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Report to LB Enfield

Train service options within LB Enfield

with Greater Anglia franchising

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Executive Summary

1. The study researches the scope for practical improvements to the local Greater Anglia rail services within the London Borough of Enfield, as they are being re-franchised by the Department for Transport. Because of the geography of the services, any changes will also affect neighbouring councils and other stakeholders.

2. There has been a constrained time since commissioning, to undertake work within the DfT-set deadline for consultation responses. The DfT noted in its franchise consultation (p38) that “because timescales are compressed we have been unable, on this occasion, to stage the usual customary wider pre-consultation briefing events”.

3. This report therefore focuses tightly on the two key railway routes through the Borough. It gives top attention to:

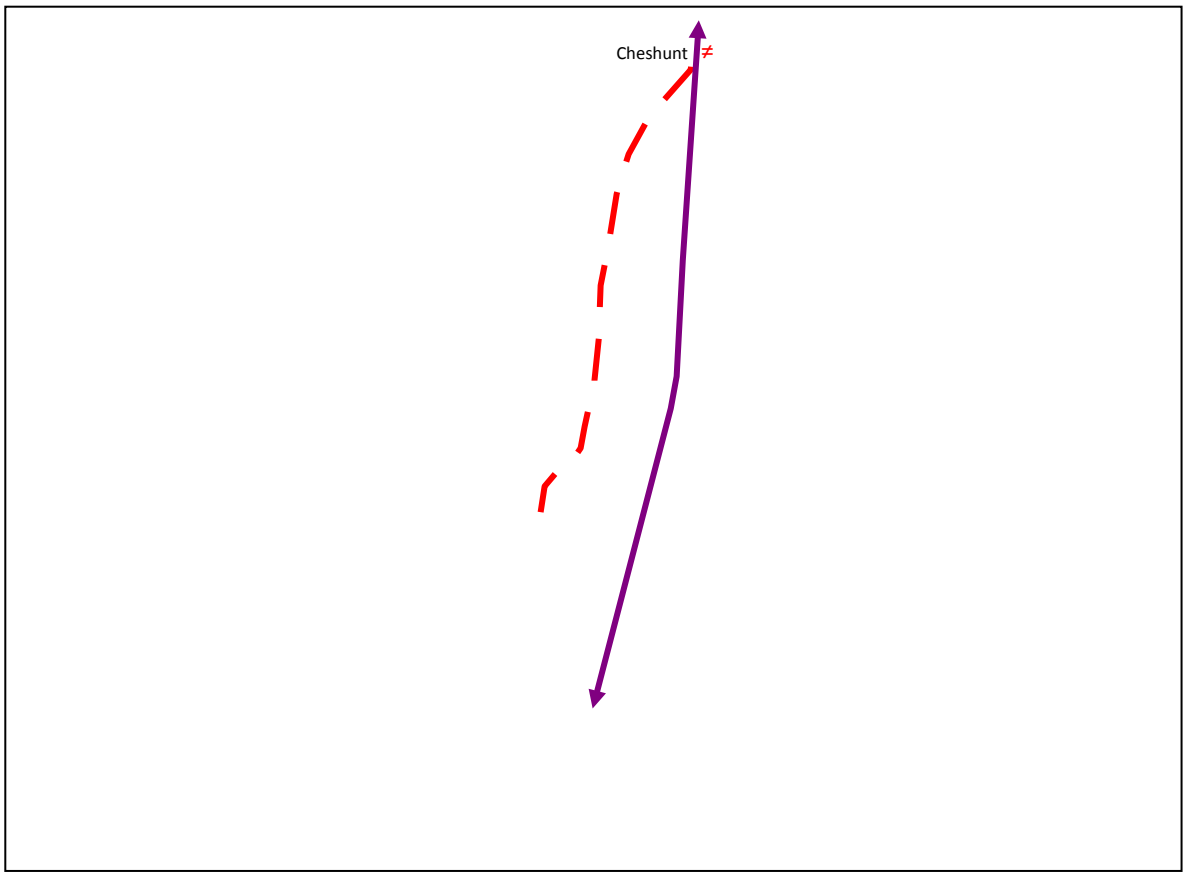
A. Improvements to the basic off-peak frequencies on the services through Edmonton Green - 'the 'Edmonton Line' linking Liverpool Street, Seven Sisters, Edmonton Green, Enfield Town, and the Southbury loop to Cheshunt.

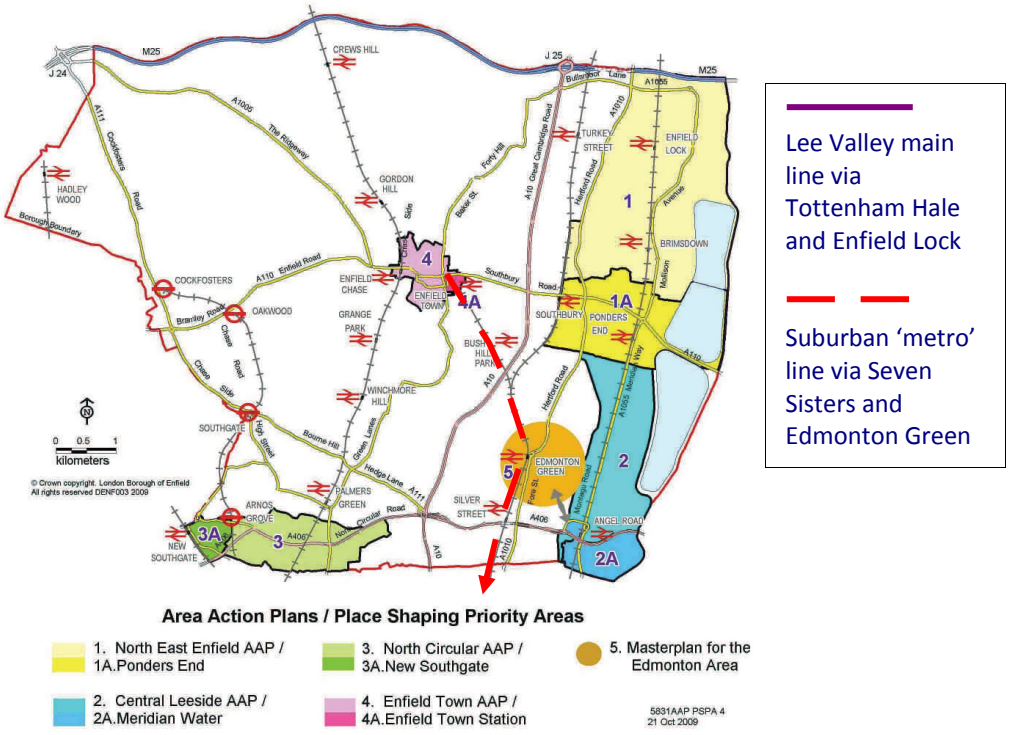
B. The peak service pattern on the Lee Valley lines, from Liverpool Street and Stratford to Tottenham Hale, the Upper Lee Valley and Hertfordshire and Essex. These are widely recognised to be one of the National Rail routes facing the greatest capacity pressures, with 2-track infrastructure which constrains the available range of passenger services. There is currently a low frequency peak service at local Lee Valley line stations, which requires major improvement to align with the large-scale spatial changes already occurring in this former industrial zone.

4. Fuller details of these options and recommendations are summarised below. The report also addresses other railway facilities and performance features relevant for LB Enfield, including offpeak services on the Lee Valley lines and the indicative scope for medium term infrastructure improvements.

5. The Council looks forward to being engaged in discussions during the next months, with the Department for Transport, the franchise bidders, and London, East of England and sub-regional stakeholders, to advance the proposals which it considers important for the future well-being of the Borough's communities, businesses and development proposals.

6. Indeed the underlying position facing the Borough is that the spatial geography of the community is changing radically, with changes to economic activity, regeneration of deprivation areas, and the area's capacity and ambition for growth. The map shows the railways and the borough regeneration catchments.





7. The growth is also stimulated and underpinned by the London Plan, the London Stansted Cambridge Peterborough Cambridge corridor, and the Council's own place shaping proposals.

8. The Borough acknowledges that the immediate train capacity shortcomings are being addressed by the Department for Transport's approval of an order for 30 new 4-car trains. These will run on Stansted Express and outer suburban services, and allow cascade of the current train fleet to increase capacity elsewhere (not all on West Anglia).

Summary of analysis and recommendations on the offpeak 'Edmonton Line' service

9. These constitute Proposal 1, with three main options and one sub-option for the off-peak services on this railway.

10. There is a Benefit Cost Ratio of 1.46 : 1 within the first year, for a 6 trains per hour offpeak service south of Edmonton Green at 10 minute intervals, with 4 trains per hour serving Enfield Town, and maintaining a 2 trains per hour service to Southbury and Cheshunt. (Proposal 1A, second variant. - called '1A2' in this summary.)

11. This BCR is derived <u>solely</u> from estimated passenger waiting time savings, and takes no additional account of NATA benefits and wider community and economic benefits. It will be a high value outcome after including these additional value for money components.

12. Benefits and costs of the different Edmonton Line offpeak proposals are brought together below.

- All proposals bring considerable waiting time benefits, £1.58m to £2.85m yearly.

- The costs are less than the benefits, with the exception of Proposal 1C (15 minutes to both destinations).
- *Based on these benefits alone*, two main proposals are significantly higher than 1:1 BCR. (both versions of Proposal 1A, Proposal 1B).)
- Proposal '1A2' almost achieves 1.5: 1 BCR, which is the DfT passmark for improvements not requiring new investment. (2:1 is the passmark for those.)

13. All proposals will generate other benefits, and income from passengers attracted to the better service. Many wider benefits can be embraced within NATA, and there are also policy objectives including the Mayor's Transport Strategy and Enfield's place-shaping.

14. Overall, there is a strong probability that Proposal '1A2' with a regular interval service south of Edmonton Green should meet DfT passmark guidelines. It should be taken forward by DfT and franchise bidders for serious evaluation. We recognise that this would need to include careful assessment of how to operate in the offpeak a mix of 10 minutes services from the Edmonton Line and 15-30 minute services from the Chingford and Lee Valley lines.

15. Among the other Proposals, '1A1' (variant with Enfield Town every 15 minutes) and 1B (3 trains per hour to each destination) also achieve credible BCR outcomes. A full NATA assessment and recognition of wider benefits may bring those within the BCR passmark.

16. On the present assessment, the maximum benefits (excluding costs) linked to a BCR above 1 : 1 are achieved by Proposal 1B. If operability of a 10 minute regular interval service proved a challenge, then the fall-back option would be the Enfield Town variant of Proposal '1A1'.

17. We commend the Edmonton Green offpeak proposals for inclusion in the ITT for Greater Anglia franchise bidders.

Summary of analysis on the peak period Lee Valley line proposals

18. We are able to define an improved specification for the Stratford-Lee Valley peak service after an extensive assessment of the operational constraints facing all services on the Lee Valley lines. To be cautious, the specification anticipates some tightening of peak timings with the Class 379 fleet.

19. Many options have been considered, but the 'flighting' of trains along this 2-track railway place an absolute limit on running more trains in peak periods on this railway.

20. Proposal 2A presents a preferred approach, by refocusing the present Stratford train onto the Upper Lee Valley stations and reorganising the train stopping pattern. This is specified to avoid the need for new large scale infrastructure, which is not seen as quick or affordable at the present time.

21. Over time, we see the current Stratford-Lee Valley service as becoming more of a frequent feeder route, undertaking a distribution function along the Lee Valley main line in a similar way to the DLR in Docklands. This proposal represents a first step.

22. The case for the new specification is essentially the change in spatial and economic characteristics described. The local Lee Valley stations are the poor relation of the railway and merit some rebalancing of the service pattern to reflect the new geography.

23. The core service would call at every station from Stratford as far as Enfield Lock, and then operate non-stop to Broxbourne to be 'looped' while the next Stansted Express passes. Overall, it is suggested that 4 peak trains per hour should be available at three Upper Lee Valley stations in Greater London (Ponders End, Brimsdown and Enfield Lock), and 2 trains per hour at Northumberland Park and Angel Road.

24. With the present investment in trains approved by the Department for Transport, there are fewer emerging benefits in Greater London than the East of England - principally some capacity strengthening of current short trains. The poor service frequency in the Upper Lee Valley, station quality, and in cases such as Angel Road, station accessibility, is at odds with the spatial agenda for the sub-region.

25. There is an increasingly urgent need to raise public transport accessibility from its low levels in areas of planned housing and business park growth. A better local train service needs to be taken forward on a phased basis as part of a wider development package.

26. This proposal is a trade off with benefits for some groups of users and stakeholders, and disbenefits for others, though this is the least heavily used of all the Lee Valley service groups. Mitigation of service reduction is proposed at Waltham Cross or Cheshunt.

27. The outcome of Proposal 2B (off-peak options) and Proposal 2C (schemes which might only require a small quantum of infrastructure) are summarised below.

28. After analysis of the impact of freight train paths on the scope to improve offpeak services, the report concludes that it is possible to run a 2 trains per hour offpeak passenger service between Stratford and the Lee Valley, while protecting freight train slots in the daytime and evening. The strengthened passenger service will achieve 4 trains per hour at selected stations, jointly with the Hertford East services.

29. There are only limited options that will be worth researching as stop-gap infrastructure improvements ahead of some 4-tracking along the Lee Valley. Two options are discussed, for improved services south of Tottenham Hale, and services north of Tottenham Hale. They merit further study if 4-tracking is liable to incur delay. It is recognised that such infrastructure options are elements for a post-2012 franchise variation, not for the immediate years.

30. However, good stations are an essential adjuct to good train services. The report identifies a good case for improving the standard of facilities at stations within LB Enfield to a new norm for London suburban stations. Proposals include gating and secure station accreditation, and achieving European-compliant disabled access at busy stations including Edmonton Green.

Background position facing LB Enfield

31. JRC was commissioned by LB Enfield in March 2010 to research and report on potential improvements to the West Anglia lines services within Enfield. This followed a proposal submitted to LB Enfield on 13 January 2010.

32. The starting points are:

- A rail service along the Upper Lee Valley (ULV) corridor, with stations that with the exception of Tottenham Hale currently do not have the Transport for London (TfL) urban minimum of 4 trains per hour in each direction (4 tph).
- Spatial and economic changes along the ULV corridor over the coming years, primarily in LB Enfield with part in LB Haringey, which will regenerate the area's economy with high value business parks and new housing developments, and require better local rail services.
- Other economic and growth pressure points along the London Stansted Cambridge Peterborough growth area, such as Stratford and Harlow, which are causing greater rail travel along the full length of the Lee Valley main line – itself part of the West Anglia railway network and currently operated by National Express East Anglia (NXEA).
- A constrained 2-track railway infrastructure which forces service compromises between inner and outer commuter rail services and Stansted Express, and which has high levels of overcrowding and other unsatisfactory features.
- The parallel services on the suburban line via Seven Sisters and Edmonton Green partly achieve TfL's basic service frequencies but reduce in the off-peak to half-hourly on each route, to Enfield Town and to Cheshunt via Southbury.

33. There is a once-in-a-decade opportunity now, to influence the shape of rail services through the current consultation and specification process for the new Greater Anglia franchise, which follows the Government announcement on 13th November 2009 that NXEA's franchise would not be extended to 2014 but instead would terminate on 31st March 2011.

34. The new franchise is currently expected to last for at least ten years – it could be longer – and will include various step changes in capacity and service provision and other important features. For train timetables these are defined as contractual Service Level Commitments (SLCs).

35. Because the Department for Transport (DfT) has a public consultation closing on 19th April 2010 on the Greater Anglia franchise, JRC has provided an initial draft report by this closing date, to allow the Council to submit a preliminary commentary preceding detailed discussions. The full report will be complete shortly. It is possible that a new Government might place new or varied requirements on the proposed new Greater Anglia franchise, or franchising generally.

Commentary on Greater Anglia franchise process

36. This section reviews the key elements of the new Greater Anglia specification already identified by the DfT ahead of other input by stakeholders. The consultation document was issued by the DfT in January 2010.

37. The driving force for decision making on the railway specification is the Department for Transport's Greater Anglia franchise consultation. Failure to achieve significant change during this process does not preclude the possibility of other, later changes. The DfT notes that "standard industry processes would be used to progress them".

38. However the franchisee will be locked into contractual commitments and must address the logistics of achieving these on a busy railway line. The chance of other fundamental change is constrained, ahead of new inputs such as extra tracks along the Lee Valley.

39. In the text below, constraints and opportunities for Enfield (and other stakeholder) input and service changes are identified.

Existing West Anglia services

40. These are:

- West Anglia inners:
  Liverpool Street via Walthamstow to Chingford (peak and offpeak 4 tph)
  Liverpool Street via Edmonton to Enfield Town (peak 4 tph, offpeak 2 tph)
  Liverpool Street via Edmonton to Cheshunt (peak and offpeak 2 tph)
  Liverpool Street via Upper Lee Valley to Hertford East (peak and offpeak 2 tph).
- West Anglia outers:
  Liverpool Street to Cambridge (peak flow 4 tph, offpeak 2 tph)
  (some peak Cambridge trains start or finish at Kings Lynn)
  Stratford-Lee Valley-Stansted (peak 2 tph, offpeak 1 tph); NB: not all trains serve Stansted.
- Stansted Express:
  Liverpool Street-limited stop-Stansted Airport (4 tph all day).

41. The total services into Liverpool Street amount to: peak flow 20 tph, offpeak 16 tph:

- Inners: peak flow 12 tph, 10 tph offpeak (including Hertford East)
- Outers and Stansted: peak flow 8 tph, offpeak 6 tph.
  (DfT 's consultation counts Hertford East as outers in peaks, inners in offpeak.)

