Benefits of new postcode based geography

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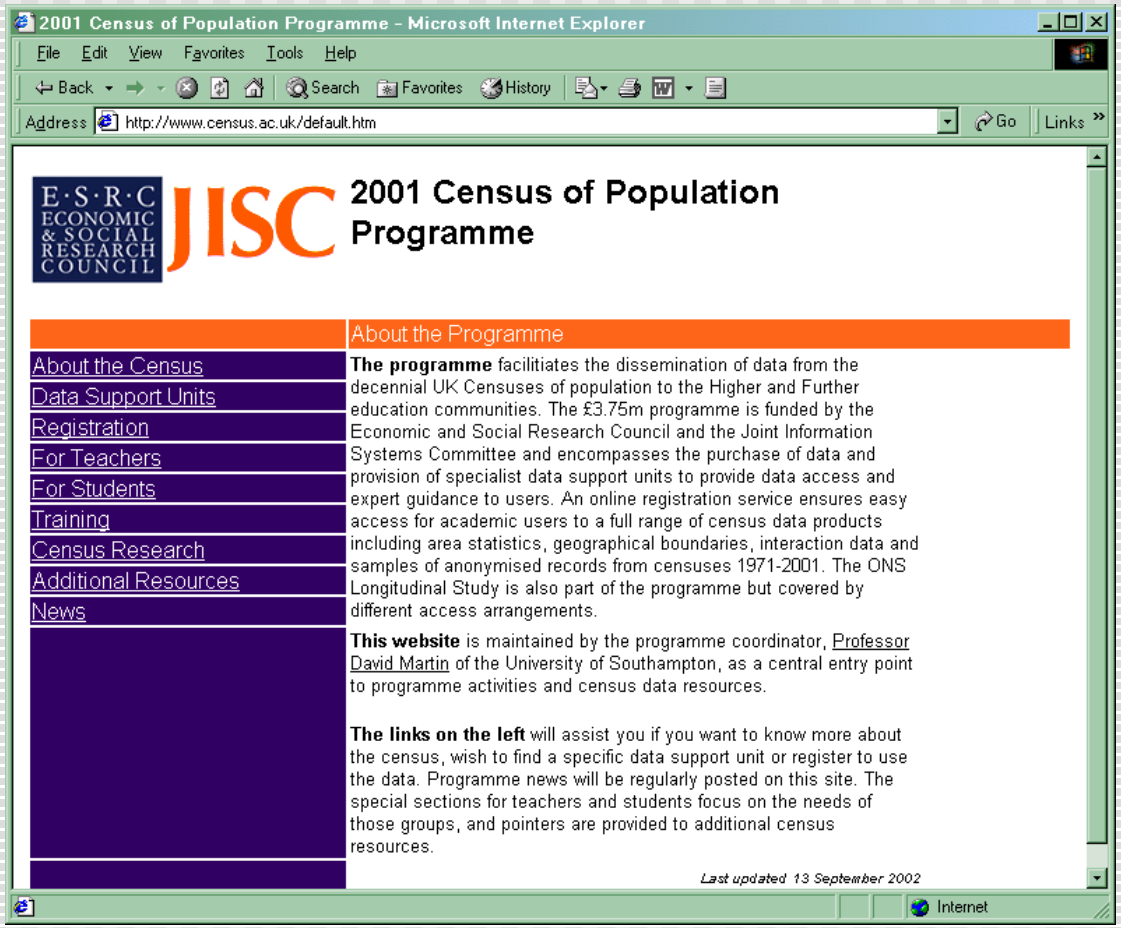
ESRC/JISC 2001 Census Programme *www.census.ac.uk*



Overview

- Background: why have a new geography?
  - Case for redesign
  - Overview of design methods
- 2001 Output area geography:
  - Key characteristics
- Potential developments
- A geography for Neighbourhood Statistics

Background: why have a new geography?

