Strategic Spatial Planning Liaison Group

First meeting to be held on Friday 7th March, 2014 at 2pm at City Hall, Queen's Walk, London.

Agenda

1 Welcome, Introductions and Apologies

2 Confirmation of Richard Linton as Chair

3 Appointment Vice-Chair

4 Agree Terms of Reference

5 Agree scope and ways of working

6 Confirm forward calendar of meetings

7 FALP consultation and issues arising – verbal update (Richard Linton)

8 London Infrastructure Investment Plan 2050 – update (Jorn Peters, GLA)

9 Strategic Spatial Policy co-operation issues of interest to the group (Lee Searles)

Working Group members (at 6/3/14)

Name	Organisation	Email
Richard Linton	GLA (Chair)	Richard.linton@london.gov.uk
John Lett	GLA	john.lett@london.gov.uk
Lee Searles	Secretary	Lee_searles@sky.com
Sue Janota	Surrey County Council	Sue.janota@surreycc.gov.uk
Jack Straw	Surrey Planning Officers Association/Mole Valley DC	Jack.straw@molevalley.gov.uk
Paul Donovan	Hertfordshire County Council	Paul.Donovan@hertfordshire.gov.uk
Des Welton	Hertfordshire Planning Officers Group Co-ordinator	des.welton@ntlworld.com
Matthew Jericho	Essex County Council	matthew.jericho@essex.gov.uk
Gary Guiver (sub Clair Stuckey)	Essex Planning Officers Group/Tendring DC (sub Claire Stuckey, Chelmsford BC)	gguiver@tendringdc.gov.uk (Claire.Stuckey@chelmsford.gov.uk)
Richard Hatter	Thurrock Council	Rhatter@thurrock.gov.uk
Tbc	Buckinghamshire County Council	
Alison Bailey	Buckinghamshire Planning Officers Group/South Bucks DC	alison.Bailey@SouthBucks.gov.uk
Andrew Roach	Kent County Council	Andrew.Roach@kent.gov.uk
Tania Smith	Kent Planning Officers Group/Dartford BC	tania.smith@dartford.gov.uk
Tara Butler	South London Partnership/LB Merton	tara.butler@merton.gov.uk
Steve Barton	West London Alliance/West London Planning Policy Group/LB Ealing	BartonS@ealing.gov.uk
Steve Walker	Environment Agency	Steve.walker@environment-agency.gov.uk
Nick Woolfenden	South East England Councils	NickWoolfenden@secouncils.gov.uk
Cinar Altun	East of England LGA	Cinar.altun@eelga.gov.uk
Tbc	London Councils	

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4. Terms of Reference

It is proposed that the following terms of reference be adopted for an initial period of one year after which they should be reviewed or reconfirmed.

The working group exists to:

- Promote shared understanding and use (where appropriate) of strategic spatial planning policy assumptions, issues and responses.
- Improve shared understanding and use of common data, standards and monitoring.
- Foster dialogue about policy options for strategic spatial planning policies in London and the wider metropolitan area.
- Discuss how shared approaches can strengthen the case for strategic transport, economic development and environmental infrastructure delivery.
- Communicate/disseminate working group findings as appropriate.

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5. Working Group Scope and ways of working

Scope of activities

This is not intended to limit the activities of the working group, but sets out how, with the agreement of its members, the working group could undertake a range of activities:

- Provide a forum for discussion of topical strategic spatial planning policy issues.
- Act as a technical sounding board for the development of London Plan policies.
- Disseminate information, with the aim of improving awareness of particular technical issues.
- Be a conduit for consult between local authorities and others on particular technical issues.
- Highlight common approaches as good practice.
- Feedback to Government on key technical aspects of planning system operation in London and the wider metropolitan area.
- Undertake research, either through the efforts of its members, through resources in host organisations, or by commissioned work funded from sources to be identified.

How meetings will operate

To provide some certainty, Meetings will be organised in the following way:

- Meetings of the working group could be held four times per annum.
- Meetings would be held in London, normally at the offices of the GLA and normally (possible) on a Friday at 2pm.
- Meetings would normally last no more than 2.5 hours.
- The group would be chaired by an officer from the GLA with a vice-chair from a local authority outside London.
- A secretary would be identified to support and resource the group.

Agendas

The agenda planning process is set out below:

- One month prior to each meeting, a call for agenda items would be made.

- A meeting or teleconference would be held between Chair, Vice-Chair and secretary to agree agendas.
- Each agenda would be despatched no later than one week prior to the meeting.
- At each meeting, the following standing items would be included:
    - New items for consideration (enabling new issues to be raised at the meeting)
    - Key actions report (based on the group's agreed actions)
    - Plans update (new issues and cases relevant to the group)
    - Confirm notes of last meeting
- One or two key discussion topics at each meeting, relating to the issues on the radar of the group. This could be informed by papers and/or presentations to the group, with actions proposed where appropriate.
- With the agreement of the group and others, a note summarising its work would be written and disseminated via the GLA website and local authority networks.

Resources

The Working Group will be supported by a secretary resourced by the GLA. The role of the secretary will be to:

- Undertake and manage the call for agenda items
- Convene a discussion with the chair and vice-chair to agree the agenda
- Commission papers and directly prepare papers for meetings
- Ensure venues are booked and are appropriately set up.
- Liaise with other participants who may be attending meetings
- Support the chair and vice chair at the meetings
- Takes notes of the meetings and log agreed actions
- Progress chase actions to delivery in-between meetings
- Collect intelligence for meetings in terms of relevant plan/issue updates
- Support the identification of emerging issues for the working group through liaison with working group members and wider stakeholders.

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Calendar of Forward Meetings

As outlined, the group will meet four times each year, with dates (to be confirmed) as follows:

Date	Potential items (to be logged as they arise)
7th March 2014	
6th June 2014	
? September 2014 (date coming)	
5th December 2014	
6th March 2015	

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Development, Enterprise and Environment

Ronald McKay
Bedford Borough Council
Consulting Bedford
FREEPOST ANG5840
Bedford MK40 1ZD

Our ref: D&P/ LDF39/LDD01/HS01
Date: 20 February 2014

Dear Ronald,

Planning and Compulsory Purchase Act 2004 (as amended); Greater London Authority Acts 1999 and 2007; Town and Country Planning (Local Development) (England) Regulations 2012

Re: Bedford Borough Council Local Plan 2032 Consultation

Thank you for your letter consulting the Mayor of London on the Issues and Options stage of Bedford Borough Council's DPD document.

In developing these options and addressing the Duty to Cooperate, it should be recognised that London is experiencing significant population growth. This is expected to increase from 50,000 pa anticipated in the 2011 Plan to over100,000 pa until the end of the present decade, and is the core concern of Further Alterations to the London Plan which are currently subject to consultation.

There is considerable uncertainty as to the long term trajectory of this growth, not least because of the effects of the recent recession on the housing market in London and the wider south east. The central demographic assumption in the Further Alterations expects growth to average 75,000 pa in the 25 years to 2036. Depending on the length of time taken to tackle the backlog of housing need, this could generate a requirement for 49,000 – 62,000 homes pa.

To address this requirement the Mayor will seek to accommodate London's growth within its boundaries. The Further Alterations therefore propose increasing London's identified housing supply target by a third to 42,000 pa and introducing new policy to bring forward further capacity through high density development at locations within London which are well served by public transport.

Despite these proposed policies, there could still be a 'gap' between demand and supply of housing in London. Until the demographics 'bed down' it is not clear how big the gap will be.

Planning authorities in the wider south east with housing markets which are influenced by that of London are strongly advised to take account of these uncertainties when addressing NPPF paragraph 47. This requires authorities to boost significantly the supply of housing by using their evidence base to ensure that their Local Plan meets full objectively assessed needs.

The balance of evidence suggests that, as the housing market across the wider region eases, out-migration from London may, at a minimum, revert closer to its longer term trend. Currently, this suggests that CLG's 2008 household projections may provide more authoritative evidence for assessing local housing needs beyond London than CLG's 2011 projections. It will also be noted that the 2011 projections extend only to 2021 and that CLG provides qualifying guidance on their use.

Recognising that London and the wider south east may face long term challenges in accommodating growth pressures, the Mayor intends to inform his forthcoming, non-statutory 2050 Infrastructure Plan with a range of 'what-if' scenarios. These scenarios will explore different ways of accommodating such pressures both within and outside London including urban extensions and development associated with new or enhanced transport infrastructure.

The Mayor has already begun consultation on proposals for the emerging Infrastructure Plan and it is hoped that as this develops it will inform consultations on the Further Alterations to the London Plan. It might also usefully inform preparation of Local Plans beyond London.

The Mayor would therefore encourage Bedford Borough Council and other relevant local authorities to plan strategically for what may well be growing populations. The Council may wish to develop its 'Option 2: Expanded Growth Area' in ways which take forward the NPPF requirement to secure sustainable development, seeking close integration of land use and public transport provision including linkages with London.

The FALP document can be found here:
http://www.london.gov.uk/priorities/planning/london-plan/draft-further-alterations-to-the-london-plan

Yours sincerely,

Stewart Murray

Stewart Murray
Assistant Director – Planning

cc Hilary Chipping, SEMLEP
National Planning Casework Unit, DCLG
Alex Williams, TfL

London Infrastructure Investment Plan 2050

GREATER LONDON AUTHORITY

CONTENTS

GREATER LONDON AUTHORITY

CONTEXT

GREATER LONDON AUTHORITY

1

OBJECTIVES

Present recommendations to ensure London's infrastructure requirements to 2050 are articulated, costed and funded.

Demonstrate to Government, Londoners and investors that infrastructure is a key priority and that London has a clear plan to meet the demands of its growing population and remain a leading world city.

Ensure the Infrastructure Investment Plan is supported and deliverable, through active engagement of key stakeholders.

Provide the Mayor and other London leaders with the information to understand and critically appraise London's infrastructure delivery.

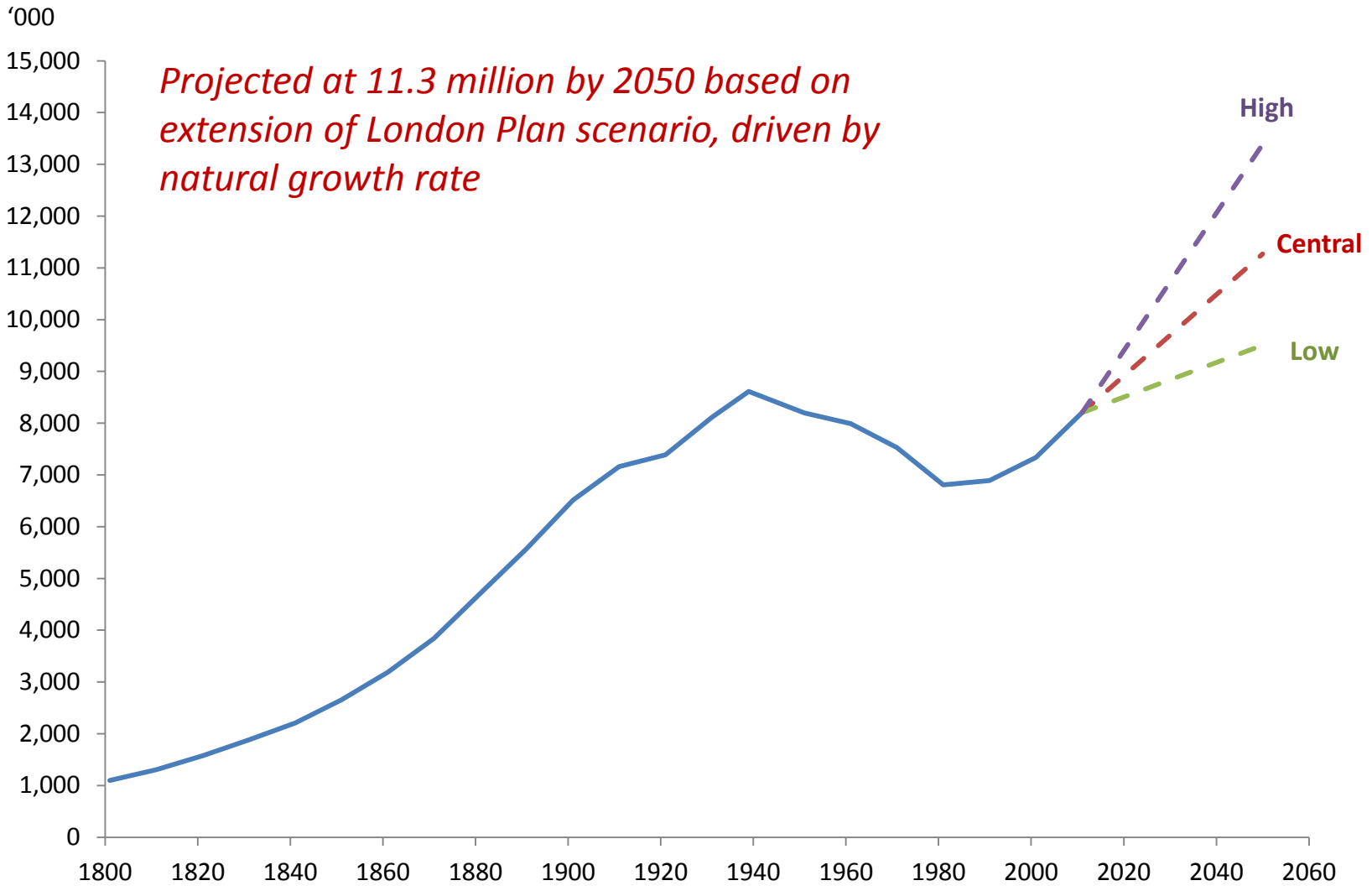
1

SCOPE

The final report will seek to present the strategic infrastructure needs for:

- **Transport**, including railways and stations (underground, overground, light and high-speed), roads (bus, car, cycling, pedestrian, street lighting), air and water, and fuel stations
- **Energy**, electricity, gas and including renewables
- **Water**, including potable water and sewerage
- **Waste**, recycling and recovery facilities
- **Telecoms**, focusing on broadband (we will use a shorter time horizon for ICT than 2050 given its rapid evolution)
- **Green Infrastructure**, multifunctional green spaces and urban greening
- **Social Infrastructure**, covering housing and schools initially, (then healthcare and wider implications of an ageing society)

2 POPULATION GROWTH



Source: GLA Economics

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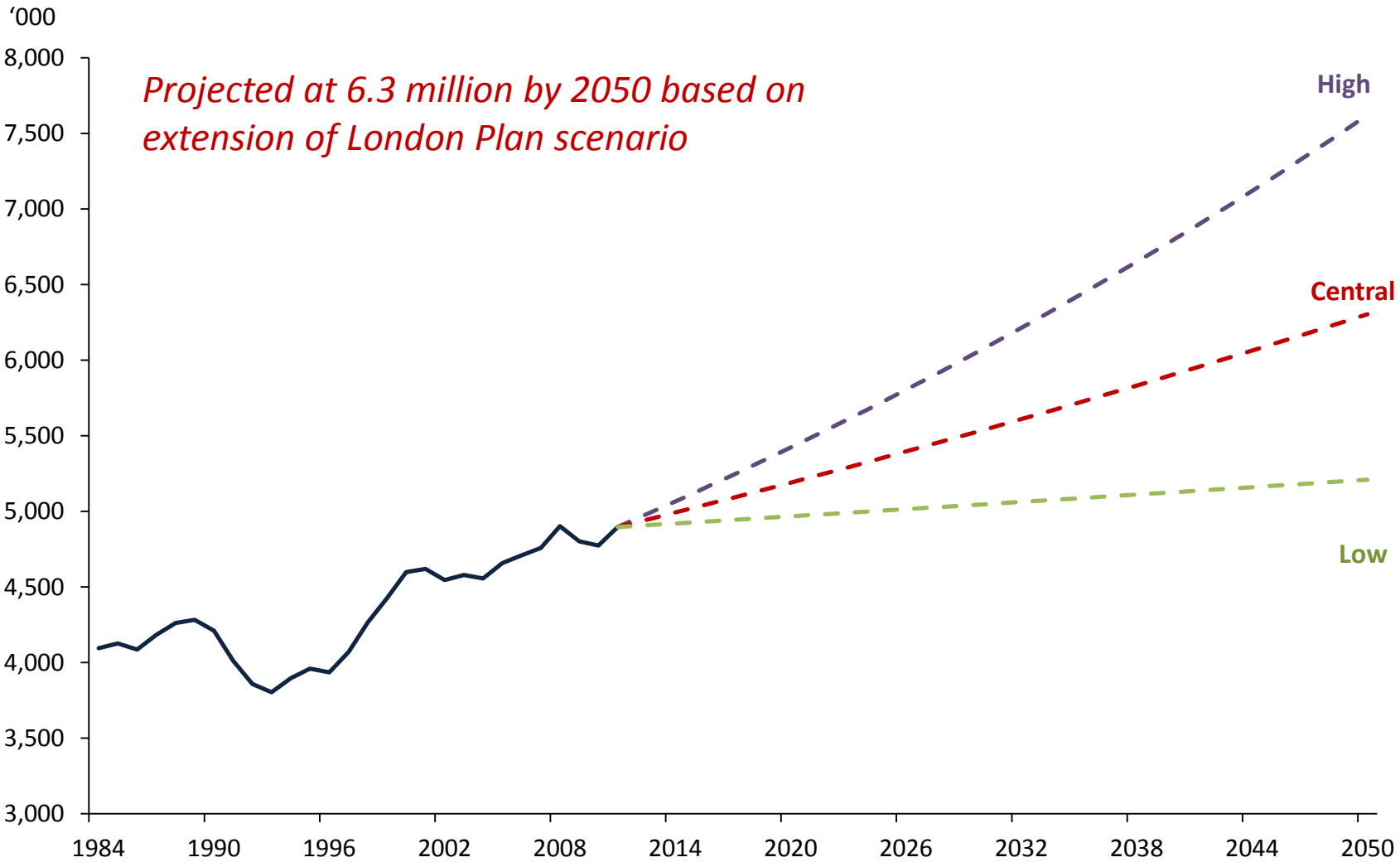
2

EMPLOYMENT GROWTH



Source: GLA Economics

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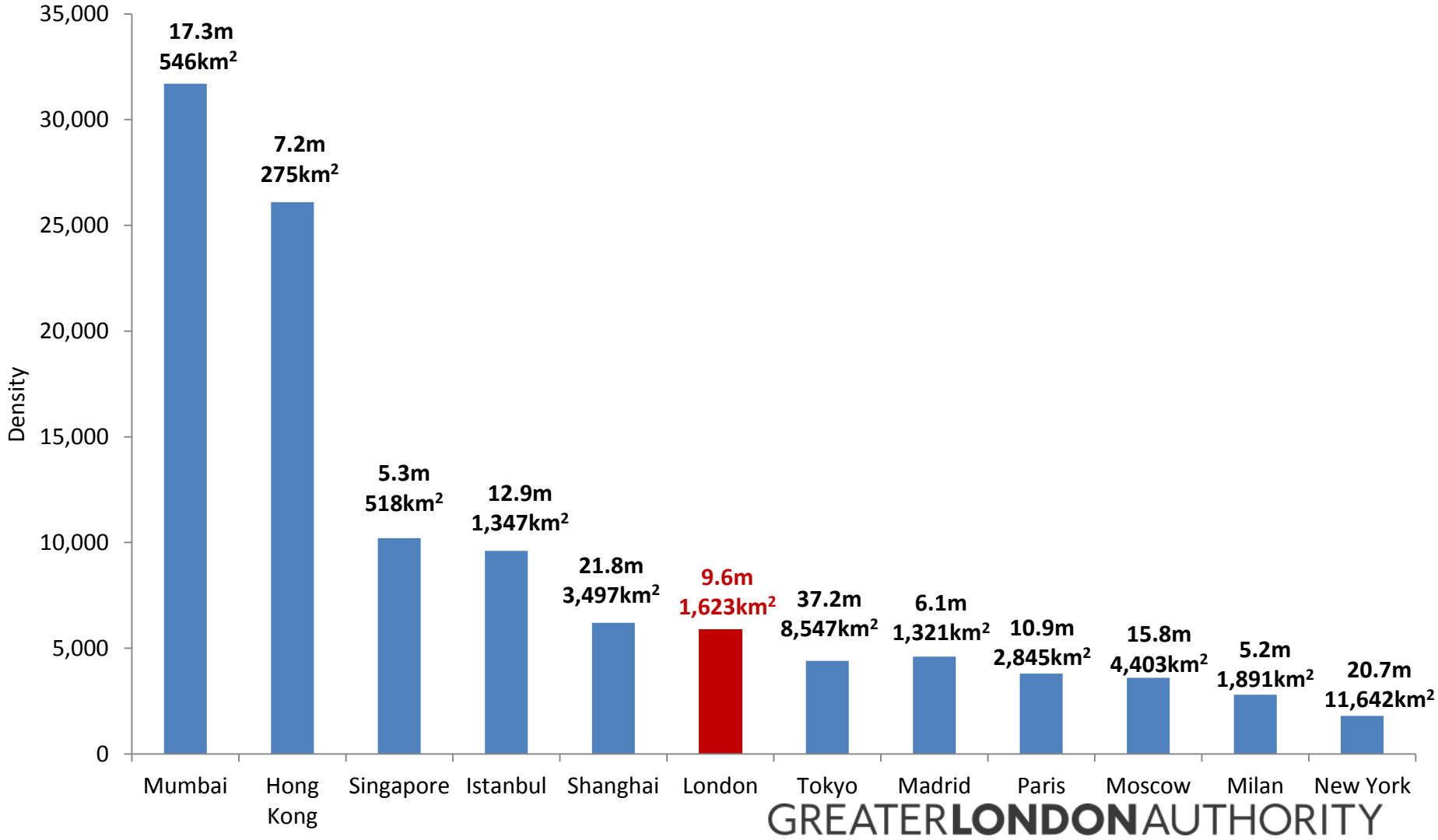
3 DENSITY RANKINGS ACROSS CITIES



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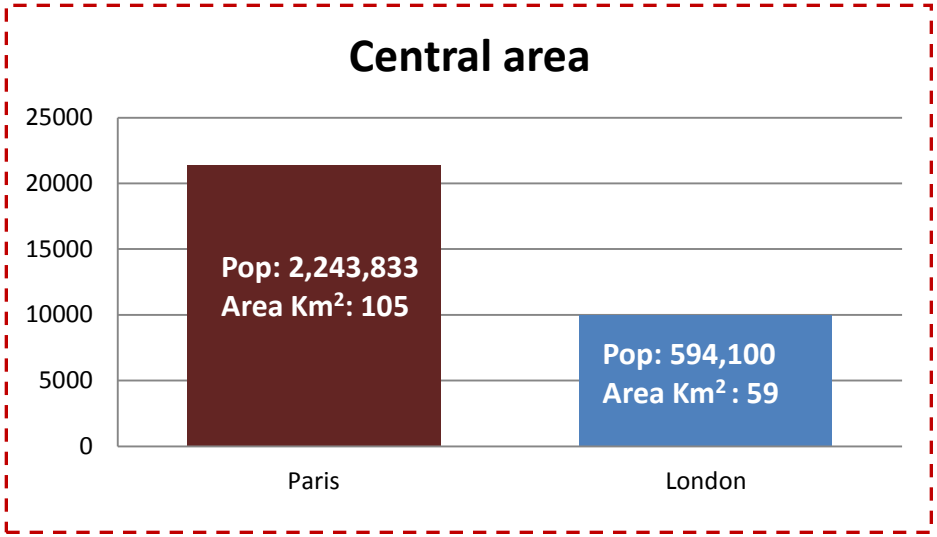
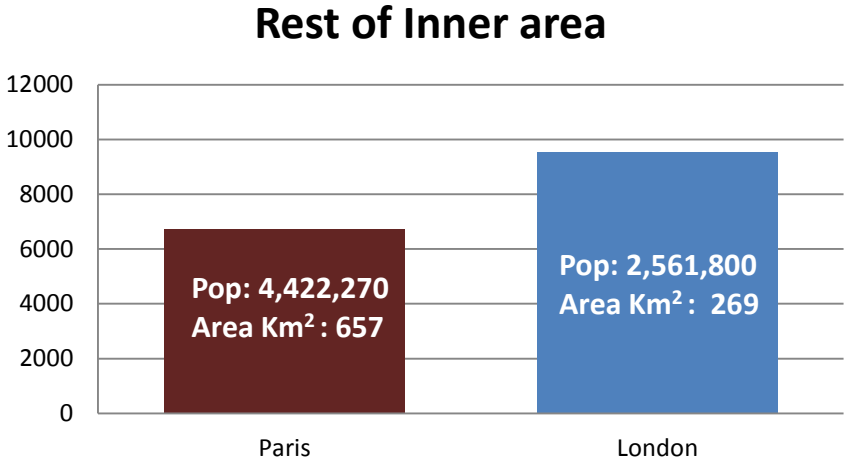
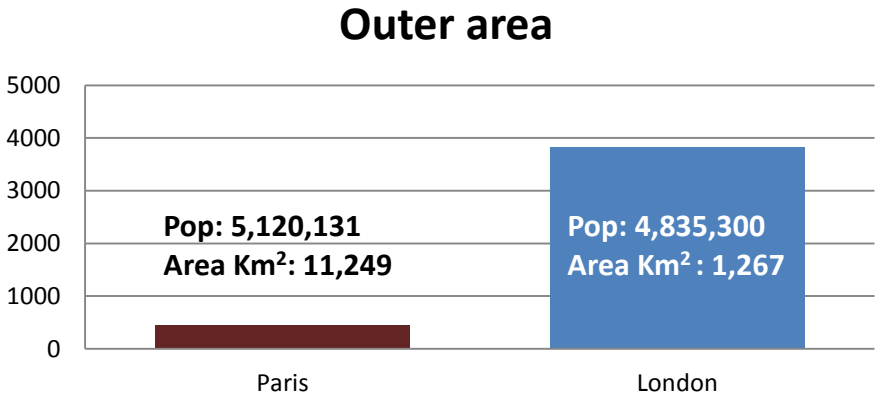
Source: Using UN Population Estimates

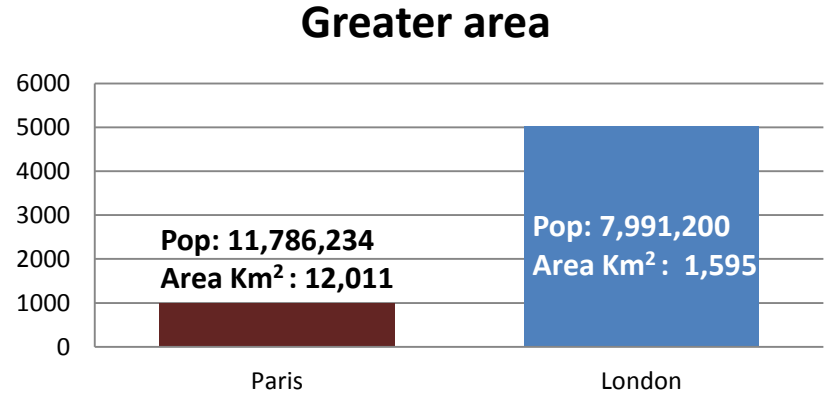
3

DENSITY BREAKDOWN: LONDON VS PARIS









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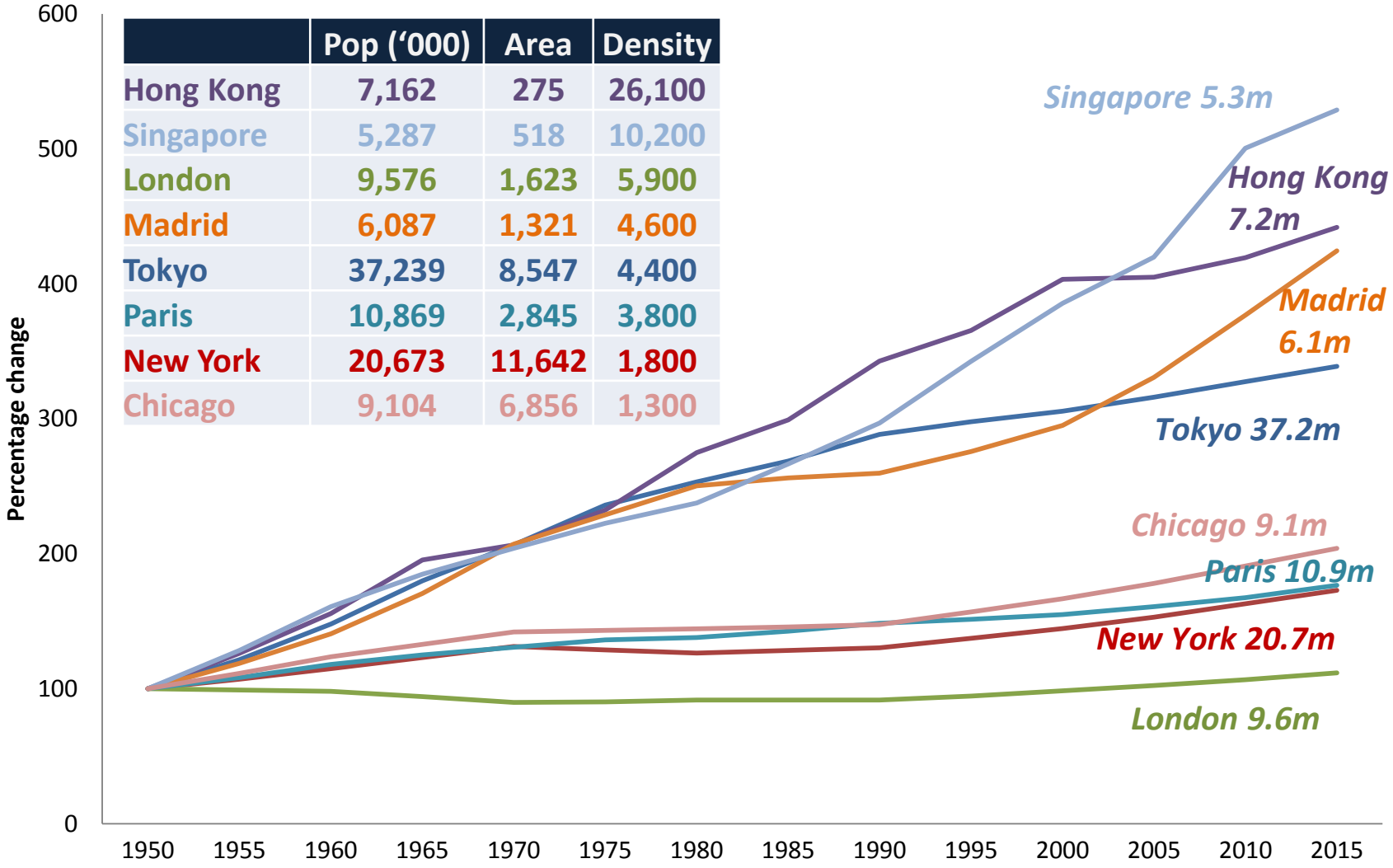
Estimates: GLA Intelligence using 2009 figures (Source: GLA SHLAA projections 2012 for London and Omphale 2010, Simulateur immobilier IAU-îdF, INSEE for Paris)

3 HISTORICAL POPULATION CHANGE ACROSS CITIES

	Pop ('000)	Area	Density
Hong Kong	7,162	275	26,100
Singapore	5,287	518	10,200
London	9,576	1,623	5,900
Madrid	6,087	1,321	4,600
Tokyo	37,239	8,547	4,400
Paris	10,869	2,845	3,800
New York	20,673	11,642	1,800
Chicago	9,104	6,856	1,300



Source: Using UN Population Estimates

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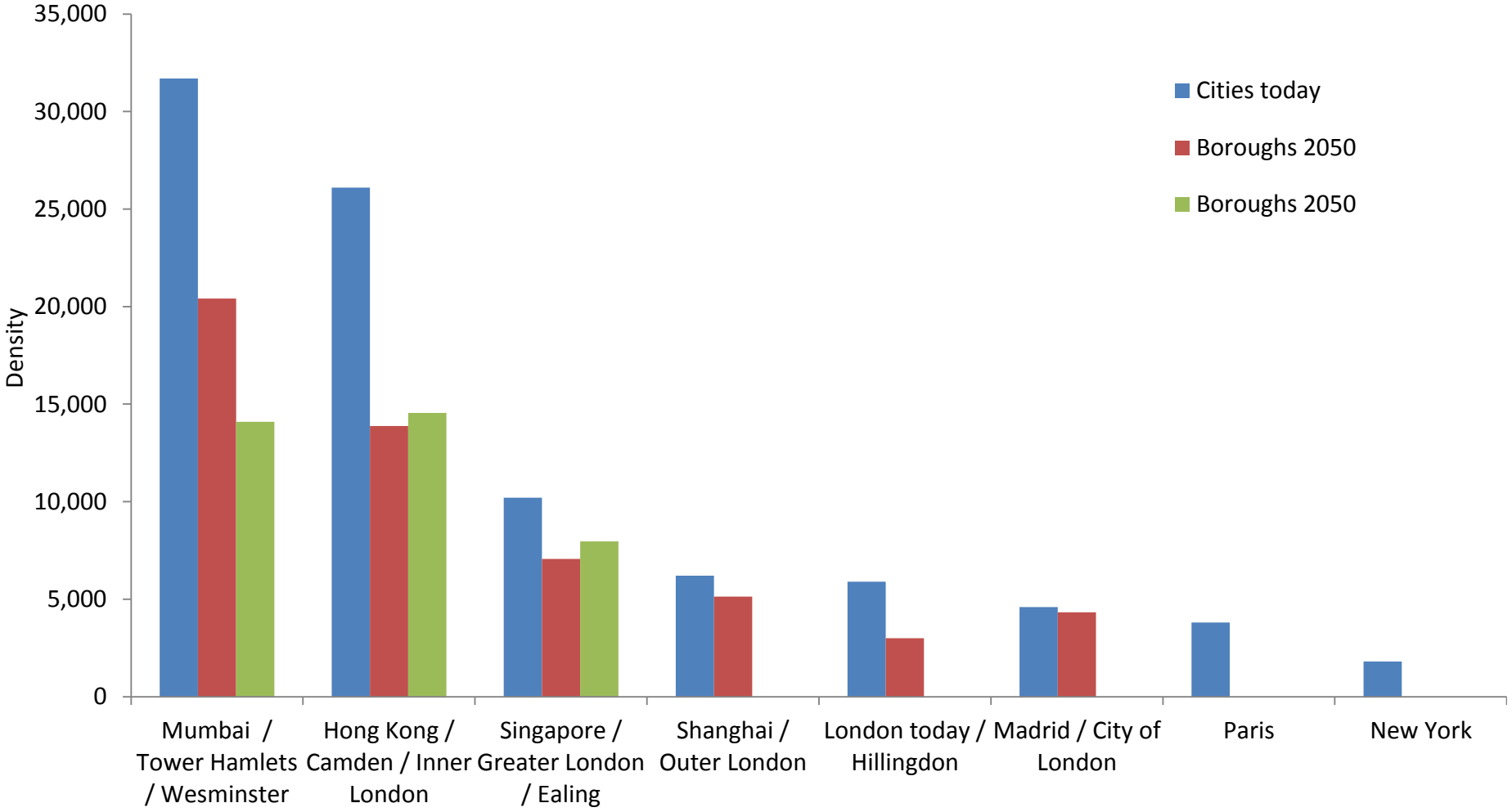
3 BOROUGH DENSITY LEVELS IN 2050 – A COMPARISON



Source: Using UN Population Estimates, GLA estimates for borough data

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CLIMATE CHANGE

The Mayor has committed to cut London's carbon output by at least 80% by 2050. This would give London the lowest carbon footprint of any big city.

Target year	Target CO2 emissions reduction on 1990 levels
2015	20%
2020	38%
2025	60%
2050	At least 80%*

* Adopted from national targets

5 INFRASTRUCTURE RANKINGS

Competitiveness	
New York	1
London	2
Singapore	3
Hong Kong	4
Tokyo	5
Sydney	6
Paris	7
Stockholm	8
Chicago	9
Toronto	10

Source: Citi (EIU) 2013

Transportation and Infrastructure	
Singapore	1
Seoul	2
Toronto	3
Tokyo	4
Hong Kong	5
Stockholm	6
New York	7
London	8
Paris	9
Berlin	10

Source: PwC 2012

Most energy efficient	
Japan	1
Denmark	2
Switzerland	3
Hong Kong	4
Ireland	5
UK	6
Israel	7
Italy	8
Germany	9
Austria	10

Source: Forbes 2008

Ranking Green City Index	
Copenhagen	1
Stockholm	2
Oslo	3
Vienna	4
Amsterdam	5
Zurich	6
Helsinki	7
Berlin	8
Brussels	9
Paris	10
London	11
Madrid	12
Vilnius	13
Rome	14
Riga	15

Source: Economist Intelligence Unit 2012

The World Economic Forum, Executive Opinion Survey (2013) finds the UK on the 28th position in terms of quality of infrastructure compared to other countries. In its own rankings, the WEF places the UK on the 8th position.

UK scores 62nd out of 185 countries in the ease of securing electricity connections (World Bank 2012)

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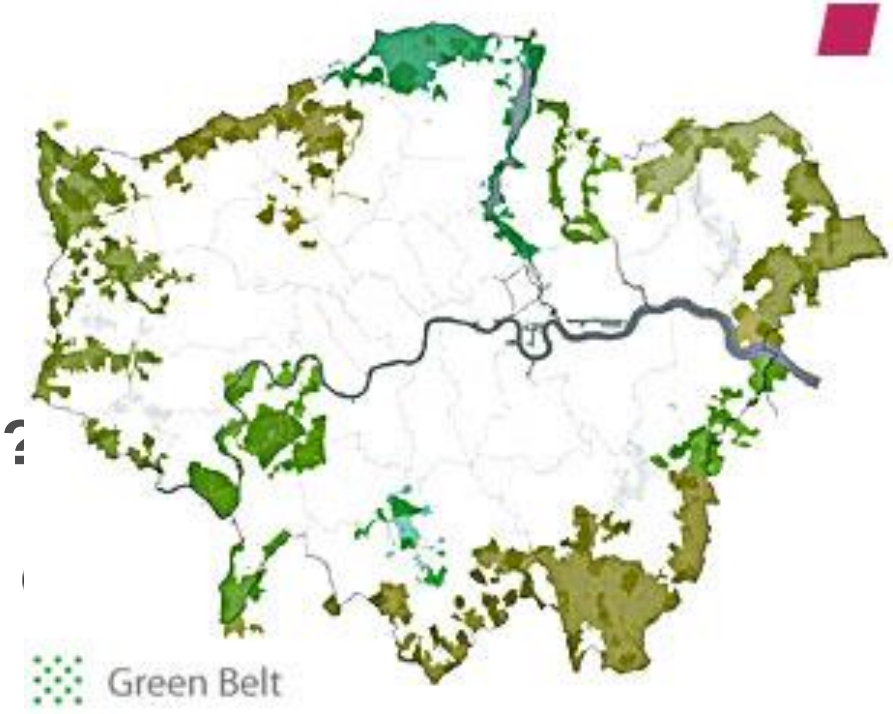
VARIABLES AND CHOICES

- Rates of growth
- HS2
- Land use planning policies
  - Aviation
  - Green Belt
  - Town centre densities
  - New growth areas

- Growth outside London
- Technology
- Population stabilisation?



EMERGING FINDINGS

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Urgent need to make plans & implement changes
"Reduction and efficiency incentives"
New growth areas…
…should generate resources
Further shift of resources to capital investment

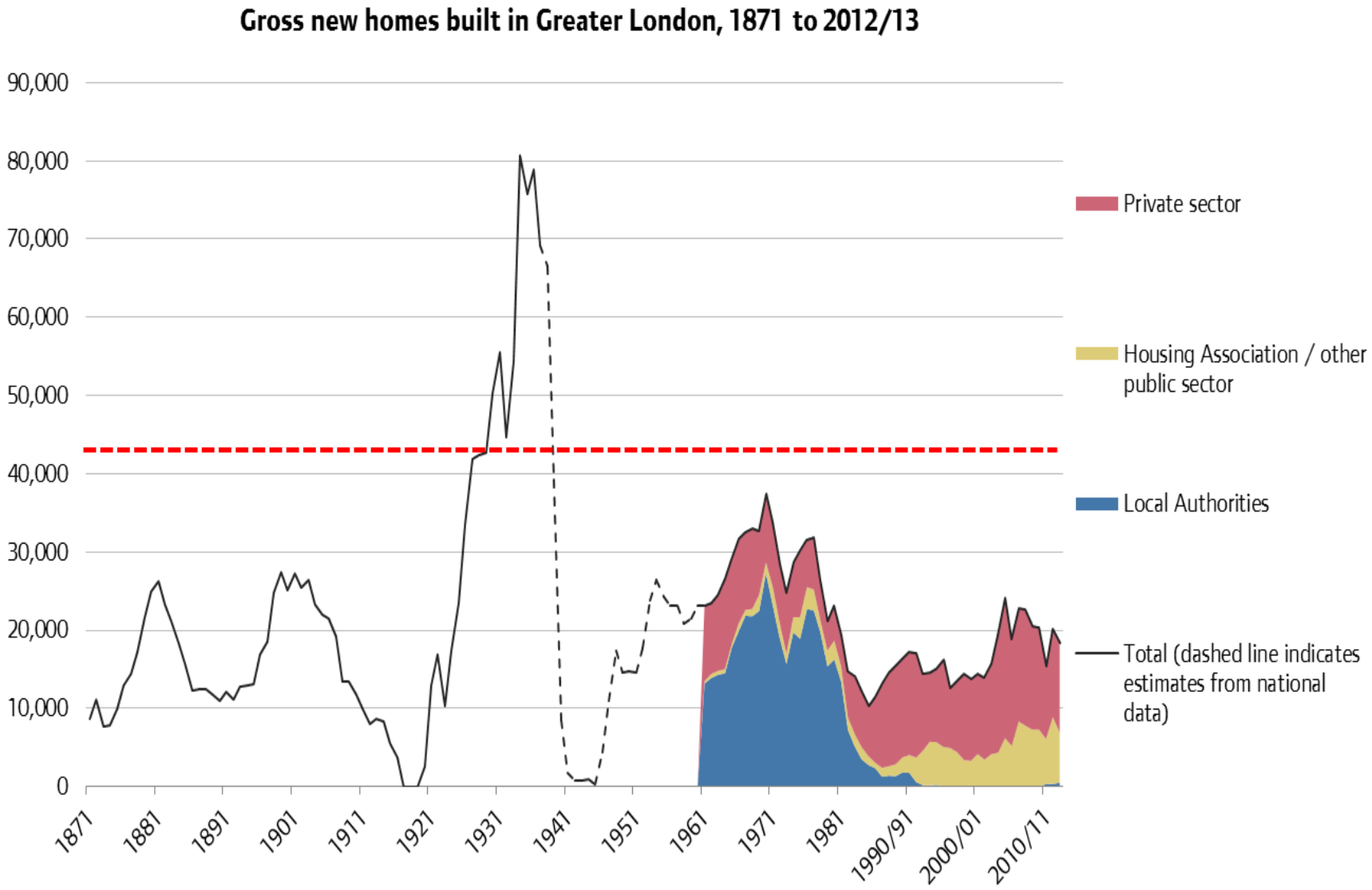
Housing	Transport	Energy	Water	Waste	Broadband	Green

Unclear or unknowable paradigm shifts: and stability
Funding - relationships with fairness and inequality

HOUSING

Key issues	• Undersupply - tension between need estimates 50-60k new homes per year and capacity estimates 42,000 new homes per year • Land - where is the land on which to build the homes • Funding and financing - public and private balance • Capacity - barriers to entry in the development industry
Emerging recommendations	• Maximise capacity in Opportunity Areas, densify town centres, new growth areas • Financial devolution of property taxes and freedom for boroughs to borrow to build • Increase institutional investment in private rented sector
Areas for further exploration	• Reforming planning gain policies eg fixed affordable housing contributions/housing tariffs, more progressive property taxes and one-off capital boost to affordable housing • Green Belt review, New Growth Areas and use-it-or-lose-it planning/undeveloped land taxes • Incentivise entry of new developers to the market (big and small)

HOUSING


Gross new homes built in Greater London, 1871 to 2012/13
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
1871
1881
1891
1901
1911
1921
1931
1941
1951
1961
1971
1981
1990/91
2000/01
2010/11
Private sector
Housing Association / other public sector
Local Authorities
Total (dashed line indicates estimates from national data)

TRANSPORT

Key issues	• Accommodating 10m + residents sustainably and largely within existing London boundary • Airport development choices influencing spatial development • Enabling Central London to consolidate its role as the UK's preeminent employment centre while adapting to changing working patterns • Destination retail activity concentrated in fewer centres • Generating funding to meet changing transport needs
Emerging recommendations	An infrastructure 'base' of projects and programmes needed in all scenarios including: • Upgrades to existing system functionality and major new radial schemes serving central London • Transport investment to serve large scale residential densification in Outer London • Additional schemes beyond HS2 to facilitate better links beyond London including to new towns and emerging growth poles in the rest of the South East
Areas for further exploration	We will examine how transport investment could be focused through different 'pathways' to respond to the emerging patterns. These could include: • business as usual • a 'green' push • a 'quality' push • a 'high tech' push Exploring potential for funding mechanisms for transport through the development it unlocks

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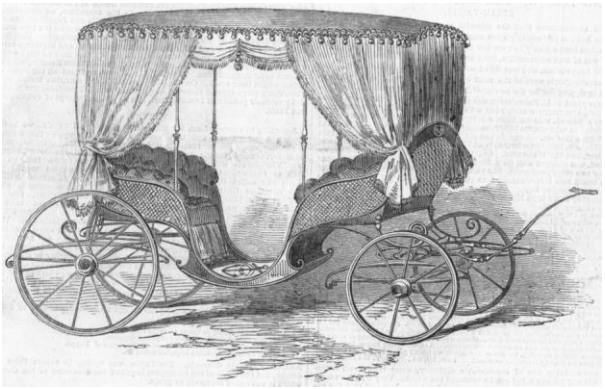
WATER

Key issues	• Decades of underinvestment • Rising bills / Significant increase in non-payment of bills • Lack of transparency between consumer costs and shareholder profit • Regulatory issues • Flood risk not recognised as a significant threat
Emerging recommendations	• Major new water resource – reservoir / effluent treatment plant / overland supply • Thames Tideway Tunnel • Major programme in reducing leakage from water mains • Major programme to alleviate pressure on drainage networks • Upgrades to Thames Barrier / new Barrage
Areas for further exploration	• Need to bring in tariffs that incentivise and reward water efficiency (whilst protecting vulnerable households) • Need to bring in tariffs that encourage property owners and managers to manage rainfall on site • Need to create an 'offsetting' mechanism and a delivery body to implement the green infrastructure retrofit (see 'Green' recommendations).

WATER

A LOOK AT THE PAST 150 YEARS: Water vs Transport



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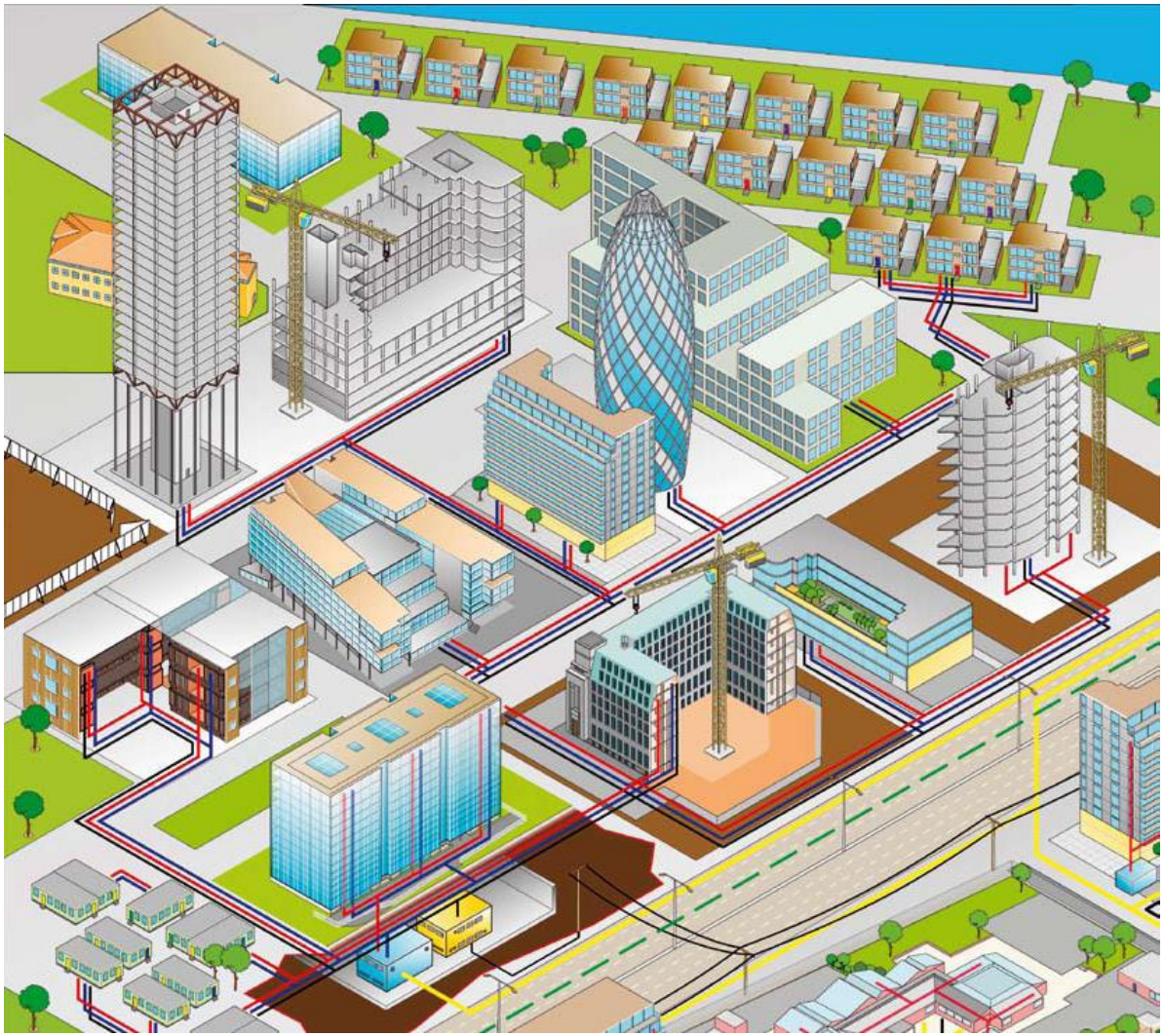
ENERGY

Key issues	• Capacity investment ahead of need • Requirement for long-term energy infrastructure planning • Market inertia/resistance to change • Decarbonisation needs • Security of supply • Regulatory barriers • Affordable and stable energy prices
Emerging recommendations	• Technical transition from 'business as usual' towards Hybrid Model - combination of Centralised Model (new nuclear and wind) in combination with Decentralist Model (local energy production with heat networks): 25% decentralist by 2025 increasing further by 2050 • Energy efficiency measures to minimise demand • Need to de-risk to attract private sector funding
Areas for further exploration	• Understand the feasibility and viability of deploying the hybrid model • Ineffective use of infra capacity - lack of incentives to affect demand/usage change - move to peak time pricing mechanisms to moderate demand peaks • Role of smart meters and systems • Socialise costs of new connections

ENERGY



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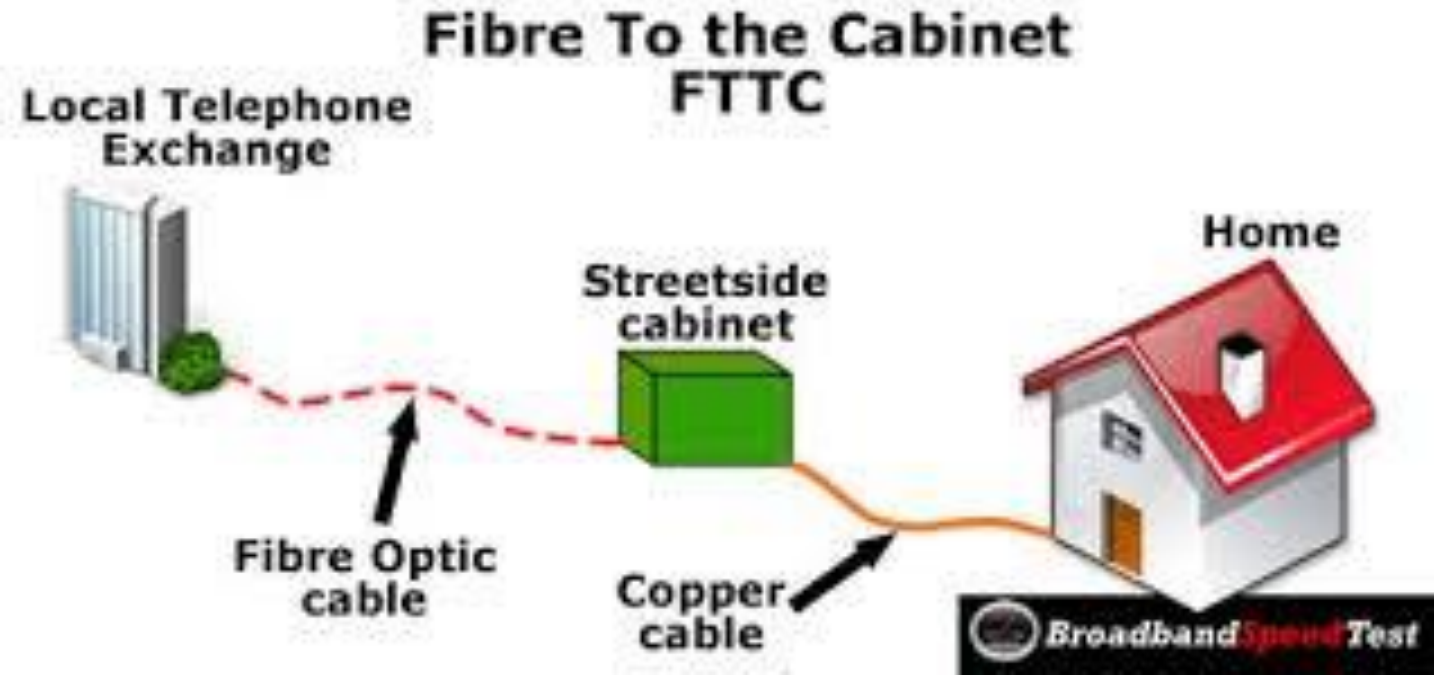
BROADBAND

Key issues	• Areas of slow or no connection • Switchover is slow – 92 years before FTTP is reached at current rates • Residential and business demand stimulation for higher speeds • Lack of information for customers about real speeds, availability and delays • State aid restrictions on public investment • Providers unaware of their existing infrastructure • Small number of providers
Emerging recommendations	• Residential and business demand stimulation for higher speeds • Transparency of information for consumers and governments • Reducing costs to providers for upgrading • Encouraging landlords and developers to consider fibre connections • Investment in dark fibre networks for areas with no connection
Areas for further exploration	• Challenging European State Aid restrictions • Regulation of dominant providers • Further innovations in technologies: Bringing fibre as close to the property as possible for as cheaply as possible • Complementary technologies: Mobile broadband provisions

BROADBAND


Fibre To the Cabinet
FTTC
Local Telephone Exchange
Streetside cabinet
Home
Fibre Optic cable
Copper cable
BroadbandSpeedTest

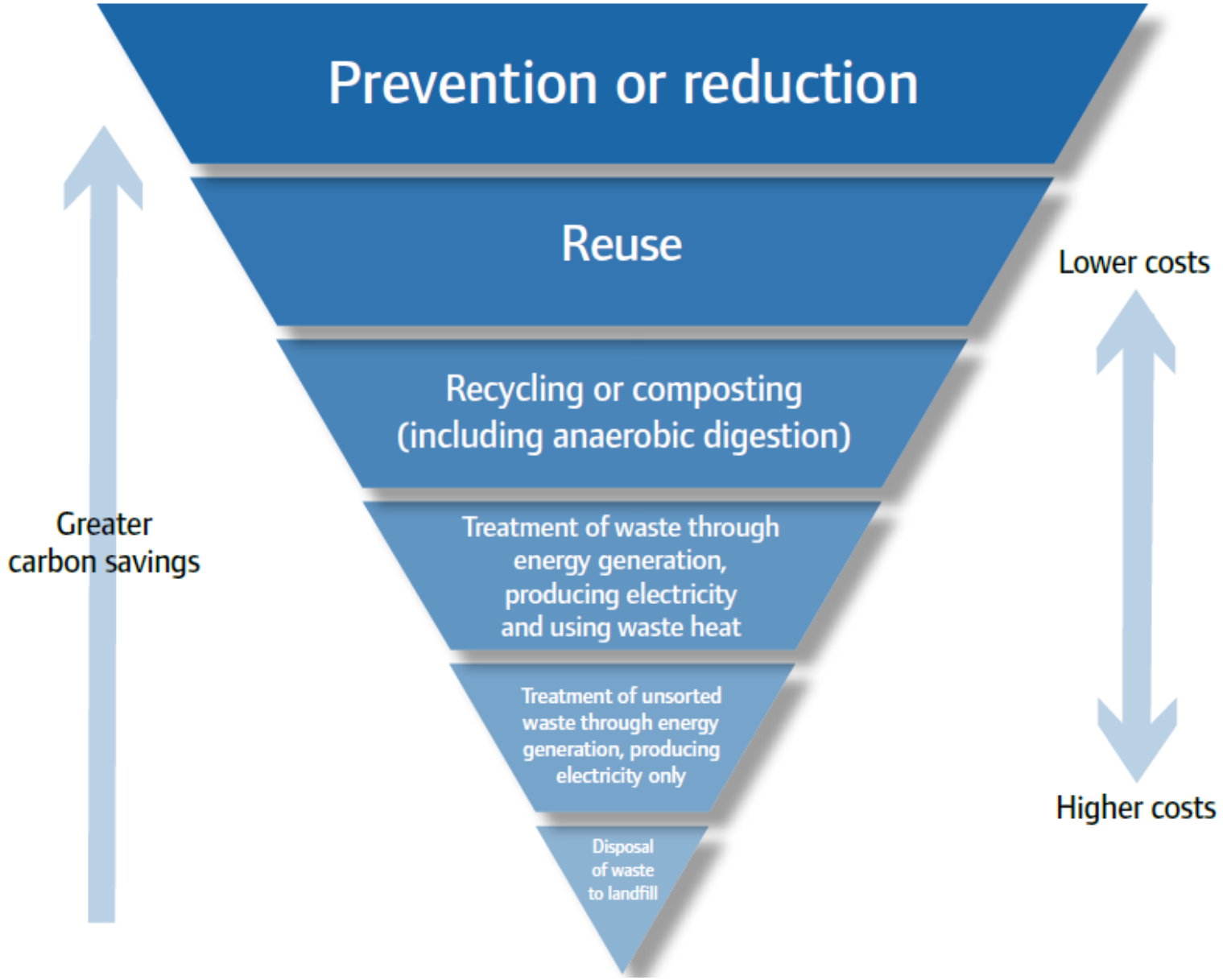
GREEN INFRASTRUCTURE

Key issues	• Decades of misdirected investment • Not considered alongside other forms of infrastructure • Lack of market-based funding mechanisms (funded as a public good) • Limited understanding about the potential future role of existing parks and green spaces
Emerging recommendations	• Functional connectivity between green spaces (e.g. for flood management) • Promote utilitarian forms of green infrastructure, rather than simple landscaping, in new development and regeneration projects • Accessible green space for all Londoners within reach
Areas for further exploration	• Design new and existing green spaces as elements in a more multifunctional network • Integrate with, and complement, other infrastructure, particularly water and transport • Develop new funding and financing models that better relate costs to beneficiaries • Establish a delivery body to promote green infrastructure and direct resources (see 'Water' recommendations)

WASTE

Key issues	• Turning London's waste into an opportunity • Delivering high quality materials to market • Access to finance • Negative public perception of waste facilities in urban environment • EU Regulation focus on weight based targets
Emerging recommendations	• Circa 20 million tonnes of waste infrastructure needed by 2050 • Reuse, reprocessing/recycling infrastructure presents greatest economic and environmental benefits • Planning links – regeneration, master planning, energy supply
Areas for further exploration	• Circular economy approach • Focus on outcomes – economic opportunity and CO2 reduction • Target most suitable/appropriate reprocessing activity • Leverage investment

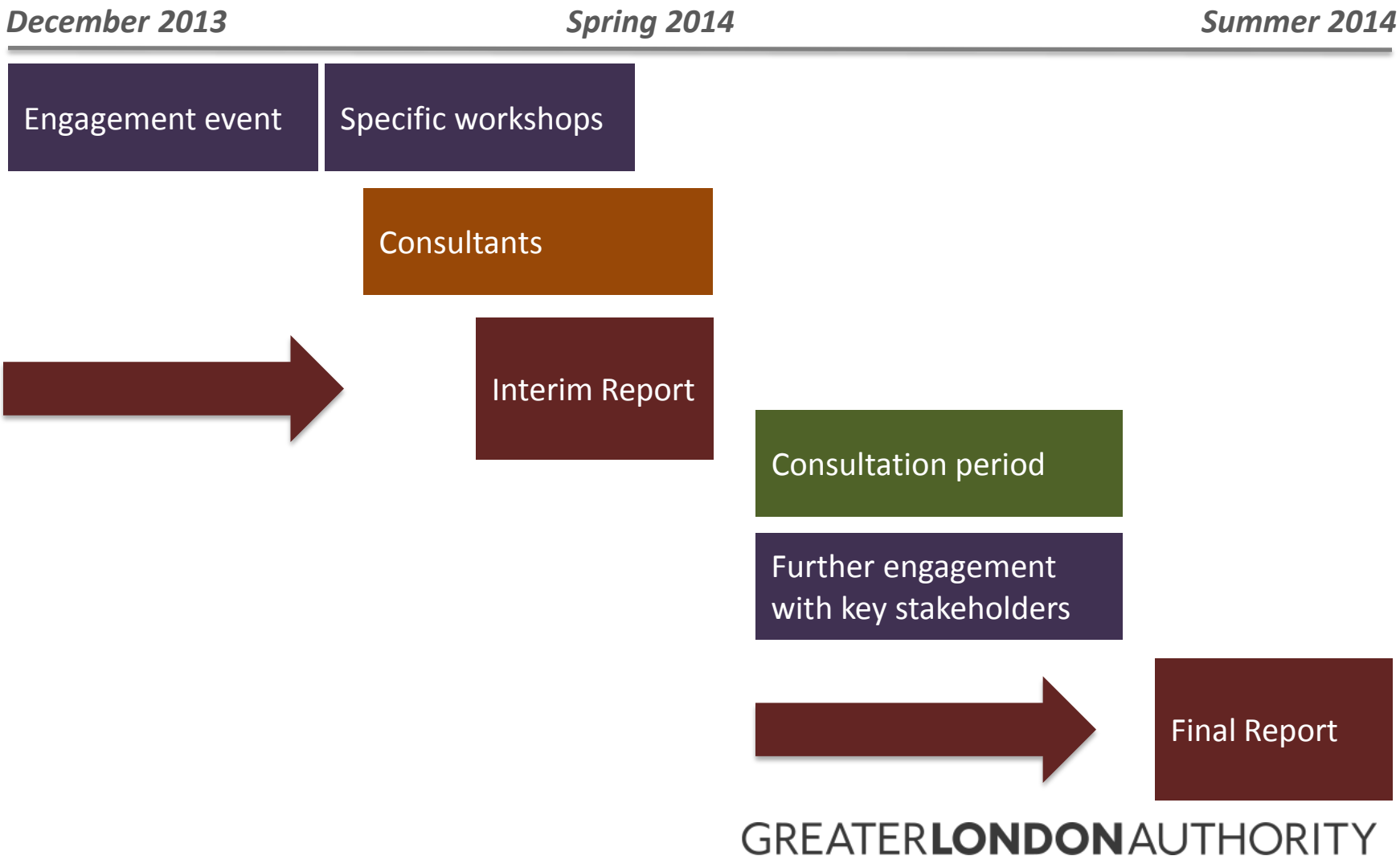
WASTE


Prevention or reduction
Reuse
Recycling or composting (including anaerobic digestion)
Treatment of waste through energy generation, producing electricity and using waste heat
Treatment of unsorted waste through energy generation, producing electricity only
Disposal of waste to landfill
Greater carbon savings
Lower costs
Higher costs

FUNDING AND FINANCING

Key issues	
Funding	• Centralised system • Lack of sufficient funding to satisfy requirements
Financing	• Risk appetite (timing / ability to assess risk and return) • Political uncertainty • Scale of projects
Emerging findings	
Funding	• Fiscal devolution • Long term resource provision from Government
Financing	• Remove borrowing limits (retain the Prudential Code) • Have a clear strategic plan agreed across government layers that incentivises investor participation
Areas to explore	
Funding	• Ability to set specific taxes to deliver projects (subject to vote) • Need to explore other funding mechanisms that create value (i.e. land value increase by creating new growth corridors)
Financing	• Explore credit enhancement mechanisms for specific projects • Asset base register for London's assets to have a better understanding of maintenance costs and depreciation

NEXT STEPS



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CONCLUSION

- Dense and growing city
- Performance and perception is mixed
- Major programmes to get on with – including new reservoirs; Crossrail 2; universal access to fast broadband; greening the city
- London should be able to afford this growth.
- Reinforces the call for fiscal devolution and long-term funding settlements
- Hence need for consensus as much as possible

- Costs and sources of funding – next stage of project
- Opportunities for integration; decentralisation; green infrastructure – OAs

SUMMARY CALL FOR EVIDENCE (1)

General	• More information and education to ensure people understand and appreciate the importance of new infrastructure • Need of long term strategy for infrastructure (to avoid political shortermism, suggested between 30-50 years) – some highlighted also the benefits of having an independent infrastructure commission for London (similar to the recommendation of Sir John Armitt's review at the national level) • More integrated and holistic approach to delivering infrastructure in the future; need to align planning cycles with massive information sharing between sectors • GLA should have more control over the capital's finance, transport, housing and other strategic infrastructure (as other global cities) • One stop shop planning authority • The regional level highly significant • Need to encourage change in behaviours, building on the approaches taken during the London 2012 Games (note behavioural transactions are economically driven / investigate techno-social solutions that help drive behavioural change and new technological solutions) • Learn from other cities in terms of planning, delivery and financing (contributes to evidence based recommendations) • Need of integrated efforts across government bodies • Most pressing issues were thought to be housing and transport (housing dependent on transport, need to exploit interdependencies between the two to trigger growth) • Evaluate options from different perspectives (financial return, sustainability, socio-economic, quality of life) • Develop parts of London to function as a 24 hour city
Land use planning policy	• Explore different options (Green Belt, build upwards in the centre, a poly-centric approach with multiple mixed use hubs)
Transport	• Need of better integrated transport networks • Road crossings across the River Thames to the east of Tower Bridge • Make greater use of the river for freight (also move freight from roads to rail) • Incentive schemes to promote deliveries between 10pm and 6am (would significantly reduce congestion) • Car clubs (shared taxi and car schemes) • Speed up Crossrail 2 • High Speed 2 and Euston rebuild • Crossrail 3 (NW to SE) • Second London Overground ring outside the current one • Facilities for cycling and walking • Bakerloo and Victoria line extensions • Mixed feelings around airport options (though agreement that decision and cross party agreement needs to be taken soon) • Incentivise companies to offer more flexible working patters to smooth peak times • Spread employment areas throughout London (use infrastructure investment to create new employment hubs) • Traffic congestion key concern for businesses

SUMMARY CALL FOR EVIDENCE (2)

Energy	• Smart technologies (intelligent demand side response systems, linked to real time pricing signals to cut peak demand) • Retrofit the built environment • Every house should have solar panels • In order to meet the carbon emission targets (80% by 2050), we need a shift to electrification of transport and heat • Consider opportunities and extent for decentralised energy • Shared heating networks – more efficient than household
Water	• Chronic underinvestment (trunk mains 150 years old, estimated it will take 1200 years to replace) • New reservoir • Charge people for run-offs • Encourage collection and use of rainwater and greywater
Green Infrastructure	• Risk of being considered in isolation and managed as a standalone and fragmented resource (need to invest strategically in green and see the wider costs and benefits of integrating it more with other forms of infrastructure particularly water and transport – this could offset, reduce the demand for and operational costs of traditional infrastructure; improve air quality and quality of life) • Ensure walking distance from a park for all Londoners (suggested 10 minutes) • Change the funding mentality (treat is as a resource)
Telecoms	• Connectivity key to remain competitive • Quality of broadband infrastructure concern for businesses • Use it to help integrate and make more efficient other infrastructure types (i.e. transport, managing peak demand for freight; energy, real time pricing signals that could help cut peak demand)
Waste	• Treat waste for general resource recovery (need of facilities to support resource recovery) • Treat waste as an energy source
Social	• Need to consider implications of an ageing population • Pressures on school places • Worklessness and social exclusion issues would need to be part of the plan
Funding	• Need of revenue raising powers for London (ability to keep local taxes and introduce additional ones as appropriate) • Exploit pricing directly related to use (i.e. road charging) • Exploit commercial development opportunity from stations • Explore dynamic pricing systems to manage demand • More Tax Increment Financing mechanisms created throughout London
Finance	• Attract more private money (provide longer term certainty, set regulatory drivers and targets, provide evidence for investment decisions) • Establish a dedicated Infrastructure Bank for London • Develop cooperative models to engage local communities and residents • Infrastructure bonds

INTER-REGIONAL LINKAGES

East Midlands

- Net migration from East of England into East Midlands
- Strategic transport links along Midland Mainline, East Coast Mainline, M1 and A14
- The A14 provides a strategic east/west route between Felixstowe/Harwich ports and the Midlands
- Role of the Felixstowe-Nuneaton Route in accommodating rail freight
- Role of Peterborough as a services and employment centre serving parts of Lincolnshire, Northamptonshire and Rutland
- The Wash as a shared environmental asset and World Heritage Site
- Shared issues of flood risk management in coastal and low lying areas
- Shared importance of agricultural & food industries

London

- Substantial net migration from London into East of England, placing demands on housing market
- Substantial net commuting from East of England into London, particularly from London Arc districts
- Key economic sectors and clusters in East of England are dependant on proximity to the buoyant London economy.
- M25 orbital and national radial routes from London pass through the East of England
- Shared transport planning issues, including better integration of public transport, demand management options in congested corridors, need for consistent parking standards and need for rail freight interchanges
- London's airports serve demand arising in East of England – shared interest in coordinated planning of airport expansion
- Thames Gateway a regeneration and growth area of national importance extending from inner East London to Southend.
- London / Stansted / Cambridge / Peterborough Growth Area begins in the lower Lee Valley in East London, with priority areas for regeneration extending into the East of England along the Lee Valley
- Major town centre and out of centre shopping centres have overlapping catchments that cross the Greater London boundary.
- London will continue to need to export waste for management/disposal in East of England, albeit a diminishing quantity and comprising a progressively higher proportion of treated residues
- Outdoor recreation resources of inter-regional importance on the edge of London, including the Lee Valley Regional Park

South East

Similar interest to East of England in relationship to London regarding migration, commuting, transport and inter-regional waste planning

Direct linkages with East of England are:

- Role of Milton Keynes / South Midlands Growth area in meeting wider needs as part of the Sustainable Communities Plan
- Cross Thames linkages between Essex Thames Gateway and Kent Thames Gateway, which share similar regeneration and infrastructure issues
- Shared interest in the Chilterns AONB and Thames Estuary, the latter an ecosystem of international importance
- Shared concerns about stewardship of water resources

Continental Europe

- Ports of Felixstowe, Harwich, and Great Yarmouth together with Port of London facilities in Essex provide major gateways for UK foreign trade
- A14 and A120 are part of Trans European Road Network
- Passenger links to Continental Europe via Stansted Airport, Harwich and the Channel Tunnel Rail Link from London, accessed at Stratford in the Lower Lee Valley
- EU Regional Programmes provide support for parts of East of England including extensive rural areas.
- Shared issues regarding impacts of climate change along low lying and vulnerable North Sea coastline
- Shared interest in North Sea resources including renewable energy

WSP

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Commuter Flows in London and the Wider South East 2001 to 2016/21

Final Report submitted to

the Corporation of London and partners

25 July 2005

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2.0	14/01/05	S Brettell	Second Interim Report
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EXECUTIVE SUMMARY

This project was commissioned by a consortium of the Corporation of London, the Greater London Authority, the London Development Agency, Transport for London, the Strategic Rail Authority, South East Regional Assembly, South East Development Agency, East of England Regional Assembly, East of England Development Agency and the Association of London Government. The work was led by Cambridge Econometrics and was conducted in collaboration with WSP Group (Cambridge) and LSE (London).