Context for new franchise services

42. The DfT advises that "while the introduction of additional rolling stock during the franchise [already-ordered Class 379, 30x4 car units] will facilitate the delivery of additional capacity, it should not affect the fundamentals of the timetable or Service Level Commitments".

43. It proposes that "the new franchise will operate a similar service pattern to that which applies in the December 2009-May 2010 timetable".

44. In summary, the Service Level Commitments (SLCs) are:

- SLC1 – the timetable existing in Spring 2011, which is required to give most attention to matching available capacity to the peak demand and improvements to passengers' experience where this is value for money – most change is expected on Great Eastern rather than West Anglia services, which will await the delivery of the new Class 379 fleet.
- SLC2 – new Class 379 fleet on Stansted Express and some Cambridge trains, with ex-Stansted 317s cascaded to Great Eastern and potentially other West Anglia services.
- SLC2A – a short term service during the 2012 Olympic Games, reverting to SLC2 afterwards, though additional trains may subsequently be able to serve Stratford using the legacy of the Olympics investment.
- SLC3 – between April 2013 and April 2016, part of the Great Eastern inner service will transfer to the new Crossrail operator. Detailed changes are not yet foreseen, but a new Crossrail fleet will be procured for (or by) the Crossrail operator, and in due course this will release inner suburban Class 315s for other use.
- The consultation document also mentions that "bidders, as always, will be encouraged to propose measures to deliver better performance, capacity or journey times". If the West Anglia Main Line upgrade proceeds, the DfT seeks "journey time and capacity improvements".

Further service opportunities in new franchise

45. The Greater Anglia franchise consultation document says "no other SLC changes are envisaged at this stage".

46. However this view needs to be considered against a franchise period which is proposed as a minimum of 10 years from 2011, and may turn out to be longer – the DfT is consulting separately on that policy. Hence service planning should look as far as 2021, and potentially beyond.

47. With Crossrail open in 2017/18, there can be an (unstated) SLC4, or equivalent franchise contractual variation, as new capacity will be released at Liverpool Street terminus in peak and offpeak times with removal of most Great Eastern inners. This capacity can benefit West Anglia inner and outer services and Great Eastern outers. At this point, the capacity- and frequency-constrained West Anglia network may be able to run additional peak time trains into Liverpool Street, if trains are available.

48. At present the likely source of trains would be Class 315s cascaded from the Great Eastern inners. It is also possible that a new high density high acceleration inner suburban fleet might be procured by then.

49. Until that date, the only additional hub interchange available from the Lee Valley is Stratford (platforms 11/12), which will be provided with additional reversing capability from the Lee Valley direction for the 2012 Olympic Games and suitable for at least 4 tph.

50. While the Department for Transport envisages in the consultation that the post-Olympics timetable will revert to SLC2, there is a clear opportunity for an improved Lee Valley-Stratford peak (and offpeak) service after the Olympic Games has ceased, and as Class 317 trains are released by new Class 379s. This presents an opportunity for new

Lee Valley inner or outer services in December 2012 – and represents an important chance for service improvements which assist the regeneration of the Upper Lee Valley.

Other emerging factors

51. Emerging factors and major schemes relevant for the West Anglia lines are listed in the consultation as:

- Introduction of 12-car trains on Stansted and Cambridge services.
- Enhanced overhead line traction power supply.
- London 2012 Olympic Games with specific investment at Stratford.
- Station upgrades including Access for All and National Stations Investment Programme.
- Upgrading stations and trains to meet 2020 compliance date for disabled access.
- Additional investment options.
- Freight traffic.
- DLR extension to Stratford International (increasing Stratford's connectivity).
- Increased Jubilee Line capacity (increasing Stratford's connectivity).
- Crossrail (increasing Stratford's and Liverpool Street's connectivity and taking over the bulk of Greater Eastern inner services - an additional benefit is that 2017/18 there will be peak track capacity released at Liverpool Street terminus).
- West Anglia Main Line upgrade, creating opportunities to enhance the West Anglia Main Line through journey time and capacity improvements (discussions at the West Anglia Routes Group meetings indicate that an initial phase of works could be achieved in Network Rail's Control Period 5, 2014-19).
- Chesterton station north of Cambridge, which would become a new railhead for the West Anglia line and other services.
- Stratford Regional Station enhancement (although not stated in the consultation, this will include increased train reversing capacity for the Lee Valley platforms 11 and 12 as part of the Olympic Games' investment).
- Hackney Interchange linking Hackney Downs on the West Anglia inners and Hackney Central on London Overground.

Input to the final franchise specification

52. The final specification for the new Greater Anglia franchise "will reflect emerging value for money and affordability requirements". Elsewhere in the consultation document, "respondents are also invited to suggest alternative options that would reduce the net cost to the taxpayers".

53. The consultation also seeks "any proposed increments or decrements that stakeholders would like to be included. If any emerge that satisfy the criteria contained in Section 10, these will be included as priced options within the ITT".

54. In Section 10, it is made clear that the only schemes currently included within the base specification for the franchise are those funded within the Government's 2007 High

Level Output Specification, and enhancements agreed between Network Rail and the Office of Rail Regulation (ORR) for investment Control Period 4 (2009-14).

55. The DfT notes that franchise bidders may be asked to submit proposals for a number of priced options, "usually promoted by local authorities", which might involve "additional services or in certain circumstances a reduction in the level of service proposed by the DfT". These increments or decrements "will be schemes that:

- stakeholders have requested be included and that the DfT believes demonstrate good value for money and can be funded by the partners concerned for the franchise period; and/or
- require infrastructure to facilitate the aspiration that has a good chance of being delivered within the franchise period".

"Any proposed increments or decrements must:

- comply with the objectives of the franchise;
- be operationally robust;
- demonstrate value for money; and
- be funded by stakeholders (for which the stakeholder will need to provide written guarantees".

"Respondents who wish to pursue increments or decrements should make these clear in their response to this consultation".

56. For other schemes outside this formal increment/decrement process, bidders will be encouraged to work with third-party promoters to develop the feasibility of projects, and "respondents to this consultation are encouraged to highlight other schemes that they believe have a case for inclusion within the franchise".

57. Transport for London (TfL) has specific entitlements within the franchise process because of its statutory role in the planning of public transport in London. The DfT will work with TfL and co-operate on increments and decrements specified by TfL.

Opportunities for improved services in LB Enfield

58. Taking into account the base specification set out above, the service opportunities are:

- Offpeak options (with use in marginal time of existing train fleets) for:
    - extra Liverpool Street-Edmonton-Enfield/Cheshunt trains (4 to 6 or 8 tph)
    - extra Liverpool Street-Lee Valley-Hertford East trains (2 to 4 tph)
    - revised offpeak Stratford-Lee Valley-(Stansted) service (2 or 4 tph)
    - not all these offpeak options will be compatible with each other:
      ►increasing offpeak West Anglia services to 20 tph or above into Liverpool Street would pose capacity pressures on the Main Line approaches into Liverpool Street (affecting timetabling on the Great Eastern route)
      ►extra Liverpool Street-Hertford East offpeak trains would require the same slots as a Stratford-Lee Valley offpeak service, because of pathing limits set by the timing of fast Stansted and Cambridge services.

- No peak time additional services into Liverpool Street until 2017/18 post-Crossrail.
- Peak time additional services are only feasible to/from Stratford after investment in extra terminating facilities for 2012 Olympic Games (2 or 4 tph) creates a legacy opportunity. This can be achieved by respecifying the current Stratford-Lee Valley service. The cascading of Class 317s from Stansted Express may assist options.

Additional factors to anticipate

Infrastructure work

59. The 2012 Olympic and Paralympic Games will limit new works before and during the Games. There will be a work-free standstill period from at least May to September 2012.

60. If significant works were required on the Lee Valley lines to support the introduction of an improved local service, then construction is unlikely to begin before September 2012, leading to possible introduction of new services in 2013 or 2014 rather than 2012.

61. This assumes that powers were acquired in the 2011 to mid-2012 period, after the franchise contract had been signed, and probably under TWA powers modified by the 2008 Planning Act.

62. It is also possible that infrastructure work might be required to coincide with the first phase of the West Anglia Main Line upgrade, which is not foreseen until the 2014-19 period, with planning and powers achieved by 2014.

63. It is therefore desirable to include at least one local Lee Valley service option that is not contingent on further infrastructure work, if better services are desired before 2016.

Train cascading and availability

64. DfT had previously foreseen in 2007/08 an orderly sequence of train replacement and cascading between franchises, leading to the oldest train fleets (over 30-35 years old) being scrapped.

65. The delays in ordering new Thameslink trains, and recent electrification approvals in the North West and for the Great Western main line, now mean that train ordering becomes an urgent policy matter for the new Government, while scrapping of trains is less important than their life-extension for further service.

66. The Greater Anglia lines are fortunate that a new fleet is already on order (Class 379) with proposals in the consultation document for two points at which part-fleets will be available for cascading and life-extension.

67. Class 317s are released in 2012 for train lengthening and for use on other services, after the delivery of the 30x4 car Class 379 trains in 2011/12.

68. Retention rather than scrapping of Class 315 units displaced from the Great Eastern inner services by new Crossrail trains in 2016 onwards, would enable new or improved services to be operated on the West Anglia routes until an entirely new inner train fleet was ordered.

69. By 2020, all vehicles have to meet the European train accessibility regulations. By this date, the franchisee will need to have determined how existing trains will need to be modified (Class 315s do not include toilets which simplifies modification), or have been replaced by new fleets.

70. A combination of Lee Valley service options, linked to train and infrastructure availability, is therefore specified below by JRC for review in the rest of this report.

71. **Proposals 1A / 1B / 1C**: Increased off-peak services on the Liverpool Street-Edmonton-Enfield and Cheshunt lines (for simplicity, these are called the 'Edmonton Line' services):

- **Proposal 1A**: Liverpool Street-Enfield Town services to be 4 tph throughout the day, not reduce to 2 tph offpeak. This mirrors the 4 tph all-day Chingford service, and improves offpeak frequency at stations between Liverpool Street and Edmonton Green from 4 to 6 tph, which meets TfL's desire for higher than minimum frequencies at inner London 'metro-standard' stations. The Cheshunt service would remain at 2 tph.
- Note that the combined service might offer a regular 15 minute service to Enfield Town and a 'push-in' half hourly service to Cheshunt, giving uneven 7-15 minute interval service south of Edmonton (Proposal '1A1'). Alternatively there could be a regular 10 minute interval service south of Edmonton, with 10-20 minute intervals to Enfield Town and 30 minute intervals to Cheshunt (Proposal '1A2').
- **Proposal 1B**: Both lines to operate at 3 tph, with a 10 minute combined frequency south of Edmonton and a 20 minute service to Enfield Town and to Cheshunt.
- **Proposal 1C**: Both lines to operate at 4 tph, 15 minute intervals, with a 7-8 minute service south of Edmonton.
- As the offpeak services are self-contained subject to pathing and platform usage between Liverpool Street and Hackney Downs, these services could be introduced

from May or December 2011. Alternatively they could be scheduled as part of the larger West Anglia changes in December 2012 when the timetable is overhauled as SLC2 for the Class 379 on outer services and cascading of Class 317s.

72. **Proposal 2A / 2B / 2C**: Altered services on the Stratford-Lee Valley line, with interchanges at Tottenham Hale and Broxbourne for other destinations (eg Stansted):

- **Proposal 2A**: Stratford-Lee Valley-Broxbourne trains to be respecified, either as a further service layer or within the current 2 tph limit, with the priority catchment being the Upper Lee Valley.
- Trains would be timetabled in partnership with the Liverpool Street-Hertford East trains to give 4 tph at main Lee Valley stations. A desired start date is December 2012 with the SLC2 timetable.
- Proposal 2A is intended to minimise demand on available peak train resources, avoid new infrastructure requirements, and minimise the operational impact at busy locations such as Coppermill Junction (south of Tottenham Hale) and Broxbourne. Peak trains may be in tight supply even after the arrival of Class 379, as Class 317 units will also be cascaded elsewhere on the Greater Anglia network.
- **Proposal 2B**: Review of offpeak options, to be followed through once practical peak services have been defined.
- **Proposal 2C**: Outline scoping work on possible high value low cost infrastructure schemes along the Lee Valley, to allow affordable development of service frequency.
- Stratford-Lee Valley trains to be 4 tph subject to pathing and infrastructure availability. If infrastructure work was required to accommodate this frequency, construction might need to be planned as post-2012 work, or within a first phase of additional West Anglia Main Line upgrading, and so might not be operable earlier than 2013/14 or 2016.
- This would require additional peak trains. It could be aligned to the availability, around 2016, of Class 315s released by the initial delivery of new Crossrail trains to the Great Eastern inners.

Offpeak services on the Edmonton Line

Present offpeak services in 2009/10

73. The present daytime offpeak timetable on the Edmonton Green lines is timetabled on a self-contained basis, separate from the rest of the West Anglia and Greater Anglia network except on the Liverpool Street-Hackney Downs section.

74. The basic train service includes long terminus layovers at Enfield Town, for a standardised interval service.

75. The current *public* timetable is set out below (Monday-Friday daytime offpeak is used as the exemplar), with the exception of the arrival time at termini (shown two minutes earlier which is the *working* timetable standard), and timings are also suggested for Bury Street Jcn as there might be conflicts in other proposals between a train heading to Cheshunt and a train heading from Enfield Town at this flat junction. Trains call at all intermediate stations in the offpeak, in-between the timing points shown below:

EDMONTON LINE current offpeak timings 2009-10									
Train #		1	2	3	4	5	6	1	etc
Liverpool Street	Dep	10:15	10:30	10:45	11:00	11:15	11:30	11:45	
Hackney Downs	Dep	10:24	10:39	10:54	11:09	11:24	11:39	11:54	
Seven Sisters	Dep	10:32	10:47	11:02	11:17	11:32	11:47	12:02	
Edmonton Green	Dep	10:40	10:55	11:10	11:25	11:40	11:55	12:10	
Bury Street Jcn	pass	10:41:30	10:56:30	11:11:30	11:26:30	11:41:30	11:56:30	12:11:30	
Enfield Town	Arr	|	11:01	|	11:31	|	12:01	|	
Cheshunt	Arr	10:52		11:22		11:52		12:22	
Cheshunt	Dep	11:01		11:31		12:01		12:31	
Enfield Town	Dep	|	11:22	|	11:52	|	12:22	|	
Bury Street Jcn	pass	11:12	11:27	11:42	11:57	12:12	12:27	12:42	
Edmonton Green	Dep	11:13	11:28	11:43	11:58	12:13	12:28	12:43	
Seven Sisters	Dep	11:21	11:36	11:51	12:06	12:21	12:36	12:51	
Hackney Downs	Dep	11:29	11:44	11:59	12:14	12:29	12:44	12:59	
Liverpool Street	Arr	11:38	11:53	12:08	12:23	12:38	12:53	13:08	
Timings in red are working times not public times									

76. It can be seen that:

- 6 trains are needed for the entire off-peak service.
- A train on each route passes an equivalent service in the opposite direction at Bury Street Jcn so there are no operational conflicts outside the Liverpool Street-Hackney Downs area.
- The Edmonton route formerly had a through service to Hertford East via Cheshunt. Connections via Cheshunt are poor offpeak northbound (17 mins for Hertford trains, 26 mins for Cambridge), good southbound from Cambridge (10-11 mins) and risky from Hertford (3 minutes to make an over-the-bridge transfer providing trains are on time).
- When working normally, the service only needs to use one platform at Liverpool Street.
- There is a long terminal wait at Enfield Town, in order to balance the return working to Liverpool Street with the rest of the service.

77. The working times are about 1-2 minutes longer end-to-end than in a 1989-90 working timetable for the same railway. However in-train timing observations on 1st and 6th April in the off-peak gave actual running times that are very similar to the current working times.[1]

78. Extra passenger traffic encouraged by a better service and by features such as extension of Oyster Pay As You Go will be capable of accommodation on the proposed additional trains.

79. It is therefore intended to retain the existing working times in the Proposals below.

Proposal 1A: Enfield Town increases from 2 to 4 tph, Cheshunt remains 2 tph

80. There are two timetable options:

a. regular interval 15 minutes Enfield Town service, and supplementary 30 minute Cheshunt trains (Proposal '1A1')

b. regular 10 minute interval service south of Edmonton Green, with 10-20 minute intervals to Enfield Town and 30 minute intervals to Cheshunt (Proposal '1A2').

81. Notional timetables for each option are set out below. They include required termini recovery and layover time, including allowance for train crew to walk to the other end of the train, with 4-car trains:

EDMONTON LINE Proposal 1A offpeak, Enfield Town every 15 mins											
Train #		1	2	3	4	5	6	7	8	1	etc
Liverpool Street	Dep	10:15	10:20	10:30	10:45	10:50	11:00	11:15	11:20	11:30	
Hackney Downs	Dep	10:24	10:29	10:39	10:54	10:59	11:09	11:24	11:29	11:39	
Seven Sisters	Dep	10:32	10:37	10:47	11:02	11:07	11:17	11:32	11:37	11:47	
Edmonton Green	Dep	10:40	10:45	10:55	11:10	11:15	11:25	11:40	11:45	11:55	
Bury Street Jcn	pass	10:41:30	10:46:30	10:56:30	11:11:30	11:16:30	11:26:30	11:41:30	11:46:30	11:56:30	
Enfield Town	Arr	10:46	|	11:01	11:16	|	11:31	11:46	|	12:01	
Cheshunt	Arr		10:57			11:27			11:57		
Cheshunt	Dep			11:06			11:36			12:06	
Enfield Town	Dep	10:52	11:07	|	11:22	11:37	|	11:52	12:07	|	
Bury Street Jcn	pass	10:57	11:12	11:17	11:27	11:42	11:47	11:57	12:12	12:17	
Edmonton Green	Dep	10:58	11:13	11:18	11:28	11:43	11:48	11:58	12:13	12:18	
Seven Sisters	Dep	11:06	11:21	11:26	11:36	11:51	11:56	12:06	12:21	12:26	
Hackney Downs	Dep	11:14	11:29	11:34	11:44	11:59	12:04	12:14	12:29	12:34	
Liverpool Street	Arr	11:23	11:38	11:43	11:53	12:08	12:13	12:23	12:38	12:43	
Timings in red are working times not public times											

82. The '1A1' option of every 15 minutes to Enfield Town has the following outcomes:

- Efficient scheduling to achieve the specified service with only an additional 2 trains – 33% more, with marginal extra use of the peak-time train fleet.
- This achieves a 50% increase in service (6 rather than 4 trains per hour) south of Edmonton Green, and a doubling of offpeak service on the Enfield Town line.

