

Lack of Orbital Rail Connections

- 2.10 Comparative analysis of public transport and road journey times demonstrates the impact that limited orbital rail provision has upon the ability to travel by public transport
- 2.11 Whilst there are orbital bus services, these are projected to become subject to similar levels of congestion as other highway movements

Lack of Orbital Connectivity between Growth Areas

- 2.12 Connections between the identified Growth Areas (e.g. OPDC and Heathrow), and with the major Town Centres, will be a key issue in facilitating economic growth across the sub-region
- 2.13 Even allowing for the spatial distribution of the sites across the sub-region (with peripheral sites inevitably less inter-connected) there are a range of constraints between some Growth Areas
- 2.14 Key issues include connections to and from:
 - the four 'Growth Areas' within Barnet
 - Harrow & Wealdstone
 - Southall
- 2.15 In addition, there are also limitations in the orbital connections to Heathrow from other Growth Areas and Town Centres across the sub-region

Developing Schemes

- 2.16 The baseline analysis has provided the evidence base that there are a range of significant constraints affecting orbital travel across West London. More significantly a number of these constraints affect connectivity to, from and between 'growth areas' within the sub-region, in particular with their links to Major Sub-regional Town Centres.
- 2.17 These transport constraints will restrict the movement of people and goods between these areas impacting upon the scale of housing, employment and business (GDP) growth that can be achieved.

Scheme Types

- 2.18 There are a range of measures that can be investigated to begin to mitigate against the identified transport constraints. These include measures to manage overall demand for travel and to influence the choice of mode made by travellers. Whilst these options should be pursued, there are unlikely to be sufficient in themselves to resolve the issues identified, unless delivered alongside infrastructure schemes.
- 2.19 In terms of infrastructure measures that will have a positive impact at a sub-regional level, these are primarily limited to the types of scheme set out within Table 2.1.

Table 2.1 Indicative Sub-regional Infrastructure Scheme

Infrastructure Type	Category of Scheme	Indicative schemes
Highway Network Enhancements	Expand junction capacity	Signalisation Additional approach lanes/expanded junction Grade separation
	Expand link capacity	Lane capacity
	Provide new capacity	New highway links
	Intelligent transport systems	Managed highway corridors
Bus Network Enhancements	Increased service capacity	Higher frequency services Larger vehicles
	New service provision	New routes
	Bus priority measures	Priority at junctions (physical, technological) Bus lanes
Rail Network Enhancements	Increased service capacity	Higher frequency services / new service patterns / signal enhancements Longer trains / higher capacity trains
	New heavy rail links	Passenger services on freight routes Rail spurs / junctions Rail links
	Light transit schemes	Light rail / trams / bus-based transit

- 2.20 Whilst bus provision will continue to be an important aspect of orbital travel in the short and medium term, the evidence base dictates that underlying highway network congestion will restrict the role that buses can play in providing strategic connectivity across the sub-region.
- 2.21 The primary focus of sub-regional infrastructure investment should therefore be around road and rail investment to provide the required capacity to support the levels of growth forecast. Whilst the use of new technologies will be an important facet in maximising the use of the transport networks, the evolving spatial distribution of housing and employment densities will require new transport infrastructure links to provide effect connections between the developing areas of the sub-regional economy.

3. Scheme Option Development

Overview

- 3.1 The Part One Evidence Base has demonstrated that there are both current and projected future constraints on orbital travel across the sub-region and that these will impact upon connectivity between the significant 'growth areas' and major sub-regional town centre in West London.
- 3.2 The primary focus of enhancements should be along the A406 and A312 corridor, focusing on both road and rail provision, as well as potential connections across Barnet and towards Harrow, as well as connections from Uxbridge to Heathrow.

