

# *Spatial Signatures*

*(Urban) Form & Function in Great Britain*

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Martin Fleischmann

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[@darribas]



**The  
Alan Turing  
Institute**

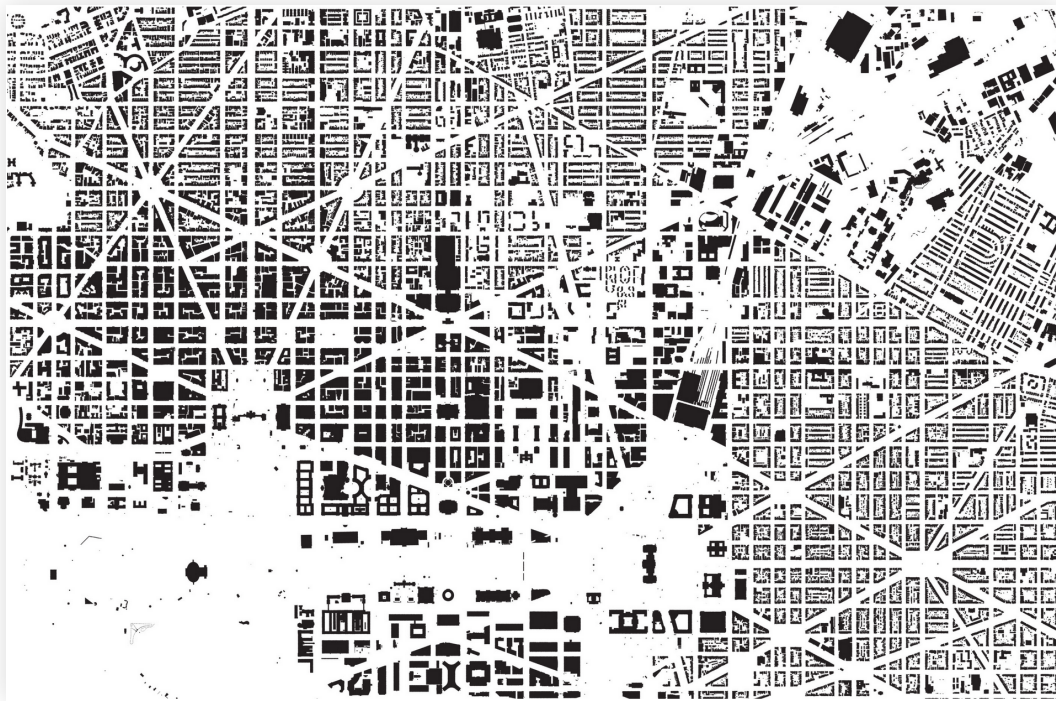


Geographic  
Data Science  
Lab

“The point”

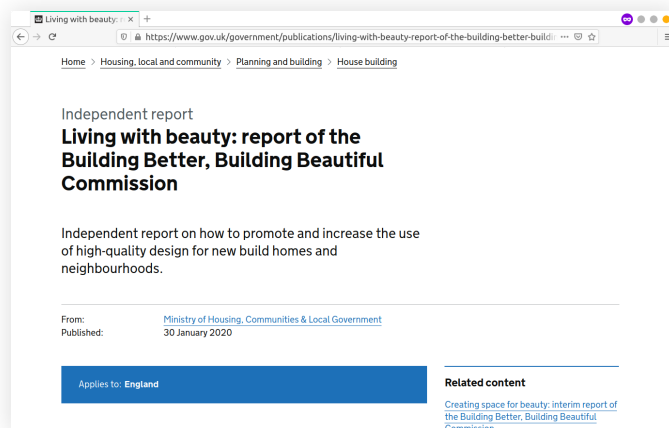
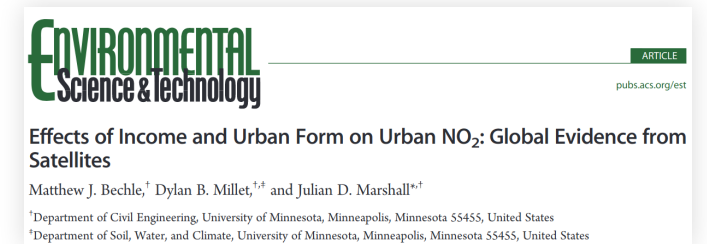
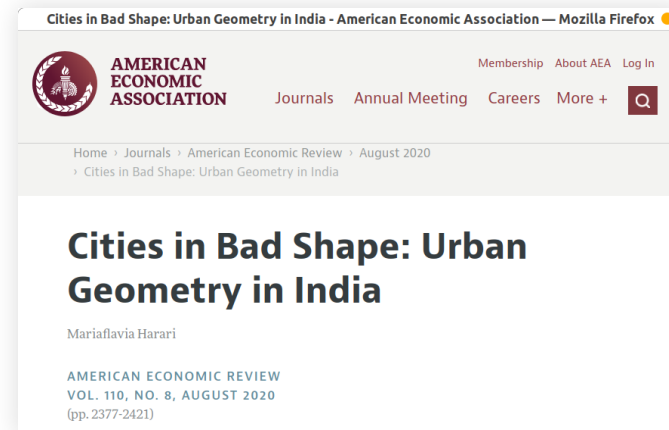
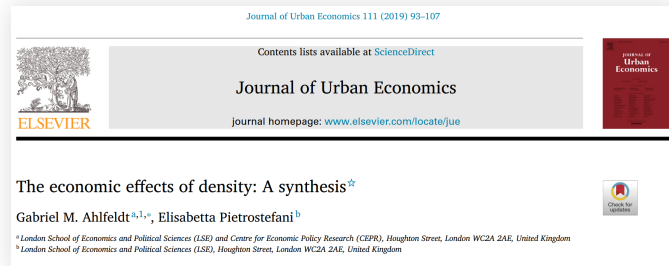


# How we arrange “stuff” in cities matters...



Source: *A map of every building in America* (New York Times)

... it matters *a lot*



## Form

*What does it look like?*

“Physical structure and appearance of cities”

