

# DEIS Identification Process

This document outlines the DEIS identification process, the data sources and the methodology for assessing the levels of concentrated disadvantage in schools across the primary and post-primary education sector.



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## Overview

The DEIS Plan 2017 contains a set of objectives and actions to support children who are at greatest risk of educational disadvantage. One of these objectives is to develop a more robust and responsive framework for assessing individual schools. Following discussions at the DEIS technical group the following methodology was agreed on for the purpose of identifying levels of disadvantage across the school system. This new identification methodology will be updated on an annual basis from the School Annual Census Returns and every five years following the CSO Census of Population.

The identification process uses data from the following sources: Small Area Population Statistics SAPS (CSO, 2012) as represented in the Pobal Small Area HP Deprivation Index (Haase and Pratschke, 2012) and centrally held Department of Education and Skills pupil data from the Primary Online Database (POD) and the Post-Primary Online Database (P-POD).

In order to identify levels of disadvantage, pupil address data is extracted, anonymised and aggregated to Small Area (SA). SAs were designed as the lowest level of geography for the compilation of statistics in line with data protection. The HP Deprivation Index was developed using variables from CSO National Census of Population SA data and provides a relative disadvantage measure for each SA. By aggregating these small area statistics to school level, a profile of concentrated disadvantage levels based on the socio-economic demographic of their pupil cohorts was obtained.

The initial application of this model assessed all schools and found that most schools have pupils from disadvantaged areas but that the concentration of disadvantage varied. When assessing concentrated disadvantage the model indicated that the vast majority of schools currently in DEIS continue to have relative levels of disadvantage that warrant their continued inclusion in the programme.

The model also identified a number of schools in disadvantaged areas, not currently within DEIS, whose level of disadvantage is significantly higher than many schools already in DEIS. Correspondingly, some schools currently included in DEIS have levels of disadvantage within their school population much lower than that in some schools not included within DEIS.

*Prior to any further adjustments to the allocation of DEIS supports, this identification process will be updated to include the most current data available. CSO Census 2016 Small Area data is scheduled for release in July 2017 and the HP Index will be updated in autumn 2017 to take account of this. Schools are encouraged to ensure that their pupil address data is accurate and of the highest quality possible for the next update.*

## 1. What are Small Area Population Statistics SAPS - Census 2011?

Small Areas are standardised areas of population comprising a minimum of 50 dwellings, a maximum of 200 dwellings and a mean of just under 100 dwellings created by The National Institute of Regional and Spatial Analysis (NIRSA) on behalf of the Ordnance Survey Ireland (OSi) in consultation with CSO. Small Areas were designed as the lowest level of geography for the compilation of statistics in line with data protection and generally comprise either complete or part of townlands or neighbourhoods. There is a constraint on Small Areas that they must nest within Electoral Division boundaries.

The small area boundaries have been amended in line with population data from Census 2011 and there are 18,488 Small Areas in the Country.

Source: <http://www.cso.ie/en/census/census2011boundaryfiles/>

### What information is contained in the Small Area Population Statistics Data?

There are 46 Small Area Population Statistics (SAPS) tables organised into the following 15 themes.

- Theme 1: Sex, age and marital status
- Theme 2: Migration, ethnicity and religion
- Theme 3: Irish language
- Theme 4: Families
- Theme 5: Private households
- Theme 6: Housing
- Theme 7: Communal establishments
- Theme 8: Principal status
- Theme 9: Social class and socio-economic group
- Theme 10: Education
- Theme 11: Commuting
- Theme 12: Disability, carers and general health
- Theme 13: Occupation
- Theme 14: Industries
- Theme 15: PC and internet Access

Data from a number of, but not all, of these themes is used in the creation of the HP Index of Small Areas. This is explained in further detail below.

[For further information on SAPS see Appendix 1](#)

## 2. What is the Pobal HP Deprivation Index (SA) (Haase and Pratschke, 2012)?

The 2011 Pobal HP Deprivation Index (SA) is a deprivation index developed by Trutz Haase and Jonathan Pratschke and funded by Pobal as a method of measuring the relative affluence or disadvantage of a particular geographical area. The HP Index is increasingly used by Government Departments and Agencies to more effectively allocate resources – e.g. Departments of Health, and Children and Youth Affairs, Pobal, Tusla, BIM, LEADER and RAPID Programmes, Higher Education Access Route (HEAR) and Local and Regional Drug and Alcohol Task Forces.

The index uses data compiled from the CSO National Census of Population. A scoring is given to the area based on a national average of zero and ranging from approximately -35 (being the most disadvantaged) to +35 (being the most affluent). The scores can be described in 8 bands:

HP Score	Description
over 30	Extremely affluent
30 to 20	Very Affluent
20 to 10	Affluent
0 to 10	Marginally above Average
-10 to 0	Marginally below average
-10 to -20	Disadvantaged
-20 to -30	Very disadvantaged
Less than -30	Extremely disadvantaged

Fig 1. – Labels and Relative Index scores



Fig 2. – Mapping colours and Labels of Relative Index Scores

What data from the Census is used in the Pobal HP Index?

The following ten variables were calculated from the Annual Census 2011.

