

Sample: Real estate and urban planning, Lisbon: report

Project: Sample: Real estate and urban planning, Lisbon

Goal: Describe the project Sample: Real estate and urban planning, Lisbon: run the analyses that tell the most about its data, draw every result, and write a cited report.

Run: 76926ded-9cc8-4578-9472-14b00b3eb370 (running, 11 agent run(s))

Generated: 2026-10-18T06:25:20Z, version 1

Model cost: USD 0.0000 over 0 model call(s)

Data used

Data	Kind	Rows	Time span	Summary	Source
Zoning districts	vector, Polygon	10		10 polygon (area) features; 'use' has 4 values (top: residential 5, mixed use 3, commercial 1); 'max_far' 1.2 to 4 (mean 2.32); 'max_height_m' 15 to 40 (mean 23.5); named by 'name' (e.g. Vila Norte, Jardim Primavera, Alto do Moinho); total area 20.02 km2; extent -9.1715,38.7188 to -9.1139,38.7550. Areas (Zoning districts) with max_far to compare and map.	[101]
Parcels	vector, Polygon	1,100		1,100 polygon (area) features; 'zone_code' has 6 values (top: I07 282, R09 189, R04 188); 'vacant' has 2 values (top: False 1051, True 49); 'built_far' 0 to 3.87 (mean 1.459); 'area_m2' 752 to 13,841 (mean 4667); 'slope_deg' 0 to 6.8 (mean 2.608); total area 5.138 km2; extent -9.1709,38.7193 to -9.1450,38.7544. Areas (Parcels) with built_far to compare and map.	[102]
Property sales	vector, Point	950	2022-01-01 to 2026-09-30	950 point features; dated by 'date' from 2022-01-01 to 2026-09-30; 'type' has 3 values (top: apartment 431, office 268, house 251); 'price_eur_m2' 2,476 to 8,706 (mean 4799); 'price_eur' 78,920 to 1,343,084 (mean 4.309e+05); 'area_m2' 24 to 242 (mean 89.94); extent -9.1704,38.7199 to -9.1457,38.7539. Dated point events by type: where and when Property sales happen.	[2]
Building permits	vector, Point	380	2023-01-01 to 2026-09-01	380 point features; dated by 'decision_month' from 2023-01-01 to 2026-09-01; 'type' has 4 values (top: extension 130, new build 127, change of use 88); 'units' 0 to 40 (mean 20.4); extent -9.1702,38.7204 to -9.1457,38.7539. Dated point events by type: where and when Building permits happen.	[3]
Transit stations	vector, Point	12		12 point features; 'lines' 1 to 2 (mean 1.333); 'daily_entries' 4,708 to 38,148 (mean 1.733e+04); named by 'name' (e.g. Metro station Jardim Primavera, Metro station Alto do Moinho, Metro station Bairro da Estacao); extent -9.1699,38.7198 to -9.1176,38.7485. Point locations of Transit stations.	[103]
Green spaces	vector, Polygon	10		10 polygon (area) features; 'type' has 3 values (top: garden 7, square 2, park 1); 'area_ha' 1.04 to 1.4 (mean 1.219); named by 'name' (e.g. Jardim Jardim Primavera, Jardim Alto do Moinho, Jardim Bairro da Estacao); total area 0.122 km2; extent -9.1688,38.7218 to -9.1188,38.7511. Areas (Green spaces) with area_ha to compare and map.	[104]

Data	Kind	Rows	Time span	Summary	Source
Streets	vector, LineString	151		151 line features; 'class' has 2 values (top: street 132, avenue 19); 'one_way' has 2 values (top: False 94, True 57); named by 'name' (e.g. Avenida Central, Avenida da Liberdade, Avenida do Mar); total length 272.2 km; extent -9.1710,38.7192 to -9.1145,38.7546. Lines (Streets) such as routes or networks.	[105]
City terrain model (DEM)	raster			1-band float32 raster (dem), 333 x 267 cells; resolution 15; band 1 12.08 to 130.7; extent -9.1715,38.7188 to -9.1140,38.7550. An elevation surface for terrain analysis.	[106]
Land values by zone and year	table	90	2018-01-01 to 2026-01-01	Table of 90 rows and 3 columns without geometry; dated by 'year' from 2018-01-01 to 2026-01-01; 'zone_code' has 10 values (top: R01 9, R02 9, R03 9); 'value_eur_m2' 1,319 to 4,341 (mean 1891). A table of Land values by zone and year without locations.	[4]
Planning applications	table	160	2025-01-01 to 2025-12-28	Table of 160 rows and 6 columns without geometry; dated by 'submitted' from 2025-01-01 to 2025-12-28; 'use' has 4 values (top: residential 47, mixed 41, hotel 37); 'status' has 3 values (top: approved 84, pending 61, refused 15); 'units' 1 to 120 (mean 55.81). A table of Planning applications without locations.	[5]
Planning committee brief	document			1-page md document 'Planning committee brief: riverside regeneration'; language en; mentions 4 place(s): Jardim dos Pinheiros (1), Jardim (1), Ribeira Sul (1), Fonte Nova (1). A document about Jardim dos Pinheiros, Jardim, Ribeira Sul.	[107]
Sample: Real estate and urban planning, Lisbon	record				[108]
Emerging hot spots: Property sales	layer, Polygon	81			[109]
Emerging hot spots: Building permits	layer, Polygon	90			[110]
Repeat and near repeat classification: Property sales	layer, Point	950			[111]
Summarize within: Parcels	layer, Polygon	1,100			[112]
Summarize within: Parcels	layer, Polygon	1,100			[113]
Summarize within: Parcels	layer, Polygon	1,100			[114]
Hot spot analysis: Property sales	layer, Polygon	213			[115]
Hot spot analysis: Building permits	layer, Point	380			[116]
Calculate density: Property sales	layer, Polygon	867			[117]
Calculate density: Building permits	layer, Polygon	1,211			[118]
Find point clusters: Transit stations	layer, Point	12			[119]
Find point clusters: cluster hulls	layer, Polygon	1			[120]

Data	Kind	Rows	Time span	Summary	Source
Find point clusters: Property sales	layer, Point	950			[121]
Find point clusters: Building permits	layer, Point	380			[122]
Find point clusters: cluster hulls	layer, Polygon	14			[123]
Find outliers: Parcels	layer, Polygon	1,100			[124]
Find outliers: Green spaces	layer, Polygon	10			[125]
Find outliers: Zoning districts	layer, Polygon	10			[126]

Timeline

Timeline: events per quarter by dataset

Per quarter: 35 quarters from 2018-01-01 to 2026-07-01; trend +3.87 per quarter; first half 96, second half 1,438 (+1397.9%)

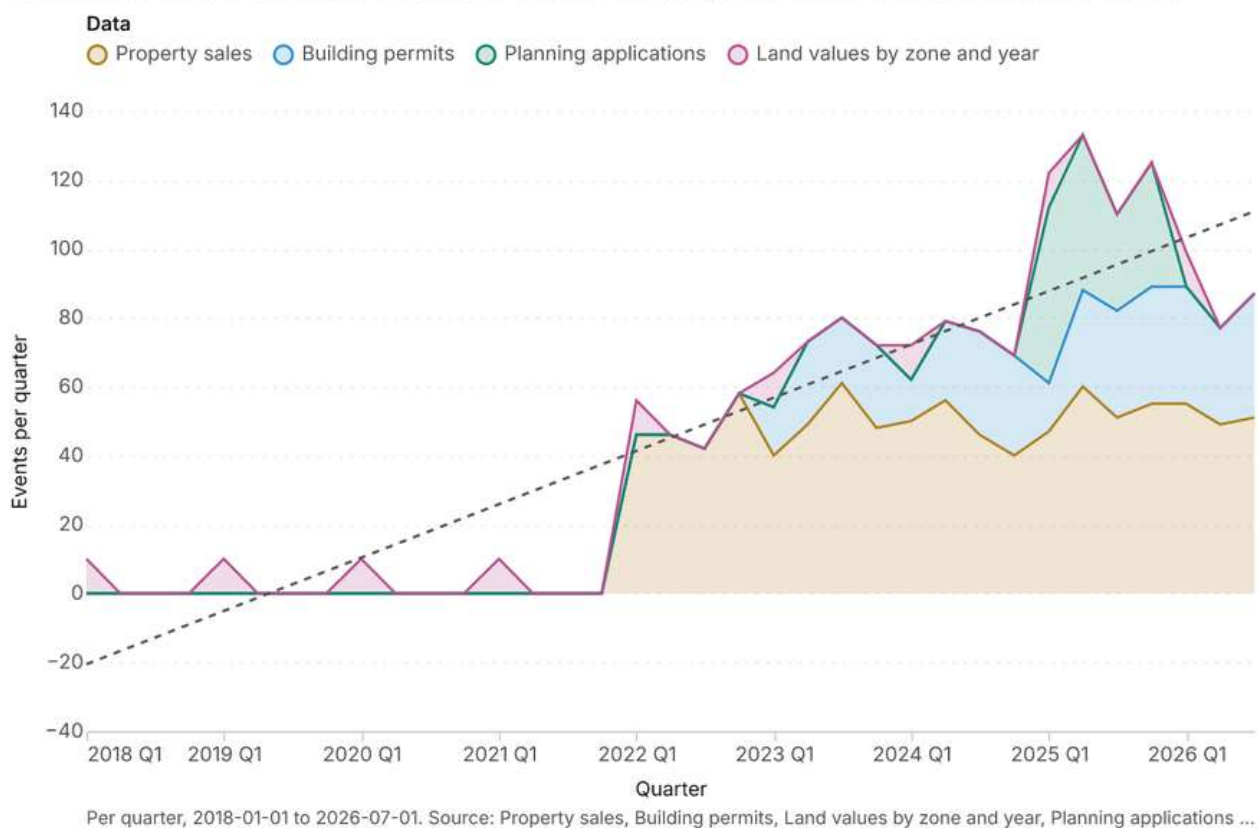


Figure 1. Timeline: events per quarter by dataset [1]. Per quarter, 2018-01-01 to 2026-07-01. Source: Property sales, Building permits, Land values by zone and year, Planning applications (1,580 features). The data is in the appendix.

The timeline counts 1,580 dated events in Property sales, Building permits, Land values by zone and year and 1 more per quarter, from Q1 2018 to Q3 2026 [1][2][3][4][5]. By dataset: Property sales 950; Building permits 380; Planning applications 160; Land values by zone and year 90 [1]. The trend is +3.87 events per quarter; the second half of the quarters has 1,438 against 96 in the first (+1397.9%) [1]. 12 of the 35 quarters had no events [1].

