility levels at radial/orbital interchanges, and with better access to major hubs from orbital lines
- that orbital rail capacity will greatly assist the existing London transport system to have room for the population (and travel) growth projected over the next decade.

There are future benefits and opportunities for Outer London:

- further improvements to orbital rail can build on the existing and authorised London Overground, and will help fill strategic gaps in the London-wide network – in turn strengthening the accessibility of Outer London
- existing and new radial/orbital interchanges allow practical planning for higher density developments: spatial and transport investments may benefit each other – higher density and area regeneration will help to make the business case for interchanges such as Brixton orbital platforms, and the Hackney Central/Hackney Downs interchange
- selected developments at hub and spoke locations, both in Outer and Inner London, can also reduce development pressures elsewhere, in areas highly sensitive to new construction, while such developments at radial/orbital interchanges ensure the maximum accessibility for both jobs and housing
- embedding the strategic benefits and opportunities that the ELL will bring, would be a catalyst for future outer London orbital public transport links as part of the

Mayor's Next Transport Strategy (MTS2) and the emerging TfL Sub Regional Plans for central, east, west, north and south London.

- overall, there is a 'virtuous [outer] circle' here in marrying transport and spatial planning.

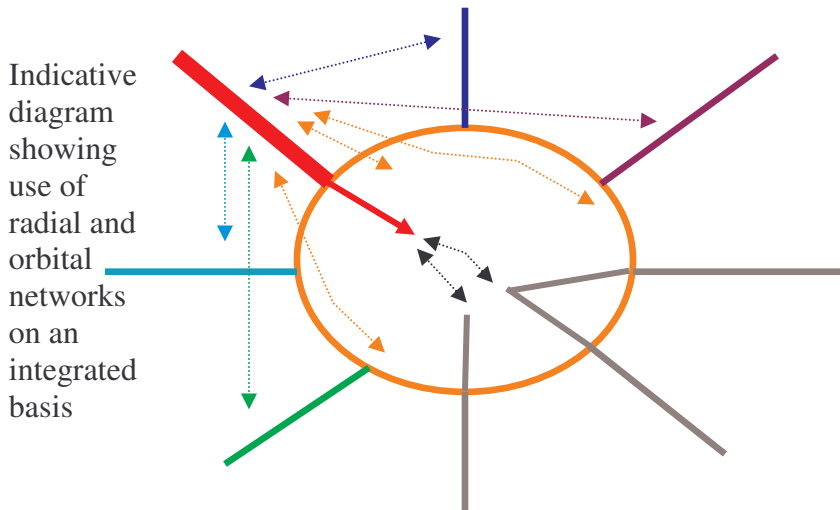
### ***Better travel opportunities***

During recent years, the East London Line Group has consistently argued that improvements to orbital rail facilities (which are mostly within Inner London because of railway geography) can be of considerable advantage to Outer London. In some cases, London Overground is or will be providing a direct service through Outer London, eg Euston-Watford, ELL to Croydon and Crystal Palace.

The various directions of travel demand to or from Outer London are:

- Other Outer London
- Inner London
- Central London
- Home Counties and further destinations.

For Outer London travel, the main advantage of an orbital rail network is the ability to reach other parts of Outer London, and much of Inner London, by using the many existing interchanges which allow travel within one suburban quadrant of London or between adjoining quadrants, without needing to travel via Central London. Relief of congestion and overcrowding within Central London is also a benefit there, including Outer London travel that has to go through the centre. The strongest advantages are illustrated below diagrammatically:



It should be noted that the orbital rail network that will exist by 2012, comprises what is initially affordable, and generally uses lines or former alignments which already existed. So it is not a purpose-designed network, that can satisfy all suburban travel needs. This is a strong case for further development of Outer London bus and tram services.