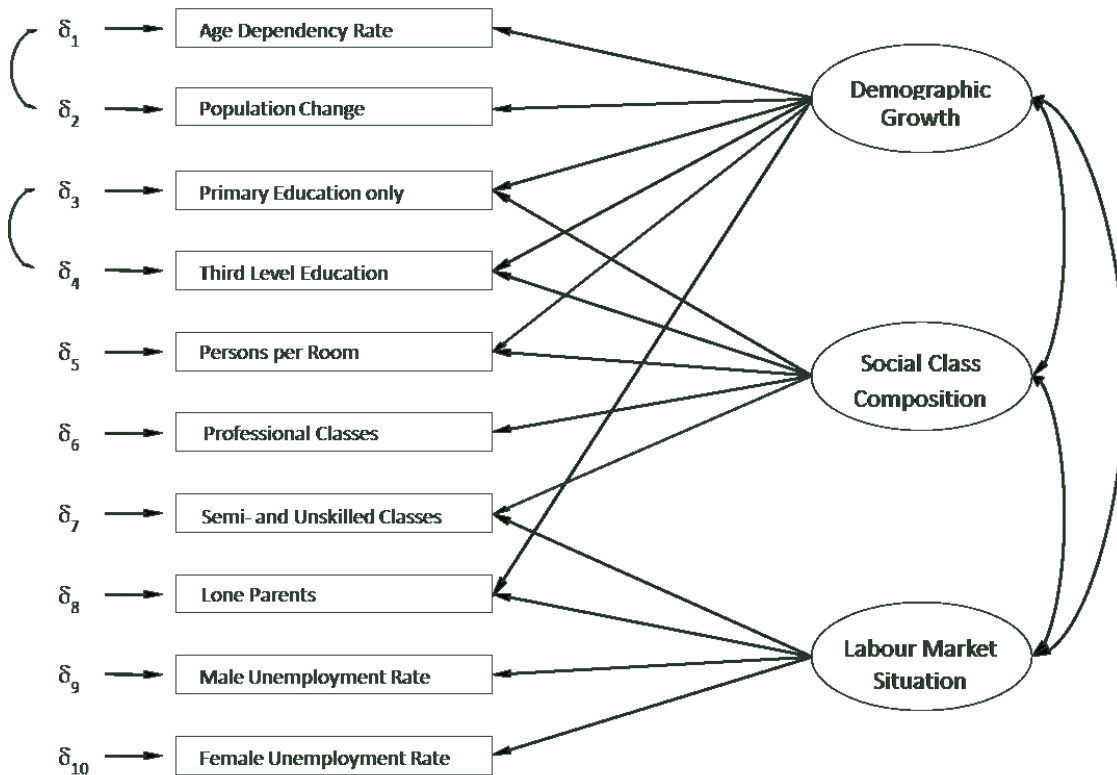


Fig 3. – The Basic Model of the Pobal HP Deprivation Index

For further information on the Pobal HP Index see Appendix 2

### 3. What are the centrally held Department of Education and Skills pupil data?

There are two centrally held data sources of pupil information. On 30<sup>th</sup> September each year the Annual School Census returns are generated from these databases. The data in these pupil databases is provided by parents/guardians to schools who in turn provide the data to the Department.

#### *Primary Online Database*

<http://www.education.ie/en/Publications/Statistics/Primary-Online-Database-POD-/>

#### *Post Primary Online Database*

<http://www.education.ie/en/Schools-Colleges/Services>Returns/Post-Primary-Online-Database-P-POD-Project/>

#### What data from the pupil databases is used?

In order to identify disadvantage levels, the CSO Small Area in which a pupil resides is used. All addresses are geocoded to one of the 18,488 CSO Small Areas and then each geocoded address is assigned a HP Small Area score derived from the Pobal HP Index. Following this, the HP scores for all matched records in every school are then aggregated by roll number, providing a picture of the relative levels of affluence and deprivation for each school in the country.

#### How were addresses matched with Small Areas?

The Statistics Section of the department took anonymised address data and matched it with the GeoDirectory. The GeoDirectory is Ireland's electronic register of addresses matched precisely to their geographical locations and is also the data which the Eircode database was built on. By matching with the GeoDirectory it was possible to identify the Small Area associated with each address. (See info on Small Areas). This small area information was then linked with Census SAPS data as represented by the Pobal HP Index (Small Area).

#### How can Eircode aid the process?

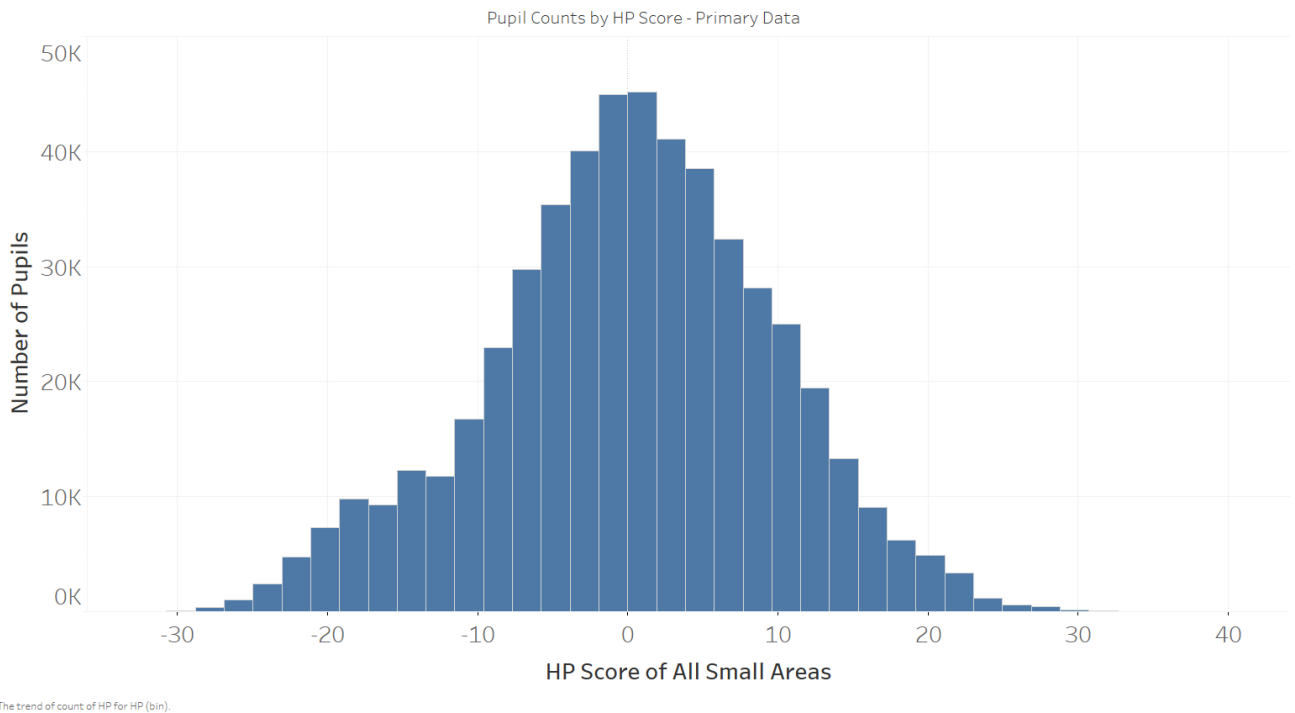
This process was extremely time consuming and labour intensive due to lack of a unique post code for Irish addresses. With the recent introduction of the Eircode the resources employed to regularly match addresses can be dramatically reduced. The Department is promoting the use of Eircode as it ensures the address data on the system is accurate and allows the compilation of Small Area statistics much more efficiently.

