ArupEconomics+Planning

Employment Densities: A Full Guide

Final Report

English Partnerships & the Regional Development Agencies

Arup**Economics+Planning**

Employment Densities

Report for English Partnerships and the Regional Development Agencies

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1. INTRODUCTION

This report gives guidance and references to assist the appraisal, monitoring and evaluation of employment densities for various types of property developments typical of economic development and regeneration projects and strategies. It has been produced by Arup Economics and Planning for English Partnerships and has been supported by the English Partnerships and the Regional Development Agencies Best Practice Group. It supports a short technical note, 'Employment Densities: A Simple Guide', on calculating employment densities for land and property and economic development projects.

This report has been prepared on the basis of the following:

- A review of the available literature and existing surveys on employment density;
- Data provided by English Partnerships and the Regional Development Agencies (RDAs) through a survey of around 100 completed developments, that have been funded by EP and the RDAs; and
- Discussions with a number of bodies who monitor and/or use employment density data, including local authorities.

There is a lack of accepted standards for forecasting or measurement of employment densities. This short report provides a useful up-to-date reference source of the available data. However, the quality and extent of the data will need to be supplemented by ongoing monitoring of the research conducted into employment densities and also through rigorous monitoring of RDA/EP funded developments at ex-post stages (including at final completion and in subsequent years).

1.1 This Report

This Report is structured as follows:

- Section 2 provides details on how to calculate densities;
- Section 3 provides the table of average densities for different types of use;
- Section 4 provides guidance notes on how densities are calculated and how they should be used; and
- A series of appendices provide details of data sources and references.

1.2 Uses of Employment Density Calculations

Measurements of the average floorspace per person in a building are used for a wide variety of purposes and by a wide variety of organisations. The main uses include:

- Ex-ante economic impact appraisal, where densities are used to forecast the number of jobs associated with a planned development;
- Traffic generation studies, where densities indicate the number of employees entering/leaving a building/site and hence inform the traffic forecasts for vehicle movements to/from the building/site;
- Other development impact studies to support or inform planning applications;
- To inform the release/allocation of development land in the statutory planning process; and
- To specify current and future floorspace requirements for occupiers of commercial property.

The measurements used to forecast density can vary for different purposes, the main difference usually being the different floorspace measurements being used (see 3.1).

For development-based regeneration and economic development initiatives, such as site and building regeneration projects, the use of employment density calculations allows two main assessments:

- Appraisal/forecast of potential outputs/impacts (forecast jobs and the associated impact of these in the local economy); and

- Appraisal of value for money, including the amount of investment per job forecast to be generated at the scheme - cost per job.

Other users of employment densities, other than economic development and regeneration organisations, include:

- Local authorities, as planning authorities; and

- Surveyors, space planners and architects advising business occupiers.

2. CALCULATING EMPLOYMENT DENSITIES

The main densities for different types of building uses are summarised in Section 3. This section provides details on the method and issues that must be considered when calculating densities.

2.1 Employment Densities

Employment density refers to the average floorspace (in sq. m. or sq. ft.) per person in an occupied building. It is therefore a measure of intensity of use and indicates how much space each person occupies within the workplace. Details on how to measure floorspace and employment is provided below.

2.2 Average Employment Density Figures

Average floorspace densities from surveys of large numbers of buildings provide density figures that can be relied upon to provide a reasonable degree of accuracy. Unfortunately there is very little survey work of a substantive nature conducted in the last few years. Appendix B provides details of the main sources. The figures provided in Section 3 comprise the best available average for each use. Explanations of variance are provided in Section 4.

2.3 Floorspace Alternatives - Gross and Net, External and Internal

Different users calculate floorspace in different ways, reflecting the fact that different measurements are used for different purposes. There are four main measurements of floorspace: gross external, gross internal, net internal and net lettable. When using data from other sources it is important to consider the measuring convention used.