The results of the project consist of a report, a database and a forecasting methodology and model.

The report analyses current and prospective commuting flows to 2021 in the three Government Office regions: London, the South East and the East of England (this whole area is referred to in this report as the Wider South East), but it also applies to and draws data from some other zones between which and these three regions there are major commuter movements.

The database has been designed for estimating and forecasting commuting flows into, out of, and within London and its neighbouring regions. The database derives its data primarily from the workfiles of the 1991 and 2001 Censuses of Population, but also from some other sources, including the Annual Business Inquiry and the Labour Force Survey. The projections are informed by the Regional Spatial Strategies of London and the two neighbouring regions.

The study developed, calibrated and then used a methodology and model (fully described in the report) to provide detailed forecasts of future patterns of commuter travel and to identify the commuting implications by 2016 and 2021 of certain scenarios for policy, economic and transport developments.

A major difficulty faced by those carrying out this study lay in combining two different types of forecasting model: an economic forecasting model, which focuses on industrial sectors and jobs, and a transport forecasting model, which focuses on commuter flows and the factors influencing choice of commuting mode. To our knowledge, this is the first study, at least in the UK, in which two such different models have been combined.

The findings of previous studies (extensively described in Chapter 2 of the full report, 'Literature Review') can be grouped into three main themes of particular relevance to understanding and forecasting commuter flows in London and the neighbouring regions.

1 There are shifting patterns of population and employment. In reference to the present study the principal trends are the growth of employment centres outside London and the increase in the population of London. For the longer-term future an issue of great importance is the influence of the growth areas in the South East and East of England designated by ODPM.

2 There are changes in specialisation of employment and skills, in income and in lifestyle preferences. These have led to the choice of inner-city residence, especially in London, by professionals, graduates and childless families. They also

lead to longer commuting journeys by higher-income professionals, particularly in the financial sector, especially if they have children. There are also clear distinctions in journey length and mode of commuting between full and part-time workers, male and female and higher and lower-income groups.

3 It is important to distinguish between changes in commuting patterns that are short-term responses to shocks (as when a deterioration in employment prospects in London leads to a sharp fall in inward commuting) and changes that result from long-term trends.

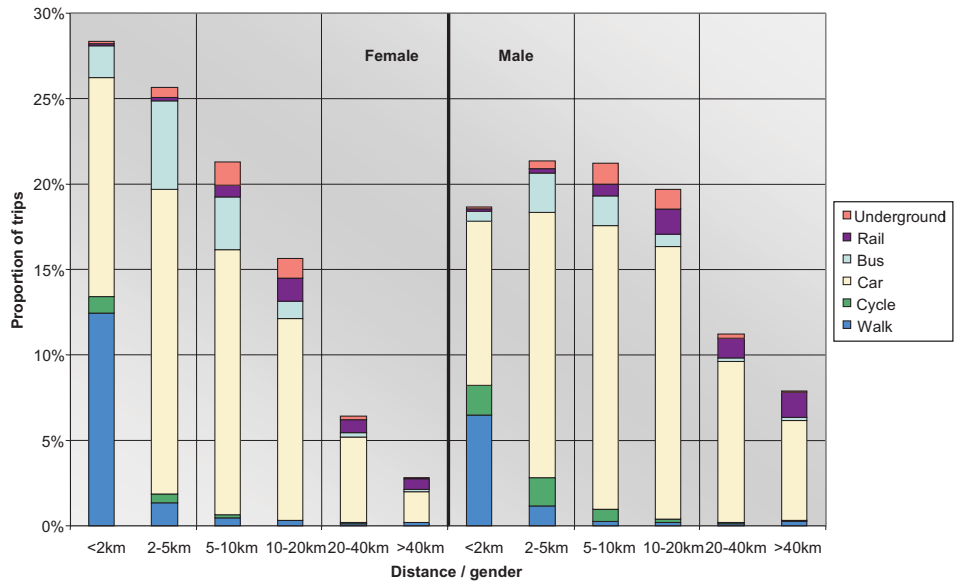
Previous studies have also shown that patterns in commuting can be analysed and understood partly through certain oppositions:

- male/female
- full-time/part-time employment
- professional/manual occupation
- higher income/lower-income employment
- specialised/non-specialised skills

The present study analysed the data in the 1991 and 2001 Censuses and revealed the separate but interlinked influences on journey-to-work distances and mode of travel of gender, manner of working, industry type, location of workplace and location of residence.

In relation to gender, the analysis revealed that males are more likely to commute long distances, and females to commute shorter distances (see Figure 1). This finding is related to another result of the analysis, that full-time workers have longer journeys than

FIGURE 1: AVERAGE DISTANCE TRAVELLED TO WORK BY MODE AND GENDER



Source(s) : 2001 Census Table S129.

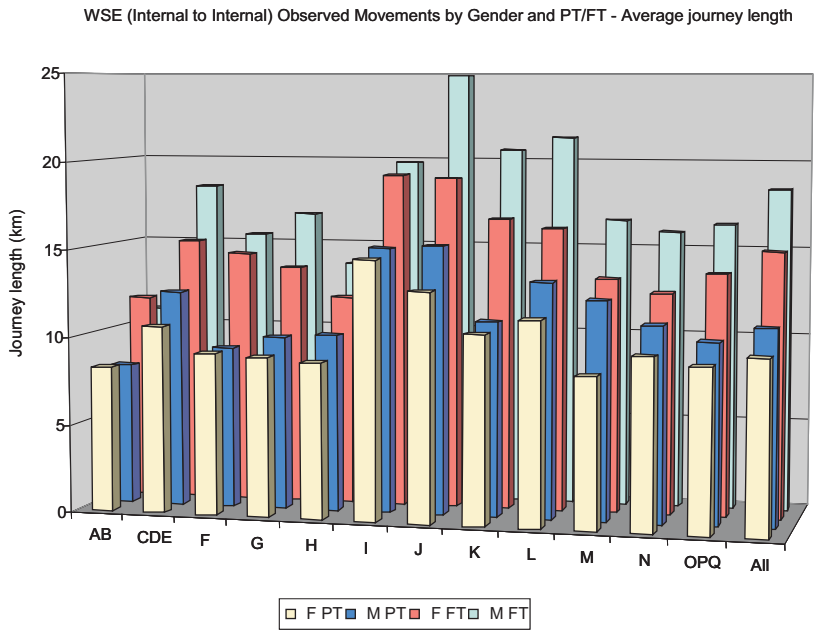
TABLE 1: STANDARD INDUSTRIAL CLASSIFICATION - SIC 92

Code	Industry	Code	Industry
A	Agriculture, Hunting, Forestry	I	Transport, Storage and Communication
B	Fishing	J	Financial Intermediation
C	Mining and Quarrying	K	Real Estate, Renting and Business Activities
D	Manufacture	L	Public Administration & Defence, Social Security
E	Electricity, Gas and Water Supply	M	Education
F	Construction	N	Health and Social Work
G	Wholesale and Retail Trade, Repair of Motor Vehicles	OPQ	Other
H	Hotels and Restaurants		

part-time workers, since a higher proportion of the female workforce is in part-time jobs than is the case for the male workforce.

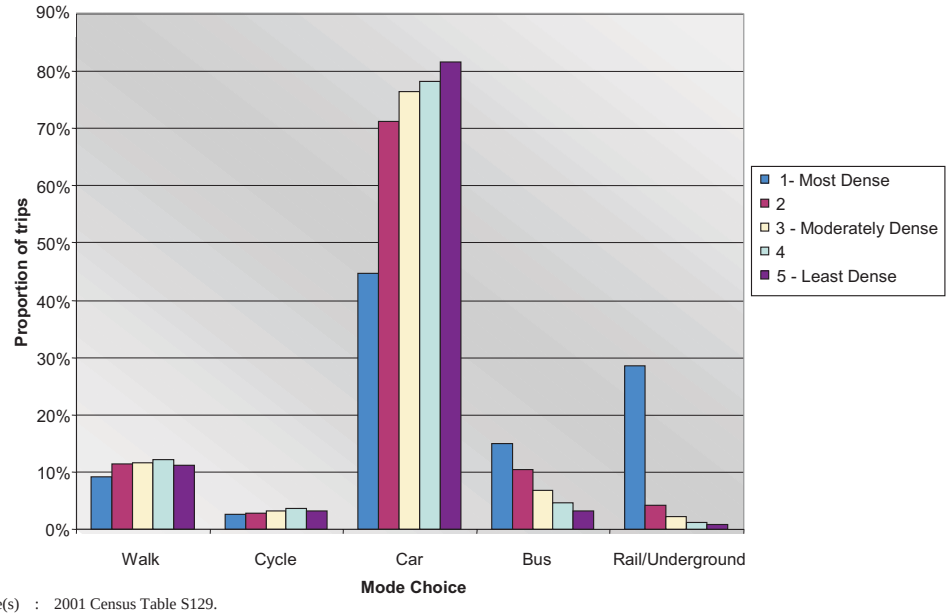
In relation to manner of working and to industry type, the analysis revealed that greater commuting distances are associated with those in professional and higher-income occupations and shorter distances with those in manual and lower-income occupations (see Figure 2 and Table 1). More specifically, those working in the financial sector tend to travel furthest to work, followed by those in office occupations (two findings that, of course, are correlated to managerial and professional occupations), while those in factory work have commuting distances at or a little below the average, and shop and catering

FIGURE 2: AVERAGE JOURNEY TO WORK DISTANCE, BY INDUSTRY TYPE FOR THE WIDER SOUTH EAST, 2001



Note(s) : See Table 3.2 for industry type definitions. Transport network distances were estimated from the LASER model.
Source(s) : 2001 Census Table W105 for England and Wales.

FIGURE 3: MODE SHARE BY EMPLOYMENT DENSITY QUINTILES, WORKPLACE END



Source(s) : 2001 Census Table S129.

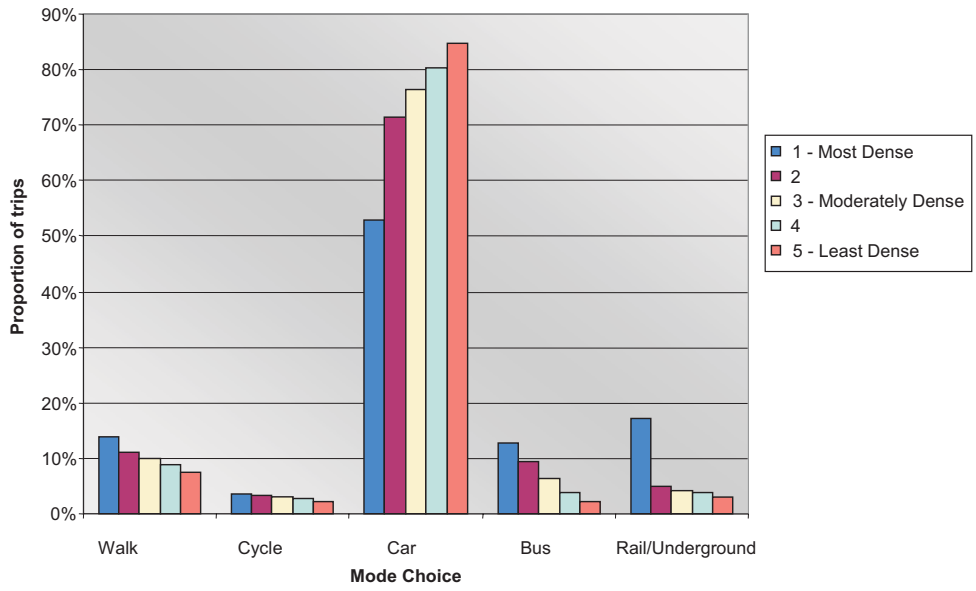
workers have the shortest journey distances. The striking exception to this correlation of professional and higher-income occupations with greater journey length is the construction sector, where commuting lengths are above the average, probably because construction workers do not have one fixed place of work but move from site to site.

The other factor influencing the length of commuting journeys is the employment density of the workplace ward (where density is measured by the number of workplaces per hectare) As employment density increases in a workplace ward, so the length of commuting journeys to that ward decreases (see Figure 3). The exception to this is the City of London, whose thick conglomeration of offices brings in professional workers from considerable distances.

In relation to mode of travel, it is interesting that, for a given journey length, females are more likely to travel by bus or on foot, whereas males are more likely to travel by bicycle or car. Two more general and important determinants of travel mode, however, are the residential density of the residence ward (where density is measured by household spaces per hectare) and the employment density of the workplace ward. Rail plus London Underground receives its heaviest usage from those who reside in the densest quintile (see Figure 4), but its usage declines only slightly as residential density declines. In contrast the use of bus or walking become far less favoured as residential densities decline, while car usage (under all conditions of residential or workplace density the most favoured mode) increases sharply. This relationship is often due to the scarcity of public transport in less densely populated areas. As employment density declines, there are steep falls in the proportions arriving by bus, rail or London Underground, but walking as a mode of commuting increases in favour (see Figure 3).

Thus the largest proportion of rail/Underground use is concentrated in the area of greatest employment density (central London) and is also attributable to those who live in areas of greatest residential density.

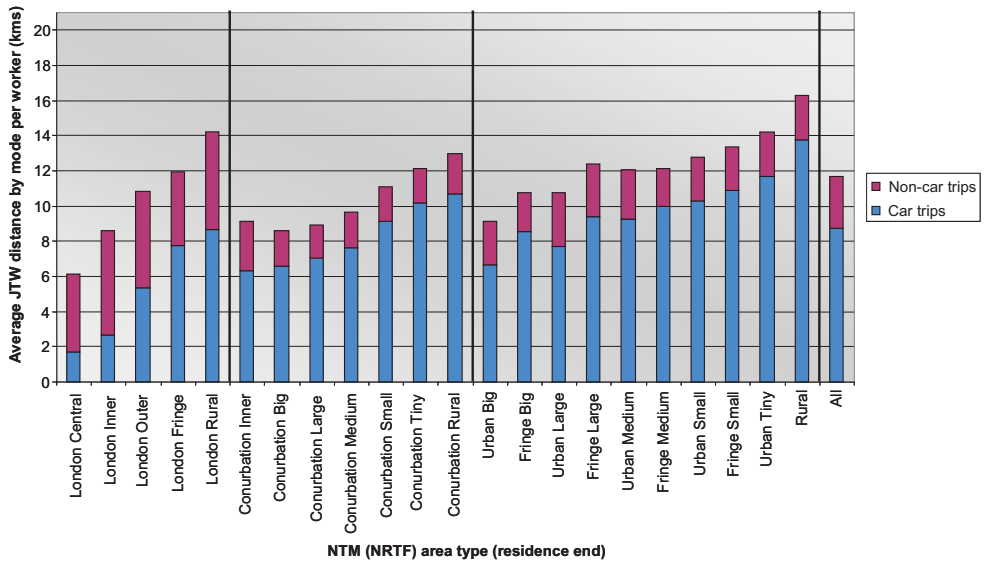
FIGURE 4: MODE SHARE BY DENSITY CLASS, RESIDENCE END



Source(s) : 2001 Census Table S121.

In relation to location of workplace and of residence, Central London attracts commuters from across the Wider South East (and beyond). The modes used form definite concentric circles around Central London (see Figure 5). Cycling and walking are popular for the shortest journeys within Central London; bus is popular for slightly longer journeys; the Underground tends to be chosen for longer journeys, particularly from the north and west of the capital. The longest journeys tend to be by rail.

FIGURE 5: AVERAGE JOURNEY TO WORK DISTANCE DIFFERENTIATED BETWEEN CAR AND OTHER MODES: BY AREA TYPE OF RESIDENCE



Source(s) : ONS (2003/2004) - 2001 Census Table S121 for England and Wales.

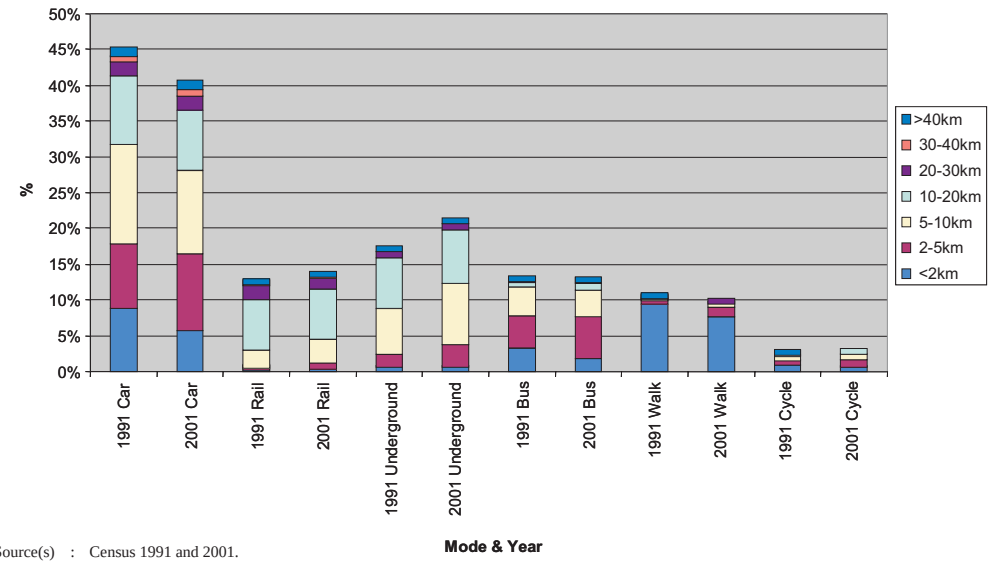
Commuting journeys to Inner London are less likely than those to Central London to originate from beyond the M25 (this has to do with financial workers commuting to the City). Car is equally favoured from any area within the M25 boundary for journeys to Inner London. Commuting to Outer London is predominantly from residences within Outer London, and car is the most favoured mode. Commuting to the Outer Metropolitan Area (up to 30 km beyond the M25) tends to be to local employment centres in such places as Reading Southend-on-Sea and Crawley/Gatwick. Car is the dominant commuting mode, but bus has a presence for shorter trips within the area.

The study devoted particular attention to commuting from and within Essex and Berkshire. It found an East-West divide: counties to the west of London have a larger supply of jobs, in relation to the size of the resident workforce, than counties to the east. Consequently, there are far more commuting journeys to London from Essex than from Berkshire, and commuting from Essex is predominantly to Central London (mainly by rail or Underground) and, to a lesser extent north-east London (mainly by car). In both Essex and Berkshire there are clusters of commuting journeys to the main urban centres in each county. These bulk larger in Berkshire than in Essex. There is, in particular, a cluster of journeys to workplaces close to the M25 ring, many connected to Heathrow.

The analysis also discovered some striking differences between 1991 and 2001 in the mode of journey to work for residents of Greater London (see Figure 6). In those ten years the proportion travelling to work by car fell by five percentage points, while the proportion commuting by Underground rose by four points (see Figure 7). There was also a rise in rail usage for commuting. Outside Greater London, however, there was virtually no change in the shares of each transport mode.

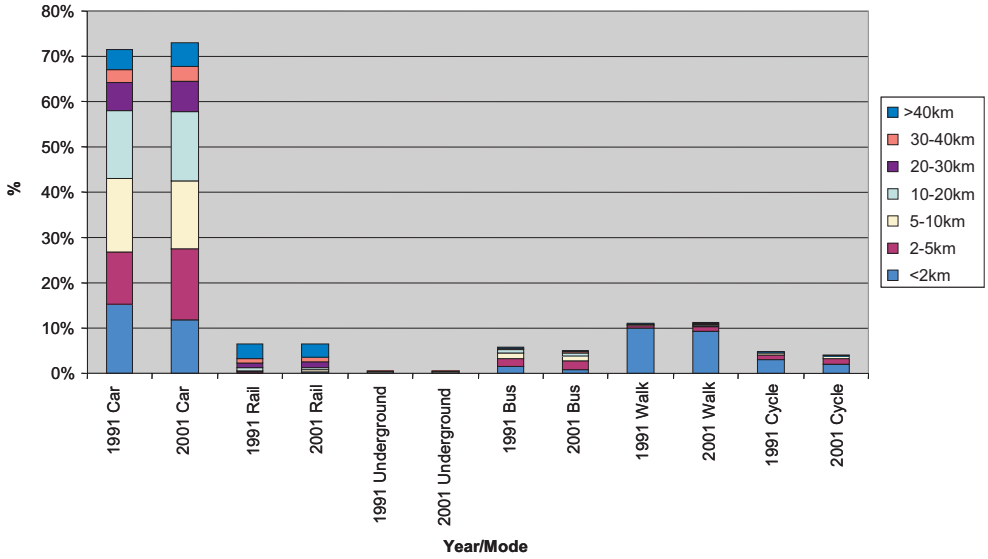
Earlier Studies (mainly by the National Travel Survey for Great Britain) had established that the average length of journey to work has been rising for many years (see Table 2).

FIGURE 6: PERCENTAGE OF TRIPS BY MODE AND DISTANCE BAND FOR LONDON RESIDENTS, 1991 AND 2001



Source(s) : Census 1991 and 2001.

FIGURE 7: PERCENTAGE OF TRIPS BY MODE AND DISTANCE BAND FOR RESIDENTS IN THE WIDER SOUTH EAST (EXC. LONDON), 1991 AND 2001



Source(s) : Census 1991 and 2001.

This can be correlated with the finding that professionals and, more generally, those in higher-income occupations tend to commute over longer distances. There has been an increase in the absolute numbers and proportions of such jobs in the Wider South East. While these fact would suggest that the average length of commuting journeys will continue to increase, two factors at least have been working in the opposite direction and are likely to continue to do so. The first is the rise in London's population and the growing professionalisation of the inner city as a place of residence. The other is the importance of immigration as a source of higher-skilled workers in London.. There is evidence that these two factors in combination are substituting to some extent for commuting into Inner and Central London. Our forecasts under all of the five future scenarios (summarised immediately below, and described in detail in Chapters 4 and 5 of the full report) show a slight decline in the length of commuting journeys by 2016.

TABLE 2: TRENDS IN CHARACTERISTICS OF JOURNEY TO WORK TRIPS IN GREAT BRITAIN

					Period	Growth rate
	1985/86	1989/91	1998/2000	2002	2003	1985-2003
Distance (kms)	9.8	12	13.4	13.6	13.6	39%
Distance growth/annum	-	4.6%	1.3%	0.4%	0%	2.2%
Time (minutes)	22	24	24	25	26	18%
Speed (kms/hour)	27	30	34	33	31	18%
Speed growth/annum	-	2.5%	1.3%	-1.0%	-3.8%	1.0%

Source(s) : National Travel Survey of Great Britain (DfT, 2004).

Following the analyses of commuting patterns and of changes between 1991 and 2001, the study then turned to making forecasts of future commuting patterns under five different scenarios of employment growth to 2016 and 2021:

- The London Plan
- Two East of England variants
  - the Enhanced Growth 2021 Scenario
  - the Regional Spatial Strategy Scenario
- South East Experian Forecast Scenario (SEEF)
- Cambridge Econometrics forecasts based on the CE forecasting model, RMDM

Employment forecasts were made under each of the five scenarios This involved the following tasks:

- building a detailed sub-regional database framework for assessing labour market balances across the Wider South East
  - establishing a labour markets database for districts in the Wider South East
  - generating estimates of resident and non-resident employment for districts in the Wider South East.

The database was divided into 48 segments. The segments were constructed by combining three characteristics:

- Industry Type: 12 aggregate codes for Standard Industrial Classification (SIC 92), Sections A,B to O,P,Q.
- Gender: male/female
- Employment type: full/part-time.

The employment forecasts were combined with WSP's LASER land-use transport model. This model has two components:

- a doubly-constrained trip-distribution model that estimates the overall matrix of commuter flows between pairs of zones based on the generalised time of transport
- a logit discrete-choice model that subdivides these flows into the main modes used between each zone pair

The result was an operational, calibrated model of commuting flows for 2001 and 2016 covering London, the South East and the East of England.

The model was then used to examine the impacts on patterns of commuting under each of the five scenarios.

The report presents and compares the results for 2016 under all five scenarios and across the three regions of the Wider South East. It also examines in detail the projections for each region based on the Regional Spatial Strategy for that region.

The principal findings are:

- London had a 15% excess of workplaces over resident labour force in 2001. The projected percentage growth in the labour force resident in London is more rapid than the percentage growth in the numbers in employment in workplaces within London. This improves the workforce balance and so lessens the need for commuting into London from outside in all scenario projections to 2016. The London Plan Scenario includes the highest growth in workplaces and so implies the greatest expected net in-commuting volume.
- Within the South East there was a 5% excess of resident labour over workplaces in 2001. This imbalance has reduced from previous decades due in part to the rapid increase in recent years in employment in areas west of London. In each of the scenarios for 2016 the rate of growth of workplaces within the South East is greater than that of resident labour, so that the past excess of resident labour in the region has largely been cancelled out by 2016. Resident labour and the number of workplaces are broadly in balance by 2016 in the South East under all scenarios, but most of all under the South East Experian Forecast Scenario.
- The East of England had an 8% excess of resident labour over workplaces in 2001, a greater excess than in the South East. Under the Enhanced Growth and the CE scenarios the resident labour force is forecast to grow more rapidly than the workplaces in the East of England. This leads to an increase in the labour imbalance within this region, which implies a greater level of net out-commuting in 2016 than in 2001. In contrast the labour imbalance is reduced in 2016 within the East of England RSS scenario.
- Under all the scenarios net in-commuting to the Wider South East as a whole increases from its level of 1.4% in 2001, and the greatest increase is to 2.1% in the London Plan Scenario.
- In general there is not expected to be major change in overall trip lengths under any of the scenarios. Under each there is a small increase in part-time trip lengths and a small decline in full-time trip lengths. This results in a slight decline overall in trip lengths. This forecast, it should be noted, represents a reversal of the historic trend of growth in commuter trip lengths. The net overall decline in trip lengths is smallest under the London Plan Scenario.
- The greatest absolute and proportional increase in the resident workforce under all scenarios is within the London region, which is also the region in which average commuting trip lengths in the 2001 Census are one-third less than those for residents in either the South East or the East.
- Although the model assumes substantial increases in rail and underground capacity around and within London, a considerable growth in demand for these modes is forecast as a result of population and job increases in urban centres. Consequently, rail overcrowding on commuter journeys to and from Central London is expected still to be a major issue in 2016.

- There are strong increases in the use of rail/LU by residents in almost all areas by 2016. The exception is for residents in the Outer Metropolitan Area of the South East, especially in the south-west quadrant outside London, where the growth in local jobs reduces the need to commute into Central London. The number of trips by slow modes also increases substantially because of increases in local employment. This is also the case for London residents.
- In the Wider South East the overall commuter distance travelled by car decreases by 5% in 2016. There is a 31% increase in passenger kilometres by rail and Underground and a 15% increase in bus kilometres.
- The SEEF Scenario has a greater proportion of its job growth in the outer part of that region than the other three scenarios. This shifts some of the growth in commuting travel by car further outwards beyond the Outer Metropolitan Area to the rest of the South East, and also offsets the decline in slow modes of commuting.

1 COMMUTING IN LONDON AND THE WIDER SOUTH EAST - AN OVERVIEW

1.1 Introduction

This is the final report in a study of commuting in London and the wider South East commissioned by the Corporation of London and a consortium of partners[1].

This chapter provides an overview of the study. Chapter 2 provides a review of the literature on commuting studies and the lessons for this study.

1.2 The overall study

The study has the following objectives:

- to establish a common methodology and database for estimating commuting flows into, out of, and within London and its neighbouring regions of SE England and East of England
- to use the methodology to identify the commuting implications of certain policy, economic development and transport scenarios envisaged by 2016 and 2021
- to use the methodology to monitor future commuting flows based on the established 2001 situation

The study has been conducted in three stages. These stages are:

- Stage 1: statistical methodology and database
  - review of data sources
  - analysis of WSE changes 1991-2001
  - commuter flow model and transport supply
  - monitoring future trends
  - labour market balances - employment and demographic drivers
- Stage 2: analysis of employment growth under five scenarios
  - variant projections: occupations, skills, sectors, housing and infrastructure developments
  - Sustainable Communities high success, central London high growth, low international migration
- Stage 3: sensitivity analysis
  - shift factors on future commuting propensities: housing supply, transport costs, quality of life, working practices

1 The consortium includes the Corporation of London, the Greater London Authority, the London Development Agency, Transport for London, the Strategic Rail Authority, South East Regional Assembly, South East Development Agency, East of England Regional Assembly, East of England Development Agency and the Association of London Government.

Key issues in the study are:

- re-examination of commuting flow change, and its spatial variation, arising from availability of 2001 Census workplace and journey-to-work data
- examination of the relationship between the occupational structure and skills derived from the sectoral composition of the London employment growth projections (led by Business Services) and the skills and characteristics of the available workforce
- growth of sub-regional employment centres outside London and the extent to which they will compete with London for (higher-order) labour
- transport capacity inside and outside London, including the extent of the London Plan's concentration of employment growth in central and inner east London
- the extent to which development in the ODPM Growth Areas and other key subregions appears likely to change the journey-to-work flows in those areas, as regards in-commuting, out commuting and 'claw-back'
- the influence of major new transport infrastructure/capacity (eg CTRL, Crossrail) or highway management measures (motorway user charging) on commuting flows

Chapter 3 presents an analysis, based on data from the censuses of 1991 and 2001, of journey to work patterns in London and the Wider South East, with particular attention to:

- the main influences on spatial patterns of journey to work
- changes in journey to work patterns between 1991 and 2001
- spatial imbalances between labour supply and demand

The themes of Chapter 3 are examined in greater detail in Appendix A.

Chapter 4 presents projections for employment growth in London, the East of England and the South East, for two periods (2001-16 and 2016-21) and under five different scenarios.

- The London Plan
- East of England - Enhanced Growth (EG21)
- East of England – Regional Spatial Strategy (RSS)
- The South East (SEEF) Experian Forecast
- CE forecast – applied to:
  - London
  - East of England
  - South East

The detailed employment projections for the districts of the three regions under the CE scenario are tabulated in Appendix F.

The methodology for building the database for assessing labour market balances and the model for forecasting are presented in Appendix B, and the method of processing Census data for the computer flow model is described in Appendix C.

Appendix D sets out the assumptions about highway and public transport schemes that are used in the transport forecasting model.

2 LITERATURE REVIEW

2.1 Introduction: aims and approach

Commuting is not a simple matter but represents the result of choices among available options of places of residence and work and modes of transport. The options themselves reflect the geographical context of work and home, competition in the property and labour markets and the range of transport available. Nor are the choices always made just by the commuter; other members of the household (sometimes themselves commuters) have an influence. Because of this complexity, analyses tend to be limited in two main ways: they tend to focus on one dimension of the issues involved, rather than others; and they face problems in linking general theories to particular geographic situations. In this study into commuting flows, we are seeking to overcome both of these limitations in order to achieve a better understanding of the implications for commuting of planned and unplanned changes of many kinds in the interlinked regions of the Wider South East.

This review sets out to draw two kinds of lesson from the literature:

(i) in relation to metropolitan regions like the Wider South East, to identify the key factors and processes relevant to understanding patterns of commuting change

(ii) in relation to the Wider South East itself, to identify the important factors in changes in commuting patterns

In relation to metropolitan regions in general, our aim is to present a coherent account - drawing on (but not confined to) reading of the literature – of how sets of generally accepted influences on locational choice and market behaviour can be expected to shape patterns of commuting and changes in these. In these cases we refer to the literature only where an idea is less widely recognised, or where a complicated idea might need some further point of reference. In the more empirical sections on the Wider South East, we give fuller citations of sources.

In practice, both the more general and the more regionally specific parts of this review involve two distinct tasks; and so the review covers four subjects:

- principles of and general influences on patterns of commuting and commuting change (Section 2.2)
- representation of the general influences in formal forecasting and analytic models (Section 2.3)
- significant contextual factors and sources of change in commuting patterns within the Wider South East (Section 2.4)
- analyses of actual commuting patterns and change in the Wider South East (Section 2.5)

2.2 Principles and general influences on patterns of commuting

If we set aside questions about the role of other household members in commuting decisions, we may summarise the key issue as follows.

Travel to work patterns may be seen as the outcome of the combinations of decisions made by individuals about where to live and where to work. In an ideal world people would make both sets of locational decisions together, so as to find the best residence-workplace pair available to them. In practice, this is extremely difficult to organise, and so, even when people move both home and job at the same time, one or other item (workplace or residence) tends to dominate their decisions. Consequently, we can think usefully about commuting patterns as the outcome of two separate choices:

- the best residence, given an existing workplace location (or for a household often a combination of workplace locations)
- the best job (and hence workplace), given an existing residence

For each of these, the reasons underlying individual choice are fairly clearly established, while the conditions in which choices are made reflect some reasonably clear aggregate processes operating in spatial labour and housing markets. We shall discuss each of these in turn.

Individual workplace choice

Where people have a choice of available jobs, they can be expected to choose among these on the basis of:

- commuting costs from their area of residence
- the location of the jobs
- wages and other short and long-term benefits

It is, then, to be expected that commuting flows should be directed toward places with more, more attractive and more accessible jobs – with the bias toward nearer jobs depending on the prevailing level of commuting costs, both in absolute terms and relative to the variability of other conditions and rewards.

This implies some significant differences between people in terms of their commuting patterns and choices.

- Those with specialised skills (or tastes for kinds of work), will commute further – because relevant opportunities at any time are more thinly distributed over space.
- Those with odd hours or more severe non-work constraints on their time are likely to commute shorter distances.
- Some groups are more likely to commute to particular kinds of area (eg the CBD or peripheral campuses/industrial estates) depending on the kind of job they are seeking – which may mean longer or shorter average commutes depending on their residential distribution.

Available transport options for the people and places concerned also influence their choice of jobs, although the implications are less easily summarised.

Individual residential choice

Where people are free to choose their residence, they can be expected to do so on the basis of:

- generalised commuting costs from their workplace or workplaces
- other housing and area characteristics (of the available options), and the weight which households attach to these
- housing prices/rents (for the different options)

This also implies significant differences between people:

- Those with higher average household incomes will be willing to commute further if this gives them access to preferred kinds of environment or makes larger housing more affordable (through lower land costs).
- Those with more specialised environmental tastes will be prepared to commute further to satisfy these.
- Some groups are more likely to commute from particular kinds of area (eg the inner city or suburbs/exurbs) depending on their lifestyle and leisure tastes (children or not; golf-player or theatre-goer).

Interactions between workplace and residence choice

For present purposes we may set aside the case of people moving away from an area to take a job in a distant place. There is, however, the related case of people who take a job in a distant area but decide not to move house. Instead they engage in extended commuting. There is evidence that this is becoming an increasingly significant phenomenon in recent times, whether in the context of greater labour market uncertainty (Evers and van der Veen, 1985; Gordon, 2003); growth in dual-career households (Green et al., 1999); or instability and inflation in house prices (Cameron and Muellbauer, 1998). Several of these studies provide evidence that commuting flows substitute for migration. For example, Gordon (2003) suggests that this substitution is a significant factor at distance ranges of up to 100 miles, and that, at distances below 50 miles, the majority of people change commuting patterns rather than move house.

Spatial labour markets

Within an integrated set of commuting areas, firms compete with each other for labour, and workers with each other for jobs. One outcome should be that all firms have to offer the same real wage (net of commuting costs) to their average worker, which means that in sub-areas where there is a greater concentration of jobs than of potential workers, money wages will have to be higher for a given type and quality of worker. If demand rises in some locality or potential workers are moving further away from it, firms will have to raise their wage offer – either to draw in commuters from further away or to draw economically inactive local residents into employment. The same effect could be achieved by lowering the skill/qualifications threshold for recruitment, since this also implies a higher wage for workers of a given quality. In either case the observable outcome would include a shifting pattern of inter-locality commuting (and also of local employment rates) associated with differential rates of employment growth, relative to those in the local working population.

How far local labour reserves or net inward commuters fill the gap is an empirical question. It might be expected to depend on how much slack (in terms of

non-employment rates) there is in the locality concerned. But within a well integrated set of commuting areas, once adjustments are made for local differences in labour quality, there should be no more difference in the tightness of labour supply than in wage rates. Within such areas the expected effect of commuting adjustments is to average out the pressure for higher or lower employment rates, producing similar changes everywhere.

In practice, however, localities cannot be grouped in this neat way into distinct labour market areas within which commuting operates perfectly freely while being much more limited across the boundaries of these areas. This is especially true around London where large numbers of commuting fields, focused around particular employment centres and residential areas, overlap with each other to form a complex with parts at least that are more or less perfectly integrated and others between which the links are less strong.

One obvious approach to assessing the strength of commuting links across different areas is in terms of current commuting flows as a proportion of jobs and employed residents in the areas concerned. Thus, for an area with 10% of its employed residents working outside and 20% of its jobs filled by people living outside the area, we might say that it was 72% closed (computed as 90%*80%). A simple prediction, then, could be that 28% of local imbalances in employment/population trends as compared with those in the neighbouring areas with which it exchanged commuters would be absorbed through shifts in those flows. This approach at least highlights the fact that commuting changes are proportionately more significant at a local level than they are likely to be for broader regions.

The applicability of that approach is limited, however, because it only calculates probabilities for the case in which a given marginal job is filled by a local resident or outsider. In reality a large proportion of jobs are actually filled by people who already hold another, which they then vacate, leaving another job (in a slightly different location) which also may be filled either by a local or by an in-commuter – and so on. Hence even for a single job change, a ‘vacancy chain’ can be created, with multiple impacts on commuting – potentially spreading beyond areas with currently strong direct links – and an ultimate impact on employment rates at the end of this chain (where a vacancy is filled by someone who would otherwise have been unemployed). The effective openness of any single area can then be substantially greater than suggested by a simple accounting of current flow patterns, while the group of commuting areas which are more or less perfectly integrated may be much broader. And this can be true even for those job types where we know that few people would commute more than a very few miles: effectively seamless metropolitan labour markets arise as a consequence of the chaining together of a series of commuting links. These links can actually operate between functional urban regions – units defined to maximise their commuting independence – as Cheshire et al (2004) show in a European context. They find that places up to 100 minutes apart (time being the key measure of separation) respond to each other’s growth performance with induced shifts in commuting. These shifts serve also to raise both employment growth and productivity levels in places within range of declining city regions from which they can attract labour (including more skilled labour). Over these longer distances they find, however, that adjustment of commuting may not take place as rapidly as appears to be the case within cities: their best results involve time lags of three to five years.

Housing Market

In the housing market, theory suggests that competition will lead to an equilibrium outcome (similar to that in the labour market) in which real prices (controlling for house and neighbourhood characteristics including accessibility) are equalised across the set of interlinked commuting areas. If access to work opportunities is the key item in accessibility, this means that (other things being equal) house prices will be highest in areas closest to concentrations of jobs. Normally these areas will attract those for whom the necessity of getting to work has greater priority than the luxury of purchasing more space. This is the stylised pattern formalised in simple urban economic models with the poorer groups located in central areas around the main concentration of jobs, as in the majority of Anglo-American cities, giving them shorter commuting distances. But this pattern may be radically altered in cultural settings where rising incomes bring a desire for accessibility to other facilities (eg to city-based entertainments and social life), in which case the more affluent may come to capture the central areas, and the poor may be displaced to locations giving them longer distances to travel to work.

Traditionally this preference for central areas has been more evident in the continental European middle class than in their British counterparts, but there are signs of change in this – and certainly evidence that some expanding groups in the population, including graduates and the unmarried (or perhaps the childless) have a stronger attachment to living near the city centre, in relation to a given employment location.

In British cities, this pure market logic, while clearly evident, has been complicated by political and administrative logics which determined the spatial distribution of social housing during the last century. In some other cities, this led to the decanting of poorer groups from the city centre to peripheral estates, whereas in London it reinforced their concentration in inner areas (particularly on the eastern side of the city).

Urban Densities

These patterns of individual choice and market interaction have to be taken into account when we are examining the effects of changing population and employment distribution on the length, direction and modal split of travel to work. For a given employment distribution, as we have seen, residential decentralisation implies some extension of travel-to-work distances, especially in the short term. However, in major urban areas with well developed regional networks of public transport (notably London), longer commuting distances need not imply a change of mode of travel (indeed it is this network that makes extended commuting initially appear feasible and attractive). Subsequent switches to more local jobs will, of course, tend to shorten commuting distances again, but are more likely to involve a switch to private modes of transport. Where employment decentralisation accompanies residential decentralisation (as has been the general pattern around London) the combined implications for travel distances are less obvious. There is empirical evidence that, in England, lower employment densities mean greater consumption of energy in travel to work, primarily because of a shift toward car use.

Overall it is likely that less compact cities are associated with longer commuting journeys, but the relationship is much less strong than has been popularly supposed. The argument for compaction, for example, has often relied on the implication of density for how far people need to travel for particular purposes (including work). However, in this context as in others people don't do what they 'need' to (in the judgement of planners) but what they choose to, in the context of their personal preferences. And, as the earlier

discussion indicates, some of these preferences imply the choice of longer commuting distances than appear necessary from aggregate comparisons. The extent to which this applies depends greatly on fuel prices as a key influence on the cost of commuting. But, holding prices constant, some broad cross-national comparisons suggest that a 10% increase in residential densities across a metropolitan region might involve a reduction in commuting energy use of just 3%. More sophisticated comparisons of different aspects of density in England, suggest that the only really significant one involves localised densities of employment.

2.3 Representation of these factors in formal models of commuting

In the literature the kinds of causal processes and relationships discussed in the previous section have been applied more formally in relation to a number of different tasks and issues. Some of these are rather highly specialised – for example the substantial body of work examining the role of 'spatial mismatch' as a factor explaining higher levels of unemployment among particular groups in the inner city – and others rather indirect – as in the use of spatial units based on commuting patterns for various kinds of economic, social and labour market analysis. However, there are three approaches of more direct relevance to this project, namely:

- modelling of individuals' commuting behaviour, eg in relation to distances travelled
- cross-sectional models of flows of commuters between particular pairs of zones
- models of change in gross or net commuting flows, either on a time-series basis or across a set of areas over a given time interval

Models of individuals' behaviour

These attempt to explain variations across individuals in either the probability of commuting to/from particular areas/all non-local areas or distances travelled. Typically this analysis uses a cross-sectional framework, rather than focusing on changes in behaviour, or on testing for possible lags in the response of commuting behaviour to external changes or stimuli. Key influences considered here are, on the one hand, personal and domestic characteristics of the individuals involved (from survey or Census sources) and, on the other hand, the effects of spatial location in terms particularly of the proximity of residences to concentrations of relevant employment. Related kinds of analysis pursued in the US, though apparently not in the UK, examine non-commuting (in the sense of non-employment) in the same way, to assess the possible role of spatial mismatch in employment/residential location to concentrations of unemployment.

Cross-sectional models of inter-area flows

This is the oldest and most developed of the approaches to modelling of commuting. It attempts to explain the pattern of flows (at some point in time) between particular pairs of origin and destination areas. Initially these explanations were formulated in terms of the so-called gravity model – based on a loose analogy with physical forces – which suggests that flows between places can be expected to be proportional to the 'mass' of each of those places, and inversely proportional to some function of their spatial separation. Adapted to the particular context of commuting, this suggested a relationship of the form:

$$C_{ij} = \frac{R_i W_j}{f(TC_{ij})}$$

where C_{ij} = the number of people from area i travelling to work in area j

R_i = the number of employed people resident in area i

W_j = the number of people working in area j

TC_ij = the cost of travelling from area i to area j

f( ) represents some positive function

In other words, the number of commuters between two areas is assumed to be proportionate to both the number of employed people living in the origin area and the number working in the destination area, but reduced in some steady way by increases in travel 'cost' (in terms of money and/or time).

In this simple form there is no guarantee at all that the predicted flows to (or from) an area are equal to the number of jobs (or employed residents) in the area – indeed they would be so only in the (very unlikely) circumstances that all areas are equally accessible. More explicitly probabilistic versions of these spatial interaction models of commuting control for this, by inserting another pair of variables into the equation, represented here by A and B to form a so-called doubly-constrained model:

$$C_{ij} = \frac{R_i A_i W_j B_j}{f(TC_{ij})}$$

These extra factors can be interpreted in different ways: on the one hand, functionally, as 'balancing factors' representing the varying pressure of competition for jobs and workers in different locations; on the other hand, in more causal terms, as representing differing 'prices' (in terms, for example, of wages and other rewards for jobs in particular areas) which stimulate the appropriate number of people to choose to live or work in the areas concerned. The latter interpretation (associated with the more modern economic version of spatial interaction models, rather than the 1970s 'entropy maximising' version developed by statistical geographers) has important advantages. First it directs attention toward the more qualitative characteristics of places, houses and jobs which underlie most commuting decisions (and are simply summarised in the A and B factors). Second, it raises the question of how actual employment and population levels in particular areas are determined (and how, for example, changes in transport capacity might affect these), rather than taking these as simple givens. The particular kinds of land-use transport models developed by Marcial Echenique and Partners relate clearly to this modernised version of the spatial interaction model.

But on either interpretation, the doubly-constrained model is distinctively an equilibrium model. That is to say, it represents a system which is in balance, in the sense that all of the current influences on the demand and supply sides in all of the areas in the system have worked their way through to influence outcomes in all of the other areas to the full extent that they are going to. This is a major strength, since it means that, for example, all vacancy chain effects can be captured. But it may also be something of a limitation, since people are not always able quickly to adjust their behaviour in a new situation to

what they will eventually choose. In particular, this means that after some major change in circumstances affecting people's location and commuting decisions, observed patterns of movements may not fully or accurately reflect the likely eventual effects. In these circumstances, attempts to explain everything in terms of current levels of the variables expected to influence equilibrium outcomes could produce some misleading conclusions.

Models of Commuting Change

Models focused on the explanation of change in commuting patterns or volumes normally and naturally give more weight to these dynamic considerations, whether they are actually attempting to model time-series fluctuations for one or more areas (Cameron and Muellbauer, 1998; Gordon, 1999), or trying to account for differing changes across all areas in a single time interval (Gordon, 1997, 1999; Cheshire, 2004). In the latter case it may be simply a matter of considering possible lags between the changes in some influencing variable and the (actual or main) impact on commuting. For full time-series analyses there is greater scope and interest in examining how particular aspects of cyclical behaviour in housing and labour markets may give rise to strong and/or complex fluctuations in commuting patterns even when there has been little or no change in the long-term fundamentals. Normally such models are set up in terms of a basic set of variables paralleling (more or less closely) those employed in cross-sectional interaction models. The null hypothesis, in such cases, is that, where levels of these variables affect levels of commuting, changes in commuting directly depend on changes in the levels of these variables.

Departures from this simple pattern may reflect:

- on the one hand, the kinds of dynamic effects we have just referred to (including influences of past commuting levels on changes, and influences from changes in variables that do not seem to affect levels in the cross-section, eg the interactions of national economic conditions with local characteristics)
- on the other hand, long-term changes affecting either the preparedness of some/all groups to travel longer/shorter distances or preferences for particular kinds of areas, housing or jobs

Such preferences may contribute substantially to long-term changes in commuting but their presence may not be at all evident from cross-sectional patterns. How far they are actually evident from the data used for change analysis is another matter – and they are actually more likely to be revealed through comparisons of a number of cross-sections, since these draw on a much richer array of data than time-series or change-analyses usually employ. This may be an argument for starting with a review of the kinds of more qualitative change (rather than simply population/employment distributions and transport costs) which could reasonably be expected to have substantial influences on future commuting patterns; and then thinking about the kind of evidence that might be relevant to these.

2.4 Sources of change in commuting patterns in the Wider South East

The established pattern of commuting in the region has involved a combination of inward flows into a series of sub-regional and regional employment centres, most notably into Central London, together with subsidiary flows between nearby areas which appear more random in character, including both 'reverse' flows, running out from urban areas (including London) and 'cross-country' flows between the immediate hinterlands of different centres. The inward flows in the first set appear the more obviously functional, responding to imbalances in the distribution of population and employment (with employment being more concentrated). This obvious functionality is largely missing from the reverse and cross-country flows, which can seem to exemplify what has been called 'wasteful commuting'. The point, however, is that, although from an aggregate labour-market perspective these latter flows may not be necessary for balancing the distribution of prospective workers and job opportunities, they represent the matching of more specialised requirements of workers and employers for particular job and personal characteristics, and of residents for housing/area characteristics. There is also an element of luck in whether accessible opportunities could be found at the particular time when they were required.

The balance between these two elements in the commuting pattern seems to have been shifting progressively toward the second, less clearly directional element. There are several plausible explanations for this trend.

- Rising incomes and education encourage more specialised and diverse residential and housing preferences.
- Rising education (and possibly technological change also) promote greater specialisation in employment skills and job preferences – for at least part of the working population.
- Greater mobility between firms could encourage more complex patterns of commuting, with residential locations being chosen with a view to a sequence of possible jobs rather than a single current one, (although, again, this may only apply to a particular part of the working population).
- A greater dispersal of jobs across the region increases the number of locations which are attractive destinations for non-local commuting.
- Now that there are more multi-career families (and perhaps more concern about schooling), residential constraints may have increased substantially, involving more commuting for some household members rather than relocation toward a new job for a main worker.
- Increasing car ownership, along with a diminished fit of public transport provision to work-travel requirements as jobs and population disperse, facilitates other patterns of movement than the radial flows traditionally promoted by the region's rail network.
- For particular occupational groups the old geographies of employment concentration relative to population may simply have been reshaped, as in the case of the very

large-scale dispersal of goods-related jobs (in both manufacturing and transport) out from London.

Overall, it is useful to distinguish three sets of influences on changing geographies of commuting in the Wider South East:

- numerical shifts in the distribution of employment and of (working-age) population – in total and/or for broad occupational types
- qualitative changes in residential, job or worker preferences on the part of particular population groups and/or employers
- structural changes in the effective transport network in the region and the pattern of accessibilities which it offers

We shall discuss each of these in turn.

Shifts in the distribution of population and employment

Until quite recently the dominant facts about population and employment change in the region were that London was steadily losing both population and employment to the rest of the Wider South East. There were differences in the processes, in that the population shifts mostly took the form of individuals (commonly families) actually moving out while, despite some office decentralisation, the outward shift in employment was preponderantly due to different rates of in situ employment growth or decline in establishments which did not relocate between the areas. As we shall see, relocation of enterprises tends to produce strong immediate effects on commuting (with decentralising residents retaining their old jobs and some transferred workers keeping their old residences).

These patterns of change were reproduced on a smaller scale around all of the subsidiary centres in the region. In the long run, however, none of these necessarily altered commuting patterns, at least in terms of the balance of inward and outward movements to/from the centre, for so long as population and employment decentralisation proceeded at the same rate; and this was broadly true for London from at least the early 1960s to the early 1980s.

Since then there have, of course, been substantial changes. Net outward migration from London to the rest of southern England, which had been running at around 100 thousand a year from the mid-1960s to the mid-1970s, fell back steadily over the next decade. International migration started to yield a substantial net inflow at the end of the 1980s, with another large increase at the end of the 1990s. And natural change within the London population shifted from negative to positive (against national trends, reflecting the effects of past and recent immigration into London) and eventually produced natural growth also within the working-age population. This recent growth in London's population seems, in its turn, to have led to increased outward migration (around a net annual out-migration of 100,000 in recent years), but most of the outward movement seems to be to areas beyond the Wider South East (possibly reflecting tighter planning controls in the South East). Nevertheless the trend of population change in London over the past 20 years clearly involves accelerating gains for London.

In terms of employment distribution, the pattern over the last 40 years or so has been of:

- decentralisation
- stronger growth on the western side of the region (inside and outside London) than in the east

The main source of decentralisation has been differences in in situ growth rates, with relocations playing a minor role (Gordon et al., 1986; LEP and sources cited there). This has produced the fastest growth rates at the edge of the Wider South East, and (for most of the time) the strongest reductions in the urban core. However, with the virtual completion of deindustrialisation in inner London, this area no longer has the worst employment trends.

Together these trends have meant that the strongest growth has been on the northern and western fringes of the Wider South East, including areas beyond the GO regions covered by this study. The belt of maximum growth has tended to move further out: in the last 20 years it has been 50-90 miles out of central London.

These trends have been paralleled in population terms, but the east-west shift has been stronger in relation to employment than population, which implies a weakening of labour market pressure on the eastern side and a strengthening in the west, with implications for commuting.

Qualitative Factors

As the earlier discussion implies, patterns of commuting are influenced by more considerations than simply the local balance of supply and demand for different kinds of jobs and how much people are willing and able to spend on travel to work – though both of these are quite basic. In particular, varying degrees of specialisation in employment capacities/interests and varying residential tastes can have important implications. We can illustrate this by looking at factors associated with the residential choices of people working in central London as revealed by the 2002 Labour Force Survey. This effectively controls for the role of employment location (in a way that is not as possible elsewhere in the Wider South East, where available micro-data from the survey only distinguish very broad regions of employment – Inner and Outer London, the South East GOR and the Eastern GOR). With a crude measure of centrality of residential location (scoring 1 for Inner London, 2 for Outer London and 3 for areas beyond) exploration of factors associated with more central locations – and hence significantly shorter commutes – reveals a series of significant factors:

- People with higher earnings tend to live further out – as conventional theory would predict.
- People with degrees, however, tend to live closer in. This is less expected from conventional theory; but it is consistent with evidence (from the BHPS) that such people are generally more likely to participate in ‘urban’ kinds of leisure pursuits (eg theatre, eating out rather than sport or gardening), than others of similar income/class and residential location. Probably kinds of education have a bearing also; and this may be linked with some differences in sectoral patterns of behaviour. For example, those in the liberal professions tend to live closer in than financial services workers, managers or civil servants.

- People who are not married also tend to live closer in. Again, this is consistent with evidence about preferred patterns of leisure activity, suggesting, as for the previous group, a positive taste for urban residence, which has the indirect effect of reducing in-commuting . It could now also be a factor in the growth of out-commuting, if some groups are not moving residences out when they take jobs outside London.
- Older people tend to live further out, except in the case of non-whites. This also seems likely to reflect tastes, though the fact that the factor does not operate for ethnic minorities may suggest concerns about their reception in outer areas, or loss of community support.

The significance of such factors is that some of the groups with more central residential preferences have been growing rapidly in numbers – nationally as well as in the Wider South East – notably graduates and non-married people.

Transport Accessibility Changes

This factor has three aspects:

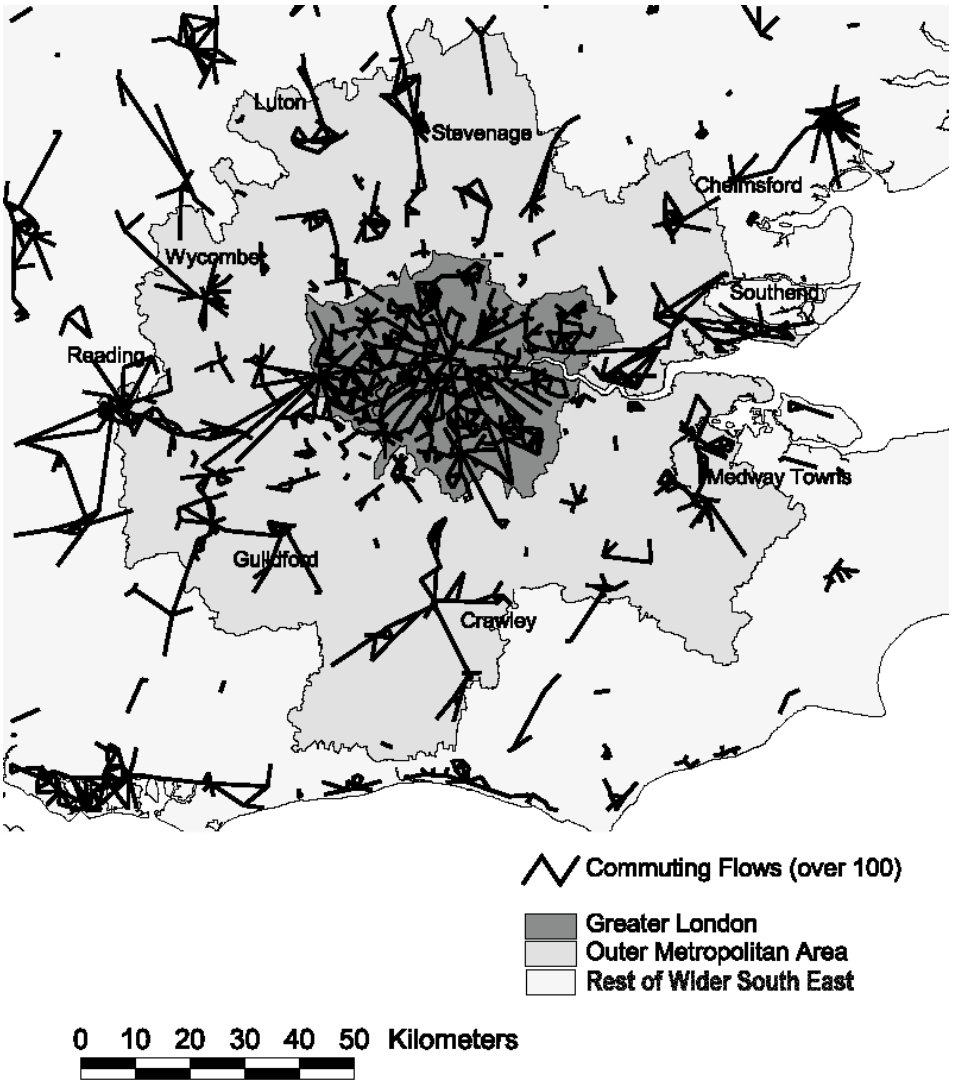
- the growth of (multiple) car-ownership
- increased congestion of many elements of the existing transportation network
- the addition of particular new links to the system

2.5 Analyses of commuting in the region

Although flows into Central London from all directions along the lines of the Wider South East's rail network are the most conspicuous element of the commuting pattern, shorter-distance flows are substantially more important in numerical terms, and are organised around a series of sub-regional employment centres. Within London also such centres have become important. In addition to the central complex, Smart (1981) identified three other broad labour-market areas in London, centred on Barking, Ealing and Hounslow, which were all then substantial engineering centres. More recent official classifications have distinguished just one subsidiary travel-to-work area, spanning parts of outer west London, and adjacent parts of the Outer Metropolitan Area - focused on Heathrow in the 1984 TTWA list and Slough/Woking in the 1998 version. In fact the Thames Valley west of London and the Essex side of the Thames Estuary are more or less unique in having large flows between particular areas cutting across the Greater London border (see Figure 2.1). Frost and Spence's (1995) analyses based on the 1981 Census actually show that longer-distance flows into London come disproportionately from the east, where the OMA economy is relatively weak, and least from the south-western side of London, despite the fact that the western side of ROSE contains more of the higher socio-economic groups expected to commute longer distances. Inward flows from Essex, and to a lesser extent Kent grew between the 1991 and 2001 censuses.

At a more strategic scale (for broader sub-regions), flows across the London border are a key element in the commuting pattern, with a million or so people commuting either into or out of Greater London. Over the long run this volume has shown a clear tendency to grow. Inward flows to Greater London have grown from the 459,000 recorded in the

FIGURE 2.1: LONDON METROPOLITAN REGION AND 1991 COMMUTING FLOWS



Source(s) : 1991 Population Census; flows mapped by M. Coombes and S. Raybould, CURDS, Newcastle University.

1966 Sample Census to 673,000 in the 1991 Census, and 723,000 in the 2001 Census. As far as outward flows are concerned, numbers appeared to be stationary between 1966 and 1981 at close to 110,000, but subsequently grew at an accelerating rate, reaching 150,000 in the 1991 Census, 176,000 in the 1992 Labour Force Survey, 236,000 in the 2001 Census - and 373,000 in the 2002 Labour Force Survey.

Both the overall growth in commuting across this border and the increased importance of outward movements clearly reflect long-term trends, both in levels of mobility and in the distribution of opportunities. But there also appears to be a potential for large short-term, cyclical fluctuations, reflecting temporary shifts in the relative performance of London employment relative to its hinterland - together with differential house prices, and (probably) international migration. A set of indirect estimates of net commuting into

London for the years 1977-94 constructed by Gordon (1999) from labour market accounts, suggests (despite margins of error of around 30,000 in individual years) that the net balance swung from a gain of about 500,000 in 1982 up to 700,000 in 1985 and back down to 400,000 in 1989. Time-series analyses suggested that these reflected two factors: the level of national unemployment, as a stimulus to long-distance commuting into London from beyond the boundaries of the South East; and the relationship between employment growth (specifically for services jobs as far as men were concerned) in London and in its hinterland. Overall, the strength of commuting adjustments in this period seemed such as to absorb between 50% and 100% of London's differential employment growth in particular years.

For the years from 1992 on, where inclusion of a workplace question in the Labour Force Survey provides more consistent evidence, the signs of short-term variability have become weaker. In fact, in the long period of growth between 1993 and 2000, though gross flows increased, net movement into Greater London stayed remarkably static at about 450,000– well short of its 1980s peak. A plausible explanation is that net overseas immigration into London has substituted for net inward commuting in this period. In the last few years, however, when London's relative employment performance has fallen back, there are again signs that net commuting to London responds strongly to differential labour market performance, with net flows falling steadily from a peak of 479,000 in 1999 to 354,000 in the fourth quarter of 2002. In the last year of this period when London employment actually fell substantially, all of the impact was actually absorbed by commuting adjustments, not by London residents (Gordon et al, 2003). It is important to emphasise, however, that gross inward commuting into London remains relatively high (though probably lower than in the mid-1980s boom).

Two analyses of change in commuting balances (net flows into or out of areas) confirm their responsiveness to differential rates of population and employment growth as between an area and its hinterland. The older of these relates to changes between the 1966 and 1971 Censuses, for which (uniquely) the source of local population changes can be fully disaggregated via the later census's five-year migration question. Cross-sectional regressions across 71 boroughs, districts or pairs of districts in the London metropolitan region showed a very strong response to both differential employment growth (relative to a wider commuting area) and also to migration, especially over the distance ranges where this is shaped by housing or environmental motives rather than employment. There was also a significant negative coefficient on lagged net commuting, with a value implying a long, slow process of adjustment. The effect of differential employment change was even stronger than might have been anticipated theoretically in the case of males – implying that these would be fully absorbed in terms of commuting adjustments. For women the effect (though still significant) was much weaker, by a factor of 3 or 4, perhaps because much employment growth would have been in part-time jobs which may not justify inter-area travel. Changes in female commuting were also less satisfactorily explained than those for men (Gordon and Molho, 1985). The second similar study was of changes between the 1981 and 1991 Censuses, with data for counties of the South East standard region and LPAC's six sub-divisions of London. The results were qualitatively similar though in this case no evidence of a lagged adjustment could be found, while it was not possible to distinguish between the effects of particular kinds of migration. In this case there was no real distinction between the responsiveness of men and of women to differential employment

changes, both implying more or less complete adjustment through commuting, though differential population growth only seemed to be significant for men (Gordon, 1996).

A third relevant study of change in the balance of commuting was undertaken on a panel basis for the years 1984-95 by Cameron and Muellbauer (1998). Their data actually relate to standard regions across the whole of Great Britain, but the South East and East Anglia are two of the critical regions in their argument, while the analysis is potentially relevant within the South East too. What they succeed in showing is that housing-market as well as labour-market factors affect the dynamics of commuting fluctuations. Net commuting tends to be more positive when regions have falling unemployment, rising earnings, and more workers in production sectors – but also higher house prices and greater downside risks in the housing market. The significance of the last two variables is that they encourage people to engage in longer-distance commuting from other regions rather than enter the region's own housing market. A lagged dependent variable is also significant, reflecting delays in reaching an equilibrium.

So far this review of empirical work on actual past commuting changes in the regions under consideration has been largely confined to academic sources, for the reason that, although they constitute the smaller part of what has been written about the subject, they are more concerned to identify general tendencies and possible causal relations, which can be harder to disentangle from more directly policy-related studies. From what has been covered, however, a point to make is that the underlying influences of growing incomes and purchasing power as factors promoting more extended commuting in all directions have not been explicitly drawn out. Nor, it must be added, has the role of planning, but one of the implications of what has already been said in this review is that in a very complex system its impacts cannot be read off directly. We do, however, have good reason to believe from old studies (notably Peter Hall's 1973 *Containment of Urban England*) that the London green belt has been a factor in promoting extended commuting, contrary to its original intentions.

2.6 Summary and conclusions

Three general points should be emphasised from this review of theoretical studies of influences on commuting behaviour, and the more limited body of empirical work relating specifically to these regions.

- The first is the influence of shifting patterns of population and employment distribution within what has become (for most of its area, except perhaps at the fringes) one extended metropolitan labour-market area linked on a chain-wise basis. These can be well-handled within conventional cross-sectional spatial interaction models – though there are very important issues about the knock-on effects of international migration which may not be so well handled;
- Second is the effect of secular changes in specialisation of employment and skills, in incomes and in tastes for centralitry/rurality. These are not directly identifiable from such models, though some of their impacts can be inferred from comparisons of estimations of these at different points in time. These secular changes may be important, however, since some contradictory trends now seem to be operating with respect to (de)centralisation of different population groups.

- Third are issues about dynamics, in the sense of short-term responses to shocks and cyclical developments which do not reflect longer-term tendencies. These can be a problem, especially when data with any detail are available only for a few points in time. At the least, however, they suggest a need to look explicitly at causes of change over inter-censal periods.

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3 ANALYSIS OF JOURNEY TO WORK PATTERNS

Census information on journey to work patterns in 1991 and 2001 has been analysed in a variety of ways, in order to understand how commuting trends within London and its surroundings will evolve in the future. The main findings from this analysis are presented below. The presentation of the main findings is structured as follows:

- A summary of the main influences on the spatial pattern of journey to work.
- Changes in journey to work patterns between 1991 and 2001.
- Spatial imbalances between labour supply and demand.

More detailed maps, discussions and tabulations of the results are included in Appendix A.

