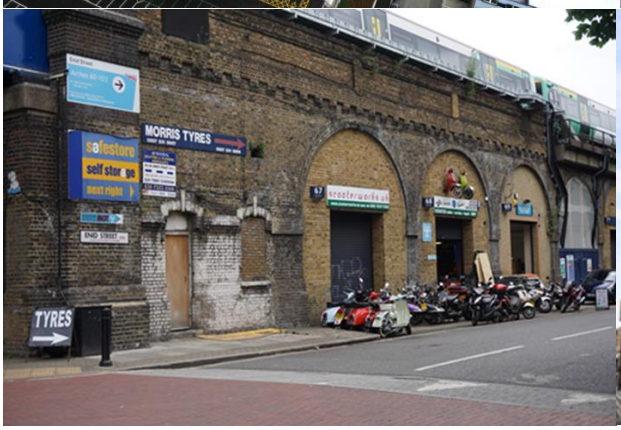
London Industrial Land Demand

Final Report



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GLA
Industrial Land Demand

A report by **CAG Consultants** in association with Colliers, Ramidus Consulting and Peter Brett Associates

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To contact CAG Consultants:

CAG CONSULTANTS
150 Minories
London EC3N 1LS
Tel 020 8555 6126
Fax 020 7900 1868
hq@cagconsult.co.uk
www.cagconsultants.co.uk

For direct enquiries about this report:

Dave Lawrence
Partner
CAG Consultants
Tel 07971 684378
Email dl@cagconsult.co.uk

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Summary

What this report aims to do

This report assesses land demands for various types of industry and the amount of industrial land that London needs to maintain to ensure it continues to function as a successful and sustainable city. There is no definitive guidance as to what is the right amount of industrial land: as London continues to grow there are increasing pressures on all forms of land use activity to demonstrate that they are contributing efficiently to London's needs. Industrial land in London is under particular pressure given the high demand for housing land and the much higher land values that residential development commands compared to industrial.

The report considers the London industrial market in the context of the Wider South East economy, to examine existing linkages and consider how these may develop on the future.

Specifically, this study aims to inform the Industrial Release Benchmarks which are published in the Land for Industry and Transport SPG. The current SPG provides guidance on the amount of industrial land to be released at Borough level over the London Plan period 2011-31 and the context for this updated assessment is set by the fact that current release levels are running at well in excess of the benchmarks

Recent Trends in Industrial Land

There are approximately 7,000 hectares (ha) of industrial land in London[1]. In the period 2010-15 the stock of industrial land in London fell by over 500 ha, at an annual rate of 106 ha per annum. This compares to a release benchmark of 37 ha per annum in the current (2016) London Plan based on recommendations in the 2011 Industrial Land Demand and Release Benchmarks in London report[2].

Current planning policy distinguishes three categories of industrial employment land:

- Strategic Industrial Locations (SIL) which accounts for 50% of industrial land
- Locally Significant Industrial Sites (LSIS) which accounts for 14% of industrial land
- Non-Designated industrial land which accounts for 36% of industrial land

In the past land designated as SIL had received a strong measure of protection, but in the last five years a significant part of the land release has come from SIL.

Spatial representation of Industrial Activity in London

London's industrial activity is concentrated in five broad property market areas:

[1] Source: AECOM, 2016. There were 7,544 ha if non-industrial uses in designated Strategic Industrial Locations and Locally Significant Industrial Locations are included.
[2] Industrial Land Demand and Release Benchmarks in London – Roger Tym & Partners (2011)

- **Central Services** area, which is dominated by businesses servicing the West End and City / Docklands office, retail and leisure economies. Typically, demand in this area is driven by companies which must be near their customers.
- **Thames Gateway,** to the east, which has developed as a significant location for large-scale warehouses and logistics facilities, notably along the A13 corridor, where a number of major new developments have been constructed over recent years.
- **Lea Valley** in north east London, which is a major industrial and warehouse location, notably between the North Circular Road and the M25, in Enfield.
- **Park Royal** and associated corridors around the A40 are now driven by warehousing and logistics activities and small-scale manufacturing / quasi service activities. Whilst also in the west, **Heathrow** is driven by airport-related activities, including air freight, but also all the industries required for the air industry to function (e.g. aircraft maintenance, in-flight catering etc.).
- **Wandle Valley** to the south, includes significant clusters of industrial and warehouse users, notably in Merton, Sutton and Croydon (off the A23 in particular) and includes a number of SILs.

The two largest property market areas are Park Royal/A40/Heathrow and Thames Gateway which in recent years have each accounted for around 38% of industrial take-up, with the Lea Valley accounting for a further 12%.

What Industrial Activity takes place in London

There are broadly four categories of activity that take place on industrial land in London:

- Manufacturing and other industrial activity
- Distribution and logistics
- Wider industrial type uses such as land for transport, waste and utilities
- Service activities that operate from industrial land or premises

We set out below the nature of activity and recent trends for each of these four broad categories of activity and project future demand for industrial land that is likely to arise, based on existing trends.

Manufacturing and other industrial activity

In employment terms we define industrial employment as consisting of manufacturing, 25% of the construction sector and parts of the motor trades and repairs sector. Following a long period of steady decline loss of jobs in manufacturing has slowed down and in recent years has even seen a small increase. But the sector is small and accounts for just 2.3% of London's jobs and 2.6% of its GVA.

What remains of manufacturing activity in London is here for a reason. It is here because:

- It is legacy manufacturing with large sunk costs that would probably relocate to cheaper locations in the UK or even overseas if it moved, although there is a large expense in doing so.
- It has a time sensitive product that needs to be as close as possible to its London market place.
- It is dependent on the skills of its workforce that cannot be easily relocated or replaced.

- It wants a London brand.

As such we see little scope for this activity to relocate elsewhere in the Wider South East. There may be some potential to address the time-sensitive and skills issues through infrastructure investment, but we do not think there is a lot a scope for substitutability of this segment of London's industrial activity. Alternative locations for the more creative end of manufacturing activity are more likely to be other cities, whether UK or overseas.

Based on employment projections prepared by GLA Economics we expect continued decline in industrial employment. But the projected rate of decline is much diminished compared with the forecast used to inform the 2011 Industrial Land Demand study. As a result, the projected land release from decline in industrial activity is only 167 ha for the period 2016-41, far lower than the release figure from the previous report.

Distribution and logistics

In contrast to the trends in manufacturing in London, distribution and logistics activity in London has experienced a long period of expansion. The demand for warehousing space is largely driven by growth in economic activity. Household consumers and businesses require goods to be delivered to shops, homes, workplaces and business premises. As both London's economy and its population have grown, so has the demand for warehouse space. And in the past many logistics businesses have taken up space vacated by manufacturing firms.

But again, there appears to have been a change in this trend. In the most recent post-recession period, the growth in warehouse floorspace appears to have levelled off. Given that the economy and population in London have continued to grow it is likely that much of the additional demand for warehouse floorspace is being met from outside London. The functional economic area for the logistics sector is not confined by the London administrative boundary. In the same way that part of London's labour market is supplied from the Wider South East, so is part of its goods market.

A significant proportion of London's demand for warehouse floorspace has long been delivered from outside of its borders. With supply of industrial land in London declining and costs of what remains rising, some logistics operators have looked at alternative solutions. For some this may mean looking outside their traditional property market areas. As costs have risen in the Park Royal property market area, some operators have considered the less constrained Lea Valley and Thames Gateway as alternative locations. Others have looked to service London from further away. For example, John Lewis used to service London from Park Royal, but now do so from Milton Keynes.

Industrial rents in London are rising faster than those in the South East, indicating continued demand for London warehousing locations. We project increased demand for land to accommodate warehouse floorspace, as firms still seek a London location. But we recognise this demand may ultimately be constrained by availability of land.

Wider Industrial uses

Wider industrial uses such as land for transport, waste and utilities account for 27% of London's industrial land. They form part of the infrastructure needed to keep a city functioning. The nature of this infrastructure changes over time. Old infrastructure, such as gasholders, are no longer needed freeing up land. And new infrastructure, such as data centres, create demand for industrial land.

Much of this new infrastructure requirement may need to be identified and provided through mechanisms such as Opportunity Area Planning Frameworks. But we have identified some locations where relatively small amounts of land will be required for transport use, outside the Opportunity Areas.

In terms of waste demand, the most recent projected arisings require less capacity than currently planned. New projections are due to be published shortly and the current projection, that shows a release of 33 ha compared to currently planned capacity, will need to be revisited.

Service activities

A large proportion of the activity that takes place on London's industrial land is not industrial activity. Surveys of major industrial estates in London suggest that services sectors accounted for 33% of jobs and 29% of floorspace. In part this is explained by factors such as the price and availability of premises.

But there is also growing demand for hybrid premises: space that is neither purely office nor purely industrial. Many occupiers of 'industrial' space today are 'clean' activities that provide the expanding central London business market, and wider London economy, with services such as: building services, catering, cleaning, courier services, design, hospitality services, maintenance, marketing services, media production, office supplies, printing, security, technology support services, training and many, many others. This activity has sometimes been called 'servicing the services'.

Demand for this type of space will continue to grow. There is an important policy choice as to whether London should seek to accommodate this on existing industrial land, accommodate it within town centres, try to incorporate it into new forms of mixed-use development, or find some other solution.

Industry Response to Diminishing Industrial Land

The industrial and logistics sector has responded in a number of different ways to the diminishing stock of industrial land.

In the first instance there has been a price response, indicating that the market is functioning normally. Industrial rents have risen faster than elsewhere in the country. Even those property market corridors that extend beyond London's boundaries have seen higher rental growth in London than outside. This price response has in turn triggered further development and operational responses. These can be considered under three broad categories of Intensification, substitution and co-location.

Intensification

This is primarily a development response: how to accommodate more activity on the same amount of land. At a relatively modest level some firms have installed mezzanines in their existing premises. But at a larger scale floor to ceiling heights have increased and there has already been an application for an underground warehouse near Heathrow. And major industrial developers are now seriously considering building multi-storey warehouses. Whilst common in tightly land constrained locations such as Hong Kong, Singapore, and Tokyo, such development had previously been considered not viable in London. But as values rise and land supply shrinks, a tipping point has now been reached: an article in the Estates Gazette reports that market opinion suggests we can expect to see more new-generation multi-storey buildings by 2020.

At the more strategic level, the Old Oak and Park Royal Development Corporation have commissioned studies on how to intensify the Park Royal Industrial Estate to accommodate more floorspace and jobs on the same site area. Whilst the physical and operational potential for significant intensification exists

on many of London's industrial estates, fragmentation of ownership, the cost of more intensive redevelopment, and high existing use values and hope values, may act as a barrier to delivery. Some form of public intervention is likely to be necessary to overcome these barriers.

Substitution

Substitution is primarily an operational response. It is about firms revising their business model in response to the change in cost and supply of industrial land and premises. It is for firms that wish to continue to serve the London market, but can do so more efficiently or effectively from outside of London's borders. There is greater scope for widespread adoption of spatial substitution amongst logistics operators. But firms engaged in other forms of industrial activity have also adapted their business models. For example, a small building firm that used to store its tiles at a warehouse in Camden now has them shipped direct to site from the supplier on a job by job basis. Or a car repair firm that maintains a shop front presence in inner London for its customers but carries out the servicing activity at a depot outside of London.

For logistics operators whose market is in London, combined costs of premises, labour and transport will determine their choice of location. The scope for spatial substitution is greatest to the north of London, because firms can operate regional or national distribution networks from the M1 Corridor, and to the east of London, because of land (and labour) availability.

Co-Location with residential

Co-location is another development response. Given that much of the pressure on industrial land comes from residential development, what is the potential to provide commercial space for industrial activity in mixed-use residential environments? Historically the market has proven sceptical about such development. But as pressures for land intensify, innovative solutions are being developed. A critical aspect of these designs is separate vehicular access, so that the residential uses do not come into conflict with commercial traffic. Poplar Business Park provides an example of a current development, where light industrial commercial premises are being built on the ground floor under residential towers

As work and workstyles continue to evolve, there may be more opportunities to integrate work and living. For example, service based activities in industrial premises tend to be less intrusive, so there may be opportunities for industrial sites to be redeveloped for high density residential and commercial uses.

Benchmark Release Baseline

Analysis of the different components of demand are drawn together to calculate the overall demand for industrial land in London, whether this be positive or negative. But to calculate the potential for industrial land release we also need to look at how much vacant land there is.

Vacant Industrial Land

The Land for Industry and Transport SPG states that vacant industrial land should be around 5% and vacant industrial floorspace around 8% for efficient market operation. For most Boroughs vacancy rates are well below these thresholds, but there are some Boroughs in east London where the level of vacant industrial land is still high. If the amount of vacant industrial land was reduced to the 'frictional' level in these Boroughs then it would enable the release of 335 ha of industrial land.

Baseline Scenario

Pulling together the different components of demand for industrial land produces a Baseline Release Scenario of 233 ha of industrial land over the London Plan period 2016-41 at an average of 9.3 ha per annum.

Alternative Projections and Scenarios

The Baseline Scenario for industrial land release is calculated based on existing demand trends and policies. We have also considered alternative scenarios.

Supply Trend Projection

We first examined the implications if recent trends in the loss of industrial land were projected forward. Applying past rates of industrial land loss over the period 2006-15 to the London Plan period 2016-41 would imply the loss of 1,630 ha of industrial land at an average of 65.2 ha per annum if policy and market operation stayed same.

Potential Pipeline Release

The next scenario was to factor in all existing commitments with planning permission and planned proposals to release industrial land through Opportunity Area Planning Frameworks, Local Plans and other spatial planning initiatives such as Housing Zones. This would imply the loss of 837 ha of industrial land at an average of 33.5 ha per annum, although much of the loss would take place within the next 10-15 years. If an allowance is made for strategic infrastructure projects such as Crossrail 2 and the Bakerloo Line Extension this figure could rise to 51 ha per annum.

Intensification and Substitution

For this scenario, we looked at the potential for increasing the amount of industrial floorspace per hectare in the least densely developed industrial Boroughs up to the current London average. This could potentially release an additional 265 ha. We also factored in increasing substitution of logistics activity being serviced from outside of London due to constraints on available land supply, which could release 280 ha. This suggests a loss of 778 ha of industrial land at an average of 31.1ha per annum, may be possible with policy changes.

Summary of Scenarios

A comparison of the alternative Scenarios by Property Market Area is set out in Figure 1 below. Whilst Figure 2 shows the trend in total stock of industrial land and how this trend would appear under each of the industrial land release scenarios for the period 2016-2041

Figure 1 Industrial Land Release Scenarios by Property Market Area 2016-41 (Ha)

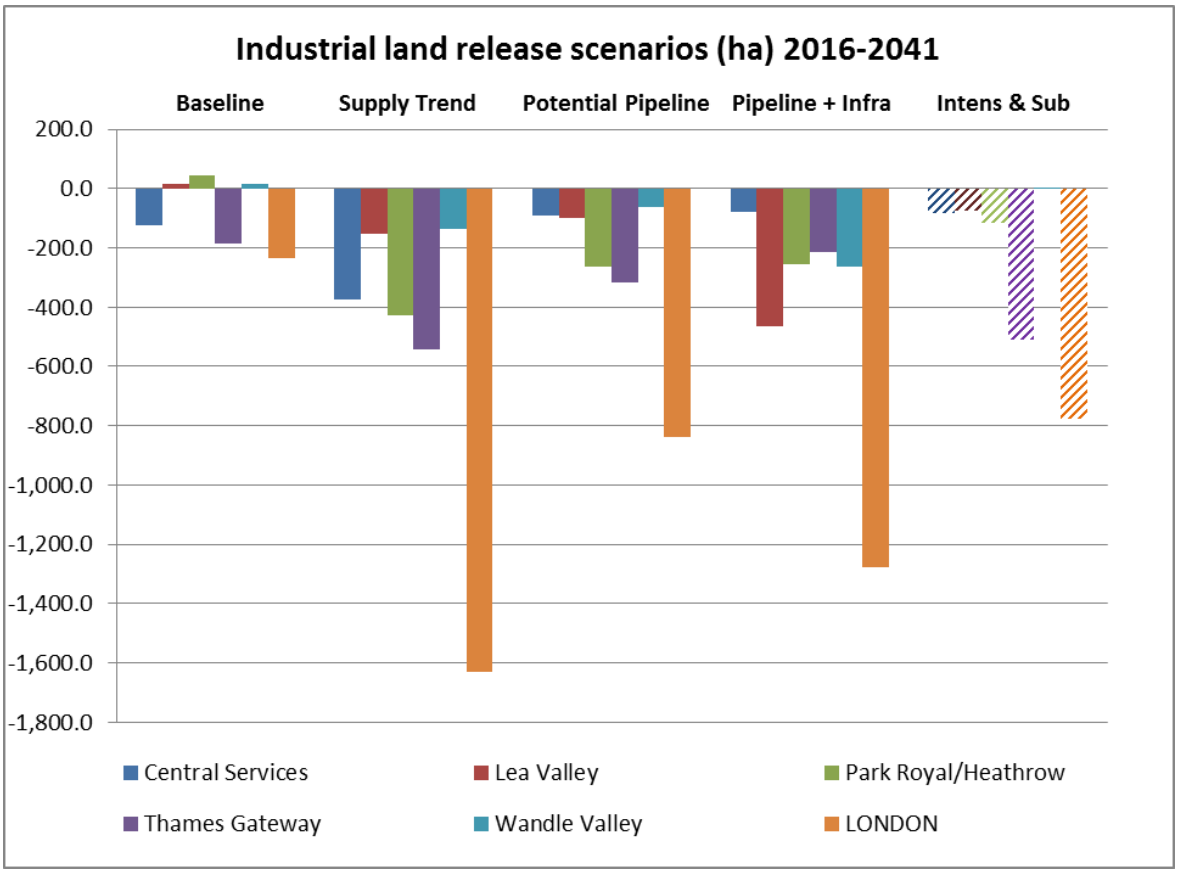
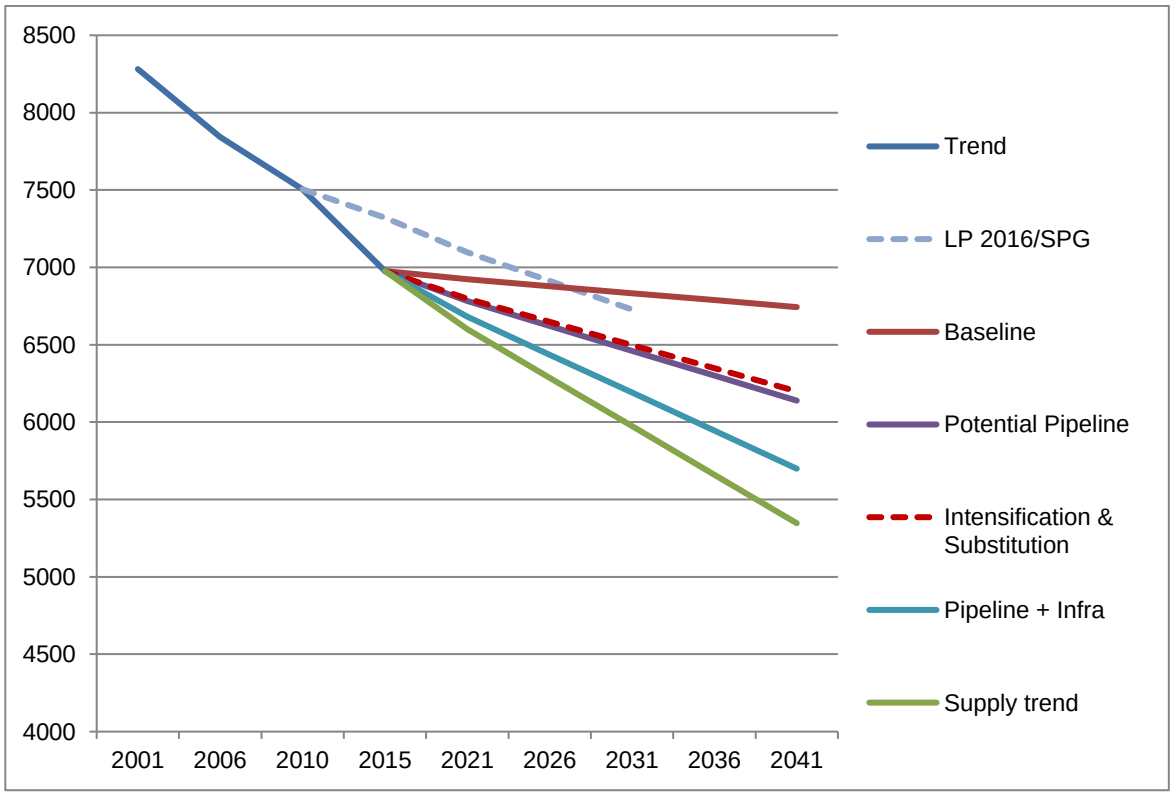


Figure 2 Trend in total stock of industrial Land and industrial land release scenarios (ha) 2016-2041



Conclusions

Industrial land release in London is currently running at around 100 ha a year, well above the benchmark release figure of 37 ha a year set out in the London Plan and Land for Industry and Transport SPG. Our new projection suggests the release figure should be revised down to just 9 ha a year. The reasons for the downward revision are twofold. Firstly, a significant proportion of the previous release total has already gone. Secondly, projections for the decline in industrial employment in London have been revised down compared to the earlier forecasts.

But these baseline projections are not the only possible outcome. In practice, the outcome will be determined by the availability of land. If the industrial infrastructure to service London's economy is not provided within London, the economy will still function but there will be costs. There will be costs in terms of additional journey lengths, which will increase the financial costs and environmental impacts of servicing London's economy. There will also be costs in terms of quality of service and reliability. And there will be costs in terms of the diversity of London's business base as SMEs in the industrial sector close down.

Some of these costs can be mitigated through intensifying the way that London's existing industrial land is utilised. There are some signs this is starting to happen, but it is likely to require significant intervention if this is going to occur on a large scale.

1 Introduction

1.1 Purpose of Study

The Greater London Authority (GLA, the Authority) commissioned the London Industrial Land Demand Study to:

- Analyse the short, medium and long term demand and supply dynamics for industrial land and related uses in different parts of London and explore relationships with the Wider South East (WSE).
- Review the existing London Plan and Supplementary Planning Guidance benchmarks of industrial land retention/release to other uses and roll these forward to 2016-2041 on a consistent, pan London demand/supply basis.
- Undertake a series of scenarios relative to the baseline benchmarks to explore the potential for further release of industrial land in London and associated impacts.

The study is framed within the wider policy context of the London Plan and the Government's National Planning Policy Framework. The work will inform a full review of the London Plan, preparation of Local Plans/Opportunity Area Planning Frameworks and support co-ordination of industrial land supply with the Wider South East.

1.2 Scope of Study

The study assesses the range of uses that occupy industrial land in London. It examines recent trends in the way land and floorspace is occupied in London. It projects future demand for industrial land but looks at a range of sensitivity tests and scenarios around a central projection.

One feature of this edition of the study is the relationship between London and the Wider South East in terms of the spatial nature of industrial and logistics activity. To help inform this aspect the study included a set of workshops where local authority and private sector stakeholders were invited to contribute their insights on the current and changing nature of demand for industrial land and premises in London and the Wider South East[3]. Four workshops were convened focussed on the four broad property markets quadrants of north, south, east and west and included participants from both inside London and from outside London. The workshops discussed a range of themes including:

- The type of industrial activity that is still viable in London.
- Migration of firms between London and the Wider South East.
- The potential substitutability of demand between London and the Wider South East.
- Technological, organisational and other change that is affecting the demand for industrial premises.

[3] These were held jointly with discussions of demand for office activity which informed the London Office Policy Review.

The workshop discussions help to inform this study as well as contributing to the start of a wider conversation about the spatial configuration of industrial activity in London and the Wider South East.

1.3 Report Outline

The structure of the report addresses each of the different components of demand for industrial land separately, before drawing conclusions on the overall level of potential industrial land release for each borough.

Chapter 2 first sets the planning policy context examining the role and purpose of planning policy in relation to industrial land. It summarises specific national and London policy and summarises the approach to Industrial Land Policy in the Wider South East.

The report then describes the current property market context. Chapter 3 describes the current stock and users of industrial land in London drawing from recent surveys commissioned by the GLA such as the Industrial Land Supply Study[4]. Chapter 4 then examines employment trends on industrial land. Chapter 5 provides an overview of London's Industrial property markets and sets this in the context of industrial and logistics activity in the Wider South East.

The report next sets out forecasts of future demand. Chapters 6 presents forecast demand for general industrial use and Chapter 7 presents forecast of demand for logistics activity.

Chapter 8 examines the impact of diminishing industrial land on the London economy and how the market might respond.

Chapters 9-12 examine trends and future investment proposals for other activity that occupy industrial land in London. These in turn look at waste, utilities, transport and wholesale markets.

Chapter 13 then draws the conclusions of the demand analysis together into a revised set of benchmark assessments

Chapter 14 then provides a series of spatial scenarios and sets out alternative benchmarks that would be implied by these scenarios

Finally, Chapter 15 sets out the overall conclusions and policy recommendations

Appendix 1 presents a definition of SIC codes used to describe various categories of industrial activity within this report.

Appendix 2 presents a summary of the findings from the London and Wider South East workshops.

Appendix 3 presents a table of substitutability indicators to assess the potential for the spatial relocation of industrial activity,

[4] London Industrial Land Supply Study 2015 - Aecom

2 Policy Context

2.1 Planning policy and Industrial Land

Role and purpose of planning policy in relation to industrial land

Planning policy exists to ensure that wider policy objectives are not subsumed by unregulated activity and that an appropriate balance of housing, employment and amenity land uses is achieved to deliver the desired quality of life. There is no explicit national guidance on how much of each type of activity should be provided in designated industrial land. The amount needed is the amount necessary to deliver the London Plan policy objectives, consistent with other land uses.

Industrial land use designations exist to ensure that viable industrial activity is not 'crowded out' by other uses. In assessing the amount of industrial land to be retained we should consider market signals within land uses but not necessarily between land uses. The 2011 Industrial Land Demand Benchmarks Study described the traditional economic rationale as to why the planning system might intervene to preserve land for industrial activity and these arguments are summarised below.

Economic Efficiency

The traditional theory for public sector intervention in the economy resides in market failure. Briefly summarised, this theory holds that the market, when left to its own devices, maximises economic efficiency and hence the economy's total output (GDP, economic well-being, economic growth etc). But this is only true in a theoretical world in which markets work perfectly. In real life, there are market imperfections - or market failures – which mean that the market will not maximise total output, unless the failures are corrected by government / planning authorities.

The forms of market failure that are most obvious with regard to industrial land provision are co-ordination market failures and externalities, both positive and negative.

Co-ordination Market Failures - As noted in textbooks, one role for land-use planning is to control environmental and amenity impacts, so that – for example - smoky factories do not locate next to people's homes. In London in particular there are fewer and fewer locations for these kinds of noisy and dirty activities (e.g. waste and recycling, utilities, construction activities). Replacing them with other uses makes it highly unlikely that they will find alternative sites within London.

Negative Externalities - These will include congestion, pollution, health risks and also climate change impacts. What would happen if industrial users moved outside London in terms of CO_2 emissions? If goods for the London market have to be supplied from further away, then there may be additional costs in terms of local and global environmental impacts. The question is whether the full social cost of additional trips is factored into land and fuel prices.

Positive Externalities -To illustrate through an often-quoted example, a development of large-scale strategic warehousing may deliver few visible benefits in its immediate locality, if it provides few jobs in relation to land area. But the development may generate substantial benefits: modern logistics lowers distribution costs and improves the supply of goods, thereby raising the economically sustainable level of output and employment in the economy as a whole. These benefits mostly accrue to people who live a long way from the new warehousing. The link between the new development and the resulting benefits is 'in the price': it operates through market mechanisms but is not visible either to the naked eyes or to planners' analyses.

There is also reason to doubt that current market prices are necessarily going to make the most efficient land use allocations for what might be very long-term time horizons of thirty years of more.

Equity objectives

Even if markets work perfectly and so produce the highest possible wealth in total, there is no reason why they should produce a fair distribution of that wealth, or indeed the costs of generating it. Therefore, besides correcting market failure, a second rationale for government intervention in the economy is to promote social justice, also known as fairness or inclusion. Planning does this, for example, by steering development and jobs to disadvantaged areas.

There is thus a labour market rationale for achieving equity objectives. There could be a strong rationale for maintaining industrial land if this was providing labour market opportunities to the most disadvantaged workers. As shown in the 2011 Industrial Land Demand Benchmarks report there is a close fit between the immediate catchment area of industrial estates and the areas of London experiencing the highest levels of deprivation. Whilst we do not have the information to know where the labour for these industrial sites is drawn from, it is a reasonable assumption that in many cases loss of industrial land would disproportionately impact upon the job opportunities of those in the areas of highest deprivation.

For lower skilled workers, the wages in sectors occupying industrial land are significantly higher than those in other lower skilled service sectors such as hotels and catering and retail. Economic intervention can be justified to maintain better paid employment opportunities in areas of higher deprivation. Many small industrial businesses cater for London's multicultural population who may be otherwise disadvantaged in the labour market,

But in addition to pure economic objectives, the London Plan has a range of broader policy objectives which also need to be considered when making land use allocations.

Investment Goods

Land use planning is concerned with the rationing of a finite resource. It needs to ensure that not all land is used for final consumption. Housing is both a consumption good and an asset, whilst business premises are an input to the production process[5]. In the same way that land is retained for infrastructure purpose as an investment in the wider economy, so might industrial land be considered part of the necessary infrastructure to enable a productive economy. Allowing land to be allocated to the highest current use value could lead to over-consumption with no land available for future investment. The notion of scarcity has been used as a justification for limiting releases of industrial land elsewhere.

"The rationale for providing restraints on the ability to rezone land from industrial is related to the notion of scarcity. Considered in isolation, each individual development site could be subject to its own highest and best use analysis. Taken together, however, they represent a portfolio of assets that District government could and should manage in a strategic manner specifically because these assets are scarce. Unlike many suburban jurisdictions with ample space for accommodating future growth, each development decision made in DC carries with it an opportunity cost: the foreclosure of other development options. The portfolio perspective means that the District should view its inventory of developable sites as serving potentially different functions: addressing immediate needs and opportunities, hedges against future uncertainty, or resources held in reserve for anticipated future needs".[6]

[5] This point is made elsewhere in a different context in the Mirless Review

[6] District of Columbia Industrial Areas Study DC Office of Planning

Placemaking

There are a further set of arguments that are often advanced for retention of industrial activity in London that revolve around the character of the city. Whilst these are not directly economic arguments they have an investment rationale akin to Placemaking. This is particularly so for an economy reliant on a highly skilled and mobile workforce. *"In today's highly competitive environment for talent, a compelling quality of place - a community's attractiveness to existing and future residents and workers - is a competitive advantage."*[7] Losing the diversity and character created by industrial activity and industrial premises may impact on future investment.

A parallel argument is often used to support cultural and creative industries – many of which increasingly occupy industrial premises. A GLA report estimated that creative industries account for 10.7% of London's GVA[8]. The report argued that in addition to standard multiplier effects, "*the creative industries may increase productivity in other sectors, in a mutual exchange of creative ideas and knowledge which becomes part of the wider production process".* It further argued that the creative industries may have an amenity value and attract tourists.

Planning has a recognised role in maintaining a balance of land uses. Parks, open spaces and greenbelt, for example make no direct contribution to economic output but are protected for their amenity value. But as part of the social infrastructure of a city they can add value to the extent that they encourage investment.

2.2 National Policy

There is no explicit national planning policy that defines industrial and logistics activity and how it should be planned for. The National Planning Policy Guidance on Housing and Economic Development Needs Assessments states that:

"In understanding the current market in relation to economic and main town centre uses, plan makers should liaise closely with the business community to understand their current and potential future requirements. Plan makers should also consider:

- *The recent pattern of employment land supply and loss to other uses (based on extant planning permissions and planning applications). This can be generated through a simple assessment of employment land by sub-areas and market segment, where there are distinct property market areas within authorities.*
- *Market intelligence (from local data and discussions with developers and property agents, recent surveys of business needs or engagement with business and economic forums).*
- *Market signals, such as levels and changes in rental values, and differentials between land values in different uses.*
- *Public information on employment land and premises required.*
- *Information held by other public sector bodies and utilities in relation to infrastructure constraints.*
- *The existing stock of employment land. This will indicate the demand for and supply of employment land and determine the likely business needs and future market requirements (though it is important to recognise that existing stock may not reflect the future needs of business). Recent statistics on take-up of sites should be consulted at this stage, along with*

[7] http://www.areadevelopment.com/business-climate/Q1-2014/quality-of-place-corporate-location-decision-22771111.shtml

[8] The creative industries in London – GLA Economics Working Paper 70 (October 2015)

other primary and secondary data sources to gain an understanding of the spatial implications of 'revealed demand' for employment land.

- *The locational and premises requirements of particular types of business.*
- *Identification of oversupply and evidence of market failure (e.g. physical or ownership constraints that prevent the employment site being used effectively, which could be evidenced by unfulfilled requirements from business, yet developers are not prepared to build premises at the prevailing market rents)."*

2.3 London Policy

London Plan 2016

The current London Plan with consolidated alterations since 2011 was published in March 2016. The overall context is one of planning for continued growth. The objectives of the London Plan strategy include: *"Ensuring London is a city that meets the challenges of economic and population growth"* and *"Ensuring London is an internationally competitive and successful city".*

With regard to industrial land policy specifically, the London Plan notes that Strategic Industrial Locations (SILs) *"are London's main reservoir of industrial land."*

Policy 2.17 states that:

Strategic

A The Mayor will, and boroughs and other stakeholders should, promote, manage and, where appropriate, protect the strategic industrial locations (SILs) designated in Annex 3 and illustrated in Map 2.7, as London's main reservoirs of industrial and related capacity, including general and light industrial uses, logistics, waste management and environmental industries (such as renewable energy generation), utilities, wholesale markets and some transport functions.

Planning decisions

B Development proposals in SILs should be refused unless:

a they fall within the broad industrial type activities outlined in paragraph 2.79

b they are part of a strategically co-ordinated process of SIL consolidation through an opportunity area planning framework or borough development plan document

c the proposal is for employment workspace to meet identified needs for small and medium sized enterprises (SMEs) or new emerging industrial sectors; or

d the proposal is for small scale 'walk to' services for industrial occupiers such as workplace crèches or cafes.

C Development proposals within or adjacent to SILs should not compromise the integrity or effectiveness of these locations in accommodating industrial type activities.

LDF preparation

D In LDFs, boroughs should identify SILs on proposals maps and develop local policies based on clear and robust assessments of need to protect their function, to enhance their attractiveness and competitiveness for industrial type activities including access improvements.

Para 2.84 of the London Plan states that:

"Development in SILs for non-industrial or related uses should be resisted other than as part of a strategically co-ordinated process of consolidation, or where it addresses a need for accommodation for SMEs or new emerging industries, or where it provides local, small scale, 'walk to' services for industrial occupiers (workplace crèches for example), or office space ancillary to industrial use. Policing and other community safety infrastructure may also be appropriate uses in these locations."

Policy 4.4 of the current London Plan states that

"The Mayor will work with boroughs and other partners to:

a adopt a rigorous approach to industrial land management to ensure a sufficient stock of land and premises to meet the future needs of different types of industrial and related uses in different parts of London, including for good quality and affordable space

b plan, monitor and manage release of surplus industrial land where this is compatible with a) above, so that it can contribute to strategic and local planning objectives, especially those to provide more housing, and, in appropriate locations, to provide social infrastructure and to contribute to town centre renewal.

It further goes on to set out a series of criteria Boroughs should consider in preparation of their LDFs. The supporting text to the policy notes that, *"Even an increasingly service-based economy needs space for less high-value activities crucial to sustaining the city's metabolism, including 'services for the service sector', manufacturing and maintenance, waste management and recycling, wholesale and logistics. Sufficient space to accommodate demand for workspace suitable for SMEs and for new and emerging industries is also required including for the needs of micro-firms".*[9]

Land for Industry and Transport SPG

The Land for Industry and Transport Supplementary Planning Guidance (SPG) published in September 2012 provides guidance to:

- *"ensure an adequate stock of industrial capacity to meet the future needs and functional requirements of different types of industrial and related uses in different parts of London, including that for good quality and affordable space (London Plan Policy 4.4Aa);*

- *plan, monitor and manage the release of surplus industrial land so that it can better contribute to strategic and local planning objectives, especially those to provide more housing (including affordable housing) and, in appropriate locations, to provide social infrastructure and to contribute to town centre renewal (Policy 4.4Ab);*

- *ensure the provision of sufficient land, suitably located, for the development of an expanded transport system to serve London's needs (Policy 6.2C)"*[10]

The SPG set a benchmark industrial land release figure for the period 2011-2031 of 733 hectares in total, or an average of 36.7 hectares per annum. To assist in planning and monitoring industrial land releases boroughs were given one of four categorisations:

- ***"Managed Transfer**: Boroughs in this category generally have a greater supply of vacant industrial sites relative to demand and should generally adopt a rigorous but sensitively managed approach to transfer of surplus capacity to other uses. There may also be scope for reconfiguration of the existing industrial land portfolio to safeguard the best quality sites and secure adequate capacity for waste, logistics and other functionally important uses including*

[9] Para 4.18 London Plan (2016)
[10] Land for Industry and Transport Supplementary Planning Guidance (SPG) – GLA (September 2012)

land for transport, utilities, energy, water management, and wholesale markets whilst maximising the potential of land released to other uses. Planning Frameworks will play a key role in managing change in SILs in Opportunity Areas. The phasing of release should have regard to the need to reduce vacancy rates for land and premises towards the frictional rates set out in paragraph 3.7.

- ***Restricted Transfer**: Boroughs in this category typically have low levels of industrial land relative to demand (particularly for waste management or land for logistics) and/or low proportions of industrial land within the SIL framework. Boroughs in this category are encouraged to adopt a more restrictive approach to the transfer of industrial sites to other uses and set appropriate evidence based criteria to manage smaller non-designated sites. This should not preclude the possibility of smaller scale release where boroughs have made adequate provision for industrial land in their DPDs in particular for waste management, logistics and for SMEs/creative industries.*

- ***Restricted Transfer with exceptional planned release**. Two boroughs, Hammersmith & Fulham and Wandsworth, though in the 'Restricted' category are implementing significant and exceptional planned releases at White City/Earls Court and Nine Elms respectively. In recognition of this, these boroughs are identified in Figure 3.2 as within a special category, 'Restricted with exceptional planned release'. Apart from these specified planned releases, the boroughs should adopt a more restrictive approach to land release elsewhere.*

- ***Limited Transfer**: This category is intermediate between the managed and restricted categories above. Taking account of local variations of demand boroughs are encouraged to manage and where possible, reconfigure their portfolios of industrial land, safeguarding the best quality sites and phasing release to reduce vacancy rates for land and premises towards the frictional rates set out in paragraph 3.7."*[11]

Mayor's Central Activities Zone (CAZ) Supplementary Planning Guidance (SPG)

The role of industrial land in servicing the economy of the Central Activities Zone is picked up in the relevant Supplementary Planning Guidance

Planning for industrial capacity

"Boroughs are encouraged to take into account the supply and demand for industrial and related uses providing essential services to the CAZ, in particular sustainable distribution/ logistics; 'just-in-time' servicing; waste management and recycling; and land to support transport functions. Boroughs are encouraged to consider whether industrial sites would merit policy designation in Local Plans as 'Locally Significant Industrial Sites' to ensure that capacity is sustained to support the efficient functioning of the CAZ."

A City for All Londoners

May 2016 saw the election of a new Mayor for London. In November 2016, the Mayor published 'A City for All Londoners', which set out his vision for London and a general direction of travel for a future London Plan. Accommodating growth was one of the key themes and the Mayor stated that:

"London's population and its economy are growing. As more people live and work here, pressure on land is likely to increase. Through the London Plan and my transport strategy, I want to accommodate as much of this growth as possible within London. My aim is to protect land used for employment across the city, and in particular in the centre. I want to intensify housing development around stations and

[11] Land for Industry and Transport Supplementary Planning Guidance (SPG) Para 3.21 – GLA (September 2012)

well-connected town centres so that more people can live in convenient locations - and I will place more of an emphasis on more mixed-use development"

The Mayor also set out some clear constraints on where growth would be permitted:

"In the first instance, I want to protect the Green Belt and other designated green spaces. That means taking bold measures to meet as much of the city's growth demands within London as possible."

There was also a signal that industrial land was seen as a potential source to accommodate further housing development.

"In some areas, industrial land may be surplus to current needs and could be better used for housing. It may be possible to relocate industry to other areas of the city without disrupting the economy or eroding the critical base of industrial land. And it may be feasible for housing and industrial activity to co-exist in certain locations. We need to be creative in how we think about space and promote mixed-use activity".

But at the same time the Mayor recognised the need to provide for a range of economic activity in the capital including the continued provision of industrial uses

"The London Plan has to make space for office, industrial and retail space – all of which are important for London's economy – and it will detail provision for these. And I firmly believe that London should be the best place in the world for businesses of all shapes and sizes to start up and scale. So, within all these categories, it is one of my main priorities to support small and medium-sized businesses by protecting existing workspace, identifying new workspace areas and including places of work in new housing developments. In areas where costs are very high, I want to make sure that new commercial developments include affordable business space, in line with different and changing business demands."

Three sets of criteria were identified in the SPG to guide boroughs when considering industrial land releases or allocations. These were economic criteria; land use criteria; and demand based criteria.

Other Land Uses

The role of industrial land in London needs to be seen in the context needs to be seen in the context of pressure from other uses, notably housing with the need to accommodate an additional 49,000 dwellings per annum over the Plan period.

To put it in context, Industrial land accounts for less than 5% of the total land in London. But this needs to be considered alongside planning policy objectives such as the desire to protect Green Belt (Policy 7.16); the desire to protect Metropolitan Open Land (Policy 7.17); and the desire to protect Open Space (Policy 7.18)

Climate Change

Climate change and the need to reduce environmental emissions is also a key policy driver. This is relevant in the context of appraising alternative options for the configuration of industrial activity in London. Economic solutions that increase carbon emissions will have a negative impact on this other policy objective.

2.4 Industrial Land Policy in the Wider South East

There is currently no regional tier or planning body that provides a comprehensive policy approach for the Wider South East

The Mayor is seeking to engage with authorities in the Wider South East though a range of consultation forums. As noted in the introductory chapter of this report, this study included a series of consultation workshops to consider some of the joint and overlapping issues with regard to demand for industrial land and premises in London and the Wider South East

For some local authorities in the Wider South East looking to attract employment growth and investment there may be opportunities to capitalise on the restricted availability of industrial land in London in order to secure new investment.

2.5 Conclusions

There is no definitive policy answer as to what is the right amount of industrial land. The role of planning is to ensure that requirements for different types of employment land are understood and where possible provided for, but it does this against the background of competing claims for a finite land resource. Current policy seeks to *"ensure a sufficient stock of land and premises to meet the future needs of different types of industrial and related uses in different parts of London"*.

But the growth of London's economy and population is creating pressures on all forms of land use in the capital and raising the questions:

- What forms of land use require policy protection?
- How to mediate competing claims on demand for land?
- How can activity be intensified to accommodate increased demand on the same land area?
- Can the economic relationship of London and the Wider South East be better configured?

3 Stock and Users of Industrial Land

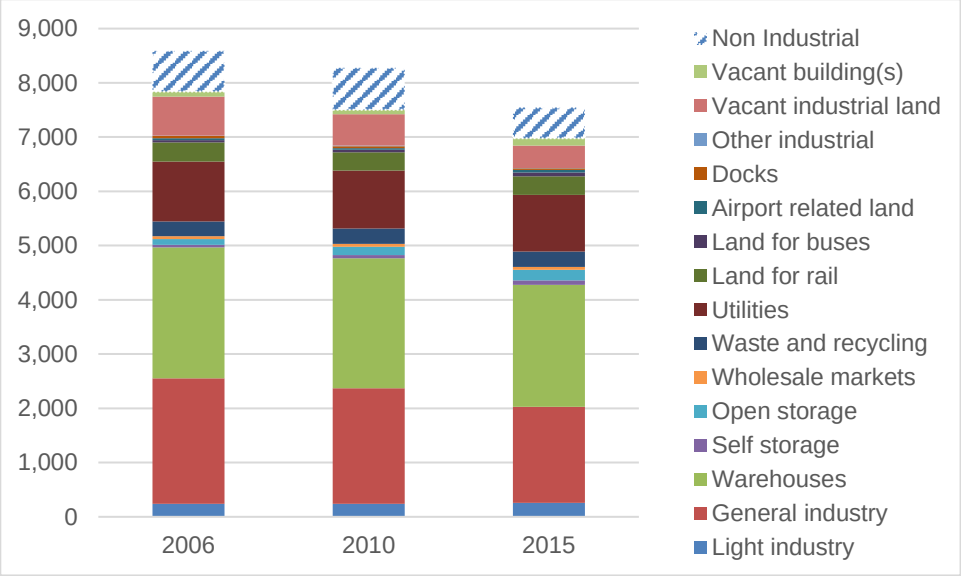
3.1 Introduction

This chapter sets out the current stock and users of industrial land in London. It summarises recent findings from the London Industrial Land Supply study. Key trends are highlighted here, with more detail available in the London Industrial Land Supply report[12].

3.2 Total stock

The 2015 London Industrial Land Supply study found there was a total of 6,976 ha of Industrial Land in London[13]. The represents a decline 528 ha (-6.7%) from 2010 and a decline of 865 ha (-11.0%) from 2006. In terms of annual average loss of industrial employment land 84 ha per annum were lost over the period 2006-10, 106 ha per annum were lost over the period 2010-15, or an average of 96 ha per annum over the period 2006-15. This compares to a release benchmark of 36.6 ha per annum recommended by the 2011 Industrial Land Demand and Release Benchmarks in London report[14].

Figure 3.1 Industrial Land in London by Use 2006-15 (ha)



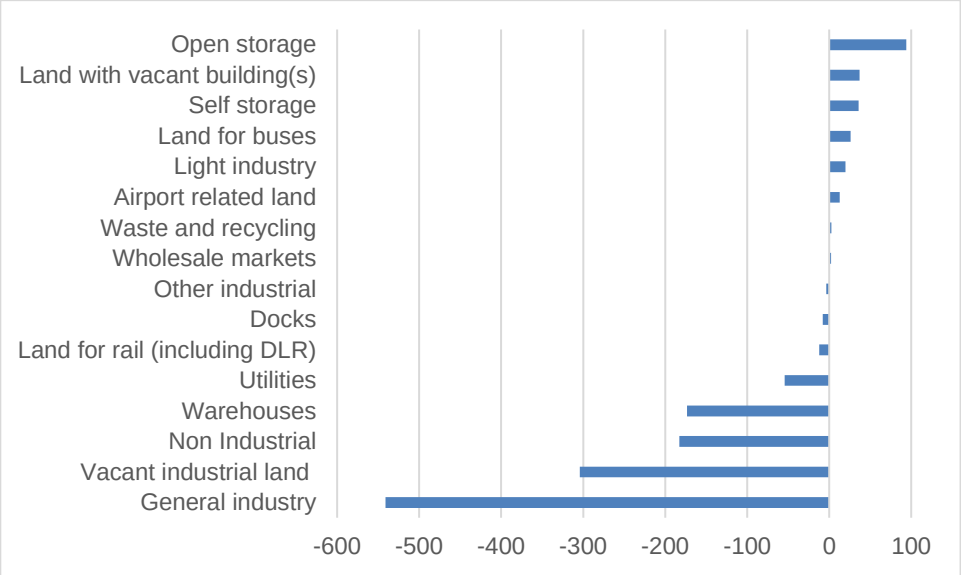
Source: London Industrial Land Supply (2006, 2010, 2016)

The biggest loss has been in land for general industry. There has also been a decline of 300 ha in vacant industrial land which has declined from 9.2% of stock in 2006 to 5.9% of stock in 2015. The overall vacancy rate once land with vacant buildings is added in declined from 10.4% in 2006 to 7.8% in 2015. If the vacancy rate is considered only in terms of Core industrial uses then it fell from 13.7% in 2006 to 10.7% in 2016.

There has been an increase of 100 ha over the period 2006-15 in terms of land for open storage and a small increase in terms of land with vacant buildings and land for self-storage, buses and light industry.

[12] AECOM. London Industrial Land Supply and Economy (GLA, 2016)
[13] There were 7,544 ha if non-industrial uses on designated industrial land (SIL/LSIS) are included
[14] Industrial Land Demand and Release Benchmarks in London – Roger Tym & Partners (2011)

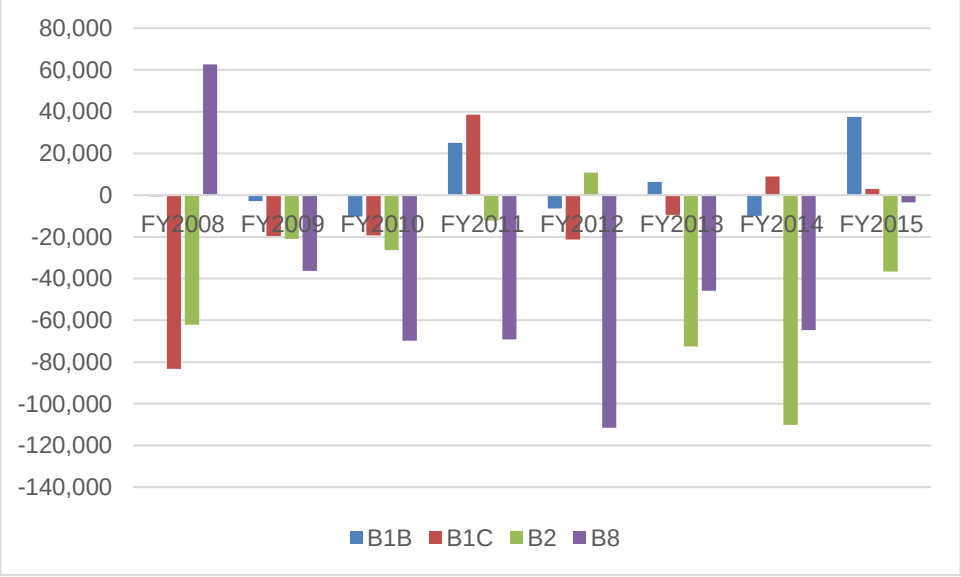
Figure 3.2 Change in Industrial Land by Use 2006-15 (Ha)



Source: London Industrial Land Supply (2006, 2010, 2016)

Data from the London Development Database (LDD) confirms the trend in loss of industrial stock. Over the period 2008/9-2015/16 there was a net loss of 770,000 sq m of industrial floorspace (B1c, B2, B8). There was a small net gain in B1B space of 39,000 sq m primarily as a result of the recent completion of the BSkyB R&D facility in Hounslow.

Figure 3.3 Net Change in Industrial Floorspace Completions 2008/9-2015/16 (Sq m)



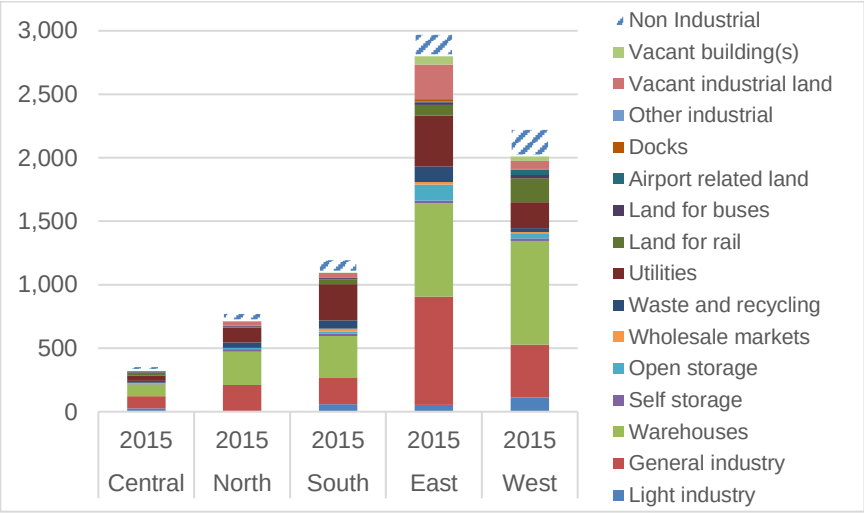
Source: London Development Database

3.3 Spatial Trends

London's Sub Regions

London's industrial land is concentrated primarily in the East and West sub-regions. 39.5% is in the East and 29.5% is in the West. Warehouses account for 36.7% of all industrial land in West London, which is the largest share of any sub-region. In East London general industry is still the largest single land use accounting for 28.6% of all industrial land. In the South sub-region utilities is also a major occupier of industrial land accounting for 23.7% of the total.

Figure 3.4 London Industrial Land Use by Sub-Region 2015 (Ha)



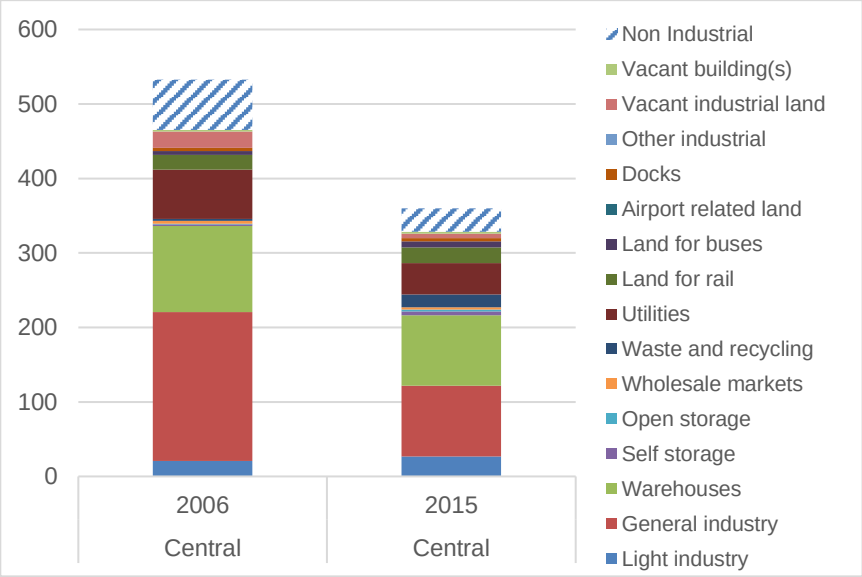
Source: AECOM. London Industrial Land Supply (GLA, 2016)

Central

Central London has the smallest industrial stock accounting for just 4.8% of London's total, down from 6.2% in 2006. The quantity of industrial land in Central London fell by one third over the period 2006-15. Losses were greatest for general industrial land which fell by over a half. 26.3% of Central London's industrial land is occupied by general industry and the same percentage is occupied by warehouses, with utilities occupying 11.7%.

Vacant industrial land is just 1.7% and land with vacant industrial buildings accounts for just 0.6%. The vacancy rate expressed as a percentage of Core uses is 3.6%.

Figure 3.5 Industrial Land Central London (Ha)



Source: London Industrial Land Supply (2006, 20109, 2016)

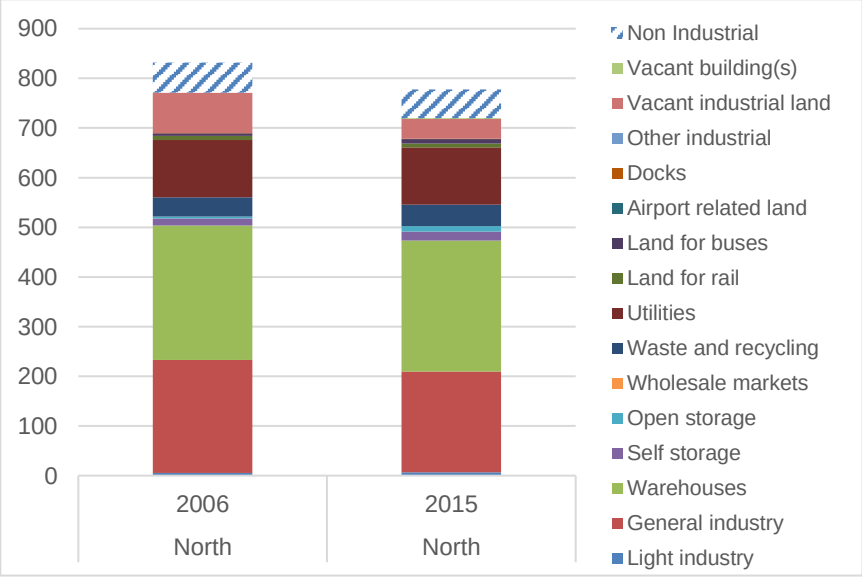
North

The North sub-region with 778 ha accounts for 10.3% of London's industrial land, the second smallest total after Central London. This is explained by the fact that the North is a small sub-region made up of only three boroughs.

The North has seen the smallest percentage loss since 2006 with a reduction of just -6.5%. Warehouses account for 33.1% of industrial land, general industry for 26.1% and utilities for 14.8%.

Vacant industrial land is 5.3% of the total, down from 9.1% in 2006. Land with vacant industrial buildings accounts for just 0.1% of the total. The vacancy rate expressed as a percentage of Core uses is 7.7%, down from 13.5% in 2006.

Figure 3.6 Industrial Land North Sub-Region 2006-15 (Ha)



Source: London Industrial Land Supply (2006, 20109, 2016)

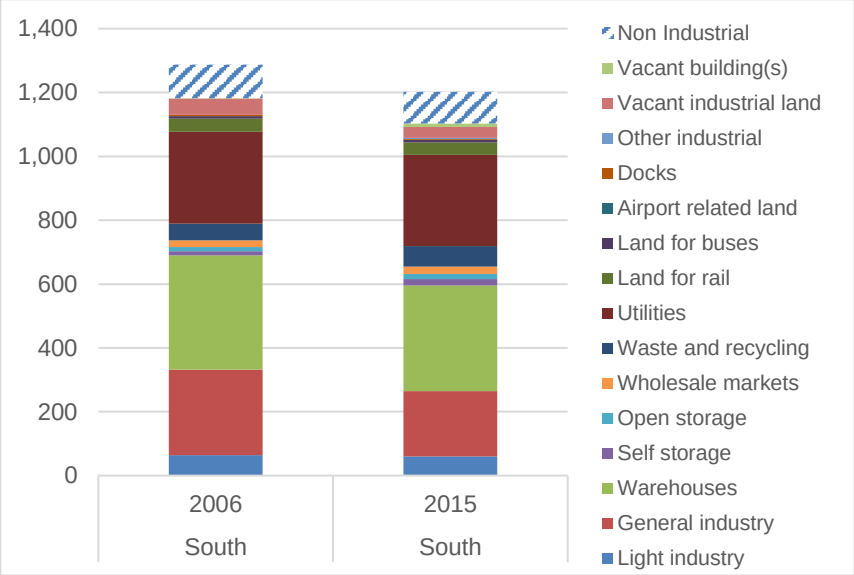
South

The South sub-region had 1,202 ha of industrial land in 2015, 15.9% of London's total. 27.5% of the total was occupied by warehouses, with the second largest use being utilities, which accounted for 23.7%. General industry occupied just17.1% of the total which is the lowest share of any sub-region.

Similar to the North, decline in stock of industrial land has been relatively modest since 2006 with a loss of -6.6%.

Vacancy rates are low with vacant land at 2.8% and land with vacant buildings at 0.9%. The vacancy rate expressed as a percentage of Core uses has remained constant at 6.7%.

Figure 3.7 Industrial Land South Sub-Region 2006-15 (Ha)



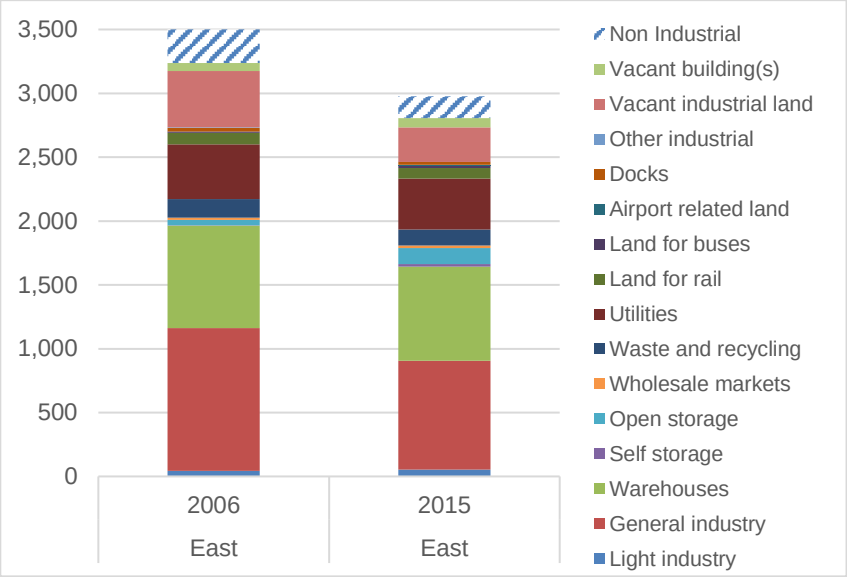
Source: London Industrial Land Supply (2006, 20109, 2016)

East

The East is London's largest industrial land sub-region. In 2015 it had just under 3,000 ha (2,977.1) of industrial land, though this was down from 3,500 in 2006, a loss of 15%. General industry accounts for 28.6% of industrial land, warehouses for 24.8% and utilities for 13.4%. There has been a relatively large increase in land for open storage which now accounts for 4.3% of all industrial land.

Vacancy rates remain the highest of any sub-region. Vacant land accounts for 9.1% of the total, though this is down from 12.8% in 2006, and land with vacant buildings accounts for a further 2.5%. The vacancy rate expressed as a percentage of Core uses is 16.2%, down from 20.0% in 2006.

Figure 3.8 Industrial Land East Sub-Region 2006-15 (Ha)



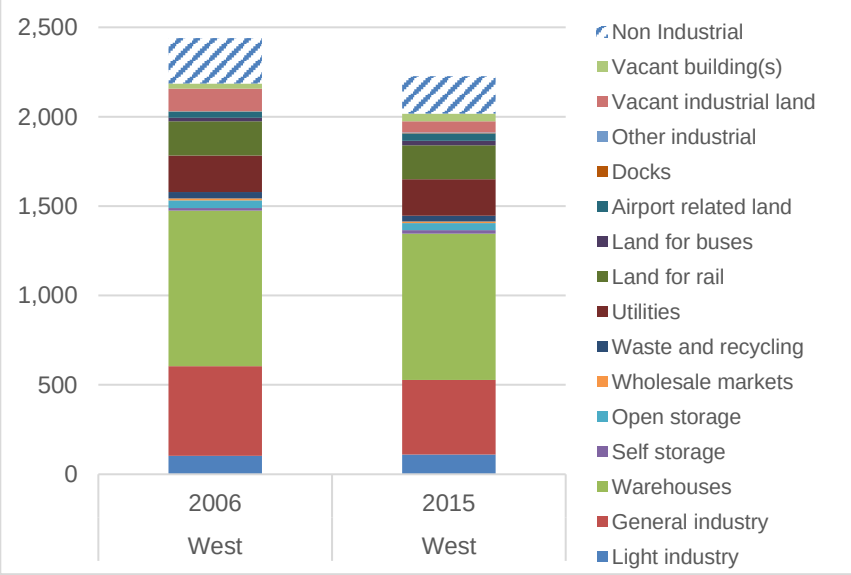
Source: London Industrial Land Supply (2006, 20109, 2016)

West

The West is London's second largest industrial sub-region with 2,227.2 ha of industrial land in 2015. In the period 2006-15 the stock of industrial land in the sub-region fell by 213 ha, a loss of -8.7%. 36.7% of land is accounted for by warehouses which is twice as high as general industry (18.7%). The West sub-region has the highest proportion of land occupied by non-industrial uses at 9.4% and the highest proportion occupied by rail at 8.5%.

Vacancy rates are low with 2.8% being vacant industrial land and a further 2.0% land with vacant industrial buildings. The vacancy rate expressed as a percentage of Core uses is 7.0%, down from 9.1% in 2006.

Figure 3.9 Industrial Land West Sub-Region 2006-15 (Ha)



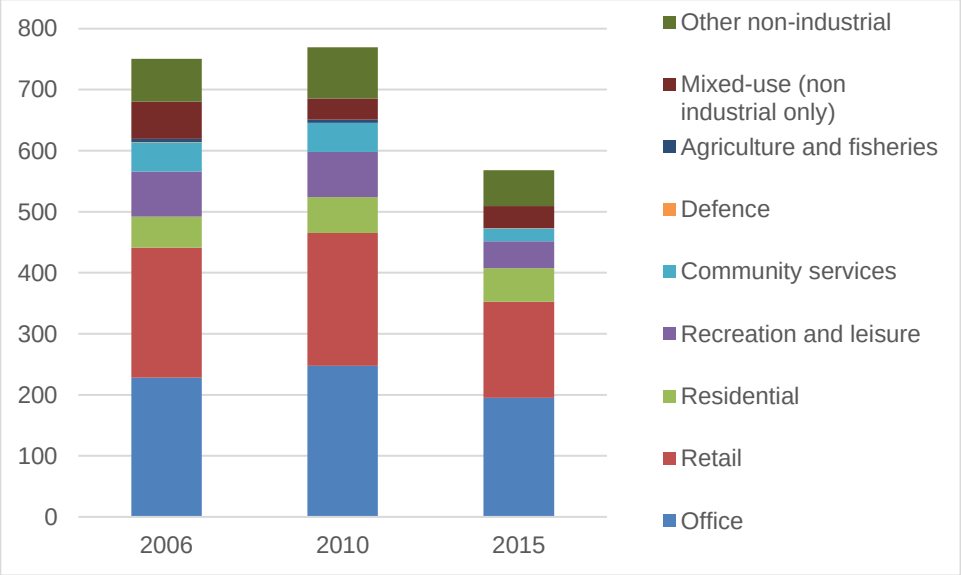
Source: London Industrial Land Supply (2006, 20109, 2016)

3.4 Non-industrial activities on designated Industrial Land

According to the London Industrial Land Supply study for 2015, 7.5% of industrial land is occupied by non-industrial uses. This represents a fall from 9.3% in 2010.

34% of non-industrial uses is accounted for by offices, 28% is accounted for by retail and 10% is taken by residential, a share that has been rising.

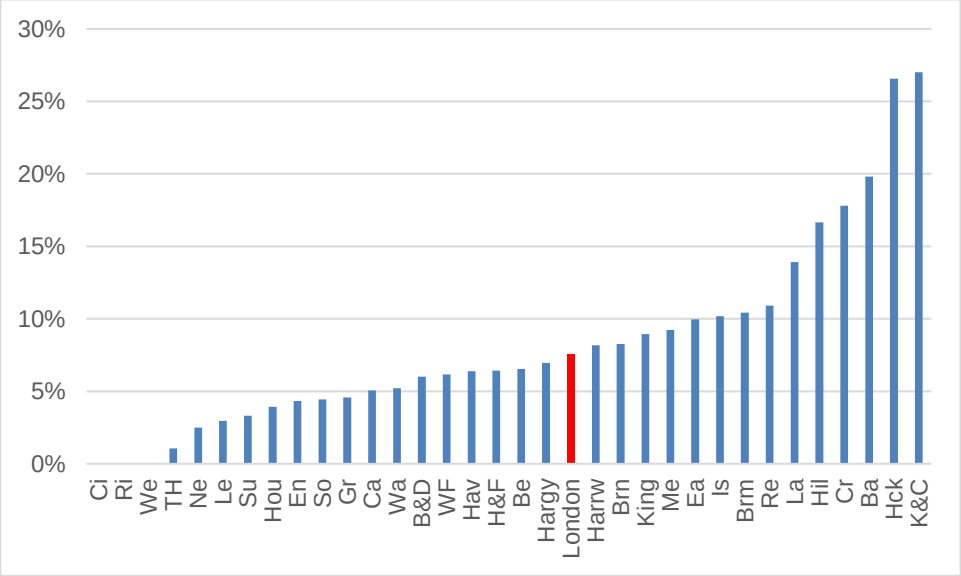
Figure 3.10 Non-industrial activities on designated Industrial Land, 2015 (Ha)



Source: AECOM London Industrial Land Supply (2016)

The proportion of non-industrial occupiers varies considerably by borough. In Kensington & Chelsea (27.0%) and Hackney (26.8%), more than a quarter of all industrial land is taken up with non-industrial uses. It is between 10%-20% in Barnet, Croydon, Hillingdon, Lambeth, Redbridge, Bromley and Islington.

Figure 3.11 Proportion of Industrial Land Occupied by Non-Industrial Uses, 2015



Source: London Industrial Land Supply (2016)

3.5 Past trends

Floorspace Stock

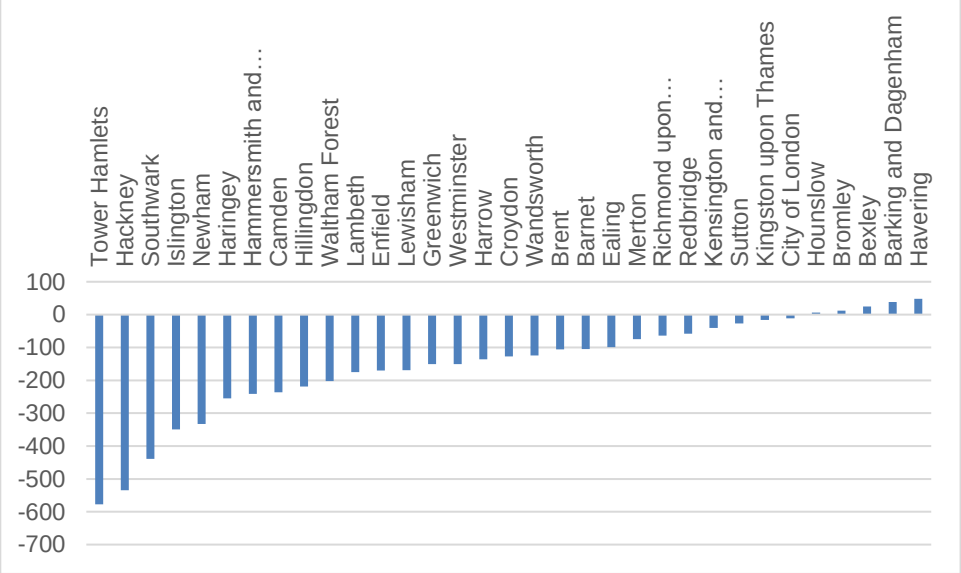
Industrial floorspace stock has steadily declined from around 25.8m sq m in 2001 to around 20.8m sq m in 2016, a loss of 5.1m sq m or roughly one fifth. Industrial floorspace in London over this period declined at an average of -1.4% p.a. compared with an average of -0.3% p.a. for England and Wales as a whole. 2008-09 saw a particularly sharp fall in industrial stock in London, probably due to a number of more marginal firms being squeezed out of business as finance dried up during the recession.

Industrial floorspace stock in the Wider South East remained broadly flat over this period growing at an average of 0.1% p.a. in both the East and South East regions.

The figure below shows the change in industrial stock by borough over the period 2001-16. Large losses were experienced in inner London boroughs such as Tower Hamlets, Hackney, Southwark and Islington. These boroughs also experienced a big increase in population and households over this period.

Five boroughs, all in outer London, saw a small increase in floorspace stock over this period. These were Havering, Barking & Dagenham, Bexley, Bromley and Hounslow.

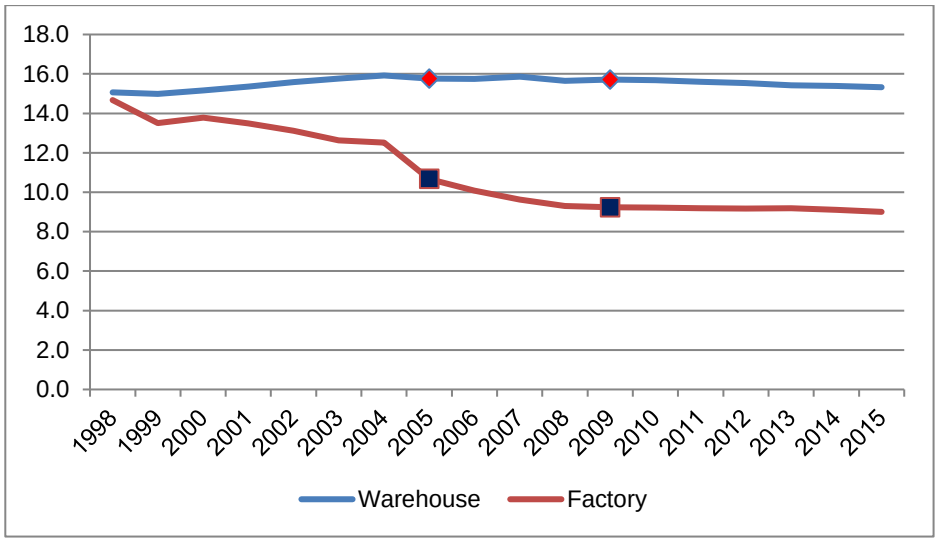
Figure 3.12 Change in Industrial Floorspace by Borough 2001-16 ('000 sq m)



Source: VOA

VOA floorspace data post 2008 does not distinguish between warehouses and factories. We have constructed a series beyond 2008 using LDD data. This shows that industrial floorspace stock has steadily declined from around 30m sq m in 1998 to around 24m sq m in 2015. The level of warehouse floorspace has been relatively stable at between 15m-16m sq m, with the decline coming in factory floorspace. Since 2008 the decline in factory floorspace has been arrested, though warehouse floorspace is now the predominant form of stock in London.

Figure 3.13 Industrial Floorspace Stock London 1998-2015



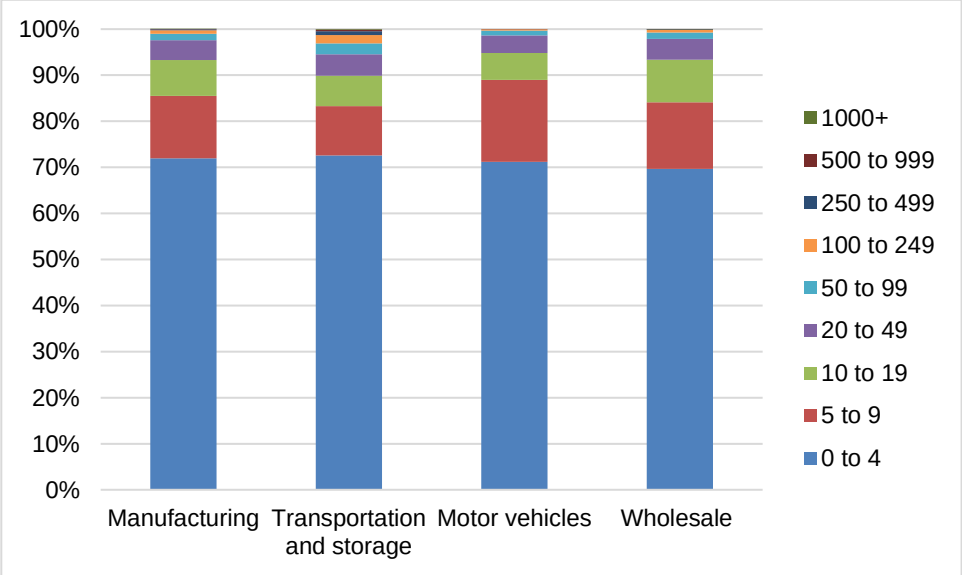
Source: VOA 2008, VOA 2012, LDD
Note there are data discontinuities at 2005 and 2008

Analysis by Size Band

As with all sectors, the vast majority of industrial businesses in London are micro businesses. Businesses with fewer than 5 employees account for just over 70% of all industrial establishments in London, while firms of fewer than 10 employees account for 85%. The proportion of the smallest business with fewer than 5 employees has increased since 2010. There are relatively few firms employing more than 50 workers and these are found primarily in the transportation and storage sectors.

Whilst the relationship between number of employees and size of industrial unit is not clear cut, this implies that demand will be higher for small units and demand for large units will be relatively limited. This is born out in the Industrial Land Supply study.[15]

Figure 3.14 Industrial Business in London by Size Band 2016



Source: UK Business Counts

[15] London Industrial Land Supply (2015) Table 4.5 Size of Premises and Availability, (page 108)

3.6 Planning designation

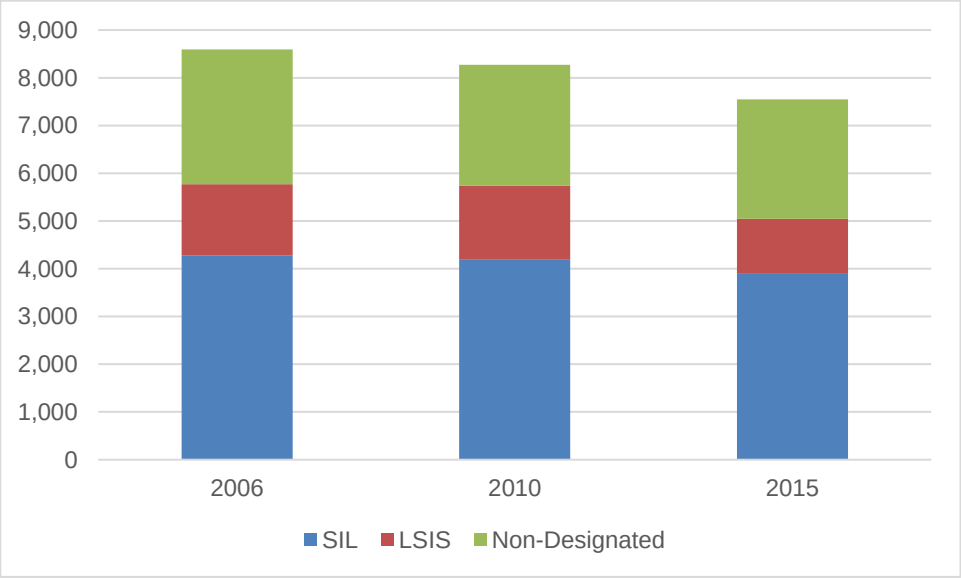
Industrial land has been lost across all planning designation though the pattern of loss appears to have changed between the two most recent surveys.

Strategic Industrial Locations account for around a half of all industrial land in London. The share increased from 49.8% in 2006 to 51.6% in 2015. The area in Strategic Industrial Locations fell by just -2.2% in the period 2006-10 but fell more rapidly by -7.0% in the period 2010-15.

The area of Locally Significant Industrial Sites actually rose by 3.8% over the period 2006-10, but then saw a heavy loss of -25.3% in the more recent 2010-15 period.

Loss of non-designated industrial land appears to have slowed in the most recent period, with the area declining by just -1.8% between 2010-15 compared with a fall of -7.0% in SIL and of -25.3% in LSIS. This may be in part due to LSIS being re-designated as SIL.

Figure 3.15 Industrial Land by Designation (Ha)



Source: London Industrial Land Supply (2006, 2010, 2016)

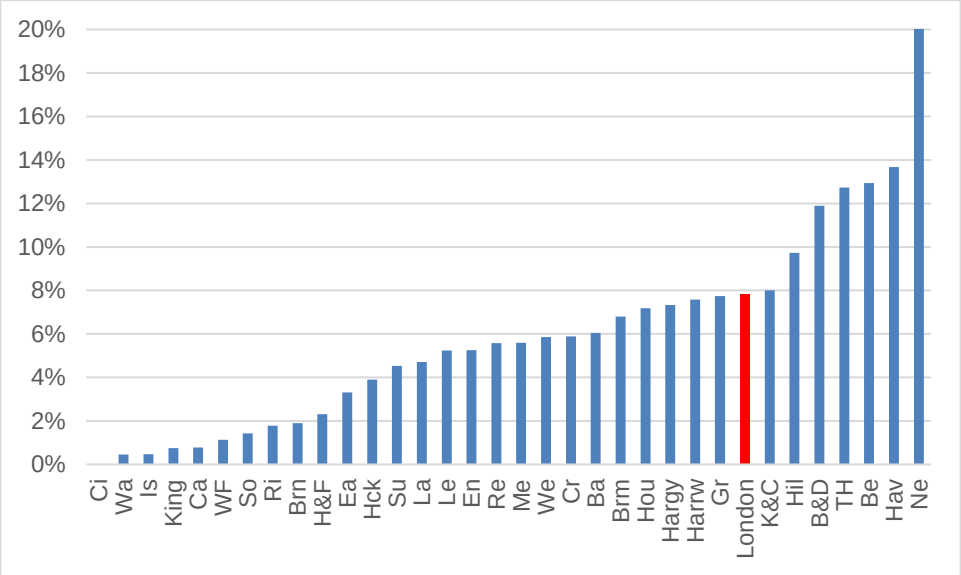
3.7 Vacant land

Figure 3.16 shows the percentage of industrial land that is vacant in each Borough. For London as a whole this is now just below 8%. But expressed as a percentage of Core industrial uses it is 10.7% and remains above the assumed frictional rate in the Industrial Land and Transport SPG.