[1] On 6th April the 13:30 from Liverpool Street to Enfield Town left at 13:29:50 and arrived at 14:00:45 (due 14:01 working timetable). The 14:22 from Enfield Town left at 14:22:15 and arrived at Liverpool Street at 14:53:10 (due 14:53 working timetable). On 1st April a diverted (and scheduled semi-fast) Lee Valley to Liverpool Street train via Cheshunt was on time until delayed 3½ mins between Hackney Downs at Liverpool Street by a late train in front. Its return working had time to spare on arrival at Cheshunt.

- There are parallel train moves at Bury Street Jcn, so there are no new conflicts.
- Actual timing of the Liverpool Street-Cheshunt service is not halfway between the Enfield Town trains (at 7½ minutes difference), but has a 5-10 minute gap which is caused by the need to avoid conflict at Liverpool Street with Enfield Town and Cheshunt trains otherwise arriving and departing at similar times.
- The nominal 'past the hour' times between Liverpool Street and Hackney Downs just replicate the 2009/10 timetable, and might need to be adjusted around the clock to fit with other movements on the West Anglia lines.
- The proposed times at Cheshunt give good connections with the current 2009/10 Hertford East service on the Lee Valley line (12 mins NB, 8 mins SB). As now, there are weak connections with the Cambridge Line (21 mins NB, 15-16 mins SB).
- A second platform is required at Liverpool Street for use by the Cheshunt service. As it only uses that platform and approaches for about 13 minutes in each half-hour, it should be possible offpeak to schedule the Cheshunt train to share a platform used by another half-hourly service which can use the alternate quarter hourly slots.

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83. The alternative option for Proposal '1A2' is for the revised service to be scheduled on a regular interval basis south of Edmonton Green, every 10 minutes, with 10-20 intervals north of Edmonton to Enfield Town, and every 30 minutes to Cheshunt as now.

EDMONTON LINE Proposal 1A offpeak, south of Edmonton Green every 10 minutes											
Train #		1	2	3	4	5	6	7	8	1	etc
Liverpool Street	Dep	10:15	10:25	10:35	10:45	10:55	11:05	11:15	11:25	11:35	
Hackney Downs	Dep	10:24	10:34	10:44	10:54	11:04	11:14	11:24	11:34	11:44	
Seven Sisters	Dep	10:32	10:42	10:52	11:02	11:12	11:22	11:32	11:42	11:52	
Edmonton Green	Dep	10:40	10:50	11:00	11:10	11:20	11:30	11:40	11:50	12:00	
Bury Street Jcn	pass	10:41:30	10:51:30	11:01:30	11:11:30	11:21:30	11:31:30	11:41:30	11:51:30	12:01:30	
Enfield Town	Arr	10:46	|	11:06	11:16	|	11:36	11:46	|	12:06	
Cheshunt	Arr		11:02			11:32			12:02		
				retiming avoids conflict between Enfield and Cheshunt trains							
Cheshunt	Dep		11:11			11:41			12:11		
Enfield Town	Dep	10:57	|	11:14	11:27	|	11:44	11:57	|	12:17	
Bury Street Jcn	pass	11:02	11:12	11:19	11:32	11:42	11:49	12:02	12:12	12:19	
Edmonton Green	Dep	11:03	11:13	11:23	11:33	11:43	11:53	12:03	12:13	12:23	
Seven Sisters	Dep	11:11	11:21	11:31	11:41	11:51	12:01	12:11	12:21	12:31	
Hackney Downs	Dep	11:19	11:29	11:39	11:49	11:59	12:09	12:19	12:29	12:39	
Liverpool Street	Arr	11:28	11:38	11:48	11:58	12:08	12:18	12:28	12:38	12:48	
Timings in red are working times not public times						———	**= timed 3 min wait at Edmonton Green**				

84. This option has the following outcomes:

- Efficient scheduling, as identified above, with only 8 trains (rather than 6) to achieve a 50-100% increase in offpeak service levels at most stations.
- Management of 2 conflicting moves every hour at Bury Street Jcn, by retiming of half-hourly Enfield Town (and Bush Hill Park intermediate station) departures, to make the departures closer to quarter-hourly from Enfield Town. This meets the Network Rail 'Rules of the Plan' standard of 2½ minutes margin for fouling moves. Some train arrivals at Enfield Town might also need to be delayed by ½-1 minute to avoid conflict with the retimed departures, depending on platforming arrangements.

- Consistent 10 minute headway south of Edmonton Green, which maximises service attractiveness at all intermediate stations and evens out passenger flows between trains.
- Good connections at Cheshunt with Hertford East services (7 mins NB, 13 mins SB), weaker connections with Cambridge Line (16 mins NB, 20-21 mins SB)
- Capability to use only one platform at Liverpool Street terminus, reducing conflicting moves there.
- A risk that a 10 minute headway would require retiming of some Chingford or Lee Valley routes on the Hackney Downs or Bethnal Green to Liverpool Street section, because these are running on 15 or 30 minute headways. Alternatively there would need to be some additional offpeak use of the '*Main Lines'* approach to Liverpool Street platforms from the Hackney Downs '*Fast Lines'*.
- Efficient use of timing slots along the Lee Valley line require 2 successive departures/arrivals every quarter hour at a 2 or 3 minute headway, widened to 3 minutes by Hackney Downs for pathing and to maximise the use of the available headway along the Lee Valley. This is difficult just using the Bethnal Green '*Suburban Lines'* approach to Liverpool Street, if there are 10 minute interval services in place.

Proposal 1B: Enfield Town and Cheshunt increase to 3 tph

85. This is similar to Proposal 1A (10 minute headway south of Edmonton Green), with trains heading alternately to/from each outer destination.

86. A notional timetable is set out below. It includes required termini recovery and layover time, including allowance for train crew to walk to the other end of the train:

EDMONTON LINE Proposal 1B offpeak, Enfield Town and Cheshunt both at 3 tph												
Train #		1	2	3	4	5	6	7	8	9	1	etc
Liverpool Street	Dep	10:15	10:25	10:35	10:45	10:55	11:05	11:15	11:25	11:35	11:45	
Hackney Downs	Dep	10:24	10:34	10:44	10:54	11:04	11:14	11:24	11:34	11:44	11:54	
Seven Sisters	Dep	10:32	10:42	10:52	11:02	11:12	11:22	11:32	11:42	11:52	12:02	
Edmonton Green	Dep	10:40	10:50	11:00	11:10	11:20	11:30	11:40	11:50	12:00	12:10	
Bury Street Jcn	pass	10:41:30	10:51:30	11:01:30	11:11:30	11:21:30	11:31:30	11:41:30	11:51:30	12:01:30	12:11:30	
Enfield Town	Arr	10:46	|	11:06	|	11:26	|	11:46	|	12:06	|	
Cheshunt	Arr		11:02		11:22		11:42		12:02		12:22	
Cheshunt	Dep		11:11		11:31		11:51		12:11		12:31	
Enfield Town	Dep	11:07	|	11:27	|	11:47	|	12:07	|	12:27	|	
Bury Street Jcn	pass	11:12	11:22	11:32	11:42	11:52	12:02	12:12	12:22	12:32	12:42	
Edmonton Green	Dep	11:13	11:23	11:33	11:43	11:53	12:03	12:13	12:23	12:33	12:43	
Seven Sisters	Dep	11:21	11:31	11:41	11:51	12:01	12:11	12:21	12:31	12:41	12:51	
Hackney Downs	Dep	11:29	11:39	11:49	11:59	12:09	12:19	12:29	12:39	12:49	12:59	
Liverpool Street	Arr	11:38	11:48	11:58	12:08	12:18	12:28	12:38	12:48	12:58	13:08	
Timings in red are working times not public times												

87. Because the timings to Enfield Town and Cheshunt (and return) need to be equalised to balance the return train workings, Enfield Town sees long terminal waits, two platforms need to be used, and 9 rather than 8 trains are required. The benefit is that there is a better service to both northern routes than the present half-hourly frequency.

88. All train moves at Bury Street Jcn are parallel, so there are no new conflicts.

89. There is a consistent 10 minute headway south of Edmonton Green, with the benefits described previously.

90. There are variable connections at Cheshunt, as 20 and 30 minute services meet: Cambridge service connections are 6 mins, 16 mins and 26 mins NB, 11 and 20 mins SB; Hertford service connections are 7 mins, 17 mins and 29 mins NB, 3 and 13 mins SB.

91. Capability to use only one platform at Liverpool Street terminus, reducing conflicting moves there.

92. The same issues arise as before at Liverpool Street, with 10 minute headways likely to require some retiming or re-platforming of Lee Valley services in the offpeak.

Proposal 1C: Enfield Town and Cheshunt increase to 4 tph

93. Frequency is doubled, with services at a nominal 7-8 minute headway between Liverpool Street and Edmonton Green, and every 15 minutes on the routes to Enfield Town and Cheshunt. It would be a 'walk-on' service throughout Enfield, Haringey, Hackney and Tower Hamlets.

94. A notional timetable is set out below. It includes required termini recovery and layover time, including allowance for train crew to walk to the other end of the train:

EDMONTON LINE Proposal 1C offpeak, Enfield Town and Cheshunt both at 4 tph														
Train #		1	2	3	4	5	6	7	8	9	10	11	12	etc
Liverpool Street	Dep	10:15	10:21	10:30	10:36	10:45	10:51	11:00	11:06	11:15	11:21	11:30	11:36	
Hackney Downs	Dep	10:24	10:30	10:39	10:45	10:54	11:00	11:09	11:15	11:24	11:30	11:39	11:45	
Seven Sisters	Dep	10:32	10:38	10:47	10:53	11:02	11:08	11:17	11:23	11:32	11:38	11:47	11:53	
Edmonton Green	Dep	10:40	10:46	10:55	11:01	11:10	11:16	11:25	11:31	11:40	11:46	11:55	12:01	
Bury Street Jcn	pass	10:41:30	10:47:30	10:56:30	11:02:30	11:11:30	11:17:30	11:26:30	11:32:30	11:41:30	11:47:30	11:56:30	12:02:30	
Enfield Town	Arr	10:46	|	11:01	|	11:16	|	11:31	|	11:46	|	12:01	|	
Cheshunt	Arr		10:58		11:13		11:28		11:43		11:58		12:13	
Cheshunt	Dep		11:06		11:21		11:36		11:51		12:06		12:21	
Enfield Town	Dep	11:03	|	11:18	|	11:33	|	11:48	|	12:03	|	12:18	|	
Bury Street Jcn	pass	11:08	11:17	11:23	11:32	11:38	11:47	11:53	12:02	12:08	12:17	12:23	12:32	
Edmonton Green	Dep	11:09	11:18	11:24	11:33	11:39	11:48	11:54	12:03	12:09	12:18	12:24	12:33	
Seven Sisters	Dep	11:17	11:26	11:32	11:41	11:47	11:56	12:02	12:11	12:17	12:26	12:32	12:41	
Hackney Downs	Dep	11:25	11:34	11:40	11:49	11:55	12:04	12:10	12:19	12:25	12:34	12:40	12:49	
Liverpool Street	Arr	11:34	11:43	11:49	11:58	12:04	12:13	12:19	12:28	12:34	12:43	12:49	12:58	
Timings in red are working times not public times														

95. Because the timings to Enfield Town and Cheshunt (and return) need to be equalised to balance the return train workings, Enfield Town sees long terminal waits, two platforms need to be used, and 12 trains are required for the service.

96. The benefit is that there is a much better service to both northern routes than the present half-hourly frequency, and a greatly improved frequency south of Edmonton Green.

97. All train moves at Bury Street Jcn are parallel, so there are no new conflicts.

98. Connections at Cheshunt with Lee Valley trains are as good as can be achieved, with 15 minute frequency trains on the Edmonton Line.

99. The interval between trains south of Edmonton Green is set at 6-9 minutes rather than a nominal 7½ minutes, so that Lee Valley and Chingford trains at 15 and 30 minute headways are more easily accommodated with pathing and platforming between Hackney Downs, Bethnal Green and Liverpool Street.

100. Even so, the available slots may be insufficient without some use of the '*Main Lines*' approach to Liverpool Street from Bethnal Green.

101. This is a challenging timetable to operate with the present track infrastructure, and gives little 'white space' for recovery in the offpeak from any peak period dislocation. It requires a more frequent offpeak service than is currently run in the peaks (although the peak service is constrained by available slots). It would be easier to operate once some Great Eastern inners have been reallocated to Crossrail in 2017/18 and there is more capacity on the Liverpool Street approach tracks.

Assessment of resource cost and benefit of Proposals 1A-1C

102. A high level assessment of the public worth of proposals for improving the Edmonton Line offpeak services is set out below.

103. It uses the following basis:

- Assumptions on current off-peak usage of the Edmonton Line services, using the ORR station data for 2008/09 and previous years.
- Valuation of waiting time savings for current Edmonton Line offpeak users.
- Valuation of marginal operating costs for the specified Edmonton Line offpeak services.
- The net benefit of costs vs waiting time savings.
- No assumption of increased passenger usage, including some diversion from bus and car modes, though this would occur. (In that situation, any net reduction in bus revenue would be need to be offset against any increase in rail revenue.)
- No estimate of wider community, environment, transport and regeneration benefits that would be normal in a NATA appraisal (because no increased usage or diversion of travel from other modes is forecast).

104. Overall this is a cautious basis for estimating public benefits, and relies just on the public worth of the offpeak journey time savings, which will be an underestimate of the total benefits and revenue returns.

105. An improved offpeak service will also support the Mayor's Transport Strategy objectives, which are:

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

106. TfL's report *Travel In London*, published in 2010, describes numerous factors which influence travel demand in the London Region. Relevant points set out in that report are noted here:

- With number of trips per head of population largely constant, there are two main sources for changes in demand: population growth (linked to economic changes) and change in use of different modes of travel.
- Public transport use has grown from 30% of all journey stages in 1993 to 41% in 2008.

- Rail trips in London have grown by 0.9m between 1993 and 2008, to 2.2m (a compound growth rate of over 3.5% per annum
- Rail journey stages in London have grown at a similar rate.

107. To continue to achieve a change in modal use, and to enable public transport to support the projected divergence between work and home locations foreseen in TfL's *Transport 2025* and simultaneously support strategies such as Enfield's new place shaping plan, there will need to be significant improvements to the rail offer locally as part of a wider public transport strategy.

Assessment of Edmonton Line offpeak use

108. A general rule of thumb for usage of National Rail services in London is that 60-65% of all rail travel is undertaken during the peak periods. This is a higher percentage than travel on tubes and buses:

- Main line services are perceived as offering fewer hours of operation and lower offpeak frequencies than high frequency urban transit services.
- There are fewer direct services to some major destinations, eg the West End.

109. The analysis below seeks to define a more precise estimate for the Edmonton Line services, by assessing the proportion of passengers NOT travelling in the period before 10am and between 16:30 and 19:30 in the evening. This is achieved by estimating the peak volumes, about which there is some public data, and deducting these from yearly usage.

110. Train operators' passenger counts at London termini for Autumn 2006 were released by DfT under FoI rules on 12th August 2008. They include National Express East Anglia: http://webarchive.nationalarchives.gov.uk/+/http://www.dft.gov.uk/foi/responses/2008/aug/foipassengercounts/
In a FoI response dated 20 May 2009, the DfT refused similar information to the applicant for Autumn 2007. Therefore Autumn 2006 is the latest detailed (train by train) information that is available.

111. To summarise this data, peak flow trains as timed at Liverpool Street (arrive 0700-0959 AM, depart 16:30-19:29 PM), carried an estimated 158,168 passengers in a typical day. These are NOT all flows at Liverpool Street, but at the maximum loading point on each train. On the Edmonton Line, this was Seven Sisters in most cases, while Tottenham Hale, Walthamstow and Stratford were the main interchange stations on other lines. Data for Liverpool Street itself was also provided. The passenger flow through Liverpool Street for those trains was less, 125,703, which highlights the importance of the other interchanges. The relevant flows for Edmonton Line trains were 12,516 at the maximum loading point , and 9,732 through Liverpool Street terminus, respectively 7.91% and 7.74% of the total peak flows.

112. This is not the whole story. The data needs to be converted to yearly volumes, to be compatible with the ORR data, and in doing so also needs to take account of:

- Pre 7AM travel which is ignored in most surveys although the peak 'shoulders' are increasingly important as some passengers avoid excessively crowded 'high peak' trains.

- Passengers via Liverpool Street who boarded or alighted at intermediate stations between Liverpool Street and Seven Sisters (inclusive).
- Contra-peak flows during the same travel period.
- Passengers on other trains, who started their journey in the suburbs before 9:30.
- Intermediate station to station users not identified at Seven Sisters or Liverpool Street.

