



Programme Area: Buildings

Project: Building Supply Chain for Mass Refurbishment of Houses

Title: Building supply chain for mass refurbishment of houses: local area mapping

Abstract:

Please note this report was produced in 2011/2012 and its contents may be out of date. This deliverable is number 6 of 7 in Work Package 2. It brings together findings from Work Packages 2 (Stock Modelling), 3 (Design Interventions) and 4 (Supply Chain) to provide a graphical representation of where the 5 key housing archetypes for mass retrofit are located. The geographical granularity of the mapping is down to local authority level. The housing types were prioritised based on impact on CO₂ emissions of retrofit and the propensity of occupants to adopt retrofit measures. The 5 housing archetypes are:

- Pre-1919 detached houses
- Pre-1919 mid-terraced houses
- Pre-1919 converted flats
- 1919-1944 semi detached houses
- 1945-1964 semi detached houses

By identifying where key house types are located within the country it is intended that the roll-out of mass retrofit could be targeted for maximum effect.

Context:

This project looked at designing a supply chain solution to improve the energy efficiency of the vast majority of the 26 million UK homes which will still be in use by 2050. It looked to identify ways in which the refurbishment and retrofitting of existing residential properties can be accelerated by industrialising the processes of design, supply and implementation, while stimulating demand from householders by exploiting additional opportunities that come with extensive building refurbishment. The project developed a top-to-bottom process, using a method of analysing the most cost-effective package of measures suitable for a particular property, through to how these will be installed with the minimum disruption to the householder. This includes identifying the skills required of the people on the ground as well as the optimum material distribution networks to supply them with exactly what is required and when.

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**Building Supply chain
for Mass Refurbishment
of Houses:**

Local area mapping

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Executive Summary

The Building Supply Chain for Mass Refurbishment of Homes project aims to identify ways in which the refurbishment and retrofitting of existing residential properties can be accelerated. A key objective of the project is to optimise the supply chain for retrofit. In support of this a set of maps have been produced which outline the locations in the UK of the top five 'prime candidates' for improvement. These are the property types which have been identified as having a combination of high technical potential and high propensity to contain households likely to be receptive to refurbishment.

Five maps have been produced which show the density of the following property types in each local authority in the UK.

These show the density of the following property types:

- Pre-1919 detached houses
- Pre-1919 mid-terraced houses
- Pre-1919 converted flats
- 1919-1944 semi detached houses
- 1945-1964 semi detached houses

Pre-1919 detached properties are relatively evenly distributed across the UK with some concentration of these properties in the western counties of England, and also in the central belt of Scotland. Pre-1919 mid terraced are concentrated in inner London boroughs, and other large conurbations across the UK. Pre-1919 converted flats are particularly concentrated in inner London with relatively high densities of these property types are the Scottish central belt and Aberdeen, the South coast of England and the Greater Manchester and Liverpool regions.

1919-1944 semi detached houses show high concentrations in London, particularly in the outer suburbs, with high concentrations of this property type include Birmingham, Manchester and Liverpool. 1945-1964 semi detached houses are particularly concentrated in the Birmingham, Tyneside and areas of Greater Manchester and the North West.

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Introduction

The Building Supply Chain for the Mass Refurbishment of Houses project will propose a supply chain wto deliver mass retrofit in the domestic sector in the UK. In support of this, five different dwelling types which are 'prime candidates' for improvement have been identified. This report includes a series of maps of the UK which plot the density of these property types. It is intended that these maps can be used to locate particular 'hot-spots' of refurbishment potential which can be targeted by the proposed supply chain.

Methodology

The sub-regional model is based on reconciliation between the national data drawn from the national house condition survey datasets, and third party data from the Experian Consumer Dynamics dataset.

Ideally we would use the house condition survey data directly to model at the local level. Unfortunately, this is not possible because of the sample used for the survey which does not give sufficient coverage for each of the ~400 authorities in the UK. To allow us to produce results at this level we use the house condition survey data totals to control much larger national datasets (such as the Experian dataset) which can then produce outputs at the national level.

Experian's Consumer dynamics database contains data on every dwelling in the country. The data itself is a mix of directly surveyed and imputed information, and includes information such as the dwelling age, type and tenure. Using this information BRE were able to classify a number of dwellings into the five 'Prime Candidates' for improvement as identified by the Building a Supply Chain project. These are:

- Pre-1919 detached houses
- Pre-1919 mid-terraced houses
- Pre-1919 converted flats
- 1919-1944 semi detached houses
- 1945-1964 semi detached houses

The Experian age and type classification, however, is not fully aligned with the one used to classify the ETI archetypes. Therefore, before it could be used, a level of data aggregation is required.

