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1. Introduction

This new statistical geography has been created to provide a more precise definition of the major towns and cities in England and Wales. It will allow existing datasets to be best-fit to these areas and enable improved analysis.

Existing analysis of towns and cities in England and Wales is often based on local authority district (LAD) data. While a LAD-based definition accurately captures some places, especially the larger cities, for other places it is less useful. For example, for many of the smaller cities and larger towns, the LAD definition includes a significant rural hinterland as well as the main urban settlement. Here, data produced at LAD level might not provide a true representation of what is happening in the actual town or city. Figure 1 shows York LAD, which includes the city of York as well as the smaller settlements surrounding it.

![Figure 1 – York LAD (dark blue line) and city (highlighted in light blue)](image)

It is recognised that the question of what constitutes a major town or city is difficult, and that there may be many different, but equally valid, answers. This definition has been developed specifically for the production and analysis of statistics. The aim is to provide a precise definition, with a focus on the ‘core’ town or city rather than its surrounding area. This necessarily breaks any link to administrative areas. It should also be noted that not all cities with official city status are included in this definition, as the population size of some of these falls well below the population threshold used here.
2. Creating the new geography

2.1 Link to the built-up areas dataset

The geography is based on the built-up areas (BUAs) dataset that was created for 2011 Census outputs in England and Wales. This dataset provides a good starting point as it captured the built environment to identify settlements, without reference to the boundaries of administrative areas. Given the wealth of detailed 2011 Census data already published for these areas (and available from the Nomis website), it made sense to retain the link to BUAs wherever possible. More information on the methodology used to define the BUAs can be found in the user guide or from the Open Geography portal.

In many cases, sub-divisions (BUASDs) were identified within BUAs. This was to provide greater detail in the data, for example suburbs of the larger conurbations or smaller settlements that surrounded towns or cities. The result was that individual towns and cities could often be identified from the BUASD, but for ‘free standing’ places where no sub-divisions were present, the town/city was only identified as a BUA.

The structure of the BUA/BUASD dataset meant that it was not possible to base a definition of major towns and cities on either BUAs or BUASDs. The major towns and cities dataset is therefore an amalgamation of both. For Darlington, as a ‘free standing’ town, the BUA is used in the major towns and cities dataset (Figure 2).

![Figure 2 - Darlington BUA](Image)
For Nottingham, the BUA definition includes a number of settlements around the city, and so the BUASD definition is used in the major towns and cities dataset (Figures 3a and 3b).

Figure 3a - Nottingham BUA

Figure 3b - Nottingham BUASD
2.2 Defining a major town or city

A population size threshold was used to define the towns and cities that should be included. This was set at 75,000 usual resident population or workday population (as at 2011 Census). The latter criteria was included to pick up cities, such as Shrewsbury, which despite having a resident population of just under 75,000 people are still important urban centres, with a significantly higher work day population. The 75,000 point was chosen as a cut-off for two reasons. First, it gave a reasonable number of places for analysis. As the population limit is reduced the number of places included increases, making the dataset less manageable for analysis. Second, the identification of individual towns and cities within the larger conurbations became increasingly difficult the smaller the population size of the settlement.

Using these criteria 112 major towns and cities were identified – see Annex 1. For 92 of these the exact boundaries of individual BUAs (8) or individual BUASDs (84) that were used for 2011 Census outputs were retained. In a further four cases, the boundaries of two exact BUASDs were joined where it was felt that this offered a better definition of the town or city. For the remaining 16 areas some manual adjustment was made to the original (and in most cases, individual) BUASDs boundaries. This occurred either:

- to improve the definition of the area by removing parts of the original BUASD; or
- to resolve inconsistencies in the boundaries that occurred during the production process, usually in the larger conurbations.

A summary of how the major towns and cities geography has been constituted in terms of BUAs/BUASDs is shown below. For full details see Annex 2.