113. A yearly estimate is derived from:

- Grossing x 5 for a week and x 46 working weeks a year (allowing 4 weeks' holiday, 2 weeks for statutory holidays and a small element of illness or other non-availability).
- Based on the individual train flows for Autumn 2006, a pre-7AM estimate for with-flow travel as measured at Seven Sisters is about 600 additional passengers in total on 4 trains. This is based on the first 4 post-7AM arrivals at Liverpool Street from the Edmonton Line (07:00-07:33), which carried 682 passengers at the maximum loading point, and 529 passengers into Liverpool Street.
- The ORR count in 2006/07 for Liverpool Street was 55.26m passengers, which, if Edmonton Line maintained its proportion of 7.74% of total usage, meant 4.28m passengers on that route travelled via Liverpool Street. (This excludes other trains between Liverpool Street and Bethnal Green, Hackney Downs, and Cheshunt.)
- The yearly passenger numbers at intermediate stations between Bethnal Green and Stamford Hill (inclusive) were, in 2006/07, estimated by ORR as 1.76m. This is the ORR figure reduced by 50% at Bethnal Green and 60% at Hackney Downs as other trains also serve those stations. Seven Sisters station had 2.59m passengers (including the Victoria Line interchange flows), while northwards, stations between Bruce Grove, Enfield Town and Theobalds Grove (inclusive) and local Cheshunt travel generated around 6.6m. It is assumed that Liverpool Street-Cheshunt passengers would travel on faster trains via Tottenham Hale though there will be some local travel to and beyond Cheshunt via Edmonton. An estimate of 20-30% of Liverpool Street passengers using stations before or at Seven Sisters is credible. To be cautious 30% has been adopted. (This will reduce the offpeak estimates.)
- A contra-peak flow rate of 15% is adopted for London suburban journeys. In practice this is a higher proportion of seated train capacity (20%) for contra-flow travel as the with-flow numbers include up to 35% standing.
- There are no trains which would have been barred for offpeak users before 9:30 which did not arrive at Liverpool Street by 10AM. The (current 2009/10 timings) 09:29 train from Enfield Town is the first offpeak train and is due in Liverpool Street at 10:03.
- It is not clear what additional proportion of travel to allow for local with-flow station-to-station peak journeys excluded from counts at Liverpool Street and Seven Sisters. Such flows can be low on National Rail services – the bulk of travel is to and from Central London and other major hubs. West Anglia services also experiences significant levels of ticketless travel which means journeys are not recorded in ORR data. For discussion, a further 15% of with-flow travel is adopted as a yardstick, and a sensitivity analysis adopted with 10% and 20% also used as comparators.

114. Applying these grossing factors allows an estimate for the Edmonton Line total yearly peak travel:

- Based on maximum peak loadings and pre-7AM travel, there is a 2006 yearly volume of 3.02m passengers in the peak flow direction, plus a further 0.91m between Liverpool Street and Seven Sisters. This is a total of 3.93m journeys before contra-peak and local travel is included.
- Contra-peak and local travel is estimated at a further 1.26m journeys, but might be as high as 1.5m or as low as 1m.

115. 5.19m peak journeys is the cumulative central estimate of 2006/07 peak travel in one year on the Edmonton Line. This contrasts with an full year estimate of 7.61m journeys, derived from ORR data proportioned by the Edmonton Line share of all Liverpool Street travel, and a share of total usage at Bethnal Green, Hackney Downs and Cheshunt stations (identified above). Peak travel represents 68.1% of all Edmonton Line travel, and implies that offpeak usage is 31.9% in 2006/07, about 2.43m journeys.

116. This is higher than the 60-65% taken as a National Rail norm. It is plausible because the suburban tube interchanges siphon a proportion of offpeak travel to the West End, distant from the Central London terminus, leaving some of that travel as a short haul National Rail flow to the suburban hub.

117. Updating to 2008/09 levels has been achieved by modifying the estimate of offpeak journeys to reflect:

- A cumulative 3.5% pa growth, following the trend of underlying change in population levels in the period 1993-2008 (see TfL *Travel in London* report), and recognising that most recent changes in travel have been driven by population growth rather than any increase in journeys made per head of population or economic factors.
- An additional (cautious) increase of 15% at inner stations which in January 2008 saw the introduction of Oyster Pay-as-you-go (PAYG) on the Seven Sisters-Liverpool Street section. Observations by LB Hackney showed very considerable increases in usage, 50-100% in some cases, but these were not reflected in ORR 2008/09 data because this excluded TfL PAYG information – indeed a number of affected inner stations showed an apparent (but untrue) *reduction* in yearly usage [2]. The proposed increase is kept low to be cautious about offpeak estimates, and about any unfavourable comparisons between the quality and volume of Edmonton Line National Rail services and other public transport modes.

118. A generalised estimate of Edmonton Line offpeak travel for 2008/09 is therefore 2.84m journeys.

Valuation of improved waiting time

119. *Nash et al* in their revision of travel time values for the Department for Transport in 2003, concluded that non-work time values are in the range 5.8-6.2p per minute, rather than higher values used previously. This was expressed in 1997 prices. They noted that

[2] ORR will include Oyster PAYG from TfL's *Moira* analysis in a later statistical update from 2010

waiting time valuation was more accurate with a weighting of 2½ x elapsed time, rather than the previous 2 x factor.

120. Applying these factors, and uprating an average 6p per minute (£3.60 per hour) to 2008/09 values, gives approximately 8p per minute (£4.80 per hour), before weighting 2½ x £4.80 to £12 per hour for waiting time.

121. Estimates of waiting time savings have been calculated by:

- Redistributing the offpeak passenger volumes in 2008/09 on a pro-rata basis to the individual Edmonton Line stations.
- Taking the net reduction in waiting time for each train service proposal, for a standard offpeak hour, weighted by train service frequency and pro-rata passenger volume at individual stations.
- The reduction in waiting time allows for a proportion of journeys to the northern branches (Enfield Town and Cheshunt), where a lower service frequency will be available than on the trunk section between Edmonton Green and Liverpool Street.
- Grossing the yearly saving in waiting time for each proposal.
- Valuing these yearly time savings.

122. The tables below highlight the main baseline calculations for estimated offpeak waiting time savings for the Edmonton Line, and by station:

	Estimated offpeak station usage 2008/09				2,836,279
Edmonton Line Station	**ORR 2006/07 users, proportioned for other trains**	**Reduced by 50% to avoid entry/ exit double counting**	**Offpeak 31.9%, +3.5% growth pa to 2008/09**	**15% PAYG generated at local stns**	**Total offpeak users 2008/09**
Liverpool Street	4,277,569	2,138,784	730,549	# in local stn	730,549
Bethnal Green	244,419	122,210	41,743	23,391	65,134
Cambridge Heath	114,369	57,185	19,533	10,945	30,478
London Fields	111,710	55,855	19,079	10,691	29,769
Hackney Downs	430,650	215,325	73,549	41,213	114,762
Rectory Road	278,779	139,390	47,612	26,679	74,291
Stoke Newington	314,821	157,411	53,767	30,128	83,895
Stamford Hill	265,335	132,668	45,316	25,393	70,708
Seven Sisters	2,586,248	1,293,124	441,695	66,990	508,685
Bruce Grove	296,050	148,025	50,561		50,561
White Hart Lane	572,406	286,203	97,759	incl 2x for return	97,759
Silver Street	471,408	235,704	80,510	jny, not counted	80,510
Edmonton Green	1,888,213	944,107	322,480	at Liverpool St:	322,480
Bush Hill Park	723,256	361,628	123,522	PAYG generation	123,522
Enfield Town	1,390,643	695,322	237,502	depends most	237,502
Southbury	317,098	158,549	54,156	on local stns	54,156
Turkey Street	442,769	221,385	75,619		75,619
Theobalds Grove	232,952	116,476	39,785	Seven Sisters	39,785
Cheshunt	270,000	135,000	46,112	excl U/D i'change	46,112

123. If users arrive randomly in relation to the timetable offered, basic offpeak waiting times per train service option are:

- Current service:
  Liverpool St-Edmonton Green 7 mins, Enfield Town 14.5 mins, Cheshunt 14.5 mins.
- Proposal '1A1': Enfield Town regular 15 min intervals:
  Liverpool St-Edmonton Green 5.33 mins, Enfield Town 7 mins, Cheshunt 14.5 mins.
- Proposal '1A2': 10 mins south of Edmonton Green, Enfield 4 tph, Cheshunt 2 tph
  Liverpool St-Edmonton Green 4.5 mins, Enfield Town 7.83 mins, Cheshunt 14.5 mins.

- Proposal 1B: 10 mins south of Edmonton Green, 20 mins on each branch:
  Liverpool St-Edmonton Green 4.5 mins, Enfield Town and Cheshunt each 9.5 mins.
- Proposal 1C: 15 min intervals on each branch, 8 tph south of Edmonton Green:
  Liverpool St-Edmonton Green 3.4 mins, Enfield Town and Cheshunt each 7 mins.

124. The actual waiting times need to be adjusted by the proportion of offpeak passengers who start at other stations (assumed to be mostly on the Liverpool Street-Edmonton Green section) and travel to destinations on the Enfield Town and Cheshunt lines. Services are less frequent for those destinations.

125. Estimated waiting times for the current and proposed services are therefore inflated on the Liverpool Street-Edmonton Green section, by the proportion of total offpeak passengers travelling on each branch, compared to the total offpeak usage. This gives modified time values:

- Current service:
  Liverpool St-Edmonton Green 8.5 mins, Enfield Town 14.5 mins, Cheshunt 14.5 mins.
- Proposal '1A1': Enfield Town regular 15 min intervals:
  Liverpool St-Edmonton Green 6.2 mins, Enfield Town 7 mins, Cheshunt 14.5 mins.
- Proposal '1A2': 10 mins south of Edmonton Green, Enfield 4 tph, Cheshunt 2 tph
  Liverpool St-Edmonton Green 5.6 mins, Enfield Town 7.83 mins, Cheshunt 14.5 mins.
- Proposal 1B: 10 mins south of Edmonton Green, 20 mins on each branch:
  Liverpool St-Edmonton Green 5.5 mins, Enfield Town and Cheshunt each 9.5 mins.
- Proposal 1C: 15 min intervals on each branch, 8 tph south of Edmonton Green:
  Liverpool St-Edmonton Green 4.1 mins, Enfield Town and Cheshunt each 7 mins.

126. Offpeak usage is then multiplied by the waiting times for each option, at each station, and the difference in total waiting time calculated compared to the current service. The table below summarises the net waiting time savings:

	Hours saved per year with better Edmonton Line offpeak services Weighted time savings, waiting for trains			
	Proposal 1A Enfield Town 15" Cheshunt 30"	**Proposal 1A** LivSt-Edmonton 10" EnfieldTn 4 tph, Chs 30"	**Proposal 1B** LivSt-Edmonton 10" EnfieldTn 20", Chs 20"	**Proposal 1C** Enfield Town 15" Cheshunt 15"
Liverpool Street to Edmonton Green	86,617	109,213	112,979	165,703
Bush Hill Park and Enfield Town	45,128	40,134	30,085	45,128
Southbury to Cheshunt	0	0	17,973	26,959
Total	131,745	149,347	161,037	237,790

127. This represents the following value of public utility benefits on a yearly basis, valued at £12 per hour for non-working time, with waiting time penalties 2½ x in-vehicle time:

£ Value	**£1,580,945**	**£1,792,164**	**£1,932,446**	**£2,853,477**

Valuation of marginal operating costs

128. It is assumed that all trains are available at marginal cost, with main leasing charges and other upfront costs paid. The current service uses 6 trains offpeak, but requires 9 peak trains, of which at least 4 are formed of two 4-car units, ie 13 x 4-car units in total. The offpeak service proposals require 8 x 4-car trains (Proposal 1A), 9 (1B) or 12 (1C).

Even with Proposal 1C, there will be sufficient marginal availability of units, as the Chingford peak service generally requires two 4-car units per train.

129. Four main costs are relevant if there is additional use of the existing train fleet:

- Fuel costs, per mile.
- Light maintenance costs, per mile.
- Variable track charges, per mile.
- Staffing costs, per hour, are principally train drivers if services run within existing operating hours.

130. There would be additional costs if trains ran a longer operating day (earlier first and later last trains), including station staffing and station lighting, etc.

131. For the purpose of this analysis, it is assumed that the existing operating day would be retained. Other stakeholders such as TfL, or franchise bidders, might seek to enlarge the operating day. However the intention of this study is to see whether a basic increase in offpeak train service is value for money, rather than attempt at this point to fine-tune its specification.

132. The train mileage per offpeak hour is estimated as:
(miles converted to decimal from the railway measurement which is in miles and chains)

- Liverpool Street-Enfield Town 10.6875 miles per single journey (10 miles 55 chains).
- Liverpool Street-Cheshunt: 14.725 miles per single journey (14 miles 58 chains).
- Current weekday service: 4 departures x Enfield Town (2 each way), 4 x Cheshunt (2 each way) = 101.65 miles per offpeak hour.
- Current Sunday service: as above but the Cheshunt trains run beyond to Hertford East, and do not serve all intermediate stations between Liverpool Street and Edmonton Green. Mileages are therefore the same per hour for the Liverpool Street-Cheshunt section for the purpose of this study, but the waiting time benefits from the proposed all stations services would be greater – they are not included in the assessment above.
- Proposal 1A: 8 x Enfield Town (4 each way), 4 x Cheshunt (2 each way) = 144.4 miles.
- Proposal 1B: 6 x Enfield Town (3 each way), 3 x Cheshunt (2 each way) = 152.475 miles.
- Proposal 1C: 8 x Enfield Town (4 each way), 8 x Cheshunt (4 each way) = 203.3 miles.

133. Operating hours for the offpeak period are taken as:

- Monday-Friday: 10:00 to 16:30, and 19:30 to Midnight = 11 hours per day.
- Saturday: all day, 05:30 to Midnight = 18.5 hours per day.
- Sunday: all day, 7:30 to Midnight = 16.5 hours per day.

134. A Saturday service is assumed in the case of Bank Holidays except for Christmas and Boxing Day (no service). A working basis is 252 x MF, 59 x Sat or equivalent, 52 x Sun.

135. Based on these assumptions, the yearly increase in train mileage is (rounded up to next 1000 miles): Proposal 1A: 203,000 miles; 1B: 241,000 miles; 1C: 481,000 miles.

Within this figure, an assumption of 1,000 additional positioning/depot miles is included for each proposal, although some units currently have to return to depot outside the peaks and this element of cost may not arise. The operating hours for this increased service are 4800 hours/year (including 70 additional hours per year for depot miles).

136. Costs per mile are based on a JMP train operating cost model:

Assumption on costs per car mile, 2006 prices		JRC assumption on cost inflation per 4-car train mile, to 2008/09	
	£	2006 per 4-car train	£
Fuel	0.23	0.92	1.6
Light maintenance	0.45	1.8	2.4
Variable track access	0.107	0.428	0.6
	0.787	3.148	4.6

137. Staffing costs are taken as driver costs (the service is operated by driver-only trains), with an assumption that staff work 1,600 hours per year. An average cost of £34,000 pa in 2006 is taken from the Office of National Statistics. However London weighting and inflation to 2008/09 should be applied. A working assumption is a staff cost of £40,000 per additional full-time roster.

138. A summary of identified variable costs is tabled below:

	Variable costs of better Edmonton Line offpeak services			
	Proposal 1A Enfield Town 15" Cheshunt 30"	**Proposal 1A** LivSt-Edmonton 10" EnfieldTn 4 tph, Chs 30"	**Proposal 1B** LivSt-Edmonton 10" EnfieldTn 20", Chs 20"	**Proposal 1C** Enfield Town 15" Cheshunt 15"
Increased train service (miles/year)	204,000	204,000	242,000	482,000
Total variable costs (£/year x miles)	**£938,400**	**£938,400**	**£1,113,200**	**£2,217,200**
Additional trains in offpeak service	2	2	3	6
Drivers / train @ 4800 hrs/1,600 hrs	3	3	3	3
Duty drivers required	6	6	9	18
Additional rest day/cover drivers	1.2	1.2	1.8	3.6
Total drivers required, fulltime equivalent	7.2	7.2	10.8	21.6
Driver costs @ £40,000 per person	**£288,000**	**£288,000**	**£432,000**	**£864,000**
Total annual costs of Proposals	**£1,226,400**	**£1,226,400**	**£1,545,200**	**£3,081,200**

Benefit / cost valuation of Edmonton Line offpeak proposals

139. Benefits and costs of the different Edmonton Line offpeak proposals are brought together below.

- All proposals bring considerable waiting time benefits, £1.58m to £2.85m yearly.
- The costs are less than the benefits, with the exception of Proposal 1C.
- *Based on these benefits alone*, Proposals 1A (either variant) and 1B are significantly higher than 1:1 BCR. Proposal '1A2' with a regular interval 10 minute service south of Edmonton Green almost achieves 1.5: 1 BCR, which is the DfT passmark for improvements not requiring new investment. (2:1 is the passmark for those.)

140. All proposals will generate other benefits, and income from passengers attracted to the better service. Many wider benefits can be embraced within NATA, and there are also policy objectives including the Mayor's Transport Strategy and Enfield's place-shaping.

141. Overall, there is a strong probability that Proposal '1A2' with a regular interval service south of Edmonton Green should meet DfT passmark guidelines, and should be taken forward by DfT and franchise bidders for serious evaluation. We recognise that this would need to include careful assessment of how to operate in the offpeak a mix of 10 minutes services from the Edmonton Line and 15-30 minute services from the Chingford and Lee Valley lines.

142. Among the other Proposals, '1A1' (Enfield Town every 15 minutes) and 1B also achieve credible BCR outcomes. A full NATA assessment and recognition of wider benefits may bring those within the BCR passmark. On the present assessment, the maximum benefits (excluding costs) linked to a BCR above 1 : 1 are achieved by Proposal 1B. If operability of a 10 minute regular interval service proved a challenge, then the fall-back option would be the Enfield Town variant of Proposal 1A ('1A1').