- Unsuitability of 1991-style enumeration geography as output geography
  - No linkage to postcode geography
  - Some sub-threshold populations, large range
  - No consideration of internal homogeneity
- NB England/Wales, Scotland, NI differences

Case for redesign

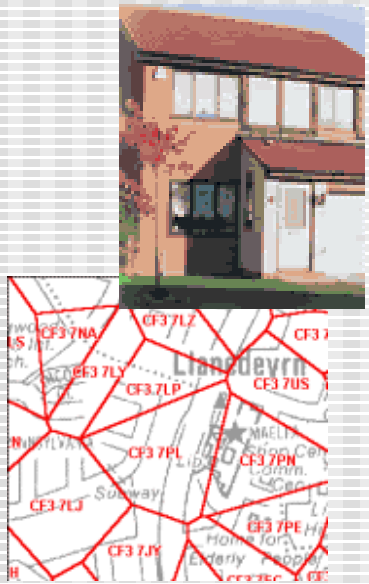
- Demands from census users:
  - Postcode and statutory geographies
  - Uniformity of population sizes (all above threshold)
  - Control over shape (observe settlement pattern and topographic features)
  - Internal homogeneity of population
  - Compatibility with previous census geographies!

Overview of design methods

- Step one
  - Assemble unit postcode geography
  - Create purpose-specific postcode polygons
- Step two
  - Assemble into output areas, meeting as many of the other criteria as possible
  - Use automated zone design

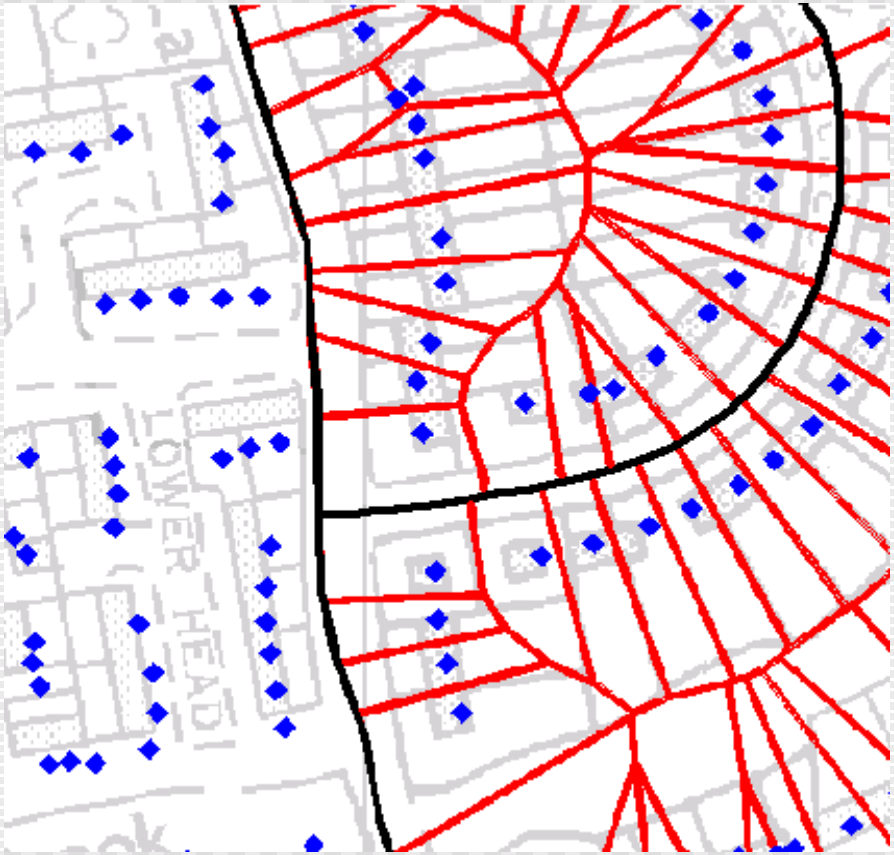
Which postcode geography?