## Function

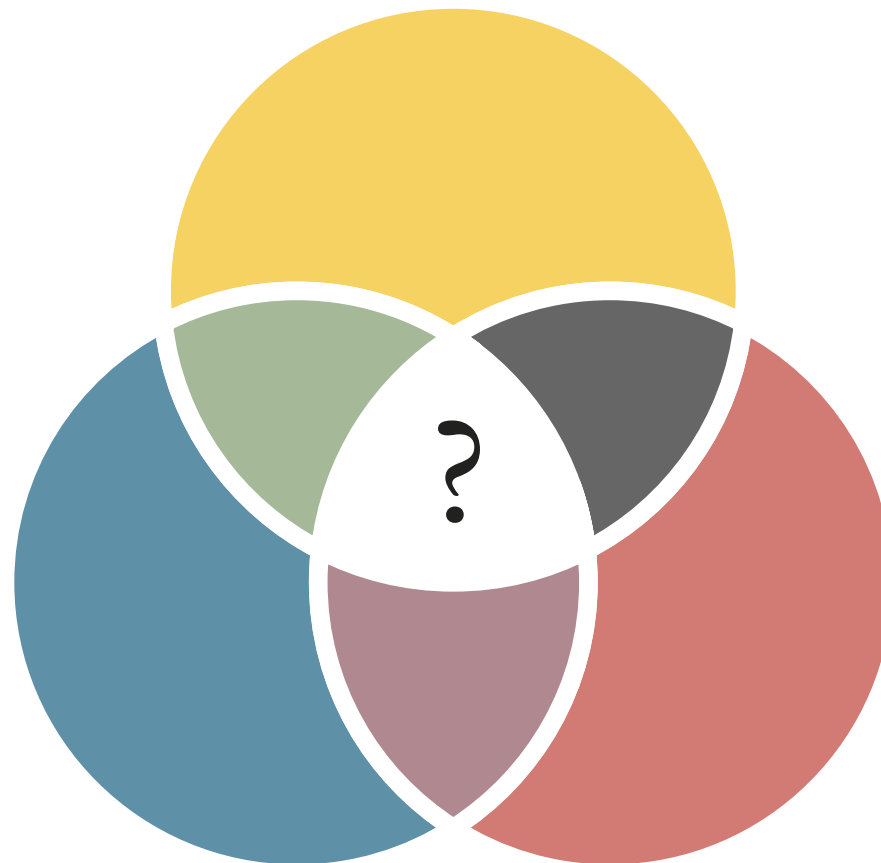
*What is it used for?*

“Activities that take place within an environment”

detailed

scalable

consistent



# Spatial Signatures

*A characterisation of space based on form and function  
designed to understand urban environments*

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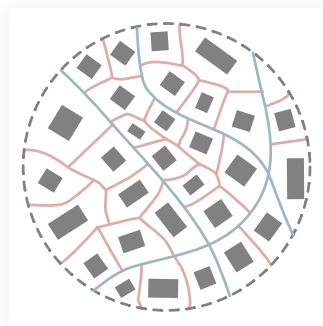


*A characterisation of space based on form and function  
designed to understand urban environments*

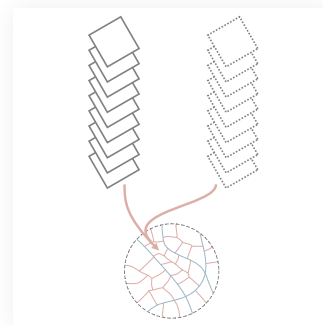
# Building *Spatial Signatures*

[STAGE] Delimiters Enclosure Anchors Encl. Tess. Characters Clusters Signatures

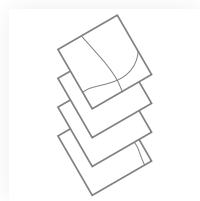
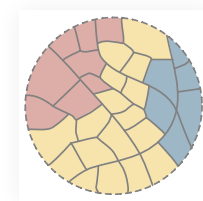
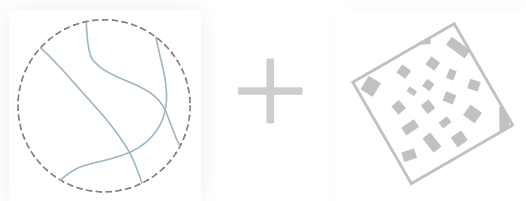
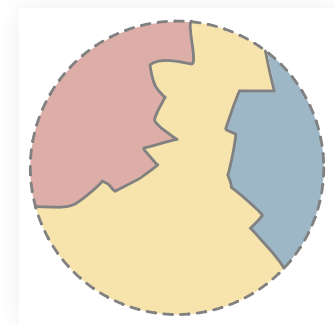
Enclosed  
Tessellation



Embedding  
*form & function*



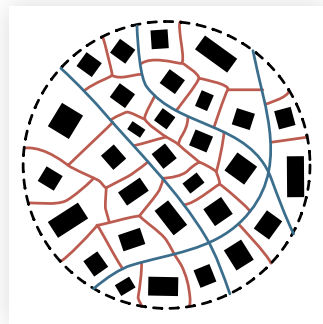
Spatial  
Signatures



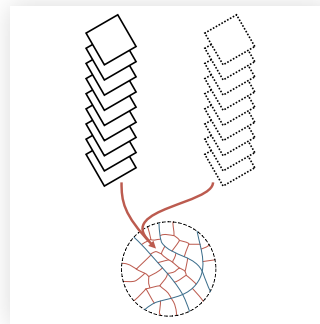
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[STAGE] Delimiters Enclosure Anchors Encl. Tess. Characters Clusters Signatures

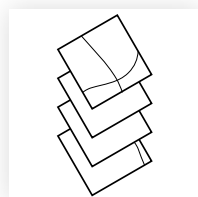
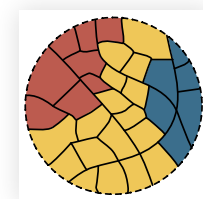
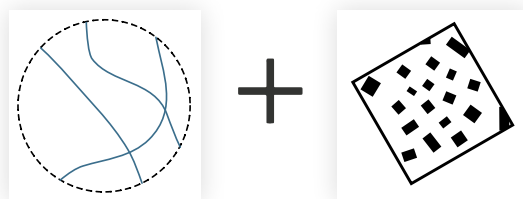
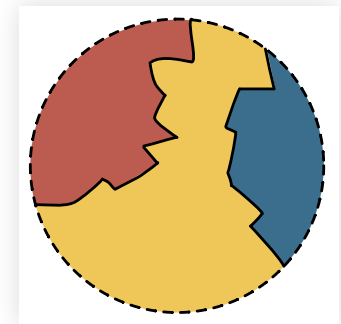
Enclosed  
Tessellation