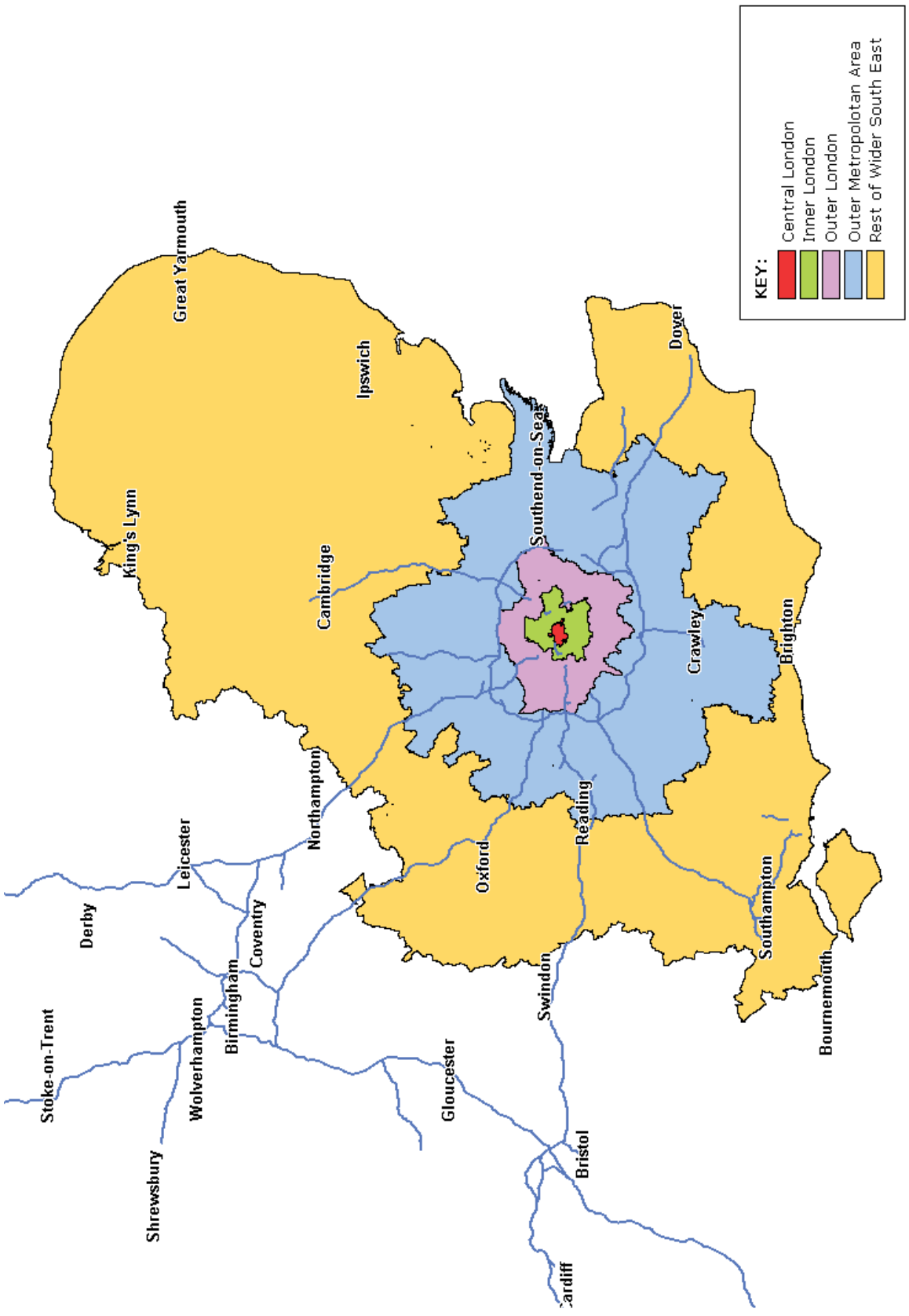
3.1 Approach

The primary data source used for the analysis below is the set of journey to work tables that were published in the 1991 and the 2001 Censuses. Although in principle these have the potential to provide a rich data source, in practice there are many potential pitfalls in their use due to such features as differences between years in classifications/definitions, suppression and randomisation of results to ensure confidentiality, limited availability of cross-classifications for multiple categories. However, we are confident that the data eventually published by ONS are sufficient to provide us with a good understanding of the current pattern of journey to work behaviour.

Some of our initial analyses were carried out at the national level in order to quantify the main influences on journey to work patterns. This national level analysis also used the National Travel Survey (NTS) of Great Britain to allow information to be analysed at the level of the individual. Based on these results the particular pattern of journey to work within the study area was then investigated in greater detail.

The study area for the commuter model comprises the regions of London, the South East and the East of England, hereafter termed the Wider South East (WSE). To aid in summarising the analysis, many of the results presented are aggregated into a system of five annuli: Central, Inner, Outer London, the Outer Metropolitan Area (districts to approximately 30 kms outside the M25) and the rest of the Wider South East. The boundaries of these study area annuli are shown in Figure 3.1.

FIGURE 3.1: STUDY AREA OF THE WIDER SOUTH EAST AND ITS CONSTITUENT ANNULI



3.2 The main influences on commuter travel

The labour markets and the resulting journey to work flows have been segmented across a number of dimensions in order to ensure that there is a satisfactory degree of homogeneity in behaviour within each segment that is modelled. This ensures that we can explicitly represent the major observed differences between segments for average trip lengths and for the spatial locations of supply and demand. The segmentation finally adopted represents a balance between data availability, model size and model precision. The analysis underlying the choice of segmentation is now presented.

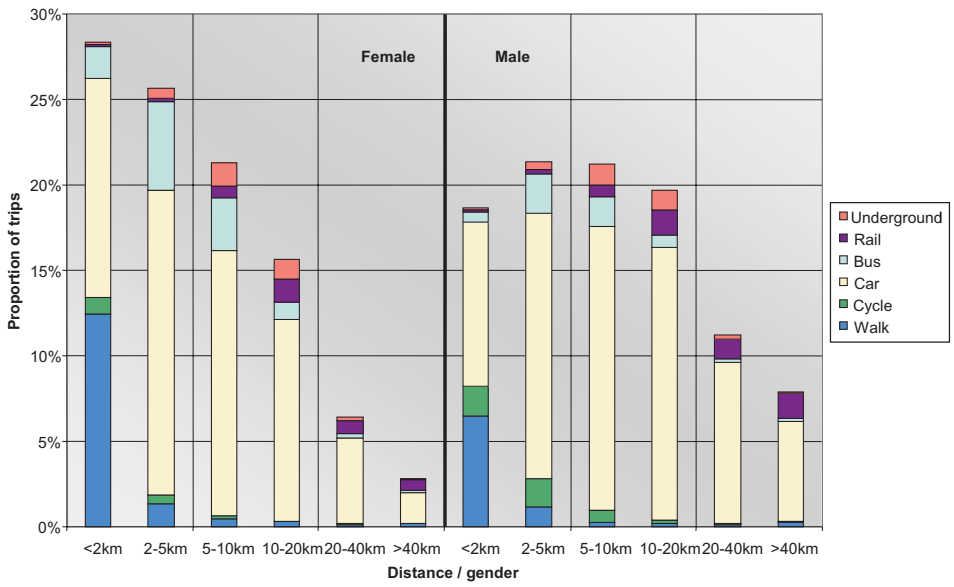
The aim of the analysis was to understand for journeys to work the main influences on:

- the mode used,
- the spatial pattern,
- the average journey length.

Analysis of the Census data as well as of the NTS has identified the following main influences on the average length of journeys to work, a number of which are analysed in greater depth in subsequent sections. It is important to note certain features of the classifications used in the Census journey to work tables underlying this analysis. Particularly that, people with no fixed place of work are treated the same as people who work mainly at or from home and are counted as working in their area of residence. Confusion can also arise where main residence is given as Norfolk/Suffolk, the workplace is London and the main mode of travel to work is London Underground or walk. This is likely to refer to those who reside in a secondary residence or lodgings in London for much of the working week.

- **Males are more likely to commute long distances**, whereas the shorter trips are more prevalent among females (see Figure 3.2).
- For a given journey length, **females are more likely to travel by bus or on foot**, whereas males are more likely to travel by bike or car (see Figure 3.2).
- **Full-time workers have longer journeys than part–time workers** (see Figure 3.6).
- There is a strong relationship between socio-economic status and journey length. **Professionals on average travel much further than manual workers**. Intertwined with this is a strong relationship between industry type and journey length. Those in the financial sector travel much further than those in the hotels and catering sector (see Figure 3.6).
- The average **length of journeys to work has increased consistently through the years**.
- The **pattern of usage of modes varies with the density of the residence ward** (measured as household spaces per hectare then subdivided into quintiles of equal numbers of wards) as shown in Figure 3.3 for England and Wales as a whole. Rail plus London Underground is heavily used by those who reside in the densest quintile but then has a much lower level of usage that reduces slightly with declining residential density for those residing in the remaining four quintiles. In contrast, bus

FIGURE 3.2: AVERAGE DISTANCE TRAVELLED TO WORK BY MODE AND GENDER

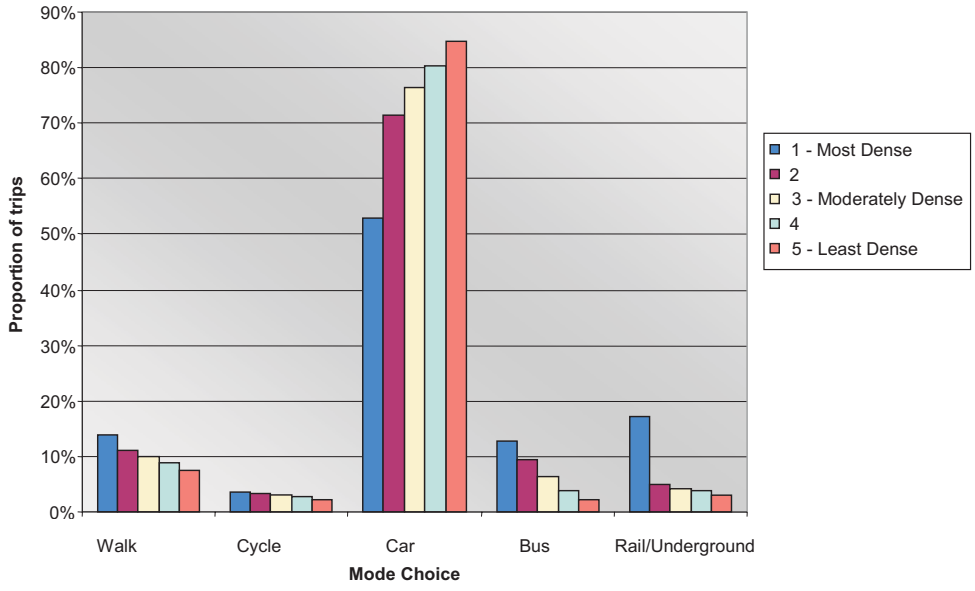


Source(s) : 2001 Census Table S129.

and walk usage decline strongly as residential densities lessen and as car usage increases. An alternative perspective is that choice of mode is in part dictated by supply, especially with regard to public transport services.

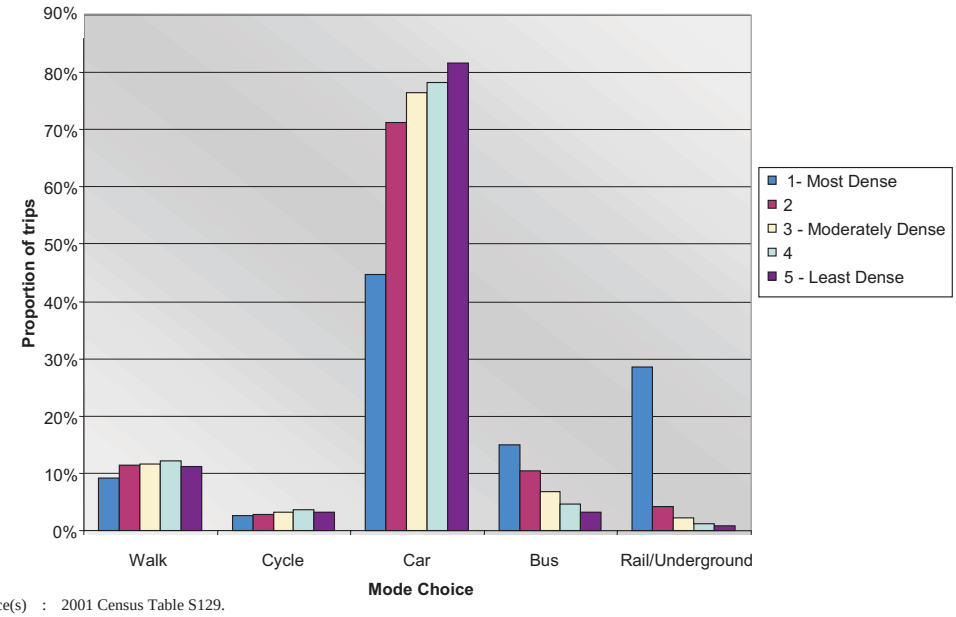
- The **pattern of usage of modes varies with the density of the workplace ward** (measured as employees per hectare and divided into quintiles of equal numbers of employees, rather than equal numbers of wards) as shown in Figure 3.4 for England

FIGURE 3.3: MODE SHARE BY DENSITY CLASS, RESIDENCE END



Source(s) : 2001 Census Table S121.

FIGURE 3.4: MODE SHARE BY EMPLOYMENT DENSITY QUINTILES, WORKPLACE END

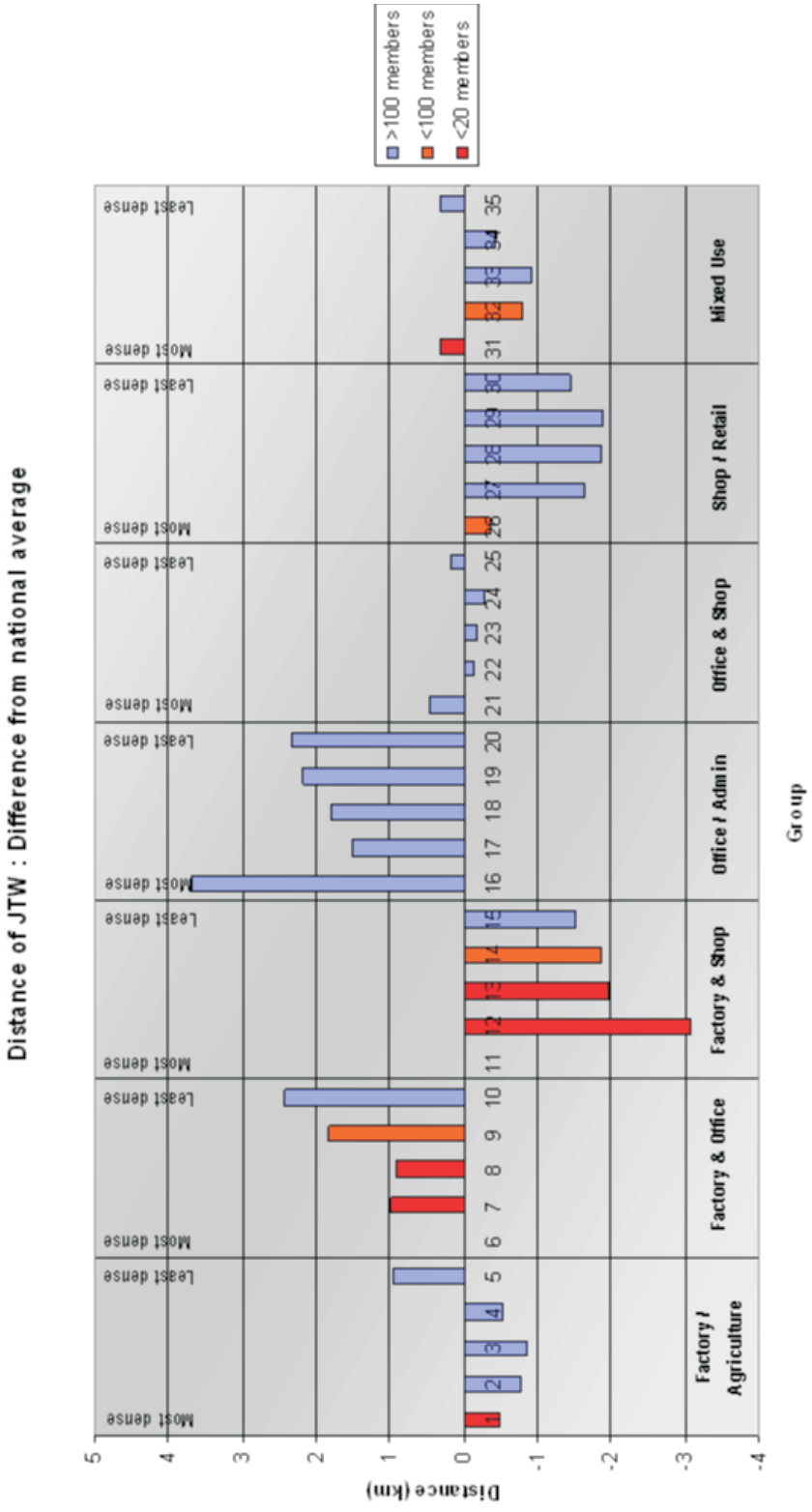


Source(s) : 2001 Census Table S129.

and Wales as a whole. This presents the pattern of modes accessing workplaces, where the wards are segmented by the density of employment in these workplace zones. This shows some interesting **differences from the pattern at the residence end**. The use of walk mode increases, rather than decreases, with declining density presumably because for jobs in areas of low density (e.g. the rural districts in the South East and East of England regions), people will have few public transport services available to access jobs there. There are very steep declines in the proportions arriving by bus or rail/London Underground as density declines. The vast majority of the rail/underground use is concentrated on the highest density workplaces in Central/Inner London, for which the proportion arriving by car is much lower than elsewhere.

- The average **journey distance to workplaces varies by predominant industrial sector and by employment density of the workplace ward.** Figure 3.5 shows the variation in average distances of workers by employment density and by the predominant industrial sector(s) at the ward of their workplace. It also presents the number of wards within each class, so that those classes in red and orange with relatively few entries are relatively unimportant numerically. It appears that office-related land usage promotes longer journeys (partly because of the predominance of managerial/professionals in this sector). Factory/agriculture wards have around-average/slightly below-average distances, while wards of shops have lower-than-average journey lengths (partly because most of their employees will be relatively poorly paid and will often be part-time workers). In general, journey lengths increase as density decreases, although this is not a universal trend. Central London, which has the highest density of offices, sucks in employees from a wide hinterland.

FIGURE 3.5: DIFFERENCE IN DISTANCE TRAVELLED TO WORK FROM NATIONAL AVERAGE BY EMPLOYMENT DENSITY AND INDUSTRIAL SECTOR, WORKPLACE END



Source(s) : 2001 Census Table S129.

3.2.1 Lengthening of journey to work trips over the years

There has been a trend for many years for people to reside increasingly further from their workplace. Part of the lengthening of journey to work trips is due to transport related changes but much is due to influences that lie outside the transport sector: to land-use planning policies, to matters of individual taste or to the economics of location.

The National Travel Survey of Great Britain (NTS) has measured passenger travel patterns on a consistent basis for 20 years. Table 3.1 shows that over this period the average length of journey to work trips has increased by 2.2% per annum, whereas the average travel time has increased more slowly by 1% per annum. In practice, the rate of growth in average trip length has reduced gradually over this interval. The table also shows that in recent years, when the trend of increases in travel speeds has reversed, the rate of growth in average journey to work trip lengths has diminished significantly.

These observations from the NTS suggest that part of the increase in journey to work distances may be due to the more rapid travel speeds that have become available in the past through greater availability of cars, greater access to motorways, and rapid rail services.

However, there are other important non-transport influences also on the distances between homes and workplaces that we have already identified above. Many of these influences are not independent of each other – possible reasons why, on average, women live closer to their workplaces than men are that women are: less likely to have driving licences, more likely to be in part-time jobs, and more likely to be in lower income employment, than men. However a further part of the difference between the sexes in their average journey to work distance is likely to be due to other aspects, including, for women with young children, the need to be able to collect them from school and to be able to spend time with the family rather than lose too much time on commuter travel. Continuing changes in social and economic roles may act in the future to lessen some of the differences in average journey to work distances between women and men.

Some of these factors are now examined in more detail in order to clarify their influence on the relationship between homes and workplaces.

3.2.2 Industry type

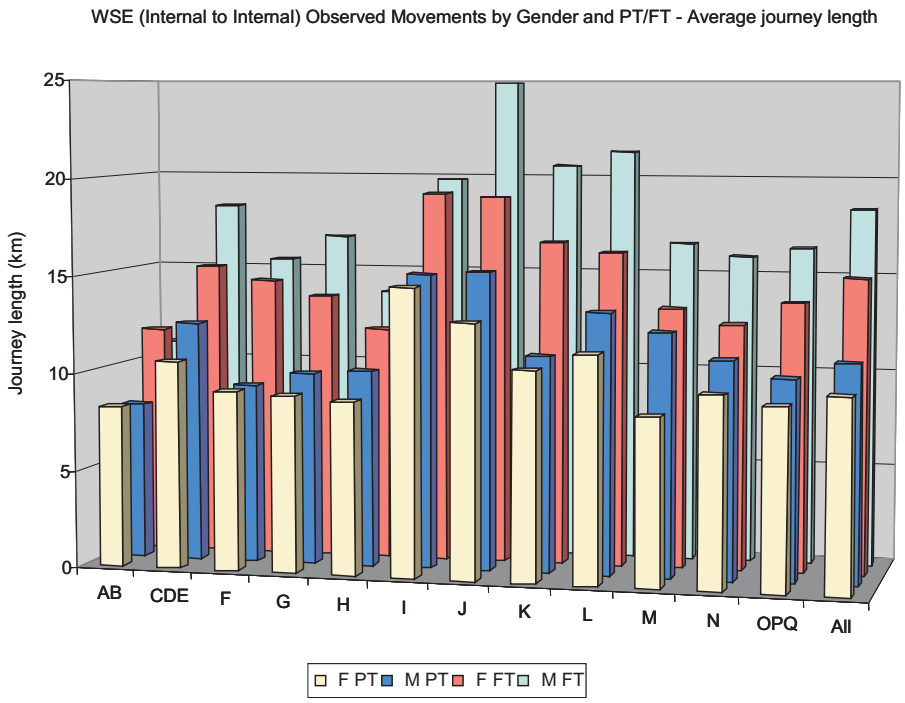
Figure 3.6 summarises the interacting influences on journey to work distances of type of industry, gender and whether working full-time or part-time. It presents the observed average one-way journey to work distance (calculated from the transport network) for

TABLE 3.1: TRENDS IN CHARACTERISTICS OF JOURNEY TO WORK TRIPS IN GREAT BRITAIN

	Period					Growth rate
	1985/86	1989/91	1998/2000	2002	2003	1985-2003
Distance (kms)	9.8	12	13.4	13.6	13.6	39%
Distance growth/annum	-	4.6%	1.3%	0.4%	0%	2.2%
Time (minutes)	22	24	24	25	26	18%
Speed (kms/hour)	27	30	34	33	31	18%
Speed growth/annum	-	2.5%	1.3%	-1.0%	-3.8%	1.0%

Source(s) : National Travel Survey of Great Britain (DfT, 2004).

FIGURE 3.6: AVERAGE JOURNEY TO WORK DISTANCE, BY INDUSTRY TYPE FOR THE WIDER SOUTH EAST, 2001



Note(s) : See Table 3.2 for industry type definitions. Transport network distances were estimated from the LASER model.
Source(s) : 2001 Census Table W105 for England and Wales.

those living and working either within London or within the South East and Eastern Regions surrounding it. As such it covers both the commuter area for London and that for the many towns located within a 100 kilometre radius of it. The figure shows clearly the separate influence of the three factors that it distinguishes, namely that:

- males commute further than females,
- full-time workers commute further than part-time workers,
- systematic differences in journey to work lengths occur between different industry types.

The industry types are listed in Table 3.2 which illustrates that the longest journey to work distances in Figure 3.6 are those associated with male full-time workers in industry "J", the financial sector. Within Central London, the financial sector provides the highest salaries, requires a wide variety of specialised professionals and is heavily concentrated in a single location. In contrast, the average journey to work distances for those working in industry "H", the hotel and catering trade, are among the shortest. This may well be because the jobs are more widespread, the salaries are low and many of the jobs are relatively unspecialised with unsocial working hours and irregular shift patterns.

The 2001 Census only presents journey to work data for the industry categories listed in Table 3.2. Accordingly, we use these throughout the analysis and modelling of the journey to work patterns in this study. An analysis based on both occupations and industries could increase our understanding of journey to work patterns but combining

TABLE 3.2: STANDARD INDUSTRIAL CLASSIFICATION - SIC 92

Code	Industry	Code	Industry
A	Agriculture, Hunting, Forestry	I	Transport, Storage and Communication
B	Fishing	J	Financial Intermediation
C	Mining and Quarrying	K	Real Estate, Renting and Business Activities
D	Manufacture	L	Public Administration & Defence, Social Security
E	Electricity, Gas and Water Supply	M	Education
F	Construction	N	Health and Social Work
G	Wholesale and Retail Trade, Repair of Motor Vehicles	OPQ	Other
H	Hotels and Restaurants		

occupations with employment by type and by industry would have been beyond the current capability of the Commuter Flow Model.

This influence of industry type on journey to work distance is a combination of three interlinked factors. On average:

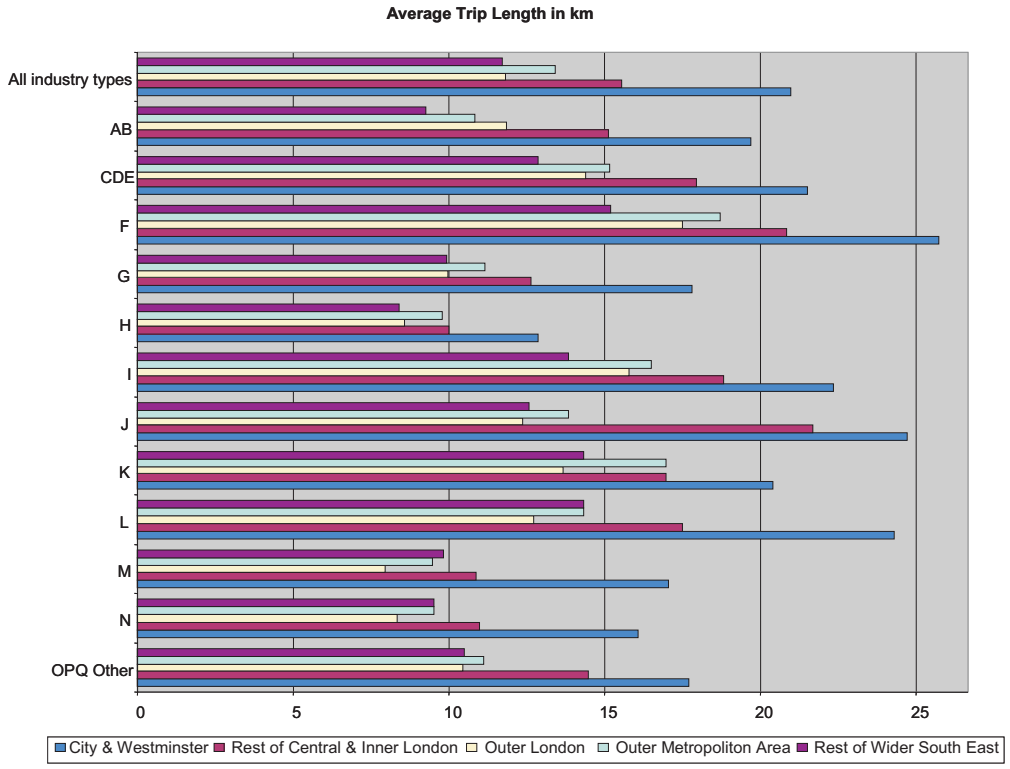
- those in higher-income occupations commute further than those in lower income occupations,
- those in specialised occupations commute further than those in non-specialised occupations,
- those in industries that have workplaces concentrated into relatively few locations commute further than those in industries that are located throughout a region.

This last point helps to explain why education workers and health and social workers many of whose jobs are spread among the community, travel shorter distances than public administration and defence workers, many of whose jobs are centralised in relatively few locations.

Analysis of average journey to work lengths by industry and workplace location illustrates the strong influence of industry type in all workplace locations. Figure 3.7 presents crow-fly journey to work distances to workplaces in each annulus around London. The general trend is that people travelling to the City and Westminster cover greater distances in all of the industry categories. Trips to outer London are generally shorter than trips to the rest of Inner London. For almost all industry types, apart from AB, trips to workplaces in the Outer Metropolitan Area are longer than those to Outer London or to the rest of the Wider South East. There is a distinct spatial influence on journey to work lengths over and above that due to the mix of industry types that are located in each workplace zone.

Figure 3.7 also confirms the interlinked influence on journey to work distances of both industry type and location of workplace. Sector J, Financial Intermediation, has much longer-than-average journey to work distances to the Central and Inner London workplaces in which it is concentrated; however, to its other workplace destinations its excess above the average distance is less pronounced. Financial sector workers in

FIGURE 3.7: AVERAGE JOURNEY TO WORK CROW-FLY DISTANCE, BY INDUSTRY TYPE AND LOCATION OF WORKPLACE, 2001



Note(s) : See Table 3.2 for industry type definitions.
Source(s) : 2001 Census Table W105 for England and Wales.

centres such as Norwich and Southend are less specialised and will not generally attain the high salary levels of those in the City of London. Sector H, Hotels and Catering, has shorter distances than other sectors in all workplace locations. For this as for almost all sectors, the Central London workers have the longest journey to work distances, and those in Outer London and the rest of the Wider South East have the shortest distances. This illustrates that there are separate but interlinked spatial and industry-type influences on journey to work distances.

Another important finding is that workers in the construction sector (F) have some of the longest commuting distances. Part of the reason for this is that many reside outside of the Wider South East and commute to jobs in London and the Wider South East on a weekly rather than daily basis. In addition the nature of construction means that workers have less ability to control where they work.

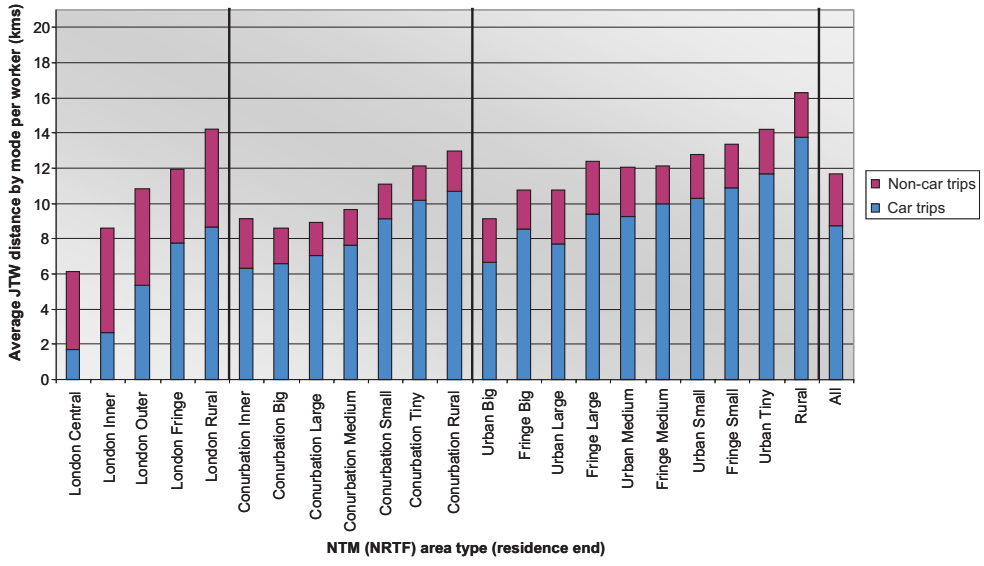
3.2.3 Job specialisation - the local balance of homes and workplaces

By their nature semi-/unskilled jobs are more ubiquitous than specialised jobs. A worker with a specific specialised skill (eg an aircraft maintenance worker or a heart surgeon) who is looking for a new job is likely to find fewer relevant opportunities close to his/her home than is a semi-/unskilled worker (eg a security guard or a mini-cab driver). It is not the total number of skilled jobs in an area that matters to a job seeker but only that subset of skilled jobs that match to the particular type of skills of that individual.

The increase in the proportion of jobs that require specialised skills within the overall national economy is an important reason for the lengthening of journey to work distances. Within the UK, managerial/professional occupations are a rapidly growing part of overall labour demand, whereas the demand for semi- and unskilled labour in manufacturing and in many (but not all) other economic sectors has declined. This is partly due to the adoption of capital-intensive production methods in the UK as well as to the increased imports of labour intensive goods from low-wage foreign countries.

Residents in areas that have a surplus in suitable jobs, relative to the local resident labour force, will tend to exhibit relatively short journey to work trip lengths and vice versa. This is illustrated in Figure 3.8 in which the height denotes the overall average (crow-fly distance) trip length and the shades denote the proportion of kilometres by car and by all the remaining modes. It demonstrates that the average journey to work distance for the residents of an area is inversely related to the urban size and residential density of the area. London, the conurbations and the rest of Great Britain, each show a pattern of increase in commuter travel as the residential density decreases. However, the ratio within an area of its total jobs to its total employed residents also correlates with residential density so that this ratio may also partially explain the increase in journey to work lengths.

FIGURE 3.8: AVERAGE JOURNEY TO WORK DISTANCE DIFFERENTIATED BETWEEN CAR AND OTHER MODES: BY AREA TYPE OF RESIDENCE



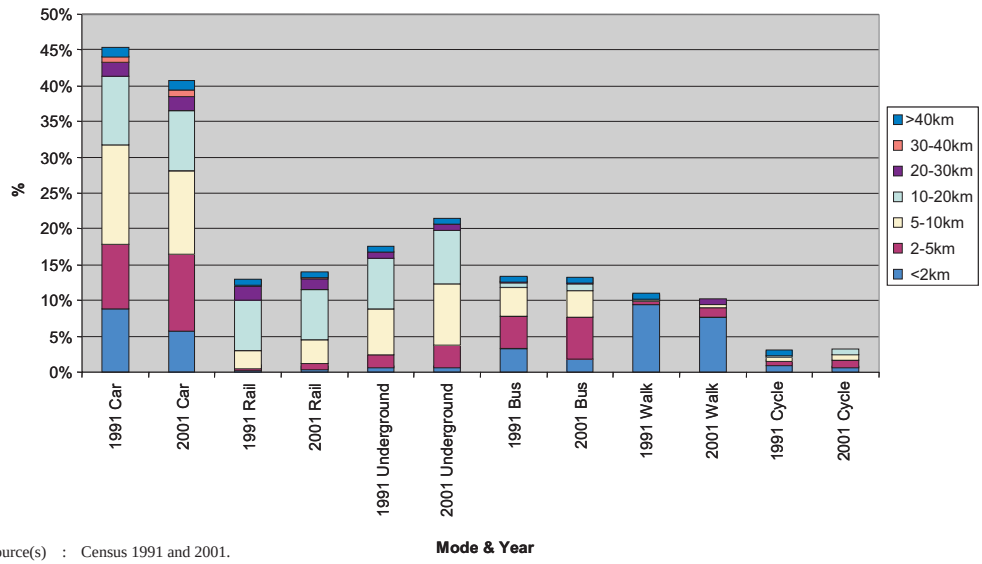
Source(s) : ONS (2003/2004) - 2001 Census Table S121 for England and Wales.

3.3 Comparison between 1991 and 2001 in modal choice and distance to work patterns

One of the most striking changes in mode choice between 1991 and 2001 for London residents is the five percentage points reduction in the proportion travelling by car to work and the increase in rail and especially in underground use, as presented in Figure 3.9 (note: park and ride is considered as main mode rail or underground rather than main mode car). By 2001 only 40% of journey to work trips by Greater London residents are made by car, though these can be seen to include most of the trips longer than 30 kms. The proportions of bus, walk and cycle trips have each stayed fairly constant over time and they continue largely to be less than 10 kms in length.

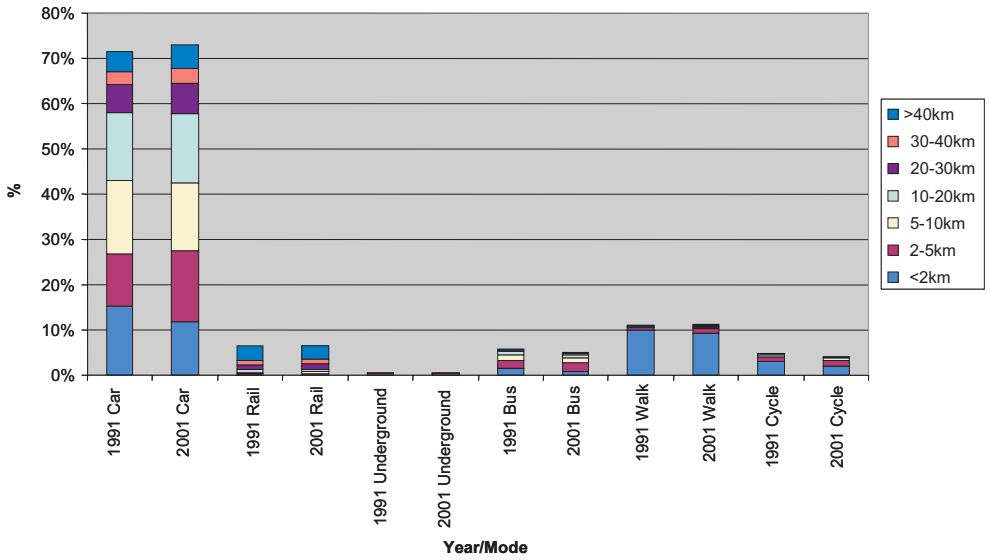
The contrasting pattern of change in the area outside Greater London is presented in Figure 3.10 in which the percentage of trips by car has increased marginally from 1991 to 2001. The increase in car use is greatest over the longer distances. It is interesting to note that the proportion of car trips over the shortest distances (<2 kms) has been reduced slightly since 1991. However this does not seem to be a function of people switching to alternative modes for these short journeys. Instead it is caused by their journey to work trips now being longer on average but still being by car. Use of alternative modes has changed little over time, which is in stark contrast to the pattern exhibited by residents of London. Public transport use remains low for residents outside London, with relatively few people using rail or bus, except for those commuting long distances by rail to Central London.

FIGURE 3.9: PERCENTAGE OF TRIPS BY MODE AND DISTANCE BAND FOR LONDON RESIDENTS, 1991 AND 2001



Source(s) : Census 1991 and 2001.

FIGURE 3.10: PERCENTAGE OF TRIPS BY MODE AND DISTANCE BAND FOR RESIDENTS IN THE WIDER SOUTH EAST (EXC. LONDON), 1991 AND 2001



Source(s) : Census 1991 and 2001.

3.4 Spatial analysis

In order to appreciate the spatial patterns of commuting in greater detail, a particular geographic sector north from London up along the M11 was studied in more depth. Figures 3.11A and 3.11B graphically present the modal and residential location patterns of those commuting to Inner/Central and those to Outer London for each of the eight districts within this chosen sector. It shows that those commuting to Outer London are less likely to live in the north of the area, than are those travelling to Inner/Central London. Also the vast majority of trips to Outer London are by car, whereas those to Inner/Central London are more likely to be by rail, except those by residents from the very south of the sector.

Figure 3.12 presents the pattern of length of journeys to work in 1991 and in 2001 for each of the districts in this sector. It shows that in each one the proportion of trips longer than 30 kilometres has increased, whereas the proportion less than five kilometres has decreased. This trend of increase in the proportion of longer commuting trips is a general trend in most locations.

FIGURE 3.11A: THE SPATIAL PATTERN OF JOURNEY TO WORK FOR RESIDENTS AROUND THE M11, 2001

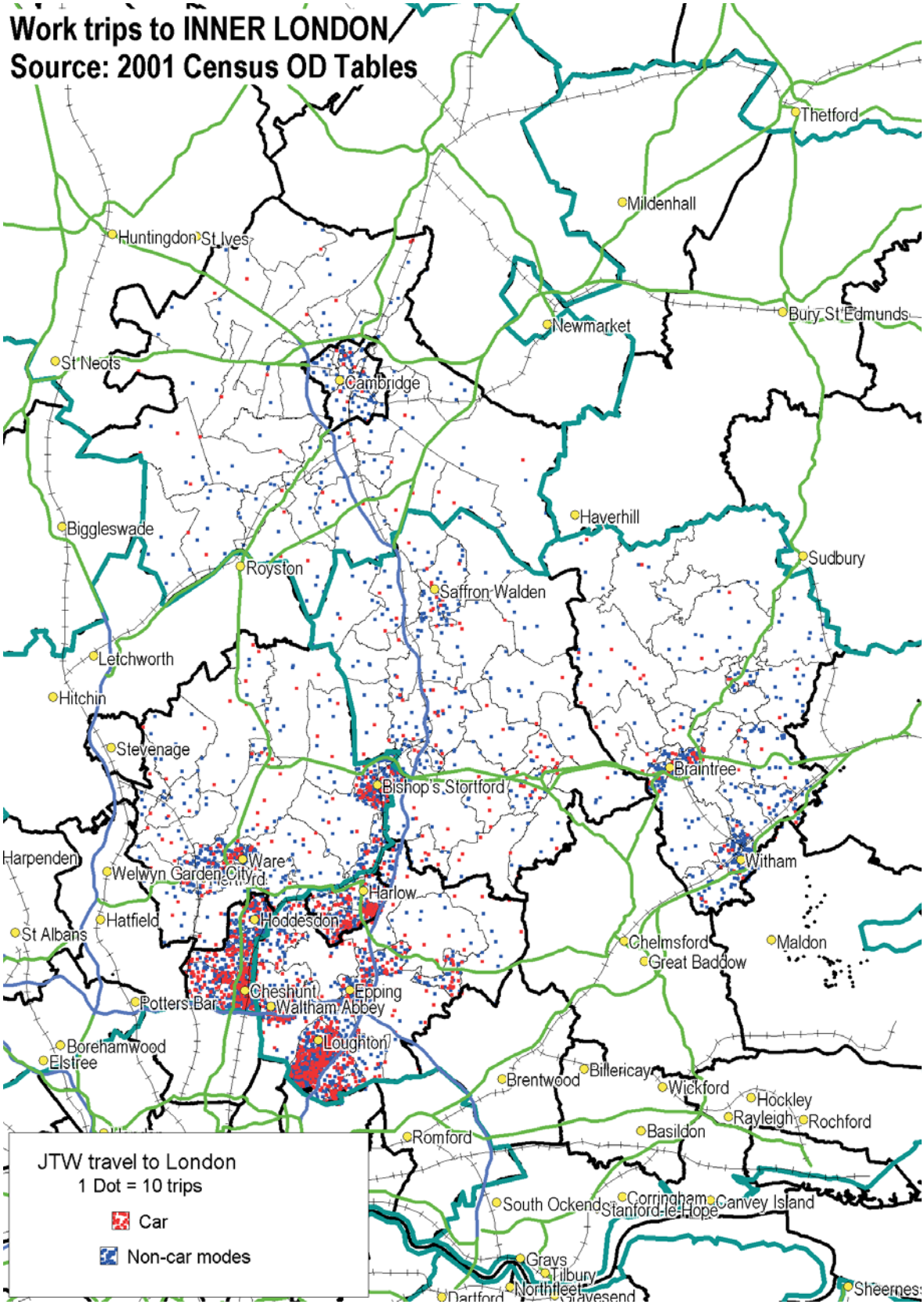


FIGURE 3.11B: THE SPATIAL PATTERN OF JOURNEY TO WORK FOR RESIDENTS AROUND THE M11, 2001

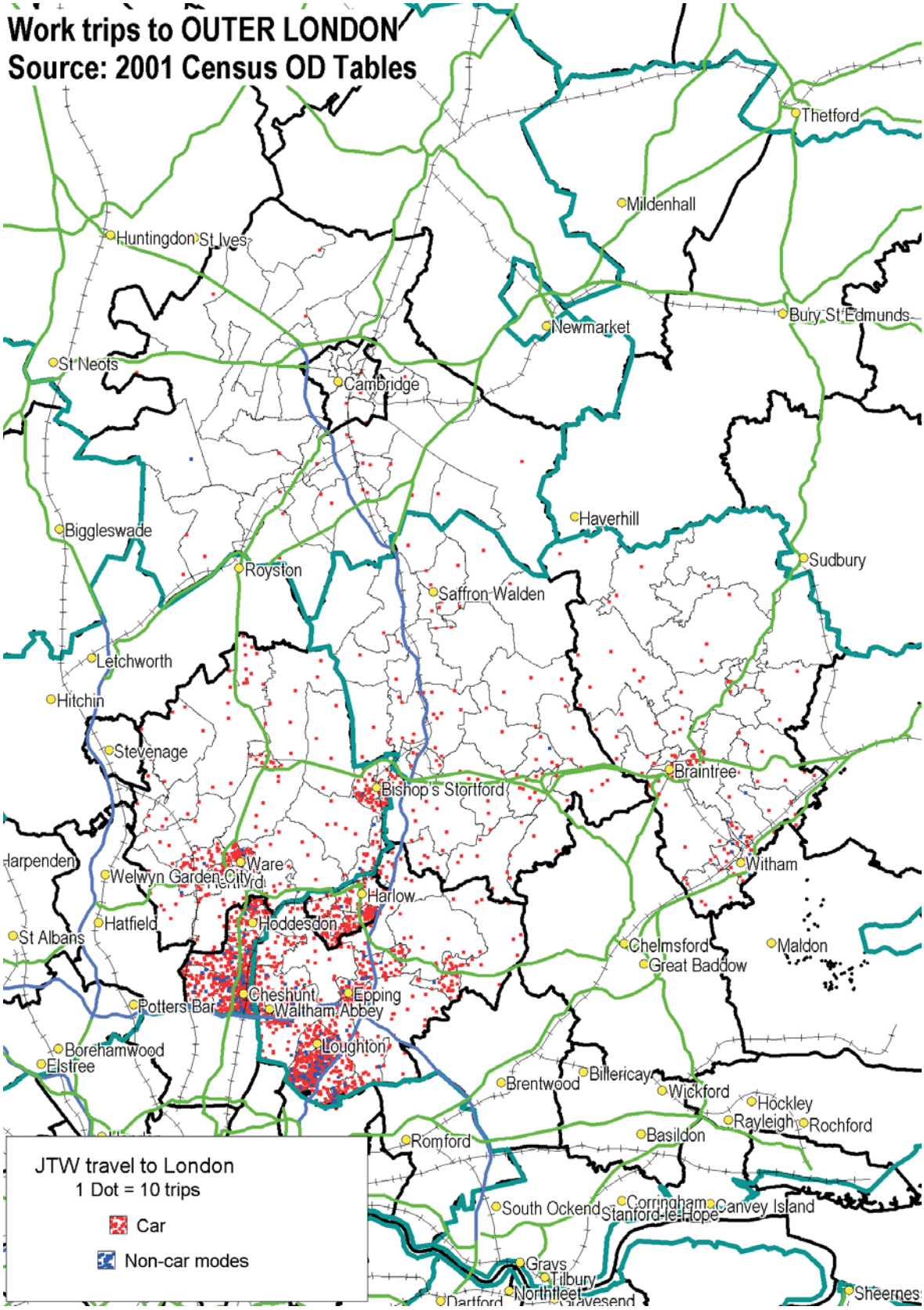
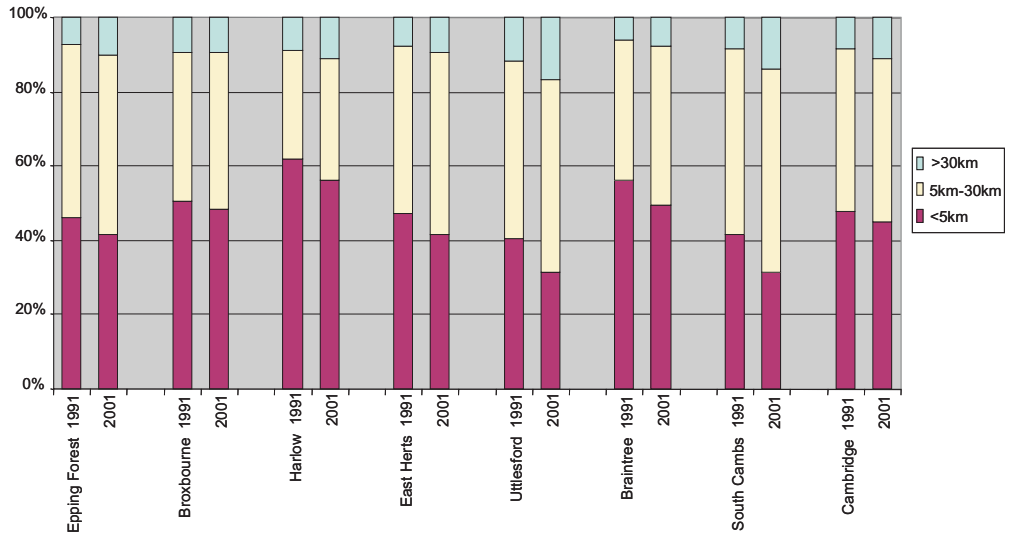


FIGURE 3.12: JOURNEY TO WORK DISTANCES BY DISTRICT, WORKPLACE END, 1991 AND 2001



Source(s) : Census 1991 and 2001.

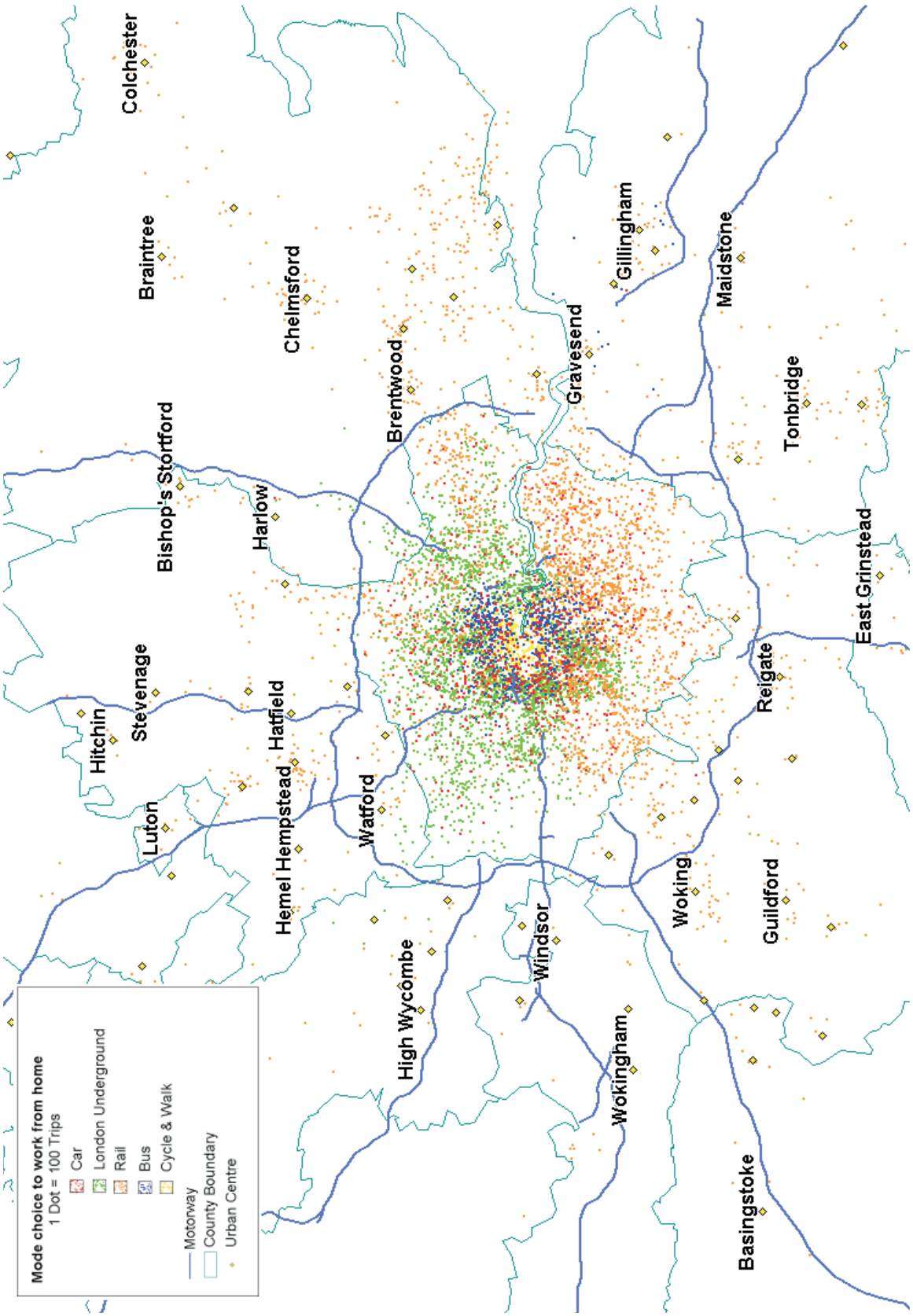
3.5 Trip distribution by mode for commuting

Figures 3.13-3.16 highlight the different patterns of commuting to workplaces in different parts of the study area. The maps illustrate the different modes used and the geographical extent to which different regions of the study area are attractive to employees. The points on each map are located randomly within the ward of residence of a work trip. They are coloured according to the mode of transport used for that particular volume of trips: each one point represents 100 trips. The strong differences in the predominant colours between the maps clearly show the differences in modal patterns between these workplaces.

3.5.1 Commuting to Central London workplaces

Central London attracts trips from across the study area, Figure 3.13. Only a small proportion of trips within the immediate vicinity of Central London use car as their mode. The modes used for trips to Central London form quite definite concentric rings around their destination. Cycle and walk appear quite popular for the shortest trips from within Central London; for slightly longer trips bus is used. Underground is popular for longer trips, especially from the north and west of the City where the underground network is more extensive. The longest trips to Central London tend to be by rail; rail is also popular for trips from the immediate south and east of the City, where the rail network is relatively extensive.

FIGURE 3.13: MODAL DISTRIBUTION OF TRIPS COMMUTING TO CENTRAL LONDON



3.5.2 Commuting to Inner London (excluding Central London) workplaces

The patterns of modal distribution of trips to Inner London (Figure 3.14) do not display such clearly differentiated patterns as those to Central London. Trips to Inner London are less likely than those to Central London to originate from beyond the Outer London/M25 boundary; the trip density for residents outside London is generally much lower in Figure 3.14 for Inner London workplaces than that in Figure 3.13 for central London workplaces. Non-mechanised modes are well used for short trips originating from Inner London. Car is used in equal amounts from origins across the area within the M25. The pattern of underground and rail use is similar to that exhibited to Central London, with underground used more to the north and west and rail more to the south and east.

3.5.3 Commuting to Outer London workplaces

Trips to Outer London (Figure 3.15) are predominantly from residences within Outer London and car is the dominant mode. Bus and slow modes have a presence but this is primarily for the shorter trips. There are a few outward trips from Inner London that use underground or rail; but these modes are little used by residents commuting into Outer London from outside London. Those trips originating from beyond the M25 have a very strong tendency to use car.

3.5.4 Commuting to Outer Metropolitan Area workplaces

Trips to the Outer Metropolitan Area workplaces (Figure 3.16) are influenced by local labour markets in towns and cities such as Reading, Southend-on-Sea and Crawley/Gatwick. Car is the dominant mode within these town clusters and also beyond the towns from residences in rural areas that are likely to be poorly served by public transport. Non-mechanised modes and, to a lesser extent, bus are important over short distances within the highlighted clusters. The majority of trips originating from outside the Outer Metropolitan Area, whether from Outer London or from the rest of the Wider South East, tend to use car. There is some out-commuting to the Outer Metropolitan Area from the west of Inner London, but no significant out-commuting from the East of Inner London.

3.5.5 Trip distribution maps of commuting from Essex and Berkshire - Imbalances in labour supply and demand

Essex and Berkshire have contrasting characteristics in terms of employment availability within the county. The Figures 3.17 and 3.18 below are slightly different to those previously presented in that they plot trips by mode from the county in question *at their workplace ward* in order to show the extent to which employees have to commute to workplaces outside the county.

The key point to note for commuters travelling from Essex (Figure 3.17) is that Central and to some extent Northeast London are particularly important as employment locations. Trips to Central London from Essex are generally by rail or Underground, whereas trips to Northeast London are more likely to be by car. The urban centres of Essex (Colchester, Harlow, Braintree, Chelmsford, Basildon and Southend) seem to form attractive employment locations, mainly for those commuting by car.

Berkshire has similar clusters of trips to urban centres such as Reading, Slough, Maidenhead and Windsor that tend to be made by car. Trips from Berkshire to employers outside of the county exhibit different characteristics from the out-bound trips of Essex. Although there are some trips from Berkshire to Central London by rail, there are far fewer than originate from Essex. There is another cluster of trips to workplaces

FIGURE 3.14: MODAL DISTRIBUTION OF TRIPS COMMUTING TO INNER LONDON

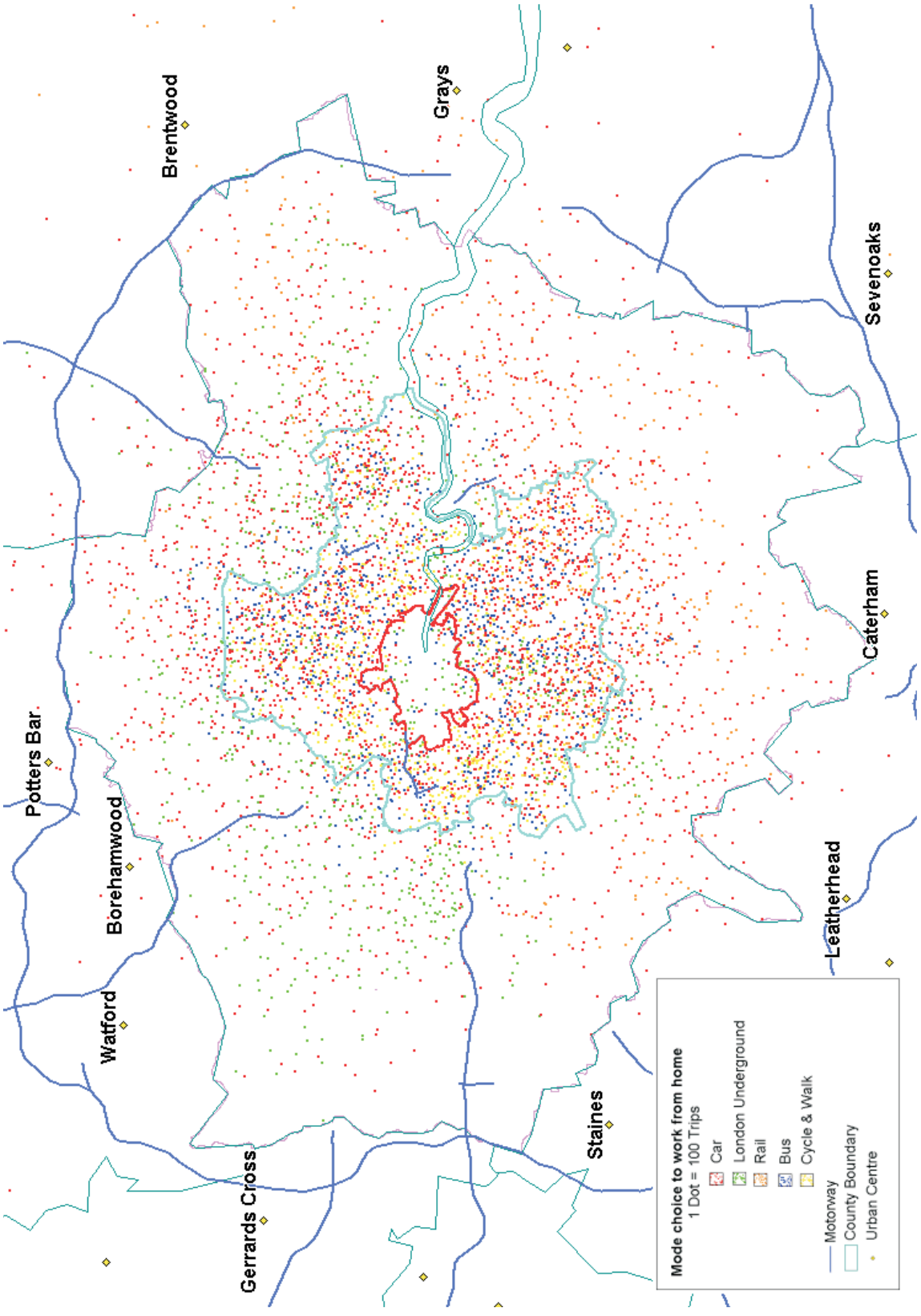


FIGURE 3.15: MODAL DISTRIBUTION OF TRIPS COMMUTING TO OUTER LONDON

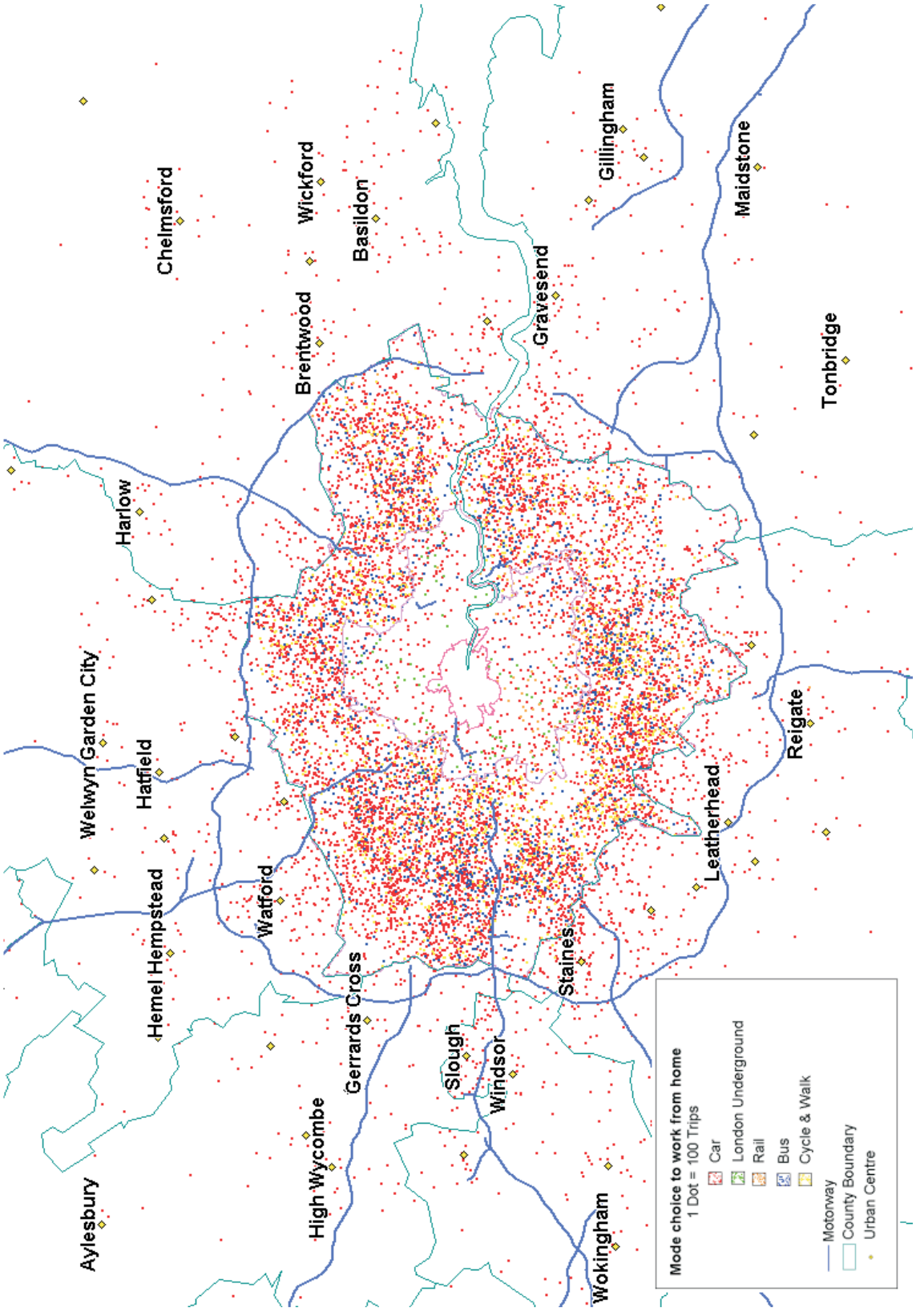


FIGURE 3.16: MODAL DISTRIBUTION OF TRIPS COMMUTING TO OUTER METROPOLITAN AREA

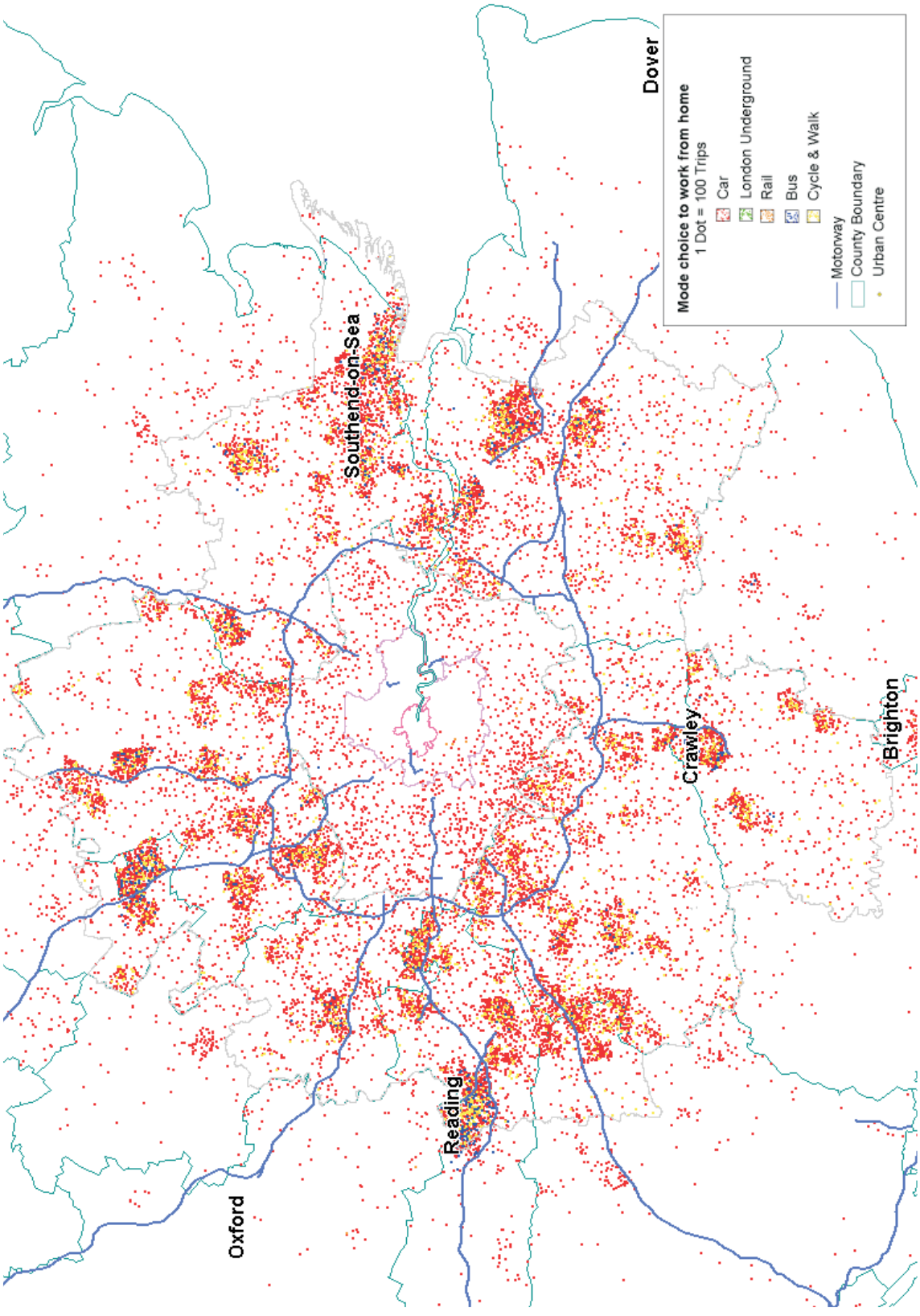


FIGURE 3.17: MODAL DISTRIBUTION OF TRIPS FROM ESSEX TO THEIR WARD OF EMPLOYMENT

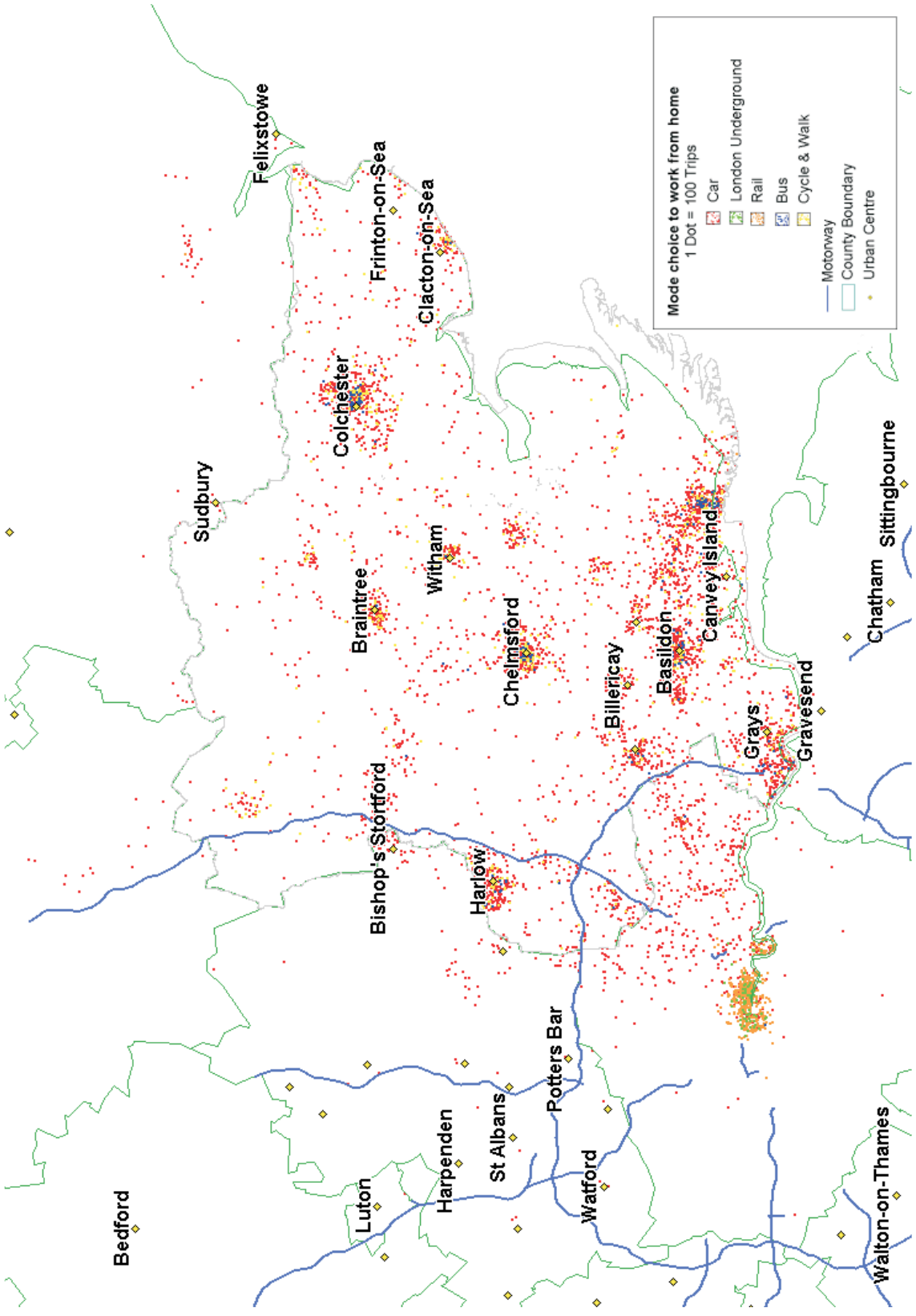
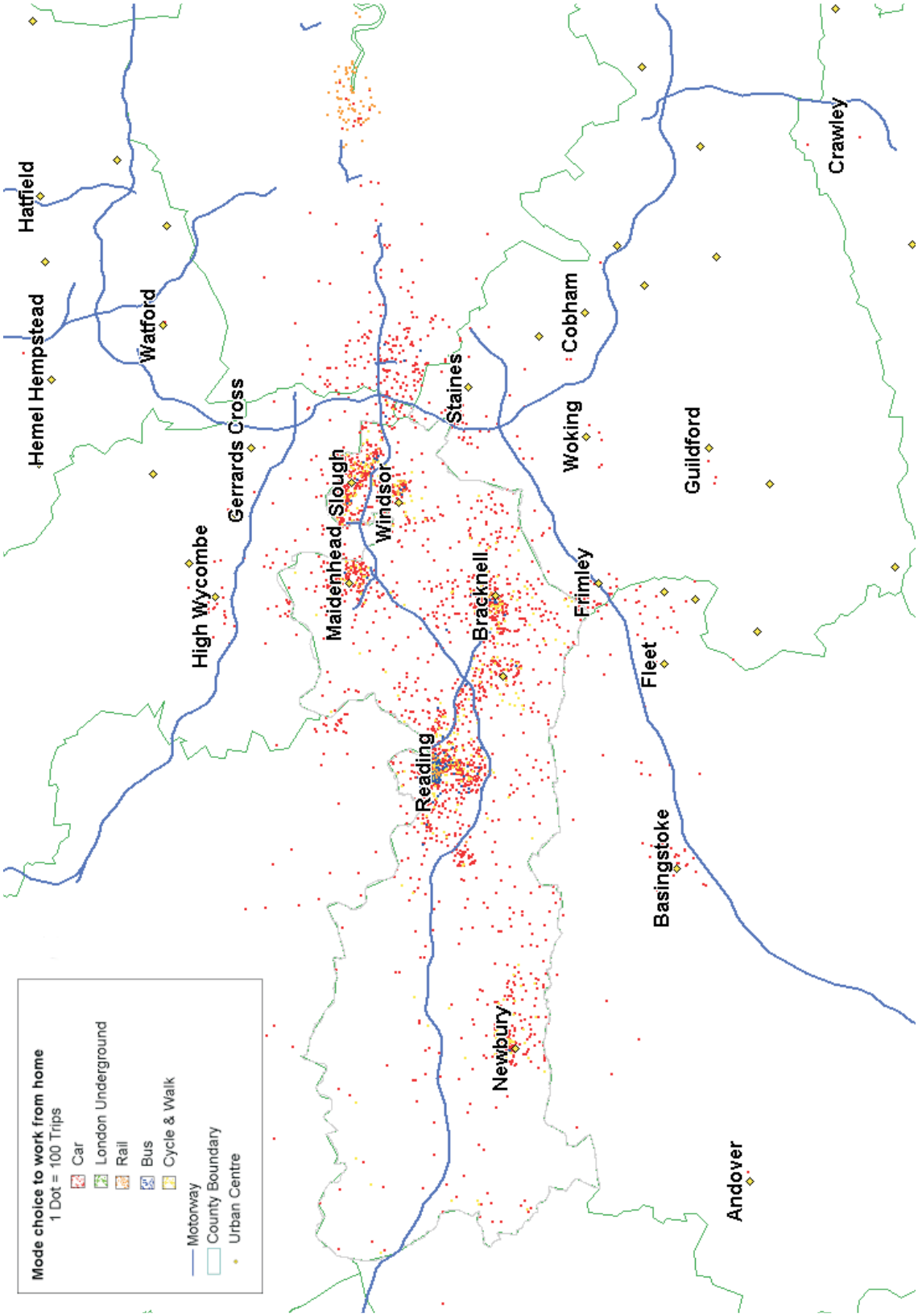


FIGURE 3.18: MODAL DISTRIBUTION OF TRIPS FROM BERKSHIRE TO THEIR WARD OF EMPLOYMENT



just inside the M25, many of which are connected to Heathrow Airport; these trips are predominantly made by car.