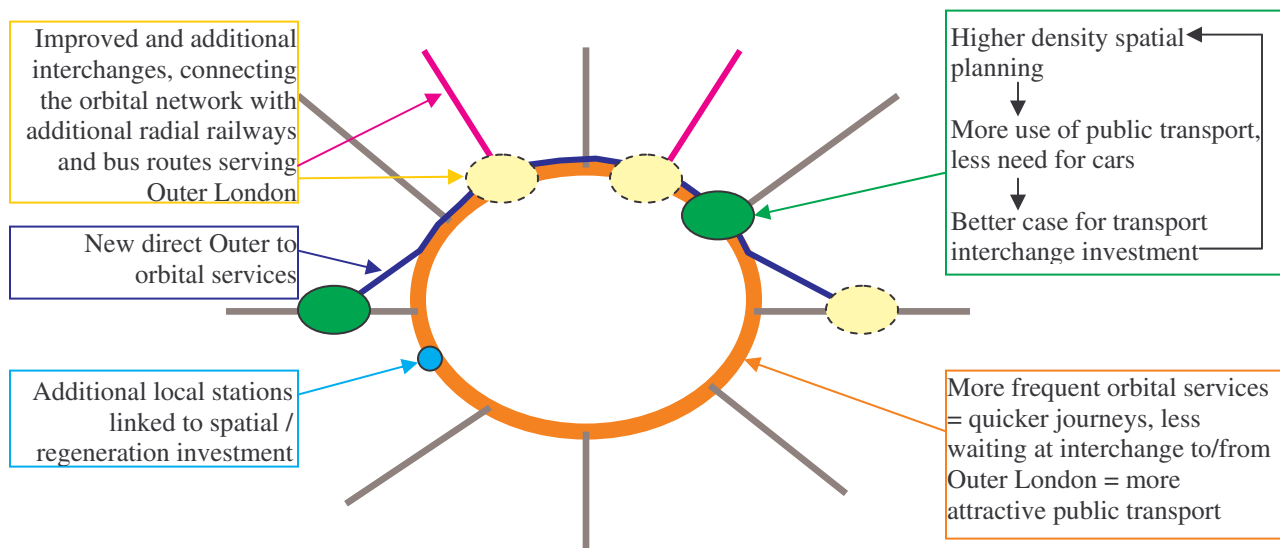
### *Synergy between transport and wider objectives*

It is evident, however, that the core rail network is capable of further development as funding and business cases justify. Such transport investment should relate to the wider spatial, social and economic priorities faced in Outer London, including strategic choices for hubs, accessibility of jobs, distribution of economic gains, and growth targets.

A strategic vision for suburban London should recognise this potential synergy, and identify primary rail and bus/tram route investment opportunities. For rail, the main options are:

- selected additional stations to improve rail accessibility locally – these may be justifiable in association with new developments, for example there are some lengthy gaps between stations on the Gospel Oak-Barking line. TfL are also looking at the value for money of providing a new station at Surrey Canal Road which was included as part of the phase 2 extension, and has wide support from both Lewisham and Southwark council in terms of regeneration potential and improved accessibility
- improved and additional interchanges between orbital and radial lines, and with radial bus corridors, which can greatly improve connectivity between principal origins and destinations in Outer London
- a number of new or improved interchanges may also be both cause and consequence of higher density spatial development
- orbital rail service frequencies may be capable of improvement, which will improve the ability to change trains and reduce journey times for ‘round the corner’ travel
- there are through track connections that might be useful in due course for direct services to Outer London, if an operational and business case could be made.

Opportunities for improvements are shown diagrammatically below:



Outer-to-orbital services, as shown in principle above, already exist along certain corridors – eg the Southern service from Croydon to West London Line, and beyond to Wembley, Harrow, Watford and Milton Keynes. However this is only hourly after the morning peak, and in the view of local partners such as Wandsworth Council merits higher frequency and an extension to Gatwick. Richmond to North London Line, and Croydon to East London Line (from 2010) are other examples, with 15 minute frequency.

This type of service offers added capacity and connections suitable for more diffuse journey opportunities, which 21st century travel patterns are showing as jobs become more foot-loose, part-time, and short-term.

Overall, there may be good spatial, social and economic business cases to be made for some further investment in the orbital network, in support of Outer London objectives, and the East London Line Group has already given this – and its rationale – some considerable thought.