Busiest quarters

- Q2 2025: 133 events [1]
- Q4 2025: 125 events [1]
- Q1 2025: 122 events [1]

Quietest quarters with events

- Q1 2018: 10 events [1]
- Q1 2019: 10 events [1]
- Q1 2020: 10 events [1]

Space time hot spots

What this analysis is. Emerging hot spots: Where hot spots are new, consecutive, intensifying, persistent, diminishing, sporadic, oscillating or historical over time [6]. In ArcGIS it is Emerging Hot Spot Analysis or Create Space Time Cube [6].

Why it was run on this data. Property sales carry dates in 'date': emerging hot spot analysis finds new, intensifying and fading hot spots per month [7].

What it found. The emerging hot spots layer, titled "Emerging hot spots: Property sales," was generated with 9 properties per resolution and involved 950 features [8]. This analysis resulted in 81 features [8]. The process took 21 elapsed milliseconds [8], and the total cost incurred was 0.1475 [8].

Result	Value
result, count	81
result, elapsed ms	21
result, resolution	9
result, features used	950
result, time neighbors	0
billing, cost	0.1475
billing, list price	0.1475
billing, upstream cost	0

Findings

Evidenced: Space time hot spots on Property sales: Emerging hot spots: 1 layer saved: Emerging hot spots: Property sales (81 features) [8][9].

Evidenced: It reported result, count 81; result, elapsed ms 21; result, resolution 9; result, features used 950; result, time neighbors 0; billing, cost 0.1475 [8].

Tool gp_space_time_hot_spots; parameters {"project": "acfed0f6-9df9-4775-9325-30c0bbed70e9", "features": {"layer": "Property sales (a421b4df)"}, "interval": "month", "bin_shape": "h3", "resolution": 9, "time_field": "date"}

Space time hot spots

What this analysis is. Emerging hot spots: Where hot spots are new, consecutive, intensifying, persistent, diminishing, sporadic, oscillating or historical over time [6]. In ArcGIS it is Emerging Hot Spot Analysis or Create Space Time Cube [6].

Why it was run on this data. Building permits carry dates in 'decision_month': emerging hot spot analysis finds new, intensifying and fading hot spots per month [10].

What it found. The `gp\_space\_time\_hot\_spots` tool was run using `Building permits` data [12], resulting in the saving of emerging hot spots containing 90 features [11].

Result	Value
result, count	90
result, elapsed ms	19
result, resolution	9
result, features used	380

Result	Value
result, time neighbors	0
billing, cost	0.119
billing, list price	0.119
billing, upstream cost	0

Findings

Evidenced: Space time hot spots on Building permits: Emerging hot spots: 1 layer saved: Emerging hot spots: Building permits (90 features) [11][12].

Evidenced: It reported result, count 90; result, elapsed ms 19; result, resolution 9; result, features used 380; result, time neighbors 0; billing, cost 0.119 [11].

Tool gp_space_time_hot_spots; parameters {"agg": "sum", "project": "acfed0f6-9df9-4775-9325-30c0bbbed70e9", "features": {"layer": "Building permits (c9732c3b)"}, "interval": "month", "bin_shape": "h3", "resolution": 9, "time_field": "decision_month", "value_field": "units"}

Near repeat

What this analysis is. Repeat and near repeat classification: Classify incidents as originators, repeats (same place) or near repeats within a distance and time window, with a Knox test table [13]. In ArcGIS it is Repeat and Near Repeat Classification or Near Repeat Calculator [13].

Why it was run on this data. Near repeat analysis tests whether Property sales close in space also follow each other within 30 days [14].

What it found. Near repeat on Property sales: Repeat and near repeat classification: 1 layer saved: Repeat and near repeat classification: Property sales (950 features) [9][15]. It reported result, days 30; result, count 950; result, chains 43; result, distance m 100; result, elapsed ms 23; result, pairs linked 51 [15].

Result	Value
result, days	30
result, count	950
result, chains	43
result, distance m	100
result, elapsed ms	23
result, pairs linked	51
billing, cost	0.0785
billing, list price	0.0785
billing, upstream cost	0

Findings

Evidenced: Near repeat on Property sales: Repeat and near repeat classification: 1 layer saved: Repeat and near repeat classification: Property sales (950 features) [9][15].

Evidenced: It reported result, days 30; result, count 950; result, chains 43; result, distance m 100; result, elapsed ms 23; result, pairs linked 51 [15].

Tool gp_near_repeat; parameters {"days": 30, "project": "acfed0f6-9df9-4775-9325-30c0bbbed70e9", "features": {"layer": "Property sales (a421b4df)"}, "distance_m": 100.0, "time_field": "date"}

Summarize within

What this analysis is. Summarize within: Count and aggregate the features inside each polygon (or bin), proportionally for lines and polygons [16]. In ArcGIS it is Summarize Within or Aggregate Points; in QGIS, native:countpointsinpolygon or native:sumlinelengths [16].

Why it was run on this data. Count Transit stations inside each feature of Parcels; the counts map as a choropleth (natural breaks, sequential colors) [17].

What it found. Summarize within on Transit stations, Parcels: Summarize within: 1 layer saved: Summarize within: Parcels (1100 features) [18][19][20]. It reported result, count 1,100; result, elapsed ms 43; billing, cost 0.03226; billing, list price 0.03226; billing, upstream cost 0 [18].

Result	Value
result, count	1,100
result, elapsed ms	43
billing, cost	0.03226
billing, list price	0.03226
billing, upstream cost	0

Findings

Evidenced: Summarize within on Transit stations, Parcels: Summarize within: 1 layer saved: Summarize within: Parcels (1100 features) [18][19][20].

Evidenced: It reported result, count 1,100; result, elapsed ms 43; billing, cost 0.03226; billing, list price 0.03226; billing, upstream cost 0 [18].

Tool gp_summarize_within; parameters {"stats": [{"stat": "sum", "field": "lines"}], "project": "acfed0f6-9df9-4775-9325-30c0bbbed70e9", "features": {"layer": "Transit stations (400e1561)", "polygons": {"layer": "Parcels (ccc22cc1)"}}

Summarize within

What this analysis is. Summarize within: Count and aggregate the features inside each polygon (or bin), proportionally for lines and polygons [16]. In ArcGIS it is Summarize Within or Aggregate Points; in QGIS, native:countpointsinpolygon or native:sumlinelengths [16].

Why it was run on this data. Count Transit stations inside each feature of Parcels; the counts map as a choropleth (natural breaks, sequential colors) [17].

What it found. Summarize within on Property sales, Parcels: Summarize within: 1 layer saved: Summarize within: Parcels (1100 features) [9][20][21]. It reported result, count 1,100; result, elapsed ms 471; billing, cost 0.05102; billing, list price 0.05102; billing, upstream cost 0 [21].

Result	Value
result, count	1,100
result, elapsed ms	471
billing, cost	0.05102
billing, list price	0.05102
billing, upstream cost	0

Findings

Evidenced: Summarize within on Property sales, Parcels: Summarize within: 1 layer saved: Summarize within: Parcels (1100 features) [9][20][21].

Evidenced: It reported result, count 1,100; result, elapsed ms 471; billing, cost 0.05102; billing, list price 0.05102; billing, upstream cost 0 [21].

Tool gp_summarize_within; parameters {"stats": [{"stat": "sum", "field": "price_eur_m2"}], "project": "acfed0f6-9df9-4775-9325-30c0bbbed70e9", "features": {"layer": "Property sales (a421b4df)", "group_by": "type", "polygons": {"layer": "Parcels (ccc22cc1)"}}

Summarize within

What this analysis is. Summarize within: Count and aggregate the features inside each polygon (or bin), proportionally for lines and polygons [16]. In ArcGIS it is Summarize Within or Aggregate Points; in QGIS, native:countpointsinpolygon or native:sumlinelengths [16].

Why it was run on this data. Count Transit stations inside each feature of Parcels; the counts map as a choropleth (natural breaks, sequential colors) [17].

What it found. Summarize within on Building permits, Parcels: Summarize within: 1 layer saved: Summarize within: Parcels (1100 features) [12][20][22]. It reported result, count 1,100; result, elapsed ms 49; billing, cost 0.03962; billing, list price 0.03962; billing, upstream cost 0 [22].

Result	Value
result, count	1,100
result, elapsed ms	49
billing, cost	0.03962
billing, list price	0.03962
billing, upstream cost	0

Findings

Evidenced: Summarize within on Building permits, Parcels: Summarize within: 1 layer saved: Summarize within: Parcels (1100 features) [12][20][22].

Evidenced: It reported result, count 1,100; result, elapsed ms 49; billing, cost 0.03962; billing, list price 0.03962; billing, upstream cost 0 [22].

Tool gp_summarize_within; parameters {"stats": [{"stat": "sum", "field": "units"}], "project": "acfed0f6-9df9-4775-9325-30c0bbbed70e9", "features": {"layer": "Building permits (c9732c3b)", "group_by": "type", "polygons": {"layer": "Parcels (ccc22cc1)"}}

Zonal statistics

What this analysis is. Zonal statistics: count/min/max/mean/std/sum/median/majority per polygon as a table and as GeoJSON [23]. In ArcGIS it is Zonal Statistics as Table (polygons) [23].

Why it was run on this data. Statistics of City terrain model (DEM) inside each feature of Parcels [24].

What it found. The Zonal statistics tool (rs_zonal_statistics) was used for the analysis [25].

Findings

Evidenced: Zonal statistics: Zonal statistics: 1100 row(s) [25].

Evidenced: zones 1100 [25].

Tool rs_zonal_statistics; parameters {"stats": ["mean", "min", "max", "std"], "zones": "Parcels (ccc22cc1)", "raster_id": "City terrain model (DEM) (45e73a8a)"}

Zonal statistics

What this analysis is. Zonal statistics: count/min/max/mean/std/sum/median/majority per polygon as a table and as GeoJSON [23]. In ArcGIS it is Zonal Statistics as Table (polygons) [23].

Why it was run on this data. Statistics of City terrain model (DEM) inside each feature of Parcels [24].

What it found. The zonal statistics tool was utilized for this analysis [26]. A total of 10 row(s) were generated for 10 zones [26]. This calculation was performed as part of the `rs\_zonal\_statistics` process during step 1 [26].

Findings

Evidenced: Zonal statistics: Zonal statistics: 10 row(s) [26].

Evidenced: zones 10 [26].