143. We commend the Edmonton Green offpeak proposals for inclusion in the ITT for Greater Anglia franchise bidders.

	Overall benefits and cost assessment			
	Based on waiting time benefits from better Edmonton Line services			
	Proposal 1A	**Proposal 1A**	**Proposal 1B**	**Proposal 1C**
	Enfield Town 15"	LivSt-Edmonton 10"	LivSt-Edmonton 10"	Enfield Town 15"
	Cheshunt 30"	EnfieldTn 4 tph, Chs 30"	EnfieldTn 20", Chs 20"	Cheshunt 15"
Value of waiting time benefits	£1,580,945	£1,792,164	£1,932,446	£2,853,477
Total annual variable costs	£1,226,400	£1,226,400	£1,545,200	£3,081,200
Public utility gain (loss)	**£354,545**	**£565,764**	**£387,246**	**- £227,723**
Direct BCR (initial year)	1.29 : 1	1.46 : 1	1.25 : 1	0.93 : 1

Services on the Lee Valley Line

Factors influencing additional service layers

Objective

144. An operable Lee Valley local passenger service which jointly with Liverpool Street-Hertford East trains achieves the regeneration requirement for 4 trains per hour in each direction (4 tph) at stations in Greater London in the Upper Lee Valley (Tottenham Hale-Enfield Lock section of Lee Valley line).

Commentary

145. This proposition reflects the needs within Greater London and the London Boroughs of Enfield and Haringey for an attractive local train service on the Lee Valley line which stimulates and also responds to the fundamental changes in spatial activity planned in the Upper Lee Valley corridor.

146. The objective above specifically seeks enhanced frequency as well as capacity, and, within Proposal 2A, is interpreted as a local service that can be fitted within the current timetable pattern AND the current and committed infrastructure improvements. It does not require further infrastructure investment. With Proposal 2A, 4 tph is achievable at main Lee Valley stations.

147. Proposal 2B will be developed once peak options have been refined, and will look at offpeak operational factors and options.

148. Proposal 2C will consider schemes which might only require a small quantum of infrastructure, rather than mega works, to achieve substantial transformation of the local service patterns. It is recognised that such infrastructure options are elements for a post-2012 franchise variation, not for the immediate years. All services need to be operable and to be sufficiently worthwhile in public terms to justify allocation of resources.

Infrastructure constraints

149. In the case of the Lee Valley line, the first challenge is operability. The present service pattern is tightly geared around the main infrastructure constraints. It is necessary to understand these in some detail.

150. The headlines are:

- Liverpool Street terminus is a busy terminus, with an inconvenient approach at Bethnal Green, where 4 pairs of tracks reduce to 3 just when full capacity is needed.
- The West Anglia routes take the strain, by being reduced to one pair of tracks during peak periods, the *'Suburban Lines'*, which limits the overall peak train frequency on the entire West Anglia network. The terminus has handled up to 22 trains per hour from the West Anglia tracks in the busiest hour – the time of maximum passenger flow – but is currently scheduled with 20 tph. [3]

[3] The Great Eastern network uses the other 2 pairs of tracks, *'Main Lines'* and *'E Lines'*, currently with 36 arrivals in the 08:15 to 09:14 period. Offpeak, the *'Main Lines'* are available for limited use by West Anglia trains.

- There is a short section of 4-track railway, under 2 miles between Bethnal Green and Hackney Downs, which allows some separation of West Anglia trains, with several points to cross to and from the Chingford and Lee Valley tracks. It is possible to schedule one train to overtake another on this section, as junctions at Bethnal Green and Hackney are both aligned towards the Lee Valley route.
- Beyond Hackney Downs the infrastructure is essentially 2-track throughout, one track in each direction, with 'flat' at-grade junctions. Conflicting train movements need to be timed to avoid unreasonable delay, and preferably incur no delay at all.
- There is a parallel railway between Hackney Downs and Cheshunt Jcn, via the Edmonton Green, but this is a suburban railway unsuited for fast trains. Hence it is the Lee Valley line which is normally used by all fast and semi-fast services.
- After Clapton station, the 4 trains per hour Chingford service diverge at Clapton Jcn. Apart from one statutory train service a week, no Lee Valley trains now call at Clapton station.
- The main line then swings left on the Clapton Curve into the Lee Valley, from Clapton Jcn to Coppermill (North) Jcn where it joins the Stratford line. Shortly afterwards, the spur to North London diverges at Tottenham South Jcn – this can be an offpeak timing constraint with conflicting freight movements on cross-London services.
- All passenger trains are scheduled to call at the busy Tottenham Hale station which is the hub interchange at the southern end of the Upper Lee Valley.
- From Liverpool Street to Tottenham Hale it has been a curvaceous railway with no opportunity for fast running. The line between Stratford and Tottenham Hale is also speed restricted and has operational junctions for freight routes and for the new Orient Way passenger train depot. [4]
- Beyond Tottenham Hale it is a 100 mph 2-track railway. Network Rail's 'Rules of the Plan' require a minimum of 3 minute headways.
- There are 5 level crossings for the ordinary public road network, in the section between Tottenham Hale and Broxbourne Jcn: Northumberland Park, Brimsdown, Enfield Lock, Trinity Lane (Waltham Cross) and Wharf Road (Broxbourne).
- There is no passing loop until Broxbourne station, 17¼ miles from Liverpool Street.
- The Edmonton Line joins at Cheshunt Jcn, with a separate reversing platform for that service. In recent timetables, this service terminates at Cheshunt station rather than continue (as previously) to Broxbourne and Hertford East, which keeps it operationally separate from the main line. [5]
- The reversing platform is also accessible from the Lee Valley line. Liverpool Street to Cheshunt via Tottenham Hale is 14 miles.
- Beyond Broxbourne, the line to Hertford East diverges at Broxbourne Jcn, with the main line continuing via Harlow Town (passing loops) to Bishops Stortford (3 platforms, all bi-directional to allow terminating services and overtaking), and on towards Stansted and Cambridge.

[4] For passenger trains terminating at Stratford from the Lee Valley direction, at present only Platform 12 is accessible for reversing, which imposes a half mile single-track limit from Temple Mills East Jcn.

[5] At the time of writing, there is an hourly through passenger train in the offpeak, a short term knock-on from engineering in North London diverting freight via South Tottenham rather than Camden.

- The Stansted Airport line has 1¼ miles of single track through the airport tunnel. There is also a ¼ mile of single track on the Hertford East line, at Ware station.
- There are crossovers between the 'up' and 'down' lines (to and from London) at various locations, but these are for occasional engineering, freight and emergency use only, as the main line is not signalled for bi-directional running on any track except at Bishops Stortford, Stansted Airport and at Stratford (platform 12).

Foreseen investment

151. It is assumed for Proposal 2A that there will be no new infrastructure other than that already planned:

- Power supply upgrade for West Anglia network.
- 12-coach platforms or, at lesser stations, Selective Door Operation, for Stansted Express and Cambridge-London services (not relevant to Lee Valley locals).
- Additional terminating capacity at Stratford (platforms 11/12) from the Lee Valley – to be in place before 2012 Olympic Games. This will allow at least 4 tph from the Lee Valley (and potentially also from Chingford subject to capacity analysis).

Consequences of infrastructure constraints

152. What all this means is:

- With the present emphasis on further improvements to train performance, Liverpool Street terminus is effectively full in the peak periods, and only Stratford is available as a realistic alternative terminus. From 2012, a legacy of Olympics investment is that Stratford will have the capacity for a regular interval service.
- When a passenger train via Tottenham Hale starts from Liverpool Street or Stratford, the present infrastructure requires it to continue to at least Broxbourne, or to Cheshunt if the reversing platform there can be accessed reliably from the main line without interfering with the operation of the Edmonton and main line services. The same is also true in the London direction.

Timing factors

153. The current Lee Valley timetable is geared around three main features:

- Stansted Express, which is the service with the longest section of non-stop running on the 2-track infrastructure.
- The 3 minute Lee Valley headway.
- 'Flighting' of trains behind each 15 minute interval Stansted Express, which in turn dictates how many trains can proceed reliably, how far, before they need to be out of the way of the next Stansted Express:
    - Trains are generally 'flighted' fastest first, then semi-fast, then stopping trains, to minimise the extent of operational conflict between the differing service speeds and timings on the same section of railway
    - It is a constraint that Broxbourne is the first passing point from London, and the last inwards.

154. Other than Liverpool Street-Hackney Downs, this causes the critical timing points to be in the Tottenham area and intermediate locations to Broxbourne. This is the section

of greatest relevance for a Stratford-Lee Valley service. In the Tottenham area, the key points are Coppermill (North) Jcn, Tottenham South Jcn and Tottenham Hale station.

155. Within the Network Rail working timetable, Coppermill is not used as a timing point. Instead timings are made for Tottenham South Jcn and Clapton Jcn (Chingford Line).

156. Other factors in timetable design for 2012 and beyond are:

- An objective of minimising train delays at 'flat' junctions, where slots for trains joining or crossing in the opposite direction must be timetabled. As discussed earlier, ideally there is no delay for any train, though if necessary fast services will generally take precedence over stopping services for the available slots.
- Better train punctuality is also achieved by Network Rail inserting recovery margins in standard point-to-point timings. This usual method of timetable design will limit the shorter journey time benefit of the new Class 379 trains.
- However the new trains' better design performance for acceleration and braking (compared to the present Class 317s) will assist with recovery from any delays and may enable some retiming.
- Class 317s will continue on all Lee Valley services other than Stansted Express, so it is the latter service that might see retiming. That in turn could have a knock-on effect on all services along the Lee Valley.
- The significant single track sections on the southern part of the West Anglia network:
    - 1¼ miles between Tye Green Jcn and Coopers Lane Jcn on the Stansted Airport Line, including Stansted Airport Tunnel (the direct spur from the Airport towards Cambridge is also single track)
    - A ¼ mile at Ware on the Hertford East line.
- Provision for freight train operation in the offpeak – along the Lee Valley line for Anglia destinations, and via the Stratford-South Tottenham spur for some cross-London freight.

Current peak and off-peak services

157. The London-bound AM peak service is:

- 4 tph from Stansted Airport
- 4 tph (alternatively fast and semi-fast) from Cambridge with occasional trains from Kings Lynn and Ely
- 2 tph stopping trains from Hertford East
- 2 tph stopping trains to Stratford from various starting points, Bishops Stortford, Hertford East or Broxbourne (none from Stansted). All Stratford trains are looped at Broxbourne to allow other trains to pass.
- Some fast trains stop at additional stations to meet the AM peak demand.

158. In the outbound direction, there is a similar peak service, except that there is only a 2tph Cambridge service, and some empty stock workings to sidings after the inbound journey, as either entire trains or peak portions come out of use.

159. In the offpeak, the Stratford service is reduced to 1 tph and runs to/from Stansted, and the Cambridge service is 2 tph in both directions (1 fast, 1 semi-fast).

160. The PM peak outbound service is the reverse of the basic AM peak, with the Stratford service 2 tph, mostly to Broxbourne or Hertford East. There are no additional stops on fast trains, as the PM peak flow is less intense.

161. There is not time for either stopping train to serve all Lee Valley stations:

- Liverpool Street-Hertford East trains serve Tottenham Hale, then fast to Ponders End, Brimsdown, Enfield Lock, Waltham Cross, Cheshunt and Broxbourne.
- Stratford-Lee Valley trains have a variable stopping pattern:
    - They call consistently at Tottenham Hale, Northumberland Park, Enfield Lock, Cheshunt and Broxbourne stations
    - Angel Road is only served in peak periods
    - Northwards, Waltham Cross is missed out except in the PM peak
    - Southwards, Waltham Cross is missed out except in the AM peak.
- Cumulatively, this is a poor transport baseline for spatial changes foreseen in the London Plan and Enfield's place shaping strategy.

162. Usage of Lee Valley stations in recent years is set out below. There are some clear trends:

- A general increase in travel demand despite a compromise train service.
- Relatively low growth at some unexpected locations such as Harlow Town and Broxbourne.
- A tendency for some lesser stations to have faster growth than the average.
- Strong growth in demand in the Greater London part of the Lee Valley, despite altered train services from December 2004 which weakened the local service at Northumberland Park and Angel Road, and increased the Stansted Express peak service to quarter hourly with consequential changes throughout the railway.

Lee Valley passenger volume at stations

Station	2002/03	no survey in 2003/04 2004/05	Tottenham Hale estimated 2005/06	2006/07	data modified within 2007/08	2008/09	% change 2005/06 to 2008/09 %	Total station user incl i/change, ORR data 2008/09
in Greater London			**4,317,927**	**5,143,697**	**5,788,981**	**5,783,566**	**+ 34%**	**5,951,113**
Tottenham Hale	?	?	*3,000,000*	3,316,037	3,753,982	3,961,490	**+ 32%**	4,129,037
Northumberland Park	98,976	73,310	295,584	305,759	173,313	161,680	**- 45%**	161,680
Angel Road	16,721	17,074	15,786	16,368	37,330	32,394	**+ 105%**	32,394
Ponders End	134,057	126,146	121,529	238,918	288,076	269,782	**+ 122%**	269,782
Brimsdown	348,347	328,654	315,148	460,844	586,037	518,704	**+ 65%**	518,704
Enfield Lock	617,403	595,997	569,880	805,771	950,243	839,516	**+ 47%**	839,516
in East of England			**13,615,439**	**16,015,845**	**16,841,559**	**16,552,348**	**+ 22%**	**17,028,774**
Waltham Cross	694,717	691,640	679,556	705,356	704,582	673,310	**- 1%**	673,310
Cheshunt	1,321,617	1,408,988	1,408,338	1,533,387	1,692,201	1,704,992	**+ 21%**	1,865,039
Broxbourne	1,355,293	1,367,328	1,334,843	1,394,165	1,495,519	1,452,982	**+ 9%**	1,698,021
Rye House	264,582	312,736	312,505	323,112	336,314	368,796	**+ 18%**	368,796
St Margarets	294,763	302,701	300,745	306,446	313,656	315,202	**+ 5%**	315,202
Ware	700,233	770,239	747,625	830,244	904,419	921,512	**+ 23%**	921,512
Hertford East	275,158	303,404	278,010	626,244	613,307	613,476	**+ 121%**	613,476
Roydon	95,277	91,905	90,064	96,810	100,351	111,310	**+ 24%**	111,310
Harlow Town	1,580,734	1,666,797	1,627,208	1,652,501	1,712,840	1,660,404	**+ 2%**	1,660,404
Harlow Mill	120,833	115,991	105,416	124,464	147,282	158,816	**+ 51%**	158,816
Sawbridgeworth	374,145	392,448	392,622	403,635	451,004	448,090	**+ 14%**	448,090
Bishops Stortford	2,166,675	2,215,843	2,180,975	2,294,840	2,464,403	2,480,700	**+ 14%**	2,537,587
Stansted Mountfitchet	361,124	352,267	358,067	354,317	383,993	401,374	**+ 12%**	411,816
Stansted Airport	2,978,771	3,822,106	3,799,465	5,370,324	5,521,688	5,241,384	**+ 38%**	5,245,395

Issues arising with the Stratford-Lee Valley service

163. The short term opportunity arises with the Stratford-Lee Valley service, using the only alternative destination to Liverpool Street. So the present structure of the Lee Valley stopping services and the potential changes to the Stratford service have been assessed.

164. Each Lee Valley station has the following service volume, shown below. There is increasing reliance on the Stratford service to top up frequencies south of Broxbourne, but the stopping pattern is variable.

165. The Stratford service also has a highly variable pattern north from Broxbourne, driven as much by timing and pathing considerations as underlying passenger demand. To have 1 or 2 trains during an entire 3 hour peak period may help to relieve other overcrowded services – but that is why the 12-car policy now exists for outer-suburban services across the peak period. The regular interval nature of most of the current peak services means that neither is an erratic Stratford service achieving much systematic station-to-station cover north of Broxbourne.

Lee Valley passenger volume		**Trains in pk 3 hours to/from London 2009/10**				
	Total station user incl i/change, ORR data	**AM peak SB (with flow) arr London 7:00-9:59**	**PM peak NB (with flow) dep London 16:30-19:29**	**AM peak NB (contraflow) TottHale 7:00:9:59**	**PM peak SB (contraflow) TottHale 16:30:19:29**	**Weekday offpeak (one hour)**
Station	**2008/09**	to/from Liverpool Street, ( ) = Stratford service				
		Cheshunt service excludes Edmonton Line trains				
in Greater London	**5,951,113**					
Tottenham Hale	4,129,037	31 + (6)	30 + (6)	24 + (6)	25 + (5)	8 + (1)
Northumberland Park	161,680	(6)	(6)	(6)	(5)	(1)
Angel Road	32,394	(5)	(6)	(6)	(5)	(0)
Ponders End	269,782	9	6	6	6	2
Brimsdown	518,704	9 + (1)	6	6	6	2
Enfield Lock	839,516	7 + (6)	6 + (6)	6 + (6)	6 + (5)	2 + (1)
in East of England	**17,028,774**					
Waltham Cross	673,310	8 + (6)	6 + (6)	6	6	2
Cheshunt	1,865,039	14 + (6)	18 + (6)	12 + (6)	13 + (5)	4 + (1)
Broxbourne	1,698,021	22 + (6)	18 + (6)	12 + (6)	13 + (5)	4 + (1)
Rye House	368,796	7 + (1)	6 + (2)	6	5 + (1)	2
St Margarets	315,202	7 + (1)	6 + (2)	6	5 + (1)	2
Ware	921,512	7 + (1)	6 + (2)	6	5 + (1)	2
Hertford East	613,476	7 + (1)	6 + (2)	6	6 + (1)	2
Roydon	111,310	6 + (2)	7 + (1)	5 + (1)	6 + (2)	1 + (1)
Harlow Town	1,660,404	18 + (3)	18 + (2)	12 + (4)	13 + (2)	4 + (1)
Harlow Mill	158,816	6 + (2)	7 + (1)	4 + (1)	6 + (2)	1 + (1)
Sawbridgeworth	448,090	8 + (3)	10 + (2)	6 + (1)	7 + (2)	2 + (1)
Bishops Stortford	2,537,587	22 + (3)	20 + (2)	12 + (4)	13 + (2)	4 + (1)
Stansted Mountfitchet	411,816	10	10 + (1)	6 + (1)	10 + (2)	1 + (1)
Stansted Airport	5,245,395	12	12	12 + (1)	12 + (2)	4 + (1)

166. Data on passenger usage of Lee Valley stopping trains, including use of the Hertford East and Stratford services, is only directly available in public data from the FoI response for Autumn 2006 data, referenced in paragraph 107 of this report.