Floorspace measurements are as follows:

- **Gross external area** is usually used by planners. It includes walls, plant rooms and outbuildings, though excludes external balconies, terraces;
- **Gross floorspace** (also referred to as **gross internal area**) is usually used by developers. This is the entire area inside the external walls of a building and includes corridors, lifts, plant rooms, service accommodation e.g. toilets, but excluding internal walls;
- **Net internal area** tends to be used by surveyors for commercial buildings. It is the internal area including entrance halls, kitchens, cleaners' cupboards but excluding toilets, stairways, lifts, corridors and common areas; and
- **Net lettable area** is a measurement that usually used by letting agents. It includes the main workspace but excludes corridors, staircases and toilets. Care needs to be taken when considering multi-let buildings and how the common parts are considered.

Full definitions of floorspace as defined by the Royal Institution of Chartered Surveyors are provided at Appendix B

When calculating densities it is essential to ensure that the floorspace figure used is that to which the employment figures relate (see 2.5 below). This is particularly important in the context of buildings that are not fully occupied (see 2.4 Vacant Space below).

2.3.1 Floorspace in regeneration and economic development projects

Figures for floorspace in economic development and regeneration projects should typically be **gross internal**, or sometimes **gross external** figures. Once a building is ready to be let or is occupied net internal or net lettable figures will be available. At ex-post stage i.e. when monitoring the

employment density within a building over time, it is important to ensure consistent measures of the floorspace or to consider converting gross measurements to net measurements. If there is doubt over whether the measurements are gross or net and external or internal, sources should be checked and consideration given to re-measuring the floorspace.

- For industrial, warehousing, distribution and some B1 use, e.g. R&D, floorspace information will typically be gross external or internal;
- For office developments figures will sometimes be gross and sometimes net internal;
- For retail developments floorspace figures are more likely to relate to net sales/lettable (internal) rather than gross internal floorspace.

2.3.2 Converting Gross to Net Floorspace

Gross internal to net internal ratios vary significantly according to use:

- For office space the gross figure is typically 15-20% higher than the net lettable space.
- For multi-occupancy buildings the range may be higher than 15-20% given the space allocated for shared or common areas.
- For large warehouses the net be as much as 95% of the gross.

In general, the 15-20% higher figure can be used as a 'rule of thumb' for converting gross to net floorspace. If there is doubt over the figures to be used then consideration should be given to re-measuring the floorspace.

2.4 Vacant Space

Vacancy rates in buildings vary significantly. At ex-post stage, when calculating employment densities on the basis of the floorspace of a whole development those units/buildings which are vacant should be excluded. Such calculations contribute to wide ranges in densities for a particular use! Floorspace figures should be used for **occupied units only** and not for all units.

2.5 Job numbers

The number of employees which should be measured to calculate density should be all those working on-site expressed as Full-Time Equivalents (see below). However, for the purposes of regeneration and economic development projects at ex-ante appraisal stage, the **number of workspaces** in a development should be used to represent the number of proposed employees. Further consideration to these measurements is given below.

2.5.1 Measurement in Planned Developments

At ex-ante stage the number of proposed workspaces provides the best representation of the likely number of employees in a development. In some instances a development may generate more full-time equivalent (FTE – see below) employees than workspaces. However, these can only be measured where the future occupier of a development is known. In general, estimates based on workspaces may provide 'conceptually sounder' forecasts. For this reason in economic development and regeneration project appraisals, **the prospective number of occupied workspaces** should be used where that information is available.

2.5.2 Measurement in Occupied Developments

At ex-post stage measurement can be made several ways:

- **Actual** i.e. the numbers of employees who are full-time, part-time, or on contract on-site (see note below);
- **Full-Time Equivalent (FTE)** is a calculation of the total number of hours worked by part-time staff (permanent and on-site contract staff) each week divided by the

number of hours in the working week (usually 37½ hours);

- **Workspaces,** these are the number of desks and/or posts.

The following calculations provide very approximate figures for converting part-time to full-time equivalents:

Construction/ industrial/ office	2 part-time = 1 full-time equivalent
Retail/ leisure/ hotels/ catering	2.5 part-time = 1 full-time equivalent

For the purposes of calculating full-time equivalent for RDA funded developments at ex-post stage, 2 part-time jobs for the creation of 1 full-time jobs should be used.