<table>
<thead>
<tr>
<th></th>
<th>Individual BUAs</th>
<th>Individual BUASDs</th>
<th>Groups of BUASDs*</th>
<th>Total</th>
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<tr>
<td>Unchanged</td>
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<td>4</td>
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<td>Manual amendment to improve definition</td>
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<td>Manual amendment to improve consistency of boundaries</td>
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<td>5</td>
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<td>6</td>
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<tr>
<td>Total</td>
<td>8</td>
<td>98</td>
<td>6</td>
<td>112</td>
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</tbody>
</table>

* In all cases 2 BUASDs were joined, apart from London which is based on 33 BUASDs.

2.3 Amendments made to improve definition

Where existing BUASDs were amended to give a better definition this often involved removing large villages or groups of smaller villages that had been included with the main part of the original BUASD, especially if they were separated from the main town by major
roads or other features. In these cases the BUASD boundary was cut at that point. In other cases the 2001 urban area boundaries were referred to as a guide for making edits.

An example of a town that was manually amended to improve definition is Solihull. Figures 4a and 4b show how the large village of Dorridge was cut from the town of Solihull BUASD at the motorway.
2.4 Amendments made to improve consistency of boundaries

One of the rules used to create the BUA/BUASD dataset was that open spaces within urban areas (for example, parks completely surrounded by housing) were merged back into the initial built-up area polygons. This rule also applied to larger areas of green belt with urban development on all sides. This created some issues when extracting BUASDs to select the major towns and cities in and around the large conurbations, where areas of adjoining open countryside were also selected.

The manual amendments made to rectify this problem were essentially to ‘tidy up’ the boundary of the town/city so that it aligned to the extent of the built environment. In two instances, the removal of ‘open countryside’ resulted in a secondary problem. Once the green space had been removed from the selected BUASD, two un-connected polygons remained. In line with the rules used to create the BUA dataset, if the gap between the two was greater than 200m then the smaller polygon was removed from the main town. By way of example, figures 5a, 5b and 5c shows how the Bolton BUASD was amended.

Figure 5a - Bolton BUASD
2.5 London

London was treated differently from other cities in this dataset because of how the capital had been captured in the original BUA dataset. The Greater London BUA extended well
beyond the London region into the surrounding counties, to include towns as far away as Guildford and Hemel Hempstead. This was as a result of the rule that linked settlements within 200m of one another. However, unlike the other cities, a London BUASD was not identified. Instead, the London region was sub-divided on the basis of the London Boroughs and the City of London. It was decided that London for this dataset would be based on the sum of the BUASDs that made up the London region.

In all cases where manual intervention has been made, new boundaries have been cut to the 50m grid used in BUA/BUASDs for consistency.

3. User Guidance

3.1 Allocating data to the major towns and cities

A number of geographic products have been created to enable the production of statistics for major towns and cities: digital boundaries and four look-up files that relate the major towns and cities geography to Output Areas (OAs), Lower Layer Super Output Areas (LSOAs), Middle Layer Super Output Areas (MSOAs) and Workplace Zones (WZs). All products are available for download from the Open Geography portal.

The look-up files were created by allocating the lower level geographies (OAs, LSOAs, MSOAs and WZs) to the major town and cities on a best-fit basis using a population weighted centroid (PWC) method. Using the OAs as an example, each OA has a PWC, a summary single point on the ground that represents how the population at Census time was spatially distributed and grouped within that OA. An OA is best-fitted to a major town or city if its PWC falls within the boundary of a major town or city.

This best-fitting process complies with the Government Statistical Service (GSS) Geography Policy¹ by using whole statistical building blocks to build aggregated statistics for a higher geography. This approach to building estimates for any geography prevents the risk of disclosure of details about very small populations exposed in slivers caused by overlapping different geographical areas. In line with the GSS Geography Policy, producers of statistics should build up estimates for major towns and cities from the lowest level statistical building block for which data are available. It is recognised that for some datasets, the lowest level of source data will be LSOA and MSOA rather than OA.