By classifying the dwellings, and then aggregating the Experian data to local authority level, estimates of the numbers of each of the archetypes in each sub-region were obtained. At this point account was taken of for some of the differences in classifying age bands by reducing or increasing the estimated number of properties pro-rated to the differences in the age band break points. Similarly, the classifications of dwelling types were aligned using stock level data from the house condition surveys.

Additionally, the data was aggregated to country level in order to compare it against the ETI totals. Any differences between the two were corrected using the ratio between the ETI totals and the sum of the modelled LA totals. These were then applied to each count of each archetype within each Local Authority (ensuring that the Local Authority level data that would sum to the same total as the ETI data).

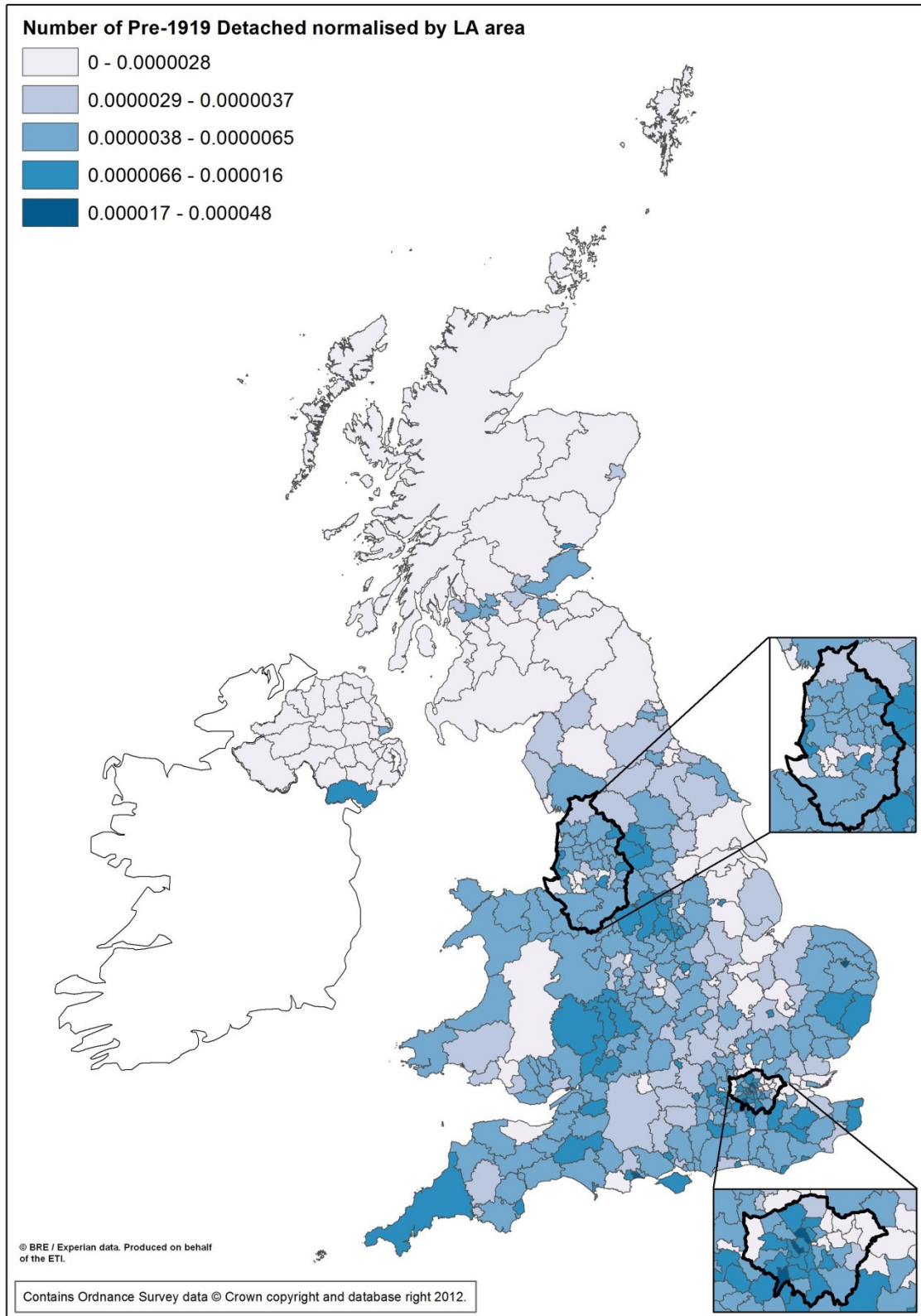
The results of these processes are estimates of the number of properties of each type in each local authority.