There are still some Boroughs, notably in East London that still have a high proportion of vacant industrial land. In Newham the vacancy level is 20% or 34% as a percentage of Core industrial uses. However, it should be noted that these figures are skewed by large sites such as Royal Albert Dock and Minoco Wharf, which are not considered available for industrial development, despite being former industrial land that is currently vacant. In Havering, Tower Hamlets, Bexley and Barking and Dagenham the vacancy rate is above 10%.

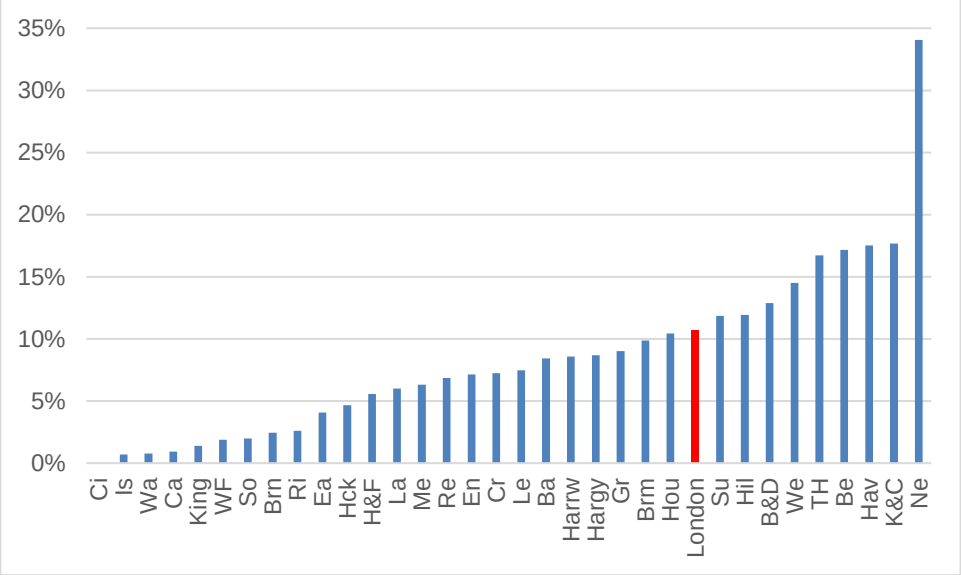
When the vacancy rate is considered in terms of Core industrial uses, nearly half the boroughs have a vacancy rate that remains above the benchmark figure set out in the Industrial Land and Transport SPG.

Figure 3.16 Percentage of Industrial Land that is Vacant by Borough 2015[16]



Source: London Industrial Land Supply (2016)

Figure 3.17 Vacancy Rates Expressed as a Percentage of Core Industrial Uses 2015



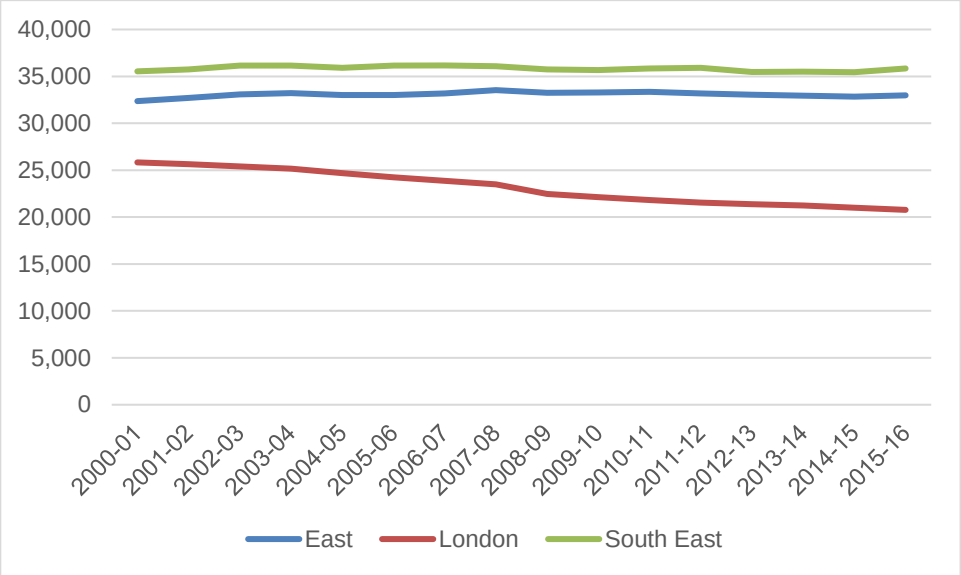
Source: London Industrial Land Supply (2016)

3.8 Floorspace Trends in the Wider South East

Whilst industrial floorspace has been consistently in decline in London, it has remained broadly constant in the Wider South East. Each of the regions experienced a shake-out in 2008-09 as a result of the recession. The loss of floorspace for that year was particularly marked in London, where 1 million sq m, 4.3% of total stock, was lost in one year.

[16] Includes both vacant land and land with vacant premises

Figure 3.18 Industrial Floorspace London and the Wider South East 2001-16



Source: VOA 2016

3.9 Conclusions

London's stock of industrial land has continued to diminish. The average annual loss is considerably higher than the London Plan benchmark rates for industrial land release. Part of this loss of industrial land is due to release of vacant industrial land: the proportion of London's industrial land that is vacant is now below 8% in overall terms but is 10.7% in terms of Core industrial uses. Vacancy rates are not uniform across London: whilst there is virtually no vacant industrial land in central London, there remain high levels of vacant industrial land in a number of east London Boroughs.

Spatially the decline in industrial land has been greatest in proportionate terms in Central London and highest in absolute terms in East London, though East London retains by far the larger share of industrial land in London. Reductions in industrial land have been relatively modest in North and South London, whilst West London remains as a popular location for warehousing land.

The SIL designation had previously proved successful in retaining industrial land, but in the last five years this (along with Locally Significant Industrial Sites) has now become the principal source of land release.

At the same time as industrial land releases are growing, the decline in industrial floorspace in London appears to be levelling off, implying some intensification of use may be underway.

4 Employment on Industrial Land

4.1 Introduction

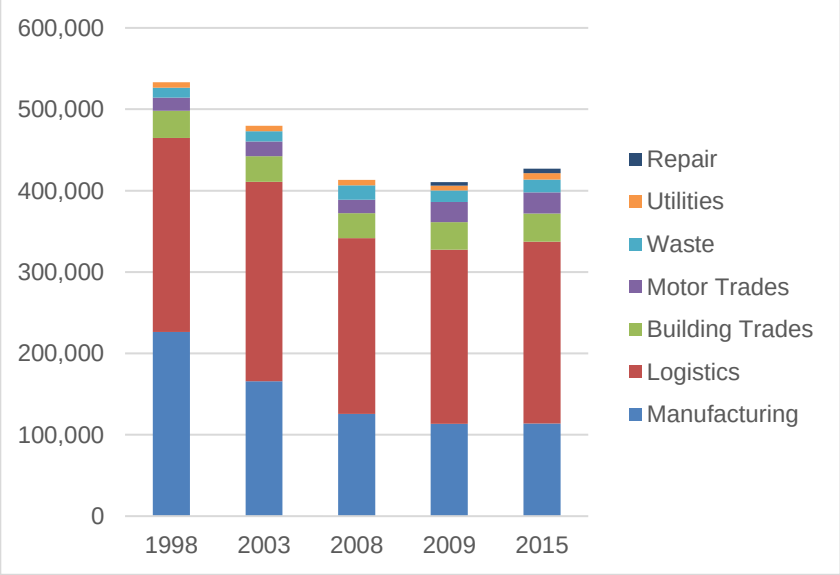
The previous chapter assessed industrial activity in London from a land use perspective. This section examines industrial activity from an employment and output perspective. That is, it focuses on sectorally defined industrial activity. The land supply analysis of the previous chapter suggested only 7.5% of land use was non-industrial. The detailed audits referenced in this chapter suggest typically non-industrial sectors (such as retail and service sectors) occupy between 50%-60% of all London's Industrial Land.

4.2 Industrial Employment in London

The 2011 London Industrial Land Release Benchmarks study identified different categories of industrial occupier, which we have followed here to analyse change in industrial employment. We have grouped industrial occupiers into seven categories: manufacturing, logistics, building trades, motor trades, waste, utilities, repair. There are, in addition, a number of service sector activities that occupy industrial land, but our interest here is in understanding trends in industrial activity itself.

Industrial employment in London declined steadily from 1998-2008, falling by 120,000 jobs over the period. This was principally due to reductions in manufacturing jobs which decreased by 101,000. There was also a loss of 22,000 jobs in the logistics sector. This decline has been halted in more recent years with overall industrial employment in London increasing by 16,500 over the period 2009-15.

Figure 4.1 Industrial Employment in London 1998-2015[17]



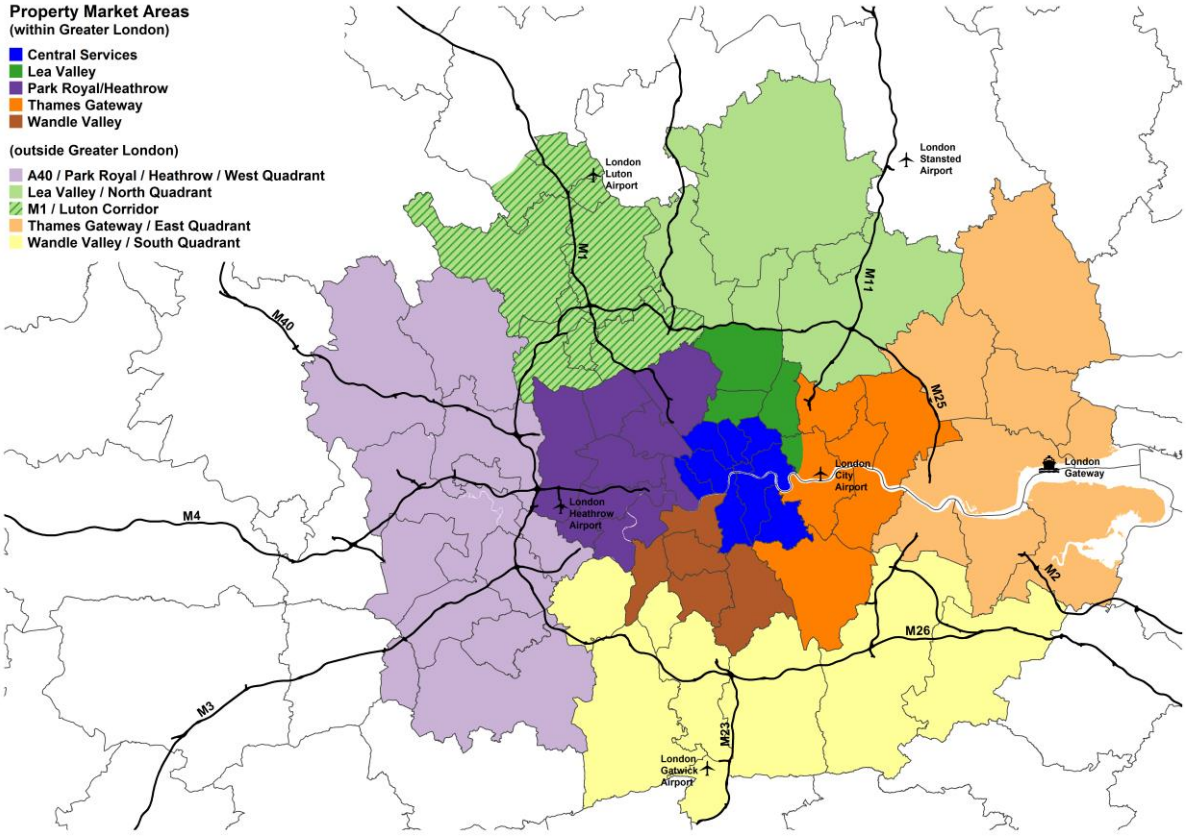
Source: BRES/CAG

Industrial employment has shown different spatial patterns of change in London. It has grown in the parts of London covered by the Lea Valley, Park Royal/Heathrow and Thames Gateway property markets areas. It has continued to decline in Inner London as defined by the Central Services area and

[17] Data on employment in the Utilities and Waste sectors is not available for 1998. To provide a better indicator of the overall scale of change we have assigned 2003 data for these sectors, which is the earliest available, to 1998. Employment in these sectors is neither large nor volatile.

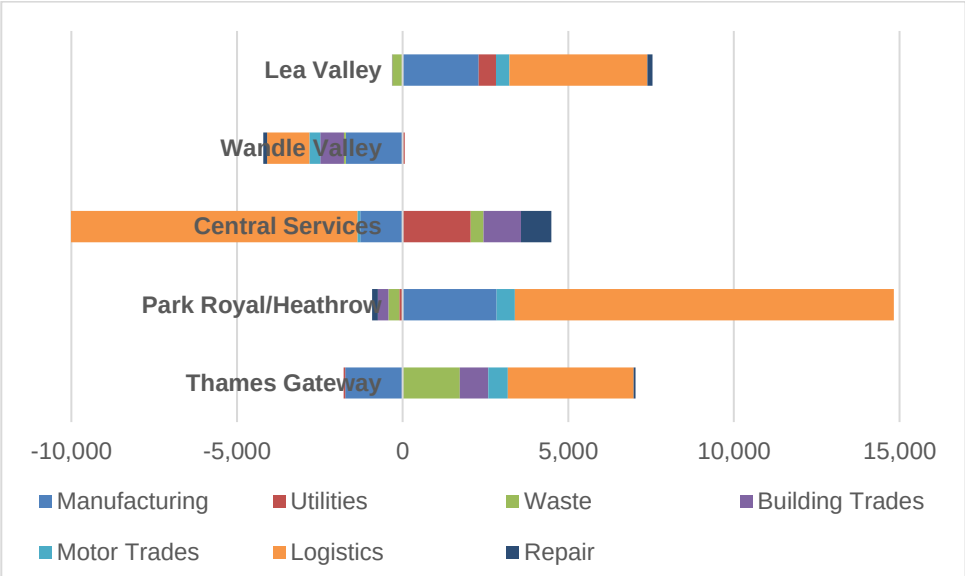
in south London as defined by the Wandle Valley PMA. These Property Market Areas are illustrated on the map below. These Property Market Areas also extend beyond London's boundaries: the comparison of London and the Wider South East is examined later in this chapter.

Figure 4.2 Industrial Property Market Areas in London and the Wider South East



Within London, the logistics sector is principally responsible for the observed growth, especially in West London as defined by the Park Royal/Heathrow property market area. Logistics has continued to decline in Inner and South London.

Figure 4.3 Change in Employment by Property Market Area 2009-15



Source: BRES/CAG

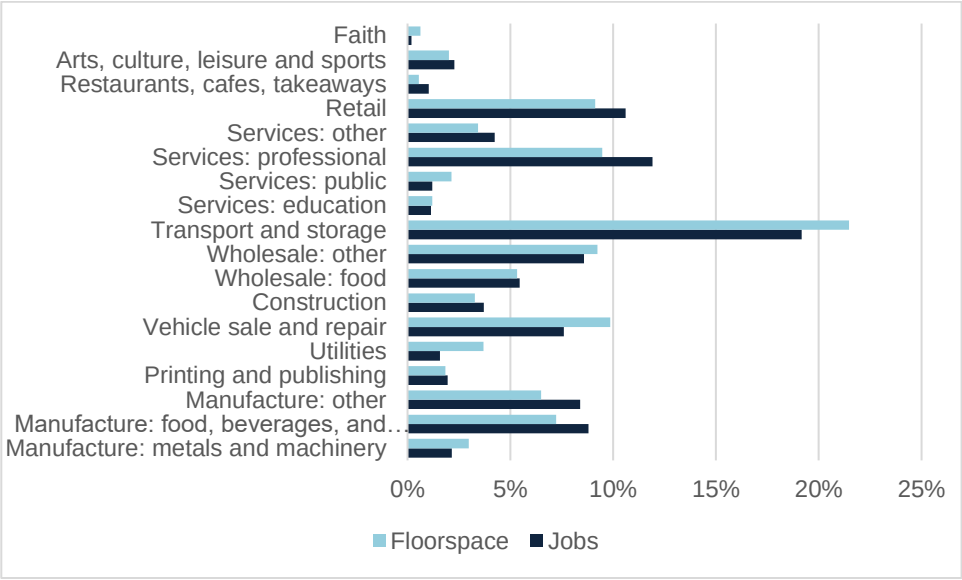
Industrial employment in all of these property market areas declined sharply over the period 1998-2008. Loss of industrial jobs in Park Royal/Heathrow was slower than in other areas, falling by just 11%, half the rate seen in the Lea Valley, Central Services and Wandle Valley. Employment loss was also slightly lower in Thames Gateway (-19.7%) than for these other areas.

Types of Activity on Industrial Land

The GLA have undertaken detailed audits of a number of industrial areas across London. Consistent and detailed data is available for four of the larger industrial locations, namely Brimsdown, Park Royal, Loughborough Junction and Old Kent Road. In total the four sites accommodate 4.4m sq m of floorspace and 59,000 jobs. Across these four areas an average of 9% of floorspace was vacant at time of survey.

Figure 4.4 below shows the breakdown of employment and floorspace by sector on these sites[18]. Manufacturing accounted for 19.4% of jobs and 16.7% of floorspace. Logistics activity accounted for 33%of jobs and 36% of floorspace. Services sectors accounted for 33% of jobs and 29% of floorspace, whilst vehicle sale and repair accounted for 8% of jobs and 10% of floorspace.

Figure 4.4 Employment and Floorspace by Sector on Surveyed Industrial Locations



Source: GLA Surveys

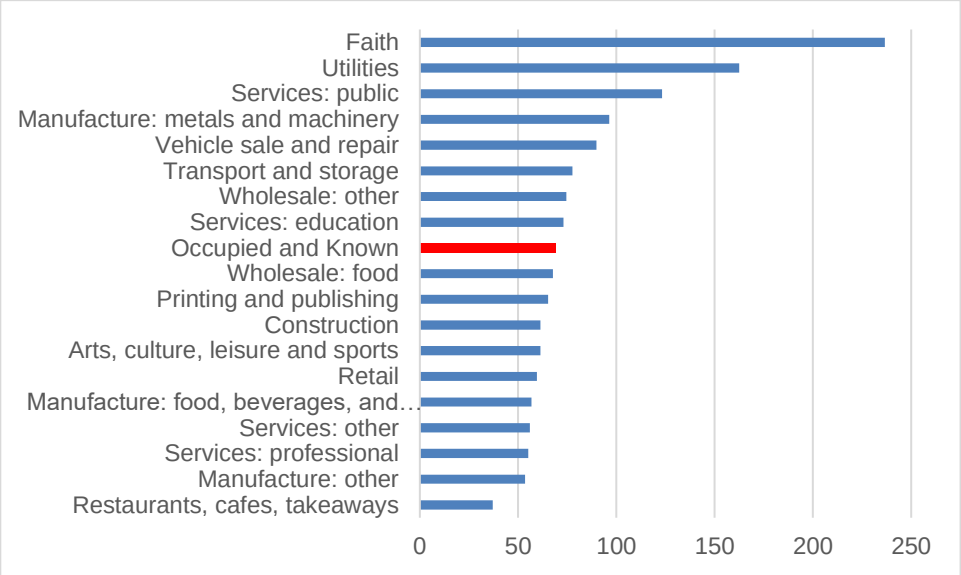
The average floorspace per worker across the sites as whole was 69 sq m. The ratio was much higher for faith, utilities and public services. 69 sq m per worker is a much higher floorspace to worker ratio than is considered to be the benchmark average. The HCA Employment Density Guide suggests 47 sq m per FTE for B1c Light Industrial and 36 sq m per FTE for B2 General Industrial and Manufacturing. A possible explanation for this apparent discrepancy is that the HCA Guidance is based on the building footprint, whilst the GLA survey includes external yard areas.[19]

Even service sectors appear to be occupying at low employment densities. This may reflect a higher than average production content for these occupiers. It may reflect the fact that firms are occupying cheaper space and hence are less sensitive to higher density utilisation; or it may reflect the fact the buildings are not designed to be used efficiently for office-type activities.

[18] Figure excludes vacant premises and those where sector unknown

[19] A sample exercise undertaken by the GLA excluding external areas brought the density ratios closer in line with the HCA benchmarks

Figure 4.5 Average Floorspace per worker on surveyed industrial locations



Source: GLA Surveys

It should also be noted that the number of jobs directly supported by these premises may be higher than the numbers employed on site. For example, in the logistics sector the survey will capture warehouse operatives but probably does not include drivers. For example, a press notice last year reported Ocado creating 205 jobs through the opening of a new 6,400 sq m delivery hub at Park Royal. That would work out at 31 sq m per worker, but as they are primarily drivers they may not be captured by surveys asking how many people are employed on site.

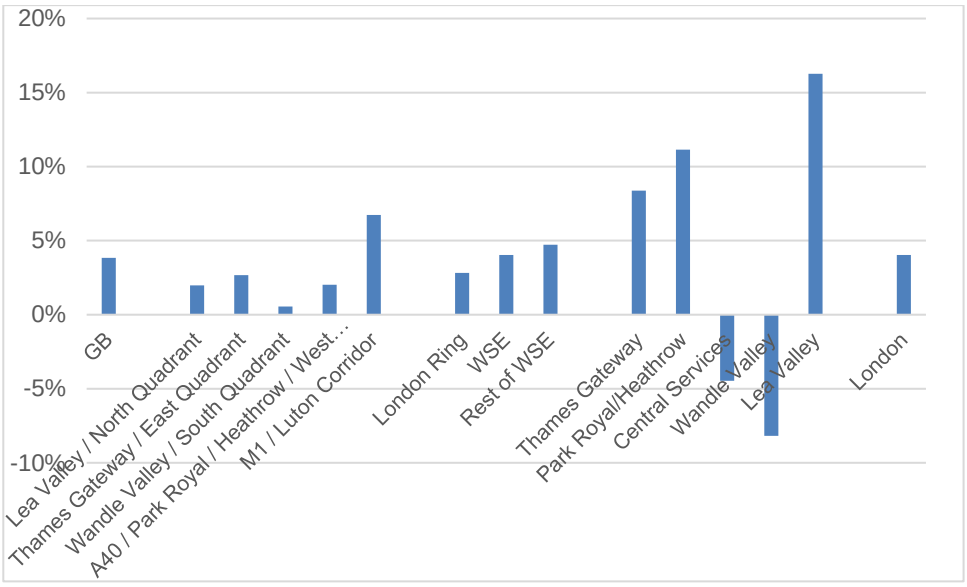
4.3 Industrial Employment in the Wider South East

To analyse industrial employment trends in the areas immediately outside of London we have followed the definitions of property market areas set out in the London Industrial Land Supply study, as illustrated at Figure 4.2 above.

Industrial employment trends for London as a whole in the recent period 2009-15 have been broadly similar to those for the Wider South East and indeed Great Britain generally. Over the period 2009-15 industrial employment grew by 4.0% in London, 4.0% in the Wider South East and 3.8% nationally.

But as noted above, employment has grown much more rapidly than this in the outer London corridors in the west, north and east of London. The figure below shows that, in contrast, industrial employment growth has been slower than the regional average in the quadrants immediately outside of London. Of the areas outside London, only the M1/Luton Corridor has shown employment growth above the rate for London as a whole.

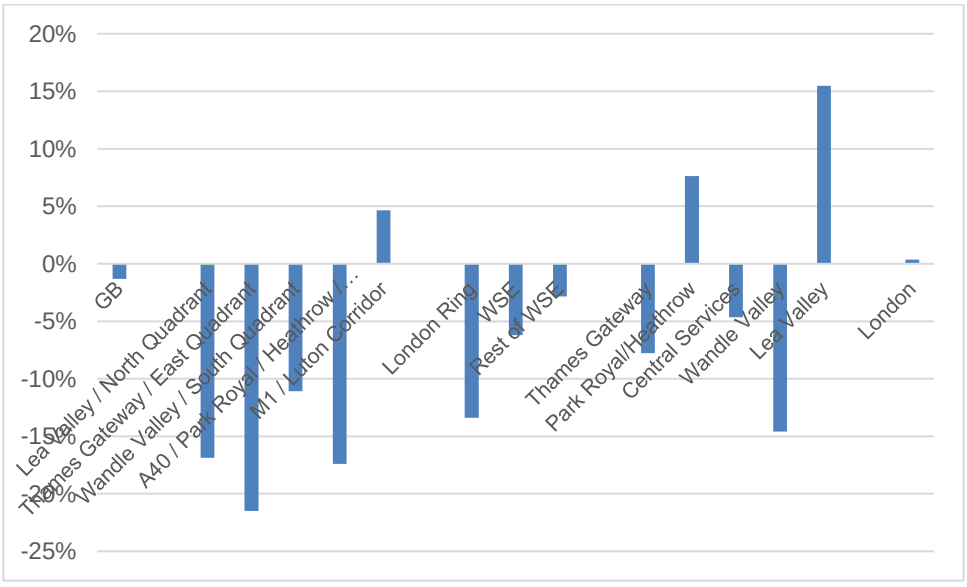
Figure 4.6 Industrial Employment Change 2009-15



Source: BRES/CAG

A similar story emerges when we examine the different components of industrial employment. Manufacturing employment has fallen sharply in the areas immediately outside of London, apart from the M1 Luton Corridor, whilst growing in Park Royal/Heathrow and the Lea Valley.

Figure 4.7 Manufacturing Employment Change 2009-15



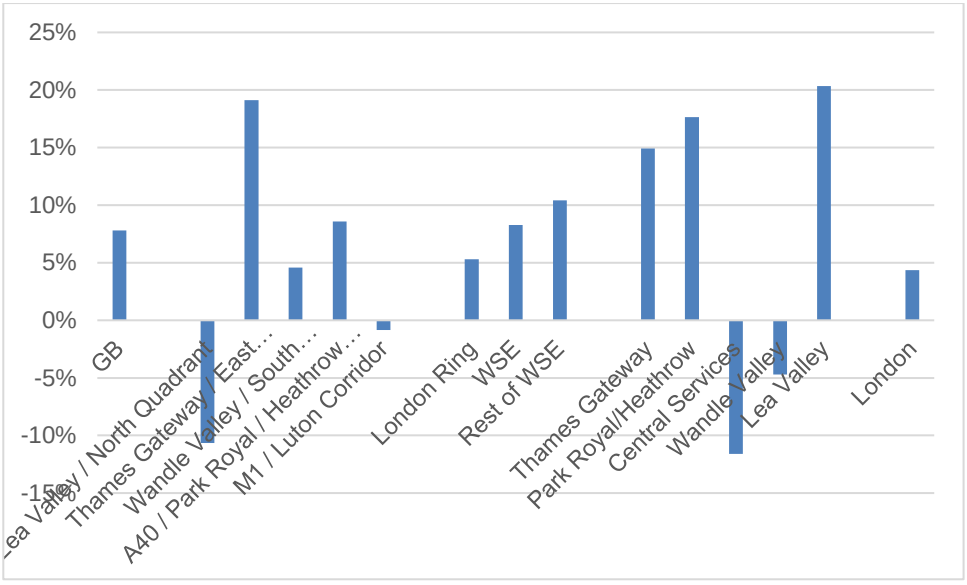
Source: BRES/CAG

For logistics the pattern is different. Employment has grown faster in the Wider South East and nationally than it has in London. Again, employment in the ring immediately surrounding London has grown less than in the Rest of the Wider South East. There also appears to have been a decline in employment in the Lea Valley/North quadrant outside of London, whilst the Lea Valley property market area inside of London appears to have grown strongly.

Employment in logistics has grown in the Thames Gateway, Park Royal and Lea Valley property market areas in London. It has shown some growth in London as a whole despite both floorspace and GDP

falling over this period. This would seem to imply the warehouse floorspace in London is being used differently with possibly more low value goods handling.

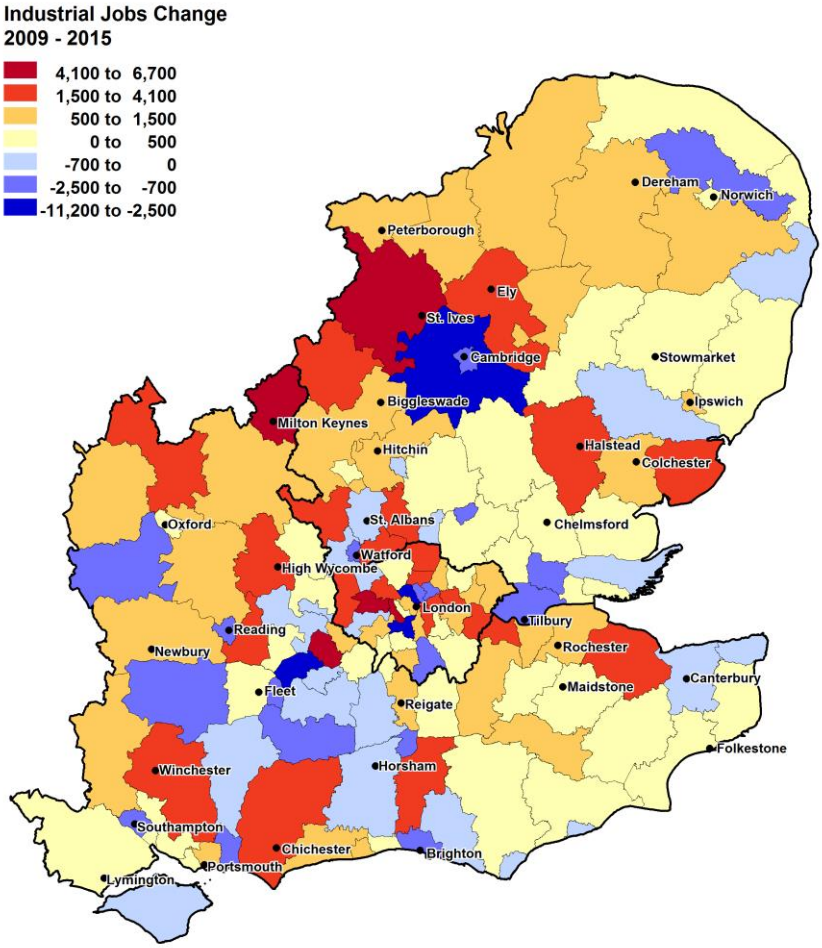
Figure 4.8 Logistics Employment Change 2009-15



Source: BRES/CAG

The next chart looks in more detail at where industrial employment has grown in recent years. Again, this highlights how, with few exceptions, growth has not occurred in the area immediately outside of London. The red shaded areas show those local authorities that have seen the largest growth in industrial employment over the period 2009-15.

Figure 4.9 Industrial Jobs Change by District 2009-15



4.4 Conclusions

Following a long period of steady decline industrial employment in London has seen a small increase in the period post-recession. It is still declining as a proportion of London's total employment and it is too early to say if this this is a permanent upward trend, but it appears likely that the long run decline has been arrested.

Industrial employment has continued to decline in Central London but has grown in the outer industrial areas such as Park Royal, Lea Valley and Thames Gateway, It seems likely that at least part of this growth is due to activity being displaced from Central London to further out.

Industrial employment in London as a whole has grown at broadly the same rate in recent years as it has nationally and in the Wider South East. Logistics is the main growth sector, but here London's growth lags that of the UK and Wider South East. But if London activity is being displaced, it is not to the area just outside of its borders but to further away in the Wider South East.

Surveys of major industrial sites suggest that logistics accounts for around a third of jobs on industrial estates, with service sectors accounting for a further third. Manufacturing activity accounts for around 20% of jobs.

5 London's Industrial and Warehousing Property Markets

5.1 Introduction and overview

Light industrial, general industrial and storage and distribution are classified as different land use classes – B1c, B2 and B8 respectively. However, the type of properties in which these activities take place have broadly similar characteristics and are covered by a B1, B2 and B8 planning consent. The exception would be specialist businesses that require bespoke premises.

The global financial crisis in 2008/09, caused Greater London industrial and warehousing take-up to stall in 2009. Year on year take-up fell by 23% to 600,000 sq m (6.47 million sq ft). Despite the fragile economic recovery that followed, demand (as measured by floorspace take-up) has been consistently strong since 2010, averaging 668,900 sq m (7.2 million sq ft) per annum between 2010 and 2015. Take-up has faltered a little in 2015/16, impacted by the lack of quality supply and the economic uncertainties created by the EU referendum vote in June 2016. The combination of relatively strong demand and very low levels of available supply have resulted in modest rental growth. As demand continues to outweigh supply, particularly in the South East and for units on the edge or inside of the M25, the London and South East markets have started to see a return of speculative development. In this, London is leading the market nationally.

The strongest demand for floorspace is from SMEs, reflecting the composition of London's business base. These occupy a diverse range of units from managed workspace to multi-let estates and larger units. London has 202,540 businesses employing less than 20 people, accounting for 18.1% of employment - or 939,000 people (Source: Department of Business, Energy & Industrial Strategy, 2016). In terms of the sheer number of leasing transactions, the 0 to 250 sq m (0 to 2,700 sq ft) bracket sees the most activity with over 1,800 transactions in the period from 2010 to Q3 2016. However, this represents less than 6% of overall take-up in Greater London. In terms of total sq m / sq ft take-up, demand is strongest in the 2,000 to 10,000 sq m (21,500 to 107,600 sq ft) range. This was consistently the highest take-up bracket between 2010 and 2016 and accounted for 36% of take-up. Take-up in this range was in excess of 200,000 sq m (2.2 million sq ft) per annum between 2010 and 2015 (see Figure 5.2).

5.2 London's industrial market areas

London's industrial and warehouse market comprises a number of sub-markets covering different geographies (see map – Figure 4.2). Some extend marginally beyond London's boundaries, but our analysis will focus on the London borough boundaries. The key sub-market areas are drawn from previous studies and are as follows:

Central Services Area: an area in and around the centre of London, servicing the Central Activities Zone and Northern Isle of Dogs. This area includes the inner London Boroughs of Camden, City of London, Hackney, Islington, Kensington and Chelsea, Lambeth, Lewisham, Southwark, Tower Hamlets and Westminster.

Thames Gateway: an area extending through the east part of Newham Borough, and the boroughs of Barking and Dagenham, Havering and Redbridge on the north side of the Thames and Greenwich, Bexley and Bromley boroughs to the south of the river.

Lea Valley: including the western half of Newham, Enfield, Haringey and Waltham Forest.

Park Royal / A40 / Heathrow corridor: a broad area running from the boroughs of Barnet and Brent in the north, through Harrow, Hillingdon, Ealing, Hammersmith and Fulham and Hounslow, to Richmond upon Thames in the south.

Wandle Valley: the area to the south / south west of London, including the boroughs of Wandsworth, Merton, Kingston upon Thames, Sutton and Croydon.

The market around the edge of the **Central Activities Zone** (CAZ) is dominated by businesses servicing the West End and City / Docklands office and retail economies. Typically, demand in this area is driven by companies which must be in close proximity to their customers, including, for example: food and drink preparation for central retail, restaurant and café outlets; printers and publishers; couriers and express delivery operators, and other providers of time critical 'services'. Competition for land in these areas is generally intense and, over time, industrial users have been squeezed out by other uses, notably other business users, residential and retail. The industrial stock in the CAZ is typically second-hand and of poor quality. However, pressure on sites for redevelopment and alternative uses contributes to rental levels often being close to or higher than Grade A space developed in the peripheral London and Inner South East zones. A true like for like comparison is not possible.

Formerly the location of much of London's manufacturing industry, the **Thames Gateway** has developed as a significant location for large-scale warehouses and logistics facilities, notably along the A13 corridor. A number of major new developments have been constructed here over recent years, including London Gateway, east of Tilbury (Lidl 17,200 sq m / 185,000 sq ft and UPS 37,200 sq m / 400,000 sq ft), Tower Thurrock, Thurrock (Amazon 9,300 sq m /100,000 sq ft), Beam Reach, Dagenham (Tesco 46,500 sq m / 500,000 sq ft), Orion Park, Dagenham (DPD 6,100 sq m / 66,000 sq ft) and Thames Gateway Park, Dagenham (Fresh Direct 6,300 sq m / 68,000 sq ft). South of the river, Belvedere and Erith have been popular locations. In 2015, this area was the main focus for recent large-scale warehouse development due to the availability of brownfield sites.

The **Lea Valley** is a major industrial and warehouse location, notably north of the North Circular Road, in Enfield. Over time, locations inside the North Circular (e.g. Tottenham) have seen a loss of industrial floorspace, while Enfield and Ponders End have seen significant new development over the past 10 years or more, notably at Innova Park and Navigation Park respectively. However, the Sainsbury Regional Distribution Centre (RDC), although on the south side of the M25, lies just outside the GLA boundary.

Park Royal is often referred to as London's largest single industrial area. Whilst, historically, this was an important centre for manufacturing, industrial demand is now more driven by warehousing and logistics activities and small-scale manufacturing / quasi service activities. One of the key attractions of Park Royal for end users is its proximity to central London, the major West End retail offer and the regional shopping centre at Brent Cross, which allows 'just in time' delivery and replenishment. The highest **Grade A** industrial rents in London (and the UK) have been achieved at SEGRO's Quad, Tudor Gate, Park Royal at £186 psm / £17.25 psf, having increased by 44% since 2010. Top rents within the CAZ can be slightly higher, for poorer quality stock, with rental levels driven by the exceptional supply / demand circumstances in the central area.

The **Heathrow** market is a crucially important market in London. It is substantially driven by airport-related activities, including air freight, but also all the industries required for the air industry to function (e.g. aircraft maintenance, in-flight catering etc.). On-airport facilities, such as airline warehouses for transit cargoes, attract the highest rents followed by off-airport facilities near the cargo terminal. Some of these off-airport facilities, such as freight forwarding consolidation and deconsolidation centres, are

located outside the GLA boundary in the boroughs of Spelthorne and Slough. Prime Heathrow rents currently stand at £161 psm / £15.00 psf, up 15.4% since 2010.

The **Wandle Valley** includes significant clusters of industrial and warehouse users, notably in Merton and Croydon (off the A23 in particular) and includes a number of SILs. Whilst the northern part of this area, in Wandsworth, extends to the fringe of the Central Activities Zone, many of the industrial areas in the outer London part of the area are not particularly well served by the main road infrastructure, which includes the A3 and the A23. In addition, the latter is not dualled and is recognised as a traffic bottleneck. As a result, the Wandle Valley is not as attractive for many industrial / warehouse users that service London when compared with Park Royal, and the lower rents reflect this. From a market perspective, certain locations in the Wandle Valley, such as Croydon, compete for industrial and warehouse users with locations outside London in the wider A23/M23 corridor, such as Crawley.

Figure 5.1 London's major industrial / warehouse property markets

	Central Services Area*	Thames Gateway	Lea Valley	Park Royal/A40 Corridor/Heathrow	Wandle Valley
Average prime rent £psf	13.25	10.17	10.67	13.27	11.25
£psm	142.62	109.43	114.81	142.87	121.09
Average secondary rent £psf	9.25	7.17	8.50	9.16	8.88
£psm	99.57	77.14	91.49	98.59	95.53
Average land values (£m per acre)	2.5	0.9	1.5	2.5	1.5
£m ha	6.18	2.22	3.71	6.18	3.71
Built Stock					
Factory sq ft	9,370,313	5,374,428	3,804,111	8,148,618	3,574,484
sqm	870,531	499,301	353,414	757,032	332,081
Warehouse sq ft	20,702,108	43,941,419	24,181,737	64,306,253	17,847,576
sqm	1,923,291	4,082,295	2,246,559	5,974,252	1,658,096
Total floorspace sq ft	30,072,421	49,315,847	27,985,848	72,454,871	21,422,060
sqm	2,793,822	4,581,597	2,599,973	6,731,284	1,990,176

Source: Colliers International, CoStar

Note: * Typically poor quality second-hand space, not comparable with new build Grade A developments in the periphery. Exceptional circumstances maintain high rental levels

5.3 South East Industrial Property Markets

As the supply of industrial land in Greater London continues to decline, the most accessible locations in the Inner South East are becoming increasingly important for the industrial and logistics market, and supporting economy and industrial businesses in London and Wider South East.

We have divided the industrial property markets in the Inner South East into five quadrants: Western, Eastern, Southern, Northern (M1) and Northern (Lea Valley), which run along major motorways and include major transport hubs such as London Gatwick and London Gateway Port. (See map – Figure 4.2).

- Northern (Lea Valley) Quadrant extends north of the M25, primarily the area between the A1(M) and M11, encompassing Harlow, Welwyn, Hatfield and Stevenage and bordering Stanstead airport.

- Northern (M1) Quadrant extends north up the M1 from south of the M25, including Watford, Hemel Hempstead, Luton and Bedford. We also refer to this as the M1/Luton Corridor.

- Eastern Quadrant extends north and south if the Thames Gateway into Essex and Kent, including Brentwood, Thurrock, Basildon, Chelmsford, Dartford, Gravesham and the Medway towns.

- Western Quadrant straddles the M25, M40, M4 and M3, taking in Staines, Slough, Bracknell, Wycombe, Woking and Guildford.

- Southern Quadrant covers a broad area straddling the M25 and M23 that includes Epsom, Reigate, Crawley and Sevenoaks.

5.4 Occupier demand for industrial and warehouse space

Changing trends in demand for space

The nature of London industrial and logistics sector has changed considerably over the last 30 years as the logistics industry has become more sophisticated in response both to global trends and to the needs of the large and complex London market. In the last five years or so, the industry has been particularly impacted by the extraordinary growth in e-commerce and an increasing “want it now” consumer culture. The requirement to meet same day / next day and timed delivery slots has forced logistics operators to react and reconfigure networks, often on a hub and spoke basis, to meet the growth in demand.

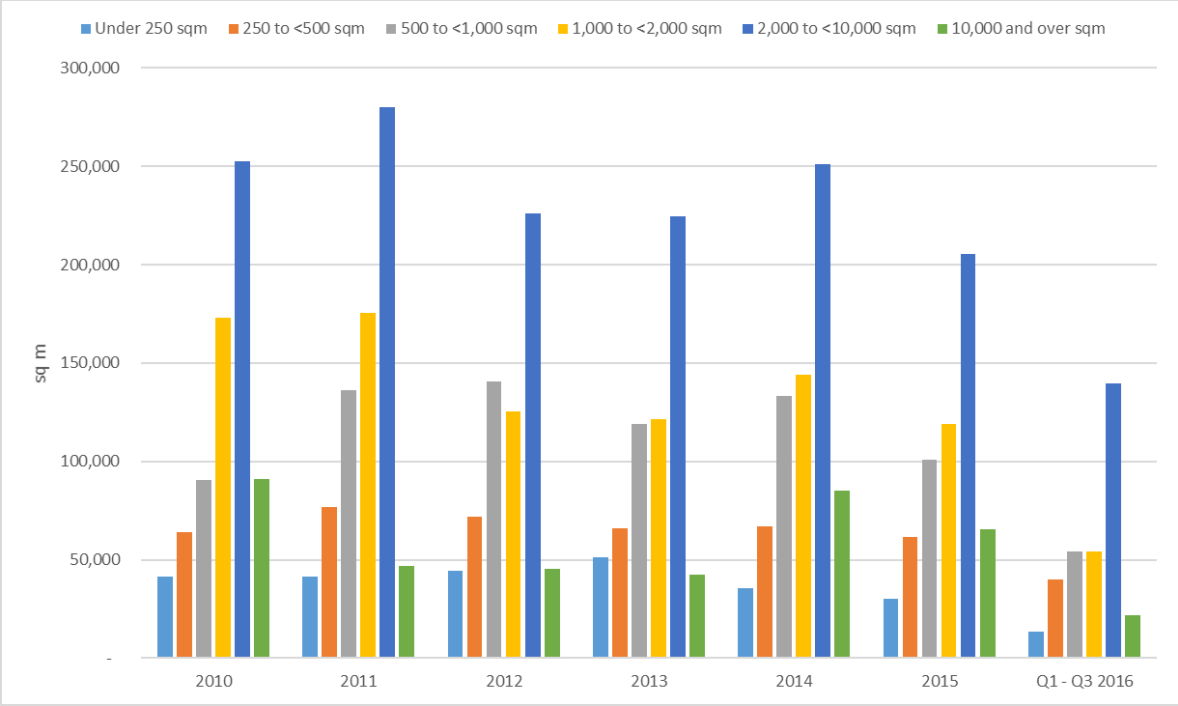
The steady rise in the number of London residents (over 10 million by 2036 according to GLA) will no doubt place further pressure on the demand for residential development land. However, population growth will also generate demand for industrial space in order to service the needs of the growing city.

The commercial property market’s measure of occupier demand is the take-up of floorspace based on market transactions, including both leasehold and freehold transactions. Take-up is a measurement of gross leasing activity for a given period of time, which typically involves relocating, consolidating or expanding industrial space the tenant physically occupies.

While the estimates of industrial and warehouse take-up in Greater London vary, the gross industrial take-up in the capital witnessed solid recovery following the financial crisis in 2008/09. The average annual take-up in Greater London over the last five years has been over 557,000 sq m / 6 million sq ft, with over one third of overall demand being for units in the 2,000 to 10,000 sq m range. The

combination of political and economic uncertainty due to the EU Referendum, as well as the acute shortage of available good quality stock, has resulted in slower Q1-Q3 2016 take-up, which reached 323,000 sq m / 3.5 million sq ft.

Figure 5.2 Take-up of industrial and warehousing floorspace in Greater London 2010 to Q3 2016 (sq m)



Source: Colliers International, CoStar

The following tables provide an analysis of this take-up by London sub-region and highlight the significance of Thames Gateway in terms of accommodating demand for larger units (over 10,000 sq m / 107,600 sq ft). Thames Gateway accounted for 47% of take-up in the 10,000 sq m plus size range since 2010, followed by the Park Royal/A40/Heathrow cluster representing 33%. The Park Royal/A40/Heathrow market accounted for half (49%) of space taken for occupation in units of 2,000 to 10,000 sq m (21,500 - 107,600 sq ft) and an equivalent of 40% for all units up to 2,000 sq m (21,500 sq ft). The Central Services Area and Wandle Valley have seen no transactional activity in the size band over 10,000 sq m (107,600 sq ft) since 2010, with Wandle Valley deals seeing a sizeable 44% of demand for 500 to 2,000 sq m (5,400 - 21,500 sq ft) units during this period.

Figure 5.3 Summary table - industrial and warehousing take-up in Greater London by sub-region since 2010 to Q3 2016 (sq m) – see Map 5.1

	Under 250 sqm	250 to <500 sqm	500 to <1,000 sqm	1,000 to <2,000 sqm	2,000 to <10,000 sqm	10,000 and over sqm	Grand Total sqm
Central Services Circle	40,545		66,846	93,735	87,916		344,306
Lea Valley	37,503	60,997	94,710	139,496	202,700	76,501	611,908
Thames Gateway	51,052	93,054	155,817	189,909	328,698	189,071	1,007,601
Park Royal / A40 / Heathrow	80,451	162,593	338,161	368,438	774,656	132,974	1,857,275
Wandle Valley	47,619	74,952	118,718	121,398	185,661		548,348
Grand Total	257,170	446,860	774,252	912,978	1,579,631	398,546	4,369,437

Source: Colliers International, CoStar

As the industrial supply remains severely constrained, an increasing proportion of the space transacted now includes pre-lets and bespoke design and build facilities. Such is the appetite for space that a lot of speculative space coming to the market secures a pre-let prior to completion or secures a tenant shortly after completion. Historically, it was the norm for speculative development to experience a 9-12-month

void period prior to letting. However, in the current market, up to a third of speculative development is pre-let before practical completion and void rates are now typically 6 months.

The demand for freehold purchases has reduced in recent years, possibly due to scarcity of available product, and reluctance among landlords to sell. Freehold transactional activity in London between Q1-Q3 2016 accounted for 30% of take-up in comparison to 55% in 2009.

The map below illustrates take-up by size band for the period 2010 to Q3 2016, clearly showing the hot spots in London. Demand has been particularly strong in Bermondsey, Croydon, Erith and Belvedere, Barking and Dagenham, the Lea Valley and the Tottenham / Ponders End / Enfield corridor, Park Royal / A40 corridor and Heathrow.

Map 5.1 Greater London Industrial and Warehousing Take-Up Map

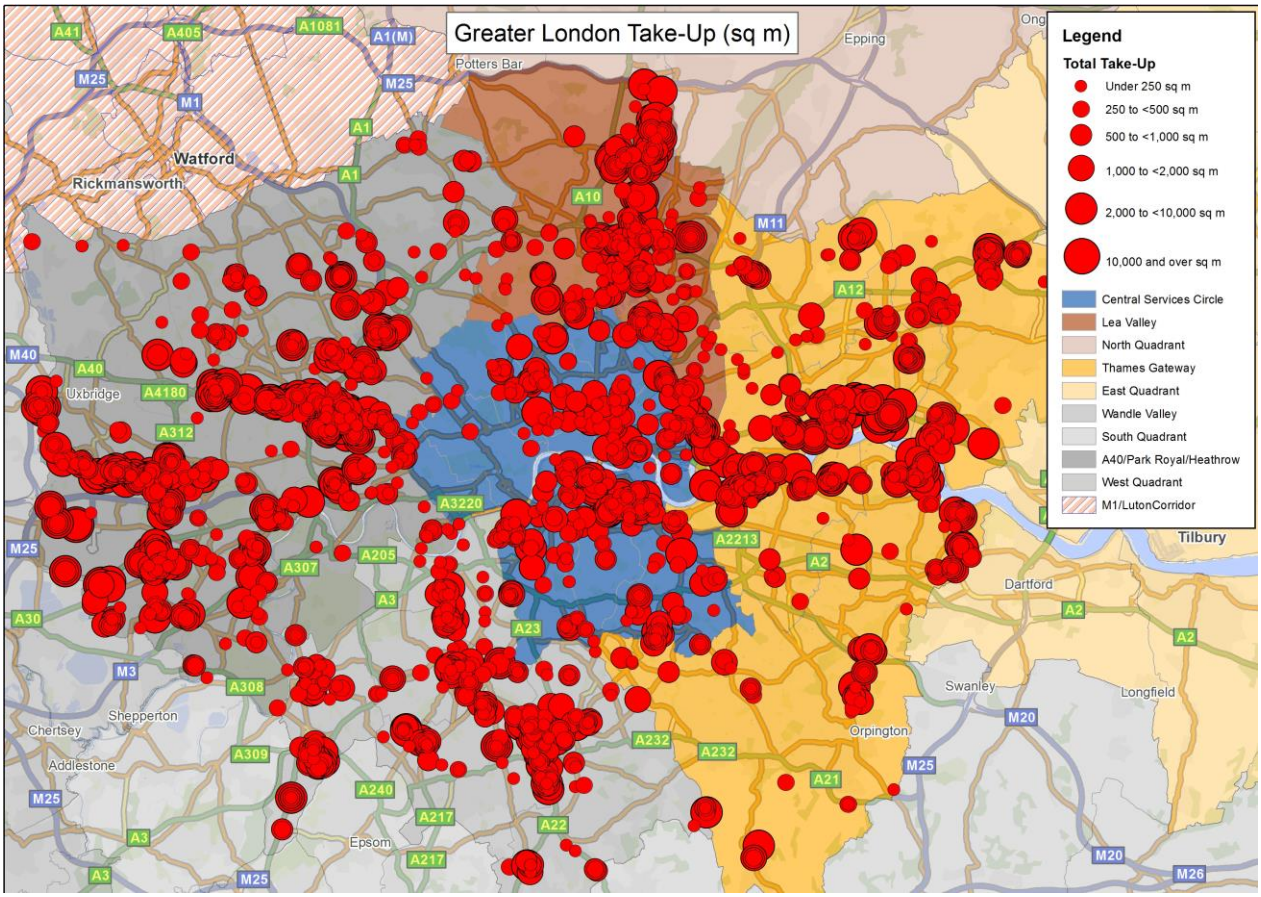


Figure 5.4 Industrial and warehousing take-up in Greater London by year and sub-region

Quarter & Year	London Area	Under 250	250 to <500	500 to <1,000	1,000 to <2,000	2,000 to <10,000	10,000 and over	Grand Total
Q1 2010	Central Services Area	2,485	1,476		3,563			7,524
	Lea Valley	1,415	2,061	905	11,555	17,846		33,782
	Thames Gateway	1,418	3,236	2,521	6,057	5,273	34,828	53,333
	Pk Royal/A40/Hrow	2,734	4,970	6,029	13,076	37,322		64,131
	Wandle Valley	2,086	2,586	3,270	4,856	18,610		31,409
Q2 2010	Central Services Area	924	1,141		3,009	5,925		10,999
	Lea Valley	961	1,223	4,353	5,869		10,268	22,675
	Thames Gateway	2,775	1,773	7,349	8,311	10,109		30,317
	Pk Royal/A40/Hrow	4,819	6,027	12,112	16,256	28,517		67,731
	Wandle Valley	2,006	2,781	6,514	1,338	4,573		17,213
Q3 2010	Central Services Area	1,724	3,881	2,244	4,046	19,144		31,039
	Lea Valley	1,381	2,681	4,040	5,011			13,113
	Thames Gateway	2,229	7,545	5,168	8,841	8,215		31,998
	Pk Royal/A40/Hrow	3,504	6,069	11,381	23,818	19,491		64,265
	Wandle Valley	1,256	1,908	3,568	3,453	17,064		27,250
Q4 2010	Central Services Area	1,817	2,335	2,782	9,530			16,464
	Lea Valley	1,576	1,702	3,170	6,705	12,620	14,109	39,882
	Thames Gateway	2,042	1,505	3,918	15,023	10,824	10,351	43,662
	Pk Royal/A40/Hrow	3,456	7,638	6,404	16,097	37,255	21,646	92,496
	Wandle Valley	743	1,600	4,926	6,582			13,852

Quarter & Year	London Area	Under 250	250 to <500	500 to <1,000	1,000 to <2,000	2,000 to <10,000	10,000 and over	Grand Total
Q1 2011	Central Services Area	3,343	2,108	3,051	3,954	8,650		21,105
	Lea Valley	1,737	2,692	4,308	8,414	8,850		26,001
	Thames Gateway	1,832	3,115	5,137	4,636	4,541		19,261
	Pk Royal/A40/Hrow	3,786	5,427	10,050	15,731	29,731		64,726
	Wandle Valley	813	2,195	3,283	10,064	7,246		23,601
Q2 2011	Central Services Area	2,375	1,642	3,910	5,417			13,344
	Lea Valley	1,036	3,375	4,257	8,603	6,276		23,548
	Thames Gateway	1,744	4,042	3,709	6,250	2,047	17,061	34,852
	Pk Royal/A40/Hrow	3,029	6,965	16,064	20,373	47,866		94,297
	Wandle Valley	1,604	4,363	3,972	5,867	13,108		28,914
Q3 2011	Central Services Area	977	254	3,196	12,706			17,133
	Lea Valley	229	2,063	5,855	1,753	8,271	11,577	29,749
	Thames Gateway	1,461	4,914	5,163	11,265	11,651		34,453
	Pk Royal/A40/Hrow	2,983	7,146	23,691	8,888	34,853		77,561
	Wandle Valley	1,487	3,083	3,601	4,745	2,446		15,362
Q4 2011	Central Services Area	2,893	2,171	2,704	5,634	2,974		16,376
	Lea Valley	3,065	3,912	4,101	7,060	27,538		45,676
	Thames Gateway	2,705	6,142	7,024	5,998	9,348		31,217
	Pk Royal/A40/Hrow	2,043	7,725	17,747	18,983	42,005	18,415	106,918
	Wandle Valley	2,352	3,517	5,269	9,342	12,747		33,228

Quarter & Year	London Area	Under 250	250 to <500	500 to <1,000	1,000 to <2,000	2,000 to <10,000	10,000 and over	Grand Total
Q1 2012	Central Services Area	1,688	1,771	7,492	6,727	13,467		31,145
	Lea Valley	1,858	4,241	6,807	1,292			14,198
	Thames Gateway	2,121	3,504	5,476	3,818	11,528		26,448
	Pk Royal/A40/Hrow	4,040	6,251	17,038	12,173	35,612	10,466	85,579
	Wandle Valley	2,432	3,141	6,004	10,432	17,048		39,058
Q2 2012	Central Services Area	2,281	1,265	1,432		2,200		7,178
	Lea Valley	1,469	3,091	3,714	4,476		10,109	22,860
	Thames Gateway	2,019	3,410	10,045	5,568	8,334		29,375
	Pk Royal/A40/Hrow	5,104	8,385	18,410	6,905	47,648	11,371	97,822
	Wandle Valley	1,077	1,800	4,323	6,782	9,966		23,947
Q3 2012	Central Services Area	2,348	2,361					4,709
	Lea Valley	732	2,482	4,147	3,517	2,647		13,526
	Thames Gateway	2,516	4,518	7,496	7,109	15,275		36,914
	Pk Royal/A40/Hrow	3,909	4,664	14,368	16,239	29,361	13,473	82,014
	Wandle Valley	2,146	2,019	7,183	3,122			14,470
Q4 2012	Central Services Area	1,185	1,041	1,866	5,849	2,991		12,933
	Lea Valley	1,234	2,800	2,856	8,446			15,336
	Thames Gateway	1,198	3,627	5,020	10,845	12,816		33,507
	Pk Royal/A40/Hrow	2,758	7,972	12,717	10,999	10,251		44,698
	Wandle Valley	2,274	3,460	4,354	1,238	6,883		18,209

Quarter & Year	London Area	Under 250	250 to <500	500 to <1,000	1,000 to <2,000	2,000 to <10,000	10,000 and over	Grand Total
Q1 2013	Central Services Area	2,304	1,543	2,792				6,640
	Lea Valley	1,441	2,215	5,172	2,812	6,987		18,627
	Thames Gateway	2,197	1,540	2,365	7,078	7,810		20,990
	Pk Royal/A40/Hrow	4,103	3,853	11,948	8,748	2,074		30,725
	Wandle Valley	3,573	3,126	4,782	1,855	2,944		16,279
Q2 2013	Central Services Area	1,629	5,206	2,268	5,754	6,407		21,262
	Lea Valley	2,245	2,678	3,225	2,334	7,755		18,237
	Thames Gateway	2,526	2,994	7,555	3,441	28,472		44,988
	Pk Royal/A40/Hrow	5,511	5,520	14,241	11,842	20,550		57,665
	Wandle Valley	1,949	3,735	3,315	1,390	4,965		15,354
Q3 2013	Central Services Area	1,801	3,903	2,519	1,026			9,249
	Lea Valley	1,333	1,891	2,706	4,508	3,046	13,192	26,677
	London Gateway	2,792	2,643	6,116	6,494	31,437		49,480
	Pk Royal/A40/Hrow	3,813	5,477	12,974	13,276	23,562		59,101
	Wandle Valley	1,377	1,807	10,272	5,104	2,438		20,998
Q4 2013	Central Services Area	1,940	1,841	1,539	3,677	2,995		11,992
	Lea Valley	1,953	1,472	2,494	11,173	12,589		29,682
	Thames Gateway	3,182	3,603	2,445	11,804	7,814	29,376	58,222
	Pk Royal/A40/Hrow	3,111	8,537	14,602	14,480	42,228		82,959
	Wandle Valley	2,318	2,242	5,481	4,708	10,287		25,037

Quarter & Year	London Area	Under 250	250 to <500	500 to <1,000	1,000 to <2,000	2,000 to <10,000	10,000 and over	Grand Total
Q1 2014	Central Services Area	1,430	1,684	1,779		8,203		13,096
	Lea Valley	1,391	3,130	2,424	4,434		17,246	28,625
	Thames Gateway	2,219	3,861	6,443	10,700	8,057		31,282
	Pk Royal/A40/Hrow	3,231	3,680	8,780	7,703	24,171		47,564
	Wandle Valley	2,085	2,309	1,473	4,727	7,445		18,038
Q2 2014	Central Services Area	729	3,477	3,304	3,040	5,073		15,623
	Lea Valley	1,098	2,293	6,250	4,286	5,834		19,760
	Thames Gateway	1,625	2,685	9,430	7,489	11,938		33,168
	Pk Royal/A40/Hrow	2,299	6,502	15,305	14,016	28,869		66,992
	Wandle Valley	1,540	2,003	2,596	2,526	4,624		13,289
Q3 2014	Central Services Area	339	3,527	3,176	4,556	2,411		14,009
	Lea Valley	1,596	1,394	7,847	10,255	14,326		35,418
	Thames Gateway	1,594	5,288	11,279	9,810	32,561	23,786	84,318
	Pk Royal/A40/Hrow	1,974	4,760	9,462	15,807	16,468	34,137	82,609
	Wandle Valley	3,229	2,959	5,432	5,501	9,324		26,446
Q4 2014	Central Services Area	1,093	1,203	1,286	2,918	5,295		11,796
	Lea Valley	1,626	2,481	2,763	1,672	9,354		17,896
	Thames Gateway	1,953	4,371	9,244	7,176	14,536		37,280
	Pk Royal/A40/Hrow	2,398	4,345	20,409	19,143	42,755	10,030	99,081
	Wandle Valley	2,058	4,853	4,553	8,491			19,955

Quarter & Year	London Area	Under 250	250 to <500	500 to <1,000	1,000 to <2,000	2,000 to <10,000	10,000 and over	Grand Total
Q1 2015	Central Services Area	724	3,030	3,880	3,159	2,180		12,974
	Lea Valley	1,164	2,174	2,719	8,099	5,125		19,281
	Thames Gateway	2,375	2,566	7,182	9,771	30,336	52,026	104,255
	Pk Royal/A40/Hrow	1,072	7,356	12,327	7,202	30,494		58,451
	Wandle Valley	2,340	2,449	5,966	4,876	4,651		20,282
Q2 2015	Central Services Area	1,054	2,385	3,625	3,056			10,120
	Lea Valley	2,607	3,806	2,363	3,576	7,613		19,964
	Thames Gateway	1,120	2,389	4,022	3,803	3,107		14,442
	Pk Royal/A40/Hrow	2,077	4,726	10,956	16,941	28,155	13,435	76,290
	Wandle Valley	1,552	1,919	3,832	2,597			9,900
Q3 2015	Central Services Area	1,627	1,275	4,750	2,534			10,186
	Lea Valley	982	1,623	1,373	1,193	7,007		12,177
	Thames Gateway	493	2,775	4,603	7,078	2,194		17,142
	Pk Royal/A40/Hrow	2,632	8,258	10,918	9,961	32,235		64,004
	Wandle Valley	1,717	5,364	762	1,457	7,776		17,077
Q4 2015	Central Services Area	804	1,106	2,834	1,347			6,091
	Lea Valley	665	1,104	2,039	6,626	11,635		22,070
	London Gateway	1,181	956	2,989	1,468	9,694		16,288
	Pk Royal/A40/Hrow	3,026	4,732	9,986	22,886	17,650		58,280
	Wandle Valley	746	1,512	3,512	1,226	5,560		12,557

Quarter & Year	London Area	Under 250	250 to <500	500 to <1,000	1,000 to <2,000	2,000 to <10,000	10,000 and over	Grand Total
Q1 2016	Central Services Area	438	712	1,354				2,503
	Lea Valley	408		1,238	2,673	6,184		10,503
	Thames Gateway	1,452	1,873	4,481	2,378	10,919		21,103
	Pk Royal/A40/Hrow	727	5,414	7,724	9,183	19,123		42,171
	Wandle Valley	770	1,024	1,923	5,391	5,382		14,491
Q2 2016	Central Services Area	595	1,695	2,259	1,001			5,550
	Lea Valley	1,108	1,520	3,584	1,639	12,417		20,268
	Thames Gateway	655	3,464	6,022	6,411	14,979	21,643	53,174
	Pk Royal/A40/Hrow	1,507	4,933	7,376	10,332	15,076		39,224
	Wandle Valley	819	4,149	7,121	2,538	2,519		17,147
Q3 2016	Central Services Area		1,230	804	1,231			3,265
	Lea Valley	1,193	894		1,513	8,779		12,380
	Thames Gateway	1,628	4,716	3,617	1,290	4,883		16,133
	Pk Royal/A40/Hrow	801	5,260	5,144	7,383	31,333		49,920
	Wandle Valley	1,269	3,045	1,430	1,188	8,055		14,988

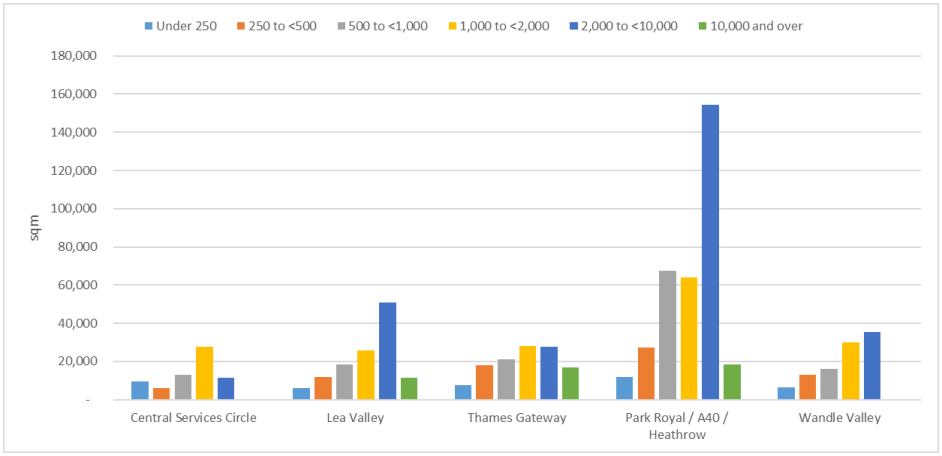
Source: Colliers International, CoStar

Figure 5.5 Industrial and warehousing take-up in Greater London by year and sub-region

2010 Industrial and Warehousing take-up in Greater London by sub-region (sq m)

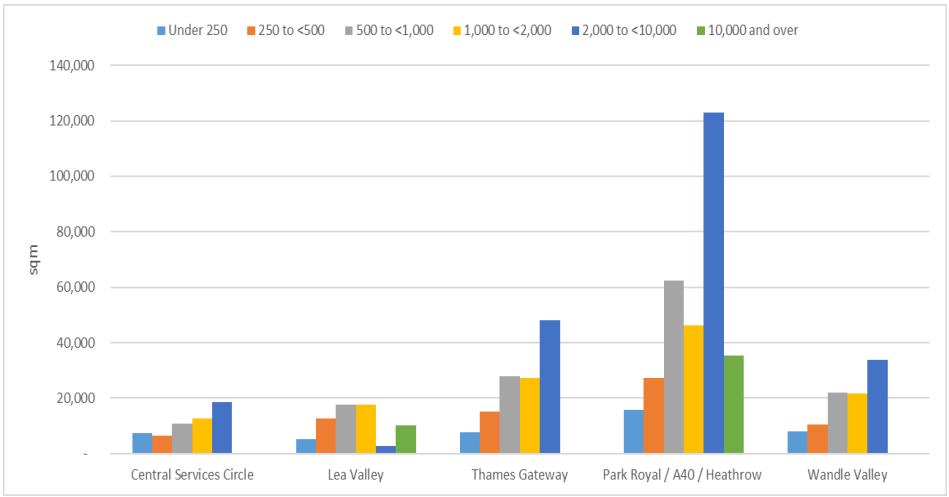
Source: Colliers International, CoStar

2011 Industrial and Warehousing take-up in Greater London by sub-region (sq m)



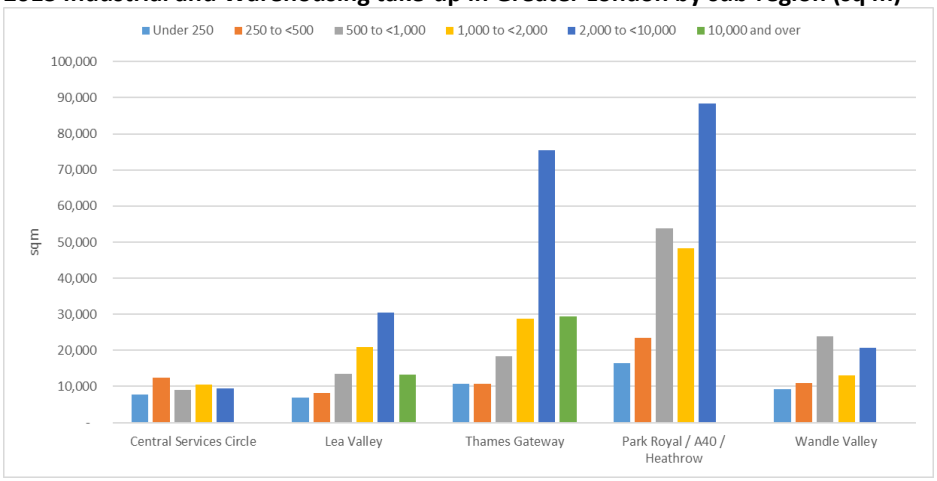
Source: Colliers International, CoStar

2012 Industrial and Warehousing take-up in Greater London by sub-region (sq m)



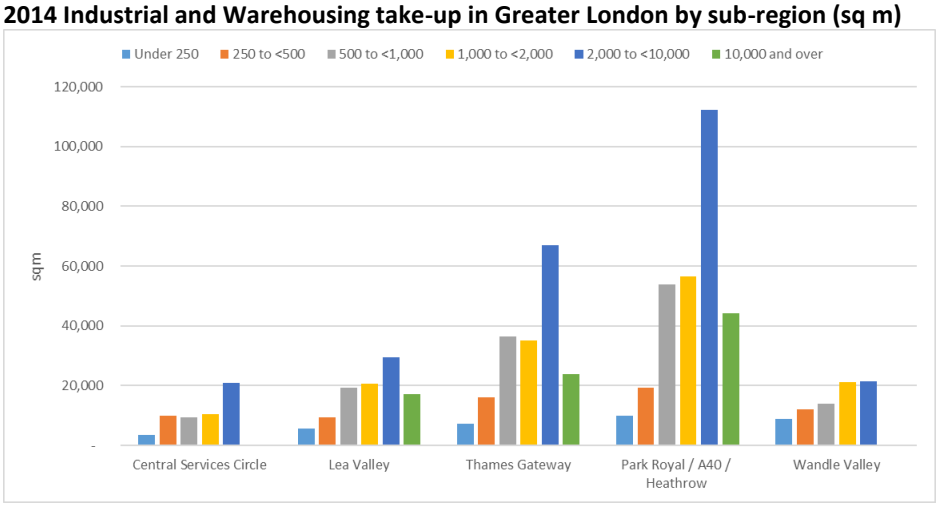
Source: Colliers International, CoStar

2013 Industrial and Warehousing take-up in Greater London by sub-region (sq m)



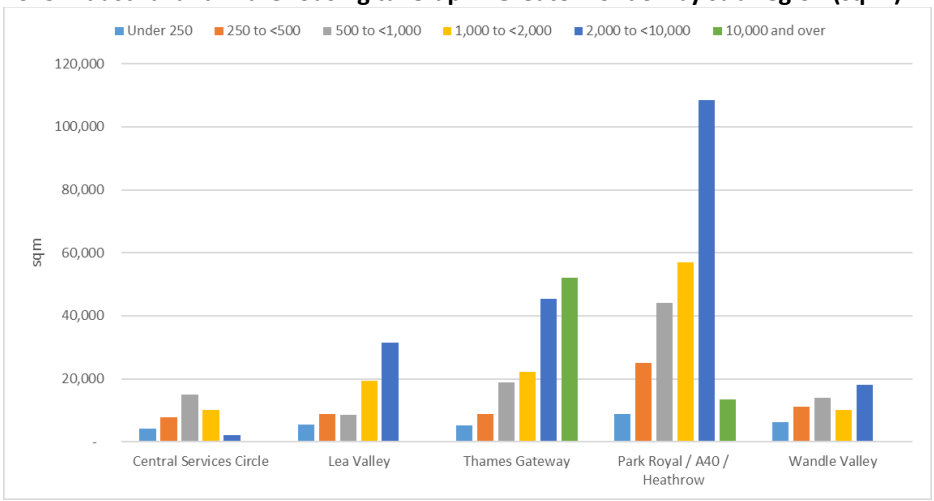
Source: Colliers International, CoStar

2014 Industrial and Warehousing take-up in Greater London by sub-region (sq m)



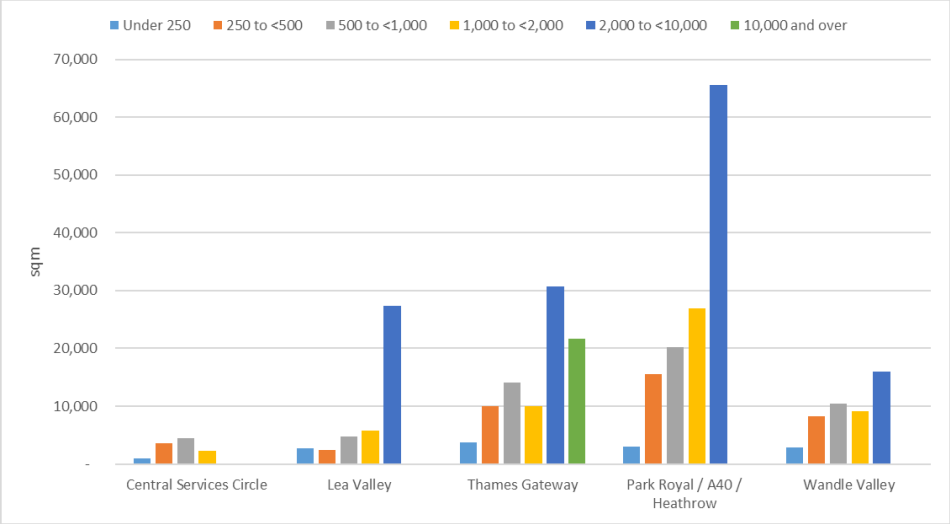
Source: Colliers International, CoStar

2015 Industrial and Warehousing take-up in Greater London by sub-region (sq m)



Source: Colliers International, CoStar

Q1-Q3 2016 Industrial and Warehousing take-up in Greater London by sub-region (sq m)



Source: Colliers International, CoStar

Types of Occupiers in London

In comparison to 2010, when a third of annual take-up was from the big supermarkets for logistics, recent years have seen a much more balanced industrial market, with demand being generated from online retailers, parcel delivery, food producers and the automotive sector. Retail logistics and wholesale are now the dominant occupier sector, accounting for 37% of all activity (2010 – Q3 2016), with logistics companies representing 20% of industrial take-up in the capital.

Online retail sales represent just over 20% of total non-food spending in the UK (Source: BRC / KPMG). At the customer-facing end, retailers are investing in more efficient transactional websites and social media to drive sales, while at the other end, the requirement is for flexible fit-for-purpose warehouses that can accommodate technology, in locations that can respond quickly and efficiently. Anecdotally, DPD, the parcel delivery business, is targeting a network of warehouses that allow deliveries anywhere in London within a 15 minute drive-time.

In one of the largest London deals in recent years, the online retailer Ocado Group took 52,025 sq m (560,000 sq ft) of industrial distribution space in Erith from Tritax Big Box REIT on a 30-year lease. In 2013, another retailer, Asda Group, secured 29,805 sq m (320,825 sq ft) from Office Depot in Belvedere on a sub-lease for a term of seven years, equating to £73.84 psm / £6.86 psf.

Manufacturing accounts for 15% of the London take-up. There has been a slight increase in acquisitions from manufacturers specialising in producing household goods, either in terms of furniture or of items relating to house construction.

In addition to the traditional industrial and logistics occupiers, other industry-related users such as self-storage, trade counters, building suppliers, car repair and service operators, data centres and waste management and recycling companies have also become more active. Small businesses and light manufacturing leaseholders are probably in the highest risk category in terms of pressure from retail logistics operators and alternative uses. But cash and carry, self-storage, building merchants and trade-counters are also at risk where they lease accessible large premises.

In order to avoid being removed from the area some operators resort to acquiring the freehold of existing sites themselves. In Battersea, Big Yellow did just that and is planning a redevelopment of its store and adjoining retail in a mixed-use residential scheme. In Limehouse, a profitable branch of Screwfix (£2.3 million annual turnover) is set to leave the area due to planned residential development and is struggling to find an alternative location. Cash and Carry wholesalers, such as Booker, Bestway, Makro, Costco, Blakemore, Parfetts, Dhamecha, CJ Lang and TRS, are also under pressure to relocate, with some unlikely to renew leases. While this evidence is anecdotal, this is a point to watch.

And a very recent mixed-use approval has just been given on another major industrial site in Battersea.

> *"Plans to redevelop the **Booker Wholesale** warehouse in Nine Elms into a residential-led scheme have been given the green light by the Mayor of London, following a unanimous approval by Wandsworth Planning Committee. DTZ Investors is behind the scheme, which will see both the Booker Wholesale Warehouse and a BMW Garage at 41- 49 and 49 -59 Battersea Park Road demolished and replaced with 307 new homes across a collection of buildings ranging from five to 18 storeys. The ground floor will be dedicated to affordable business space and food/beverage uses to animate the surrounding streets and the development's new public space. The 2,880 sq m (31,000 sq ft) of incubator-style office space targets SMEs, including creative start-ups, and has been designed to complement the commercial offering for surrounding developments, assisting local businesses to staircase up to the nearby Battersea Power Station." (Source: CoStar News)*

This is one of the last industrial / warehouse sites in the area which, not long ago, was entirely industrial. The B1 incubator type space proposed is targeted at SMEs and start-ups, effectively replacing a "goods" function on the site with higher value "services", and specifically to align with and benefit from Apple's occupation of Battersea Power Station. It should be noted that when employment space is provided as part of a housing-led mixed-use development, it is often unsuitable for large-scale logistics and distribution uses, which typically require a degree of separation.

After a period of limited new store openings following the recession, the self-storage industry has seen steady growth. This is partially due to the increase in renting and overcrowding in housing in London and the South East. Self-storage operators are typically located in densely populated urban areas, such as London, where the level of self-storage supply per head of population is about twice the UK average. Effective media campaigns have resulted in a better understanding of the self-storage product offer and subsequent demand for its use in the capital has increased. The main self-storage operators that actively look to target London in order to expand include Safestore, Big Yellow and Access Self Storage.

Trade counter businesses, such as Screwfix and Toolstation, are continuing to expand their networks, while building suppliers, including Buildbase and Selco, have also been very active in taking pre-lets in recent years. With an average of 26 retail/trade centres per borough occupying an average of 734 sq m (7,900 sq ft) (Deloitte, 2014), they represent the core segment of the occupier base in London. Trade centres require high visibility locations, near to centres of population, such as London, and within easy reach of customers – both residents and tradesmen.

The table below give an indication of the type of trade park operators with requirements in Greater London.

Figure 5.6 Trade Park occupiers with requirements

A Plant Hire		Howdens Joinery
Al Murad Tiles		HSS Plc
Arco		Jewson
ATS Euromaster		Keyline
Bemco		Kwik Fit
Benchmarx		Machine Mart
Brandon Tool Hire		Magnet
Brewers & Sons		Medlock Electrical
BSS		Mr Clutch
Buck & Hickman		National Lighting
Buildbase		National Tyre & Autocetres
CCF		Newey & Eyre
Ceramic Tile Distributors		Nicholls & Clarke
Chubb Security		Omnico Plastics/ SIG Roofline
City Electrical Factors		Priority Plumbing
City Plumbing Supplies		Plumb Center
Crown Decorating Centres		Plumbase
Denman Electrical		ProTyres
Drain Center		PTS
Dulux Decorating Centres		Sally Hair & Beauty
Edmundson Electrical		Screwfix
Electrical Center		Speedy Hire
Euro Car Parts		Tile Giant
Eurocell		TLC (Electrical Wholesalers)
Formula 1 Auto Centres		Toolstation
Gil Lec		Topps Tiles
Grahams		Travis Perkins
GSF		WF Electrical
Halford Auto Centres		Wilts Electrical
Hilti Tool Hire		

Source: Colliers International

As a growth city, London will continue to demand construction and building services to support residential and commercial development and maintenance. These facilities need to be in reasonably close proximity to areas of new development. These include sites for concrete batching, aggregates supply, scaffolding and other trade specialists.

The market is also seeing an upsurge in demand from automobile-orientated /roadside operators such as Halfords Autocentre, Kwik-fit, Mr Clutch, ATS Euromaster, Euro Carparts, National Tyres and Autocare. Much of this is due to efficient “fast-fit” facilities winning over the owners of older cars, given the trend towards longer average length of car ownership. The average space that is occupied by this sector in inner London boroughs is 399 sq m / 4,300 sq ft (Deloitte, 2014).

Warehouse-based data centres have emerged as another driver of industrial demand in London over the years. As companies look to outsource their data storage and adopt cloud computing, they need to store their large computer servers and disaster recovery centres in warehousing facilities. This trend is likely to continue as the use and accumulation of “big data” growing exponentially. Data centres tend to be based in “higher value use” warehouses on the edge of major cities, typically serving financial institutions and third party data providers.