In the context of matching addresses to small areas, Eircode is particularly advantageous for the approximately 35% of addresses, mainly in rural areas, that do not have a unique name or number in their address and require the greatest amount of time and resources to match manually.

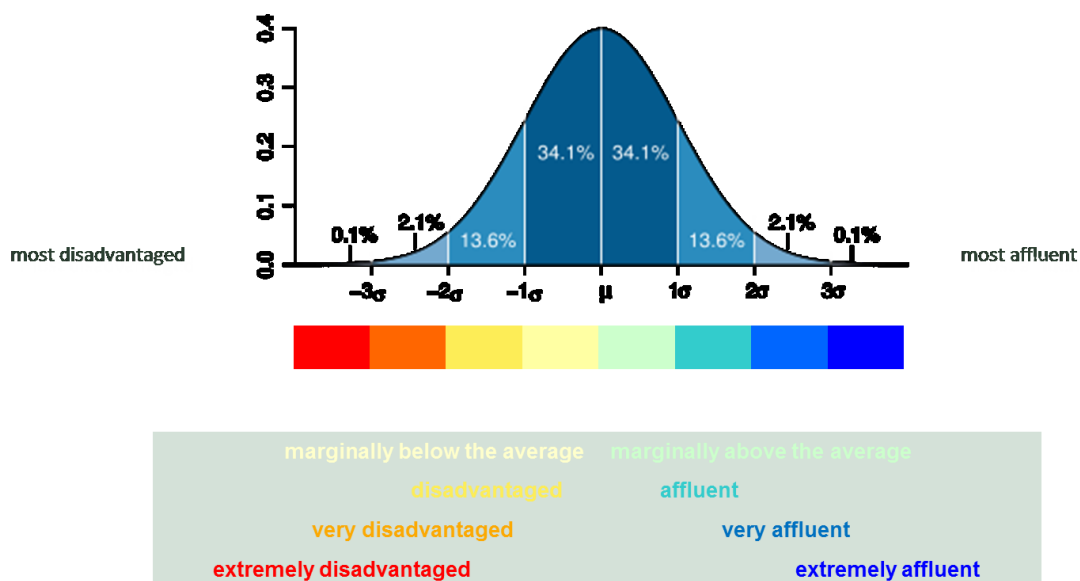
[For further information on Department of Education and Skills Pupil Data see Appendix 3](#)

4. How was the HP Index applied to schools in the context of Concentrated Disadvantage and for the allocation of supports?

When the individual HP scores of the school population as a whole are looked at, they follows a normal curve. One way to visualise this is the histogram of the HP scores of all the pupil records (Fig. 4)



(Fig. 4 – Frequency distribution of Primary Pupil counts by HP score)



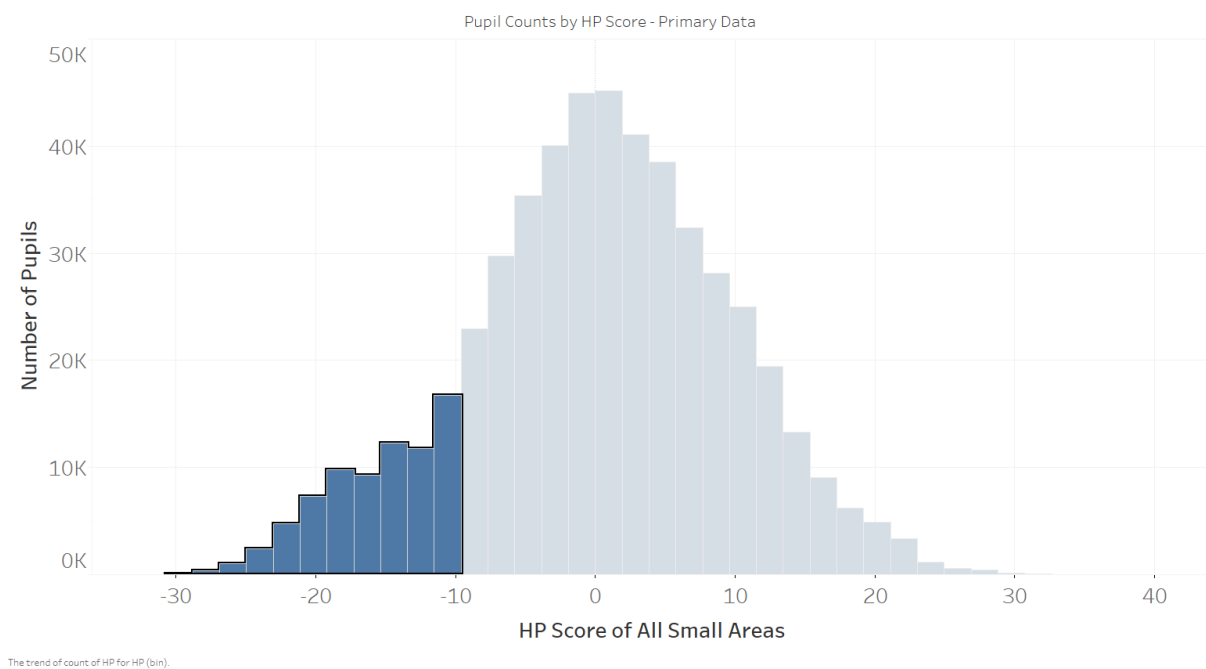
(Fig. 5 – Illustration of empirical rule of a normal distribution)



## Targeting DEIS supports

In the context of DEIS, the target group is the cohort of pupils who are **from Small Areas that are 1 Standard Deviation (SD) or more below the mean**. This group represents just under 16%\* of the school population (Fig. 6) and comes from Small Areas categorised as **Disadvantaged, Very Disadvantaged and Extremely Disadvantaged**.