In the monitoring and evaluation of completed projects (ex-post stage) it is recommended that workspaces are used as the actual measure of employment activity: that is, those workspaces which are occupied at the time the measurement is taken. Under certain circumstances, it may be necessary to calculate full-time equivalent figures e.g. in order to make direct comparison with other densities calculated on the same basis.

2.5.3 Contract and Temporary Staff

Both short-term and long-term contract and temporary staff should be included in measurement of FTE employees where they are located on or work from a particular site or building. Changing company practices mean that more organisations are using higher numbers of contract and temporary staff. Previously it has been considered that temporary staff should be excluded from measurements of FTE staff for employment density purposes. However, changing working practices and the increasing numbers of temporary staff in some organisations indicate that it is more appropriate to include these staff. When using earlier figures, care should be taken to understand how the FTE have been calculated.

2.6 Calculating Densities for New Developments and Redevelopments

SERPLAN/Roger Tym research (1997) identifies employment density figures being at their most accurate when applied to new developments or modern buildings and therefore in forecasting the employment that can be accommodated in these developments. However, often there is a need to identify the employment lost at sites/buildings which are to be redeveloped or undergo a change of use. This should be done using surveys of actual employment as far as possible. If such data is not available then floorspace densities provide a good indication of employment levels.

Note: It should be noted that using employment densities to identify numbers in existing buildings is merely a tool in the appraisal of net 'additional' employment created by the regeneration and appraisal project and not a substitute for that appraisal (for which there is separate advice in existence).

3. TABLE OF EMPLOYMENT DENSITIES

Most of the broad categories of use contain very wide variations of density. The figures given in the table below represent those recommended for use in the appraisal of potential employment at land and property and economic development projects. They reflect the median figures from a range of sources as listed at Appendix B.

Where density figures calculated vary from those given below, users should make their own judgements as to factors which may cause these variances. The notes in the next section should assist.

Density figures have been adjusted to show **gross internal floorspace unless otherwise indicated**. The figures below represent the gross internal floorspace per workspace (rather than full-time equivalent employee – see Section 2.5).

USE TYPE	Sq. m.	Sq. ft.	Major factors creating variations
INDUSTRY			
General industrial buildings	34	365	Higher densities in areas of higher land value e.g. London 27 sq. m., South East 31 sq. m. There are significant variances with the nature and sector of occupier and the degree of automation (see Section 4.3.1)
Small business units	32	340	
High tech / R&D (non-Science Park)	29	310	
Science Park	32	340	
WAREHOUSING AND DISTRIBUTION	**Gross external figures**		
General Warehousing	50	540	Wide variations may exist between industrial sectors
Large Scale and High Bay	80	860	Technological developments are reducing densities. Long-term and large scale storage have much lower densities than smaller and short-term storage.
OFFICE			
General (purpose built) offices	19	205	Densities vary according to location. Non-town and non-city centre developments e.g. business park developments have higher densities. Town and city centre densities are often lower than might be expected given occupancy costs.

			Changing working practices are affecting densities.
Headquarters	22	240	
Serviced Business Centre	20	215	Densities within units may be high but common areas reduce the overall density
City of London	20	215	
Business Park	16	170	Suburban densities have similar figures (high density). However town/city fringe locations have lower densities.
Call Centre	12.8	140	
RETAIL			
Town/City Centre (net internal figures)	20	215	Some variance with retail type. Small shops (less than 50 sq. m.) may have much higher densities of up to 10 sq. m)
Food Superstores (net internal figures)	19	205	
Other Superstores/ retail warehousing (incl. wholesale but not storage) (gross internal figures)	90	970	
LEISURE AND VISITOR ATTRACTIONS			
General Hotels (3 star)	1 employee per 2 bedrooms		
Budget Hotels	1 employee per 3 bedrooms		
4/5 star Hotels	0.8 employees per bedroom		
Restaurants	13	140	Densities may be lower in fast-food restaurants and higher in high standard restaurants.
Cultural attractions	36	390	
Cinemas (including multiplex)	90	970	
Amusement and Entertainment Centres	40	430	
Sports Centres	90	970	
Private Sports Clubs	55	600	

4. GUIDANCE NOTES

These notes are to be read in conjunction with the table in Section 3. They explain the wide range of factors affecting density.