Embedding  
*form & function*



Spatial  
Signatures



**Great Britain**

# Characters

## *Form*

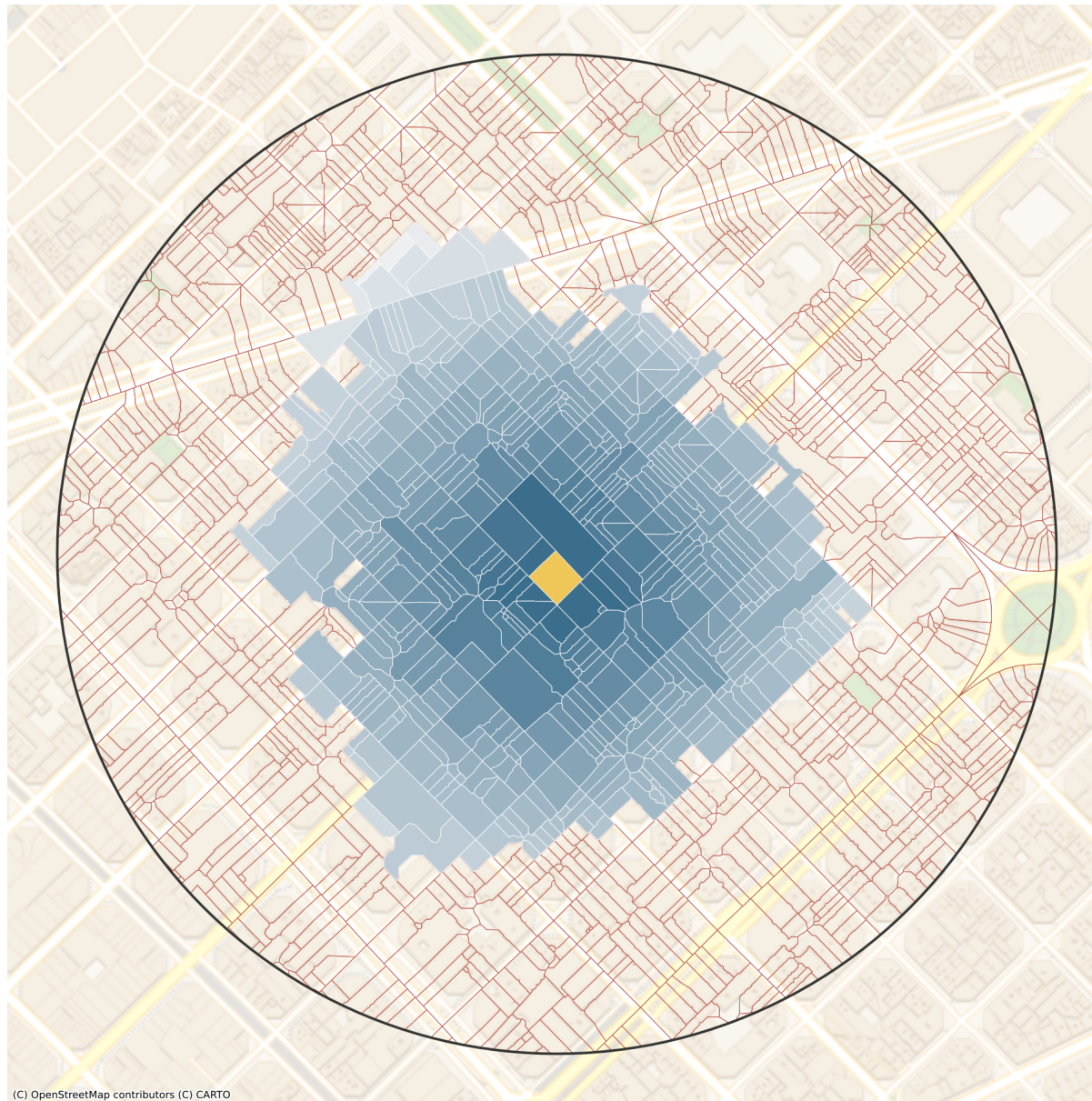
- Dimension
- Shape
- Intensity
- Connectivity
- Diversity

## *Function*

- Population
- Employment
- Industry
- Land  
use/cover
- Amenity access

$N \approx 300$

# Context



(C) OpenStreetMap contributors (C) CARTO

# Data

## *Form*

- OS OpenMap
- OS OpenRoads

## *Function*

- (Business) Census
- OpenStreetMap
- Geolytix
- Listed buildings
- CDRC
- CORINE /  
Sentinel 2
- VIIRS