- No existing postcode boundaries (as in Scotland)
- Code-Point with polygons – synthetic: no admin. boundaries
- MasterMap still under development
- Uncertainty at key stage



Address-based Thiessen polygons

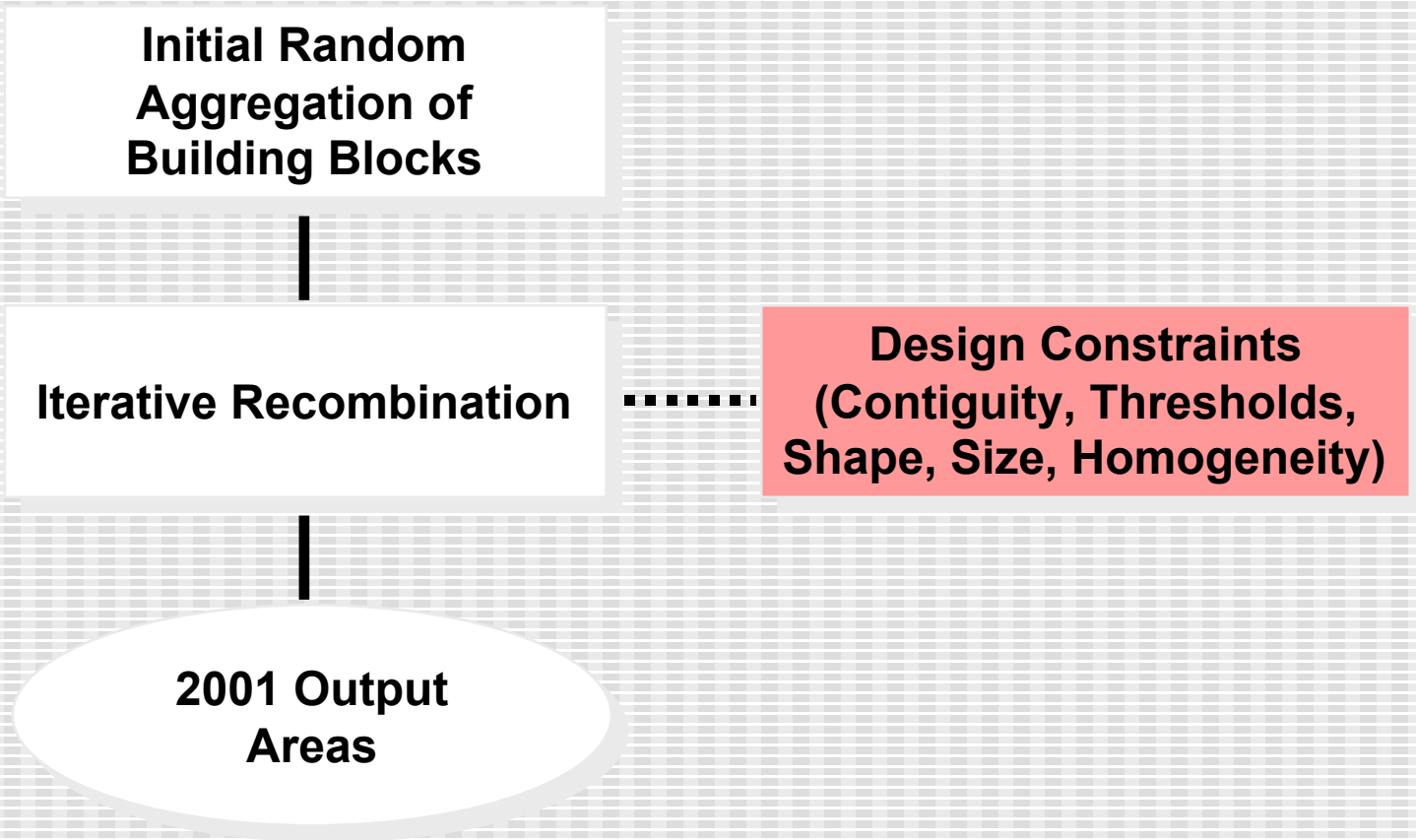
- Thiessen polygons around ADDRESS-POINTS
- Intersected with EDs, wards (Dec 2002), parishes and road centrelines



Unit postcode building blocks

- Address polygon boundaries dissolved to form unit postcode polygon building blocks

Automated output area design



AZP (Openshaw, 1977)

- Random initial aggregation of building blocks into output areas within ward or parish polygon
- Compute design statistics
- Evaluate effect of possible swaps of building blocks between output areas
- Keep swaps that improve the overall solution