*\*Based on the empirical rule – See Appendix 5*



(Fig. 6 - Frequency distribution of Pupil counts by HP score with target group highlighted)

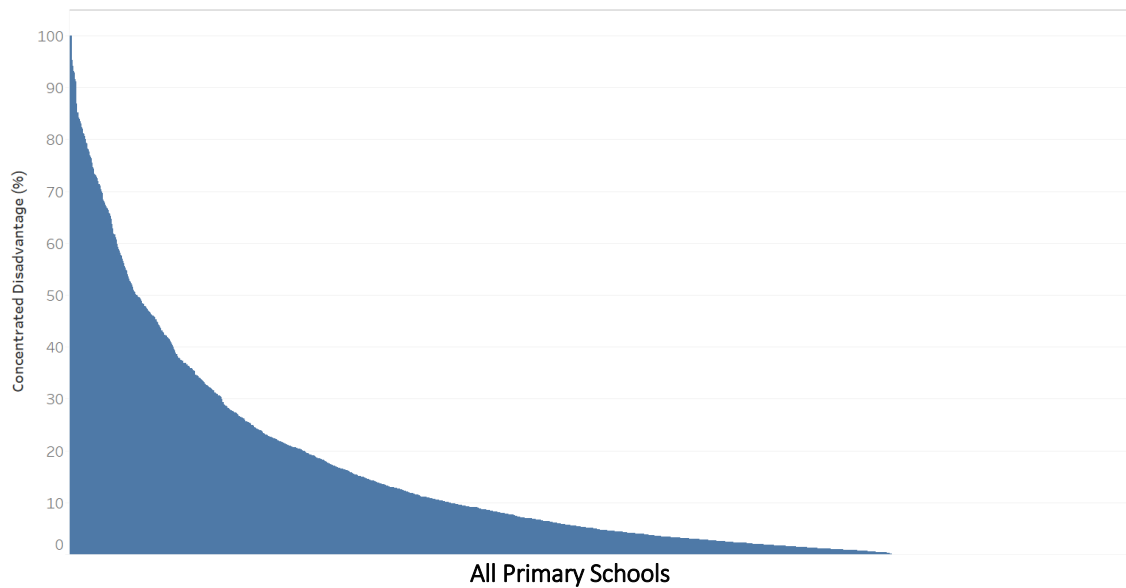
## Identification criteria

In order to quantify the levels of concentrated disadvantage, each school was assessed to establish the % of pupils from these Small Areas categorised as Disadvantaged, Very Disadvantaged and Extremely Disadvantaged in their pupil population. This % gives a level of concentrated disadvantage based on the Small Areas that are specifically serving each school. A single ranking of all schools was then produced based on this level of concentrated disadvantage.

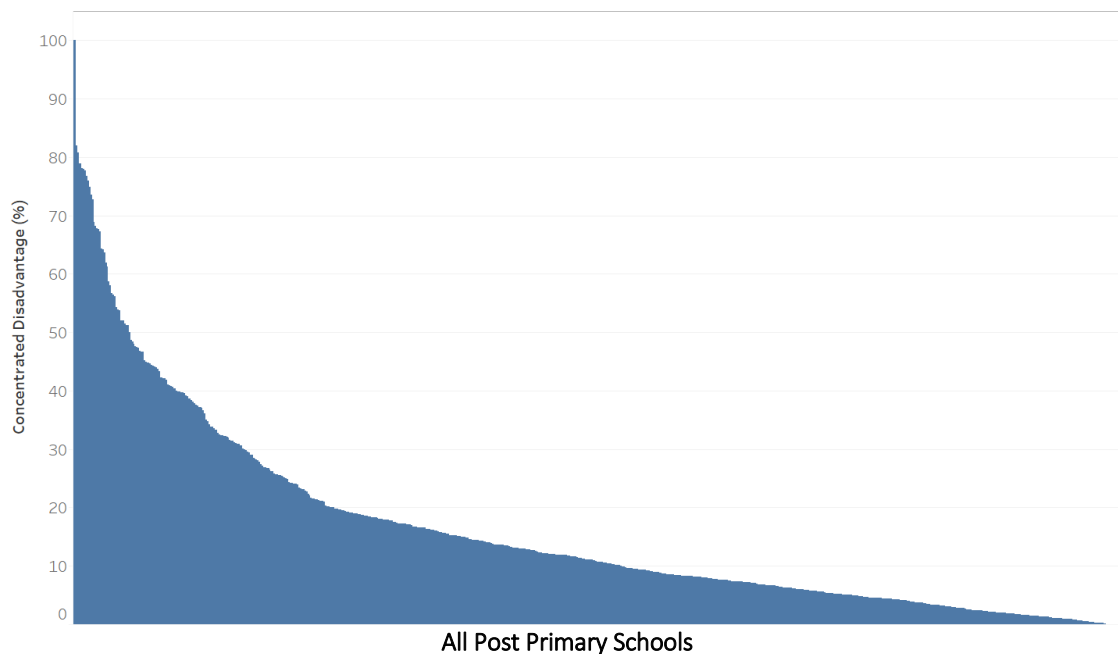
### Where are the pupils from these disadvantaged Small Areas in school?

The initial application of this model assessed all schools and found that most schools have pupils from disadvantaged areas but that the concentration of disadvantage varied.

This group is spread out across approximately 2436 out of 3124 (78%) of mainstream schools at primary level (2015/16) (*Fig. 7a*) and across approximately 695 out of 709 (98%) of mainstream post primary level schools (*Fig. 7b*).



*(Fig. 7a - Distribution of group across the primary school sector)*



*(Fig. 7b - Distribution of group across the post-primary school sector)*

## 5. Urban/Rural Designation at Primary School

The 2005 DEIS programme introduced a categorisation of urban/rural based on the geographical location of the school as reported by the schools themselves. For the new schools announced in DEIS 2017, Urban/Rural designation was done using CSO boundary data. The criteria for designating a school as urban is on the basis of the ***school residing within a settlement area that has population of over 1500 (Census 2011)***.

This CSO classification also takes into account growth in population and the expansion of urban areas over time (urban sprawl)

It is important to note that the categorisation of a school as urban or rural is not related to the assessed level of concentrated disadvantage of its pupil cohort.

[Further information on CSO settlements is in Appendix 4](#)

## Appendices

### Appendix 1 - Small Area population Statistics (SAPS)

Where can I find out more information on Small Areas?