Slough Trading Estate an example of a major data centre facility being hosted in proximity to London. Two significant data centres are also located in Croydon, at the relatively modern Prologis Park on Beddington Lane, run by Morgan Stanley and Sentrum, respectively. While in the past, data centres

needed to be located in close proximity to financial institutions, particularly city traders, technological advances have allowed some data centres to locate further away from central London.

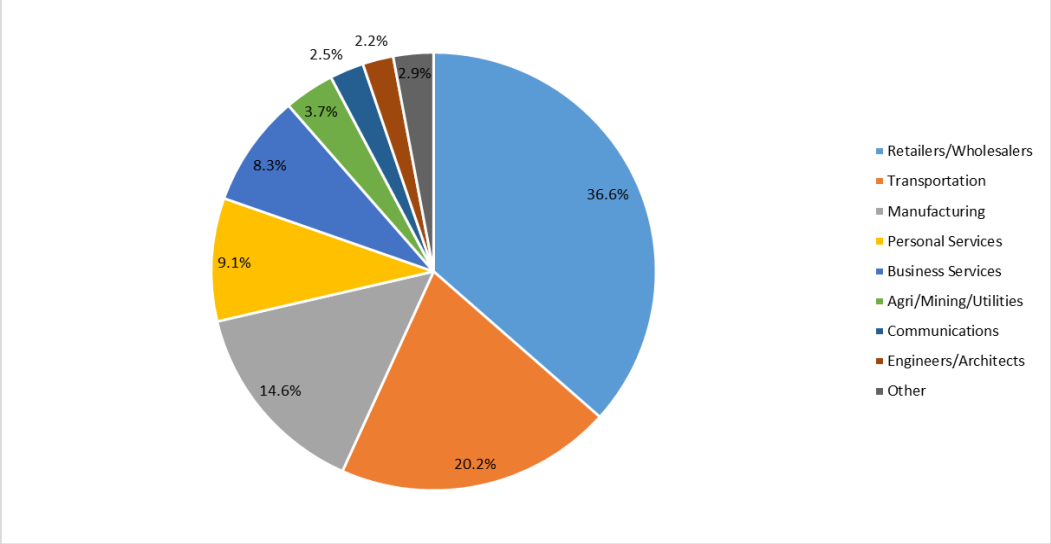
Waste management and recycling has been another significant growth area in terms of the demand for industrial premises and land. As the Mayor of London sets out challenging targets to reduce and recycle of waste above disposal, the need for sufficient industrial facilities to manage waste is becoming more evident. As discussed further in chapter 11, transition towards a circular economy should reduce volumes of waste, and change the nature of activities away from waste management to repair and remanufacturing. These are facilities that could be located / relocated to parts of the Inner South East, subject to London Plan policies on self-sufficiency for waste.

Catering and food providers that supply food to London on the daily basis typically look to occupy industrial units in central London, with close access to a key client base of hotels, restaurants and similar businesses. A further rise in 'craft industries', ranging from cake making, artisan baking, coffee roasting and cheese production to bespoke furniture, lighting and tiling has also led to a requirement for small scale industrial space.

For example, Britain's rapidly growing craft beer sector, where according to the British Beer and Pub Association, 339 breweries opened between 2015 and 2016, has also generated demand for industrial space. Typically, craft beer brewers seek 185 to 465 sq m (2,000 to 5,000 sq ft) of industrial premises as close to their roots as possible. Well-known London breweries include Camden Town Brewery, Meantime Brewery and London Beer Factory. To accommodate its expansion, Camden Town Brewery has leased 5,333 sq m (57,400 sq ft) at Navigation Park, Enfield, for a new brewing, bottling and canning plant to open in 2017. It will retain and refurbish its existing Kentish Town premises.

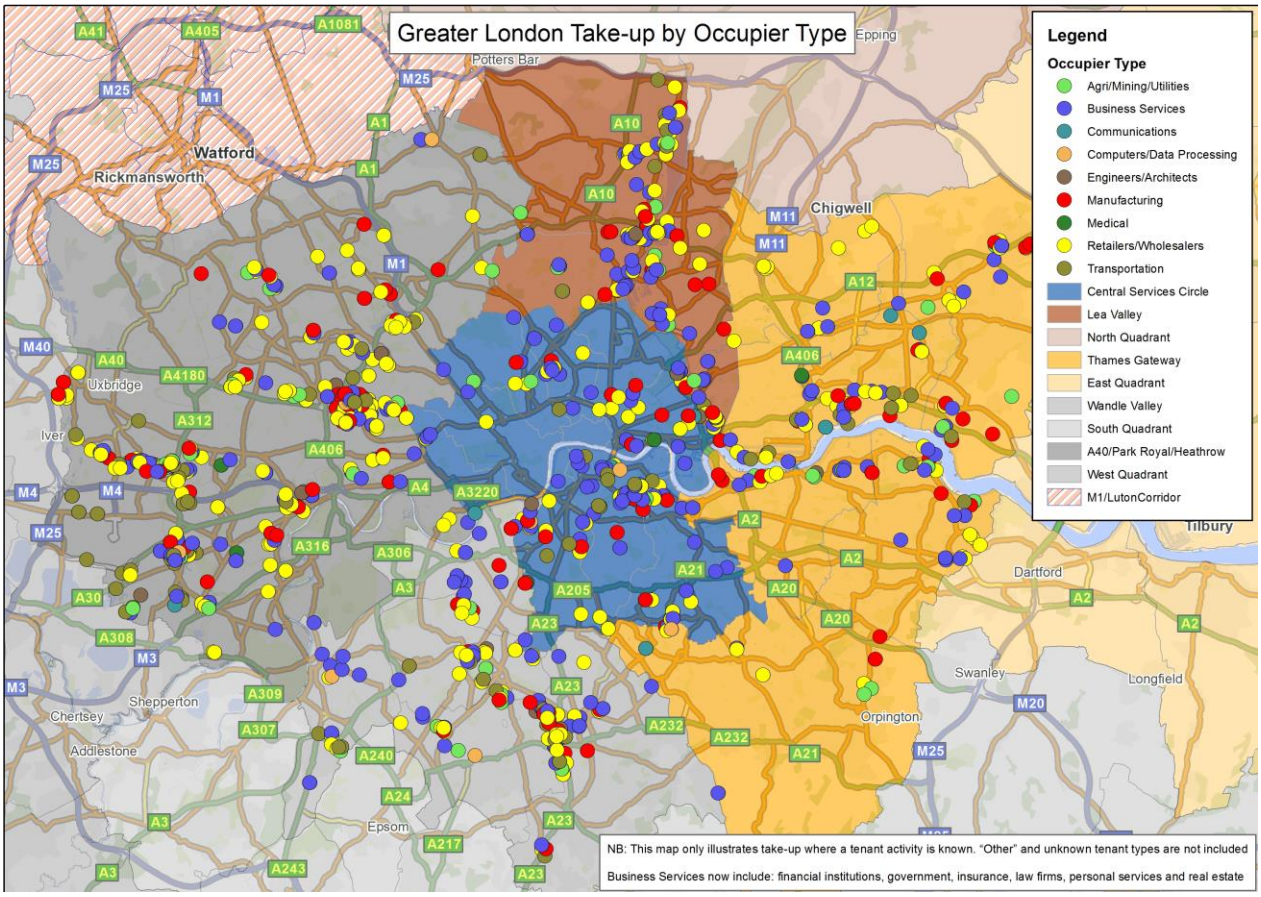
Camden Town Brewery – new facility at Navigation Park, Enfield

Figure 5.7 London industrial and warehousing take-up by business type (2010 – Q3 2016) – proportion of floorspace (see Map 5.2)



Source: Colliers International, CoStar

Map 5.2 London Industrial and warehousing Take-Up by Occupier Type



Source: Colliers International, CoStar

Types of Occupiers in South East

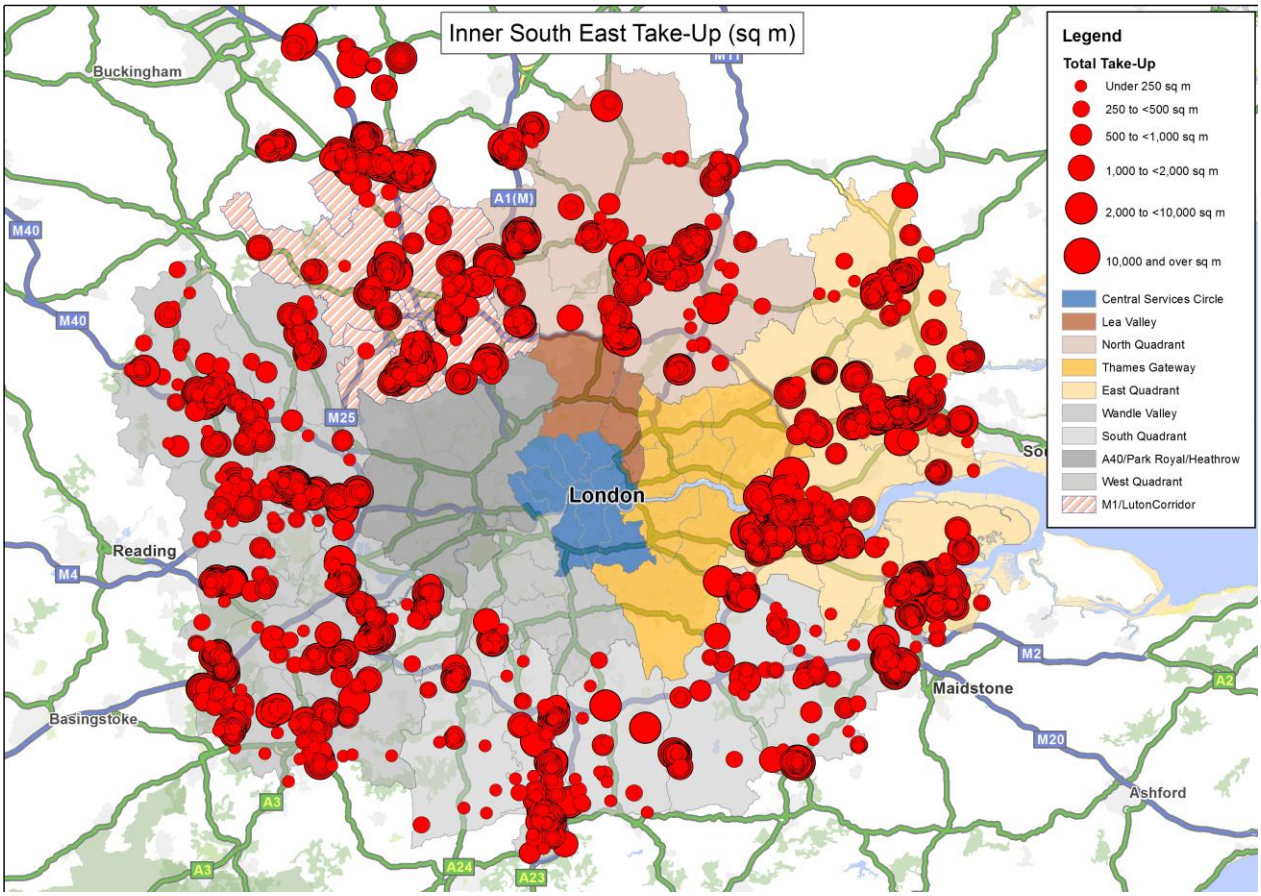
Demand for logistics space around urban areas in the South East is at unprecedented levels due to the growth of e-commerce and last mile fulfilment. Retailers, supermarkets and third party logistics

providers (3PLs) have increased their transactional activity, with continued appetite for large (9,290 sq m / 100,000 sq ft) and mid-size (2,790 to 4,645 sq m / 30,000 – 50,000 sq ft) Grade A modern facilities.

The map below illustrates take-up by size band for the period 2010 to Q3 2016, clearly showing the hot spots. In the Inner South East these include Crawley / Horley, Dartford, Chatham, Thurrock, Grays, Basildon, Harlow, Luton and Dunstable, Hemel Hempstead, Uxbridge, Slough, Camberley and Farnborough.

Ideally, future plans should designate and protect at least one area in each of the strategic quadrants outside London, with M25 access and good arterial routes into the suburbs and central London.

Map 5.3 Inner South East Industrial and warehousing Take Up

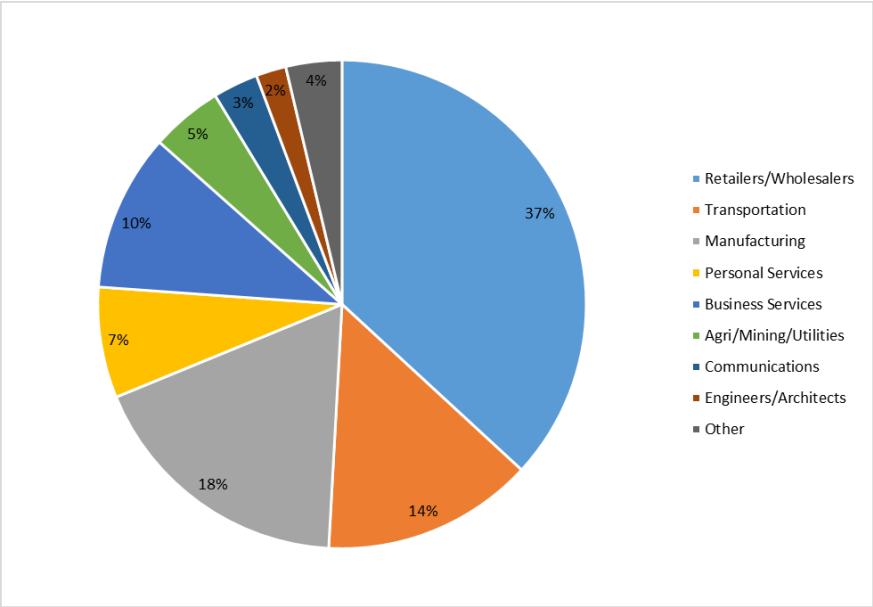


Retailers and wholesalers (which include Trade Parks) in the Inner South East increased their share of industrial take-up from 19% in 2010 to 39% in 2014 - 2015. That figure was further boosted to 67% in Q1-Q3 2016 due to Amazon's activities, including the 204,385 sq m / 2.2 million sq ft letting at London Distribution Park in Tilbury. Amazon has been the most acquisitive occupier in South East and nationally in the last few years and continues to invest heavily in its logistics network. Given the amount of warehouse space occupied by Amazon and pure play retailers and parcel distributors now committing in the region, the South East market could come to be dominated by this occupier segment.

However, the industrial and logistics occupier market in Inner South East has, in fact, in the last five years, acquired a more diverse occupier base, with take-up being derived from a wider range of companies rather than being dominated by the supermarkets. Retailers, third-party logistics and manufacturing are three core occupier groups, which means the market is less likely to decline should one sector suffer a slowdown.

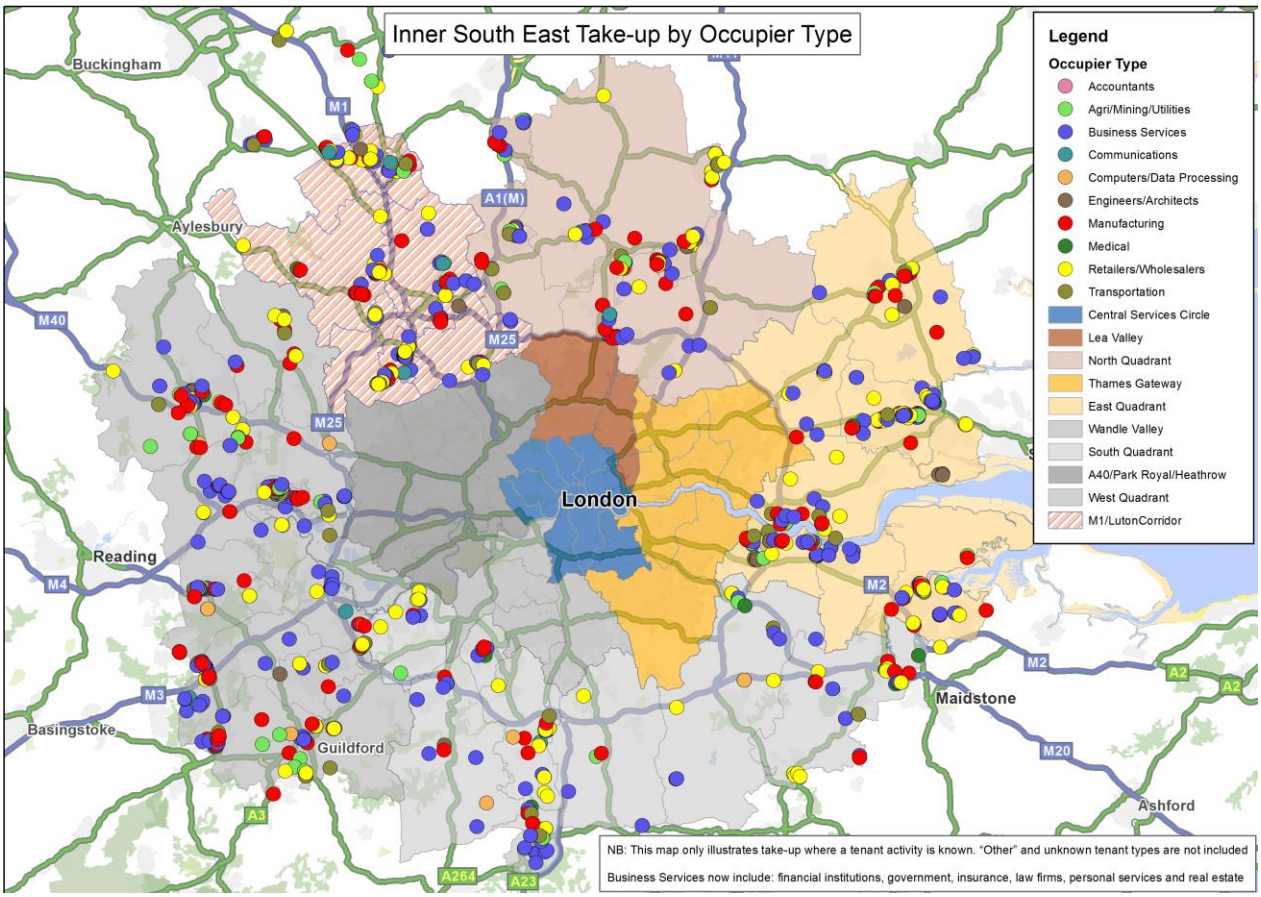
In London and the Inner South East there is solid demand for mid-box (2,790 to 4,645 sq m / 30,000 – 50,000 sq ft) and cross-dock facilities in prime and second-tier locations as occupiers look to optimise their distribution networks within easy reach of the customer. Prime locations include Park Royal, Enfield, Croydon, Dartford, Dagenham / Barking and Erith / Belvedere. Second tier locations include Watford, Hemel Hempstead, Radlett, Luton/Dunstable, West Drayton, Brooklands / Weybridge, Crawley and Swanley. Cross-dock facilities usually comprise two sets of dock doors on two sides of the warehouse for inbound and outbound goods. This allows efficient transfer of goods from inbound "supplier" to outbound "customer". Increasingly these facilities are designed specifically to accommodate inbound articulated vehicles and outbound white vans. Companies are seeking to reduce supply chains and improve efficiency in the face of insatiable demand from the "want it now" consumer. For example, in the last year, TNT has agreed to take a new 12,263 sq m (132,000 sq ft) delivery hub on a 6.7 ha / 15acre site at the Capacity site at Dartford, which is ideally situated for "Business to Customer" (B2C) deliveries in South London and beyond. UPS is on site constructing a 400,000 sq ft warehouse at DP World's London Gateway, east of Tilbury, which will be a major strategic base for deliveries into the London area. DPD has also relocated in Dagenham to a new 6,132 sq m (66,000 sq ft) parcel delivery centre at Orion Park, Dagenham, adjacent to the A13. Two further examples are: a high street retailer looking for 5,110 sq m (55,000 sq ft) of cross-dock facilities in South / South East London and a second high street retailer, whose online business is up 80%, who requires 13,935 to 18,580 sq m (150,000 to 200,000 sq ft). The commitment remains strong to source sites close to the capital to service burgeoning online demand.

Figure 5.8 Inner South East Industrial and warehousing take-up by business type (2010 - Q3 2016) – see Map 5.4



Source: Colliers International, CoStar

Map 5.4 Inner South East Take-Up by Occupier Type



Source: Colliers International, CoStar

5.5 Rents and land values

London Sub Regions

The London industrial property market is one of the strongest performing sectors of the UK property market in terms of both rental value growth and total returns over the short, medium and long term (see figures 5.9 and 5.10). Constrained supply in the industrial and logistics sector, combined with strong levels of take-up ensured that rents have maintained their upward trajectory in recent years. The average prime industrial rents in London reached the highest ever recorded level at £136.70 psm / £12.70 psf in December 2016, a 26% uplift on pre-recessionary levels and significantly above the national average (£92.60 psm / £8.60 psf) (Source: Colliers International).

Figure 5.9 Annualised Total Returns (%) to Dec 2015

	3 yr	5yr	10yr
London Industrial	*19.0*	*14.0*	*8.3*
SE Industrial	17.6	12.5	6.0
UK Industrial	17.7	12.5	6.4
UK Retail	10.8	8.3	4.2
London West End Retail	**22.6**	**19.1**	**13.0**
UK Office	18.1	13.4	7.6
London CIty Office	18.8	15.3	8.6

Source: IPD / MSCI

Figure 5.10 Annualised Rental Growth (%) to Dec 2015

	3 yr	5yr	10yr
London Industrial	*4.2*	*2.5*	*1.3*
SE Industrial	3.1	1.6	0.4
UK Industrial	2.7	1.3	0.3
UK Retail	0.8	0.4	0.0
London West End Retail	**8.3**	**7.8**	**5.1**
UK Office	6.5	4.9	2.4
London City Office	9.1	7.4	3.7

Source: IPD / MSCI

The highest prime rent was established at the beginning of 2016 at the Quad, Park Royal, with rents ranging from £180.30 to £185.70 psm (£16.75 to £17.25 psf). Heathrow's headline rents remain at £161.50 psm / £15.00 psf for smaller units and £166.85 psm / £15.50 psf for space over 9,290 sq m (100,0000 sq ft). Historically, Heathrow was perceived as the more expensive location, but, in fact, Park Royal rents caught up in 2011.

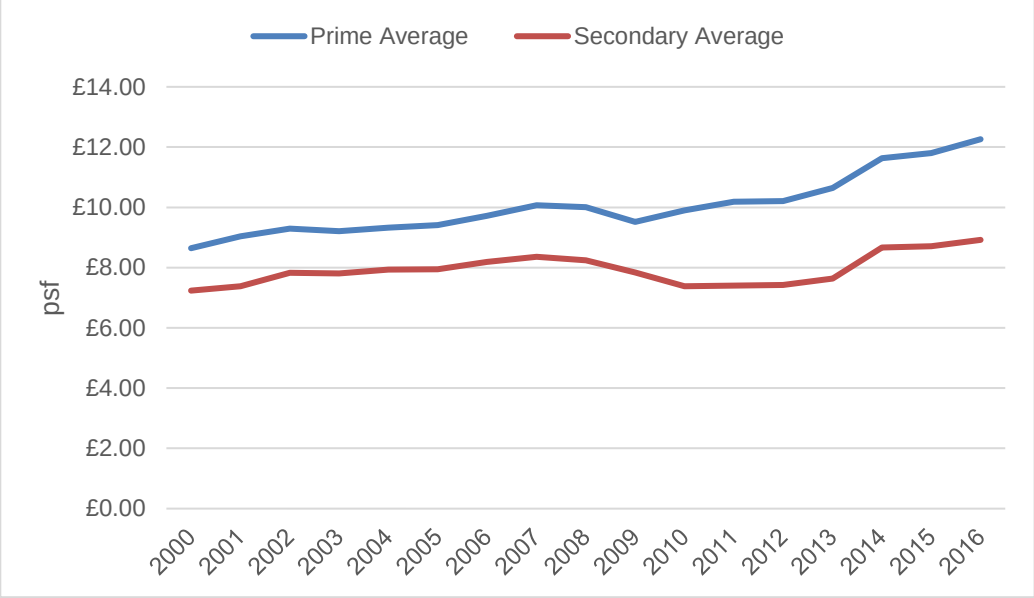
The Heathrow market is dominated by air-cargo operators, while Park Royal attracts a more diverse range of users - media-related, food production and traditional storage and manufacturing, as well as internet retailers. Heathrow's rents, however, are expected to rise going forward as a result of the development of a third runaway, while nearby markets, such as Park Royal, are likely to benefit more from the displacement of more traditional occupiers by higher value (higher rent) occupiers.

In the absence of new Grade A industrial space, secondary, poorer quality stock has also been absorbed at a higher rate than the norm, which has contributed to rising rents. Average secondary rents in London have reached almost £96.90 psm / £9.00 psf, with Heathrow achieving £113.00 psm / £10.50 psf, followed by Wembley, Poyle, Park Royal and Staples Corner all targeting £107.65 psm / £10.00 psf.

London industrial land values have also increased since the financial crisis, reaching an average price of £1.87 million per acre (£4.62 million per ha). This is only 2% below the 2007 levels of £1.91 million per acre (£4.72 million per ha) (gross price, excluding development costs). The highest land values of £2.5 million per acre (6.17 million per ha) can be found in Heathrow, Poyle, Park Royal and Staples Corner. While Heathrow is yet to reach its pre-recessionary land values of £3 million per acre (£7.41 million per ha), Park Royal and Staples Corner are achieving record values for their respective locations.

The London industrial land market is most affected by redevelopment for higher value uses, particularly residential, with traditional areas such as Battersea and Wandsworth seeing significant redevelopment. Some industrial buildings are being redeveloped for residential towers, with land values equating to around £25 million per acre (£61.75 million per ha) not being unusual.

Figure 5.11 Average prime and secondary industrial rents in Greater London (2000 – 2016)

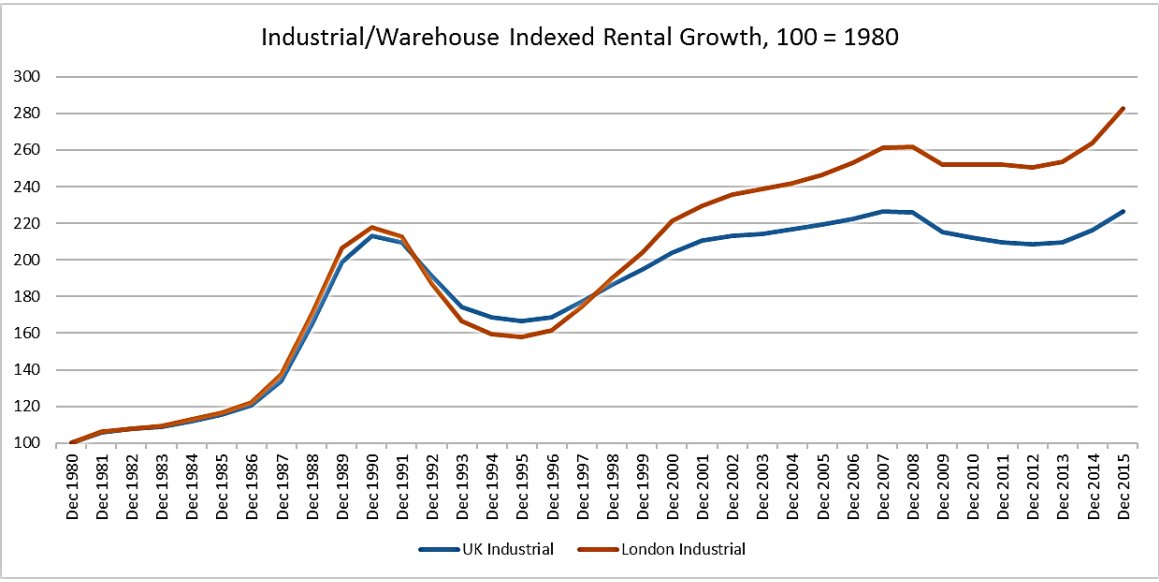


Source: Colliers International

While rental growth is largely due to the continued demand and constrained supply, construction costs are also rising. Building and construction costs rose 10% between 2015 and 2016, and post EU Referendum sterling devaluation is likely to increase costs further. Current development cost for a mid-size box (2,790 to 4,645 sq m / 30,000 – 50,000 sq ft) stands at £377 to £431 psm (£35 to £40 psf).

Over the longer term, the IPD / MSCI[20] data in the figure below clearly shows the relative strength of rental growth in the London industrial market when compared with the national data, particularly from the mid-1990s. It should be noted that the IPD / MSCI index comprises largely institutional grade stock, although the general performance trends are also likely to be replicated in poorer quality stock.

Figure 5.12 Long-term industrial rental growth indexed

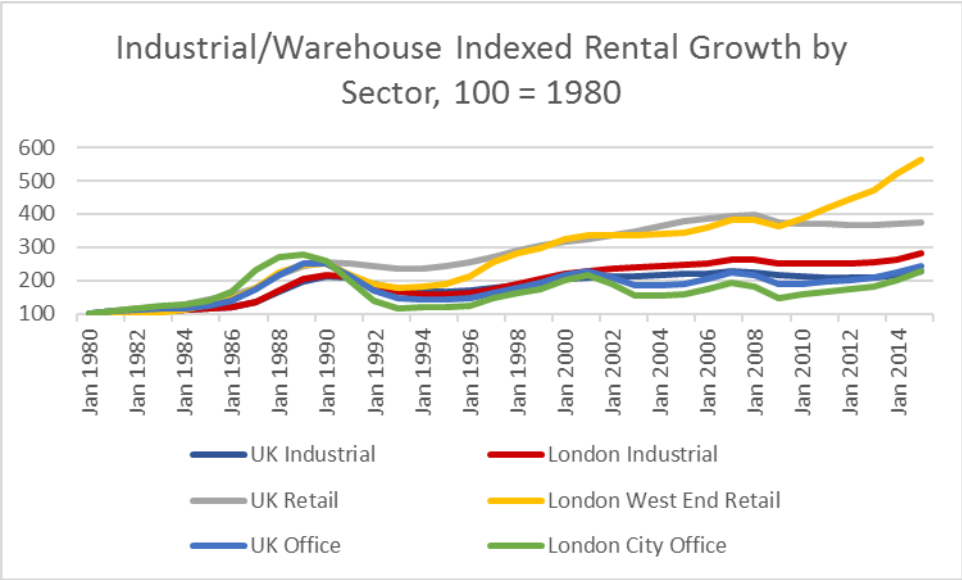


Source: IPD / MSCI

[20] Investment Property Databank/ Morgan Stanley Capital International

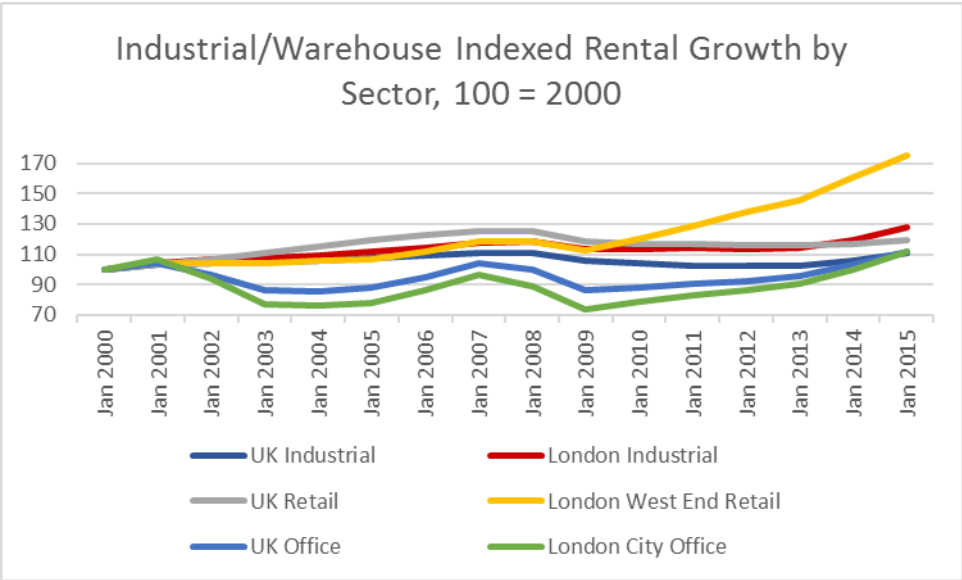
When comparing the performance of the London industrial sector rents against the other main commercial market sectors – retail and office – its relative performance depends very much on the time period selected. Over the long-term (25 years), London industrial indexed rental growth falls some way behind that of the retail sector, particularly the growth seen in London's West End, but better than offices (figure 5.13). Over the short term (five years), the strength of the London economy has contributed to strong London retail and office market performance (up 40%+), which in turn has also boosted UK office rents (figure 5.15), but over the medium term (15 years), London industrial rents, up by 28%, are only bettered by London West End Retail, where the limited supply and strong demand from both domestic and international retailers has boosted rents by a staggering 75% (figure 5.14).

Figure 5.13 Long-term rental growth – industrial, retail, office



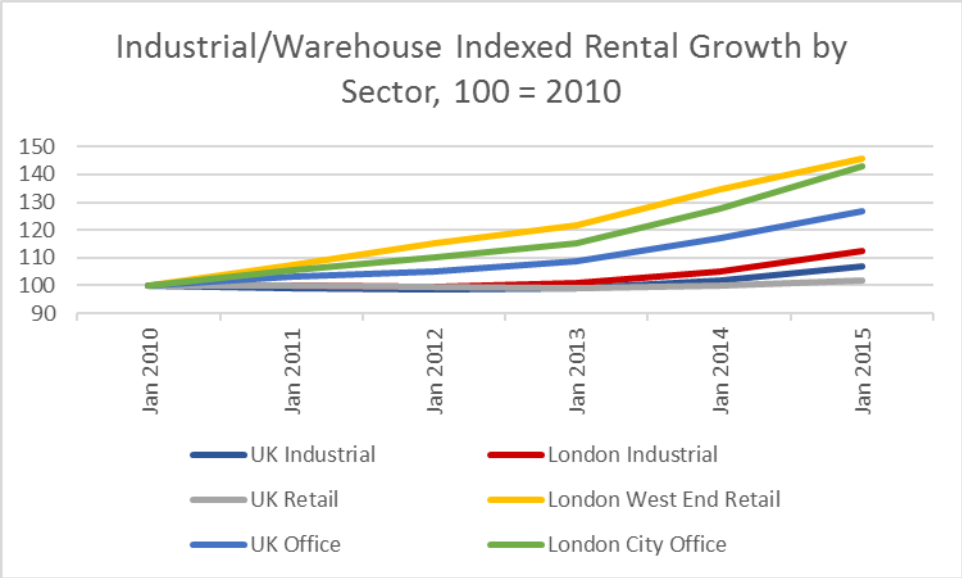
Source: IPD / MSCI

Figure 5.14 Medium-term rental growth – industrial, retail, office



Source: IPD / MSCI

Figure 5.15 Short-term rental growth – industrial, retail, office



Source: IPD / MSCI

South East Sub Regions – Inner South East

The Inner South East regions spread out from Greater London as illustrated on the map (Figure 4.2). Average prime rents are generally lower than London, but sit within a fairly tight band of £94.20 to £107.65 psm (£8.75 psf to £10.00 psf), with secondary rents in the range £69.95 to £83.95 psm (£6.50 psf to £7.80 psf).

Figure 5.16 Inner South East's major industrial/warehouse property markets

	North (M1) Luton Corridor	North (Lee Valley) Quadrant	South Quadrant	East Quadrant	West Quadrant
Average prime rent £psf	9.58	9.25	10.00	8.75	9.91
£psm	103.2	99.6	107.6	94.2	106.7
Average secondary rent £psf	7.13	7.38	7.80	6.90	6.50
£psm	76.7	79.4	84.0	74.3	70.0
Average land values (£m per acre)	1.23	0.89	1.22	0.90	1.17
£m ha	3.04	2.20	3.01	2.22	2.89
Built Stock					
Factory sq ft	3,113,654	2,291,127	2,834,534	3,305,230	5,224,326
sqm	289,268	212,853	263,337	307,066	485,356
Warehouse sq ft	33,803,349	28,378,662	20,874,238	42,713,316	33,204,570
sqm	3,140,437	2,636,467	1,939,282	3,968,201	3,084,808
Total floorspace sq ft	36,917,003	30,669,789	23,708,772	46,018,546	38,428,896
sqm	3,429,705	2,849,319	2,202,619	4,275,267	3,570,165

Source: Colliers International, CoStar

5.6 Available supply

Shed availability is severely constrained in London as existing new/refurbished space represents just a few months of supply, based on average annual take-up levels. The present vacancy rate is 4%, by far the lowest of any region of the country. Availability is around 687,477 sq m (7.4 million sq ft), of which new and refurbished space accounts for only 9% (61,315 sq m / 660,000 sf), and second-hand space represented 91% (622,445 sq m / 6.7 million sf).

London Grade A supply remains severely constrained. Units that are available are typically of secondary quality and, in some cases, no longer fit for purpose. The relatively low share of new and refurbished supply is likely to partly reflect the very low level of new speculative development following the credit crunch and recession. However, speculative developments began to return in London in 2014-2015 in response to the acute shortage of supply, with half of current pipeline schemes already pre-let.

Having fallen in recent years, supply levels are also stabilising in the South East, primarily due to higher levels of speculative development. However, the supply of modern, flexible warehouse space has remained limited and there are no signs of an impending oversupply. Examples of recent speculative schemes in London and the Inner South East include: SEGRO's Navigation Park at Enfield, Standard Life's Thames Gateway Park, Dagenham, ProLogis schemes at London Gateway (east of Tilbury), Hayes (Dawley Road and West London) and Dunstable, Graftongate / Legal & General's Thurrock 162 at West Thurrock, Graftongate / Blackrock's Heathrow Logistics Park at Bedfont and SEGRO's Orbital Park and Skyline developments at Heathrow.

We are beginning to see some absorption of secondary stock in centres where supply is extremely constrained, in centres like Hemel Hempstead, Croydon, Watford, Crawley and Stevenage, with recent specific examples being Wincanton taking the remaining 230,000 sq ft at DC380 in Harlow and 266,000 sq ft at Angle 265, London Medway Commercial Park in Kent. Kuehne + Nagel recently renewed its lease in Croydon despite the unit not being fit for purpose. With a lack of availability and contracts to service, Kuehne + Nagel had no choice. The quality of the available second-hand stock, more often than not, does not meet the typical tenant requirements for operating in an efficient and cost-effective manner.

Figure 5.17 Greater London availability of industrial /warehousing floorspace by property market area (sq m)

	Under 250	250 to <500	500 to <1,000	1,000 to <2,000	2,000 to <10,000	10,000 and over
Central Services Circle	4,359	5,069	12,473	8,455	16,747	
Lea Valley	3,151	5,088	12,317	8,877	36,620	15,501
Thames Gateway	3,228	8,742	19,648	21,977	83,685	16,758
Park Royal / A40 / Heathrc	6,788	15,281	42,291	65,851	224,921	29,110
Wandle Valley	5,336	10,070	12,297	16,795	38,236	

Source: Colliers International, CoStar

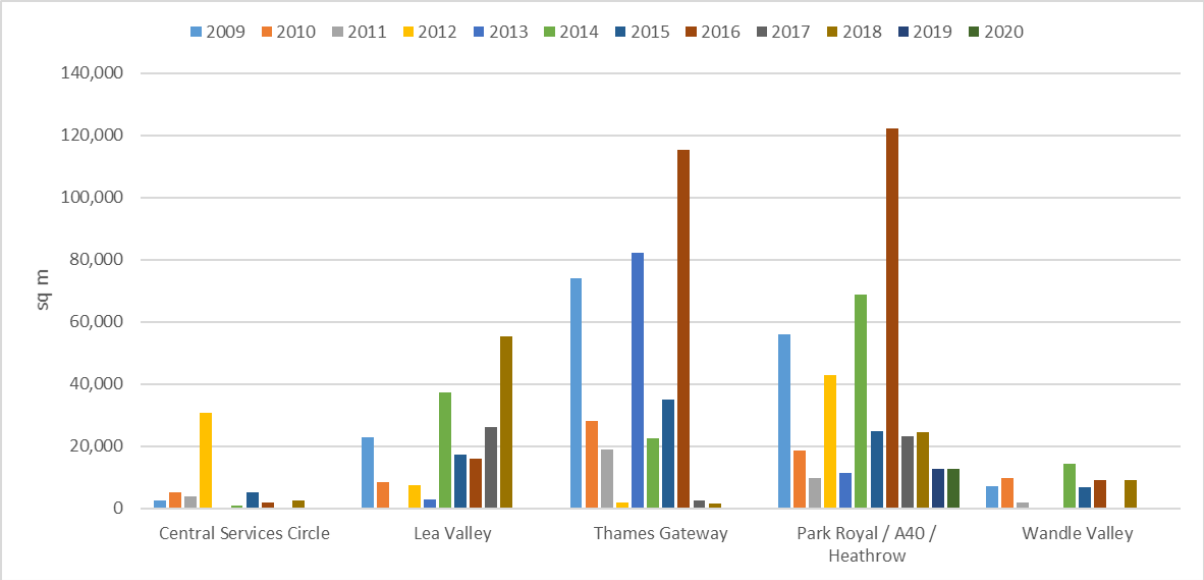
Figure 5.18 Inner South East availability of industrial /warehousing floorspace by property market area (sq m)

	Under 250	250 to <500	500 to <1,000	1,000 to <2,000	2,000 to <10,000	10,000 and over
Eastern Quadrant	4,977	12,491	17,250	26,943	78,114	97,189
North (Lea Valley)	4,807	7,318	17,052	18,652	48,274	26,832
North (M1) Luton Corridor	4,807	7,318	17,052	18,652	48,274	26,832
Southern Quadrant	3,917	6,738	15,942	26,465	68,646	22,799
Western Quadrant	8,026	17,703	35,967	57,841	45,197	

5.7 Development

Reduced business confidence and a tightening of bank lending conditions resulted in much reduced development following the global financial crisis. With demand continuing to outstrip supply, particularly for Grade A product, and as bank lending constraints eased as the economy strengthened, some developers have been encouraged to develop speculatively in the last two years or so. Speculative development includes both multi-let and large single-let units, with the larger single-let units being constructed in West London and Enfield. The level of speculative development in Greater London actually declined from 169,082 sq m / 1.82 million sq ft in 13 schemes in 2007 to zero in 2010. Total completions for 2016 were 232,690 sq m / 2.5 million sq ft, with half believed to be speculative developments. Examples of recent speculative development are listed in section 5.6.

Figure 5.19 London industrial development completions and pipeline (sq m)



Source: Colliers International, CoStar

Even though speculative development has increased in the past two years, the impact of the EU referendum is leading to a more cautious approach amongst developers, which is likely to result in lower levels of speculative development in the immediate future. As the occupier demand for industrial space shows no sign of slowing in London, with an average void period of 6 months between practical completion and lease agreement (9-12 months in the past), the lower levels of speculative development will, undoubtedly, contribute to an increasing industrial supply-demand imbalance.

Similarly, supply levels in the Wider South East are now stabilising having fallen significantly in recent years, which is partly due to stronger levels of speculative developments. Currently, the amount of new space being planned is unable to keep up with the demands of online retailers and their distributors. Major occupiers, such as Amazon, are now prepared to wait up to 12 months for new schemes to be delivered, as evidenced by their upcoming 204,385 sq m / 2.2 million sq ft facility at London Distribution Park, Tilbury.

Figure 5.20 Key London and South East schemes under construction

SCHEMES UNDER CONSTRUCTION						
Building Address	Building Name	Property Market Area	Year Built	Rentable Building Area (sqm)	Developer Name	Owner Name
St Andrews Rd	Amazon	Eastern Quadrant	2017	204,387	Roxhill Developments Ltd	Legal & General Group plc
Essex Regiment Way	Industrial Premises	Eastern Quadrant	2017	65,255		Aquila House Developments Ltd
Christopher Martin Rd	Prologis Park	Eastern Quadrant	2016	26,027	Prologis Group Holdings Ltd	Prologis Group Holdings Ltd
Barclay Way	Thurrock 162	North (Lea Valley)	2017	15,097		TH Real Estate Ltd
Bessemer Rd	Design and Build	North (Lea Valley)	2017	14,864		Industrial Property Investment Fund
Chequers Ln		London Gateway	2017	12,542	Ravenbourne Developments Ltd	Standard Life Investments Ltd
Ashley Rd		Park Royal / A40 / Heathrow	2017	10,363		
East Duck Lees Ln	EDP	Lea Valley	2017	8,779		
Royston Gtwy	High Bay Warehouse	North (Lea Valley)	2017	6,552		
Aerospace Blvd	Voyager	Western Quadrant	2017	5,468		
Rutherford Way	Gatwick 55	Southern Quadrant	2017	5,232		Goya Developments
Motherwell Way		North (Lea Valley)	2017	5,090		
Aerospace Blvd	Voyager	Western Quadrant	2017	5,036		
Motherwell Way		North (Lea Valley)	2017	4,270		
Dunmow Rd		Eastern Quadrant	2017	4,014		Royal London Asset Management Ltd
Aerospace Blvd	Voyager	Western Quadrant	2017	3,984	Canmoor Developments Ltd	
Lyon Way	Logistics City	Western Quadrant	2017	3,980		Kier Property Developments Ltd
43 Western Rd		Western Quadrant	2017	3,851		Hermes Investment Management Ltd
Forsyth Rd		Southern Quadrant	2017	3,818	Goya Developments	Goya Developments
Uxbridge Rd	Unit 4	Park Royal / A40 / Heathrow	2016	3,746		AXA Real Estate Investment Management
Motherwell Way	Trade City	North (Lea Valley)	2017	3,485		
Motherwell Way		North (Lea Valley)	2017	3,425		
Endeavour Dr		Eastern Quadrant	2017	3,374	Taurus Developments Ltd	LaSalle Investment Management Ltd
Motherwell Way		North (Lea Valley)	2017	3,290		
Ten Acre Ln		Western Quadrant	2017	3,259		Goya Developments
Forsyth Rd		Southern Quadrant	2017	3,234	Goya Developments	Goya Developments
Waxlow Rd		Park Royal / A40 / Heathrow	2017	3,215		Aviva Investors Global Services Ltd
772 Buckingham Ave		Western Quadrant	2017	3,205		Segro plc
Dunmow Rd		Eastern Quadrant	2017	3,197		Royal London Asset Management Ltd
Westway		Eastern Quadrant	2017	3,183		
Ashley Rd		Park Royal / A40 / Heathrow	2017	3,158	Mentmore Investments LLP	
Fawkes Ave	Unit 4-5	Eastern Quadrant	2017	2,620		
Uxbridge Rd	Unit 1	Park Royal / A40 / Heathrow	2017	2,574		AXA Real Estate Investment Management
Fawkes Ave	Unit 1-3	Eastern Quadrant	2017	2,521		
Waxlow Rd		Park Royal / A40 / Heathrow	2017	2,463		Aviva Investors Global Services Ltd
Dunmow Rd		Eastern Quadrant	2017	2,443		Royal London Asset Management Ltd
Endeavour Dr		Eastern Quadrant	2017	2,433	Taurus Developments Ltd	LaSalle Investment Management Ltd
52-54 White Post Ln	The Bagel Factory	Central Services Circle	2018	2,335		
Ten Acre Ln		Western Quadrant	2017	2,218		Goya Developments
Motherwell Way	Trade City	North (Lea Valley)	2017	2,030		
Ten Acre Ln		Western Quadrant	2017	2,017		Goya Developments
43 Western Rd		Western Quadrant	2017	1,967		Hermes Investment Management Ltd
Motherwell Way	Trade City	North (Lea Valley)	2017	1,950		
Endeavour Dr		Eastern Quadrant	2017	1,936	Taurus Developments Ltd	LaSalle Investment Management Ltd
Wells Pl	Site 1	Southern Quadrant	2017	1,858		
Fishponds Rd		Western Quadrant	2017	1,814	Areawise Ltd	Areawise Ltd
Fishponds Rd		Western Quadrant	2017	1,630	Areawise Ltd	Areawise Ltd
Endeavour Dr		Eastern Quadrant	2017	1,281	Taurus Developments Ltd	LaSalle Investment Management Ltd
The Hollow		Southern Quadrant	2017	1,172		Hargreaves Properties Ltd
Ashley Rd		Park Royal / A40 / Heathrow	2017	1,069		
55 Waterloo Rd	Land At	Park Royal / A40 / Heathrow	2017	1,064		Porchfern Ltd
Well Hall Rd	Adelphi A Building	London Gateway	2017	185.81		

Source: Colliers International, CoStar

From October 2017 the government's permitted development rights (PDR) proposals will allow landlords to change the use of a building from light industrial (B1c) to residential. The new PDR legislation could potentially worsen the supply shortfall in certain areas, when the tightening supply of light industrial units in London is already forcing businesses to move outside of the city.

5.8 Conclusions

The pressure on land for industrial and urban logistics is immense, particularly in areas of population concentration where industrial developers are competing with house builders. Around 500 ha of industrial land has been lost in Greater London over the period 2010-2015 as places like Nine Elms and the Olympic Park have become mixed use/residential areas.

The imbalance between supply and demand is expected to continue, driven particularly by increasing demand from e-commerce and last mile fulfilment requirements. Another driving factor is the reluctance amongst developers to build speculatively as occupier requirements become more demanding and bespoke, to accommodate increased eaves heights, greater floor loadings, more volume and sophisticated technology. Many occupiers now think not in terms of sq ft or sq m, but cubic feet or cubic metres.

With the London industrial occupier base now dominated by "clean" and more service-based businesses, there is a more convincing argument to support mixed use type developments to increase the intensification of land use in London. In its infancy at present, there are some examples of original design incorporating forms of "clean" industrial occupiers alongside residential and other uses.

As pressure on land availability and land pricing continues to rise, the viability of such schemes will become more evident. However, there may be a reluctance amongst developers to take the lead, here, and it may become necessary to make it a planning requirement for residential to accompany warehouse type developments in areas of high demand for industrial and residential development.

As the retail sector continues to undergo a structural shift to online, there may be sites released by supermarkets and failing retail parks, but these will be very limited in London.

Finally, technology has been the great enabler in providing consumers with much greater flexibility around when and how to shop. Technology could also facilitate the much more efficient use of existing warehousing space by creating a market for spare capacity – for example, an 'AirBnB' for industrial and warehouse space that would allow sharing of space by compatible users who face short-term capacity issues.

6 General and Light Industry

6.1 Introduction

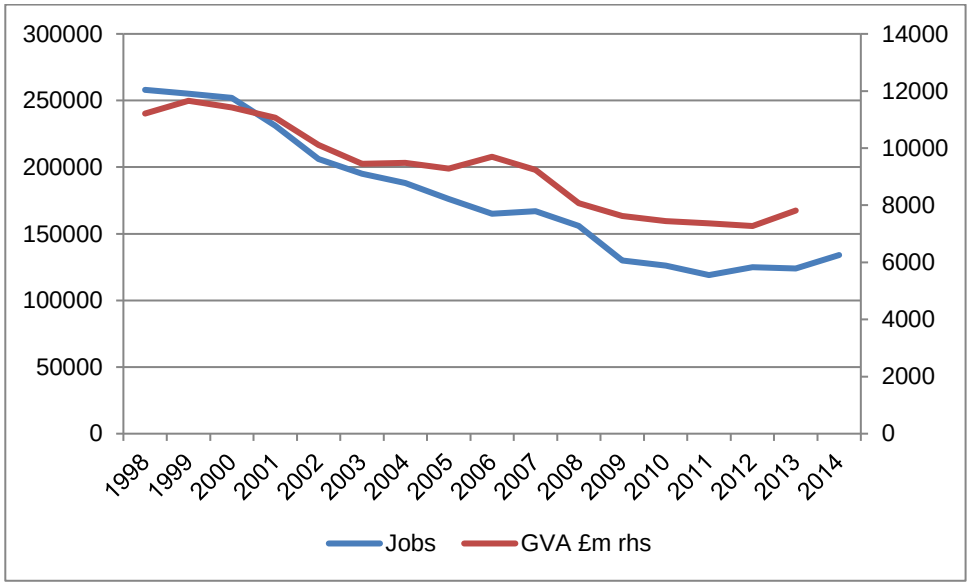
This section reviews the activity of general industrial users of industrial land in London. This excludes warehouse and logistics activity which is discussed in the following chapter. The 2011 Industrial Land Demand and Release Benchmarks study distinguished between Production sectors and Service sectors that occupied industrial land. Here we seek to extend that analysis by also considering hybrid activities that do not sit readily in traditional office or industrial definitions. This analysis is also relevant to the parallel GLA research report on the demand for office space in London[21].

6.2 Production sectors

Manufacturing

Despite a recent uptick in the last two years manufacturing has been in long term decline in London whether measured in terms of jobs or in output.

Figure 6.1 Manufacturing Jobs and GVA London 1998-2014

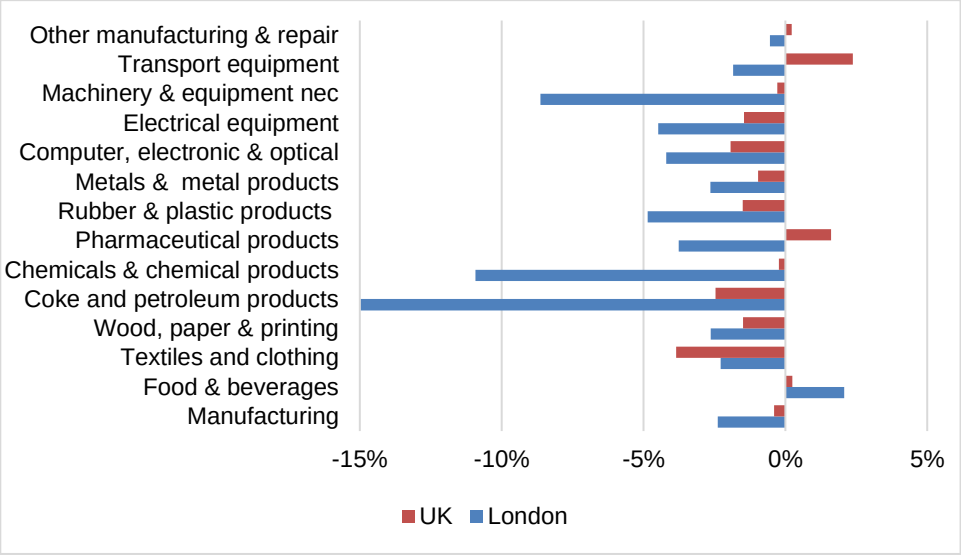


Source: ONS/GLA

Manufacturing in London has performed significantly below the national average. Over the period 1998-2013 UK GVA only declined at an average of -0.4% p.a. compared with -2.4% p.a. in London. Food manufacturing was the one sector in London that stood out against the trend.

[21] London Office Policy Review 2017

Figure 6.2 Annual Percentage Change in Manufacturing GVA 1998-2013



Source: ONS

In 2015 we estimate that manufacturing accounts for 26.7% of all London's industrial employment. That is down from 44% in 1998. The rate of decline in manufacturing employment has slowed: over the period 2009-15 it actually saw a small increase of 0.4%, though it continued to decline as a share of total employment.

There were 108,000 employee jobs in manufacturing in London in 2015. 21,000 of these were in the food sector and 15,000 in printing and reproduction of other recorded material. No other 2-digit Standard Industrial Classification (SIC) sector account for more than 10,000 jobs. Looking at finer grained activities[22], there are no dominant sub-sectors: activities in food, clothing, printing, plastics, machining and repair and maintenance of transport make up the larger employment activities.

Table 6.1 London's Largest Employment Manufacturing Sectors 2015

Sector	Employees
Manufacture of prepared meals and dishes	2,000-2,500
Manufacture of women's outerwear, other than leather clothes and workwear	2,000-2,500
Printing (other than printing of newspapers and printing on labels and tags) nec	1,000-2,000
Repair and maintenance of other transport equipment	1,000-2,000
Manufacture of builders ware of plastic	1,000-2,000
Manufacture of men's outerwear, other than leather clothes and workwear	1,000-2,000
Machining	1,000-2,000
Manufacture of other plastic products	1,000-2,000
Manufacture of rusks and biscuits; manufacture of preserved pastry goods and cakes	500-1,000
Other processing and preserving of fruit and vegetables	500-1,000

Source: BRES

Most of the manufacturing activity that remains in London is here because it wants to be close to the customer. Other reasons include: businesses that are still here as a legacy of London's manufacturing

[22] Table 6.1 shows 5-digit SIC categories. The SIC is a hierarchical classification system with the 5-digit category being the most disaggregated level of activity.

past[23]; firms locating here for access to a specialist skills base; or craft sectors that want a London brand.

The long run structural decline in manufacturing caused by globalisation of production may be at an end. Manufacturing of the future is likely to be more customised and may again look to be close to the customer. As noted in one report, "*The manufacturing of the past was characterised by long production runs and repetitive manual labour. It was used to make goods that varied little between one day and the next. The focus in the industries of the future will be on fast changing products, created to high specifications, often through mixing a range of technologies, from electronics to biotech. Next generation manufacturing will be tailored to individual requirements and fabricated in short runs*."[24]

A Foresight report on manufacturing noted that, *"Manufacturing in 2050 will look very different from today, and will be virtually unrecognisable from that of 30 years ago. Successful firms will be capable of rapidly adapting their physical and intellectual infrastructures to exploit changes in technology as manufacturing becomes faster, more responsive to changing global markets and closer to customers"*[25]

The report noted four key future characteristics of manufacturing and their implications for policy making:

- Faster more responsive and closer to customers
- Exposed to new market opportunities
- More sustainable
- Increasingly dependent on highly skilled workers

These are factors that could result in London again becoming a more favoured location for manufacturing activity. Such conclusions must for now remain speculative and as a result our central projection for manufacturing is based on existing trends. But there is potentially an upside.

However, we know that these factors will influence the type of manufacturing premises that will be in demand in the future.

"The general trend is towards smaller, manageable, clean, well-organised, highly flexible factories that contain updated but traditional technologies that can be quickly ramped up to meet volume and deliver 'highest quality' to changing customer and market requirements".[26]

A growth in 'craft industries', ranging from artisan baking, coffee roasting and cheese production to bespoke furniture, lighting and tiling, may be an early indication of the small customised production of the future, although the type of premises demanded by manufacturing firms in the future may be a longer-term question. A more immediate question for policy makers to consider is the evolving nature of demand for 'industrial' premises.

[23] The Whitechapel Bell Foundry began life in 1570 and moved to its site on Whitechapel Road in 1739 from where it has traded ever since. But even such a long-standing manufacturing institution has announced it will be relocating. It is unlikely that anyone wishing to set up a bell foundry today would seek to do so in Inner London.
[24] Marsh, P (2015) 'London and the New Industrial Revolution'. London Essays, Issue 2, 2015, Centre for London: http://essays.centreforlondon.org/issues/technology/london-and-the-new-industrial-revolution/
[25] Foresight (2013). The Future of Manufacturing: A new era of opportunity and challenge for the UK
[26] The Factory of the Future - Future of Manufacturing Project: Evidence Paper 29 - Foresight (2013)

6.3 The evolving nature of demand for 'industrial' premises

It is conventional for economic and property market studies to assess the supply and demand dynamics of commercial land and buildings in terms of the major divisions of the 1987 Use Classes Order, namely: office (B1), industrial (B2) and warehouse/distribution (B8). This demarcation is a perfectly rational one when the dominant activities that take place in offices, factories and warehouses (respectively) are mutually exclusive.

However, fundamental changes to the nature of the economy are resulting in new demands on buildings and building design, which call into question the exclusivity of these uses. While a central business district office building, a food production plant and a logistics building are clearly all quite distinct from one another, a growing amount of economic activity involves the blending of different uses within buildings. Indeed, we argue here that while the scale of activities requiring 'hybrid' buildings has been largely ignored in property development and spatial planning terms, it now forms a critical element of the efficient running of the London economy.

The significance of this observation becomes apparent when spatial policy seeks, for example, to protect or release 'industrial' land. It is important to have a clear understanding of exactly what is being protected or released. Much activity on 'industrial' land is no longer 'industrial' in the conventional sense of the term (i.e. firms making goods). For example, when it is suggested that a block of employment land is released "*because it's industrial, and we all know industry is in terminal decline*", then there is a danger that such a move could contribute to a potentially growing shortage of exactly the kind of space that London's modern economy needs.

In other words, there is a need for a subtler understanding of what activities take place on so-called industrial land.

This section examines trends in the use of industrial land and buildings, in order to shed light on the way in which London's industrial land is used, particularly the huge number of businesses locating in 'secondary' space on most of the capital's industrial estates. This section outlines the nature of demand; it then describes the kinds of premises required, before outlining some of the spatial planning and property market issues.

Servicing the services

Over the past three decades the London economy has become dominated by the service sector. This is amply demonstrated by the fact that between 1984 and 2014, manufacturing shrank by almost four-fifths, while financial and business services jobs more than doubled in number. These dichotomous trends not only illustrate a very significant economic shift, but also hint at a critical issue for London's spatial planning and property markets: the growth of economic activity, mostly around the fringes of central London and in outer London, that supports the expansion and smooth running of the central area.

The central area of London is a vast and complex economy that draws upon an extraordinary array of support activities. The financial and business services sectors are fundamental to London's World City role, but London also has great strengths in the creative and media industries, medicine, technology, higher education and other sectors. In addition, there is the backdrop of the cultural and entertainment industries (including museums, galleries and theatres), as well as the tourist industry which generates many thousands of jobs in shops, restaurants and hotels.

This great weight of activity itself draws upon a vast range of support activities. For example, consider the diversity of services and products consumed by the average office building: catering; cleaning; furniture; maintenance and fit out; office equipment and supplies; print and copy; security; waste disposal, and many others. Multiplied across the city economy, the demand for supporting activity

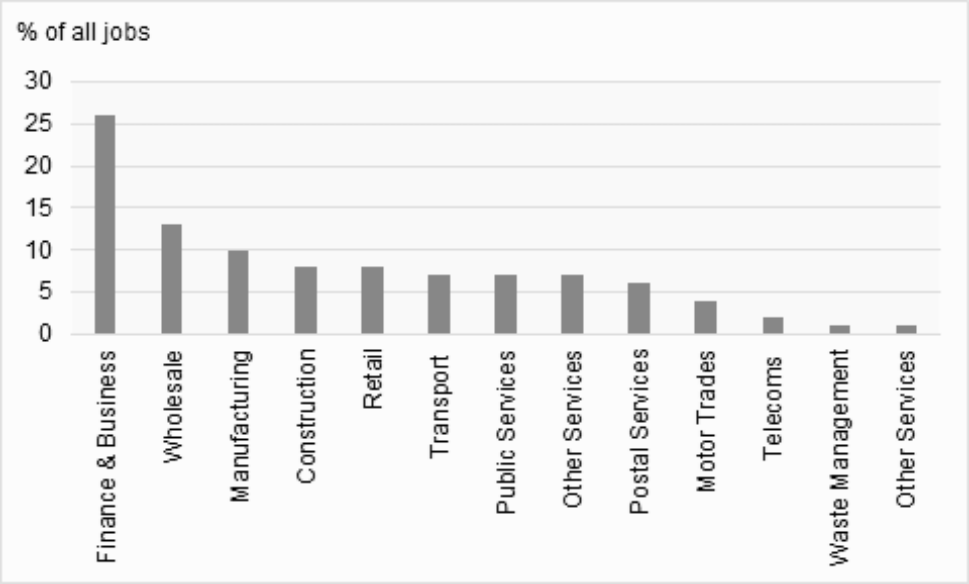
becomes evident. Much of this support activity is located away from the central area, often clustered around its periphery and beyond. The activity is mostly 'low key', but is vital to the efficient functioning of the city.

As the economy has become dominated by service activity, and manufacturing declined, so London's industrial estates have evolved, changing from places where heavy industry once dominated, to areas providing critical, often service-based support. In some senses, Park Royal (Europe's largest industrial estate) symbolises this transition.

The GLA notes that in 1932 there were 73 factories in Park Royal, employing 13,500 workers on site.[27] Having sustained relatively light damage during the war, the area continued to boom, and by the 1960s it employed over 45,000 people. But by the 1970s it was facing large-scale industrial restructuring: "*Many of the multinational firms, the area's largest employers, chose to relocate, and by the early 1970s around 70 larger firms left Park Royal*". However, the estate has adapted, and "*Many of the large factories that produced everything from beans and beer to bombers and buses have been replaced by or subdivided into smaller industrial units. These are being used by many smaller businesses today*". Many of these smaller businesses are not conventionally considered to be 'industrial'.

The changing nature of London's industrial estates was highlighted in a 2011 study[28] that described a wide variety of sectors occupying industrial land (Figure 6.3). Indeed, it found that only one-third of jobs on land designated for industrial uses were in manufacturing. In yet another illustration of the non-manufacturing nature of much light and general industrial land, the GLA found that while manufacturing comprises just 3% of London's jobs, London's industrial areas accommodate 11% of all jobs in the capital.[29]

Figure 6.3 Distribution of jobs by sector on industrial land



Source: Roger Tym & Partners (2011)

A recent study by Aecom[30] underscored the widespread evolution of industrial estates across London. The study found that almost half of all employment on designated (SIL and LSIS) locations is in fact of a non-industrial nature (Figure 6.4). Thus, of 301,000 jobs on SIL and LSIS sites, 129,400 are of a non-industrial nature.

[27] Greater London Authority (2014) *Park Royal Atlas*
[28] Roger Tym & Partners (2011) *Industrial Land Demand and Release Benchmarks in London*
[29] Greater London Authority (2012) *Land for Industry and Transport*
[30] Aecom (2016) *London Industrial Land Supply & Economy Study 2015* Greater London Authority

Figure 6.4 Estimated non-industrial jobs in designated locations

Sub-region	Non-industrial jobs in SIL	Non-industrial jobs in LSIS	Total non-industrial jobs in designated areas	Total jobs in designated areas	% non-industrial jobs in designated areas
Inner London	9,400	17,000	26,400	58,000	45.5
Outer London	63,900	39,100	103,000	243,000	42.4
All London	73,300	56,100	129,400	301,000	43.0

Source: Aecom (2016)

The implication of these numbers is that many occupiers of 'industrial' space today are in fact 'clean' activities that provide the expanding central London business market, and wider London economy. These include building services, catering, cleaning, courier services, design, hospitality services, maintenance, marketing services, media production, office supplies, printing, security, technology support services, training and many, many others. We have referred to this activity elsewhere as '*servicing the services*'.[31] It should also be noted that many of these businesses also directly serve London's growing population (in building services, automotive services and personal services) as well as providing space for activities, such as religious meeting places, gyms and go-karting tracks.

Businesses and activities

We need to consider whether the property typically available to such companies is suitable for their needs. To begin to understand this question, we need to examine businesses and the activities they undertake in their buildings, rather than the economic sector into which they slot.

Figure 6.5 illustrates the breadth of company types undertaking non-industrial activities in industrial buildings, and suggests that 'industrial' space is not necessarily appropriate for much of the activity. The list is partial, and intended only for illustrative purposes, but it can be inferred that many of these firms are undertaking activities within their buildings that cannot be described as 'industrial' in the traditional sense of the term.

Figure 6.6 then takes the analysis to the next level and describes the range of activities that might be taking place in the buildings occupied by the businesses listed in Figure 6.5. The key point here is that the range of activities listed implies a range of working environments, from office space, to production space to warehousing.

Furthermore, the range of activities implies something about the nature of the workers employed within the buildings. For example, many are professional, skilled and technical staff. Such workers have higher expectations of their workplace than perhaps is the case with the generally perceived staff profile of a traditional industrial estate. Many are not involved in 'making things' in a traditional sense, but rather in assembly, customisation, design, maintenance, repair, storage and value-adding. Further, many do not involve 'things' at all, but are trading services: customer support, design, sales, software and training.

[31] Ramidus Consulting Limited (2012) *London Office Policy Review 2012* Greater London Authority

Figure 6.5 Occupier types in 'industrial' buildings

Occupier types	
Art production and sale	Furniture & equipment
Audio-visual equipment	Graphic design
Building materials & services	ICT infrastructure
Business services	Import & export
Cash and carry	Interior design
Clothing and fashion	Mail management
Computers & peripherals	Maintenance contracting
Craftwork	Packaging supplies
Data services	Photography
E-commerce	Printing
Electrical services	Publishing
Engineering	Recording equipment repair
Event management	Retail & wholesale sales
Film & sound recording	Security
Food and drink production	Software support
Freight forwarding	Training

Source: Ramidus Consulting

Figure 6.6 Activities in multi-use buildings

Activities	
Assembly	Production & manufacture
Customer & technical support	Renting & leasing
Customisation & repair	Sales & marketing
Design	Showroom & demonstration
Distribution	Software development
Management & administration	Storage & consolidation
Packaging & printing	Wholesale & retail

Source: Ramidus Consulting

Emerging industries

Also hinted at in Figures 6.5 and 6.6 is a mix of more traditional (e.g. assembly, maintenance and storage) and more modern businesses and activities (e.g. e-commerce and software). This is an important point, suggesting that industrial land and buildings continue to evolve and cater not only for established uses but also emerging uses.

Some activities that might be considered as traditional activities have themselves undergone dramatic change, often involving a switch from mass production to niche production. For example, printing no longer involves vats of ink and large mechanical printing presses: it is now digitised. Similarly in the food and drinks sector: while very large manufacturers of very high volume foodstuffs have largely relocated away from London, much activity in this sector is now driven by SMEs making and selling specific and more customised products. The same dynamics hold in the clothing and furniture sectors, where 'artisan' and small-scale manufacturers are increasingly common.

There are a number of emerging activities, or sectors, that also make demands on industrial land. For example, renewable energy generation, data centres, life sciences, clean technology and low carbon activities. Such activities tend towards lower density land use and are more likely to be located in Outer London locations. The potential for industrial land to accommodate new uses is demonstrated by the Mayor of London's recent announcement of a feasibility study (to be undertaken by Film London,

London Local Enterprise Panel and London Borough of Barking & Dagenham) into the creation of a major new film studio on a seven hectare industrial site in Dagenham East.

The very wide variety of businesses and activities described here suggests that the conventional understanding of 'industrial' property needs to be expanded, in order that spatial policy can be more sensitive to the dynamics of demand in industrial areas. In particular, there is a need to recognise the important role of hybrid buildings in accommodating activities that are vitally important to London's economy.

Hybrid buildings

Hybrid buildings typify the demand of 'servicing the services' occupiers because they can be adapted to accommodate different uses within the same building shell. The construction of mezzanines, sub-division of space and enhanced specification are typical of such modifications to accommodate a wide range of activities. Many companies would be adequately accommodated in different kinds of environments; however, the lack of alternative supply means spaces in industrial areas often offer more cost effective and realistic premises.

The results of a study by Aecom in Wandsworth underline the issue about multi-use and adaptability.[32] It notes, for example, that there are a considerable number of SMEs within the study area, including businesses offering catering equipment hire, commercial cleaning services, event floristry and signage and laminating. The report observes that these businesses typically occupy space in "*industrial premises which have been adapted to suit their requirements*", where parking and loading is generally good, enabling them "*to transport goods easily to end destinations within the CAZ and wider London area*".

Aecom go on to conclude that there is likely to be a growing demand for such businesses, and that technology-led developments in customer businesses, such as online ordering and digital marketing and communications, might result in them "*requiring larger size premises, improved supporting and utilities infrastructure such as internet connections, or more parking and loading space to allow for more deliveries*". The implications for the provision of flexible space for small businesses are obvious, "*especially on land within or near to the CAZ*".

One of the defining features of servicing the services activity is its seeming inability to be neatly defined. The activities, as we have seen, are broad and widely varying. It is almost pointless referring to 'sectors' of industry in this context: there are no identifiable relationship between business sectors and design or specification requirements. This is why we stress the term 'activities': to reflect what happens inside the buildings, rather than how businesses are defined in government statistics.

Despite this aspect, it is possible to describe the main features of hybrid buildings suitable for 'servicing the services' activity. While there are no hard boundaries to the definition, the following series of images helps to illustrate what might be excluded and what might be included. For example, Figure 6.7 shows a traditional industrial building, a waste recycling plant and two large logistics sheds. None of these are considered as hybrid buildings: apart from access needs and neighbourliness issues, their occupiers are more traditional and tend towards a single use within their space.

[32] Aecom (2016) *London Borough of Wandsworth Employment Land and Premises Study*

Figure 6.7 Industrial and logistics buildings

Similarly with office buildings (Figure 6.8). Whether new and located in landscaped surroundings, or old and situated in the middle of an industrial estate, such single use buildings do not fall within the hybrid building concept for servicing the services activities.

Figure 6.8 Office buildings

In contrast to traditional industrial, logistics and office buildings, servicing the services requires flexible buildings that can accommodate different and changing proportions of activities. Figure 6.9 illustrates the types of buildings that are appropriate. The plots show relatively low density developments. And the structures allow a mix of one and two storey accommodation, for office, production, storage and many other activities. The buildings are relatively 'lightweight' and made from largely pre-fabricated materials.

Figure 6.9 New hybrid buildings

The images shown in Figure 6.9 are of new buildings, but of course, the reality is that most businesses occupy older, more economic stock. Figure 6.10 shows typical stock: older, deteriorating, poorly serviced and increasingly obsolete, but relatively cheap.

Figure 6.10 Secondary hybrid buildings

The images in Figures 6.9 and 6.10 suggest that occupiers require economical buildings of simple specification, in locations with good access to the central London economy. They require functional

space, of a higher standard than many traditional local industrial estates provide. The buildings should be simple and functional in design, and available in a range of sizes. Ideally they should be provided on integrated estates with good management. Access is paramount both in terms of getting to clients efficiently and in terms of access and turning space for delivery vehicles. Figure 6.11 summarises the main features of hybrid business space.

Figure 6.11 Basic features of hybrid business space

Space that combines economy and quality
A basic, low specification that can be upgraded
A fit out that allows adaptation to specific needs
The ability to erect and dismantle partitions to suit changing needs
Better designed environmental control systems
A menu of options available over fit out
A management regime sensitive to business dynamics

Source: Ramidus Consulting

Premises size

The spectrum of companies occupying multi-use buildings is very wide, and there is no typical premises size requirement. However, it is possible to narrow down the options. Thus, there are very small units of, say, less than 100 sq m, suitable for micro businesses, often in multi-let buildings and 'business centres'. At the other end of the scale, a large building might be described as one larger than 3,000 sq m. There will be requirements for space much larger that this; but in terms of typical market activity, anything over 3,000 sq m would be considered a large unit. Between these two extremes, two size bands, of 100-1,000 sq m and 1,000-3,000 sq m are helpful to distinguish smaller and larger requirements.

Storeys, access and servicing

The number of floors in multi-use buildings normally varies between one and three, with two being typical. Many purpose-built buildings are constructed as single-storey, double height space with the capability of accommodating a mezzanine floor.

Ideally, a mix of single and double height space would also permit different kinds of uses. Proportions will vary, but for generic guidance, perhaps two-thirds of the space at 4.5m high, and a third at 6-8m for storage, studios, production, and so on. The higher dimensions allow pallets to be racked six high.

The need for 'white van' access for goods and materials has led to a market norm whereby occupiers are not normally 'stacked' across multiple floors. However, there are many examples of 'business centres' where occupiers with low access needs occupy two and three level developments, with access to a shared goods lift.

Specification typology

Despite the enormous variety of occupiers and activities within multi-use buildings, it is possible to prepare a typology of activities and their appropriate key specification features (Figure 6.12). The table shows four generic demand functions, each reflecting a slightly different use profile and specification requirements, although the management regime is likely to be common to all – more intensive than normal for sheds, with greater emphasis on customer services.

The four generic types are not exhaustive, but illustrative of a principle, and can overlap within a single occupation. The proportions of each type of space will vary according to the occupier, emphasising the need for building flexibility, and for a sympathetic ownership/management approach. All four generic types require space that is flexible and easy to adapt. A depth of 13-18m is adequate to cater for most

needs, allowing reasonably deep open plan areas, while also giving sufficient depth to allow different configurations of sub-division.

Figure 6.12 Four categories

Production	Client-facing	Workshop	Goods handling
Occupier priorities			
Power supply	Quality image	Natural light	Eaves height
Fire protection	Comfort	Comfort	Loading bays
24-hour operation	Accessibility	Security	Column free
Security	Security	Car parking	Secure yard
Retail trade	Car parking	Local amenities	Turning space
Parking & access	Local amenities	Power supply	Parking

Source: Ramidus Consulting

The type of accommodation needed is a higher quality than traditional sheds and has a greater functionality. The table above illustrates four generic demand functions, each reflecting a slightly different use profile and specification requirements, although the management regime is likely to be common to all – more intensive than normal for sheds, with greater emphasis on customer services.

Building security, access and parking are, unsurprisingly, all important issues. Attention to detail in these areas would make a very significant impact on a building's attractiveness to potential occupiers.

The overriding concern of the types of companies that we are considering here is to find space that combines economy and quality. While they do not need office rents and specifications, they are looking for a step up from poor quality shed environments. Occupiers need a basic (low specification) fit out that they can adapt to their specific requirements.

The ability to erect and dismantle partitions to suit changing needs as product lines and volumes change is an obvious solution. Better designed temperature control systems and protection from the elements would make a major improvement to most buildings, and would also reduce environmental impacts. While partitions and temperature control systems are often in conflict, the key is a creative solution to the configuration of single and double height space.

Lighting is generally less of an issue, so long as natural lighting is good. Again, a basic lighting system can be inexpensively supplemented by the occupier to suit specific needs.

The key to an appropriate fit out solution is to offer a menu of options available over the shell and 'core' provision. This allows occupiers to meet their budgetary constraints whilst securing a solution that suits their needs.

Neighbourliness and colocation with residential uses

Much of the foregoing concentrates on the design features of hybrid buildings without referring to the context within which they fit, i.e., their neighbourhoods. As the occupiers of industrial estates have evolved to become less 'industrial', so their compatibility with housing has improved. Noise and air pollution, for example, have fallen dramatically.

However, some issues remain. One of the most important is the issue of access for cars, vans and lorries. Throughout the average working day, vehicle movements can be numerous, introducing both congestion and safety concerns. This places limitations on how far such estates can or should be integrated with residential areas.

Additionally, many businesses on industrial estates operate long hours and at weekends. A location within a residential setting can cause problems regarding neighbourliness. Such sites should not be

restricted unduly in terms of hours of working. Waste management can be a further issue as waste material can accumulate quickly. This issue is of growing importance given increasing legislation on responsibilities. Improved estate management solutions to waste management will grow as a differentiator for occupiers.

Most new 'industrial' developments are aimed at a host of occupier types, and the developer/owner must be able to maximise letting opportunities. This generally means that, within the context of the overriding use of any given site, there should be no user restrictions in order to improve neighbourliness.

In terms of compatibility, there is also a question of critical mass. Most businesses prefer to be in 'business environments', i.e. surrounded by other commercial activity. This brings non-tangible benefits in areas such as staff attraction and retention. More isolated businesses might find it more problematic to recruit staff. There are also tangible benefits. For example, greater concentrations of business activity are more able to attract support services such as retail and food offerings.

It is for these reasons that employment space on the ground floors of residential developments are unpopular. Being ancillary to another land use, i.e. residential, does not work for many businesses.

Overall, while many modern occupiers of 'industrial' space are far more compatible with residential uses than their forebears, there remain significant issues. The opportunities for co-location with residential are therefore more restricted than might be superficially apparent.

Industrial intensification

There is then the question of intensification and multi-storey industrial/business space. As the pressure to provide more housing increases, there is a growing need to make the best use of land. There is no doubt that modern buildings on industrial estates are more efficient than most of the older stock. It is also clear that modern buildings are occupied more densely. So intensification is already occurring as older stock is gradually replaced.

But the question remains: can such premises be provided even more intensively? As already indicated, two storey developments are relatively common and popular with businesses. The key limitation relates to the question of deliveries and servicing. And when going higher than two storeys, further complications arise.

Even if occupiers on upper levels have relatively low level requirements for receiving and dispatching goods, they will have some need; and this will imply the installation of lifts, as well as modifications to cope with utilities (particularly water and gas) and fire escapes. While not insurmountable, such modifications would add significantly to construction and maintenance costs and therefore to the base rent.

One of the defining features of the types of buildings we are considering here is their ability to be adapted by different types of occupiers for a range of different activities. This fundamental requirement is defeated by providing three, four, or even five storey buildings, because the flexibility of these buildings is generally lower.

The Nature of Demand for Hybrid Premises

During the mid-1980s there was some innovation in providing for hybrid office/industrial occupiers, but it was overtaken by events. The first phase of Stockley Park, near Heathrow, was designed as 'multi-use' buildings, which blended office space with production space, in a flexible shell. This was all provided with an economic rent in a managed environment. However, the 1987 Use Classes Order led to the Business Park, and Stockley Park became an office location with premium rents.