Tool rs_zonal_statistics; parameters {"stats": ["mean", "min", "max", "std"], "zones": "Green spaces (448e3c1b)", "raster_id": "City terrain model (DEM) (45e73a8a)"}

Zonal statistics

What this analysis is. Zonal statistics: count/min/max/mean/std/sum/median/majority per polygon as a table and as GeoJSON [23]. In ArcGIS it is Zonal Statistics as Table (polygons) [23].

Why it was run on this data. Statistics of City terrain model (DEM) inside each feature of Parcels [24].

What it found. The rs_zonal_statistics tool produced results for 10 rows and 10 zones [27]. This indicator provides zonal statistics for the given dataset [27].

Findings

Evidenced: Zonal statistics: Zonal statistics: 10 row(s) [27].

Evidenced: zones 10 [27].

Tool rs_zonal_statistics; parameters {"stats": ["mean", "min", "max", "std"], "zones": "Zoning districts (f84e0e45)", "raster_id": "City terrain model (DEM) (45e73a8a)"}

Hot spots

What this analysis is. Hot spot analysis: Getis-Ord Gi* hot and cold spots with z-scores, p-values and confidence bins [28]. In ArcGIS it is Find Hot Spots or Hot Spot Analysis (Getis-Ord Gi*); in QGIS, qgis:hotspot (plugin) [28].

Why it was run on this data. 950 points: Getis-Ord Gi* tests whether the concentrations in Property sales are statistically significant [29].

What it found. Hot spots on Property sales: Hot spot analysis: 1 layer saved: Hot spot analysis: Property sales (213 features) [9][30]. It reported result, bins 213; result, count 213; result, elapsed ms 37; result, cell size m 200; result, incidents used 950; result, distance band m 200 [30].

Result	Value
result, bins	213
result, count	213
result, elapsed ms	37
result, cell size m	200
result, incidents used	950
result, distance band m	200
billing, cost	0.069
billing, list price	0.069
billing, upstream cost	0

Findings

Evidenced: Hot spots on Property sales: Hot spot analysis: 1 layer saved: Hot spot analysis: Property sales (213 features) [9][30].

Evidenced: It reported result, bins 213; result, count 213; result, elapsed ms 37; result, cell size m 200; result, incidents used 950; result, distance band m 200 [30].

Tool gp_hot_spots; parameters {"project": "acfed0f6-9df9-4775-9325-30c0bbbed70e9", "features": {"layer": "Property sales (a421b4df)"}, "aggregation": "hexagon", "cell_size_m": 200.0, "distance_band_m": 200.0}

Hot spots

What this analysis is. Hot spot analysis: Getis-Ord Gi* hot and cold spots with z-scores, p-values and confidence bins [28]. In ArcGIS it is Find Hot Spots or Hot Spot Analysis (Getis-Ord Gi*); in QGIS, qgis:hotspot (plugin) [28].

Why it was run on this data. 380 points: Getis-Ord Gi* tests whether the concentrations in Building permits are statistically significant [31].

What it found. Hot spots on Building permits: Hot spot analysis: 1 layer saved: Hot spot analysis: Building permits (380 features) [12][32]. It reported result, count 380; result, elapsed ms 10; result, excluded null 0; result, distance band m 500; billing, cost 0.0576; billing, list price 0.0576 [32].

Result	Value
result, count	380
result, elapsed ms	10
result, excluded null	0
result, distance band m	500
billing, cost	0.0576
billing, list price	0.0576
billing, upstream cost	0

Findings

Evidenced: Hot spots on Building permits: Hot spot analysis: 1 layer saved: Hot spot analysis: Building permits (380 features) [12][32].

Evidenced: It reported result, count 380; result, elapsed ms 10; result, excluded null 0; result, distance band m 500; billing, cost 0.0576; billing, list price 0.0576 [32].

Tool gp_hot_spots; parameters {"field": "units", "project": "acfed0f6-9df9-4775-9325-30c0bbbed70e9", "features": {"layer": "Building permits (c9732c3b)"}, "aggregation": "hexagon", "cell_size_m": 200.0, "distance_band_m": 500.0}

Calculate density

What this analysis is. Calculate density: Kernel density per square kilometer on a grid [33]. In ArcGIS it is Calculate Density or Kernel Density; in QGIS, native:heatmapkerneldensityestimation [33].

Why it was run on this data. 950 points in Property sales: a density surface shows where they concentrate [34].

What it found. The calculation utilized the Property sales data [9] and produced a total count of

Result	Value
result, count	867
result, elapsed ms	31
result, bandwidth m	200
result, cell size m	100
result, excluded null	0
result, max density per km2	364
billing, cost	0.069
billing, list price	0.069
billing, upstream cost	0

Findings

Evidenced: Calculate density on Property sales: Calculate density: 1 layer saved: Calculate density: Property sales (867 features) [9][35].

Evidenced: It reported result, count 867; result, elapsed ms 31; result, bandwidth m 200; result, cell size m 100; result, excluded null 0; result, max density per km2 364 [35].

Tool gp_calculate_density; parameters {"kernel": "quartic", "project": "acfed0f6-9df9-4775-9325-30c0bbbed70e9", "features": {"layer": "Property sales (a421b4df)"}, "bandwidth_m": 200.0, "cell_size_m": 100.0}

Calculate density

What this analysis is. Calculate density: Kernel density per square kilometer on a grid [33]. In ArcGIS it is Calculate Density or Kernel Density; in QGIS, native:heatmapkerneldensityestimation [33].

Why it was run on this data. 380 points in Building permits: a density surface shows where they concentrate [36].

What it found. The density calculation used the Building permits layer [12]. The process resulted in 1,211 features [37]. This calculation required 41 milliseconds and generated a bandwidth of 500 meters [37]. The resulting max density per km^2 was 2,113 [37].

Result	Value
result, count	1,211
result, elapsed ms	41
result, bandwidth m	500
result, cell size m	100
result, excluded null	0
result, max density per km2	2,113
billing, cost	0.0576
billing, list price	0.0576
billing, upstream cost	0

Findings

Evidenced: Calculate density on Building permits: Calculate density: 1 layer saved: Calculate density: Building permits (1211 features) [12][37].

Evidenced: It reported result, count 1,211; result, elapsed ms 41; result, bandwidth m 500; result, cell size m 100; result, excluded null 0; result, max density per km2 2,113 [37].

Tool gp_calculate_density; parameters {"kernel": "quartic", "project": "acfed0f6-9df9-4775-9325-30c0bbbed70e9", "features": {"layer": "Building permits (c9732c3b)"}, "bandwidth_m": 500.0, "cell_size_m": 100.0, "weight_field": "units"}

Find point clusters

What this analysis is. Find point clusters: Density-based clusters (DBSCAN, HDBSCAN or OPTICS, optionally space-time) with hulls and noise [38]. In ArcGIS it is Find Point Clusters or Density-based Clustering; in QGIS, native:dbscanclustering or native:stdbscanclustering [38].

Why it was run on this data. DBSCAN finds dense groups of Transit stations and separates noise [39].

What it found. The `gp\_find\_point\_clusters` tool processed the `Transit stations` layer [19]. This process yielded 12\$ point clusters [40]. The resulting noise count was 0\$ [40], and the maximum cluster distance was 2,000\$ meters [40]. The operation was completed in 5\$ milliseconds [40] and included 12\$ features in the final output [40].

Result	Value
result, count	12
result, noise	0
result, distance m	2,000
result, elapsed ms	5
result, min points	3
billing, cost	0.05024
billing, list price	0.05024
billing, upstream cost	0

Findings

Evidenced: Find point clusters on Transit stations: Find point clusters: 2 layers saved: Find point clusters: Transit stations (12 features); Find point clusters: cluster hulls (1 feature) [19][40].

Evidenced: It reported result, count 12; result, noise 0; result, distance m 2,000; result, elapsed ms 5; result, min points 3; billing, cost 0.05024 [40].

Tool gp_find_point_clusters; parameters {"method": "dbscan", "project": "acfed0f6-9df9-4775-9325-30c0bbbed70e9", "features": {"layer": "Transit stations (400e1561)"}, "distance_m": 2000.0, "min_points": 3}

Find point clusters

What this analysis is. Find point clusters: Density-based clusters (DBSCAN, HDBSCAN or OPTICS, optionally space-time) with hulls and noise [38]. In ArcGIS it is Find Point Clusters or Density-based Clustering; in QGIS, native:dbscanclustering or native:stdbcanclustering [38].

Why it was run on this data. DBSCAN finds dense groups of Property sales and separates noise [41].

What it found. Find point clusters on Property sales: Find point clusters: 1 layer saved: Find point clusters: Property sales (950 features) [9][42]. It reported result, count 950; result, noise 950; result, distance m 100; result, elapsed ms 12; result, min points 20; billing, cost 0.069 [42].

Result	Value
result, count	950
result, noise	950
result, distance m	100
result, elapsed ms	12
result, min points	20
billing, cost	0.069
billing, list price	0.069
billing, upstream cost	0

Findings

Evidenced: Find point clusters on Property sales: Find point clusters: 1 layer saved: Find point clusters: Property sales (950 features) [9][42].

Evidenced: It reported result, count 950; result, noise 950; result, distance m 100; result, elapsed ms 12; result, min points 20; billing, cost 0.069 [42].

Tool gp_find_point_clusters; parameters {"method": "dbscan", "project": "acfed0f6-9df9-4775-9325-30c0bbbed70e9", "features": {"layer": "Property sales (a421b4df)"}, "distance_m": 100.0, "min_points": 20}

Find point clusters

What this analysis is. Find point clusters: Density-based clusters (DBSCAN, HDBSCAN or OPTICS, optionally space-time) with hulls and noise [38]. In ArcGIS it is Find Point Clusters or Density-based Clustering; in QGIS, native:dbscanclustering or native:stdbcanclustering [38].

Why it was run on this data. DBSCAN finds dense groups of Building permits and separates noise [43].

What it found. Building permits served as the input data for the point cluster analysis [12].

Result	Value
result, count	380
result, noise	126
result, distance m	200
result, elapsed ms	11
result, min points	10

Result	Value
billing, cost	0.0576
billing, list price	0.0576
billing, upstream cost	0

Findings

Evidenced: Find point clusters on Building permits: Find point clusters: 2 layers saved: Find point clusters: Building permits (380 features); Find point clusters: cluster hulls (14 features) [12][44].

Evidenced: It reported result, count 380; result, noise 126; result, distance m 200; result, elapsed ms 11; result, min points 10; billing, cost 0.0576 [44].