167. Data is missing for one Stratford train (was it cancelled?), but shows that overall the Stratford route did not justify more than one 4-car unit for each train, on a broadly half-

hourly peak service. The Liverpool Street-Hertford East trains, on a comparable frequency, loaded far better. Southbound, Stratford trains discharged most of their passengers at Tottenham Hale, and also picked up most of their northbound passengers there. There was a lighter load to and from Stratford.

Autumn 2006 Train loadings on Lee Valley stopping trains

AM Peak

Time	From	To	Arrive	Formation	First?	Standard Seats	PIXC Capacity	Critical Load	Point	PIXC	On train arr Tottenham	Stratford Alight	Liverpool St Alight	Manual Count	Seated % LF	PIXC % LF
06.03	Stansted Apt	Stratford	07.09	317/1	Y	271	400	140	Tott Hale	0	151	77		M	51.8	35.1
06:37	Hertford East	Liverpool St	07:28	315	N	318	431	634	Tott Hale	203	634		460	M	199.4	147.1
06:41	Bishops Stort	Stratford	07:39	317/1	N	271	400	202	Tott Hale	0	202	141		M	74.5	50.5
07:07	Hertford East	Liverpool St	07:58	317/1+317/1	N	542	800	779	Tott Hale	0	779		585	M	143.7	97.4
07:17	Hertford East	Stratford	08:08	no data for this train							?	?				
07:17	Hertford East	Liverpool St	08:13	317/1	N	271	400	473	Tott Hale	73	473		317	M	174.5	118.3
07:37	Hertford East	Liverpool St	08:28	315+315	N	636	862	673	Tott Hale	0	673		537	M	105.8	78.1
07:45	Hertford East	Stratford	08:38	317/1	N	271	400	318	Tott Hale	0	318	174		M	117.3	79.5
08:10	Hertford East	Liverpool St	08:58	315+315	N	318	862	758	Tott Hale	0	758		551	M	238.4	87.9
08:11	Bishops Stort	Stratford	09:10	317/1	N	271	400	219	Tott Hale	0	219	81		M	80.8	54.8
08:41	Hertford East	Liverpool St	09:28	317/6+317/6	N	468	692	339	Tott Hale	0	339		253	M	72.4	49.0
09:09	Broxbourne	Stratford	09:38	317/1	N	271	400	51	Tott Hale	0	51	36		M	18.8	12.8
09:11	Hertford East	Liverpool St	09:58	317/1	N	271	400	185	Tott Hale	0	185		114	M	68.3	46.3
Morning peak 07:00 to 09:59						4179	6447	4771		276	4782	509	2817			

PM Peak

Time	From	To	Arrive	Formation	First Class	Std. Seats	Capacity	Critical Load	Point	PIXC	Liverpool St. Join	Stratford Join	On Train Dep. Tottenham	Manual	Seated % LF	PIXC % LF
16.12	Liverpool St	Hertford East	17.01	2 x 317/1	N	542	784	357	Tott Hale	0	199		357	M	65.9	45.5
16.30	Stratford	Broxbourne	17.02	1 x 317/1	N	271	392	160	Tott Hale	0		50	160	M	59.0	40.8
16.46	Liverpool St	Hertford East	17.34	1 x 317/1	N	271	392	412	Tott Hale	20	241		412	M	152.0	105.1
17.00	Stratford	Hertford East	17.54	1 x 317/1	N	271	392	154	Tott Hale	0		61	154	M	56.8	39.3
17.16	Liverpool St	Hertford East	18.04	2 x 317/1	N	542	784	667	Tott Hale	0	470		667	M	123.1	85.1
17.30	Stratford	Broxbourne	18.02	1 x 317/1	N	271	392	215	Tott Hale	0		92	215	M	79.3	54.8
17.46	Liverpool St	Hertford East	18.34	2 x 317/1	N	542	784	743	Tott Hale	0	551		743	M	137.1	94.8
18.00	Stratford	Hertford East	18.54	1 x 317/1	N	271	392	315	Tott Hale	0		85	315	M	116.2	80.4
18.16	Liverpool St	Hertford East	19.04	2 x 317/1	N	542	784	681	Tott Hale	0	558		681	M	125.6	86.9
18.30	Stratford	Stansted	19.41	1 x 317/1	N	271	392	167	Tott Hale	0		82	167	M	61.6	42.6
18.46	Liverpool St	Hertford East	19.35	1 x 317/1	N	271	392	503	Tott Hale	111	426		503	M	185.6	128.3
19:00	Stratford	Bishops Stort	19:58	317/1	N	271			Tott Hale	0		112		M	41.3	
19:15	Liv St	Hertford East	20:04	2x317/1	N	542		337	Liv St	0	337			M	62.2	
19:42	Liv St	Hertford East	20:30	1x317/1	N	271		240	Tott Hale	0	167			M	88.6	
Evening peak 1600 to 18:59						4065	5880	4374		131	2445	370	4374			
Evening peak 1630 to 19:29						4336		4354		131	2583	482				

168. Many factors will change the demand at Stratford:

- The developments at Stratford City.
- Olympics legacy infrastructure.
- Growth of the Upper Lee Valley economy.
- The permanent creation of a regional transport hub at Stratford, and a sub-regional hub at Tottenham Hale.
- Further developments throughout the Thames Gateway.
- General economic growth throughout the Greater London and Home Counties regions.
- Inclusion of London area National rail services within the Oyster Pay-as-you-go zoning.

169. Just as we see that DLR is a highly successful local service and distributor from the main railheads and termini, after years of steady investment, so the Stratford-Lee Valley service needs to be seen in this context:

- It needs to be frequent.
- Local stations need to be fit for purpose and well located for the spatial changes along the Upper Lee Valley.
- It should secure a good hub interchange at its northern end, instead of trying to serve multiple destinations poorly.

- It should support transport accessibility to all growth areas in its catchment, so should be planned to cater for contra-peak travel as well as with-peak flows.

Proposal 2A – no new infrastructure

170. Following this logic takes us to specification of a detailed train service.

171. The Greater Anglia franchising document does not foresee a radical change in the service structure during the new franchise. Paragraphs 39-40 of this report set out the DfT's base specification: "the new franchise will operate a similar service pattern to that which applies in the December 2009-May 2010 timetable".

172. Some Class 317 trains will be released and cascaded by the arrival of Class 379. This will also enable Service Level Commitment (SLC2) to be operated from December 2011, when "bidders, as always, will be encouraged to propose measures to deliver better performance, capacity or journey times".

173. So the present service structure is assumed to be retained, but possibly with adjusted timings.

174. Using existing, cascaded Class 317 4-car trains for a modified Stratford-Lee Valley service, including those already in use on Stratford-Lee Valley, will allow compatible timings with existing Class 317 operations. It would be preferable to operate higher acceleration trains to tighten local journey times, but these would need to be funded. The initial timetable research therefore relies on existing timings, with estimates for intermediate stations served or passed where these are relevant.

Key point-to-point timings

175. A key element of the Lee Valley timetable is the flighting of trains, discussed earlier. To achieve this, all trains must clear the section between Tottenham Hale and Broxbourne before the next Stansted Express.

176. The point-to-point timing between the Tottenham Hale stop and passing Broxbourne on a Stansted train is the most critical factor with the current service. If it is attempted to introduce other trains within the current service structure, then other, shorter distance intermediate timings are required.

177. In 1989/90, trains were timed **northbound** (without recovery or pathing allowance) from Tottenham Hale start to passing Broxbourne station in 10-10½ minutes, and to Harlow Town stop in 14½ minutes. Additional timing allowances amounting to 0-4 minutes were distributed as a recovery or pathing margin between Cheshunt and Broxbourne, where necessary, resulting in actual peak times from Tottenham Hale start to passing Broxbourne station of 10-14½ minutes, with a further 4½ minutes until the Harlow Town stop. The greatest margin was added in the busiest part of the peak.

178. In 2009/10, the typical start-to-stop times from Tottenham Hale to Harlow Town are 17 minutes offpeak and 18-20 minutes in peaks. So essentially the 2009/10 timetable has similar overall timings, with recovery and pathing margins applied more extensively.

179. In 1989-90, trains were timed **southbound** (without recovery or pathing allowance) from passing Broxbourne to Tottenham Hale stop in 9½-10 minutes. Additional timing

allowances amounting to 2-5 minutes were distributed as a recovery or pathing margin between Cheshunt and Broxbourne, and between Brimsdown and Tottenham Hale. The typical AM peak pass-to-stop times from Broxbourne to Tottenham Hale were 11½-14½ minutes, while from Harlow Town start took a further 5½ minutes with no other allowance needed.

180. In 2009/10, the typical start-to-stop times from Harlow Town start to Tottenham Hale stop are around 16 minutes offpeak and 18-19 minutes in the peak. The greatest margin is added in the busiest part of the peak. This is a similar overall timing to 1989/90, with slightly less recovery and pathing required in some instances. This is reasonable as the Hertford East services no longer run via the Edmonton Line with the potential for pathing needs at Cheshunt.

181. These existing timings when applied to Stansted Express limit the availability of paths for other trains. There might be modifications of point-to-point timings for Class 379 trains, but there will also be insertion of recovery and pathing minutes. A mid-range timing is given below, which assumes tighter running during the height of the peak – this is a cautious estimate against which to path other flighted trains. It *includes* average recovery and pathing:

Timed journey, Stansted Express trains	Peak NB	Peak SB	Offpeak NB	Offpeak SB
Tottenham Hale (start) > Broxbourne (pass) & vv	13½	12½	11	10½
Tottenham Hale (start) > Harlow Town (stop) & vv	18	18	15½	16

182. Cambridge Line trains incur the following mid-range times in 2009/10, including recovery and pathing, and are assumed to be similar for a 2012 timetable as they have a more frequent stopping pattern:

Timed journey, Cambridge Line trains	Peak NB	Peak SB	Offpeak NB	Offpeak SB
Tottenham Hale (start) > Cheshunt (stop), Broxbourne (stop) & vv	14	13	12½	12
Tottenham Hale (start) > Cheshunt (stop), Broxbourne (stop), Roydon (stop), Harlow Town (stop) & vv	23	21	20	20½
Tottenham Hale (start) > Broxbourne (stop) & vv	14	12	12½	11
Tottenham Hale (start) > Broxbourne (stop), Harlow Town (stop) & vv	21½	19	18½	18½

183. Hertford East trains are timed at the standard station-to-station timing, including ½ minute station stops, between Tottenham Hale and Broxbourne, except where recovery and pathing is needed. The non-stop run between Tottenham Hale and Ponders End is taken as 4 minutes each way, though additional pathing is inserted southbound in current timetables. 4 minutes is also identified from actual train timings on 1st and 6th April. This gives an 18½ minute timing northbound to arrival at Broxbourne, and 17½ minutes southbound to arrival at Tottenham Hale.

184. Stratford trains are timed at the standard station-to-station timing where relevant, including ½ minute station stops, except where recovery and pathing is needed. It is assumed that offpeak Stratford trains will also serve Angel Road. The non-stop run between Angel Road and Enfield Lock is takes as 4½ minutes, also identified from on-train timing. If Waltham Cross is not served, the non-stop time between Enfield Lock and Cheshunt is 3 minutes, taken from on-train timing. Including Waltham Cross, it is 18½ minutes northbound, and 17½ minutes southbound, the same as Hertford East trains. Excluding Waltham Cross, the times are 16½ minutes each way.

185. Estimates have also been made for short distance all-stations trains via Tottenham Hale, terminating at Cheshunt or Enfield Lock. Cheshunt has a bay platform accessible from the main line, and is being explored by Transport for London as an extension zone for Oyster Pay-as-you-go., so might have a future relevance as a terminus for inner suburban services.

186. There is no current infrastructure to allow trains to terminate at Enfield Lock. However it is the northernmost station in Greater London on the Lee Valley line, and it is useful to understand what might be operable at a future date if a 4 tph service were eventually sponsored by Transport for London only within the London area.

187. Equivalent train timings have also been estimated for non-stop and fast trains to reach these stations, based on the standardised timings above, working timetable timing points, and also informed by on-train timings on 1st and 6th April.

188. A 'ready-reckoner' of comparative train times for PM peak northbound journeys is set out below. The timings for fast and semi-fast trains include a mid-range recovery and pathing allowance, but this is not included for stopping trains (this is Network Rail's practice for the 2011 'Rules of the Plan'):

Lee Valley standardised timings, 2012 notional service options, clockface timings

STX = Stansted Express
CBF = Cambridge Fast
CBS = Cambridge Semi-Fast
HFE = Hertford East
SFW = Stratford (calling at Waltham Cross)
SFX = Stratford (not calling at Waltham Cross)
SFB = Stratford all stations terminating at Broxbourne
SFC = Stratford all stations terminating at Cheshunt
SFE = Stratford all stations terminating at Enfield Lock
SFP = Stratford all stations to Ponders End
SLV = Stratford all stations to Enfield Lock then Broxbourne

□ departure
□ arrival
□ pass
□ Loop or terminate
(1) Pathing/ recovery

Northbound	STX Peak	STX Offpeak	CBF Peak	CBF Offpeak	CBS Peak	CBS Offpeak	HFE	SFW	SFX	SFB	SFC	SFE	SFP	SLV
Tottenham Hale	xx:00	xx:00	xx:00	xx:00	xx:00	xx:00	xx:00	xx:00	xx:00	xx:00	xx:00	xx:00	xx:00	xx:00
Northumberland Park	|	|	|	|	|	|	|	xx:02	xx:02	xx:02	xx:02	xx:02	xx:02	xx:02
Angel Road	|	|	|	|	|	|	|	xx:04	xx:04	xx:04	xx:04	xx:04	xx:04	xx:04
Ponders End	|	|	|	|	|	|	xx:04½	|	|	xx:07½	xx:07½	xx:07½	xx:07½	xx:07½
Brimsdown	|	|	|	|	|	|	xx:06½	|	|	xx:09½	xx:09½	xx:09½		xx:09½
Enfield Lock	xx:06	xx:05½	xx:06	xx:05½	xx:06	xx:05½	xx:09	xx:09	xx:09	xx:12	xx:12	xx:12		xx:12
Waltham Cross	|	|	|	|	|	|	xx:11	xx:11	|	xx:14	xx:14			|
Cheshunt	(1) xx:09	(½) xx:08	(1) xx:09	(½) xx:08	xx:09	xx:08½	xx:14½	xx:14½	xx:12½	xx:17½	xx:17½			|
Broxbourne	(2) xx:13½	(½) xx:11	(1) xx:14	(½) xx:12½	(½) xx:14	xx:12½	xx:18½	xx:18½	xx:16½	xx:21½				xx:18½

189. There is a large range of nominal service options. Using these timings, an indicative service based on the current service structure is shown below, using current peak departure times from Tottenham Hale northbound.

Indicative northbound PM peak timetable, current service characteristics

Northbound	STX Peak	CBF Peak	SFW	STX Peak	CBS Peak	HFE	STX Peak	repeats every half hour
Tottenham Hale	xx:07	xx:10	xx:13	xx:22	xx:25	xx:28	xx:37	
Northumberland Park			xx:15					
Angel Road			xx:17					
Ponders End						xx:32½		
Brimsdown						xx:34½		
Enfield Lock	xx:13	xx:16	xx:22	xx:28	xx:31	xx:37	xx:43	
Waltham Cross			xx:24			xx:39		
Cheshunt	(1) xx:16	(1) xx:19	xx:27½	(1) xx:31	xx:34	xx:42½	(1) xx:46	
Broxbourne	(2) xx:20½	(1) xx:24	xx:31½	(2) xx:35½	(½) xx:39	xx:46½	(2) xx:50½	

190. Yellow highlights where the timing is critical between trains. A sequence must leave Tottenham Hale, and be clear of the next Stansted train at Broxbourne. The reason for the lack of stops in the Upper Lee Valley is because this is prevented by the closeness of the next Stansted Express.

191. The various service options identified above have been assessed against this indicative timetable. If they do not fit, then either they should be discarded, or considered as an input to Proposal 2C.

