

## Trams and house prices in Manchester

This example investigates the spatial relationship between tram stops in the Bury district of Manchester, and the price paid for houses sold in the first half of 2016.

### Select and map district boundary

In ArcGIS search for the layer **OS boundary line** and add it to your basemap. Deselect all layers except **District Borough Unitary**. Use an [online map](#) to select a Manchester borough—this example uses Bury. Filter the boundary layer to show only this layer using the expression *Name - contains - Bury*.

### House price data

Download house price data from the [Land Registry](#), searching by district and limiting the date (this example uses a 6 month range in 2016) to control for price growth. Download *at most* 1000 results (ArcGIS cannot import more than 1000; if you find yourself with a larger dataset, you can use Excel to [filter it](#)). Download the data (*selected results*) as a CSV file and delete all columns except 3-5. Insert a row at the top of the data and title these columns *Price paid*, *Date* and *Postcode*. Save the file, and drag it onto your basemap. Choose price as the attribute to show, and select your preferred drawing style. This example uses *Counts and Amounts* with the theme *above and below*, and a blue/red colour gradient to show prices relative to the average.

### Metrolink data

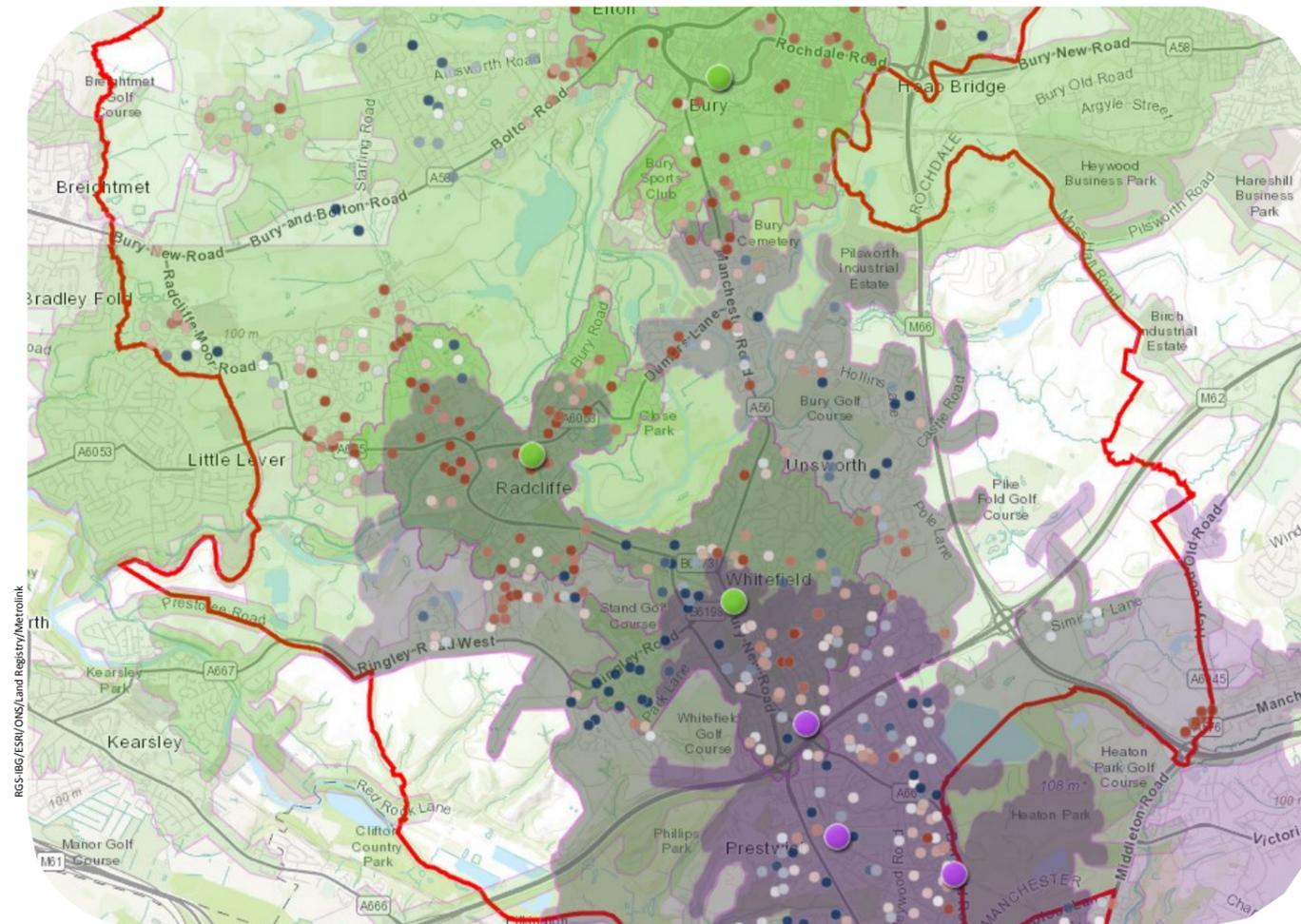
Manchester has a [geospatial data portal](#) which provides a CSV file of [rail and tram stops in the city](#) (tram stops are in the lower half of the spreadsheet in mixed-case text). Identify and copy rows for the line heading to Bury with the help of the [Metrolink network map](#), though omit Queens Road, Abraham Moss, Crumpsall and Bowker Vale as these are not in the Bury district. Delete all columns except 3-5. Copy the remaining data and paste it into the [UK grid reference finder](#) (choose XY coordinates in step 2) to convert location data from *Eastings/Northings* to *Latitude/Longitude*. Copy the converted data back to the same spreadsheet.