Over the past couple of decades there has been little innovation in shed design, beyond the specific case of the logistics market: the traditional 'shed' product is little changed. One reason for this lack of innovation is building economics – there is perceived to be limited scope to create a higher cost product. Another possible reason is the standard model of the UK institutional lease, which can be slow to respond to shifts in market demand. As a result, there are significant gaps between the nature and demands of the businesses and the property that is generally available to them.

To summarise, hybrid office/industrial activity in multi-use buildings is a very significant but poorly recognised sector of the commercial property market. This activity is often to be found away from the central area, where prices are lower and property less densely provided. These 'servicing the services' activities are generally 'low key', but are vital to the efficient functioning of the city and to supporting its global role.

The bulk of companies occupying hybrid office/industrial space are SMEs, often owner managed. These companies are part of a dynamic sector of the economy, and are the focus of government initiatives to pump prime economic growth. More specifically, given the tight market conditions for office property in large parts of Outer London, providing appropriate physical infrastructure for this integral part of the economy could become more important.

6.4 Future demand for land

Our method for forecasting future land demand from these industrial sectors is to[33]:

- Forecast change in employment in industrial sectors
- Calculate change in floorspace through application of employment density ratios
- Calculate demand for land through application of plot ratios

Industrial Employment Projections

Our estimates of change in industrial employment are based on the GLA Economics employment projections for London at sector level published in June 2016.[34] These projections of employment are at the level of sixteen broad sectors, but these sectors do not directly correspond to industrial activity. We therefore define industrial employment sectors at the finest grained 5-digit SIC level. The definition is contained in Appendix 2. A further sensitivity test has been carried out on the evolving nature of demand for 'industrial' premises, and businesses 'servicing the services'. These are not included here as the sectoral breakdown is hard to define, however they are discussed further in section 13.4. Applying this definition, we have calculated the proportion of industrial employment in each of the GLA's sixteen sectors at the 2014 baseline date using BRES data and hold this proportion constant over the forecast period.

For London as a whole, there is a forecast loss of -36,000 industrial jobs over the period 2016-41. This is made up of a loss of around 50,000 manufacturing jobs partially offset by some growth related to construction activities.

[33] This is a standard approach used in Employment Land Reviews and Employment Developments Needs Assessment

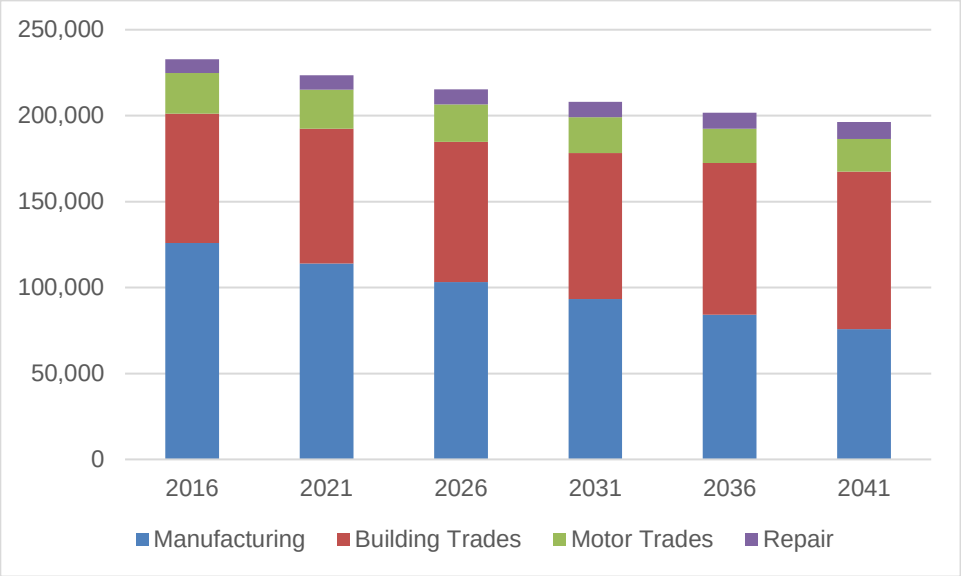
[34] London Labour Market Projections 2016 – GLA Economics

Table 6.2 Industrial Employment Projections London by Broad Sector 2016-41

Sector	Employment Change 2016-41
Manufacturing	-50,200
Building Trades	16,500
Motor Trades	-4,600
Repair	1,600

Source: GLA Economics/CAG

Figure 6.13 Industrial Employment Change by Broad Sector 2016-41



Source: GLA Economics/CAG

The GLA do not produce sector forecasts at borough level. We generate borough sector forecasts by initially assuming that each sector grows at the same rate as the London sector forecasts. The London sector growth rates are applied to the 2014[35] borough sector data (for the 16 sectors at which GLA Economics produce their London forecasts). The input data for this is BRES 2014 employment data which are grossed up to the GLA 2014 borough employment totals to account for the self-employed.

These initial borough-level sector forecasts are calibrated to ensure consistency with both the GLA's London sector-level forecasts and with the GLA's borough-level forecasts, through a process of reiterations to these dual constraints. Industrial employment at the Borough level is calculated by applying the same process.

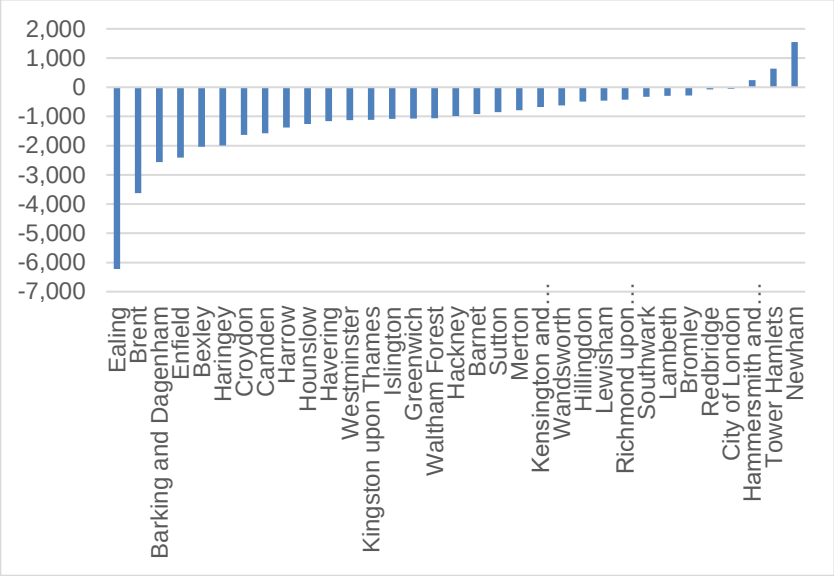
The forecast by Borough are shown in Figure 6.14 below. These projections show a small increase for Newham, Tower Hamlets and Hammersmith and Fulham but losses for all other Boroughs. The Boroughs that are projected to have growth in industrial employment are all Boroughs that are projected to have a high growth in total jobs in all sectors. The largest losses are to be found in Ealing, Brent,

[35] 2015 BRES data is the latest available, but 2014 is used as it is consistent with the base data for the GLA Economics projections

Barking and Dagenham, Enfield and Bexley. These are all Boroughs with a comparatively high share of industrial employment and hence a larger number of jobs to lose in absolute terms.

Whilst the projections are based on existing employment structure there may be some spatial adjustment within property market areas. For example, some of the projected industrial employment growth in Newham may occur in neighbouring Barking & Dagenham mitigating the projected loss in that borough.

Figure 6.14 Projected Change in Industrial Jobs 2016-41



Source: CAG

Floorspace Projections

For the four segment of industrial employment we apply the following employment density ratios:

- Manufacturing – 36 sq m per worker
- Building Trades – 50 sq m per worker
- Motor Trades – 50 sq m per worker
- Repairs – 36 sq m per worker

This generates a forecast reduction in demand for industrial floorspace for London as a whole of 1.15m sq m over the period 2016-41. The projections by Borough are set out in the Table 6.3 below.

These employment-based projections are compared with trend-based projections which have been derived from the average annual change in floorspace stock over the period 2008-15. At the London level this trend-based projection produces a forecast reduction in demand for industrial floorspace of 1.05m sq m for the period 2016-41 and hence is quite close to the employment-based method. Indeed the correspondence between the two estimates is quite strong across the Boroughs as whole with a correlation coefficient of 0.91.

But there are some significant differences in the two estimates at Borough level. The employment-based projections show positive growth for Hammersmith & Fulham, Hillingdon and Tower Hamlets. But recent trends would suggest large losses for these boroughs.

Conversely the employment-based method shows losses for Havering, Kingston and Sutton. Yet the trend-based method shows positive growth. Also for boroughs such as Barking & Dagenham and Ealing, the employment-based projections show much greater loss than the trend-based method.

Table 6.3 Projected Change in Industrial Floorspace by Borough 2016-41

	Employment Projection Method	Trend Based
Barking and Dagenham	-91,600	-5,700
Barnet	-27,300	-1,400
Bexley	-71,400	-124,500
Brent	-129,100	-151,500
Bromley	800	17,200
Camden	-52,800	-8,300
City of London	4,600	0
Croydon	-61,700	-123,600
Ealing	-221,300	-23,200
Enfield	-84,700	110,400
Greenwich	-36,700	-37,900
Hackney	-31,300	-63,300
Hammersmith and Fulham	18,300	-124,600
Haringey	-69,600	-27,700
Harrow	-51,000	-14,800
Havering	-37,600	1,100
Hillingdon	1,700	-163,300
Hounslow	-43,900	-32,400
Islington	-35,000	-11,800
Kensington and Chelsea	-23,900	0
Kingston upon Thames	-41,300	27,200
Lambeth	-7,800	-8,600
Lewisham	-15,300	-29,100
Merton	-21,700	-116,300
Newham	81,300	86,300
Redbridge	5,500	-3,400
Richmond upon Thames	-10,700	-9,500
Southwark	-5,100	-36,400
Sutton	-31,100	98,700
Tower Hamlets	40,000	-145,800
Waltham Forest	-33,400	-88,900
Wandsworth	-19,700	-1,700
Westminster	-30,700	-35,400
London	**-1,151,400**	**-1,048,100**

Source: CAG

Industrial Land Demand

Projections of floorspace by Borough are converted into demand for land by application of plot ratios. Work for the GLA on Industrial Land Use found a plot ratio of 65% of industrial uses and 95% for non-industrial uses giving an overall average of 69%. Analysis undertaken for LESD(2016)[36] found similar plot ratio for industrial uses and suggested there had been some intensification of land use in Outer London compared with LESD(2012).

[36] London Employment Sites Database (2016) – CAG Consultants

Following the assumptions set out in LESD(2016) we have used a plot ratio of 9,000 sq m per ha for CAZ (here applied to City and Westminster) and 6,500 sq m per has for all other boroughs. The resulting forecasts for land demand are summarised in the Table below with Borough grouped by Property Market Area. The Table also shows the average of the employment-based and trend-based

Table 6.4 Forecast Land Demand for General and Light Industry by Borough 2016-41 (Ha)

Sub Region	Property Market Area	Borough	Employment -Based	Trend-Based	Average
Central	Central Services	Camden	-8.1	-1.3	-4.7
Central	Central Services	City of London	0.5	0.0	0.3
East	Central Services	Hackney	-4.8	-9.7	-7.3
Central	Central Services	Islington	-5.4	-1.8	-3.6
Central	Central Services	Kensington and Chelsea	-3.7	0.0	-1.8
Central	Central Services	Lambeth	-1.2	-1.3	-1.3
East	Central Services	Lewisham	-2.4	-4.5	-3.4
Central	Central Services	Southwark	-0.8	-5.6	-3.2
East	Central Services	Tower Hamlets	6.1	-22.4	-8.1
Central	Central Services	Westminster	-3.4	-3.9	-3.7
North	Lea Valley	Enfield	-13.0	17.0	2.0
North	Lea Valley	Haringey	-10.7	-4.3	-7.5
East	Lea Valley	Waltham Forest	-5.1	-13.7	-9.4
North	Park Royal/Heathrow	Barnet	-4.2	-0.2	-2.2
West	Park Royal/Heathrow	Brent	-19.9	-23.3	-21.6
West	Park Royal/Heathrow	Ealing	-34.1	-3.6	-18.8
West	Park Royal/Heathrow	Hammersmith and Fulham	2.8	-19.2	-8.2
West	Park Royal/Heathrow	Harrow	-7.8	-2.3	-5.1
West	Park Royal/Heathrow	Hillingdon	0.3	-25.1	-12.4
West	Park Royal/Heathrow	Hounslow	-6.7	-5.0	-5.9
South	Park Royal/Heathrow	Richmond upon Thames	-1.6	-1.5	-1.6
East	Thames Gateway	Barking and Dagenham	-14.1	-0.9	-7.5
East	Thames Gateway	Bexley	-11.0	-19.2	-15.1
South	Thames Gateway	Bromley	0.1	2.6	1.4
East	Thames Gateway	Greenwich	-5.7	-5.8	-5.7
East	Thames Gateway	Havering	-5.8	0.2	-2.8
East	Thames Gateway	Newham	12.5	13.3	12.9
East	Thames Gateway	Redbridge	0.8	-0.5	0.2
South	Wandle Valley	Croydon	-9.5	-19.0	-14.3
South	Wandle Valley	Kingston upon Thames	-6.4	4.2	-1.1
South	Wandle Valley	Merton	-3.3	-17.9	-10.6
South	Wandle Valley	Sutton	-4.8	15.2	5.2
South	Wandle Valley	Wandsworth	-3.0	-0.3	-1.6
		London	**-173.3**	**-159.7**	**-166.5**

Source: CAG

These totals are summarised by Property Market Area and Sub Region in the Table below. For London as a whole the employment-based projection shows a loss of -173.3 ha and the trend-based projection shows a loss of 159.7 ha, giving an average of 166.5 ha. Over a 25 year period this is an average loss of just -6.8 ha per annum. That is significantly below the comparable figure of -41 ha projected in the 2011 Industrial Land Demand and Release Benchmarks in London study. There are two principal reason for this. Firstly the steep downward trajectory in manufacturing and similar industrial activity in

London has now bottomed out. Secondly, as noted previously, loss of industrial land has been running at well above benchmark rates. (So if the previous projection were held constant then the fact that more land was lost in the period 2011-16 would imply there would be less to be released for the period 2016-36.)

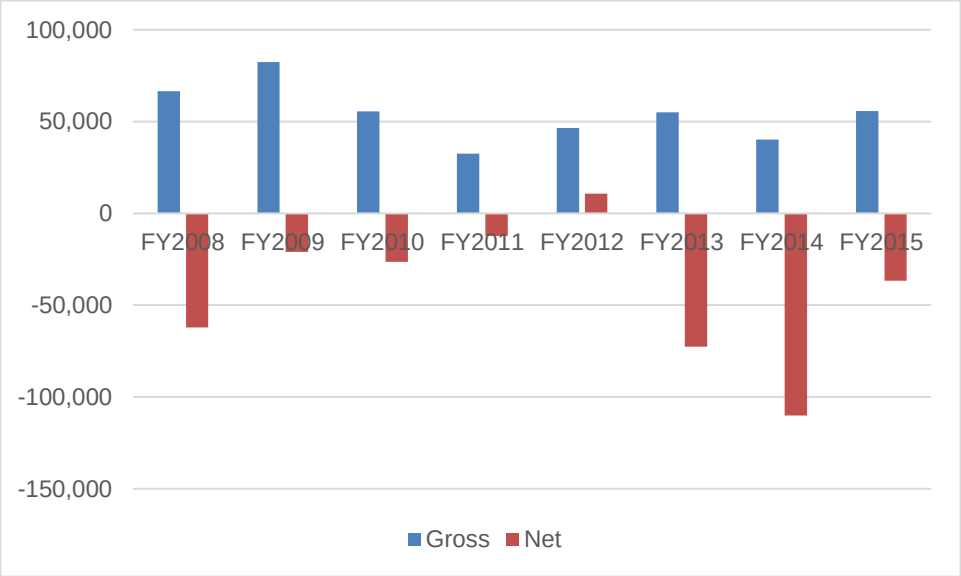
Table 6.5 Forecast Land Demand for General and Light Industry by Property Market Area and by Sub Region 2016-41 (Ha)

Property Market Area	Employment-Based	Trend-Based	Average
Thames Gateway	-23.0	-10.3	-16.7
Park Royal/Heathrow	-71.3	-80.1	-75.7
Central Services	-23.1	-50.6	-36.8
Wandle Valley	-27.0	-17.8	-22.4
Lea Valley	-28.9	-1.0	-14.9
London	**-173.3**	**-159.7**	**-166.5**
Annual Average	**-7.1**	**-6.5**	**-6.8**
Sub Region			
East	-29.3	-63.3	-46.3
North	-27.9	12.5	-7.7
West	-65.4	-78.4	-71.9
South	-28.5	-16.6	-22.6
Central	-22.1	-14.0	-18.0

Source: CAG

It is important to remember that overall net loss of industrial space does not mean that there won't still be demand for new premises. Analysis of LDD data shows that there has been a net loss of B2 floorspace in each of the last eight years, with one minor exception. But gross new development of B2 floorspace over this period has averaged just over 50,000 sq m per annum. There is still a need to replenish the existing stock to make it fit for modern purpose.

Figure 6.15 Gross and Net B2 Floorspace Completions



Source: LDD

Sensitivity Tests

Economic Growth Scenarios

GLA Economics have published a 'High' and 'Low' variant alongside their 'Central' employment forecast. Use of this High and Low variant enables us to generate a sensitivity test around that element of the forecast driven by employment projections.

Applying the High and Low Growth Scenarios gives a range of -104.6 ha and -247.9 ha on the employment based scenario compared to -173.3 ha on the Central Scenario

The High and Low Demand scenarios will also impact the demand for warehouse floorspace and land as this is deemed to be a function of GVA. So, we would expect demand for warehouse land to be greater under the High scenario.

Density Ratios

Further sensitivity tests can be generated by varying the employment density ratios and plot ratio assumptions to account for potential intensification. We examine this further in Chapter 14 where we test alternative scenarios.

Service Sectors on Industrial Land

We noted in Section 6.3 above the growth in service type activity occupying industrial land and premises. But these service sectors are not included in our projections of demand. Whilst acknowledging that these sectors occupy industrial land, in the base case we are not allocating industrial land to accommodate growth in their activity. For this category of sectors there is an overlap with the work being prepared for the London Office Policy Review.[37] The question is, in planning for employment land should Boroughs seek to provide for activities such as say, design, media or training in office accommodation or in industrial accommodation? For many firms the type of premises may matter less than their cost and location.

We have carried out sensitivity tests around the SIC sector definition. In this sensitivity test, we have created an intermediate definition of economic activity that could take place in either office or industrial premises. It is important that demand for this activity is catered for. They cannot be excluded from the office demand calculations because they are not office activities and excluded from the industrial demand calculations because they are not industrial activities. Planning for employment land and premises must take account of the needs of these businesses.

It is possible to consider three categories of economic activity in the form of a Venn diagram: those that clearly occupy office premises, those that clearly occupy industrial premises and an overlapping category that may be found in either. In terms of the SIC sectors this 'hybrid' category of occupiers can be drawn from those

- currently classified as office occupiers;
- currently classified as industrial occupiers, and
- not currently classified to either use as they cannot be clearly identified as predominantly office or industrial occupiers.

There is no perfect nor definitive definition of these sectors but drawing on work but the London Office Policy Review (LOPR) identified a number of sectors that are currently classified as being predominantly office sectors but which from observation and local surveys are frequently to be found in industrial type locations or buildings. The list is set out in Appendix 2.

[37] London Office Policy Review 2017 – Ramidus and CAG

Some, possibly most, employment in these sectors will be in offices, but there will be a significant number of jobs in non-office premises. Particularly in building services, catering, cleaning, courier services, hospitality services, maintenance, office supplies, printing, security. Location might be one clue: if it is in CAZ, or another major office centre, it is more likely to be in offices whilst outside it may be occupying other premises.

The effect of this sensitivity test was to reduce the forecast demand for office floorspace by 600,000 sq m over the period 2016-41. But if the demand for office floorspace is reduced because firms in these sectors are occupying industrial floorspace, then there would need to be a corresponding addition to forecasts for industrial floorspace as the jobs still need to be accommodated somewhere.

The table below summarises the forecast change in jobs in Hybrid' sectors following the definition in LOPR[38].

Table 6.6 Jobs in 'Hybrid' Sectors and Potential Demand for Industrial Floorspace and Land

	2016	2041	2016-41	Sq m	Land Ha
Thames Gateway	19,700	27,900	8,200	169,330	26.1
Park Royal/Heathrow	32,500	40,900	8,400	173,460	26.7
Central Services	2,400	3,600	1,200	24,780	3.8
Wandle Valley	15,300	20,100	4,800	99,120	15.2
Lea Valley	13,700	20,300	6,600	136,290	21.0
London	**83,600**	**112,800**	**29,200**	**602,980**	**92.8**

Source: CAG

6.5 Substitutability of Demand between London and the South East

Firm Migration

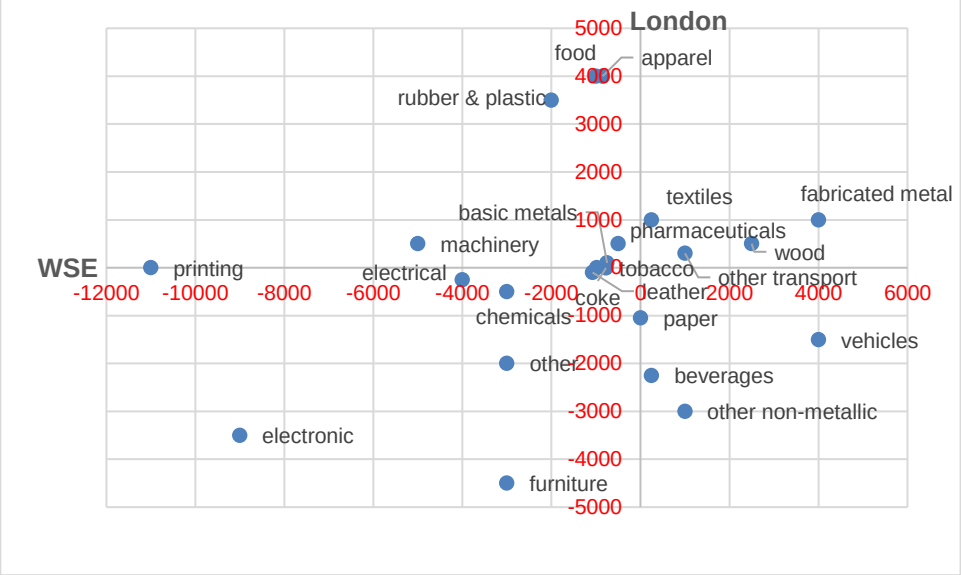
There are is no evidence of any strong recent trend for manufacturing activities to relocate out of London to the Wider South East. Research by TBR for the GLA has shown that over the period 2008-14 there was some in-migration of manufacturing firms to London averaging 1% of total stock or 274 firms per year. This was an increase on the period 1998-2007. In-migrating firms in the manufacturing sector accounted for an average of 4,200 jobs per annum over the period 2008-14.

Principal outward flow of firms from Outer London are to the Wider South East. Out-migration of manufacturing firms from London over the period 2008-14 averaged 1.6% of stock or 415 firms per year. This leaves a net outflow of 145 firms per annum

This is reinforced by looking at manufacturing employment for London and the South East by manufacturing sector. The graph shows employment change by manufacturing sector (illustrated by the blue circles) over the period 2009-15 for London (vertical axis) against WSE (horizontal axis). If there had been significant recent trends in relocation to the WSE we would expect to see an increase in employment in the WSE where there has been a reduction in employment in London. This is represented by the bottom right hand quadrant where there appear limited cases. The two most prominent observations are for the motor vehicles and other non-metallic mineral products manufacturing sub-sectors.

[38] The floorspace totals in this table and those in the LOPR report are not directly comparable due to adjustments for vacancy rates and different assumptions on employment densities.

Figure 6.16 Employment Change in Manufacturing sectors for London and the Wider South East 2009-15



Source: BRES

Given the nature of manufacturing activity that remains in London we would not necessarily expect a strong substitutability effect. What remains in London is there because:

- It is legacy manufacturing that would probably relocate to cheaper locations in the UK or even overseas if it moved[39].
- It has a time sensitive product that needs to be as close as possible to its London market place.
- It is dependent on the skills of its workforce that cannot be easily relocated or replaced.
- It wants a London brand.

There may be some potential to address the time-sensitive and skills issues through infrastructure investment, but we do not think there is a lot a scope for substitutability of this segment of London's industrial activity. Alternative locations for the more creative end of manufacturing activity are more likely to be other cities, whether UK or overseas.

The limited scope for substitution of general industrial activity will not have major implications in terms of releasing land for alternative uses. According to the GLA Economics Evidence Base only 1% of London's land is occupied by general industrial sites[40].

6.6 Conclusions

After a long period of decline the loss of manufacturing employment in London has levelled off. Long run projections from GLA Economics suggest that manufacturing employment will continue to decline but the rate of decline is much diminished. As a result the amount of land that will become available

[39] There are examples of this legacy type of manufacturing (e.g. Tate & Lyle in the Royals) which have made substantial recent investments in their plant - which means in viability terms they have no immediate plans to relocate to cheaper locations in the UK

[40] Economic Evidence Base for London 2016 (p.139) – GLA Economics

through decline in manufacturing activity is also much diminished. Our central projection is for reduction in demand for industrial land of 166.5 ha over the period 2016-41, an average of 6.8 ha per annum.

The manufacturing activity that remains in London is largely here because it needs to close to its customer markets. Hence it entails time sensitive products such as food. The type of manufacturing activity that suffered from structural decline in the past has largely gone from London.

There is limited scope for substitutability of demand for these types of production activities to elsewhere in the wider south east.

There will also be positive demand for industrial land as a result of growth in construction and other service activities. This will further mitigate some of the projected loss as a result of continued decline in manufacturing activity.

7 Warehousing and Logistics

7.1 Introduction

This chapter analyses the demand for employment land arising from warehousing and logistics activity. It first describes the size and significance of the logistics sector within London and then looks at activity in the Wider South East.

Forecasts of future demand for warehouse floorspace have previously been calculated by assessing the relationship between growth in the volume economic activity as represented by GVA and growth in the volume of warehouse floorspace. We re-examine the relationship between these two variables using the most recent data available for London.

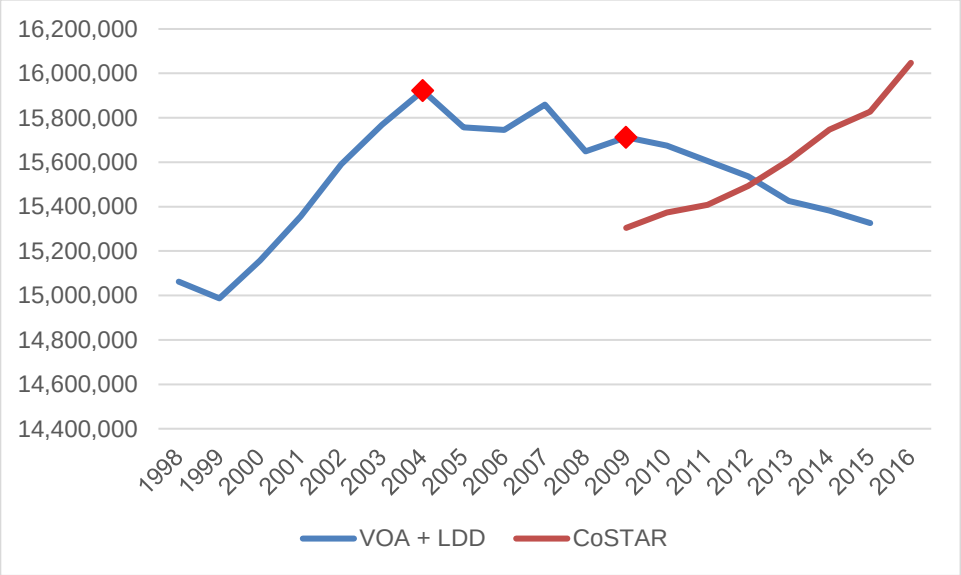
7.2 The size and significance of London's logistics sector

VOA data on warehouse floorspace stock is only available for the period 1998-2008[41]. For the period post 2008 we have used net change in B8 floorspace according to LDD data.

This data shows that after rising sharply during the first half of the last decade the stock of warehouse floorspace in London has been declining steadily during the current decade.

An alternative estimate of warehouse floorspace stock is provided by Co-Star. This provides an opposite picture of the pattern of growth in London, with floorspace growing at an average of 0.7% p.a. over the period 2009-16. We suspect the Co-Star data may not be picking up some of the losses to stock. The true picture may lie somewhere between the two estimates with the stock of warehouse floorspace relatively flat in recent years.

Figure 7.1 Warehouse Floorspace Stock London 1998-2015

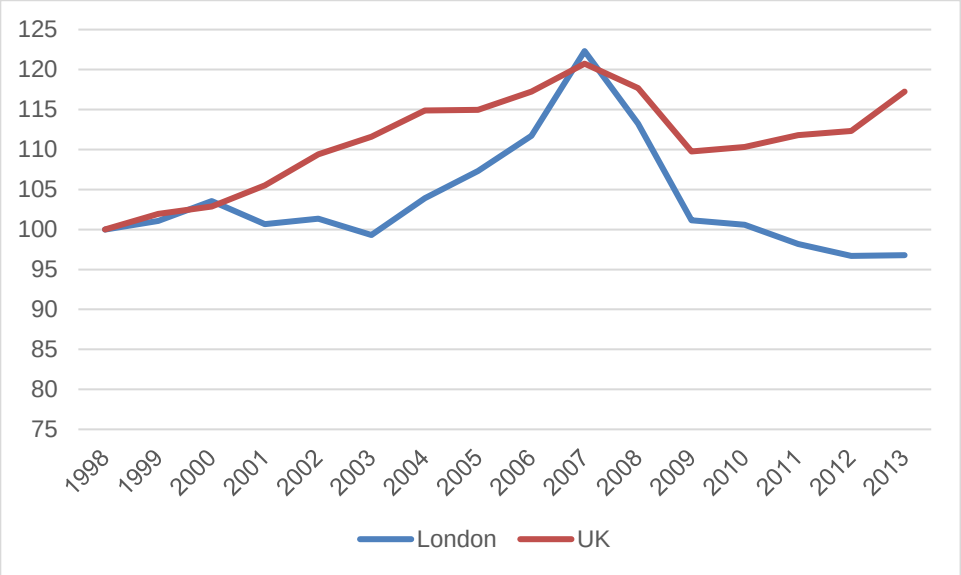


Source: VOA Floorspace Statistics, LDD, ♦(denotes data discontinuities), Co-Star

[41] VOA commercial floorspace statistics published in 2012 and 2016 did not disaggregate industrial floorspace between warehouse and factory premises.

Yet over this period London's economy has continued to grow rapidly. Both employment and population have increased. London has a growing demand for goods that needs servicing. The trend in floorspace data would seem to be confirmed through analysis of GVA data for London. Whilst GVA for the logistics sector is not published in its own right, combining the 'Wholesale, Retail and vehicle repair sector' with the 'Transportation and Storage sector' gives a broad approximation and seems consistent in showing a decline from a peak in 2007. Whilst the sector has recovered nationally post-recession the same has not occurred in London.

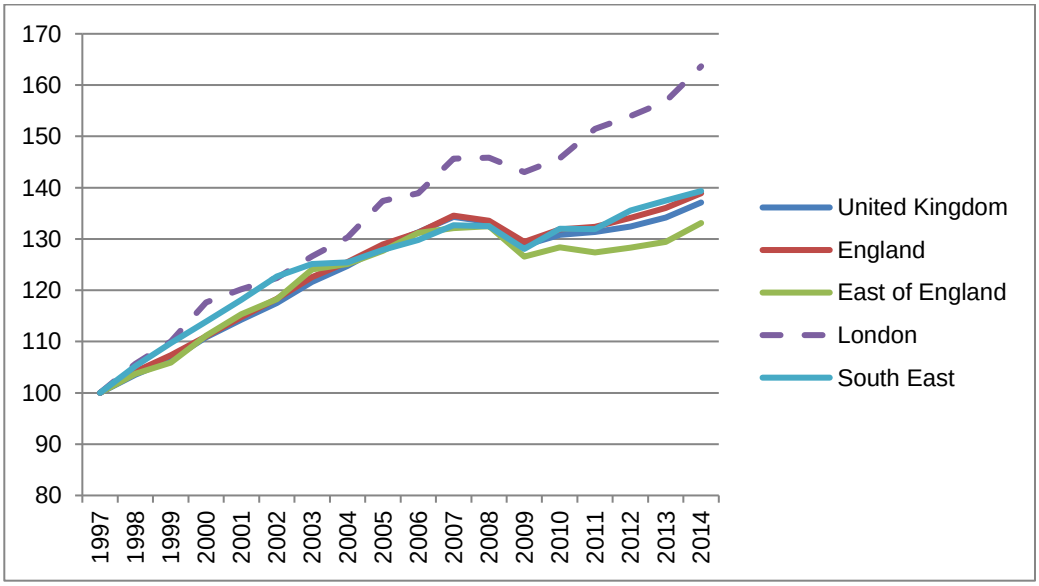
Figure 7.2 GVA in the Wholesale, Retail and Transportation and Storage Sectors (Index 1998=100)



Source: ONS

GVA as a whole for London has recovered strongly post-recession with growth in London strongly outperforming both the national average and that of the Wider South East. Given the assumption that growth in warehouse floorspace is a function of growth in GVA, then this implies that an increasing proportion of London's demand for goods is being provided from outside of the capital.

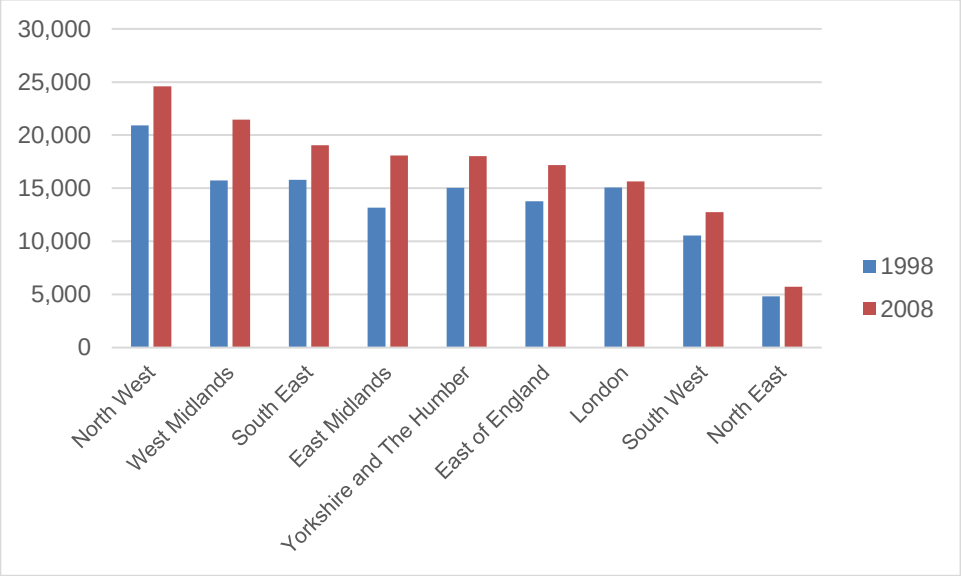
Figure 7.3 GVA 1997-2014 Index 1997=100



Source: ONS

The nature of warehouses is also very different in London. Whilst nationally there has been a trend to ever increasing size of warehouse units, especially in the Midlands which is the home of the National Distribution Centres, average size of units in London have not increased reflecting their more local distribution networks, and constrained site areas.

Figure 7.4 Average Size of Warehouse Units by Region 1998 and 2008



Source: VOA

At the national level there is a relationship between warehouse floorspace and GDP as floorspace is a function of the demand for goods. Although as McKinnon points out the relationship between GDP and warehouse floorspace is more complex and, *"It can be split into two key ratios, GDP to inventory and inventory to warehouse floorspace, which can vary independently."*[42] The scale and nature of growth determines the demand for inventory, logistics practices determine how much and for how long this inventory needs to be physically stored. And logistics activities also determine where the inventory needs to be stored.

The relationship between GVA and warehouse floorspace does not hold at the spatial level of London because London's demand does not need to be met from inside its borders. The 2011 Industrial Land Benchmarks study noted a growing proportion of London demand and being met from outside and projected a continuation of this trend.

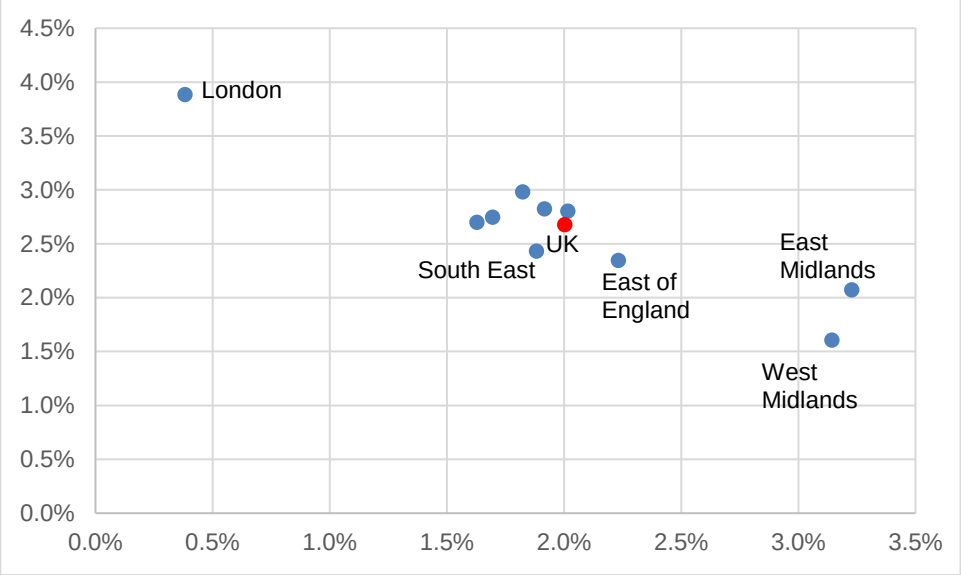
Logistics as a locationally driven sector becomes clear when we illustrate the relationship between GVA and warehouse floorspace at the regional level. The figure below plots the change in GVA on the vertical axis against change in warehouse floorspace on the horizontal axis. Over the period 1998-2008 GVA nationally grew by an average of 2.7% p.a. and warehouse floorspace grew at an average of 2.0% p.a. For most regions of the UK the relationship is clustered close to the national average. For the East Midlands and West Midlands, the growth in warehouse floorspace significantly outstripped growth in regional GVA due to the role this area plays in accommodating National Distribution Centres and large scale Regional Distribution Centres.

For London GVA grew at an average of 3.7% p.a. well above the 0.4% p.a. growth in warehouse floorspace. The explanation may be found partly in the fact that economic activity in London is less goods hungry and does not create such a strong demand for floorspace but it is also to be found in the

[42] Logistics and Land: The Changing Land Use Requirements of Logistical Activity– Alan McKinnon 2009

fact that much of the demand London does create for warehouse floorspace is physically provided outside its borders.

Figure 7.5 Average Annual Change in GVA (vertical axis) and Warehouse Floorspace (horizontal axis) by Region 1998-2008[43]

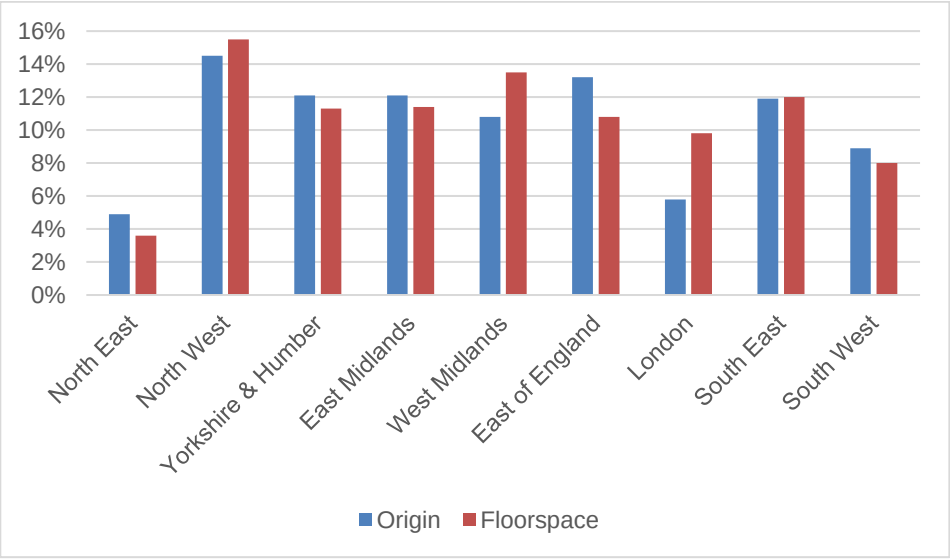


Source: VOA, ONS

In the period 2008-15 London's GVA has continued to grow at an average of 2.0% p.a. but its warehouse floorspace has declined by an average of -0.3% p.a.

One proxy measure for warehouse floorspace is origin of goods lifted. As can be seen from the chart the share of 'goods lifted' and share of warehouse floorspace is broadly similar across each region. As often the situation is different for London. The goods lifted statistics are for HGVs and in London a high proportion of deliveries are by LGVs.

Figure 7.6 Percentage of UK total of Goods Lifted and Warehouse Floorspace by Region (2008)

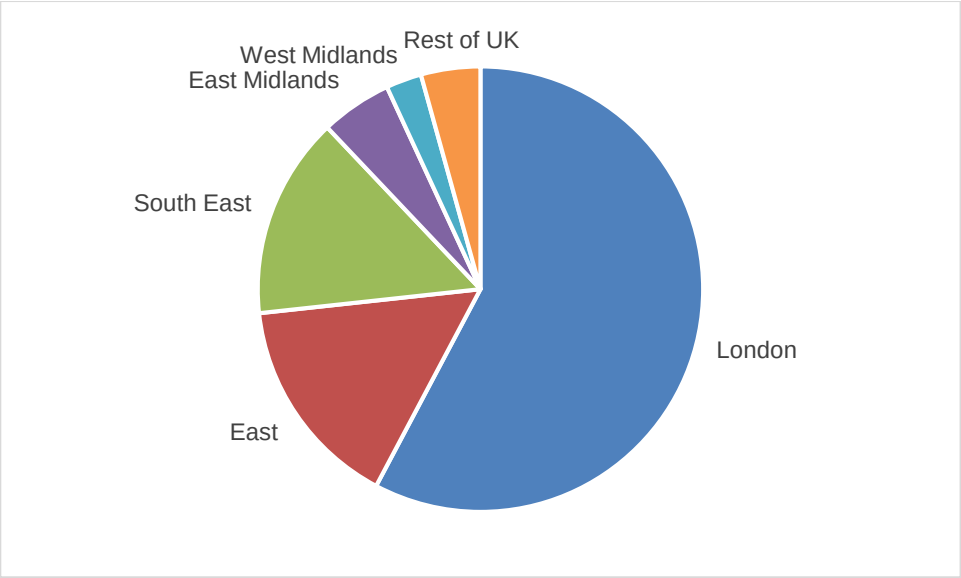


Source: Dft, VOA

[43] This time period has been selected because it is the most recent for which data of warehouse floorspace stock is available from VOA statistics

In 2015 57% of the total volume of HGV goods lifted with a destination in London, originated in London. 15.5% of London's goods came from the East of England and 14.5% came for the South East.

Figure 7.7 Origin of HGV Goods Lifted with London Destination



Source: DfT

Or looked at from the other end, around 10% of goods lifted in both the South East and East of England regions had a London destination.

Further evidence that the relationship between GVA and warehouse floorspace in London may not be strong is provided in the TfL Freight Data report which notes that,

Growth in London's Gross Value Added (GVA) has outstripped growth in LGV and HGV traffic over the last fifteen years (with GVA increasing by 68 per cent between 1997 and 2012, LGV traffic increasing by 11 per cent and HGV traffic falling by 1 per cent). This suggests that London's economy has become less road freight intensive over this period.[44]

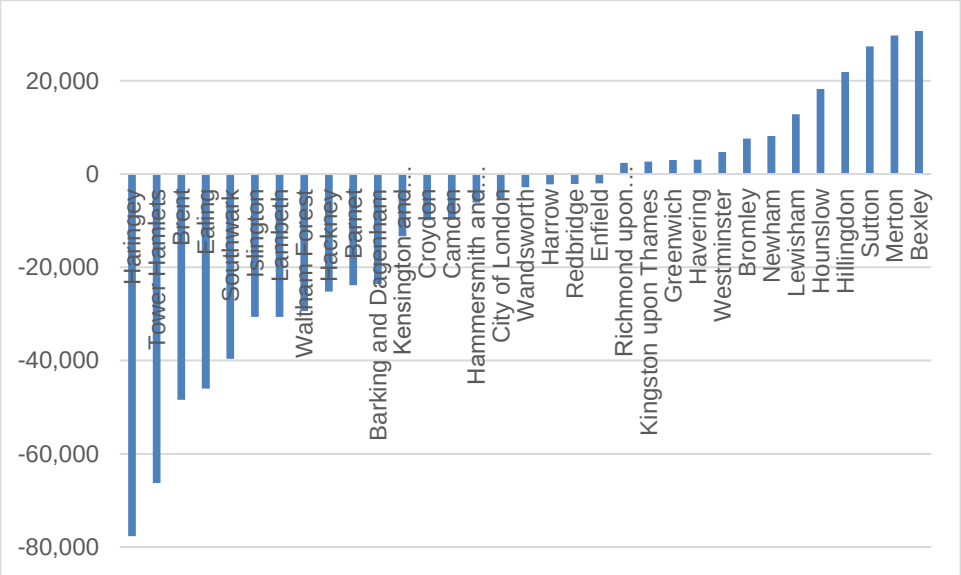
In the DfT's 2015 Road Traffic Forecasts the central scenario shows HGV traffic growth for London averaging 0.7% p.a. over the period 2015-40. These forecasts represent increase in demand for goods and are derived from economic growth assumptions. As such they represent a reasonable proxy of growth in demand for goods and hence warehouse floorspace generated by the London economy. At present, just under 60% of London's total of HGV goods lifted originate from within London. If that percentage were held constant, then this would imply increased demand for warehouse floorspace in London growing at 0.4% p.a. This is the rate at which warehouse floorspace in London grew over the period 1998-2008.

7.3 Spatial Trends in London

As noted above since 2008 there has been a small but gradual decline in the overall quantum of warehouse floorspace in London. But this is not universal across the city. Warehouse floorspace has continued to grow especially in certain outer London boroughs such as Bexley, Merton, Sutton, Hillingdon and Hounslow as illustrated in the Figure below.

[44] London Freight Data Report (2014) - TfL

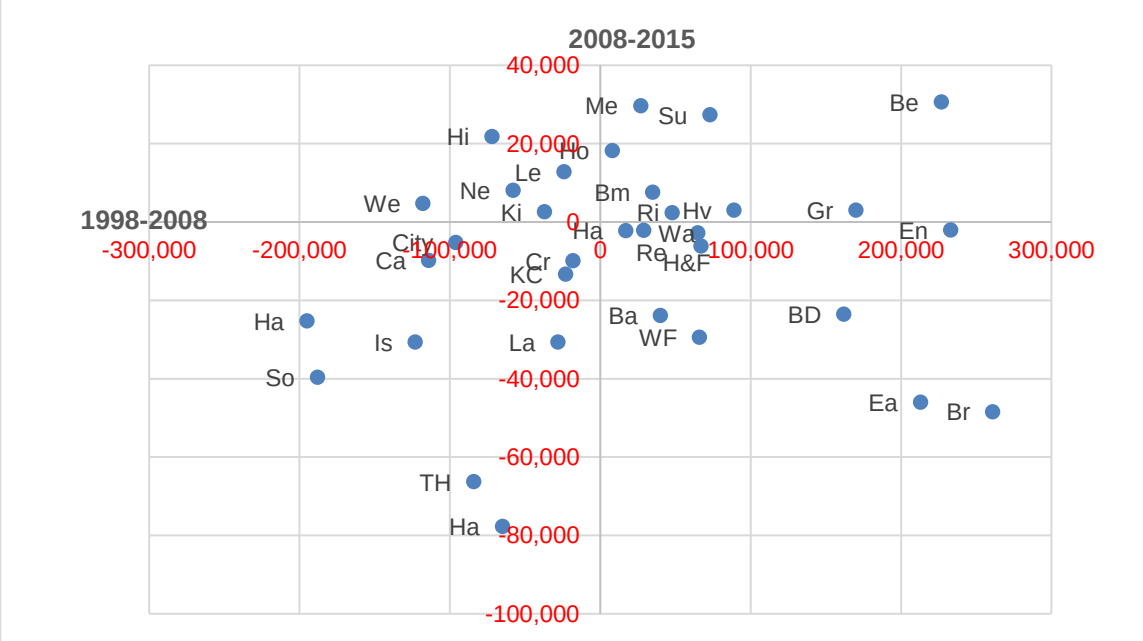
Figure 7.8 Change in Warehouse Floorspace Stock 2008-15



Source: CAG, VOA, LDD

The next chart compares this later period of decline with the previous period when warehouse floorspace was growing across London as a whole. This enables us to categorise Boroughs according to how they changed over these two time periods,

Figure 7.9 Change in Warehouse Floorspace Stock by Borough 1998-2008 (horizontal axis),2008-2015 (vertical axis)



Source: VOA 2008, LDD

The Boroughs that experienced a growth in stock over both periods are predominantly south of the river and in outer London, though Havering and Hounslow complete a u-shaped ring to the north of the river.

The Boroughs that saw a decline in stock over both periods are principally the Central London Boroughs but also includes Croydon

The Boroughs that saw growth in stock followed by contraction are primarily outer London Boroughs to the north.

There is probably nothing too significant in the pattern of Boroughs that experienced decline followed by growth and the scale of change in these Boroughs is relatively small.

These broad conclusions seem to fit with our earlier observations that industrial activity of all forms is being squeezed out of Inner London. Whilst London's logistics needs are increasingly being serviced from outside London, the potential for this is greater to the north than it is to the south. The south is both physically more constrained, has relatively high residential values and has a more limited population catchment from which to operate a Regional Distribution Centre.

Table 7.1 The Rise and Fall of Warehouse Floorspace

Decline 98-08, Growth 08-15	**Growth 98-08, 08-15**
Hillingdon	Bexley
Lewisham	Merton
Newham	Sutton
Westminster	Hounslow
Kingston upon Thames	Bromley
	Havering
	Greenwich
	Richmond upon Thames
Decline 98-08, 08-15	**Growth 98-08, Decline 08-15**
City of London	Enfield
Camden	Redbridge
Croydon	Harrow
Kensington and Chelsea	Wandsworth
Hackney	Hammersmith and Fulham
Lambeth	Barking and Dagenham
Islington	Barnet
Southwark	Waltham Forest
Tower Hamlets	Ealing
Haringey	Brent

Source: VOA, LDD

7.4 Drivers of demand for warehouses and their spatial distribution

Location is vital to successful distribution warehouses as it is sensitive to the source and destination of goods, i.e. access to markets. Accessibility is the most important consideration when choosing a location primarily in terms of:

- Being close to motorway junctions
- Proximity to a large labour pool.
- Responding to the needs of a demanding and sophisticated client base

- Providing users with reliability and flexibility with their product.

Distribution Centres

Internal research by TfL has demonstrated the spatial characteristics and locational preference for Distribution Centres (DCs) in London. This research noted that,

"92 DC's are located within the M25 area concentrated around Dagenham, Barking, Edmonton, Enfield and Heathrow. Within the M25 area, DC's are clustered around major road links such as the M1, M25 and M2. Although, most sites in the east are located close to both rail and water infrastructure. There is also a cluster of six DC's in the Croydon area. This is the only cluster in the south London area shown in the available data."

It further goes on to say that

"Analysis by London Borough shows:

- *Barking and Dagenham has 10 DC's all centred on the A13, this is the greatest number of DC's in any single Borough.*
- *Enfield has the second highest number in a single Borough with nine – mainly due to the proximity of the M25 and North Circular Road*
- *Hillingdon and Hounslow have a cluster of DC's, numbering 12, centred around Heathrow*
- *14 DC's are located within easy reach of the Thames"*

In terms of the type of operator of these Distribution Centres

"The predominant types of DC within the M25 area are:

- *General logistics: 32%*
- *Mail logistics: 27%*
- *Food and drink: 18%*

Mail and general logistics, which includes business like DHL, are fairly evenly spread across the capital, whereas food and drink DC's have a cluster in south east London from Dartford to Greenwich and around the M25 in Enfield.

All Food and drink DC's are within easy reach of the Thames in south east London. Historically, land may have been cheaper in these areas, but an opportunity exists to harness this waterway as a route into central London for this sector.

Courier DC's tend to cluster in inner London areas in or around the SRN/ TLRN network close to the City.

Only seven construction consolidation centres are shown, which is an indication that these are under-represented. However, these show a cluster in the east London area in Dagenham, and two are connected by rail/ water interchange – the Tar Mac site in Greenwich and Kings Cross"

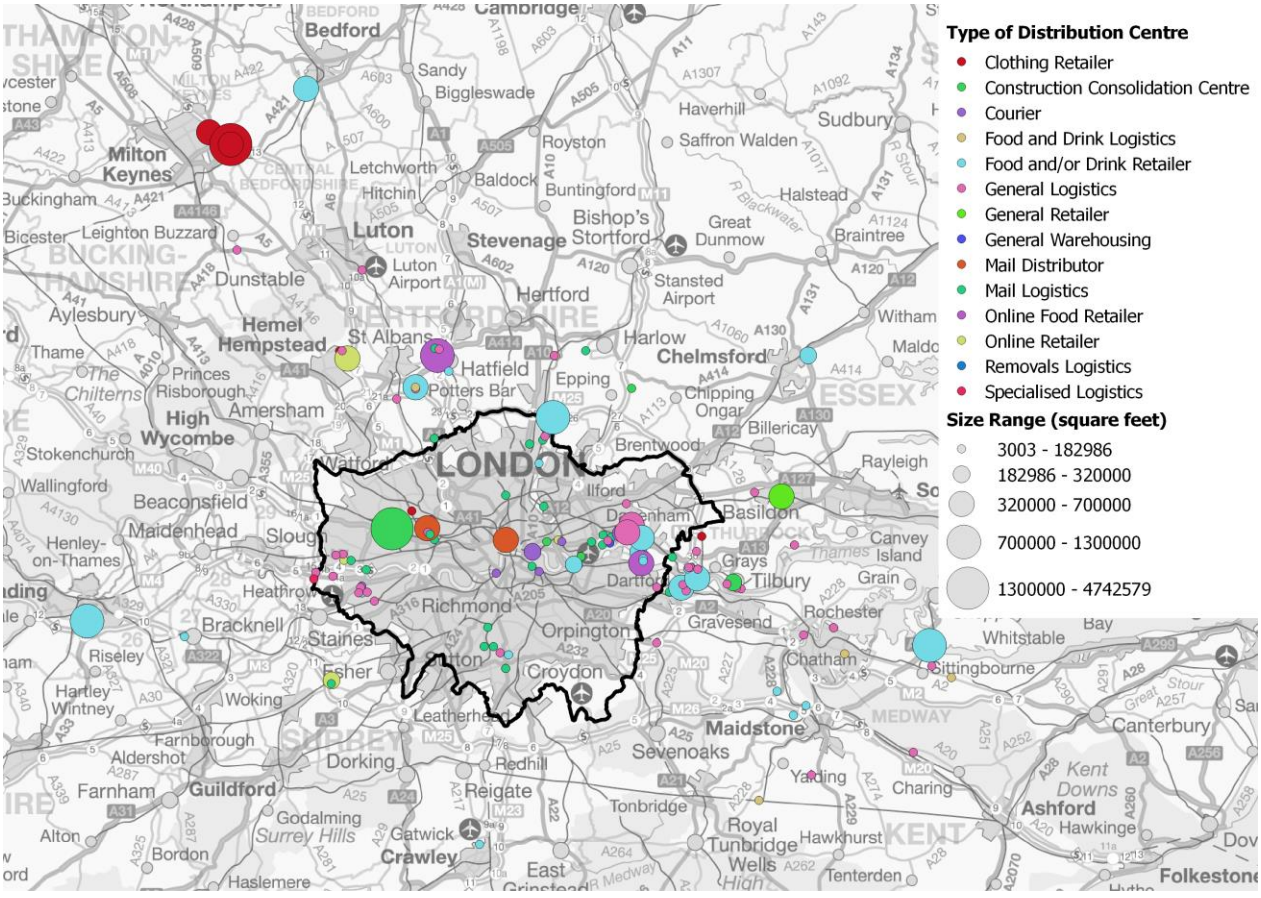
In terms of size profile the larger Distribution Centres are to be found in East London.

"For those sites where data is available, the largest RDC/ DC's are located in outer London by the M25, or in east London. However, data for this section suggests:

- *Largest DC's, (500, 0000 sqft and above) make up only 5.5% of the total and are mostly located in the east of London.*
- *Second largest DC's (300,000 – 500,000 sqft) make up 5.5% of the total and cluster in east London and Wembley/ Park Royal areas.*
- *The largest number of DC's (79%) are 150,000 sqft or smaller and spread across London. This reflects a general trend in London for small DC's which cluster around central points such as Enfield, Heathrow and Wallington.*
- *Central London has only one DC that appears in this data, Royal Mail's Mount Pleasant site – which is over 500,000 sq ft. Inner east and south east London has a cluster of DC's, possibly due to easy location of the Blackwall and Rotherhithe tunnels.*
- *Larger DC's within London are located in the Park Royal area".*

Map 7.1 shows the location of Distribution Centres in London and the South East by broad type of activity and scale of warehouse floorspace.

Map 7.1 Distribution Centres in London and the South East



Source: TfL

Warehousing and Logistics Activity in the South East

The TfL report on Distribution Centres noted above also analysed Distribution Centres outside of London to try and asses which may be serving London. It noted that,

"There are 125 DC's in this category. The largest number cluster in the south east area in Kent and Essex close to, or by, the Dartford crossing M2 and M20 for easy access to London and the Channel

ports. A cluster of DC's exists around the north and south sections of the Dartford crossing which would indicate both cheaper land and good road links"

In terms of activity:

"The majority of the DC/RDC's outside of London are classed as:

- *47% general logistics*
- *12% mail logistics*
- *11% food and drink*

General logistics DC's cluster around the Dartford Crossing and M1/ A1 area, reflecting good road links to wider Great Britain.

Food and drink DC's are represented at north, south east and west points around the M25, with a small group on the M20 corridor with easy access to the Channel ports, south and east London. Mail logistics sites are fairly evenly spread across the south east

Removals and construction consolidation centres are significantly under-represented in this data and if better quality were available this would impact on any analysis.

It also noted that:

"DC's outside of the M25 area reflect the trend seen within London. Of those for which data was available:

- *87% were 150,000 sq ft or under*
- *4.8% were over 500,000 sq ft.*

By percentage, larger DC's (over 500,000 sq ft) were comparable to London, which may reflect high land costs in the south east in general or a move to smaller DC/RDC's in this part of Britain."

7.5 Future demand for land

Forecasting demand for land for logistics and warehousing for London is different to other forms of employment land as the functional economic market area is different. London's demand for warehousing land does not need to be physically accommodated within London. But that makes the demand forecast to a large extent dependent on the amount of land available for warehousing and hence somewhat circular as a demand forecast to inform a supply allocation.

The most recent evidence suggests that warehouse floorspace has been decline at an average of -0.3% p.a. over the period 2008-15. But this is a relatively short run time series and may represent a cyclical response following the recession or a response to lack of available supply and there is conflicting evidence that is has been growing.

We think that it is reasonable to assume that recent trend in warehouse floorspace stock in London have been broadly flat with demand constrained by available supply due to industrial land releases running at well above the benchmark levels.

In order to generate a forecast that is not supply-constrained we have reverted to the trend growth rate of the earlier 1998-2008. As noted in the 2011 Industrial Land Demand study this still represents a period during which a growing proportion of London's demand for warehouse floorspace was met from

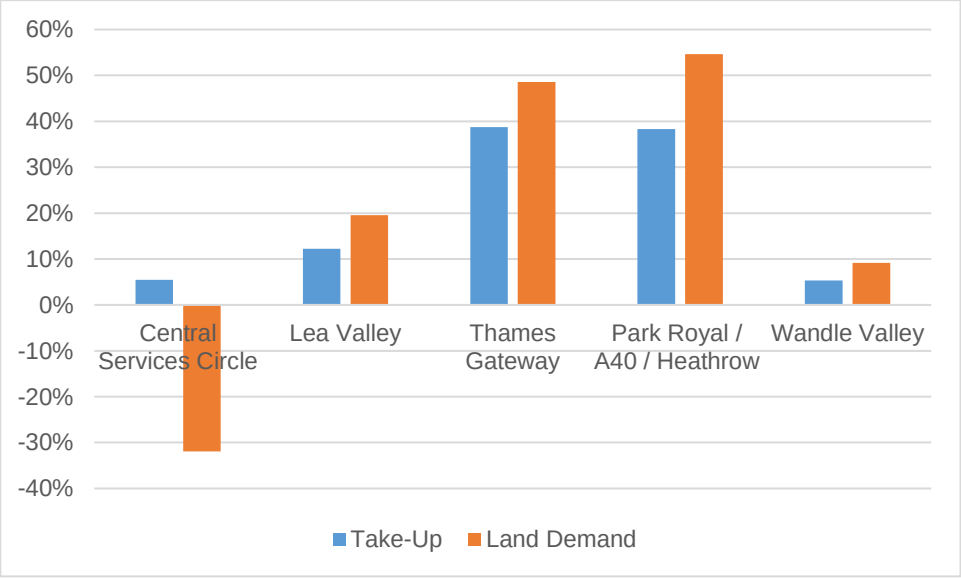
outside its borders. Over this period London's stock of warehouse floorspace increased at an annual average of 58,700 sq m, or at a rate of 0.4% p.a.

We have applied the annual change in floorspace per Borough for the period 1998-2008 to the future growth period 2016-41. Boroughs in the Central Services PMA have however, been treated differently. Over the period 1998-2008 these Boroughs experienced a loss in warehouse floorspace averaging -3.0% p.a., a rate that would not be sustainable for the forecast period. Following this shake out the rate of decline slowed in the Central Services Boroughs and for these Boroughs we have applied the annual average change in floorspace for the period 2008-15. To maintain the growth rate of 0.4% p.a. for London as a whole we have then recalibrated the growth rates of the non-Central Services Boroughs in proportion to their share of projected growth.

To convert from floorspace to land we have applied a plot ratio of 9,000 sq m per ha for Central Services boroughs and 6,500 sq m per ha for all other boroughs. Whilst high by traditional standards for B8 development these are the plot ratios used in the London Employment Sites Database based on analysis of data from the London Development Database. We also believe that developers will be incentivised to develop at high density given the pressures on industrial land in London. We set out a sensitivity test below looking at the impact if these higher plot ratios are not achieved.

To test the spatial distribution of demand for warehouse land we have compared this with past take-up of industrial floorspace over the period 2009-16. Whilst take-up of industrial floorspace cannot be directly equated with demand for warehouse land it does provide a reasonable indication of the spatial demand for industrial premises. This shows the forecasts broadly following the spatial pattern of demand evident from past take-up.

Figure 7.10 Comparison of Projected Share of Warehouse Land Demand and past Industrial Take-up by Property Market Area



Source: Colliers/CAG

Borough Level Projections of Warehouse Demand

Projections of floorspace demand at Borough level are set out in Table 7.2 below. As with other projections of this type the Borough level figures should be seen as only indicative as demand can readily transfer between Boroughs in the same property market area depending on the availability of premises.

Table 7.2 Projected Change in Demand for Warehouse Floorspace and Land 2016-41

Sub Region	Property Market Area	Borough	Floorspace	Land Ha
Central	Central Services	Camden	-34,900	-3.9
Central	Central Services	City of London	0	0.0
Central	Central Services	Islington	-109,500	-12.2
Central	Central Services	Kensington and Chelsea	-47,700	-5.3
Central	Central Services	Lambeth	-109,500	-12.2
Central	Central Services	Southwark	-141,500	-15.7
Central	Central Services	Westminster	16,900	1.9
East	Thames Gateway	Barking and Dagenham	245,900	37.8
East	Thames Gateway	Bexley	344,500	53.0
East	Thames Gateway	Greenwich	258,000	39.7
East	Central Services	Hackney	-90,100	-10.0
East	Thames Gateway	Havering	135,100	20.8
East	Central Services	Lewisham	-36,400	-5.6
East	Thames Gateway	Newham	-88,000	-13.5
East	Thames Gateway	Redbridge	44,000	6.8
East	Central Services	Tower Hamlets	-236,800	-26.3
East	Lea Valley	Waltham Forest	100,200	15.4
North	Park Royal/Heathrow	Barnet	60,700	9.3
North	Lea Valley	Enfield	353,600	54.4
North	Lea Valley	Haringey	-98,600	-15.2
South	Thames Gateway	Bromley	53,100	8.2
South	Wandle Valley	Croydon	-27,300	-4.2
South	Wandle Valley	Kingston upon Thames	-56,200	-8.6
South	Wandle Valley	Merton	41,000	6.3
South	Park Royal/Heathrow	Richmond upon Thames	72,800	11.2
South	Wandle Valley	Sutton	110,800	17.0
South	Wandle Valley	Wandsworth	98,600	15.2
West	Park Royal/Heathrow	Brent	396,100	60.9
West	Park Royal/Heathrow	Ealing	323,300	49.7
West	Park Royal/Heathrow	Hammersmith and Fulham	101,700	15.6
West	Park Royal/Heathrow	Harrow	25,800	4.0
West	Park Royal/Heathrow	Hillingdon	-109,300	-16.8
West	Park Royal/Heathrow	Hounslow	12,100	1.9
			1,608,400	**279.6**

Source: CAG

The projections are summarised by sub-region and property market area in Table 7.3 below. These projections show continued reduction in floorspace in the Central London sub region and Central Services property market area, but at a much slower rate than in the recent past.

The projections show the greatest level of growth in the Park Royal/Heathrow and Thames Gateway property market areas reflecting where demand pressures have been highest as reflected in past take-up.

Table 7.3 Projected Change in Demand for Warehouse Floorspace and Land 2016-41 By Sub Region and Property Market Area

Sub Region	Floorspace Sq m	Land Ha
Central	-426,200	-47.4
East	676,300	118.0
North	315,700	48.6
South	292,900	45.1
West	749,700	115.3
London	**1,608,400**	**279.6**
Property Market Area		
Central Services	-789,500	-89.3
Lea Valley	355,100	54.6
Park Royal/Heathrow	883,300	135.9
Thames Gateway	992,500	152.7
Wandle Valley	166,900	25.7

Source: CAG

Sensitivity Test – Plot Ratios

If new warehouse development is not built at the higher plot ratios used in our central assumptions but rather at a lower, more traditional density of 4,000 sq m per ha then this would increase demand for industrial land from 280 ha to 402 ha.

7.6 Substitutability of Demand between London and the South East

The logistics sector is undergoing a lot of change driven by technological advances, consumer demand and environmental factors. As the sector continues to expand having the right skills and training in place to up-skill existing staff, as well as recruiting highly skilled staff, becomes increasingly important.

The 2011 London Industrial Land Demand Study concluded that an increasing proportion of London logistics needs were being serviced from outside of the capital and in our central projection we believe that this trend will continue. The potential for this to happen to a greater or lesser extent is perhaps best explored through the broad property markets quadrants discussed earlier.

The area to the west of London is strongly dominated by Heathrow in terms of logistics activity. The government's announced intention to expand capacity at Heathrow is likely to reinforce that market dominance.

The area to the east of London both north and south of the river may be best placed to accommodate activity that is being displaced from London due to pressures on space. The area to the east also in general has the biggest driver in terms of labour market need.

To the area to the north of London provides good opportunities for servicing London from a Regional Distribution Centre or even a National Distribution Centre. The example of John Lewis moving its London distribution centre from Park Royal to Milton Keynes provides evidence of this effect.

The area to the south of London currently undertakes primarily local servicing activity. It is not as suited to logistics as the area to the north of London due to a more limited catchment. The limited prospects for logistics activity are further reinforced by the higher residential land values to be found in this area.

But in all this there is the issue of the Greenbelt which acts as a big constraint on industrial growth in much of the area immediately adjacent to London and hence further increases the time and distance that must be factored into any locational decision.

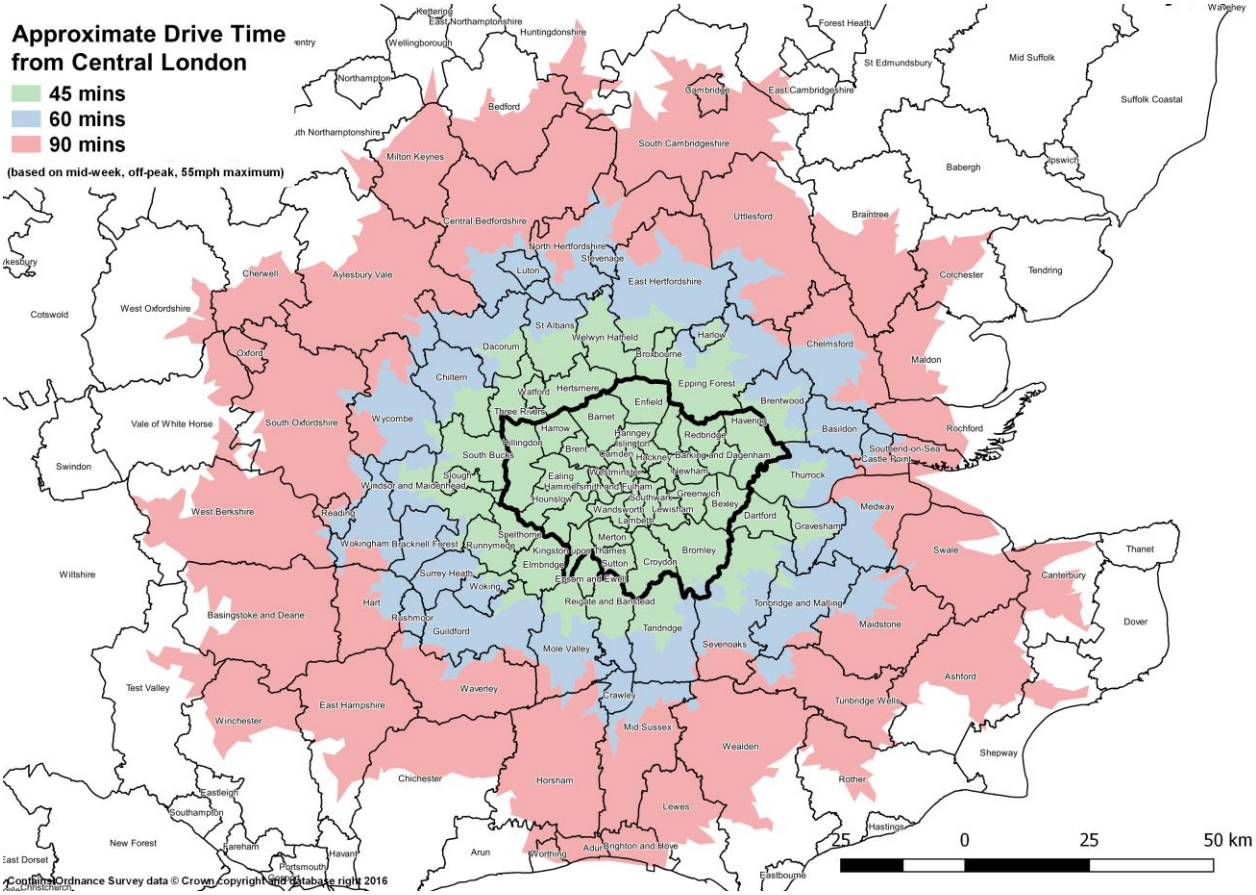
Catchment Areas

To give some indication of the potential to service the London economy from outside the figure below illustrates drive-time catchments to Central London. A notional 45-minute drive-time implies Central London could served from Districts adjacent to London's borders. But much of this area on London's fringes is Greenbelt and hence very constrained in terms of industrial development.

The 60-minute catchment probably forms the maximum from which logistics operators would ideally wish to service Central London and this approximates to the Wider South East property market area defined in the London Industrial Land Supply Report

For a limited number of activities that do not need to make frequent trips the 90-minute catchment might be viable, but beyond that we would suggest that it is not reasonable to think of these areas as providing demand substitution opportunities.

Figure 7.11 Drive-time Catchment Areas to Service Central London



Source:

Substitutability Indicators

We have considered a number of measures that might act as indicators of the potential for industrial and logistics activity to locate and still service London and in particular Central London. These are a

combination of demand indicators, locational indicators and labour market indicators which can be measured at Local Authority level.

- Average Rateable Value (£/ sq m) for Industrial premises – as a proxy for rents with a high figure being indicative of high demand for industrial property
- Industrial Floorspace (sq m) – with a large stock being indicative of a large industrial base
- Number of Industrial Jobs – with a high number again reflecting a large industrial base
- The proportion of Industrial Jobs in total employment – with a high proportion reflecting the importance of the sector
- Change in number of industrial jobs 2009-15 – with a large positive number reflecting recent demand for industrial activity
- Change in share of industrial jobs in total employment 2009-15 - with a large positive number reflecting recent demand for industrial activity
- Drive-time from Central London – with those in the shortest drive-time isochrones being better placed to service central London demand
- Employment rate – with a low employment rate indicative of a labour market need
- Share of industrial occupations in total employment - with a high proportion indicative of a relevant skills base
- Average Weekly Earnings – with low weekly earnings indicative of labour market need and potentially of a competitive offer.

Against each of these indicators we compiled a set of quintile rankings, and scored each of the Districts in the Wider South East against these quintiles. This table is shown in full in the Appendix.

If each indicator is weighted equally then it produces the following list of local authorities where there may be the best potential to provide some substitution of demand for London. Authorities outside the 90-minute catchment have been excluded. Most of these local authorities lie either to the north of London or to the east. Only Slough lies to the west and none of the authorities are to the south of London.

Table 7.4 Local Authorities that rank high on industrial indicators criteria

Swale	Welwyn Hatfield
Medway	Braintree
Thurrock	Slough
Dacorum	Luton
Central Bedfordshire	Bedford
Dartford	Cherwell
Milton Keynes	

7.7 Sensitivity Tests

Employment-Based Projections

As a further test on the forecast we have prepared a forecast based on the employment-based method used for the industrial forecast in the previous chapter. The GLA Economics projections show a small decline in employment over the period 2016-41 for both Wholesale Distribution (-18%) and for Transport and Storage (-5%), the two principal logistics sectors. Overall using our more fine-grained definition of logistics employment this show a loss of around 50,000 logistics jobs in London over the period 2016-41.

Applying an employment density 36 sq m per worker and a plot ratio of 40% a reduction of -450 ha of land for logistics. Thus, the employment-based approach implies a significant loss of industrial land. However, this approach implies a constant relationship between floorspace and employment which may not hold in the long term in the logistics sector given the rapid productivity gains and as we have noted the London boundary is not the appropriate functional economic area for the logistics sector.

Plot Ratios

Varying the plot ratios, the quantum of square metres per hectare, can have a significant effect on the forecast demand for land. In our baseline projection, we have assumed that warehouse floorspace is developed at 6,500 sq m per ha, except for the Central Services Areas where it is developed at 9,000 sq m per ha

Plot ratios in London are far higher than elsewhere and given the pressures on land we would expect solutions that develop at relatively high density.

But if we were to apply the standard warehouse plot ratio of 4,000 sq m per ha then this would increase the demand for land for warehousing from 280 ha to 402 ha.

Spatial Substitution

As we have noted in the recent past warehouse floorspace in London has not in fact been growing due to lack of land availability and that the stock of warehouse floorspace has been broadly flat in London in recent years despite growing demand for goods driven by growth in the population and economy. In this spatial substitution scenario we assume that this trend continues and that all London's net additional demand for warehousing floorspace can be met from outside of its borders.

For this scenario we therefore assume that there is zero net change in demand for warehouse floorspace in London. Based on the most recent trend London's warehouse floorspace is declining at an average of 0.3% p.a. so we have mitigated this decline but used it to inform the spatial distribution.

- Central Services area - we have assumed continued floorspace decline but at half the rate of the period 2008-15
- Lea Valley – an area of strong demand but loss of floorspace we have assumed zero net change
- Park Royal/Heathrow - an area of strong demand but loss of floorspace we have assumed zero net change
- Thames Gateway – we have assumed the Boroughs with positive past growth continue to grow at the same annual rate as the period 2008-15 and for Boroughs with a loss over that period these losses are largely mitigated

- Wandle Valley - we have assumed the Boroughs with positive past growth continue to grow at the same annual rate as the period 2008-15 and for Boroughs with a loss over that period these losses are largely mitigated

The results by Sub Region and Property Market Area are summarised in Table 7.5 below, reflecting the assumptions set out above.

Table 7.5 Warehouse Demand Projections by Sub Region and Property Market Area – Spatial Substitution Scenario

Sub Region	Floorspace Sq m	Land Ha
Central	-222,400	-55.6
East	-15,100	-3.8
North	0	0.0
South	237,500	59.4
West	0	0.0
London	**0**	**0.0**
Property Market Area		
Central Services	-362,900	-90.7
Lea Valley	0	0.0
Park Royal/Heathrow	0	0.0
Thames Gateway	152,500	38.1
Wandle Valley	210,400	52.6

Source: CAG

This spatial substitution scenario is used to inform the alternative scenarios set out in Chapter 14 where we consider other ways of how London's growing demand for goods might be serviced.

7.8 Conclusions

Recent years have seen a small but steady decline in the total stock of warehouse floorspace in London. This follows many years of steady growth up to the middle of the last decade. This is not because London's demand for warehousing has fallen but rather that demand is not being accommodated within its borders.

We have tried to avoid our warehouse demand forecasts being supply constrained from the outset. We have therefore adopted a central projection that acknowledges that an increasing proportion of London's warehouse floorspace demand will be met from outside of its borders, but accommodates growth in stock at rates seen pre-recession. This produces total demand for additional industrial land from growth in warehouse demand of 280 ha over the period 2016-41. If we assume this can only be accommodated at the lower plot ratio of 4,000 sq m per ha, then that demand figure rises to 402 ha.

But we also recognise that there is a lot of potential for spatial substitution between London and the Wider South East in the logistics sector. This is particularly the case to the east of London, due to land availability, and to the north of London where there is potential to service wider regional distribution networks. In our spatial substitution scenario we assume that all London's net additional demand for warehousing floorspace is met from outside of its borders, although there will still be some spatial reallocations within London.

8 Impact of Diminishing Industrial Land on the London Economy

8.1 Introduction

In this chapter we explore some socio-economic impacts of shrinking industrial land supply in London. The two sections that follow deal with the labour market and the property market respectively, using top-down statistics. In the final section we look at impacts on the wider economy more generally, using case studies.

8.2 The labour market

To assess the impact of industrial decline on London's labour force, we have analysed the numbers and occupational profile of London residents that work in the industrial sectors. The analysis relates to all working residents of the capital, whether they work in London or elsewhere. The data are from the 2011 Census; no more recent information is available.

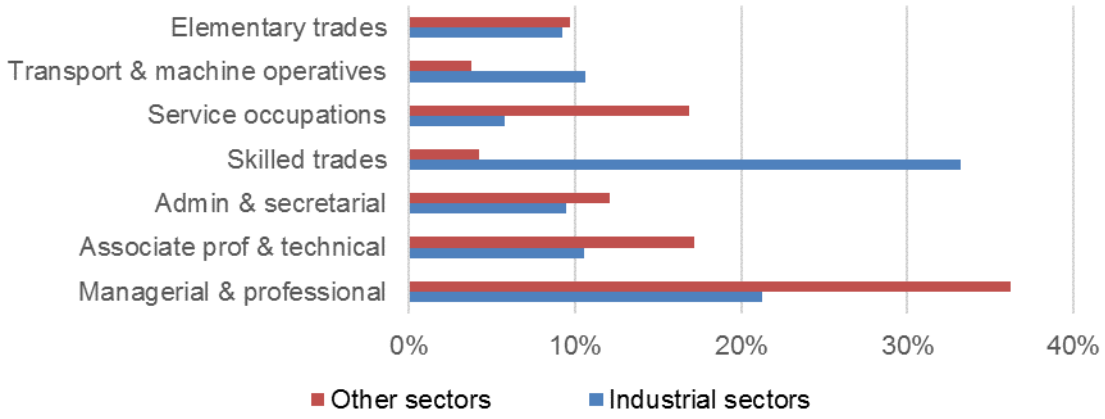
Table 8.1 Working London residents, sectors and occupations, 2011

	Industrial sectors	Other sectors	Total
Managerial & professional	120,508	1,249,708	1,370,216
Associate prof & technical	59,896	593,945	653,841
Admin & secretarial	53,804	415,789	469,593
Skilled trades	188,364	146,467	334,831
Service occupations	32,447	583,536	615,983
Transport & machine operatives	60,265	130,369	190,634
Elementary trades	52,537	334,146	386,683
Total	567,821	3,453,960	4,021,781

Source: 2011 Census

Of London's 4m working residents, we estimate that some 570,000, or 14%, work in the sectors that we have identified as industrial. Within this total industrial workforce, **Error! Reference source not found.** s hows that the largest occupational group is Skilled Trades, which accounts for about one third of all industrial workers. Next comes the Managerial and Professional category, with some 20% of industrial workers. Admin and Secretarial workers, Transport and Machine Operatives and Elementary Trades account for about 10% of the industrial workforce each, and the remaining 6% of that workforce are in Service Occupations.