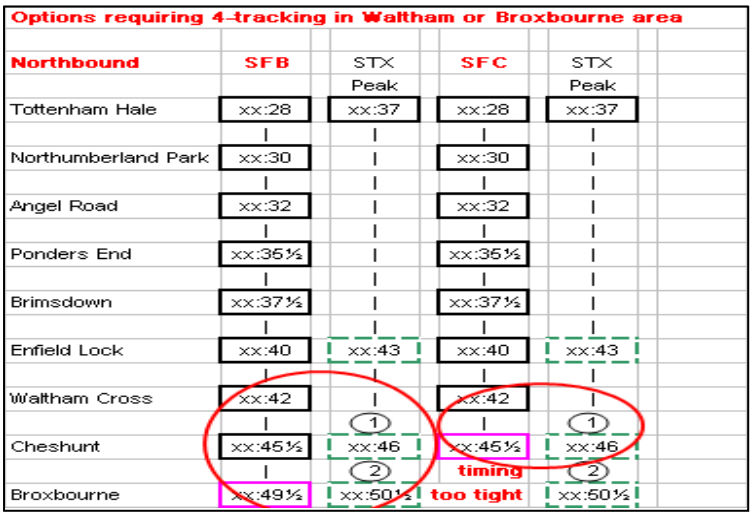
192. There is no capability for a **fourth train** in the sequence from Tottenham Hale, in peak periods, even as a short shuttle from Stratford to Ponders End (SFP service). This is because there are no tracks off the main line to reverse the service without blocking the main line. However this option, and another to reverse a service at Enfield Lock (SFE service), would be relevant if partial 4-tracking of the West Anglia Main Line allowed a separate section of track for local services:

Options requiring extra track in Ponders End–Enfield Lock area

Northbound	HFE	SFE	SFP OR	STX Peak
Tottenham Hale	xx:28	xx:31	xx:31	xx:37
Northumberland Park		xx:33	xx:33	
Angel Road		xx:35	xx:35	
Ponders End	xx:32½	xx:38½	xx:38½	xx:41
Brimsdown	xx:34½	xx:40½	extra track to allow	
Enfield Lock	xx:37	xx:43	local service	xx:43
Waltham Cross	xx:39			
Cheshunt	xx:42½			(1) xx:46
Broxbourne	xx:46½			(2) xx:50½

193. A Stratford-Tottenham Hale-all stations to Broxbourne service does not work unless there are additional tracks in the Waltham Cross-Broxbourne area, which because of its cost would require a larger reorganisation of services to generate consumer benefits.

The basis for a large scale investment in 4-tracking, and its funding, has not yet been developed.



Proposal 2A: Lee Valley peak service specification

194. It is possible to restructure the stopping patterns of the existing services, particularly the stopping trains, to give a stronger service level to the Upper Lee Valley. This is virtually the only peak time option available, within the present 2009/10 service structure and with present or future timings.

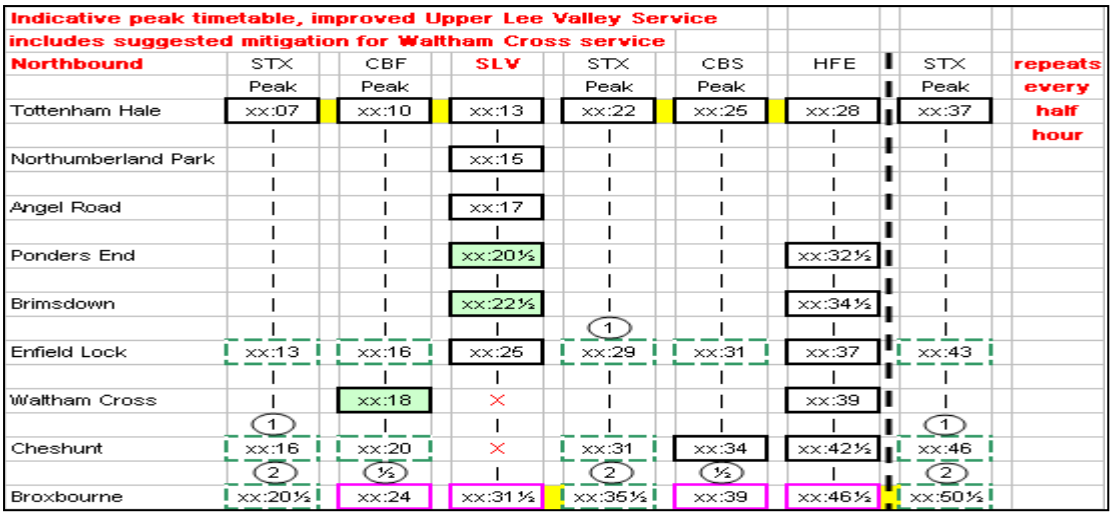
195. The core scheme to be assessed further is for the rôle of the Stratford-Lee Valley service to be redefined. The service can be refocused on the Upper Lee Valley stations between Tottenham Hale and Enfield Lock, then run fast to Broxbourne to remain within the overall 'flighting' limits and be out of the way of the next Stansted Express.

196. The Upper Lee Valley (ULV) local stations are offered 2 or 4 trains per peak hour, all connecting with other services at Tottenham Hale, Broxbourne, and Stratford or Liverpool Street.

197. An internal ULV connection is opened up at Ponders End, from Northumberland Park and Angel Road stations, to Ponders End itself, Brimsdown, Waltham Cross (on a regular basis) and Cheshunt.

198. Depending on where the Stratford trains go north of Broxbourne, other origins and destinations are also accessed. It is suggested in paragraphs 160-166 that there should be a review of this element of the service, as it has weak direct service frequencies to every northern destination.

199. The indicative timetable pattern is set out overleaf. The major change compared to today is the stopping pattern of the Stratford trains. Reduced peak services at Waltham Cross and Cheshunt are mitigated by an additional stop on the Cambridge fast trains at Waltham Cross, within its timing margins.



Rationale for the refocusing of the Stratford service

200. Basically there is a trade off between the outer Greater London and inner Hertfordshire stations while the railway still has its constrained infrastructure.

201. In the East of England sector, the benefits will arrive in 2011 from new investment in the outer suburban and Stansted Express routes, with longer, 12-car trains and some services formed of new rolling stock.

202. There are fewer emerging benefits in Greater London than the East of England - principally some capacity strengthening of current short trains. The poor service frequency in the Upper Lee Valley, station quality, and in cases such as Angel Road, station accessibility, is at odds with the spatial agenda for the sub-region.

203. There is an increasingly urgent need to raise public transport accessibility from its low levels in areas of planned housing and business park growth. A better local train service needs to be taken forward on a phased basis as part of a wider development package.

204. Enfield's Core Strategy Transport Assessment of November 2009 shows the change in overall accessibility achieved by increasing rail frequencies and improving station and bus stop arrangements. Progress with Angel Road station is a 'must have' if this station is to pull its weight within the Upper Lee Valley – currently it is the least used station on the line south of Stansted.

205. It is possible to interpolate cautiously the long term forecasts within Enfield's Core Strategy Transport Assessment, through to 2026, in relation to Proposal 2A. For example, taking Proposal 2A's service levels as the end service in 2025, would achieve many of the modelled 4 tph user benefits at Ponders End and Brimsdown stations, and some of the modelled user benefits at Angel Road and Northumberland Park (at a level in-between the reference case and 4 tph).

206. At 80% of the 4 tph volume, and say 50% of the lesser improvement, the additional volume is equivalent to a further 2-2½ million riders a year. The benefits start to be gained sooner than 4-tracking whose first stage may be a mid-2010s project. It can be both a cause and consequence of the spatial changes.

207. The refocusing of the Stratford service can therefore be considered within affordability limits which will face public sector decisions such as refranchising. It does not incur significant new peak-time resource costs, or end-to-end timing changes for Liverpool Street trains. There is a NATA study required for the net change in ridership arising from the service change, and a public utility assessment of the regional planning benefits.

208. Operationally the proposed service takes up the slots of the existing trains, ideally on more of a standard interval basis than is currently the case. The service has been demonstrated to meet current infrastructure constraints, even though the assessment here has been on a cautious basis, assuming some tighter timings for future fast trains than exist in the peak period operation of the current timetable.

Mitigation for peak service reduction at Waltham Cross

209. On its own, the re-specification weakens the service at Waltham Cross (at least in the direction of peak flow), from 8 to 4 trains per hour. It should be noted that Stratford trains do not call at Waltham Cross at other times, so it is a matter relating to a specific period of the day. The peak service pattern at Cheshunt is also reduced from 8 to 6 trains per hour.

210. With the economic downturn, there will also be additional capacity for the next few years. This would enable the lengthened peak-only Cambridge Fast service to call at Waltham Cross and provide an attractive half-hourly peak flow train to and from Central London, until elements of the West Anglia Main Line upgrade are in place.

211. Waltham Cross is initially suggested for the additional stop, despite its much lower passenger footfall, because of the proportional reduction in services. Cheshunt already has a half-hourly peak flow fast train from Liverpool Street and Tottenham Hale in addition to the Hertford East service. Waltham Cross is also a growth area in the Upper Lee Valley. If however the NATA assessment pointed towards the higher value-for-money location being Cheshunt, then this should be considered.

212. To be workable, mitigation might require platform lengthening at Waltham Cross (or Cheshunt) (platforms are 8-cars southbound and 9-car northbound) – or use of Selective Door Operation (SDO). Cheshunt is to have platform lengthening as part of the 2011 introduction of Class 379 and 12-car trains.

Off-peak services for the Upper Lea Valley

213. The structure of offpeak rail services is different from the peak period. The same passenger flows are served, but there are also rail freight flows along the Lee Valley main line and on the cross-London route via Stratford and Tottenham South Jcn. This increases the complexity of timetabling additional passenger flows.

214. With Stansted Express still at 4 trains per hour (tph) in the offpeak, Tottenham to Broxbourne continues to set the strategic constraint on the pathing of services outside the Liverpool Street-Hackney Downs area.

Providing offpeak capacity for freight

215. Provision of any slot for rail freight must be pre-programmed within the standard passenger timetable, as the lack of flexibility and lack of passing loops means that speculative introduction of a freight train would disrupt the passenger services.

216. Within an hourly pattern timetable, this forces at least one slot per offpeak hour to be available for freight use, whether or not it is used, unless no freight can be guaranteed in the daytime offpeak – when a different service pattern might be achievable in the daytime compared to the evening. In practice, there is a requirement for freight pathing during both the daytime and evening, at least on the Lee Valley lines.

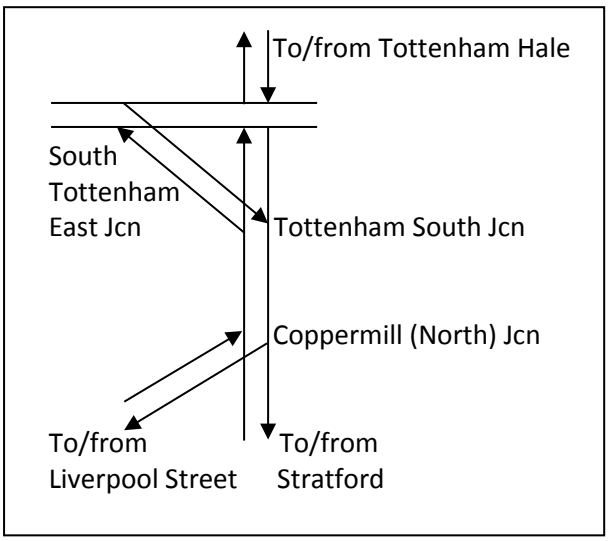
217. These days, there are no freight sidings between Tottenham and Broxbourne so there is no requirement for intermediate freight stops. Current freight flows are infrequent, and do not run every day. The main trains are for specific commodities such as aggregates. Freight trains enter or leave the terminals along the Lee Valley (Broxbourne, Rye House, Harlow Mill and Bishops Stortford) from the Cambridge or London direction, depending on where the materials are sourced. There is also through freight, infrequently, and the modern day equivalent of railway 'departmental' services, such as Network Rail's own requirement for engineering trains. The town of March, north of Cambridge and Ely, is a major railway engineering base.

218. Looking to the future, Network Rail's national Freight Utilisation Strategy sees merit in upgrading the Lee Valley main line as a 'W12-loading gauge' diversionary route for container flows. This is close to European mainland dimensions, and may require some slower running by freight trains in Britain, in areas with limited width and headroom, to keep the load within the dynamic gauge.

219. Hence it is proposed in the timetabling below to offer at least one offpeak freight slot hourly in each direction along the Lee Valley, to handle current and anticipated requirements at differing freight speeds. Slots are also required for cross-London flows via Stratford and North London, at Coppermill Jcn / Tottenham South Jcn.

Capacity at Coppermill and Tottenham South Junctions

220. There is a significant combination of junctions south of Tottenham Hale, at Tottenham South Jcn and Coppermill Jcn. Their configuration is shown overleaf.



221. At Coppermill Jcn, trains from Stratford and to Liverpool Street may conflict unless their timings are managed. The sequence of northbound trains also needs to be defined.

222. At Tottenham South Jcn, the timing of freight trains from North London towards Stratford needs to be managed across the northbound and southbound Lee Valley sequence. Freight trains heading to and from South Tottenham may be held on the half-mile curve linking with Tottenham South Jcn, awaiting an onwards path.

223. All junctions are speed restricted, and freight trains may incur slower acceleration and braking than passenger trains.

224. Tottenham South Jcn is the main timing point locally rather than Coppermill Jcn.

225. Freight trains can be timed for non-stop operation with journey times dependent on the engine power, the laden or unladen load hauled (the trailing load) and the wagons' suitability for fast running. Northbound, timing loads require 13-14 minutes for trains suitable for up to 60 mph, between Tottenham South Jcn (one minute south of Tottenham Hale station) and Broxbourne station loop. This is equivalent to 12-13 minutes between Tottenham Hale and Broxbourne. Trains limited to 45 mph take 17 minutes (16 from passing Tottenham Hale). Pathing and engineering margins might require additional time.

226. South of Broxbourne, because any freight comes to or from the Stratford area (whether through or reversing there), such trains effectively take a third or fourth slot in one quarter hour sequence between Tottenham Hale and Broxbourne. This puts a premium on organisation of passenger trains to release the hourly slot.

Present offpeak timetable structure

227. The current offpeak timetable is organised around 4 tph Stansted express, 2 tph Cambridge and 2 tph Hertford East. The Cambridge and Hertford East trains take alternate second slots north from Tottenham Hale (xx:40 / xx:55 etc past the hour) after the Stansted departure (xx:37 / xx:52 etc).

228. There is a 3 minute minimum headway as in the peak period, but fast trains take less time in the offpeak along the Lee Valley, so there is no spare margin at Broxbourne after a third train slot (xx:43 / xx:58 etc from Tottenham Hale, arr Broxbourne xx:59 / xx:14 etc) before the next Stansted Express is due to pass about x1:02-x1.04 / x1:17-x1.19, depending on pathing. You cannot run a fourth train as far as Broxbourne.

229. The critical factor is the basic 16 minute journey time between Tottenham Hale and Broxbourne (17 mins from Tottenham South Jcn) for the third train in the sequence, which also is the point-to-point time for a 45 mph speed limited-freight train. Essentially this offpeak timing can be used by any third train in the quarter hourly sequence, whether it is passenger or freight.

230. At present an hourly Stratford-Stansted train is scheduled as a third train northbound in a sequence which has a Cambridge train as no.2, and similarly southbound, as that spaces this local train equally between the two Hertford East trains.

231. Subject to North London freight pathing at Coppermill Jcn and Tottenham South Jcn, the opposite half hour slot could also be used by a Stratford-Broxbourne service, to give a 2 tph passenger service to/from Stratford.

232. However, at present this is <u>not</u> guaranteed. The slot constraints for offpeak freight services at Coppermill Jcn and Tottenham South Jcn are considerable, even on an hourly basis. Essentially, one additional slot needs to be allowed hourly in every direction for theoretical freight paths to and from North London, even if these are not used each hour.

233. In the present offpeak timetable sequence, slots for northbound and southbound Stratford passenger trains are not co-ordinated on the Coppermill to Tottenham section, but are organised to maximise the spacing between these and the Hertford East service. On an hourly service, this is helpful and doesn't affect freight train pathing. However doubling up this pattern of passenger service with this specific sequencing will in practice inhibit the best use of the available slots at Coppermill/Tottenham South, and consequently hinders the desired freight paths to and from North London.

234. If this specific passenger timetable pattern was essential, it would be necessary to explore with Network Rail and the Office of Rail Regulation (ORR) whether it was necessary for daytime freight slots to be kept available for North London-Stratford freight flows via South Tottenham. The North London route via Highbury & Islington reopens on 1st June 2010 having been upgraded in quality and capacity, and might be found to offer sufficient freight slots in daytime (and possibly in the early evening). If so, that would permit a second Stratford passenger train to run. [6]

[6] Further alternatives to create a second Stratford passenger slot would be:

- Altering the track layout between Coppermill Jcn and south of Tottenham Hale, to create conflict-avoiding tracks. This might be justified as part of the larger West Anglia Route Modernisation scheme, or in its own right, as a medium-term local passenger service initiative for Upper Lea Valley catchments within the sub-regional areas of North and East London.
- Condensing the offpeak passenger service so that the alternate 2 tph Liverpool Street-Cambridge and 2 tph Liverpool Street-Hertford East trains were merged as one train every half-hour between London and Broxbourne, where they split for each destination (and merged in the London direction). This would allow a 2 tph alternative half hour stopping service from Stratford as far as Cheshunt which would take up the released paths of the

Proposal 2B: Lee Valley offpeak service specification

235. Further investigation into alternative timetable patterns has identified that, by co-ordinating the north and southbound parallel train paths for all Stratford passenger and freight trains on the Coppermill / Tottenham South section, a 2 tph offpeak Stratford passenger service can be accommodated along with North London and Lee Valley freight paths, between the Stansted, Cambridge and Hertford East services.

236. The consequence is that Stratford passenger trains would be timed in one direction close to a Hertford East train. However the flighting arrangement south of Tottenham allows hourly freight paths without recourse to regulatory intervention. This is based on Tottenham South Jcn being approximately 1 minute south of Tottenham Hale, and Coppermill Jcn as a further 1 minute. The available slots are defined after allowing for the following minimum timings: 3 minute margins for all conflicting or merging train moves at Tottenham South Jcn; 3 minute headways via Tottenham Hale; 4 minute headways to and from Stratford.