Tool gp_find_point_clusters; parameters {"method": "dbscan", "project": "acfed0f6-9df9-4775-9325-30c0bbbed70e9", "features": {"layer": "Building permits (c9732c3b)"}, "distance_m": 200.0, "min_points": 10}

Outliers

What this analysis is. Find outliers: Anselin local Moran's I: HH, LL clusters and HL, LH outliers [45]. In ArcGIS it is Find Outliers or Cluster and Outlier Analysis (Anselin Local Moran's I) [45].

Why it was run on this data. Local Moran's I maps clusters and outliers of 'built_far' [46].

What it found. The `gp\_outliers` tool was utilized on the Parcels layer [20]. The analysis result reported a count of 1,100 features [47]. This task was completed with an elapsed time of 74 ms [47]. Key metrics generated included a distance band of 86.92 m [47], and the billing cost was 0.083 [47].

Result	Value
result, count	1,100
result, elapsed ms	74
result, permutations	199
result, excluded null	0
result, distance band m	86.92
billing, cost	0.083
billing, list price	0.083
billing, upstream cost	0

Findings

Evidenced: Outliers on Parcels: Find outliers: 1 layer saved: Find outliers: Parcels (1100 features) [20][47].

Evidenced: It reported result, count 1,100; result, elapsed ms 74; result, permutations 199; result, excluded null 0; result, distance band m 86.92; billing, cost 0.083 [47].

Tool gp_outliers; parameters {"field": "built_far", "project": "acfed0f6-9df9-4775-9325-30c0bbbed70e9", "features": {"layer": "Parcels (ccc22cc1)"}, "aggregation": "hexagon"}

Outliers

What this analysis is. Find outliers: Anselin local Moran's I: HH, LL clusters and HL, LH outliers [45]. In ArcGIS it is Find Outliers or Cluster and Outlier Analysis (Anselin Local Moran's I) [45].

Why it was run on this data. Local Moran's I maps clusters and outliers of 'area_ha' [48].

What it found. Outliers on Green spaces: Find outliers: 1 layer saved: Find outliers: Green spaces (10 features) [49][50]. It reported result, count 10; result, elapsed ms 3; result, permutations 199; result, excluded null 0; result, distance band m 1,747; billing, cost 0.0503 [49].

Result	Value
result, count	10
result, elapsed ms	3
result, permutations	199
result, excluded null	0
result, distance band m	1,747
billing, cost	0.0503
billing, list price	0.0503
billing, upstream cost	0

Findings

Evidenced: Outliers on Green spaces: Find outliers: 1 layer saved: Find outliers: Green spaces (10 features) [49][50].

Evidenced: It reported result, count 10; result, elapsed ms 3; result, permutations 199; result, excluded null 0; result, distance band m 1,747; billing, cost 0.0503 [49].

Tool gp_outliers; parameters {"field": "area_ha", "project": "acfed0f6-9df9-4775-9325-30c0bbbed70e9", "features": {"layer": "Green spaces (448e3c1b)"}, "aggregation": "hexagon"}

Outliers

What this analysis is. Find outliers: Anselin local Moran's I: HH, LL clusters and HL, LH outliers [45]. In ArcGIS it is Find Outliers or Cluster and Outlier Analysis (Anselin Local Moran's I) [45].

Why it was run on this data. Local Moran's I maps clusters and outliers of 'max_far' [51].

What it found. Outliers on Zoning districts: Find outliers: 1 layer saved: Find outliers: Zoning districts (10 features) [52][53]. It reported result, count 10; result, elapsed ms 2; result, permutations 199; result, excluded null 0; result, distance band m 1,435; billing, cost 0.0503 [52].

Result	Value
result, count	10
result, elapsed ms	2
result, permutations	199
result, excluded null	0
result, distance band m	1,435
billing, cost	0.0503
billing, list price	0.0503
billing, upstream cost	0

Findings

Evidenced: Outliers on Zoning districts: Find outliers: 1 layer saved: Find outliers: Zoning districts (10 features) [52][53].

Evidenced: It reported result, count 10; result, elapsed ms 2; result, permutations 199; result, excluded null 0; result, distance band m 1,435; billing, cost 0.0503 [52].

Tool gp_outliers; parameters {"field": "max_far", "project": "acfed0f6-9df9-4775-9325-30c0bbbed70e9", "features": {"layer": "Zoning districts (f84e0e45)"}, "aggregation": "hexagon"}

Maps and charts

The run also made 21 map image(s) [54][55][56][57][58][59][60][61][62][63][64][65][66][67][68][69][70][71][72][73][74] and 26 chart(s) [75][76][77][78][79][80][81][82][83][84][85][86][87][88][89][90][91][92][93][94][95][96][97][98][99][100].

Emerging hot spots: Property sales



Figure 2. Emerging hot spots: Property sales [54]

Emerging hot spots: Building permits

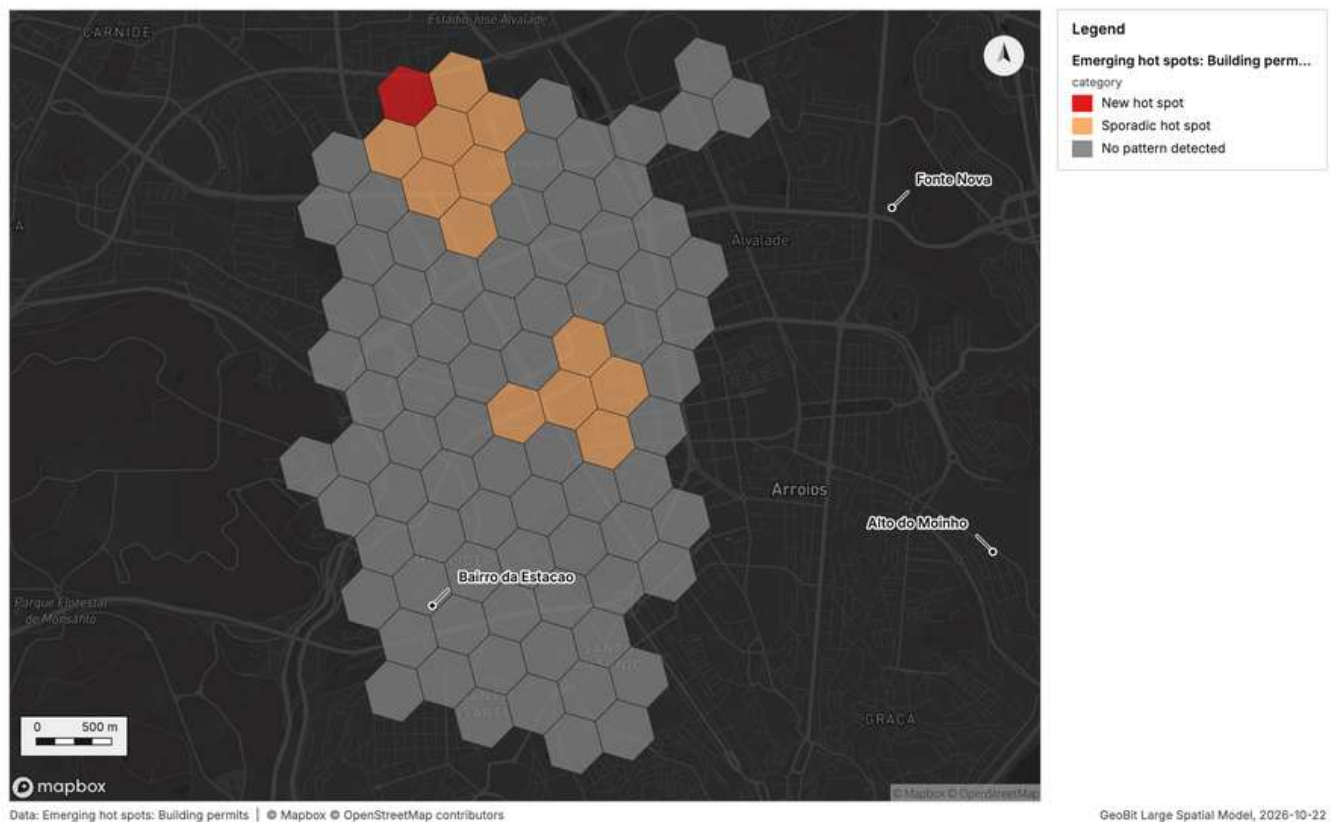


Figure 3. Emerging hot spots: Building permits [55]

Repeat and near repeat classification: Property sales



Figure 4. Repeat and near repeat classification: Property sales [56]

Summarize within: Parcels



Figure 5. Summarize within: Parcels [57]

Summarize within: Parcels



Figure 6. Summarize within: Parcels [58]

Summarize within: Parcels



Figure 7. Summarize within: Parcels [59]

Parcels by built_far



Figure 8. Parcels by built_far [60]