4.1 Average Densities

The figures given reflect the paucity and patchy nature of the existing data. Often there is a wide variation in figures or, statistically, a high standard deviation, but with a core of figures close to an average (mean). The median of any range of figures is therefore often more appropriate to use than the mean and median figures have been used in this report.

The high standard deviations for many samples i.e. the densities with very high or very low floorspace figures per person (or workspace) for some uses, reflect the types of activities within those uses or reasons particular to that site/building e.g. activity on a site being reduced. Appropriate average figures have only really been developed in the office sector where studies with a large sample size for any given use type, location or region and such samples are available.

4.2 Density Variances

Issues relating to variances within the different uses include:

- Type of activity within the use, including different industrial sectors;
- Size of premises;
- Location;
- Region;
- Economic cycles;
- Building age;
- Over time; and
- Length of occupation and type of tenure.

Density variances according to each of the factors above are outlined in this section.

4.3 Density Variances within Uses

Some uses, particularly in the industrial sector have very varied employment densities.

4.3.1 Industry and Warehousing

Density variances within both industrial and warehousing uses can vary widely according to the sector and the operational: storage ratio on site. There is not a strong consensus around density of use within particular sectors. That said, research indicates that clothing and footwear and food and drink manufacture have higher densities than most other manufacturing. SERPLAN/Roger Tym research identified an average floorspace level of 17.3 sq. m. per person for the food and drink industry and 36.8 sq. m. per person for the non-metal products industry. Average floorspace levels for metal products manufacture and general machinery and equipment manufacture were in between these levels. These figures relate to South East England and lower densities are known to exist elsewhere in the country.

Technological developments and restructuring in most industrial sectors tends to be increasing floorspace per head i.e. creating lower densities.

For warehousing use the range of densities is even greater than that for solely industrial use. This wide variation is often skewed by small amounts of very low density warehousing. Long-term and large scale storage facilities have very much lower densities than smaller and short-term storage facilities. It is for this reason that two average figures are provided in Section 3. As an example perishable (fresh or frozen) food

warehousing has significantly higher employment densities than non-perishable foods.

4.3.2 Office

Within office use there are differences according to the type of office function. Gerald Eve/RICS (1999) found that branch offices have the lowest density (18.3 sq. m. net internal), headquarters buildings have a similar density (18 m² net internal), administration buildings have a higher density (15.5 m² net internal) and computer/IT office use has a high density (11.9 m² net internal).

Within the different types of sectoral occupancy of offices, Gerald Eve/RICS (1999) found that public and not-for-profit occupiers have lower densities than most private sector organisations (21.3 m² net internal for public and not-for-profit occupiers). Business (financial and professional) and communication/IT sectors have the highest densities (13-16 m² net internal) with offices ancillary to industrial/retail/leisure uses having densities between 15 and 20 m² net internal. (Note: all of the above figures are net internal whereas office density figures given in Section 3 are gross internal. The data in Section 3 reflects median figures from a range of other sources).

SERPLAN/Roger Tym (1997) identified lower densities for offices associated with manufacturing activities and suggest that this may reflect the mix of activities or possibly higher space standards for head office functions.

4.3.3 Retail

As would be expected small shops (less than 50 sq. m.) tend to have higher employment densities than larger shops. Densities in small shops may only be 10-15 sq. m. gross internal per person. For most shops larger than this including large retail supermarkets densities vary but not significantly with an average of around 20 sq.m. gross internal (and marginally higher for food superstores). Retail warehousing including DIY stores and 'cash and carry' stores (excluding wholesale) tend to have very much lower densities.

4.3.4 Hotels, Restaurants, Leisure and Visitor Facilities

Employment at hotels varies with the standard of the hotel and is measured in terms of the number of bedrooms per employee.