237. An example timetable is set out overleaf, and shows the interlocking slots on the Coppermill-Tottenham section. This timetable spaces the Stratford trains northbound evenly between the Hertford East service, but they run closely in the southbound direction. The timings suggest there might be capacity to offer an Angel Road stop in the offpeak – a question mark is inserted there and later timings for that train would need to be increased by 1-1½ minutes. The Stratford-Lee Valley freight slot is timed at 16 minutes between Tottenham Hale and Broxbourne but has an additional pathing margin when using the identified slot. Stansted trains are allowed 12 minutes including pathing, between Tottenham Hale and Broxbourne.

238. It would be possible to change the sequence, swapping the freight and Stratford passenger slots so that each group occupied the alternate quarter hours. There would be consequential adjustments to pathing times.

239. There is a marginal resource cost in operating a second offpeak passenger service from Stratford. The northern terminal of might be Broxbourne, Hertford East, Harlow Town, Bishops Stortford or Stansted Airport, depending on waiting and pathing times to slot into the return direction and to free up the loop for other uses including freight trains.

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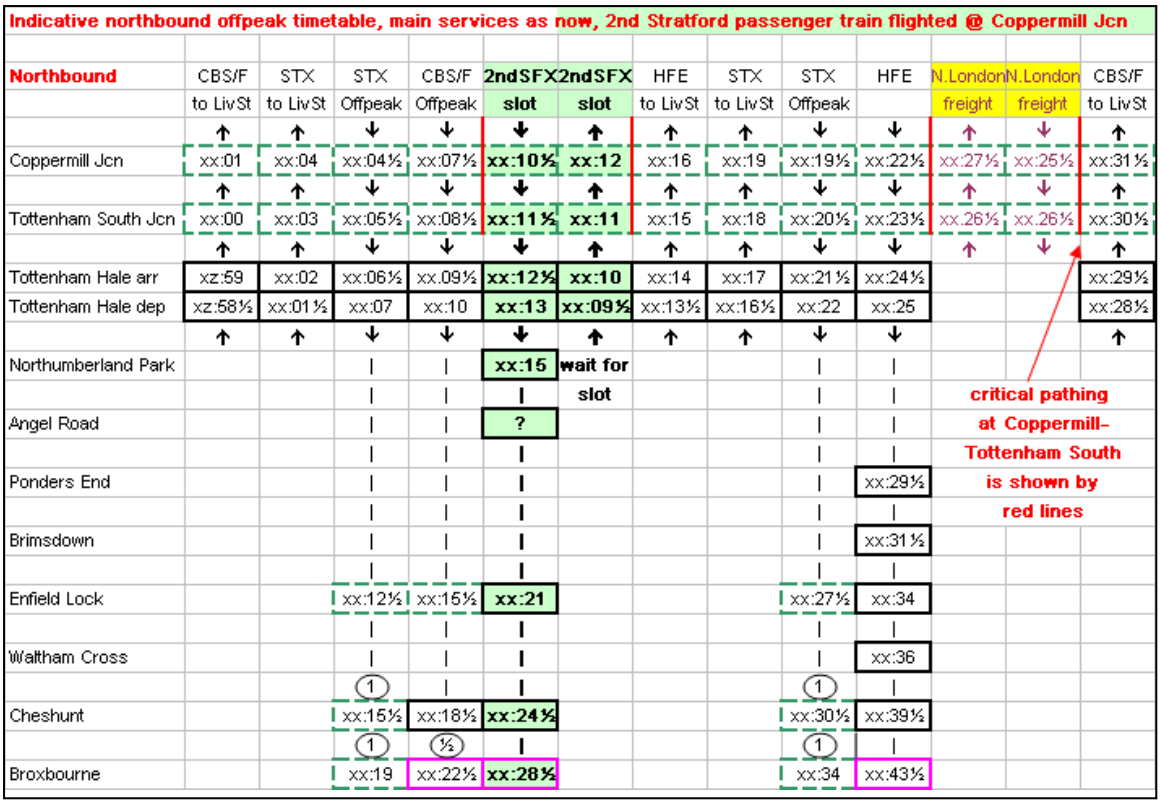
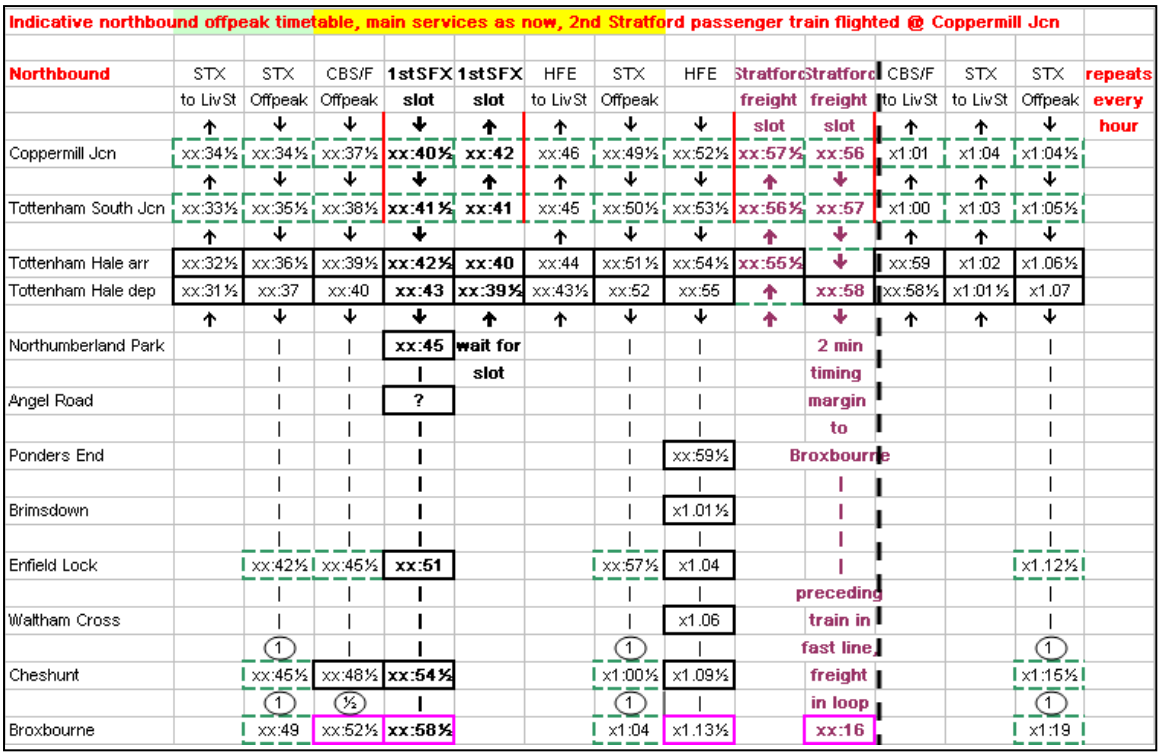
second trains through Tottenham Hale. An all-stations service could not reach Broxbourne before being overtaken by a fast offpeak Stansted train, and would have to terminate at Cheshunt bay platform, connecting there for trains beyond. This would also require availability of the Cheshunt bay platform for part of every half hour.

- There would then be enough margin at Tottenham South and Coppermill Jcns to run daytime North London-Stratford freight paths via South Tottenham, at least once every two hours.





240. As now, the 16 minute timing allows three (or, by using the margins, possibly four) intermediate stations to be served between Tottenham Hale and Broxbourne. The current stations as shown above are: Northumberland Park, Enfield Lock and Cheshunt. It would be possible to serve a combination of: Northumberland Park, Angel Road, Ponders End and Enfield Lock stations, then non-stop to Broxbourne. Passengers travelling between intermediate Lee Valley stations and Brimsdown, or between London

area stations and those in Hertfordshire, could connect at Ponders End or Enfield Lock, to and from the Hertford East trains.

241. This creates a 2 tph service at and between all Upper Lee Valley stations, some via connections, and jointly with Hertford East trains, a 4 tph frequency at designated stations.

242. However, the case for this stopping pattern will depend on Angel Road being well connected with the new nearby developments at Meridian Water, and marketed to serve those, in order to be attractive to passengers. At that point, it might be relevant also to review the stopping pattern of the offpeak Hertford East trains, so that the local rail services better supported the required accessibility of the regenerated catchments along the Upper Lee Valley.

243. In the absence of new track infrastructure or signalling, or new high acceleration trains, the limiting constraint on stopping patterns will continue to be the overall time between Tottenham Hale and Broxbourne, and the freight pathing limitations south of Tottenham Hale. Any further stops north of Tottenham Hale inserted in any passenger train service would need to be substituted by another's deletion.

244. Operation of faster offpeak trains is also a consideration. There is scope for some tighter offpeak timing on Stansted Express, at least twice per hour, but not every quarter hour while there is a combination of one freight and 2 Stratford trains per hour having to run all the way to Broxbourne.

Proposal 2C: medium term potential for improved local services at Upper Lee Valley stations

245. The discussion on Lee Valley passenger services has focused primarily on what may be achievable within current track, signalling and train availability. Since the services work within existing or foreseen investment, they may be operable by the December 2011 timetable, as part of SLC2, or not later than the implementation date for the additional Olympics train reversing facilities at Stratford platforms 11 and 12.

246. Throughout the analysis, the key constraints have been:

- Lack of additional peak capacity into Liverpool Street until after Crossrail is open (earliest date, 2017/18).
- Restrictive peak paths between Tottenham and Broxbourne.
- Lack of intermediate reversing points or loops (except Cheshunt) in useful locations south of Broxbourne, that might allow an additional local service to get out of the way of a following fast service.
- In the offpeak, further pathing constraints imposed by the routeing and timing of freight trains, particularly south of Tottenham Hale.

247. The best frequency that it has been possible to suggest at intermediate stations in the Upper Lee Valley is 4 trains per hour at selected stations in the peak and offpeak, and 2 tph at other stations. The link to Stratford is capped at 2 tph in peak and offpeak by the various pathing limitations.

248. A consequence of prioritising access to Upper Lee Valley stations in Greater London, is the withdrawal or reduction of the Stratford service at Waltham Cross or Cheshunt stations, north of the Greater London boundary. Mitigation has been proposed for their peak period service, where possible.

249. The regeneration and development timescales for the Upper Lee Valley are already proposed, and are to be subject to public examination in 2010. Transport consultants JMP have modelled for LB Enfield the forecast change in rail usage when the Lee Valley line offers 4 or 8 local trains per hour.

250. The rate of progress towards full 4-tracking is uncertain with the present national considerations of affordability and value for money. A first draft layout presented by the Departmewnt for Transport to the West Anglia Routes Group in 2009 focused on additional tracks in the Coppermill and Tottenham area, and a third track north to Northumberland Park. These plans will be subject to further development.

251. The rationale for the DfT's proposal is understood. It addresses the point of maximum performance risk and pathing constraint at the southern end of the Lee Valley. However the sequencing of trains would still be constrained northwards towards Cheshunt and Broxbourne. A complete 4 tph local service, aimed for by London Boroughs and Transport for London, is not guaranteed.

252. So are there other options, arising from the analysis in this current report, that could form a medium-term basis for an improved local service, beyond the timing changes already proposed but ahead of a larger investment in 4-tracking?

253. To make a real difference, there should be potential for 4 tph operation south of Tottenham Hale to Stratford, and further increases to local services at some or all Upper Lee Valley stations.

254. Points to consider are that:

- To insert additional reversing points into a intensively operated 2-track railway will require close attention to pathing margins in order to maintain performance.
- Such reversing points may come with a significant cost, but might have only a short life if some 4-tracking were then authorised.
- An additional 2 tph south of Tottenham Hale to Stratford will introduce a further, pressure on peak operations if these trains are inserted into the existing conflicted track layout at Coppermill Jcn, and will not be operable in the offpeak with the present freight paths.

Pre 4-tracking infrastructure for additional Stratford-Tottenham Hale service

255. The starting point for an additional track option is therefore to address the shortcomings south of Tottenham Hale.

256. It is suggested that providing a third track southwards should be useful in future options, from a new eastern platform at Tottenham Hale which is intended as part of planned station rebuilding. This could if necessary be a temporary platform starting south of the Ferry Lane road bridge, accessed from the southbound Platform 1.

257. A third track would be laid to conform as far as possible with eventual 4-tracking plans, and rejoin the Stratford line south of Coppermill Jcn. The joining point with the Stratford might be close to Lea Bridge (closed) station, to allow freight trains to be held between the new junction and Coppermill Jcn. It would be signalled for passenger train use, two-way, as a single line. Beyond, the existing 2-track Stratford line would be used as a 'dynamic loop' for the additional train in use, to pass other services on that section.

258. Cost would be signalling and points north of Lea Bridge (closed) station, up to 1¾ miles of single track combined with refurbishment of the formation, and a new platform (assumed 4-car). The track would allow an additional shuttle service between Stratford and Tottenham Hale, increasing peak frequency to as high as 12-15 minute headways if required, in conjunction with the existing and proposed Stratford services.

259. By keeping costs to a minimum, it may be possible to establish a viable Benefit Cost Ratio. This would merit investigation to understand the revenues and wider benefits of a high frequency connector between the Stratford and Tottenham Hale hubs.

Pre 4-tracking infrastructure for additional rail service north of Tottenham Hale

260. Northwards from Tottenham Hale, fast trains take only 5-5½ minutes between that station and Brimsdown. This has a direct effect on the ability to path another local train. As an example, a peak period local train starting from Tottenham Hale as a fourth train in a sequence of 3 minute departures (Stansted, Cambridge, Hertford then this), would have to be onto another track before it reached its third stop at Ponders End. This is to adhere to the requirement for a clear 3 minute headway on the main line – the next fast would be only 2½ minutes behind at Ponders End station.

261. The outline peak period timetable discussion in Proposal 2A achieves a 4 tph capability at all stations except Northumberland Park and Angel Road, where 2 tph is offered.

262. The core questions to influence when additional train services are merited, are: "when is Angel Road station to be better connected with its new catchments, and become known as 'Meridian Water' ", and "is this when the station needs a 4 tph service to be offered?" . If this is within the next 2-4 years, then awaiting 4-tracking may not meet the strategic planning objective, and an alternative method of achieving a better rail service will be desirable, particularly to and from Tottenham Hale hub.

263. Options are:

- Change the stopping pattern of the Hertford East train service, to give a higher priority to the new Meridian Water (*aka* Angel Road) station.
- Acquire new high acceleration trains which permit an additional local station to be served without new tracks being required.
- Extend the Stratford-Tottenham Hale shuttle, by entirely new track along the path of the planned 4-tracking. This would be complex in the Northumberland Park area, because of route clearance necessary and alterations to the level crossing, or its replacement by a bridge or underpass.
- Extend the Stratford-Tottenham Hale shuttle, by rejoining the main line north of Tottenham Hale station and diverging onto a separate single line before or after Angel Road station. Trains would either reverse at Meridian Water/Angel Road or continue on a separate track to a third platform at Ponders End. In that case, the possibility of having an intermediate platform at Picketts Lock could be investigated.

264. With a journey time each way between Tottenham Hale and Angel Road of 4 minutes, a 12-15 minute shuttle could be operated with one train if line paths permitted. However that frequency would only be plausible if there was a separate track throughout. More likely would be a lower frequency, subject to detailed assessment, achieving 4 tph jointly with existing trains and the suggested Stratford-Tottenham Hale shuttle.

265. Other options, such as having a more flexible three-platform layout at Tottenham Hale, move any infrastructure project towards the 4-tracking proposals in timescale as well as costs.

266. Enfield should consider closer analysis of these limited infrastructure proposals, in conjunction with modelling of economic benefits of early provision of better rail services, ahead of 4 –tracking.

267. This work would inform the Department for Transport and Greater Anglia franchise bidders of rail service and infrastructure options additional to and earlier than the 4-tracking scheme.

Station facilities

268. The success of local passenger services depends on good and usable station facilities as well as attractive train timetabling.

269. The National Express franchise was not strongly incentivised to improve passenger facilities at local intermediate stations, and this needs to be remedied with the new franchise. This includes passenger security, higher quality passenger facilities and other standards including staffing. There is now a new 'norm' agreed between Department for Transport and Transport for London for suburban stations in South London with the new Southern franchise. This standard could become a baseline at local stations in North and NE London.

270. The lack of station gating at local stations in North and NE London has several impacts:

- loss of fares revenue, which could be ploughed back into local facilities
- concerns about passenger security with stations not accredited under the Secure Stations scheme.

271. The Department and franchisees could consider introduction of gating at stations which show high levels of passenger use, above 500,000 combined entry and exit passengers per annum. As a norm, this is broadly when gating becomes cost-effective to protect urban revenues, in addition to 'click-in, click-out' readers. A proportion of revenues gained can be re-invested in the stations.

272. The expectation is that the new Greater Anglia franchise will run for at least 10 years. This will take the franchise beyond the 2020 European deadline for modifying passenger trains to meet disabled access standards, as is recognised in the franchise consultation document.

273. As part of defining a core network which ensures full facilities for mobility-impaired passengers, those stations which exceed a norm should be prioritised – for example 500,000 passengers to align with other investment. This is under 750 stations on the entire National Rail network.

274. There is an important example within LB Enfield of inadequate access, whichever norm is adopted. Edmonton Green has nearly 2m passengers in the Office of Rail Regulation's 2008-09 station usage survey. It is the 208th busiest station in Britain, counting entries and exits, so within the top 10 per cent of stations. It will be busier in 2009-10 when ORR counts in Oyster Pay-as-you-go. For entry and exit passenger numbers, it is in the same league as Crewe (213th), Durham (207th)and Swansea (206th).

275. Other LB Enfield stations on the Greater Anglia lines above 500,000 entries and exits in 2008-09 are: Enfield Town (1.39m, already with level access); Bush Hill Park (0.72m); Enfield Lock (0.60m, already with level access); and Brimsdown (0.52m).

276. There is a good case for Edmonton Green and other busy local stations to be prioritised within the new franchise, and funded through the Access for All programme, to meet the European disabled access standards well before 2020.