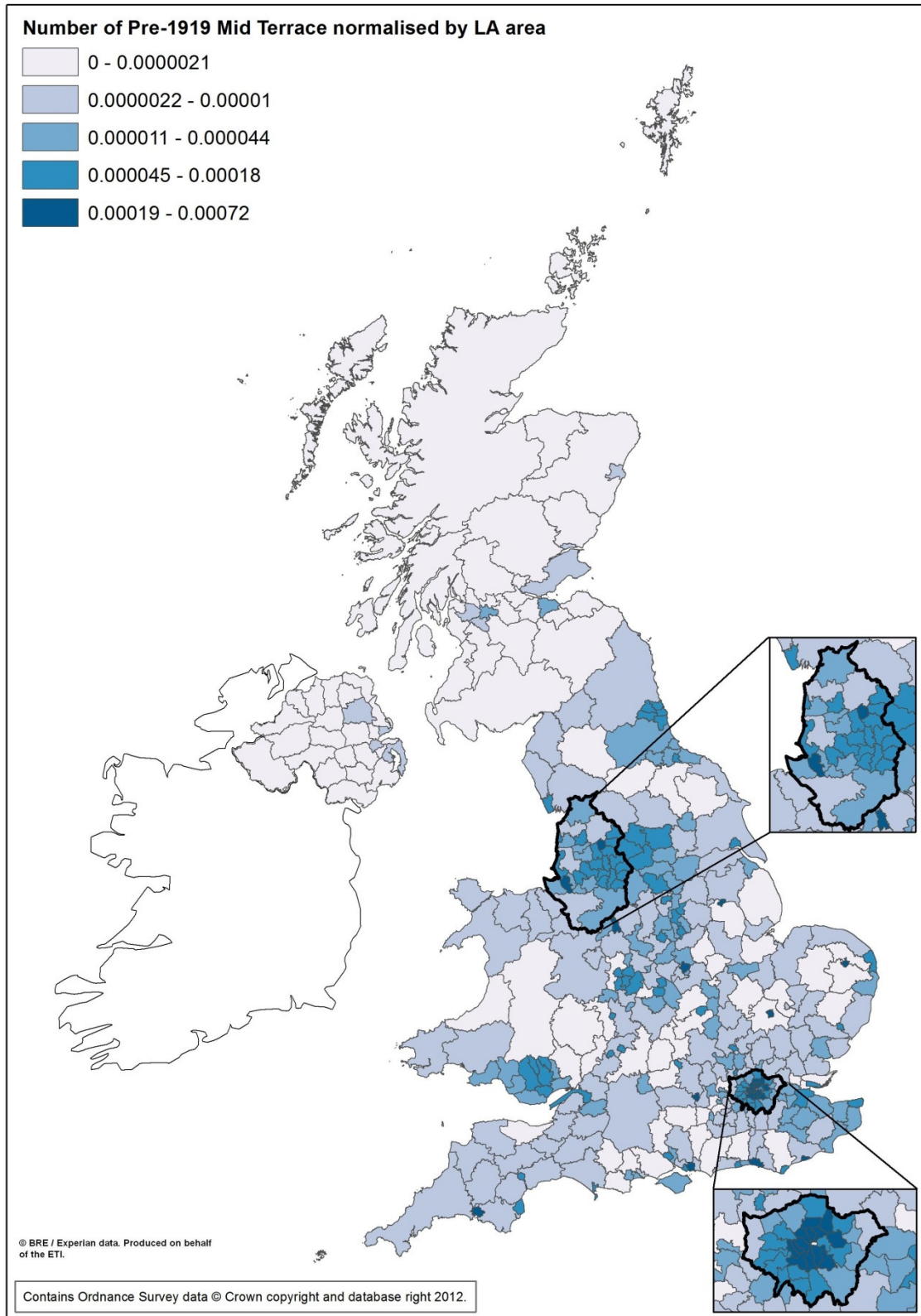
Data was mapped using the GIS system ARCGIS. Rather than the absolute number of properties in each region, of primary interest for development of a supply chain is the *density* of properties. Therefore, the number of properties is normalised by the area (m²) of each local authority to provide maps of density. The