# British Signatures



**P A R E N T A L**

**A D V I S O R Y**

**E X P L I C I T   C O N T E N T**

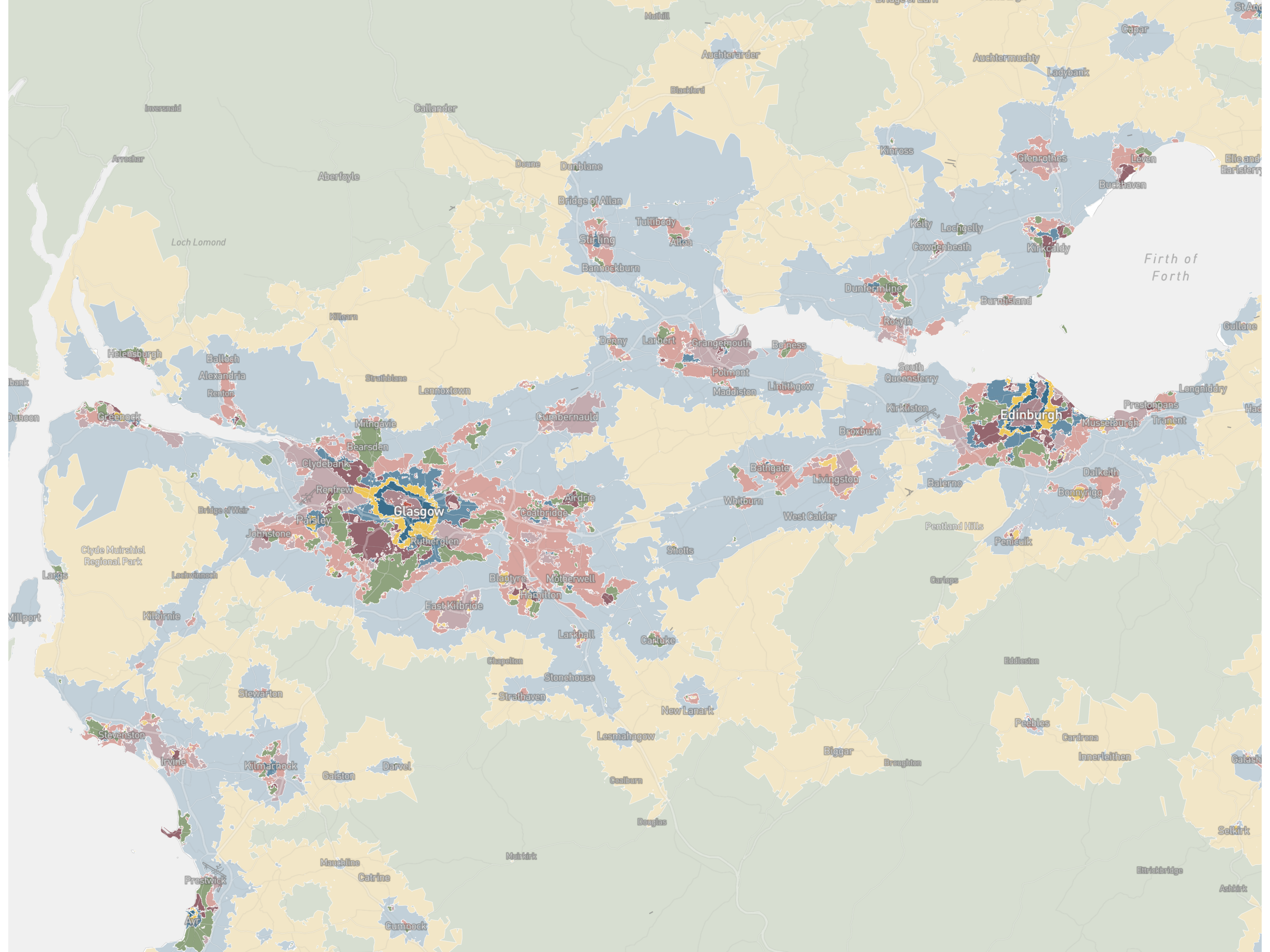
# BRITISH SIGNATURES

## Countryside



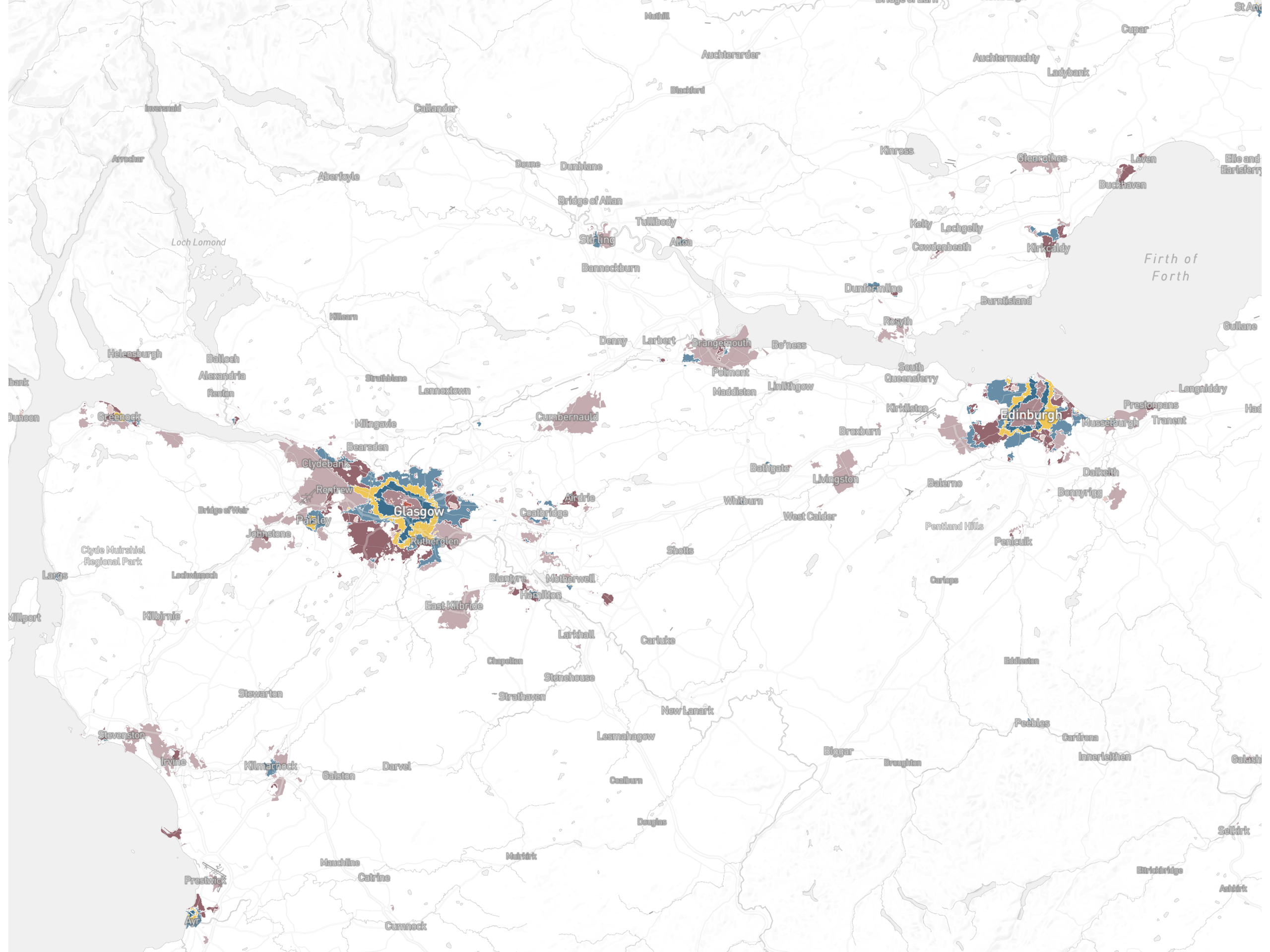
## Urban Areas





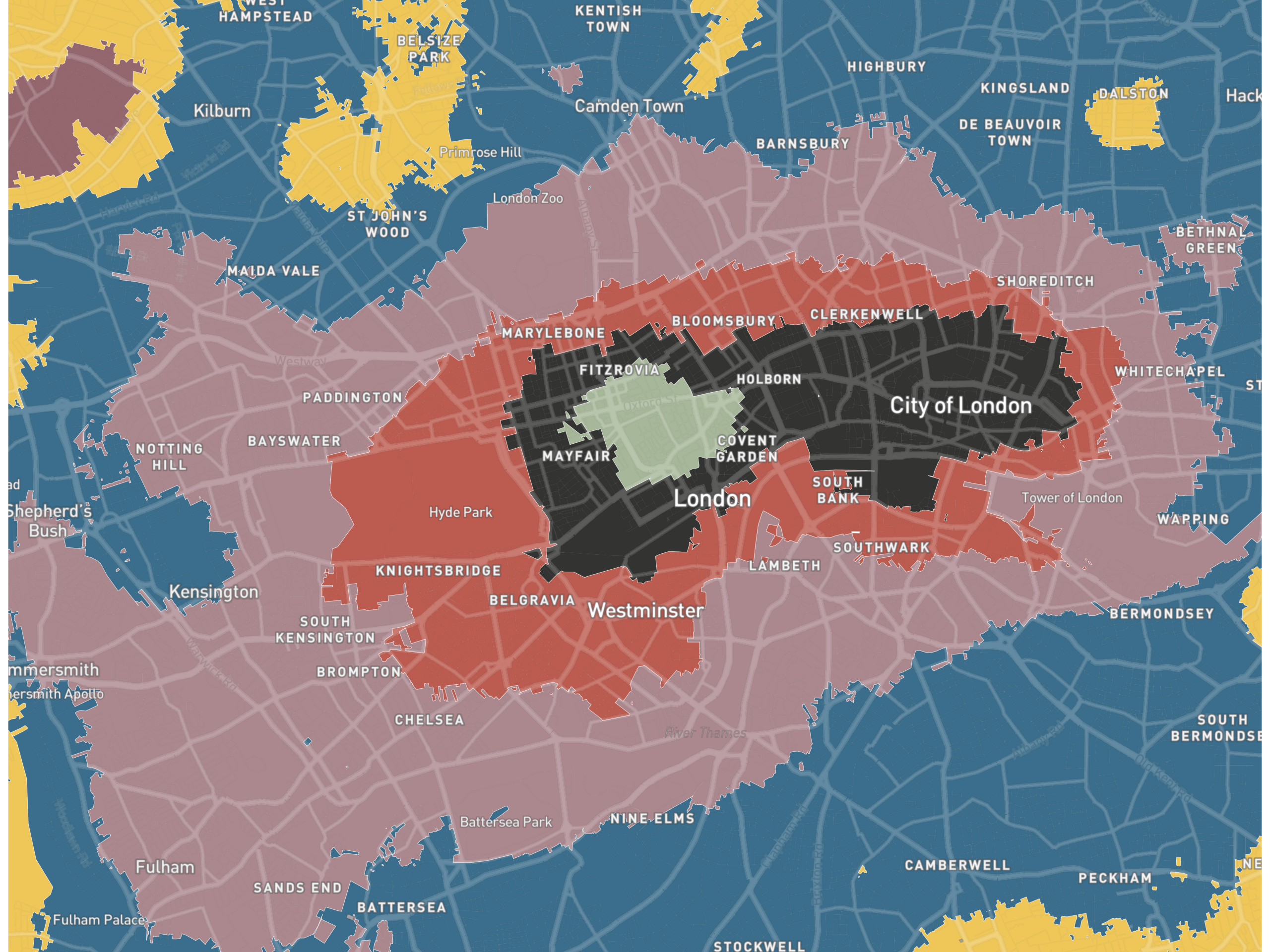