**In the Annexes, we attach several papers which illustrate our thinking. The East London Line Group is happy to share its assessments and views with the Outer London Commission, and would be pleased to attend a meeting with the Commission to discuss the topics and opportunities further.**

Annex A: Maps showing 2012 orbital rail network

Annex B: Evidence to GLA Public Transport in Outer London Investigative Committee, Jan. 2002

Annex C: Linkage between spatial and economic impacts, and London orbital rail services

Annex D: Orbital rail capacities, 2003 to 2012 and 2025

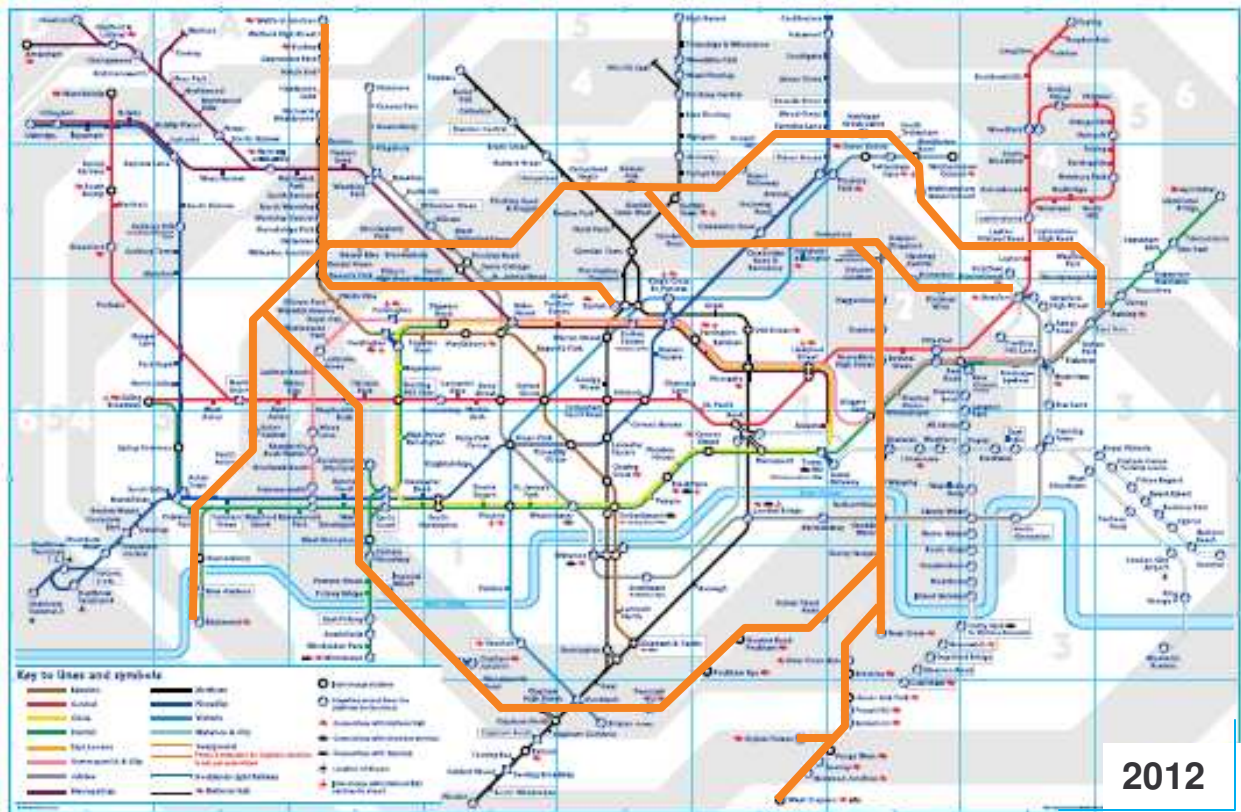
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# ANNEX A



LONDON OVERGROUND NETWORK IN 2012, including 'Outer Circle' coverage. East London Line extensions are shown in blue, and will open in 2010-2012.