This difference in behaviour is explained by Table 3.3 which presents for each county: its ratio of workplaces to employed residents. There is an East-West divide adjacent to London - counties west of London have a relatively greater supply of jobs than those to the east. Berkshire with a ratio of 1.06 in 2001 can be seen to be more than self-sufficient overall in jobs (though there may still be imbalances within some individual occupation/industry segments). Essex on the other hand in both 1991 and 2001 had the largest proportional deficiency in jobs of all the counties. This implies that many of its residents will need to travel further to find employment. The observation of imbalances between the resident supply and local demand for labour reflects choice and constraints on jobs and residences and is associated with, for example, the long journey to work distances that have been observed for Essex residents.

This analysis has illustrated that one possible determinant of journey to work distance is the local balance of the demand and supply of jobs. For this comparison to be most meaningful it must be segmented by type of job, so as to take appropriate account of job specialisation when balancing labour supply and demand.

Essex contains four of the local authority districts with the longest average trip lengths in England, namely Braintree, Maldon, Rochford and Uttlesford (their trip lengths are exceeded only by some deeply rural districts in Northumberland and in West Devon). Hence it is of particular interest to examine the extent to which the long commuter travel distances throughout Essex are a function of job imbalance. With the exception of

TABLE 3.3: RATIO OF WORKPLACES TO RESIDENTS IN EMPLOYMENT BY COUNTY, 1991 AND 2001

	Ratio of workplaces/residents in employment	
	1991	2001
Essex	0.83	0.85
	0.88	0.91
Kent	0.88	0.90
Hertfordshire	0.89	0.93
Bedfordshire	0.91	0.88
East Sussex	0.92	0.89
Buckinghamshire	0.92	0.96
West Sussex	0.96	0.97
Hampshire	0.96	0.96
Isle of Wight	0.97	0.95
Oxfordshire	0.98	1.00
Norfolk	0.98	0.97
Suffolk	0.99	0.97
Berkshire	1.00	1.06
Cambridgeshire	1.00	1.03
Inner London	1.89	1.73
Outer London	0.82	0.79

Source(s) : 1991 and 2001 Population Census.

Uttlesford, these districts do not have above-average proportions of the higher managerial or professional occupations – the group that tends to commute the longest distances.

This suggests that the long distances have more to do with the location, than with the type of labour resident at that location. Moreover, in these districts the proportion commuting by car is above that for Essex as a whole, and except for Rochford, the proportion by rail is below the Essex average. This shows that the explanation is not primarily an effect of commuting to Central London. Part of the effect relates to the relatively low population density, since three have densities of 1 to 2.5 persons per hectare (more typical of Norfolk or Suffolk), although Rochford has a density of 4.6, which is above the overall Essex average of 3.8. The impact on trip lengths of local imbalances in labour supply and demand is discussed in more detail in Appendix A as well as in the model results in the later Section 5.3.

4 THE EMPLOYMENT GROWTH SCENARIOS

In this chapter we describe the five scenarios and give the employment forecasts under each scenario. In Chapter 5 we explain how these employment forecasts are combined with the results from the 2001 Census and other demographic information to create the supply of and demand for labour by Unitary Authority/district required by the Commuter Flow Model.

The forecasts of labour market activity at borough/district level required for the Commuter Flow Model are based on five different scenarios of employment growth to 2016 and 2021. Employment projections under all the scenarios are based on employment data from the Annual Business Inquiry (ABI) and self-employment data from the Labour Force Survey. Thus employment here is equivalent to the number of jobs. Total regional employment includes employment in the defence industry and HM Forces.

Table 4.1 presents total employment growth under each scenario over the periods 2001-16 and 2016-21. While each of the other scenarios forecasts employment growth for the named region, the Cambridge Econometrics (CE) Scenario includes forecasts for all three regions in the Wider South East. It is, therefore, easy to see the main differences between the employment forecasts for each region and the CE Scenario forecasts. The two largest differences are between the CE Scenario forecast for London and the London Plan forecast and between the CE Scenario forecast for the East of England and the East of England Regional Spatial Strategy (RSS) Policy forecast. Over 2001-16, employment increase in London under the CE scenarios is about 200 thousand less than in the London Plan. The CE forecast shows slower growth in employment, in business services, distribution and hotels and catering, but faster growth in government services. Compared with the RSS forecast, the CE forecast for the East of England expects faster growth in distribution but all other sectors are expected to grow at a slower rate.

In the following sections employment projections are aggregated to the twelve industry types (twelve aggregate codes for SIC92), which are the industries used for the

TABLE 4.1: THE EMPLOYMENT GROWTH SCENARIOS

	2001	2016	2021	2001-2016		2016-2021	
			Thousands	Thousands	%	Thousands	%
The London Plan	4522	5120	5315	598	13.2	195	3.8
EE - Enhanced Growth (EG 21)	2596	2833	2934	237	9.1	101	3.5
EE - RSS	2596	2911	3017	316	12.2	106	3.6
South East SEEF	4146	4750	4873	604	14.6	123	2.6
CE - London	4572	4970	5173	397	8.7	203	4.1
CE - East of England	2669	2881	2955	212	8.0	75	2.6
CE - The South East	4200	4817	5035	617	14.7	218	4.5

presentation of employment results from the 2001 Census. Employment projections by borough/district consistent with the CE scenario are presented in Appendix F.

The London Plan

Table 4.2 presents the employment projections to 2016 consistent with the London Plan. Employment growth over 2016-21 is not available from the London Plan and projections from 2016 to 2021 are based on CE forecasts. According to the London Plan employment in London will increase by around 600 thousand, a 13.2% increase, over the period 2001-16. Fast employment growth of more than 370 thousand jobs is expected in business services, accounting for 63% of the total employment increase. Employment in hotels and restaurants is projected to see the sharpest increase, about 53%, rising by 155 thousand over 2001-16.

The East of England Scenarios

There are two employment scenarios for the East of England: the Enhanced Growth EG21 Scenario and the Regional Spatial Strategy Policy Scenario (RSS).

The Enhanced Growth (EG21) Scenario (see Table 4.3) implies an economic performance in the East of England in which job growth and the output value of those jobs raise the GDP per capita in the region to a level that places the region in the top 20 regions of Europe by 2021. This scenario implies an increase in employment of 338 thousand, 13%, over 2001-21. Several service sectors are forecast to see fast growth, including hotels & restaurants, transport & communications, business services, education and health. Employment is expected to decline in distribution and PAD.

Table 4.4 presents the employment projections for the East of England consistent with the Regional Spatial Strategy Scenario (RSS). According to this scenario employment in the East of England is expected to grow by 421 thousand over 2001-21. The allocation of this total employment growth to the industries is based on the EG21 Scenario, but is in line with the higher participation rate assumed in the RSS Scenario.

TABLE 4.2: EMPLOYMENT: LONDON PLAN SCENARIO

Industries	2001	2016	2021	2001-2016		2016-2021	
		Thousands		Level	%	Level	%
Agriculture, etc.	9	6	7	-3	-31.9	0	6.2
Mining, Manuf., & Utilities	307	249	223	-59	-19.1	-25	-10.2
Construction	203	160	140	-43	-21.1	-20	-12.5
Wholesale and Retail Trade	651	705	710	54	8.3	5	0.7
Hotels and Restaurants	290	445	490	155	53.4	45	10.1
Transport and Communications	371	325	315	-46	-12.4	-10	-3.1
Financial Intermediation	348	364	369	16	4.7	5	1.4
Business Services	1125	1501	1641	376	33.5	140	9.3
Public Admin and Defence	208	175	160	-33	-15.7	-15	-8.6
Education	300	301	305	1	0.4	4	1.3
Health and Social Work	333	359	370	26	7.9	11	3.1
Others	378	530	585	152	40.2	55	10.4
Total	4522	5120	5315	598	13.2	195	3.8

TABLE 4.3: EMPLOYMENT: EAST OF ENGLAND ENHANCED GROWTH EG21 SCENARIO

Industries	2001	2016	2021	2001-2016		2016-2021	
		Thousands		Level	%	Level	%
Agriculture, etc.	43	17	10	-26	-60.8	-7	-39.1
Mining, Manuf., & Utilities	381	307	294	-74	-19.4	-13	-4.1
Construction	190	187	181	-3	-1.7	-6	-3.4
Wholesale and Retail Trade	478	468	453	-10	-2.1	-15	-3.3
Hotels and Restaurants	148	182	193	34	22.6	11	6.1
Transport and Communications	171	210	230	39	22.8	20	9.4
Financial Intermediation	85	80	83	-5	-6.4	3	4.0
Business Services	423	565	628	142	33.6	63	11.1
Public Admin and Defence	118	115	109	-3	-2.8	-6	-4.9
Education	190	232	242	42	22.1	11	4.6
Health and Social Work	239	277	282	38	16.0	5	1.8
Others	130	195	229	65	49.9	34	17.6
Total	2596	2833	2933	237	9.1	101	3.6

The South East Scenario

Table 4.5 presents the employment forecasts for the South East. These forecasts are those in 'Scenario 3' prepared for the South East of England Regional Assembly (SEERA) by Experian Business Strategies. Scenario 3 (SEEF) is based on assumptions about migration in the short term and on a medium-level participation rate proposed by Anglia Polytechnic University.

Total employment is forecast to increase by more than 600 thousand over 2001-16 and by 123 thousand over 2016-21. The strongest growth is projected for business services accounting for more than 50% of the total employment increase. Employment in hotels and restaurants, education and health also increases fast, while employment in PAD is expected to decline.

TABLE 4.4: EMPLOYMENT: EAST OF ENGLAND - RSS SCENARIO

Industries	2001	2016	2021	2001-2016		2016-2021	
		Thousands		Level	%	Level	%
Agriculture, etc.	43	17	10	-26	-60.8	-7	-39.1
Mining, Manuf., & Utilities	381	307	294	-74	-19.5	-13	-4.1
Construction	190	192	185	2	1.0	-7	-3.4
Wholesale and Retail Trade	478	483	467	5	1.0	-16	-3.2
Hotels and Restaurants	148	188	200	40	27.0	12	6.3
Transport and Communications	171	217	237	46	26.7	20	9.4
Financial Intermediation	85	83	86	-3	-3.0	3	3.9
Business Services	423	580	645	158	37.2	65	11.2
Public Admin and Defence	117	117	111	0	0.3	-6	-5.1
Education	190	239	251	50	26.1	12	4.9
Health and Social Work	239	287	292	48	20.0	5	1.8
Others	131	202	238	71	54.0	36	17.6
Total	2596	2911	3017	316	12.2	106	3.6

TABLE 4.5: EMPLOYMENT: THE SOUTH EAST SCENARIO

Industries	2001	2016	2021	2001-2016		2016-2021	
		Thousands		Level	%	Level	%
Agriculture, etc.	75	47	44	-28	-37.0	-4	-7.6
Mining, Manuf., & Utilities	479	409	394	-71	-14.7	-15	-3.7
Construction	274	275	265	1	0.4	-10	-3.6
Wholesale and Retail Trade	756	789	776	33	4.3	-13	-1.6
Hotels and Restaurants	244	323	351	79	32.5	28	8.7
Transport and Communications	252	297	306	45	17.8	10	3.2
Financial Intermediation	151	154	152	3	2.0	-2	-1.5
Business Services	805	1129	1224	323	40.1	95	8.4
Public Admin and Defence	207	198	184	-10	-4.6	-14	-6.9
Education	309	386	395	77	24.9	9	2.3
Health and Social Work	385	485	506	99	25.7	22	4.5
Others	208	260	276	52	24.9	17	6.4
Total	4146	4750	4873	604	14.6	123	2.6

The CE Scenario

Tables 4.6-4.8 present the employment projections based on the CE forecasting model and published in the July 2004 edition of Regional Economic Prospects.

Over 2001-16 employment is expected to increase by 397 thousand (8.7%) in London, 212 thousand (7.9%) in the East of England and 617 thousand (14.7%) in the South East.

The CE Scenario forecast for the South East is higher, by about 100 thousand jobs, by 2016 than the forecast under the South East SEEF Scenario.

In the other two regions apart from the South East, employment growth is slower under the CE Scenario than under the scenarios based on the regional plans or spatial strategies. This difference is especially striking in London, where the London Plan Scenario

TABLE 4.6: EMPLOYMENT: LONDON - THE CE SCENARIO

Industries	2001	2016	2021	2001-2016		2016-2021	
		Thousands		Level	%	Level	%
Agriculture, etc.	8	5	5	-4	-42.5	-0	-6.0
Mining, Manuf., & Utilities	326	233	219	-92	-28.4	-14	-6.1
Construction	228	236	235	9	3.8	-2	-0.8
Wholesale and Retail Trade	662	663	677	1	0.1	14	2.1
Hotels and Restaurants	292	350	355	59	20.1	5	1.3
Transport and Communications	383	350	352	-33	-8.7	3	0.7
Financial Intermediation	258	237	226	-22	-8.4	-10	-4.3
Business Services	1221	1508	1683	288	23.6	175	11.6
Public Admin and Defence	221	232	227	11	5.0	-5	-2.3
Education	262	297	298	35	13.4	1	0.3
Health and Social Work	372	457	475	86	23.1	18	3.9
Others	340	401	421	61	17.9	20	4.9
Total	4572	4970	5172	397	8.7	203	4.1

TABLE 4.7: EMPLOYMENT: EAST OF ENGLAND - THE CE SCENARIO

Industries	2001	2016	2021	2001-2016		2016-2021	
		Thousands		Level	%	Level	%
Agriculture, etc.	43	28	23	-16	-36.3	-4	-15.4
Mining, Manuf., & Utilities	383	297	280	-86	-22.6	-16	-5.5
Construction	206	223	213	17	8.5	-10	-4.5
Wholesale and Retail Trade	488	550	576	62	12.7	25	4.6
Hotels and Restaurants	153	172	174	19	12.6	2	1.1
Transport and Communications	177	180	187	3	1.9	7	3.7
Financial Intermediation	68	58	56	-11	-15.9	-2	-3.5
Business Services	451	561	618	111	24.6	57	10.1
Public Admin and Defence	121	128	123	7	5.5	-4	-3.3
Education	187	222	228	36	19.1	5	2.4
Health and Social Work	244	286	297	42	17.0	11	3.7
Others	147	176	181	29	19.4	5	2.8
Total	2669	2881	2955	212	7.9	75	2.6

predicts 200 thousand more jobs in London by 2016 than are forecast under the CE Scenario.

Comparison between Census figures for employment in 2001 and data from ABI

Table 4.9 and Figures 4.1-4.3 compare the numbers for employment by sector in each region used in the five scenarios with data from the 2001 Census. The numbers used in the scenarios are derived from ABI data for employees and LFS data for self-employment. In all regions the employment figures from the Census are lower than those used in the scenarios.This is partly expected as data from ABI report jobs and there is double counting when a person has two or more part-time jobs.

TABLE 4.8: EMPLOYMENT: SOUTH EAST - THE CE SCENARIO

Industries	2001	2016	2021	2001-2016		2016-2021	
		Thousands		Level	%	Level	%
Agriculture, etc.	81	69	67	-13	-15.8	-1	-1.7
Mining, Manuf., & Utilities	480	394	378	-86	-17.9	-16	-4.0
Construction	280	302	312	22	7.8	10	3.4
Wholesale and Retail Trade	752	852	878	101	13.4	26	3.0
Hotels and Restaurants	246	312	319	67	27.1	7	2.2
Transport and Communications	253	272	272	20	7.8	0	0.1
Financial Intermediation	134	130	127	-4	-3.0	-3	-2.0
Business Services	818	1153	1314	335	41.0	161	14.0
Public Admin and Defence	213	210	204	-4	-1.7	-5	-2.6
Education	305	368	381	63	20.6	13	3.4
Health and Social Work	388	473	491	85	21.9	18	3.9
Others	252	283	291	32	12.7	8	2.8
Total	4200	4817	5035	617	14.7	218	4.5

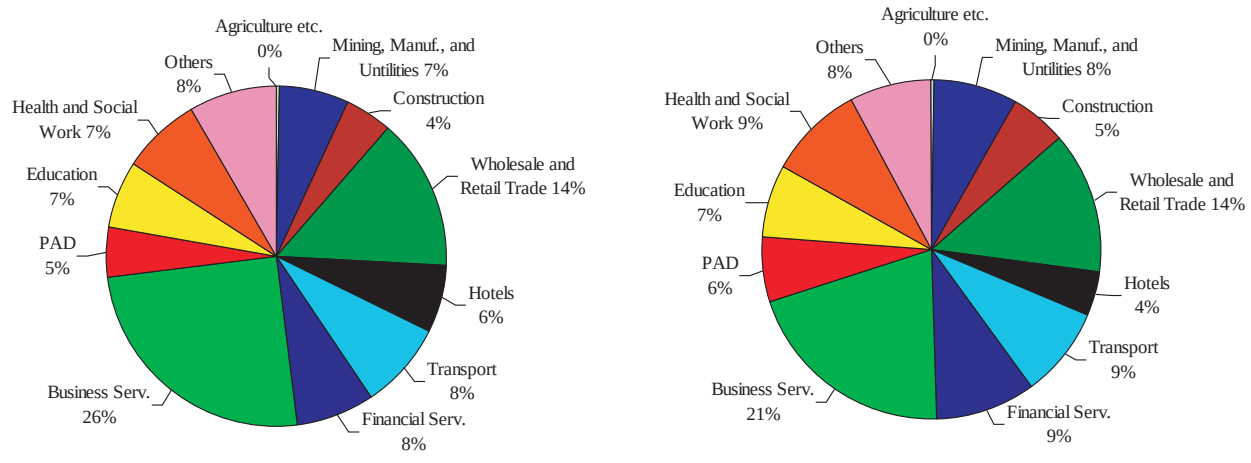
TABLE 4.9: EMPLOYMENT BY SECTORS IN 2001 ('000)

Industries	London			East of England			South East		
	ABI/LFS	Census	Dif-ferences	ABI/LFS	Census	Dif-ferences	ABI/LFS	Census	Dif-ferences
Agriculture, etc.	9	12	2	43	50	7	75	57	-18
Mining, Manuf., & Utilities	307	308	1	381	380	-1	479	495	16
Construction	203	195	-8	190	190	0	274	271	-3
Wholesale and Retail Trade	651	518	-133	478	431	-47	756	627	-129
Hotels and Restaurants	290	157	-133	148	107	-41	244	166	-78
Transport and Communications	371	336	-35	171	174	3	252	280	28
Financial Intermediation	348	361	13	85	97	12	151	159	8
Business Services	1125	777	-348	423	299	-124	805	568	-238
Public Admin and Defence	208	229	21	118	117	-2	207	208	1
Education	300	265	-35	190	182	-8	309	299	-10
Health and Social Work	333	356	23	239	240	1	385	376	-10
Others	378	293	-85	130	118	-13	208	191	-17
Total	4522	3804	-718	2596	2384	-212	4146	3697	-449

Source(s) : ABI, LFS for number of jobs and Census 2001 for workplace employment.

The difference between ABI/LFS and census data is greatest for London where employment from the Census is 16% lower than the figure derived from ABI and LFS data, while the difference in the East of England and the South East is around 10%. Employment in business services in London is about 30% lower in the Census than the figure reported in the London Plan. The Census figures for business services employment are lower also in the other regions. Employment in transport &

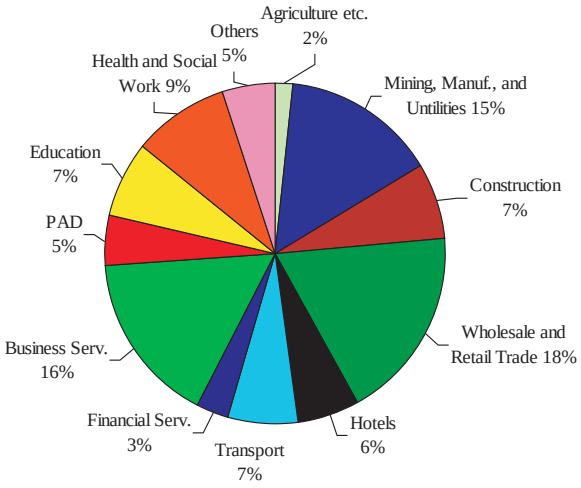
FIGURE 4.1: EMPLOYMENT SHARES IN LONDON



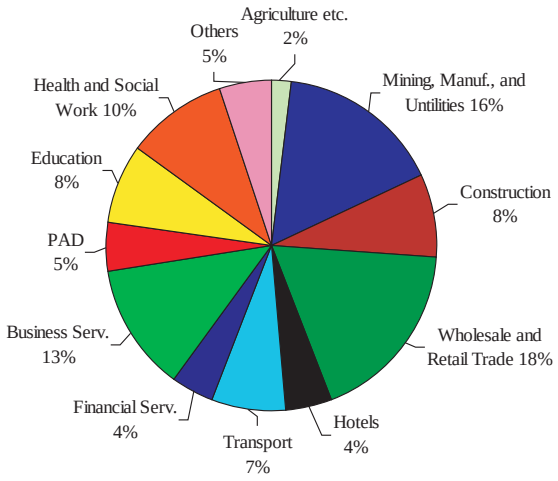
Source(s) : ABI, LFS for number of jobs and Census 2001 for workplace employment.

FIGURE 4.2: EMPLOYMENT SHARES IN THE EAST OF ENGLAND

Number of Jobs



Workplace Employment



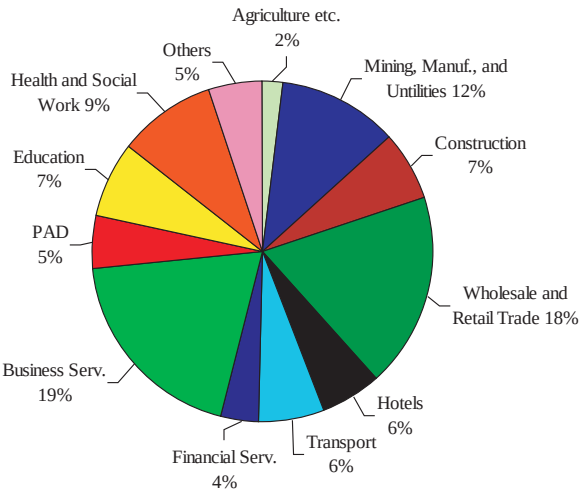
Source(s) : ABI, LFS for number of jobs and Census 2001 for workplace employment.

communications is lower in the Census than in the London Plan, but it is higher than the estimates in the scenarios for the other two regions.

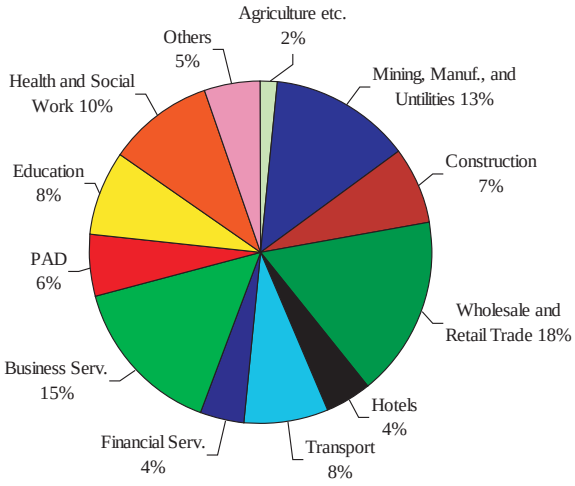
These differences in levels affect also the shares of sectorial employment in total employment. These shares are presented in Figures 4.1-4.3.

FIGURE 4.3: EMPLOYMENT SHARES IN THE SOUTH EAST

Number of Jobs



Workplace Employment



Source(s) : ABI, LFS for number of jobs and Census 2001 for workplace employment.

5 COMMUTER FLOW MODEL: RESULTS

This chapter presents the main travel demand patterns resulting from running each of the five employment growth scenarios through the commuter flow model, using the reference case transport characteristics for 2016. It also presents results showing the further impacts on commuter patterns of applying a road user charging policy across the three regions.

The chapter starts with an explanation of how workplace employment and residents in employment were estimated for the five scenarios. Then an overview of how the model has been run for the forecast year is presented. Finally the results for each of the five employment growth scenarios for 2016/21 are presented, providing extra spatial detail within the region to which that scenario is directly related.

The Commuter-Flow Model requires the following inputs:

- the supply of labour by segment and by residence zone for 2016/21
- the demand for labour by segment and by workplace zone for 2016/21
- a matrix of the generalised time of journey-to-work travel between zone pairs for 2016

The study area of the model comprises the three government office regions, London, South East and the East of England. The zoning system used is generally the local authority districts/unitary authorities and boroughs. In the rest of the chapter the three regions together will be referred to as the Wider South East and the zoning system as districts.

The first section in this chapter discusses the first two requirements of the Commuter Flow Model and the analysis which was undertaken to create the demand for and supply of labour for each scenario.

CENSUS INDUSTRIES

1	Agriculture, Hunting & Forestry and Fishing
2	Mining & Quarrying, Manuf., and Elec., Gas & Water
3	Construction
4	Wholesale and Retail Trade, Repairs
5	Hotels and Restaurants
6	Transport, Storage and Communication
7	Financial Intermediation
8	Real Estate, Renting and Business Activities
9	Public Administration and Defence
10	Education
11	Health and Social Work
12	Other

5.1 Workplace Employment and Residents in Employment in the Wider South East Scenarios

The analysis in this chapter is based on 48 distinct segments defined by twelve aggregate sectors and four types of employment. The sectoral disaggregation has been determined by the industrial detail available in the 2001 Census. For each district, the Census provides data for destination (workplace) and origin (residence place) employment for twelve sectors and four types of employment, male and female, full-time and part-time. The sector of employment and the distinction between full-time/part-time employment and employment by gender are important determinants of patterns and distance of travel to work.

Workplace Employment

For each employment growth scenario, as described in Chapter 4, data for workplace employment by sector and by type were generated for each district for 2016 and 2021. The basis for creating workplace employment in these two years was the employment data available from the Census for 2001 by the twelve industries and four employment types. As census data are not available frequently, it is not possible to create a forecasting model using this source of employment information. Therefore rates of employment growth from the regional plans, based on ABI/LFS time series data for employment (presented in Chapter 4), were used to extrapolate the Census 2001 employment by 48 segments in each district to 2016/21.

The first step in this exercise was to create employment by district for the twelve economic sectors and the four types of employment consistent with the expected employment growth in each of the regional employment scenarios. The employment growth at the regional level expected in each scenario is shown in Chapter 4, Tables 4.2-4.8. Since the information available from the different regional plans was varied, we had to adopt several procedures to create the 48 segments required by the model.

The actions taken included:

- Construction of forecasts for regional employment by type, given the forecast of regional employment by sector (all the regional scenarios).
- Construction of district employment by sector and type of employment, given regional employment by sector and type and total employment by district (the London Plan).
- Construction of district employment by sector and type of employment, given regional employment by sector and type (the South East scenario, the East of England scenarios).
- Creating an intermediate forecast for 2016 (the East of England and the South East scenarios); extrapolating the forecast to 2021 (the London Plan).

In the analysis we used all the available information provided by the plans and we supplemented it with information from the Cambridge Econometrics detailed forecasts. These forecasts include employment projections for 49 sectors by type of employment to 2021 for all the UK government office regions. They are produced with the RMDM, the Regionalised Multisectoral Dynamic Model of the UK economy. Forecasts for districts

are produced using CE's LEFM (Local Economy Forecasting Model) methodology. The model consists of estimated equations relating the district employment by sector to the region's or UK employment in the same sector depending on the best fit. The projections are created at the 49-industry level and then aggregated to the twelve sectors required for this project.

Information from the detailed CE forecasts, such as the shares of employment by type and/or by sector, and the profile of the regional forecasts have been used to disaggregate employment for the different scenarios. The profile of the CE forecasts was also used in the cases where we had to estimate projections for an intermediate year or extrapolate the forecast to a more distant horizon.

The Workplace employment in 2016 corresponding to each regional scenario is presented in Tables 5.1-5.5. As the levels and shares of the 48 segments based on ABI/LFS in each district for 2001 are different from the levels and shares reported by the census, total employment growth in each district and (in fact) in each region using census data for the base year does not exactly match growth from the original forecasts reported in Chapter 4. A general observation for all the scenarios is that employment growth using census employment as a base year has resulted in a slower overall regional growth over 2001-16 than in the original regional plans; this can mainly be explained by the fact that the level of employment for all regions in 2001 is lower in the census than in ABI/LFS data (for example, in ABI there is double counting of persons with two jobs), but also because the share of business services in total employment is lower in the census than in the ABI data, while the share of manufacturing is higher. Because in all regions business services are forecast to have some of the highest rates of growth while employment in manufacturing is expected to decline, overall growth in workplace employment is lower than implied from the ABI/LFS data. This result does not uniformly apply to the districts, and the total employment growth forecast by district may be either higher or lower than implied by the ABI data, depending on the industrial structure of the area.

Residents in Employment

The analysis of the residents in employment in each scenario started with the district population estimates that were available for each regional plan. These were combined with activity rates to produce a first estimate of employment in 2016/21. For the East of England activity rates from the Chelmer Population and Housing Model were used, while for the other regions we used activity rates from the census. In the East of England, these activity rates take account of recent changes in pension legislation. These are likely to ensure that a greater proportion of females over the age of 55 remain in the labour force in the future. This helps to explain the higher growth of the resident workforce in this region and the associated greater resident/workforce imbalance discussed later. Total employment by residence in a district was thus calculated in 2001 and 2016/21. The rate of growth from these estimates was then applied to residents-in-employment data from the census in order to estimate residents in employment consistent with the census results. The allocation of total residents in employment to the 48 segments, discussed earlier, was made by using sector shares from the workplace employment results. This involves the implicit assumption that residence employment in a sector and type of employment in a district grow at the rate of workplace employment in the same sector and type in the district.

TABLE 5.1: EMPLOYMENT IN THE LONDON PLAN SCENARIO

WORKPLACE EMPLOYMENT

	London			South East			East of England			The Wider South East		
	2001	Change 2001-16		2001	Change 2001-16		2001	Change 2001-16		2001	Change 2001-16	
	’000s	’000s	%	’000s	’000s	%	’000s	’000s	%	’000s	’000s	%
Agriculture etc.	11	3	30	57	-14	-25	50	-22	-44	118	-32	-27
Min., Manuf., Utilities	308	-54	-18	495	-66	-13	380	-79	-21	1183	-199	-17
Construction	194	-41	-21	271	99	37	190	20	11	655	79	12
Whol. & Retail Trade	518	33	6	627	-43	-7	431	56	13	1576	46	3
Hotels & Restaurants	157	89	57	166	-7	-4	107	12	11	430	93	22
Transport & Comms.	335	-42	-13	280	40	14	174	6	4	790	4	1
Financ. Intermediation	361	50	14	159	14	9	97	-14	-14	617	50	8
Business Services	777	284	37	568	220	39	299	80	27	1644	584	36
Pub. Admin. & Def.	229	-44	-19	208	29	14	116	14	12	553	-1	-0
Education	265	-4	-2	299	142	48	182	34	19	746	172	23
Health & Social work	356	58	16	376	26	7	240	52	22	971	135	14
Others	293	113	39	191	48	25	118	22	19	602	184	31
Total	3804	445	12	3697	489	13	2384	181	8	9885	1114	11

RESIDENTS IN EMPLOYMENT

	London			South East			East of England			The Wider South East		
	2001	Change 2001-16		2001	Change 2001-16		2001	Change 2001-16		2001	Change 2001-16	
	’000s	’000s	%	’000s	’000s	%	’000s	’000s	%	’000s	’000s	%
Agriculture etc.	11	4	35	57	-15	-26	50	-22	-43	117	-33	-28
Min., Manuf., Utilities	267	-57	-21	505	-75	-15	393	-71	-18	1165	-203	-17
Construction	174	-42	-24	276	87	31	196	23	12	647	69	11
Whol. & Retail Trade	477	30	6	635	-59	-9	445	67	15	1557	37	2
Hotels & Restaurants	153	87	57	166	-12	-8	107	13	12	426	87	21
Transport & Comms.	269	-37	-14	314	30	10	190	8	5	773	1	0
Financ. Intermediation	263	28	11	197	25	13	149	-14	-10	609	39	6
Business Services	670	275	41	603	202	33	342	91	27	1616	567	35
Pub. Admin. & Def.	177	-31	-17	228	18	8	132	14	10	538	1	0
Education	247	-8	-3	304	133	44	189	39	21	740	164	22
Health & Social work	334	57	17	381	9	3	250	56	23	965	123	13
Others	263	95	36	205	45	22	128	30	24	596	171	29
Total	3306	401	12	3872	387	10	2571	235	9	9748	1023	11

Source(s): Census 2001 and Cambridge Econometrics

TABLE 5.2: EMPLOYMENT IN THE SOUTH EAST SEEF SCENARIO

WORKPLACE EMPLOYMENT

	London			South East			East of England			The Wider South East		
	2001	Change 2001-16		2001	Change 2001-16		2001	Change 2001-16		2001	Change 2001-16	
	'000s	'000s	%	'000s	'000s	%	'000s	'000s	%	'000s	'000s	%
Agriculture etc.	11	-1	-9	57	-28	-49	50	-22	-44	118	-51	-43
Min., Manuf., Utilities	308	-88	-28	495	-55	-11	380	-79	-21	1183	-222	-19
Construction	194	16	8	271	6	2	190	20	11	655	43	7
Whol. & Retail Trade	518	-6	-1	627	29	5	431	56	13	1576	80	5
Hotels & Restaurants	157	27	17	166	53	32	107	12	11	430	93	22
Transport & Comms.	335	-25	-7	280	48	17	174	6	4	790	30	4
Financ. Intermediation	361	-3	-1	159	15	10	97	-14	-14	617	-1	-0
Business Services	777	192	25	568	229	40	299	80	27	1644	500	30
Pub. Admin. & Def.	229	7	3	208	-3	-2	116	14	12	553	17	3
Education	265	32	12	299	80	27	182	34	19	746	146	20
Health & Social work	356	90	25	376	103	28	240	52	22	971	245	25
Others	293	56	19	191	51	27	118	22	19	602	129	22
Total	3804	299	8	3697	529	14	2384	181	8	9885	1010	10

RESIDENTS IN EMPLOYMENT

	London			South East			East of England			The Wider South East		
	2001	Change 2001-16		2001	Change 2001-16		2001	Change 2001-16		2001	Change 2001-16	
	'000s	'000s	%	'000s	'000s	%	'000s	'000s	%	'000s	'000s	%
Agriculture etc.	11	0	-3	57	-29	-51	50	-21	-43	117	-51	-43
Min., Manuf., Utilities	267	-73	-27	505	-76	-15	393	-74	-19	1165	-223	-19
Construction	174	17	10	276	-5	-2	196	25	13	647	37	6
Whol. & Retail Trade	477	13	3	635	-2	-0	445	69	15	1557	79	5
Hotels & Restaurants	153	38	25	166	41	25	107	12	12	426	91	22
Transport & Comms.	269	-11	-4	314	37	12	190	10	5	773	36	5
Financ. Intermediation	263	3	1	197	14	7	149	-21	-14	609	-4	-1
Business Services	670	211	32	603	184	31	342	91	27	1616	487	30
Pub. Admin. & Def.	177	13	8	228	-13	-6	132	18	14	538	18	3
Education	247	37	15	304	68	23	189	37	20	740	143	19
Health & Social work	334	101	30	381	78	21	250	57	23	965	236	25
Others	263	51	19	205	44	21	128	29	23	596	124	21
Total	3306	399	12	3872	341	9	2571	232	9	9748	973	10

Source(s): Census 2001 and Cambridge Econometrics

TABLE 5.3: EMPLOYMENT IN THE EAST OF ENGLAND EG21 SCENARIO

WORKPLACE EMPLOYMENT

	London			South East			East of England			The Wider South East		
	2001	Change 2001-16		2001	Change 2001-16		2001	Change 2001-16		2001	Change 2001-16	
	’000s	’000s	%	’000s	’000s	%	’000s	’000s	%	’000s	’000s	%
Agriculture etc.	11	-1	-9	57	-14	-25	50	-33	-68	118	-48	-41
Min., Manuf., Utilities	308	-88	-28	495	-66	-13	380	-72	-19	1183	-226	-19
Construction	194	16	8	271	99	37	190	-6	-3	655	110	17
Whol. & Retail Trade	518	-6	-1	627	-43	-7	431	-6	-1	1576	-55	-4
Hotels & Restaurants	157	27	17	166	-7	-4	107	21	20	430	41	10
Transport & Comms.	335	-25	-7	280	40	14	174	43	25	790	58	7
Financ. Intermediation	361	-3	-1	159	14	9	97	-4	-4	617	8	1
Business Services	777	192	25	568	220	39	299	123	41	1644	535	33
Pub. Admin. & Def.	229	7	3	208	29	14	116	-2	-2	553	33	6
Education	265	32	12	299	142	48	182	37	20	746	211	28
Health & Social work	356	90	25	376	26	7	240	45	19	971	161	17
Others	293	56	19	191	48	25	118	55	47	602	160	27
Total	3804	299	8	3697	489	13	2384	199	8	9885	987	10

RESIDENTS IN EMPLOYMENT

	London			South East			East of England			The Wider South East		
	2001	Change 2001-16		2001	Change 2001-16		2001	Change 2001-16		2001	Change 2001-16	
	’000s	’000s	%	’000s	’000s	%	’000s	’000s	%	’000s	’000s	%
Agriculture etc.	11	0	-3	57	-15	-26	50	-34	-68	117	-49	-42
Min., Manuf., Utilities	267	-75	-28	505	-81	-16	393	-69	-18	1165	-226	-19
Construction	174	17	10	276	89	32	196	-4	-2	647	102	16
Whol. & Retail Trade	477	9	2	635	-65	-10	445	0	-0	1557	-56	-4
Hotels & Restaurants	153	35	23	166	-17	-10	107	20	19	426	38	9
Transport & Comms.	269	-16	-6	314	25	8	190	44	23	773	53	7
Financ. Intermediation	263	1	0	197	11	6	149	-11	-7	609	1	0
Business Services	670	195	29	603	190	32	342	133	39	1616	518	32
Pub. Admin. & Def.	177	13	7	228	23	10	132	-3	-2	538	33	6
Education	247	35	14	304	127	42	189	40	21	740	202	27
Health & Social work	334	97	29	381	6	2	250	50	20	965	154	16
Others	263	47	18	205	41	20	128	64	50	596	153	26
Total	3306	358	11	3872	335	9	2571	232	9	9748	925	10

Source(s): Census 2001 and Cambridge Econometrics

TABLE 5.4: EMPLOYMENT IN THE EAST OF ENGLAND RSS SCENARIO

WORKPLACE EMPLOYMENT

	London			South East			East of England			The Wider South East		
	2001	Change 2001-16		2001	Change 2001-16		2001	Change 2001-16		2001	Change 2001-16	
	'000s	'000s	%	'000s	'000s	%	'000s	'000s	%	'000s	'000s	%
Agriculture etc.	11	-1	-9	57	-14	-25	50	-33	-68	118	-48	-41
Min., Manuf., Utilities	308	-88	-28	495	-66	-13	380	-72	-19	1183	-225	-19
Construction	194	16	8	271	99	37	190	0	0	655	116	18
Whol. & Retail Trade	518	-6	-1	627	-43	-7	431	6	1	1576	-43	-3
Hotels & Restaurants	157	27	17	166	-7	-4	107	24	23	430	44	10
Transport & Comms.	335	-25	-7	280	40	14	174	50	29	790	65	8
Financ. Intermediation	361	-3	-1	159	14	9	97	-2	-2	617	10	2
Business Services	777	192	25	568	220	39	299	135	45	1644	547	33
Pub. Admin. & Def.	229	7	3	208	29	14	116	0	-0	553	36	7
Education	265	32	12	299	142	48	182	43	23	746	217	29
Health & Social work	356	90	25	376	26	7	240	52	22	971	169	17
Others	293	56	19	191	48	25	118	60	51	602	164	27
Total	3804	299	8	3697	489	13	2384	261	11	9885	1049	11

RESIDENTS IN EMPLOYMENT

	London			South East			East of England			The Wider South East		
	2001	Change 2001-16		2001	Change 2001-16		2001	Change 2001-16		2001	Change 2001-16	
	'000s	'000s	%	'000s	'000s	%	'000s	'000s	%	'000s	'000s	%
Agriculture etc.	11	0	-2	57	-14	-25	50	-34	-68	117	-48	-41
Min., Manuf., Utilities	267	-74	-28	505	-79	-16	393	-71	-18	1165	-224	-19
Construction	174	20	11	276	95	34	196	-4	-2	647	111	17
Whol. & Retail Trade	477	11	2	635	-64	-10	445	-3	-1	1557	-57	-4
Hotels & Restaurants	153	36	24	166	-16	-10	107	20	19	426	40	9
Transport & Comms.	269	-13	-5	314	28	9	190	43	23	773	58	8
Financ. Intermediation	263	4	2	197	14	7	149	-10	-7	609	8	1
Business Services	670	201	30	603	196	32	342	132	39	1616	528	33
Pub. Admin. & Def.	177	14	8	228	25	11	132	-3	-3	538	36	7
Education	247	38	15	304	131	43	189	40	21	740	209	28
Health & Social work	334	101	30	381	11	3	250	49	20	965	161	17
Others	263	51	19	205	44	22	128	64	50	596	159	27
Total	3306	389	12	3872	370	10	2571	223	9	9748	981	10

Source(s): Census 2001 and Cambridge Econometrics

TABLE 5.5: EMPLOYMENT IN THE CE SCENARIO

WORKPLACE EMPLOYMENT

	London			South East			East of England			The Wider South East		
	2001	Change 2001-16		2001	Change 2001-16		2001	Change 2001-16		2001	Change 2001-16	
	'000s	'000s	%	'000s	'000s	%	'000s	'000s	%	'000s	'000s	%
Agriculture etc.	11	-1	-9	57	-14	-25	50	-22	-44	118	-37	-31
Min., Manuf., Utilities	308	-88	-28	495	-66	-13	380	-79	-21	1183	-232	-20
Construction	194	16	8	271	99	37	190	20	11	655	136	21
Whol. & Retail Trade	518	-6	-1	627	-43	-7	431	56	13	1576	8	1
Hotels & Restaurants	157	27	17	166	-7	-4	107	12	11	430	32	7
Transport & Comms.	335	-25	-7	280	40	14	174	6	4	790	21	3
Financ. Intermediation	361	-3	-1	159	14	9	97	-14	-14	617	-2	-0
Business Services	777	192	25	568	220	39	299	80	27	1644	492	30
Pub. Admin. & Def.	229	7	3	208	29	14	116	14	12	553	50	9
Education	265	32	12	299	142	48	182	34	19	746	208	28
Health & Social work	356	90	25	376	26	7	240	52	22	971	168	17
Others	293	56	19	191	48	25	118	22	19	602	127	21
Total	3804	299	8	3697	489	13	2384	181	8	9885	969	10

RESIDENTS IN EMPLOYMENT

	London			South East			East of England			The Wider South East		
	2001	Change 2001-16		2001	Change 2001-16		2001	Change 2001-16		2001	Change 2001-16	
	'000s	'000s	%	'000s	'000s	%	'000s	'000s	%	'000s	'000s	%
Agriculture etc.	11	0	-3	57	-15	-26	50	-22	-43	117	-37	-31
Min., Manuf., Utilities	267	-74	-28	505	-80	-16	393	-76	-19	1165	-231	-20
Construction	174	17	10	276	89	32	196	25	13	647	131	20
Whol. & Retail Trade	477	10	2	635	-64	-10	445	65	15	1557	11	1
Hotels & Restaurants	153	36	23	166	-16	-10	107	11	10	426	31	7
Transport & Comms.	269	-14	-5	314	28	9	190	7	4	773	21	3
Financ. Intermediation	263	3	1	197	13	7	149	-21	-14	609	-5	-1
Business Services	670	198	30	603	194	32	342	85	25	1616	477	30
Pub. Admin. & Def.	177	12	7	228	22	10	132	16	12	538	49	9
Education	247	37	15	304	131	43	189	37	20	740	205	28
Health & Social work	334	99	30	381	8	2	250	56	22	965	163	17
Others	263	51	19	205	44	22	128	29	23	596	125	21
Total	3306	374	11	3872	354	9	2571	213	8	9748	940	10

Source(s): Census 2001 and Cambridge Econometrics

Employment in the Scenarios

In the Cambridge Econometrics scenario employment for each of the three regions in the Wider South East was based on CE forecasts. In the other scenarios, the employment forecasts based on a region's plan were combined with the CE forecasts for the other two regions.

For each scenario, workplace and residents in employment for the Wider South East were compared and adjustments were made to residents in employment so that the imbalances of supply and demand for labour for each sector and type of employment in the Wider South East were plausible. The final estimates of residents in employment for each plan are shown in Table 5.1-5.5.

5.2 Running the Commuter Flow model for a future year

Commuting trips are represented by movements between transport model zones which cover the whole of the UK. The zoning scheme represents the way in which the Wider South East and the rest of Great Britain are subdivided into suitable geographical units. This scheme is constructed in accordance with criteria related to the geography and transport network in the Wider South East, data availability and model run time.

The detailed representation of these zones is presented in Figure 5.1 for London itself and in Figure 5.2 for the rest of the Wider South East. Within and adjacent to London the zones consist of between two and four subdivisions of district/boroughs, whereas further out they comprise whole districts or in the counties of Norfolk and Suffolk are groups of districts. A full list of the zones is provided in Appendix E.

When run for policy scenarios in future years the Commuter Flow model estimates the modal pattern of journey to work flows in a manner that is responsive to the range of influences, including:

- Modifications to the supply of labour of a given type resident within a zone.
- Modifications to the demand for labour of a given type at the workplaces within a zone.
- The impacts of improvements in road or rail infrastructure in a specific corridor, both in terms of increased volumes of commuting along this corridor and the corresponding reductions in commuter flows from other areas.
- Economic trends leading to overall changes in trip lengths, including: increased job specialisation, increased income, a change in the balance of the workforce within the study area towards a higher proportion of managerial/professional positions and away from manual labour.
- Impacts of transport policy issues on the overall demand for commuter travel, eg the influence of road tolling, road congestion, fuel prices, public transport fares and overcrowding.

The main advantage of this approach is that it enables overlapping labour market areas to be represented in a continuous and thus realistic fashion. Urban areas such as Brighton, Reading and Cambridge, which in their own right are major employment centres for professionals, will also be significant residential sources of professionals commuting to jobs in Central London. Over the years labour market areas have extended and overlapped, especially in the area to the west of London which has experienced rapid growth in jobs, but less rapid growth in housing. This modelling methodology

FIGURE 5.1: LASER3.0 MODEL ZONES: LONDON

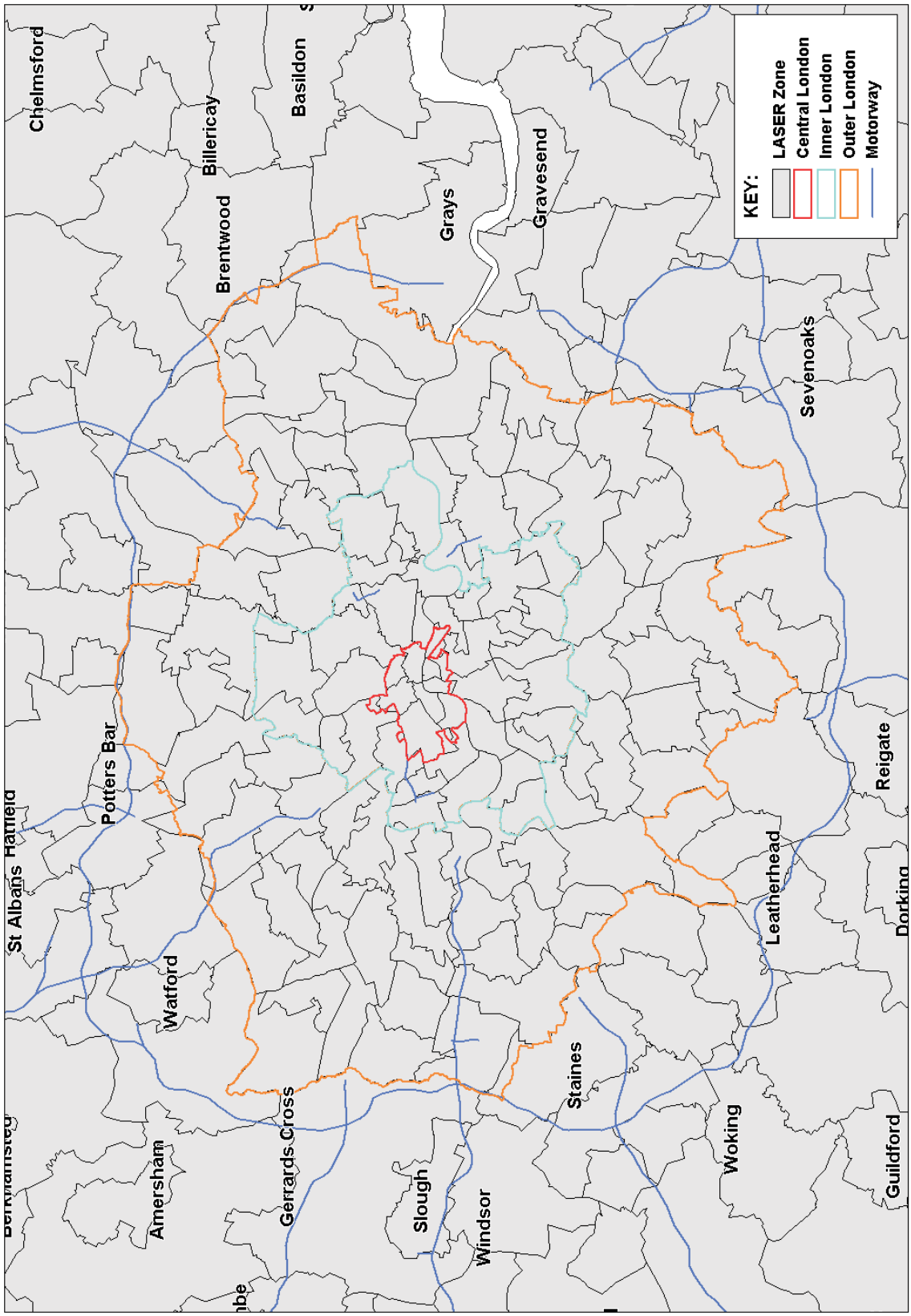
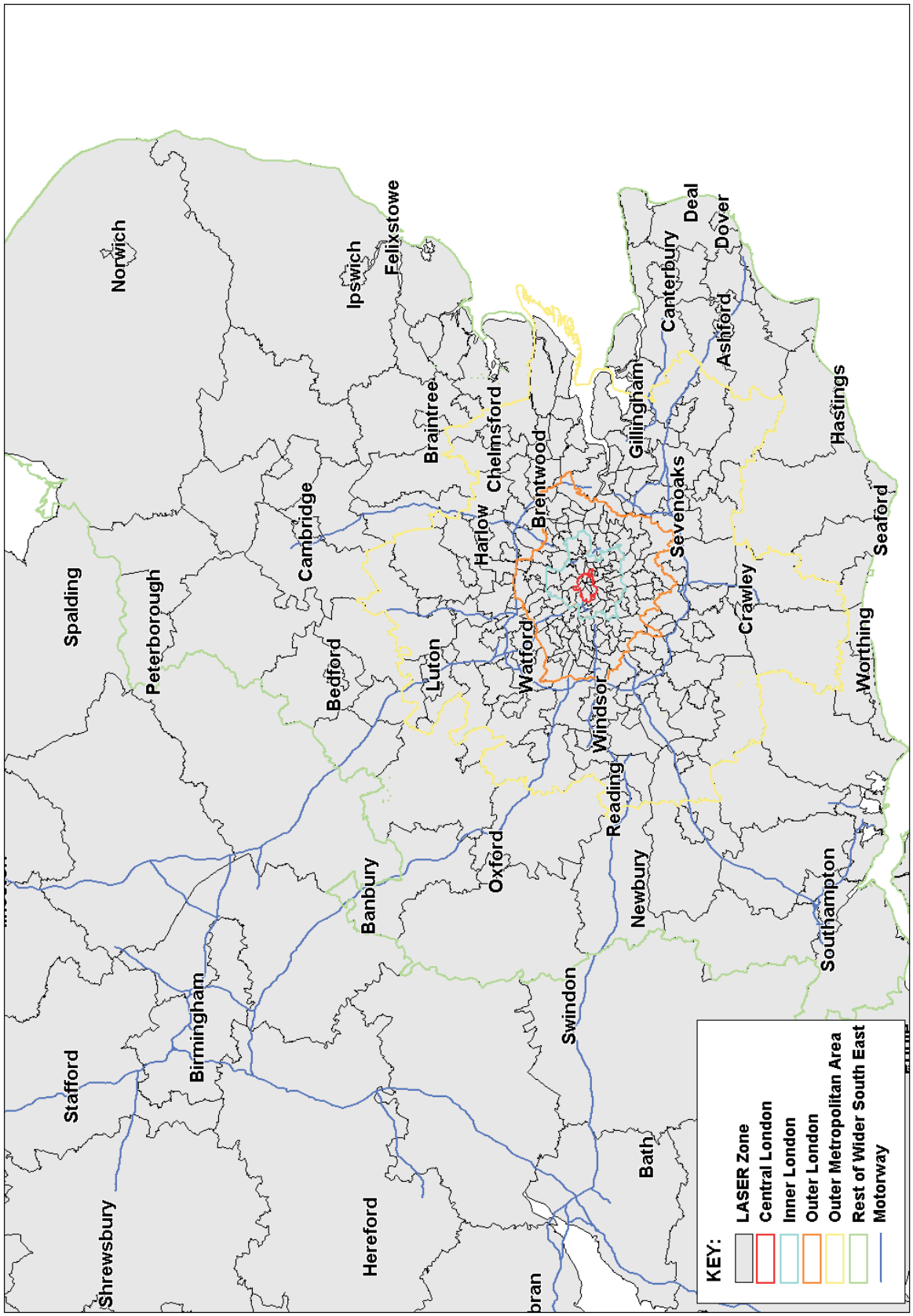


FIGURE 5.2: LASER3.0 MODEL ZONES: THE SOUTH EAST AND THE EASTERN REGIONS



represents this fluidity, because it avoids the adoption of fixed discrete labour market areas.

The main outputs from a run of the model for a specific future year are:

- A matrix of journey to work flows between zone pairs for each segment in the future year.
- A matrix of passenger movements by mode between zone pairs.
- The average journey distance, travel time and cost for each segment in the future year, based on the input matrix of travel distance, cost and time by mode between zone pairs for that particular year and transport policy scenario.

The 2016 Reference Case was run on the basis of the matrix of generalised times of transport produced in the LASER 2016 Reference Case Run. This matrix was developed in a recent study carried out by WSP for DfT. The model takes as input the zonal forecasts of the numbers of residents in employment and of workplace employment for each of the 48 segments. These were derived from the economic modelling of CE. The parameter values in the distribution and mode choice models have been left unchanged from their 2001 values, other than to increase the value of time to take account of the forecast growth over the period in income per head.

The model is first run in the future year with an unchanged matrix of travel costs from that of the base year, but using the estimated future year zonal resident labour supply and workplace demand totals for each segment. Across the study area as a whole, the total labour demand for each individual segment must approximately equal the total labour supply that is input to the commuter flow model. An allowance is made for in- and out-commuting to the study area at a rate that is similar to or a little above that observed in the base year 2001.

If this first run, with the 2001 travel costs and the 2016 zonal location pattern, produces segments for which the average journey length has changed substantially from the corresponding length observed in the base year, this suggests that the local balance of labour supply and demand has changed significantly in that locality. This is an indicator that is then used within the residence and workplace location models to adjust the spatial balance of supply or demand between zones to lessen the local imbalances for this segment. Having resolved any such local inconsistencies the definitive policy scenario runs were then carried out to produce the results that are presented below.

5.3 Overall commuter travel results for 2016

The overall results are compared here across the five employment growth scenarios for 2016 with the changes contrasted by region within the Wider South East. In later sections the scenarios based on the individual plans for each region are examined in greater spatial detail within their own region.

5.3.1 Labour force/workplace balance

The empirical analysis of the influences on travel demand presented earlier in this report has highlighted the importance of having a local balance between the resident labour force and the number of workplaces in each economic sector. Accordingly, we start by reviewing at the regional level how this balance evolves from 2001 to 2016 within each of the scenarios. This helps to inform the expected trends in commuter trip lengths. In practice, commuting patterns depend on the employed residents/workforce balance in each of the individual economic sectors, a feature that is represented explicitly within the model. These detailed results by economic sector have subsequently been aggregated and summarised for presentation purposes in this report.

London traditionally has been a region with a strong excess of workplaces (15% in 2001) compared to its resident labour force, leading to significant net in-commuting. In the South East and especially in the East of England there has traditionally been a significant net out-flow of commuters to work in London. In all four scenarios for 2016 the percentage growth in the labour force resident in London is more rapid than the percentage growth in the numbers in employment in workplaces within London (see Table 5.6). This improves the regional balance and so lessens the need for commuting into London from outside. However, within London itself job growth is greater in Central/Inner London than in Outer London, while the job growth in Outer London is

TABLE 5.6: CHANGE FROM 2001 TO 2016 IN EMPLOYMENT BY SCENARIO, FOR REGION OF RESIDENCE, WORKPLACE AND BALANCE

	London			South East			East of England			The Wider South East		
	2001	2016	Change	2001	2016	Change	2001	2016	Change	2001	2016	Change
	000s	000s	%	000s	000s	%	000s	000s	%	000s	000s	%
CE Scenario												
Residence	3306	3680	11.3	3872	4225	9.1	2571	2783	8.3	9748	10689	9.6
Workplace	3804	4103	7.9	3697	4185	13.2	2384	2565	7.6	9885	10854	9.8
Residence - Workplace	-498	-423	-	175	40	-	187	218	-	-136	-165	-
London Plan Scenario												
Residence	3306	3707	12.1	3872	4259	10	2571	2805	9.1	9748	10771	10.5
Workplace	3804	4248	11.7	3697	4185	13.2	2384	2565	7.6	9885	10999	11.3
Residence - Workplace	-498	-541	-	175	73	-	187	240	-	-136	-228	-
South East SEEF Scenario												
Residence	3306	3705	12.1	3872	4213	8.8	2571	2802	9	9748	10721	10
Workplace	3804	4103	7.9	3697	4226	14.3	2384	2565	7.6	9885	10894	10.2
Residence - Workplace	-498	-398	-	175	-13	-	187	237	-	-136	-174	-
East of England EG21 Scenario												
Residence	3306	3663	10.8	3872	4207	8.7	2571	2802	9	9748	10673	9.5
Workplace	3804	4103	7.9	3697	4185	13.2	2384	2583	8.4	9885	10871	10
Residence - Workplace	-498	-439	-	175	22	-	187	219	-	-136	-199	-
East of England RSS Scenario												
Residence	3306	3695	11.8	3872	4242	9.6	2571	2794	8.7	9748	10729	10.1
Workplace	3804	4103	7.9	3697	4185	13.2	2384	2645	11	9885	10934	10.6
Residence - Workplace	-498	-408	-	175	57	-	187	149	-	-137	-205	-

strongly focused on the west. Accordingly, there are continuing imbalances within London because the growth in the resident labour force is more uniformly spread across the boroughs than is the growth in jobs. Among the scenarios the London Plan Scenario includes the highest growth in workplaces and so implies the greatest expected net in-commuting volume.

The Census-based values in Table 5.6 show that in 2001 within the South East region there was a 5% excess of resident labour over workplaces. This imbalance has reduced from previous decades due in part to the rapid increase in recent years in employment in areas west of London. In each of the scenarios for 2016 the rate of growth of workplaces within the South East is greater than that of resident labour, so that the past excess of resident labour in the region has largely been cancelled out by 2016, and is broadly in balance with the workplaces there in all four scenarios, particularly within the South East Plan scenario. There are however, continuing imbalances within the region between the west which is relatively rich in jobs and the east from which there continues to be major commuting into London.

The East of England had in 2001 an 8% excess of resident labour over workplaces, which is a higher rate than that in the South East. Both the Enhanced Growth and the CE scenarios exhibit more rapid growth in the resident labour force than in the workplaces within this region. This leads to an increase in the labour imbalance within this region, which implies a greater level of net out-commuting in 2016 than in 2001 from the East of England. In contrast the labour imbalance is reduced in 2016 within the East of England RSS scenario. As in the case of the other two regions, the East of England has an east/west imbalance. Cambridgeshire and Hertfordshire are forecast to be successful in creating workplace employment, whereas in Essex the growth in jobs is not sufficient to offset the existing surplus of resident labour.

Although the discussion above has been about overall spatial imbalances in labour supply and demand, it is important to bear in mind that in practice it is at the level of the individual industry sector that such spatial imbalances arise. Because the Commuter Flow model operates with a detailed segmentation by industry type it does take account of these finer details. Inclusion of segmentation by occupation type within the model in addition to the existing industry type segmentation, would improve its results but at the expense of a much more complex model structure and calibration procedure. Accordingly it was not attempted in this study.

Over the Wider South East as a whole, in all future scenarios net in-commuting increases from its level of 1.4% in 2001, with the greatest increase being to 2.1% in the London Plan scenario.

5.3.2 Trip length change

The overall change in trip lengths from 2001 to 2016 is presented in Table 5.7 in a form that is segmented by gender and by part-time/full-time employment. It shows that in general there is not expected to be major change in overall trip lengths in any of the

TABLE 5.7: CHANGE IN TRIP LENGTH FROM 2001 TO 2016 FOR SCENARIOS, BY GENDER AND PART/FULL-TIME FOR THE WIDER SOUTH EAST

	Scenarios			
	CE	London Plan	SEEF	EE (EG21)
				(kms)
Male part-time	0.0	0.4	0.1	0.0
Female part-time	1.2	1.4	1.1	1.0
Male full-time	-1.0	-0.7	-0.9	-1.0
Female full-time	-0.2	-0.1	-0.3	-0.4
All in employment	-0.4	-0.1	-0.4	-0.5

scenarios. Each has a small growth in part-time trip lengths and a small decline in full-time trip lengths. The net overall decline in trip lengths is least in the London Plan scenario. This reversal of the historic trend of significant growth in commuter trip lengths arises for a number of reasons.

- The two regions with the largest populations and number of workplaces, London and the South East, both exhibit reductions in 2016 in the imbalances between their number of workplaces and their resident labour force. This will act to reduce the pressure in 2016 for long-distance commuting between them. It is only in the smallest region, the East of England, that interregional commuting pressures will increase.
- The greatest absolute and proportional increase in the resident workforce is within the London region, which is also the region in which average commuting trip lengths from the 2001 Census are one-third less than those for residents in either the South East or the East of England.
- Under all scenarios there is a reduction in the past trend of rapid growth of jobs and of households in the low-density, non-urbanised areas in which average commuter trip lengths tend to be greatest.
- The transport supply characteristics in 2016 are likely, in many respects, to be less rather than more attractive to commuters than those in 2001. The future increases in road capacity included in the 2016 reference case are not large in relative terms, whereas freight and business traffic by road is likely to continue to increase. Although significant rail and underground capacity increases are included, the growth in demand for these modes due to population and job increases in urban centres is substantial, so that rail overcrowding to Central London is expected still to be a significant issue in 2016.