Contiguities, thresholds, urban/rural

- Output areas assembled from contiguous postcodes (NB treatment of stacked postcodes)
- Output areas above 100 person and 40 household thresholds (NB treatment of sub-threshold parishes)
- Initial postcode classification to urban/rural based on DETR boundaries

Size and shape

- Output areas should be as uniformly sized as possible; target 125 households

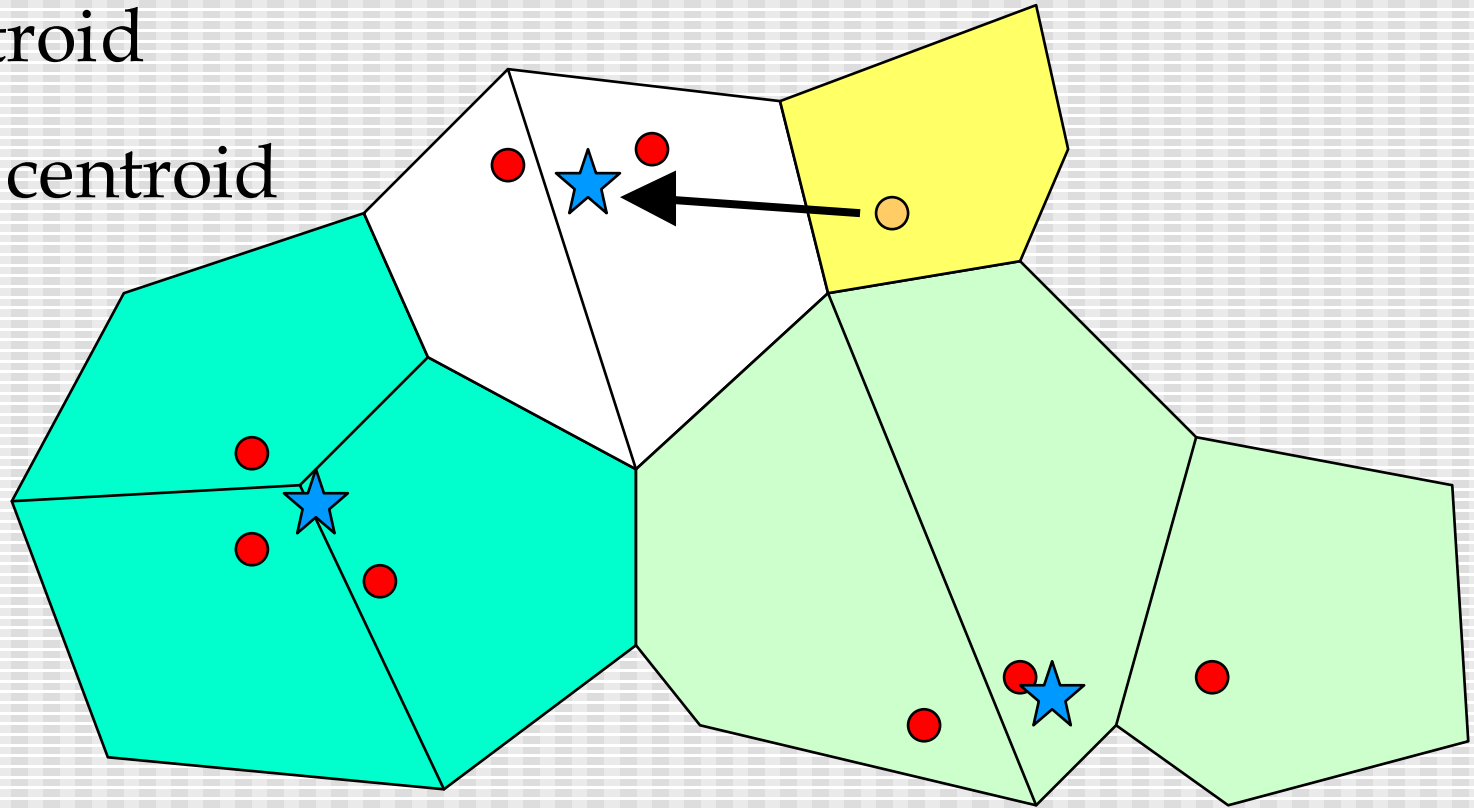
  minimize $\Sigma(OApop\text{-}target)^2$