LONDON OVERGROUND NETWORK overlaid on tube and DLR map

## Annex B

### Evidence to GLA Public Transport in Outer London Investigative Committee, January 2002

**From:** Archie Galloway, Chair, East London Line Group, c/o Members' Room, Guildhall, London EC2P 2EJ

Catherine Copsey  
Co-ordinator  
Public Transport in Outer London Investigative Committee  
Greater London Assembly  
Romney House  
43 Marsham Street  
London SW1P 3PY

15 January 2002

Dear Ms Copsey

I am delighted to attach the East London Line Group's submission to the GLA Public Transport in Outer London Investigative Committee.

If you have any questions or queries, please do not hesitate to contact Margaret Cooper, the Group Secretary at the address below.

Yours sincerely,



Archie Galloway  
Chair, East London Line Group

#### **EAST LONDON LINE GROUP SUBMISSION TO THE GLA PUBLIC TRANSPORT IN OUTER LONDON INVESTIGATIVE COMMITTEE**

1. The East London Line Group is delighted to submit evidence to the GLA's Public Transport in Outer London Investigative Committee.
2. The Group is a consortium of local authorities, regeneration agencies, public-private partnerships and other interested parties, seeking the earliest possible construction of northern and southern extensions to the East London Line.
3. The extensions would deliver numerous transport, regeneration and economic development benefits which have been set out in considerable detail elsewhere. Precise service patterns and destinations will be agreed by the SRA and TfL in due course, but it is clear at this stage, that benefits will accrue not only to inner London but to outer London as well:
  - Possible destination and intermediate East London Line stations could lie in the London boroughs of Croydon and Merton
  - New interchanges between the East London Line and National Rail at destinations such as Wimbledon, Finsbury Park, Peckham Rye and West Croydon (and the Croydon Tramlink in the case of West Croydon) could improve transport connections for other outer London areas which are currently poorly served, with subsequent economic development benefits.

- TfL is formulating plans to create enhanced multi-modal interchanges between the extended East London Line and local bus networks at selected stations, such as Dalston. This again, could improve the accessibility of certain outer-London destinations served by the relevant local bus services.
4. The extensions scheme has almost universal support from London and national stakeholders. The project was cited as a top priority in the Government's Ten Year Transport Strategy, published in July 2000, and was also listed as a key project several times in the Mayor's Transport Strategy, published in July 2001. The project has also gained endorsement from MPs, GLA members, all major players in the rail industry, and local stakeholders who are members of the East London Line Group.
  5. The project has made significant progress in recent months:
    - On 9 October, Stephen Byers, the Secretary of State for Transport, Local Government and the Regions, gave planning approval for the construction of the southern extensions.
    - On 6 December, construction work began on the northern extension.
  6. It is, however clear, that there are a number of areas where further significant progress will be needed throughout 2002, if the extensions are to be completed by the target date of 2006.
    - The Group is concerned that full funding is not yet in place. The SRA has guaranteed London Underground funding for initial stages of the work. However, subsequent funding is dependent on the successful appointment of a concessionaire by the SRA. In view of this, we would like to see sufficient guarantees that the project will be able to continue, should there be any delay or problem with the concessionaire process, for example, as a result of the placement of Railtrack into administration (see also below).
    - We are also concerned that Railtrack projects which are essential in ensuring that a full range of services can operate on the extended line (*ie* the upgrade of the North London Line for freight services, and infrastructure improvements on the South Central lines) have neither been agreed in design nor signed off financially. The placement of Railtrack into administration would appear to suggest that there could be further delay.
    - We are concerned about the lack of a definitive timetable leading up to the start of works on the southern extensions. The Group hopes that a timetable can be formulated as soon as possible, with a view to a start to construction within the next few months.
  7. The Group hopes that all of the above points are borne in mind by the Committee, and that pressure is applied on central government to provide guarantees of funding, and on the SRA to ensure that a timetable towards delivery of the southern extensions is finalised.
  8. The Group notes that the ALG gave evidence to the Committee on 22 November, at which representatives challenged the Mayor to move quicker to deliver the scheme. While acknowledging the valuable role which the Mayor has played in helping to achieve progress to date, the Group calls on the Mayor to redouble his efforts and apply pressure, where necessary, to ensure that remaining obstacles to construction are removed.
  9. The Mayor has indicated that TfL will undertake a review of possible service patterns in South London. This will examine East London Line routes and destinations and their inter-relationship with a) the planned South London Metro within Go-Via's preferred bid for South Central, and b) options for service patterns on Thameslink 2000. TfL and others have concerns about the operability and benefits of running multiple services over the same tracks and it is hoped that TfL's review will create a more viable service pattern across South London in which each of the train services can dovetail and interchange effectively with the other. The Group supports this work in principle and will be submitting evidence to TfL and other interested parties in due course. The Committee will no doubt want to consider the possible opportunities opened up by TfL's review.
  10. The Group would be happy to supply supplementary evidence, if the Committee felt that this would be helpful.