Figure 8.1 Occupational mix of working London residents, 2011

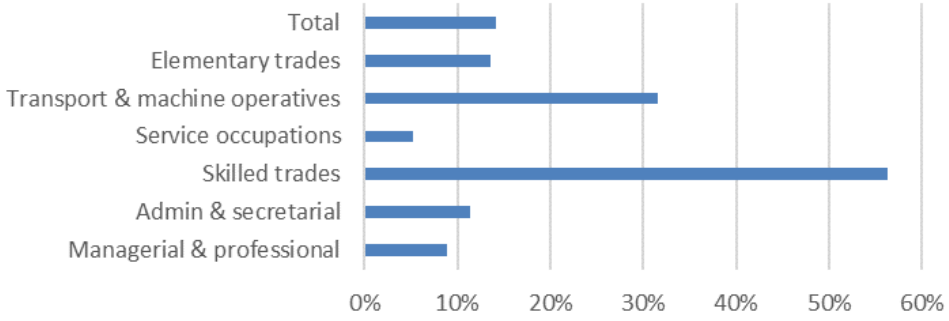


Source: 2011 Census

Error! Reference source not found. also compares the occupation profile of the industrial workforce w ith that of other industries and services. It shows that Skilled Trades are very over-represented in the industrial sector - where as we have seen they account for 33% of workers, whereas in other sectors the proportion is just 5%. Transport and Machine Operatives also are very over-represented in the industrial sectors, where they account for 11% of the workers against 4% in other sectors.

Error! Reference source not found. looks at occupations from another perspective, showing the p roportion of workers in different occupations that are employed in industrial sectors.

Figure 8.2 Proportion of London residents working in industrial sectors



Source: 2011 Census

By far the highest figure is for Skilled Trades: of London residents in this occupation group, 56% work in industrial sectors. The next highest proportion relates to Transport and Machine Operatives, of whom 32% work in the industrial sectors. For all other occupational groups the proportion working in industrial sectors is less than 15%, and for Service Occupations it is as low as 5%.

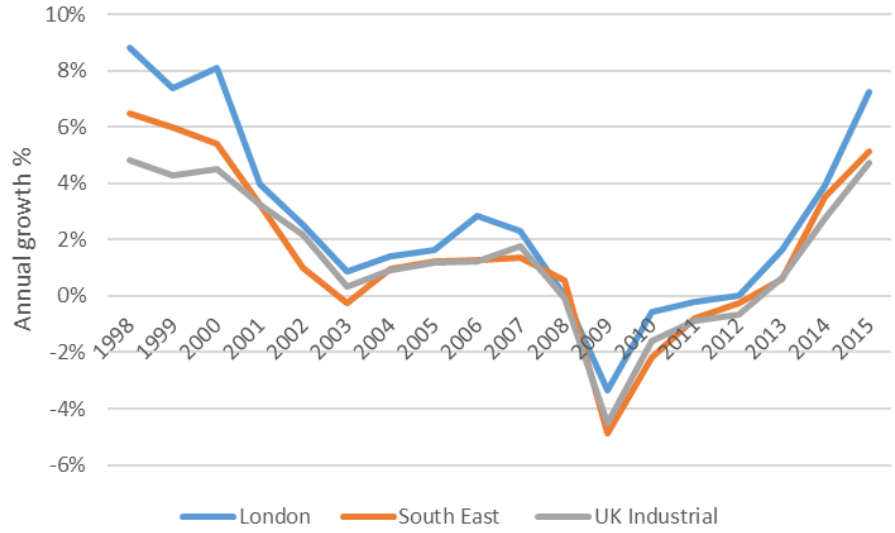
From a social welfare perspective, these figures suggest that if industrial jobs in London decline, two groups will see a substantial deterioration in their employment opportunities: Skilled Trades and Transport and Machine Operatives. The more industrial jobs are lost, the greater will be the disadvantage affecting those groups – unless of course they change occupation, move out of London or commute outwards from London. The group most dependent on industrial jobs, Skilled Trades, comprises 188,000 people, equal to 8% of working London residents. The second most dependent group, Transport and Machine Operatives, comprises 60,000 workers – 5% of working London residents.

8.3 The property market

The last chapter has already shown that London's constrained industrial supply has resulted in high and rising rents, well ahead of national benchmarks. In this section, we analyse rents in more detail, looking at individual property market areas and comparing London with the South East.

Error! Reference source not found. and **Error! Reference source not found.** below show industrial re ntal growth in London, the UK and South East England since 1997. The data are taken from the property investment database IPD / MSCI. The contents overlap with Figures 5.9 and 5.10 presented in Chapter 5, but in the charts below we have added the South East and used a shorter time period (because data for the South East do not go as far back).

Figure 8.3 Industrial rental growth: London versus UK and Wider South East

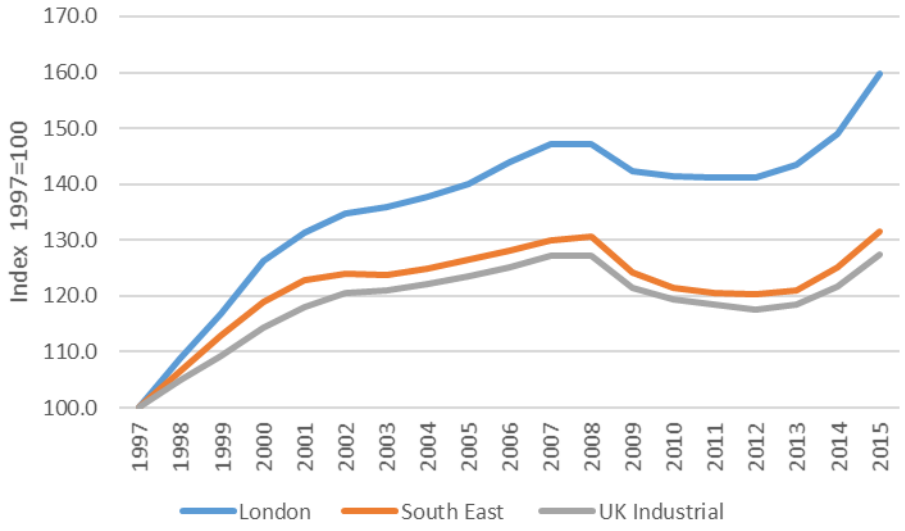


Source: IPD / MSCI

In all but one year since 1998[45], London showed faster rental growth or (in the recession) slower decline than either the UK or the South East region. The sole exception is an insignificant one: in 2008 rents in London and the UK were virtually unchanged, while the South East gained rose fractionally by 0.5%.

[45] Data for the South East is not available prior to 1998.

Figure 8.4 Industrial rents: London versus UK and Wider South East

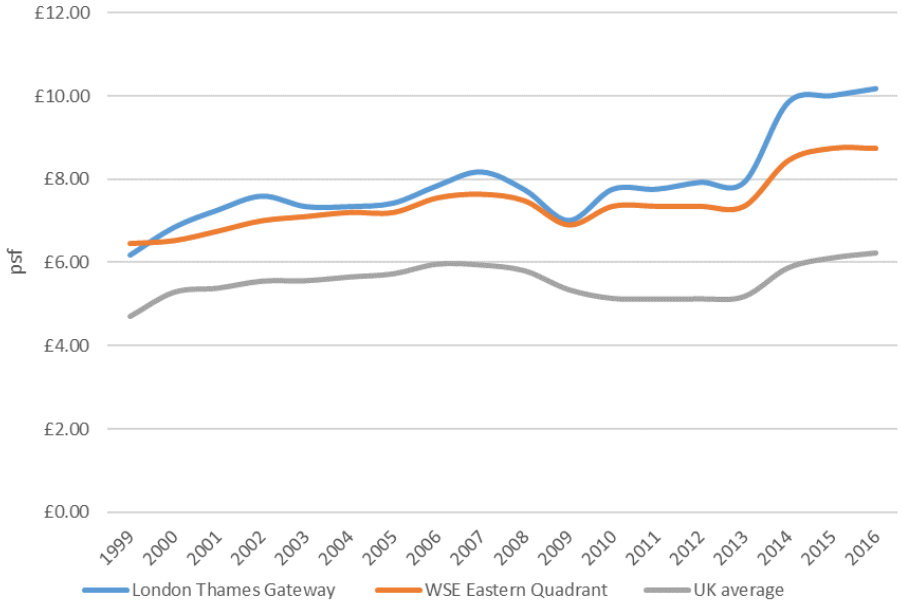


Source: IPD / MSCI

Error! Reference source not found. illustrates the cumulative impact of these annual changes. B etween 1997 and 2015 rents increased by 60% in London, against some 30% in both the UK and the South East region.

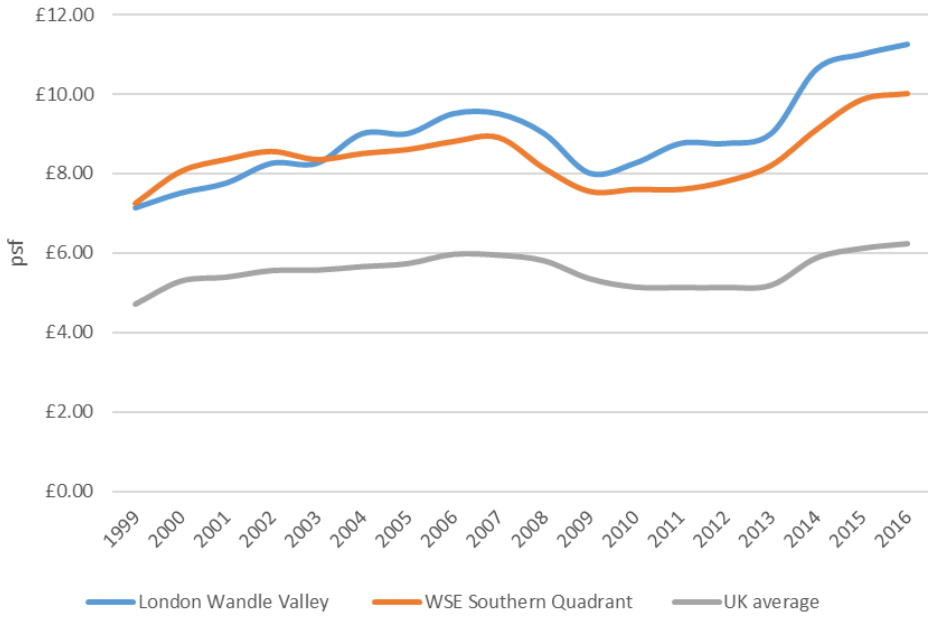
The next three charts go to the next level of detail, comparing each market area in London with its adjoining market area in the Wider South East. In contrast to the above, these more detailed data are provided by Colliers International and cover a slightly shorter but more recent period, from 1999 to 2016. There are no data for the Central Services area.

Figure 8.5 Prime industrial rents: London Thames Gateway and Wider South East Eastern Quadrant



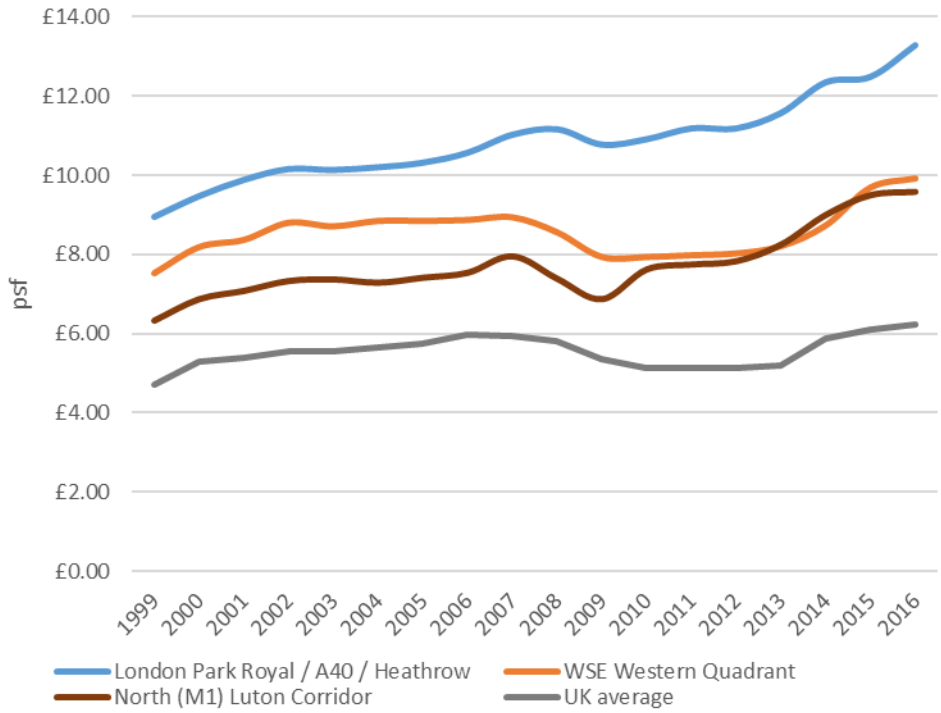
Source: Colliers International

Figure 8.6 Prime industrial rents: London Wandle Valley and Wider South East Southern Quadrant



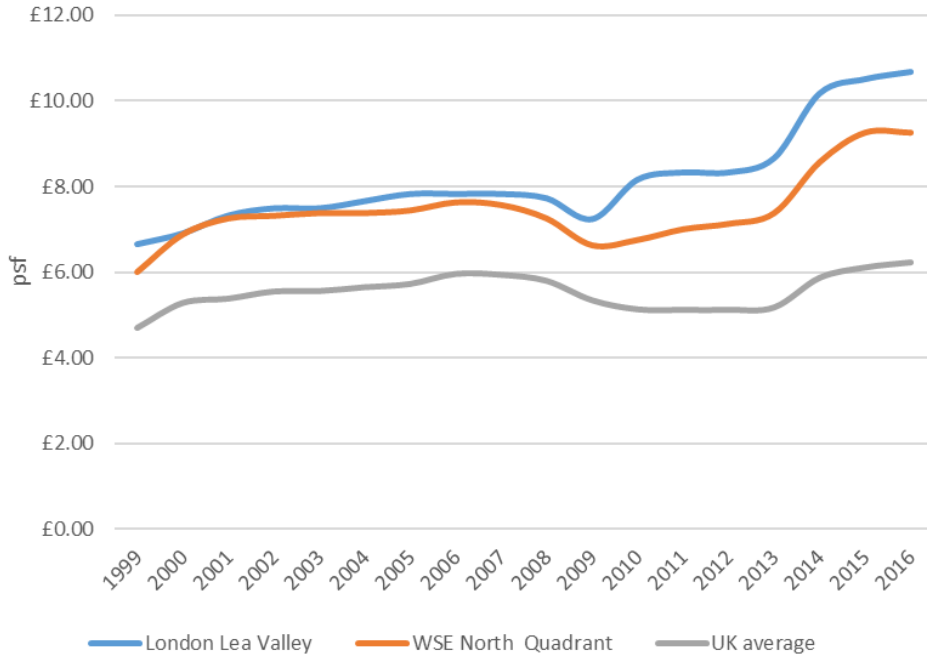
Source: Colliers International

Figure 8.7 Prime industrial rents: London Park Royal etc and WSE Western Quadrant and M1 Corridor



Source: Colliers International

Figure 8.8 Prime industrial rents: London Lea Valley and WSE North Quadrant



Source: Colliers International

For all the London market areas, average prime rents at 2016 are significantly above those in the adjoining areas of the Wider South East, which in turn are even further above the UK average. The gap between London and the adjoining part of the WSE is largest for the Park Royal / Heathrow area, at £3.40 per sq ft; while for the other three market areas it ranges from £1.25 to 1.40 per sq ft. For three of the four areas, the gap has widened markedly since the trough of the recession in 2009. The exception is Park Royal/Heathrow, when the gap widened in the mid-2000s and has stayed much the same since.

In conclusion, the evidence suggests that London's tightening supply of industrial land has resulted in rental growth above adjoining areas of the South East, and far above the UK average. The implication for the future is that the more industrial land is lost, the more industrial rents and values will rise, both in London and to a lesser extent in surrounding areas.

These rising rents and values are what basic economics would lead us to expect. They are not necessarily a bad thing, because they reflect the opportunity cost of land – that is, the value added it produces, including in alternative uses such as housing. High rents allow those occupiers who realise the greatest economic benefits from being in London to locate there, outpricing activities that can operate as successfully in cheaper places. Whether the process has gone or will go too far, depends on whether is affected by market failure or unfairly disadvantages certain members of the community.

8.4 Case studies

To illustrate the factors that keep industrial land uses in London, and the implications of shrinking land supply to accommodate these uses, we use five case studies of industrial occupiers. The case studies have been chosen to reflect different types of business and accommodation, from corporate occupiers in premium properties to SMEs based in open yards and portacabins. Each case study uses a different research method, to suit the circumstances. The case studies have been anonymised, because some of them may contain confidential information.

To identify the subject businesses we have used the team's specialist knowledge and contacts. In our opinion, which is based on long experience of studying industrial land uses in London, they provide an

accurate reflection of wider realities. But the evidence they provide can only be anecdotal. A statistically representative survey would be beyond the scope of this study.

Open yardage: Company A

Introduction

Company A is an independent family business that provides open yards in the Park Royal area of West London. At present some 30 businesses rent yards at the site, which they use for parking commercial vehicles (accommodating some 150 vehicles), open storage and in many cases as the main base of their operations. As the site is currently proposed for redevelopment, which would extinguish its existing use, those users have been considering relocation options. We explored these options and their implications through discussion with Company A's managing director – whom we advised on planning matters – and an interview survey of eight businesses that use the site.

All the businesses surveyed are independent Small or Medium Enterprises (SMEs), with employment between five and 50 people. Nearly all are single-site businesses, with no premises other than the space they rent from Company A. Iin addition to open yardage, some also occupy small offices, either in portacabins or Company A's building. The firms' activities include building-related services such as skip hire and supply / erection of scaffolding, haulage and parcel services, removals and waste collection / disposal, coach operation, and vehicle recovery. Their customers are mostly businesses, but also include households, and are located mainly in London. Some of the firms provide important public services, such as recovery of broken-down police vehicles, bussing schoolchildren and NHS deliveries.

Location decisions

For the purposes of this study a central question is why the businesses have chosen to base their operations at the Company A site. The single most important factor, common to all our survey respondents, is market geography. All the vehicles that these businesses keep at the site pick up their loads (whether goods or passengers) from places in London, deliver those loads to places in London, or (very often) both:

- Typically, these origins and destinations are spread across a large section of London that includes Central London plus a southwest to-north radial slice that is typically bordered by the river Thames, the M1 or A1 and the M25:
    - Thus, coaches pick up tourists or other travellers mostly from hotels or gathering points in central London. Transport, removal and building-related services serve customers who may be evenly spread across London, but are more often or concentrated in the centre – because this is the most densely developed part of London, especially for commercial uses such as offices and retail.
    - Several of our respondents are closely tied to specific sites located in the immediate vicinity, usually in Park Royal itself. For waste operators, these are tipping sites, of which there is a concentration on the estate. For a vehicle recovery service, a large proportion of trips ends at a repair facility also located in Park Royal. Several other firms have a dominant customer located on the estate.
- Those trips that go beyond London and its immediate surroundings – probably the minority – typically use the strategic road network, including motorways and the A406 North Circular Road. One respondent notes that all strategic routes out of London are accessible from the site without going through the congestion of Central and Inner London - 'we're always skirting round the edge of London'.

This market geography explains why our respondents have chosen their present location. But it is not the whole explanation. Site-specific factors are also important, in particular:

- The site offers open yard space, which is essential for parking large vehicles and storing large objects;
- It is away from sensitive land uses, especially housing, so there are no near neighbours who would be disturbed by noise or unsightly storage;
- Due to this lack of sensitive neighbours, to the physical configuration of the site, and perhaps to the fact that it is known to the licensing authorities, it is easy for occupiers to secure the operator's licences they need to operate their businesses.
- Also due to the lack of sensitive neighbours, the site is suitable for 24-hour operation. All or most of our respondents need this, for example so they can drive at times when there is no congestion, pick up or drop off passengers on night flights or service building sites in busy central London streets that are only allowed to operate at night.
- Some respondents also told us that the site is cost-effective, partly because there are no buildings and hence no business rates are payable. These are businesses who do not wish to pay the cost of a conventional office and find portacabins perfectly adequate.
- Finally, several respondents praise the site's ready access to public transport, on which significant numbers of workers travel to work, including drivers. One reason for this is that 'people who drive for a living do not necessarily want to drive to work as well'.

The impact of losing the site

All the businesses we interviewed were aware that Company A was threatened with closure; more than one had chosen to move there after this threat became apparent, seemingly because they had found no alternative. When asked how easy or difficult it would be to find a satisfactory alternative site, all said it would be difficult or very difficult. Specific responses include:

- 'Almost impossible'
- 'It's not a question of price, there is nothing around'
- 'Everyone is looking for land; it's all being take up by developers'
- 'There is no open land left'
- 'It would be a challenge'.

In support of these views, several respondents mention that they have looked for sites for months without success, either before finding Company A or in anticipation of being displaced from there. As further evidence that there is a severe shortage of alternative sites in the locality, the Managing Director of Company A advises that:

- There is no spare capacity at the Willesden site, and any yard space that becomes available is immediately taken up.
- There is an informal waiting list comprising three potential customers, seeking to park about 40 vehicles in total.
- To meet this demand, the company is planning to take on two additional plots at the site.
- Many facilities in the area have closed in recent years.
- The only alternative facility within a five-mile radius, at Wembley, has no spare capacity either.

When asked what they would do in practice if the site were to cease:

- Two respondents don't know, including one who 'might sell the business'.
- One says that the business would certainly close.
- The remaining five say that they would have to move further out from London – mostly to Heathrow or Northolt, with some mention of Harrow or 'beyond Wembley'.

These are the nearest places where our respondents think they would be able to find open yards comparable to what is provided by Company A. Without exception, they consider that these alternative locations would be unsatisfactory.

For a minority of respondents this is partly because they consider that significant proportions of their workforce would not follow them. For more than one employer this is a personal issue as well as a business one, because they have valued and long-standing relationships with their workforces: 'we've been together a long time, we are like a family'. It is a problem that could affect any business that moves beyond its local area, regardless of where that area is.

A more geographically specific difficulty, which applies to all but one of our respondents, is that an alternative location would result in longer vehicle trips. The reason for this is simple: the vehicles based at the site would be further away from the places where they pick up or deliver goods or passengers.

The businesses told us that this would have a major impact on costs, because to provide the same service as now would require more mileage, hence more fuel, and greater numbers of vehicles. It would also require more drivers. Typically, this 'people cost' may be the largest additional cost resulting from relocation. In proportional terms, numbers of drivers employed may have to rise faster than the mileage covered, because drivers are subject to maximum working hours, controlled through tachographs. Where journeys go over the maximum permitted time, a second driver would have to be brought in, which would make some trips financially unviable or even practically impossible.

In an industry where margins are tight, our respondents tell us that these additional costs would be life-changing for their businesses. Those that would continue in business say they would need to put up their prices and downsize, because some customers would not accept the higher prices; for others it could be physically impossible to provide the same service. At a new location they would also expect to gain new customers, but this could take time: 'we'd be starting again, would need to establish a new reputation'. The same volume of business may not be available in more peripheral locations, because the density of potential customers in these new locations would be lower.

Finally, we asked businesses to consider how their relocation or closure would impact on their customers. Most noted that they had many competitors, who would pick up the customers they could no longer serve. But in their view this would not resolve the underlying problem, because there is no open yardage available that those competitors could use, given that many facilities have closed in recent years and the remaining sites are already full. They added that in some cases lorries and coaches were parked, loaded and unloaded illegally, causing problems for neighbours and users of the public highway.

In the view of our respondents, the possible closure of Company A is part of a wider problem. They consider that, in an area which is ideally located to provide transport and related services to London, the physical capacity to accommodate the necessary parking and storage is shrinking. Therefore, vehicles and materials will have to be stationed further away from the places they serve, and therefore vehicles will cover more mileage to provide the same service – regardless of whether they are operated by our respondents or other businesses. Consequently, the mileage involved in serving London is having to increase. This adds to the costs borne by users, including public service users such as the

police and health service. It also adds to the social costs of traffic congestion, atmospheric pollution and climate change, and also perhaps bad neighbour impacts from commercial parking and loading in unsuitable places.

Conclusion

The users of yards at the Company A site are small enterprises that provide transport and related services to central London and a large 'wedge' of the rest of London, extending roughly from the Thames in the south west to the M1 or A1 to the north. They report unanimously that, if the site is redeveloped for other uses, it would be difficult or impossible for them to find equally suitable accommodation, because land in the surrounding area is being increasingly developed for higher-value uses. For them, the next best alternative locations are more peripheral areas such as Heathrow and Northolt.

If they were obliged to leave the site, one or two of our respondent business would close and most of the others would downsize, putting people out of work. The business lost to our respondents would go to competing firms, who in turn would create new jobs - though the result could be to transfer income and jobs away from SMEs to more 'corporate' operators. Regardless of who provides these transport services, their cost would likely increase, because vehicles would be stationed further away from where they need to be, and therefore cover more mileage to provide the same service. This would probably lead to additional costs for users and also cause social costs from traffic congestion, atmospheric pollution and possibly parking and loading in unsuitable places.

Coach depot: Company B

Profile

Company B is a coach operating company that in 2013 moved its coach depot within the London Borough of Ealing, from Old Oak Lane to Perivale. The move was a forced one, as the landowner at Old Oak Lane decided to expand his construction materials operation onto the site. In this case study, we set out the history of the relocation and its impact on the company and its customers. Our main sources of information have been the company's managing director, whom we advised on planning matters, and Council documents.

The company works for tour operators, transporting tourists from West End hotels on day trips to historic or cultural locations such as Oxford and Stratford on Avon, and also to/from airports. In the warmer months, it also run longer holiday tours, but the vast majority of the company's business is trips in and out of London's West End.

The company employs approximately 35 staff, most of whom are coach drivers. The depot is busy in the mornings as the drivers set off to pick up their tourist clients from hotels in the West End, and again in the evenings when the coaches return to the depot having dropped the tourists back to their hotels. Generally, these trips are undertaken in the morning and evening rush hours, between hotel breakfast and dinner, and the depot is busiest at either end of the day.

The location decision

In terms of geography. Company B's location choice is determined by the places where its vehicles need to go. These places comprise:

- West End hotels, where they pick up and drop off passengers
- Visitor destinations and airports, which they access via the strategic road network.

Against these criteria, the company's old site at Old Oak Lane was ideally located, being close to the West End and Heathrow Airport and readily accessible to major visitor destinations accessible via that M40, M4 and M3. The company aimed to find a site that maintained these advantages. It was also keen to stay close enough to the old depot to keep its existing workforce.

As regards site-specific features, the company was looking for open yard space sufficient to park its fleet of over 20 coaches. It was important that the site be away from sensitive uses, especially housing, because although it is not a 24-hour operation the depot makes noise at unsocial hours - both from vehicle engines and cleaning / maintenance. Another requirement was that the company's costs should not increase significantly, given that operating coaches is a low-margin industry.

The company would have liked to move to an existing or former coach depot, which would have meant that they need not apply for a new planning permission. But its search for an available depot in west London drew a blank. The most suitable land it did identify was a vacant site at Aintree Road, Perivale, whose previous use was B2/B8 industrial. Accordingly, the company had to apply for planning permission to operate a bus depot, which is a *sui generis* use.

The new site has other disadvantages compared to Old Oak Lane. It is further from central London. It is also less well located to the A40 and hence to the strategic road network. These disadvantages are small, so the company has been able to maintain its standards of service without breaching the rules on drivers' hours and while remaining financially viable.

A greater disadvantage of the new site is that it has housing in close proximity. This caused great difficulties in gaining planning permission, as discussed in the next section.

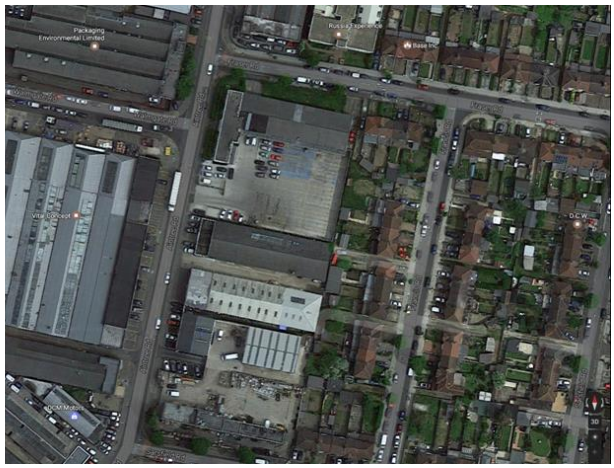
The new site

The site is in the Perivale Industrial Area, which is designated in the London Plan as a Strategic Industrial Location. Indeed, the Perivale area is in the SIL sub-class Preferred Industrial Locations (PIL), which are particularly suitable *for 'general industrial, light industrial, storage and distribution, waste management, recycling, some transport related functions, utilities, wholesale markets and other industrial related activities'*[46]*.*

Thus, in terms of planning policy use of the site as a coach depot is entirely acceptable. Indeed, it is the purpose of PILS to accommodate businesses such as Company B, which if sited elsewhere would be bad neighbours.

Nevertheless, securing planning permission for Company B proved difficult, lengthy and expensive. This is because the site is on the edge of the PIL and adjoins housing on one side, as shown in the aerial photograph below.

[46] London Plan, Policy 2.17



Given this sensitive boundary, the planning authority was concerned about the impact of the proposal on adjoining residents, particularly in terms of noise generation. Gaining planning permission took 12 months and the eventual agreed solution involved complex and expensive mitigation measures, including erection of an acoustic barrier and purchase of 'quiet technology' cleaning equipment.

After Company B submitted its planning application, the Council received an application for prior approval to convert to housing an office block on Aintree Road, opposite the proposed depot. Under Permitted Development Rights such change of use does not require planning permission, even in a PIL. Luckily for Company B, the proposed change of use did not proceed. If it had proceeded, concerns about noise disturbing residents would have been much worse, and gaining planning permission much more difficult, if not impossible.

Conclusion

The main point illustrated by this case study is the difficulty of securing planning permission for 'bad neighbour' uses, even in Strategic Industrial Locations (SILs), which are designated in the London Plan for the very purpose of accommodating such uses. There are two reasons for Company B's planning problem: firstly, its new site was on the edge of a SIL, and therefore abutted existing housing outside the SIL, and secondly new housing development might have been allowed on an adjoining site inside the SIL, under Permitted Development Rights.

It is of course unavoidable that SILs have edges, and sites on these edges abut sensitive land uses beyond the SIL. But if planning allows these boundaries to be eroded, so the SILs become smaller, there will be less land that is surrounded by the SIL on all sides and hence suitable for 'bad neighbour' land uses. Yet, as the example of Company B illustrates, such land uses can play an important role in the London economy, supporting the important export industry that is international tourism.

There are two conclusions from the case study of Company B. Firstly, planning policy should resist erosion of the SILs, ensuring that they retain critical mass and their boundaries are defensible and well defended. Secondly, Permitted Development Rights that allow change of use from employment to housing are especially unhelpful in SILs, because they undermine the purpose of protecting these areas for 'bad neighbour' industries.

Catering supplier: Company C

Company C is a Small / Medium Enterprise and a family business that delivers fruit and vegetables to high-end restaurants. The company was originally based at the Covent Garden wholesale market, first in its historical location in Central London and later at New Covent Garden in Nine Elms. It specialises in premium fresh produce, including unusual, fashionable and exotic varieties, both home-grown and imported. Its customers are clustered in central London, together with Kensington and Chelsea to the west.

When the redevelopment of New Covent Garden was announced, Company C sought to secure accommodation in the new building. But it found that the owners could not guarantee enough suitable space to accommodate its growing operation which included daily deliveries to some 300 customers and the use of 25 lorries.

In searching for a new home, Company C's main priority was to be to remain in London, and specifically to be as close as possible to its customers in central London. Access to the wholesale market was less important to it than before, partly because the company's produce was increasingly sourced directly from growers. But fast and reliable access to central London was (and remains) critical, because that is where the bulk of the company's customers is.

The closer to central London the new warehouse was, the lower would be the cost of deliveries. There are also two less obvious, but no less important, reasons why the company wants to be close to its customers. Firstly, goods need to be delivered at very short notice, so the restaurants that use them can respond to short-term fluctuations in demand. Secondly, the deliveries need to be reliable, because the day's menus depend on them; the company cannot risk its vans being delayed by accidents, congestion or unexpected roadworks.

The result of the search is that Company C has located in a new build warehouse in Park Royal. While the accommodation is far superior to its previous home, the location is not ideal, because the company would prefer to be closer to its customers in central London.

In business terms, the cost of this sub-optimal location falls on the company and its customers. Again there is also a social cost, or negative externality, because longer distances between the warehouse and its customers translate into more traffic through the congested streets of Inner West London. Admittedly this may partly offset by shorter journeys for the vehicles that supply Company C, insofar as produce is sourced from growers outside London. Nevertheless, on balance the relocation most probably adds to traffic congestion and pollution, because supplies into the Company C site arrive in large good vehicles that may travel overnight, while deliveries go out in vans that will make frequent trips, typically during the day.

If significant sections of Park Royal are redeveloped for other uses, these private and social costs will increase, as Company C and others like it are forced to locate further away from their customers. The reduction in industrial land supply may have implications beyond the economic sectors that occupy industrial land, if the up-market restaurants that source produce from the company have to change their own business models to adjust to longer lead times and less reliable deliveries. For example, they may store more supplies in their own premises, and therefore need more floorspace than they otherwise would, in some of the highest-rent buildings in the world.

Online retailer: Company D

Overview

In this case study we aim to understand the property requirements of a large-scale online retailer serving London. This is of particular interest because if internet shopping grows in future, as is generally expected, distribution models similar to Company D's could become widespread. This case study is based on discussion with property agents and developers, plus publicly available information such as company reports and websites.

Company D is the online operation of a major grocery retailer. Its distribution network comprises two tiers. In the top tier are four 'central fulfilment centres', or strategic hubs, which consolidate incoming goods from different suppliers, store them as necessary and pick them to match customers' orders. The goods are then shipped in articulated lorries to second-tier facilities known as 'spokes', which hold them for a short time before dispatching them to customers' homes in delivery vans.

To serve customers in the London area, Company D uses two central fulfilment centres, one in Hertfordshire and the other in south East London (part of the Thames Gateway). The Hertfordshire facility is long-established; the south east London one is new and serves the London area south of the river. At the second tier of the hierarchy there are six spokes spread across outer London and a seventh spoke just outside the London boundary. These two types of warehouse are quite different in terms of geography and specification, and we discuss them in turn below.

Strategic distribution: hubs

Company D central fulfilment centres are very large warehouses, of the order of 500,000–1m sq ft, purpose-built to an exacting specification for automated operation. They require large sites, to allow parking and circulation for employees' cars as well as lorries: thus, the south east London facility provides 563,000 sq m of floorspace on a 35-acre site. Sites also need to be separated from sensitive land uses such as housing, accessible to the strategic road network and as close as possible to the urban area, where customers live. As the example of Hertfordshire illustrates, the sites can be outside the administrative area of London or the M25.

From discussion with property agents we understand that Company D had no particular difficulty in finding the south east London site. This may be because they were lucky, or because the Thames Gateway is less constrained than other parts of London. But in the agents' view a more likely reason is that the search was more than three years ago, since when industrial land supply has tightened. A search for a site that meets the same criteria today may be more challenging. Thus, one of our consultees reported that he is finding it difficult to secure a 25-to-30-acre sites for two retailers (food and non-food respectively) whose requirements are similar to those of Company D.

More generally, our consultees say that in and around London there are few remaining areas suitable for large-scale warehouse development. Such areas inside the M25 currently include Park Royal, Enfield, Dartford / South east London, the Brooklands Industrial Park at Weybridge. Beyond the M25, such areas include the London Gateway Logistics Park at Tilbury and the proposed rail freight terminal at Radlett in Hertfordshire.

Consultees commented that this is a short list, and hence there is little choice for occupiers – especially to the south of London. This is especially true for food retailers, who typically serve London from several warehouses, because they handle larger volumes. Due to the width of the Green Belt, the nearest alternative opportunities are much further from London, in places such as Peterborough, Luton / Dunstable / South Bedfordshire, Milton Keynes, Swindon and Didcot. Many retailers, both internet and conventional, serve London from these more remote locations; examples include John Lewis / Waitrose at Milton Keynes and Superdrug at Luton.

The greater the reduction in London's industrial land supply, the more strategic warehousing development serving London will be shifted outwards, beyond the Green Belt. This shift adds to transport costs, whether borne by suppliers, customers or – more likely – shared between the two. It also adds to the social costs of congestion, pollution and climate change, specifically by increasing LGV traffic on strategic routes into and around London. The alternatives are either to plan for more strategic warehousing in London or to allow such development in selected locations in the Green Belt.

Local distribution: spokes

Company D's spokes are far smaller than its strategic hubs, typically around 30,000-50,000 sq ft. They do not need to be new or purpose-built, because the operations they house are much simpler. As well as warehouse floorspace they need sizeable open yards, for parking and circulation of delivery vans. This is a common requirement of distribution depots, and developers often redevelop industrial estate at lower densities to accommodate it. Company D's aim is to locate depots close to as many households as possible: on average each driver's shift covers 30 miles and makes 20 deliveries, which means only 1.5 miles driving per delivery. This is partly to minimise transport costs, but also because reliable timing is essential. Company D gives customers one-hour delivery slots and keeping these promises is central to its business model; therefore it must avoid the risks of delay that would result from long trips. In practice, minimising trip lengths means that the spokes need to be close to Inner London, as this area has the greatest population densities.

Our respondents did not mention any problems that Company D might have had in securing its existing local spokes. But they believe that going forward it will be far more difficult to find such sites, due to potential loss of industrial space in the Mayor's Opportunity Areas that are still to be implemented. They point out that planning frameworks for these areas typically aim to intensify employment uses, which means providing more jobs per unit of land area than existing use. This in turn implies that lower-density employment uses such as distribution depots will be replaced by high-density ones, typically offices.

Local distribution depots may not be a common approach to food retailing, at least for the time being. But they are very common in parcel distribution, which is a large sector and is growing fast, because it is the channel for non-food internet retail. Our consultations with agents and developers indicate that parcel distributors have requirements for local depots similar to the Company D ones described above.

The implication of shrinking industrial land supply, together with pressures for intensification, is that local distribution facilities may have to locate further away from their customers. Again this would result in higher costs for operators and / or customers, possibly worse service for customers, and social costs from additional motor traffic.

One possible solution to these problems is to rethink the planning of development / regeneration areas, so that land is safeguarded or new sites provided for local distribution to serve residents, just as it would be for primary schools, GP surgeries or utilities. A related suggestion is that development / regeneration plans should not necessarily aim to maximise job numbers. Such an aim penalises low-density employment uses, including distribution; and it is not necessarily good policy anyway, because much of London has a shortage of workers rather than a shortage of jobs.

Light manufacturing: Company E

Profile

In this final case study we look at a light manufacturing business long-established in south London, aiming to show how it has been affected by the shrinking supply of industrial land. But first, to set the context we briefly profile the company and explain why it wants to remain in London despite the difficulty of finding accommodation,

Company E was set up in the late 1940s, as a family business operating in a shop basement near the Elephant and Castle. Initially a manufacturer of radio chassis, it later diversified, first into domestic goods and later into sheet metal production, and at its peak employed around 200 people in a large factory off the Old Kent Road. From the early 1990s onwards the company went through a long decline, ending with just two employees in 2012 – when it was purchased by a new owner, whose background and interest were in design. Under new ownership the company has been revived as a maker of high-quality trays and trolleys for use in private homes as well restaurants, hotels and the like. It now operates in a small industrial unit, part of an estate also off the Old Kent Road. The company is expanding: its current workforce comprises two owner-managers and seven employees.

In terms of logistics, the company has no particular reason to be in London. The materials it sources, the services it sub-contracts and the skills it employs would be available in many parts of the UK. Indeed some of these inputs are more readily available outside London: for example the Midlands would offer a wider choice of suppliers for certain tools and sub-contractors for services such as metal polishing. Also, for some specialist engineering trades, skilled workers are scarce in London. The firms' outputs go to a range of destinations, from retailers' distribution depots in the Home Counties to overseas customers all over the world. Again there are particular ties to London.

On the other hand, some of the physical problems that drive other industrial businesses out of London do not apply to Company E. As a manufacturer of light, high-value goods the firm has very modest requirements in terms of vehicle access, parking or circulation space, and it generates little traffic. For these reasons, and because it does not work unsocial hours, the owner comments that Company E, and many others like it, could be easily accommodated in a mixed-use environment close to housing.

However, the decisive reasons that tie Company E to London are nothing to do with logistics or physical convenience. There are two such reasons, in no particular order:

- The company's owner-managers wish to live and work there, and specifically in South London, where the family is well established.
- The 'made in London' label is central to the company's brand and a major selling point, valued by retailers and customers both in the UK and abroad.

The company's owner-manager considers that these factors are important to many industrial businesses in the area. Founders of creative and innovative start-ups often choose London as a lifestyle choice, and for many businesses – again often in creative sectors – a London address is a valuable selling point. But he considers that such businesses are not typical of the majority. In his experience, for most of the remaining industrial businesses in the area the factor that ties them to London is the need to be close to their customers. This applied to manufacturing just as much as the service and distribution activities we discussed in earlier case studies. Examples of such manufacturing include printing, theatre scenery, food and drink including breweries and distilleries, fashion items and specialist machinery.

Finding premises

Company E has been at its present site for around 18 months, having left its previous site after it gained planning permission to be redeveloped for housing. Its searched widely for a new location across South London – largely by leafletting and walking the streets, because in many cases small industrial units are not marketed formally through agents.

The owner-manager reports that the search was challenging, not only because little property was available, but also because the space that was on offer did not provide security of tenure. Lease lengths were plummeting and many landlords only offered property on licence, which means that the tenant can be asked to leave at any time. Landowners tend to prefer short-term leases or licences because they hope to secure planning permission to redevelop sites – typically for housing or related

uses such as schools, but sometimes for large-scale warehousing, which produces a major uplift in land values, though not as spectacular an uplift as for housing. Redevelopment for higher-value uses is especially likely in London Plan Opportunity Areas, of which the Old Kent Road is one. For industrial tenants the lack of security can be a major problem.

From Company E's perspective, security of tenure for at least the next five years was essential, because without it they could not afford the investment necessary to fit out their new unit and install the necessary machinery. Taking account of this, and also the cost and disruption of moving, the owners thought that if they were forced to relocate again the company might not survive. In the end they found a unit to buy freehold, which provides more security and allowed them to invest in the building and fixed machinery. In the owner's view such an opportunity would not be available locally today. He advises that the supply of industrial space in the area is becoming exhausted, partly due to an influx of businesses from other parts of London where industry is being displaced by housing development – including the Lea Valley, Tottenham, Barking and Dagenham.

Conclusion

The main point from this case study is the difficulty of securing industrial property in parts of London, and specifically the problem of insecure tenure. This is a side-effect of the policy and market pressures to redevelop industrial space for higher-value uses. It means that property is typically offered on very short leases or on licence, so that occupiers' businesses may be asked to leave at short notice at any time. This is a major issue for Company E's manufacturing operation, because it uses specialist machinery and equipment which are expensive to install and move.

8.5 Implications of increasing supply distances for businesses in London

We have also researched the potential impact of suppliers and services moving further out of London, from the perspective of the servicing needs of organisations and businesses based in central London. We asked a range of organisations in London whether and how they were affected by suppliers and services moving further out, and whether this was a concern to them. We also explored the potential for electric vehicles and consolidation services to mitigate these impacts.

Some organisations are not really concerned about their suppliers moving out, provided that suppliers still meet their 'Just in Time' delivery requirements. For example, from the perspective of a large university college based in central London, the distances travelled by suppliers and services (and the emissions associated with them) are the suppliers' concern, not the college's concern. This college already has some maintenance contractors, IT supplies and food supplies coming from outside London. The college has enough onsite storage to keep some stocks on-site if needed, for items that are needed at very short notice. They use a range of specialist suppliers which could not be served by a single dedicated consolidation centre, as they come from all directions around London. So, currently, increasing supply distances are not seen as a problem by this college, and having a consolidation centre of their own is not seen as viable.

Retail consolidation

In contrast, we found that major shopping centre managers and retailers in London tend to be much more concerned about rising 'supply miles'. This is partly because they are concerned about sustainability issues, possibly because of their public profile, and also because they have to comply with local planning conditions (e.g. number of delivery vehicle movements around their shopping centres). From the shopping centre managers' viewpoint, the drivers for concern about rising supply miles tend to be carbon emissions, air quality in central London and minimising the number of delivery vehicles serving their stores. While there are examples of successful retail consolidation centres (see

the case study below on Clipper, serving the Regent Street area), the motivation for smaller retailers to participate in consolidation services appear fairly weak. There can be advantages in terms of consolidated deliveries requiring less staff time and reducing the space required for on-site storage of supplies. But it is challenging to establish consolidation services across multiple smaller retailers, because of the need to keep costs down and integrate systems across different organisations. Some additional drivers may be needed to encourage retail participation, possibly in terms of planning conditions for new retail centres, if the potential benefits for central London's economy and environment are to be achieved.

Figure 8.9 Regent Street Delivery Consolidation Scheme

Clipper Group, a logistics company, were appointed by Crown Estate to operate the Regent Street delivery consolidation scheme. Since 2011, the scheme has used electric delivery vehicles to serve over 35 retailers in Regent Street and the West End from a consolidation centre in Enfield, outside the congestion charging zone. Rather than multiple suppliers making deliveries to multiple retailers, the suppliers deliver to the consolidation centre and Clipper makes consolidated deliveries at pre-agreed times to each of the retailers. This results in fewer trips, lower mileage and less retail staff time being used to handle multiple deliveries.

The environmental benefits of the scheme are quoted as:

- 77% reduction in vehicle movements
- 74% reduction in average trip length (saving 75,412 miles per year)
- Improved air quality in central London (8kg reduction in particulate emissions per annum, equivalent to an average car driving 6,200 times around the M25)
- 78% reduction in peak time trips, reducing congestion
- 44 tonnes of CO2 saved per year, equivalent to average annual CO2 emissions of 10 households.

In addition to these environmental benefits, which can boost green credentials for participating organisations, other benefits for retailers are reported to be less in-store storage and less staff time spent handling deliveries. Benefits for customers are reduced congestion, traffic noise and reduced pollution, which improves their shopping experience.

In addition to the consolidation scheme for retailers, the Crown Estate has also worked with office-based organisations in the Regent Street area to identify preferred suppliers for commonly-used commodities such as stationery, water deliveries and courier services. Offices are encouraged to use the preferred suppliers, which allows consolidation of deliveries and use of sustainable delivery methods such as cargo bikes.

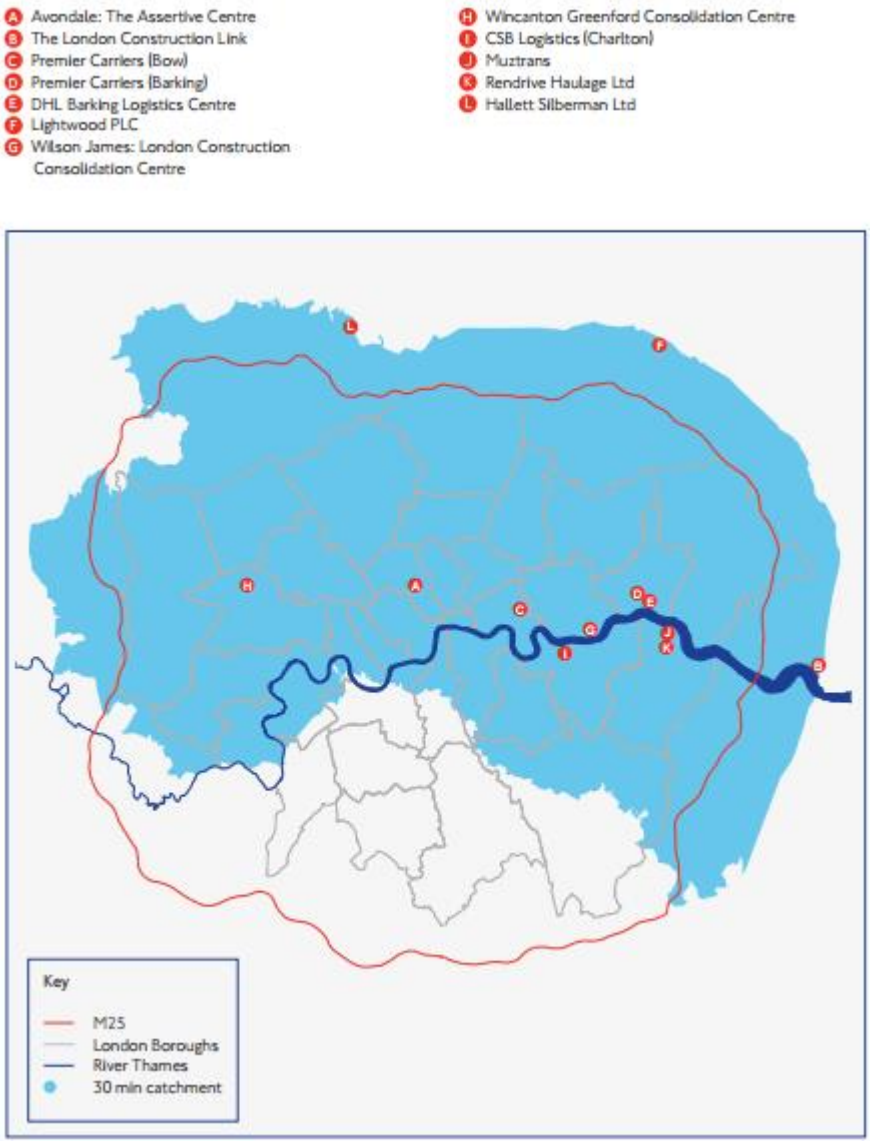
Sources: http://content.tfl.gov.uk/regent-street-case-study.pdf ; http://www.clippergroup.co.uk/wp-content/uploads/2016/01/Regent-Street-Consolidation-Case-Study_LR_v2.pdf

Construction consolidation

Another sector where consolidation is already practiced is construction. Construction consolidation centres (CCCs) are appropriately located distribution facilities, where multiple bulk material deliveries are stored and transported to construction sites. Deliveries of materials are made to the CCC from suppliers in consolidated loads, at agreed times. Benefits to construction projects include compliance with planning conditions, better supply chain management, reduced loss and damage and economies of scale for purchasing supplies. Benefits to society include reductions in movement of heavy goods vehicles, with associated reductions in emissions, congestion and noise. Vehicles can also be used for reverse logistics operations, with waste, damaged goods, pallets and stillages taken back to the CCC

on the return journey. CCCs have been used successfully in the Heathrow Terminal 5 and the London Olympics developments. Some are established on a temporary basis for a particular construction project, while others are permanent and serve multiple clients and projects. TfL publishes a directory[47] of construction consolidation centres and estimates that use of CCCs can reduce vehicle movements to a construction site by 80%. The diagram below, from the 2016 directory, lists 12 such sites in and around London.

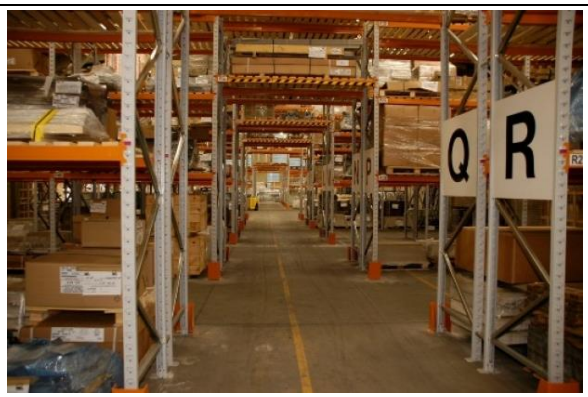
Figure 8.10 Construction Consolidation Centres in London (2016)



Further details of the Construction Consolidation Centre in Silvertown, run by Wilson James, are given in the case study below. This centre occupies an area of 15,000 sq m (160,000 sq ft), which is typical of the size of these centres. A few of the more central CCCs are smaller (930-4,600 sq m or 10,000-50,000 sq ft) while a few of the peripheral centres are even larger. The TfL directory highlights the area that lies within 30 minutes or 45 minutes' drive of each of these centres. As explained in section 8.4 above, there may be future demand for more distribution centres of this type within London, offering relatively local consolidation of bulky deliveries.

[47] http://content.tfl.gov.uk/directory-london-construction-consolidation-centres.pdf

Figure 8.11 Construction Consolidation Centre – Silvertown



The Construction Consolidation Centre (CCC) approach demonstrates the key role supply logistics play in preventing construction waste by delivering materials to the site when needed. Serving a large project or a number of different jobs, the centres are also able to reuse surplus materials, rather than disposing them to landfill.

The main purpose of the CCC is to promote the efficient flow of construction materials through the supply chain to the actual points of use on the projects. It is not a warehouse. The centre aims to enhance construction site performance and reduce the impact on environmental issues such as congestions, pollution and noise.

Construction goods, excluding steel frames, aggregates and major plant, are delivered to the LCCC in relative bulk. From there, materials are called-off by the various trade contractors and formed into work packs for immediate use on-site, following a just-in-time approach. Goods are checked on arrival at the centre for quality and condition, to ensure any problems are highlighted at an early stage. The centre does not store goods in the conventional sense, with an aim of a turnaround time of 10 - 15 days.

Key Facts/Main Benefits:
15% reduction in waste materials
95% improvement in delivering performance (right materials, right place, right time)
68% reduction of vehicles traveling to site
25% reduction in accidents/injuries
47% increase in site productivity
75% reduction in CO_2 emissions

Materials are consolidated which means that multiple part-loads are combined into single deliveries. This process maximises the efficiency of distribution vehicles, and leads to a reduction in the overall vehicle movements delivering to a congested environment.

The site productivity benefits from having a steady supply of materials delivered right to the point of use and keeping the skilled workforce at their work stations, doing what they do best.

Site housekeeping issues such as quality, health & safety and waste are greatly enhanced by the arrival and on-site storage of only those materials intended for immediate incorporation. At the end of the shifts, un-used materials and packaging can be returned to the centre for recycling or reuse.

With its mission to deliver materials to site in the safest and most efficient manner, in active partnership with the Trade Contractors and Project Managers, the CCC significantly benefits the various projects it serves contributing greatly to the achievement of programme certainty.

Several clients now view Materials Consolidation as an ‘added insurance’ in the delivery of their projects and openly recognise that leaving individual Trade Contractors to ‘fend for themselves’ is no longer the way forward. Equally important, Materials Consolidation has a positive impact on good neighbour relations, with the restricted flow of vehicle movements and associated emissions in any given location and time.

Wilson James’ London Construction Consolidation Centre is based in Silvertown and operates a fleet which was recently awarded TfL’s FORS gold standard and is one of a few construction related companies to have achieved this.

Source: http://www.wilsonjames.co.uk/case-study-6-construction-consolidation-centre-.html

Other consolidation services

As explained elsewhere in this report, large supermarkets and delivery companies tend to have regional distribution centres already, located at various points around the M25 or further afield. These are often located so that they can serve both London and the regional hinterland, with locations to the East, North and West being more suitable for this dual role than the South of London. These regional distribution centres effectively operate as consolidation centres, receiving deliveries from a whole host of suppliers and consolidating them into fewer delivery vehicles heading into or out of London. Because of the need for easy road access by suppliers, and for access by road both into and out of London, most of these centres tend to be close to the M25 or other parts of the motorway network.

There has been some interest from a few major retailers and delivery companies in using river transport for deliveries from mouth-of-the-Thames East London distribution centres (e.g. the new Amazon distribution centre in Tilbury) to West London customers/stores. Such an initiative could offer environmental benefits, in terms of reduced carbon emissions and reduced congestion in central London, potentially offering slower but more reliable journey times by river than by road. But there are many challenges in establishing such a service, not the least the availability of suitable wharves and the need for major investment in wharf infrastructure. One major retailer who trialled such a scheme a few years ago concluded that establishment of a dedicated wharf service for its stores would be significantly more expensive than road transport. But sharing such a service with other retailers/distribution companies, on a 'cost per container' basis, might be cost-effective. Such a scheme would only happen if an investor was willing to coordinate a scheme across different potential users, and 'pump prime' investment in a container wharf in West London that could serve a range of users.

Micro-distribution

Finally, another issue of relevance to London's environment and traffic congestion is the growing demand for parcel and home delivery in across London. Retail companies are competing to provide faster deliveries within narrower time slots, potentially increasing the number of delivery vehicles on the road. Again, there may be scope for more consolidation of local deliveries within London, to reduce traffic movements and improve air quality. This would imply increasing demand for small or micro-distribution sites in and around central London, as explained in the case study on Gnewt Cargo below. (Figure 8.12)

It is possible that rail transport could also serve small-scale consolidation centres close to London rail stations, which can offer 'last mile' deliveries within central London using electric or low emission vehicles. Rail could theoretically provide an environmentally-friendly link between a regional distribution centre outside London and one or more micro-distribution centres within London. While such services would offer environmental advantages, they might face challenges competing with the flexibility and cost of distribution by road.

Figure 8.12 Micro-distribution services – Gnewt Cargo

Gnewt Cargo is a micro-distribution firm using electric commercial vehicles to move items around city centres and to provide the first and last touch-points for items on their journey from one city to another. Gnewt Cargo started operating in London in 2009, with cargo bikes, and now operates a zero emission fleet including over 100 electric vehicles.

Gnewt (which stands for Green NEW Transport) focuses on the first mile and final mile of deliveries, offering 24/7 deliveries at times convenient to customers, including home deliveries. The company serves London postcodes and operates several small depots within and just outside the congestion charging zone.

Drivers behind their business model include concerns about London's air quality and emissions, as well as congestion in central London and customers demanding deliveries at convenient times. Gnewt Cargo serves a number of high-profile clients including DX, Hermes, TNT, Farm drop and others.

The environmental benefits of Gnewt Cargo's deliveries for Hermes have been assessed independently by the University of Westminster: 1.9 million were parcels delivered, replacing 329,630 diesel-fuelled miles with 139,460 emission-free miles. This resulted in a 71% reduction in nitrogen oxide emissions, a 67% reduction in CO2 emissions and a carbon saving of 292 tonnes.

Gnewt Cargo have advised TfL that they have difficulties locating suitable depot sites in central London. Micro-distribution centres generally require:

- At least 2,300 sq m (25,000 square feet)
- 24/7 operations
- Safe and secure
- Access for large trucks
- Charging facilities for electric vehicles (if operating electric vehicle fleet)

Source: www.gnewtcargo.co.uk; communications with TfL.

Conclusions

In conclusion, the combined trends of (a) services and supplies being squeezed out of London by land pressures and (b) delivery schedules and delivery windows becoming ever tighter and more customer-friendly, will have potentially negative impacts in terms of transport emissions, London's air quality – and reliability/congestion/traffic movements in London – unless efforts are made to consolidate deliveries.

In some sectors (e.g. major retailers, major delivery companies, construction), the market is delivering retail distribution and consolidation centres in response to these pressures. But there may be arguments for more proactive encouragement of consolidation services that can be used by smaller organisations, both those requiring large consolidation sites located around the M25 (which can reduce vehicle movements into central London) and those requiring smaller distribution sites within London (to allow more efficient and cleaner deliveries at a local level). Use of such centres, similar in pattern to the 'hub' and 'spoke' centres used by Company D in the case studies above, could be promoted through planning conditions that limit HGV movements to and from central London sites, and through initiatives to protect London's environment, such as the proposed Ultra Low Emission Zone.

Increased usage of consolidation and distribution centres could have strategic benefits for London's economy and environment, in terms of lower emissions, improved air quality, reduced congestion and more reliable delivery times. Subject to cost and feasibility, use of the River Thames and/or rail transport within these solutions could offer further strategic benefits. There may be a role for strategic leadership by public sector bodies such as the GLA in achieving these strategic goals.

8.6 Market Response to Diminishing Industrial Land

As supply of industrial land diminishes at a faster rate than the demand for it, rents and land values will rise and this may cause occupiers and developers to respond with solutions different to those that have prevailed under the old equilibrium. Based on some observed recent changes in market activity we explore what some of these responses might be and the potential implications. We also set out the circumstances under which some of these initiatives are likely to succeed and mechanisms that could help to deliver them.

Spatial Substitution

Historically industrial firms forced to relocate through loss of premises or higher rents have moved further out in the same property market corridors. Thus, for example, businesses from inner London have relocated to Park Royal, and firms from Park Royal have move out to Greenford. As land in west London is diminishing further, property agents are now reporting that some businesses are starting to look east as their next relocation step. So rather than move from Greenford to Slough, say, they will look to relocate somewhere like Enfield which is still in London and offers cheaper rents.

Market evidence of consideration of west to east substitution in London is reinforced by the fact the major industrial developers SEGRO have recently spent significant sums of money buying land in north and east London.

The other form of spatial substitution as discussed earlier is London's demand being serviced from further afield. John Lewis moving from Park Royal to Milton Keynes is one such example of this. This form of spatial substitution is viable for larger firms. Their locational decision will be determined by the trade-off between costs incurred on greater travel against costs incurred on higher property costs. For marginal firms and many SMEs this form of relocation is not a realistic option. Many SMEs faced with the prospect of relocation will simply close. This was observed, for example, with the Olympic Park relocation.

Spatial substitution does also entail the loss of some jobs in London. Whilst this may not involve a net loss of jobs at the UK level (and may even bring net gains), we have noted at the outset of this chapter the concentration of industrial jobs in particular occupations. For these displaced workers there may be real costs with limited opportunities to secure alternative employment.

Intensification

Intensification is about getting a higher level of industrial activity on the same area of land. There are two ingredients needed to deliver this: design and viability.

Design

Intensification of use can be achieved by simply designing space so that it can be used more intensively. For example, using foundations that allow buildings to be increased in height; using a structural system to allow mezzanines to be installed, and laying floor systems that permit high density storage and racking systems.

Where possible, yard areas should be optimised for efficient use. This can mean more sharing of yard space by different occupiers, but also implies careful consideration of circulation and drop off requirements.

Of course, intensification can also be achieved through 'stacking' occupied units across two, three and four storeys. There are many examples across London of business centres that are designed in this format. However, there are limitations in terms of the types of occupiers that are able to occupy the upper levels. Key constraints are access for goods and materials. One solution is to layer different types of uses/users so that, for example, the ground floor has more production/workshop-style space, grading to occupiers with more generic uses higher up the building.

Multi-storey developments must also preserve requirements for high ceiling space. This is a key requirement for occupier flexibility. It should be possible to mix activities with higher space on lower floors and lower ceiling heights on upper levels. Multi-storey solutions should also be aware of requirements for public access, and the potential for health and safety issues.

Multiple storeys also imply shared facilities such as goods lifts and yard areas which need to be carefully designed, especially in terms of capacity. Design must also consider access to power and utilities in terms of separating individual demises. For example, requirements for air extraction, water supply and three-phase power (for heavier loadings) can exceed 'normal' requirements, but are not predictable.

The GLA report, Industrial Intensification Primer, also refers to placing small industrial units above or alongside larger warehouses. This is currently much less common, but there is no reason why it should not become more common practice. The same report refers to yard space on the roof to support units on upper storeys, although the economics of this are likely to be prohibitive in the near future.

Some older and redundant office buildings can also be used for multi-storey 'light industrial' and studio-type space – they already have the goods access and parking. They allow higher density industrial use while retaining employment space in an area. Equally, multi-storey industrial buildings can be converted for the same purpose: the Chocolate Factory in Wood Green and the Bootstrap in Dalston are good examples.

There are fewer sectoral differences in intensification opportunities and more activity differences. Thus, more intensive developments need to be designed to allow different activities, ranging from more-or-less office space (albeit in studio format), to 'maker' space where materials are being manufactured by a range of businesses, in shared spaces.

Viability

As land and property values have risen, redevelopment of industrial estates has become viable in some circumstances. Potential is greatest in high demand, high value areas such as Park Royal as demonstrated in research carried out for the Park Royal Industrial Land Review.

"Ground floor space can be freed up for larger warehouses by developing sites to include additional light industrial workplaces on upper floors for businesses that do not require regular use of yard space and parking. Developing new industrial estates with a second storey of yard and warehouse space accessed via ramps and providing shared facilities for larger deliveries could provide a viable solution. Raising roofs, adding floors and freeing up yard space in dense light industrial sites can provide additional space for businesses to start-up, grow and be more efficient." [48]

[48] Park Royal Industrial Land Review

But whilst the potential for intensification exists it may need a nudge to make it happen. As the Park Royal Industrial Land Review further noted,

"One barrier to implementing many of the proposals is overcoming the conservative nature of most industrial development in London ……. Many of the options discussed would require specialist industrial site developers and management firms to take on new roles or work together to deal with the more intense design, planning and management necessary for more intensive industrial sites. As the conditions of the industrial site market evolve the public sector can play a role in supporting and encouraging industrial developers to adapt and innovate to provide the spaces required by a diverse range of industrial businesses." [49]

Multi-Storey Warehousing

A specific form of intensification is multi-storey warehousing. Whilst common in places such as Hong Kong and Tokyo, the UK has a very limited number of multi-storey warehouses, including the X2 unit in Heathrow that was completed in 2008, which has not widely been considered a success, and Amazon's 204,385 sq m (2.2 million sq ft) facility being built in Tilbury.

X2 Heathrow

Amazon Tilbury

There is a distinction to be drawn between multi-level and multi-storey warehouses which has been described as follows:

"Ramp-up buildings will have higher throughput but lower area efficiency as some of the site area is used by the ramp itself. Cargo-lift buildings are cheaper to build and can be constructed in smaller site areas. However, the throughput suffers as all goods on the upper floors must be transported via elevators."[50]

Overseas examples of multi-level facilities do exist (see below), but the costs, in the UK, are prohibitive at present. While the cost and construction risks involved when building multi-level warehouses will need to be overcome by modular construction and technology, rising rents and the lack of available land are likely to encourage more build-to-suit multi-level facilities in the future.

Japan, Singapore, Hong Kong and other parts of Asia, where shortage of land justifies more intense use, are leaders in multi-level facilities. Some examples are shown below:

[49] Park Royal Industrial Land Review

[50] Jason Fong, Hong Kong-based Asia Pacific research manager at CBRE quoted in Estates Gazette

GLP Misato III, Tokyo – 1m sq ft (93,000 sq m) multi-tenant facility

ProLogis Parc Osaka II, Osaka – eight storeys, 1.8m sq ft (167,000 sq m)

ATL Logistics Centre, Kwai Chung Container Terminals, Hong Kong – 9.3m sq ft (866,000 sq m)

Goodman Interlink, Hong Kong – 2.4m sq ft (223,000 sqm) over 24 storeys

One of the factors holding back multi-storey warehousing in the UK to date is that developers are cautious where a product does not already exist. As reported in the Estates Gazette,

This chicken-and-egg situation may explain why developers have politely declined sites offered with a potential for multi-storey shed use, says Montagu Evans's industrial and logistics partner, Jody Smith. "Initially they may find it hard to fund the build cost. But if one developer goes ahead, others may follow," he says.[51]

"Even if the concept is sound, developers want reassurance that investors will, literally, buy into it. Savills' Sullivan admits: "The challenge for the industry is how to value these buildings so that they can be traded. Somebody has to take a big leap of faith to provide the evidence that creates comparables."

But it could be that the time for multi-storey warehousing has now come. An assessment undertaken for the Park Royal Industrial Land Review concluded that such development was viable.

[51] Estates Gazette feature: Is the only way up for urban logistics buildings?

"we believe that in the current market a multi-storey warehouse development would be viable in Park Royal and such a development would have a higher plot density than a standard new ground floor development"[52]

Elsewhere it has been reported that,

"As land values in urban areas continue to rocket, largely due to competing residential use, that leap may now not be that far off – market opinion suggests we can expect to see one or more new-generation multi-storey buildings, probably in London, by 2020."

So, it is very likely that new multi-storey warehouses will be developed in London in the near future. But there will be limited number of places where such development will be feasible. It is likely to require large sites and the impact in terms of the overall quantum of floorspace is likely to be relatively limited.

Mobile Warehousing

An even more innovative logistics solution has recently been announced by Amazon in the form of mobile warehousing:

In 2014 the company released a patent for mobile warehouses. The idea was that it would use online purchasing analysis to stack trucks with products most likely to be ordered in a certain area or postcode before the customer has even decided to buy them. They called it "anticipatory shipping". [53]

We would only expect innovations such as this to act at the margin on demand for industrial land, but it serves to highlight how the logistics sector has consistently evolved and raised its productivity to meet growing demand.

Co-location with residential

Given the strength of demand and tight supply, the developers and the wider real estate industry have given some consideration to how the market might adapt to new forms of mixed-use development.

Several industry professionals have suggested 'bed and shed' facilities in order manage warehousing supply shortfall in urban areas. This will potentially involve light and/or clean service-based industrial units located in the basement / ground, gym on the ground / first floor serving as a noise buffer, residential development on top floors and the use of electric cars /vans to minimise traffic and delivery noise.

A permutation on this is already being progressed by self-storage businesses. Big Yellow has bought the freehold of its site in Battersea and is discussion with Wandsworth Council to redevelop the site for mixed use – trebling the size of its existing unit to 8,361sq m / 90,000 sq ft plus and placing residential above. Big Yellow is thought to be seeking a suitable partner for this type of scheme that could be replicated elsewhere in high value neighbourhoods in London. Properly planned basement and ground floor self-storage, with residential above, could be a viable option to retaining storage facilities and adding to housing supply. Other self-storage mixed use developments include Lok'n Store at Maidenhead, where half the ground floor area was sold to Lidl (which helps to drive footfall), and Access Self Storage in Brixton, where serviced offices are on the upper floors. Safestore has around 10 locations that have shared uses, including Camden and Notting Hill which have residential above.

[52] Park Royal Industrial Land Review 2015
[53] Estates Gazette 13 February 2016

Lok'n Store / Lidl, Maidenhead

Access Self-Storage with offices above, Brixton

The Travis Perkins and Unite scheme at King's Cross, completed in 2014, is another example of innovative use where a 3,716 sq m (40,000 sq ft) builders merchant sits under a 563 bed Unite student accommodation block.

Travis Perkins / Unite, trade unit with student accommodation above, King's Cross

One of the key considerations here is 'neighbourliness': often residents object to the noise, out-of-hours activity and vehicle movement associated with commercial activity, and businesses don't want unhappy (complaining) neighbours. On this basis, the more 'generic' the activity, the more likely it is to be compatible with residential neighbours. Carefully designed solutions for servicing are key. In particular, the separation of vehicular access such that the residential uses do not come into conflict with commercial traffic is crucial.

In new developments, residential and commercial uses should be physically segregated such that line-of-sight views of the commercial activity are avoided. From a commercial occupiers' perspective, horizontal separation is preferable to vertical separation (in other words, commercial space on the lower floors of residential space or even below ground level is not popular).

The GLA report, Industrial Intensification Primer, suggests integrating residential and industrial space using, for example, part of the roof space of the latter as garden space for residents. Such an approach would need to deal with potential conflict in terms of noise, but also in terms of the needs of commercial occupiers to have access to roof space for plant.

The key point when considering the co-location of commercial activity with residential is to recognise that commercial activities change over time: the property needs to be able to respond to changing occupier needs. There is a danger in some approaches that a solution is delivered that cannot adapt at a later date due to the restrictions of the surrounding residential uses.

A fundamental issue that is often ignored in regeneration initiatives, and in design discussions, is the motivation of the owner/developer. In order to secure funding, any new scheme must satisfy basic design requirements, notably around leasing prospects. Funding will be available, other things being equal, for schemes that demonstrably meet market needs; this means being attractive to as wide a base of occupiers as possible. Secure, long-term income is a key component in investor decision-making and if there is any doubt at all about the leasing prospects for space, then funding will be less forthcoming.

The implication here is twofold. First, there is a default position which is that 'people and business don't mix': the risk profile increases and therefore co-location is not favoured. Secondly, if the design is atypical, or in some way seen to be 'too innovative', then funders will shy away. The question, of course, is under what circumstances might these perspectives change? A combination of prices and land supply constraints might cause developers to re-visit their models. For example, there have recently been a number of proposals for residential development above self-storage.

Similarly, it might be the case that as work and workstyles continue to evolve, there will be more opportunities to integrate work and living because the former is less intrusive, especially where industrial sites can be redeveloped for high density residential and commercial uses. For example, in Poplar E14, commercial provider Workspace is in the process of selling light industrial land to residential developer Telford, including the re-provision of workspace. In the first of three phases, Workspace sold Telford a plot for the construction of 170 apartments (of which 50 are Affordable) and 743 square metres (8,000 square feet) of light industrial space which will be returned to Workspace. Workspace had previously obtained planning consent on this four-acre industrial estate in September 2013 for a total of 392 apartments (80 of which are Affordable) and 6,500 sq m (70,000 square feet) of business and light industrial space.

In October 2017 the government's permitted development rights (PDR) proposals will allow landlords to change the use of a building from light industrial (B1c) to residential. The new PDR legislation could, however, potentially worsen the supply shortfall in certain areas when the tightening supply of light industrial units in London is already forcing businesses to move outside of the city. Where supply of such stock is tight then Boroughs should consider the use of Article directives to remove permitted development rights.

8.7 Conclusion

Our case studies illustrate a finding stated earlier in this report: for those industrial activities that are still operating in London, the main factor that keeps them there is access to their customers, which include both the capital's households and its other industries, including tourism, leisure and the Central London office cluster. This applies not only to services like transport and distribution, but also to construction and even manufacturing.

As the supply of industrial land in London shrinks, the businesses that need to occupy industrial land adjust to this reduced supply by locating further from their customers. Typically, businesses that would ideally locate in inner London shift towards outer London, and those that would ideally be in outer London go beyond the M25 – which may mean a long way away, to places beyond the Green Belt.

In all our case studies, the impact of this adjustment is that businesses have to travel further to deliver goods and services to their customers. The resulting costs may be borne by suppliers or customers, or (more likely) shared between the two. For customers, they may include slower or less reliable delivery as well as higher prices.

These additional costs may be economically efficient adjustments, reflecting the opportunity cost of land in London - which is in high demand for housing and other uses, in competition with industry and warehousing. If so, the loss of well-being from loss of industrial land may be more than compensated by gains from alternative land uses, such as housing. But loss of industrial land also results in social costs, or negative externalities, as additional traffic worsens congestion, air quality and carbon emissions, with adverse consequences for London's quality of life and for climate change.

Another impact is that occupier businesses may go out of business and jobs may be lost. In general this will not amount to a reduction in overall output or employment, because other businesses will supply the same demand for goods and services. But in the process individual lives are disrupted; and on balance larger, corporate businesses probably gain at the expense of SMEs, which may impact adversely on social cohesion or diversity.

To reduce such adverse impacts, one option is selective release of Green Belt sites for industrial development. Another option is that the planning of development and regeneration areas, including the Opportunity Areas identified in the London Plan, make provision for local distribution facilities such as parcel depots, and also other industrial land uses that need to be close to people's homes, such as builders' merchants or car repair. Arguably these services are comparable to doctors' surgeries, schools and utilities, for which land is routinely set aside when new housing development is planned. Such industrial land allocations in residential areas would not necessarily be at the expense of much-needed housing. Rather, they may replace allocations for high-density employment uses, especially offices, which realistically may not be in demand and also may not be needed to keep people employed - given that in much of London there is a shortage of workers rather than a shortage of jobs.

Finally, our second case study focuses on 'bad neighbour industries' – activities that should not be located close to housing because they harm residents' amenity. In this case study, Company B had great difficulty securing planning permission, although its site was in a Strategic Industrial Area (SIL), designated for the very purpose of accommodating activities that if located close to housing would be bad neighbours. The reasons were that Company B's site was on the edge of the SIL, adjoining a housing area, and that a neighbouring office building inside the SIL might have been shifted to residential use under Permitted Development Rights.

The lesson from the case study is that SILs will not fulfil their purpose if their edges are allowed to erode, or their integrity is undermined by change of use to residential. An effective SIL needs sufficient critical mass, defensible and defended boundaries, and a prohibition on housing and other sensitive uses, so that it provides sites that are surrounded on all sites by compatible land uses.

9 Utilities

9.1 Introduction

In 2015, utilities occupied 1,048 hectares of industrial land in London, according to AECOM's Industrial Land Supply study. This was the third largest category, after general industry and warehousing, and represents the land used by infrastructure for energy production, transmission and distribution; water supply and treatment; and telecommunications. As telecommunications infrastructure has minimal land-take, this section focuses primarily on energy and water.

Land use for infrastructure has declined slightly from the level of 1,109 hectares in 2001. London's strategy for infrastructure provision to 2050 is set out in the London Infrastructure Plan. This plan emphasises the need for strategic planning and joined-up delivery of infrastructure to meet the needs of London's growing population and economy. This approach is being taken forward through more detailed infrastructure planning for London's Opportunity Areas: while plans for VNEB and Old Oak Common are well advanced, most other areas are at an earlier stage. Where relevant, Opportunity Area Planning Frameworks are supported by a Development Infrastructure Funding Study (DIFS), setting out how key infrastructure requirements can be funded.

9.2 Energy

Context

The London Infrastructure Plan and its supporting papers set out aims for London's energy infrastructure to 2050.[54] The plan emphasises that access to secure, affordable and sustainable sources of energy is essential to provide long-term confidence for London's businesses, investors and residents. The overall aim of London's energy infrastructure strategy is to achieve effective balancing of three inter-related objectives:

- Security and reliability of supply
- Affordability and cost-competitiveness of energy
- 80% carbon dioxide emissions by 2050, in line with Mayoral and national government policy.

The London Infrastructure Plan emphasises that local energy supplies will play an important role in achieving these three objectives. It supports a model where 50% of energy supply is generated from local sources, as opposed to more centralised scenarios in which London gets most of its energy from national sources.

GLA has prepared a London Energy Plan that sets out four scenarios to 2050, exploring how much energy London would need in the future, where it might be needed and the different ways of supplying that energy (including potential local sources). The plan consists of a set of interconnected data models and associated maps for building demand, power, heat, decentralised energy and transport. The maps and scenarios can be found at: https://www.london.gov.uk/what-we-do/environment/energy/scenarios-2050-london-energy-plan. This is discussed further below.

[54] See supporting paper 'Enabling infrastructure: green, energy, water and waste infrastructure to 2050', published by the GLA

Infrastructure

Energy infrastructure on industrial land includes power stations, cableways and transformer stations for electricity distribution, energy centres and thermal stores for district heating networks, as well as gas transmission and distribution facilities. The replacement of town gas with North Sea gas has reduced the need for gas manufacture and storage facilities.

London's major power stations and Combined Heat and Power (CHP) plants are listed in the Digest of UK Energy Statistics produced by BEIS. One major change is that Barking Reach power station closed in 2014. The Barking Reach site is very large (approximately 14 ha) but the land-take of other power stations ranges from 0.15 ha to 2.7 ha. In recent years, there has been a significant increase in the installation of CHP plants in London: this is discussed further below.

Table 9.1 Major power stations and CHP plants in London (> 1 MW)

Name and location	Fuel source	Installed capacity (MW)	Start year
Enfield Power Station, LB Enfield	Gas (Closed Cycle Gas Turbine)	408	1999
Taylor's Lane Power Station	Gas oil (Open Cycle Gas Turbine)	144	1979
Belvedere, LB Bexley	Waste*	80	2011
Edmonton, LB Enfield	Waste*º	40	1971
SELCHP, LB Lewisham	Waste*	32	1994
Thames Refinery,Tate & Lyle, LB Newham	Biomass CHP	28	Not known
Citigen, LB Islington	Gas CHP	8	Renewed 2015/16
London Heat and Power, Imperial College, LB Kensington & Chelsea	Gas CHP	9	2000
Powell Energy, St George's Hospital, LB Wandsworth	Gas CHP	4	2016 est
UCL Gower Street	Not known	3	2000
Vital Energi, Kings Cross – Metro#1, LB Islington	Gas CHP	2	2016 est
Bunhill Heat and Power, LB Islington	Gas CHP with thermal store	2	2012
Barkantine Heat, LB Tower Hamlets	Gas CHP	1	2000

Source: DUKES, 2016. (Note: plants marked with an asterisk * may be classed as waste management sites rather than energy infrastructure. Plants with renewal plans are marked º).