Green spaces by area_ha

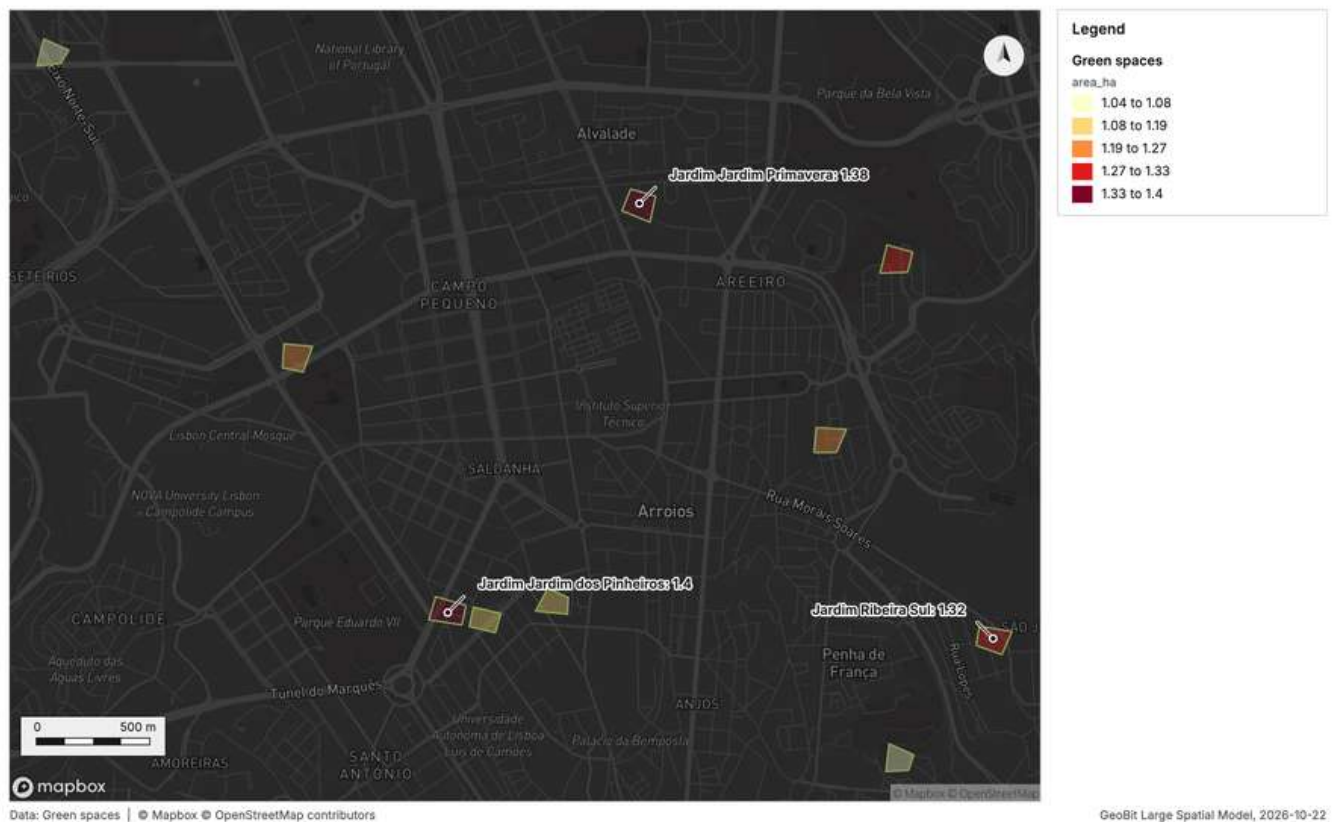


Figure 9. Green spaces by area_ha [61]

Zoning districts by max_far

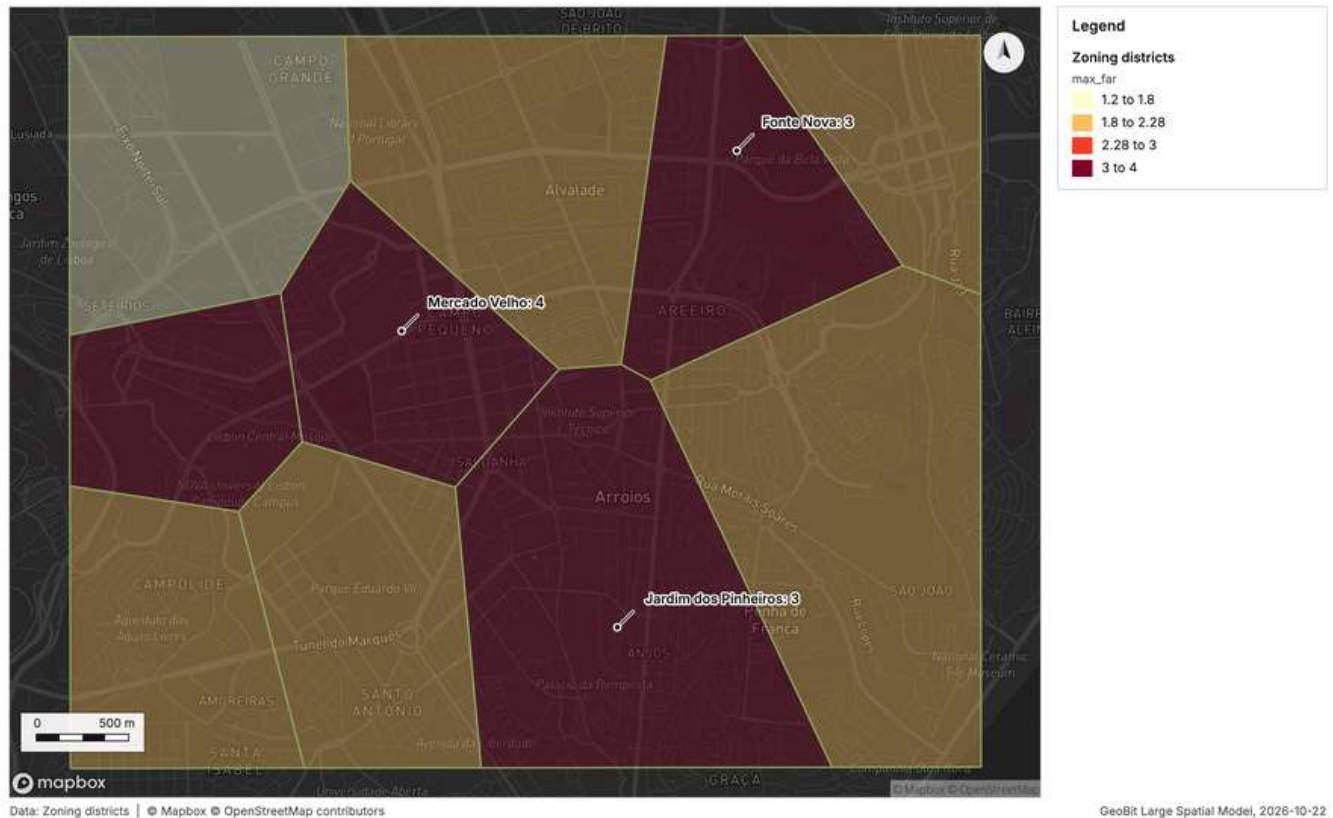


Figure 10. Zoning districts by max_far [62]

Hot spot analysis: Property sales

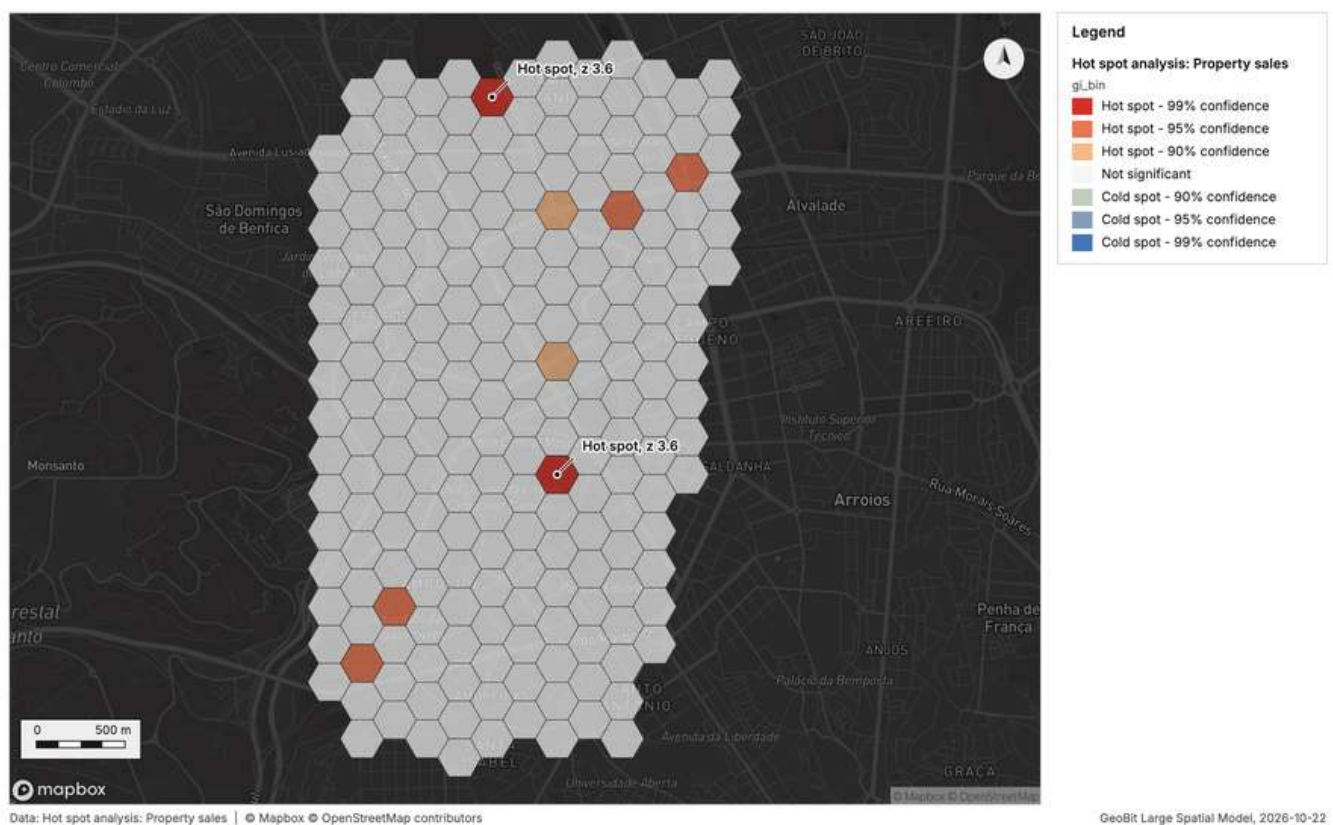


Figure 11. Hot spot analysis: Property sales [63]

Hot spot analysis: Building permits



Figure 12. Hot spot analysis: Building permits [64]

Calculate density: Property sales



Figure 13. Calculate density: Property sales [65]