## Annex C

### Linkage between spatial and economic impacts, and London orbital rail services

The ELLG submitted evidence to the Examination in Public of the draft London Plan, in March 2003. The core arguments made in 2003 are still relevant now in 2009.

#### *Continuing imbalance between jobs and housing location*

There is still an imbalance between the spatial elements in the London Plan and its updates, and the capacity and availability of transport. TfL's recent Transport 2025 research takes as a starting point that the imbalance of location between jobs and housing will be greater, not less, which leads to an increased transport challenge.

Then, and now, there can be additional strategic focus on using the orbital rail network as a high capacity bypass of Central London – and as a means of stimulating location of economic activity and regeneration in the suburbs.<sup>1</sup>

#### *TfL focus on managing congestion*

Assessments of transport capacity and availability in 2003 were geared to the 3-hour morning peak period, and alleviating congestion, even though much of London is moving towards a 24-hour lifestyle as well as growing in population and economic activity.

These assessments need to be modernised. This can be assisted by the high utilisation of orbital rail capacity – short journeys in both directions are the norm on this network, to and from main interchanges, so the same capacity can be re-used several times during any one train journey. This is more efficient than the typical radial journey where trains tend to fill up in the peak flow only.

#### *Orbital rail achieves high utilisation, so can carry many more passengers*

Extending TfL's place kilometres analysis which was used in 2003 to estimate the supply of public transport in the morning peak period, shows that orbital rail developments could accommodate over 420,000 passengers in the morning peak when the full 2012 system is open, compared to 82,000 in 2003 – a fivefold increase.<sup>2</sup> (See **Annex D**)

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<sup>1</sup> *Transport for London, Analysis of the Transport Programme to Support the Draft London Plan, Technical report January 2003*

ELLX “improves accessibility to a high proportion of Areas of Deprivation, provides alternative access to Opportunity Areas in Thames Gateway, avoiding Central London”. Orbirail “enhances the existing orbital rail network around inner London, improves access to town centres and potential development areas, relieves public transport pressures in central London”.

<sup>2</sup> See Annex D for detailed assessment of place kilometres available in 2012. An extra 1.9 million place kilometres (seating + standing) if used for orbital travel whose journey distance is typically 3-8 km in length, would allow capacity for at least 340,000 additional passengers taking an average journey stage of 5.5 km.

Longer term improvements can increase this capacity further. The benefits that such schemes can bring to spatial and economic priorities should be analysed by the Outer London Commission. Annex D looks towards 2025.

For example, as shown in Annex D, if there is a modest expectation about additional orbital capacity by 2025:

- 20 trains per hour on the core East London Line (not 18 as planned in 2012, and noting that Crossrail and Thameslink are planning for 24 trains per hour, so up to 24 tph may be possible on orbital rail)
- electrification of the Gospel Oak-Barking line and 4-car trains (but still at 4 trains per hour), and with extension of services west to Willesden Junction and the Ealing Broadway Outer London hub, thence to Greenford (also electrified)
- 8 trains per hour as a Metro-standard service on the West London Line (rather than 6 in 2012)

then the total orbital rail capacity would be 3.1 million place kilometres in the 3 hour morning peak.

