



Population Weighted Centroids Guidance

INTRODUCTION

Population weighted centroids have been created for the 2011 output area (OA), lower layer super output area (LSOA) and middle layer super output area (MSOA) geographies. These centroids represent the spatial distribution of the population in each instance of those geographies, as recorded in the 2011 Census, as a single summary reference point on the ground.

METHODOLOGY

Each population weighted centroid was calculated using a median centroid algorithm, the result of which is less influenced by outliers than the result of an algorithm to calculate the mean centroid.

The median algorithm used was the Median Center (*sic*) function in ArcGIS 10.0, run against the coordinates and the populations of each household in each OA, LSOA and MSOA. Where the calculated centroid fell outside the boundary of the area being calculated, or within two metres of the area boundary, it was moved to the nearest location at least two metres inside the area boundary.

The population weighted centroids were created using the Full Resolution Extent of the Realm boundaries, for the OA, LSOA and MSOA.

More information about how the Median Center algorithm works is [here](#).

PURPOSE

The population weighted centroid is a summary reference point for the centre of the population in an OA or LSOA or MSOA. These centroids can be used in GIS software to support a variety of analyses. National statistics, including all census estimates, for all levels of geography, are best-fitted from output area. This means that estimates for all geographies produced as a national statistic are aggregations of whole output areas, in line with the [Geography Policy for National Statistics](#). The best-fitting of OA to any geography is determined by plotting the population weighted centroids into the boundaries of the output geography. Where an OA's centroid falls within an area's boundary, the OA is assigned to that area.

This is the standard method that ONS has used for the best-fitting of OA to any output geography. This method can be used to best-fit OA, using a simple GIS, to any geography for which digital boundaries are available. The resulting OA best-fit allocations can then be used to aggregate whole OA of estimates to create estimates for that geography, in line with the policy.

CURRENCY

Population weighted centroids were produced from the 2011 Census population database as at July 2012, using the 2011 OA, LSOA and MSOA digital boundaries. Each set of population weighted centroids are respectively referred to as:

- population weighted centroids for the 2011 OA
- population weighted centroids for the 2011 LSOA
- population weighted centroids for the 2011 MSOA

GEOGRAPHIC EXTENT

Population weighted centroids have been calculated for every 2011 OA, LSOA and MSOA in England and Wales.

FORMAT

The population weighted centroids are available in ESRI Shapefile and MapInfo Mid/Mif format.