Developing a 'Long-List' of Schemes

- 3.3 This section sets out a 'long list' of scheme options that could offer some potential to address the identified constraints, with a description of the key attributes of each scheme and the role they would play in enhancing connectivity, in particular between the Growth Areas and Major Town Centres.
- 3.4 Three broad types of scheme are considered:
- Orbital rail schemes
 - Orbital bus rapid transit schemes
 - Orbital road schemes

Orbital Rail Schemes

Overview

- 3.5 The Evidence Base identified a range of strategic orbital connections for which there is currently limited, or no, rail provision. The development of schemes to address these connectivity gaps is challenging within a built-up environment where land availability restricts the opportunities to construct new rail lines. An initial assessment has, therefore, been undertaken of freight lines and disused lines to gain an understanding of potential infrastructure that could be (re)instated for passenger rail services.

Freight Lines and Disused Lines

- 3.6 An initial approach to identifying potential for rail schemes was to review all existing rail freight lines and disused rail lines across the West London sub-region or within neighbouring boroughs. From this process a total of 14 separate lines have been identified that could, theoretically, facilitate alternative passenger service routes. All these lines either currently, or historically, connect to the existing operational passenger rail network and so, if deliverable, would permit not only new connections in themselves, but also the potential to provide wider connectivity across the sub-region.
- 3.7 At this stage of the process, no pre-judgement was applied as to the suitability of any of these freight or disused lines in meeting the study aim, nor were any others lines intentionally left of the list.

3.8 The 14 identified freight and disused lines are summarised below and presented within Figure 3.1.

- 1) Denham/West Ruislip – Uxbridge High Street
- 2) Uxbridge Vine Street – West Drayton
- 3) West Drayton – Colnbrook - Staines
- 4) Ruislip Gardens - Ickenham
- 5) Greenford – West Ealing
- 6) Southall – Brentford Goods
- 7) Edgware – Mill Hill East
- 8) Finsbury Park – Highgate – Alexandra Palace
- 9) Neasden Junction - Neasden South Junction
- 10) Dudding Hill Lines (Cricklewood Acton Wells Junction)
- 11) Acton Canal Wharf Junction
- 12) Acton East Junction
- 13) Junction Road Junction to Carlton Road Junction
- 14) Harringay Jn – Harringay Park Junction

Figure 3.1 Freight Lines and Disused Rail Lines



3.9 The diagrammatic representation indicates there are a number of existing freight or disused rail lines that provide some form of orbital connectivity. Others, whilst not specifically for orbital movements, may facilitate wider orbital movements through the provision of connections between other existing lines.

3.10 A brief description of each identified line is provided below.

R1. Denham/West Ruislip – Uxbridge High St

- Status: Closed in 1939
- Description: Land either side of line now flooded brick pits or reservoirs
- Potential role: Link Central Line/Chiltern Mainline to Uxbridge as alternative to Metropolitan Line. Potential to link Uxbridge to Old oak Common or Paddington via Greenford. Note: the same role could be provided by 4. Ruislip Gardens – Ickenham Link
- Potential influence on Growth Areas/Major Town Centres: Connectivity from Uxbridge to Wembley and OPDC

R2. Uxbridge Vine St – West Drayton

- Status: Closed in 1962
- Description: Formation almost entirely built over
- Potential role: Link from Uxbridge to Heathrow/Great Western Mainline
- Potential influence on Growth Areas/Major Town Centres: Connectivity from Uxbridge to Heathrow and Southall

R3. West Drayton – Colnbrook - Staines

- Status: West Drayton – Colnbrook mothballed; Colnbrook to Staines closed
- Description: Operable to Colnbrook – but Heathrow new runway may obliterate it. South of Colnbrook M25 J14 to J13 has covered formation
- Potential role: Link from West London to South West Trains network at Staines
- Potential influence on Growth Areas/Major Town Centres: n/a

R4. Ruislip Gardens – Ickenham

- Status: London Underground stock transfer line
- Description: In situ but would require alterations Ruislip LUL Civil Engineers Depot
- Potential role: Link Central Line/Chiltern Mainline to Uxbridge as alternative to Metropolitan Line. Potential to link Uxbridge to Old oak Common or Paddington via Greenford. Note: the same role could be provided by 1. Denham/West Ruislip – Uxbridge High Street
- Potential influence on Growth Areas/Major Town Centres: Connectivity from Uxbridge to Wembley and OPDC