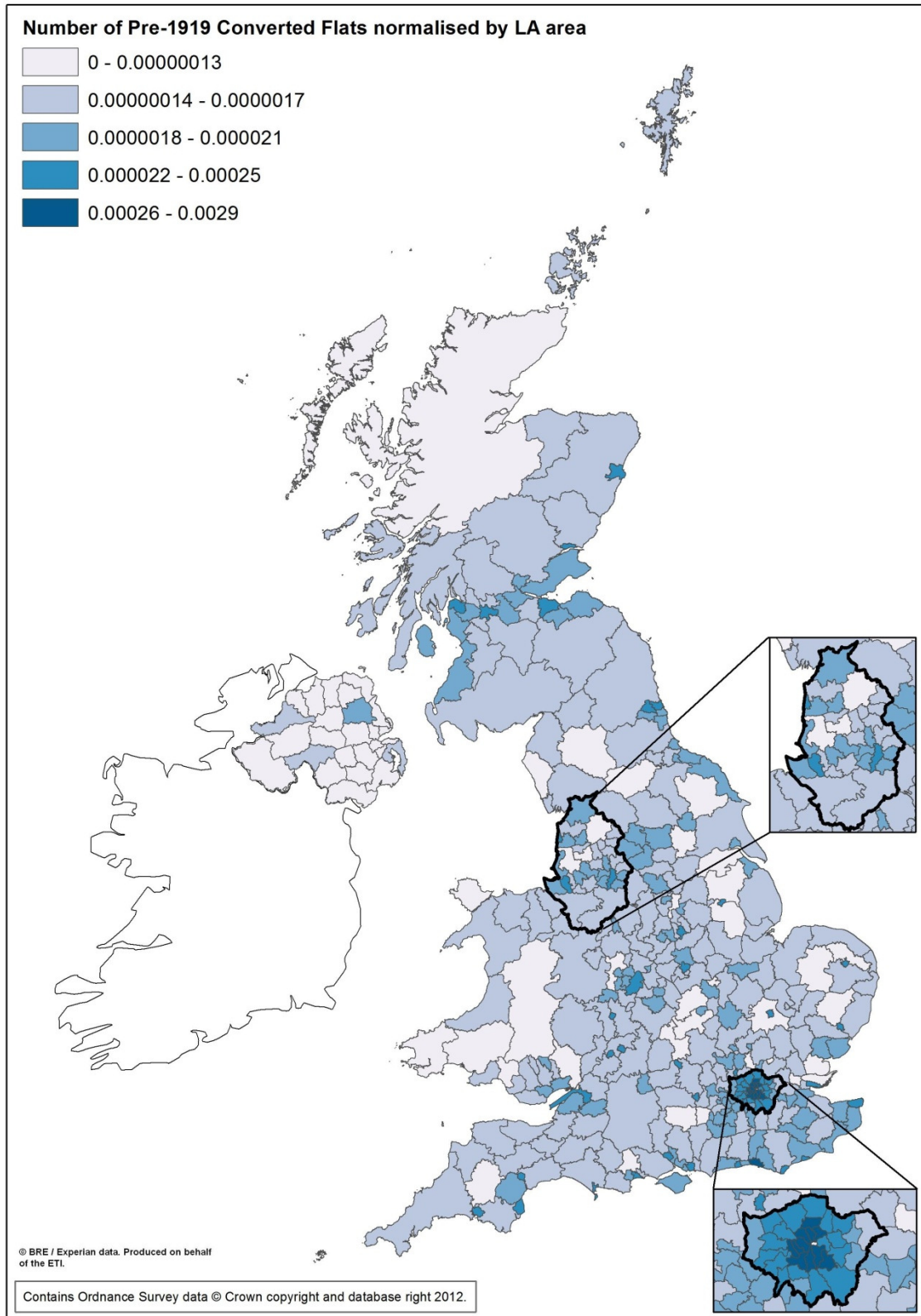
maps are coloured to indicate the density of each property type (darker colours indicate higher densities¹). The resulting maps should provide a good indication of the prevalence of these property types at a local level. Areas of high density seem likely to be the best areas to develop supply chain capacity for retrofitting.