The list above includes some CHP plants that meet onsite demand for the host organisation (e.g. the CHP plant at Tate & Lyle's Thames Refinery), as well as some CHP plants that deliver heat through local district heating networks (e.g. the King's Cross Metro #1, Citigen and Bunhill schemes). Energy centres for district heating generally typically have a land-take of less than 1 hectare but arrangements vary between schemes: the King's Cross Metro scheme has been built underground and the Citigen scheme has been constructed within a listed building.

The DUKES list does not appear to include electricity generation plants that meet onsite demand, such as the two wind turbines in LB Dagenham. Constructed in 2009/10, these wind turbines have a

combined capacity of 5.8 MW and generate electricity for Ford's car factory in Dagenham. The DUKES list also omits Greenwich Power Station, which provides emergency back-up power for London Underground, and the Croydon Energy gas turbine power station, which is owned by Rolls Royce Power Development Ltd. DUKES also omits smaller CHP schemes with electrical capacity less than 1 MWe.

The installation of renewable capacity in London has to date been much lower than in other parts of the UK. Installed capacity within the capital in 2015 was 349.4 MW, which represented only 1% of the UK total. Within London, photovoltaic installations tend to be integrated into new buildings or retrofitted to existing buildings, so have little direct land-take. Wind installations also have low land-take, while landfill gas and sewage gas facilities normally form part of waste management and water treatment sites, respectively. Bio-energy plants cover quite a wide range of technologies, from anaerobic digestion plants which would tend to be classed as waste management sites, to biomass boilers which might be housed in an energy centre or might be integrated into buildings such as hospitals or leisure centres.

Table 9.2 Renewable energy capacity in London, 2015.

Type of renewable energy	Number of sites	Installed capacity (MW, 2015)
Wind	31	11.2
Solar photovoltaics	19,943	82.1
Hydro	0	0
Landfill gas	5	25.8
Sewage gas	8	38.6
Other bio-energy*	16	191.7
Total	**20,003**	**349.4**

Source: Energy Trends, September 2016 (*bio-energy includes plants co-fired with fossil fuels)

Energy infrastructure also includes the many cables and sub-stations required for both the high-voltage transmission network (132 kV and above) operated by National Grid and the low-voltage distribution network (11 kV) operated by Distribution Network Operators (DNOs). While UK Power Networks (UKPN) is the DNO that serves most of London, part of West London is served by Scottish and Southern Electricity Networks (SSEN).

Drivers of Demand for Land

The infrastructure needed to meet the energy requirements of individuals and businesses in London depends not only on the capital's population and economy, but on fuel choices, on the technologies chosen to generate electricity and on peak demand. Other factors identified by the National Grid[55] as influencing the level of peak demand in the electricity transmission system are: the weather, energy prices, energy efficiency/conservation, customer demand management, take-up of self-generation, supplies taken from generation embedded within distribution networks, and the level of external interconnection exports and regulation.

Technological change is currently sparking major changes in the energy system. Renewables contributed nearly 25% of electricity generated in the UK in 2015. Given the intermittent nature of much renewable generation, this has increased demand for flexibility in the transmission and distribution system. Various national policy initiatives are underway to encourage electricity demand management, not just to save carbon but to reduce the need for investment in the transmission and distribution networks. Battery storage has fallen significantly in price, so storage is likely to play an increasing role

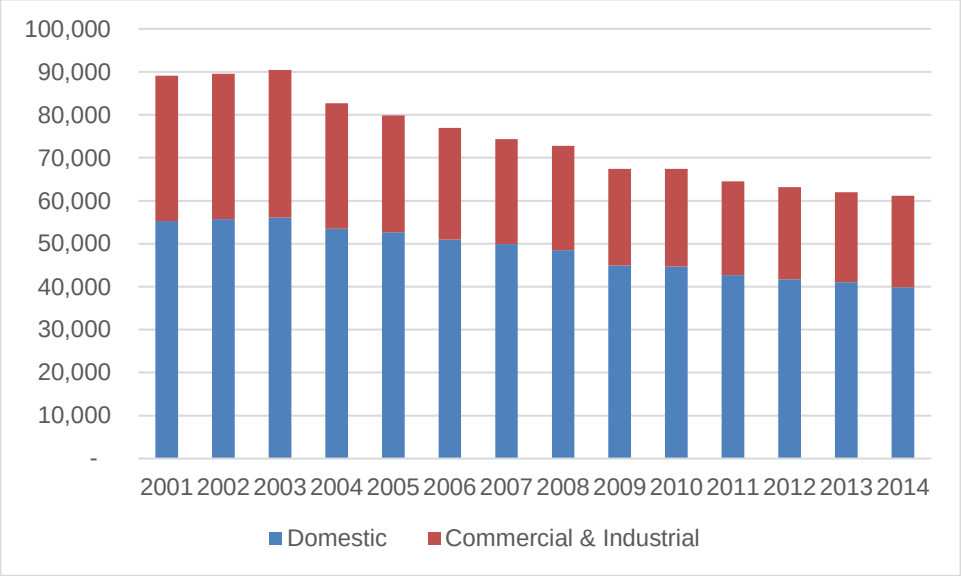
[55] National Grid, National Electricity Transmission System Seven Year Statement, May 2010.

in balancing supply and demand at different times of day, reducing the generation, transmission and distribution infrastructure needed to meet peak demand.

Changes are underway in the gas sector too. Technologies such as anaerobic digestion (AD) can be used to generate biogas which can be used to generate electricity and power locally. Other plants produce high grade biomethane that can be pumped into the national grid network.

Historic data show that London's gas consumption has significantly reduced in recent years, falling by 31% overall between 2001 and 2014. Consumption has fallen in both the domestic sector and commercial and industrial sectors. In the domestic sector, this is largely driven by a reduction in the consumption per household, owing to improvements in home energy efficiency and rising gas prices. But in the commercial and industrial sector, consumption per consumer has been fairly stable while the number of gas consumers has reduced, possibly owing to the decline in manufacturing in London over this period.

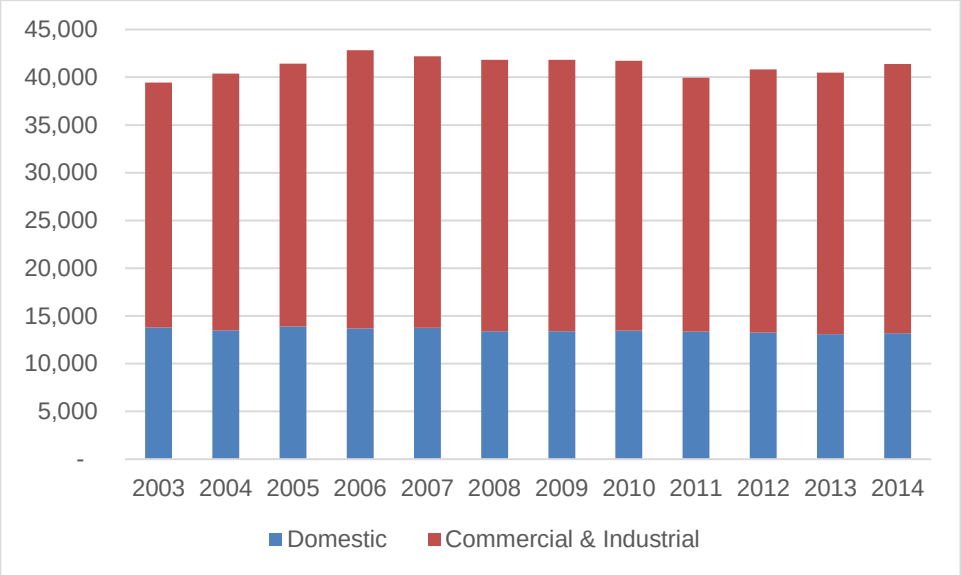
Figure 9.1 London's gas consumption (GWh)



Source: Department of Energy and Climate Change, London Datastore.

In contrast, electricity consumption in London has been fairly stable and has risen slightly rather than fallen in recent years. Although there have been significant efficiency gains in electrical appliances, and pressure from rising prices, this have been counteracted by growth in the number of appliances used. While overall consumption has grown by 5% over the period 2003 to 2014 there are differences between sector performance: commercial and industrial demand has grown by 10% over this period while domestic consumption has declined by just over 4% despite growth in London's population since 2003.

Figure 9.2 London's electricity consumption (GWh)



Source: Department of Energy and Climate Change, London Datastore.

London's Energy Plan has developed four scenarios for future energy supply and demand, based on detailed modelling of future demand and of the ways in which supply can meet demand across the capital. The scenarios are summarised below. Only the 'low demand' scenarios would meet the Mayor's carbon target for an 80% reduction in carbon emissions by 2080. A report by the London Assembly Environment Committee on sustainable growth in London has suggested that the London Infrastructure Plan predictions are based on the high demand scenario[56] which is not compatible with carbon reduction objectives.

[56] 'Growing, growing, gone – long term sustainable growth for London'; report by the London Assembly Environment Committee (March 2016).

Table 9.3 Summary of future energy scenarios underlying the London Infrastructure Plan

High demand, centralised supply 2050 • Similar energy system to today, with low energy prices • 60% CO2 emissions reduction below 1990 levels by 2050 • Climate impacts drive up demand for cooling • 10% improvement in energy efficiency of appliances and 40% improvement for lighting by 2050, but offset by increased usage • High level of electric, hydrogen and hybrid vehicles, driven by air quality concerns and mobility • Significant increase in power demand from 2015 to 2050, requiring investment in heat pumps, in reinforcement of the electricity distribution network and additional substations • Around 10% of London's heat demand met by heat networks • Limited uptake of demand-side response technologies	**Mid demand, mixed supply 2050** • Medium energy prices lead to some reduction in energy demand from buildings and encourage a move towards heat demand being met by local heat networks and grid electricity • 75% reduction in Co2 from 1990 levels • Climate impacts drive 20% increase in energy for cooling from 2015 to 2050 • 30% improvement in energy efficiency of appliances and 70% improvement in lighting by 2050 but some increased usage • Medium level of electric vehicle usage – charging network introduced to support this • Electricity demand increase by 15% between 2015 and 2050, reflecting population increase and more heat pumps for buildings not heated by heat networks • Around a third of London's heat demand met by heat networks • Increased uptake of demand-side response helps to limit overall capital investment in energy supply infrastructure
Low demand, centralised supply, 2050 • Similar energy system to today, but with national interventions (e.g. regulations) to reduce energy demand from buildings, with decarbonisation of electricity grid and significant electrification of heat and transport • 80% reduction in CO_2 from 1990 levels • All non-domestic and domestic properties receive energy efficiency refits. • Climate impacts drive 30% increase in energy demand for cooling from 2015 to 2050, but passive measures used too • 50% improvement in energy efficiency of appliances and 80% improvement in lighting by 2050. Some increased usage but overall demand is assumed to fall by up to 30% from 2015 levels. • High level of electric vehicle usage and increased energy demand for rail travel in the capital • Electricity grid decarbonised fully by 2050. • Around 10% of London's heat demand met by heat networks with high uptake of heat pumps (1.5 million). Initially Gas CHP but latterly renewables and secondary heat sources. • High update of demand-side response, coupled with increased prices, help to limit overall capital investment in energy supply infrastructure	**Low demand, decentralised supply, 2050** • High energy prices significantly reduce energy demand from buildings and encourage use of heat networks using waste heat. • 80% reduction in CO_2 from 1990 levels • Climate impacts drive 30% increase in energy demand for cooling from 2015 to 2050, but passive measures used too • 50% improvement in energy efficiency of appliances and 80% improvement in lighting by 2050. Some increased usage but overall demand is assumed to fall by up to 30% from 2015 levels. • Medium level of electric vehicle usage – charging network introduced to support demand • Electricity demand across the city reduces by 15% between 2015 and 2050, reflecting population increase and more heat pumps for buildings not heated by heat networks • High levels of installation of solar PV (150,000 installs by 2050) • Around a third of London's heat demand met by heat networks, which are increasingly low carbon (e.g. using waste heat from waste plants, data centres etc) • Increased uptake of demand-side response, coupled with increased prices, help to limit overall capital investment in energy supply infrastructure

Across all these scenarios, important drivers of demand for energy land in London are:

- Increased delivery of heat networks, meeting heat demand through local sources, supported by London Plan policies mandating connection to CHP schemes for developments of 500+ dwellings – requiring land for energy centres, energy storage and associated heat network infrastructure;

- Increased investment in low-carbon and renewable electricity generation – requiring land for some, but not all, types of technologies (e.g. biomass, energy from waste);

- Increased demand for electricity, driven by rising population and economic activity, as well as increased electrification of heat and transport, countered to varying degrees by energy efficiency improvements and demand management – potentially requiring investment in electricity network infrastructure and sub-stations.

The demand for additional energy land is likely to be highest in Opportunity Areas, where development is focused.

Forecast Demand for Land

The GLA has been working with key infrastructure providers across London to assess the infrastructure requirements of future growth across the capital. A detailed list of forthcoming infrastructure projects, by provider, are set out in the London Infrastructure Mapping Application. Estimates of land-take are not included in the project details. Detailed plans are being developed for each of London's Opportunity Areas, but only a few have yet been completed. The table below summarises the provision made for energy infrastructure in the VNEB and Old Oak Common/Park Royal Opportunity Areas.

Table 9.4 Summary of energy land provision in Development Infrastructure Funding Study

VNEB	Old Oak Common/Park Royal OA
• Total electricity demand is predicted to be 50 MW (excluding demand met from sources within OA) • One new electricity sub-station is likely to be needed (land-take estimated at 50x50m or 2500 sq m = 0.25 ha). • Onsite supply: proposed Anaerobic Digestor to use biomass waste from New Covent Garden Market • Potential further onsite supply: possible biogas-fuelled power station (30 MW). • Existing gas infrastructure operated by SGN has sufficient capacity for the development.	• 132 kV main transmission line required from NG's main substation at Willesden • One new 132 kV electricity sub-station (land-take estimated at 45x40m = 1800 sq m = 0.18 ha) • Various smaller 11 kV distribution lines • Possible CHP network (either a multi-source heat network or a series of energy cells) • But smart grid/demand reduction across the area could substitute for a CHP network • Existing gas infrastructure, operated by National Grid, would require some investment (e.g. gas governors), but with minimal land-take.

Source: VNEB Development Infrastructure Funding Study, RTP, March 2010; Old Oak Common and Park Royal Development Infrastructure Funding Study, PBA, February 2016.

Overall, the GLA's modelling for support the London Infrastructure Plan[57] suggested that 8 to 9 new sub-stations might be needed to support growth in Opportunity Areas. Assuming that the average size of main sub-stations is 0.2 ha (based on advice from UKPN and figures in the table above), this would imply additional land demand of just under 2 ha. National Grid substations are likely to be larger, potentially 250 m x 100 m (i.e. 2.5 ha). It is possible that the need for investment in cables and/or sub-stations could be reduced through peak demand management.

[57] See page 18 of 'Enabling Infrastructure: Green, Energy, Water and Waste Infrastructure to 2050', GLA (2014).

We are not aware of any firm plans for the construction of major new power stations, other than renewal of the energy from waste plant at Edmonton on its existing site. But the decentralised energy strategy proposed by the GLA implies the need for a number of smaller CHP plants and heating networks across the capital. While most of this infrastructure will be building-integrated, there may be a need for standalone energy centres in some OAs. The London Heat Map identifies those areas with most demand for heat and therefore greatest opportunity for heat networks. See: https://www.london.gov.uk/what-we-do/environment/energy/london-heat-map

We have contacted key providers of electricity and gas transmission and distribution infrastructure in London to obtain an overview of their land requirements. These are summarised in the table below.

Table 9.5 Summary of planned electricity and gas network investments, and their land implications

Organisation and role	Current and planned infrastructure investments	Implications for land demand
National Grid, electricity transmission	• London Power Tunnels project (just completed) • North London Reinforcement • Replacement of metal pipes in various locations • Internal improvements to various substations • New National Grid substation at Kensal Green to supply Crossrail • New National Grid substation at Highbury to accommodate growth in energy demand, with integrated heating scheme	• None – underground • None - cable • None – underground • None – internal • Estimate 2.5 ha • Estimate 2.5 ha
UKPN, electricity distribution	• Numerous network reinforcements • Potentially 8 new sub-stations in the London license area, to meet forecast of rising demand for domestic, C&I, heat pumps and electric vehicles. (These sub-stations include VNEB and White City/Willesden within the OA areas. This scale of investment is consistent with the 8-9 sub-stations referenced in the London Infrastructure Plan.)	• No significant land-take • Land-take 0.2 ha per sub-station (1.6 ha in total). • Fewer substations may be required if demand-side response and network charging can reduce peak network constraints.
Scotia Gas Networks, gas distribution (South London)	• Reinforcement of existing network • Replacement of iron gas mains with polyurethane pipe • Biomethane injection into gas network • Dismantling of gas holders (55 sites across UK to 2021)	• Minimal land-take • Minimal land-take • Associated with Anaerobic Digestion plants (waste management land) • Some land release possible from former gas holder sites in London
National Grid, gas distribution (North London)	• Potential new gas governors, off-take points and pressure reduction works. • Gas holders no longer needed.	• Minimal land take for new investments. • Potential release of up to 120 ha from former gas works, across 12-15 sites in North London.

Source: Communication from providers; publicly available investment plans.

As noted in the table above, there has been and will be some potential release of land previously used for energy infrastructure. Re-use of redundant energy sites forms a key element in some Opportunity

Area plans (e.g. Barking Riverside uses land previously used for Barking A and B power stations; while the King's Cross development area uses land previously used for gas storage). There is likely to be further scope for release of redundant energy sites (e.g. National Grid and SGN gas holder sites), although many such sites already form part of the pipeline of industrial sites identified for development (see Chapter 13). Land contamination can constrain the future of such land (e.g. for former gas holder sites): decontamination works are costly and can require the incentive of higher land values (e.g. from residential developments). However, expensive decontamination works can sometimes be avoided by incorporating contaminated elements of the land into green infrastructure. Given the trend towards release of redundant energy sites, it will be important to safeguard the industrial land required to meet London's future energy needs, in terms of electricity distribution, district heating networks and other decentralised energy projects.

9.3 Water

Context

This section examines the land required to manage London's water supply. The London Infrastructure Plan to 2050 builds on previous priorities set out in the Mayor's Water Strategy (Securing London's Water Future, GLA, October 2011). The supporting paper[58] for the London Infrastructure plan explains the role of regulated water companies in supplying water and managing waste water. It sets out priorities for better integration of water management, and for improving water security in ways that are both affordable and sustainable. These priorities emphasise the importance of London's water companies' role in:

- Improving the security and sustainability of London's water supply
- Actively investigating and investing in new technologies and approaches to using the water we have more wisely (e.g. metering, consumer awareness, reducing leakages)
- Investing more in existing infrastructure, supported by the regulator
- Taking a resilience-based approach to long-term water resource management, adapting to future climate change impacts.

Sustainable drainage is also a key theme in the London Infrastructure Plan and Mayor's Water Strategy. The combination of climate change impacts (including more frequent and more intense rainfall) with the progressive loss of permeable surfaces in London (e.g. because of front gardens being paved for parking) are likely to lead to increased risk of fluvial, sewer and surface water flooding.

Infrastructure

The types of water infrastructure that use industrial land include: water treatment and purification facilities; water storage and distribution sites (e.g. reservoirs, water towers and pumping stations); sewage disposal and treatment works (including drains, pumping stations and sewage farms). In 2010, a desalination plant was opened at Beckton in East London, capable of producing 150 megalitres of drinking water per day. This is powered by bio-diesel, but is generally kept on standby in case of need.

[58] See supporting paper 'Enabling infrastructure: green, energy, water and waste infrastructure to 2050', published by the GLA

Four companies provide water supply in London: Thames Water, Affinity Water Three Valleys, Essex & Suffolk Water and Sutton & East Surrey Water. The majority of London's water supplies come from outside the city's boundaries, from the rivers Thames and Lee, and are then stored in reservoirs around the capital. In South London, some areas depend on extraction of water from chalk aquifers.

In terms of wastewater treatment, Thames Water is the 'sewage undertaker' for almost the whole of London. A small part of Havering is served by Anglian Water. The 'sewage undertaker' is responsible for collecting wastewater from homes and businesses and treating it at one of the sewage treatment works below. The treated water is then returned to the Thames or one of its tributaries.

There are currently nine sewage treatment works in London, which are large occupiers of land. Beckton sewage treatment works is the largest site, covering an estimated 100 hectares, while Mogden is the second largest site, covering 55 hectares. The areas served by these sewage treatment works is set out below. Sewage treatment sites have historically made poor neighbours, because of odours from open sewage lagoons.

Table 9.6 Sewage treatment works in London

Treatment works	Catchment area
Beckton	Barking & Dagenham, Brent, Camden, City of Westminster, City of London, Ealing, Hackney, Hammersmith & Fulham, Haringey. Islington, Kensington and Chelsea, Newham, Redbridge, Tower Hamlets, Waltham Forest
Crossness	Bexley, Bromley, Croydon, Greenwich, Lambeth, Lewisham, Merton, Southwark, Sutton, Wandsworth
Mogden	Barnet, Brent, Ealing, Harrow, Hillingdon, Hounslow, Richmond Upon Thames, and parts of Berkshire, Buckinghamshire and Hertfordshire
Long Reach*	Bexley, Bromley, Croydon, and parts of Kent & Surrey
Riverside	Barking & Dagenham, Havering, Redbridge
Deephams	Barnet, Brent, Enfield, Haringey, Waltham Forest and parts of Essex and Hertfordshire
Hogsmill A	Kingston upon Thames, Sutton and parts of Surrey
Hogsmill B	Kingston upon Thames, Sutton and parts of Surrey
Beddington	Croydon, Sutton and parts of Surrey

Source: Mayor of London, Securing London's Water Future, 2011. (*Note: just outside London)

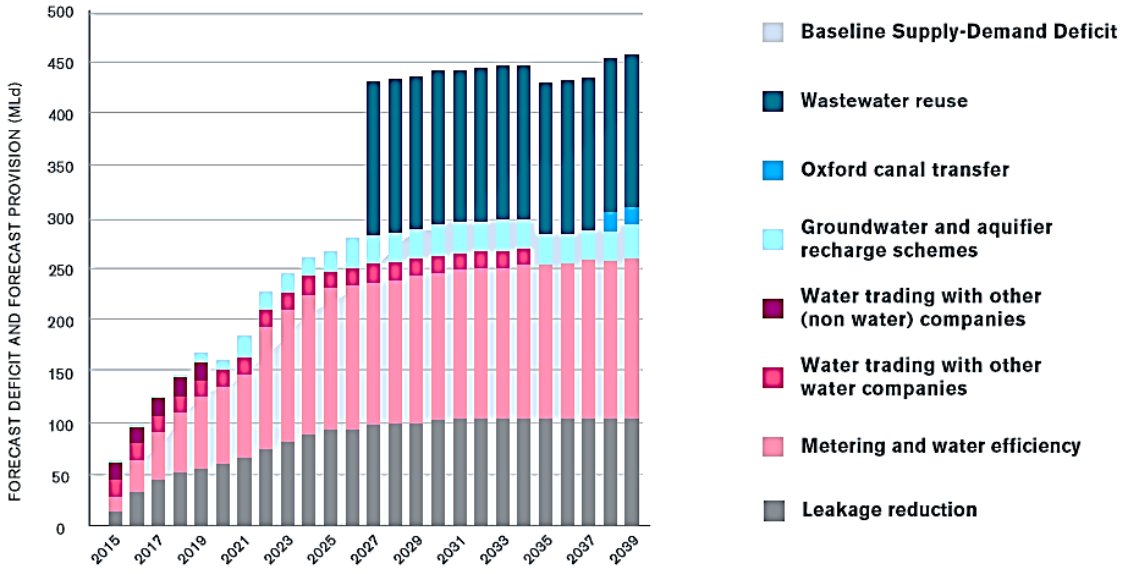
Drivers of Demand for Land

Water demand has risen steadily during the twentieth century, with the fall in industrial demand for water being more than outpaced by the rise in household use. London is now classified by the Environment Agency as an area under serious water stress. Water supply has been identified as a particular risk for London's long-term quality of life and competitive position (see 'Future Proofing London', prepared by Atkins and Oxford Economics (2016)).

Thames Water's analysis, presented in a supporting paper for the London Infrastructure Plan, indicates that demand for water in London was expected to exceed supply in 2015. By 2025, Thames Water predict that London will have a 10% shortfall in supply (213 megalitres per day) rising to a 26% shortfall by 2050 (522 megalitres per day). This shortfall is predicted to arise from a combination of rising demand for water (driven by population and economic growth) and constrained water supply (arising from climate change impacts and protection of river water quality).

Thames Water have set out a range of measures to close this gap, as set out in the figure below. While reducing leaks, improving water efficiency and extending coverage of water meters can reduce the gap between supply and demand, it is likely that other sources of supply will need to be found before 2050.

Figure 9.3 Measures proposed by Thames Water to close their supply-demand gap



Source: Thames Water: Final Surface Water Management Plan, 2015-2040.

The supporting paper on 'Enabling Infrastructure' for the London Infrastructure Plan reports that the Environment Agency is leading discussions with Thames Water and other water companies in the South East to identify the most sustainable regional water supply options for the long term. These options may include new reservoirs, using bulk transfer to bring water to the South East from other parts of the UK, purifying effluent from sewage treatment works and potentially more desalination plants.

While new reservoirs and canals would generally require land-take in the wider South East, not within London, there might be additional demand for industrial land for purifying wastewater from sewage treatment plants or installing more desalination plants. Any of these options would have implications not only for land demand but also for energy use (including potential new electricity sub-stations).

Forecast demand for land

A detailed list of Thames Water projects is presented in the Infrastructure Mapping Application underlying the London Infrastructure Plan, but the IMA does not currently provide information on land take.

Thames Water has advised that it will generally aim to use existing sites for future investments, where possible, but that it may seek to take a decentralised approach to infrastructure provision where more capacity is needed. Thames Water encourages developers and Opportunity Area plans to consider provision of water and drainage infrastructure within their sites, such as:

- Sustainable Urban Drainage (SuDS to slow down storm-water run-off)
- Online pipe storage for surface water and foul water
- Pumping stations for surface water and waste water, to control flows into the network

- Booster pumps within large buildings, to reduce the need for high pressure in the water supply network.

The Development Infrastructure Funding Studies (DIFS) for VNEB and Old Oak Common/Park Royal have considered water and waste water infrastructure needs:

- **VNEB** is expected to need an upgrade in waste water discharge capacity (via additional pipework) but appears to have sufficient water supply capacity for the proposed development. Developers are expected to integrate SuDs into their development proposals. Land-take implications appear to be low.

- **Old Oak Common/Park Royal** will require investment in water mains and in waste water infrastructure. Again SuDs are expected to be incorporated into development proposals, subject to constraints on using SuDS in an area of clay soils and contaminated land. The DIFS highlights the need for an integrated water management strategy for the OA to consider water supply and drainage issues in a coordinated way. Subject to the findings of that strategy, the DIFS suggests that two surface water pumping stations may be needed to pump water to the proposed outfall in the Grand Union Canal. There would be modest land-take associated with these pumping stations, if required.

We have reviewed the emerging resource options for Water Resources Management Plans for London's four water suppliers to identify potential long-term investments that may require significant land-take. The options summarised below would complement other initiatives by these companies to reduce leakages, encourage water efficiency and extend metering, which have no implications for industrial land. It is not clear the extent to which desalination and reuse plants could be sited on the current land holdings of the water companies.

Table 9.7 Summary of long-term investment options and their implications for land demand

Water company	Long-term investment options	Land-take implications
Thames Water[59]	• Reservoir (e.g Abingdon) • Desalination plants (e.g. Beckton expansion, Thamesmead) • Reuse of waste water (e.g. Beckton and/or Deephams) • Direct river abstraction (e.g. Teddington) • Raw water transfer (e.g. Deerhurst)	Outside London Significant, within London Modest/significant, within London Modest land-take, within London Modest land-take, within London
Affinity Water – Central Region[60] (previously Veolia)	Affinity Water has a supply / demand deficit in five of its six Central Region zones in 2015 and all six zones by 2040. The WRMP puts forward a substantial investment programme, including some supply-side measures. The plan refers to one reservoir project being included in the plan, but this would be outside London.	Land-take would be outside London
Essex & Suffolk Water[61]	Following implementation of the Abberton Scheme, which included enlargement of the Abberton reservoir near Colchester, all four Water Resource Zones are now predicted to have a surplus of supply over demand to 2039/40 so no new water resource investments are proposed.	No significant land-take
Sutton & East Surrey Water[62]	Supply is predicted to exceed demand in the medium-term, with this company exporting water to neighbouring water companies. In the longer term, the preferred options are to upgrade Reservoir A, to develop one new borehole from 2034/35 and to redevelop another disused borehole from 2038/39.	Land-take would be outside London

Source: Water Resources Management Plans for each company.

[59] Thames Water WRMP19 Resource Options, Fine screening report update, September 2016.
[60] Affinity water, Final WRMP 2014.
[61] Essex & Suffolk Water, Final WRMP 2014 (v3).
[62] Sutton & East Surrey Water, Final WRMP 2014.

9.4 Other infrastructure-related land demand

Although IT and telecommunications are not currently major users of industrial land, we are aware that the growing demand for data centres may have implications for land demand. We have undertaken some limited research with a data centre provider in London, who suggests that there is increasing demand for smallish data centres located close to users (known as 'edge' data centres), in addition to larger, more remote data centres which could be outside London. Proximity is important to some organisations because it reduces security risks and makes management easier. For financial sector organisations, proximity is important because it reduces 'latency' (i.e. the time taken for signals to travel to the data centre and back): split second timing can be crucial in financial trading. With growth in IT applications, and future introduction of artificial intelligence and driverless cars, there is likely to be increasing demand for data centre space within London, including central London. Data centres may need to be purpose built, as office buildings cannot generally bear the loads imposed by data centre equipment. However, they have relatively low impacts on their localities and could be integrated into mixed-use developments. One typical data centre occupies a 11,000 sq ft building in central London. The rate of introduction of driverless cars will have implications for land demand for data centres in London: driverless cars are likely to be particularly data hungry, as the cars themselves will not have the capacity to store the extensive volume of image data created by their control equipment. Local data centres are likely to be required to provide low latency and ensure safety, probably combined with backup at larger, more remote data centres outside London.

Another long-term consideration for land demand is flood alleviation measures. Many of London's Opportunity Areas would be at flood risk from the Thames or its tributaries (e.g. the Lee River) but are currently protected by flood defences (e.g. river embankments and the Thames Barrier). The GLA has advised that some allowance should be made for improvement of flood defences over time, by allocating land along river banks for future strengthening of flood defences, particularly in the context of future climate change impacts.

9.5 Substitutability of Demand between London and the South East

The potential for substitutability of demand between London and the South East for the different utilities can be summarised as:

- **Energy:** while major power stations can readily be located in the South East rather than within London, heat-related plant such as Combined Heat and Power plants have to be located close to local heat loads, to avoid excessive heat loss.

- **Water:** many of the major investments in water supply will be in the South East rather than London. But some pumping station, desalination and waste water reuse investments will have to be in London.

- **Communications:** Similarly, there is likely to be increasing demand for data centres close to users in London, to reduce 'latency' in data transfer for certain applications.

9.6 Conclusions

It is difficult to predict the overall balance of land release and increased land demand for utilities in London. There has been, and will continue to be, significant land release from former power station sites and disused gas infrastructure in London. Some of these sites are already in the pipeline of industrial land due to be released for development (e.g. through Opportunity Area Planning Frameworks). But the scale of growth forecast for London will require the identification of a series of

small-scale sites for electricity sub-stations and pumping stations to support new development (e.g. in Opportunity Areas).

In terms of water supply, investment is likely to be required in reservoirs in the wider South East, or in desalination or wastewater reuse plants within London, to ensure London's water security. It is not clear whether the latter could be accommodated on water company's existing sites within London.

Some additional sites are likely to be needed for data centres near the interface with consumers, within London, but there may be potential to accommodate these within mixed-use developments

10 Land for Transport

10.1 Context

Transport activities play an important role in London's economy, bringing employees to jobs, visitors to attractions and shoppers to retailers, as well as enabling the delivery of goods and services to businesses and residents. The area of land used for transport activities in London ha increased by an estimated 43 hectares over the past five years, to 489 hectares. This represents an increase of just under 10%, which is largely attributable to growth in land use for buses and for airports/freight. Rail remains the largest transport-related land use, representing 69% of land use in this category.

Table 10.1 Change in Industrial Employment Land use in London (2010 to 2015)

Industrial land used for transport (ha)	2010	2015	Change
Land for rail (including DLR)	337.9	338.5	+0.6
Land for buses[63]	43.2	72.1	+28.9
Airport related land and freight	33.4	46.4	+13.0
Docks	31.9	32.4	+0.5
Total land for transport	**446.4**	**489.4**	**+43.0**

Source: AECOM, Industrial Land Supply (2015)

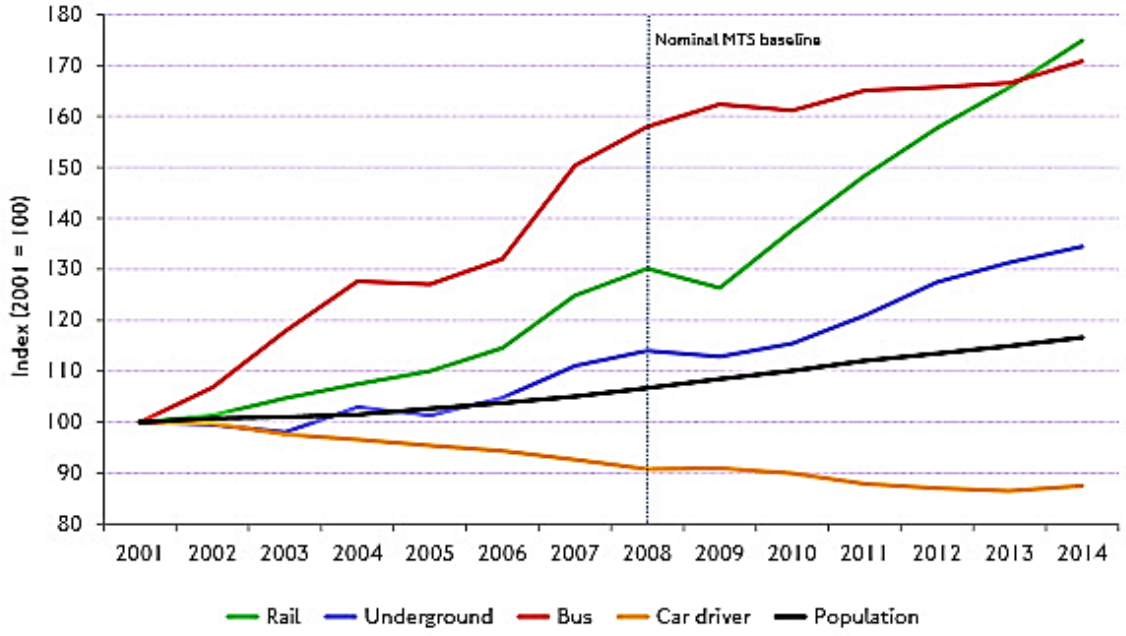
London's transport system is largely radial, bringing goods and people from outer London – and outside London – to the centre. Population growth and economic growth in London are expected to increase demand for transport: the number of jobs in London is projected to increase from 5. 5 million in 2015 to 6.7 million in 2041[64]. The GLA's London Labour Market projections (2016) predict that 50% of the forecast change in employment from 2015 to 2041 will be in three London boroughs: Tower Hamlets, the City and Westminster.

Housing development is likely to be more dispersed and focused primarily in the Opportunity Areas and town centres identified in the London Plan. This will further increase demand for public transport on radial routes: rail is expected to continue to be the dominant mode in accessing central London. Currently 80% of journeys into central London are made by rail or Underground, and this pattern is expected to continue.[65]

As shown in the figure below, historic data on transport modes in London shows that rail, underground and bus travel have been rising steadily, at more than the rate of growth in population, while use of private cars has declined since 2001.

[63] GLA and TfL advise that the increase in land used for buses between 2010 and 2015 largely reflects more complete data on bus garage sites, rather than a physical increase in the land used by buses.
[64] GLA Economics, 2016, London Labour Market Projections.
[65] Transport Supporting Paper for London Infrastructure Plan 2050, GLA, 2014.

Figure 10.1 Historic trends in transport modes in London (volumes - 2001 base)



Source: Travel in London, Report 8, TfL. (2015)

The London Infrastructure Plan 2050 similarly argues that 'there is strong evidence that the very high employment densities in central London are a result of powerful agglomeration economies'. It reports that this agglomeration effect depends on the 'hyper connectivity' central London enjoys at the heart of the rail system and in its access to a leading international hub airport. This plan, and the supporting paper on transport infrastructure, argue that the 'single pole' employment model is preferable to a 'multi-polar' employment model, but points out that the two models are not mutually exclusive. The plan expects Outer London town centres and London's other employment areas to continue to play a vital role in London's economy, alongside central London, and transport investment will continue to facilitate employment growth in all of the following locations:

- Established employment areas in central London;
- Previously peripheral areas of central London, such as VNEB and King's Cross;
- New clusters of high density employment such as Old Oak Common and Stratford;
- Employment growth areas across London in sectors that are less dependent on the agglomeration economies found in central London.

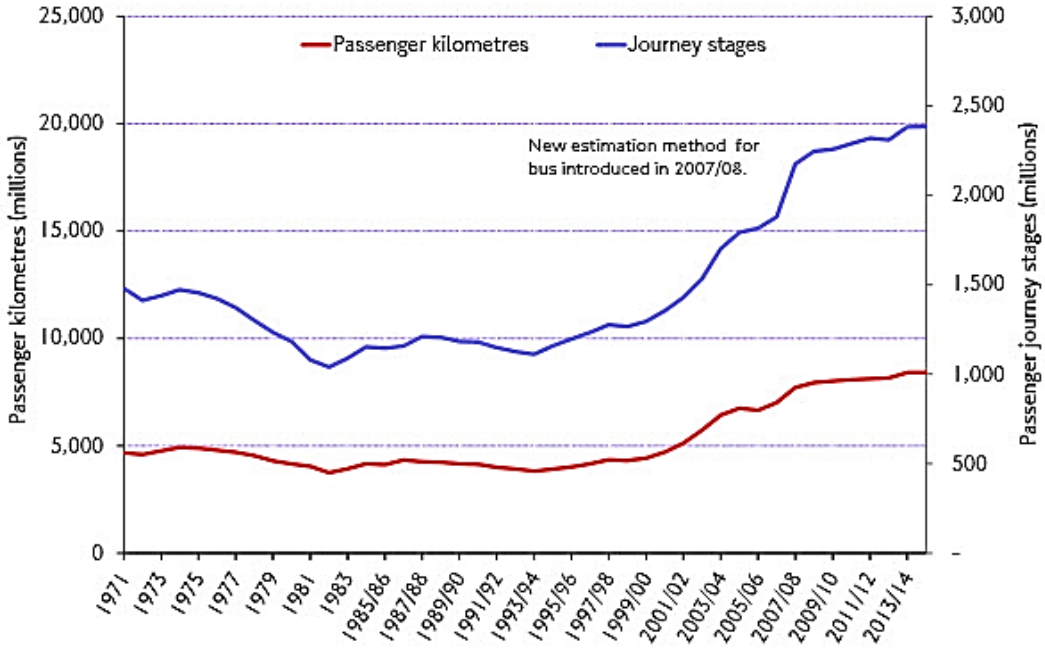
Without adequate transport infrastructure, London's ability to operate as a competitive business location will be adversely affected by delays and congestion for passengers and freight, on both road and rail networks, as the city's population and employment grow.

10.2 Land for buses and coaches

Context

Buses are the most widely used form of public transport across London. The SPG for Industrial and Transport Land (2012) reported that London buses then carried 2.3 billion passengers each year. Bus use has been increasing in recent years and buses now provide around 8,000 passenger kilometres per year. In 2015/16, buses operated 492 million vehicle-kilometres in the city.[66]

Figure 10.2 Performance service data for buses in London



Source: Travel in London, Report 8. (2015)

Buses play a key role in providing access to jobs and services. They also facilitate longer radial trips into London by feeding into railway stations and enabling passengers to reach their final destinations in London. They are central to achieving the Mayor's strategic objectives of reducing use of private motor vehicles and overall CO_2 emissions.

The Mayor's Transport Strategy (2010) recognises this and aims to deliver 'a bus network that is developed to provide an even better value for money service, building on its success and expansion over the last decade'.

The Mayor's Transport Strategy also recognises the role of coaches in London's transport system. The offer give broad types of services: 'UK short distance services, including commuter coaches; UK long distance services; European services; private hire or charter services; and airport services.' The majority of UK scheduled short and long distance services in London serve Victoria Coach Station. In the 12 months to March 2014, 14 million passengers travelled on 240,000 services to and from the coach station (TfL Annual Report, 2013/14).

Infrastructure

Industrial land provides garages and depots for the operation of buses and coaches, as well as for a few terminals. The garages and depots generally provide space for the overnight storage of vehicles,

[66] TfL Annual Report, 2015/16.

fuel, vehicle washing, maintenance, driver facilities and bus operating company management. While bus stations (providing passenger drop-off and pick-up) are generally located in areas of high passenger flows, bus garages and depots are often on industrial sites. Bus garages and depots need sites which can operate for extended hours without disturbing neighbours, and they need good road access within easy reach of the routes being operated.

Bus garages and depots are operated by individual bus companies, and are not under the control of Transport for London. But Tfl keep a record of existing garages and depots. TfL provided up to date information on bus garages for the 2015 Industrial Land Supply study by AECOM, so the land allocated for bus garages and depots appears to have increased (see Table 10.1 above). We understand that this increase largely reflects more complete data, and that the actual number of depots may have decreased slightly. In 2016, TfL estimates that there are 72 bus depots, of which 7 are located in surrounding counties that operate buses for London. This is a slight reduction from the 84 bus garages/depots in Greater London (and 8 in surrounding counties) identified in the 2011 Industrial Land Demand study.

Drivers of Demand for Land

Future bus garage requirements will be largely determined by: growth in London's population and economy, leading to demand and new development (particularly focused in Opportunity Areas); changes and enhancements in the bus network to meet this demand; the availability of suitable sites for bus garages and depots; and consolidation of sites and operations where appropriate.

TfL's Business Plan for 2015/16 predicts that the number of bus passengers will continue rising as the city's population grows, reaching about 2.6 billion per year by 2022. Bus kilometres operated on the network are expected to increase by 0.8 per cent to 498 million in 2016/17.

Future Land Demand

Bus garages are predominantly owned by private bus operators who compete for contracts to run bus routes in an open market, so selection of sites and obtaining planning permission will be the responsibility of private bus companies. However, the SPG for Industrial and Transport Land (2012) highlights that local authorities need to ensure that there are sufficient sites in appropriate locations to accommodate bus garages and depots and to enable bus operators to respond to growth in the network. The examples of Companies A and B, presented in chapter 8, highlight the implications of depot location for coach journey lengths and associated business and environmental impacts.

The SPG points out that flexibility will be important and that ensuring suitable industrial sites for bus garages will require consideration not only of the sites themselves, but of the type of development allowed on adjacent sites. For example, an industrial site might become unsuitable for use as a bus depot if it was located next to residential accommodation, because of the potential noise and disruption cause by vehicle movements.

The SPG for Industrial and Transport Land (2012) reports that a typical bus garage has an average land requirement of one to two hectares, although this will vary on a case by case basis. Land is required for parking, maintenance, fuel and washing. Sites need to be rectangular or 'L' shaped to enable efficient vehicle storage, and have good access to the strategic road network.

TfL has not quantified the land needed for bus depots and coaches to 2050, but it is likely that this will be an area of increasing demand for industrial land. It is recommended that local authorities identify potential sites for bus garages (particularly on SILS and close to Opportunity Areas), protect existing bus garages against change of use, and consider the needs of the bus network prior to releasing industrial land to other uses. An example of this can be seen in the Development Infrastructure Funding

Study for Old Oak (PBA, 2016) which highlights the need for increased bus capacity in this OA, including the possible need for a new bus depot.

10.3 Land for rail

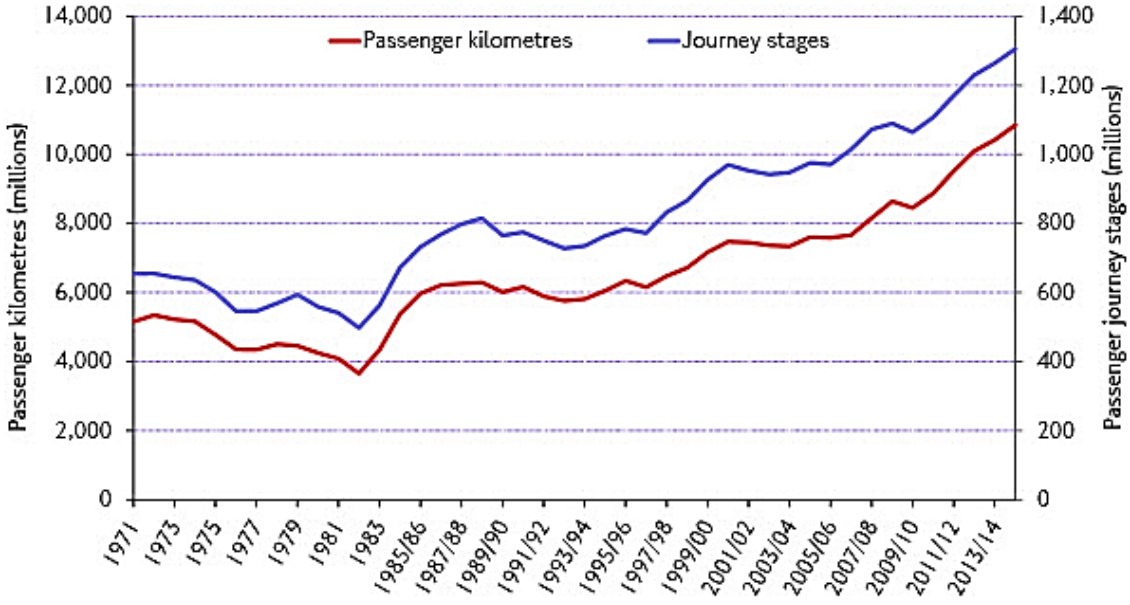
Context (passenger services)

Rail services are a major user of industrial land in London, representing nearly 70% of land used for transport. Passenger rail services in London include Network Rail infrastructure, the London Underground, the Overground, Docklands Light Railway, and in future Crossrail. Further rail investments have been proposed which would also increase passenger rail services within the capital, including HS2, Crossrail 2 and the Bakerloo Line Extension.

The Mayor's Transport Strategy highlights London's dependence on rail travel: three quarters of all trips from Outer London to central London are made by National rail, and 70% of passenger rail travel in the UK is from or within London (including Tube journeys).

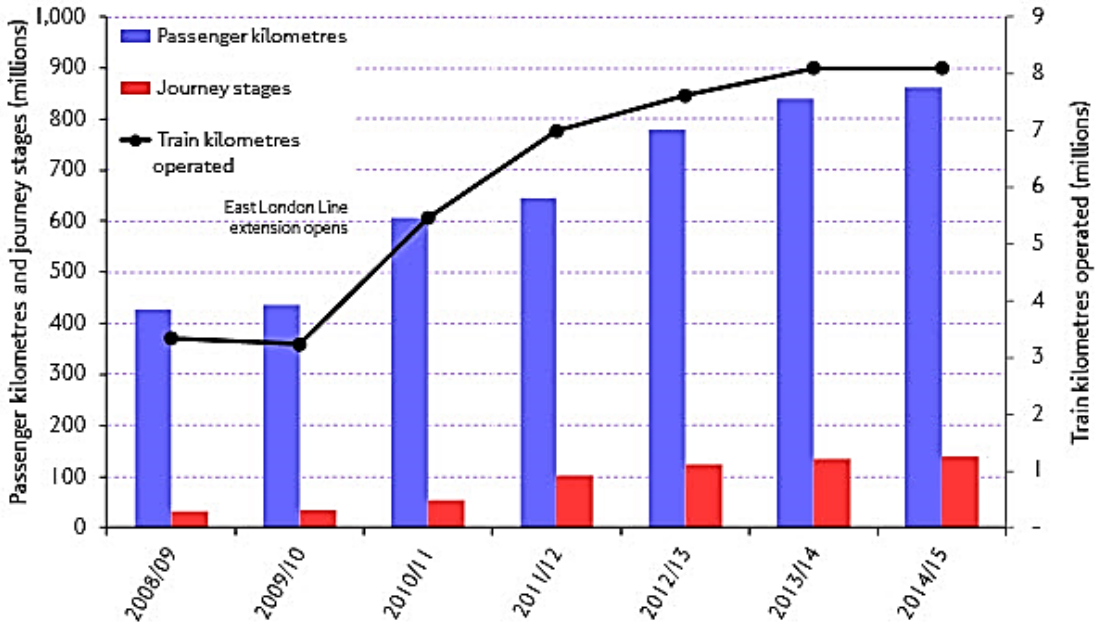
The latest performance data shows a steady increase in usage of the London Underground, as well as London Overground services, and National rail services serving London and the South East.

Figure 10.3 Performance service data for London Underground



Source: Travel in London, Report 8. (2015)

Figure 10.4 Performance service data for Overground



Source: Travel in London, Report 8. (2015)

Table 10.2 Passenger km and passenger journey stages by National Rail, for operators classified as London and South East operators.

Year	Passenger kilometres (billions)	Year-to-year percentage change	Passenger journeys (millions)	Year-to-year percentage change
1998/99	17.1	..	616	..
1999/00	18.4	7.6	639	3.6
2000/01	19.2	4.3	664	4.0
2001/02	19.3	0.5	663	-0.1
2002/03	19.8	2.6	679	2.4
2003/04	20.1	1.7	690	1.6
2004/05	20.5	1.9	704	2.1
2005/06	20.7	1.1	720	2.2
2006/07	22.2	7.1	769	6.9
2007/08	23.5	6.1	828	7.7
2008/09	24.2	2.9	854	3.1
2009/10	23.8	-1.8	842	-1.4
2010/11	25.0	5.2	918	9.0
2011/12	26.4	5.3	994	8.3
2012/13	27.3	3.4	1,032	3.9
2013/14	28.6	4.9	1,107	7.2
2014/15	29.6	3.4	1,155	4.3

Source: Travel in London, Report 8. (2015)

Context (rail freight services)

Rail services currently carry a relatively low proportion of London's freight, but transferring freight from road to rail freight is strategically important as a means of reducing congestion and improving air pollution and carbon emissions in London.

The Department for Transport's Rail Freight Strategy (2016) emphasises the strategic benefits of moving freight by rail rather than road: 'Each tonne of freight transported by rail reduces carbon

emissions by 76 per cent compared to road and each freight train removes 43 to 76 lorries from the roads - meaning rail freight has real potential to contribute to reducing UK emissions as well as building a stronger economy and improving safety by reducing lorry miles.'

According to the Rail Freight Strategy, an increasing proportion of freight is now being moved by rail across the UK. Since 1998, rail's share of all freight across the UK moved has increased from just under 8 per cent to 12 per cent in 2014, despite a decrease in the volume of coal transported for power generation.

However, rail services currently provide a relatively low proportion of freight tonnes lifted in London. The London Freight Data Report (University of Westminster, 2014) indicates that rail freight's share was only 4.5%, compared to 5.9% for water and 88.6% for road.

Table 10.3 Freight lifted by mode on journeys to, from and within London, 2012

Mode	Million tonnes
Road	131.7
Water (Thames inside London)	8.7
Rail	6.7
Air	1.6

Notes: Road - only goods vehicles over 3.5 tonnes gross weight (i.e. light goods vehicle activity not included). Water (Thames inside London) – does not include traffic handled by PLA wharves on the Thames outside London, or waterways in London other than the Thames. Air – only includes freight and mail handled at Heathrow Airport (other London Area Airports not included).

Source: London Freight Data Report, University of Westminster, 2014

The weight of goods transported by rail to, from and within London has remained relatively stable in recent years, as shown in the figure below.

Figure 10.5 Goods lifted by rail on journeys, to, from and within London, 2004-2012

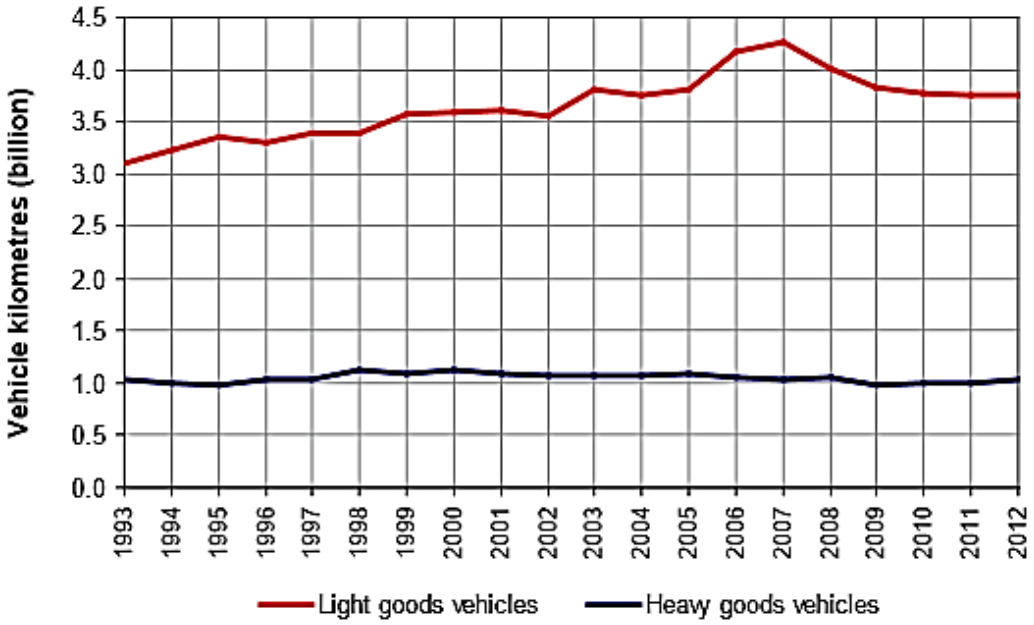
Source: London Freight Data Report, University of Westminster (2014)

The London Freight Data Report states that London is a net importer of freight by rail, with almost four times as much weight arriving as leaving in 2012. Rail freight lifted on journeys to, from and within London in 2012 represented 7% by weight of total rail freight lifted in Britain.

TfL has estimated that there are currently just over 62 freight train movements within London per day. These mainly carry aggregate and cement, with some transport of waste and aviation kerosene. There are also about 7 freight services carrying post for the Royal Mail, and a large number of passenger services which carry some light goods. TfL have calculated that there would be nearly 5,000 additional HGV trips in the capital daily if this freight was moved by road.

The lack of a clear growth trend in rail freight in recent years provides a contrast with recent growth in freight transport, particularly for light goods vehicles. Introduction of the Low Emission Zone in Central London in 2008 is likely to have impacted on heavy good vehicle movements in London, which have also shown little growth.

Figure 10.6 Vehicle kilometres performed by goods vehicles on all roads in London, 1993-2012.



Source: London Freight Data Report, University of Westminster (2014)

Infrastructure

Industrial land is used by rail operators to accommodate depots and rail sidings for loading and unloading goods. It does not include land used for railway stations or the rail track itself.

We understand that there are currently fifteen rail depots for aggregates in London (listed in Annex 5 of the SPG Industrial and Transport Land (2012)). London Freight Data Report (2009) reported that there were then 29 active rail freight terminals in London, and that some others were mothballed and could return to use if needed. This is consistent with current rail freight depot data provided by Network Rail[67].

[67] http://www.networkrail.co.uk/aspx/10520.aspx

The development of strategic rail freight interchanges (SRFI) is strongly advocated by DfT and the National Infrastructure Commission, as a means of encouraging rail freight. There are currently 4-5 rail freight sites serving London, including Broxbourne. In the long term, the development of SRFI capacity serving London may be required to support growth in rail freight. These sites require good rail and road access, and sufficient land available for onsite warehousing.

Drivers for demand

The demand for land for rail is influenced by a range of factors including: population growth, economic activity, modal shifts, policy objectives and planning choices. Additional capacity will be needed as London's population grows and concentration of employment in the CAZ continues. The Transport Supporting Paper for the London Infrastructure Plan predicts that a 70% increase in radial peak capacity will be needed by 2050 to prevent worse overcrowding on passenger rail services.

Passenger services

Demand for rail passenger services is likely to be driven primarily by population growth and employment growth in London. The GLA's latest population projections predict that Greater London's population will grow from 8.8 million in 2017 to 9.8 million in 2030 and 10.8 million in 2050, an increase of nearly 23%. Similarly, the GLA predict that employment in London will increase from 5.6 million in 2016 to 6.7 million in 2041, an increase of nearly 21%. CAZ employment is predicted to grow from 2.0 million in 2016 to 2.3 million in 2041, an increase of 19%.

While this suggests that there will be strong growth in demand for passenger rail services, there are some drivers that may to some degree mitigate this. In particular, the internet is already changing people's working patterns and allowing some types of workers to do some or most of their work from home, within or beyond London. This will reduce the need for daily commuting journeys for some types of economic activities. Conversely, the trend towards more homeworking may encourage people to live further away from London and make less frequent but longer rail trips to the capital. However, the Transport Supporting Paper for the London Infrastructure Plan to 2050 predicts that the overall demand for travel will increase significantly, with the effects of population and employment growth outweighing these trends.

Freight services

DfT's Rail Freight Strategy (2016) predicts long-term growth in rail freight associated with construction from 18.2 million tonnes per annum in 2011 to 25.5 million tonnes per annum in 2030 (central forecast), an increase of 40%. This is driven by plans for new housebuilding, HS2 and Crossrail construction, much of which will be focused in London and the South East.

TfL also predict that demand for rail freight will increase during construction of HS2, Crossrail and Crossrail 2, since TfL will aim to remove spoil by rail rather than road. They estimate that an increase of 13 freight trains per day in West London during HS2 construction, which would be equivalent to about 800 HGV movements per day.

Another major source of rail freight growth predicted by the Rail Freight Strategy is growth in the transport of deep-sea containers (predicted to double from 15.1 million tonnes per annum in 2011 to 31.8 million tonnes in 2030). The strategy predicts that much of this growth will be in the South East, owing to the concentration of population in this region.

The Rail Freight Strategy predicts that the volumes of domestic waste transported by rail will stay fairly static, although there is potential for some new flows (e.g. from London to the energy to waste plant at Avonmouth).

The major rail infrastructure projects currently proposed (HS2, Crossrail, Crossrail 2) are passenger services and will not directly provide freight capacity. However, they may create some modest new capacity for the transport of light goods on passenger services ('behind the cab'). TfL also advise that HS2 may create new freight paths on the West Coast Mainline by freeing up capacity on the line.

It is possible that introduction of the Ultra Low Emission Zone in the heart of London, proposed for 2020, will further constrain use of larger goods vehicles in central London and may lead to increased demand for some forms of rail freight (e.g. for the transport of light goods on passenger services which terminate in central London).

Future land demand

The London Infrastructure Plan 2050 and Transport Supporting Paper confirm the Mayor's commitment to invest in rail capacity to meet the predicted increase in demand to 2050. These documents set out a programme of large scale investment in London's rail transport system, including:

- A 30% increase in morning peak rail capacity between 2011 and 2019, achieved through current Crossrail, Tube Upgrade and Thameslink upgrades;
- Increased capacity on the National Rail network, particularly in South London, and transfer of some National Rail services to TfL to provide reliable and frequent metro services;
- Enhancement of orbital rail services on the London Overground network, including expansion to Barking Riverside;
- Extension of the Northern line to VNEB and potential extension of the Bakerloo to Lewisham;
- Increased capacity on Docklands Light Railway, to support Isle of Dogs and Royal Docks development, and potentially other investments in light rail/tram systems;
- Further potential increases to capacity through Crossrail 2 and possibly an eventual Crossrail 3;
- Investment in HS2 and potentially a link between HS1 and HS2;
- A new transport hub at Old Oak Common, linked to HS2, Crossrail and potentially London Overground;
- Potential new river crossings at Woolwich, Gallions Reach and Belvedere in East London, in addition to the Silvertown tunnel, which could unlock development potential in Strategic Industrial Locations;
- Potential new stations at Cricklewood near Brent Cross, Beam Park near Rainham and Thames Wharf.

Our estimates of land-take for rail transport are based on the medium-term consequences of these investments, as longer term impacts are as yet uncertain. TfL's annual business plan sets out its proposed rail investments over the next 10 years. The information below is based on communication with TfL about planned investments that have implications for industrial land demand.

Passenger rail

While National Rail depots tend to be beyond London's boundaries, TfL will seek to expand its depots within London to provide these services. The additional areas likely to be required in the next few years are set out in the tables below, based on TfL's current assumptions about how growth will be allocated

between existing depots. In total, an estimated 43.8 hectares would be required for additional passenger rail depot space within London (excluding Overground services and depots outside Greater London). This would be required in the medium term, and further land is likely to be required in the longer term.

Table 10.4 Predicted depot requirements for TfL passenger rail services, by area

Service	Current Area (ha)	Likely increase (ha)	New Area (ha)
South Eastern	16.0	6.4	22.4
South Central	20.0	8.0	28.0
Great Northern	20.3	3.4	23.7

Source: TfL (Totals may not add due to rounding)

Overground

Overground services use existing National Rail depots. As for other rail passenger services, TfL is planning to take over more services from National Rail which will increase the land required for depots within London. A further 10.6 hectares is likely to be required in the medium-term.

Table 10.5 Predicted depot requirements for TfL Overground rail services

Overground (35% increase in depot requirements)

Site	Current Area (ha)	Likely increase (ha)	New Area (ha)
New Cross (incl. Silwood Sidings)	4.6	1.4	6.0
Willesden	3.2	1.4	4.6
Total	7.8	2.7	10.6

Source: TfL (Totals may not add due to rounding).

DLR

Major investment is planned in the DLR, both to increase capacity on the existing network and to support regeneration of the Royal Docks Opportunity Area. The proposed Royal Docks investment package, which will be implemented from 2019 to 2023, includes new stations and expansion of the DLR depot at Beckton. We understand that TfL is currently seeking about 5 hectares of additional land for expansion of the Beckton Depot, as it cannot find suitable sites elsewhere on its network. If 5 hectares cannot be allocated within the Royal Docks Opportunity Area Planning Framework, DLR may consider double-decking the Beckton Depot.

Various other extensions to the DLR have been considered but these are currently tentative and land requirements are not known.

Underground

Most of TfL's investment plans involve improvements to existing infrastructure such as refits and station upgrades. There are proposals to increase capacity on many lines, including the introduction of night services. TfL have advised that night services will use the existing fleet and will not require additional space for depots or stabling.

In terms of new lines, an extension of the Northern Line to Battersea is currently under construction, which will support regeneration of the VNEB Opportunity Area. Land has already been allocated for this.

TfL have advised that the proposed Bakerloo Line extension to Lewisham will use the tunnels themselves for stabling and will not therefore generate additional demand for depots.

TfL's property arm has also identified some sites that are not required for operation of the Underground and that could be sold in future, including some on industrial land. This is discussed further below.

Tramlink

Capacity expansions are also planned on the Tramlink network. Tramlink will need a small satellite depot in South East London in the medium term (2020-2015) and is also looking to expand its current depot at Therapia Lane in the long term (2025). This will probably use industrial land to the west of the current depot. In terms of area, the requirement is for at least 0.5ha in South East London, and potentially an additional 1.7ha at Therapia Lane.

Crossrail

The depot for Crossrail is at Old Oak Common, which is a Strategic Industrial Location However, the depot location may restrict implementation of the vision for redevelopment of the Old Oak Common and Park Royal Opportunity Areas. The Development Infrastructure Funding Study for Old Oak (PBA, 2016) explores option for relocation of the Crossrail and Intercity Express (IEP) depots at Old Oak Common. This would involve not change the overall demand for depot land, and would be dependent on finding a suitable location for a new depot.

TfL have advised that there may be additional land requirements if Crossrail 2 goes ahead. About 55 hectares may be required for depots, stabling and vent shafts and so on. The Transport Supporting Paper for the London Infrastructure Plan 2050 advocates that the location of major new depots should be carefully considered, to avoid potential conflict with other regeneration objectives in Opportunity Areas (as has happened with the Crossrail depot). It is currently expected that the Crossrail 2 would involve two new depots at Oakleigh Road (New Southgate) and Weir Road (Durnsford Road Industrial Estate, Wimbledon). The Oakleigh Road site is identified in the Local Plan as an employment site, but not an industrial area. It is safeguarded for Crossrail 2 and is also safeguarded within the draft North London Waste Plan (which is out to consultation). Similarly, the Weir Road site is not a SIL but is identified as a locally important industrial site within LB Merton's Local Plan. Additional land may also be required to support the business case for Crossrail 2. This is considered separately under the spatial scenario testing of the industrial land release benchmarks in Chapter 14.

Freight rail

Tfl and DfT share a strategic objective of shifting freight from road to rail. This freight effectively has three elements: bulk transport of materials for construction and industry, transport of whole containers from deep-sea ports, and transport of smaller part-loads in containers or on passenger services.

The Rail Freight strategy warns that growth in rail freight for construction may be constrained by the availability of terminal handling sites for bulk materials in appropriate locations. This is consistent with guidance in the SPG for Transport and Industrial Land (2012) that railheads for aggregates should be safeguarded.

Construction of Crossrail, HS2 and potentially Crossrail 2 may create short-term demand for additional rail freight land. In particular, TfL have advised that Barking rail freight depot may need to be expanded to cope with Crossrail. Also, the Willesden rail freight depot is likely to be dedicated to construction freight from HS2, with the result that more rail freight may have to operate out of Euston during HS2 construction. It is not yet clear whether this depot will be returned to rail freight usage when HS2 construction is complete.

The Rail Freight Strategy highlights various initiatives to promote growth in rail freight, including Network Rail's experimentation with 'nodal yards' which provide strategic regulating points for rail freight services (e.g. at Wembley). It is not clear whether 'nodal yards' would require additional land for rail freight infrastructure or simply a change in management of existing yards.

To enable growth in rail transport of smaller part-loads, and enable it to compete with road freight, TfL advise that rail freight may require more micro-distribution centres close to central London stations, to facilitate 'last mile' deliveries. Demand for micro-distribution centre land may grow when the Ultra Low Emission Zone is introduced, as this will constrain the use of larger goods vehicles in central London.

Potential redevelopment of railway land

While highlighting the importance of maintaining or increasing rail freight capacity, the Rail Freight Strategy mentions that Network Rail is generating funds for investment by making land sales. TfL has similar plans to generate funds from its property portfolio. Such land release is closely linked to London's development plans: potential relocation of the Crossrail and IEP depots will potentially play an important role in providing land for new housing in the Old Oak and Park Royal Opportunity Area.[68] It is important that release of railway land does not constrain future growth in rail services, whether passenger or freight.

Opportunity area infrastructure

Rail investments will play an important role in stimulating development of Opportunity Areas within London, increasing their attraction as places to live and work. For example, the Northern Line extension is critical to redevelopment of the VNEB Opportunity Area. Similarly, plans for Old Oak Opportunity Area are closely linked to the proposed development of a major new railway station at Old Oak Common beyond 2026, providing access to Crossrail, HS2 and potentially London Overground. The Development Infrastructure Funding Study for Old Oak also highlights other rail investments such as the creation of 2-3 new Overground stations on the North and West London lines. These examples from VNEB and Old Oak highlight that earmarking land for improved rail infrastructure within OA plans will be critical to successful and sustainable development of these areas.

The overall vision for Old Oak OA is dependent on relocating the existing Crossrail and IEP depots which currently divide the OA area. As highlighted above, the London Infrastructure Plan 2050 and Transport Supporting strongly advocate a joint strategic approach to transport and housing development in these areas, so that both transport and regeneration objectives can be achieved.

10.4 Airport-related land

Context

Only ancillary land related to airports is classed as industrial land. This includes land for the storage of planes and related parts, repair shops and other areas for cargo. AECOM (Industrial Land Supply Study, 2015) report that 46 hectares of industrial land is used for these purposes. This has increased slightly (by 13 hectares) since 2010.

There are three airports located within the boundaries of London:

- Heathrow, to the West of London, is one of the busiest international airports in the world and is considered critical to the competitiveness of the UK economy.
- London City Airport, located in the Royal Docks, primarily serves the business market, focusing on domestic and European destinations.
- Biggin Hill, located in South East London, provides business aviation and also accommodates private aviation and flying clubs.

[68] Development Infrastructure Funding Study for Old Oak and Park Royal, prepared by Peter Brett Associates, 2016.

The London Plan (policy 6.6) recognises that 'adequate airport capacity serving a wide range of destinations is critical to the competitive position of London in a global economy. Airport capacity serving the capital and wider south east of England must be sufficient to sustain London's competitive position'. The Mayor stated in his Mayoral Manifesto (May 2016) that he will 'oppose a third runway at Heathrow and, if the Government chooses to pursue this option, continue to call for a new runway at Gatwick as a more viable, cheaper and easier to-build alternative'.

Infrastructure

Heathrow

Heathrow Airport Holdings (formerly BAA) state on their website that there are approximately 1.4 million sq m of commercial accommodation at Heathrow airport, hosting more than 280 tenant organisations. Their property portfolio includes offices, airside support facilities, airline lounges, business centres, warehouses, airline check-in desks, ground handling accommodation, fuel facilities, crew reporting centres and aircraft hangars.

Airside support facilities are the main users of industrial land allocated for airport use. Heathrow Airport owns more than 100,000 sq m of space leased for airside support in the heart of the airports. Airside support accommodation includes ramps (used for forward servicing and located under the piers); motor transport depots (used for servicing the vehicles and equipment that attend the planes); catering bases for the preparation and delivery of inflight catering; and aircraft hangars for maintenance at a local base to minimise disruption to flight schedules.

London City Airport

Commercial and airside activities on the airport site at London City Airport include: an airport fire station and training ground, ground handling and minor aircraft maintenance facilities, a fuel storage facility, and an office building (City Aviation House, which houses offices for the Airport company and a number of airlines and other concessions). Further business centre facilities are also located here. Freight handling and baggage handling are undertaken in the King George V building. The amount of freight passing through LCA is very low and predominantly consists of courier and express deliveries.

Biggin Hill

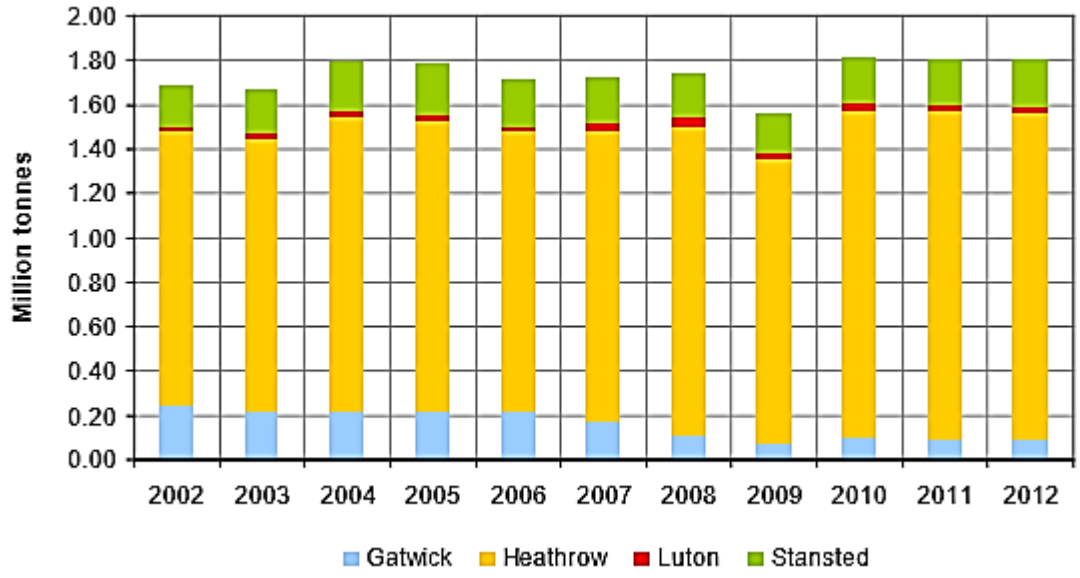
The Biggin Hill site hosts an engineering and technology centre as well as the airport itself. According to the airport's website, the site is hope to around 65 tenant companies and employees over 1,000 people. The site offers a variety of buildings and office space for air and technology-related businesses.

Drivers of Demand for Land

The London Freight Data Reports states that 78% of the UK's air freight passed through the London area airports of Heathrow, Gatwick, Stansted and Luton in 2012. Annual air freight tonnages at London area airports have been relatively stable since 2000, following a period of continuous growth prior to this.

Heathrow dominates the air freight market in London and in the UK. Heathrow Cargo Strategy states that Heathrow provided 76% of all air cargo in the UK in 2015, and handled £80 billion of trade by value (26% of the UK's trade in goods, by value). Passenger and freight flights are closely linked: the strategy reports that 95% of Heathrow's cargo currently flies in the bellyhold of passenger aircraft.

Figure 10.7 Freight handled at London area airports, by airport, 2002-2012



Source: London Freight Data Report, 2014.

Future Land Demand

Heathrow's Strategic Capital Business Plan (2016) sets out planned investments, including improvements to cargo facilities. These are also presented in the Heathrow Cargo Strategy. If the third runway were to go ahead at Heathrow, the airport would aim to increase freight volumes to 3 million tonnes per year by 2041, from a base of 1.5 million tonnes in 2015. This would have implications for demand for warehousing land in and around the Heathrow Opportunity Area.

Conversely, expansion of Gatwick Airport – as supported by the Mayor – would be likely to increase demand for warehousing land in the Gatwick area, including some parts of South London.

London City Airport has submitted a planning application for works to improve its existing infrastructure, including expansion of the terminal. We understand that this would have minimal implications for the industrial land occupied by the airport and its facilities.

Biggin Hill Airport has planning permission for construction of a new hotel and for construction of a new 18,605 sqm hangar and maintenance facility, with associated offices. These would enhance Biggin Hill's role as a high technology hub for South London. As the proposed developments are located on the existing airport site, there are no significant implications for industrial land demand.

10.5 Docks & wharves

Context

Docks are located in wharves and are used for building or repairing boats, loading and unloading ships or passenger ferries. The land currently used for docks in London is only 32 hectares, which has risen by only 0.5 hectares since 2010. Some but not all of the docks use land in Strategic Industrial Locations. Activities such as loading and unloading cargo at wharves, and boat repairs, can involve noisy operations. Due to the tidal cycle of the Thames, this can require working outside normal business hours.

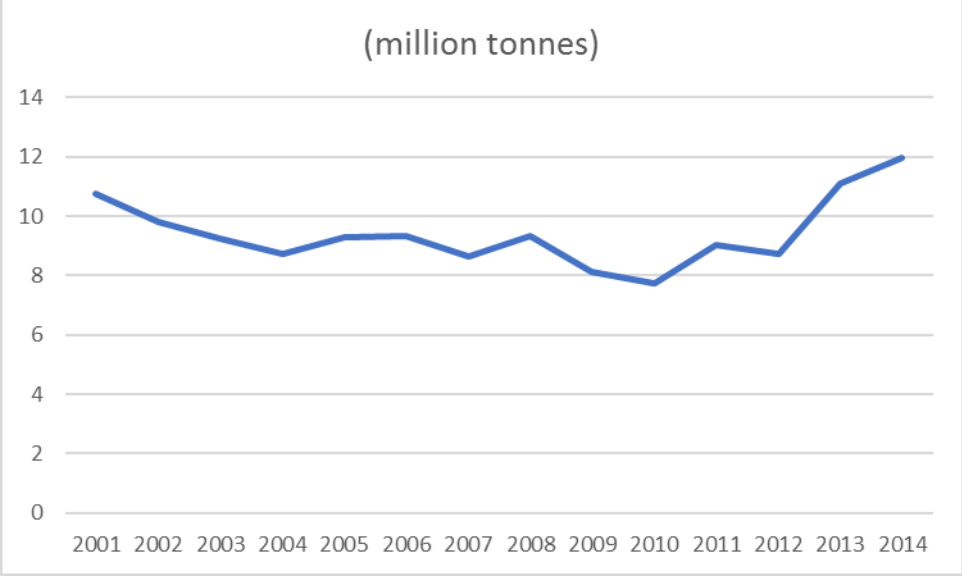
The Port of London Authority issues licences for 80 operational wharves, both within and outside London. The London Freight Data Report (2014) reports that there are currently 50 safeguarded wharves for freight transport on the Thames and its tributaries in London. The London Freight Data Report states that approximately 45 million tonnes of goods originating from overseas and UK ports were handled at wharves in the PLA in 2012. Of this, 7 million tonnes of these goods were loaded or unloaded at a PLA wharf within Greater London, and 0.2 million tonnes were transported between wharves in London.

The London Plan policies recognise the strategic benefits of water freight as an alternative to road transport, as a way of tackling road congestion and reducing CO_2 emissions. Water transport is supported by London Plan policies on waste (policy 5.17), on construction, excavation and demolition waste (policy 5.18), on aggregates (policy 5.2), on freight transport (policy 6.14) and on increasing use of the Blue Ribbon Network (policy 7.26). This underlies the need to safeguard wharves for these low-value uses. Policy 7.26 also indicates that the redevelopment of safeguarded wharves should only be accepted if the wharf is no longer viable or capable of being made viable for waterborne freight handling uses. Where additional need has been identified, boroughs should find locations that are suitable for additional waterborne freight.

The London Plan (2015) sets a dual target to increase passengers and freight transport by the Blue Ribbon Network by 50% between 2011 and 2021. The Annual Monitoring Reports on the London plan show that good progress is being made towards these two targets.

The figures presented in Figure 10.8 below are the sum of trade handled at Greater London wharves that originated downstream of the Port of London (including sea-dredged aggregates and sugar) and trade that originated within or upstream of the Port of London. Much of the freight transported on the River Thames is aggregates related to the construction industry, but construction, excavation and demolition waste (CE & DW) is also significant. Since 2011, cargo trade has risen by almost one third. Growth in aggregate trade was particularly strong at wharves in Greenwich, Barking and Dagenham. Movements related to CE&DW waste from Crossrail and the Lea Tunnel sewage project slowed in 2014, but these movements are likely to be replaced by waste from the Thames Tideway Tunnel.

Figure 10.8 Cargo trade on the River Thames within Greater London

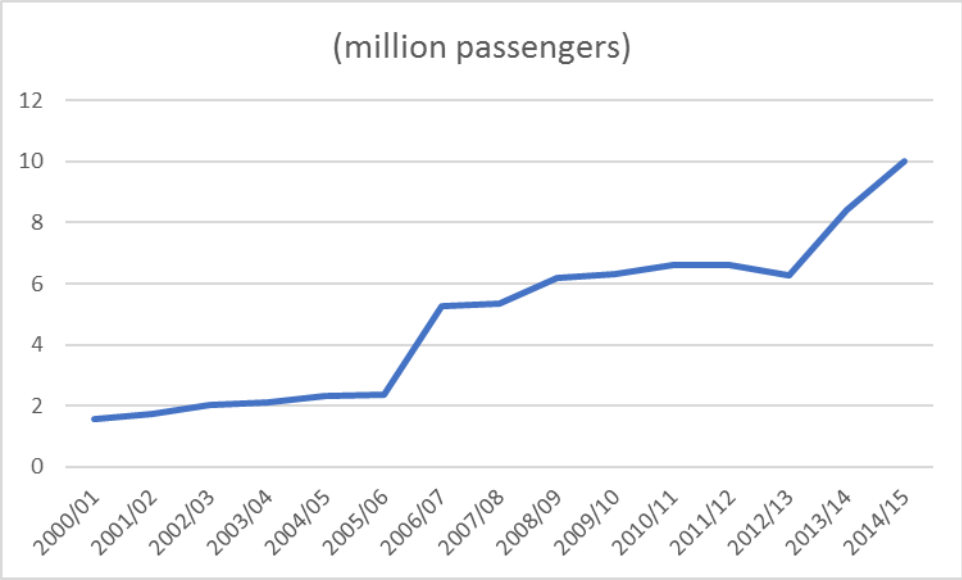


Source: Annual Monitoring Report 12 (2014/15)

Figure 10.9 presents figures for passenger journeys on all river boat services on the Thames, which show steady growth in usage with a couple of step changes. The step change in 2006/7 represents inclusion of Woolwich Ferry passengers in the statistics from 2006/7 year onwards. The 34% increase

from 2012/13 to 2013/14 is explained by introduction of a more accurate passenger counting system, while the rise in 2014/15 may be explained by two high profile events at riverside locations. Passenger numbers have already exceeded the London Plan ten-year target. A new pier has opened at Plantation Wharf, and pier extensions are planned at Bankside, Embankment and Westminster, but these are not at safeguarded wharves and do not have implications for industrial land demand, except insofar as they increase demand for boatyard facilities.