The CSO has a number of downloads containing small area statistics at the following link:

<http://www.cso.ie/en/census/census2011smallareapopulationstatistics.aspx/>

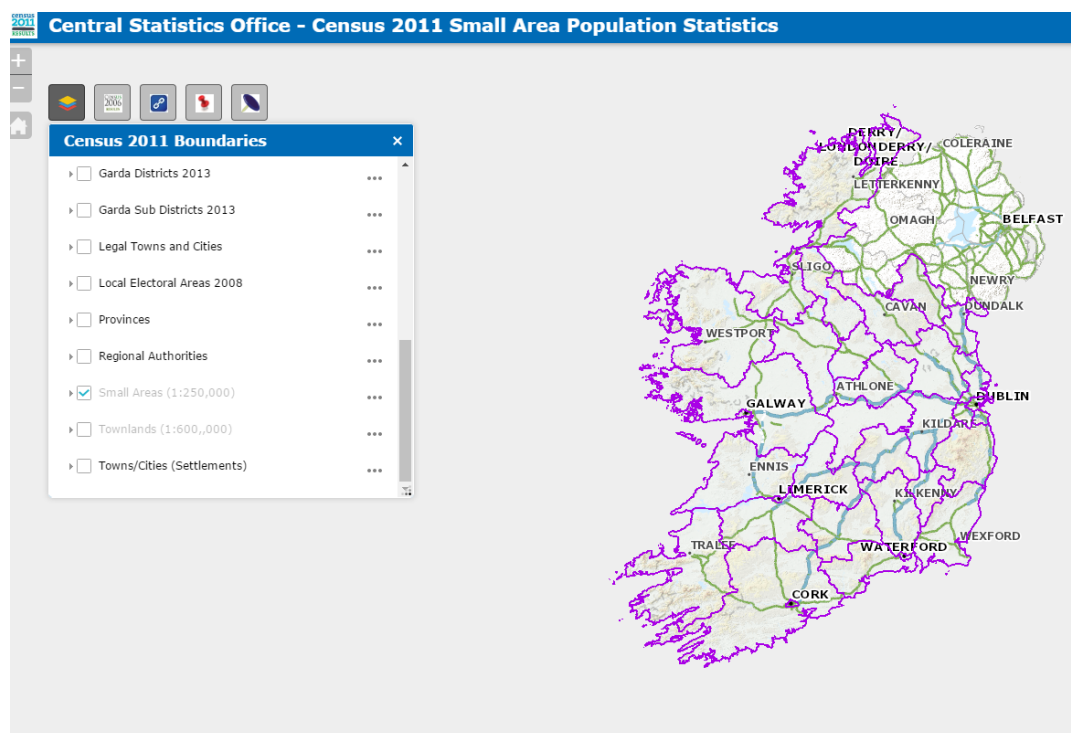
A CSV file of the entire SAPS information can be downloaded here:

<http://www.cso.ie/en/media/csoie/census/documents/saps2011files/AllThemesTablesSA.csv>

An interactive map of Ireland with Small Areas is available at this link:

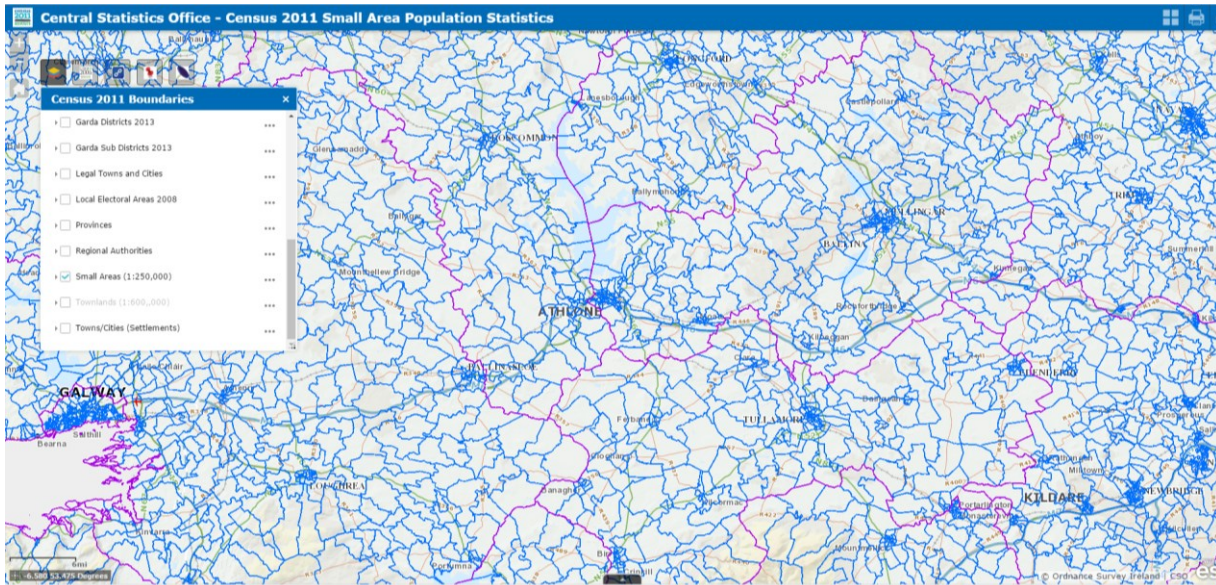
<http://census.cso.ie/sapmap/>

To view small areas you need to select the tick box beside Small Areas from the Census 2011 Boundary dropdown menu on the left of the page.



(Fig 8 – CSO SAPMAP interactive census mapping tool)

As Small areas are quite small you will need to zoom in on the map before they become visible.



(Fig 9 – CSO SAPMAP Small Areas borders highlighted in blue)

Clicking on a particular small area opens a pop up with summary statistics and also a link to further, more detailed census information about the area.

A more detailed guide to using the SAPMAP interface can be viewed here:

[http://www.cso.ie/en/media/csoie/census/documents/saps2011files/sapmap\\_user\\_guide.pdf](http://www.cso.ie/en/media/csoie/census/documents/saps2011files/sapmap_user_guide.pdf)

Why was 2011 Census Data used?

The latest available SAPS data is from the 2011 Census. The CSO have a release schedule for the 2016 Census and the SAPS file is due for release on 20<sup>th</sup> July 2017.