The PWC methodology described above was used to allocate OAs to the built-up areas to produce 2011 Census data. It should be noted that it was necessary to apply a 100m buffer

to all built-up areas to ensure that all OAs were correctly allocated to a given built-up area (for more detail, see section 2.2 of the BUAs user guide). In order to retain consistency between previously published 2011 Census data and the major towns and cities data, the same adjustment was applied during the best-fitting process for all geographies. Therefore, it is important that users work with the look-up files available from the Open Geography portal.

3.2 Using major towns and cities data in analysis

This dataset has been created to provide a precise definition of the major towns and cities in England and Wales to underpin data and analysis. Of course, this can only be achieved if data are available at this level, either through geo-referencing of source data or by aggregating up pre-existing statistical building block data.

It is recognised that some data cannot be produced for areas smaller than local authority district (LAD), especially survey data where sample sizes are not big enough to provide reliable estimates. Here, LADs can be used as a proxy for cities (and alternative city definitions based on whole LADs are available, for example Urban Audit\(^2\) or Primary Urban Areas\(^3\)). But there is a trade-off between availability of data and precision of definition – more data are available for LADs but the definitions will not be as precise as the major towns and city dataset. Therefore, this new geography should be seen as part of a suite of city definitions available to analysts.

LAD based definitions of towns and cities work well for those places where the population of the town/city mirrors that of the LAD, for example Hartlepool where the town accounts for 97% of LAD’s population. But for other places, this figure can be much lower, for example the town of Shrewsbury makes up only 23% of the population of Shropshire. To help users assess the extent to which it is appropriate to use LAD data as a proxy for the towns and cities included in this dataset, Annex 4 shows the population of each of the 112 towns and cities as a percentage of its ‘parent’ LAD.

3.3 Analysis of major conurbations and London

The focus of this dataset is on the core of a city, and therefore it will not be appropriate for analysts with an interest in the wider conurbation/greater city. Various alternative definitions are available for these areas, for example the ‘Greater Cities’ contained in Urban Audit or the recently announced Combined Authorities with a focus on city regions. In both cases definitions are based on groups of whole LADs, and should provide a good estimate as the LADs surrounding the main city are often entirely or largely urban.

\(^2\) [http://ons.maps.arcgis.com/apps/Viewer/index.html?appid=68971e138a67470385b8f88851905e7a](http://ons.maps.arcgis.com/apps/Viewer/index.html?appid=68971e138a67470385b8f88851905e7a)

As discussed in section 2.5, London has been captured slightly differently from other places. The definition is built from the BUASDs that correspond to the London Boroughs, with the effect that it is more akin to Greater London rather than a ‘core of London’, for which there is no obvious definition. Therefore users need to be aware that the definition of London differs from that used for the other major cities included in the dataset, such as Manchester, where the core city is identified rather than a greater city definition.

4. Experimental geography status

The major towns and cities geography has been released as 'experimental'. This mechanism allows time for ONS to assess the response from the user community, both about its usefulness for analysis and its definitional accuracy.

The geography has been created specifically for the production and analysis of statistics on the ‘core’ town or city, rather than the administrative area within which it is based. As such, it aims to offer a more precise definition than existing definitions of towns and cities used in statistics. The geography will be formally adopted if users demonstrate that such a definition is useful for research and analysis.

ONS also welcome feedback about the methodology used to create the geography, and whether the boundaries for individual towns and cities are fit for purpose. While there is some scope to make changes to the major town and cities geography, this will need to be balanced with the benefits of retaining the link to the built-up areas dataset on which the geography is based.

At this point in time, it is expected this geography will remain experimental until February 2017. It is possible its status may change prior to this date depending on the speed of review and the nature of feedback from the user community. The geography uses a 9 character GSS code pre-fixed by the letter 'J' to denote 'experimental'. Once the geography is no longer experimental, it will be recoded and assigned a code reflecting the country within which the entity lies.