This is equivalent to a sevenfold increase in capacity since 2003, with space for over 560,000 passengers, and is equivalent in practical capacity to at least one more London tube line, after allowing for the occupancy of such lines. This shows the economy and sustainability of making more use of orbital rail.<sup>3</sup>

### *Supporting spatial changes at the best-served transport locations*

Particularly, location of higher density developments at radial/orbital interchanges and other major public transport hubs can be a process benefitting both spatial and economic distribution, and transport supply and demand.

The London Plan intends to facilitate growth in jobs and population, and to:

- make London an easier city to move around
- improve access to new job opportunities through training, improved mobility and support, particularly for people disadvantaged in the labour market
- improve and expand public transport whilst tackling congestion
- reduce the environmental impact of a growing London.

Greater focus on increasing transport capacity on orbital rail routes, within realistic capabilities, can underpin and unlock extra spatial and regeneration opportunities, in areas of London which most need this stimulus to assist higher densities and further economic activity.

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<sup>3</sup> 3,100,000 place kilometres, used by orbital passengers travelling 3-8 kilometres (5.5km average), equates to 565,000 passengers. Crush loading capacity on tube trains depends on the type of train and its length, and is typically 1200-1600 passengers – ‘comfortable’ planning capacity is less. 1600 capacity x 30 trains per hour x 2 directions x 3 hours, used twice per journey, would be 576,000 passengers. In practice, tube usage would on average be much less, because of the radial nature of much of their route, with peaked directional flows.

We therefore seek consideration by the Outer London Commission on the capabilities on the orbital rail network, including further development of the system to be integrated with other transport modes. Examples are given of the implications and opportunities for the London Plan as a whole.

*Generic London Plan opportunities arising from improved orbital rail*

- **Regeneration:** The ELL extensions are a regeneration project on wheels. Our July 2002 assessment of that project and how it underpinned £10 billion of regeneration in its catchment is available from the ELLG. The data was compiled from London Boroughs' own figures.
- **Densification:** Orbital rail schemes present a fundamental opportunity to create corridors of high quality public transport for less cost than an entirely new railway. This in turn enables London land uses to take advantage of the additional capacity, with higher development densities near to stations and interchanges. This can secure extra housing accommodation and economic activities in those areas which truly need the additional economic throughput. Efficient public transport provision also enables lower parking densities and associated landtake.
- **Interchanges:** Locations where there are strategically placed orbital / radial interchanges will be points of maximum public transport accessibility. This can broaden mobility by public transport around London, with an effective distribution network for suburb-to-suburb travel by a combination of orbital and radial journeys, as well as expanding choice of travel options for access to different parts of Central London. Average distances travelled on orbital rail are in the 3-8 km range, enabling multiple usage of the same train capacity over different segments of its journey.
- **Boosting London:** Historically, the easiest land use options have relied on and reinforced the conventional radial commuting routes. As a result, new jobs, housing and shopping and leisure investments located progressively away from London, for instance along the Thames Valley, and at out-of-town centres. Recent Government initiatives, on re-use of brownfield land and other planning policy measures, are compatible with urban public transport initiatives, and the emergence of schemes such as the East London Line extensions enables additional Opportunity Areas to be defined within Greater London.
- **Addressing transport inequalities:** Orbital rail will ease transport inequalities. Elements such as the need for better access to jobs, and responding to greater job mobility from a fixed location of accommodation, are assisted by greater travel choice, include some ability to avoid central London, and better suburb-to-suburb travel. An intelligible orbital rail network will help create better awareness of public transport in the suburbs, and so help redress the 'lacking-a-Tube' perceptions felt strongly in parts of the suburbs.

### *What can this mean for Outer London?*

The London Plan is cautious about the extent to which more land use development / densification can be accommodated generally. Policy 3C.1 links the availability of public transport to the location of land use development. But we are concerned in particular that policy 3C.2 restricts opportunities unless or until more transport capacity is identified as existing or firmly planned. Thus locations have, for example, been selected at Crossrail's major stations, in the SLDP, but little along the orbital lines, because the statutory Transport Strategy only looked to 2016 – and for orbital lines only to 2008 for new schemes. This denies new land use opportunities for the period to 2025-30, and must be put right.