<http://www.cso.ie/en/census/census2016reports/census2016publicationschedule/>

## Appendix 2 - Pobal Small Area HP Deprivation Index (Haase and Pratschke, 2012)

Where can I find out more information on the Pobal HP index?

The index can be viewed through Pobal Maps, a free online Geographical Information System map viewer. Pobal Maps provides a visual representation of the data which is crucial in terms of highlighting pockets of relative disadvantage, especially to small area level, and is a valuable resource in targeting and tackling disadvantage. The system also allows users to run specific reports to selected areas, as well as visually compare changes between 2006 and 2011.

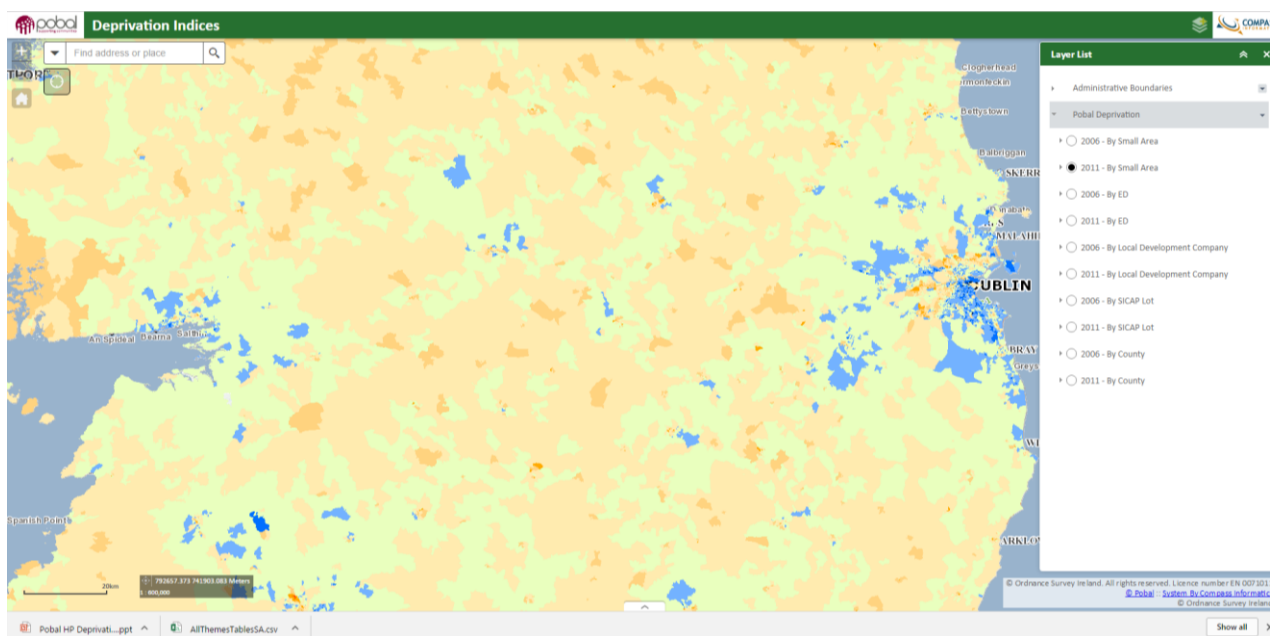
<https://maps.pobal.ie/WebApps/DeprivationIndices/index.html>

A detailed introduction to the HP Index can also be downloaded at the following link:

<http://trutzhaase.eu/wp/wp-content/uploads/HP-Index-2011-SA-An-Introduction-02.pdf>

A video explaining the map is on Pobal's YouTube channel

<https://youtu.be/MZPMLfFBxbQ>



(Fig. 10 – Pobal Interactive Map – 2011 Pobal HP Index (SA))

Sources:

<https://www.pobal.ie/Pages/New-Measures.aspx>

<http://trutzhaase.eu/deprivation-index/the-2011-pobal-hp-deprivation-index-for-small-areas/>

When will the 2017 Pobal HP Index (SA) be available?

The HP Index is built on the CSO SAPS data which will be released on 20<sup>th</sup> July. The HP Index will be updated based on this information and is due for release in autumn 2017.

Is there a way to get Pobal HP data for a number of or group of Small Areas?

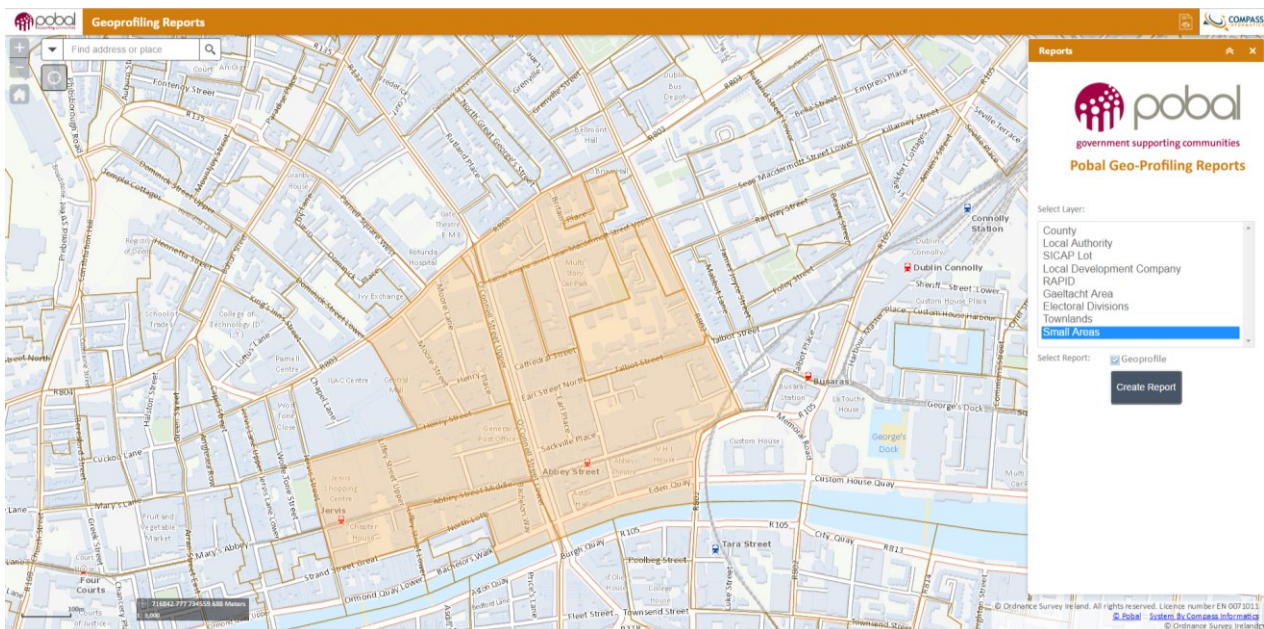
Pobal on its website also provides a very useful tool for Generating demographic and deprivation analytical reports called “Geo-profiling Reports”

<https://maps.pobal.ie/WebApps/GeoprofilingReports/index.html>

By zooming in on an area you can select “**Small Areas**” from the box on the right. Then choose the areas from which you wish to generate the report then click Create Report. After a few seconds a new box will appear with the download link “**Download Small Areas Geoprofile**”. You will then be able to download an Excel file with detailed area info.