Figure 10.9 Passengers on the River Thames



Source: Annual Monitoring Report 12 (2014/15)

Increased capacity for boatyard facilities is likely to be needed to support current growth in river traffic. The GLA is currently procuring a developer for a proposed new commercial boatyard at Albert Island, which would be capable of repairing larger vessels including those providing regular passenger services. It is envisaged that the 10 ha Albert Island site would provide space for the new boatyard and other employment uses. Floating dry dock facilities also operate at Bay Wharf, in Greenwich, having relocated to allow redevelopment of their previous location at Greenwich Wharf. It is important that industrial land is available for boatyard facilities which are needed to support growth in river transport.

Infrastructure

There are currently 50 safeguarded wharves in London. The GLA currently estimate that 32 of these wharves are operational, handling river freight. A further 10 wharves are not currently in use but are either subject to planning processes relating to restarting river freight transport, or are in industrial locations where there is little pressure for alternative use. Five further wharves are non-operational and could be re-used but are under pressure from competing land uses, while three are not used and are unlikely to be suitable for river freight transport use in future.

The type of wharf activity and demand varies depending on the commodities handled and the location of the site. In general, import and export to London occurs more frequently in the North-Eastern and South-Eastern wharves (to the east of Tower Bridge), while wharves in the Western region (to the west of Tower Bridge) generally handle internal cargo movements to other wharves. Boatyards also play an important function in servicing passenger and freight vessels on the River Thames.

Drivers of Demand for Land

Building waste, construction materials and other forms of waste are important components of the freight carried to and from safeguarded wharves in London. While population and general economic activity

will be overall drivers of demand (particularly for import/export of commodities and transport of domestic waste), another important driver will be major infrastructure projects. The Crossrail project has a target of transporting 85% of waste by rail or water. The Thames Tideway Tunnel aims to excavate 90% of material from the main tunnel by water. It is possible that Crossrail 2 and HS2 may also make use of water transport for construction waste, if canals can be used to link to the Thames.

A further driver of river-based freight transport is that it offers an alternative to road transport that has lower environmental impacts and is less subject to congestion. In future, it is possible that new types of cargo (e.g. retail supplies or deliveries) may seek to use river transport, to reduce impacts relative to road transport.

Future Land Demand

The GLA is currently finalising new research on freight trade demand and supply. Current indications are that growth in river freight will continue over the next 10-12 years, before reaching a plateau around 2030 and possibly declining slightly thereafter. The forecasts take account of major construction projects which are currently planned, for which 2030 may represent the planning horizon. They assume that potential use of the river for new types of delivery/distribution will remain uneconomic without strategic investment in wharf facilities capable of handling container traffic, particularly in the west of London.

The Thames Tideway Tunnel construction work has involved compulsory purchase or leasing of 4 wharves in West London. As a condition of this project, these wharves will be reinstated ready for use for freight transport at the end of the project. This is likely to provide increased access to wharves in west London in the early 2020s, which might otherwise have been under pressure from competing land uses.

GLA's new research predicts that wharf capacity will be adequate to meet predicted demand to 2041, although it identifies some temporary shortages of capacity for construction-related cargo in specific locations. The GLA will review the number of wharves that need to be safeguarded for future use, in the light of these new projections.

10.6 Substitutability of Demand between London and the South East

Much of London's transport infrastructure land has, by its nature, to be in a specific location. A new railway station would not serve its intended purpose if located in a different place. There is rather more flexibility about the location of supporting infrastructure, such as some railway depots (e.g. those providing stabling, rather than those used to uplift freight from specific locations). But moving depots outside London could have implications for travel times for vehicles and staff travelling to and from depots, which would in turn have both financial and environmental implications. The location of bus depots is likely to be even more sensitive to location, as longer travel times from depots make bus services more costly and less competitive. Overall, there is likely to be little scope for relocation of transport land outside London, with the possible exception of some rail depots.

10.7 Conclusions

The major transport investment programme required to support London's growth to 2050 will generate demand for additional industrial land. This demand will primarily include land for new rail and bus depots, and for new stations. The demand is likely to be focused in Opportunity Areas and also in locations that support major transport projects such as the Bakerloo Line Extension and Crossrail 2, although there may be increased demand outside these areas (e.g. for bus depots). The overall scale

of demand to 2050 is currently difficult to assess, but could be around 200 ha or more. This increased demand is likely to be balanced to some degree by release of transport land in other locations from facilities that are no longer used, by National Rail or TfL.

11 Waste

11.1 Introduction

AECOM's industrial land supply study found that waste management and recycling currently occupy 279.8 hectares of land in London, representing 4.0% of total industrial land. This is little changed from the figure of 278 hectares identified in URS's study of 2010. Activities on these sites include refuse disposal facilities (including tips, landfill and disposal plants) and recycling facilities.

London's strategy on planning for waste management is set out in the London Plan, the London Infrastructure Plan to 2050 and supporting papers. In particular, the paper on 'Enabling Infrastructure: Green, Energy, Water and Waste Infrastructure to 2050' (GLA, 2014) highlights the importance of moving towards a circular economy in which resources are reused or remanufactured rather than entering the waste stream. This will help to reduce waste management costs, as well as conserving resources which are themselves increasingly scare and costly.

11.2 Context

Local authority collected waste

Defra's statistics on household waste collected by local authorities indicates that London generated 3.08 million tonnes of household waste in 2015/16, up by 1% from 3.05 million tonnes in 2015/15. Total waste collected by local authorities, including a small element of non-household waste, increased from 3.66 tonnes in 2014/15 to 3.70 tonnes in 2015/16[69]. London's local authority collected waste (including the small element of non-household waste) reduced by nearly 20% from 4.4 million tonnes in 2000/01 to 3.56 million tonnes in 2012/13, in spite of a growing population. Over the last three years, the weight of waste generated has risen very slightly. England's local authority collected waste generation declined less sharply, reducing by 11% between 2000/01 and 2012/13, but has also risen slightly in the last three years. The current London Plan predicts that household waste arisings in 2016 will be 3.1 million tonnes, of which 2.3 million tonnes will be managed within London.

The residual household waste produced per household in London also declined from 993 kg per household in 2000/01 to 568 kg per household in 2012/13 and has since risen slightly to 600 kg per household. A similar pattern has been observed across England as a whole.

The percentage of London's local authority collected waste going to landfill has declined strongly from 72.0% in 2000/01 to 20.3% in 2015/16. Over this period, the proportion of municipal waste being incinerated in 'energy from waste' plants has risen, from 20% in 2000/01 to 46% in 2015/16, with most of the increase being since 2009/10. Recycling percentages have also risen from 8% in 2000/01 to 30% in 2014/15, although these rates have plateaued in recent years. Recycling rates are still below the London Plan targets for 45% of London's local authority collected waste to be recycled by 2015, 50% to be recycled by 2020 and 60% by 2031. And recycling rates are below the national average of 42.4% local authority collected waste being recycled in England in 2015/16.

Commercial and industrial waste

Commercial and industrial waste (C&I) is waste generated by businesses and industry in London, which is collected by the private sector and local authorities. The current London Plan states that London

[69] All statistics on local authority collected waste are from Defra's published statistics from April 2000 to March 2016.

produced approximately 4.7 million tonnes of C&I waste in 2012, and predicts that C&I arisings in 2016 will remain at 4.7 million tonnes, of which 3.5 million tonnes would be managed within London. This has reduced from an estimated 6.5 million tonnes[70] in 2010 and 7.5 million tonnes[71] in 2008, showing a reduction of 37% from 2008 to 2012.

Recycling rates for business waste in London tend to be higher than for local authority collected waste: the Business Waste Strategy for London estimates that 52% of commercial and industrial waste was recycled in 2010.

Construction, demolition and excavation waste

Construction, demolition and excavation waste (CDE) is one of the largest waste streams, generated by development activity in London. It is generally managed by the private sector. The current London plan states that London generated approximately 7.2 million tonnes of waste in 2012, representing 48% of all waste. This is lower than the estimate of 9.8 million tonnes of CDE waste in 2010 reported in the Business Waste Strategy for London (GLA, 2011). But levels of CDE waste are highly dependent on the level of development and construction activity in the capital.

Most CDE waste is recycled: the Business Waste Strategy for London (GLA, 2011) estimated that 82% of this waste stream was recycled in 2010. National waste policies such as the landfill tax have encouraged recycling of this and other waste streams.

The National Planning Policy for Waste (DCLG, 2014) requires local authorities to identify land for municipal and C&I waste but not CDE waste. We have therefore not included CDE waste in our estimates of future land requirements.

While CDE requirements have not been included in our projections of industrial land demand, CDE waste must be taken into account in broad terms within local and regional planning processes. At local level, boroughs have to encourage recycling. At regional level, it is a strategic issue for transport because CDE waste generates large amounts of HGV movements on the strategic transport network. Ensuring the availability of land for the recycling and transport requirements of CDE waste has been an important aspect of current infrastructure projects such as the Thames Tideway Tunnel and Crossrail, and will be important in planning for potential future projects in and around London such as HS2 and Crossrail 2.

Hazardous waste

The current London Plan reports that around 320,000 tonnes of hazardous waste was produced in London in 2011. An estimated 35% of this was from construction, excavation and demolition waste (e.g. asbestos and contaminated soil), while 32% was from the utilities sector. The definition of hazardous waste has been changed to include more types of Waste Electronic and Electrical Equipment (WEEE) waste, as a result of an EU Directive, resulting in increased volumes in recent years. Although the volumes of hazardous waste are still relatively low, special facilities are required to collect and treat hazardous waste separately from other waste streams.

11.3 Drivers of demand

The land required for waste management depends both on the amount of waste generated by London's residents and businesses, and the management approaches chosen to deal with it.

[70] Business Waste Strategy for London, GLA, 2011.
[71] Original figures in London Plan, 2011.

Waste generation

Each type of waste has its own drivers:

- Generation of residential waste is driven largely by population, or more specifically, by the number of households in London. The previous declining trend in residual waste per household per year appears to have halted and slightly reversed in recent years.

- Generation of commercial and industrial waste is driven by the number of businesses and their employees in the London's economy, as well as the economy's sector structure.

- Construction, demolition and excavation waste is related to investment (including investment in major infrastructure projects) as well as population and economic activity.

- Hazardous waste is driven by these same factors, and also by changes in regulation on what constitutes 'hazardous' waste.

While increasing population and economic growth will put upward pressures on the quantity of waste generated within London, this will be counteracted by the proposed transition to a 'circular economy'[72]. The London Infrastructure Plan to 2050 predicts that the circular economy is likely to result in much less waste disposal land being required than originally envisaged. If the circular economy is successfully implemented, the LIP predicts that only 40 new waste disposal facilities will be required by 2050, in addition to London's existing capacity. Most of these facilities will be required to help reuse and recycle materials (e.g. repair workshops, disassembly lines and recycling and reprocessing facilities). These facilities will tend to have lower environmental impacts on their local neighbourhoods than 'conventional' waste management plant.

Waste minimisation already forms part of London's Municipal Waste Strategy and Business Waste Strategy (GLA, 2011). London's own policies are supported by national initiatives such as public awareness campaigns (such as 'Love Food, Hate Waste'), and by work with manufacturers to reduce packaging and save material resources. More far-reaching policies on policies on waste and the circular economy in London will be set out in the Mayor's Environmental Strategy, which will be developed over the next two years.

Waste management choices

Despite waste minimisation initiatives and the move to a circular economy, facilities will still be needed to reuse and remanufacture materials, and to process and dispose of residual waste. Reuse and remanufacturing activities may become indistinguishable from wider industrial and commercial activity, contributing to general demand for industrial land within and around London. These activities may be better neighbours than conventional waste management facilities. Some land will continue to be required for process and disposal of residual waste. As pointed out in the Business Waste Strategy for London, even conventional waste facilities do not have to be poor neighbours: but appropriate measures need to be in place to ensure that transport impacts, noise and odours do not negatively affect neighbouring communities.

The main type of conventional waste management facilities are:

- Material Recovery Facilities (MRF), which receive, separate and prepare recyclable materials for marketing to end-user manufacturers;

[72] A circular economy is an alternative to a traditional linear economy (make, use, dispose) in which we keep resources in use for as long as possible, extract the maximum value from them whilst in use, then recover and regenerate products and materials at the end of each service life. (WRAP, 2016)

- Mechanical Biological Treatment facilities (MBT) which combine a sorting facility with a form of biological treatment such as composting or anaerobic digestion. MBT plants are designed to process mixed household waste as well as commercial and industrial waste, and often produce a refuse-derived fuel which can be used elsewhere for power generation.

- Mechanical Heat Treatment facilities which combine a sorting stage followed by a form of thermal treatment. Again, MHT facilities are often used to a refused-derived fuel which can be used elsewhere.

- Energy from waste plants (EfW), where waste is burned. Some EfW plants implement energy recovery from the process through technologies such as gasification and pyrolysis. The London Plan also advocates that waste heat from EfW plants should – wherever possible – be used in district heat networks.

- Landfill, which is generally the choice of last resort.

The choice of waste management technology depends on cost, legislation and policy. A supporting paper[73] for the London Infrastructure Plan highlights that waste disposal of local authority collected waste currently costs Londoners £500 million, about 15% of London's total council tax bill. Landfill is currently being discouraged by a number of policies affecting London:

- Landfill tax is a key driver changing the way that many waste streams are managed. In 2016, landfill tax is charged at £84.40 per tonne. The Municipal Waste Strategy highlights that this makes landfill more costly than recycling.[74]

- In 2011, Defra redefined municipal waste to include all types of waste covered by the EU Landfill Directive. This includes waste streams collected from households by local authorities, as well as similar types of waste generated by businesses. All of these waste streams have to meet landfill diversion targets.

- The current London Plan sets a target for zero bio-degradable or recyclable waste to landfill by 2026.

In parallel with the landfill target, the London Plan sets targets for recycling of local authority collected waste to 50% by 2020 and 60% by 2031, for recycling of C&I waste above 70% in 2020 and for recycling of CDE waste of 95% by 2020. The London Plan also cites the Mayor's target of recycling 60% of 'municipal waste' by 2031, which includes household and commercial waste. This is supported by WRAP's research showing that 85% of household waste is recyclable, including composting.

Self-sufficiency is a key principle in the London Plan 2016. This principle is strategically important as a means of reducing transport demands and encouraging a sense of responsibility for waste. Over the period of the London Plan, there is a target to increase the proportion of London's waste managed within the capital. The Plan estimates that, in 2012, London managed 46% of its own waste and also imported a further 2.6 million tonnes of waste. In 2016, the Plan assumes net exports of 1.9 million tonnes of household and C&I waste to be treated beyond London's boundaries, declining to 1.2 million tonnes in 2021. From 2026 onwards, the Plan aims for the equivalent of 100% of London's waste to be managed within London's boundaries, where practicable, accepting that this may involve some importing and exporting of particular waste streams.

[73] Enabling Infrastructure: Green, Energy, Water and Waste Infrastructure to 2050. (GLA, 2014)

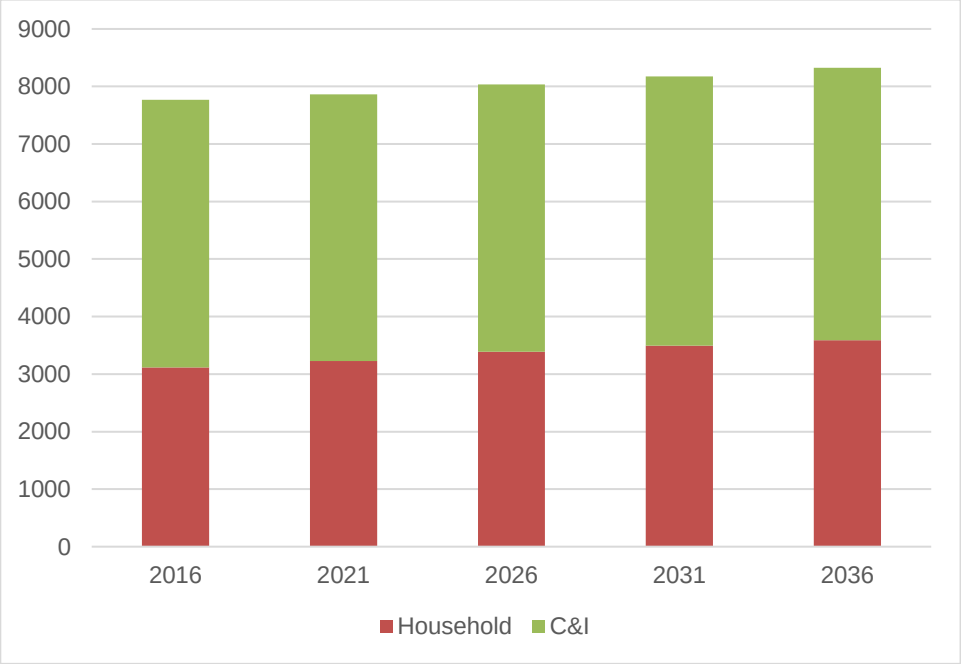
[74] The Strategy states that In 2011, when landfill tax was £56 per tonne, the cost of recycling (including collection costs) was approximately £109 while landfill was approximately £142 per tonne. At this level, the tax also made the cost of energy recovery roughly equivalent to landfill (depending on contractual arrangements).

The move to a circular economy may make the principle of self-sufficiency less important, since waste management will involve much lower volumes of residual waste being sent for final disposal or landfill. The transport and other environmental impacts of recycling, reuse and remanufacturing activities are likely to be lower. While London's future waste policies (as presented in the forthcoming Environmental Strategy) may put less stress on self-sufficiency, there may still be employment benefits (and some transport/carbon benefits) from these activities being located within Greater London.

Waste streams and waste arisings

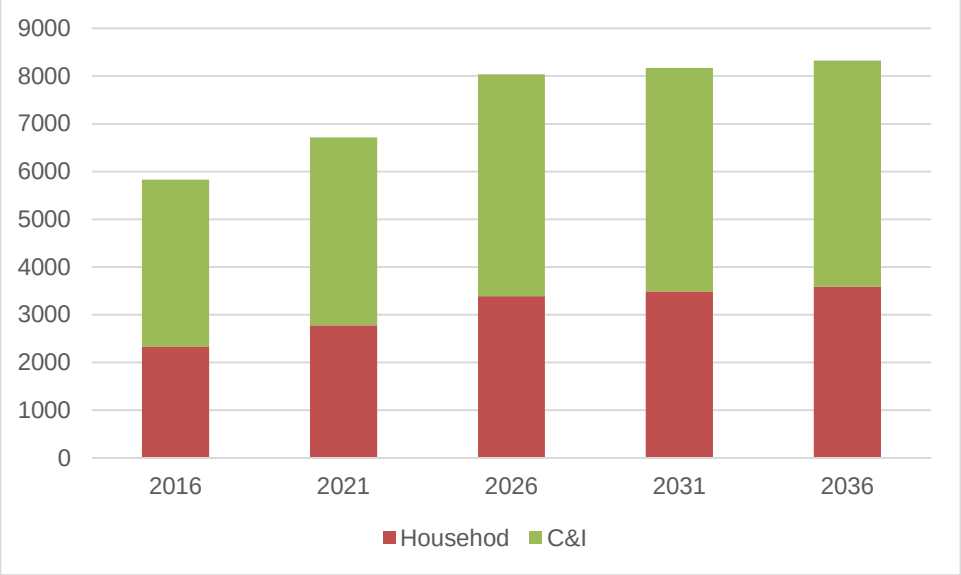
The previous Industrial Land Demand study assumed that total waste arisings from household and C&I in London would be 11.7 million tonnes in 2031. Subsequent work by the GLA has shown a drop in waste arisings, so the latest London Plan predicts waste arisings of 8.2 million tonnes in 2031 and 8.3 million tonnes in 2036. Updated forecasts to 2041 will be available shortly from the GLA.

Figure 11.1 Projected waste arisings from London – household and C&I waste ('000 tonnes)



Source: London Plan, 2016.

Figure 11.2 Waste to be managed within London – household and C&I waste ('000 tonnes)



Source: London Plan, 2016.

The London Boroughs are currently required to provide for treatment of a specified share of London's household and C&I waste. This is their 'apportionment' of the London's total waste, which takes into account their potential capacity for waste management, their share of waste generation and self-sufficiency assumptions for London's different waste streams.

For the purposes of this study, we have used the latest apportionment figures in the London Plan, as shown in the next section. However, we are aware that updated figures will shortly be available since borough apportionment figures are currently being revised by the GLA, and extended to 2041.

11.4 Future land requirements for municipal and commercial waste

Existing waste sites are identified on the GLA's waste map of London. This is still work in progress but should eventually include all existing waste management sites, providing details of the type of waste they manage and their licensed capacity: https://maps.london.gov.uk/webmaps/waste/

We have estimated the total land required to manage London's household and C&I waste in 2036, using apportioned waste projections from the 2016 London Plan and throughput figures (tonnes per hectare) agreed with the GLA for the 2011 study. These throughput figures were based on waste authority plans across London to around 2020, which remain largely unchanged, but they do not take into account the transition towards a circular economy and changes in the mix of waste management facilities in the longer term. Also, we have used unchanged estimates of the land footprint of current and planned capacity, as these are also influenced by throughput assumptions. We understand that the GLA is in the process of updating both the apportioned waste projections and throughput figures, which will have implications for the projections below.

The main change from the 2011 study is that apportioned waste projections for household and C&I waste have reduced from 11.7 million tonnes to 8.3 million tonnes. The estimated land required to manage this waste has therefore reduced from 194.2 ha to 137.9 ha. When the GLA's revised projections are available, it will be possible to assess future requirements for waste processing, taking into account the likely reduction in waste volumes associated with the transition to a circular economy.

Table 11.1 Indicative net land requirement for apportioned waste to 2036

Borough	Apportionment of HH & C&I waste to 2036 tonnes per annum	Land Requirement (ha)	Indicative land take of planned capacity (ha)	Net Indicative Land Requirement (ha)
Barking & Dagenham	502,000	13.4	34.7	-21.3
Havering	329,000	8.8	22.7	-13.9
Newham	403,000	10.7	27.8	-17.1
Redbridge	156,000	4.2	10.8	-6.6
Barnet	222,000	2.6	2.4	0.2
Camden	189,000	2.3	2.1	0.2
Enfield	305,000	3.6	3.3	0.3
Hackney	206,000	2.5	2.2	0.2
Haringey	189,000	2.3	2.1	0.2
Islington	198,000	2.4	2.1	0.2
Waltham Forest	198,000	2.4	2.1	0.2
Brent	280,000	5.2	1.6	3.6
Ealing	362,000	6.7	2.0	4.7
Harrow	181,000	3.3	1.0	2.3
Hillingdon	305,000	5.6	1.7	3.9
Hounslow	288,000	5.3	1.6	3.7
Richmond	181,000	3.3	1.0	2.3
Hammersmith & F	247,000	3.1	5.9	-2.8
Kensington & Chelsea	198,000	2.5	0.0	2.5
Lambeth	222,000	2.8	0.0	2.8
Wandsworth	313,000	3.9	1.1	2.9
Croydon	247,000	4.2	0.2	4.0
Kingston	148,000	2.5	0.0	2.5
Merton	239,000	4.1	2.5	1.5
Sutton	198,000	3.4	4.8	-1.4
Bexley	453,000	5.7	14.0	-8.3
Bromley	247,000	3.1	0.9	2.2
City	100,000	1.3	0.0	1.3
Greenwich	329,000	4.1	2.7	1.4
Lewisham	206,000	2.6	6.0	-3.5
Southwark	247,000	3.1	5.7	-2.6
Tower Hamlets	313,000	5.8	6.7	-0.9
Westminster	124,000	1.6	0.0	1.6
TOTAL	**8,325,000**	**137.9**	**171.8**	**-33.9**

Source: GLA

11.5 Sensitivity Test – The Circular Economy

As explained above, further reductions in waste arisings, below the levels set out in Table 11.1, should be achieved through a move towards a circular economy. The London Waste and Recycling Board[75] has set out the opportunities achievable through keeping resources in use for as long as possible, extracting maximum value from them while in use, and recovering or regenerating products and materials at the end of each service life. The London Infrastructure Plan 2050, and its supporting paper on waste, emphasise that the circular economy can reduce London's waste management costs, particularly for landfill and incineration. This plan refers to research by McKinsey[76] which highlights that commodity prices have risen since 2000, because of increasing resource scarcity. This creates another driver for better resource management and recovery.

The GLA currently predict that, by 2041, transformation to a circular economy could reduce waste arisings in London by 20-50%. This would reduce demand for land to manage waste arisings, while increasing demand for employment land (primarily B1c and B2) to repair and remanufacture resources.

As a full analysis of future waste scenarios is beyond the scope of this study, we have undertaken a highly simplistic sensitivity test to the land implications of a successful circular economy. The sensitivity test does not take account of any change in the balance of waste management technologies, or of any shift from conventional waste management to repair and remanufacturing activities. Fuller analysis of the implications for land demand will be possible when current GLA work on waste projections has been completed.

Table 11.2 Sensitivity to Circular Economy

Scenario	Apportioned waste in 2036 (tonnes pa)	Indicative land requirement (ha)	Indicative land take of planned capacity (ha)	Net indicative land requirement (ha)
Base case	8,325,000	137.9	171.8	-33.9
20% reduction	6,660,000	110.4	171.8	-61.5
50% reduction	4,163,000	70.6	171.8	-109.6

Source: sensitivity applied to figures in Table 11.1

In practice, the circular economy will not only involve a significant reduction in waste, but also a shift from final recovery technologies (which tend to involve a few large sites processing high tonnages of waste per hectare) towards recycling and material facilities (which tend to involve more, smaller sites processing slightly lower tonnages of waste per hectare). GLA modelling work, underlying the London Infrastructure Plan to 2050, suggests that – in a successful circular economy - around 40 new facilities will be required to 2050 in addition to London's existing facilities, and that most of these will be required to help reuse and recycle materials. Indicative land-take for conventional waste management facilities are shown in the table below.

[75] http://www.lwarb.gov.uk/wp-content/uploads/2015/12/LWARB-circular-economy-report_web_09.12.15.pdf

http://www.londonsdc.org/documents/LondonCircularEconomyJobsReport2015OnlineVersionFinal.pdf

[76] McKinsey & Company, Towards the Circular Economy: Economic and Business Rationale for an Accelerated Transition, Ellen MacArthur Foundation, 2013, pp. 17-18.

Table 11.3 Indicative land-take for different types of waste management technologies

Type of waste management technology	Throughput (tonnes/ha)		
	Small	Large	Supersize
Materials Recycling Facility	50,000	100,000	100,000
Anaerobic Digestion/food IVC	33,333	50,000	100,000
Composting (garden)	12,500	12,500	12,500
Residual treatment (eg.EfW, MBT, MHT)	52,632	66,667	250,000

Source: GLA, 2016 (based on examples of actual plants)

GLA have advised that co-location of these facilities could reduce land-take by about 80% by improving efficiencies of waste handling.

Further work is needed to explore the implications of a circular economy, in terms of the reduction in waste stream volumes (which would tend to decrease tonnages and hence land requirements), and the shift from final recovery to higher levels of recycling and remanufacture (which could slightly increase land requirements per tonne of waste, and change the nature of the sites required). Some recycling and remanufacturing activities might be able to use employment as well as industrial sites.

11.6 Substitutability of Demand between London and the South East

Demand for waste management land within London, rather than the wider South East, is driven by the London Plan's current commitment to self-sufficiency. This policy commitment helps to keep waste transport costs low and creates a sense of responsibility for London to manage its own waste. The self-sufficiency policy is also a response to the declining availability of landfill site capacity in the South East. As use of landfill reduces further, and the move towards a circular economy reduces the tonnages of residual waste, it is possible that the principle of self-sufficiency can be relaxed in London's future waste policies. It may be more acceptable for some repair and remanufacturing activities – rather than landfill activities - to be undertaken in sites around, rather than within, London. However, there may still be benefits associated with retaining these activities within London, both to capture employment benefits and to minimise transport requirements and their associated environmental impacts.

11.7 Conclusions

Overall, projections of land demand for waste management have reduced significantly since the 2011 industrial Land Demand study, owing largely to lower projections of C&I waste arisings. When the move to a circular economy is taken into account, waste arisings – and demand for industrial land for waste management - are likely to reduce further.

There are several major uncertainties at present. Firstly, revised waste projections and revised borough apportionments are currently under development by the GLA. It is possible that the principle of self-sufficiency for London, and apportionment between boroughs, may be applied to CDE and hazardous waste in addition to household and C&I waste. This would tend to increase the amount of land required to manage waste within London. But, conversely, the principle of self-sufficiency may itself be revisited in future waste policies for London, which would work in the opposite direction.

Secondly, the proposed move towards a circular economy will both reduce the amount of residual waste generate and will reduce demand for residual waste treatment facilities (such as energy from waste plants, MBT, MHT and landfill), while increasing demand for repair, recycling and remanufacturing

facilities. The latter will tend to be better neighbours than conventional waste treatment facilities and may in some cases be suitable for location on employment rather than industrial land.

12 Wholesale Markets

12.1 Introduction

There are five wholesale markets in London: Smithfield, Billingsgate, New Covent Garden, New Spitalfields and Western International. AECOM's industrial land supply study found that these markets together occupy 55.6 hectares, a slight increase on the 54 hectares occupied by the markets in 2011.

The wholesale markets have historically played an important role in London's economy: distributing fresh products to retailers, restaurants and street markets across the capital. Their future role is affected by a number of different trends. On the one hand, they have to compete with increasingly efficient distribution systems used by supermarkets and other suppliers, who can bypass the wholesale markets and supply directly to stores and restaurants. But on the other hand, they have taken advantage of the trend towards increased eating out, supplying a significant proportion of restaurants and cafes in the capital. They also supply a growing range of products to serve London's increasingly diverse ethnic communities. Some of the traders are major businesses which increasingly take opportunities to add value to their products (e.g. by supplying restaurants with prepared food products, not just raw ingredients).

Two reviews of wholesale markets have been undertaken in recent years. In 2002, Defra commissioned Nicholas Saphir to undertake a review of the wholesale markets, while the GLA commissioned URS to undertake the London Markets Review in 2007. Both studies advised that the markets would need to become more innovative, efficient and flexible to remain competitive in future. They considered the possibility of consolidating several markets into one or more larger markets which could offer a wider range of services.

In the light of these reviews, the London Plan (Policy 4.4 and paragraph 4.24) recognizes that wholesale markets will continue to play an important role in London and sets out the Mayor's objective to retain an efficient wholesale market function to meet London's requirements. Paragraph 4.24 recognises that to do so may involve consolidation. Policy 4.8 recognises the importance of street markets to many Londoners and wholesale markets, via street markets, provide Londoners with access to fruit and vegetables. They also provide wider societal benefits by bringing people together and reducing social isolation.

The City of London Corporation, which owns Smithfield, Billingsgate and New Covent Garden, is currently planning to commission a study of possible consolidation of these three markets within East London.

Further details of current and planned changes to each of the markets are set out below.

12.2 The markets

The wholesale markets in London vary in size and location. Smithfield and Billingsgate are respectively specialist meat and fish markets while the others are more broadly based fruit, vegetable and flower markets. While Smithfield, Billingsgate and New Covent Garden Market are centrally located, Western International and New Spitalfields are in outer London. Fuller details are given in the table below.

Table 12.1 London's wholesale markets

Market	Location	Total site area (ha)	Total floor space (sq m)	Number of units	Broad catchment area	Changes underway
Smithfield	City of London	2.4 ha	25,685	42 meat trading premises*	London	Possible review
Billingsgate	Tower Hamlets, Isle of Dogs	5.5 ha	6,381	98 stands, 30 shops, 79 offices*	London	Possible review
New Spitalfields	Waltham Forest, Leyton	13 ha	28,700*	115 trading units plus supporting offices and services*	East London, Kent, East of England	Possible review
New Covent Garden	Boundary of Lambeth and Wandsworth	24.6 ha*	Fruit & veg: 56,183 sq m* Flowers: 15,900 sq m* (gross internal area)	200*	Central London	Current redevelopment will reduce size to 14.5 ha. The gross internal area will reduce to: Fruit & veg: 47,124 sq m Flowers: 6,771 sq m
Western International	Hounslow	7.2 ha	17,431	101	West London, South East	Permission granted for additional warehouse (1,115 sq m)

Source: London Markets Review (2007). Figures marked * have been updated with information supplied by the City of London Corporation, CGMA, LB Wandsworth.

Smithfield is located within the Central Activities Zone (CAZ) in the north-west of the City of London, between Farringdon and Barbican stations. It sells meat and poultry, as well as cheese, pies and other delicatessen products. The market sells more than 100,000 tonnes of meat and meat products per year. Buyers include butchers, restaurateurs and caterers, as well members of the public. The market operates in three Grade 2* listed buildings. These buildings were renovated in the 1990s to meet current hygiene standards, costing more than £70 million. Smithfield is a multi-level site, offering two-levels of parking underneath the market buildings. In future, Smithfield may be affected by introduction of the proposed Ultra Low Emission Zone (ULEZ) in central London, which will limit the size of vehicle that can be used for deliveries.

Billingsgate is located within the Isle of Dogs, close to Canary Wharf. It is the UK's largest inland fish market, selling an average of 25,000 tonnes of fish and fish products each year. These include processed fish products such as cured and smoked fish, prepared products for the table, fish soups, cooked shellfish and pates. The market also sells cooking oils, potatoes, trade sundries and catering supplies. Approximately 40% of the traded tonnage is imported from abroad, mainly by road from UK ports with some airfreight. Some merchants offer delivery to London and the South East; many have cold storage facilities. The annual turnover of the market is estimated to be around £200 million.

New Spitalfields is located in the North East of London, in the London Borough of Waltham Forest. It is a purpose-built market for fruit, vegetables and flowers, occupying an area of 13 hectares. The market claims to attract the highest number of wholesale traders of any horticultural market in the UK and is used by catering supply businesses. It specialises in supplying a wide choice of exotic fruit and vegetables for shops and restaurants serving minority ethnic groups. Facilities include a central market hall with cold storage rooms, ripening rooms and racks for pallet products. There are four additional buildings offering 3,720 sq m of accommodation for catering supply companies, a further 900 sq m of office space for fruit importers and additional service facilities. The site has good road access and includes extensive parking areas for over 1,800 vehicles. The market site is on a flood plain but was raised 1.5 m above the level of the surrounding land, to reduce risk of flooding.

New Covent Garden is located on the boundary of the London Boroughs of Lambeth and Wandsworth, in the Vauxhall/ Nine Elms/Battersea Opportunity area. The market is reported by CGMA to be the largest wholesale market for fruit, vegetables and flowers, supplying 40% of fresh fruit and vegetables eaten outside of the home in London. Its central location facilitates supply to central London. CGMA report that top restaurants in London use the New Covent Garden and that the flower market is used by 75% of London florists. The merchants include catering distributors and companies which specialise in a wide range of food products (including meat, fish, ice, dairy, sauces, prepared fruit and vegetables, fine foods, desserts, juices and frozen goods and so on). The flower market hosts 30 wholesale traders selling flowers, plants, foliage and other floristry supplies.

Works to redevelop New Covent Garden market are currently underway, as part of the VNEB masterplan. The market used to cover three sites totalling 24.6 hectares, both North and South of the railway lines running into Waterloo station. The new market will be consolidated to a smaller area to the South of the railway, covering 14.5 hectares. The gross internal area of the fruit and vegetable market will be reduced by 16% but the market will still offer the same number of trading units for these products. But the flower market will be reduced more significantly, by 41%, with some loss of units. There is some intensification of use involved in the redevelopment, with hard standing areas being reduced and an additional deck being added to a multi-storey car park. LB Wandsworth have advised that the overall level of trade and employment is not expected to fall. However, some of the market traders involved in the Covent Garden Trading Association are currently resistant to the proposed changes and to the temporary de-camping arrangements required during redevelopment. The case study of Company C, in chapter 8, illustrates the implications of relocation for a company whose scale of operations could not be accommodated in the redeveloped market.

Western International is a horticultural market located in Hounslow close to the M4 and Heathrow. It sells fruit, vegetables and plants, specialising in air freighted products that are then distributed throughout the UK. There are approximately 75 wholesale traders at the market selling fruit, vegetables and flowers, including exotic produce and products for the catering trade. In 2008, the market moved from the Eastern part of the Hayes Road site to new facilities on the Western part of the site. The new site is smaller but uses the land more intensively than the former market. LB Hounslow report that the market is currently expanding, owing partly to relocation of some traders from New Covent Garden.

Planning permission has been granted for a new warehouse on the site, which would provide an additional 1,115 sq m[77].

12.3 Future demand for land

Possible consolidation of the wholesale markets into fewer, less central, sites has been under consideration since the reviews in 2002 and 2007. The GLA has not yet commissioned further study of this option.

However, the City of London Corporation is currently considering potential consolidation of their three markets: Smithfield, Billingsgate and New Spitalfields. Drivers for the consolidation are: the need to consider the future of Smithfield in the light of the proposed ULEZ; the creation of a single market that handles a wider range of products, including potentially dairy and charcuterie; the opportunity to add value to products; and the scope to release land values on existing sites. Relocation of Smithfield and Billingsgate to the New Spitalfields site is not feasible owing to lack of suitable land. So consolidation would probably involve all three markets moving to a new site in north-east or east London, within the M25. This is likely to involve an increase rather than decrease in land requirements compared to the existing markets, partly because of the wider range of services that might be offered and partly because parking would probably be at ground level (rather than underground, as currently provided at Smithfield). The Corporation estimate that they would require 24-40 hectares to replace the current sites totalling 20 hectares.

Extensive studies would be required to establish the feasibility of this potential move. The whole process could take around 10 years because changes to the wholesale markets require primary legislation. In addition to finding a suitable site, the move would be dependent on planning permission being given by another borough, and on Select Committee approval of the impact on the environment, on local employment and so on.

For the time being, demand for land for wholesale markets appears to be growing slightly rather than declining. Some market traders offer exotic produce and added-value products which enable them to compete with supermarket distribution chains. Experience from other countries suggest that larger markets, such as the Rungis market outside Paris, may offer a way to sustain competitiveness.

12.4 Substitutability of Demand between London and the South East

The wholesale markets are primarily selling to customers within London, so travel times from London are critical for their competitiveness. While there may be arguments for relocating some of the markets from inner to outer London, in terms of air quality impacts and land values in central London, it is unlikely to be feasible to relocate the wholesale markets beyond the M25.

12.5 Conclusions

While some of the wholesale markets may relocate to outer London within the timescale considered by this study, the overall land requirement appears likely to remain stable and may increase slightly. However, there are significant uncertainties around this prediction, as it depends on the continued ability of the wholesale markets to compete with other forms of distribution.

[77] Planning application reference number: 01032/E/S10.

13 Industrial Land Release Benchmarks

13.1 Industrial Land Supply

The 2015 Industrial Land Supply study identified potential releases of industrial land including the development pipeline (schemes recorded on the London Development Database with planning permission) and areas earmarked in Opportunity Area Planning Frameworks, Local Plans and in Housing Zones[78]. Table 13.1 presents this data updated with more recent information on Opportunity Area planned release. The sum of all planned release totals 838 ha, of which 45% comes through Opportunity Area planned release. There may be additional potential release associated with proposals for Crossrail 2 and the Bakerloo Line Extension. These are considered under the Spatial Scenarios in Chapter 14.

[78] With double counting of sites excluded where categories overlap.

Table 13.1 Industrial Pipeline Planned Release (Ha)

	Development Pipeline (LDD)	OA Planning Frameworks	Local Plan Reg 19+	Local Plan Reg 18	Housing Zone Sites	Total
London	**184.8**	**375.4**	**75.5**	**79.3**	**122.5**	**837.5**
Inner London	76.3	164.7	15.9	35.5	44.1	336.6
Outer London	108.5	210.7	59.6	43.7	78.3	501.0
Central sub-region	**13.6**	**5.2**	**0.0**	**0.0**	**5.2**	**24.0**
Camden	1.0	0.0	0.0	0.0	0.0	1.0
City of London	0.0	0.0	0.0	0.0	0.0	0.0
Islington	5.1	0.0	0.0	0.0	0.0	5.1
Kensington and Chelsea	0.7	0.5	0.0	0.0	0.0	1.2
Lambeth	1.3	4.7	0.0	0.0	5.1	11.0
Southwark	5.4	0.0	0.0	0.0	0.1	5.5
Westminster	0.1	0.0	0.0	0.0	0.0	0.1
East sub-region	**71.7**	**207.8**	**1.4**	**79.3**	**52.2**	**412.4**
Barking and Dagenham	14.6	96.7	0.0	0.0	0.0	111.3
Bexley	2.1	0.0	0.0	43.7	0.1	45.9
Greenwich	9.0	0.0	0.0	35.5	7.8	52.3
Hackney	1.6	0.5	0.0	0.0	0.0	2.1
Havering	5.4	0.0	0.0	0.0	15.6	21.0
Lewisham	4.6	0.0	0.0	0.0	5.6	10.2
Newham	19.7	63.8	0.0	0.0	0.0	83.5
Redbridge	0.9	0.0	1.4	0.0	0.0	2.3
Tower Hamlets	8.9	24.9	0.0	0.0	23.1	57.0
Waltham Forest	4.9	21.9	0.0	0.0	0.0	26.9
North sub-region	**9.6**	**55.4**	**2.0**	**0.0**	**8.6**	**75.4**
Barnet	0.8	0.0	0.0	0.0	1.0	1.8
Enfield	1.5	38.1	2.0	0.0	0.9	42.4
Haringey	7.3	17.3	0.0	0.0	6.7	31.2
South sub-region	**21.7**	**31.2**	**0.0**	**0.0**	**9.8**	**62.6**
Bromley	1.3	0.0	0.0	0.0	0.2	1.4
Croydon	1.3	0.0	0.0	0.0	0.0	1.3
Kingston upon Thames	0.6	0.0	0.0	0.0	0.0	0.6
Merton	0.7	0.0	0.0	0.0	0.1	0.8
Richmond upon Thames	0.7	0.0	0.0	0.0	0.0	0.7
Sutton	10.2	0.0	0.0	0.0	7.5	17.7
Wandsworth	6.9	31.2	0.0	0.0	2.0	40.0
West sub-region	**68.3**	**75.9**	**72.2**	**0.0**	**46.7**	**263.1**
Brent	5.7	0.0	10.3	0.0	22.3	38.4
Ealing	4.3	36.7	0.0	0.0	13.1	54.1
Hammersmith and Fulham	12.1	39.2	15.9	0.0	0.4	67.5
Harrow	15.4	0.0	0.0	0.0	5.2	20.6
Hillingdon	23.8	0.0	46.0	0.0	0.0	69.8
Hounslow	7.0	0.0	0.0	0.0	5.7	12.8

Source: London Industrial Land Demand (2015), GLA

13.2 Future demand for industrial land in London

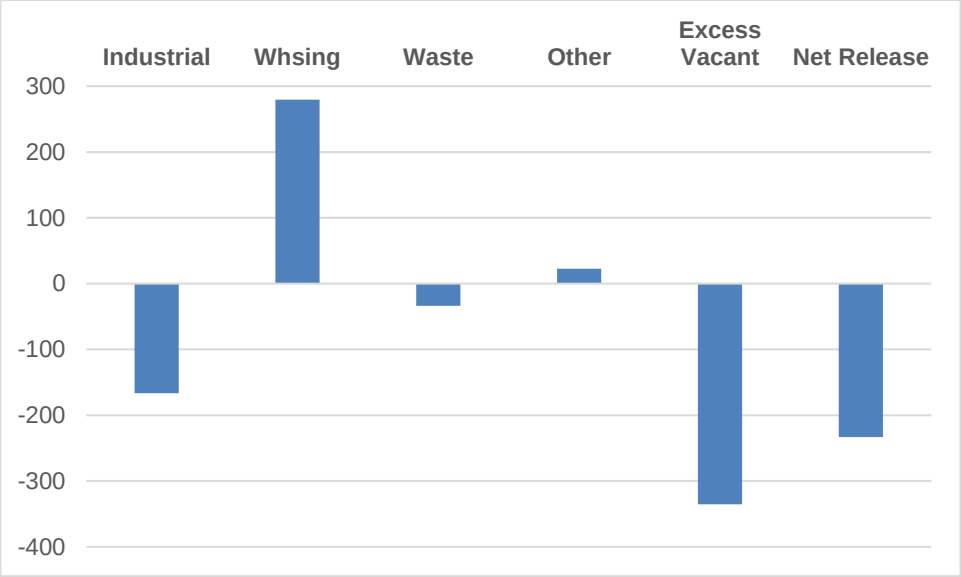
The Table below aggregates the different components of demand based on the analysis in Chapters 6 to 12 of this report. With regard to vacant land, the Land for Industry and Transport SPG states that vacant industrial land should not exceed 5% and vacant industrial floorspace should not exceed 8%. For most boroughs, vacancy rates are well below these thresholds, but there are some boroughs in east London where the level of vacant industrial land is still high. If vacant industrial land rates were reduced to the benchmark level in these boroughs then it would enable the release of 335 ha of industrial land.

Combining the components of industrial land demand with the surplus from the management of vacancy rates suggests a total of 233 ha of industrial land could be released over the period 2016-41, or an average of 9.3 ha per annum.

Without this surplus vacant land to release there would be positive demand for industrial land. London has successfully managed down its surplus of vacant industrial land over the past twenty years. But this is a reservoir that will not be replenished. Once the last of this current stock of vacant industrial land has gone, industrial land in London would potentially cease to be a source of brownfield land for alternative uses unless ways can be found to use industrial land more efficiently such as through intensification, co-location and substitution (see Alternative Spatial Scenarios section 14).

The components that make up the benchmark release total for London are illustrated in Figure 13.1

Figure 13.1 Benchmark Release 2016-41 (Ha) by Componenty



Source: CAG

Release totals by Sub Region and Property Market Areas are summarised in Table 13.2.

Table 13.2 Industrial Land Release 2016-41 by Sub Region and Property Market Area (Ha)

Sub Region	Industrial	Whsing	Waste	Other	Demand	Surplus from Excess Vacant Land	Net Demand
Central	-18.0	-47.4	6.0	2.5	-56.9	-0.3	-57.2
East	-46.3	118.0	-69.8	5.8	7.7	-259.1	-251.4
North	-7.7	48.6	0.7	0.0	41.5	-23.7	17.9
South	-22.6	45.1	14.0	10.5	47.0	-15.1	31.9
West	-71.9	115.3	15.4	3.9	62.7	-37.0	25.7
London	**-166.5**	**279.6**	**-33.7**	**22.7**	**102.1**	**-335.2**	**-233.1**
Property Market Area							
Central Services	-36.8	-89.3	1.8	5.1	-119.2	-4.7	-123.9
Lea Valley	-14.9	54.6	0.7	0.0	40.4	-23.7	16.7
Park Royal/Heathrow	-75.7	135.9	17.9	3.9	82.0	-37.0	45.0
Thames Gateway	-16.7	152.7	-63.6	4.0	76.4	-262.1	-185.6
Wandle Valley	-22.4	25.7	9.5	9.7	22.5	-7.8	14.7

Source: CAG

Table 13.3 presents the release totals by individual borough. Whilst presented at borough level, property markets do not adhere neatly to administrative boundaries. It is the broader sub-regional or property market areas that provide a better guide. For example, a road may represent a boundary between two boroughs and in practice it makes little difference to an occupier which side of the road they locate.

The individual borough totals presented below should be subject to some spatial reallocation within sub-regions as occupiers seek the most appropriate location. This will also be a function of land use allocations of the boroughs themselves, occupiers will locate where space is available within their broad area of search.

The largest release figures are to be found in East London where there are still large quantities of vacant industrial land, notably in Newham, Barking and Dagenham, Tower Hamlets and Havering. Much of the Central sub-regional industrial land has already gone. The baseline benchmarks suggest that there are some further potential releases in Islington, Lambeth and Southwark as demand arising from logistics activity continues to be met from outside of the Central Services area. However this should be considered in the light of the need for sustainable 'last mile' distribution to service the Central Activities Zone. The North, South and West sub-regions all show a positive demand for industrial and in our baseline projections. There is little surplus vacant land to be released in these sub-regions and there is positive demand for warehousing space to serve the logistics sector.

Figure 13.2 Benchmark Release by Borough and Component

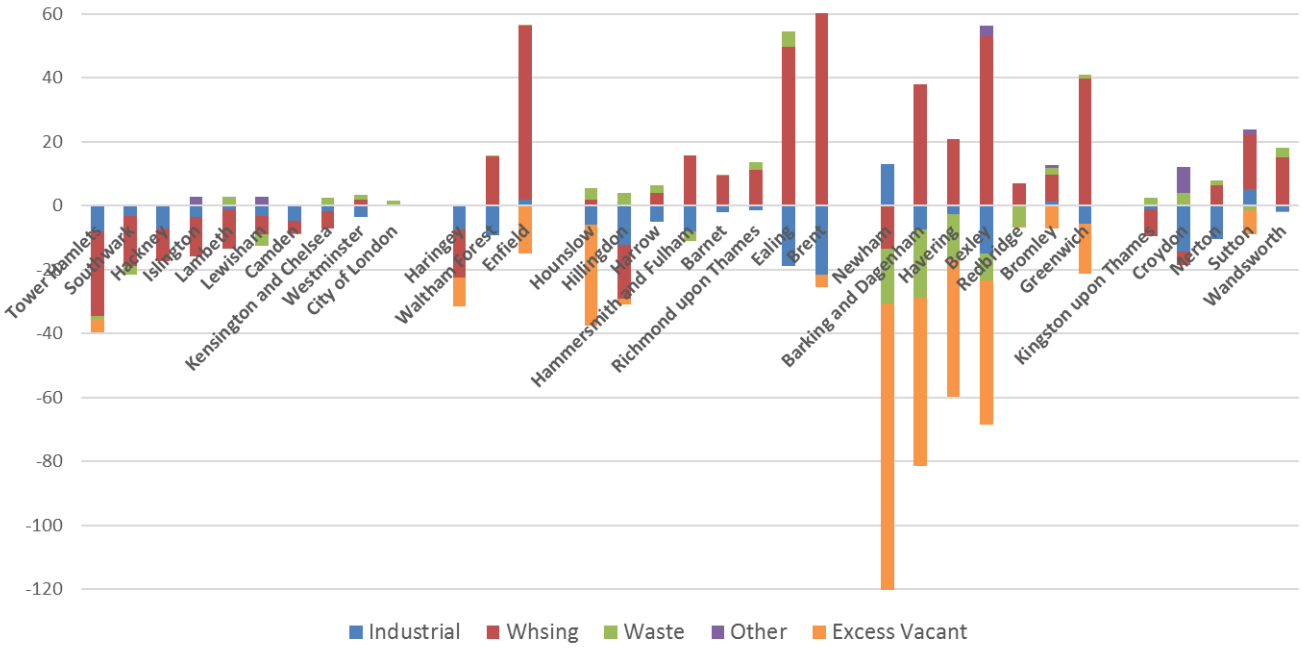


Table 13.3 Industrial Land Release by Borough 2016-41

	Industrial	Whsing	Waste	Other	Demand	Surplus from Excess Vacant Land	Net Release
Central							
Camden	-4.7	-3.9	0.2		-8.4	-0.3	-8.7
City of London	0.3	0.0	1.3		1.6	0.0	1.6
Islington	-3.6	-12.2	0.2	2.5	-13.1	0.0	-13.1
Kensington and Chelsea	-1.8	-5.3	2.5		-4.6	0.0	-4.6
Lambeth	-1.3	-12.2	2.8		-10.6	0.0	-10.6
Southwark	-3.2	-15.7	-2.6		-21.5	0.0	-21.5
Westminster	-3.7	1.9	1.6		-0.2	0.0	-0.2
East							
Barking and Dagenham	-7.5	37.8	-21.3		9.0	-52.8	-43.7
Bexley	-15.1	53.0	-8.3	3.2	32.8	-45.1	-12.3
Greenwich	-5.7	39.7	1.4		35.4	-15.5	19.8
Hackney	-7.3	-10.0	0.2		-17.1	0.0	-17.1
Havering	-2.8	20.8	-13.9		4.1	-43.0	-38.9
Lewisham	-3.4	-5.6	-3.5	2.6	-9.9	0.0	-9.9
Newham	12.9	-13.5	-17.1		-17.7	-98.0	-115.7
Redbridge	0.2	6.8	-6.6		0.3	-0.4	-0.1
Tower Hamlets	-8.1	-26.3	-0.9		-35.3	-4.3	-39.7
Waltham Forest	-9.4	15.4	0.2		6.2	0.0	6.2
North							
Barnet	-2.2	9.3	0.2		7.3	0.0	7.3
Enfield	2.0	54.4	0.3		56.7	-14.9	41.7
Haringey	-7.5	-15.2	0.2		-22.5	-8.7	-31.2
South							
Bromley	1.4	8.2	2.2	0.8	12.6	-7.3	5.3
Croydon	-14.3	-4.2	4.0	8.0	-6.5	0.0	-6.5
Kingston upon Thames	-1.1	-8.6	2.5		-7.2	0.0	-7.2
Merton	-10.6	6.3	1.5		-2.8	0.0	-2.8
Richmond upon Thames	-1.6	11.2	2.3		12.0	0.0	12.0
Sutton	5.2	17.0	-1.4	1.7	22.5	-7.7	14.9
Wandsworth	-1.6	15.2	2.9		16.4	-0.1	16.3
West							
Brent	-21.6	60.9	3.6	3.9	46.9	-3.9	43.0
Ealing	-18.8	49.7	4.7		35.6	0.0	35.6
Hammersmith and Fulham	-8.2	15.6	-2.8		4.7	0.0	4.7
Harrow	-5.1	4.0	2.3		1.2	0.0	1.2
Hillingdon	-12.4	-16.8	3.9		-25.3	-1.6	-26.9
Hounslow	-5.9	1.9	3.7		-0.3	-31.5	-31.8
London	**-166.5**	**279.6**	**-33.7**	**22.7**	**102.1**	**-335.2**	**-233.1**
Annual	**-6.7**	**11.2**	**-1.3**	**0.9**	**4.1**	**-13.4**	**-9.3**

Source: CAG

13.3 Demand Release Benchmarks and Pipeline

Comparing the Demand Release Benchmarks of Table 13.3 with the Planned Release Pipeline of Table 13.1, it is apparent that the potential through planned release already exceeds the benchmark release total. In total, currently planned release exceeds the benchmark release by 600 ha. In other words, the planned release of industrial land far exceeds the levels suggested by the forecast demand. If the narrowest measure of the pipeline is taken, then there are already 185 ha of industrial land to be released through outstanding permissions, which would leave only a further 50 ha to be released over the plan period to 2041 if the benchmark figure were to be achieved.

The planned release exceeds the benchmark release in all bar the Central sub-region. The excess of planned release over benchmark release is greatest in the West sub-region.

Table 13.4 Comparison of Benchmark Demand and Pipeline Release by Sub Region, (Ha)

Sub Region	Benchmark Release	Planned Release	Planned - Benchmark
Central	-57.2	-24.0	33.2
East	-251.4	-412.4	-161.0
North	17.9	-75.4	-93.3
South	31.9	-62.6	-94.5
West	25.7	-263.1	-288.8
Property Market Area			
Central Services	-123.9	-93.2	30.7
Lea Valley	16.7	-100.5	-117.3
Park Royal/Heathrow	45.0	-265.6	-310.6
Thames Gateway	-185.6	-317.7	-132.1
Wandle Valley	14.7	-60.4	-75.1
London	-233.1	-837.5	-604.5

Source: CAG, London Industrial Land Demand (2015), GLA

Planned release exceeds benchmark release in around two-thirds of the Boroughs. The excess of planned release is greatest in the boroughs of Ealing, Enfield, Brent, Hammersmith & Fulham and Barking & Dagenham. These are the principal boroughs that make up the Park Royal, Lea Valley and Thames Gateway industrial property market areas.

In the next chapter we explore alternative scenarios that may help to mitigate some of the apparent imbalance between market demand for industrial employment land and planned release of such land.

Table 13.5 Comparison of Benchmark Demand and Pipeline Release

Sub Region		Benchmark Release	Planned Release	Planned – Benchmark Comparison
Central	Camden	-8.7	-1.0	7.7
Central	City of London	1.6	0.0	-1.6
Central	Islington	-13.1	-1.2	11.8
Central	Kensington and Chelsea	-4.6	-5.1	-0.5
Central	Lambeth	-10.6	-5.5	5.1
Central	Southwark	-21.5	-0.1	21.5
Central	Westminster	-0.2	-11.0	-10.8
East	Barking and Dagenham	-43.7	-111.3	-67.6
East	Bexley	-12.3	-45.9	-33.7
East	Greenwich	19.8	-52.3	-72.1
East	Hackney	-17.1	-2.1	15.0
East	Havering	-38.9	-21.0	17.9
East	Lewisham	-9.9	-10.2	-0.3
East	Newham	-115.7	-83.5	32.3
East	Redbridge	-0.1	-2.3	-2.2
East	Tower Hamlets	-39.7	-57.0	-17.3
East	Waltham Forest	6.2	-26.9	-33.1
North	Barnet	7.3	-1.8	-9.1
North	Enfield	41.7	-42.4	-84.2
North	Haringey	-31.2	-31.2	0.0
South	Bromley	5.3	-1.4	-6.7
South	Croydon	-6.5	-1.3	5.1
South	Kingston upon Thames	-7.2	-0.6	6.7
South	Merton	-2.8	-0.8	2.0
South	Richmond upon Thames	12.0	-0.7	-12.7
South	Sutton	14.9	-17.7	-32.5
South	Wandsworth	16.3	-40.0	-56.3
West	Brent	43.0	-38.4	-81.3
West	Ealing	35.6	-54.1	-89.8
West	Hammersmith and Fulham	4.7	-67.5	-72.2
West	Harrow	1.2	-20.6	-21.8
West	Hillingdon	-26.9	-69.8	-42.9
West	Hounslow	-31.8	-12.8	19.1
	London	**-233.1**	**-837.5**	**-604.5**

Source: CAG, London Industrial Land Demand (2015), GLA

13.4 Sensitivity tests

In constructing the benchmark projections, we carried out a series of sensitivity tests around the various components of demand as set out in previous chapters. The results of those sensitivity test are brought together and summarised below.

- High Growth – used the GLA High employment projections as set out in Section 6.4
- Low Growth – used the GLA Low employment projections as set out in Section 6.4
- Hybrid – assumes some 'office' sectors occupy industrial land as set out in Section 6.4
- Plot Ratios – assumes lower density of development from new warehouse demand as set out in Section 7.5

- Spatial Substitution – assumes a higher proportion of London's demand for warehousing is met from outside of its borders as set out in Section 7.7

The effects of these sensitivity tests against the baseline projections are summarised in the Table 13.6 below. The Table shows the impact of each sensitivity test on the baseline benchmark and the consequent revised benchmark. The sensitivity tests are not all mutually exclusive. So, for example, if the 'High Growth', 'Hybrid Sectors' and 'Plot Ratio' test were all combined this would imply a positive demand for 50.4 ha of industrial land over the plan period 2016-41[79]. Conversely if the 'Low Growth' scenario were combined with the 'Spatial Substitution' scenario, this raise the benchmark release total to -587 ha

Table 13.6 Impact on Sensitivity Test on Benchmark Release

Sensitivity Test	Impact	Benchmark
Baseline Projections		-233.1
High Growth	68.7	-164.4
Low Growth	-74.6	-307.7
Hybrid Sectors	92.8	-140.3
Plot Ratios	122.0	-111.1
Spatial Substitution	-279.6	-512.7

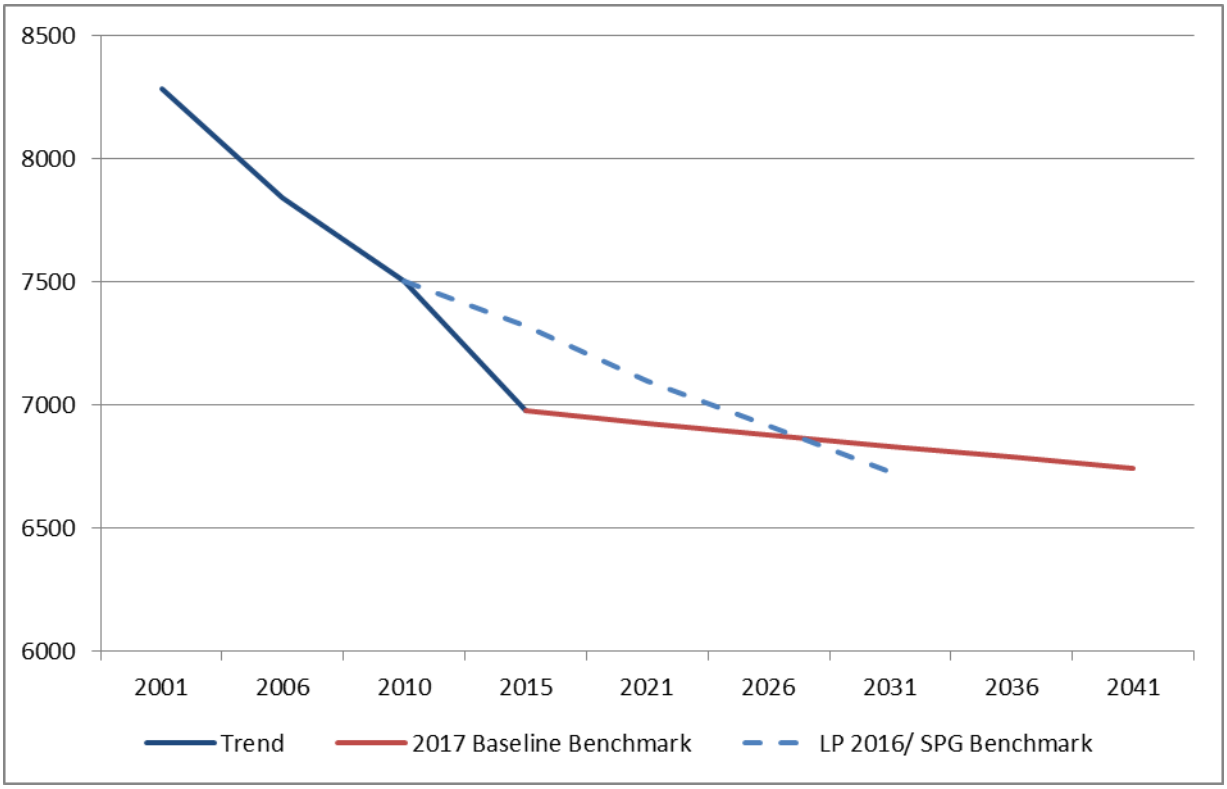
Source: CAG

13.5 Conclusions

The updated benchmarks suggest that for the period 2016-41 a total of 233 ha of industrial land can be released, or an average of 9.3 ha per annum. This is a significantly lower level of release than the 37ha per annum set out in the 2011 Industrial Land Benchmark study and can be explained by the following graph (Figure 13.2). By 2016 the level of industrial land was almost 250 ha lower than the benchmark guidance recommended by the 2011 study due to the high levels of release (around 100ha pa). So up to 2025 the difference on the two projections can be explained by industrial land being released at faster than the benchmark guidance. Beyond 2025 it can be explained by the fact that the current GLA projections show industrial employment in London declining at a much slower rate than those which informed the 2011 study.

[79] This is a simplification for illustration. If in reality all these assumptions were made the various components of demand analysis would impact on each other to produce a slightly different figure.

Figure 13.3 Trend in the stock of London Industrial Land 2001-2015 and comparison with London Plan/SPG Release Benchmark and the 2017 baseline release benchmark (Hectares)



Surplus from release of excess vacant land accounts for 335 ha. Without this surplus to release there would be positive demand for industrial land. London has successfully managed down its surplus of vacant industrial land over the past twenty years. But this is a reservoir that will not be replenished. Once the last of this current stock of vacant industrial land has gone, industrial land in London will cease to be a source of brownfield land for alternative uses.

Currently planned release of industrial land exceeds the benchmark release by 600 ha. The planned release exceeds the benchmark release in all bar the Central sub-region. The excess of planned release over benchmark release is greatest in the West sub-region

14 Spatial Scenarios

14.1 Alternative Spatial Scenarios

For many years planning policy in London has aimed to resist or slow down the loss of industrial land, by selectively protecting industrial sites, so it is not permitted to redevelop them for higher-value uses such as housing. With increasing pressure to find land for residential development, alternatives to the demand led scenarios are required to test the implications of other policy choices.

This chapter sets out some alternative scenarios and attempts to quantify the likely impact in terms of potential release of industrial land by borough. The report has discussed some of the spatial and development responses that are being implemented as supply of industrial land in London diminishes faster than demand for it. In summary, these responses are:

- Intensification – where a greater quantum of economic activity is enabled per hectare of land
- Co-Location – creating a form of development where industrial activity and residential development can comfortably work alongside each other.
- Substitution – with London and the Wider South East acting as a more integrated functional economic area and industrial activity relocating further from the centre of the market they are serving.

For each of these scenarios one or more of these market responses would need to be implemented at above current trends. To achieve this may require some form of policy intervention. Where these responses are not able to accommodate demand then the implication will be cessation of activity or relocation to outside of the Wider South East.

Supply Trend Release

The first scenario is one of Supply Trend Led Release, which recognises the recent rate of release and illustrates what would happen if this high rate of release continued to 2041. This effectively relaxes the current aims of protecting industrial land and does not try to accommodate projected demand. This can be considered a “do nothing” or “continue as is” scenario.

If non-industrial activity is excluded then over the period 2006-15 industrial land diminished at an annual average rate of 96 ha per annum, or a rate of -1.3% p.a. The rate of loss has been accelerating however in the most recent period.

Table 14.1 Annual Average Change in Industrial Land London (Hectares)

	2006-10	2010-15	2006-15
Total Industrial Land	-79.4	-146.0	-116.4
Annual %	*-0.9%*	*-1.8%*	*-1.4%*
Excluding Non-Industrial Activity	-84.2	-105.7	-96.1
Annual %	-1.1%	-1.4%	-1.3%

Source: London Industrial Land Demand (2015)

Data from the VOA floorspace statistics shows a loss of industrial floorspace in London on 337,000 sq m over the period 2001-16. At a standard plot ratio of 40% this would imply a loss at an annual average of 84 ha per annum over the period, or using the 60% plot ratio we more commonly adopt for London this would imply an average annual loss of 56 ha per annum. That this is lower than the figure from the

industrial land survey can be explained by the fact that it will not include loss of vacant industrial land. If reduction in vacant industrial land is excluded from the industrial land supply data, then this shows land disappearing at an average of 62 ha per annum over the period 2006-15, so the two data sets are reasonably well aligned.

If we assume that industrial land continues to be released at a rate of 96.1 ha per annum then over the period 2016-2041 a further 2,400 ha will have been lost. This will give a total stock of industrial land at 2041 of 4,944 ha applied to all industrial land (65.5% of its 2015 total), or 4,376 if applied to land excluding non-industrial activity (62.7% of its 2015 total).

This rate of decline would also mean that Central sub-region has lost more than its entire stock of land. We would expect the total level of floorspace loss to diminish as the total declines and hence apply the historic rate of loss for the period 2006-15 to the future period[80]. This gives a loss of 1,630 ha over the period 2016-41, just over a quarter of its 2016 stock. an average of 65 ha per annum. Supply led loss by sub-region and property market area is summarised in the Table below.

Table 14.2 Industrial Land Release 2016-41 – Supply Trend Scenario

Sub Region	2016	2041	2016-41
Central	316	128	-188
East	2,765	1,990	-775
North	715	593	-121
South	1,095	929	-166
West	2,001	1,621	-380
Property Market Area			
Central Services	621	245	-376
Lea Valley	810	658	-151
Park Royal/Heathrow	2,139	1,713	-426
Thames Gateway	2,399	1,857	-541
Wandle Valley	923	788	-135
London	**6,891**	**5,261**	**-1,630**

Source: CAG, London Industrial Land Demand (2015)

Potential Pipeline Scenario

A second alternative scenario can be developed by looking at how much industrial land would be released under current plans for other Mayoral priorities such as infrastructure and housing. It includes the development pipeline (schemes recorded on the London Development Database with planning permission) and areas earmarked in Opportunity Area Planning Frameworks, Local Plans and in Housing Zones[81]. Effectively this includes all the planned release set out in Table 13.1. This totals 837.5ha or the equivalent of a benchmark release of 33.5 ha per annum. However, it is likely that most of this pipeline will be released within the first 10-15 years, which would represent a release of 67ha per annum until 2028/29. This is not dissimilar to the rate of release under the 'Supply Trend' scenario above.

This Scenario is summarised by sub-region and property market area in Table 14.3 below.

[80] We are conscious that the rate of loss has actually accelerated over this period but we do not see this as likely to be sustained in the long run

[81] Source: AECOM Industrial Land Supply and Economy Study, GLA 2016, based upon the London Development Database

If additional industrial land releases related to the development of Crossrail 2 and the Bakerloo Line Extension are included this could add up to a further 440 ha to the total taking it to 1,277 ha (an average of 51.1 ha per annum).

This Scenario is summarised by sub-region and property market area in Table 14.4 below.

Table 14.3 Industrial Land Release 2016-41 – Potential Pipeline Scenario

	2016	2041	2016-41	2041 as % of 2016
Central	315.9	291.9	-24.0	92.4%
East	2,762.9	2,350.5	-412.4	85.1%
North	714.5	639.0	-75.4	89.4%
South	1,094.5	1,031.9	-62.6	94.3%
West	2,000.3	1,737.2	-263.1	86.8%
London	**6,887.9**	**6,050.4**	**-837.5**	**87.8%**
Property Market Area				
Central Services	621.0	527.9	-93.1	85.0%
Lea Valley	809.6	709.1	-100.5	87.6%
Park Royal/Heathrow	2,139.0	1,873.4	-265.6	87.6%
Thames Gateway	2,398.7	2,080.9	-317.7	86.8%
Wandle Valley	922.8	862.4	-60.4	93.5%

Table 14.4 Potential Pipeline and Strategic Infrastructure Scenario (CR2+BLE)

	2016	2041	2016-41	2041 as % of 2016
Central	315.9	238.2	-77.7	75.4%
East	2,762.9	2,297.4	-465.5	83.2%
North	714.5	458.7	-255.8	64.2%
South	1,094.5	879.2	-215.2	80.3%
West	2,000.3	1,737.2	-263.1	86.8%
London	**6,887.9**	**5,610.6**	**-1,277.3**	**81.5%**
Property Market Area				
Central Services	621.0	464.8	-156.2	74.9%
Lea Valley	809.6	495.4	-314.2	61.2%
Park Royal/Heathrow	2139.0	1,862.8	-276.1	87.1%
Thames Gateway	2398.7	2,080.9	-317.7	86.8%
Wandle Valley	922.8	709.8	-213.0	76.9%

Intensification and Substitution

Another way to look at potential industrial land release is to try to assess the maximum potential additional land release that could be achieved through a combination of intensification, co-location and substitution. Beyond that point industrial activity is effectively being prevented from supporting or being part of the London economy.

Intensification

There may be scope for intensification of industrial and warehousing activity, always recognising that it is the nature of activity on industrial estates we are concerned with rather than with maximising employment as an objective in its own right.

Intensification can be achieved through several different mechanisms:

- through more efficient utilisation of existing floorspace;
- through higher intensity of development on existing land;
- through higher density forms of activity replacing less dense activity.

The potential for intensification may in turn depend on tipping points in terms of the industrial rents at which such development becomes viable. We have noted earlier in Section 8.5 that developers are starting to consider solutions such as multi-storey warehousing that even a short number of years ago would have been considered non-starters in the UK. So, there is some evidence of market appetite for intensification.

Intensification is most likely to occur in those areas where industrial rents are high and demand is strong. The Park Royal Property Market Area is a clear candidate. We are aware that the Old Oak and Park Royal Development Corporation (OPDC) are currently undertaking a study to explore the potential for intensification and the output of that study can help inform this answer.

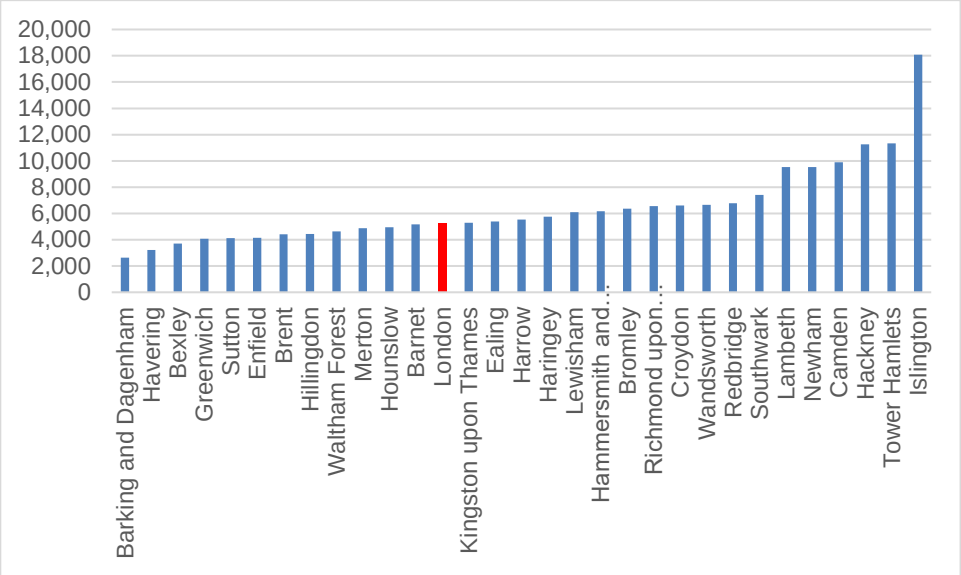
For the purposes of this scenario we have looked at where there might be potential for further intensification of industrial land use in London. We have considered this in two parts: where industrial values are high and the market might deliver higher density industrial development; and secondly where the density of industrial development is currently low and there should be potential for greater intensification without adversely impacting on operational efficiencies.

As noted in Chapter 5 industrial rents are highest in the Park Royal/Heathrow property market area. Here we assume that as new industrial development happens it will be at relatively high development densities and have assumed that for Boroughs in this property market area it is at an average of 6,500 sq m per ha, which analysis of data from the London Development Database (LDD) suggests is the plot ratio for new industrial development in London.

Analysis of the LDD data also shows that gross completions of new industrial floorspace have averaged around 1% of industrial stock in London over recent years. Hence we might expect that over 25 years around 25% of total floorspace in a Borough might be redeveloped. If we apply this higher development density then this effectively reduces the demand for industrial land in the Park Royal Heathrow PMA by 81.9 ha.

The same assumptions have also been applied to those Boroughs where floorspace density ratios are currently low. In 2015 there were 4,006 ha of industrial land occupied by Core industrial uses excluding any vacant land. According to the VOA floorspace statistics there were a total of 21m sq m of industrial floorspace, which would give an implied plot ratio of 5,240 sq m per ha. But there is a wide distribution of plot ratios by Borough. In general, there are very high ratios in inner London and low ratios in Outer London. But there is a big difference between, say, Barking and Dagenham and Ealing, which are the two Boroughs with the largest supply of industrial land.

Figure 14.1 Industrial Floorspace per Hectare London Boroughs 2015[82]



Source: AECOM. Industrial Land Supply and Economy Study, GLA 2016, VOA 2016

If we apply the same assumptions about intensification of new development to those boroughs where the floorspace per hectare is currently below the London average, then this would free up 182.9 ha of industrial land, with two-thirds of that coming in the Thames Gateway property market area. This level of intensification in these boroughs is likely to require some more active form on intervention in order to achieve it. This may require land assembly though some gain may be possible through planning policy seeking to secure more intense levels of development.

Thus through a combination of market led intensification and policy and intervention driven intensification the demand for industrial land over the period 2016-41 could be reduced by 264.8 ha.

Co-Location with Residential

The potential for co-location is greatest in areas of highest residential values. Developers will look to innovative solutions to secure planning permissions and will be prepared to incorporate commercial space within their developments in order to do this. We have previously noted examples of where this this has started to occur.

The activities that can co-locate with residential are those of a more hybrid nature which require less servicing and a lower volume of goods movements. The growth of these activities and their accommodation needs has also been discussed in the London Office Policy Review.

Given this combination of high residential values and hybrid activities we think that this has the greatest potential in the Central Services area, but we would expect to see it in other parts of London as well.

For the purposes of this scenario test we have assumed that all the forecast growth for service activity that is accommodated on industrial land or premises can be accommodated within premises co-located with residential development. In other words, we have used the co-location scenario to accommodate the 'Hybrid' sensitivity test. (see Section 6.4)

[82] City, Westminster and Kensington and Chelsea have been excluded from this graph due to their low industrial land and stock figures generating abnormal ratios

Spatial Substitution

There are very few industrial activities, such as concrete batching, that might be considered time critical. There are a number of industrial activities in London that are time-sensitive. If industrial land in London diminishes to the extent that goods need to be supplied from longer distances, then the cost may be felt in terms of customer service and/or prices. Instead of the trend currently being experienced to more and quicker delivery, then suppliers might have to back track on that level of service if in future if land is not available close by. Whilst this is not a cost that will show up in GDP terms it is a cost from a welfare perspective.

Ultimately a tipping point is effectively created by transport. There comes a point at which the negative costs of longer journey movements, both in financial terms, journey times and as externalities make servicing London unviable and/or negative externalities of congestion become a major cost on the economy. TfL have recently commissioned a study on Industrial Relocation and Transport which should help to quantify these costs.

There will be a tipping point at which the negative externalities of congestion exceed the positive externalities of agglomeration. Whilst this is not easy to quantify or predict it will become observable at the point at which people and business decide they have had enough and move elsewhere.

This point does not seem to have been reached yet and it is likely that further spatial substitution, resulting in longer journey times, can take place before this tipping point is reached.

For the purposes of this scenario test we have adopted the spatial substitution scenario set out in Chapter 7 and assumed that all London's net additional demand for warehousing floorspace can be met from outside of its borders. This releases an additional 279.6 ha of industrial land compared to the Baseline Scenario. There will be a different spatial configuration of this release, as we have noted that spatial substitution is easier to achieve from the North and from the East.

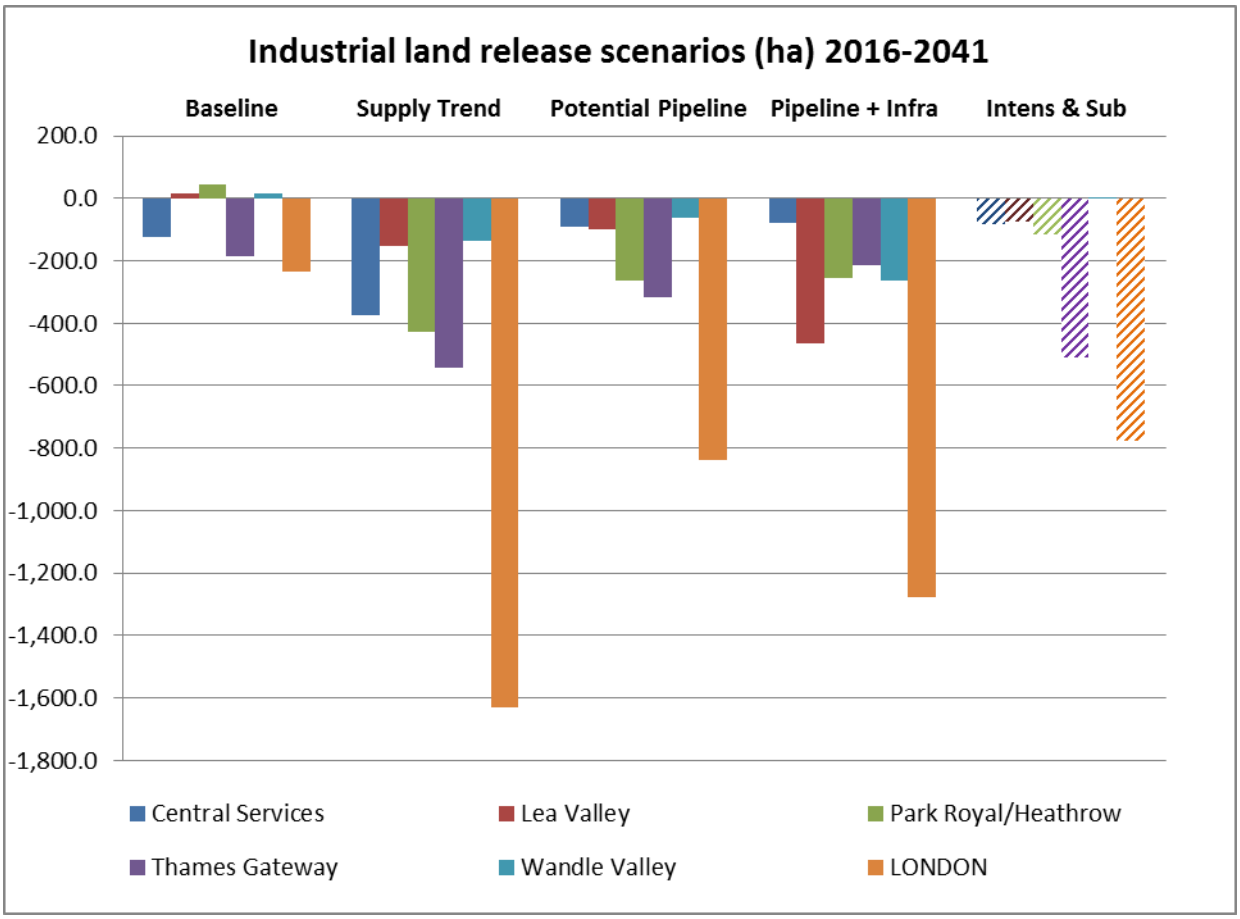
Combining the intensification component (-264.8 ha) with the Baseline scenario benchmark (-233.1 ha) and adjusted for the substitution component (-279.6 ha) yields a total 'intensification and substitution' benchmark equivalent of -777.5 ha (see Appendix A4).