# Hierarchy of *Urbanity*





WEST  
HAMSTEAD

BELSIZE  
PARK

KENTISH  
TOWN

HIGHBURY

KINGSLAND

DALSTON

Kilburn

Camden Town

BARNSBURY

DE BEAUVOIR  
TOWN

Primrose Hill

ST JOHN'S  
WOOD

London Zoo

MAIDA VALE

BETHNAL  
GREEN

SHOREDITCH

MARYLEBONE

BLOOMSBURY

CLERKENWELL

FITZROVIA

HOLBORN

City of London

PADDINGTON

BAYSWATER

NOTTING  
HILL

MAYFAIR

COVENT  
GARDEN

London

SOUTH  
BANK

Tower of London

WAPPING

Hyde Park

KNIGHTSBRIDGE

LAMBETH

SOUTHWARK

BERMONDSEY

Westminster

BELGRAVIA

SOUTH  
KENSINGTON

BROMPTON

CHELSEA

SOUTH  
BERMONDSEY

Battersea Park

NINE-ELMS

CAMBERWELL

PECKHAM

Fulham

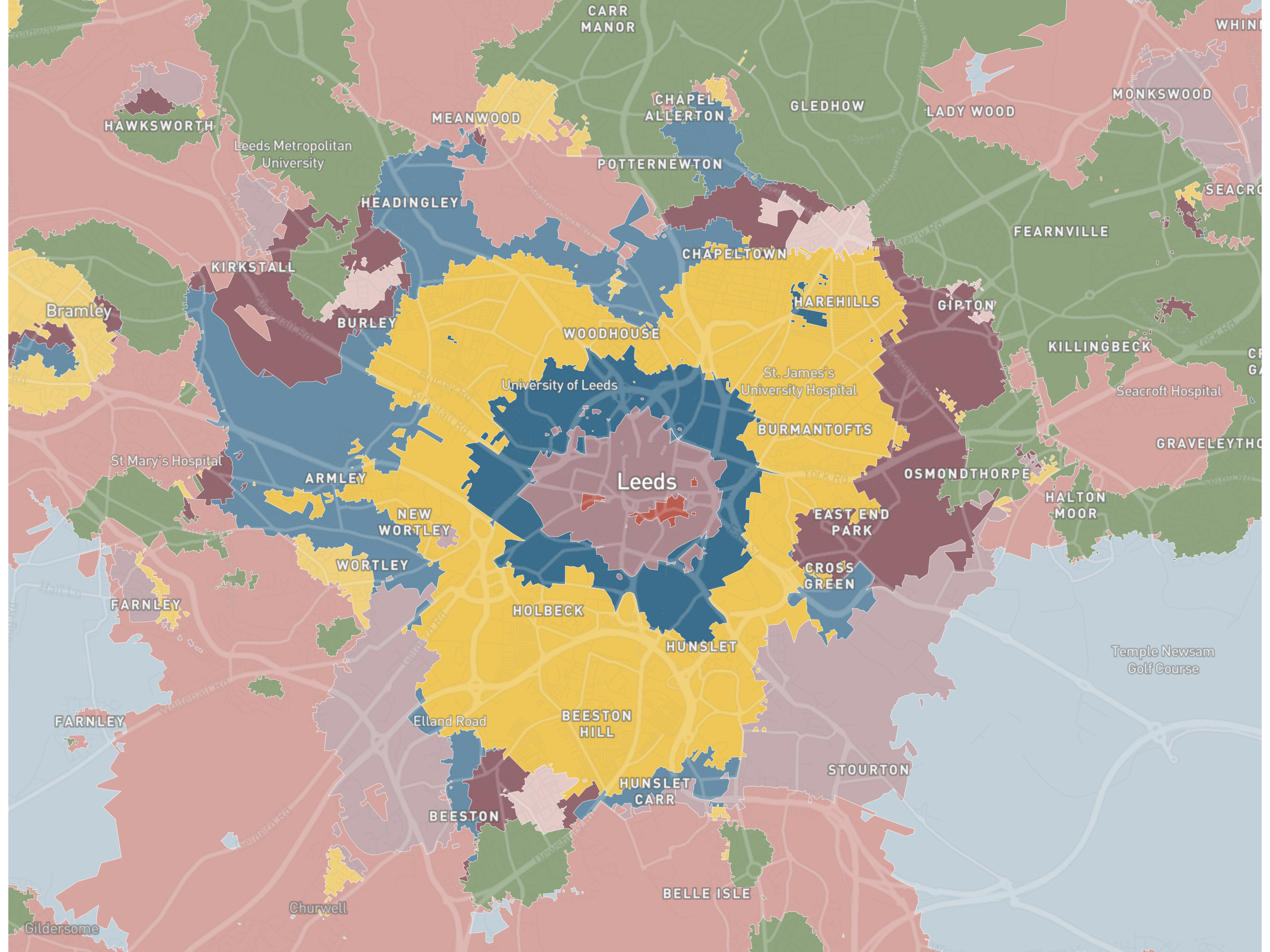
SANDS END

BATTERSEA

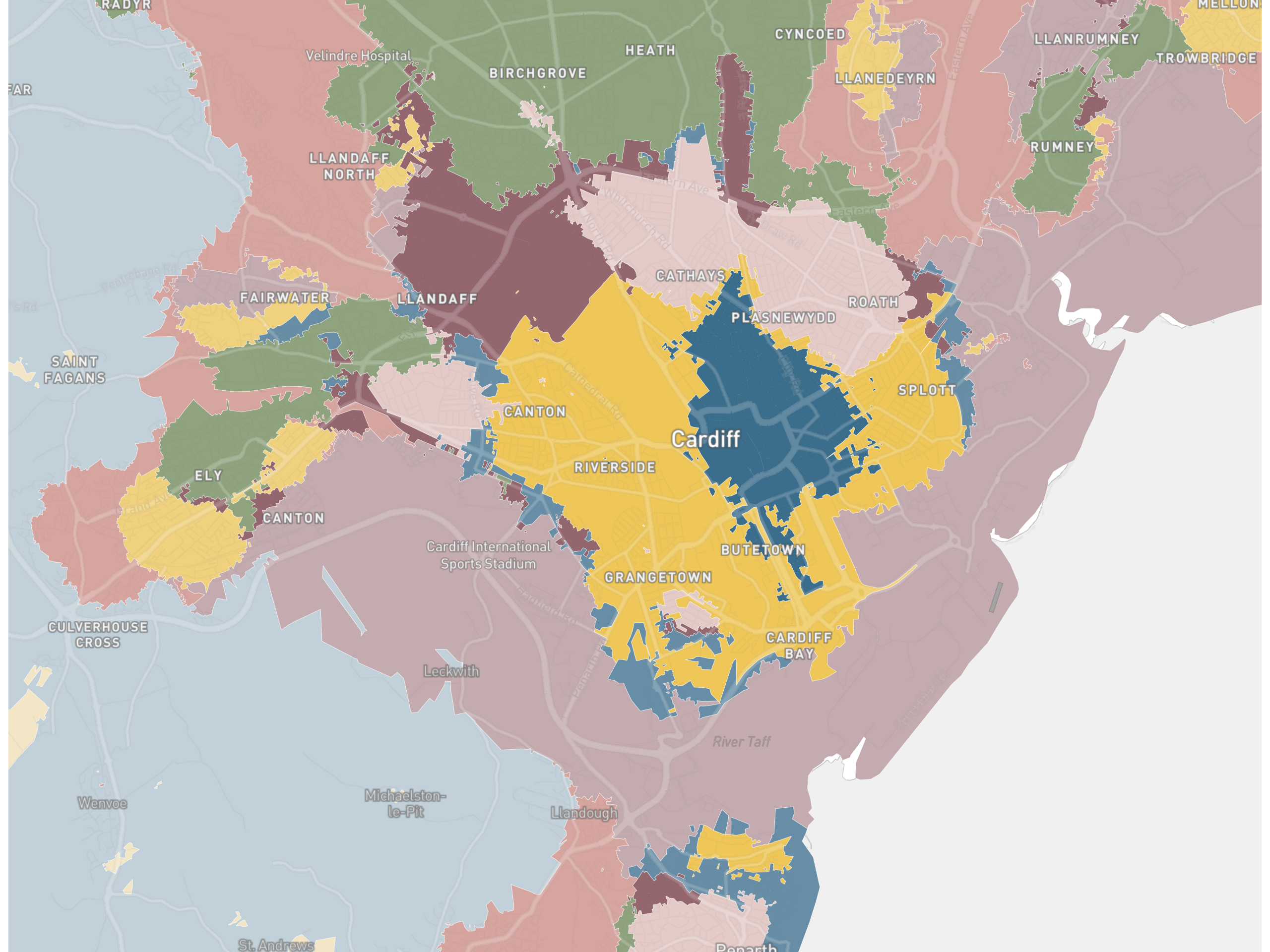
STOCKWELL

Fulham Palace

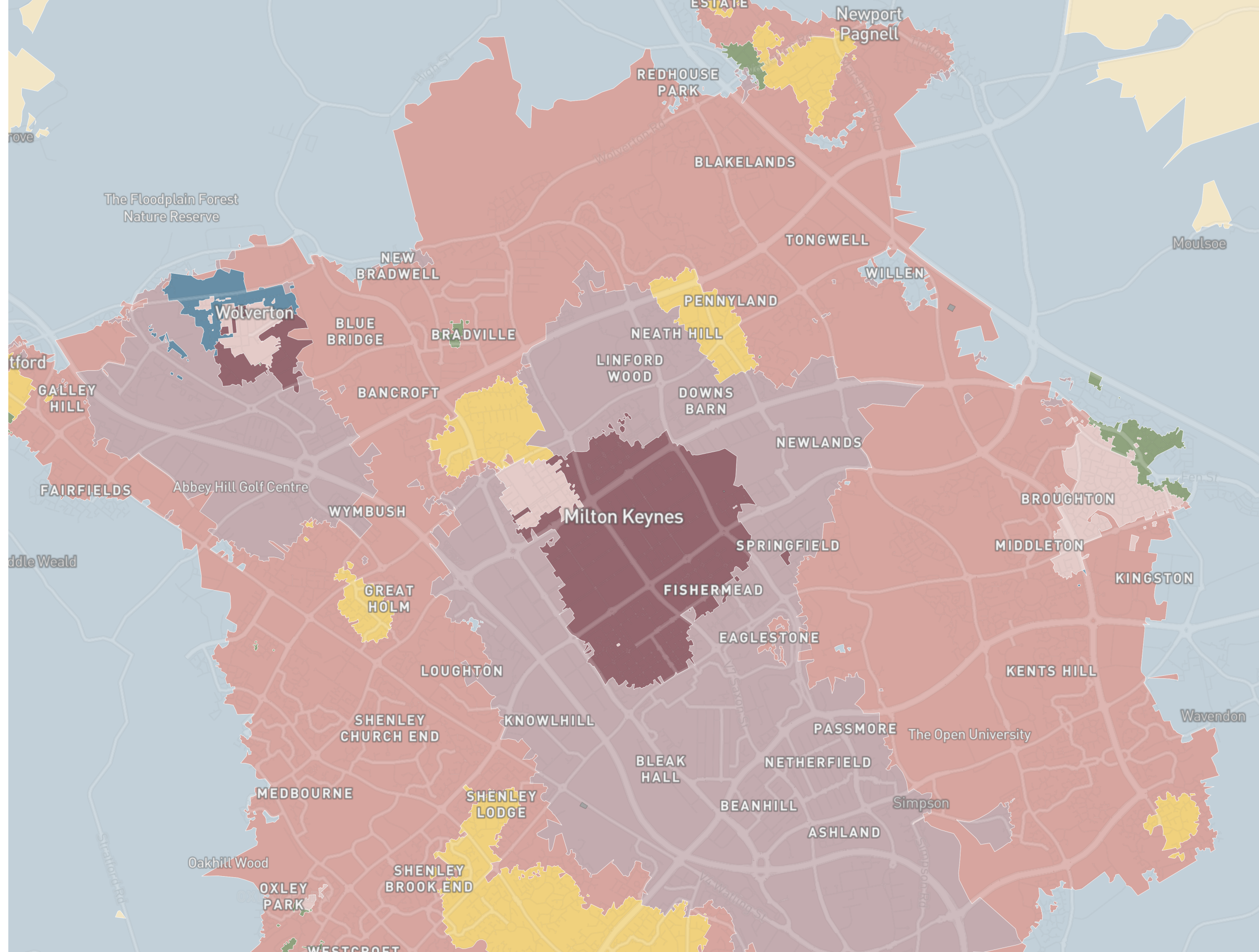






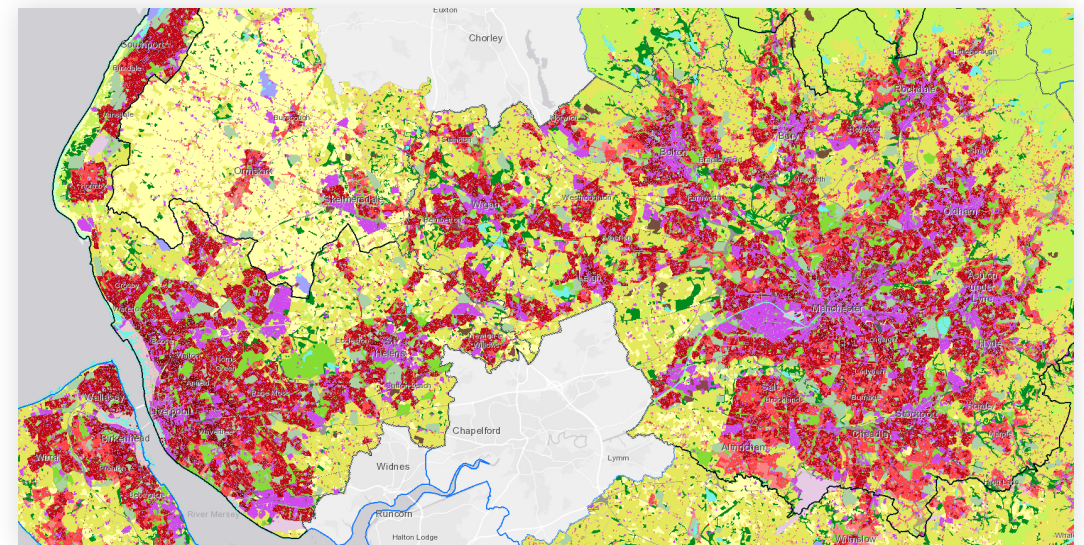
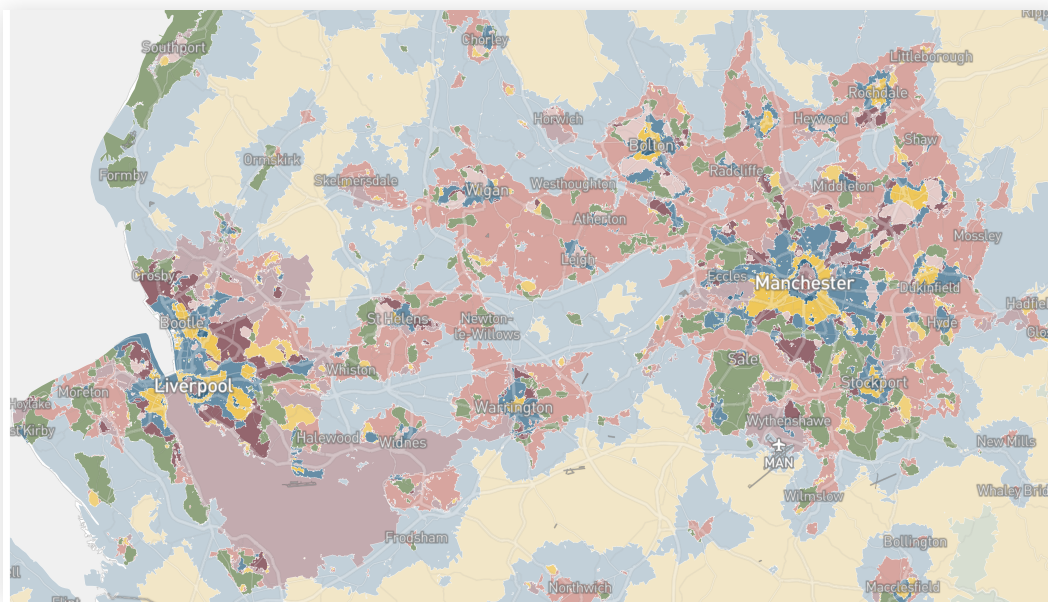