R5. Greenford – West Ealing

- Status: Open
- Description: Underutilised currently served by shuttle from West Ealing
- Potential role: Various potential options for linking Chiltern routes to Great Western Mainline – but duplicated by Greenford – Old Oak Common which would link to HS2. Extend Crossrail Paddington terminators to Uxbridge
- Potential influence on Growth Areas/Major Town Centres: Limited unless delivered alongside other schemes (e.g. 1 or 4)

R6. Southall – Brentford Goods

- Status: Open to freight traffic as far as Transport Avenue
- Description: Deliverable as far as aggregates terminal – closed and built on thereafter. Link to SWT Windsor Lines only possible by crossing Great West
- Potential role: Potential to link Southall into South West Trains network. Junction faces Reading at Southall so no easy access to east towards Ealing/Central London
- Potential influence on Growth Areas/Major Town Centres: Connectivity between Southall and The Golden Mile. Greater potential if scheme could connect to South West Trains network e.g. connections to Hounslow.

R7. Edgware – Mill Hill East

- Status: Closed in 1930s/40s
- Description: Formation largely unbuilt on but would require crossing under M1 at Mill Hill Broadway
- Potential role: Extension of Northern Line from Mill Hill East to Edgware
- Potential influence on Growth Areas/Major Town Centres: Connectivity between Mill Hill East and Edgware

R8. Finsbury Park – Highgate – Alexandra Palace

- Status: Closed (date unknown)
- Description: Route intact some building on Alexandra Palace branch, part of route used as footpath
- Potential role: Primarily a radial route with little direct role from a West London Sub-regional context
- Potential influence on Growth Areas/Major Town Centres: Connectivity between Mill Hill East and Finsbury Park

R9. Neasden Junction - Neasden South Junction

- Status: Open to freight
- Description: Fully operational
- Potential role: Potential to link Uxbridge/Amersham/Aylesbury to Old Oak Common via Dudding Hill Lines
- Potential influence on Growth Areas/Major Town Centres: Connectivity from Wembley to OPDC with Schemes 10

R10. Dudding Hill Lines (Cricklewood Acton Wells Junction)

- Status: Open to freight
- Description: In situ and links possible from MML slow lines to Dudding Hill Lines from Hendon and north, but no link from slow lines from Cricklewood station and south thereof
- Potential role: Link MML to Old Oak Common via new interchange on North London Line
- Potential influence on Growth Areas/Major Town Centres: Connectivity from Cricklewood/Brent Cross to OPDC. Additional connections to Wembley with Scheme 9. Additional connection to Ealing with Scheme 12. Potential to connect with The Golden Mile and Hounslow with Scheme 15.

R11. Acton Canal Wharf Junction

- Status: Open to freight
- Description: In situ links North London Line to West Coast Mail Line – but would need flyover to link to Euston – Watford DC lines rather than West Coast Mail Line fast/slow lines
- Potential role: Watford – Old Oak – Richmond service via Euston – Watford DC lines
- Potential influence on Growth Areas/Major Town Centres: Potential connections from Harrow and Wembley to The Golden Mile and Hounslow with Schemes 10 and 15.

R12. Acton East Junction

- Status: Open to freight
- Description: Links Great Western Main Line with North London Line
- Potential role: Link North London Line to Great Western Main Line and services to Heathrow
- Potential influence on Growth Areas/Major Town Centres: Connectivity from Ealing to Cricklewood/Brent Cross with Scheme 10.

R13. Junction Road Junction to Carlton Road Junction

- Status: Open to freight
- Description: Open but to access Dudding Hill line at present requires at grade crossing of Midland Main Line
- Potential role: Link Barking – Gospel Oak to Dudding Hill Lines and North London Line
- Potential influence on Growth Areas/Major Town Centres: Connection from Cricklewood/Brent Cross to New Southgate with Scheme 14.

R14. Harringay Jn – Harringay Park Junction

- Status: Open to freight
- Description: In situ but access from Southbound ECML is complex
- Potential role: Route inner suburban Great Northern services onto North London Line
- Potential influence on Growth Areas/Major Town Centres: Connection from New Southgate to Cricklewood/Brent Cross with Scheme 13.