- Output areas should be as compact as possible

  minimize distance to OA centroid…

Distance to OA centroid

- PC mean centroid
- OA centroid



Intra area correlations

- Maximize intra-area correlations (IAC): ratio of area level to individual level variance
- Higher correlations ~ greater internal homogeneity
- Tenure (4) and dwelling type (7) categories used

Combination of constraints

- All constraint statistics recomputed at each iteration
- Must always meet contiguity and threshold requirements; urban/rural if possible above threshold
- Population, shape and homogeneity constraints combined with equal weighting

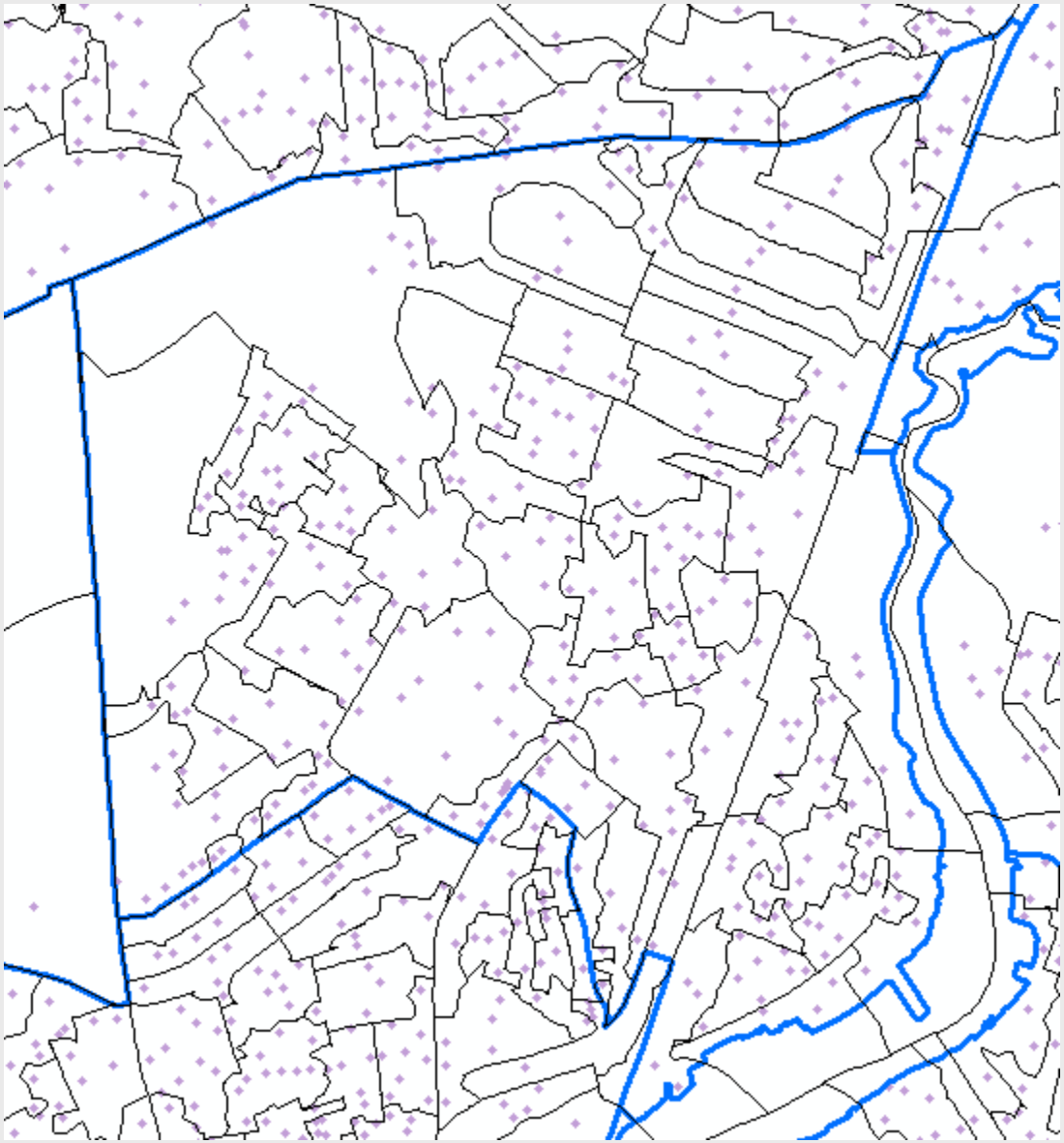
2001 Output Areas (n=175,434)