Calculate density: Building permits

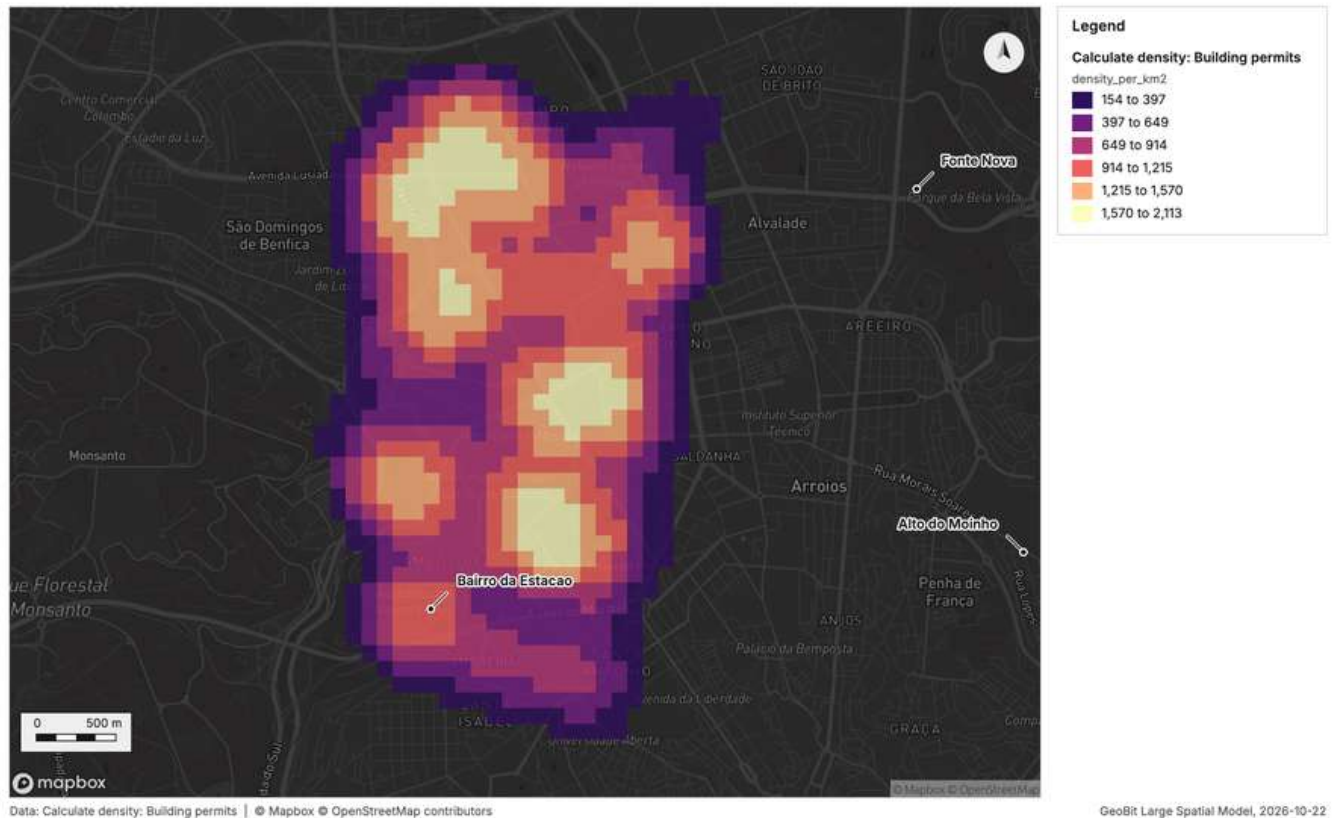


Figure 14. Calculate density: Building permits [66]

Find point clusters: Transit stations

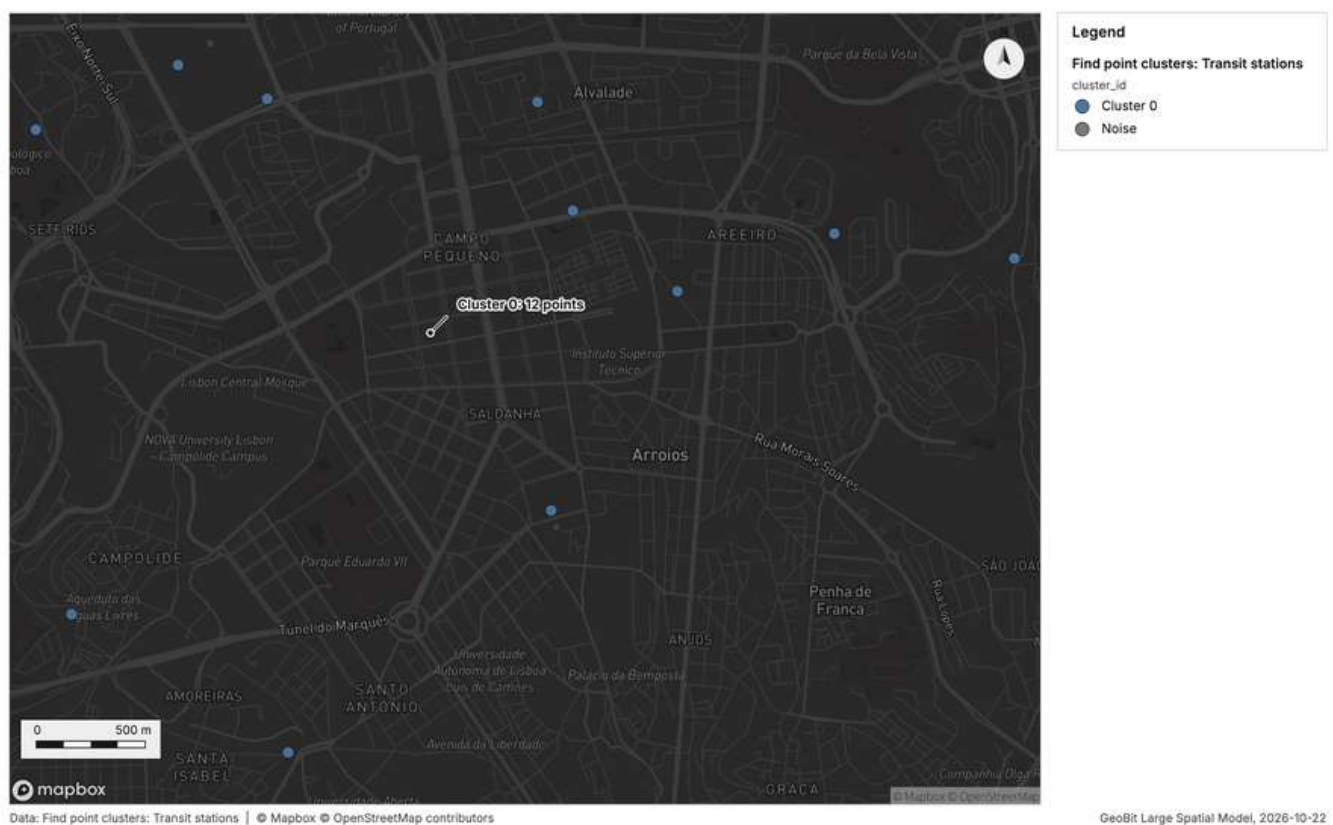


Figure 15. Find point clusters: Transit stations [67]

Find point clusters: cluster hulls



Figure 16. Find point clusters: cluster hulls [68]

Find point clusters: Property sales



Figure 17. Find point clusters: Property sales [69]

Find point clusters: Building permits



Figure 18. Find point clusters: Building permits [70]

Find point clusters: cluster hulls

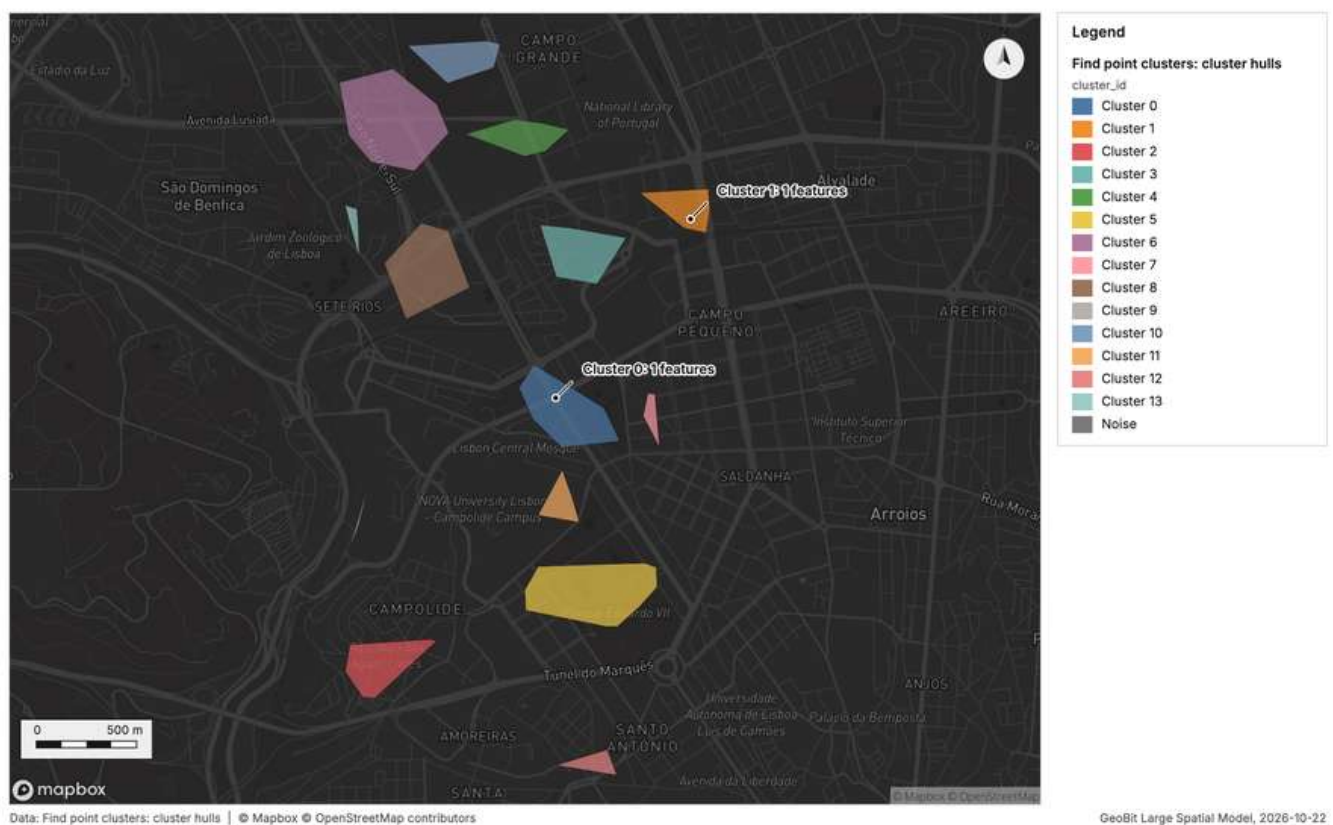


Figure 19. Find point clusters: cluster hulls [71]