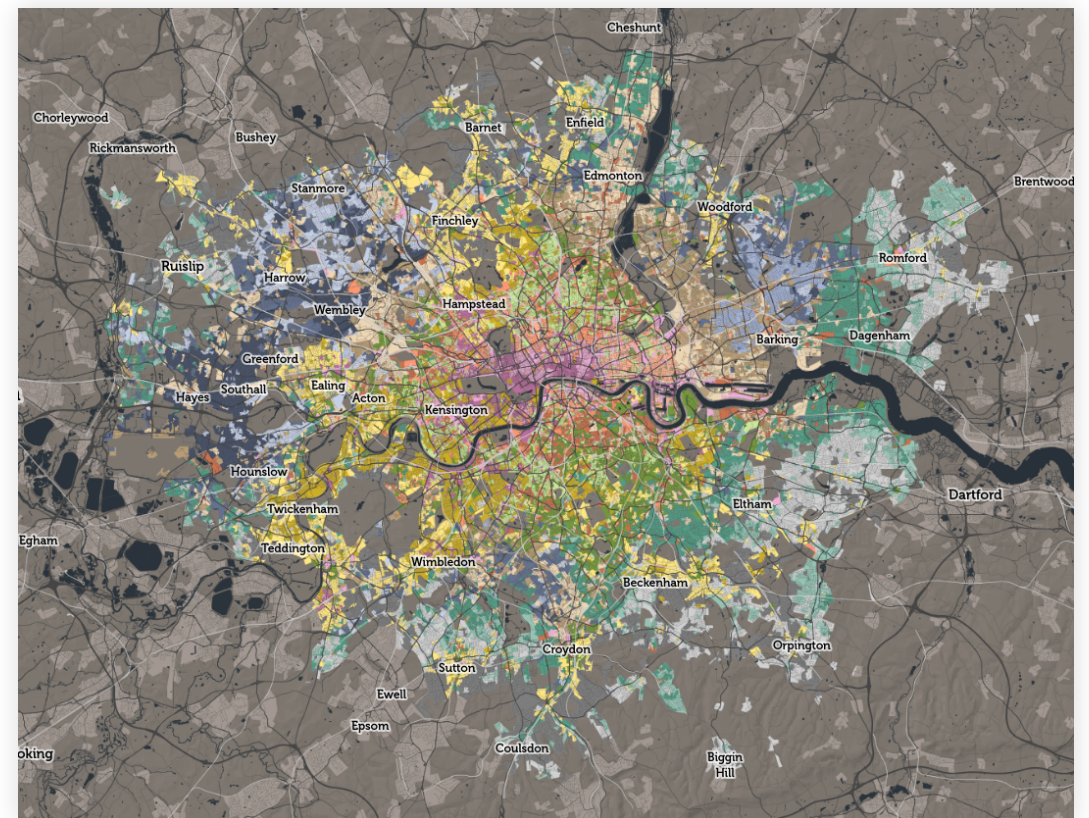
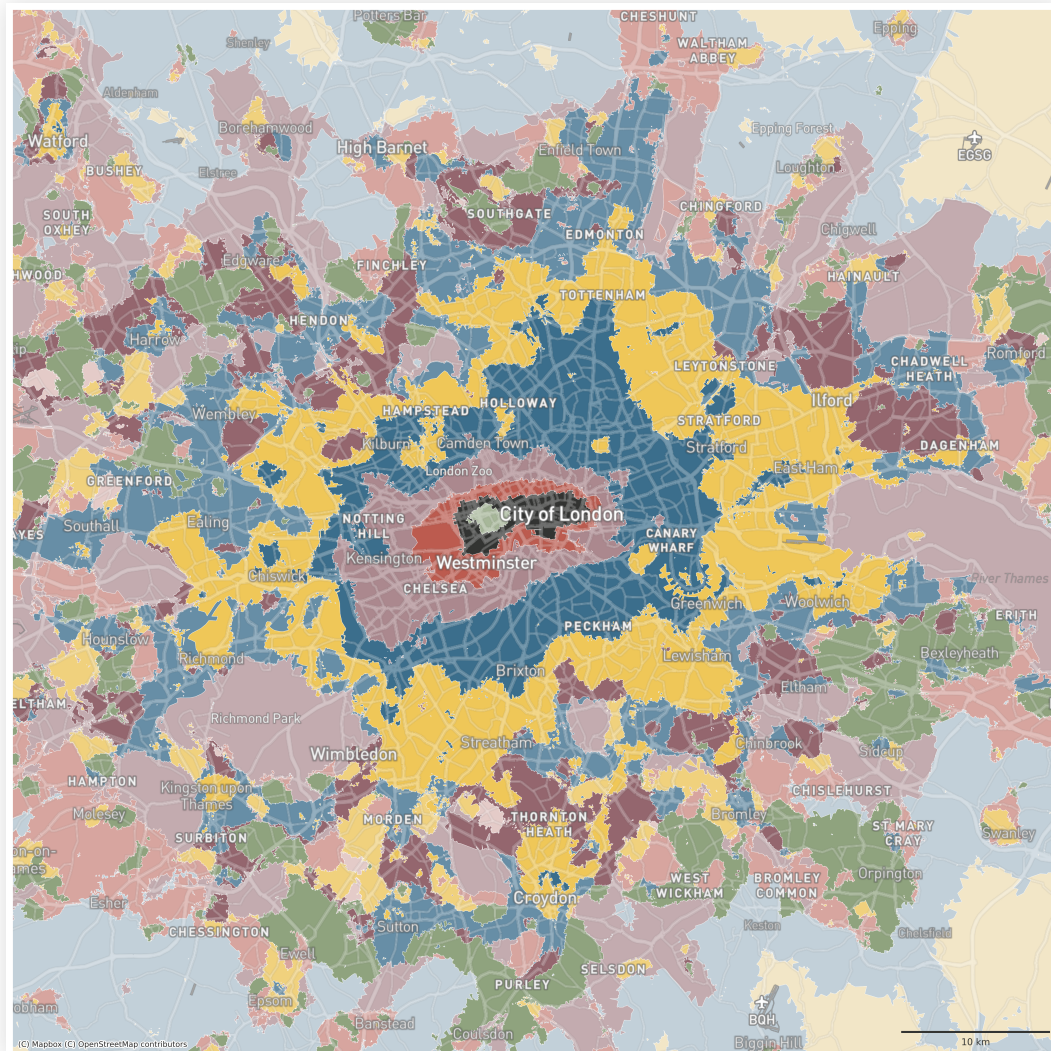


# Spatial Signatures Vs Land Use





# Spatial Signatures Vs Geodemographics



# Conclusions

1. Urban *form* and *function* matters
2. **Spatial Signatures**: F&F for cities, in detail, at scale
3. Good **measurement** → better **understanding**

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