Alterations to current rail network routes and service patterns

- 3.11 In addition to considering rail scheme along alignments that are not currently utilised for passenger services, consideration has also been given to potential alterations to routes and service patterns utilising existing infrastructure.

R15. Kew East Junction / Old Kew Junction Chord

- **Status:** Open
- **Description:** in situ
- **Potential Role:** Permits rail service from Old Oak Common to Hounslow
- **Potential influence on Growth Areas/Major Town Centres:** Connection from Hounslow/The Golden Mile to OPDC

New Rail Alignments

- 3.12 The final alternative approach to (re)opening existing or disused passenger routes is to create entirely new rail alignments. This clearly not only requires substantial infrastructure investment but can also be extremely challenging within an urban environment.
- 3.13 Whilst there are pockets of unbuilt land across the whole of the sub-region, these invariably are clusters of land and do not form natural transport corridors. In particular, in the vicinity of town centres, as well as many of the regeneration areas, there is rarely available land through which to develop a new rail alignment. Any new alignments are, therefore, as a minimum, likely to require connection with existing alignments on the approaches to major centres.
- 3.14 Previous work has been undertaken to consider potential new rail alignments to connect into Heathrow. A western access (WRATH) has already received backing from Central Government but would not directly benefit West London. There are also a range of proposals for a southern access to Heathrow from Feltham, Ashford and Staines. Whilst it is recognised that, from amongst the West London Sub-Region, the benefits of the southern access schemes would primarily be for residents and businesses within LB Hounslow, it is still considered a scheme of sufficient magnitude, which improves orbital travel, to be included within the initial long-list of schemes.
- 3.15 To deliver any additional new rail alignments in West London is likely to require either substantial demolition of existing properties or tunnelling. Neither option is particularly attractive, politically or financially.

R16. Heathrow Southern Access

- **Status:** Proposal for new rail alignment
- **Description:** Variety of proposed alignments from Feltham, Ashford, and Staines
- **Potential Role:** Permits rail services to connect with South West Trains line
- **Potential influence on Growth Areas/Major Town Centres:** Connection from Heathrow to Hounslow