[England and Wales]

2001 OA

1991 Ward

Code-Point



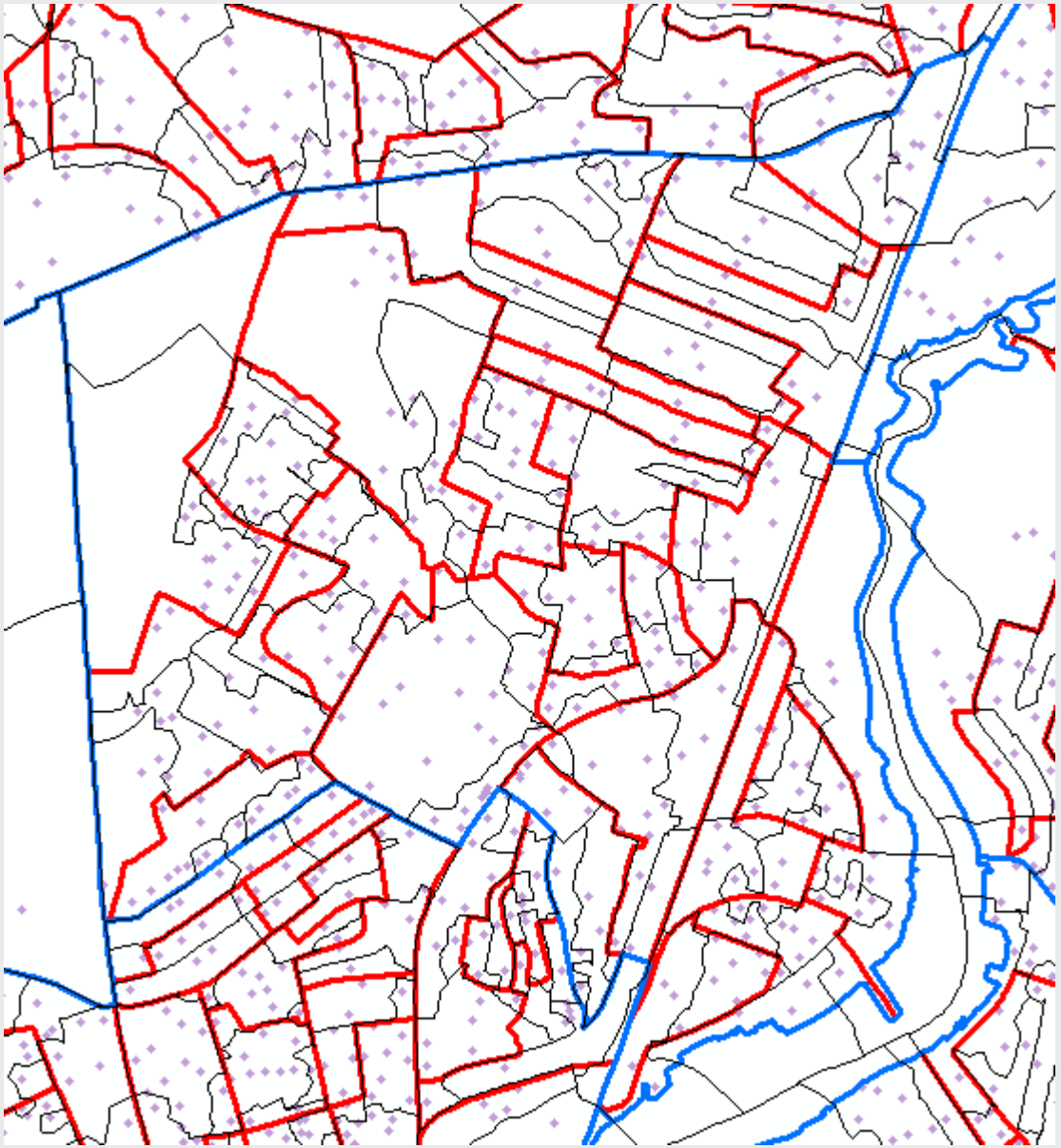
[Portswood, Southampton]