14.2 Alternative Scenario Benchmarks

We summarise below the implication of each of these alternative scenarios for the London Plan Benchmarks. The figures below summarise what each of the scenarios would imply in terms of industrial land loss by sub-region and by property market area. These illustrate how far existing rates of release are running above the new baseline projections for all sub-regions and property market areas. It also illustrates how far the existing planned releases are running above the baseline for all bar the Central Service property market area.

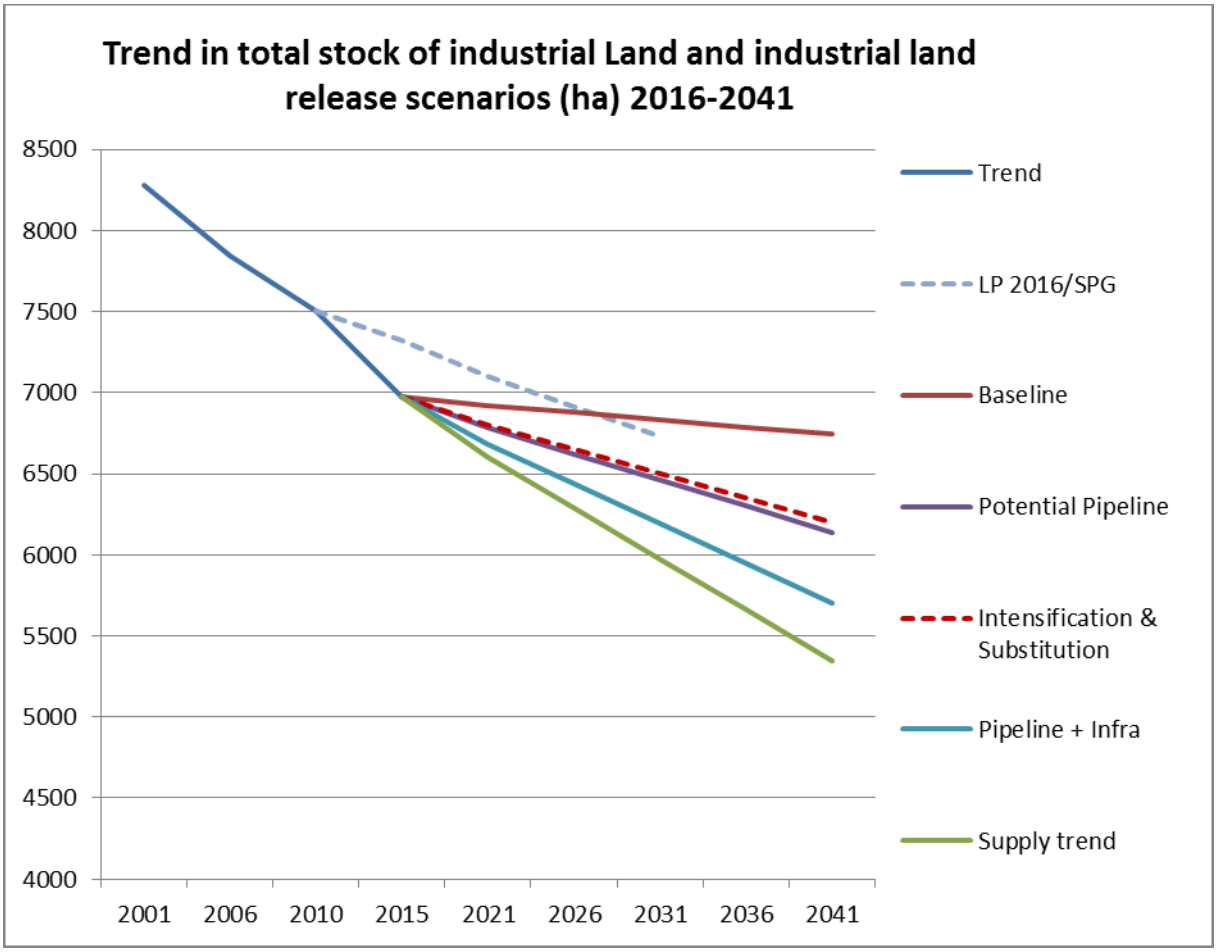
The intensification and substitution scenario goes someway to demonstrate how planned releases in the potential pipeline scenario might be accommodated without any significant adverse impacts on the London economy – if the degree of intensification can be delivered. There will be significant challenges to delivering this scenario but developers such as SEGRO are already assessing development options that will provide greater intensification and local authorities such as Barking and Dagenham are seeking to achieve greater intensification of industrial development through the planning process.

Figure 14.2 Industrial Land Change 2016-41 by Scenario by Property Market Areas



Source: CAG

Figure 14.4 Total Stock of London Industrial Land (Ha) showing comparison with 2016 London Plan/SPG Benchmark Release and illustration of alternative scenarios



14.3 Impact of Scenarios on London Economy

Whilst London can continue to function on lower levels of industrial land than the baseline release figures there will be costs. These have been noted at various points in this report and here we bring together and explore further here the nature and potential scale of those impacts.

Transport Costs

Spatial substitution, whether within London or between London and the Wider South East, will add costs in terms of added journey lengths. If firms are having to supply the markets from further away journey times are longer and transport costs higher.

There is firstly a direct impact in terms of transport costs both in term of fuel and in terms of labour costs as drivers work longer hours to deliver the same loads. These may be partially offset by lower property costs but this is only in relative terms. As industrial land diminishes, costs of industrial premises rise overall.

There is then the issue of who absorbs these costs. They may, potentially be absorbed by the logistics or other industrial operator in which case the impact will be on the firm's profitability (and hence marginally on GVA). The costs may be forward shifted on to the consumer in which case business and households are paying a higher price for being in London. The outcome will probably fall somewhere between the two and will in any event be very marginal in terms of overall costs.

Secondly there are the externality costs of additional transport journeys, which work through two mechanisms. Other things being equal additional journey lengths means additional fuel consumption which in turn add to environmental pollutants and have an adverse impact on the Mayor's climate change and air quality objectives. Whilst over time some of the pollution effects may be mitigated by the wide adoption of low emission and electric vehicles this would also be the case in the baseline scenario. But additional road miles and additional vehicles are also likely to worsen road congestion and hence add negative externality costs to other road users.

Longer journey times are also likely to impact on the frequency and reliability of deliveries. This is explored further below.

Customer Service and Welfare Costs

The impact of London's economy being serviced from further away is a transport effect. But longer journey times and reductions in reliability of journeys is not necessarily an impact that would show up in a GVA measure of the economy. Longer journey times may indeed add to GVA by increasing fuel costs, but this would not be considered a benefit measured from an economic welfare perspective. Given that in transport appraisal terms the standard approach is a welfare based one, then this may be the best way to measure the costs of longer journey times. TfL have recently commissioned work to look at the economic impacts of industrial relocation and this should shed further light on these impacts.

Labour Market Impacts

Where businesses close because of high property costs or forced relocations, there will be a resulting loss of jobs. Whilst some of these jobs may be *'replaced'* by other forms of economic activity or *'transferred'* to the Wider South East, the nature of industrial jobs is that they are concentrated in specific occupations, notably skilled trades and transport and machine operatives.

As job opportunities in these occupations in London diminish, it may be increasingly hard for Londoners with those skills to find alternative employment. As well as the costs to the individuals themselves there may be wider social costs if this creates a cohort of long-term unemployed. These costs may be both financial in terms of higher welfare payments and societal in terms of social cohesion.

Diversity of London's Economic Base

Loss of industrial land is likely to impact disproportionately on SMEs. Larger firms are better able to accommodate major restructuring or refashioning their business models to operate from different locations. For many small business operating from a single site industrial locations, being forced out or priced out of their premises will mean the end of their businesses. As noted earlier the Mayor has stated that, "*it is one of my main priorities to support small and medium-sized businesses by protecting existing workspace, identifying new workspace areas and including places of work in new housing developments."*

If it is a policy objective to ensure there are a range of affordable premises for SMEs reducing London's industrial land stock beyond the baseline benchmarks will adversely impact on this objective unless it can be achieved through a combination of intensification, co-location and carefully managed spatial substitution.

Bad Neighbour Externality Costs

There are categories of ‘bad neighbour industries’ that should not be located close to housing because they harm residents’ amenity. Part of the role of designations such as SIL is to separate these uses from residential areas due to their negative externality effects. There needs to be a critical mass of such activity with defensible boundaries. To the extent that decreases in industrial land stock beyond the baseline benchmarks impact on the coherence of these industrial areas, it may put residential and industrial uses in conflict creating negative externality costs.

Alternatively, slicing a site below its critical mass may undermine the viability of the industrial location entirely. The effect may be to lose more industrial land than originally planned. To the extent some bad neighbour industries still need to be in London, then the city could find itself without the necessary infrastructure for the London economy. Attempting to push up to the tipping point may inadvertently push it beyond.

15 Conclusions and Policy Recommendations

15.1 Conclusions

Study Aims

The objectives of the study were to analyse the short, medium and long term demand and supply dynamics for industrial land and related uses in different parts of London and explore relationships with the Wider South East.

The analysis set out in this report will feed into a review of the existing London Plan and Supplementary Planning Guidance benchmarks of industrial land retention/release to other uses and roll these forward to 2016-2041 on a consistent, pan London demand/supply basis.

The study also sets out a series of scenarios relative to the baseline benchmarks to explore the potential for alternative approaches to the management and release of industrial land in London and associated impacts.

Defining the Policy Objectives

There is no definitive policy answer as to what is the right amount of industrial land. The role of planning is to ensure that requirements for different types of employment land are understood and where possible provided for, but it does this against the background of competing claims for a finite land resource. Current policy seeks to *"ensure a sufficient stock of land and premises to meet the future needs of different types of industrial and related uses in different parts of London"*.

But the growth of London's economy and population is creating pressures on all forms of land use in the capital and asking the questions:

- What forms of land use require policy protection?
- How to mediate competing claims on demand for land?
- How can activity be intensified to accommodate increased demand on the same land area?
- Can the economic relationship of London and the Wider South East be better configured?

Trends in Industrial Land Supply

London's stock of industrial land has continued to diminish and has done so at well above the London Plan benchmark rates. Part of this loss of industrial land is due to release of vacant industrial land and the proportion of London's industrial land that is vacant is now below 8% in overall terms, although it is 10.7% considered in terms of Core industrial uses. Vacancy rates are not uniform across London and whilst there is virtually no vacant industrial land in central London, in several East London Boroughs there remains high levels of vacant industrial land.

Spatially the decline in industrial land has been greatest in proportionate terms in Central London and highest in absolute terms in East London, though East London retains by far the larger share of industrial land in London. Reductions in industrial land have been relatively modest in North and South London, whilst West London remains as a popular location for warehousing land.

Designation of key industrial sites as Strategic Industrial Locations (SIL) had previously proved a successful planning tool in retaining the best industrial land. But in the last five years this has now become one of the principal sources of land release.

At the same time as industrial land releases are growing, the decline in industrial floorspace in London appears to be levelling off. This implies some intensification of activity is underway.

Industrial Employment Trends

Following a long period of steady decline, industrial employment in London has seen a small increase in the period post-recession. It is still declining as a proportion of London's total employment and accounts for less than 10% of total jobs in the capital. It is too early to say if the recent upturn in jobs represents a permanent upward trend, but it appears likely that the long run decline has been arrested.

Industrial employment in London in recent years has grown at broadly the same rate as it has nationally and in the Wider South East. Logistics is the main growth sector, but here London's growth lags that of the UK and Wider South East. With both London's economy and population continuing to grow and requiring servicing, this suggests that part of London's growth in demand is being met from logistics activity in the Wider South East. But if London activity is being displaced it is not to the area immediately outside of its borders but to further away in the Wider South East.

Spatially within London, industrial employment has continued to decline in Central London but has grown in the outer industrial areas such as Park Royal, Lea Valley and Thames Gateway. It seems likely that at least part of this growth is due to activity being displaced from Central London to further out.

Surveys of major industrial areas suggest that logistics accounts for around a third of jobs on industrial estates with service sectors accounting for a further third. Manufacturing activity accounts for around 20% of jobs on industrial estates.

London's Industrial Property Markets

London's industrial property markets are having to respond to growing pressures of demand. The economy and population continue to grow and require servicing. Industrial land has been lost at a rapid rate with over 500 ha of land taken out of the supply between 2010-15. And what remains faces ever greater pressure from residential development.

Constrained supply in the industrial and logistics sector, combined with strong levels of take-up ensured that rents have maintained their upward trajectory in recent years. The average prime industrial rents in London reached the highest ever recorded level at £136.70 psm / £12.70 psf in December 2016, a 26% uplift on pre-recessionary levels and significantly above the national average (£92.60 psm / £8.60 psf).

London's industrial activity is concentrated in five broad property market areas:

- **Central Services** area which is dominated by businesses servicing the West End and City / Docklands office and retail economies. Typically, demand in this area is driven by companies which must be in close proximity to their customers.

- **Thames Gateway** which has developed as a significant location for large-scale warehouses and logistics facilities, notably along the A13 corridor, where a number of major new developments have been constructed over recent years.

- **Lea Valley** which is a major industrial and warehouse location, notably between the North Circular Road and the M25, in Enfield.

- **Park Royal** and associated corridors, now driven by warehousing and logistics activities and small-scale manufacturing / quasi service activities. And **Heathrow** which is driven by airport-related activities, including air freight, but also all the industries required for the air industry to function (e.g. aircraft maintenance, in-flight catering etc.).

- **Wandle Valley** includes significant clusters of industrial and warehouse users, notably in Merton and Croydon (off the A23 in particular) and includes a number of SILs.

In recent years the Park Royal/A40/Heathrow and Thames Gateway property market areas have each accounted for around 38% of industrial take-up, with the Lea Valley accounting for a further 12%.

The imbalance between supply and demand is expected to continue, driven particularly by increasing demand from e-commerce and last mile fulfilment requirements. Added to this is a reluctance amongst developers to build speculatively as occupier requirements become more demanding and bespoke to accommodate increased eaves heights, greater floor loadings, more volume and sophisticated technology. Many occupiers think, now, not in terms of sq ft or sq m, but cubic feet or cubic metres.

Demand for General and Light Industrial Land

After a long period of decline the loss of manufacturing employment in London has levelled off. Long run projections from GLA Economics predict that manufacturing employment will continue to decline but the rate of decline is much diminished. As a result, the amount of land that will become available through decline in manufacturing activity is also much diminished. There is increased demand from building trades. Our central projection is for reduction in demand for general and light industrial land of 166.5 ha over the period 2016-41, an average of 6.8 ha per annum.

The manufacturing activity that remains in London is largely here because it needs to close to its customer markets. Hence it entails time sensitive products such as food. The type of manufacturing activity that suffered from structural decline in the past has largely gone from London.

There is limited scope for substitutability of demand for these types of production activities to elsewhere in the south east.

Demand for Warehouse Land

Recent years have seen a small but steady decline in the total stock of warehouse floorspace in London. This follows many years of steady growth up to the middle of the last decade. This is not because London's demand for warehousing has fallen but rather that demand is not being accommodated within its borders.

Our central projection assumes that an increasing proportion of London's warehouse floorspace demand will be met from outside of its borders, but accommodates some growth in stock within London as well. Our central projection is for growth in warehouse demand of 280 ha over the period 2016-41.

But we also recognise that there is a lot of potential for spatial substitution between London and the Wider South East in the logistics sector. This is particularly the case to the east of London, due to land availability, and to the north of London where there is potential to service wider regional distribution networks. In our spatial substitution scenario, we assume that all London's net additional demand for warehousing floorspace is met from outside of its borders.

Land for Utilities

It is difficult to predict the overall balance of land release and increased land demand for utilities in London. There has been, and will continue to be, significant land release from former power station sites and disused gas infrastructure in London. But the scale of growth forecast for London will require

the identification of a series of small-scale sites for electricity sub-stations and pumping stations to support new development (e.g. in Opportunity Areas).

In the longer term, investment is likely to be required in reservoirs in the wider South East, or in desalination or wastewater reuse plants within London, to ensure London's water security. It is not clear whether these could be accommodated on water company's existing sites within London. Some additional sites are likely to be needed for data centres near the interface with consumers, within London.

Land for Transport

The major transport investment programme required to support London's growth to 2050 will generate demand for additional industrial land. This demand will primarily include land for new rail and bus depots, and for new stations. The demand is likely to be focused in Opportunity Areas and also in locations that support major transport projects such as HS2 and Crossrail 2, although there may be increased demand outside these areas (e.g. for bus depots). The overall scale of demand to 2050 is currently difficult to assess, but could be around 200 ha or more (excluding land that may be needed for mixed-use development to support the business case for new transport infrastructure schemes). This increased demand is likely to be balanced to some degree by release of transport land in other locations from facilities that are no longer used, by National Rail or TfL.

Land for Waste

Overall, projections of land demand for waste management have reduced significantly since the 2011 Industrial Land Demand study, owing to lower projections of waste arisings from household and C&I waste. Instead of there being a shortfall in land for management of household and C&I waste, there now appears to be a modest surplus.

Two factors could yet change this position. Firstly, revised waste projections and revised borough apportionments are currently under development by the GLA. It is possible that the principle of self-sufficiency for London, and apportionment between boroughs, may be applied to CDE and hazardous waste in addition to household and C&I waste. This may have implications for the amount of land required to manage waste within London.

Secondly, the proposed move towards a circular economy would reduce the need for residual waste treatment facilities, but is likely to generate increased demand for recycling and remanufacturing facilities. So, the overall effect of transition to a circular economy will depend on the extent to which the circular economy reduces the volume of resources entering the waste stream in the first place.

Wholesale Markets

While some of the wholesale markets may relocate to outer London within the timescale considered by this study, the overall land requirement appears likely to remain stable and may increase slightly. However, there are significant uncertainties around this prediction, as it depends on the continued ability of the wholesale markets to compete with other forms of distribution.

15.2 Industrial Land Release Benchmarks

Combining the various components together our Baseline projection for London the updated benchmarks suggest that for the period 2016-41 a total of 233 ha of industrial land can be released, or an average of 9.3 ha per annum. This is a significantly lower level of release than set out in the 2011 Industrial Land Benchmark study and can be explained by industrial land being released at faster than

the benchmark guidance and by the fact that the current GLA projections show industrial employment in London declining at a much slower rate than those which informed the 2011 study.

This implies much tighter policy is needed if industrial land releases are to be restricted to the Benchmark targets. If industrial land were to continue to be released at the same rate as in recent years then this would result in the loss of 1,630 ha on industrial land. There is already planned release of 838 ha of industrial land in the pipeline and if land identified for Crossrail 2 and the Bakerloo Line Extension were factored in this would rise to 1,277 ha.

There is potential for the Benchmark release total to be raised through a combination of intensification, substitution and co-location of industrial activity. Our Intensification and Substitution scenario estimated that the Benchmark Release total could be increased from 233 ha to 778 ha if such approaches could be successfully implemented.

Intensification

Boroughs can create additional capacity for industrial activity through intensification. Releases over and above Baseline guidance could be facilitated by industrial demand being accommodated more intensively. The objective would be to accommodate demand for industrial activity rather than preserve land for its own sake. Boroughs could be encouraged to promote higher density of development and activity on industrial land. This can be both reactively in response to development proposals and proactively in seeking to encourage redevelopment on selected sites. Available tools include planning policy guidance, engagement with developers and land assembly.

Substitution

There may also be scope to release more industrial land in London to the extent that an even greater proportion of London's demand for warehousing is met from outside of its borders. The capacity for this to occur depends in part on market response but also in part on the provision of land for industrial uses being allocated by local authorities in the Wider South East. Boroughs may wish to consult with and collaborate with local authorities in the Wider South East who are in the same property market quadrant in order to establish their plans and policy response to accommodating or attracting industrial uses. Any proposals to actively encourage the relocation of industrial or logistics activity to the Wider South East should be mindful of the externality costs of longer transport movements.

Co-Location

Boroughs should seek to accommodate growth in demand for Hybrid industrial activities in developments that are not on industrial land. This may include town centres locations and mixed use residential development areas. Mixed use residential development proposals that incorporate employment space should be strictly controlled to ensure that the workspace provided is both appropriate to occupier demand and maintained for employment use. This will mean using specialist providers that understand the market and the product that occupiers want. Schemes should also ensure new non-residential space has basic fit-out to bring the entry threshold closer to the existing market in that area[83].

15.3 Borough Benchmarks

Given the considerable tightening of the industrial land market in London the current categorisation of Boroughs into Managed, Limited and Restrictive should be revisited. These were first introduced in 1999 and the context now as evidenced in this report is very different.

[83] Tools for delivery of employment space in Mixed Use development is looked at in 'Accommodating Growth in Town Centres' - Maccreanor Lavington et al for GLA (2014)

Based on the net demand projections the appropriate Borough categorisations might now be:

- **Limited Release**– for those Boroughs where there is still a surplus of industrial land to release. These Boroughs are will be found predominantly in the Thames Gateway.
- **Retain** – this will apply to the majority of Boroughs and in such cases Boroughs should seek to retain their capacity to accommodate industrial activity.
- **Provide Capacity** – where Boroughs are experiencing positive net demand for industrial land and should seek some way to accommodate that demand.

The Baseline net demand estimates for each Borough are summarised below grouped by Property Market Area. The table also shows two other key indicators of demand, vacancy rates and rents, as a means of informing the Borough categorisations.

- **Vacant industrial land.** A high vacancy rate implies more scope for release. Vacancy rate as a percentage of all industrial land excluding non-industrial premises is the measure used
- **Rents**. Using data on Industrial rents by Borough from the Aecom/Cushman & Wakefield report. A higher rent will be an indicator of higher demand relative to supply.

We have noted previously that the Borough level net demand estimates should be treated with a degree of caution as most demand relates to the property market area rather than a specific Borough. The Baseline net demand estimates are thus a starting point.

As recommended above Boroughs should seek to create additional capacity for industrial activity through intensification. This should apply to all Boroughs and in particular to those which are identified as having a positive net demand. Providing capacity does not necessarily mean providing additional land for industrial activity. It can be achieved through intensification of use, providing more capacity for industrial activity on the same site area. This applies equally to those Boroughs that seek release above the benchmark levels. This can be justified if it can be shown that additional capacity for industrial activity has been created through intensification.

Secondly Boroughs need to work together and consider industrial demand at the level of their sub-regional property market area. Where one Borough has a positive demand for industrial land and a neighbouring Borough has a surplus of land to release, then there should be some reallocation between Boroughs to ensure demand is met at the property market level.

Thirdly there may be some limited scope for demand to be met by transfers between property market areas. As noted in the report there are some signs that occupiers and developers who would previously only consider west London locations are now looking to the east. But any reallocations between Boroughs need to be included in both Borough's plans to ensure demand is met at the London level.

The proposed categorisation for each Borough is set out in Figure 15.1 below. In arriving at the proposed categorisations we have taken into account the following factors.

- **Central Services Area** – whilst the Baseline net demand projections indicate potential for small releases of industrial land, stock in these Boroughs is already at low levels and should be retained to allow capacity for last mile distribution activity.
- **Lea Valley** – there is some scope for reallocation between Boroughs with Enfield providing some additional industrial capacity having the strongest net demand.
- **Park Royal/Heathrow** – there is some scope for reallocation between Boroughs with potential releases in Hillingdon and Hounslow offset by positive net demand for Ealing and Brent.
- **Thames Gateway** – north of the river there is potential for limited release. South of the river potential release in Bexley is offset by positive demand in Bromley and Greenwich.

- **Wandle Valley** – there is positive net demand in this property market area, and this is strongest in Sutton and Wandsworth

Figure 15.1 Borough Release Categorisations

Sub Region	Property Market Area	Borough	Vacancy Rate	Rents	Baseline Net Demand (ha)	Proposed Categorisation
Central	Central Services	Camden	0.8%	£10.00	-8.7	Retain
Central	Central Services	City of London	0.0%	*	1.6	Retain
East	Central Services	Hackney	3.9%	£10.00	-17.1	Retain
Central	Central Services	Islington	0.5%	£12.00	-13.1	Retain
Central	Central Services	Kensington and Chelsea	8.0%	£10.00	-4.6	Retain
Central	Central Services	Lambeth	4.7%	£10.00	-10.6	Retain
East	Central Services	Lewisham	5.2%	£9.00	-9.9	Retain
Central	Central Services	Southwark	1.4%	£9.50	-21.5	Retain
East	Central Services	Tower Hamlets	12.7%	£10.00	-39.7	Retain
Central	Central Services	Westminster	5.9%	£12.00	-0.2	Retain
North	Lea Valley	Enfield	5.3%	£9.00	41.7	Provide Capacity
North	Lea Valley	Haringey	7.3%	£8.00	-31.2	Retain
East	Lea Valley	Waltham Forest	1.1%	£11.00	6.2	Retain
North	Park Royal/Heathrow	Barnet	6.0%	£10.00	7.3	Retain
West	Park Royal/Heathrow	Brent	1.9%	£12.50	43.0	Provide Capacity
West	Park Royal/Heathrow	Ealing	3.3%	£11.00	35.6	Provide Capacity
West	Park Royal/Heathrow	Hammersmith and Fulham	2.3%	£14.00	4.7	Retain
West	Park Royal/Heathrow	Harrow	7.6%	£11.00	1.2	Retain
West	Park Royal/Heathrow	Hillingdon	9.7%	£11.00	-26.9	Retain
West	Park Royal/Heathrow	Hounslow	7.2%	£12.00	-31.8	Retain
South	Park Royal/Heathrow	Richmond upon Thames	1.8%	£9.00	12.0	Retain
East	Thames Gateway	Barking and Dagenham	11.9%	£7.00	-43.7	Limited Release
East	Thames Gateway	Bexley	12.9%	£7.50	-12.3	Retain
South	Thames Gateway	Bromley	6.8%	£10.00	5.3	Retain
East	Thames Gateway	Greenwich	7.7%	£10.00	19.8	Retain
East	Thames Gateway	Havering	13.7%	£7.00	-38.9	Limited Release
East	Thames Gateway	Newham	20.3%	£11.50	-115.7	Limited Release
East	Thames Gateway	Redbridge	5.6%	£9.00	-0.1	Retain
South	Wandle Valley	Croydon	5.9%	£10.25	-6.5	Retain
South	Wandle Valley	Kingston upon Thames	0.8%	£12.00	-7.2	Retain
South	Wandle Valley	Merton	5.6%	£10.50	-2.8	Retain
South	Wandle Valley	Sutton	4.5%	£11.75	14.9	Provide Capacity
South	Wandle Valley	Wandsworth	0.5%	£13.00	16.3	Provide Capacity

15.4 Other Policy recommendations

Public Sector Enabling Role

A principal objective of industrial land policy in London, as set out above, should be to encourage intensification of use. There are signs that new innovative and more intensive forms of industrial development are emerging – and these should be promoted through policy. But there may be barriers that may limit the level of intensification that is delivered through the market alone.

Many industrial estates have highly fragmented ownership patterns that hinder the type of comprehensive redevelopment that is needed to optimise industrial land use density on a site. Industrial developers may also lack the incentive to redevelop more intensively on a site by site basis as the full value of intensification (in terms of land released for non-industrial development) may not accrue to industrial developers. The public sector may therefore need to intervene in the land assembly process to ensure that the potential benefits that could be realised through intensification are actually realised.

Strengthen Policy and Release Guidance

The stock of industrial land in London is shrinking rapidly and existing policy does not seem to be controlling releases to benchmark levels. The 2011 Industrial Land Demand report recommended improving monitoring to ensure releases were not in excess of Benchmarks. That release has continued well in excess of benchmark guidance suggests this cannot be just down to poor monitoring. There therefore needs to be a strengthening of policy and a commitment from both the GLA and Boroughs at the highest level to ensure that the Benchmark Release guidance, with flexibility to allow for intensification, is actually adhered to.

Article 4

Local planning authorities are required to plan for “The locational and premises requirements of particular types of business”. But it is increasingly difficult for local authorities to meet this requirement as the supply and range of premises is eroded by permitted development rights for change of use. Boroughs should therefore give consideration to the use of Article 4 Directions to preserve B1a, B1c and B8 from being changed to residential use. This is necessary to maintain both the quantity and range of industrial premises to meet the needs of businesses in London.

A1 Appendix 1

SIC Classification of Industrial Sectors

Activity	SIC
Manufacturing	10110 : Processing and preserving of meat
Manufacturing	10120 : Processing and preserving of poultry meat
Manufacturing	10130 : Production of meat and poultry meat products
Manufacturing	10200 : Processing and preserving of fish, crustaceans and molluscs
Manufacturing	10310 : Processing and preserving of potatoes
Manufacturing	10320 : Manufacture of fruit and vegetable juice
Manufacturing	10390 : Other processing and preserving of fruit and vegetables
Manufacturing	10410 : Manufacture of oils and fats
Manufacturing	10420 : Manufacture of margarine and similar edible fats
Manufacturing	10511 : Liquid milk and cream production
Manufacturing	10512 : Butter and cheese production
Manufacturing	10519 : Manufacture of milk products (other than liquid milk and cream, butter, cheese) nec
Manufacturing	10520 : Manufacture of ice cream
Manufacturing	10611 : Grain milling
Manufacturing	10612 : Manufacture of breakfast cereals and cereals-based foods
Manufacturing	10620 : Manufacture of starches and starch products
Manufacturing	10710 : Manufacture of bread; manufacture of fresh pastry goods and cakes
Manufacturing	10720 : Manufacture of rusks and biscuits; manufacture of preserved pastry goods and cakes
Manufacturing	10730 : Manufacture of macaroni, noodles, couscous and similar farinaceous products
Manufacturing	10810 : Manufacture of sugar
Manufacturing	10821 : Manufacture of cocoa, and chocolate confectionery
Manufacturing	10822 : Manufacture of sugar confectionery
Manufacturing	10831 : Tea processing
Manufacturing	10832 : Production of coffee and coffee substitutes
Manufacturing	10840 : Manufacture of condiments and seasonings
Manufacturing	10850 : Manufacture of prepared meals and dishes
Manufacturing	10860 : Manufacture of homogenised food preparations and dietetic food
Manufacturing	10890 : Manufacture of other food products nec
Manufacturing	10910 : Manufacture of prepared feeds for farm animals
Manufacturing	10920 : Manufacture of prepared pet foods
Manufacturing	11010 : Distilling, rectifying and blending of spirits
Manufacturing	11020 : Manufacture of wine from grape
Manufacturing	11030 : Manufacture of cider and other fruit wines
Manufacturing	11040 : Manufacture of other non-distilled fermented beverages
Manufacturing	11050 : Manufacture of beer
Manufacturing	11060 : Manufacture of malt
Manufacturing	11070 : Manufacture of soft drinks; production of mineral waters and other bottled waters
Manufacturing	12000 : Manufacture of tobacco products
Manufacturing	13100 : Preparation and spinning of textile fibres
Manufacturing	13200 : Weaving of textiles
Manufacturing	13300 : Finishing of textiles
Manufacturing	13910 : Manufacture of knitted and crocheted fabrics
Manufacturing	13921 : Manufacture of soft furnishings
Manufacturing	13922 : Manufacture of canvas goods, sacks etc
Manufacturing	13923 : Manufacture of household textiles (other than soft furnishings of 13921)
Manufacturing	13931 : Manufacture of woven or tufted carpets and rugs
Manufacturing	13939 : Manufacture of carpets and rugs (other than woven or tufted) nec

Manufacturing	13940 : Manufacture of cordage, rope, twine and netting
Manufacturing	13950 : Manufacture of non-wovens and articles made from non-wovens, except apparel
Manufacturing	13960 : Manufacture of other technical and industrial textiles
Manufacturing	13990 : Manufacture of other textiles nec
Manufacturing	14110 : Manufacture of leather clothes
Manufacturing	14120 : Manufacture of workwear
Manufacturing	14131 : Manufacture of men's outerwear, other than leather clothes and workwear
Manufacturing	14132 : Manufacture of women's outerwear, other than leather clothes and workwear
Manufacturing	14141 : Manufacture of men's underwear
Manufacturing	14142 : Manufacture of women's underwear
Manufacturing	14190 : Manufacture of other wearing apparel and accessories
Manufacturing	14200 : Manufacture of articles of fur
Manufacturing	14310 : Manufacture of knitted and crocheted hosiery
Manufacturing	14390 : Manufacture of other knitted and crocheted apparel
Manufacturing	15110 : Tanning and dressing of leather; dressing and dyeing of fur
Manufacturing	15120 : Manufacture of luggage, handbags and the like, saddlery and harness
Manufacturing	15200 : Manufacture of footwear
Manufacturing	16100 : Sawmilling and planing of wood
Manufacturing	16210 : Manufacture of veneer sheets and wood-based panels
Manufacturing	16220 : Manufacture of assembled parquet floors
Manufacturing	16230 : Manufacture of other builders' carpentry and joinery
Manufacturing	16240 : Manufacture of wooden containers
Manufacturing	16290 : Manufacture of other products of wood; manufacture of articles of cork, straw and plaiting materials
Manufacturing	17110 : Manufacture of pulp
Manufacturing	17120 : Manufacture of paper and paperboard
Manufacturing	17211 : Manufacture of corrugated paper and paperboard; manufacture of sacks and bags of paper
Manufacturing	17219 : Manufacture of paper and paperboard containers other than sacks and bags
Manufacturing	17220 : Manufacture of household and sanitary goods and of toilet requisites
Manufacturing	17230 : Manufacture of paper stationery
Manufacturing	17240 : Manufacture of wallpaper
Manufacturing	17290 : Manufacture of other articles of paper and paperboard
Manufacturing	18110 : Printing of newspapers
Manufacturing	18121 : Manufacture of printed labels
Manufacturing	18129 : Printing (other than printing of newspapers and printing on labels and tags) nec
Manufacturing	18130 : Pre-press and pre-media services
Manufacturing	18140 : Binding and related services
Manufacturing	18201 : Reproduction of sound recording
Manufacturing	18202 : Reproduction of video recording
Manufacturing	18203 : Reproduction of computer media
Manufacturing	19100 : Manufacture of coke oven products
Manufacturing	19201 : Mineral oil refining
Manufacturing	19209 : Other treatment of petroleum products (excluding mineral oil refiningpetrochemicals manufacture)
Manufacturing	20110 : Manufacture of industrial gases
Manufacturing	20120 : Manufacture of dyes and pigments
Manufacturing	20130 : Manufacture of other inorganic basic chemicals
Manufacturing	20140 : Manufacture of other organic basic chemicals

Manufacturing	20150 : Manufacture of fertilisers and nitrogen compounds
Manufacturing	20160 : Manufacture of plastics in primary forms
Manufacturing	20170 : Manufacture of synthetic rubber in primary forms
Manufacturing	20200 : Manufacture of pesticides and other agrochemical products
Manufacturing	20301 : Manufacture of paints, varnishes and similar coatings, mastics and sealants
Manufacturing	20302 : Manufacture of printing ink
Manufacturing	20411 : Manufacture of soap and detergents
Manufacturing	20412 : Manufacture of cleaning and polishing preparations
Manufacturing	20420 : Manufacture of perfumes and toilet preparations
Manufacturing	20510 : Manufacture of explosives
Manufacturing	20520 : Manufacture of glues
Manufacturing	20530 : Manufacture of essential oils
Manufacturing	20590 : Manufacture of other chemical products nec
Manufacturing	20600 : Manufacture of man-made fibres
Manufacturing	21100 : Manufacture of basic pharmaceutical products
Manufacturing	21200 : Manufacture of pharmaceutical preparations
Manufacturing	22110 : Manufacture of rubber tyres and tubes; retreading and rebuilding of rubber tyres
Manufacturing	22190 : Manufacture of other rubber products
Manufacturing	22210 : Manufacture of plastic plates, sheets, tubes and profiles
Manufacturing	22220 : Manufacture of plastic packing goods
Manufacturing	22230 : Manufacture of builders  ware of plastic
Manufacturing	22290 : Manufacture of other plastic products
Manufacturing	23110 : Manufacture of flat glass
Manufacturing	23120 : Shaping and processing of flat glass
Manufacturing	23130 : Manufacture of hollow glass
Manufacturing	23140 : Manufacture of glass fibres
Manufacturing	23190 : Manufacture and processing of other glass, including technical glassware
Manufacturing	23200 : Manufacture of refractory products
Manufacturing	23310 : Manufacture of ceramic tiles and flags
Manufacturing	23320 : Manufacture of bricks, tiles and construction products, in baked clay
Manufacturing	23410 : Manufacture of ceramic household and ornamental articles
Manufacturing	23420 : Manufacture of ceramic sanitary fixtures
Manufacturing	23430 : Manufacture of ceramic insulators and insulating fittings
Manufacturing	23440 : Manufacture of other technical ceramic products
Manufacturing	23490 : Manufacture of other ceramic products
Manufacturing	23510 : Manufacture of cement
Manufacturing	23520 : Manufacture of lime and plaster
Manufacturing	23610 : Manufacture of concrete products for construction purposes
Manufacturing	23620 : Manufacture of plaster products for construction purposes
Manufacturing	23630 : Manufacture of ready-mixed concrete
Manufacturing	23640 : Manufacture of mortars
Manufacturing	23650 : Manufacture of fibre cement
Manufacturing	23690 : Manufacture of other articles of concrete, plaster and cement
Manufacturing	23700 : Cutting, shaping and finishing of stone
Manufacturing	23910 : Production of abrasive products
Manufacturing	23990 : Manufacture of other non-metallic mineral products nec
Manufacturing	24100 : Manufacture of basic iron and steel and of ferro-alloys
Manufacturing	24200 : Manufacture of tubes, pipes, hollow profiles and related fittings, of steel

Manufacturing	24310 : Cold drawing of bars
Manufacturing	24320 : Cold rolling of narrow strip
Manufacturing	24330 : Cold forming or folding
Manufacturing	24340 : Cold drawing of wire
Manufacturing	24410 : Precious metals production
Manufacturing	24420 : Aluminium production
Manufacturing	24430 : Lead, zinc and tin production
Manufacturing	24440 : Copper production
Manufacturing	24450 : Other non-ferrous metal production
Manufacturing	24460 : Processing of nuclear fuel
Manufacturing	24510 : Casting of iron
Manufacturing	24520 : Casting of steel
Manufacturing	24530 : Casting of light metals
Manufacturing	24540 : Casting of other non-ferrous metals
Manufacturing	25110 : Manufacture of metal structures and parts of structures
Manufacturing	25120 : Manufacture of doors and windows of metal
Manufacturing	25210 : Manufacture of central heating radiators and boilers
Manufacturing	25290 : Manufacture of other tanks, reservoirs and containers of metal
Manufacturing	25300 : Manufacture of steam generators, except central heating hot water boilers
Manufacturing	25400 : Manufacture of weapons and ammunition
Manufacturing	25500 : Forging, pressing, stamping and roll-forming of metal; powder metallurgy
Manufacturing	25610 : Treatment and coating of metals
Manufacturing	25620 : Machining
Manufacturing	25710 : Manufacture of cutlery
Manufacturing	25720 : Manufacture of locks and hinges
Manufacturing	25730 : Manufacture of tools
Manufacturing	25910 : Manufacture of steel drums and similar containers
Manufacturing	25920 : Manufacture of light metal packaging
Manufacturing	25930 : Manufacture of wire products, chain and springs
Manufacturing	25940 : Manufacture of fasteners and screw machine products
Manufacturing	25990 : Manufacture of other fabricated metal products nec
Manufacturing	26110 : Manufacture of electronic components
Manufacturing	26120 : Manufacture of loaded electronic boards
Manufacturing	26200 : Manufacture of computers and peripheral equipment
Manufacturing	26301 : Manufacture of telegraph and telephone apparatus and equipment
Manufacturing	26309 : Manufacture of communication equipment (other than telegraph and telephone apparatus and equipment)
Manufacturing	26400 : Manufacture of consumer electronics
Manufacturing	26511 : Manufacture of electronic instruments and appliances for measuring, testing, and navigation, except industrial process control equipment
Manufacturing	26512 : Manufacture of electronic industrial process control equipment
Manufacturing	26513 : Manufacture of non-electronic instruments and appliances for measuring, testing and navigation, except industrial process control equipment
Manufacturing	26514 : Manufacture of non-electronic industrial process control equipment
Manufacturing	26520 : Manufacture of watches and clocks
Manufacturing	26600 : Manufacture of irradiation, electromedical and electrotherapeutic equipment
Manufacturing	26701 : Manufacture of optical precision instruments
Manufacturing	26702 : Manufacture of photographic and cinematographic equipment
Manufacturing	26800 : Manufacture of magnetic and optical media

Manufacturing	27110 : Manufacture of electric motors, generators and transformers
Manufacturing	27120 : Manufacture of electricity distribution and control apparatus
Manufacturing	27200 : Manufacture of batteries and accumulators
Manufacturing	27310 : Manufacture of fibre optic cables
Manufacturing	27320 : Manufacture of other electronic and electric wires and cables
Manufacturing	27330 : Manufacture of wiring devices
Manufacturing	27400 : Manufacture of electric lighting equipment
Manufacturing	27510 : Manufacture of electric domestic appliances
Manufacturing	27520 : Manufacture of non-electric domestic appliances
Manufacturing	27900 : Manufacture of other electrical equipment
Manufacturing	28110 : Manufacture of engines and turbines, except aircraft, vehicle and cycle engines
Manufacturing	28120 : Manufacture of fluid power equipment
Manufacturing	28131 : Manufacture of pumps
Manufacturing	28132 : Manufacture of compressors
Manufacturing	28140 : Manufacture of other taps and valves
Manufacturing	28150 : Manufacture of bearings, gears, gearing and driving elements
Manufacturing	28210 : Manufacture of ovens, furnaces and furnace burners
Manufacturing	28220 : Manufacture of lifting and handling equipment
Manufacturing	28230 : Manufacture of office machinery and equipment (except computers and peripheral equipment)
Manufacturing	28240 : Manufacture of power-driven hand tools
Manufacturing	28250 : Manufacture of non-domestic cooling and ventilation equipment
Manufacturing	28290 : Manufacture of other general-purpose machinery nec
Manufacturing	28301 : Manufacture of agricultural tractors
Manufacturing	28302 : Manufacture of agricultural and forestry machinery (other than agricultural tractors)
Manufacturing	28410 : Manufacture of metal forming machinery
Manufacturing	28490 : Manufacture of other machine tools
Manufacturing	28910 : Manufacture of machinery for metallurgy
Manufacturing	28921 : Manufacture of machinery for mining
Manufacturing	28922 : Manufacture of earthmoving equipment
Manufacturing	28923 : Manufacture of equipment for concrete crushing and screening roadworks
Manufacturing	28930 : Manufacture of machinery for food, beverage and tobacco processing
Manufacturing	28940 : Manufacture of machinery for textile, apparel and leather production
Manufacturing	28950 : Manufacture of machinery for paper and paperboard production
Manufacturing	28960 : Manufacture of plastics and rubber machinery
Manufacturing	28990 : Manufacture of other special-purpose machinery nec
Manufacturing	29100 : Manufacture of motor vehicles
Manufacturing	29201 : Manufacture of bodies (coachwork) for motor vehicles (except caravans)
Manufacturing	29202 : Manufacture of trailers and semi-trailers
Manufacturing	29203 : Manufacture of caravans
Manufacturing	29310 : Manufacture of electrical and electronic equipment for motor vehicles
Manufacturing	29320 : Manufacture of other parts and accessories for motor vehicles
Manufacturing	30110 : Building of ships and floating structures
Manufacturing	30120 : Building of pleasure and sporting boats
Manufacturing	30200 : Manufacture of railway locomotives and rolling stock
Manufacturing	30300 : Manufacture of air and spacecraft and related machinery
Manufacturing	30400 : Manufacture of military fighting vehicles
Manufacturing	30910 : Manufacture of motorcycles

Manufacturing	30920 : Manufacture of bicycles and invalid carriages
Manufacturing	30990 : Manufacture of other transport equipment nec
Manufacturing	31010 : Manufacture of office and shop furniture
Manufacturing	31020 : Manufacture of kitchen furniture
Manufacturing	31030 : Manufacture of mattresses
Manufacturing	31090 : Manufacture of other furniture
Manufacturing	32110 : Striking of coins
Manufacturing	32120 : Manufacture of jewellery and related articles
Manufacturing	32130 : Manufacture of imitation jewellery and related articles
Manufacturing	32200 : Manufacture of musical instruments
Manufacturing	32300 : Manufacture of sports goods
Manufacturing	32401 : Manufacture of professional and arcade games and toys
Manufacturing	32409 : Manufacture of games and toys (other than professional and arcade games and toys) nec
Manufacturing	32500 : Manufacture of medical and dental instruments and supplies
Manufacturing	32910 : Manufacture of brooms and brushes
Manufacturing	32990 : Other manufacturing nec
Manufacturing	33110 : Repair of fabricated metal products
Manufacturing	33120 : Repair of machinery
Manufacturing	33130 : Repair of electronic and optical equipment
Manufacturing	33140 : Repair of electrical equipment
Manufacturing	33150 : Repair and maintenance of ships and boats
Manufacturing	33160 : Repair and maintenance of aircraft and spacecraft
Manufacturing	33170 : Repair and maintenance of other transport equipment
Manufacturing	33190 : Repair of other equipment
Manufacturing	33200 : Installation of industrial machinery and equipment
Utilities	35110 : Production of electricity
Utilities	35120 : Transmission of electricity
Utilities	35130 : Distribution of electricity
Utilities	35140 : Trade of electricity
Utilities	35210 : Manufacture of gas
Utilities	35220 : Distribution of gaseous fuels through mains
Utilities	35230 : Trade of gas through mains
Utilities	35300 : Steam and air conditioning supply
Waste	36000 : Water collection, treatment and supply
Waste	37000 : Sewerage
Waste	38110 : Collection of non-hazardous waste
Waste	38120 : Collection of hazardous waste
Waste	38210 : Treatment and disposal of non-hazardous waste
Waste	38220 : Treatment and disposal of hazardous waste
Waste	38310 : Dismantling of wrecks
Waste	38320 : Recovery of sorted materials
Waste	39000 : Remediation activities and other waste management services
Building Trades	41100 : Development of building projects
Building Trades	41201 : Construction of commercial buildings
Building Trades	41202 : Construction of domestic buildings
Building Trades	42110 : Construction of roads and motorways
Building Trades	42120 : Construction of railways and underground railways

Building Trades	42130 : Construction of bridges and tunnels
Building Trades	42210 : Construction of utility projects for fluids
Building Trades	42220 : Construction of utility projects for electricity and telecommunications
Building Trades	42910 : Construction of water projects
Building Trades	42990 : Construction of other civil engineering projects nec
Building Trades	43110 : Demolition
Building Trades	43120 : Site preparation
Building Trades	43130 : Test drilling and boring
Building Trades	43210 : Electrical installation
Building Trades	43220 : Plumbing, heat and air-conditioning installation
Building Trades	43290 : Other construction installation
Building Trades	43310 : Plastering
Building Trades	43320 : Joinery installation
Building Trades	43330 : Floor and wall covering
Building Trades	43341 : Painting
Building Trades	43342 : Glazing
Building Trades	43390 : Other building completion and finishing
Building Trades	43910 : Roofing activities
Building Trades	43991 : Scaffold erection
Building Trades	43999 : Specialised construction activities (other than scaffold erection) nec
Motor Trades	45200 : Maintenance and repair of motor vehicles
Motor Trades	45310 : Wholesale trade of motor vehicle parts and accessories
Motor Trades	45400 : Sale, maintenance and repair of motorcycles and related parts and accessories
Logistics	46210 : Wholesale of grain, unmanufactured tobacco, seeds and animal feeds
Logistics	46220 : Wholesale of flowers and plants
Logistics	46230 : Wholesale of live animals
Logistics	46240 : Wholesale of hides, skins and leather
Logistics	46310 : Wholesale of fruit and vegetables
Logistics	46320 : Wholesale of meat and meat products
Logistics	46330 : Wholesale of dairy products, eggs and edible oils and fats
Logistics	46341 : Wholesale of fruit and vegetable juices, mineral waters and soft drinks
Logistics	46342 : Wholesale of wine, beer, spirits and other alcoholic beverages
Logistics	46350 : Wholesale of tobacco products
Logistics	46360 : Wholesale of sugar and chocolate and sugar confectionery
Logistics	46370 : Wholesale of coffee, tea, cocoa and spices
Logistics	46380 : Wholesale of other food, including fish, crustaceans and molluscs
Logistics	46390 : Non-specialised wholesale of food, beverages and tobacco
Logistics	46410 : Wholesale of textiles
Logistics	46420 : Wholesale of clothing and footwear
Logistics	46431 : Wholesale of gramophone records, audio tapes, compact discs and video tapes and of the equipment on which these are played
Logistics	46439 : Wholesale of radio and television goods and of electrical household appliances (other than of gramophone records, audio tapes, compact discs and video tapes and the equipment on which these are played) n.e.c.
Logistics	46440 : Wholesale of china and glassware and cleaning materials
Logistics	46450 : Wholesale of perfume and cosmetics
Logistics	46460 : Wholesale of pharmaceutical goods
Logistics	46470 : Wholesale of furniture, carpets and lighting equipment
Logistics	46480 : Wholesale of watches and jewellery

Logistics	46491 : Wholesale of musical instruments
Logistics	46499 : Wholesale of household goods (other than musical instruments) nec
Logistics	46510 : Wholesale of computers, computer peripheral equipment and software
Logistics	46520 : Wholesale of electronic and telecommunications equipment and parts
Logistics	46610 : Wholesale of agricultural machinery, equipment and supplies
Logistics	46620 : Wholesale of machine tools
Logistics	46630 : Wholesale of mining, construction and civil engineering machinery
Logistics	46640 : Wholesale of machinery for the textile industry and of sewing and knitting machines
Logistics	46650 : Wholesale of office furniture
Logistics	46660 : Wholesale of other office machinery and equipment
Logistics	46690 : Wholesale of other machinery and equipment
Logistics	46711 : Wholesale of petroleum and petroleum products
Logistics	46719 : Wholesale of fuels and related products (other than petroleum and petroleum products)
Logistics	46720 : Wholesale of metals and metal ores
Logistics	46730 : Wholesale of wood, construction materials and sanitary equipment
Logistics	46740 : Wholesale of hardware, plumbing and heating equipment and supplies
Logistics	46750 : Wholesale of chemical products
Logistics	46760 : Wholesale of other intermediate products
Logistics	46770 : Wholesale of waste and scrap
Logistics	46900 : Non-specialised wholesale trade
Logistics	49410 : Freight transport by road
Logistics	49420 : Removal services
Logistics	52101 : Operation of warehousing and storage facilities for water transport activities of division 50
Logistics	52102 : Operation of warehousing and storage facilities for air transport activities of division 51
Logistics	52103 : Operation of warehousing and storage facilities for land transport activities of division 49
Logistics	52211 : Operation of rail freight terminals
Logistics	52212 : Operation of rail passenger facilities at railway stations
Logistics	52213 : Operation of bus and coach passenger facilities at bus and coach stations
Logistics	52219 : Other service activities incidental to land transportation, nec (not including operation of rail freight terminals, passenger facilities at railway stations or passenger facilities at bus and coach stations)
Logistics	52241 : Cargo handling for water transport activities of division 50
Logistics	52242 : Cargo handling for air transport activities of division 51
Logistics	52243 : Cargo handling for land transport activities of division 49
Logistics	53100 : Postal activities under universal service obligation
Logistics	53201 : Licensed Carriers
Logistics	53202 : Unlicensed Carriers
Logistics	77310 : Renting and leasing of agricultural machinery and equipment
Logistics	77320 : Renting and leasing of construction and civil engineering machinery and equipment
Logistics	77330 : Renting and leasing of office machinery and equipment (including computers)
Logistics	77341 : Renting and leasing of passenger water transport equipment
Logistics	77342 : Renting and leasing of freight water transport equipment
Logistics	77351 : Renting and leasing of passenger air transport equipment
Logistics	77352 : Renting and leasing of freight air transport equipment
Logistics	77390 : Renting and leasing of other machinery, equipment and tangible goods nec
Manufacturing	82920 : Packaging activities
Repair	95110 : Repair of computers and peripheral equipment
Repair	95120 : Repair of communication equipment

Repair	95210 : Repair of consumer electronics
Repair	95220 : Repair of household appliances and home and garden equipment
Repair	95230 : Repair of footwear and leather goods
Repair	95240 : Repair of furniture and home furnishings
Repair	95250 : Repair of watches, clocks and jewellery
Repair	95290 : Repair of other personal and household goods

A2 Summary of Findings for London and Wider South East Workshops

Overall Concluding Themes from each Workshop

Overall Themes - South
Physical Constraints and Land Availability
Competition with Residential
Balance between Jobs and Housing – Risk
Infrastructure Investment – improve accessibility for own areas.
Impact of PDR
Scope for substitution is limited?
M25 Office market has own dynamic – not alternative to London
M25 road gives orbital links
Office space design is different – smarter working. Not left with right product.
Stock outdated
Can make more efficient use of commercial space to free up land for housing.

Overall Themes – West
Balance – Jobs/Skill/Uses. Green Belt. Dormitories. Building Constraint
Efficiency of Use (Whole Life). Density. Output. Moving Goods.
Large. SMEs. Micro Businesses
Capacity. New Demand (Pharma). Traffic Constraints. Infrastructure
Proximity/Clusters.
Place. (Town Centre/Campus Dormitories) Policy = Unmixing. Shared Lack of Experience.
Collaboration. Sub Regional Issues

Overall Themes – East
Restraint.
Town Centres. Vitality
Intensification. Examples
London and Wider South East. Demand pressures being exported. White vans. Logistics. Strategic. More spokes in London
Clustering. Supply Chains
Employment
Co-ordinated approaches. Layers of Demand.
SMEs. Indigenous growth. Rent gradient.

Overall Themes – North
London will be poorer without its layering of businesses.
Certain use pressures
10% is not insignificant.
Observe decline and then plan for decline
Capacity issue = Myth. Huge opportunities. Near shoring
SMOs been grabbed/solved
London and WSE. Diversity. Scale
London activity transfers. Industry won't.
Flexibility of Space. Break down of uses
Development economist

A3 Definition of Hybrid Sectors

For the Boroughs of									
	Camden	Islington							
	City	Kensington & Chelsea							
	Croydon	Lambeth							
	Hackney	Southwark							
	Hammersmith & Fulham	Tower Hamlets							
	Hillingdon	Wandsworth							
	Hounslow	Westminster							
Employment in the following sectors is assigned to 'Office', for other Boroughs it is not									
	Industry								
*	68310 : Real estate agencies								
*	72110 : Research and experimental development on biotechnology								
*	72190 : Other research and experimental development on natural sciences and engineering								
*	82190 : Photocopying, document preparation and other specialised office support activities								
	58110 : Book publishing								
	58120 : Publishing of directories and mailing lists								
	58130 : Publishing of newspapers								
	58141 : Publishing of learned journals								
	58142 : Publishing of consumer, business and professional journals and periodicals								
	58190 : Other publishing activities								
	59111 : Motion picture production activities								
	59112 : Video production activities								
	59113 : Television programme production activities								
	59200 : Sound recording and music publishing activities								
	60100 : Radio broadcasting								
	62011 : Ready-made interactive leisure and entertainment software development								
	62012 : Business and domestic software development								
	62030 : Computer facilities management activities								
	62090 : Other information technology and computer service activities								
	63110 : Data processing, hosting and related activities								
	63120 : Web portals								
	71111 : Architectural activities								
	71112 : Urban planning and landscape architectural activities								
	71121 : Engineering design activities for industrial process and production								
	71122 : Engineering related scientific and technical consulting activities								
	71129 : Other engineering activities (not including engineering design for industrial process and production or engineering related scientific and technic								
	71200 : Technical testing and analysis								
	74901 : Environmental consulting activities								
	74909 : Other professional, scientific and technical activities (not including environmental consultancy or quantity surveying)								
	82110 : Combined office administrative service activities								
	82200 : Activities of call centres								
	82301 : Activities of exhibition and fair organizers								
	82302 : Activities of conference organizers								
	82911 : Activities of collection agencies								
	82912 : Activities of credit bureaus								
	82990 : Other business support service activities nec								

A4 Borough Release Benchmarks by Scenario

Industrial Land Demand Study - Baseline and Alternative Scenarios 2016-2041

Sub Region	Property Market Area	Borough	Baseline	Trend Supply	Potential Pipeline	Potential Pipeline + Infrastructure	Intensification & Substitution
East	Thames Gateway	Barking and Dagenham	-43.7	-46.5	-111.3	-111.3	-152.0
North	Park Royal/Heathrow	Barnet	7.3	-29.1	-1.8	-12.3	-5.1
East	Thames Gateway	Bexley	-12.3	-12.1	-45.9	-45.9	-122.6
West	Park Royal/Heathrow	Brent	43.0	-55.2	-38.4	-38.4	-43.1
South	Thames Gateway	Bromley	5.3	-13.4	-1.4	-1.4	-3.3
Central	Central Services	Camden	-8.7	-24.2	-1.0	-1.0	-9.2
Central	Central Services	City of London	1.6	-2.3	0.0	0.0	-0.8
South	Wandle Valley	Croydon	-6.5	-54.6	-1.3	-1.3	-2.3
West	Park Royal/Heathrow	Ealing	35.6	-84.2	-54.1	-54.1	-31.0
North	Lea Valley	Enfield	41.7	-57.6	-42.4	-159.7	-39.0
East	Thames Gateway	Greenwich	19.8	-49.4	-52.3	-52.3	-33.0
East	Central Services	Hackney	-17.1	-39.3	-2.1	-10.2	-7.1
West	Park Royal/Heathrow	Hammersmith and Fulham	4.7	-61.0	-67.5	-67.5	-9.3
North	Lea Valley	Haringey	-31.2	-34.5	-31.2	-83.8	-19.2
West	Park Royal/Heathrow	Harrow	1.2	-25.8	-20.6	-20.6	22.0
East	Thames Gateway	Havering	-38.9	-203.4	-21.0	-21.0	-87.8
West	Park Royal/Heathrow	Hillingdon	-26.9	-99.1	-69.8	-69.8	-5.0
West	Park Royal/Heathrow	Hounslow	-31.8	-54.3	-12.8	-12.8	-49.5
Central	Central Services	Islington	-13.1	-27.0	-5.1	-8.2	-12.2
Central	Central Services	Kensington and Chelsea	-4.6	-12.0	-1.2	-1.2	-13.0
South	Wandle Valley	Kingston upon Thames	-7.2	3.2	-0.6	-81.0	-2.7
Central	Central Services	Lambeth	-10.6	-36.0	-11.0	-13.7	-4.4
East	Central Services	Lewisham	-9.9	-60.1	-10.2	-10.2	-5.3
South	Wandle Valley	Merton	-2.8	-25.0	-0.8	-44.2	10.2
East	Thames Gateway	Newham	-115.7	-186.6	-83.5	-83.5	-102.2
East	Thames Gateway	Redbridge	-0.1	-29.8	-2.3	-2.3	-6.9
South	Park Royal/Heathrow	Richmond upon Thames	12.0	-17.4	-0.7	-0.7	7.5
Central	Central Services	Southwark	-21.5	-78.5	-5.5	-53.5	-19.5
South	Wandle Valley	Sutton	14.9	-3.7	-17.7	-17.7	-8.4
East	Central Services	Tower Hamlets	-39.7	-88.7	-57.0	-58.0	-13.4
East	Lea Valley	Waltham Forest	6.2	-59.3	-26.9	-70.7	-17.5
South	Wandle Valley	Wandsworth	16.3	-54.8	-40.0	-68.9	3.8
Central	Central Services	Westminster	-0.2	-7.9	-0.1	-0.1	3.7
		London	**-233.1**	**-1,629.8**	**-837.4**	**-1,277.3**	**-777.5**
		Annual average	**-9.3**	**-65.2**	**-33.5**	**-51.1**	**-31.1**

Property Market Area	Baseline	Trend Supply	Potential Pipeline	Potential Pipeline + Infrastructure	Intensification & Substitution
Central Services	-123.9	-376.1	-93.1	-156.2	-81.2
Lea Valley	16.7	-151.4	-100.5	-314.2	-75.6
Park Royal/Heathrow	45.0	-426.1	-265.6	-276.1	-113.5
Thames Gateway	-185.6	-541.2	-317.7	-317.7	-507.9
Wandle Valley	14.7	-135.0	-60.4	-213.0	0.7

Intensification & Substitution Scenario by Component of Demand

Sub Region	Property Market Area		Industrial	Whsing	Waste	Other	Demand	Surplus from Excess Vacant Land	Intensification Market	Intensification Physical	Intensification Combined	Net Release
Central	Central Services	Camden	-4.7	-4.4	0.2		-8.9	-0.3	0.0	0.0	0.0	-9.2
Central	Central Services	City of London	0.3	-2.3	1.3		-0.8	0.0	0.0	0.0	0.0	-0.8
Central	Central Services	Islington	-3.6	-11.3	0.2	2.5	-12.2	0.0	0.0	0.0	0.0	-12.2
Central	Central Services	Kensington and Chelsea	-1.8	-13.7	2.5		-13.0	0.0	0.0	0.0	0.0	-13.0
Central	Central Services	Lambeth	-1.3	-6.0	2.8		-4.4	0.0	0.0	0.0	0.0	-4.4
Central	Central Services	Southwark	-3.2	-13.7	-2.6		-19.5	0.0	0.0	0.0	0.0	-19.5
Central	Central Services	Westminster	-3.7	5.7	1.6		3.7	0.0	0.0	0.0	0.0	3.7
East	Thames Gateway	Barking and Dagenham	-7.5	-17.7	-21.3		-46.5	-52.8	0.0	-52.8	-52.8	-152.0
East	Thames Gateway	Bexley	-15.1	-29.6	-8.3	3.2	-49.8	-45.1	0.0	-27.8	-27.8	-122.6
East	Thames Gateway	Greenwich	-5.7	2.1	1.4		-2.2	-15.5	0.0	-15.3	-15.3	-33.0
East	Central Services	Hackney	-7.3	0.0	0.2		-7.1	0.0	0.0	0.0	0.0	-7.1
East	Thames Gateway	Havering	-2.8	0.0	-13.9		-16.7	-43.0	0.0	-28.1	-28.1	-87.8
East	Central Services	Lewisham	-3.4	0.0	-3.5	2.6	-4.3	0.0	0.0	-1.0	-1.0	-5.3
East	Thames Gateway	Newham	12.9	0.0	-17.1		-4.2	-98.0	0.0	0.0	0.0	-102.2
East	Thames Gateway	Redbridge	0.2	0.0	-6.6		-6.4	-0.4	0.0	0.0	0.0	-6.9
East	Central Services	Tower Hamlets	-8.1	0.0	-0.9		-9.0	-4.3	0.0	0.0	0.0	-13.4
East	Lea Valley	Waltham Forest	-9.4	0.0	0.2		-9.2	0.0	0.0	-8.3	-8.3	-17.5
North	Park Royal/Heathrow	Barnet	-2.2	0.0	0.2		-2.0	0.0	-3.1	0.0	-3.1	-5.1
North	Lea Valley	Enfield	2.0	0.0	0.3		2.3	-14.9	0.0	-26.3	-26.3	-39.0
North	Lea Valley	Haringey	-7.5	0.0	0.2		-7.3	-8.7	0.0	-3.1	-3.1	-19.2
South	Thames Gateway	Bromley	1.4	0.0	2.2	0.8	4.4	-7.3	0.0	-0.4	-0.4	-3.3
South	Wandle Valley	Croydon	-14.3	0.0	4.0	8.0	-2.3	0.0	0.0	0.0	0.0	-2.3
South	Wandle Valley	Kingston upon Thames	-1.1	-1.3	2.5		0.1	0.0	0.0	-2.8	-2.8	-2.7
South	Wandle Valley	Merton	-10.6	27.4	1.5		18.3	0.0	0.0	-8.1	-8.1	10.2
South	Park Royal/Heathrow	Richmond upon Thames	-1.6	6.8	2.3		7.5	0.0	0.0	0.0	0.0	7.5
South	Wandle Valley	Sutton	5.2	2.7	-1.4	1.7	8.2	-7.7	0.0	-8.9	-8.9	-8.4
South	Wandle Valley	Wandsworth	-1.6	2.7	2.9		4.0	-0.1	0.0	0.0	0.0	3.8
West	Park Royal/Heathrow	Brent	-21.6	-0.1	3.6	3.9	-14.2	-3.9	-25.0	0.0	-25.0	-43.1
West	Park Royal/Heathrow	Ealing	-18.8	-0.6	4.7		-14.7	0.0	-16.4	0.0	-16.4	-31.0
West	Park Royal/Heathrow	Hammersmith and Fulham	-8.2	2.4	-2.8		-8.6	0.0	-0.6	0.0	-0.6	-9.3
West	Park Royal/Heathrow	Harrow	-5.1	26.5	2.3		23.8	0.0	-1.7	0.0	-1.7	22.0
West	Park Royal/Heathrow	Hillingdon	-12.4	24.4	3.9		15.9	-1.6	-19.4	0.0	-19.4	-5.0
West	Park Royal/Heathrow	Hounslow	-5.9	-0.2	3.7		-2.3	-31.5	-15.6	0.0	-15.6	-49.5
		London	**-166.5**	**0.0**	**-33.7**	**22.7**	**-177.5**	**-335.2**	**-81.9**	**-182.9**	**-264.8**	**-777.5**
Annual			-6.7	0.0	-1.3	0.9	-7.1	-13.4	-3.3	-7.3	-10.6	-31.1

Sub Region	Industrial	Whsing	Waste	Other	Demand	Surplus from	Intensification Market	Intensification Physical	Intensification Combined	Net Demand
Central	-18.0	-45.5	6.0	2.5	-55.1	-0.3	0.0	0.0	0.0	-55.4
East	-46.3	-45.2	-69.8	5.8	-155.5	-259.1	0.0	-133.3	-133.3	-547.9
North	-7.7	0.0	0.7	0.0	-7.0	-23.7	-3.1	-29.4	-32.6	-63.3
South	-22.6	38.2	14.0	10.5	40.2	-15.1	0.0	-20.2	-20.2	4.9
West	-71.9	52.5	15.4	3.9	-0.2	-37.0	-78.7	0.0	-78.7	-115.9
London	-166.5	0.0	-33.7	22.7	-177.5	-335.2	-81.9	-182.9	-264.8	-777.5
Central Services	-36.8	-45.5	1.8	5.1	-75.5	-4.7	0.0	-1.0	-1.0	-81.2
Lea Valley	-14.9	0.0	0.7	0.0	-14.2	-23.7	0.0	-37.7	-37.7	-75.6
Park Royal/Heathrow	-75.7	59.2	17.9	3.9	5.4	-37.0	-81.9	0.0	-81.9	-113.5
Thames Gateway	-16.7	-45.2	-63.6	4.0	-121.4	-262.1	0.0	-124.4	-124.4	-507.9
Wandle Valley	-22.4	31.5	9.5	9.7	28.3	-7.8	0.0	-19.8	-19.8	0.7

A5 Indicators of Substitutability

	RV £/sq m	Floorspace 000 m2	IndJobs	Ind%All	Chg Ind Jobs	Chg Ind %	Drive Time	Emp Rate	In Occ	Wages
Brentwood	£59.70	201	5,774	16.3%	456	1.3%	1	74.8		£611.20
Broxbourne	£56.51	637	9,724	24.8%	-95	-1.7%	1	74.5	25.6	£537.40
Dacorum	£64.77	633	14,847	23.0%	2,627	2.0%	1	83.4	15.7	£499.50
Epping Forest	£56.22	498	8,360	17.5%	220	-0.6%	1	75.5	23.2	£541.10
Harlow	£55.62	845	8,796	21.4%	-1,585	-5.8%	1	79.8	38.1	£540.00
Hertsmere	£73.90	433	10,311	19.9%	2,600	1.7%	1	84.0		£574.90
St Albans	£69.77	387	8,959	11.9%	-116	-1.9%	1	78.6	14.2	£519.30
Three Rivers	£74.83	147	6,156	14.6%	-57	-5.0%	1	75.4	24.4	£556.50
Thurrock	£56.26	1,262	17,571	27.8%	-1,015	-3.2%	1	72.7	35.7	£487.10
Watford	£68.03	441	7,902	9.4%	-956	-4.2%	1	78.5		£529.00
Welwyn Hatfield	£56.38	674	15,266	22.0%	2,661	4.5%	1	74.6	26.5	£578.80
Chiltern	£41.47	217	5,451	15.6%	269	-0.8%	1	80.9		£575.10
Dartford	£65.13	476	12,339	19.9%	2,374	-0.1%	1	81.3	31.1	£567.10
Elmbridge	£59.70	335	9,201	15.3%	98	-1.6%	1	71.4	12.7	£625.20
Epsom and Ewell	£69.77	86	2,891	9.2%	288	-0.2%	1	86.9		£532.00
Gravesham	£34.85	373	4,968	17.5%	534	0.6%	1	70.2	20.9	£535.00
Mole Valley	£60.30	199	6,026	13.7%	-563	-2.0%	1	84.7	17.5	£627.70
Reigate and Banstead	£64.41	295	8,435	12.6%	656	-0.3%	1	83.3	19.5	£637.90
Runnymede	£80.36	224	12,700	22.6%	4,100	5.6%	1	72.1		£670.80
Sevenoaks	£55.00	400	7,965	16.0%	523	-2.0%	1	76.7	25.8	£489.70
Slough	£76.78	1,042	21,781	27.7%	-208	-0.3%	1	74.3	36.7	£593.60
South Bucks	£59.14	186	7,202	20.0%	448	-1.1%	1	74.3	18.1	£563.00
Spelthorne	£67.09	313	7,375	19.4%	1,411	2.8%	1	81.1	17.5	£631.60
Tandridge	£49.50	202	4,340	13.7%	34	-0.2%	1	87.4	21.9	£498.10
Windsor and Maidenhead	£63.90	313	10,834	13.8%	-202	-1.0%	1	80.7	16.9	£640.50
Basildon	£53.88	1,225	18,515	22.5%	-1,227	-2.7%	2	77.1	24.2	£573.80
East Hertfordshire	£52.47	667	10,992	18.1%	91	-1.1%	2	80.0	24.4	£549.30
Luton	£46.84	918	17,406	20.0%	129	-0.6%	2	68.5	34.3	£525.40
Stevenage	£55.56	612	8,643	20.1%	-89	-0.2%	2	75.8	30.0	£587.00
Bracknell Forest	£60.87	345	12,101	19.5%	183	-1.6%	2	83.6	22.3	£613.30
Crawley	£68.97	638	14,155	16.7%	-791	-2.2%	2	84.9	35.9	£597.60
Guildford	£67.02	373	10,403	13.6%	-180	-1.1%	2	72.6	20.0	£608.20
Rushmoor	£63.69	314	7,339	15.1%	-1,566	-4.4%	2	86.8	26.5	£601.10
Surrey Heath	£58.82	323	8,819	16.4%	-3,936	-9.2%	2	80.4	10.8	£557.10
Tonbridge and Malling	£48.17	1,038	14,156	25.1%	121	-0.7%	2	79.9	20.6	£518.80
Woking	£68.11	323	7,398	15.6%	-317	-1.1%	2	85.3	19.8	£480.40
Wokingham	£69.35	447	11,548	14.8%	2,614	1.7%	2	78.4	12.4	£675.10
Castle Point	£43.27	208	3,768	18.7%	277	1.1%	3	75.9	31.7	£457.60
Central Bedfordshire	£46.67	1,800	22,791	24.7%	1,345	-1.1%	3	77.4	27.3	£478.50
Chelmsford	£54.98	673	12,502	15.4%	320	0.4%	3	81.3	30.0	£510.10
North Hertfordshire	£47.62	651	13,939	27.6%	1,434	0.3%	3	84.1	22.8	£580.60
Southend-on-Sea	£38.12	446	8,306	13.0%	395	0.7%	3	76.2	27.1	£464.60
Uttlesford	£53.14	414	7,272	19.2%	129	-1.6%	3	80.7	19.4	£491.30
Hart	£58.06	155	5,042	13.2%	70	-1.6%	3	79.7		£624.30
Maidstone	£44.62	650	12,311	16.8%	156	-0.5%	3	81.8	27.3	£499.40
Medway	£45.70	941	17,544	20.3%	704	0.0%	3	72.3	31.8	£505.70
Mid Sussex	£57.14	420	11,242	19.8%	2,181	2.8%	3	79.6	12.4	£537.60
Reading	£58.54	632	10,454	10.4%	-2,452	-3.5%	3	76.4	22.2	£593.00
Tunbridge Wells	£54.63	421	8,182	13.5%	522	-2.9%	3	79.0		£517.90
Waverley	£59.70	268	5,579	10.4%	-783	-2.4%	3	79.7	24.9	£509.60
Wycombe	£50.60	751	18,829	23.0%	2,575	1.2%	3	80.5	18.5	£580.00
Bedford	£45.20	1,084	17,224	23.7%	2,144	1.6%	4	79.2	26.8	£518.20
Braintree	£45.40	903	14,596	27.4%	2,204	1.6%	4	77.7	35.2	£513.60
Cambridge	£62.27	273	5,520	5.5%	-1,110	-2.2%	4	76.5	20.4	£598.90
Colchester	£45.03	644	11,486	14.5%	1,098	0.3%	4	78.7	23.0	£479.10
Maldon	£32.97	364	5,119	26.9%	54	0.0%	4	69.5		£442.80
Rochford	£43.32	277	4,818	22.9%	-353	-1.9%	4	82.4	22.7	£525.10
South Cambridgeshire	£44.79	893	16,876	22.4%	-3,844	-8.5%	4	82.0	19.1	£617.00

Adur	£42.76	304	4,753	23.6%	421	0.1%	4	77.9	22.9	£460.50
Arun	£41.75	527	7,138	16.6%	750	0.1%	4	68.8	25.8	£419.70
Ashford	£44.73	626	12,818	23.9%	134	-1.4%	4	74.7	33.1	£492.60
Aylesbury Vale	£42.17	830	13,352	18.3%	1,154	-0.4%	4	80.9	17.7	£513.10
Basingstoke and Deane	£45.92	980	17,059	21.5%	-2,140	-1.8%	4	79.3	25.5	£594.10
Brighton and Hove	£58.97	407	9,196	6.9%	-1,157	-1.9%	4	73.1	19.3	£514.60
Canterbury	£44.23	407	6,565	10.6%	-192	-0.7%	4	62.6		£466.10
Cherwell	£40.45	1,162	18,357	25.5%	1,714	1.1%	4	76.0	23.5	£544.70
Chichester	£45.06	466	9,306	16.1%	1,743	2.0%	4	82.8	16.6	£481.00
East Hampshire	£49.25	467	9,031	20.8%	-42	0.3%	4	74.0	21.8	£519.90
Horsham	£47.53	547	10,540	20.2%	-82	-1.7%	4	81.9	17.9	£528.10
Lewes	£46.88	384	5,196	14.8%	-289	-2.6%	4	81.7	28.5	£544.20
Milton Keynes	£42.09	2,637	37,300	22.5%	6,632	0.6%	4	73.9	28.9	£552.30
Oxford	£46.44	323	9,931	8.3%	48	-1.2%	4	74.5	19.1	£580.30
Rother	£34.88	258	3,710	13.8%	191	-0.6%	4	71.3	27.8	£414.60
Shepway	£35.93	334	5,381	14.8%	169	0.5%	4	75.5	27.0	£467.60
South Oxfordshire	£46.30	540	8,816	15.0%	906	-0.4%	4	86.8	22.1	£583.10
Swale	£41.96	1,001	14,688	30.7%	2,236	1.3%	4	73.8	33.4	£505.80
Test Valley	£46.64	1,072	14,293	24.9%	1,188	-2.4%	4	78.0	21.5	£519.80
Vale of White Horse	£48.33	807	10,807	17.5%	-760	-3.8%	4	78.7	21.6	£617.50
Wealden	£48.48	495	8,670	18.6%	374	-0.4%	4	77.1	28.5	£442.70
West Berkshire	£57.11	823	23,325	24.9%	1,016	-1.1%	4	83.0	18.0	£636.30
West Oxfordshire	£37.87	581	9,526	22.6%	1,302	0.9%	4	86.9	27.4	£524.60
Winchester	£49.55	444	9,707	12.1%	1,567	0.1%	4	83.1		£585.00
Worthing	£47.24	254	6,408	14.3%	770	1.3%	4	80.5	30.3	£489.40
Babergh	£29.27	615	8,207	26.9%	-55	-1.5%	5	73.4	31.7	£460.00
Breckland	£25.76	1,048	14,195	29.9%	1,197	-3.6%	5	72.9	33.4	£419.30
Broadland	£33.65	624	9,581	21.4%	-1,068	-2.0%	5	79.7	26.8	£488.70
East Cambridgeshire	£33.68	475	9,932	33.8%	1,786	-1.0%	5	79.0	27.8	£496.00
Fenland	£27.14	958	11,634	37.2%	1,100	2.3%	5	72.2	44.7	£461.40
Forest Heath	£30.95	420	5,663	24.0%	524	1.8%	5	76.5	38.1	£406.50
Great Yarmouth	£27.50	509	6,663	18.0%	164	0.6%	5	71.6	37.6	£517.50
Huntingdonshire	£39.65	1,362	23,303	31.9%	4,338	4.6%	5	81.1	23.2	£497.00
Ipswich	£32.35	711	9,947	14.3%	678	0.4%	5	73.8	33.9	£495.20
King`s Lynn and West Norfolk	£25.02	1,079	12,755	24.7%	1,029	1.0%	5	77.0	38.9	£472.40
Mid Suffolk	£26.54	829	11,263	33.5%	231	-1.2%	5	75.0	28.8	£465.00
North Norfolk	£24.61	447	6,439	21.0%	232	-0.2%	5	70.9	35.4	£457.50
Norwich	£35.27	879	12,050	13.8%	240	-0.2%	5	78.9	33.4	£483.00
Peterborough	£34.19	1,784	21,533	20.5%	891	-1.0%	5	75.5	38.5	£497.10
South Norfolk	£29.63	540	9,072	18.3%	1,091	-0.3%	5	82.0	28.7	£489.50
St Edmundsbury	£32.72	978	14,082	23.1%	224	-2.7%	5	86.4	32.7	£466.20
Suffolk Coastal	£31.70	631	8,653	17.7%	410	-0.3%	5	77.2	30.1	£555.00
Tendring	£30.23	430	7,438	19.8%	1,853	4.2%	5	65.4	29.7	£461.20
Waveney	£20.73	772	10,364	26.2%	-631	-0.5%	5	74.1	34.6	£439.70
Dover	£43.31	508	6,623	19.7%	498	2.3%	5	73.2	36.4	£506.10
Eastbourne	£41.96	286	4,817	12.4%	-313	-0.9%	5	69.1	32.3	£524.30
Eastleigh	£45.61	855	14,155	22.6%	312	-0.3%	5	82.0	21.4	£537.80
Fareham	£52.16	556	10,205	20.7%	113	-0.5%	5	77.5		£529.90
Gosport	£42.25	213	4,130	20.4%	15	-0.5%	5	78.3	37.2	£552.90
Hastings	£37.59	266	4,397	14.4%	-142	-1.6%	5	68.2	24.6	£478.00
Havant	£40.69	467	8,567	19.7%	-1,051	-4.9%	5	74.9	33.1	£521.70
Isle of Wight	£29.52	542	7,474	15.1%	-34	-0.8%	5	75.5	28.5	£441.30
New Forest	£46.36	604	14,567	21.3%	217	-0.3%	5	80.9	29.9	£518.70
Portsmouth	£44.97	845	16,790	16.6%	790	1.0%	5	70.9	31.8	£532.10
Southampton	£46.58	687	11,510	10.0%	-1,222	-1.9%	5	73.4	34.1	£549.90

Thanet	£32.86	426	5,665	13.8%	-429	-1.7%	5	72.5	33.0	£415.80