Please send all comments on the new major towns and cities geography to ONS Geography Customer Services by email (ons.geography@ons.gov.uk) or call 01329 444971.
## Annex 1 – full list of major towns and cities

<table>
<thead>
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<th>Barnsley</th>
<th>Grimsby</th>
<th>Redditch</th>
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<tbody>
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<td>Rochdale</td>
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Annex 2 – major towns and cities that are constituted in terms of individual, unchanged BUAs or BUASDs

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Annex 3 – major towns and cities that are not constituted in terms of individual, unchanged BUAs or BUASDs

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<th>Groups of unchanged BUASDs (4)</th>
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<td>Fulwood BUASD added to Preston BUASD</td>
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<td>Wolverhampton</td>
<td>Wednesfield BUASD added to Wolverhampton BUASD</td>
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<th>Individual BUASDs, with manual intervention to improve definition (9)</th>
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<td>Birkenhead</td>
<td>Remove area west of motorway</td>
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<td>High Wycombe</td>
<td>Remove urban development south of motorway, including Wooburn Moor</td>
</tr>
<tr>
<td>Leicester</td>
<td>Remove Oadby and Wigston, clipping at current LAD boundary</td>
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<tr>
<td>Portsmouth</td>
<td>Remove Purbrook area north of Portsdown Hill road</td>
</tr>
<tr>
<td>Salford</td>
<td>Remove Pendlebury in north east and Trafford Park in the south, cutting at canal</td>
</tr>
<tr>
<td>Slough</td>
<td>Remove Farnham Royal</td>
</tr>
<tr>
<td>Solihull</td>
<td>Remove Dorridge at motorway</td>
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<tr>
<td>Wigan</td>
<td>Remove area to the west of the motorway</td>
</tr>
<tr>
<td>Woking</td>
<td>Remove West End and Bisley, west of Guildford Road</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Groups of BUASDs, with manual intervention to improve definition (1)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Reading</td>
<td>Woodley BUASD added to Reading BUASD. Remove eastern part of Woodley, cutting boundary at river</td>
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<table>
<thead>
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<th>Individual BUASDs, with manual amendment to make boundary consistent (5)</th>
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<tr>
<td>Birmingham</td>
<td>Remove rural/park land from Birmingham periphery bordering Halesowen BUASD.</td>
</tr>
<tr>
<td>Bolton</td>
<td>Remove area to the south, 'cut off' from main part</td>
</tr>
<tr>
<td>Bradford</td>
<td>Remove area to the south, 'cut off' from main part</td>
</tr>
<tr>
<td>Manchester</td>
<td>Remove rural/park land from Manchester periphery, bordering Middleton and Failsworth BUASDs</td>
</tr>
<tr>
<td>Watford</td>
<td>Remove rural/park land from Watford periphery, bordering Northwood and Rickmansworth BUASDs</td>
</tr>
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<table>
<thead>
<tr>
<th>Groups of BUASD, with manual amendment to make boundary consistent (1)</th>
<th></th>
</tr>
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<tbody>
<tr>
<td>London</td>
<td>Combine all BUASDs that are based on the 33 London Boroughs, clipped to the LAD boundaries. Remove rural/park land from London peripheries</td>
</tr>
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Annex 4 – Population of the towns and cities as a percentage of its ‘parent’ LAD