TABLE 5.8: CHANGE IN TRIP LENGTH BY MODE FROM 2001 TO 2016 FOR THE WIDER SOUTH EAST

	Trip Lengths (kms)				
	Car	Bus	LU & Rail	Slow	Total
2001	15.1	7.3	28.2	1.9	14.0
2016 CE Scenario	13.5	7.7	29.9	1.9	13.6
Absolute change	-1.6	0.4	1.7	0.0	-0.4
% change	-10.60%	4.90%	6.20%	-0.70%	-2.30%

Note(s) : Excludes trips external to WSE.

Consideration was given, when running the trip distribution model for 2016, to reducing slightly the values of the travel deterrence parameters in each economic segment in order to take account of possible future increases in job specialisation within a sector (differences between sectors are already represented in the model). Such specialisation would tend to cause employees to have to look over a wider geographical area when searching for a new job. On balance it was decided not to make this adjustment, on the grounds of simplicity and of insufficient evidence. This implies that the results presented here may (or perhaps may not) be conservative in their estimate of the future growth in commuter-travel kilometres in each region. The journey-to-work data available from ONS do not facilitate detailed analysis of the implied changes in deterrence parameters between 1991 and 2001 because the definitions of all three relevant segmentation classifications (industry, occupation and socio-economic group) have each been radically revised between the Censuses; and so no consistent data exist for both years. This means that the influence on trip lengths due to the undoubted changes in socio-economic structures cannot be disentangled from changes that have come about for other reasons.

The change to 2016 in the average trip length is presented by mode in Table 5.8 for all commuting trips that both start and end within the Wider South East Study Area. The measurement of the distance travelled and the mode used to zones outside the study area is coarse within the model so external trips are excluded in general from the tables and graphs in this and subsequent sections.

Table 5.8 shows that over the WSE as a whole the average length of car trips reduces somewhat whereas the lengths on bus and on rail or London Underground increase on average. Some of the longer trips by car to congested urban areas are replaced by the use of rail, as will be seen below in the more detailed analyses of specific regions.

5.3.3 Changes in commuter volume by mode between 2001 and 2016

This section provides an overview of the growth in the number of trips and trip kilometres on each mode between 2001 and 2016 for four of the five scenarios. The second scenario for the East of England, the Regional Spatial Strategy Scenario, is discussed separately in Section 5.6.2.

Because the modal pattern of growth differs considerably between locations, Figures 5.3 (A-D) present the journeys to work subdivided by broad area of workplace. The results for London are aggregated to three annuli (Central, Inner and Outer), whereas those for the South East and East of England are each aggregated to two annuli, one for the Outer Metropolitan Area (OMA) covering an area to about 25 kilometres beyond the M25, and the other comprising the remaining districts of the region in the Rest of the Study Area (ROSA).

Figures 5.4 (A-D) present journeys to work by location of residence. In these tables, the small number of residents in Central London are grouped together with residents of Inner London, in contras to the treatment in Figures 5.3 (A-D) where, at the workplace end, Central London employment is distinguished from Inner London employment.

Looking first at the workplace end of the commuting trip, the broad pattern of growth by mode by zone of workplace in Figures 5.3 (A-D) is common across all scenarios, with some distinctions occurring for specific scenarios in certain locations. In general, the growth in trips by rail plus LU is greater the closer the workplace is to Central London. The total commuting trips by car decline for all London destinations, but increase strongly outside London, especially within the South East, which in all scenarios has the largest increase in workplaces of the three regions. The decline in car trips to Central London is accentuated by the impact of congestion charging since 2001. In the rest of London, the number of commuting trips by car has declined, mainly due to the reduced speeds arising as a result of the congestion on networks in which total capacity is not expected to increase in the future, and has in many cases reduced as a result of bus priority lanes and traffic-calming measures.

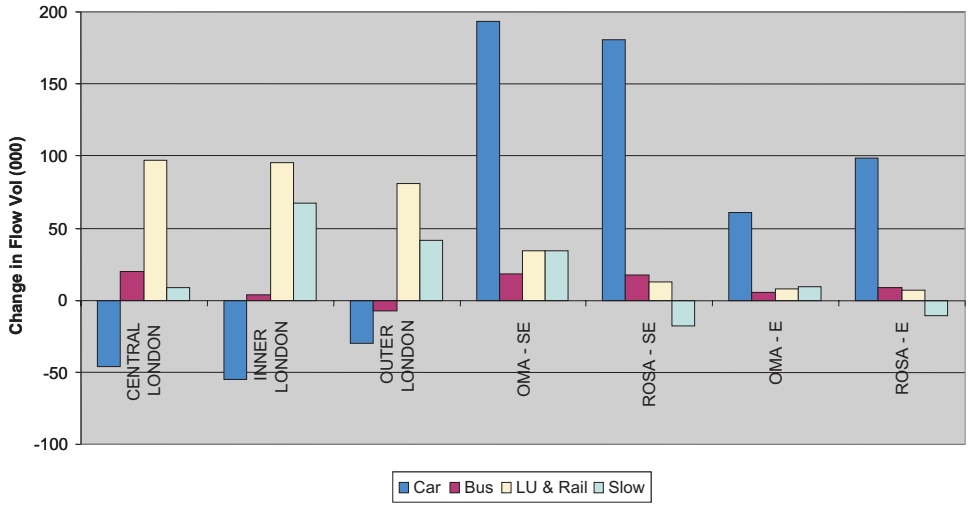
Public transport fares have also been pegged, or in the case of rail are assumed to decline, as discussed in Appendix D. The increase in trips by rail and LU is strongly concentrated on London workplaces. It is only the urban areas of the South East that are close to London that exhibit substantial increases in rail destinations, and these are still dwarfed by the increase in car commuters to the same areas. The number of trips by slow modes has increased broadly in line with the overall increase in the labour force resident in London. In those local areas with plenty of workplaces relative to the local labour force there are a wide range of adjacent job opportunities, so that the proportion of trips by slow modes is less likely to reduce there.

At the workplace end, Figures 5.3 (A-D) illustrate the main differences between the overall CE scenario and the specific scenarios for each region.

These are:

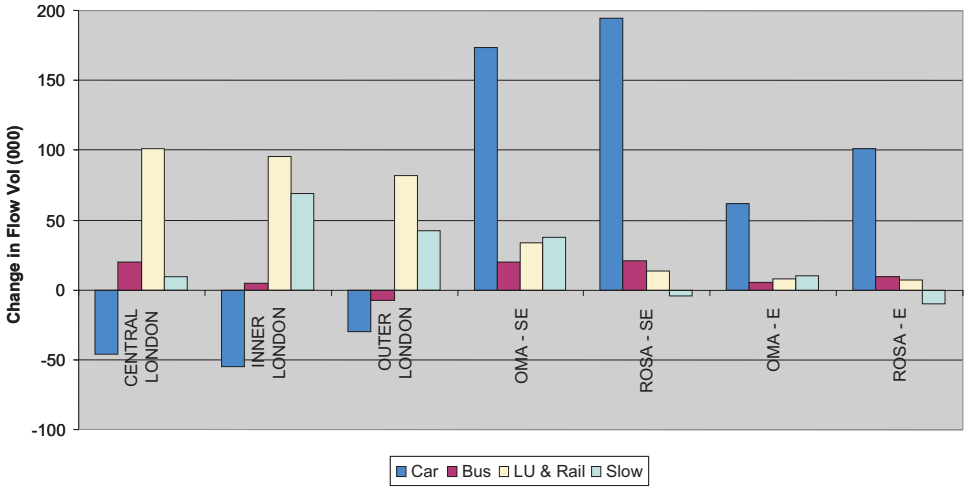
- The London Plan scenario contains a major increase in the number of workplaces in both Central and Inner London, when compared to the other three scenarios; these workplaces are fed primarily by the rail and LU modes. Many of these extra jobs are filled by the workforce resident outside London leading to small declines in car trips to the workplaces outside London.

FIGURE 5.3A: WORKPLACE LOCATION - CHANGE IN COMMUTER FLOWS FROM 2001 TO 2016 BY MODE IN THE WIDER SOUTH EAST
CE SCENARIO



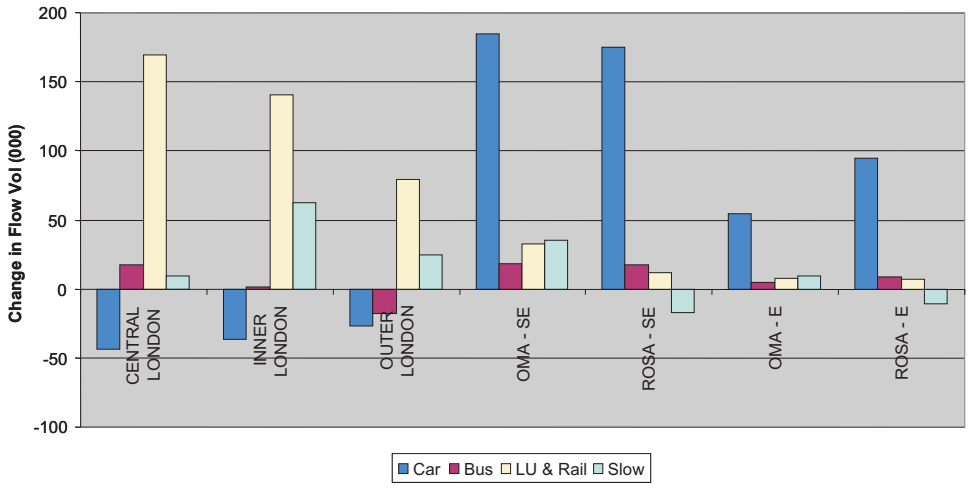
Note(s) : Excludes external trips.

FIGURE 5.3B: WORKPLACE LOCATION - CHANGE IN COMMUTER FLOWS FROM 2001 TO 2016 BY MODE IN THE WIDER SOUTH EAST
SOUTH EAST SEEF SCENARIO



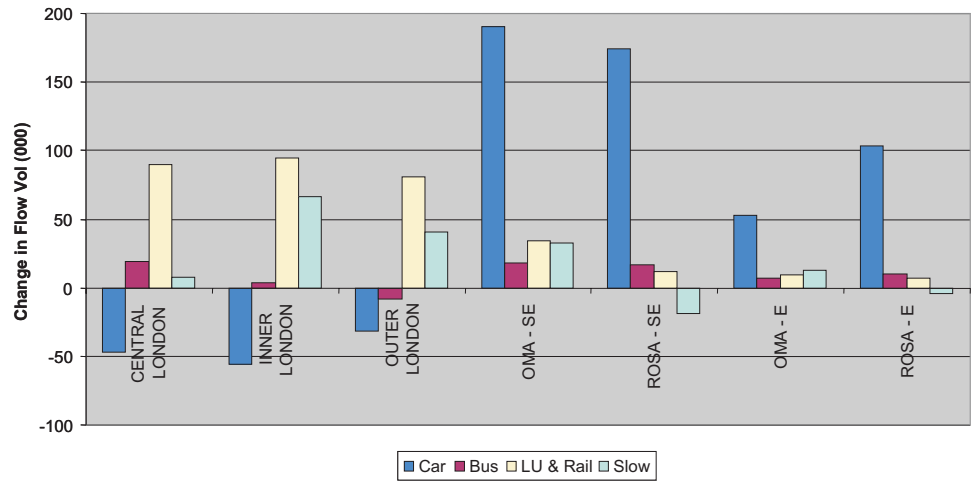
Note(s) : Excludes external trips.
See text for the definition of the scenario.

FIGURE 5.3C: WORKPLACE LOCATION - CHANGE IN COMMUTER FLOWS FROM 2001 TO 2016 BY MODE IN THE WIDER SOUTH EAST LONDON PLAN SCENARIO



Note(s) : Excludes external trips.

FIGURE 5.3D: WORKPLACE LOCATION - CHANGE IN COMMUTER FLOWS FROM 2001 TO 2016 BY MODE IN THE WIDER SOUTH EAST EAST OF ENGLAND EG21 SCENARIO



Note(s) : Excludes external trips.
See text for the definition of the scenario.

- The South East Scenario has a greater proportion of its job growth in the outer part of that region than the other three scenarios. This shifts some of the car travel growth to workplaces in the region from the Outer Metropolitan Area out further to the rest of the South East and also offsets the decline in slow modes further out.
- The East of England scenario likewise has a greater proportion of its job growth in the outer part of that region than the other three scenarios; it also has a higher rate of growth in the resident labour force, which reduces the decline in trips by slow modes in the region.

Turning now to the residence end of the commuting trip, Figures 5.4 (A-D) show that, in contrast to the analysis at the workplace end, there are strong increases in the use of rail/LU by residents in almost all areas. The exception is for residents in the Outer Metropolitan Area of the South East, especially in the south-west quadrant outside London, where the growth in local jobs has reduced their need to commute into Central London. The number of trips by slow modes has also increased significantly because of increases in local job availability, which is also the case for London residents.

Although the number of car trips by residents of Inner London declines, car trips by residents of Outer London increase, though not by very much considering the overall growth in the population there. This increase in car use is largely associated with out-commuting to workplaces outside London. Outside London the largest increases in the resident labour force are in the more peripheral parts of the regions, in which commuter travel is mainly by road, though long-distance commuting by rail to London also increases.

At the residence end, Figures 5.4 (A-D) illustrate the main differences from the overall CE scenario that arise from the specific scenarios for each region. These are:

- The London Plan scenario has higher rail flows from all areas to cater for the increased number of jobs in Inner and Central London relative to the other scenarios. It reduces the number of car trips in London relative to the other scenarios, but it does not reduce car trips by residents of the other regions.
- The South East Scenario has a lower usage of car and a greater use of slow modes in the SE region than the other scenarios due to the closer balance between the workplaces and the labour force within it. This plan has concentrated much of the future growth in nodal hubs that are served by public transport. The model results confirm that this has a direct impact by lessening the growth in car demand.
- The East of England Scenario has a greater part of its growth in residents occurring within the Outer Metropolitan area of the region, causing an increase in car demand there, and leading to a corresponding reduction in car travel by residents in the rest of the East of England.

The absolute growth in commuter travel demand by mode between 2001 and 2016 is presented in Table 5.9 based on the CE Scenario. It shows in particular the impact of the major increase in the labour force within the Wider South East on the demand for rail and underground services.

TABLE 5.9: ESTIMATED COMMUTER VOLUMES AND PERSON KILOMETRES BY MODE FOR 2001 AND 2016 FOR THE WIDER SOUTH EAST

CE SCENARIO/WORKPLACE

Wider South East	Trip volume (000s)					Person kilometres (million)				
(Exc. External)	Car	Bus	LU & Rail	Slow	Total	Car	Bus	LU & Rail	Slow	Total
2001	5744	680	1408	1816	9647	86.8	5.0	39.7	3.4	134.8
2016	6145	745	1742	1949	10581	83.0	5.7	52.1	3.6	144.4
Absolute change	401	65	334	133	933	-3.8	0.7	12.4	0.2	9.6
% growth	6.98%	9.54%	23.74%	7.34%	9.68%	-4.35%	14.93%	31.36%	6.55%	7.15%

The overall commuter distance travelled by car decreases by 5% for the reasons discussed in Section 5.3.2 above. There is a major 31% increase in passenger kilometres by rail and LU and a 15% increase in bus kilometres.

5.4 Travel results for the London Plan Scenario

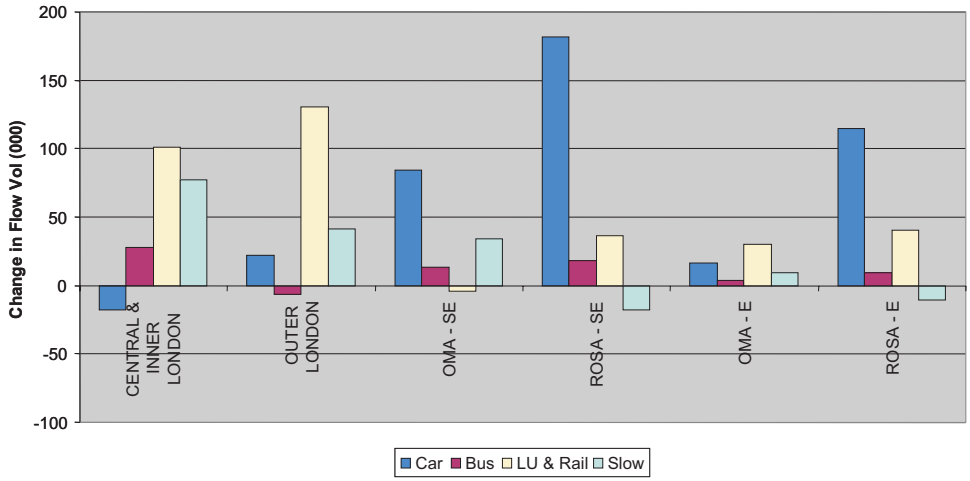
The analysis in the present section is specific to London and presents the model results for commuter flows under the London Plan scenario.

Table 5.10 shows that for London residents car commuting has continued to lose its share of total commuting in line with trends that first became apparent between the 1991 and 2001 Censuses. A part of this decline has been caused by the Central London congestion charge policy, but much is due to many of the new jobs in the London Plan scenario being concentrated in the areas in and around Central London where there is little spare parking or road capacity in the peak periods. Figures 5.4 (A-D) have shown that the decline in car use occurs for residents in Inner rather than in Outer London. The new commuting trips are being attracted to rail and LU instead of car.

There is a major reduction in numbers commuting into London by car; and this creates much of the reduction in car kilometres to London workplaces. Within the London Plan Scenario there is a large increase in the labour force resident in Outer London, compared to a smaller increase in workplaces there. This increases the local competition for the jobs in Outer London. These traditionally are the London jobs that have been accessed by the car commuters from outside London. This decline in car in-commuting to London is further accelerated because the rate of growth in workplaces in the Outer Metropolitan Area is much greater than that of the resident labour force there, as can be seen by contrasting Figures 5.3 (A-D) with Figures 5.4 (A-D). There are sufficient jobs available locally in the OMA to lessen the need to travel into London for work.

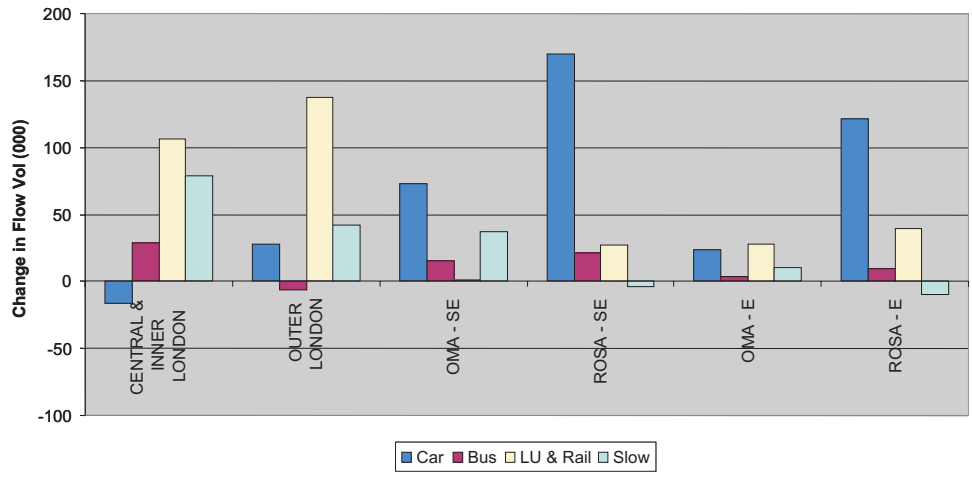
A complementary view of the changing pattern of travel demand is provided by Table 5.11. It presents the change in the average commuter trip length for each mode. The bus and rail/LU journeys are lengthening, whereas the car journeys are shortening. In particular, it highlights the great difference in trip lengths between those who live in

FIGURE 5.4A: RESIDENCE LOCATION - CHANGE IN COMMUTER FLOWS FROM 2001 TO 2016 BY MODE IN THE WIDER SOUTH EAST
CE SCENARIO



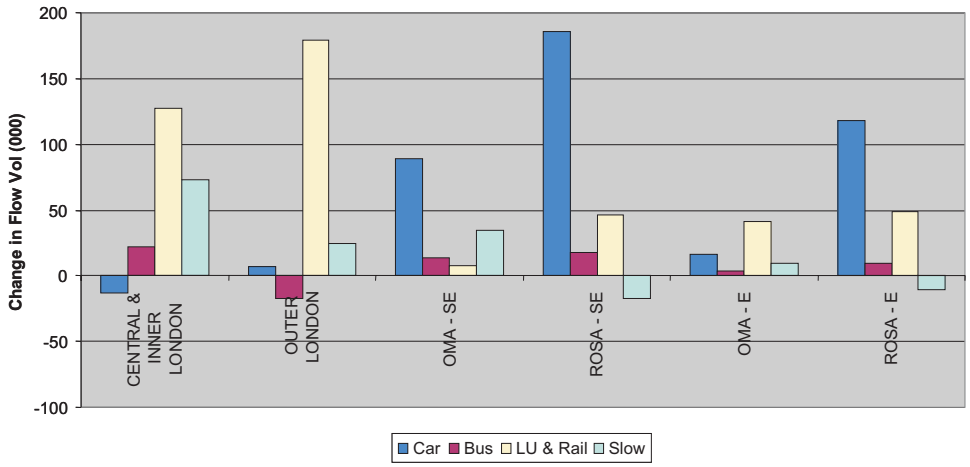
Note(s) : Excludes external trips.

FIGURE 5.4B: RESIDENCE LOCATION - CHANGE IN COMMUTER FLOWS FROM 2001 TO 2016 BY MODE IN THE WIDER SOUTH EAST
SOUTH EAST SEEF SCENARIO



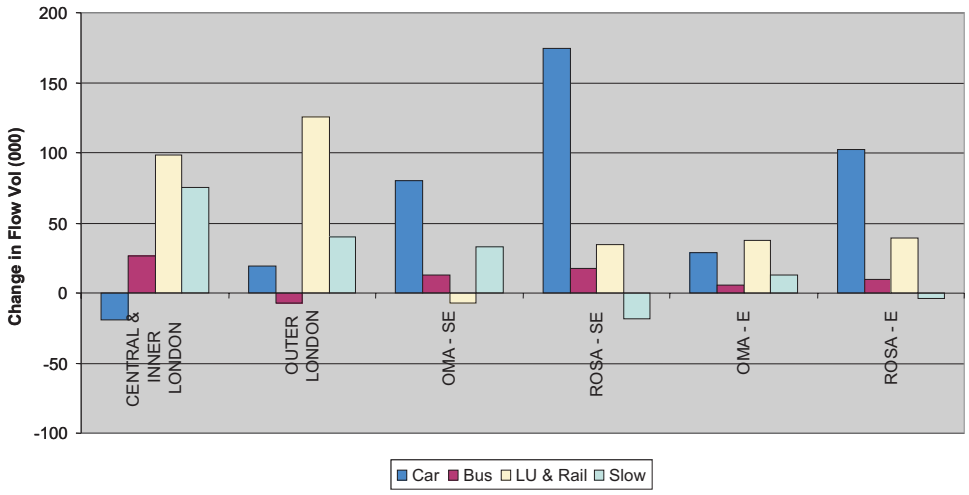
Note(s) : Excludes external trips.
See text for the definition of the scenario.

FIGURE 5.4C: RESIDENCE LOCATION - CHANGE IN COMMUTER FLOWS FROM 2001 TO 2016 BY MODE IN THE WIDER SOUTH EAST LONDON PLAN SCENARIO



Note(s) : Excludes external trips.

FIGURE 5.4D: RESIDENCE LOCATION - CHANGE IN COMMUTER FLOWS FROM 2001 TO 2016 BY MODE IN THE WIDER SOUTH EAST EAST OF ENGLAND EG21 SCENARIO



Note(s) : Excludes external trips.
See text for the definition of the scenario.

TABLE 5.10: ESTIMATED COMMUTER VOLUMES AND PERSON KILOMETRES BY MODE FOR 2001 AND 2016 BY WORKPLACE AND RESIDENCE FOR LONDON THE LONDON PLAN SCENARIO

London workplaces	Trip volume (000s)					Person kilometres (million)				
(Exc. External)	Car	Bus	LU & Rail	Slow	Total	Car	Bus	LU & Rail	Slow	Total
2001	1296	400	1342	706	3744	21.9	2.5	38.8	1.2	64.5
2016	1189	401	1732	803	4125	14.5	2.6	52.8	1.4	71.4
Absolute change	-107	1	390	97	382	-7.4	0.0	14.1	0.2	6.9
% growth	-8.22%	0.28%	29.04%	13.79%	10.19%	-33.57%	1.82%	36.30%	13.35%	10.75%

London residents	Trip volume (000s)					Person kilometres (million)				
(Exc. External)	Car	Bus	LU & Rail	Slow	Total	Car	Bus	LU & Rail	Slow	Total
2001	1238	397	960	705	3300	17.6	2.4	16.3	1.2	37.6
2016	1232	402	1267	803	3703	15.0	2.6	22.6	1.4	41.6
Absolute change	-6	5	306	98	403	-2.6	0.2	6.2	0.2	4.0
% growth	-0.48%	1.26%	31.88%	13.84%	12.21%	-14.77%	7.51%	38.24%	13.43%	10.62%

TABLE 5.11: CHANGE IN TRIP LENGTH BY MODE FROM 2001 TO 2016 FOR LONDON WORKPLACES AND RESIDENTS

	Trip Lengths (kms)				
Workplace in London	Car	Bus	LU & Rail	Slow	Total
2001	16.9	6.3	28.9	1.8	17.2
2016 London Plan Scenario	12.2	6.4	30.5	1.8	17.3
Absolute change	-4.7	0.1	1.6	0.0	0.1
% change	-27.60%	1.50%	5.60%	-0.40%	0.50%
Residence in London	Car	Bus	LU & Rail	Slow	Total
2001	14.2	6.0	17.0	1.8	11.4
2016 London Plan Scenario	12.2	6.4	17.8	1.8	11.2
Absolute change	-2.0	0.4	0.8	0.0	-0.2
% change	-14.40%	6.20%	4.80%	-0.40%	-1.40%

Note(s) : Excludes trips external to WSE.

London, whose numbers are well below the GB national average, and those who work in London, whose numbers are well above the national average.

Figures 5.5 (A-B) break the overall changes across London down into five sectors that are aggregates of boroughs as listed in Table 5.12. Figure 5.5A shows that the main growth by rail/LU occurs in workplaces in Central and East London (East London contains the City of London and Docklands, as well as the other Inner and Outer London boroughs to the east). The growth in rail trips to West London is related to this area being a part of Outer London with a large number of workplaces that attract labour from other parts of London which are less rich in jobs. The inclusion of Crossrail as one of the rail enhancements within the 2016 transport reference case used in all of the scenarios, has also increased the attractiveness of rail travel to those boroughs in the three zones through which it passes. Figure 5.5B shows a consistent growth in rail use by residents in all sectors. Car use increases slightly in the three zones that consist mainly of outer London boroughs but declines in the other two zones closer to Inner London.

5.4.1 Public Transport Fares Sensitivity Test

This sensitivity test was carried out to demonstrate the impact of changes in public transport fares on the patterns of commuting. The test was applied only to the London Plan scenario in 2016 so that the results below are directly comparable to those provided in Tables 5.9 and 5.10 in the previous section. The London Plan scenario was chosen as the base for this sensitivity test because London is the part of the study area with the greatest usage of public transport, and so these results would be of greater interest.

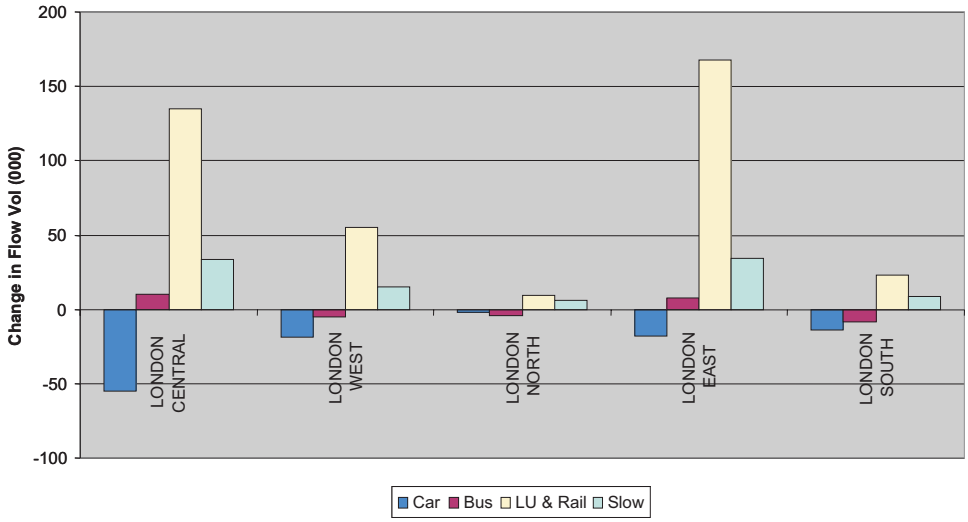
In this sensitivity test car costs and times remained unchanged (the knock-on effects of increased congestion were not measured here). The costs on public transport were increased from those of the Base run of the London Plan scenario in 2016 as follows:

- Bus fares wholly within London - up by 10.5%
- Bus and coach fares elsewhere - up by 38%
- Rail and London underground fares throughout - up by 12.3%

TABLE 5.12: SECTOR DEFINITIONS FOR THE LONDON CHARTS

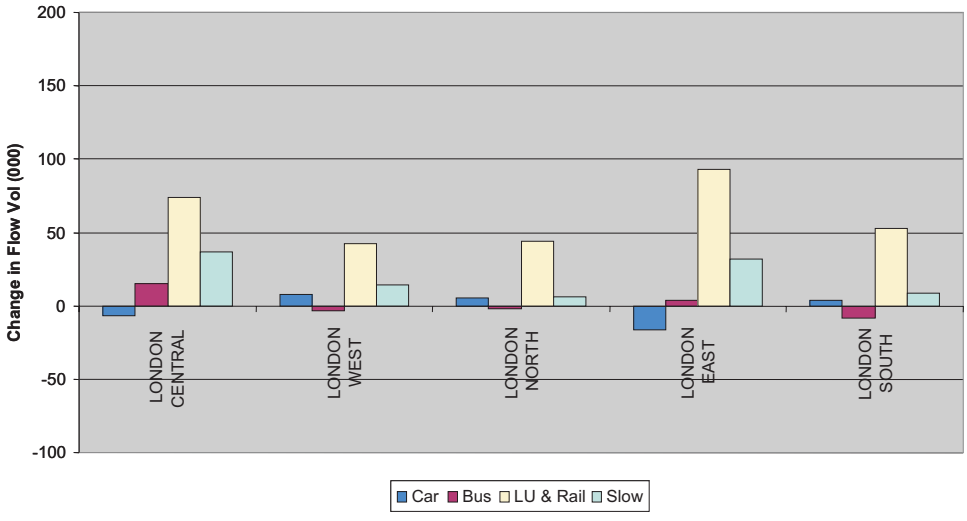
Sector name	Areas within sector
London Central	Kensington and Chelsea, Camden, Westminster, Islington, Southwark, Lambeth, Wandsworth
London West	Hillingdon, Harrow, Brent, Ealing, Hounslow, Hammersmith and Fulham
London North	Barnet, Enfield, Haringey, Waltham Forest
London East	City, Hackney, Tower Hamlets, Newham, Redbridge, Barking and Dagenham, Havering, Lewisham, Greenwich, Bexley
London South	Richmond, Kingston, Merton, Sutton, Croydon, Bromley

FIGURE 5.5A: WORKPLACE LOCATION - CHANGE IN COMMUTER FLOWS FROM 2001 TO 2016 BY MODE IN LONDON, LONDON PLAN SCENARIO



Note(s) : Excludes external trips.

FIGURE 5.5B: RESIDENCE LOCATION - CHANGE IN COMMUTER FLOWS FROM 2001 TO 2016 BY MODE IN LONDON, LONDON PLAN SCENARIO



Note(s) : Excludes external trips.

Within the Commuter Flow model the following responses to charging are represented for travellers:

- Redistribution of trips between zone pairs - but without any change in the total number of workplaces or of residents by type by zone.
- Change of mode of travel between zone pairs.

For workplaces within Central London the trip redistribution effect is of particular importance. Most of the workplaces there are effectively captive to public transport, since there is neither sufficient road capacity nor parking to allow many more commuter cars to access Central London. The main effect of the rail fare increases on those working in Central London is to reduce the number that commute over long distances by rail. Some of those living furthest out will commute by car instead to workplaces in other parts of the study area, and their jobs in Central London will potentially be filled by others who live less far from Central London.

It can be seen by comparing Table 5.10 for the Base case against values in Table 5.13 for the PT fares increase, that the average journey length on rail/LU has reduced from 30.5 (kms) to 29.9 for those working within London. A much smaller reduction in trip lengths from 17.8 to 17.7 is shown for those rail/LU commuters who are resident in London, since many of these will need to travel to Central London to compensate for the long-distance commuters that have moved to workplaces elsewhere.

For those working in London the PT fares increase has lengthened the average trip length by car from 12.2 to 13.4 kms, because some of the longer-distance commuting by rail will switch to car. Trip lengths by bus change relatively little.

TABLE 5.13: CHANGES IN TRIP LENGTH BY MODE BETWEEN 2001 AND 2016 WITH FARES INCREASE ON PT

				Trip Lengths (kms)	
Workplace in London	Car	Bus	LU & Rail	Slow	Total
2001	16.9	6.3	28.9	1.8	17.2
2016 PT Fares Sensitivity	13.4	6.4	29.9	1.8	17.3
Absolute change	-3.5	0.1	1.0	0.0	0.1
% growth	-20.5%	1.6%	3.4%	0.1%	0.5%
Residence in London	Car	Bus	LU & Rail	Slow	Total
2001	14.2	6.0	17.0	1.8	11.4
2016 PT Fares Sensitivity	12.4	6.3	17.7	1.8	11.3
Absolute change	-1.8	0.3	0.7	0.0	-0.1
% growth	-12.7%	5.0%	4.2%	0.1%	-1.1%

The key point to understand from the discussion above is that the longer-term response to the increased fares involves a substantial amount of trip redistribution and is not just a simple switch of modes within a fixed existing pattern of commuting between zone pairs.

Turning now to the absolute changes in travel patterns, Table 5.13 presents the overall travel statistics for the PT fares increase for those working in and for those resident in London but excluding those who commute to or from outside the Wider South East. There are many commuters into London from locations such as Swindon and Northamptonshire and from places farther afield but these are an unknown mixture of daily and weekly commuters and their distances travelled are not well measured in the model. Accordingly, they have been excluded from this Table, though they are explicitly included within the model's calculations.

It can be seen by comparing Table 5.9 for the Base case against values in Table 5.14 for the PT fares increase, that the number of workplaces in London appears to have increased from 4.125 million to 4.141 million. Because external commuters have been excluded from this Table, this in fact represents a reduction of 16 thousand in the number of long-distance commuters to London from outside the region. The high rail fares make this long-distance commuting a less attractive proposition. It will be replaced by shorter distance commuting by car into workplaces outside London. Similarly the apparent increase in the total person kilometres travelled by London workers from 71.4 to 71.7 million kms simply reflects the travel of those in jobs vacated by commuters to London from outside the Wider South East.

The travel on rail/LU reduces by 3% from 52.8 to 51.3 million person kms for workers in London. This suggests a fares elasticity of 0.24 for rail, given that fares have increased by 12.3%. In contrast the commuter travel on road for workers in London increases by

TABLE 5.14: CHANGE IN COMMUTER VOLUME AND PERSON KILOMETRES BY MODE BETWEEN 2001 AND 2016 - WITH FARES INCREASE ON PT

London workplaces	Flow Vol. (000s)					Person kilometres (million)				
(Exc. External)	Car	Bus	LU & Rail	Slow	Total	Car	Bus	LU & Rail	Slow	Total
2001	1296	400	1342	706	3744	21.9	2.5	38.8	1.2	64.5
2016 PT Fares Sensitivity	1220	396	1716	808	4141	16.4	2.6	51.3	1.4	71.7
Absolute change	-76	-4	374	102	397	-5.5	0.0	12.5	0.2	7.2
% growth	-5.8%	-1.0%	27.9%	14.4%	10.6%	-25.1%	0.5%	32.2%	14.6%	11.1%
London residents	Flow Vol. (000s)					Person kilometres (million)				
(Exc. External)	Car	Bus	LU & Rail	Slow	Total	Car	Bus	LU & Rail	Slow	Total
2001	1238	397	960	705	3300	17.6	2.4	16.3	1.2	37.6
2016 PT Fares Sensitivity	1237	395	1263	808	3703	15.4	2.5	22.4	1.4	41.7
Absolute change	-1	-2	303	103	403	-2.2	0.1	6.1	0.2	4.1
% growth	-0.0%	-0.4%	31.5%	14.5%	12.2%	-12.7%	4.5%	37.1%	14.7%	10.9%

Note(s) : London Plan Scenario.

13% from 14.5 to 16.4 million. In general the changes induced for residents in London are much less pronounced than those for workers in London, since the latter contains those who travel the longest distances by rail and this is the group that will be most affected.

5.5 Travel results for the South East Scenario

The analysis in the present section is specific to the South East region and presents the model results on commuter flows that are based on the South East Experian Forecast scenario. The results are interpreted below mainly in the context of the 2016 forecasts since these are broadly mirrored by the results in 2021.

Table 5.15 shows that for residents in the South East, car commuting has retained its mode share for trips, but has reduced its share of trip kilometres due to the reduction in journey lengths by car shown in Table 5.16. Much of this reduction in trip lengths has arisen because the closer balance between the number of workplaces and the labour force

TABLE 5.15: ESTIMATED COMMUTER VOLUMES AND PERSON KILOMETRES BY MODE FOR 2001 AND 2016 BY WORKPLACE AND RESIDENCE FOR THE SOUTH EAST THE SOUTH EAST SEEF SCENARIO

South East workplaces	Trip volume (000s)					Person kilometres (million)				
(Exc. External)	Car	Bus	LU & Rail	Slow	Total	Car	Bus	LU & Rail	Slow	Total
2001	2665	176	43	701	3585	39.5	1.5	0.6	1.4	42.9
2016	3032	217	90	734	4073	41.4	2.0	2.7	1.4	47.5
Absolute change	367	41	47	33	488	1.9	0.4	2.2	0.1	4.5
% growth	13.78%	23.26%	107.59%	4.75%	13.61%	4.85%	27.87%	379.42%	4.10%	10.60%
2021	3196	222	98	752	4267	45.1	2.0	3.2	1.5	51.8
Absolute change	531	46	54	51	682	5.7	0.5	2.6	0.1	8.9
% growth	19.9%	26.2%	125.7%	7.2%	19.0%	14.4%	33.0%	465.2%	7.0%	20.8%
South East residents	Trip volume (000s)					Person kilometres (million)				
(Exc. External)	Car	Bus	LU & Rail	Slow	Total	Car	Bus	LU & Rail	Slow	Total
2001	2682	177	251	701	3811	40.8	1.6	13.3	1.4	57.0
2016	2924	214	279	734	4151	36.5	1.9	14.7	1.4	54.5
Absolute change	243	37	28	33	340	-4.3	0.3	1.4	0.1	-2.6
% growth	9.05%	20.64%	11.19%	4.70%	8.93%	-10.60%	18.57%	10.65%	4.04%	-4.50%
2021	3049	218	285	751	4303	38.6	1.9	15.6	1.4	57.6
Absolute change	367	40	35	50	492	-2.2	0.3	2.3	0.1	0.6
% growth	13.6%	22.6%	13.7%	7.1%	12.9%	-5.3%	20.6%	17.6%	6.9%	1.0%

TABLE 5.16: CHANGE IN TRIP LENGTH BY MODE FROM 2001 TO 2016 FOR WORKPLACES AND RESIDENTS IN THE SOUTH EAST

				Trip Lengths (kms)	
Workplace in SE	Car	Bus	LU & Rail	Slow	Total
2001	14.8	8.7	13.1	1.9	12.0
2016 SE SEEF Scenario	13.6	9.0	30.2	1.9	11.6
Absolute change	-1.2	0.3	17.1	0.0	-0.3
% change	-7.90%	3.70%	130.90%	-0.60%	-2.70%
2021 SE SEEF Scenario	14.1	9.2	32.8	1.9	12.1
Absolute change	-0.7	0.5	19.7	0.0	0.2
% change	-4.5%	5.3%	150.3%	-0.1%	1.5%
Residence in SE	Car	Bus	LU & Rail	Slow	Total
2001	15.2	8.9	52.9	1.9	15.0
2016 SE SEEF Scenario	12.5	8.7	52.7	1.9	13.1
Absolute change	-2.7	-0.2	-0.3	0.0	-1.8
% change	-18.00%	-1.70%	-0.50%	-0.60%	-12.30%
2021 SE SEEF Scenario	12.7	8.7	54.7	1.9	13.4
Absolute change	-2.5	-0.1	1.8	0.0	-1.6
% change	-16.7%	-1.6%	3.4%	-0.2%	-10.5%

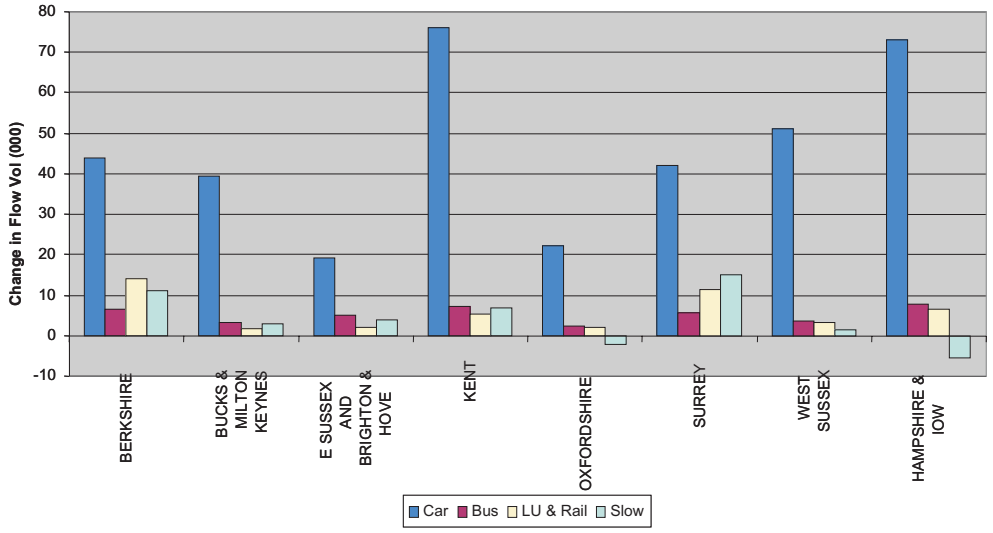
Note(s) : Excludes trips external to WSE.

across the South East has reduced the need to commute from the region. This has encouraged a major reduction in long-distance commuting into Outer London and elsewhere by car, and it has encouraged some commuting into the South East by rail, though from a low initial base.

Despite these changes in modal patterns, in all parts of the region the vast majority of the increase in work trips is attributable to car travel (see Figures 5.6 A-B). Moreover, car is used for 87% of all commuter miles to workplaces within the South East. The percentage growth rates on other modes need to be seen in this perspective.

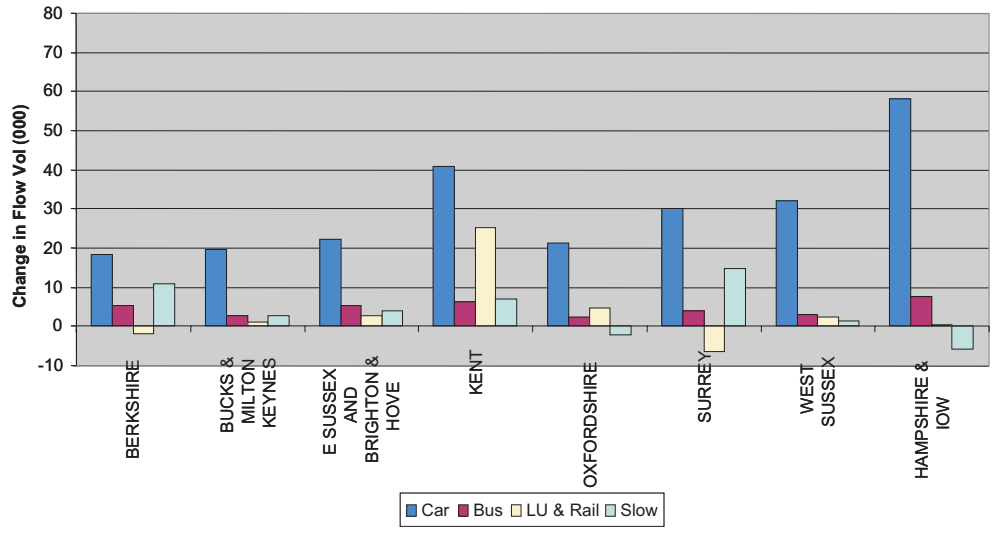
The Figures 5.6A and 5.6B show the overall changes across the South East according to the former eight counties (listed in Table 5.17). Figure 5.6B shows a decline in commuting by rail by Berkshire and Surrey residents. The increase in local workplaces there lessens the need to travel into Central London. Figure 5.6A shows that commuting by rail to the workplaces in Berkshire and Surrey increases. Some of this rail increase will be due to out-commuting by rail from the increased London labour force, especially that in Outer London. There is a need to cater for the large increase in workplaces in the Outer Metropolitan Area of the South East within this South East Scenario. Rail commuting from Kent to London does continue to increase, but rail commuting remains

FIGURE 5.6A: WORKPLACE LOCATION - CHANGE IN COMMUTER FLOWS FROM 2001 TO 2016 BY MODE IN THE SOUTH EAST, SOUTH EAST SEEF SCENARIO



Note(s) : Excludes external trips.
See text for the definition of the scenario.

FIGURE 5.6B: RESIDENCE LOCATION - CHANGE IN COMMUTER FLOWS FROM 2001 TO 2016 BY MODE IN THE SOUTH EAST, SOUTH EAST SEEF SCENARIO



Note(s) : Excludes external trips.
See text for the definition of the scenario.

TABLE 5.17: SECTOR DEFINITIONS FOR THE SOUTH EAST CHARTS

Sector name	Areas within sector
Berkshire	Berkshire
Bucks & Milton Keynes	Bucks & Milton Keynes
East Sussex and Brighton & Hove	East Sussex and Brighton & Hove
Kent	Kent
Oxfordshire	Oxfordshire
Surrey	Surrey
West Sussex	West Sussex
Hampshire & IOW	Including Isle of Wight, Portsmouth and Southampton

unchanged from other counties in the South East. There is major growth throughout the South East in car commuting trips, though not necessarily in car trip kilometres.

5.6 Travel results for the East of England Scenarios

The analysis in the present and following section is specific to the East of England region and presents the model results on commuter flows that are based on the East of England (EG21) Scenario (Section 5.6.1) and the East of England (RSS) Scenario (Section 5.6.2). The results are interpreted mainly in the context of the 2016 forecasts since these are broadly mirrored by the results in 2021.

5.6.1 Travel results for the East of England (EG21) Scenario

Table 5.18 shows that for residents in the East of England, car commuting has slightly decreased its mode share for trips, and has more substantially reduced its share of trip kilometres due to the reduction in journey lengths by car shown in Table 5.19. Within the South East it was seen above that the closer balance of workplaces to labour force has reduced trip lengths. For the East of England scenario the imbalance in the region has increased so it is not surprising that average trip lengths for residents of the East of England have increased by 6% in Table 5.19.

For all workplaces within the East of England the vast majority of the increase in work trips is attributable to car travel (see Figures 5.7 A-B). Moreover, car is used for 90% of all commuter miles to workplaces within the East of England. In contrast to the situation in the South East, the growth in the commuter miles for residents in the East of England region is seen from Figure 5.7B to vary by area between car and rail. The differences in modal pattern between the workplace (Figure 5.7A) and residence (Figure 5.7B) figures indicate that the increase in rail trips by residents is almost entirely to places outside the East of England, generally to Central and Inner London.

In Figures 5.7 (A-B) Norfolk and Suffolk are excluded from the presentation of detailed results because these counties only have a coarse representation within the LASER model, using zones that comprise many districts combined together and a coarse transport network. Accordingly, the results within these two counties do not have the

TABLE 5.18: ESTIMATED COMMUTER VOLUMES AND PERSON KILOMETRES BY MODE FOR 2001 AND 2016 BY WORKPLACE AND RESIDENCE FOR THE EAST OF ENGLAND THE EAST OF ENGLAND EG21 SCENARIO

Eastern workplaces	Trip volume (000s)					Person kilometres (million)				
(Exc. External)	Car	Bus	LU & Rail	Slow	Total	Car	Bus	LU & Rail	Slow	Total
2001	1783	104	22	409	2319	25.4	0.9	0.3	0.8	27.4
2016	1940	121	39	417	2517	26.7	1.1	1.0	0.8	29.6
Absolute change	157	17	17	8	198	1.3	0.2	0.7	0.0	2.2
% growth	8.78%	15.96%	74.67%	2.02%	8.54%	5.00%	22.73%	198.78%	1.12%	7.89%
2021	1999	126	40	435	2600	27.5	1.2	1.0	0.8	30.5
Absolute change	216	21	18	26	281	2.1	0.2	0.7	0.0	3.1
% growth	12.09%	20.60%	80.47%	6.30%	12.11%	8.13%	27.07%	206.27%	5.16%	11.14%
Eastern residents	Trip volume (000s)					Person kilometres (million)				
(Exc. External)	Car	Bus	LU & Rail	Slow	Total	Car	Bus	LU & Rail	Slow	Total
2001	1824	107	196	409	2536	28.3	1	10.1	0.8	40.2
2016	1956	122	273	418	2769	28.4	1.2	16.0	0.8	46.3
Absolute change	132	16	76	8	232	0.0	0.2	5.9	0.0	6.1
% growth	7.23%	14.66%	38.96%	2.03%	9.16%	0.16%	15.51%	58.77%	1.15%	15.23%
2021	2017	127	283	435	2863	29.5	1.2	16.7	0.8	48.2
Absolute change	193	21	87	26	327	1.1	0.2	6.6	0.0	8.0
% growth	10.59%	19.29%	44.40%	6.31%	12.89%	3.98%	19.86%	66.12%	5.19%	19.95%

same precision as elsewhere. They have been embedded within all results presented at the regional level to ensure completeness of coverage.

Figures 5.7 (A-B) show the overall changes across the East of England broken down into six sectors that are aggregates of unitary authorities and of districts as listed in Table 5.20. The lower chart for residences shows that commuting by rail increases from all origins. This is the opposite of the pattern presented for residents in the South East and arises because in the East of England (EG21) Scenario the growth in the number of workplaces in the East of England region is less than the increase in the workforce resident in the region - the imbalance of the excess of labour over workplaces is increased. This potential increase in local work force may increase the need to travel to locations such as Central London or other regional employment centres such as Cambridge or Norwich, which are rich in jobs. This travel, especially to Central London, is more likely to be by rail than by car. Equally, Figure 5.7A shows an increase in commuting by rail to workplaces in Cambridgeshire & Peterborough and in the rest of Hertfordshire. These are the only two zones in the East of England scenario where workplace growth exceeds that of the resident labour force, so that commuters are sucked in from more distant locations.

TABLE 5.19: CHANGE IN TRIP LENGTH BY MODE FROM 2001 TO 2016 FOR WORKPLACES AND RESIDENTS IN THE EAST OF ENGLAND

				Trip Lengths (kms)	
Workplace in EE	Car	Bus	LU & Rail	Slow	Total
2001	14.2	8.7	15.4	1.9	11.8
2016 EE EG21 Scenario	13.7	9.2	26.3	1.9	11.8
Absolute change	-0.5	0.5	10.9	0	-0.1
% change	-3.50%	5.80%	71.10%	-0.90%	-0.60%
2021 EE EG21 Scenario	13.7	9.1	26.1	1.9	11.7
Absolute change	-0.5	0.5	10.7	0.0	-0.1
% change	-3.5%	5.3%	69.7%	-1.0%	-0.8%
Residence in EE	Car	Bus	LU & Rail	Slow	Total
2001	15.5	9.4	51.2	1.9	15.8
2016 EE EG21 Scenario	14.5	9.5	58.5	1.9	16.7
Absolute change	-1	0.1	7.3	0	0.9
% change	-6.60%	0.70%	14.30%	-0.90%	5.60%
2021 EE EG21 Scenario	14.6	9.5	58.9	1.9	16.8
Absolute change	-0.9	0.0	7.7	0.0	1.0
% change	-5.9%	0.4%	15.0%	-1.0%	6.2%

Note(s) : Excludes trips external to WSE.

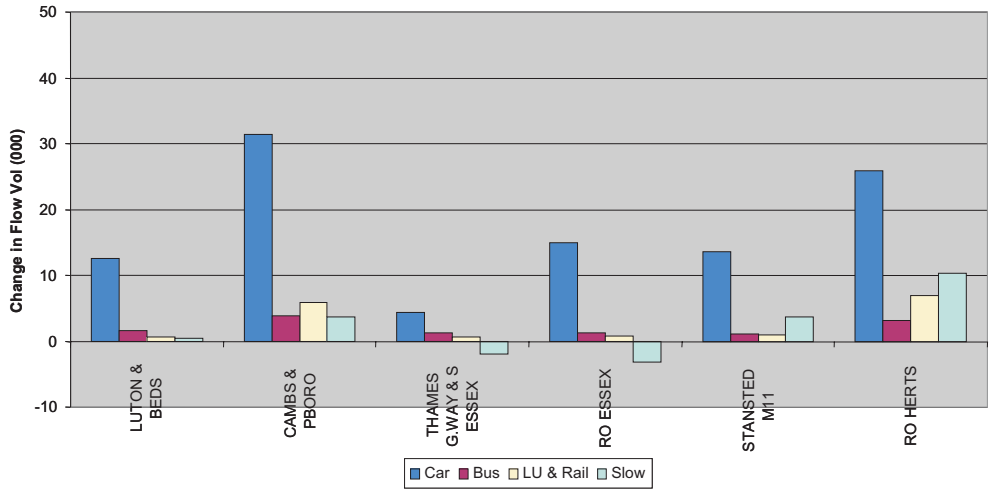
Because much of the past and the expected future growth in this region arises as a result of in-migration rather than of natural population growth, it is likely that future in-migration of residents would be influenced in part by perceptions of job availability. This could act to lessen the tendency for labour imbalances to increase into the future.

5.6.2 Changes in trip length by mode between 2001 and 2021 - RSS Scenario

This RSS Plan scenario run for 2021 provides an alternative scenario for the East of England to the EG21 scenario discussed in Section 5.6.1. The results here are directly comparable to those presented for the EG21 scenario for 2021 in Tables 5.15 and 5.16. The transport cost and time characteristics are identical in both scenarios, only the numbers and the location of residents and of workplaces differ between runs.

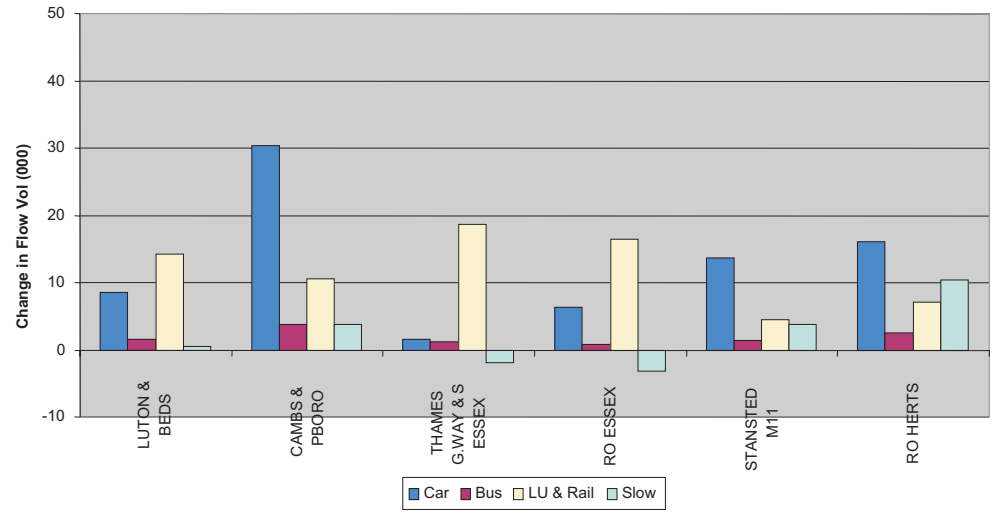
It can be seen, by comparing Table 5.21 with Table 5.15, that in the RSS scenario the total number of workplaces, 2.656 million, is in closer balance with the 2.853 million residents in the East of England, than was the case for the EG21 Scenario. By comparing Table 5.22 with Table 5.16 this lesser imbalance can be seen for residents of the region to lead to a reduction of 7% in their average distance travelled to work, from 16.8 to 15.6 kms. This is primarily due to a reduction in the longest-distance commuting by rail to London, trip lengths on modes other than rail reduced much less. The average trip length

FIGURE 5.7A: WORKPLACE LOCATION - CHANGE IN COMMUTER FLOWS FROM 2001 TO 2016 BY MODE IN THE EAST OF ENGLAND, EAST OF ENGLAND EG21 SCENARIO



Note(s) : Excludes external trips.
See text for the definition of the scenario.

FIGURE 5.7B: RESIDENCE LOCATION - CHANGE IN COMMUTER FLOWS FROM 2001 TO 2016 BY MODE IN THE EAST OF ENGLAND, EAST OF ENGLAND EG21 SCENARIO



Note(s) : Excludes external trips.
See text for the definition of the scenario.

TABLE 5.20: SECTOR DEFINITIONS FOR THE EAST OF ENGLAND CHARTS

Sector Name	Areas within sector
Luton & Beds	Luton, North Bedfordshire, South Bedfordshire, Mid Bedfordshire & Bedford
Cambs & Pboro	Cambridge, South Cambridgeshire, East Cambridgeshire, Huntingdonshire, Fenland & Peterborough UA
Thames G.Way & S Essex	Southend-on-Sea, Castle Point, Basildon, Rochford, Thurrock
RO Essex	Colchester, Tendring, Brentwood, Chelmsford & Maldon
Stansted M11	Epping Forest, Harlow, Braintree, Uttlesford, East Hertfordshire & Broxbourne
RO Herts	Dacorum, Hertsmere, North Hertfordshire, Stevenage, St Albans, Three Rivers, Watford, Welwyn, Hatfield

of workers in the region increased a little both for road and for rail trips, from 11.7 to 12.0 kms averaged over all modes.

Turning now to the changes in travel mode, Table 5.22 presents the overall travel statistics for the RSS Scenario for those working in and for those resident in the East of England. It can be seen by comparing Table 5.15 for the EG21 scenario against values in Table 5.22, that in the RSS Scenario the number of car commuting trips made either by residents or by workers of the region increases. However, a more complete picture is provided by the columns for kilometres travelled by car, which increase by 5% from 27.5 to 28.9 million person kms for those working in the region (partly because there are 2% more workers in the region) but reduce by 3% from 29.5 to 28.7 million person kms for

TABLE 5.21: CHANGE IN TRIP LENGTH BY MODE BETWEEN 2001 AND 2021 FOR WORKPLACES AND RESIDENTS IN THE EAST OF ENGLAND

				Trip Lengths (kms)	
Workplace in East of England	Car	Bus	LU & Rail	Slow	Total
2001	14.2	8.7	15.4	1.9	11.8
2021 East of England RSS Scenario	14.1	9.2	26.6	1.9	12.0
Absolute change	-0.1	0.5	11.3	0.0	0.2
% growth	-0.8%	6.1%	73.1%	-0.7%	1.7%
Residents in East of England	Car	Bus	LU & Rail	Slow	Total
2001	15.5	9.4	51.2	1.9	15.8
2021 East of England RSS Scenario	14.1	9.3	54.8	1.9	15.6
Absolute change	-1.4	-0.1	3.6	0.0	-0.2
% growth	-8.93%	-1.53%	7.02%	-0.80%	-1.52%

TABLE 5.22: ESTIMATED COMMUTER VOLUMES AND PERSON KILOMETRES BY MODE FOR 2001 AND 2021 BY WORKPLACE AND RESIDENCE FOR THE EAST OF ENGLAND. THE EAST OF ENGLAND RSS SCENARIO

Eastern workplaces	Trip volume (000s)					Person kilometres (million)				
(Exc. External)	Car	Bus	LU & Rail	Slow	Total	Car	Bus	LU & Rail	Slow	Total
2001	1783	104	22	409	2319	25.4	0.9	0.3	0.8	27.4
2021	2044	128	39	444	2656	28.9	1.2	1.1	0.9	32.0
Absolute change	261	24	17	35	337	3.5	0.3	0.7	0.1	4.5
% growth	14.65%	22.69%	77.62%	8.63%	14.55%	13.72%	30.21%	207.57%	7.78%	16.51%
Eastern residents	Trip Volume (000s)					Person kilometres (million)				
(Exc. External)	Car	Bus	LU & Rail	Slow	Total	Car	Bus	LU & Rail	Slow	Total
2001	1824	107	196	409	2536	28.3	1.0	10.1	0.8	40.2
2021	2029	128	251	444	2853	28.7	1.2	13.8	0.9	44.5
Absolute change	205	21	55	35	317	0.4	0.2	3.7	0.1	4.3
% growth	11.24%	20.11%	27.95%	8.62%	12.49%	1.31%	18.27%	36.94%	7.75%	10.77%

those resident in the region despite only a minimal difference between scenarios in the number of residents in the region.

To reconcile these numbers it is useful to examine the change in person kilometres by mode over a more complete area. For the RSS Scenario relative to the EG21 Scenario in 2021 for all workplaces in the Wider South East as a whole:

- Rail commuter travel reduces by 4% to 53.2 million person kms
- Road commuter travel increases by 0.5% to 98.8 million person kms. This is because the total number of workplaces in the Wider South East is 0.6% higher in the RSS Scenario than in EG21 Scenario, rather than because of an increase in car travel per person.
- Commuter travel on bus and by slow modes increases a little in the RSS Scenario.

5.7 Overall commuter travel results for 2016 under the Road User Charging Model Scenario

The main points of the road-user charging (RUC) strategy within the model are that distance-based charging has been implemented across the whole of the LASER area and on road links connecting the rest of Great Britain. The distance-based charges vary by levels of road congestion, as well as road type and geographic area. The charging rates (as shown in Table 5.23) are provided by the Department for Transport. Figures 5.8 (A-B) summarise the influence of the RUC strategy on person kilometres travelled in 2016 at the residence end of trips.

TABLE 5.23: DISTANCE-BASED CHARGES APPLIED TO LINK TYPES (PENCE/KILOMETRE 1998 PRICES)

Volume of traffic relative to road capacity	Road type	Central and Inner London	Outer London and conurbations	Urban areas (>10,000 population but not conurbation)	Rural areas (<=10,000 population)
Uncongested	Motorways and dual carriageways	-2	-2	-2	-2
0 to 0.25	Trunk and principal single roads	2	0	-1	-2
BAND 1	Urban B and C roads, rural B roads	5	1	0	-2
	Rural C roads, unclassified	11	1	-1	-2
	Motorways and dual carriageways	-2	-2	-2	-2
0.25 to 0.5	Trunk and principal single roads	5	1	1	-1
BAND 2	Urban B and C roads, rural B roads	20	5	5	0
	Rural C roads, unclassified	50	5	-1	-2
	Motorways and dual carriageways	-2	1	1	0
0.5 to 0.75	Trunk and principal single roads	11	11	1	2
BAND 3	Urban B and C roads, rural B roads	50	20	11	5
	Rural C roads, unclassified	50	20	0	-1
	Motorways and dual carriageways	-1	11	11	20
0.75 to 1	Trunk and principal single roads	50	50	50	20
BAND 4	Urban B and C roads, rural B roads	80	80	50	20
	Rural C roads, unclassified	80	80	20	20
Very congested	Motorways and dual carriageways	-1	20	20	20
Greater than 1	Trunk and principal single roads	80	80	80	50
BAND 5	Urban B and C roads, rural B roads	80	80	80	80
	Rural C roads, unclassified	80	80	20	50

The main patterns revealed during this analysis were that charging switches proportions of trip kilometres made by car to the bus and rail modes, with only marginal gains in slow-mode trip kilometres. Charging also has the effect of reducing the overall commuter distance travelled within the Wider South East.

A possible explanation for the strong gains in bus use is that it benefits from faster speeds brought about by reduced road congestion related to the RUC scheme. It is clear from Figures 5.8 (A-B) that these impacts occur to a similar extent in all of the plan scenarios considered. Differences in person kilometres travelled at this area wide strategic scale are only marginal between the individual scenarios.

5.8 Assessment of the approach

The commuter-flow model and its results that have been presented above are dependent on some assumptions that merit further consideration in terms of their likely bearing on the conclusions that can be drawn from these results.

First, as discussed in Section 5.3.2, the calibrated deterrence parameters have been retained and were unchanged between 2001 and 2016. There is some indirect (but not conclusive) evidence that increased job specialisation and other social changes may justify some reduction in these deterrence parameter values over time. It would be worthwhile to carry out a sensitivity test of the results if these deterrence parameter values were reduced. In general the effect of such a reduction would be to increase average trip lengths and the knock-on pressure on road and rail capacity. It would also have some impact in reducing the growth in slow modes and in bus travel, with some consequent small increase in the numbers using rail or car.

Second, the travel demand patterns are influenced by the particular assumptions that have been listed in the Reference Case transport infrastructure assumptions and policies in Appendix D. Changes to these assumptions, especially area-wide changes to future public-transport fare levels or to car costs, can have a major impact on the pattern of choice of mode and on overall trip lengths. The Road User Charging Model Scenario provides evidence of the scale of change in demand for commuter travel that can arise from a major area-wide cost change.

Third, the commuter-flow model draws heavily on existing outputs of the generalised cost of transport from runs of WSP's comprehensive LASER land-use and transport model of the study area. The use of LASER outputs has provided a cost-effective method of representing the complex networks of each mode across the whole region in both 2001 and 2016. However, in order to produce a more accurate measure of the impact of the forecast growth in commuting on the level of local road congestion and overcrowding in rail and LU in 2016, it would be necessary to interface the outputs from the commuter flow model to the LASER model. Such a two-way interface could be used to iterate the running of the two models until the network demand is in balance with the supply capacity on each road link and PT service. It would provide more accurate estimates of future commuting patterns by mode and would provide extra information on the key future bottlenecks and delays in the transport networks for each mode. The results reported here are based on generalised costs of transport drawn from a LASER run in which the spatial pattern of growth in jobs and households to 2016 will differ from any of the above four scenarios.

5.9 Summary conclusions from the results of the commuter flow model

A number of conclusions can be drawn from this commuter flow modelling exercise.

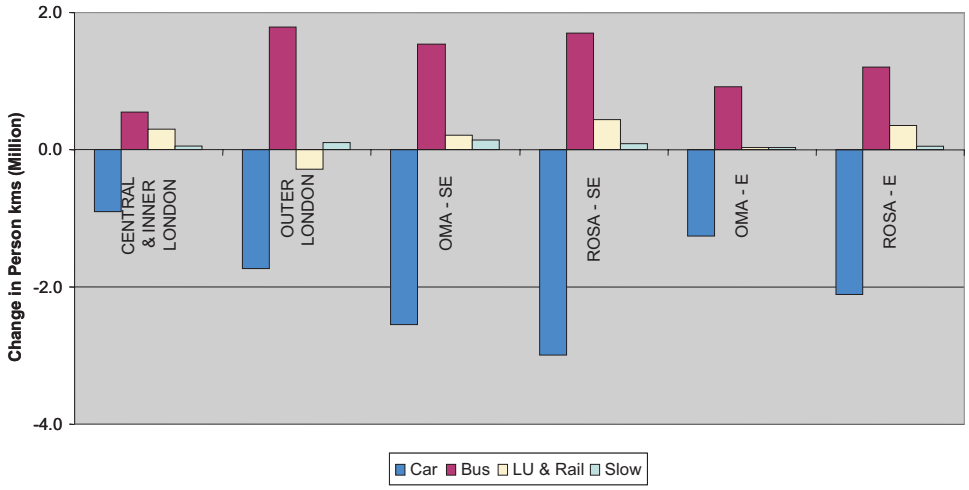
The modelling methodology has been successfully implemented, calibrated and then used to provide detailed forecasts of future patterns of commuter travel. Some recommendations on further developments and experiments have been outlined for the model in Section 5.8 above.

The analysis of existing commuter patterns has highlighted a number of important influences on commuting behaviour:

- Mode choice and trip lengths vary by: gender, working hours, industry type, occupation, location of residence and location of workplace.
- Of special importance is the overall balance within each industry sector between the number of workplaces and the size of the local resident workforce. The empirical analysis of current commuting patterns has highlighted its importance - the greater the imbalance, the longer the average commuter distance.