Little accurate data has been collected on restaurant employment. In general, 13 sq. m. per person (gross internal) is considered to represent an average density. Densities may be slightly lower in fast food establishments and slightly higher in high standard restaurants.

Information provided in Business in Sport and Leisure (1997) provides useful information on employment in a range of leisure developments. The following provide a guide:

Bingo Hall	50 sq. m.
Casino (London, middle-upper market)	6 sq. m.
Private health and fitness club	40-70 sq. m.
Multiplex cinema	90 sq. m.

Note: It is not known whether the above figures are based on gross or net internal floorspace.

4.4 Density Variances with Size of Premises

In general research has found that for all uses, smaller buildings tend to have higher densities than larger buildings.

RICS/Gerald Eve research indicated that for office buildings of less than 250 sq.m. the occupational density was 16.7 sq. m. per person (net internal). This increased steadily to 19.5 sq. m. per person for buildings over 10,000 sq. m. (the exception to the steady rise were offices of 501-1,000 sq. m. which had

density of 18.1 sq. m. and slightly lower than the 'trend' would have indicated). Similarly SERPLAN/Roger Tym research (1997) in London and the South East found the amount of floorspace per worker increasing with the size of the building for all uses. Corporation of London data, which focuses on offices, also indicated a general decrease in density for larger buildings, for all uses. For buildings of under 500 sq.m. average density was found to be very high at only 11 sq.m. per person (gross internal) on average for the 1996-2000 survey period.

4.5 Density Variances According to Location

One of the most significant factors affecting density is usually the location of the development in terms of its accessibility or its centrality within a town or city. The main information on variances according to location relates to the office sector, (partly as office locations vary more than other uses). Suburban and business park locations have the highest densities for office use. Industrial and fringe locations have the lowest densities for office use, which partly reflects the cheaper occupancy costs at these locations. City and town centre locations tend to have moderate or surprisingly low densities given the occupancy costs.

Gerald Eve/RICS (1999) found that out of centre office locations supported higher densities. The research also found that this was consistent for each age band classification i.e. older office buildings in out of centre locations had higher densities than older buildings in central metropolitan locations (see 4.7 Density Variance According to Building Age below).

4.6 Density Variances According to UK Regions

In general it is not possible to identify clear regional differences. This partly reflects the lack of regional data available. However, in addition, whilst there will be differences across the country e.g. between north and south or between London and the south west there are unlikely to be significant differences between the north east and the north west or between parts of the south east and the eastern region. Differences within uses are more likely to relate to the accessibility and location of a particular development and in accordance with the other factors identified in this section.

4.6.1 EP/RDA Survey for this Study

A survey conducted for this study collected data from each of the RDAs and EP on a range of RDA/EP funded developments. Data on up to 12 developments was collected for each region. The findings from the survey have been used to inform the table in Section 3.

The survey provided further demonstration of the wide range of densities which exist for any particular use. As expected it did not provide statistically significant data given the extent of the survey but is useful in providing information on RDA and EP developments to support data available from elsewhere. The survey was also useful in providing a basis for future monitoring exercises to be conducted by the RDA on employment densities in developments which they have part-funded.

4.7 Density Variances with Economic Cycles

Densities fluctuate over time and for any given building. During times of economic buoyancy and expansion, space is required to meet increased employment levels, customer demand and to increase revenues. Conversely, during periods of economic instability or recession, companies will reduce the number of employees and where possible, space. That said, it can be difficult to identify clear correlations between economic activity and changing density levels due to the time lags in acquiring and disposing or property. As floorspace occupation is not generally as flexible as staff resources, what RICS/Gerald Eve term 'optimisation of occupation' is difficult to achieve. This means that adjustments in floorspace in accordance with the number of employees are only made in step changes.

SERPLAN//Roger Tym research in the South East (1997) estimated that the number of employees in a fixed area of floorspace can vary up to 20% in either direction before an occupier will consider relocation necessary.