Find outliers: Parcels

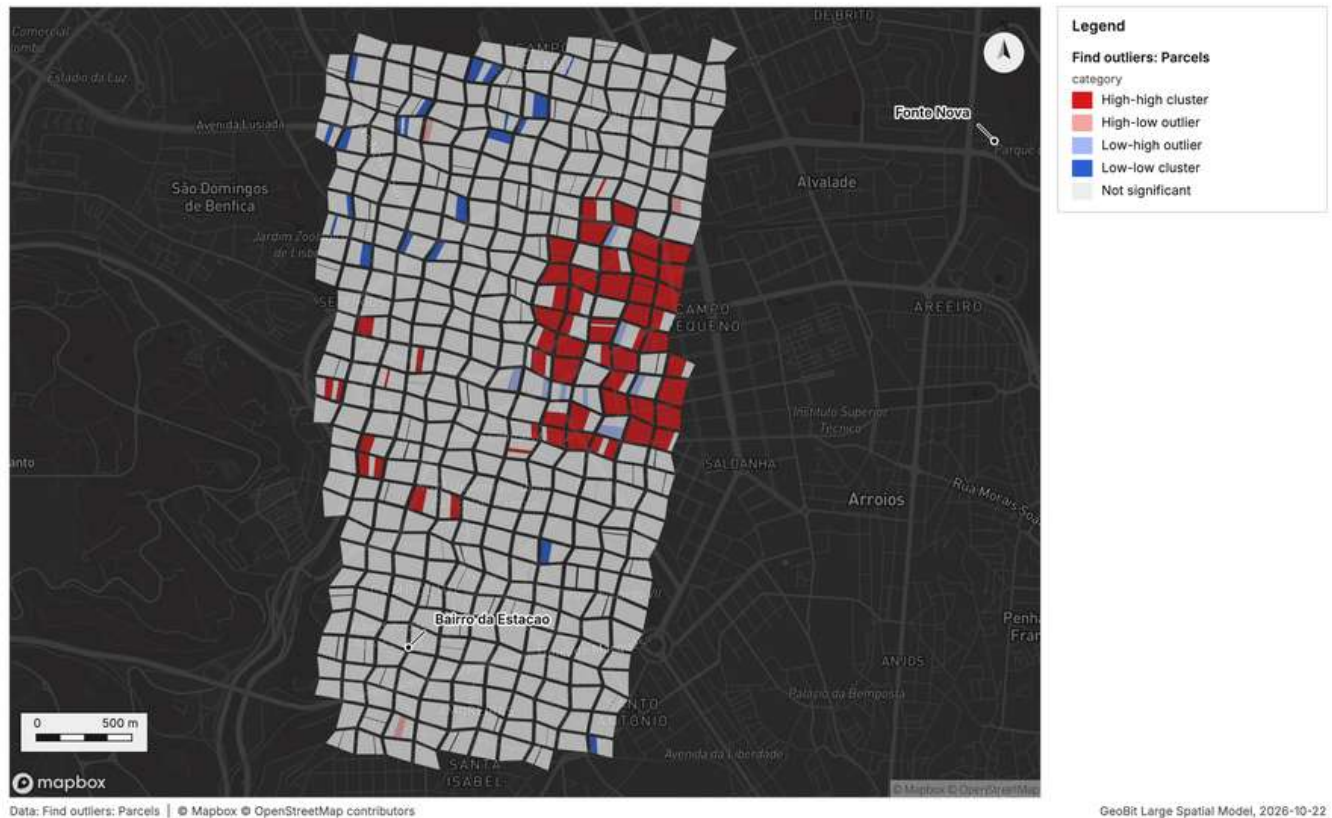


Figure 20. Find outliers: Parcels [72]

Find outliers: Green spaces



Figure 21. Find outliers: Green spaces [73]

Find outliers: Zoning districts

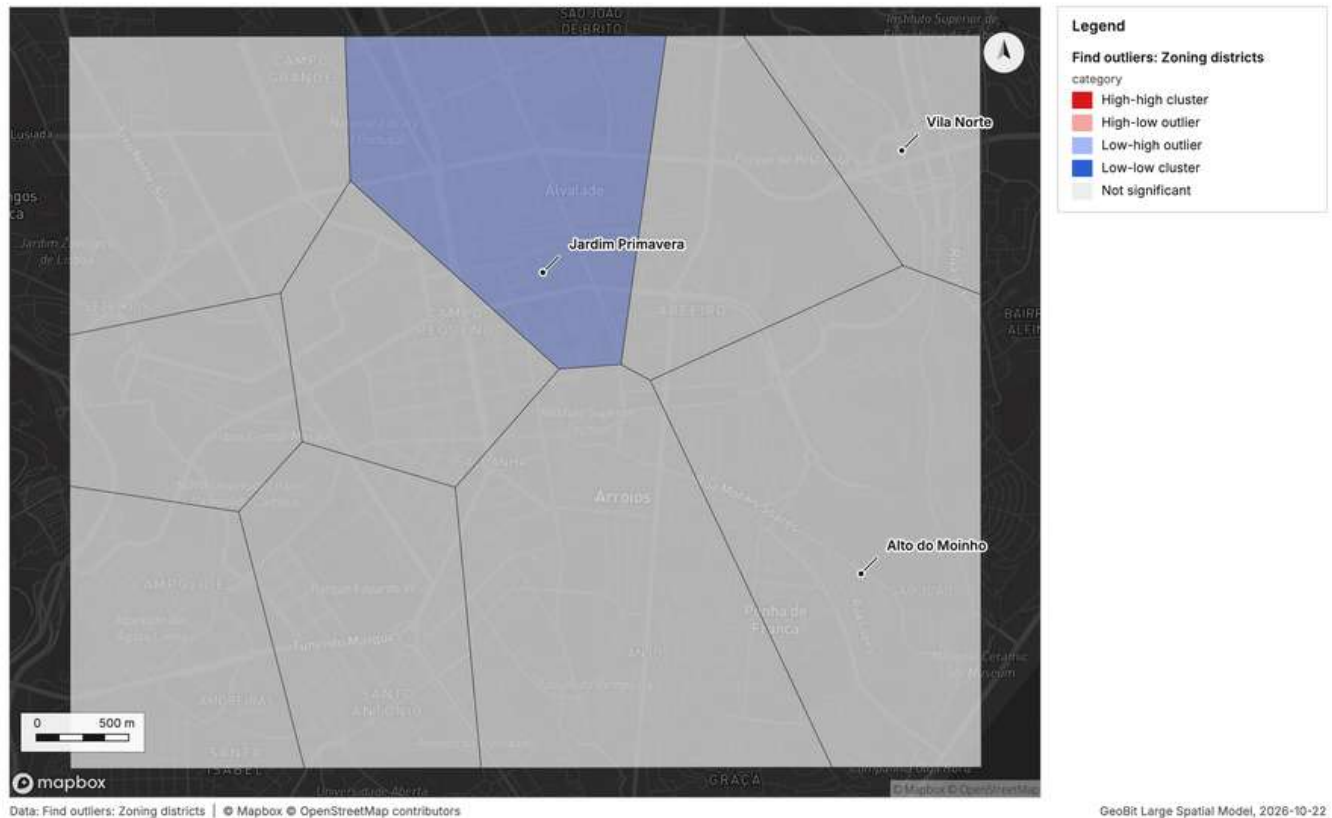


Figure 22. Find outliers: Zoning districts [74]

What the map shows. The map, titled "Emerging hot spots: Property sales," displays the pattern of property sales across a hexagonal grid. The majority of the area is colored grey, indicating that no pattern was detected in these regions. A cluster [54]

Inferred: read from the image by gemma4:e4b, not evidence.

Distribution of built_far

1,100 values in 12 bins

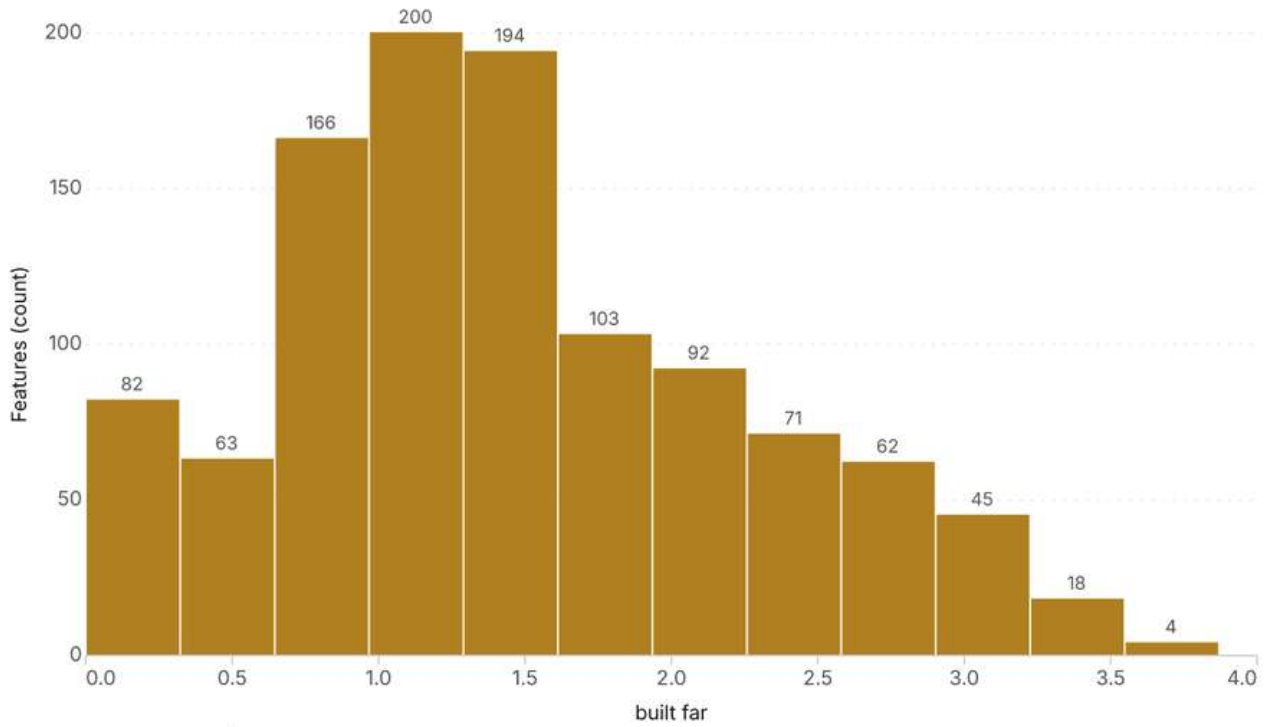


Figure 23. Parcels over time (year_built) [75]. Source: Parcels (1,100 features). The data is in the appendix.