A video explaining the process is hosted on Pobal’s YouTube channel:

<https://youtu.be/28MIKMxT6LE>



(Fig. 11 – Pobal Interactive Geo-profiling Reports– 2011 Pobal HP Index (SA))

### Appendix 3 - Centrally held Department of Education and Skills pupil data

Detailed information about the two databases used can be found at the following links.

*Primary Online Database*

<http://www.education.ie/en/Publications/Statistics/Primary-Online-Database-POD-/>

*Post Primary Online Database*

<http://www.education.ie/en/Schools-Colleges/Services>Returns/Post-Primary-Online-Database-P-POD-Project/>



## Appendix 4 – CSO Settlements

How does the CSO define a “settlement”?

### **Settlements (Census towns, legal towns and environs, cities and suburbs)**

*In order to distinguish between the urban and rural population for census analysis, the boundaries of distinct settlements need to be defined. This requires the creation of suburbs and extensions to existing cities and legal towns as well as delineating boundaries for settlements which are not legally defined (called Census towns).*

*From 1971 to 2006, Census towns were defined as a cluster of fifty or more occupied dwellings where, within a radius of 800 metres there was a nucleus of thirty occupied dwellings (on both sides of a road, or twenty on one side of a road), along with a clearly defined urban centre e.g. a shop, a school, a place of worship or a community centre. Census town boundaries were extended over time where there was an occupied dwelling within 200 metres of the existing boundary.*

*To avoid the agglomeration of adjacent towns caused by the inclusion of low density one off dwellings on the approach routes to towns, the 2011 criteria were tightened, in line with UN criteria.*

*In Census 2011 a new Census town was defined as being a cluster with a minimum of 50 occupied dwellings, with a maximum distance between any dwelling and the building closest to it of 100 metres, and where there was evidence of an urban centre (shop, school etc). The proximity criteria for extending existing 2006 Census town boundaries was also amended to include all occupied dwellings within 100 metres of an existing building. Other information based on OSi mapping and orthogonal photography was taken into account when extending boundaries. Boundary extensions were generally made to include the land parcel on which a dwelling was built or using other physical features such as roads, paths etc.*

*Extensions to the environs and suburbs of legal towns and cities were also constructed using the 100 metre proximity rule applied to Census towns.*

*For census reports, urban settlements are towns with a population of 1,500 or more, while settlements with a population of less than 1,500 are classified as rural.*

*At this time pupils addresses are not used in the classification of schools as urban/rural.*

Source: <http://www.cso.ie/en/census/census2011boundaryfiles/>

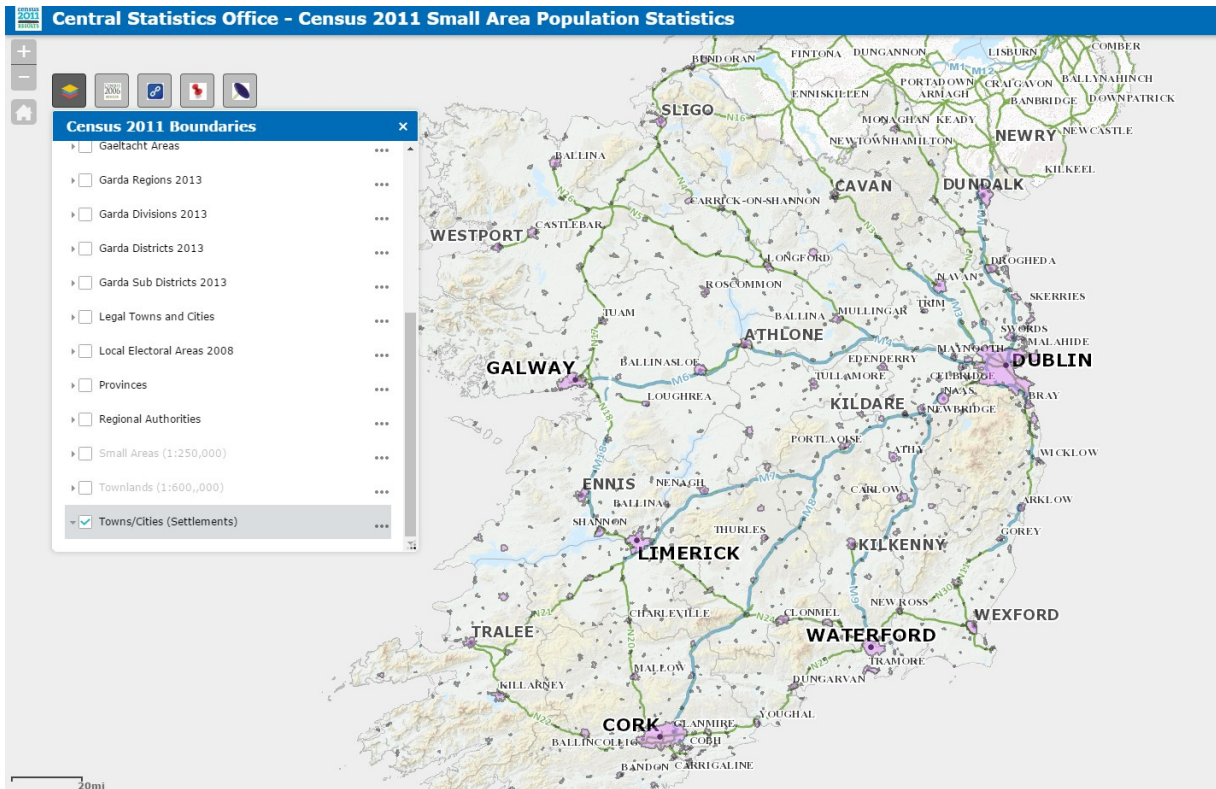
Can settlements borders change over time?