Regional variations in the economic cycle such as have been seen in the UK in the late 1990s between the North and the South East (and other parts of southern England), may complicate densities which vary according to economic cycles. In this respect, past studies which identify trends according to economic cycles may not be a guide to future fluctuations. Variations in property prices between different parts of England also mean that overall impacts of economic cycles are likely to be too complex to assess. There is a lack of long-term comparable data with which to measure any of these variations. In general consideration should be given to the fact that pressure on density may increase in areas that are economically buoyant and/or with high property prices. However, in some sectors, particularly more profitable sectors such pressure may not have an effect on overall densities.

4.8 Density Variance According to Building Age

In general, lower densities occur in older buildings. This reflects the fact that such buildings are usually less efficient than modern purpose-designed buildings[1]. Much appears to depend on the construction of the building and the constraints imposed by internal load bearing walls and column spacing.

Gerald Eve/RICS (1999) found that 1970s buildings were the most densely occupied but that, in general, buildings constructed since the 1970s are more densely occupied than buildings constructed before this date. Pre-war buildings were found to have the lowest occupational densities (17.1 sq. m. net internal).

As occupation in older buildings falls (as these buildings are gradually refurbished/modernised) densities will, on average, increase and therefore densities are considered to be increasing over time (see 4.9 below). More modern buildings allow more efficient use of space which will be allowing densities to increase.

4.9 Density Variances Over Time

In general, the relatively small amount of data available makes comparisons over time difficult. However, there is some evidence that densities are increasing over time. SERPLAN/Roger Tym made comparisons between their own survey and work undertaken by Land Use and Urban Analysis in 1989 which identified densities which were 10% lower for offices and 20% lower for manufacturing and warehousing. As identified at 4.8 more modern, efficient buildings are allowing increases in density.

4.10 Density Variances According to Length of Occupation and Type of Tenure

The longer the period of occupation in a building, the lower the density according to Gerald Eve/RICS (1999). It is suggested that this is a result of the space planning that is undertaken in preparation for new occupancy, when occupation costs are closely monitored. Over time, the physical and economic costs of reorganisation may lead to less efficient use of space.

The same research identified that leasehold buildings were more densely occupied than owner-occupied buildings. The difference is most apparent in branch offices where densities in owner occupied buildings were found to be much lower than leasehold buildings (22.4 m² against 15 m² net internal floorspace).

[1] SERPLAN/Roger Tym Study (1997). Findings supported by Corporation of London Research 1997-2000

4.11 The Effect of Changing Working Practices in Offices

Changing working practices are manifest in all sectors but particularly in the office, manufacturing and warehousing/distribution sectors. Whilst it is understood that these practices are increasing densities there is, as yet, a lack of evidence to clearly indicate this trend.

- **24 hour working**. The rise in 24 hour working in the service sector has meant that it may be more appropriate to count occupied workspaces within a building (or proposed building), as indicated at Section 2.5 rather than total or FTE staff.
- **Teleworking and homeworking** allow employees to work away from the office on one or more days each week either at home, on client's premises or travelling. This in theory allows more employees to be 'based' at a building than for whom there are actually workspaces.
- **Hot-Desking or hotelling** allows employees to occupy a workspace only when they are in their employer's office. This multiple use of workspaces allows more employees to be based in an office than there are workspaces.

SERPLAN/Roger Tym found that space saving working practices such as those highlighted above are spreading but from a small base and to a small minority of offices. The research identifies changes in technology and organisation as being more important in affecting office densities.

4.12 The Effect of Changing Technologies in Manufacturing and Warehousing

It is known that the effects of increasing automation in industrial and distribution sectors are reducing densities and it is thought, very significantly. Again, there is a relative lack of data to providing clear evidence of this. However, SERPLAN/Roger Tym found that technology/restructuring factors are reducing densities and suggest that this trend easily outweighs the increase in densities which generated by changing working practices identified above.

4.13 Quality and Type of Employment

The quality and type of employment associated with a use should be taken into consideration in evaluating and monitoring the impact of a development. High employment densities are associated with high job generation figures for a development given its size. However, if the jobs are low skilled, low paid and/or seasonal the quality of employment is not as high and the overall impact in the local economy (were it to be measured) may not be as great as a lower employment densities but which involve higher skill levels.