Orbital Road Schemes

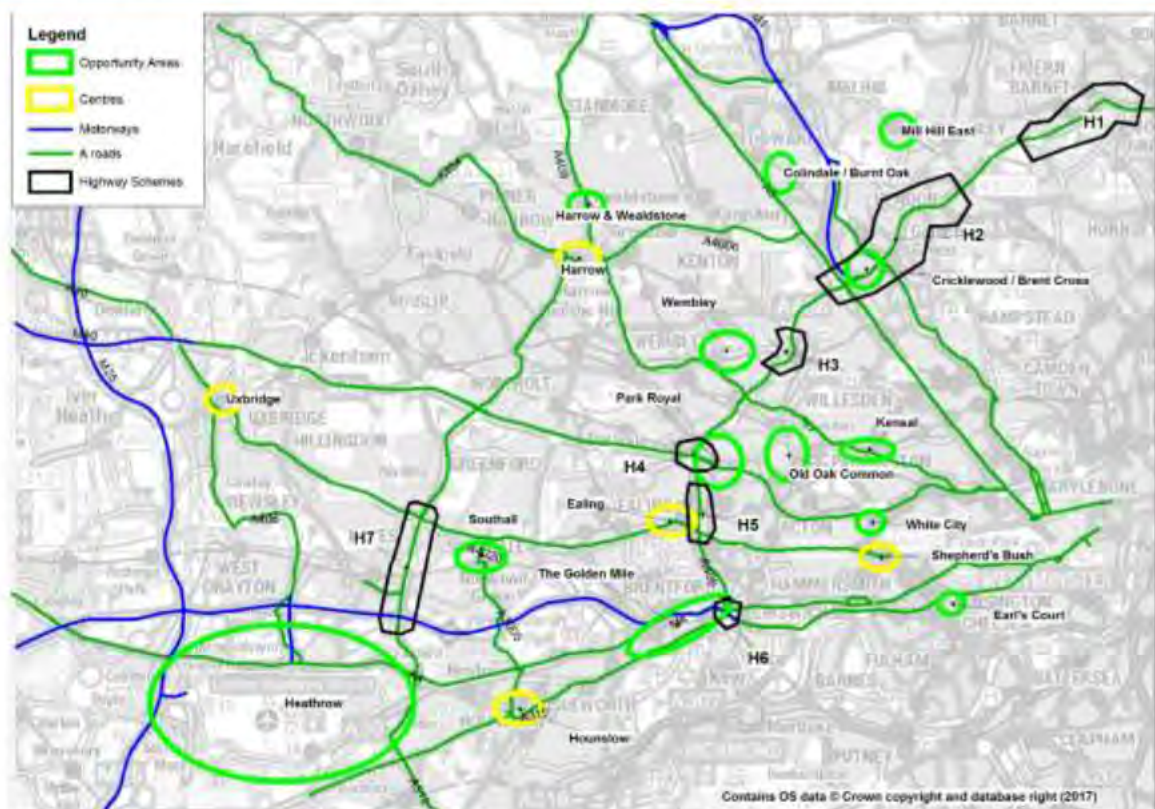
Overview

- 3.16 The Evidence Base for the study has demonstrated a range of capacity constraints and congestion hotspots across the two main orbital road corridors of the A406 and A312/A4006. A number of these areas suffer not only from the scale of delays, but also the degree to which the delays can vary from day-to-day, creating uncertainty for strategic orbital road trips. The future modelling indicates that this situation is likely to deteriorate significantly for some parts of the network.
- 3.17 An initial assessment has been undertaken to examine specific areas where investment in highway infrastructure could generate positive benefits for orbital road travel. The type of schemes that are likely to be deliverable will include increasing of link capacities (e.g. providing additional carriageway provision) or expanding, or enhancing the operation, of junctions. In a similar manner to the analysis of rail provision, it is unlikely that new strategic road alignments can be delivered due to land constraints requiring expensive tunnelling.

Capacity Enhancements and Operational Improvements

- 3.18 For the purposes of the scheme development and subsequent appraisal process, seven conceptual locations for capacity enhancements and/or operational improvements have been identified for consideration. These are set out in Figure 3.3 and described in further detail below.

Figure 3.2 Potential Highway Capacity Enhancements and Operational Improvements



H1. A406 – New Southgate to Colney Hatch

- Status: Proposed link capacity enhancement
- Description: Enhancements to improve journey time reliability
- Potential influence on Growth Areas/Major Town Centres: Connectivity from New Southgate to Cricklewood/Brent Cross

H2. A406 – Brent Cross (A5 to A1)

- Status: Proposed link and junction capacity enhancement
- Description: capacity enhancements to reduce current and projected delays across these four major interchanges on the A406
- Potential influence on Growth Areas/Major Town Centres: Cricklewood/Brent Cross to New Southgate, Wembley, and OPDC.

H3. A406 – Brent Park

- Status: Proposed link and junction capacity enhancement
- Description: Capacity enhancement to reduce delays caused by access/egress from Brent Park area
- Potential influence on Growth Areas/Major Town Centres: Connectivity from Cricklewood/Brent Cross to Wembley and OPDC

H4. A406 – Hangar Lane Junction

- Status: Proposed junction capacity enhancement
- Description: Junction enhancement to reduce conflicts of movement through the junction to reduce delay
- Potential influence on Growth Areas/Major Town Centres: Connectivity from Wembley and OPDC to The Golden Mile

H5. A406 – Hangar Lane (A40) to Uxbridge Road (A4020)

- Status: Proposed A406 link capacity enhancement
- Description: Capacity enhancement or improvement to operational performance of section of A406 to reduce overall delays and improve journey time reliability
- Potential influence on Growth Areas/Major Town Centres: Connectivity from Wembley and OPDC to The Golden Mile

H6. A406 – M4 Junction

- Status: Proposed A406/M4 junction capacity enhancement
- Description: Junction enhancement to reduce conflicts of movement through the junction to reduce delay
- Potential influence on Growth Areas/Major Town Centres: Connectivity from Wembley and OPDC to The Golden Mile