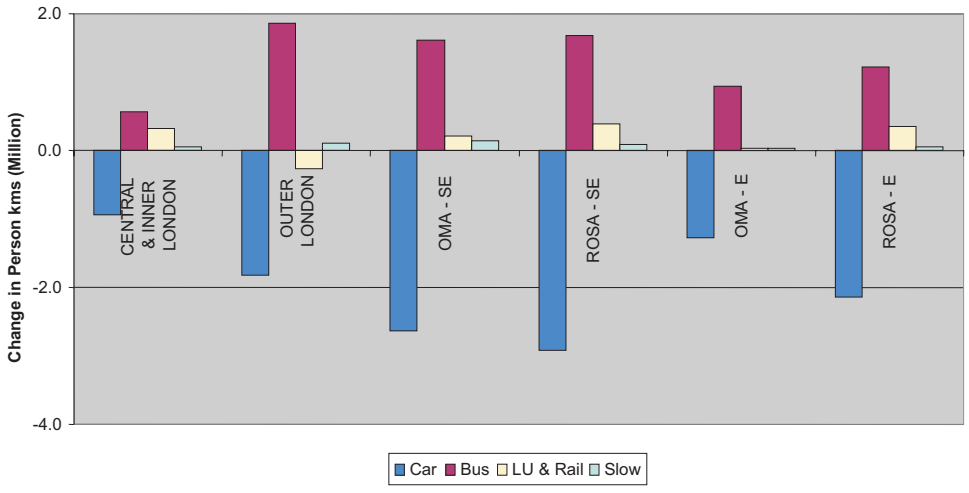
The important influence of the balance of home places to workplaces has been confirmed by the differences between regions in future patterns of growth in commuting demand as estimated by the model. For both the London Plan Scenario and the South East Scenario the ratio of the demand to the supply of labour in these regions has moved closer to unity

FIGURE 5.8A: RESIDENCE - CHANGE IN PERSON KILOMETRES FROM 2016 REFERENCE TO 2016 ROAD USER CHARGING MODEL BY MODE IN THE WIDER SOUTH EAST



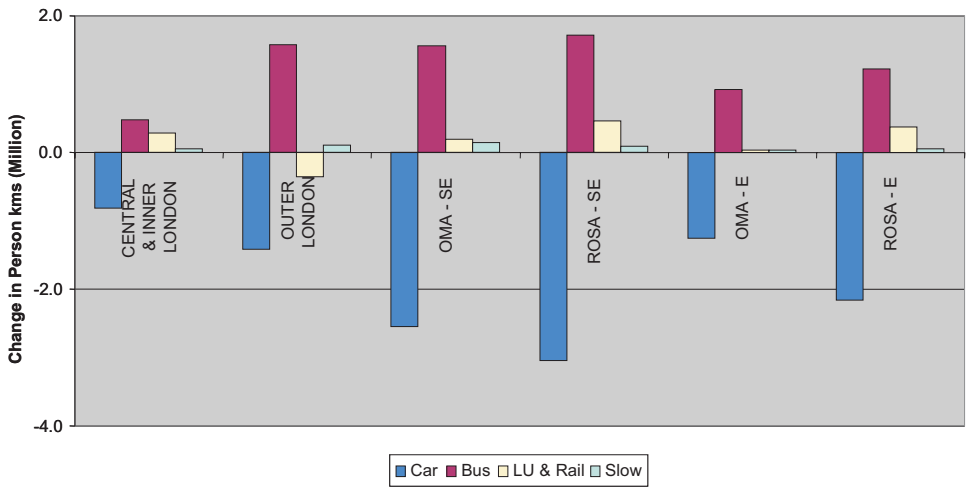
Note(s) : Excludes external trips.
Cambridge Econometrics Scenario.

FIGURE 5.8B: RESIDENCE - CHANGE IN PERSON KILOMETRES FROM 2016 REFERENCE TO 2016 ROAD USER CHARGING MODEL BY MODE IN THE WIDER SOUTH EAST



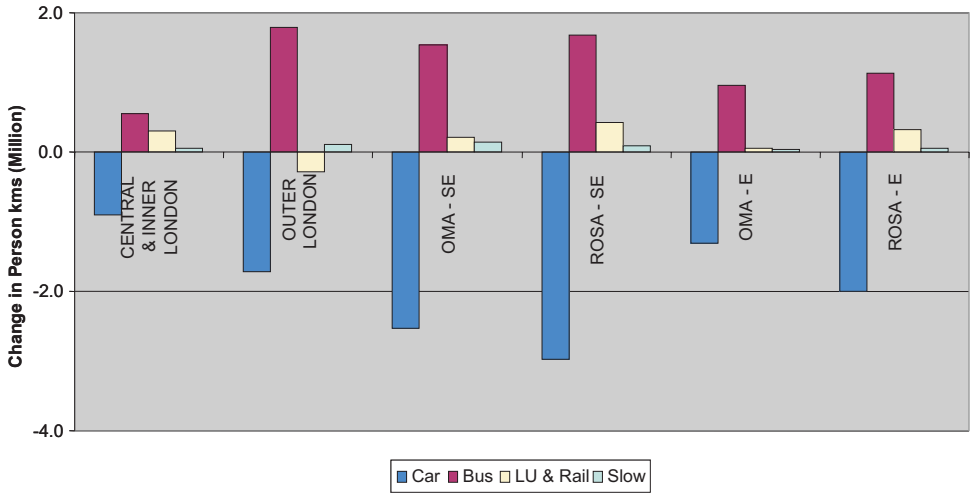
Note(s) : Excludes external trips.
South East SEEF Scenario.

FIGURE 5.8C: RESIDENCE - CHANGE IN PERSON KILOMETRES FROM 2016 REFERENCE TO 2016 ROAD USER CHARGING MODEL BY MODE IN THE WIDER SOUTH EAST



Note(s) : Excludes external trips.
London Plan Scenario.

FIGURE 5.8D: RESIDENCE - CHANGE IN PERSON KILOMETRES FROM 2016 REFERENCE TO 2016 ROAD USER CHARGING MODEL BY MODE IN THE WIDER SOUTH EAST



Note(s) : Excludes external trips.
East of England EG21 Scenario.

in 2016 relative to 2001. The resulting estimated average trip lengths have been little changed in London and have reduced for residents in the South East. This lessens the future increase in pressure on the capacity of the transport system in these regions. In contrast, in the East of England (EG21) Scenario the existing excess of resident labour force in this region has increased by 2016. This has resulted in a 6% increase in trip lengths for residents in the East of England region, leading to major growth in their commuter rail travel to the job-rich areas of Central and Inner London. In contrast there is minimal increase in rail trips from the South East region to London, other than those from Kent.

In terms of the modal pattern: for workplaces within London rail captures most of the growth whereas car kilometres actually decline for London residents. In contrast for workplaces outside London, car captures most of the new trips but with a reduced average trip length. There is also growth in rail passenger kilometres to workplaces outside London. Nevertheless, to workplaces outside London almost 90% of the passenger miles in 2016 continue to be by car.

6 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

The study team has established a common methodology (a doubly-constrained, origin-destination entropy model) and a database for estimating commuting flows into, out of, and within London and its neighbouring regions of SE England and East of England. This is based on data drawn from the recently published Census of Population 2001 workfiles, among other sources. The study team has successfully implemented, calibrated and then used this methodology to provide detailed forecasts of future patterns of commuter travel and to identify the commuting implications of certain policy, economic development and transport scenarios envisaged by 2016 and 2021. The approach embraces an understanding of past commuting flow change, and its spatial variation between 1991 and 2001 as driven by optimising behaviour on the part of individual households seeking to work and reside in particular districts of the wider South East. It has allowed the projections of commuting to 2016 and beyond to reflect the effects of a changing mix of costs of travel and changing opportunities for work in future periods. These projections embody the pattern of relationships seen in the past and assumed to continue - relationships between the occupational structure and skills arising, especially, from the sectoral composition of the London employment growth projections, and the skills and characteristics of the available workforce in London (taking planned housing development into account). Variant scenarios and sensitivity testing allowed for the growth of sub-regional employment centres outside London and the extent to which they may compete with London for (higher-order) labour. This also highlighted the relationship between locations of employment and housing growth, and public transport capacity inside and outside London. Variant development scenarios explored the extent to which development in the ODPM Growth Areas and other key sub-regions appears likely to change the strength of journey-to-work flows in those areas; and sensitivity testing explored the influence of major new transport infrastructure/capacity or highway management measures on commuting flows in the areas served.

Detailed analysis of the 2001 census workfiles finds:

- Males are more likely to commute long distances, whereas shorter trips are more prevalent among females.
- For a given journey length, females are more likely to travel by bus or on foot, whereas males are more likely to travel by bike or car
- Full-time workers have longer journeys than part-time workers.

In addition, there are differences by type of work and specific location:

- In all of the industry categories people travelling to the City and Westminster cover greater distances

- On average, those in higher-income occupations commute further than those in lower-income occupations and those in specialised occupations commute further than those in non-specialised occupations.

It is evident that there is an increase in the proportion of jobs that require specialised skills within the overall national economy and this is an important reason for the lengthening of journey-to-work distances. One possible driver for higher commuting rates is a local imbalance in the demand and supply of residence-based jobs. This is one explanation for the long travel-to-work journeys of those in South Essex, for example.

The report presents results compared across all growth scenarios for 2016 with the changes contrasted by region within the study area of the Wider South East. Scenarios based on the individual plans for each region are examined in greater spatial detail within the relevant region. Among the broad findings are:

- London had a 15% excess of workplaces over resident labour force in 2001. The projected percentage growth in the labour force resident in London is more rapid than the percentage growth in the numbers in employment in workplaces within London. This improves the workforce balance and so lessens the need for commuting into London from outside in all scenario projections to 2016. The London Plan Scenario includes the highest growth in workplaces and so implies the greatest expected net in-commuting volume.
- Within the South East there was a 5% excess of resident labour over workplaces in 2001. This imbalance had reduced from previous decades due in part to the rapid increase in recent years in employment in areas west of London. In each of the scenarios for 2016 the rate of growth of workplaces within the South East is greater than that of resident labour, so that the past excess of resident labour in the region has largely been cancelled out by 2016, and is broadly in balance with the numbers of workplaces there in all four scenarios, particularly within the South East Plan scenario.
- The East of England region had in 2001 an 8% excess of resident labour over workplaces, which is a higher rate than that in the South East. Both the Enhanced Growth and the CE scenarios exhibit more rapid growth in the resident labour force than in the workplaces within this region. This leads to an increase in the labour imbalance within this region, which implies a greater level of net out-commuting in 2016 than in 2001 from the East of England. In contrast, the labour imbalance is reduced in 2016 within the East of England RSS scenario.
- Over the Wider South East study area as a whole, in all future scenarios net in-commuting to the study area increases from its level of 1.4% in 2001. The greatest increase is to 2.1% in the London Plan scenario.
- In general there is not expected to be major change in overall trip lengths in any of the scenarios. Each has a small growth in part-time trip lengths and a small decline in full-time trip lengths. The net overall decline in trip lengths is least in the London Plan scenario. This represents a slowing of historic trend of significant growth in commuter trip lengths.

- The greatest absolute and proportional increase in the resident workforce is within the London region, which is also the region in which average commuting trip lengths in the 2001 Census are one-third less than those for residents in either the South East or the East.
- Although significant rail and underground capacity increases are included, the growth in demand for these modes due to population and job increases in urban centres is substantial, so that rail overcrowding to Central London is expected to be a significant issue in 2016.
- There are strong increases in the use of rail/LU by residents in almost all areas by 2016. The exception is for residents in the Outer Metropolitan Area of the South East, especially in the south west quadrant outside London, where the growth in local jobs reduces their need to commute into Central London. The number of trips by slow modes also increases significantly, because of increases in local job availability. This is also the case for London residents.
- In the Wider South East the overall commuter distance travelled by car decreases by 5% by 2016. There is a major, 31% increase in passenger kilometres by rail and LU and a 15% increase in bus kilometres.
- The South East Scenario has a greater proportion of its job growth in the outer part of that region than the other three scenarios. This shifts some of the car travel growth to workplaces in the region from the Outer Metropolitan Area out further to the rest of the South East and also offsets the decline in slow modes further out.

6.2 Recommendations

Any modelling of economic agents necessarily simplifies the true reality of those agents' behaviour. It is clear that some of the assumptions that have been made as bases for projections over ten years, while sensible and workmanlike, are likely to be severely tested by actual changes over the next twenty years, especially for such a complex phenomenon as commuting behaviour. In this sense the projections developed in this study should be treated with some caveats. While the team has explored scenarios and variants of infrastructure supply to undertake sensitivity testing, much of the underlying behavioural analysis is inevitably linked to factors infrequently or poorly observed, but that are evidently critical in driving decisions by households and firms. In this case the analysts had only limited access to detailed occupational and sectoral ONS data sources on travel to work behaviour. These are far from appropriate, timely and comprehensive. Data problems emerged throughout this project as ONS releases were delayed and there were changes in disclosure arrangements for the census workfiles. This meant that the fullest exploration of worker characteristics by occupations and sectors could not be linked to travel-to-work activity. It is recommended that pressure be exerted to enable a fuller release of cross-tabulated data from ONS that would better match the needs in calibrating the type of model used in this study.

APPENDIX A: DETAILED PRESENTATION OF SPATIAL PATTERNS OF COMMUTER TRAVEL

A1.1 Distance travelled to work by mode and gender (Residents)

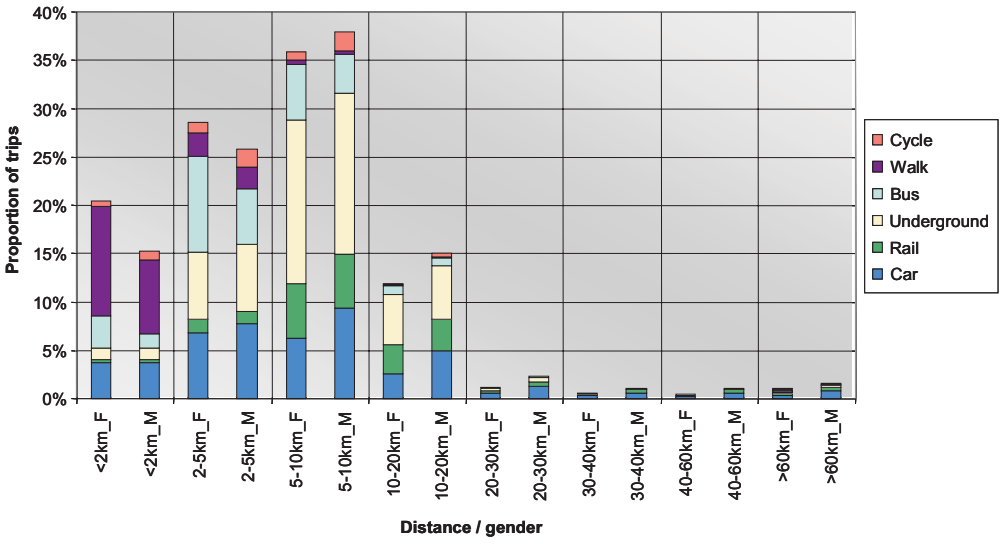
The graphs below reveal a variety of information specific to the part of the study area in question. Comparisons of mode preferred by gender and assessment of distances travelled to work highlight differences specific to the various area characteristics.

Common themes that can be picked out in most of the parts of the study area are: that a greater proportion of the trips by females tend to be short trips; and more females than males use bus as their mode of transport to work.

A1.1.1 Central & Inner London

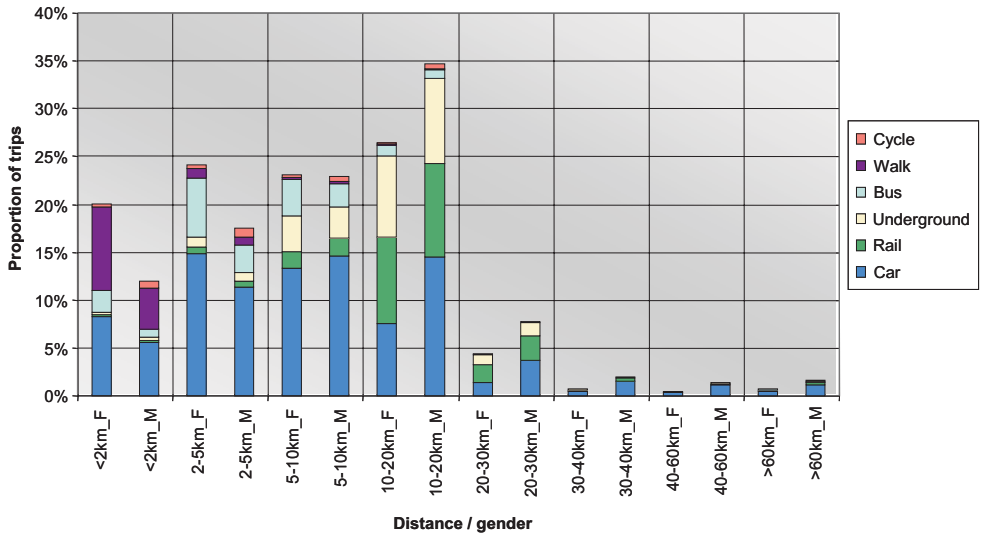
Very few residents in Central & Inner London travel over 20 kilometres to work. The majority of residents in fact travel less than 10 kms.The most popular mode for 5 to 10 kms trips is underground. Bus is the most popular mode for trips between 2 and 5 kms; bus is particularly favoured by female travellers. Car accounts for less than 10% of trips in all of the distance bands.

FIGURE A1.1: MODE AND DISTANCE BAND PROFILE FOR MALE AND FEMALE RESIDENTS OF CENTRAL AND INNER LONDON



Note(s) : Residence in Central and Inner London travel to work 2001: Distance travelled by gender and mode.

FIGURE A1.2: MODE AND DISTANCE BAND PROFILE FOR MALE AND FEMALE RESIDENTS OF OUTER LONDON



Note(s) : Residence in Outer London travel to work 2001: Distance travelled by gender and mode.

A1.1.2 Outer London

Residents in Outer London tend to favour car use, especially over comparatively short distances. In Outer London for both males and females, over 50% of trips to work below 10K use car. For trips in the 10 to 20 kms band, rail and underground are almost equally as popular as car.

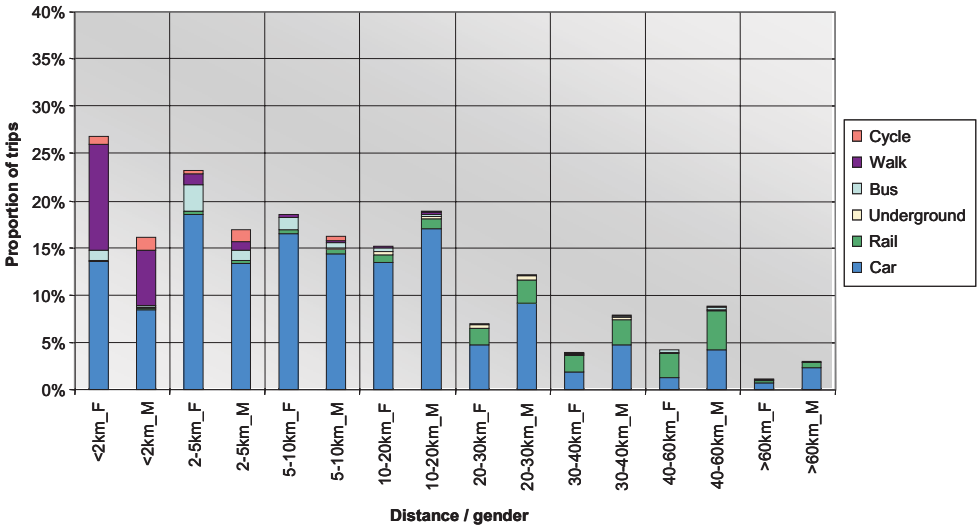
A1.1.3 Outer Metropolitan Area

Car is the predominant mode in the OMA beyond London. Only in the <2K band does walk come close to matching car in terms of modal proportion.The very low proportion of trips by bus and rail for bands <20K implies that the level of service cannot compete with car.Rail becomes an option for the longer distance trips >20K and is in fact the most popular mode for trips between 40 and 60K.The vast majority of these rail trips are to destinations in Central London.

A1.1.4 Rest of Wider South East

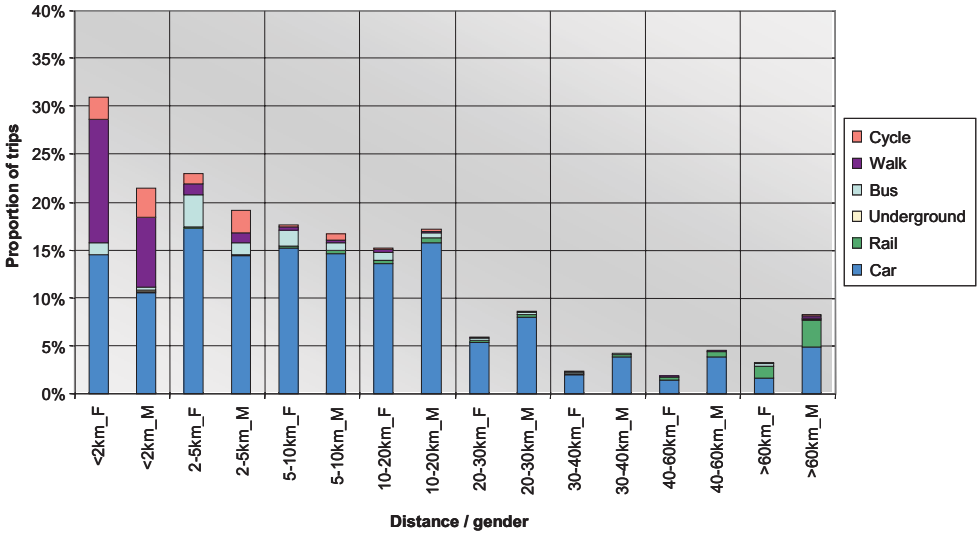
Car dominates in all except the shortest and the longest distance bands; other public transport modes have little or no usage in the Rest of the Wider South East. Only for trips >60K does rail have any significant share of patronage. Car remains the most popular mode choice even for the shortest trips, walk and to some extent cycle have a fair share of the trips <2K. As a mode, bus is most popular in the 2 to 5K band and is again more popular amongst females.

FIGURE A1.3: MODE AND DISTANCE BAND PROFILE FOR MALE AND FEMALE RESIDENTS OF OUTER METROPOLITAN AREA



Note(s) : Residence in Outer Metropolitan Area travel to work 2001: Distance travelled by gender and mode.

FIGURE A1.4: MODE AND DISTANCE BAND PROFILE FOR MALE AND FEMALE RESIDENTS OF REST OF WIDER SOUTH EAST



Note(s) : Residence in Rest of Wider South East travel to work 2001: Distance travelled by gender and mode.

A1.2 Distance travelled to work by mode and gender (Workplace)

Journey to work trips when analysed at the workplace end exhibit different characteristics to those analysed from the residence end. Since there are far more jobs in Central London than houses, it was important to differentiate between Central and Inner London as part of this analysis.

A1.2.1 Central London

Those employed in Central London are prepared to travel greater distances and have a lower propensity to travel by car than to any other part of the study area considered. Car has less than 5% of trips in all distance bands; even bus is more popular over shorter distances than car, which is not the case for any other destination of the study area. Rail is the dominant mode for both males and females for trips to Central London over 10K. For trips between 5 and 10K, underground is the most popular mode. Relatively few people travel <2K to work in Central London, and most of them walk. Substantial numbers of both males and females travel more than 60 kms by rail.

A1.2.2 Inner London

Trips to workplaces in Inner London are quite evenly spread across the distance bands <20K. The popularity of car is much greater than to Central London as one might expect, but the combined usage of rail, underground and bus is generally equal to or greater than car in all bands. The proportion of long trips (ie in each of the distance bands above 20K) is substantially lower than to Central London.

A1.2.3 Outer London

The popularity of forms of public transport other than car wanes for destinations in Outer London. The popularity of walk as the mode of choice for trips <2K continues. Bus is again more popular with women; bus only has a significant mode share for trips between 2 and 10K. Rail and underground have only a very limited number of commuter trip destinations in the Outer London region. These results are in marked contrast to the modal pattern of origins of commuting from Outer London.

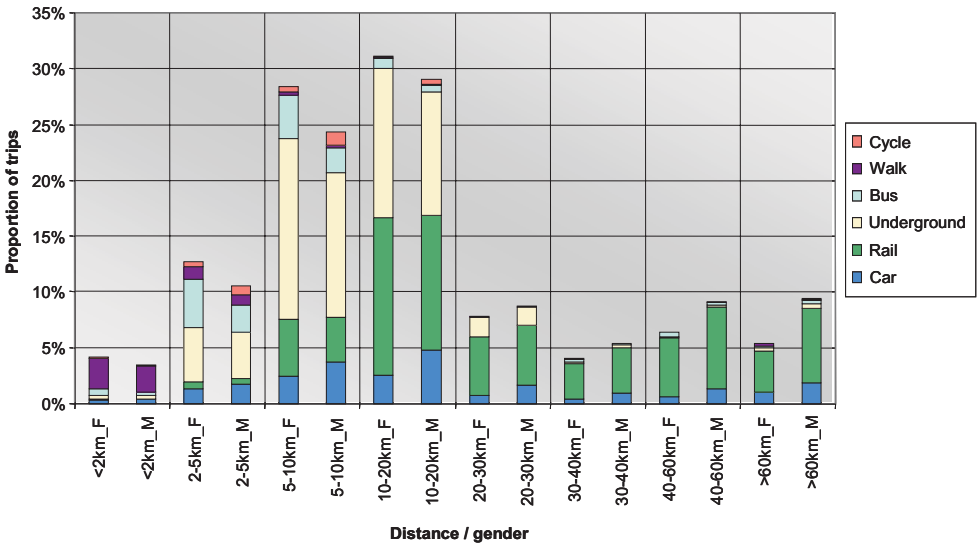
A1.2.4 Outer Metropolitan Area

Car is again the most popular mode by far in all except the shortest distance band. Walk is the next most popular mode but is significant only for trips <2K. The proportions of trips in the bands above 20K are higher than those for Inner or Outer London destinations but over the longest distances the proportions are well below those to Central London.

A1.2.5 Rest of Wider South East

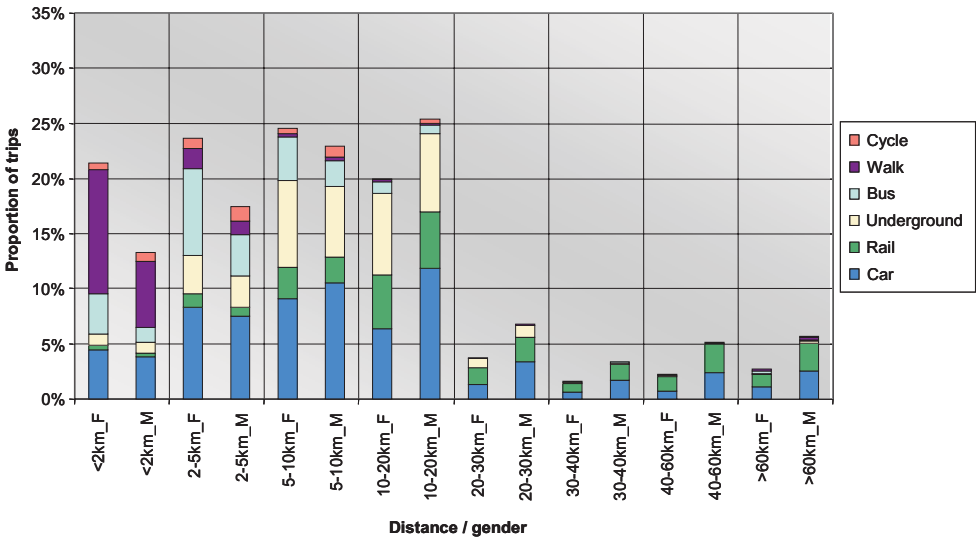
Car is again the most popular mode in all distance bands. Walk is the next most popular mode but only for trips <2K. Cycle has a higher mode share here than elsewhere in the Wider South East, but this is still quite small and is significant only for journeys less than 5K where it may be competing with bus. The proportion of long distance commuting is lower than in the OMA.

FIGURE A1.5: MODE AND DISTANCE BAND PROFILE FOR MALE AND FEMALE WORKERS IN CENTRAL LONDON



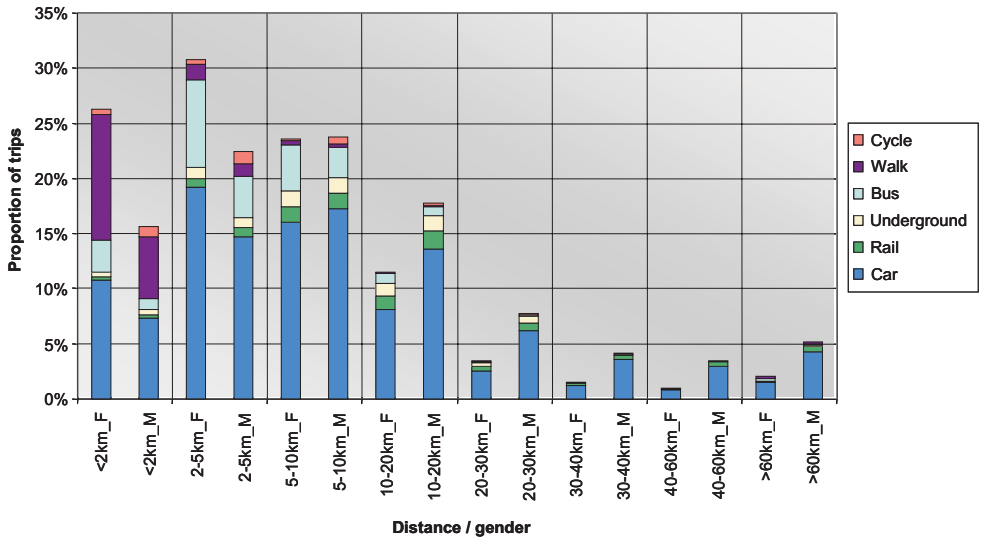
Note(s) : Workplace in Central London travel to work patterns. Distance travelled by gender and mode.

FIGURE A1.6: MODE AND DISTANCE BAND PROFILE FOR MALE AND FEMALE WORKERS IN INNER LONDON



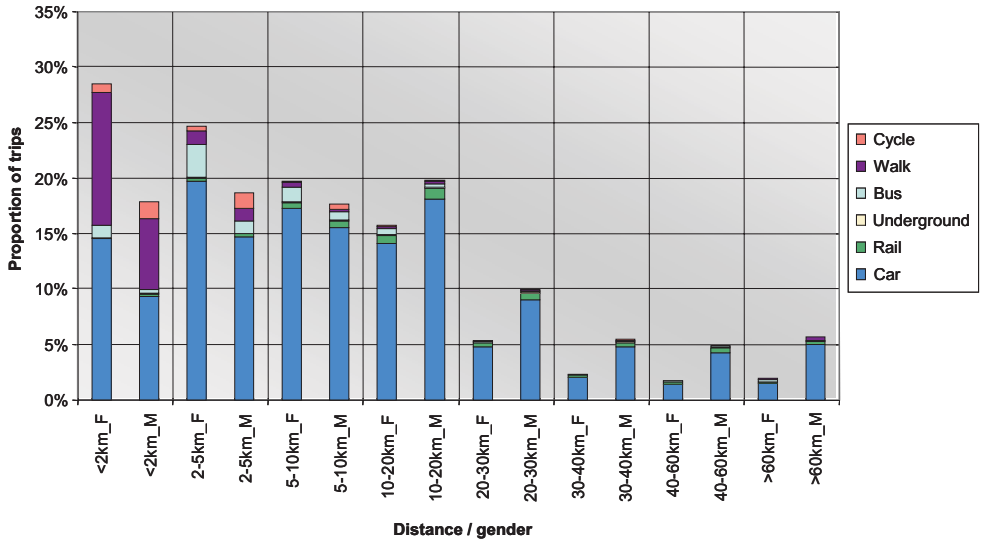
Note(s) : Workplace in Inner London travel to work patterns. Distance travelled by gender and mode.

FIGURE A1.7: MODE AND DISTANCE BAND PROFILE FOR MALE AND FEMALE WORKERS IN OUTER LONDON



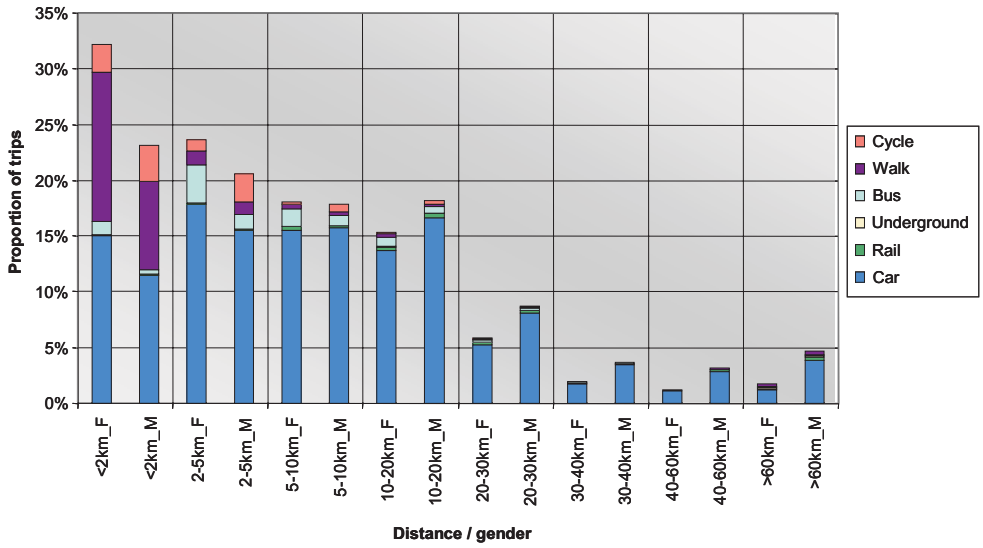
Note(s) : Workplace in Outer London travel to work patterns. Distance travelled by gender and mode.

FIGURE A1.8: MODE AND DISTANCE BAND PROFILE FOR MALE AND FEMALE WORKERS IN OUTER METROPOLITAN AREA



Note(s) : Workplace in Outer Metropolitan Area travel to work patterns. Distance travelled by gender and mode.

FIGURE A1.9: MODE AND DISTANCE BAND PROFILE FOR MALE AND FEMALE WORKERS IN REST OF WIDER SOUTH EAST



Note(s) : Workplace in Rest of Wider South East travel to work. Distance travelled by gender and mode.

A1.3 Trip Length Analysis by area

A1.3.1 Central & Inner London workplaces

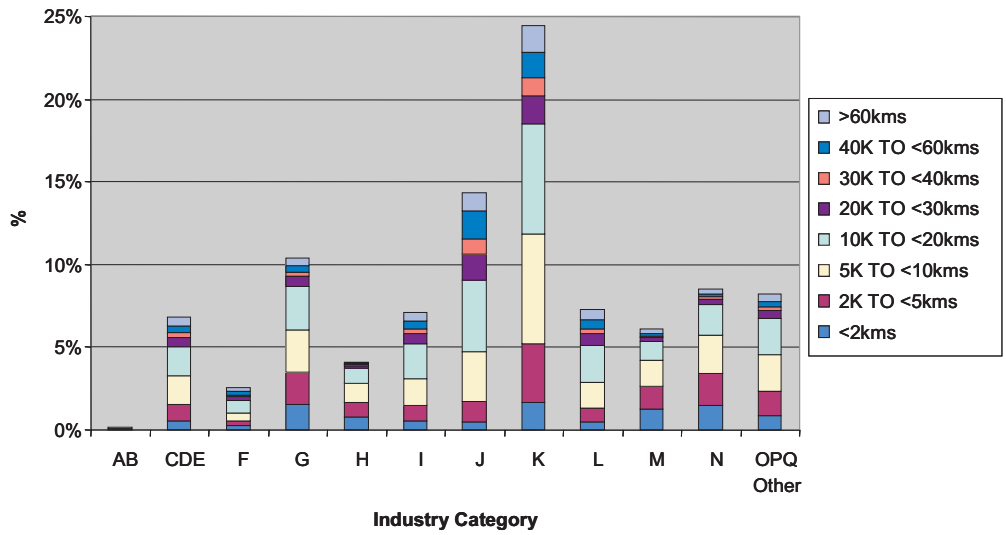
Chart A1.10 shows the proportion of people in each of the industry categories. The industry category with the greatest proportion of people is K - Real estate, renting and business activities. Of the 25% of people employed in this industry 1.7% travel <2K, 3.5% travel 2-5K and 6.7% travel 5-10K and so on, summing to 24.47% of people in industry K. Industry types CDE, G, I, L, M and N all have similar proportions of employees (between 5 and 10% of the labour force).

Trip lengths for any industry type tend to be clustered in the 2K to 20K distance bands.

A1.3.2 Outer London workplaces

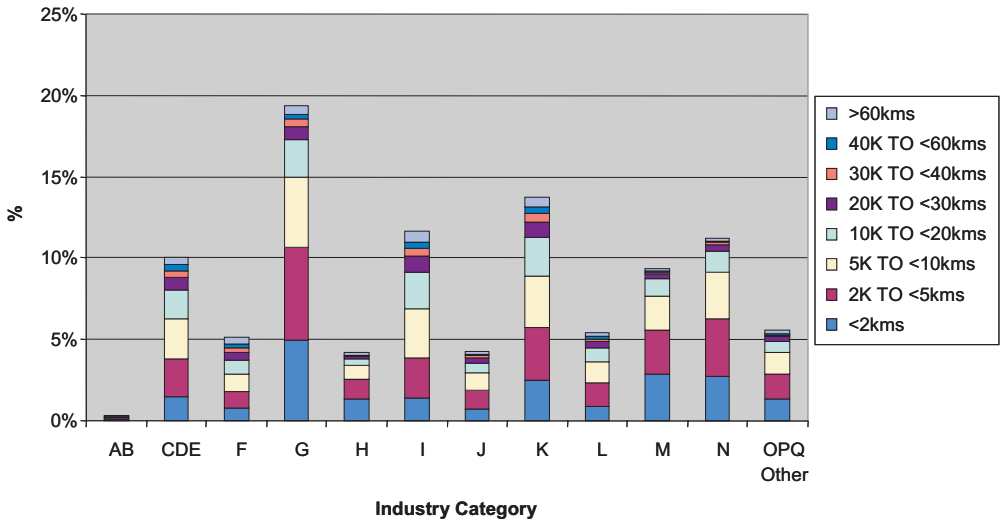
Outer London has a more even spread of jobs across the industry types, the greatest employer being the sector G, wholesale and retail. The real estate, K, has a much reduced share of the labour force in Outer London compared to Central London, but is still the second most popular industry category.

FIGURE A1.10: PROPORTION OF TRIPS BY INDUSTRY TYPE AND DISTANCE BAND FOR RESIDENTS IN CENTRAL & INNER LONDON



Note(s) : Inner & Central London distance travelled to work by industry type, 2001.

FIGURE A1.11: PROPORTION OF TRIPS BY INDUSTRY TYPE AND DISTANCE BAND FOR RESIDENTS IN OUTER LONDON



Note(s) : Outer London distance travelled to work by industry type, 2001.

A1.3.3 Proportion of trips below 40 kms

The maps in Figure A1.12 show the spatial differences in the proportion of long trips between the residence and workplace end. For each district or borough the percentage of trips that are less than 40 kms is presented. The vast majority of Inner London residents travel less than 40 kms to work. The number of residents travelling more than 40 kms increases in the Outer Metropolitan Area, where the greatest proportion of residents are prepared to travel more than 40 kms to work. The highest proportions of residents travelling more than 40 kms to work are those from Essex and to a lesser extent Kent, where the shortage in the number of suitable jobs available means that residents have further to travel to their job.

The second map uses the same scale to present trips from the perspective of the workplace rather than the residence end. It is possible to see from the inset for Inner and Central London that more than 10% of those people working in Central London itself travel more than 40 kms, but that the proportion of long trips to most wards in the rest of Inner London is much lower, except around Docklands. It is apparent that most employment centres within the South East and East have a work force within 40 kms of their establishments. However, workplaces along the M4 Corridor and Berkshire attract employees from a little further afield, as do those in Cambridgeshire and around the airports at Heathrow, Gatwick and Stansted.

For the most part the colours in the two maps tend to be the reverse of each other. In general those areas that are rich in jobs will suck in labour from a long distance away, whereas those that are relatively low in jobs will disperse their resident labour force to more distant locations that have a surplus in jobs. The contrasting switch in colours between maps for of the job-rich area just to the west of the M25 as compared to the job poor areas to the north and east of Essex illustrate this pattern.

The clear exception to the switch in colours between maps is for the Uttlesford district in which the rapidly growing Stansted airport is located. The labourforce/workforce balance in an area ideally should be able to match the number of jobs within each employment type/income category with a similar number of houses of each quality/price level. However, in Uttlesford the newly created airport-related jobs are of limited relevance to the existing labour force, many of whom are managerial/ professionals who commute to Central London. In turn, the high house prices caused by the high quality and the limited overall supply of housing in Uttlesford make it difficult for low-income workers to live close to their jobs at the airport. Consequently, Uttlesford is somewhat distinctive in that it has very long journey to work trip lengths for both the residents and the workforce in the district. It is the local imbalance between the *types* of jobs and the *types* of housing available that encourages this high commuter travel demand there. In South Cambridgeshire and in the west of the M4 corridor other areas with high proportions of long commuter trips for both the residents and the workforce are found.

FIGURE A1.12A: PERCENTAGE OF JOURNEY TO WORK TRIPS LESS THAN 40 kms FOR WORKPLACES IN THE WIDER SOUTH EAST

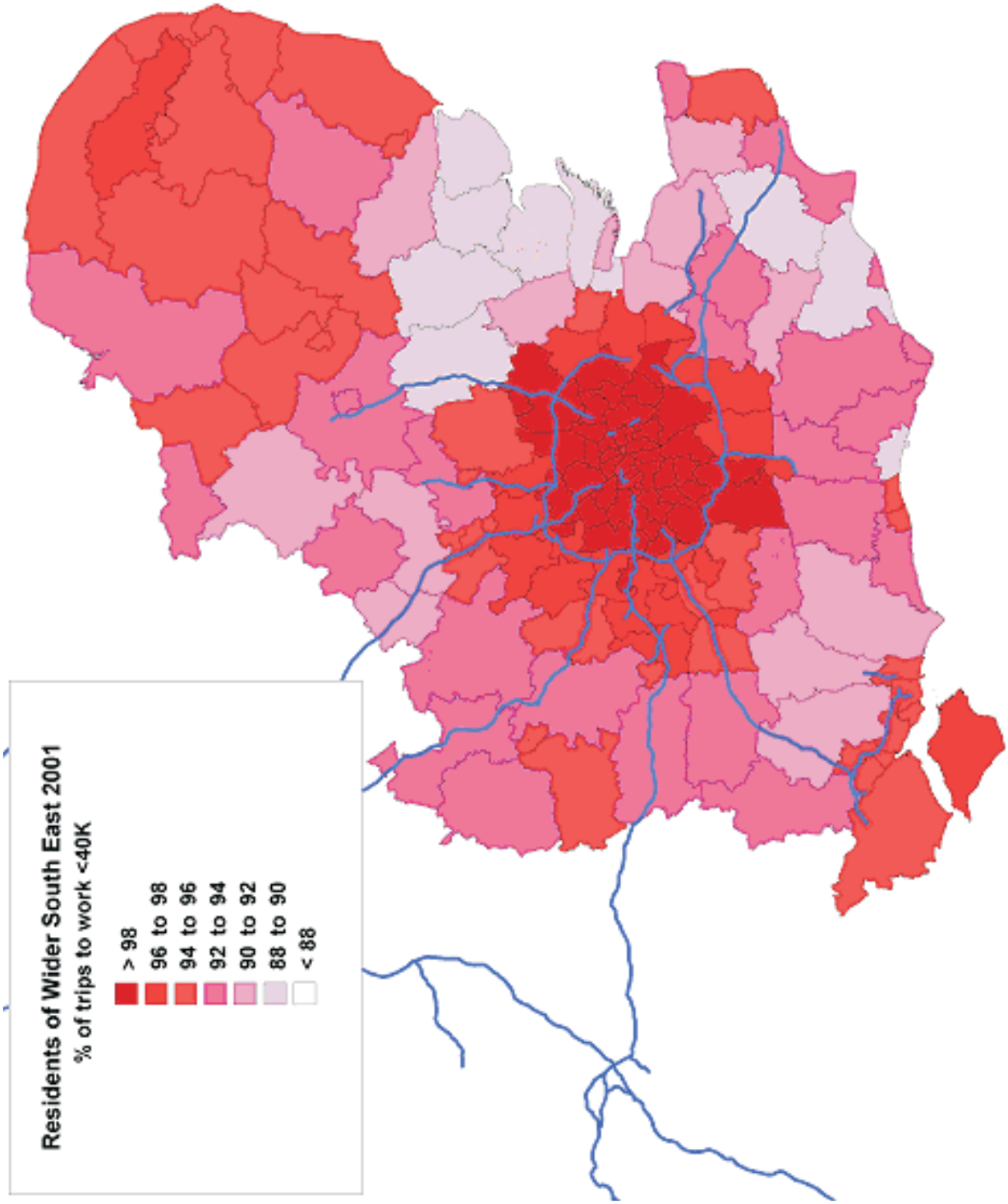
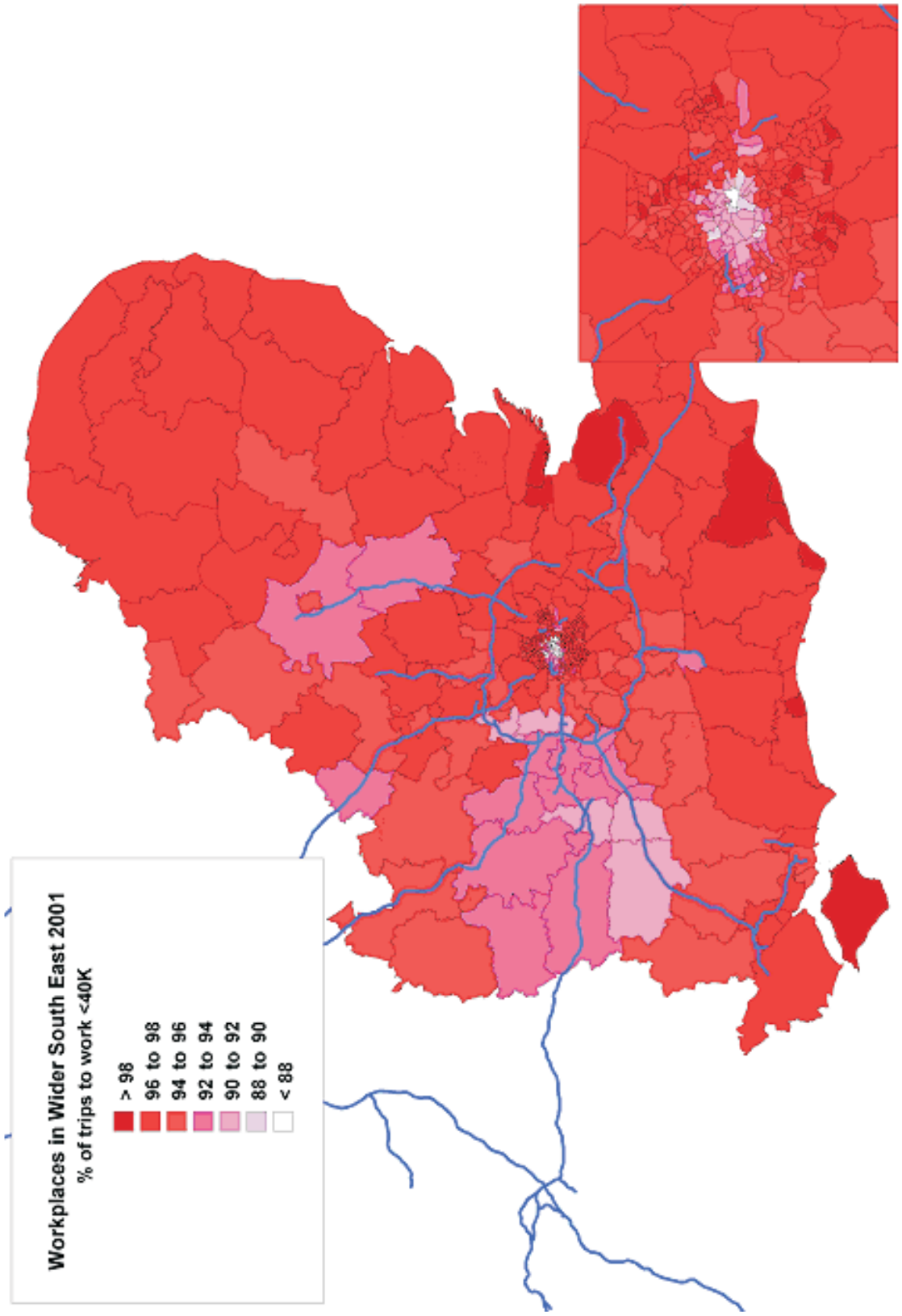


FIGURE A1.12B: PERCENTAGE OF JOURNEY TO WORK TRIPS LESS THAN 40 kms FOR WORKPLACES IN THE WIDER SOUTH EAST



A1.4 Comparison of average trip length, 1991 to 2001

The average crow-fly distance travelled to work, at both the residence and the workplace end, was calculated using the following methodology. This average trip length was calculated for each zone and was subsequently mapped as shown below.

Each distance band defined by the Census was assigned an assumed standard trip length for that particular band:

TABLE A1.1: ASSUMED LENGTHS OF CENSUS DISTANCE BANDS

Distance band (kms)	Length (kms)
<2	1.5
2 to 5	3.3
5 to 10	8
10 to 20	14
20 to 30	23
30 to 40	33
>40	50

The number of trips in each band was multiplied by the average distance ascribed to that category to give a total distance travelled by those in that band. These total distances were summed to give an overall total distance travelled by all persons. The total number of trips in each district was calculated; then the average trip length in each district was calculated as: total distance travelled, divided by the total number of trips. This was carried out for the 1991 Census using the SWS Tables A4 and B4 and for the 2001 Census using the tables ST121 and ST129.

A1.4.1 Workplace end

In 1991 Figure A1.13 demonstrates that the longest trip lengths are in Central London; other areas having longer than average trip lengths are the districts containing airports and Newbery/West Berkshire. Most other districts have average journey lengths below 10 kms. Contrasting the colours between the two years shows that by 2001 average trip lengths have generally become longer across the study area. An example of this is in the A1/M11 corridor and the M4 corridor through Berkshire and the Home Counties.

The separate map of Inner London in Figure A1.14 shows that specific wards contribute heavily to the average trip length of their constituent districts; this is particularly true of the district containing Canary Wharf. The map also shows that the long average trip lengths to the rest of Inner London are more of a spillover from the wards just outside the City and Westminster and in Docklands, rather than being typical of the remaining parts of Inner London, which tend to have relatively short trip lengths.

A1.4.2 Residence end

Figure A1.15 shows that in 1991 many of the workforce tended to live within 6 kms of their workplace. At the residence end, larger cities such as Southampton, Portsmouth, Brighton, Ipswich, Cambridge, Norwich and Reading all appeared to be quite self sufficient attracting most of their resident employees from <6 kms away in 1991. By 2001, residents are travelling greater distances than in 1991. In particular, the people living in the cities mentioned above generally tend to be travelling slightly longer distances than before.

FIGURE A1.13A: AVERAGE JOURNEY TO WORK DISTANCE BY DISTRICT OF WORKPLACE, 1991

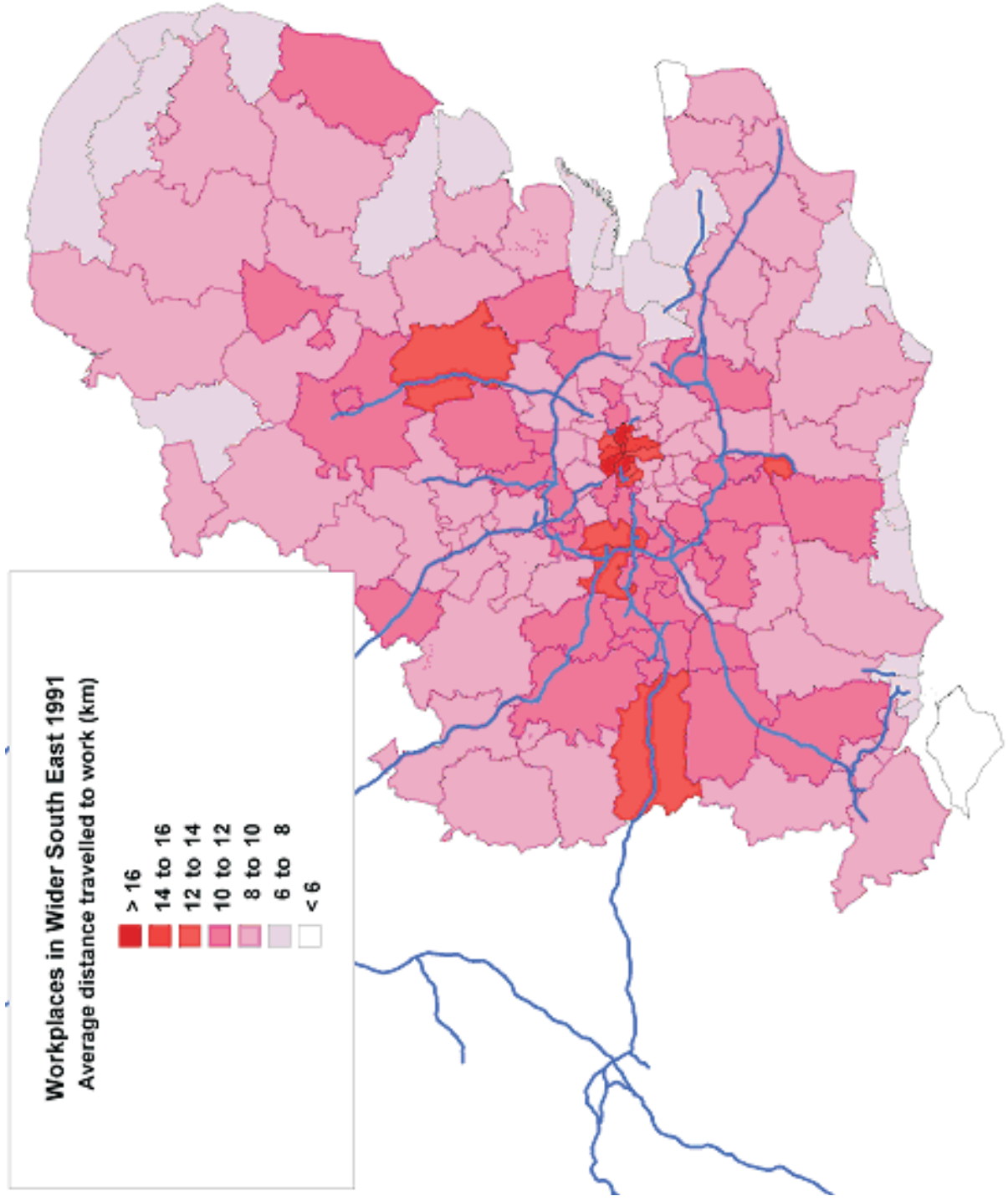


FIGURE A1.13B: AVERAGE JOURNEY TO WORK DISTANCE BY DISTRICT OF WORKPLACE, 2001

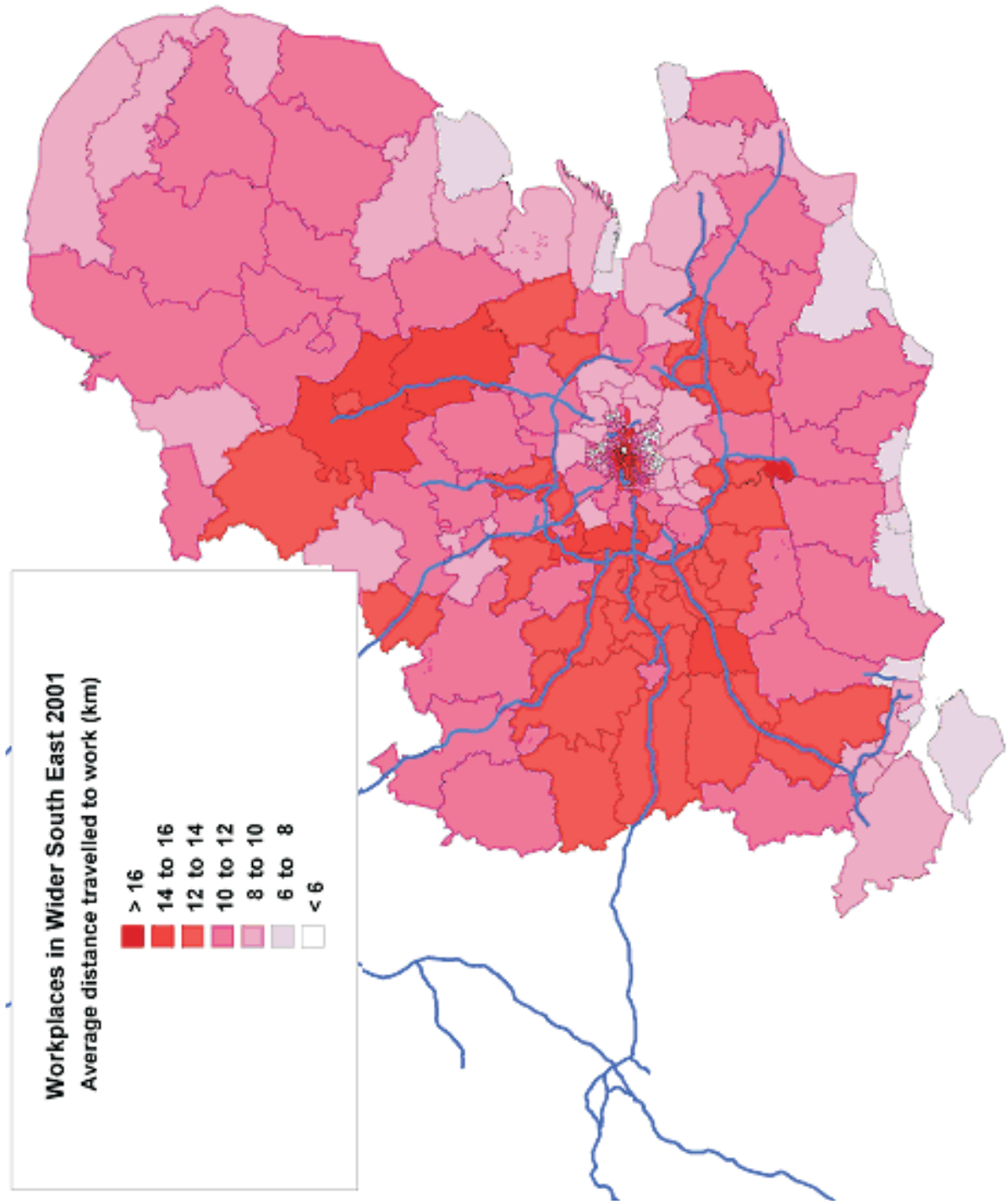


FIGURE A1.14A: AVERAGE JOURNEY TO WORK DISTANCE BY DISTRICT OF WORKPLACE IN LONDON, 1991

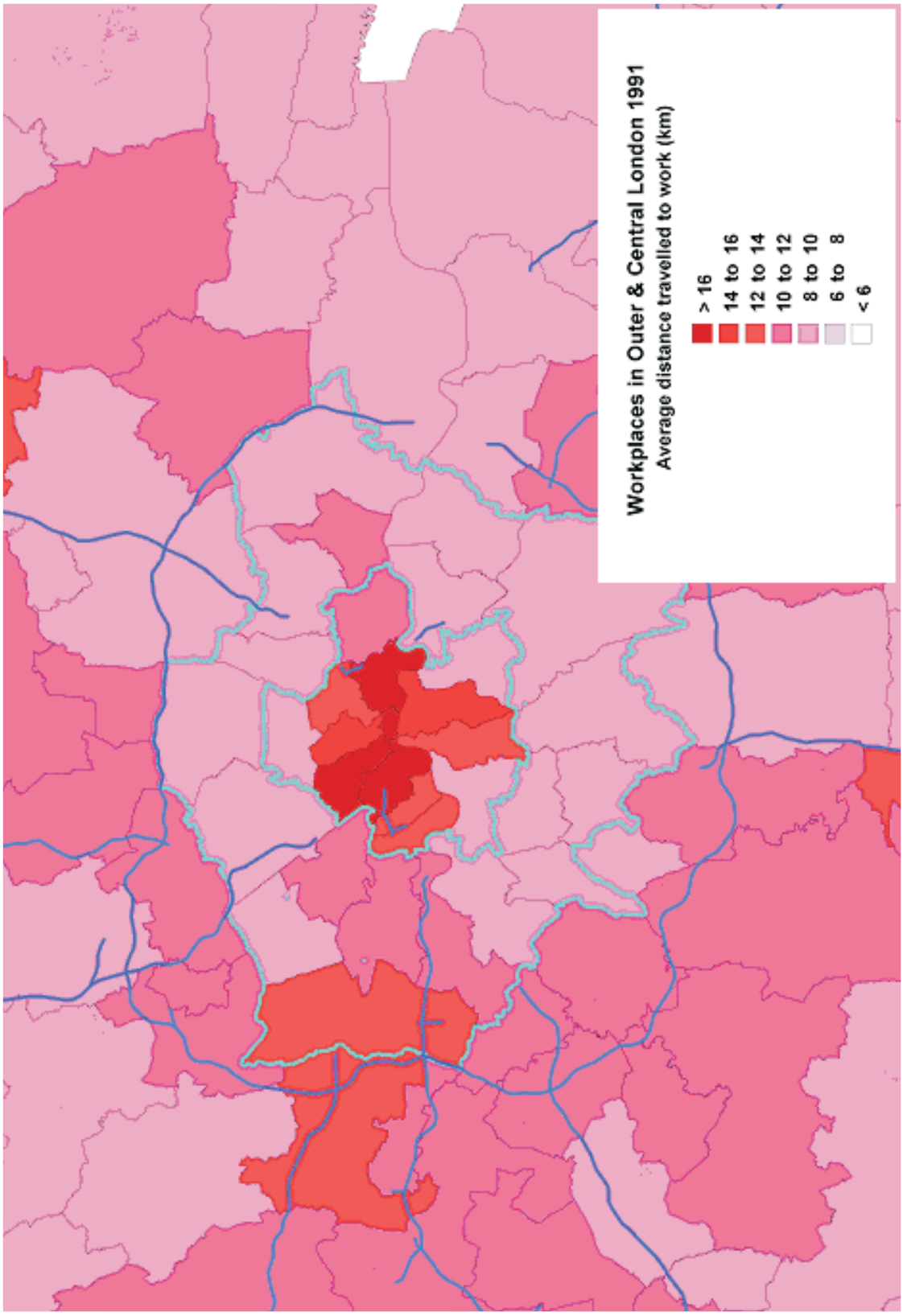


FIGURE A1.14B: AVERAGE JOURNEY TO WORK DISTANCE BY DISTRICT OF WORKPLACE IN LONDON, BY WARD IN INNER LONDON, 2001

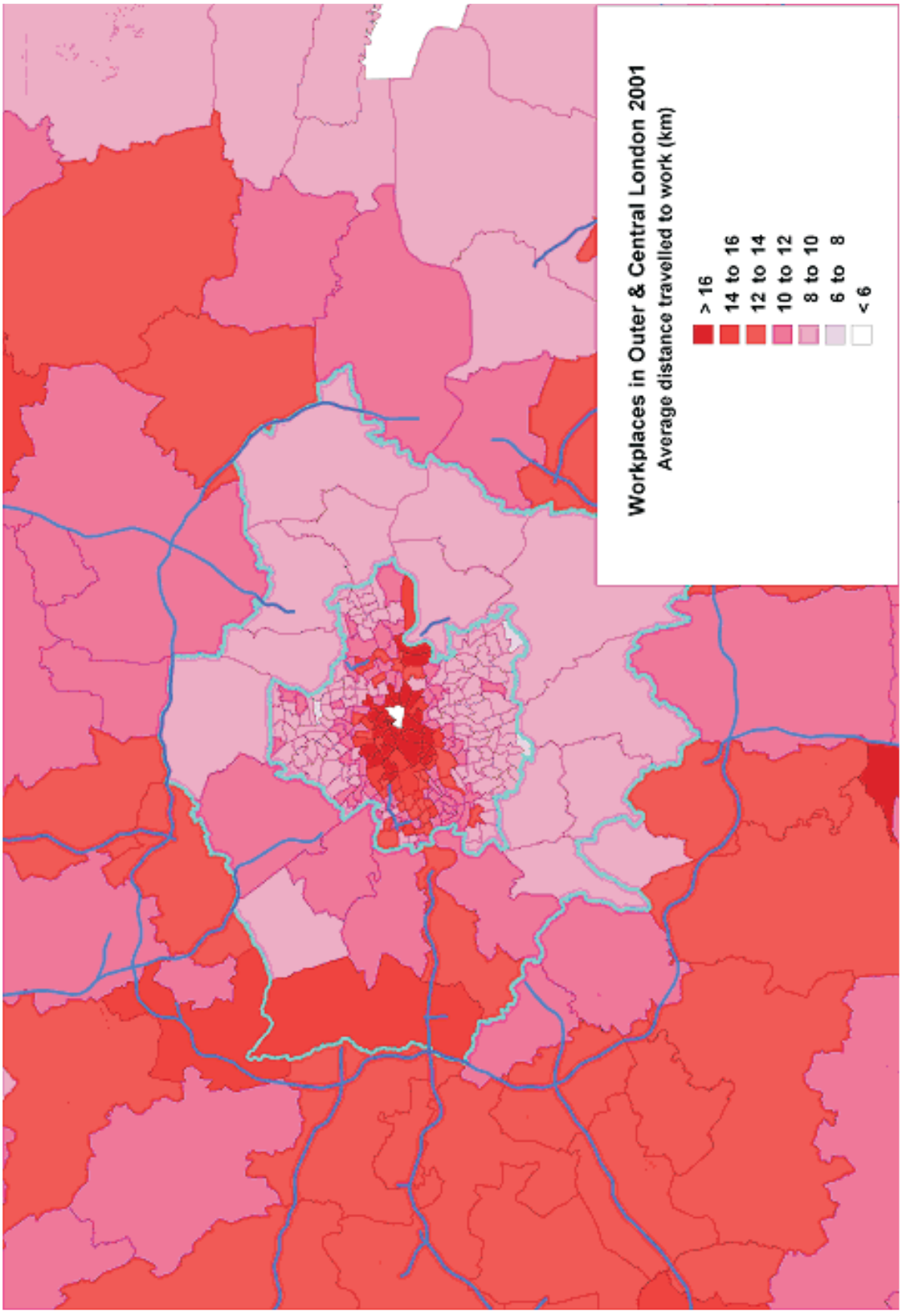


FIGURE A1.15A: AVERAGE JOURNEY TO WORK DISTANCE BY DISTRICT OF RESIDENCE, 1991

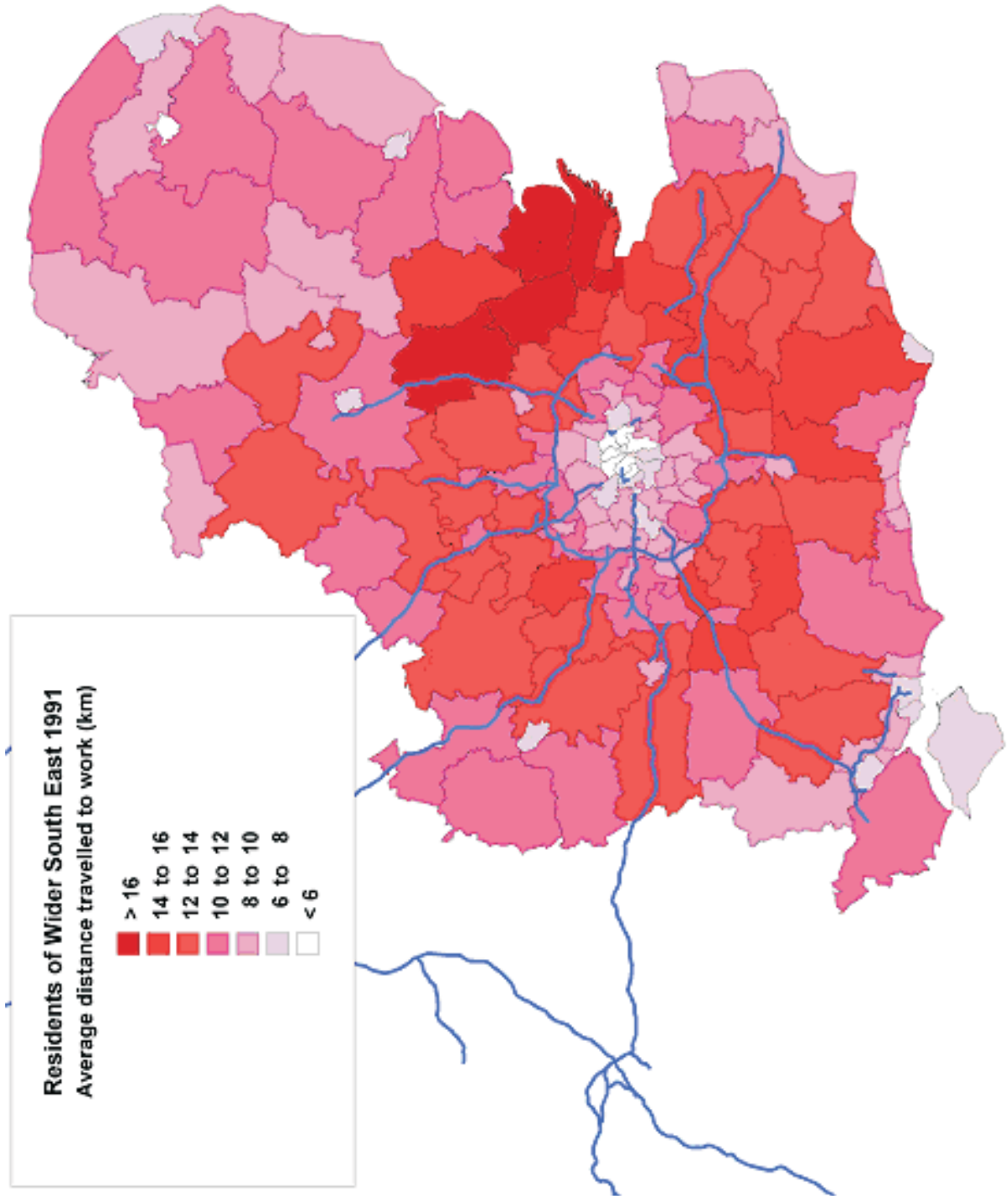
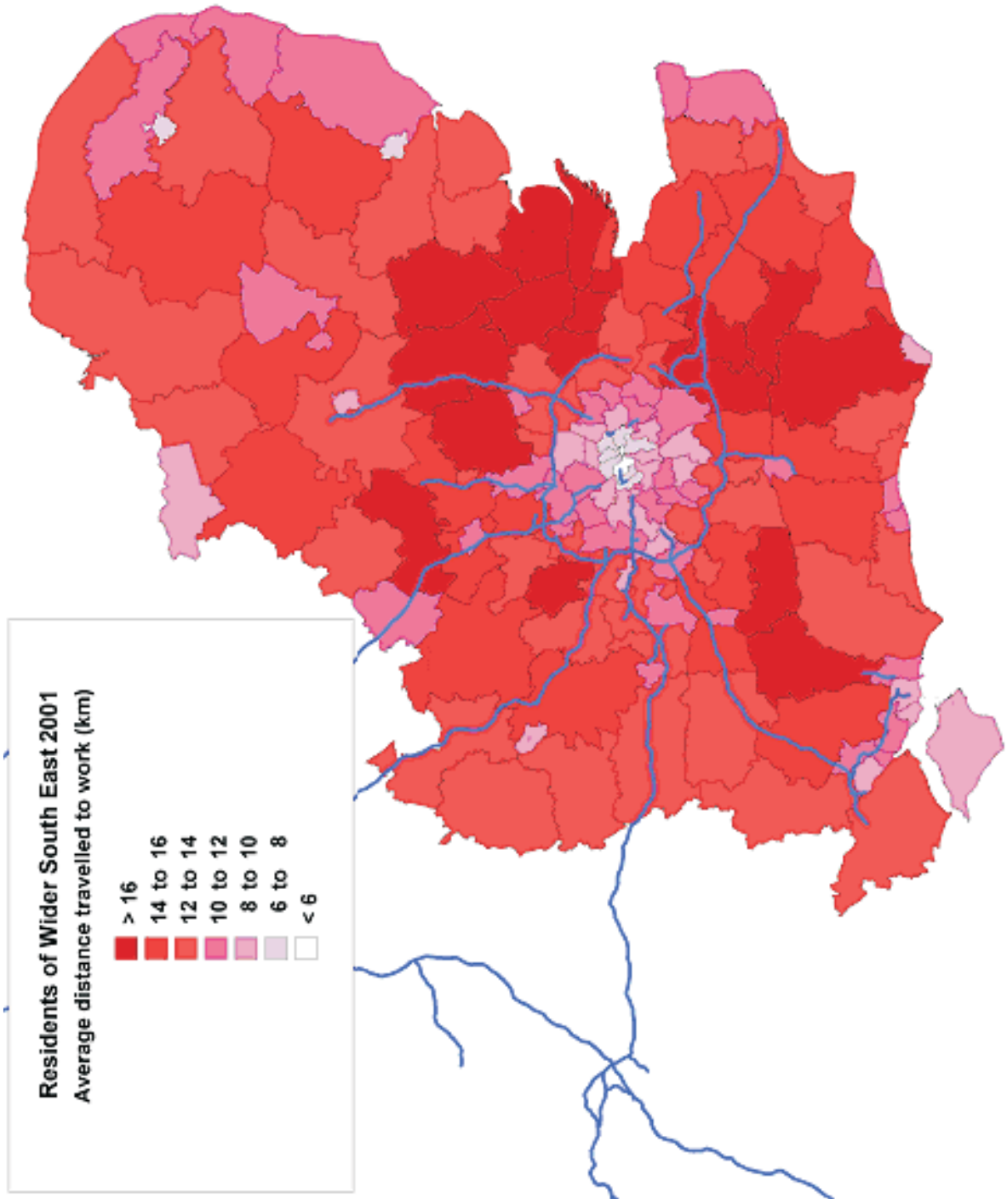


FIGURE A1.15B: AVERAGE JOURNEY TO WORK DISTANCE BY DISTRICT OF RESIDENCE, 2001



APPENDIX B: METHODOLOGY AND IMPLEMENTATION OF THE COMMUTER FLOW MODEL

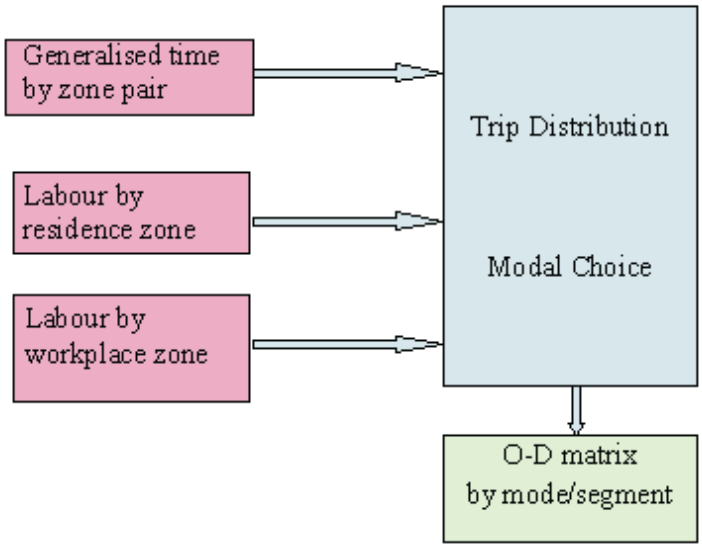
This Section outlines the structure of the commuter flow model component. The model of commuting flows has been implemented and calibrated for the base year of 2001, because this is the year for which comprehensive Census data is available.