APPENDIX A: CONSULTEES

This report has been prepared with the co-operation and material from a wide range of organisations. Arup Economics and Planning would particularly like to thank the following for their input:

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The Regional Development Agencies in England

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Steven Brown, RICS Research Foundation

Christopher Hedley, Occupiers Property Databank

Dr Rob Harris, ISCG

Dr Andy Pratt, Department of Geography, London School of Economics

Selective local planning authorities in England including Corporation of London, Northampton City Council, Sheffield City Council and Cambridgeshire County Council

Pannell Kerr Forster, accountants and business advisors

APPENDIX B: REFERENCES

Literature and Data sources

A list of references on employment density is provided below. There is no single source of up-to-date data on employment densities across the UK. The principal and most recent relevant sources are:

- The Use of Business Space, Employment Densities and Working Practices in South East England, 1997, SERPLAN/Roger Tym & Partners. This is based on over 1,000 business establishments.
- 'Overcrowded, Under-utilised or Just Right: A Study of Office Occupational Densities in the UK', December 1999, RICS Research Foundation/ Gerald Eve. This is based on 280 buildings.

Calculating Density from Statistical Data Sources

There are a number of sources of floorspace data which can be used in conjunction with employment census data to develop employment densities. The main source is '*Commercial and Industrial Floorspace Statistics'*, last published in 1995 by the then Department of Environment. This provides details of the floorspace of the main commercial and industrial property types by region and district across England and Wales. It is based on data collected by the Valuation Office Agency which obtains such information for rating purposes. These statistics are currently being updated and are due to be published in late summer/early autumn 2001.

Floorspace statistics can be used in conjunction with data from the Annual Employment Survey (AES). The SIC data in the AES can be mapped against the floorspace uses in the DETR's statistics (Commercial and Industrial Floorspace statistics, 1995 currently being updated). These uses are not those outlined in the Use Classes Order (to which Standard Industrial Classification data cannot easily be matched).

Other Sources of Floorspace and Density Data

Some local commercial property agents and local authorities collect information on floorspace and occupancy but most do not calculate employment densities. There is a tendency to collect information on major rather than small occupiers, which is likely to create a bias in any densities that are calculated.

A number of local authorities collate data on forecast employment densities as provided in planning applications. Unfortunately, in most cases the subsequent employment densities achieved are not monitored. Forecast densities may vary significantly from actual densities achieved and indeed, where they are not based on robust analysis, densities may be over-optimistic in reflection of positive forecast job creation figures.

A number of property investment companies collect and analyse floorspace data in order to measure occupier performance. The Occupiers Property Databank (OPD)[2], part of the Investment Property Databank[3] collect information on building utilisation, maintenance and management in order to measure performance. They collect or have the ability to prepare employment density data on a number of different use types but do not hold comprehensive data sources for all property sectors.

[2] http://www.propertymall.com/ipdindex/opd/
[3] http://www.propertymall.com/ipdindex/

AUTHOR	PUBLICATION DATE	TITLE
Barker, R/ London Research Centre	Nov, 1998	Floorspace per Worker Ratios in Commercial Premises in London
Business in Sport and Leisure	Nov-97	A Guide to Site Criteria for Commercial Leisure
Corporation of London	2000 (and previous annual surveys)	Land Use and Employment Survey
Dawson, Findlay and Sparks - Institute for Retail Studies, University of Stirling	1987	Employment in British Superstores: Summary of Project Findings
DETR	Jun-98	The Use of Density in Urban Planning
DETR	1995	Commercial and Industrial Floorspace Statistics
English Partnerships	March 1999	Employment Densities Paper
Gerald Eve	Jul-95	Occupational Densities, Establishing a Benchmark Index
Gerald Eve/RICS	April 1997 and Dec 1999	Overcrowded, Underutilised or Just Right? A Study of Office Occupational Densities in the UK
LPAC	Dec-87	Employment, Report by the Topic Working Party for Consultation and Discussion
McKinnon, A and Pratt, A	1984	Jobs in Store? An Analysis of the Employment Potential of Warehousing
SERPLAN/Roger Tym and Partners	1997	The Use of Business Space: Employment Densities and Working Practices in South East England
Segal Quince Wicksteed	2001	Monitoring and Evaluation Framework for RDAs