<table>
<thead>
<tr>
<th>Town or City name</th>
<th>Town/ City usual resident population, 2011 Census</th>
<th>Local authority name</th>
<th>Local authority usual resident population, 2011 Census</th>
<th>Town/ City population as percentage of its ‘parent’ local authority</th>
</tr>
</thead>
<tbody>
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<td>Reading</td>
<td>245,571</td>
<td>Reading</td>
<td>155,698</td>
<td>158%</td>
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<tr>
<td>Watford</td>
<td>131,703</td>
<td>Watford</td>
<td>90,301</td>
<td>146%</td>
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<tr>
<td>Norwich</td>
<td>186,682</td>
<td>Norwich</td>
<td>132,512</td>
<td>141%</td>
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<tr>
<td>Middlesbrough</td>
<td>174,700</td>
<td>Middlesbrough</td>
<td>138,412</td>
<td>126%</td>
</tr>
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<td>535,907</td>
<td>Bristol, City of</td>
<td>428,234</td>
<td>125%</td>
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<td>Liverpool</td>
<td>552,267</td>
<td>Liverpool</td>
<td>466,415</td>
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<td>145,818</td>
<td>Cambridge</td>
<td>123,867</td>
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<td>Leicester</td>
<td>387,590</td>
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<td>Gloucester</td>
<td>136,362</td>
<td>Gloucester</td>
<td>121,688</td>
<td>112%</td>
</tr>
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<td>Kingston upon Hull</td>
<td>284,321</td>
<td>Kingston upon Hull, City of</td>
<td>256,406</td>
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<td>109,185</td>
<td>Eastbourne</td>
<td>99,412</td>
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<td>Stoke-on-Trent</td>
<td>270,726</td>
<td>Stoke-on-trent</td>
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<td>Ipswich</td>
<td>144,957</td>
<td>Ipswich</td>
<td>133,384</td>
<td>109%</td>
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<tr>
<td>Portsmouth</td>
<td>219,910</td>
<td>Portsmouth</td>
<td>205,056</td>
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</tr>
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<td>253,651</td>
<td>Southampton</td>
<td>236,882</td>
<td>107%</td>
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<td>Lincoln</td>
<td>100,160</td>
<td>Lincoln</td>
<td>93,541</td>
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<td>89,663</td>
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<td>Coventry</td>
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<td>255,394</td>
<td>Derby</td>
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<td>187,503</td>
<td>Bournemouth</td>
<td>183,491</td>
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<td>100,819</td>
<td>Woking</td>
<td>99,198</td>
<td>102%</td>
</tr>
<tr>
<td>Plymouth</td>
<td>260,203</td>
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<td>256,384</td>
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<td>212,069</td>
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<tr>
<td>Hastings</td>
<td>91,053</td>
<td>Hastings</td>
<td>90,254</td>
<td>101%</td>
</tr>
<tr>
<td>Cheltenham</td>
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<td>Cheltenham</td>
<td>115,732</td>
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<td>Population</td>
<td>Growth</td>
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<td>Harlow</td>
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<td>London (Region)</td>
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<td>Greater London (Region)</td>
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<td>346,090</td>
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<tr>
<td>Sheffield</td>
<td>518,090</td>
<td>Sheffield</td>
<td>552,698</td>
<td>94%</td>
</tr>
<tr>
<td>Burnley</td>
<td>81,548</td>
<td>Burnley</td>
<td>87,059</td>
<td>94%</td>
</tr>
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<td>161,707</td>
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<td>145,736</td>
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<td>92,363</td>
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<td>105,564</td>
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<td>Swindon</td>
<td>182,441</td>
<td>Swindon</td>
<td>209,156</td>
<td>87%</td>
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<td>Telford</td>
<td>142,723</td>
<td>Telford and Wrekin</td>
<td>166,641</td>
<td>86%</td>
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<td>88,483</td>
<td>Chesterfield</td>
<td>103,788</td>
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<td>Brighton and Hove</td>
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<td>Blackburn</td>
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<td>Blackburn with Darwen</td>
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<td>Nuneaton and Bedworth</td>
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<td>Colchester</td>
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<td>Bracknell</td>
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<td>Dacorum</td>
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<tr>
<td>Location</td>
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<td>Location</td>
<td>Population</td>
<td></td>
</tr>
<tr>
<td>---------------------------</td>
<td>------------</td>
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<tr>
<td>Sutton Coldfield</td>
<td>109,015</td>
<td>Birmingham</td>
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