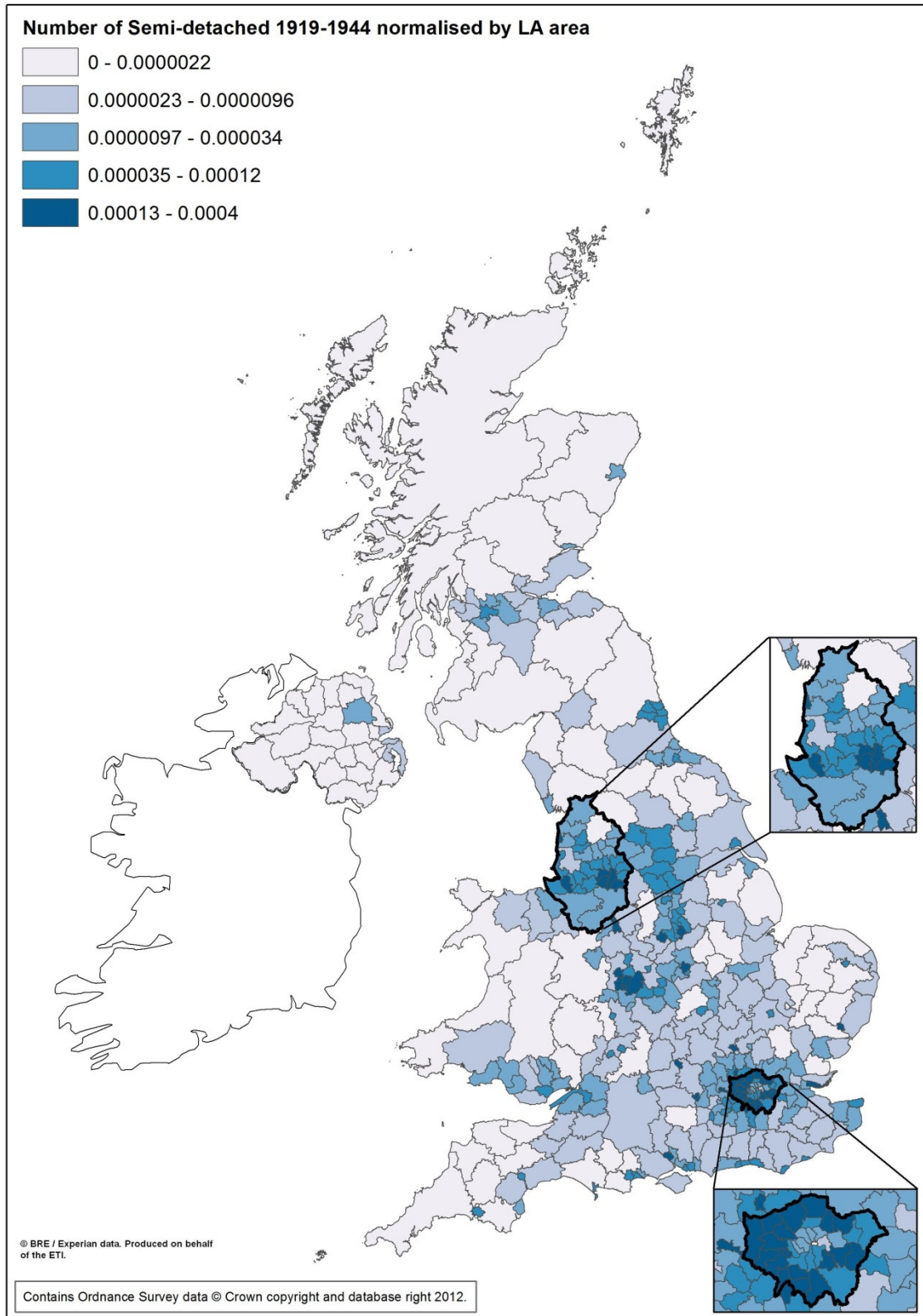
Maps

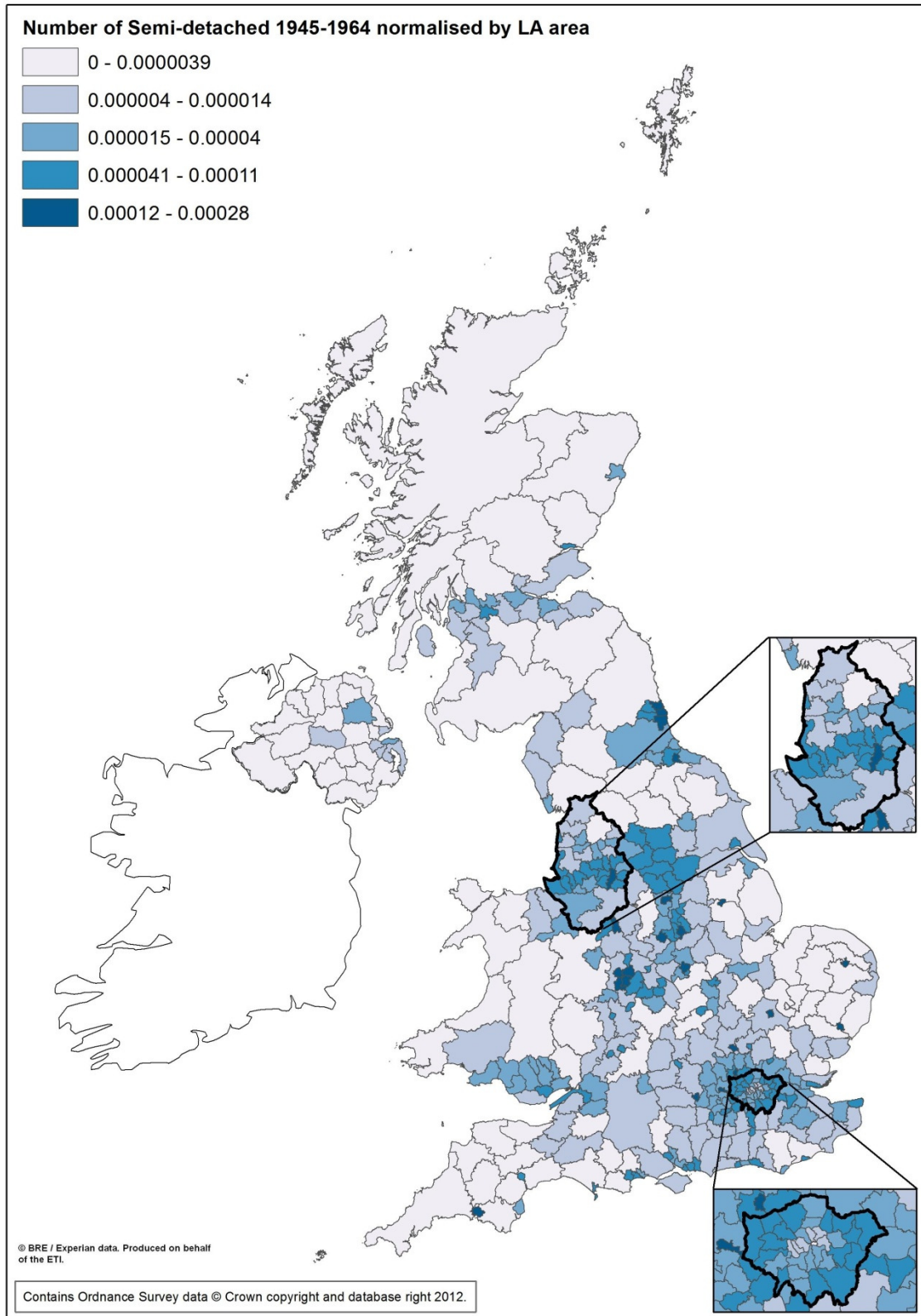
The dwelling density maps were produced as a result of this exercise are shown below. Care needs to be taken using these maps comparing potential in unitary authorities (e.g. Luton or Norwich) with larger district authorities. As distinct urban areas, unitary authorities are always likely to show high densities of all types. To determine the potential for regional refurbishment hubs, the density shown by unitary authorities should be considered in the context of the surrounding regional potential.











Key patterns shown by the maps

It can be seen that there are differences in the density of dwellings of different types across the UK. These are of interest to the supply chain design teams, as they identify where particular types of solutions may be more (or less) appropriate.

Compared to the other types which have been mapped, it can be seen that the Pre-1919 detached properties are relatively evenly distributed across the UK. There appears to be some greater concentration of these properties in the western counties of England, and also in the central belt of Scotland.

Pre-1919 mid terraced properties show a much clearer regional pattern. They appear to be concentrated in inner London boroughs, and other large conurbations across the UK. There are large concentrations in cities in the northern counties of England and in South Wales.

Pre-1919 converted flats also show strong regional patterns. These are particularly concentrated in inner London. Other regions with relatively high densities of these property types are the Scottish central belt and Aberdeen, the South coast of England and the Greater Manchester and Liverpool regions.

1919-1944 semi detached houses show high concentrations in London, but particularly in the outer suburbs (as opposed to the Pre-1919 properties which are found in inner London). Other regions with high concentrations of this property type include Birmingham, Manchester and Liverpool.

1945-1964 semi detached houses are particularly concentrated in the Birmingham, Tyneside and areas of Greater Manchester and the North West. In the South East these property types are found at equal density both in and around London (extending beyond the borders of Greater London).