Often, European city planning has looked to densification of land use activity in close proximity to good public transport. Taking only 400 metres from a station entrance – about 5 minutes' walk – gives 5.4 million sq.ft. of catchment, at a single storey. If 30% of that area is roads and open space, then taking only 15% of that area as suitable for redevelopment in a 20 years period to 2030 (implying a land use replacement rate of once every 135 years), but developing that to the equivalent of two additional storeys, would give a gross floor area gain of 1 million sq.ft.

Actual land use replacement rate (and the purpose to which this additional capacity is put) will vary between individual catchments, but it is clear that an enhanced orbital rail network can provide a high level of capacity for additional economic activity in London, centred on natural public transport interchanges with high accessibility.

Indicatively, for every 15% gain in gross sq.ft. in a 400m catchment, there could be an additional 1000 to 1500 people housed in single or 2-person apartments, or accommodation for 1500-2000 jobs. All this means additional economic turnover locally, and the ability to avoid passporting so many housing requirements to out-of-town or greenfield sites, and also enable local spending wealth to be recycled within that community.

### *Greater density near Orbital stations – and funding implications*

If one looked at roundly 30 stations as a possible development target, then even at 15% gain in gross sq.ft., this offers 28,000 to 42,000 additional population (i.e. 1 to 2 year's worth of the additional housing capacity required in London by the Government), or 42,000 to 56,000 extra jobs, or a mix of the two, or other initiatives including cultural and leisure projects. The expanded orbital rail network offers adequate additional capacity to support this additional activity. There are nearly 80 stations on the full orbital rail network, which offers further opportunities.

Creating the ability to fund changes is important as the planning policies themselves. The orbital rail network will make it easier for the planning authorities to achieve the desired change in community structures, by adding value to land ownership and development opportunity close to the interchanges.

This should make it possible for planning authorities to secure greater planning gains through S106 or S278 agreements, or their successors proposed in the Government's Planning Green Paper. The Planning Green Paper also proposes to make it more straightforward to achieve comprehensive renewal of areas through use of compulsory purchase orders. Business Improvement Districts and other means of funding changes are also being explored in the Local Government Finance review and in work on securing developer contributions towards the Crossrail project.

## Annex D

### Orbital rail capacities, 2003 to 2012 and 2025

This assessment by the East London Line Group extends the TfL technical analysis published in January 2003. That assessed the future capacity offered by the Transport Strategy schemes, in relation to the draft London Plan proposals. It showed that land use strategies were dependent on much of the Transport Strategy being implemented, to achieve practical capacity at tolerable levels of crowding.

The Transport Strategy showed that the majority of additional capacity was foreseen to be provided by rail. It included major rail schemes contemplated to be completed to 2016, including the East London Line Extensions (by 2008), Thameslink, and Crossrails 1 and 2. The Strategy did not develop a specific propositions for further orbital rail stages, even though these are relevant for spatial allocation policies. TfL is now forecasting to 2025. So it is important to have a set of propositions also for orbital rail in 2012, and to look further to 2025. The East London Line Group offers this Appendix as material evidence.