2001 OA

1991 Ward

1991 ED

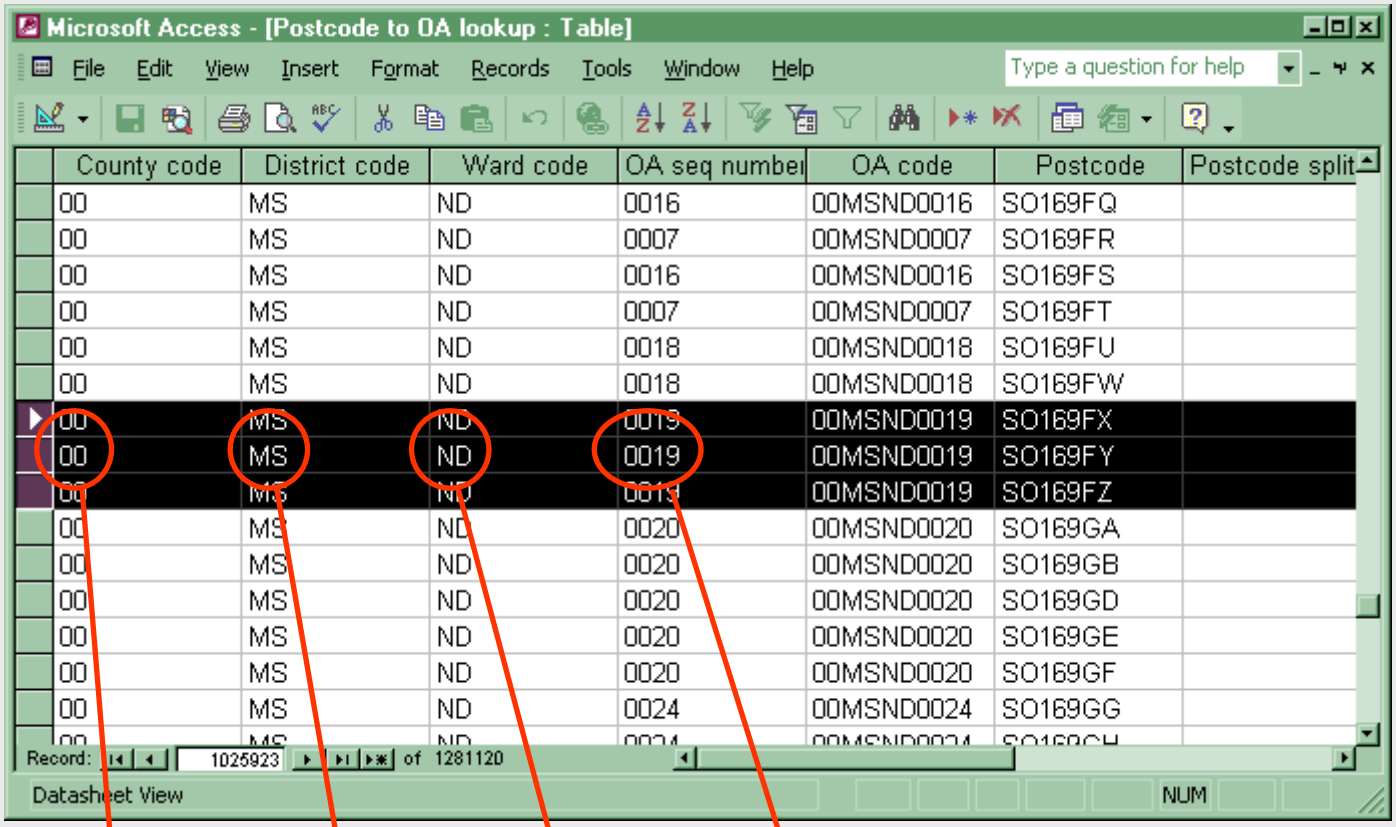
Code-Point



[Portswood, Southampton]