Settlements can grow or shrink over time due to population changes and therefore their boundaries may change from census to census. Also a number of legal towns will have their boundaries redrawn in line with UN criteria from the 2016 Census data as legal town boundaries, which settlements previously incorporated were abolished in 2014. Provisional CSO analysis indicates that approximately 40 towns will have their borders redrawn in light of the 2016 Census.

Where can I find details on Settlement boundaries?

The CSO SAPMAP includes a map layer with details on settlements.

<http://census.cso.ie/sapmap/>



(Fig. 12 – CSO SAPMAP Census 2011 – Settlements Layer)

## Appendix 5 – Glossary of Statistical Terms

### Normal curve.

The normal distribution is the single most important distribution in the social sciences. It is described by the bell-shaped curve defined by the probability density function where  $\exp$  is the exponential function,  $\mu$  the mean of the distribution,  $\sigma$  the standard deviation, and  $\sigma^2$  the variance. As a matter of convenience, this distribution is often expressed as  $X \sim N(\mu, \sigma)$ . If  $X \sim N(0, 1)$  so that  $\mu = 0$  and  $\sigma = 1$ , the outcome is the standard normal distribution. The resulting curve is shown in Figure 1, where the horizontal axis indicates values of  $X$  in terms of positive and negative integer values of the standard deviation. The curve's shape is typical of normally distributed variables, even when they have different means and variances.

The normal distribution has two significant features. First, the curve is perfectly symmetrical about the mean of the distribution. As a result, the distribution mean is identical to the two alternative measures of central tendency, namely, the mode (the most frequent value of  $X$ ) and the median (the middle value of  $X$ ). Second, the mathematical function provides the basis for specifying the number of observations that should fall within select portions of the curve. In particular, approximately 68.3 percent of the observations will likely fall within one standard deviation of the mean. In the case of the standard normal deviation, this would indicate that more than two-thirds of the observations would have a value between  $-1$  and  $+1$ . Moreover, about 95.4 percent of the observations would fall within two standard deviations above and below the mean, and about 99.7 percent would fall within three standard deviations below and above the mean. Hence, relatively fewer observations are expected in the upper and lower tails of the distribution; the more extreme the departure from the mean the lower the score's probability of occurrence.

### Standard Deviation (Statsoft.com, 2013)

The most widely used measure of dispersion of a frequency distribution introduced by K. Pearson (1893). It is equal to the positive square root of the variance. The standard deviation should not be confused with the root mean square deviation.

The standard deviation of a population of values is computed as:

$$\sigma = \left[ \frac{\sum (x_i - \mu)^2}{N} \right]^{1/2}$$

Where

$\mu$  is the population mean

$N$  is the population size.

The sample estimate of the population standard deviation is computed as:

$$s = [\sum(x_i - \bar{x})^2 / (n-1)]^{1/2}$$

where

$\bar{x}$  is the sample mean

$n$  is the sample size.

Normal Distribution and the Empirical Rule (McClave and Sincich, 2013)

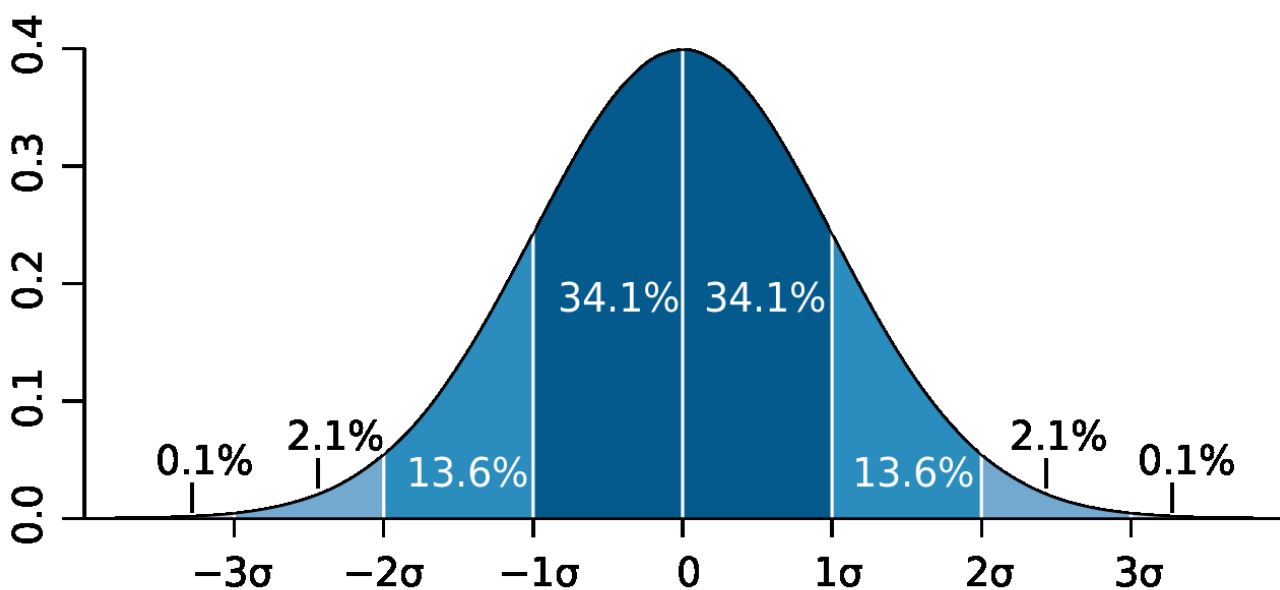


Fig 13: (Commons.wikimedia.org, 2017)

The empirical rule is a rule of thumb that applies to datasets with frequency distributions that are mound shaped and symmetrical as follows:

- Approximately 68% of the measurements will fall within one standard deviation of the mean.
- Approximately 95% of the measurements will fall within two standard deviations of the mean.
- Approximately 99.7% of the measurements will fall within three standard deviations of the mean.

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