The primary inputs to this commuter flow model for each distinct segment of the workforce are shown in Figure B1 as:

- the supply of labour by segment by residence zone for the year *t,*
- the demand for labour by segment by workplace zone for the year *t*,
- a matrix of the generalised time of journey to work travel between zone pairs for the year *t.*

Each of these inputs is now discussed further, along with other information on aspects such as the zoning system and the segmentation.

FIGURE B1: DATA FLOWS FOR THE COMMUTER FLOW MODEL FOR A GIVEN YEAR



B1.1 Zoning system and study area

The study area for the model comprises the three standard regions of London, the South East and the East of England as presented earlier in Figure B1. Some external zones outside this area are also defined so as to represent major commuter movements to or from this study area.

The zoning system used within the Commuter Flow Model is generally at the local authority district/borough/UA level (hereafter referred to collectively as "districts"), though close to and within London a finer zoning system is adopted in order to identify the main employment concentrations that are accessed by specific major future rail schemes such as CTRL, Crossrail and Thameslink 2000. In particular, it is necessary to sub-divide the Inner London boroughs in order to identify the areas of Central London and Docklands explicitly. In the parts of the South East and Eastern regions most distant from London, some districts are aggregated together to lessen the overall size of the model. However, the urban centres, which typically have good rail access to London, are kept separate from rural districts with lower density settlements and poorer rail connectivity.

This approach provides a convenient zoning system that has been designed to match to that of the existing LASER land-use/transport model. It facilitates the use of matrices of generalised time of transport that have been produced by the network based transport model component of LASER. This increase in spatial detail, above what was originally requested in the call for tenders, is primarily to maximise the realism of the representation of the local supply of transport. It does not imply that the zonal forecasts of resident labour and of workplaces operate at this finer level of spatial detail – they are estimated only at the district level.

We use the LASER zoning system throughout the Commuter Flow model. The LASER zoning system is based originally on the 1991 ward system; some minor adjustments have been made to it in order to match it to the Census 2001 wards from which the pattern of commuter movements are derived.

B1.2 Location data and segmentation

The labour markets and the resulting commuting flows have been segmented in three dimensions in order to ensure that there is a satisfactory degree of homogeneity in travel patterns within each segment. This provides an explicit representation of the major differences between segments that are observed for average trip lengths and for the spatial locations of supply and demand. The segmentation detail adopted has been based on achieving a suitable balance between data availability, model size and model precision.

The segmentation uses 48 distinct segments that were chosen based on the analysis presented in Chapter 1. They comprise the combination of the following three characteristics:

- **Industry Type** (12 aggregate codes for Standard Industrial Classification (SIC 92), Sections A,B to O,P,Q). The 2001 Census provides data at the local authority

district/borough level: in the Standard Table S039 for persons in employment, segmented by Industry by Occupation (but not by Sex) at their **residence** location; and in the Standard Table S132 for persons in employment, segmented by Industry by Occupation by Sex at their **workplace** location. ONS decided that this Table S132 would only be published at the district/borough level but not at the finer ward level of spatial detail that they had originally specified.

- Gender (2) – males on average travel further to work than females.
- Full or Part-time employment (2) – full-time employees travel further on average to work.

Consideration was also given to further segmenting this data by car ownership/availability. However, the form in which ONS currently publishes the tables of journeys to work does not facilitate any analysis of commuting behaviour that is jointly segmented by car ownership with either industry type or the part/full-time employment split. Given the obvious importance of these latter two segmentation dimensions as demonstrated by Figure 1.6, it appeared appropriate to retain them, which in turn implied that the car ownership dimension would have to be dropped.

In any case, our analysis of car-ownership patterns suggested that its influence on modal patterns of commuting appears to have settled down in more recent years. The vast majority of those commuting to Central London by rail from outside London are from car owning households. In 2001, relatively few employed households in the Wider South East outside London do not have at least one car. Outside London the non car-owning households are mainly the households without employees, particularly the retired households. Within London, growth in car ownership rates stagnated between 1991 and 2001 and as we saw in Figure 1.9 the proportion of London's residents commuting by car decreased by 5 percentage points between 1991 and 2001.

B1.3 Formulation of the Commuter Flow Model

The Commuter Flow model comprises two components:

- A doubly constrained trip distribution model that estimates the overall matrix of commuter flows between pairs of zones based on the generalised time of transport.
- A logit discrete choice model that subdivides these flows into the main modes used between each zone pair.

The journey to work matrix, segmented by Industry (SIC 92) *n*, gender *g*, full/part-time employment *e,* for residents in zone *I* who work in zone *j,* is calculated by the following mathematical formulation.

$$\hat{T}_{ij}^{gne} = T_{i+}^{gne} p_{j|i}^{|gne}$$

$$p_{j|i}^{|gne} = T_{+j}^{gne} e^{-\lambda^{gne} g_{ij}^{f}} / \sum_{j'} \left(T_{+j'}^{gne} e^{-\lambda^{gne} g_{ij'}^{f}} \right)$$

where

$\hat{T}_{ij}^{gne}$ denotes the estimated journey to work matrix, segmented by industry type *n*, gender *g*, full/part-time *e,* for residents in zone *I* who work in zone *j*

T_{i+}^{gne} denotes the workforce that is resident in zone *I*, segmented by industry type *n*, gender *g*, full/part-time *e*

T_{+j}^{gne} denotes the workforce with workplace in zone *j*, segmented by industry type *n*, gender *g*, full/part-time *e*

g_{ij}^{f} denotes the generalised time of transport for flow type *f* for residents in zone *I* travelling to workplaces in zone *j.* It is measured in units of generalised minutes per trip and is an output from the modal networks of the LASER transport model as explained below

λ^{gne} denotes the calibrated travel deterrence parameter for the industry type *n*, gender *g*, full/part-time *e*

The calibration of this travel deterrence parameter is carried out individually for each of the 48 segments, based on the corresponding journey to work trip length observed in the 2001 Census, as now explained.

B1.4 Trip distribution model calibration

The deterrence parameter governs the influence of the generalised time on the overall pattern of distance travelled. For those who typically commute over shorter distances (eg female part-time workers) the value of the deterrence parameter will be higher than average. In contrast, for male professionals it will be lower, in order to reproduce the dispersed pattern of long distance commuting that is typical of this segment.

The calibration requires matching the average trip length for each segment to that observed from the Census for that segment. The method used was as follows. Two initial sets of estimates of the deterrence parameters were selected and then test runs of the trip distribution model were carried out for each set. The resulting trip lengths that were generated were tabulated for each segment. For each segment the deterrence parameter values were then adjusted up or down as indicated by the interpolation of these initial results, in a manner that matched to its observed trip length. The trip distribution model was then rerun with this new set of calibrated deterrence parameters to confirm that each segment now did match closely to its observed value.

There was some added complexity that arose in this task because the journey lengths that are published within the Census tables are straight line/crow-fly distances, whereas those used in the commuter flow model are distances measured along the modal transport networks. To produce a transport network based estimate of the observed average journey length, the district-to-district matrix of journeys to work movements (segmented into the 48 categories as published in the Census Table W105) was multiplied by the network based distance for each district pair, as estimated by the LASER model. This

calculation then provided the required "observed" average trip length for each segment that was to be matched within the calibration procedure.

The results of this calibration are presented in Table B1. There is in general a close match between the modelled and observed trip lengths. For males the calibrated deterrence parameter generally is less than or equal to 0.029, whereas for females it typically is greater than 0.029. This difference between the sexes was expected and ensures that the observed relatively longer distances travelled by males and the shorter distances of females are replicated. Even though the trip lengths themselves are much shorter for the part-time than for the full-time workers, nevertheless there is some similarity between the two in their calibrated pattern of deterrence parameter values by industry type.

As part of the calibration process in order to understand the influence on journey to work distances of the localised balance between jobs and resident workforce, a set of doubly constrained gravity models were run for each of the 48 combinations of industry type, gender and part/full-time workers. In all cases the same deterrence parameter value of 0.029 was adopted. Two distinct deterrence matrices of generalised times were used; one for all part-time workers, the other with a higher value of time for all full-time workers.

Table B2 shows the variation in the estimated journey to work distances between the 48 categories from this model run based on a constant parameter. The results present a broadly similar pattern to the observed pattern of Figure 1.6, in that the sectors I to L have the longest distances and sectors AB and H have the shortest. Table B2 demonstrates the importance of spatial imbalances between residences and workplaces in determining average journey to work distances. Those jobs which tend to be dispersed

TABLE 2.1: CALIBRATION RESULTS FOR DISTRIBUTION MODEL: TRIP LENGTH COMPARISONS (kms) AND DETERRENCE PARAMETER VALUES, SEGMENTED BY INDUSTRY TYPE, GENDER AND PART/FULL-TIME

	Industry type	AB	CDE	F	G	H	I	J	K	L	M	N	OPQ	All
M PT	Modelled	8.4	12	9.3	10.2	9.8	14.8	15.2	11.3	12.3	12.1	10.8	10	11
	Observed	8.1	12.4	9.2	9.9	10.1	15.2	15.3	11.1	13.4	12.4	11.1	10.3	11.1
	Difference	0.3	-0.5	0.1	0.3	-0.3	-0.4	-0.1	0.2	-1.1	-0.3	-0.3	-0.2	-0.1
	Deterrence	0.031	0.027	0.03	0.029	0.029	0.027	0.028	0.028	0.028	0.027	0.028	0.029	-
F PT	Modelled	8.5	10.8	9.6	9.7	9.2	14.2	13.5	10.6	11.8	8.7	9.5	9.7	10
	Observed	8.3	10.7	9.2	9.1	8.9	14.7	13	10.7	11.6	8.6	9.7	9.2	9.8
	Difference	0.2	0.1	0.4	0.6	0.3	-0.5	0.5	-0.1	0.2	0.1	-0.3	0.4	0.2
	Deterrence	0.031	0.029	0.031	0.031	0.03	0.029	0.03	0.03	0.03	0.032	0.032	0.03	-
M FT	Modelled	11.1	18.5	15.4	16.2	14.1	19.7	24.6	20.2	20.9	16.6	15.7	16.3	18.3
	Observed	10.8	18.3	15.4	16.7	13.8	19.8	24.9	20.6	21.3	16.6	15.9	16.4	18.4
	Difference	0.3	0.2	0	-0.5	0.3	-0.1	-0.2	-0.4	-0.4	0.1	-0.2	-0.1	-0.1
	Deterrence	0.032	0.027	0.029	0.029	0.03	0.028	0.028	0.027	0.027	0.029	0.029	0.029	-
F FT	Modelled	11.8	15.3	14.6	13.7	12.6	18.9	19.3	16.8	16.4	13.7	12.6	14	15.2
	Observed	11.8	15.2	14.5	13.7	12	19.2	19	16.7	16.2	13.4	12.6	13.8	15.1
	Difference	0.1	0.1	0.2	0	0.6	-0.2	0.3	0.1	0.2	0.3	0	0.2	0.1
	Deterrence	0.033	0.03	0.031	0.032	0.032	0.03	0.032	0.03	0.031	0.031	0.033	0.031	-

TABLE 2.2: ESTIMATED AVERAGE TRIP LENGTHS WITH DETERRENCE PARAMETER = 0.029

Industry type	AB	CDE	F	G	H	I	J	K	L	M	N	OPQ	All	Agg.
Male part -time	9.5	10.3	10	10.2	9.8	13.1	14.6	10.5	11.7	10.5	10.1	10	10.6	10.1
Female part -time	9.5	10.8	10.9	10.9	9.8	14.2	14.1	11.3	12.4	10.5	11.2	10.3	11.1	9.1
Male full -time	13.4	16	15.4	16.2	15.1	18.6	24	18	18.9	16.6	15.7	16.3	17.3	13.4
Female full -time	14.6	16.3	16.6	16.3	15.2	19.8	21.2	17.6	18.1	15.7	15.9	15.6	17.1	13.2

widely throughout the zones of the study area, such as catering (H), education (M) and agriculture (A), tend to have shorter journey to work distances than jobs in sectors such as finance (J) and public administration (L) which tend to concentrate mainly into a few large agglomerations, particularly within Central London.

The column headed “All” on the right hand side of Table B2 is the flow weighted average trip length obtained by combining together the results that were output from the twelve separate trip distribution model runs for the industry type segments. In contrast the final column that is headed “Agg.” presents the results from a single run without segmentation by industry type that was carried out as follows. For each zone the residents are summed across all twelve industry types. The workplaces are similarly aggregated in each of the workplace zones. A single distribution model is then run for each of the four segments of gender by part/full-time. Each such run takes as input the same generalised time matrix used in its corresponding industry specific set of twelve runs. These four runs use the same deterrence parameter value of 0.029.

Their resulting estimated average trip lengths are tabulated in the final column of Table B2. A comparison of the last two columns shows that there is a substantial reduction (25% for the full-time workers but rather less for the part-time workers) in the estimated average trip length as a result of removing the segmentation by industry type prior to running the distribution model. The only way to match the overall observed trip length when the segmentation is reduced would be by reducing the deterrence parameter significantly. However, this would be obtaining the right result for the wrong reason, since it would bias downwards the elasticities of trip redistribution response. It highlights the benefits in terms of more realistic model results that arise from using the detailed level of segmentation that we have adopted here.

B1.5 Transport supply characteristics – generalised time

The effect of increased geographical separation on deterring commuter travel is represented within the mode by a generalised time, rather than a generalised cost or a pure distance term. Research and experience in travel demand modelling has shown that generalised time is generally a suitable formulation for this purpose. The generalised time is measured for each main mode *m* as follows:

$$g_{ij}^{fm} = t_{ij}^{m} + c_{ij}^{m} / V^{f}$$

where

t_{ij}^{m} denotes the actual door to door time in minutes on the mode *m* for residents in zone *I* travelling to workplaces in zone *j*

c_{ij}^{m} denotes the monetary cost on the mode *m* for residents in zone *I* travelling to workplaces in zone *j*

V^{f} denotes the value of time for travellers in the flow type *f*. We have adopted the values of time in use in the LASER model: All part-time workers are assumed to have the values of time from the LASER low income group and all full-time workers are in the LASER medium/high income group

The modal matrices of the time and cost of travel between zone pairs are based on past work that WSP have carried out as part of the creation and use of the LASER model. The ORBIT Multimodal study and the subsequent Thames Gateway study for DfT required the creation of highway and rail networks for present and future years. These include the major infrastructure schemes under current examination. These networks are used to provide the required base year and future year origin-destination matrices of the generalised times of transport by mode. These generalised times take full account of the availability and characteristics of the supply of transport. They use explicit frequency, tariff and travel time details for rail and underground services, as well as congested times and tolls/congestion charges for bus and car on road. The generalised time measure includes monetary car operating and parking costs, public transport tariffs and the overcrowded (on rail/London Underground) or congested (on road) travel time. The generalised costs and times are summed along all of the links on the minimum path from the residence to the workplace zone as calculated by the assignment procedure for each mode in the LASER model.

B1.6 Modal choice

For the mode choice procedure the travellers are first summed across all sex and industry type categories into two aggregate flow types *f* that correspond to part-time and full-time workers. The proportion choosing each mode for a zone pair is explicitly dependent on the competing patterns of generalised times on each mode. The main modes *m* distinguished within the mode choice model are: car, bus/coach, rail, London Underground and walk/cycle. The choice of mode is estimated using a logit discrete choice model based on the complete door-to-door set of monetary costs and times of each of these competing modes.

$$\hat{T}_{ij}^{fm} = \hat{T}_{ij}^{f} \, e^{-\lambda^{f}\left(\alpha^{fm} + g_{ij}^{fm}\right)} / \sum_{m'} \left(e^{-\lambda^{f}\left(\alpha^{fm'} + g_{ij}^{fm'}\right)} \right)$$

where λ^{f} and α^{fm} are parameters whose values were originally calibrated for the LASER model for the low-income and the medium/high-income commuter flows respectively.

The modal choice procedure also outputs to the trip distribution model the generalised time term in a form that is composited across all the modes that are available for that zone pair, as:

$$g_{ij}^{f} = \left(-1/\lambda^{f}\right)\ln\sum_{m'}\left(e^{-\lambda^{f}\left(\alpha^{fm'}+g_{ij}^{fm'}\right)}\right)$$

B1.7 Validation of the Modal Choice model

The results from running the mode choice model in 2001 and 2016 are summarised in Table B3 which also contrasts them with the mode choice data observed in the Census. This illustrates the difference in data definitions between: the number of *persons aged 16 to 74 in employment* as measured in the Census journey to work data, and the number of *trips to work on a specific day* which is what is measured in LASER choice model and in other standard transport models. The column headed "home/other" denotes those people counted in the Census who are working "mainly at or from home, or with no fixed workplace", but who have not supplied data on the mode of transport used on their usual journey to work. A large but unknown proportion of these people on any one day will be working at home and not making any trips to work. Within the commuter flow model structure this group of non-travellers logically falls within intra-zonal trips on the mode, slow. The remainder who do make a work trip on a specific day should be distributed across the modes. On the basis of the Census data on those working mainly at or from home who do report a mode, these trips will be more strongly car oriented than the average (60%, 89%, 90% by car in London, South East and East, respectively). Assimilating the differences in definitions explained above, suggests that there is a close match in the comparison of the Census mode choice and that generated by use of the LASER based calibration.

The comparison in Table B3 of the mode choice pattern of 2016 against that in 2001 shows the influence of the assumptions that have been made on future transport supply. In summary, public transport fares have been assumed to remain constant in real terms. There are upgrades to rail services through the inclusion of the domestic services on the Channel Tunnel Rail Link and various other planned increases in rail/LU capacity or frequency. There are some increases in road capacity but overall the influence of road congestion increases into the future. The overall lengthening of trips encourages switching from walk/cycle onto rail/LU, with car and bus reducing their share slightly. An outline of the assumptions made regarding transport infrastructure in 2016 is provided in Appendix D

TABLE B3: OBSERVED AND MODELLED MODE SPLIT FOR WORKPLACE DESTINATIONS IN THE WIDER SOUTH EAST

Mode	Car	Bus	LU & Rail	Slow	Home/Other	Total
Census 2001	57.1%	6.5%	14.6%	12.1%	9.8%	100%
Model 2001	60.4%	6.8%	14.5%	18.2%		100%
Model 2016	59.4%	6.3%	17.9%	16.3%		100%

APPENDIX C: CENSUS DATA PROCESSING TO PROVIDE INPUTS TO THE COMMUTER FLOW MODEL

The steps in setting up the base year model are as follows:

- Extract the journey to work (JTW) matrix by Industry (SIC 92) *n*, gender *g*, full/part-time *e,* (here we consider "part-time" to be both the part-timers and the full-time students in employment) by district *d,* from Table W105 of the Census as $T_{dd'}^{gne}$. Extract it for every origin or destination district that is inside the WSE study area, and also at a spatially more aggregate level consistent with the LASER external zone definition for all trips to or from the WSE. We want accounting closure so that we need to know total origins by zone and total destinations by zone for all districts in the WSE.
- Aggregate the O-D data into origin totals T_{d+}^{gne} , and destination totals T_{+d}^{gne} , ("+" throughout denotes summation over the corresponding sub-/superscript) for the 48 segments for every district – these totals then need to be subdivided further for certain districts in order to match the LASER zoning system.
- Pivot table matrices of trips for each industry type were created for each of the gender/time groups listed above and the row and column totals extracted for each industry category.
- Part-time and full-time trips need to be distinguished when disaggregating the column totals into destination zone workplace totals. The column totals are disaggregated into LASER zones as outlined below.
- Checking of these matrices was carried out and summarised. A key point to note is that the matrix totals of the origins and destinations were equal, thus demonstrating the consistency of the results.

To disaggregate destination zone workplace totals:

Extract from the Census Standard Table S132 the workplace population in employment W_d^{gnc} by gender *g* and Industry *n* by Occupation *c* for every district *d* that needs to be disaggregated.

For each district *d* in turn, use the values $T_{ww'}^{ce}$ of the JTW Table W205 to subdivide the workforce segmented by occupation, down to a finer spatial scale through calculating the proportion of the workplace population when segmented by full/part-time that is within each ward of the district, as:

$$p_{w|d}^{|ce} = T_{+w}^{ce} / \sum_{w' \in d} T_{+w'}^{ce'}$$

Apply proportions to the workforce value to (I) disaggregate the workplace population firstly by Occupation at the district level *d*, and (ii) to the LASER zone *I* by full/part-time *e*, as

$$\hat{T}_{+i}^{gnce} = T_{+d}^{gne}\left(W_d^{gnc} / W_d^{gn+}\right)\sum_{w\in i} p_{w|d}^{|ce}$$

Destination Total - Checks

Check that the resulting estimated totals when summed, still match to the original district values from the JTW matrix by part/full-time by Industry:

$$\sum_{c,i\in d} \hat{T}_{+i}^{gnce} = T_{+d}^{gne} \; ?$$

Check that the district totals for each Occupation, as given by summing Table S132 across Industry and gender, are consistent with the summation of JTW Table 205 across ward and working hours:

$$\sum_{e',w'\in d} T_{+w'}^{ce'} = \sum_{gn} W_d^{gnc} \; ?$$

Check that the ward totals for each Occupation, as given by the workplace population W_w^c from Theme Table T10, are consistent with the summation of JTW Table 205 across working hours:

$$\sum_{e'} T_{+w'}^{ce'} = W_w^c \; ?$$

To disaggregate origin zone resident labour force totals:

Extract from the Census Standard Table S039 the resident population in employment by Industry *n,* by Occupation *c,* (gender and working hours are not presented within this table) for every ward *w,* within the districts that need to be disaggregated, and at the district level elsewhere. Aggregate the detailed Industry and Occupation categories up to the level at which they are available at the workplace end.

Use proportions by gender by part/full-time within each occupation category derived from Table S40 of occupation by gender by ward, to disaggregate the resident labourforce by gender and part/full-time for each LASER zone i:

$$\hat{R}_i^{gnce} = \sum_{w\in i} R_w^{nc}\left(R_w^{gce} \Big/ \sum_{g't'} R_w^{g'ce'}\right)$$

Apply proportions to the workforce value to (I) disaggregate the resident workforce population by Occupation, and (ii) to the LASER zone *I* by full/part-time, as

$$\hat{T}_{i+}^{gnce} = T_{d+}^{gne}\left(\hat{R}_i^{gnce} \Big/ \sum_{c,i'\in d} \hat{R}_{i'}^{gnce}\right)$$

The overall output from these steps is an estimated set by LASER zone of row totals $\hat{T}_{i+}^{gnce}$ and of column totals $\hat{T}_{+j}^{gnce}$ that aggregate back up to the original row and column

sums derived from Table W105. These are the zonal totals that are input to the ULC file in order to set up the doubly constrained models. They should first be summed across the occupation categories *c.*

APPENDIX D: DEFINITION OF FUTURE YEAR TRANSPORT SCHEMES

Two transport networks will be used in the runs for 2016. This Appendix outlines the highway and public transport schemes implemented within the transport model.

D1.1 Transport scenario A_ScB

This transport scenario is the Reference Case run and was built up from the committed and realistic schemes as defined in the Thames Gateway project. It should be noted that some of these scheme definitions are now out of date in particular the Crossrail scheme used, also the Central London Charging scheme used is currently charged at £5 for entering instead of the £2.50 as agreed in the Wider South East Regional Study.

With regards to the fare inputs in the 2016 Reference Case the following inputs have been used:

Bus

London: Mayor's flat fares implemented in 2002 plus discount for students, people not in work and pensioners.

Outside London: Fares assumed to fall by 1% per year for ten years from 1999.

Coach

Same as bus outside London.

London Underground

The 1999 fares are assumed to be unchanged in real terms to 2016.

Rail

Fares to fall in real terms by 1% per year from 1999 for 10 years.

D1.2 A_ScC_RUC

Uses the same network as used in run A_ScB, but also incorporates the same Road User Charging Scheme as used in the RPFS_LASER project, except a 2 pence reduction has not been applied (Fuel Duty reduction).

TABLE D1.1: HIGHWAY SCHEMES

Scheme	Completion Date
A120 Stansted Airport to Braintree	2003
STDR (Gravesend)	2003
A228 Grain (Phase 1)	2004
A41 Aston Clinton Bypass	2004
A2 Bean to Cobham widening	2006
A249 2nd Swale Crossing	2006
A505 Baldock Bypass	2006
M25 junctions 12-15	2006
West Thurrock Regeneration route	2006
A2/A282 Dartford improvements	2008
A13 Ironbridge/ Canning Town junction improvements	2011
A13 West of Heathway - Mar Dyke	2011
A13/ A117 Woolwich Manor Way junction improvement	2011
A13/A112 Prince Regents Lane junction improvement	2011
A130 Bypass	2003
A23 Coulsden Inner relief road	2011
A31 Farnham Bypass improvements	2011
A4146 Stoke Hammond & Linslade Bypass	2011
T5 improvements	2011
Luton Airport improvements	2016
A12/A14 Junction Improvement	2005
M25 J1b-3 (Dartford to A20/M20) - widening to D4	2006
M25 J5 slip roads (M26 - A21)	2006
STDR (Thames Road)	2008
M25 J27-31 (M11 - Dartford Crossing) - widening to D4	2009
M25 J5-7 - (M26 - Redding/ M23) - widening to D4	2009
A12 widening - M25 to Chelmsford	2011
A120 Braintree - A12	2011
M1 widening between junction 6A and 13	2011
M25 - J28	2011
Thames Gateway Bridge	2011
M25 J16-23 - (M40 - A1 (M)) - widening to D4	2012
M11 widening between junction 8 and 14	2014
A12 Widening - Chelmsford to Colchester	2016
A120 Dualling to Harwich	2016
A228 Grain (Phase 2)	2016
M25 J23-27	2016

TABLE D1.2: PUBLIC TRANSPORT SCHEMES

PT Schemes	
Docklands Light Rail with new station at London City Airport	2006
Virgin Cross-Country	2006
East London Line	2006
East London Transit (Phase 1)	2006
Kent Thames-side Fastrack (Phase 1)	2006
CTRL Domestics (Core option via Ebbsfleet to Ashford)	2007
Chiltern Franchise Replacement	2006/2011
Woolwich DLR	2007
Greenwich Waterfront (Phase 1)	2008
DLR Dagenham Dock	2011
Kent Thames-side Fastrack (Phase 2)	2012
Crossrail (As defined in the Thames Gateway Study)	2015

APPENDIX E: LASER 3.0 MODEL ZONES

There are 3 types of zones in LASER 3.0: ordinary internal zones which are ward(s) or local authority district(s) within the internal study area, point zones which represent airports and ports in the internal study area, and external zones which represent the rest of Great Britain. In addition there is one dummy zone which is used as a modelling device. The Heathrow zones are defined with information supplied by SERAS, into functional zones which cover different terminals and work areas. Tables A2.1-A2.3 provide a full list of these zones.

It is of particular note that the ward and county definitions used are those from the 1991 Census.

TABLE E1: ORDINARY INTERNAL ZONES (LONDON, SOUTH EAST AND EASTERN REGIONS)

Ordinary Internal Zones	Zone Name	Constituent Ward(s)
1	City of London	Aldersgate, Aldgate, Bassishaw, Billingsgate, Bishopsgate, Bread Street, Bridge, Broad Street, Candlewick, Castle Baynard, Cheap, Coleman Street, Cordwainer, Cornhill, Cripplegate, Dowgate, Farringdon Within, Farringdon Without, Langbourn, Lime Street, Portsoken, Queenhithe, Tower, Vintry, Walbrook
2	Camden (South)	Bloomsbury, Brunswick, Holborn, King's Cross, Somers Town
3	Camden (Mid)	Adelaide, Belsize, Camden, Castlehaven, Caversham, Chalk Farm, Fitzjohns, Fortune Green, Gospel Oak, Grafton, Kilburn, Priory, Regent's Park, St.John's, St.Pancras, South End, Swiss Cottage, West End
4	Camden (North)	Frognal, Hampstead Town, Highgate
5	Hackney (South)	Kings Park, Wick
6	Hackney (North)	Brownswood, Chatham, Clissold, Dalston, De Beauvoir, Eastdown, Haggerston, Homerton, Leabridge, Moorfields, New River, North Defoe, Northfield, Northwold, Queensbridge, Rectory, South Defoe, Springfield, Victoria, Wenlock, Westdown
7	Hammersmith & Fulham (South)	Avonmore, Broadway, Brook Green, Colehill, Crabtree, Eel Brook, Gibbs Green, Grove, Margravine, Normand, Palace, Ravenscourt, Sands End, Sherbrooke, Sulivan, Town, Walham
8	Hammersmith & Fulham (North)	Addison, College Park and Old Oak, Coningham, Starch Green, White City and Shepherds Bush, Wormholt
9	Haringey (West)	Alexandra, Archway, Fortis Green, Highgate, Muswell Hill
10	Haringey (Central)	Bowes Park, Bruce Grove, Crouch End, Green Lanes, Harringay, Hornsey Central, Hornsey Vale, Noel Park, Park, Seven Sisters, South Hornsey, South Tottenham, Tottenham Central, West Green, White Hart Lane, Woodside, Cranford
11	Haringey (East)	Coleraine, High Cross
12	Islington (South)	Bunhill, Clerkenwell
13	Islington (North)	Barnsbury, Canonbury East, Canonbury West, Gillespie, Highbury, Highview, Hillmarton, Hillrise, Holloway, Junction, Mildmay, Quadrant, St.George's, St.Mary, St.Peter, Sussex, Thornhill, Tollington
14	Kensington & Chelsea (North)	Avondale, Colville, Golborne, Holland, Kelfield, Norland, Pembridge, St.Charles
15	Kensington & Chelsea (South)	Abingdon, Campden, Cheyne, Church, Courtfield, Earls Court, North Stanley, Queens Gate, Redcliffe, Royal Hospital, South Stanley
16	Kensington & Chelsea (SSA)	Brompton, Hans Town
17	Lambeth (North)	Bishop's
18	Lambeth (Mid)	Angell, Clapham Town, Ferndale, Larkhall, Oval, Prince's, Stockwell, Town Hall, Tulse Hill, Vassall
19	Lambeth (South)	Clapham Park, Gipsy Hill, Herne Hill, Knight's Hill, St.Leonard's, St.Martin's, Streatham Hill, Streatham South, Streatham Wells, Thornton, Thurlow Park

20	Lewisham (South West)	Blythe Hill, Forest Hill, Horniman, Perry Hill, Sydenham East, Sydenham West
21	Lewisham (South East)	Bellingham, Churchdown, Downham, Grove Park, St.Mildred, Whitefoot
22	Lewisham (Mid)	Blackheath, Catford, Crofton Park, Drake, Hither Green, Ladywell, Manor Lee, Pepys, Rushey Green, St.Andrew, St.Margaret
23	Lewisham (North)	Evelyn, Grinling Gibbons, Marlowe
24	Newham (West)	Beckton, Hudsons, Ordnance
25	Newham (North West)	Canning Town and Grange, New Town, Stratford
26	Newham (North East)	Bemersyde, Castle, Central, Forest Gate, Greatfield, Kensington, Little Ilford, Manor Park, Monega, Park, Plaistow, Plashet, St.Stephens, Upton, Wall End, West Ham
27	Newham (South)	Custom House and Silvertown, South
29	Southwark (North West)	Cathedral
30	Southwark (North East)	Abbey, Riverside
31	Southwark (Central)	Alleyn, Barset, Bellenden, Bricklayers, Browning, Brunswick, Chaucer, Consort, Faraday, Friary, Liddle, Newington, St.Giles, The Lane
32	Southwark (Mid-North)	Burgess, Dockyard, Rotherhithe
33	Southwark (South)	College, Lyndhurst, Ruskin
34	Southwark (Mid-South)	Rye, Waverley
35	Tower Hamlets (South West)	St.Katherine's, Shadwell
36	Tower Hamlets (South East)	Blackwall, East India, Milwall
37	Tower Hamlets (North)	Bow, Bromley, Grove, Holy Trinity, Lansbury, Limehouse, Park, Redcoat, St.Dunstan's, St.James', St.Mary's, St.Peter's, Spitalfields, Weavers
38	Wandsworth (North East)	Latchmere, Queenstown, St.John, St.Mary's Park, Shaftesbury
39	Wandsworth (South)	Balham, Bedford, Furzedown, Graveney, Nightingale, Tooting
40	Wandsworth (North)	Earlsfield, East Putney, Fairfield, Southfield, Thamesfield
41	Wandsworth (West)	Parkside, Roehampton, West Hill, West Putney
42	Wandsworth (South East)	Northcote, Springfield
43	Westminster (South East)	St.James'
44	Westminster (South West)	Belgrave, Churchill, Millbank, St.George's, Victoria
45	Westminster (Mid)	Baker Street, Bryanston, Cavendish, Hyde Park, Knightsbridge, West End
46	Westminster (North)	Bayswater, Church Street, Hamilton Terrace, Harrow Road, Lancaster Gate, Little Venice, Lords, Maida Vale, Queen's Park, Regent's Park, Westbourne
50	Barking (West)	Abbey, Cambell, Eastbury, Gascoigne, Longbridge, Manor, Parsloes, Thames
51	Barking (North)	Chadwell Heath, Heath, Marks Gate, Triptons, Valence
52	Barking (East)	Alibon, Eastbrook, Fanshawe, Goresbrook, River, Village
53	Barnet (North East)	Brunswick Park, East Barnet, Friern Barnet, Hadley, Woodhouse
54	Barnet (North West)	Edgware, Hale, Mill Hill
55	Barnet (South West)	Arkley, Totteridge
56	Barnet (South)	Burnt Oak, Childs Hill, Colindale, Golders Green, Hendon, West Hendon

57	Barnet (South East)	East Finchley, Finchley, Garden Suburb, St.Pauls
58	Bexley (North)	Barnehurst North, Belvedere, Bostall, Erith, North End, Northumberland Heath, Thamesmead East
59	Bexley (West)	Barnehurst, Brampton, Christchurch, Danson, East Wickham, Falconwood, St. Michael's
60	Bexley (South East)	Cray, Crayford, St. Mary's, Upton
61	Bexley (South West)	Blackfen, Blendon and Penhill, Lamorbey, Sidcup East, Sidcup West
62	Brent (North)	Barnhill, Fryent, Kenton, Kingsbury, Queensbury, Roe Green
63	Brent (North West)	Barham, Preston, Sudbury, Sudbury Court
64	Brent (Mid South)	Alperton, Carlton, Chamberlayne, Harlesden, Kensal Rise, Kilburn, Manor, Queens Park, Roundwood, St. Raphael's, Stonebridge, Tokyngton, Wembley Central, Willesdon Green
65	Brent (South)	Brentwater, Brondesbury Park, Church End, Cricklewood, Gladstone, Mapesbury, St. Andrew's
66	Bromley (South)	Biggin Hill, Chelsfield and Goddington, Darwin, West Wickham South
67	Bromley (South East)	Crofton, Orpington Central, Petts Wood and Knoll, St. Mary Cray, St. Paul's Cray
68	Bromley (West)	Bromley Common and Keston, Farnborough, Hayes, West Wickham North
69	Bromley (North)	Bickley, Chislehurst, Martins Hill and Town, Mottingham, Plaistow and Sundridge
70	Bromley (North West)	Anerley, Clock House, Copers Cope, Eden Park, Kelsey Park, Lawrie Park and Kent House, Penge, Shortlands
71	Croydon (North)	Bensham Manor, Beulah, Norbury, South Norwood, Thornton Heath, Upper Norwood, West Thornton
72	Croydon (East)	Ashburton, Monks Orchard, Rylands, Spring Park, Woodside
73	Croydon (West)	Addiscombe, Broad Green, Croham, Fairfield, Waddon, Whitehorse Manor
74	Croydon (South West)	Purley, Woodcote and Coulsdon West
75	Croydon (South East)	Coulsdon East, Fieldway, Heathfield, Kenley, New Addington, Sanderstead, Selsdon
76	Ealing (West)	Glebe, Mount Pleasant, Northcote, Waxlow
77	Ealing (North West)	Costons, Mandeville, Perivale, Ravenor, West End, Wood End
78	Ealing (Mid)	Argyle, Dormers Wells, Hanger Lane, Hobbayne, Pitshanger, Victoria
79	Ealing (East)	Ealing Common, Elthorne, Heathfield, Northfield, Southfield, Springfield, Vale, Walpole
80	Enfield (North West)	Chase, Trent, Worcesters
81	Enfield (North East)	Bullsmoor, Enfield Lock, Enfield Wash, Green Street, Hoe Lane
82	Enfield (South East)	Angel Road, Arnos, Bowes, Craig Park, Highfield, Huxley, Jubilee, Latymer, Palmers Green, Ponders End, Raglan, St.Alphege, St. Marks, St. Peters, Southbury, Town, Weir Hall, Willow
83	Enfield (South West)	Grange, Grovelands, Merryhills, Oakwood, Southgate Green, Village, Winchmore Hill
84	Greenwich (North West)	Charlton, St. Alfege, Trafalgar, West
85	Greenwich (North)	Arsenal, Glyndon, St. Mary's, Thamesmead Moorings
86	Greenwich (South)	Avery Hill, Coldharbour, Eltham Park, Middle Park, New Eltham, Palace, Tarn

87	Greenwich (Mid)	Abbey Wood, Blackheath, Burrage, Deansfield, Eynsham, Ferrier, Herbert, Hornfair, Kidbrooke, Lakedale, Nightingale, Plumstead Common, Rectory Field, St. Nicholas, Sherard, Shrewsbury, Slade, Sutcliffe, Vanbrugh, Well Hall, Woolwich Common
88	Harrow (North West)	Canons, Harrow Weald, Hatch End, Headstone North, Pinner, Stanmore Park
89	Harrow (North East)	Centenary, Greenhill, Headstone South, Kenton East, Kenton West, Marlborough, Ridgeway, Stanmore South, Wealdstone, Wemborough
90	Harrow (South West)	Harrow on the Hill, Pinner West, Rayners Lane, Roxbourne, Roxeth
91	Havering (North)	Chase Cross, Gooshays, Harold Wood
92	Havering (South East)	Cranham East, Cranham West, Rainham, Upminster
93	Havering (South West)	Airfield, South Hornchurch
94	Havering (West)	Ardleigh Green, Brooklands, Collier Row, Elm Park, Emerson Park, Gidea Park, Hacton, Heath Park, Heaton, Hilldene, Hylands, Mawney, Oldchurch, Rise Park, St.Andrew's, St.Edward's
95	Hillingdon (North East)	Harefield, Northwood, Ruislip
96	Hillingdon (North West)	Cavendish, Deansfield, Eastcote, Manor, Northwood Hills, St.Martins
97	Hillingdon (Mid North)	Bourne, Ickenham
98	Hillingdon (West)	Colham, Cowley, Hillingdon East, Hillingdon North, Hillingdon West, Uxbridge North, Uxbridge South, Yiewsley
99	Hillingdon (East)	Barnhill, Botwell, Charville, Townfield, Wood End, Yeading
100	Hillingdon (South)	Crane, Harlington, Heathrow, West Drayton
107	Hounslow (South West)	East Bedfont, Feltham Central, Feltham North, Feltham South, Hanworth, Heston West
108	Hounslow (West)	Heston Central, Heston East, Hounslow Central, Hounslow Heath, Hounslow South, Hounslow West
109	Hounslow (Mid)	Brentford Clifden, Isleworth North, Isleworth South, Spring Grove
110	Hounslow (East)	Chiswick Homefields, Chiswick Riverside, Gunnersbury, Turnham Green
111	Kingston-upon-Thames (South)	Chessington South
112	Kingston-upon-Thames (North)	Berrylands, Burlington, Cambridge, Canbury, Chessington North, Coombe, Grove, Hill, Hook, Malden Manor, Norbiton, Norbiton Park, St.James, St.Mark's, Surbiton Hill, Tolworth East, Tolworth South, Tolworth West, Tudor
113	Merton (North)	Durnsford, Raynes Park, Village
114	Merton (South West)	Abbey, Colliers Wood, Dundonald, Graveney, Hillside, Trinity
115	Merton (South East)	Cannon Hill, Figge's Marsh, Lavender, Longthornton, Lower Morden, Merton Park, Phipps Bridge, Pollards Hill, Ravensbury, St.Helier, West Barnes
116	Redbridge (North West)	Bridge, Church End, Fairlop, Fullwell, Monkhams, Roding, Snaresbrook
117	Redbridge (North East)	Aldborough, Hainault
118	Redbridge (South West)	Barkingside, Clayhall, Cranbrook, Wanstead
119	Redbridge (South)	Clementswood, Loxford, Newbury, Valentines
120	Redbridge (South East)	Chadwell, Goodmayes, Mayfield, Seven Kings

121	Richmond-upon-Thames (North)	Barnes, Kew, Mortlake, Palewell, Richmond Hill, Richmond Town
122	Richmond-upon-Thames (East)	East Sheen, Ham and Petersham
123	Richmond-upon-Thames (West)	Central Twickenham, East Twickenham, Heathfield, South Twickenham, West Twickenham, Whitton
124	Richmond-upon-Thames (South West)	Hampton, Hampton Hill, Hampton Nursery
125	Richmond-upon-Thames (South East)	Hampton Wick, Teddington
126	Sutton (West)	Belmont, Cheam South, Cheam West, North Cheam, Rosehill, St.Helier North, Sutton Central, Sutton Common, Sutton East, Sutton South, Sutton West, Worcester Park North, Worcester Park South
127	Sutton (East)	Beddington North, Beddington South, Carshalton Beeches, Carshalton Central, Carshalton North, St.Helier South, Wallington North, Wallington South, Wandle Valley, Woodcote, Wrythe Green
128	Waltham Forest (North)	Chingford Green, Endlebury, Hale End, Hatch Lane, Higham Hill, Larkswood, Valley
129	Waltham Forest (South)	Cann Hall, Cathall, Chapel End, Forest, Grove Green, High Street, Hoe Street, Lea Bridge, Leyton, Leytonstone, Lloyd Park, St.James Street, Wood Street
130	Sutton (South)	Clockhouse
149	Portsmouth	St.Thomas,Havelock,Milton,Fratton,Charles Dickens,Copnor,Hilsea,Nelson,Drayton and Farlington,Cosham,Paulsgrove,Highland,Hayling East,Hayling West,Bedhampton,Purbrook,Stakes,Waterloo,Cowplain,St.Faith's,Emsworth,Bondfields, Battins Barncroft,Warren Park,Hart Plain,St.Jude
150	Newbury	Aldermaston, Basildon, Beenham, Bradfield, Bucklebury, Burghfield, Calcot, Chieveley, Cold Ash, Compton, Craven, Downlands, Falkland, Greenham, Hungerford, Kintbury, Lambourn Valley, Mortimer, Northcroft, Pangbourne, Purley, St.John's, Shaw-cum-Donnington, Speen, Thatcham North, Thatcham South, Thatcham West, Theale, Tilehurst, Turnpike, Winchcombe
151	Reading	Abbey, Battle, Caversham, Church, Katesgrove, Kentwood, Minster, Norcot, Park, Peppard, Redlands, Southcote, Thames, Tilehurst, Whitley
152	Twyford	Arborfield, Barkham, Charvil, Emmbrook, Evendons, Finchampstead North, Finchampstead South, Hurst, Norreys, Remenham and Wargrave, Swallowfield, Twyford and Ruscombe, Wescott, Winnersh, Wokingham Without
153	Maidenhead	Belmont, Boyn Hill, Cox Green, Furze Platt, Oldfield, Pinkneys Green, St. Mary's
154	Windsor & Maidenhead	Bisham and Cookham, Bray, Hurley
155	Sunningdale	Sunningdale and South Ascot, Sunninghill
156	Windsor	Castle, Clewer North, Clewer South, Datchet, Eton North and South, Eton West, Horton and Wraysbury, Old Windsor, Park, Trinity
157	Bracknell	Ascot, Binfield, Bullbrook, College Town, Cranbourne, Crowthorne, Garth, Great Hollands North, Great Hollands South, Hanworth, Harmanswater, Little Sandhurst, Old Bracknell, Owlsmoor, Priestwood, St.Mary's, Central Sandhurst, Warfield, Wildridings

158	Slough	Baylis, Britwell, Central, Chalvey, Cippenham, Farnham, Foxborough, Haymill, Kedermister, Langley St.Mary's, Stoke, Upton, Wexham Lea
159	Wokingham	Bulmershe, Coronation, Little Hungerford, Loddon, Redhatch, Shinfield, Sonning, South Lake, Whitegates
160	Chesham	Amersham Common, Amersham-on-the-Hill, Asheridge Vale, Chesham Bois and Weedon Hill, Hilltop, Little Chalfont, Lowndes, Newtown, Pond Park, St.Mary's, Townsend, Waterside
161	Amersham	Amersham Town, Ashley Green and Latimer, Austenwood, Ballinger and South Heath, Chalfont Common, Chalfont St.Giles, Chalfont St.Peter Central, Chartridge, Cholesbury and The Lee, Coleshill and Penn Street, Gold Hill, Great Missenden, Holmer Green, Little Missenden, Penn, Prestwood and Heath End, Seer Green and Jordans, Chenies
162	South Bucks	Beaconsfield North, Beaconsfield South, Beaconsfield West, Burnham Beeches, Burnham Church, Burnham Lent Rise, Denham North, Denham South, Dorney, Farnham Royal, Gerrards Cross North, Gerrards Cross South, Hedgerley and Fulmer, Iver Colnbrook, Iver Heath, Iver Richings Park, Iver Village, Stoke Poges, Taplow, Wexham
163	High Wycombe	Booker and Castlefield, Bowerdean and Daws Hill, Cressex and Frogmoor, Downley, Green Hill and Totteridge, Hazlemere Central, Hazlemere East, Hazlemere West, Keep Hill and Hicks Farm, Kingshill, Marsh and Micklefield, Oakridge and Tinkers Wood, Tylers Green, West Wycombe and Sands
164	Wycombe	Bledlow-cum-Saunderton, Bourne End-cum-Hedsor, Flackwell Heath, Great Marlow, Hambleden Valley, Hughenden Valley, Icknield, Lacy Green and Hampden, Lane End and Piddington, Little Marlow, Loudwater, Marlow Bottom, Marlow North, Marlow South, Naphill-cum-Bradenham, Princes Risborough, Stokenchurch, The Wooburns
165	Aylesbury	Aston Clinton, Aylesbury Central, Bedgrove, Elmhurst, Gatehouse, Grange, Mandeville, Meadowcroft, Oakfield, Southcourt, Wendover, Weston Turville
166	Buckingham	Bierton, Brill, Buckingham North, Buckingham South, Cheddington, Edlesborough, Great Brickhill, Great Horwood, Grendon Underwood, Haddenham, Hogshaw, Long Crendon, Luffield Abbey, Marsh Gibbon, Newton Longville, Oakley, Pitstone, Quainton, Steeple Claydon, Stewkley, Stone, Tingewick, Waddesdon, Wing, Wingrave, Winslow
167	Milton Keynes	Bradwell, Church Green, Danesborough, Denbigh, Eaton, Fenny Stratford, Lavendon, Linford, Loughton, Manor Farm, Newport Pagnell, Newton, Olney, Pineham, Sherington, Stantonbury, Stony Stratford, Whaddon, Woburn Sands, Wolverton, Wolverton Stacey Bushes, Woughton
168	Brighton	Hanover, Hollingbury, King's Cliff, Marine, Moulsecoomb, Patcham, Preston, Queen's Park, Regency, Rottingdean, St.Peter's, Seven Dials, Stanmer, Tenantry, Westdene, Woodingdean, Brunswick and Adelaide, Goldsmid, Hangleton, Nevill, Portslade North, Portslade South, Stanford, Vallance, Westbourne, Wish
169	Lewes	Barcombe, Chailey, Ditchling, East Saltdean, Hamsey, Kingston, Lewes Bridge, Lewes Castle, Lewes Priory, Newhaven Denton, Newhaven Meeching, Newhaven Valley, Newick, Ouse Valley, Peacehaven East, Peacehaven North, Peacehaven West, Plumpton, Ringmer, Seaford Central, Seaford East, Seaford North, Seaford West, Telscombe Cliffs, Wivelsfield

170	Wealden	Alfriston, Arlington, Buxted, Chiddingly and East Hoathly, Crowborough East, Crowborough North, Crowborough St Johns, Crowborough West, Danehill, East Dean, Fletching, Forest Row, Framfield, Frant, Hailsham Central and North, Hailsham East, Hailsham South and West, Hartfield, Heathfield, Hellingly, Herstmonceux, Horam, Maresfield, Mayfield, Ninfield, Pevensey and Westham, Polegate North, Polegate South, Rotherfield, Uckfield, Wadhurst, Waldron, Willingdon, Withyham
171	Hastings	Ashdown, Braybrooke, Broomgrove, Castle, Central St.Leonards, Elphinstone, Gensing, Hollington, Maze Hill, Mount Pleasant, Old Hastings, Ore, St.Helens, Silverhill, West St.Leonards, Wishing Tree, Central, Collington, Old Town, Sackville, St.Marks, St.Michaels, St.Stephens, Sidley
172	Eastbourne	Devonshire, Downside, Hampden Park, Langney, Meads, Ocklynge, Ratton, Roselands, St.Anthony's, Upperton
173	Rother	Ashburnham, Battle, Beckley and Peasmarsh, Bodian and Ewhurst, Brede and Udimore, Burwash, Camber, Catsfield and Crowhurst, Etchingham and Hurst Green, Fairlight, Guestling and Pett, Northiam, Rye, Salehurst, Sedlescombe and Whatlington, Ticehurst, Westfield, Winchelsea
174	Fareham	Leesland,Anglesey,Alverstoke,Lee,Rowner,Bridgemary,Sarisbury,Locks Heath,Warsash,Titchfield,Hill Head,Stubbington,Fareham East,Portchester East,Portchester Central,Portchester West,Fareham North,Fareham North-West,Fareham West,Fareham South,Hardway and Forton,Elson,Brockhurst, Town
175	New Forest	Barton, Bashley, Becton, Blackfield and Langley, Boldre, Bransgore and Sopley, Brockenhurst, Colbury, Copythorne South, Dibden and Hythe North, Dibden Purlieu, Downlands, Fawley Holbury, Fordingbridge, Forest North, Forest North West, Forest South, Forest West, Hordle, Hythe South, Lymington Town, Lyndhurst, Marchwood, Milford, Milton, Netley Marsh, Pennington, Ringwood North, Ringwood South, Sway
176	Southampton	Bishopstoke, Botley, Bursledon, Chandler's Ford, Eastleigh Central, Eastleigh North, Eastleigh South, Eastleigh West, Fair Oak, Hamble, Hedge End St.John's, Hedge End Wildern, Hiltingbury East, Hiltingbury West, Hound, West End North, West End South, Totton Central, Totton North, Totton South, Bargate, Bassett, Bitterne, Bitterne Park, Coxford, Freemantle, Harefield, Millbrook, Peartree, Portswood, Redbridge, St.Lukes, Shirley, Sholing, Woolston,
177	Winchester	Badger Farm, Bishops Sutton, Bishops Waltham, Boarhunt and Southwick, Cheriton, Compton, Curdridge, Denmead, Droxford Soberton and Hambledon, Durley and Upham, Itchen Valley, Littleton, Micheldever, New Alresford, Olivers Battery, Otterbourne and Hursley, Owlesbury and Colden Common, St.Barnabas, St.Bartholomew, St.John and All Saints, St.Luke, St.Michael, St.Paul, Shedfield, Sparsholt, Swanmore, The Worthys, Twyford, Upper Meon Valley, Waltham Chase, Wickham, Wonston
178	Test Valley	Abbey, Alamein, Anna, Blackwater, Bourne Valley, Chilworth and Nursling, Cupernham, Dun Valley, Field, Harewood, Harroway, Kings Somborne and Michelmersh, Millway, Nether Wallop and Broughton, North Baddesley, Over Wallop, Romsey Extra, St.Mary's, Stockbridge, Tadburn, Tedworth, Weyhill, Winton
179	Deane	Baughurst, Bramley, Burghclere, East Woodhay, Kingsclere, North Waltham, Oakley, Overton, Pamber, St. Mary Bourne, Sherborne St. John, Sherfield on Loddon, Silchester, Tadley Central, Tadley North, Tadley South, Upton Grey, Whitchurch

180	Basingstoke	Basing, Black Dam, Brighton Hill, Buckskin, Chapel, Daneshill, Eastrop, Farleigh Wallop, Kempshott, King's Furlong, Norden, Popley, South Ham, Viables, Westside, Winklebury
181	Hart	Crondall, Eversley, Frogmore and Darby Green, Hartley Wintney, Hawley, Hook, Long Sutton, Odiham, Whitewater, Yateley East, Yateley North, Yateley West
182	Fleet	Church Crookham, Fleet Courtmoor, Fleet Pondtail, Fleet West
183	Rushmoor	Alexandra, Belle Vue, Cove, Empress, Fernhill, Grange, Heron Wood, Knellwood, Manor, Mayfield, Newport, Queens, St.Johns, St.Marks, Westheath
184	East Hamps	Alton Holybourne, Alton North East, Alton North West, Alton South East, Alton South West and Beech, Binsted, Bramshott and Liphook, Clanfield and Buriton, East Meon and Langrish, Farringdon, Four Marks, Froxfield and Steep, Froyle and Bentley, Grayshott, Headley, Horndean-Catherington, Horndean-Hazleton, Horndean-Kings, Horndean-Murray, Liss, Medstead, North Downland, Petersfield-Heath, Petersfield-St.Mary's, Petersfield-St.Peters, Ropley and West Tisted, Rowlands Castle, Selborne, The Hangers, Whitehill-Bordon and Whitehill, Whitehill-Lindford
185	Isle of Wight	Cowes Castle, Cowes Central, Cowes Medina, Cowes Northwood, East Cowes, Newport Carisbrooke, Newport Central, Newport Mount Joy, Newport Pan, Newport Parkhurst, Newport Wootton and Fairlee, Osborne, Ryde Ashey and Binstead, Ryde East, Ryde St. Helens, Ryde St. Johns, Ryde West, Arreton and Newchurch, Bembridge, Brading, Brightstone and Shorwell, Calbourne and Shalfleet, Chale and Niton, Freshwater, Gatcombe and Godshill, Lake, Sandown, Shanklin North, Shanklin South, Totland, Ventnor, Wroxall, Yarmouth
186	Shepway (S)	Dymchurch and Burmarsh, Lydd, Marsh, New Romney, St.Mary in the Marsh
187	Shepway (N)	Elham, Hawkinge and Paddlesworth, Lympne and Stanford, Saltwood and Newington, Sellindge, Stone Street, Swingfield and Acrise
188	Deal & Sandwich	Ash, Aylesham, Capel-le-Ferne, Cornilo, Eastry, Eythorne, Little Stour, Lower Walmer, Lydden and Temple Ewell, Middle Deal, Mill Hill, Mongeham, Noninstone, North Deal, Ringwould, St.Margaret's at Cliffe, Sandwich, Shepherdswell with Coldred, Upper Walmer, Woodnesborough with Staple, Worth
189	Dover	Barton, Buckland, Castle, Maxton and Elms Vale, Pineham, Priory, River, St.Radigunds, Tower Hamlets, Town and Pier
190	Margate & Ramsgate	Beacon Road, Birchington East, Birchington West, Bradstowe, Cecil, Central Eastcliff, Central Westcliff, Cliftonville, Dane Park, Ethelbert, Kingsgate, Margate West, Marine, Minster Parish, Newington, Northdown Park, Northwood, Pier, Pierremont, St.Lawrence, St.Peters, Salmestone, Sir Moses Montefiore, Southwood, Thanet Parishes, Upton, Westgate-on-Sea
191	Canterbury	Barton, Blean Forest, Harbledown, Northgate, St.Stephens, Sturry North, Sturry South, Westgate, Wincheap
192	Herne Bay	Chestfield, Gorrell, Harbour, Herne, Heron, Little Stour, Marshside, Reculver, Seasalter, Swalecliffe, Tankerton, West Bay
193	Canterbury (S)	Barham Downs, Chartham, North Nailbourne, Stone Street
194	Ashford (SW)	Aldington, Appledore, Bethersden, Biddenden, Brabourne, Great Chart, Hamstreet, High Halden, Kingsnorth, Mersham, Rolvenden, Tenterden East, Tenterden St.Michaels, Tenterden South East, Tenterden West, Wittersham, Woodchurch

195	Ashford (NE)	Boughton Aluph, Charing, Chilham, Hothfield, Pluckley, Smarden, Wye
196	Ashford	Ashford Bockhanger, Ashford Brookfield, Ashford Bybrook, Ashford Central, Ashford Eastmead, Ashford Hampden, Ashford Henwood, Ashford Kennington Lees, Ashford Musgrove, Ashford Queens, Ashford Singleton, Ashford South Willesborough, Ashford Spearpoint, Ashford Twelve Acres, Ashford Victoria Park, Ashford Warren, Ashford Waterside, Ashford Willesborough Lees, Ashford Windmill, Ashford Woolreeds, Stanhope
197	Tunbridge Wells	Culverden, Pantiles, Park, Pembury, Rusthall, St.James', St.John's, St.Mark's, Sherwood, Southborough East, Southborough North, Southborough West, Speldhurst and Bidborough
198	Tunbridge Wells (E)	Benenden, Brenchley, Capel, Cranbrook, Frittenden and Sissinghurst, Goudhurst, Hawkhurst, Horsmonden, Lamberhurst, Paddock Wood, Sandhurst
199	Maidstone (NE)	Boxley, Detling, Harrietsham and Lenham, Hollingbourne, Thurnham
200	Maidstone	Allington, Bearsted, Bridge, East, Heath, High Street, Langley, North, Park Wood, Shepway East, Shepway West, South
201	Maidstone (S)	Barming, Boughton Monchelsea, Coxheath, Farleigh, Headcorn, Leeds, Loose, Marden, Staplehurst, Sutton Valence, Yalding
202	Faversham	Abbey, Boughton, Courtenay, Davington Priory, East Downs, St.Ann's, Teynham and Lynsted, Watling, West Downs
203	Sittingbourne	Borden, Eastern, Grove, Hartlip and Upchurch, Iwade and Lower Halstow, Kemsley, Milton Regis, Minster Cliffs, Murston, Newington, Queenborough and Halfway, Roman, Sheerness East, Sheerness West, Sheppey Central, Woodstock
204	Gillingham	Beechings, Brompton, Hempstead and Wigmore, Medway, North, Park Wood, Priestfield, Rainham, Rainham Mark, Riverside, St.Margaret's, South, Twydall, Watling Street
205	Rochester (N)	All Saints, Frindsbury Extra, Hoo St.Werburgh, Thames Side
206	Rochester	Cuxton and Halling, Earl, Frindsbury, Rede Court, Temple Farm
207	Tonbridge	Cage Green, Castle, Higham, Hildenborough, Judd, Medway, Trench, Vauxhall
208	Tonbridge (NE)	Aylesford and Eccles, Blue Bell Hill, Burham and Wouldham, Ditton, East Malling, Larkfield, Snodland
209	Tonbridge	Birling, Ryarsh and Leybourne, Borough Green, East Peckham, Hadlow, Ightham, Mereworth and West Peckham, Oast, Platt, Plaxtol and Shipbourne, Wateringbury, West Malling, Wrotham
210	Gravesham (S)	Cobham and Luddesdown, Higham, Istead, Meopham North, Meopham South, Shorne
211	Gravesend	Central, Chalk, Coldharbour, Northfleet East, Northfleet West, Painters Ash, Pelham, Riverside, Riverview, Singlewell, Westcourt, Whitehill, Woodlands
212	Dartford	Brent, Gundulf, Heath, Joyce Green, Littlebrook, Maypole, Miskin, Newtown, Princes, Priory, Wilmington Central, Wilmington East, Wilmington West
213	Swanscombe	Galley Hill, Greenhithe, Stone, Swanscombe
214	Dartford (S)	Bean, Darenth, Horns Cross, Longfield, Southfleet, Sutton-at-Hone and Hawley
215	Sevenoaks (S)	Edenbridge North, Edenbridge South, Leigh, Penshurst and Fordcombe, Sevenoaks Weald and Underriver, Somerden

216	Sevenoaks (W)	Brasted, Chevening, Halst'd Knockholt & Badgers Mt, Sundridge and Ide Hill, Westerham and Crockham Hill
217	Sevenoaks	Dunton Green, Otford, Riverhead, Sevenoaks Kippington, Sevenoaks Northern, Sevenoaks Town and St.John's, Sevenoaks Wildernesse
218	Sevenoaks (NW)	Hextable and Swanley Village, Swanley Christchurch, Swanley St.Mary's, Swanley White Oak
219	Sevenoaks (N)	Crockenhill, Eynsford, Farningham, Kemsing, Seal, Shoreham, West Kingsdown
220	Sevenoaks (N)	Ash-cum-Ridley, Fawkham and Hartley, Horton Kirby
221	Folkestone	Folkestone Central, Folkestone Cheriton, Folkestone East, Folkestone Foord, Folkestone Harbour, Folkestone Harvey, Folkestone Morehall, Folkestone Park, Folkestone Sandgate, Hythe East, Hythe North, Hythe South, Hythe West
222	Chatham	Holcombe, Horsted, Lordswood, Luton, St.Margarets and Borstal, Town, Troy Town, Walderslade, Warren Wood, Wayfield, Weedswood
223	Cherwell	Adderbury, Ambrosden, Ardley, Bicester East, Bicester South, Bicester West, Bloxham, Bodicote, Calthorpe, Chesterton, Cropredy, Deddington, Easington, Fringford, Gosford, Grimsbury, Hardwick, Heyford, Hook Norton, Hornton, Kirtlington, Launton, Neithrop, North West Kidlington, Otmoor, Ruscote, Sibford, South East Kidlington, Steeple Aston, Wroxton, Yarnton
224	Oxford	Blackbird Leys, Central, Cherwell, East, Headington, Iffley, Littlemore, Marston, North, Old Marston and Risinghurst, Quarry, St.Clement's, South, Temple Cowley, West, Wolvercote, Wood Farm
225	South Oxfordshire	Aston Rowant, Benson, Berinsfield, Brightwell, Chalgrove, Chinnor, Cholsey, Clifton Hampden, Crowmarsh, Didcot North, Didcot Northbourne, Didcot South, Dorchester, Forest Hill, Garsington, Goring, Goring Heath, Great Milton, Hagbourne, Henley, Horspath, Kidmore End, Nettlebed, Rotherfield Peppard, Shiplake, Sonning Common, Thame North, Thame South, Wallingford, Watlington, Wheatley, Woodcote
226	Oxfordshire (W)	Abbey, Appleton, Caldecott, Craven, Cumnor, Drayton, Faringdon and Littleworth, Fitzharris, Greendown, Grove, Harwell and Chilton, Hendred, Hinksey, Icknield, Island Villages, Kennington, Kingston Bagpuize and Southmoor, Longworth, Marcham, Northcourt, Ock, Radley, St.Helen Without, Segsbury, Shrivenham, Stanford, Steventon, Sunningwell and Wooton, Sutton Courtenay, The Coxwells, Upton and Blewbury, Ascott and Shipton, Aston Bampton and Standlake, Bampton, Bartons, Bladon and Cassington, Brize Norton and Curbridge, Burford, Carterton North, Carterton South, Chadlington, Charlbury, Chipping Norton, Clanfield and Shilton, Combe and Stonesfield, Ducklington, Enstone, Eynsham, Filkins and Langford, Finstock and Leafield, Freeland and Hanborough, Hailey, Kingham, Milton-under-Wychwood, Minster Lovell, North Leigh, Rollright, Stanton Harcourt, Tackley and Wootton, Witney East, Witney North, Witney South, Witney West, Woodstock
227	Surrey Heath	Bagshot, Bisley, Chobham, Frimley, Frimley Green, Heatherside, Lightwater, Mytchett, Old Dean, Parkside, St.Michaels, St.Pauls, Town, Watchetts, West End, Windlesham
228	Woking	Brookwood, Byfleet, Central and Maybury, Goldsworth Park, Horsell East and Woodham, Horsell West, Kingfield and Westfield, Knaphill, Mayford and Sutton, Mount Hermon East, Mount Hermon West, Old Woking, Pyrford, St.John's, Sheerwater, West Byfleet