Create two new Excel sheets; one each for station *with* and *without* Park & Ride facilities (see [Metrolink map](#)). Save these as individual CSV files with descriptive names and import them into your map individually. Choose different symbols for each layer to reflect the two different types of station (this example uses purple for stations without P&R and green for those with P&R).

### Analysis

Perform *'Drive-time'* analysis on the stations layers. For P&R stations only, map *10 minutes* driving time using typical traffic for rush-hour. For all stations map both *1 mile walking distance* and *3 miles walking distance* (to represent a typical cycling distance). Dissolve areas from different points for each analysis.

To improve the clarity of the map change the colour and transparency for each of these layers. In this example I have used the colours of the P&R/non-P&R tram stops and increased transparency for the lower layers. Finally, move the house price data and tram stops layers above the other to make them more visible.

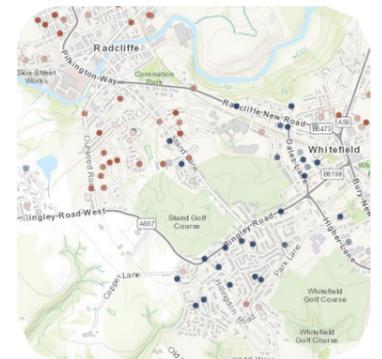


(Clockwise from top right) Plot District Borough **boundary data** to delineate the study area. Geolocate a random sample of 'price-paid' **house price data** and map to show prices relative to the average. Geo-locate **Metrolink tram stops** and differentiate those with/without Park & Ride facilities. Complete analysis area from which people would be willing to drive, cycle and walk around each station. Use these areas to identify sample populations that may be statistically analysed to evaluate any effect on house prices.

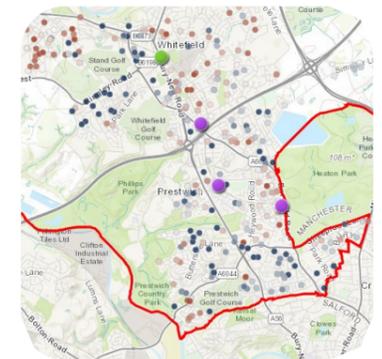
Source: RGS-IBG, (2017). Arcgis.com. ESRI. Using data from OS, Land Registry and Metrolink.



RGS-IBG/ESRI/OS



RGS-IBG/ESRI/OS/Land Registry



RGS-IBG/ESRI/OS/Land Registry/Metrolink

## Further development

- Comparative analysis of other districts of Manchester might suggest other socio-economic/geographical factors that influence house prices e.g. socio-economic group, average income, direction from city centre. Remember though, that correlation does not prove causality.
- Fieldwork to survey locals could better determine how they travel to work, and how far/long they are willing to travel by each mode of transport. Integrating this into the GIS model could reduce error and provide greater confidence in results.
- It is highly likely that there will be other (confounding) variables that affect the house prices and, consequently, the strength of any relationship between trams and house prices e.g. proximity to train stations, bus stops, open countryside, or major transport links.

## Exploring the data

- Change your assumptions about travel time/distance. How are your data and results affected? How could you reduce uncertainty and ensure your model reflects reality?
- Is the 'drive-time' analysis accurate? Use Google maps (which uses real data) to confirm travel times in rush-hour traffic. If results disagree, re-run the GIS analysis to better represent 'reality'.
- Complete a similar analysis for another city with trams, such as Sheffield. Evaluate differences and suggest further potential investigations and analyses that might further explore any relationship suggested.
- Map and integrate other transport nodes/variables, such as bus stops, train stations, and proximity to arterial roads. Account for the proportion of people using each mode by completing surveys to better understand personal travel preferences.