Postcode-OA relationships

- (Initial release – England and Wales)
  - 175,000 OAs
  - 1.25m postcodes captured at census and related to OAs in lookup table
  - 2.5% split between OAs (compared to 15% split across EDs in 1991)
  - Other postcodes and postcode head counts info to be added to lookup tables later



County District Ward Output Area

Microsoft Access - [Postcode to OA lookup : Table]

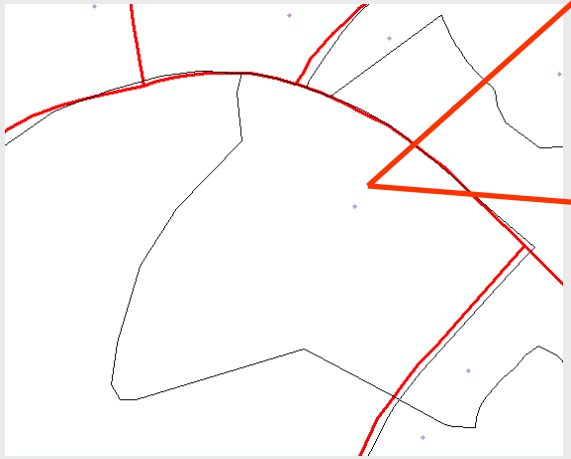
File Edit View Insert Format Records Tools Window Help

Type a question for help

County code	District code	Ward code	OA seq numbe	OA code	Postcode	Postcode split
00	MS	ND	0016	00MSND0016	SO169FQ	
00	MS	ND	0007	00MSND0007	SO169FR	
00	MS	ND	0016	00MSND0016	SO169FS	
00	MS	ND	0007	00MSND0007	SO169FT	
00	MS	ND	0018	00MSND0018	SO169FU	
00	MS	ND	0018	00MSND0018	SO169FW	
00	MS	ND	0019	00MSND0019	SO169FX	
00	MS	ND	0019	00MSND0019	SO169FY	
00	MS	ND	0019	00MSND0019	SO169FZ	
00	MS	ND	0020	00MSND0020	SO169GA	
00	MS	ND	0020	00MSND0020	SO169GB	
00	MS	ND	0020	00MSND0020	SO169GD	
00	MS	ND	0020	00MSND0020	SO169GE	
00	MS	ND	0020	00MSND0020	SO169GF	
00	MS	ND	0024	00MSND0024	SO169GG	

Record: 1025923 of 1281120

Datasheet View NUM



Postcode finder

Delivery point results This search has returned 270 results

Flat 96, Millbrook Tower, Windermere Avenue, SOUTHAMPTON, SO16 9FY
Flat 97, Millbrook Tower, Windermere Avenue, SOUTHAMPTON, SO16 9FY
Flat 98, Millbrook Tower, Windermere Avenue, SOUTHAMPTON, SO16 9FY
Flat 99, Millbrook Tower, Windermere Avenue, SOUTHAMPTON, SO16 9FY
Flat 100, Millbrook Tower, Windermere Avenue, SOUTHAMPTON, SO16 9FY
Flat 101, Millbrook Tower, Windermere Avenue, SOUTHAMPTON, SO16 9FZ
Flat 102, Millbrook Tower, Windermere Avenue, SOUTHAMPTON, SO16 9FZ

View label English Welsh New search Help

Potential developments

- Integration with MasterMap to produce new polygon set?
- Maintenance in relation to changing postcode geography?
- Maintenance in relation to changing population geography?
- All based around address-level census database

Neighbourhood statistics

- Aggregated source records from multiple suppliers
- Single hierarchy based on census OAs (and hence primarily on postcodes, with lookup tables)
- Durable core geography
- Consultation Spring 2003, pilots and review currently under way

Developments towards Super Output Areas

- OAs as building blocks
- Three-tier geography
- Tier one (pop 1-3k)
  - Automated zone design, constrained to census wards
- Tier two (pop 5-10k)
  - Automated design, with consultation
- Tier three (pop 25-50k)
  - Local consultation

Conclusion

- Entirely new Output Area geography
- Strongly based on unit postcodes
- Full boundary set and postcode lookup table now available on CD from ONS – more to follow
- Potential for geography refinement and development
- Provides basis of durable geography for Neighbourhood Statistics