	000s of place kilometres, 3 hour morning peak capacity	
<b>Current orbital services</b>		
East London Line, 2001	100	TfL technical evidence, Jan. 2003
Richmond - North Woolwich (North London Line), 2003	206	National Rail timetable, 3-car trains, 15" service
Barking – Gospel Oak (North London Line), 2003	40	National Rail timetable, 2-car trains, 30" service
Clapham Jcn - Willesden Jcn (West London Line), 2003	55	National Rail t/t incl Southern (3/4 car trains)
South London Line, 2003	54	National Rail timetable, if 4-car trains, 30" service
<b>TOTAL orbital capacity, 3 hours AM peak, 2003</b>	<b>455</b>	<b>Complete orbital network in 2003</b>
<b>ELLG views on Orbital capacity by 2012</b>		
East London Line Extensions by 2012, to Clapham Jcn, West Croydon, Crystal Palace, Dalston, Highbury & Islington	1,215	Two-way capacity on orbital section Highbury-Dalston-New X/New X Gate-Clapham Junction. Inwards direction only from West Croydon/Crystal Palace to New Cross Gate. Includes extra peak trains Sydenham Line to Dalston, agreed in the South London RUS
Stratford-Richmond (North London Line), and extra service Stratford-Camden in peaks	718	Two-way capacity Willesden Jcn-Stratford. Counted in Inwards direction only from Richmond to Willesden Jcn
Barking – Gospel Oak (North London Line)	162	2-car trains, 15" service
Clapham Jcn - Willesden Jcn (West London Line)	251	15" service, 4-car trains, plus 2 Southern trains per hour Clapham Jcn-Shepherds Bush
<b>TOTAL orbital capacity, 3 hours AM peak, 2012</b>	<b>2,346</b>	<b>Complete orbital network in 2012</b>
<b>ELLG views on further orbital rail development by 2025</b>		
20 trains per hour on main ELL extensions	1,404	Assumes Highbury 10 tph not 8, with extra trains serving Clapham Junction line
Stratford-Richmond (North London Line), and extra service Stratford-Camden in peaks	718	As in 2012 (though might by 2025 have longer trains). Additional services overlaid Gospel Oak-Willesden Jcn
Barking-Gospel Oak-Willesden Jcn-Ealing-Greenford	608	Extension of Gospel Oak service, 4-car electric trains, linked to Ealing Broadway hub. Two-way capacity Ealing-Barking, one-way Greenford-Ealing Broadway
6 trains per hour on basic West London Line service	377	Improve walk-on frequency on WLL = 8 tph on WLL including 2 tph Southern service (plus Willesden Jcn LL platforms for Southern service)
<b>TOTAL orbital capacity, 3 hours AM peak, 2025</b>	<b>3,107</b>	<b>Complete orbital network in 2025</b>

In summary, the ELLG suggestions look principally to new high capacity trains (the first trains have been delivered to TfL), higher frequencies where possible, and platform lengthening, on much of the existing orbital rail network. This would achieve a substantial increase in capacity measured as 3 hour place kilometres.

Because these represent upgrading of the current rail system rather than new lines, they can be less demanding on construction and signalling resources at a time when other new lines are due to be underway, such as Crossrail.

The place kilometres shown by the table above need to be converted into passenger capacity, by allowing for the average journey length on orbital lines. The typical distances travelled on existing orbital lines are 3 to 8 kilometres, so we have taken an average of 5.5 kilometres, to show the effective passenger capacity in a 3 hour morning peak period:

2003 – 82,000 passengers  
2012 – 420,000 passengers  
2025 – 560,000 passengers

The bulk of this capacity can be used efficiently because orbital capacity tends to be used in both directions, and with frequent changeover of passengers as people alight and join at main interchanges.

We also note that, with a 24-hour city, assessments of transport validity based mainly on the 3 hour morning peak will also be an incomplete basis for transport planning and for recognising the full role that rail can offer throughout the day. Radial and orbital rail services have spare capacity outside the peaks, so that it makes sense to encourage their use at marginal cost.<sup>4</sup>

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<sup>4</sup> The East London Line Group sees a risk with current transport analyses, from measuring orbital transport supply largely by conventional 3 hour AM morning peak figures. This approach is of course relevant for radial commuting, where commuting flows inbound AM and outbound PM represent half to two-thirds of all daily rail travel. But suburban travel is linked to a trend towards a growing, 24 hour city, with a growing suburban ring with a 6 million-plus population, yet with no high quality, high capacity internal transport network except by taking multi-stage journeys via tube/rail into and across Central London, and out again (which also uses up valuable radial capacity).

The scale and quality change offered by orbital rail by 2012 ought to be recognised as at least as dramatic in proportion as a new tube line. Nor do we ignore the importance of suburban bus networks and some tram developments – we recognise that while orbital rail is inevitably concentrated in inner London and will rely on effective interchanges to achieve its maximum impact within Outer London, there is scope for development of a strong network of orbital bus routes connecting the major economic centres and public transport hubs.