229	Waverley	Alford and Dunsfold, Blackheath and Wonersh, Bramley, Busbridge Hambledon & Hascombe, Chiddingfold, Cranleigh East, Cranleigh West, Elst'd Peper Harrow & Thursley, Ewhurst, Farnham Bourne, Farnham Castle, Farnham Hale and Heath End, Farnham Rowledge & Wrecclesham, Farnham Upper Hale, Farnham Waverley, Farnham Weyb'rne & Badshot Lea, Frensham Dockenfield & Tilford, Godalming North, Godalming NE and SW, Godalming North West, Godalming South East, Haslemere North and Grayswood, Haslemere South, Hindhead, Milford, Shamley Green, Shottermill, Witley
230	Guildford (W)	Ash, Ash Vale, Normandy, Pirbright, Shalford, The Pilgrims, Tongham, Worplesdon
231	Guildford	Christchurch, Friary and St.Nicholas, Holy Trinity, Merrow and Burpham, Onslow, Stoke, Stoughton, Westborough
232	Guildford (E)	Clandon and Horsley, Effingham, Lovelace, Send, Tillingbourne
233	Tandridge (S)	Bletchingley, Burstow and Horne, Chelsham & F'leigh, Tat. & Tit., Dormans, Felbridge, Godstone, Limpsfield, Lingfield and Crowhurst, Nutfield, Oxted North and Tandridge, Oxted South, Woldingham
234	Tandridge (NW)	Chaldon, Harestone, Portley, Queens Park, Valley, Warlingham East, Warlingham West, Westway, Whyteleafe
235	Reigate	Horley East, Horley West, Reigate Central, Reigate East, Reigate North, Reigate North Central, Reigate North East, Reigate South Central, Reigate South East, Reigate South West, Salfords And Sidlow
236	Kingswood	Banstead Village, Chipst'd-Hooley & Woodmanst'ne, Kingswood with Burgh Heath, Nork, Preston, Tadworth And Walton, Tattenhams
237	Epsom	College, Court, Stamford, Town, Woodcote
238	Ewell	Auriol, Cuddington, Ewell, Ewell Court, Nonsuch, Ruxley, Stoneleigh, West Ewell
239	Mole Valley (S)	Box Hill, Charlwood, Holmwood and Beare Green, Leith Hill, Okewood, Rural East, Rural South, Westcott
240	Dorking	Brockham, Dorking North-East, Dorking North-West, Dorking South-East, Dorking South-West, North Holmwood
241	Leatherhead (SW)	Bookham North, Bookham South, Fetcham East, Fetcham West, Leatherhead North, Leatherhead South
242	Leatherhead (NE)	Ashtead Common, Ashtead Park, Ashtead Village
243	Cobham	Cobham and Downside, Cobham Fairmile, Oxshott and Stoke D'Abernon
244	Weybridge	Hersham North, Hersham South, Oatlands Park, St.George's Hill, Walton Ambleside, Walton Central, Walton North, Walton South, Weybridge North, Weybridge South
245	Esher	Claygate, Esher, Hinchley Wood, Long Ditton, Molesey East, Molesey North, Molesey South, Thames Ditton, Weston Green
246	Spelthorne	Ashford Common, Ashford East, Ashford North, Ashford Town, Ashford West, Halliford and Sunbury West, Laleham, Shepperton Green, Shepperton Town, Staines East, Staines Town, Stanwell North, Stanwell South, Sunbury Common, Sunbury East, The Moors
247	Runnymede (NW)	Virginia Water

248	Runnymede (NE)	Addlestone Bourneside, Addlestone North, Addlestone St.Paul's, Chertsey Meads, Chertsey St.Ann's, Egham, Englefield Green East, Englefield Green West, Hythe, New Haw, Thorpe, Woodham
249	Runnymede (S)	Foxhills
250	Chichester	Birdham, Bosham, Boxgrove, Bury, Chichester East, Chichester North, Chichester South, Chichester West, Donnington, Easebourne, East Wittering, Fernhurst, Fishbourne, Funtington, Graffham, Harting, Hunston, Lavant, Linchmere, Lodsworth, Midhurst, Oving, Petworth, Plaistow, Rogate, Selsey North, Selsey South, Sidlesham, Southbourne, Stedham, Stoughton, Westbourne, West Wittering, Wisborough Green
251	Horsham	Billingshurst, Bramber and Upper Beeding, Broadbridge Heath, Chanctonbury, Cowfold, Denne, Forest, Henfield, Holbrook, Itchingfield and Shipley, Nuthurst, Pulborough, Riverside, Roffey North, Rudgwick, Rusper, Slinfold, Southwater, Steyning, Storrington, Sullington, Trafalgar, Warnham, West Chiltington, West Grinstead
252	Adur	Buckingham, Churchill, Cokeham, Eastbrook, Hillside, Manor, Marine, Mash Barn, Peverel, St.Mary's, St.Nicholas, Southlands, Southwick Green, Widewater, Broadwater, Castle, Central, Durrington, Gaisford, Goring, Heene, Marine, Offington, Salvington, Selden, Tarring
253	Crawley	Bewbush, Broadfield, Furnace Green, Gossops Green, Ifield, Langley Green, Northgate, Pound Hill North, Pound Hill South, Southgate, Three Bridges, Tilgate, West Green
254	Bognor Regis	Aldingbourne, Angmering, Arundel, Barnham, Walberton
255	Arundel	Aldwick East, Aldwick West, Bersted, East Preston and Kingston, Felpham East, Felpham West, Ferring, Findon, Hotham, Littlehampton Beach, Littlehampton Central, Littlehampton Ham, Littlehampton River, Littlehampton Wick, Marine, Middleton-on-Sea, Orchard, Pagham, Pevensey, Rustington East, Rustington North, Rustington South
256	Haywards Heath	Ardingly, Balcombe, Bolney, Burgess Hill-Chanctonbury, Burgess Hill-Franklands, Burgess Hill-North, Burgess Hill-St.Andrews, Burgess Hill-Town, Burgess Hill-West, Clayton, Copthorne and Worth, Crawley Down, Cuckfield, East Grinstead East, East Grinstead North, East Grinstead South, East Grinstead West, Haywards Heath Ashenground, Haywards Heath Bentswood, Haywards Heath Franklands, Haywards Heath Harlands, Haywards Heath-Heath, Horsted Keynes, Hurstpierpoint, Keymer, Lindfield Rural, Lindfield Urban, Slaugham, Turners Hill, West Hoathly
270	South Beds	Caddington, Eaton Bray, Kensworth, Slip End, Stanbridge, Studham, Totternhoe
271	Leighton Buzzard	Barton-Le-Clay, Heath And Reach, Hockliffe, Streatley, Toddington
272	Luton	Biscot, Bramingham, Challney, Crawley, Dallow, Farley, High Town, Icknield, Leagrave, Lewsey, Limbury, Putteridge, Saints, South, Stopsley, Sundon Park, Dunstable Central, Houghton Central, Houghton East, Houghton South, Icknield, Northfields, Priory, Watling
273	Ampthill	Ampthill, Aspley, Cranfield, Flitwick East, Flitwick West, Marston, Woburn
274	Biggleswade	Arlesey, Biggleswade Ivel, Biggleswade Stratton, Blunham, Campton And Meppershall, Clifton And Henlow, Clophill, Flitton And Pulloxhill, Harlington, Haynes And Houghton Conquest, Langford, Maulden, Northill, Old Warden And Southill, Potton, Sandy All Saints, Sandy St.Swithuns, Shefford, Shillington and Stondon, Stotfold, Wensley, Westoning, Wrest,

275	Bedford	Brickhill, Castle, Cauldwell, De Parys, Goldington, Harpur, Kempston East, Kempston West, Kingsbrook, Newnham, Putnoe, Queens Park
276	North Beds	Bromham, Carlton, Clapham, Felmersham, Harrold, Kempston Rural, Oakley, Riseley, Sharnbrook, Wootton, Eastcotts, Great Barford, Renhold, Roxton, Wilshamstead
277	Dunstable	Beaudesert, Brooklands, Linslade, Plantation, Southcott
278	Cambridge	Abbey, Arbury, Castle, Cherry Hinton, Coleridge, East Chesterton, King's Hedges, Market, Newnham, Petersfield, Queen Edith's, Romsey, Trumpington, West Chesterton
279	East Cambridgeshire (N)	Downham, Ely Northern, Ely Southern, Ely West, Fordham Villages, Haddenham, Isleham, Littleport, Soham, Stretham, Sutton, Witchford
280	South Cambridgeshire (N)	Arrington, Bar Hill, Barrington and Shepreth, Barton, Bassingbourn, Bourn, Comberton, Coton, Cottenham, Elsworth, Gamlingay, Girton, Hardwick, Haslingfield, Histon, Longstanton, Melbourn, Meldreth, Milton, Orwell, Over, Papworth, Swavesey, The Mordens, Waterbeach, Willingham
281	South Cambridgeshire (S)	Abington, Balsham, Castle Camps, Duxford, Foxton, Fulbourn, Great Shelford, Harston, Ickleton, Linton, Little Shelford, Sawston, Stapleford, Teversham, The Wilbrahams, Whittlesford
282	Huntingdon	Brampton, Buckden, Bury, Earith, Eaton Ford, Eaton Socon, Ellington, Elton, Eynesbury, Farcet, Fenstanton, Godmanchester, Gransden, Hemingford Abbots and Hilton, Hemingford Grey, Houghton And Wyton, Huntingdon North, Huntingdon West, Kimbolton, Needingworth, Paxton, Priory Park, Ramsey, St.Ives North, St.Ives South, Sawtry, Somersham, Staughton, Stilton, The Offords, The Stukeleys, Upwood and The Raveleys, Warboys, Yaxley
283	Fenland	Benwick and Doddington, Chatteris East, Chatteris North, Chatteris South, Chatteris West, Elm, Leverington, Manea, March East, March North, March West, Newton and Tydd St.Giles, Outwell and Upwell, Parson Drove & Wisbech St.Mary, Whittlesey Bassenhally, Whittlesey Central, Whittlesey East, Whittlesey Kingsmoor, Whittlesey South, Whittlesey West, Wimblington, Wisbech East, Wisbech North, Wisbech North East, Wisbech South West
284	Peterborough	Barnack, Bretton, Central, Dogsthorpe, East, Eye, Fletton, Glinton, Newborough, North, Northborough, Orton Longueville, Orton Waterville, Park, Paston, Ravensthorpe, Stanground, Thorney, Walton, Werrington, West, Wittering
285	East Cambridgeshire (S)	Bottisham, Burwell, Cheveley, Dullingham Villages, The Swaffhams, Woodditton
286	Thurrock (W)	Aveley, Belhus, Chadwell St.Mary, Grays Thurrock North, Grays Thurrock Town, Little Thurrock, Ockendon, Stifford, Tilbury, West Thurrock
287	Thurrock (E)	Corringham and Fobbing, Stanford-le-Hope, The Homesteads
288	Tilbury	East Tilbury, Orsett
289	Castle Point	Appleton, Boyce, Canvey Island Central, Canvey Island East, Canvey Island North, Canvey Island South, Canvey Island West, Canvey Island Winter Gardens, Cedar Hall, St.George's, St.James, St.Mary's, St.Peter's, Victoria
290	Southend	Belfairs, Blenheim, Chalkwell, Eastwood, Leigh, Milton, Prittlewell, St.Lukes, Shoebury, Southchurch, Thorpe, Victoria, Westborough

291	Rochford	Ashingdon, Barling and Sutton, Canewdon, Downhall, Foulness & Great Wakering East, Grange and Rawreth, Great Wakering Central, Great Wakering West, Hawkwell East, Hawkwell West, Hockley Central, Hockley East, Hockley West, Hullbridge Riverside, Hullbridge South, Lodge, Rayleigh Central, Rochford Eastwood, Rochford Roche, Rochford St.Andrews, Trinity, Wheatley, Whitehouse
292	Maldon	Althorne, Burnham-on-Crouch North, Burnham-on-Crouch South, Cold Norton, Goldhanger, Great Totham, Heybridge East, Heybridge West, Maldon East, Maldon North West, Maldon South, Purleigh, St.Lawrence, Southminster, The Maylands, Tillingham, Tollesbury, Tolleshunt D'arcy, Wickham Bishops, Woodham
293	Tendring	Alresf'd, Thorrington & Frating, Ardleigh, Beaumont and Thorpe, Bockings Elm, Bradfield Wrabness and Wix, Brightlingsea East, Brightlingsea West, Elmstead, Frinton, Golf Green, Great and Little Oakley, Great Bentley, Gt & Lt Bromley & Lt Bentley, Harwich East, Harwich East Central, Harwich West, Harwich West Central, Haven, Holland and Kirby, Lawford and Manningtree, Little Clacton, Mistley, Ramsey, Rush Green, St.Bartholomews, St.James, St.Johns, St.Marys, St.Osyth, Southcliff, Tendring and Weeley, Walton
294	Colchester	Berechurch, Castle, East Donyland, Harbour, Lexden, Mile End, New Town, Prettygate, St.Andrew's, St.Anne's, St.John's, St.Mary's, Shrub End, Stanway, Wivenhoe
295	Colchester (W)	Birch/Messing and Copford, Pyefleet, Tiptree, West Mersea, Winstree
296	Braintree	Black Notley, Bocking North, Bocking South, Braintree Central, Braintree East, Braintree West
297	Witham	Hatfield Peverel, Witham Central, Witham Chipping Hill, Witham North, Witham South, Witham West
298	Braintree (N)	Bumpstead, Castle Hedingham, Coggeshall, Colne Engaine & Greenst'd Gr'n, Cressing, Earls Colne, Gosfield, Halstead St.Andrews, Halstead Trinity, Kelvedon, Panfield, Rayne, Sible Hedingham, Stour Valley Central, Stour Valley North, Stour Valley South, Terling, Three Fields, Upper Colne, Yeldham, Witham Silver End and Rivenhall
299	Chelmsford (SE)	Boreham, East and West Hanningfield, Gt & Lt Leighs & Lt Waltham, Little Baddow Danbury & Sandon, Rettendon and Runwell, South Hanningfield, S Woodham-Collingwood E & W, S Woodham-Elmwood & Woodville, Woodham Ferrers and Bicknacre
300	Chelmsford	All Saints, Baddow Rd & Gt Baddow Village, Cathedral, Galleywood, Goat Hall, Moulsham Lodge, Old Moulsham, Patching Hall, Rothmans, St.Andrews, Springfield North, Springfield South, The Lawns, Waterhouse Farm
301	Chelmsford (N)	Broomf'ld, Pleshey & Gt Waltham, Chig., Gd. E., Mash. H. & Rox., Margaretting and Stock, Writtle
302	Basildon	Fryerns Central, Fryerns East, Laindon, Langdon Hills, Lee Chapel North, Nethermayne, Pitsea East, Pitsea West, Vange
303	Billercay	Billericay East, Billericay West, Burstead, Wickford North, Wickford South
305	Brentwood (N)	Blackmore, Brizes and Doddinghurst, Hook End and Wyatts Green, Ingatestone and Fryerning, Mountnessing
306	Brentwood	Brentwood North, Brentwood South, Brentwood West, Hutton East, Hutton North, Hutton South, Pilgrims Hatch, Shenfield, South Weald, Warley, Herongate and Ingrave, West Horndon

307	Harlow	Brays Grove, Great Parndon, Hare Street and Town Centre, Katherines with Sumners, Kingsmoor, Latton Bush, Little Parndon, Mark Hall North, Mark Hall South, Netteswell East, Netteswell West, Old Harlow, Passmores, Potter Street, Stewards, Tye Green
308	Theydon Bois	Lambourne, Passingford
309	Loughton	Broadway, Buckhurst Hill East, Buckhurst Hill West, Chigwell Row, Chigwell Village, Debden Green, Epping Hemnall, Grange Hill, Loughton Forest, Loughton Roding, Loughton St.John's, Loughton St.Mary's, Theydon Bois
310	Epping Forest (W)	Paternoster, Waltham Abbey East, Waltham Abbey West
311	Epping	Epping Lindsey, High Beach, Nazeing, North Weald Bassett, Roydon
312	Chipping Ongar	Chipping Ongar, Greensted and Marden Ash, High Ongar, Moreton and Matching, Roothing Country, Sheering, Shelley
313	Stansted Airport	Birchanger, Clavering, Elsenham, Great Hallingbury, Hatfield Broad Oak, Hatfield Heath, Henham, Littlebury, Little Hallingbury, Newport, Rickling, Stansted Mountfitchet, Stort Valley, The Chesterfords, Wenden Lofts
314	Uttlesford	Ashdon, Felsted, Great Dunmow(North), Great Dunmow(South), Saffron Walden(Audley), Saffron Walden(Castle), Saffron Walden(Plantation), Saffron Walden(Shire), Stebbing, Thaxted, The Eastons, The Sampfords, Wimbish and Debden ,Takeley, The Canfields, The Rodings
315	Colchester	Boxted and Langham, Dedham, Fordham, Great and Little Horkesley, Great Tey, Marks Tey, W Bergholt & Eight Ash Green
316	Hoddeson	Great Amwell, Hunsdon, Little Amwell, Much Hadham, Sawbridgeworth, Stanstead
317	Hertford	Hertford Bengeo, Hertford Castle, Hertford Kingsmead, Hertford Sele, Ware Christchurch, Ware Priory, Ware St.Mary's, Ware Trinity
318	East Hertfordshire	Braughing, Buntingford, Cottered, Datchworth, Little Hadham, Munden, Standon St.Mary, Stapleford, Tewin, Thundridge, Walkern, Watton-at-Stone
319	Stevenage	Bandley Hill, Bedwell Plash, Chells, Longmeadow, Martins Wood, Mobbsbury, Monkswood, Old Stevenage, Pin Green, Roebuck, St.Nicholas, Shephall, Symonds Green, Wellfield
320	North Hertfordshire	Arbury, Ashbrook, Baldock, Bearton, Cadwell, Codicote, Grange, Highbury, Hitchwood, Hoo, Kimpton, Knebworth, Letchworth East, Letchworth South East, Letchworth South West, Newsells, Offa, Oughton, Priory, Royston East, Royston West, Sandon, Walsworth, Weston, Wilbury
321	Hatfield	Brookmans Park and Little Heath, Hatfield East, Northaw, Welham Green and Redhall
322	Welwyn	Haldens, Handside, Hatfield Central, Hatfield North, Hatfield West, Hollybush, Howlands, Peartree, Sherrards, Welwyn East, Welwyn West
323	Potters Bar	Potters Bar Central, Potters Bar East, Potters Bar North, Potters Bar South
324	South Mimms	Potters Bar West, Shenley
325	Borehamwood	Aldenham East, Aldenham West, Brookmeadow, Campions, Cowley, Elstree, Heath North, Heath South, Hillside, Kenilworth, Lyndhurst, Mill, St.James East, St.James West
326	Watford	Callowland, Central, Holywell, Leggatts, Meriden, Nascot, Oxhey, Park, Stanborough, Tudor, Vicarage, Woodside

327	Three Rivers	Abbots Langley, Ashridge, Bedmond, Carpenders Park, Chorleywood, Chorleywood West, Croxley Green, Croxley Green North, Croxley Green South, Hayling, Langleybury, Leavesden, Maple Cross and West Hyde, Mill End, Money Hill, Moor Park, Northwick, Oxhey Hall, Rickmansworth, Sarratt
328	St.Albans	Ashley, Batchwood, Clarence, Cunningham, London Colney, Marshalswick North, Marshalswick South, St.Peters, Sopwell, Verulam
329	Harpenden	Colney Heath, Harpenden East, Harpenden North, Harpenden South, Harpenden West, Park Street, Redbourn, St.Stephens, Sandridge, Wheathampstead
330	Hemel Hempstead	Adeyfield East, Adeyfield West, Bennetts End, Berkhamsted Central, Berkhamsted East, Berkhamsted West, Bovingdon and Flaunden, Boxmoor, Central, Chaulden, Chipperfield, Crabtree, Cupid Green, Gadebridge, Grove Hill, Highfield, Kings Langley, Leverstock Green, Nash Mills, South, Warners End
331	Tring	Aldbury and Wigginton, Ashridge, Flamstead and Markyate, Northchurch, Tring Central, Tring East, Tring West
332	Bishop’s Stortford	Bishop’s Stortford Central, Bishop’s Stortford Chantry, Bishop’s Stortford Parsonage, Bishop’s Stortford Thorley
333	Cheshunt	Goffs Oak
334	Broxbourne	Broxbourne, Bury Green, Cheshunt Central, Cheshunt North, Flamstead End, Hoddesdon North, Hoddesdon Town, Rosedale, Rye Park, Theobalds, Waltham Cross North, Waltham Cross South, Wormley And Turnford
335	Norwich	Bowthorpe, Catton Grove, Coslany, Crome, Eaton, Heigham, Henderson, Lakenham, Mancroft, Mile Cross, Mousehold, Nelson, St.Stephen, Thorpe Hamlet, Town Close, University

336	Norfolk	Abbey, Abbeyfield, Acle, Airfield, All Saints, Astley, Aylsham, Bacton, Beauchamp, Beck Vale, Beckhithe, Beetley and Gressenhall, Berners, Besthorpe, Blakeney, Blofield, Bodham, Boyland, Bradwell North, Bradwell South and Hopton, Broads, Brookwood, Brundall, Buckenham, Burlingham, Burnham, Buxton, Caister North, Caister South, Catfield, Catton, Cawston, Chase, Chaucer, Chet, Clavering, Claydon, Clenchwarton, Cley, Coltishall, Conifer, Corpusty, Creake, Cringleford and Colney, Cromer, Cromwells, Crown Point, Denton, Denver, Depwade, Dersingham, Dickleburgh, Diss Town, Ditchingham, Docking, Downham Market, Drayton, East Dereham-Neatherd, East Dereham-St.Withburga, East Dereham-Toftwood, East Dereham-Town, East Guiltcross, Emneth, Erpingham, Eynsford, Fleggburgh, Forehoe, Foulsham, Four Stowes, Freethorpe, Fulmodeston, Gayton, Gaywood Central, Gaywood North, Gaywood South, Glaven, Gorleston, Great Witchingham, Grimston, Haggard de Toni, Hainford, Happisburgh, Harleston, Harling, Haverscroft, Heacham, Heathlands, Hellesdon North, Hellesdon Southeast, Hellesdon West, Hempnall, Hemsby, Hermitage, Hevingham, Hickling, Hingham, Horning, Horsefen, Horsford, Hoveton, Humbleyard, Hunstanton, Kidner, Lancaster, Launditch, Lichfield and Cobholm, Long Row, Lothingland, Lynn Central, Lynn North, Lynn South West, Magdalen East, Magdalen West, Marshland, Martham, Mattishall, Mergate, Mershe Lande, Middleton, Mid-Forest, Mundesley, Nar Valley, Neatishead, Necton, Nelson, New Costessey, North Coast, North Walsham East, North Walsham West, Northfields, Northgate, Old Costessey, Ormesby, Overstrand, Pastonacres, Peddars Way, Plumstead, Priory, Queen's, Rackheath, Reedham, Reepham, Regent, Rollesby, Rosebery, Roughton, Rudham, Rustens, Scottow, Sheringham, Shipworth, Smockmill, Snettisham, South Walsham, Spellowfields, Spixworth, Springfields, Springvale, Sprowston Central, Sprowston East, Sprowston South, Sprowston West, St.Andrews, St.Faiths, St.Lawrence, St.Margarets, Stalham, Stratton, Suffield Park, Swaffham, Swanton Morley, Tasvale, Taverham, Taverner, Templar, Ten Mile, The Raynhams, The Runtons, The Walpoles, The Woottons, Thetford-Abbey, Thetford-Barnham Cross, Thetford-Guildhall, Thetford-Saxon, Thorpe St.Andrew Northeast, Thorpe St.Andrew Northwest, Thorpe St.Andrew South, Town, Two Rivers, Upper Wensum, Upper Yare, Upwell,Outwell and Delph, Valley, Valley Hill, Walsingham, Watlington, Watton, Waveney, Wayland, Weeting, Wells, Wensum Valley, West Guiltcross, West Walton, West Winch, Westwood, Wiggenhall, Winterton and Somerton, Wissey, Wissey, Wodehouse, Worstead, Wroxham, Yarmouth North
337	Ipswich	Bixley, Bridge, Broom Hill, Castle Hill, Chantry, Gainsborough, Priory Heath, Rushmere, St.Clement's, St.John's, St.Margaret's, Sprites, Stoke Park, Town, White House, Whitton

338	Suffolk (E)	Aldeburgh, Alderton and Sutton, Alton, Badwell Ash, Barham, Barking, Bealings, Beccles Town, Beccles Worlingham, Berners, Bildeston, Blything, Boxford, Bramfield and Cratfield, Bramford, Brantham, Brett Vale, Brookvale, Bungay, Bures St.Mary, Buxlow, Capel and Wenham, Carlton, Carlton Colville, Chadacre, Claydon, Copdock, Creeting, Debenham, Dennington, Dodnash, Earl Soham, Elmsett, Elmswell, Eye, Felixstowe Central, Felixstowe East, Felixstowe North, Felixstowe South, Felixstowe South East, Felixstowe West, Framlingham, Fressingfield, Gislingham, Glemham, Glemsford, Great Cornard North, Great Cornard South, Grundisburgh and Witnesham, Gunton, Hadleigh, Halesworth, Harbour, Hasketon, Haughley and Wetherden, Helmingham, Holbrook, Hollesley, Hoxne, Kelsale, Kesgrave, Kessingland, Kirkley, Kirton, Lavenham, Leavenheath, Leiston, Long Melford, Lothingland, Martlesham, Melton, Mendlesham, Mutford, Nacton, Nayland, Needham Market, Normanston, North Cosford, Norton, Onehouse, Orford, Otley, Oulton Broad, Pakefield, Palgrave, Polstead And Layham, Rattlesden, Rickinghall, Ringshall, Rushmere, Saxmundham, Shotley, Snape, South Elmham, Southwold, St.Margarets, Stonham, Stowmarket Central, Stowmarket North, Stowmarket South, Stowupland, Stradbroke, Sudbury East, Sudbury North, Sudbury South, Thurston, Trimleys, Tunstall, Ufford, Wainford, Walberswick, Waldingfield, Walsham-le-Willows, West Samford, Westleton, Wetheringsett, Weybread, Whitton, Wickham Market, Woodbridge Centre, Woodbridge Farlingaye, Woodbridge Kyson, Woodbridge Riverside, Woodbridge Seckford, Woolpit, Worlingworth, Yoxford
339	Suffolk (W)	Brandon East, Brandon West, Exning, Granby, Great Heath, Iceni, Lakenheath, Manor, Market, Mill, St.Mary’s, Severals, South, Studlands Park, The Rows, Abbeygate, Barningham, Barrow, Cangle, Castle, Cavendish, Chalkstone, Chevington, Clare, Clements, Eastgate, Fornham, Great Barton, Honington, Horringer, Horringer Court, Hundon, Ixworth, Kedington, Northgate, Pakenham, Risby, Risbygate, Rougham, St.Mary’s and Helions, St.Olaves, Sextons, Southgate, Stanton, Westgate, Whelnetham, Wickhambrook, Withersfield

TABLE E2: POINT ZONES (AIRPORTS AND PORTS)

Point Zones	Name
28	City Airport
101	Heathrow central
102	Heathrow south
103	Heathrow east
104	Heathrow north
105	Heathrow west
106	Heathrow Terminal 5
257	Gatwick airport
269	Luton airport
340	Stansted airport
341	Felixtowe port
342	Harwich port
343	Tilbury port
344	Dover port
345	Folkestone port
346	Southampton port

TABLE E3: DUMMY ZONE AND EXTERNAL ZONES (REST OF GREAT BRITIAN)

Zone	Name	Constituent County/Counties
349	Dummy	None (modelling device only)
350	Dorset	Dorset
351	Wiltshire	Wiltshire
352	Gloucestershire	Gloucestershire
353	Warwickshire	Warwickshire
354	Northamptonshire	Northamptonshire
355	Leicestershire	Leicestershire
356	Lincolnshire	Lincolnshire
357	West Midlands	West Midlands
358	Hereford and Worcestershire	Hereford & Worcestershire
359	Staffordshire	Staffordshire
360	Shropshire	Shropshire
361	Derbyshire	Derbyshire
362	Nottinghamshire	Nottinghamshire
363	South west	Somerset, Devon, Cornwall
364	Avon	Avon
365	Wales - south	Gwent, South/ Mid & West Glamorgan,
366	Wales - Mid	Dyfed, Powys
367	Wales - North	Gwynedd, Clwyd
368	North west	Cheshire, Lancashire, Gt. Manchester, Merseyside, Cumbria
369	Yorkshire & Humberside	Humberside, West Yorkshire, South Yorkshire, North Yorkshire
370	North East	Cleveland, Tyne & Wear, Northumberland, Durham
371	Scotland	

APPENDIX F: CE SCENARIO EMPLOYMENT

TABLE F1: WORKPLACE EMPLOYMENT IN LONDON
THE CE SCENARIO

Boroughs	2001	2016	2021	2001-2016		2016-2021	
	Thousands			Level	%	Level	%
City of London	312	344	361	32	10.4	16	4.7
Camden	227	265	279	38	16.6	14	5.2
Hackney	74	83	87	9	12.1	4	4.7
Hammersmith And Fulham	100	116	124	16	16.1	8	7.3
Haringey	63	72	76	9	14.3	4	5.3
Islington	138	155	162	17	12.1	7	4.6
Kensington And Chelsea	102	111	116	9	9.2	5	4.2
Lambeth	113	133	137	20	17.8	4	2.7
Lewisham	65	70	73	6	8.6	3	4.1
Newham	67	76	79	8	12.4	3	4.4
Southwark	142	143	148	1	0.8	5	3.6
Tower Hamlets	157	162	162	5	3.0	0	-0.1
Wandsworth	98	114	122	17	17.3	8	6.7
Westminster	510	542	556	32	6.2	14	2.6
Barking And Dagenham	52	48	52	-4	-7.0	3	6.3
Barnet	107	112	118	6	5.3	6	5.0
Bexley	68	72	72	4	6.3	0	0.5
Brent	90	93	94	3	3.6	1	1.0
Bromley	103	114	118	11	10.9	4	3.8
Croydon	128	128	129	0	0.0	1	0.8
Ealing	110	116	118	7	6.1	1	1.2
Enfield	90	92	93	2	1.8	2	1.9
Greenwich	65	72	75	8	11.8	3	4.0
Harrow	67	68	68	0	0.5	0	0.5
Havering	76	78	78	2	2.2	0	0.1
Hillingdon	175	178	181	3	1.7	3	1.5
Hounslow	109	111	116	2	1.6	5	4.5
Kingston Upon Thames	66	74	76	8	11.7	2	2.8
Merton	66	75	79	9	13.9	4	5.0
Redbridge	69	78	81	10	13.9	3	3.9
Richmond Upon Thames	68	72	76	4	5.7	4	5.4
Sutton	67	73	75	7	9.8	2	2.1
Waltham Forest	61	61	63	0	0.7	2	2.9
London	3804	4103	4243	299	7.9	140	3.4

TABLE F2: WORKPLACE EMPLOYMENT IN THE SOUTH EAST
THE CE SCENARIO

Districts	2001	2016	2021	2001-2016		2016-2021	
	Thousands			Level	%	Level	%
Bracknell Forest	62	71	76	9	14.8	6	8.1
West Berkshire	78	93	95	14	18.0	3	3.0
Reading	94	106	111	12	13.1	4	4.1
Slough	72	80	84	8	10.8	4	5.4
Windsor And Maidenhead	70	83	86	13	18.0	3	3.1
Wokingham	65	81	90	15	23.5	9	11.7
Aylesbury Vale	69	72	77	3	4.4	4	6.2
Chiltern	32	39	42	7	21.5	3	6.5
Milton Keynes	124	132	138	8	6.7	5	4.1
South Buckinghamshire	30	34	37	4	13.6	3	8.9
Wycombe	79	89	97	10	12.5	8	8.8
Brighton And Hove	112	115	118	3	2.6	3	2.3
Eastbourne	37	40	41	3	7.9	1	3.1
Hastings	32	37	38	5	15.4	1	2.9
Lewes	36	41	43	5	15.2	2	4.0
Rother	28	32	33	4	14.0	1	4.2
Wealden	47	54	58	7	14.7	4	7.3
Basingstoke And Deane	80	88	91	8	10.1	3	3.9
East Hampshire	43	48	48	4	9.9	1	1.8
Eastleigh	57	65	64	8	13.3	0	-0.2
Fareham	46	53	54	6	13.8	1	1.7
Gosport	27	29	33	2	7.3	4	15.1
Hart	36	41	43	5	13.7	1	3.2
Havant	42	45	46	3	8.1	1	1.5
New Forest	64	71	73	6	9.9	2	3.3
Portsmouth	105	116	124	11	10.6	8	6.8
Rushmoor	53	53	55	0	-0.2	2	4.5
Southampton	111	133	143	22	20.0	10	7.6
Test Valley	53	61	62	8	14.7	2	2.5
Winchester	64	72	73	8	12.5	1	1.8
Isle Of Wight	52	62	64	10	19.9	2	3.6
Ashford	46	52	55	6	13.5	2	4.5
Canterbury	56	60	62	4	6.5	2	2.9
Dartford	47	54	55	7	15.0	2	3.0
Dover	45	53	56	8	17.9	3	6.5
Gravesham	30	33	36	4	13.4	2	6.5
Maidstone	70	77	79	8	10.8	2	2.2
Medway	90	107	117	17	19.2	10	9.4
Sevenoaks	43	51	55	8	18.3	4	7.9
Shepway	37	36	38	-1	-3.6	2	5.0
Swale	46	51	53	5	10.8	2	3.9
Thanet	41	39	39	-2	-6.0	0	0.3
Tonbridge And Malling	53	66	70	13	24.1	4	5.6
Tunbridge Wells	50	62	65	12	23.3	3	4.7
Cherwell	65	63	65	-2	-3.5	2	2.7
Oxford	86	92	96	7	7.7	4	3.9
South Oxfordshire	56	57	61	2	3.0	3	6.0

TABLE F2 (CONTINUED): WORKPLACE EMPLOYMENT IN THE SOUTH EAST - THE CE SCENARIO

Districts	2001	2016	2021	2001-2016		2016-2021	
	Thousands			Level	%	Level	%
Vale Of White Horse	57	66	68	9	15.0	2	3.6
West Oxfordshire	43	44	47	1	2.7	3	8.0
Elmbridge	51	59	64	9	17.4	5	8.4
Epsom And Ewell	27	32	35	5	17.9	3	7.9
Guildford	68	85	93	17	25.2	7	8.5
Mole Valley	40	49	54	9	23.1	5	10.2
Reigate And Banstead	58	71	76	13	23.1	4	6.3
Runnymede	44	56	62	12	27.7	6	10.5
Spelthorne	39	40	42	1	2.6	2	3.9
Surrey Heath	43	50	55	7	17.3	5	10.2
Tandridge	29	37	40	8	28.2	3	7.7
Waverley	48	61	68	13	28.4	7	10.9
Woking	41	49	55	8	19.0	6	13.0
Adur	21	26	27	5	22.9	1	4.1
Arun	46	49	51	3	6.3	2	3.7
Chichester	51	55	58	4	7.9	4	6.4
Crawley	82	98	101	16	18.9	4	3.6
Horsham	50	56	57	6	12.1	1	1.4
Mid Sussex	54	63	65	9	17.2	2	3.3
Worthing	43	50	51	7	15.0	2	3.0
South East	3697	4185	4408	489	13.2	223	5.3

TABLE F3: WORKPLACE EMPLOYMENT IN THE EAST OF ENGLAND THE CE SCENARIO

Districts	2001	2016	2021	2001-2016		2016-2021	
	Thousands			Level	%	Level	%
Luton	84	85	86	1	1.1	1	1.5
Mid Bedfordshire	45	47	47	2	4.4	0	0.8
Bedford	68	69	69	0	0.7	1	0.8
South Bedfordshire	44	47	48	3	6.0	1	1.7
Basildon	77	81	81	4	5.7	0	-0.3
Braintree	50	54	55	4	7.1	1	1.0
Brentwood	33	37	38	4	13.3	1	1.4
Castle Point	22	24	24	2	10.8	0	0.7
Chelmsford	75	85	86	10	13.0	0	0.4
Colchester	73	78	79	5	6.4	1	1.4
Epping Forest	39	43	44	5	11.9	1	2.0
Harlow	39	41	42	2	4.6	1	2.5
Maldon	21	23	24	3	12.8	0	1.1
Rochford	23	23	24	0	-0.3	1	3.6
Southend-On-Sea	63	74	75	11	16.6	1	1.6
Tendring	41	47	48	6	15.1	1	1.6
Thurrock	57	63	65	6	10.1	2	2.9
Uttlesford	35	38	40	4	10.7	1	3.4
Broxbourne	32	38	38	6	17.1	0	0.5
Dacorum	69	71	74	3	4.2	2	2.9
East Hertfordshire	57	63	65	6	10.9	1	2.2
Hertsmere	44	42	42	-3	-5.9	1	1.3
North Hertfordshire	48	51	53	3	6.8	2	4.5
St Albans	56	62	66	6	11.5	4	6.3
Stevenage	42	46	50	4	10.4	4	7.6
Three Rivers	31	31	31	0	0.3	0	-0.1
Watford	49	51	52	1	2.6	1	2.1
Welwyn Hatfield	55	58	58	3	5.3	1	1.2
Cambridge	79	87	90	9	11.0	2	2.6
East Cambridgeshire	25	29	29	4	14.6	1	2.7
Fenland	32	34	34	2	7.6	0	0.5
Huntingdonshire	69	77	78	8	11.2	2	2.0
Peterborough	91	105	109	15	16.4	4	3.4
South Cambridgeshire	64	76	82	11	17.7	7	8.8
Breckland	45	44	45	-2	-3.6	1	2.1
Broadland	39	41	42	2	3.9	2	4.2
Great Yarmouth	36	38	40	2	5.8	1	3.7
King’s Lynn And West Norfolk	56	59	59	3	5.3	0	-0.1
North Norfolk	37	39	41	2	4.2	2	5.5
Norwich	93	95	96	2	2.3	1	0.9
South Norfolk	40	58	59	18	44.4	2	2.8
Babergh	32	32	31	-1	-2.0	0	-0.6
Forest Heath	32	34	35	2	6.1	1	2.0
Ipswich	66	71	72	5	7.3	2	2.3
Mid Suffolk	35	32	32	-3	-7.9	0	-0.3
St. Edmundsbury	50	51	51	1	1.3	0	0.4
Suffolk Coastal	48	49	50	1	1.9	1	2.2
Waveney	43	43	43	1	2.2	0	-0.1
East of England	2384	2565	2621	181	7.6	56	2.2

TABLE F4: RESIDENCE EMPLOYMENT IN THE LONDON THE CE SCENARIO

Boroughs	2001	2016	2021	2001-2016		2016-2021	
	Thousands			Level	%	Level	%
City of London	4	5	6	1	24.8	0	6.2
Camden	91	109	116	18	19.2	7	6.2
Hackney	79	91	96	12	15.4	5	5.3
Hammersmith And Fulham	83	97	102	14	17.2	5	5.5
Haringey	96	109	114	14	14.3	5	4.7
Islington	80	89	93	10	12.4	4	4.3
Kensington And Chelsea	75	88	93	13	17.6	5	6.0
Lambeth	130	143	149	13	9.8	6	4.3
Lewisham	114	124	128	10	8.4	4	3.3
Newham	86	105	113	19	21.9	8	7.3
Southwark	107	124	132	17	15.7	7	5.9
Tower Hamlets	74	103	116	29	39.8	13	12.6
Wandsworth	141	150	153	9	6.5	4	2.4
Westminster	89	98	102	10	11.1	4	3.8
Barking And Dagenham	66	72	74	6	9.2	2	3.0
Barnet	145	161	168	16	10.8	7	4.1
Bexley	103	108	110	4	4.3	2	1.7
Brent	118	133	139	15	12.5	6	4.5
Bromley	141	146	149	5	3.8	3	2.0
Croydon	156	171	177	15	9.4	6	3.6
Ealing	143	156	161	12	8.7	5	3.3
Enfield	121	134	139	13	10.9	5	3.7
Greenwich	91	98	101	7	7.7	2	2.3
Harrow	97	104	107	7	7.0	3	2.5
Havering	104	103	103	-1	-1.2	0	-0.2
Hillingdon	117	128	132	11	9.6	4	3.3
Hounslow	103	116	122	13	12.5	5	4.7
Kingston Upon Thames	74	85	90	11	14.4	5	5.3
Merton	94	110	116	15	16.4	7	5.9
Redbridge	106	121	127	15	14.0	6	5.0
Richmond Upon Thames	89	98	102	9	10.1	4	3.8
Sutton	90	97	100	7	7.7	3	3.3
Waltham Forest	98	103	106	6	5.9	2	2.2
London	3306	3680	3833	374	11.3	154	4.2

TABLE F5: RESIDENCE EMPLOYMENT IN THE SOUTH EAST THE CE SCENARIO

Districts	2001	2016	2021	2001-2016		2016-2021	
	Thousands			Level	%	Level	%
Bracknell Forest	60	73	79	13	22.0	6	8.0
West Berkshire	77	86	90	9	11.4	4	4.3
Reading	73	78	80	5	6.3	2	2.5
Slough	58	68	72	10	16.5	4	5.7
Windsor And Maidenhead	68	68	68	0	-0.1	0	0.1
Wokingham	81	93	98	12	14.9	5	5.2
Aylesbury Vale	86	100	106	14	16.8	6	5.8
Chiltern	43	42	42	-1	-1.3	0	-0.5
Milton Keynes	108	142	158	35	32.3	16	11.0
South Bucks	30	31	31	1	3.2	0	1.2
Wycombe	82	84	84	2	2.2	1	1.0
Brighton And Hove	117	123	125	6	4.8	2	2.0
Eastbourne	37	41	43	4	11.9	2	4.2
Hastings	35	37	38	2	6.0	1	2.6
Lewes	41	45	47	4	10.5	2	3.5
Rother	33	36	37	2	6.8	1	2.8
Wealden	64	71	74	7	10.7	3	4.3
Basingstoke And Deane	82	90	93	8	9.1	3	3.4
East Hampshire	55	61	63	6	10.4	2	4.0
Eastleigh	60	68	71	8	12.9	3	4.9
Fareham	54	61	65	8	14.4	3	5.3
Gosport	37	37	37	0	0.9	0	0.2
Hart	45	50	53	5	11.2	2	4.5
Havant	53	52	51	-1	-2.5	0	-0.6
New Forest	76	83	86	7	8.8	3	3.3
Portsmouth	86	87	88	1	1.1	0	0.4
Rushmoor	50	51	51	1	1.8	1	1.1
Southampton	98	106	108	8	8.0	3	2.8
Test Valley	57	64	67	7	12.8	3	5.0
Winchester	53	60	62	7	12.6	3	4.6
Isle Of Wight	54	59	61	5	9.1	2	2.9
Ashford	49	57	60	8	16.9	3	5.7
Canterbury	57	61	63	4	7.8	2	3.0
Dartford	42	46	47	4	8.5	2	3.4
Dover	45	47	48	2	4.6	1	1.7
Gravesham	44	45	46	1	3.0	1	1.1
Maidstone	69	74	76	5	6.7	2	2.7
Medway	119	126	129	7	6.1	3	2.4
Sevenoaks	52	52	53	0	0.5	0	0.4
Shepway	42	45	46	3	8.2	1	3.0
Swale	55	64	67	8	14.7	3	4.9
Thanet	49	52	54	3	7.1	1	2.6
Tonbridge And Malling	53	58	60	5	9.8	2	3.6
Tunbridge Wells	51	53	55	3	5.5	1	2.4
Cherwell	70	79	84	9	13.5	4	5.6
Oxford	60	65	68	6	9.9	3	3.9
South Oxfordshire	67	74	78	8	11.3	3	4.1

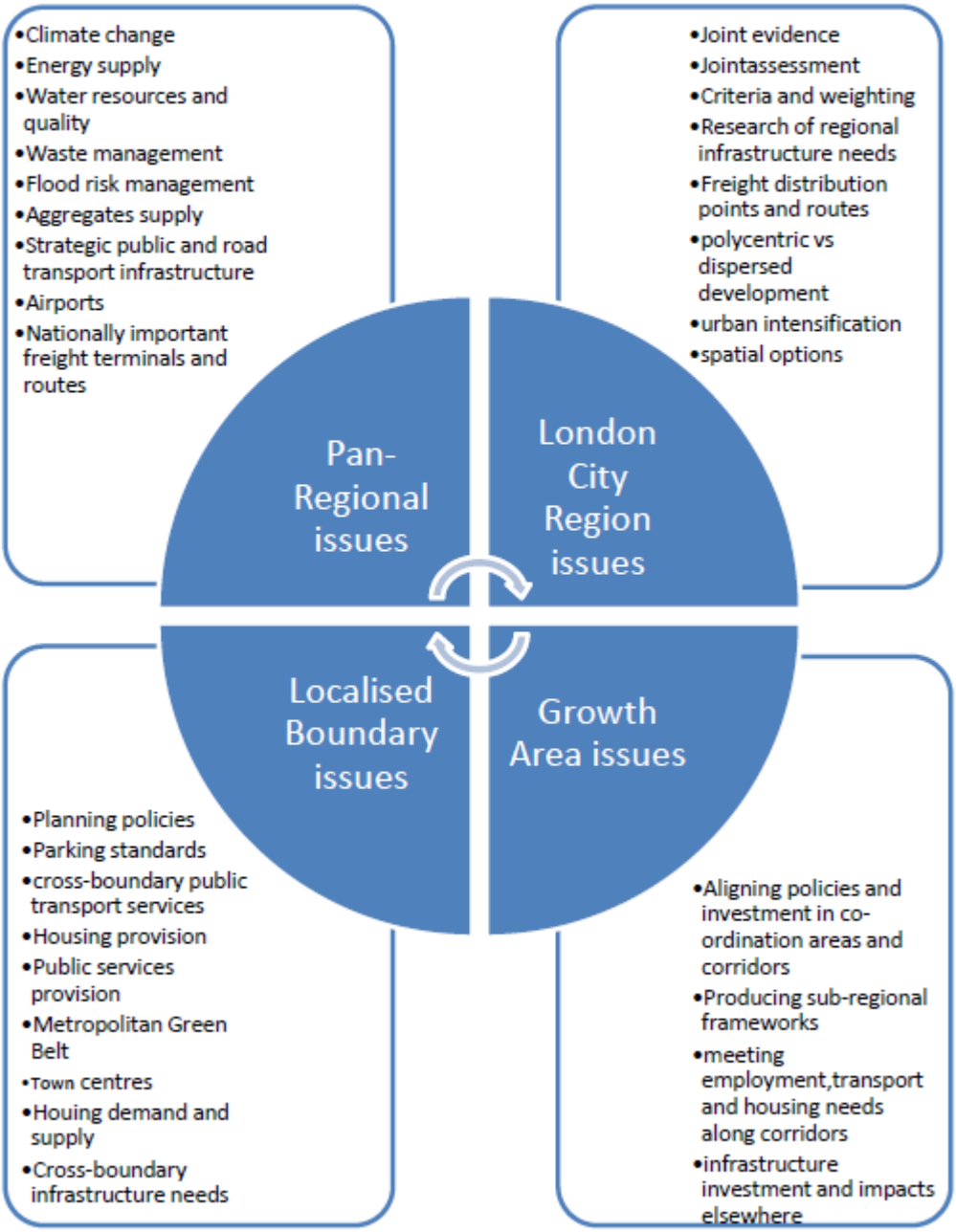
TABLE F5 (CONTINUED): RESIDENCE EMPLOYMENT IN THE SOUTH EAST - THE CE SCENARIO

Districts	2001	2016	2021	2001-2016		2016-2021	
	Thousands			Level	%	Level	%
Vale Of White Horse	59	68	72	9	15.2	3	5.0
West Oxfordshire	50	59	63	9	17.9	4	7.1
Elmbridge	58	65	68	7	11.5	2	3.7
Epsom And Ewell	33	34	35	1	3.3	1	1.6
Guildford	67	69	71	3	3.9	1	1.9
Mole Valley	39	41	42	2	5.2	1	2.2
Reigate And Banstead	64	70	72	6	8.7	2	3.6
Runnymede	39	43	45	5	11.6	2	4.1
Spelthorne	47	48	49	1	2.2	1	1.6
Surrey Heath	42	45	46	2	5.7	1	2.6
Tandridge	39	42	43	3	7.6	1	3.2
Waverley	56	58	59	2	4.3	1	1.7
Woking	46	48	49	2	5.0	1	2.3
Adur	27	29	29	2	5.7	1	2.3
Arun	60	67	69	6	10.5	3	3.8
Chichester	48	51	52	3	6.9	1	2.5
Crawley	51	58	61	7	13.5	3	5.2
Horsham	61	70	73	9	14.2	4	5.3
Mid Sussex	65	68	69	3	4.7	1	2.0
Worthing	44	46	46	1	3.4	1	1.6
South East	3872	4225	4376	354	9.1	150	3.6

TABLE F6: RESIDENCE EMPLOYMENT IN THE EAST OF ENGLAND THE CE SCENARIO

Districts	2001	2016	2021	2001-2016		2016-2021	
	Thousands			Level	%	Level	%
Luton	82	88	90	6	7.1	2	2.8
Mid Bedfordshire	64	70	72	6	9.6	2	3.5
Bedford	70	76	79	6	8.4	2	3.1
South Bedfordshire	57	59	59	2	3.0	1	1.0
Basildon	78	80	81	2	3.2	1	1.6
Braintree	66	75	78	9	13.0	3	4.4
Brentwood	33	32	31	-1	-3.5	0	-0.9
Castle Point	41	41	41	0	0.3	0	0.3
Chelmsford	80	84	85	4	4.7	2	1.9
Colchester	75	81	83	6	7.7	3	3.4
Epping Forest	58	60	61	2	3.4	1	1.6
Harlow	39	39	39	0	1.0	0	0.4
Maldon	29	33	35	4	15.4	2	5.1
Rochford	38	39	40	1	3.7	1	1.5
Southend-On-Sea	70	71	71	1	1.3	1	0.8
Tendring	53	62	65	8	15.3	3	5.3
Thurrock	69	79	83	9	13.7	4	4.8
Uttlesford	35	37	38	2	5.6	1	2.6
Broxbourne	43	47	48	3	7.3	1	2.8
Dacorum	69	72	74	3	4.5	1	1.9
East Hertfordshire	67	75	78	8	11.6	3	4.5
Hertsmere	46	48	49	2	3.9	1	2.2
North Hertfordshire	59	63	65	4	7.5	2	2.5
St Albans	65	67	67	1	2.0	1	1.1
Stevenage	40	42	43	2	6.0	1	2.3
Three Rivers	41	42	43	1	3.6	1	1.8
Watford	42	44	45	2	5.8	1	2.2
Welwyn Hatfield	46	48	48	2	3.7	1	1.6
Cambridge	49	54	56	5	11.0	2	3.8
East Cambridgeshire	37	47	52	10	27.5	4	9.2
Fenland	38	46	50	8	22.2	4	7.6
Huntingdonshire	82	95	100	13	15.6	5	5.5
Peterborough	73	80	83	7	9.7	3	3.6
South Cambridgeshire	69	79	83	10	14.1	4	5.2
Breckland	55	63	67	8	14.6	3	5.3
Broadland	58	66	69	8	14.4	3	5.1
Great Yarmouth	37	40	41	3	8.1	1	2.5
King’s Lynn And West Norfolk	60	64	67	5	7.6	2	3.3
North Norfolk	41	46	48	5	11.6	2	4.3
Norwich	53	51	51	-2	-3.4	-1	-1.1
South Norfolk	53	59	61	6	10.6	2	3.5
Babergh	40	45	47	5	11.8	2	4.0
Forest Heath	28	28	28	0	-0.4	0	0.5
Ipswich	54	55	55	1	1.4	0	0.6
Mid Suffolk	43	50	53	8	17.7	3	6.1
St. Edmundsbury	50	55	57	5	10.2	2	4.1
Suffolk Coastal	52	58	61	6	11.6	2	4.3
Waveney	45	51	53	5	11.4	2	4.1
East of England	2571	2783	2872	213	8.3	89	3.2

Diagram 1 – Spatial factors in co-operative working in the Greater South East



Perfectly Placed for Business: Hertfordshire's draft Strategic Economic Plan

Vision

Our vision is that **by 2030, Hertfordshire will be among the UK's leading economies, helping to realise the full economic potential of the assets and opportunities within the UK's Golden Triangle** (which is defined spatially by the science and technology-based resources in the area between London, Cambridge and Oxford).

Priority 1

We have globally significant science-based businesses (such as GSK, EADS Astrium, MBDA, Johnson Matthey, etc.) which are "doing science" in Hertfordshire. We also have the experience and insight gained from building a world class commercialisation infrastructure (e.g. GSK's Stevenage Bioscience Catalyst). **We are therefore uniquely wellplaced to be the open innovation capital of the UK**. This is **Priority 1** from *Perfectly Placed for Business.* We believe it will add disproportionally and additionally to the UK's economic growth.

Priority 2

Hertfordshire is also defined in relation to its connectivity, particularly with London. Four major radial roads (and both the East and West Coast Mainline) and a number of orbital links traverse Hertfordshire and **we are committed to delivering enhanced economic impacts through our connectivity**. **Priority 2** from *Perfectly Placed for Business* is therefore concerned with seizing this economic potential – and managing some of the downside risks.

Priority 3

In order to grow our economy, it is essential that our towns perform better as *economies.* In physical terms too, it is our towns that must accommodate the lion's share of future growth given that much of Hertfordshire lies within the Metropolitan Green Belt. We have a number of New Towns and others that have seen accelerated growth and in many cases, there is now a substantial legacy of underinvestment in infrastructure. We are determined to put this right and to **re-invigorate our places – by defining new Urban Futures – such that they can spearhead economic growth**.

Priority 4

Whilst focusing on Hertfordshire's distinctive assets and opportunities, we also recognise the crucial role which is played by our smaller enterprises – in urban and rural areas alike. Some of these have the potential to grow and many are telling us that recruitment is especially challenging. Whilst often "under the radar", **these businesses – and the people within them – are**

the real foundation for future economic growth, and we intend to support them.

Underpinning our four priorities is a commitment to **growth which is smart**. Our county is constrained physically and conserving our natural environment is a "non-negotiable". We will therefore deliver economic and housing growth that minimises its environmental footprint and ensures that our quality of life is maintained for the benefit of future generations.

Implementation Plan

Priority 1

Priority 1 will be delivered through five programmes (**Package A)**. Two of these are cross-cutting, and they are concerned with fundamental market failures linked to the growth of science and technology-based enterprises: **A1: Equity/Funding** and **A2: Skills for Science and Technology**. The other three reflect technologies which are identified as national priorities and in which Hertfordshire already has specialisms of national or international standing: **A3: Bioscience; A4: Advanced Engineering;** and **A5: Green Technology**.

Priority 2

Priority 2 will be delivered through two programmes (**Package B**). **B1: Promoting Hertfordshire** is concerned with inward investment and the particular place-based opportunities in relation to tourism, culture, leisure and sport, and film/media; in these domains, Hertfordshire's relationship with London is extremely important. Our second programme within Priority 2 is one of our most important. **B2: Growth Corridors** is concerned with realising the economic potential of our main strategic links and three Corridors (A1(m)/East Coast Mainline, M1/West Coast Mainline, East- West) are identified as immediate priorities.

Priority 3

Priority 3 includes three programmes (**Package C**). Of these, the most ambitious is **C1: Urban Futures.** This is a top priority for *Perfectly Placed for Business* and through it we are working with our towns to re-invigorate urban economic and housing growth (including through our town centres and high streets, but also more broadly). Initially we are working with our three largest towns (Hemel Hempstead, Stevenage and Watford) and our intention is to roll-out the approach to our southern Hertfordshire/London fringe towns (such as Broxbourne) and to the market towns in the north and east of the county. Also contributing to Priority 3 are two more specific ventures: **C2: Digital** and **C3: Locations for Enterprise.**

Priority 4

Priority 4 embraces two projects (**Package D**). **D1: Growth Hub** will reach out to our large population of SMEs and provide information, advice and signposting to a range of business support services (both those provided by national organisations and those available locally). **D2: Skills for Business** will provide support for SMEs seeking to engage in workforce development. In practice, there are synergies between our projects. In particular, the two main spatial projects (**B2: Growth Corridors** and **C1: Urban Futures)** are designed to complement both each other, and the other 11 projects within our Implementation Plan.

DRAFT Notes of first meeting of the Strategic Spatial Planning Officer Liaison Group

Friday 7th March 2014 at GLA, City Hall, London

Present

Richard Linton, GLA (Chair)
John Lett (GLA)
Hermine Sansom (GLA)
Jorn Peters (GLA)
Lee Searles (Secretary)
Sue Janota, Surrey County Council
Jack Straw, Surrey Planning Officers Association/Mole Valley (Vice- chair)
Paul Donovan, Hertfordshire County Council
Des Welton, Hertfordshire Planning Officers Group Co-ordinator
Matthew Jericho, Essex County Council
Claire Stuckey, Essex Planning Officers Group/Tendring DC
Richard Hatter, Thurrock Council
Alison Bailey, Buckinghamshire Planning Officers Group/ South Buckinghamshire DC
Adam Reynolds (for Andrew Roach), Kent County Council
Tania Smith, Dartford Borough Council
Steve Barton, West London Alliance/West London Planning Policy Group/LB Ealing
Steve Walker, Environment Agency
Nick Woolfenden, South East England Councils
Cinar Altun, East of England LGA

Apologies

Tara Butler, South London Partnership/LB Merton

Members still to be confirmed

London Councils
Buckinghamshire County Council

DECISIONS RELATING TO THE ESTABLISHMENT OF THE GROUP

Chair of Group - Richard Linton from GLA was confirmed as Chair of the Group.

Vice Chair of Group - Jack Straw from Surrey Planning Officers Association/Mole Valley DC was appointed as Vice-Chair.

Terms of Reference - The terms of reference were agreed subject to the addition of the following clause 'Provide a mechanism for informal officer level consultation and discussion, without replacing formal consultation and co-operation mechanisms, on issues raised by the Duty to Co-operate.

Webpage - It was agreed that GLA will set up a webpage to store notes and information about the group.

Membership - All members of the group are asked to consider representative gaps and forward suggestions to Richard Linton and Lee Searles.

Group title - It was agreed that the group's title will make clear that it is an officer liaison group.

Scope and ways of working - The scope and ways of working of the group were agreed subject to the following amendments:

- With reference to the group's scope of activities (4th bullet) this was amended to read 'Be an informal conduit for consultation between local authorities and others on particular technical issues.'
- With reference to agendas (1st bullet) 'six weeks prior to each meeting, a call for agenda items will be made.'
- Also on agendas (3rd bullet) 'Each agenda will be despatched no later than two weeks prior to the meeting'

Forward Calendar - The calendar of forward meetings was agreed. A date for the September meeting will be agreed later, once the timetable for the FALP EIP is clearer. Potential items to be discussed at the forthcoming meetings were identified:

- Infrastructure Plan (June) – Invite a member of the GLA business team, Circulate the progress report to the group (done), and use June meeting to contribute to the development of the July draft of the Infrastructure Plan.
- EIP feedback (September)

Waste issues – It was agreed that the London RTAB is the appropriate mechanism for the consideration by officers of strategic waste planning issues.

DISCUSSION ITEMS AND DECISIONS

FALP Update

Richard Linton gave a verbal update on issues arising from the FALP consultation. The slides from the 31 January FALP consultation event were distributed. Ahead of the 28 March 2014 wider South East FALP consultation event, GLA (Jorn Peters) have invited all counties and districts in the areas surrounding London.

Retail trends - FALP's coverage of retail planning issues raises some interesting issues. Reports for GLA on retail highlight a number of trends:

- Rise of internet shopping
- Lower disposable incomes
- Slower growth in retail space requirement

- Relative health of small and large centres, with impacts on mid-sized centres (district centres) – there is a focus on expanding their roles.

Industrial land release – there is a managed benchmarked release. Monitoring is showing a higher rate of release, leading to pressure industrial land.

Housing - The most significant issue being raised through FALP consultation responses so far relates to the uplift in Borough housing targets and mechanisms for discovering additional housing potential through increased densities, exploiting opportunity areas with good transport access and in town centres.

In discussion, the issue of confidence over the ability of boroughs to meet their housing targets was raised. For example, in West London, sites regarded as marginal and which require significant public investment to deliver, are now included within targets.

The GLA's demographic projections raise uncertainty over long term population and migration trends from London. The GLA wrote to Bedford Borough Council in response to its consultation with GLA on the development of its local plan. Its letter alerted the council to information on demographic projections which GLA believes might need to be taken into account in developing its plan.

Concern was raised by some group members over how such information should be interpreted at district council level in terms of implications for local housing provision. Concern was expressed over how FALP has not addressed options for dealing with the shortfall in London housing provision arising from the projections, for example through release of Metropolitan Greenbelt.

The existence of options within the GLA's Integrated Impact Analysis for FALP was referred to. RL made the point that there is uncertainty over the durability of recent trends in lower migration from London, experienced during the recession. Also, FALP has set out a number of ways in which housing provision will be increased, based on a series of tools to deliver higher densities, utilise town centres, and open up opportunity areas for new development. However, these need to be consistent with neighbourhood character and the maintenance of appropriate space standards. It has been made clear that FALP offers a short term response and a fuller one will be made with the next full review of the London Plan. By then, the picture should be clearer on demographic projections.

The issue of housing delivery in the context of the GLA research report 'Barriers to Delivery' was discussed and it was agreed that that this should be discussed at the next meeting of the group.

ACTION - It was agreed that the group should seek to create a shared understanding and agreement about the demographics at play during this period and of how they could be dealt with in local plans and the London Plan.

ACTION - It was agreed to invite demographer Ben Corr from GLA to the next meeting, to discuss the methodological developments of CLG data undertaken to inform FALP.

ACTION – Discuss 'Barriers to Delivery' and options for improving housing delivery at the next meeting.

London Infrastructure Investment Plan 2050

A presentation was given on the key elements of the work of the business team within GLA on the development of the plan. A progress report will be published at the end of March (done), leading to further engagement and publication of a draft plan in the Summer. The final plan is expected to be agreed in the Autumn of 2014. It is anticipated that the plan will inform a future full review of the London Plan. Whilst FALP does not require an implementation plan, GLA has prepared one and will review it annually once the Infrastructure Plan (IP) is finalised.

The infrastructure plan will examine strategic infrastructure needs over the long term, unconstrained by shorter term planning considerations. It will set out infrastructure needs and their cost, funding opportunities by infrastructure type and opportunities for funding contributions. Work so far has been informed by two rounds of consultation. The summer draft will provide a further opportunity to input to the development of the plan.

The group asked whether there will be spatial implications arising from the IP and how they will be quantified in terms of the predicted scale of growth and the different spatial options.

The importance of investment in infrastructure outside London's boundaries to support London's growth was raised as an issue on which it will be important for the group to input.

ACTION- It was agreed that the Infrastructure Plan should be included as a full discussion item on the agenda of the next meeting in June, as an opportunity to contribute to the draft plan being published later in the summer.

ACTION - The progress report will be circulated to the group.

Other issues

A number of transport issues were raised as of interest and relevance to the group:

- Route based strategies.
- Major infrastructure and the gap between nationally funded projects and those funded as major schemes. This will be addressed at a later meeting.
- Wider South East Commuting Study – GLA is considering an update to this study undertaken in 2004.
- Strategic Economic Plans – There would be benefit in pulling together the main transport proposals from relevant SEPs .

ACTION – Timetable meeting at which major transport infrastructure should be discussed.

ACTION – Pull together information from SEPs about major transport schemes.

ACTION - A fuller discussion of Strategic Economic Plans will be timetabled for a later meeting, including growth areas and LEP housing ambitions and timescales

Strategic Spatial Policy co-operation issues

The Mayor's Planning team have indicated that the Mayor would like to work positively with local authorities and others to develop mechanisms for strategic spatial planning policy co-operation. Some policies are currently under review in the Further Alterations to the London Plan (FALP) which it is anticipated for completion by early 2015. The issues set out below, arising from FALP, were discussed by the task and finish group meeting in late 2013 and are put to the new working group for discussion about possible actions to respond to them. Also, the meeting will consider any other issues raised by working group members.

Policy issue	Specific issues and source	Discussion	Action by the Strategic Spatial Planning Policy Group
Housing requirements	(FALP) Population growth – projections (models) and migration assumptions, implications for household size.	Important and unexpected demographic challenges have arisen from the 2011 Census results. These are complicated by the effects of the economic downturn, in particular in relation to whether recent trends are transitory or structural. Current models also may need to evolve to more accurately interpret the data. Together, there is uncertainty over how to reflect the results in FALP and then a subsequent full review of the London Plan. Clearly, there is a need for London and surrounding local planning authorities to develop a shared understanding of what the data reveals, over the methodology and scenarios that should be used for projections, and the implications for housing requirements. This is important for the Mayor in setting out London's housing requirement in the London Plan and also local planning authorities in developing their local plans. Initial discussion of this issue at the first working group meeting and at the GLA workshop in October hinted at technical capacity issues which may exist outside London. How can this be dealt with?	PLEASE THINK ABOUT HOW THE GROUP COULD BEGIN TO ADDRESS THESE ISSUES

	(FALP) Density assumptions – intensification around high PTAL locations, High quality urban environment, scaled to surrounding areas.	Emerging policy proposals for FALP are examining the potential to intensify development in areas of high public transport accessibility including in town centres, opportunity areas and on surplus employment land, but consistent with the objective of sustaining local neighbourhood character. Developing a shared understanding around how the approach to density has been formulated and the contribution it makes to meeting London's housing requirements could be useful to all local planning authorities in responding to London Plan issues but also in developing consistent approaches across local plans.	
	(FALP) Space standards – Effects of maintaining Mayor's standards instead of Government proposed standards.	The Mayor's adoption of London housing space standards has been a successful policy in terms of improving the quality of housing provided in the Capital. FALP will examine the implications of sticking with these standards, as opposed to adopting emerging national standards. The implications for housing provision could be usefully discussed in order to understand the scale of impacts.	
	(FALP) SHMA	The implications for the SHMA should be discussed.	
	(FALP) Delivery assumptions – backlog and forward delivery	The recession of the last five years has led to a housing delivery backlog in London. Demand and need has not gone away and so, looking forward, there is a need for a shared understanding of what a sustainable delivery trajectory looks like. This will help to foster a shared understanding of what is reasonable in terms of projecting London's housing delivery over the London Plan period.	

	(FALP) 'Exports'	What does all of the above mean with regard to London's ability to meet its housing requirements within its boundaries and the extent to which some housing needs will need to be met in surrounding areas?	
	(FALP) Longer term thinking	The scale of population growth predicted needs to be understood. The approach taken by the London Plan to meeting the resulting housing requirement, based on making the most effective use of land in relation to public transport accessibility, access to employment and sustaining local character, also needs to be understood. It may be that there is a longer term requirement for a more radical strategic spatial approach in future full London Plan reviews. It would be useful to discuss the premise for this and to consider what approaches could be examined.	
Transport	(FALP) Parking policy in outer London	Parking policies are an important factor in the economic performance of town centres. The difference in parking standards applied to town centres in adjacent local authority areas inside and outside London is affecting their attractiveness. It would be useful to develop shared thinking about how parking policies can play a positive role in shaping successful town centres.	
Employment	(FALP) Employment projections, Town Centres and Retail	There is a need to begin thinking in policy terms about how to take account of the impact of changes in consumer demand and behaviour on town centres and retail patterns, for example through multi-channel. The usefulness of retail needs assessments which currently underpin planning policies needs some careful review. There would be a significant advantage for all in developing a shared understanding and approach to future planning policies for town centres and retail, across borders and avoiding potentially damaging short term approaches.	

Waste arising and apportionments	(FALP) Municipal, Commercial and Hazardous	Projections for Municipal and Commercial & Industrial waste arisings have been reworked using the latest available data, and consequently borough-level apportionments have been revised (this has been done in-house but evaluated by an external consultant). Across the piece, projected arisings and apportioned waste are down by around 25-30% on the 2011 London Plan figures, and consequently the amount of waste projected to be exported from London (already due to reduce over time as London's waste self-sufficiency kicks in) is less than before.	
Other issues…?		PLEASE RAISE STRATEGIC SPATIAL POLICY ISSUES THAT YOU THINK COULD BE EXPLORED BY THE GROUP	