APPENDIX C: FLOORSPACE DEFINITIONS

RICS defines floorspace in its 'Code of Measuring Practice: A Guide for Surveyors and Valuers'[4]. These are set out in the table below. Full measurement diagrams and details of when to apply definitions are given in the guide.

Floorspace Definitions according to the RICS Code of Measuring Practice

GROSS EXTERNAL AREA Gross External Area is the area of a building measured externally at each floor level.	
It includes:	It excludes:
Perimeter wall thicknesses and external projections;	Open balconies;
Areas occupied by internal walls and partitions;	Open fire escapes;
Column piers, chimney breasts, stairwells, lift-wells etc.;	Open-sided covered ways and canopies;
Atria with clear height above, measured about base level only;	Open vehicle parking areas, terraces etc.
Internal balconies;	
Lift rooms, plant rooms, fuel stores, tank rooms which are housed in a structure of a permanent nature whether or not above main-roof level;	
Outbuildings which share at least one wall with the main building;	
Loading bays;	
Areas with a headroom of less than 1.5m; and	
Pavement vaults.	

[4] 'Code of Measuring Practice: A Guide for Surveyors and Valuers' 1993, Fourth Edition, RICS

GROSS INTERNAL AREA Gross internal area is the area of a building measured to the internal face of the perimeter walls at each floor level.	
It includes: Areas occupied by internal walls and partitions; Columns, piers, chimney breasts, stairwells, lift-wells, other internal projections, vertical ducts etc. Atria with clear height above, measured at base level only; Internal open-sided balconies; Corridors of a permanent essential nature (e.g. fire corridors, smoke lobbies etc.); Lift rooms, plant rooms, tank rooms, fuel stores which are housed in a structure of a permanent nature whether or not above main-roof level; Serviced accommodation such as toilets, toilet lobbies, bathrooms, showers, changing rooms, cleaners' cupboards etc.; Voids over stairwells, lift shafts, on upper floors; Loading bays; Areas with a headroom of less than 1.5m; and Pavement vaults.	It excludes: Perimeter wall thicknesses and external projections; and External open-sided balconies, covered ways, fire escapes and canopies.

NET INTERNAL AREA Net internal area is the useable area within a building measured to the internal face of the perimeter walls at each floor level.	
It includes: Atria with clear height above, measured at base level only; Entrance halls; Notional lift lobbies; Kitchens, cleaners' cupboards accessed from usable areas; Built-in units, cupboards occupying usable areas; Ramps of lightweight construction to false floors; A floor area which contains a ventilation/heating grille; Area occupied by skirting and perimeter trunking; Areas severed by internal non-structural walls, demountable partitions, whether or not permanent, where the purpose of the division is partition of use, not support, provided the area beyond is not used in common; and Pavement vaults.	It excludes: Toilets, toilet lobbies, bathrooms; Lift rooms, plant rooms, tank rooms, other than those of a trade process nature, fuel stores etc.; Stairwells, liftwells, permanent lift lobbies, those parts of entrance halls, atria, landings and balconies used in common or for the purpose of essential access; Corridors and other circulation areas, where used in common with other occupiers or of a permanent nature (e.g. fire corridors, smoke lobbies etc); Areas under the control of service or other external authorities including meter cupboards and statutory service supply points; Internal structural walls, walls enclosing excluded areas, columns, piers, chimney breasts, other projections, vertical ducts etc. The space occupied by permanent and continuous air-conditioning heating or cooling apparatus, and ducting in so far as the space it occupies is rendered substantially unusable (where such apparatus is present its area may be stated separately for valuation purposes). Areas with a headroom of less than 1.5m; Vehicle parking areas