Count per quarter by date and type

Per quarter: 19 quarters from 2022-01-01 to 2026-07-01; trend +0.314 per quarter; first half 440, second half 454 (+3.2%)

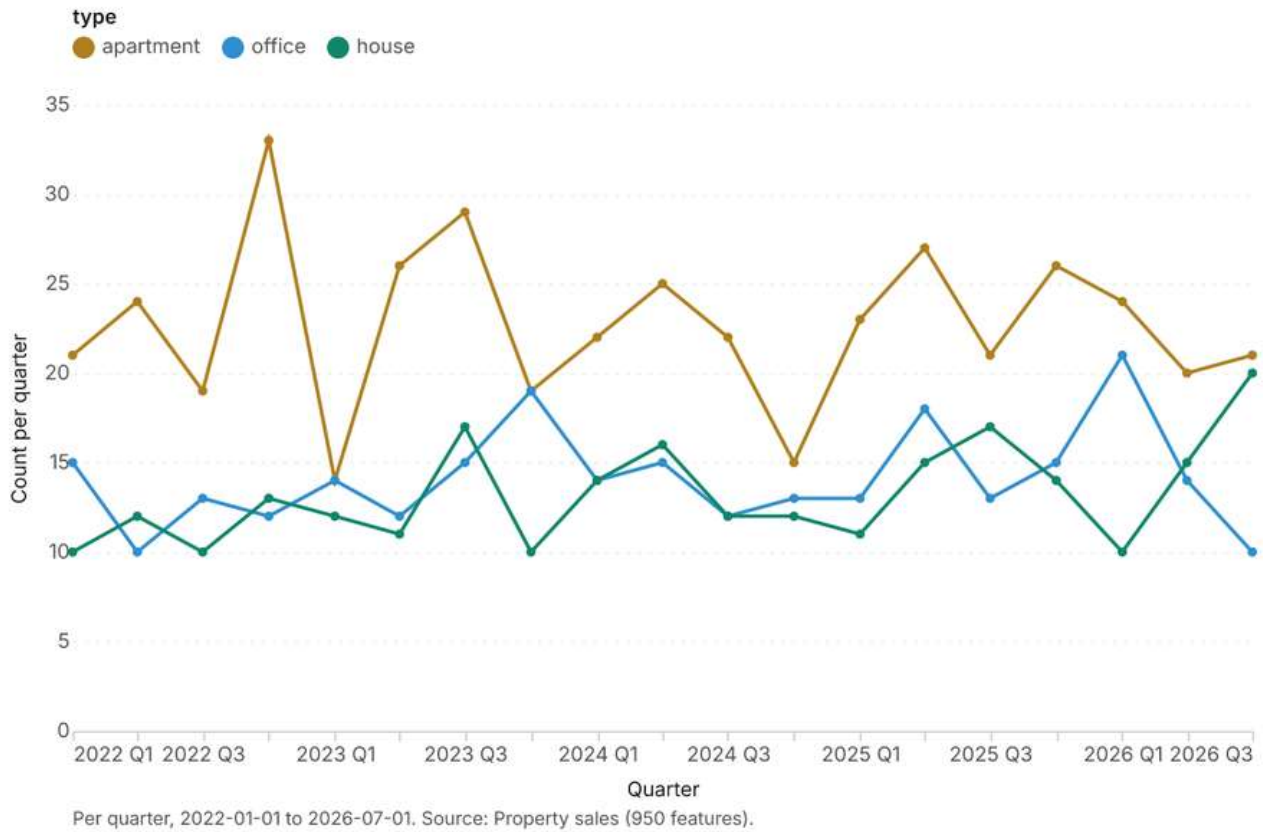


Figure 24. Property sales over time (date) [76]. Per quarter, 2022-01-01 to 2026-07-01. Source: Property sales (950 features). The data is in the appendix.

Sum of units per month by decision_month and type

Per month: 45 months from 2023-01-01 to 2026-09-01; trend +3.25 per month; first half 3,024, second half 4,352 (+43.9%)

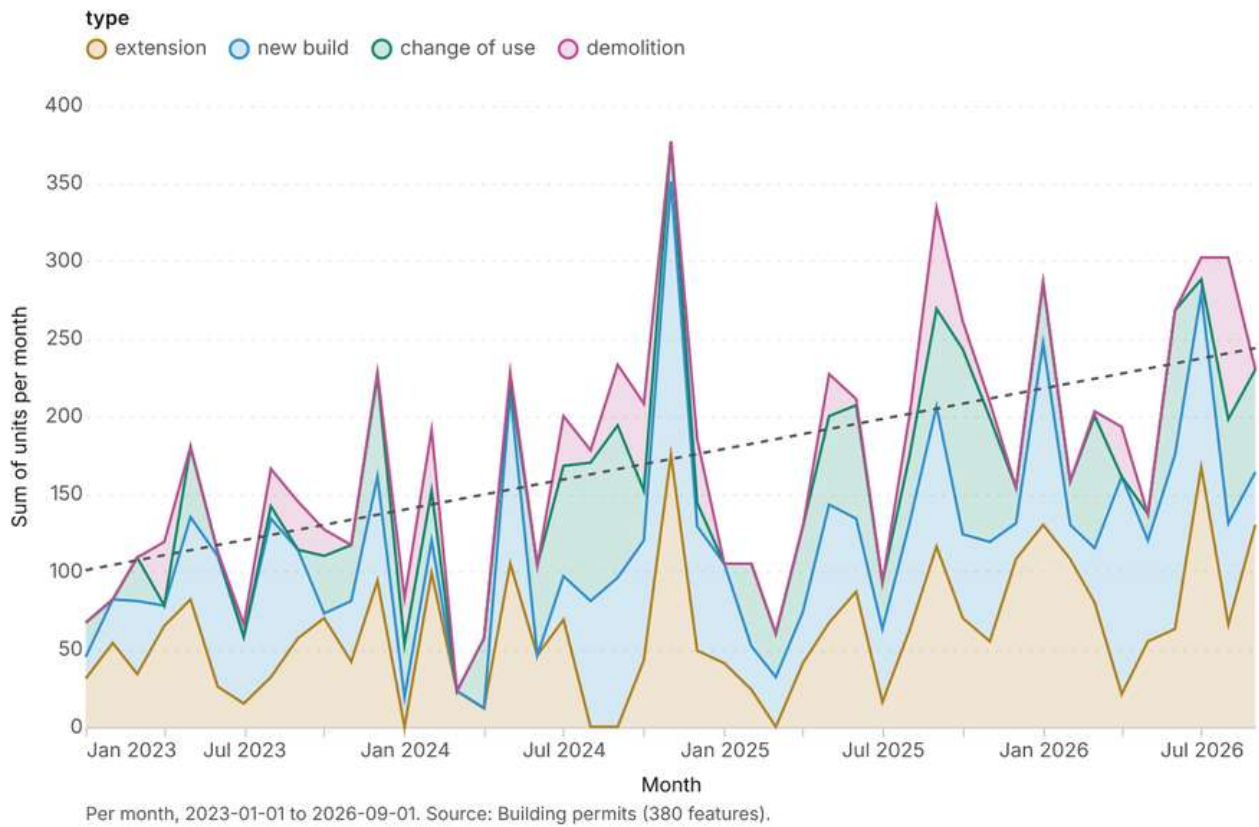


Figure 25. Building permits over time (decision_month) [77]. Per month, 2023-01-01 to 2026-09-01. Source: Building permits (380 features). The data is in the appendix.

Count per quarter by year and zone_code

Per quarter: 33 quarters from 2018-01-01 to 2026-01-01; trend +0 per quarter; first half 40, second half 40 (+0.0%)

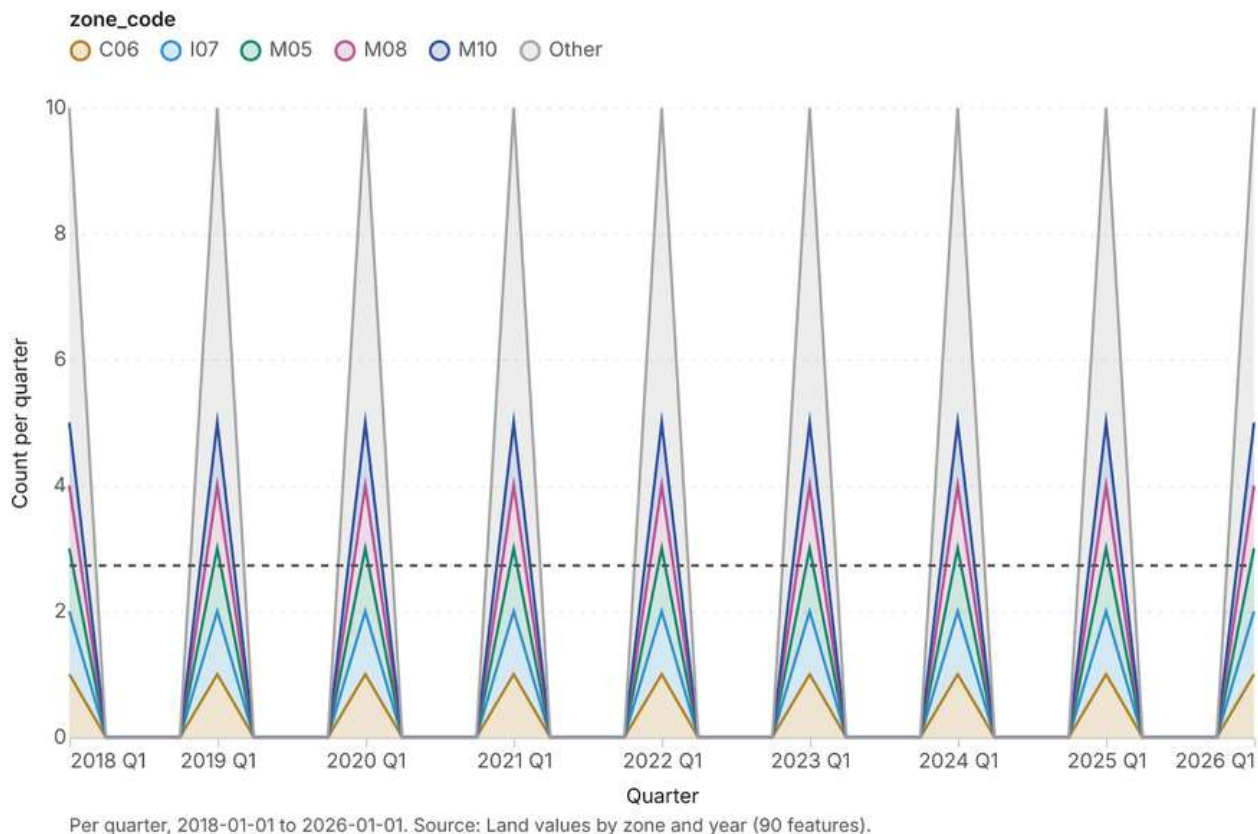


Figure 26. Land values by zone and year over time (year) [78]. Per quarter, 2018-01-01 to 2026-01-01. Source: Land values by zone and year (90 features). The data is in the appendix.

Distribution of last_z

81 values in 8 bins

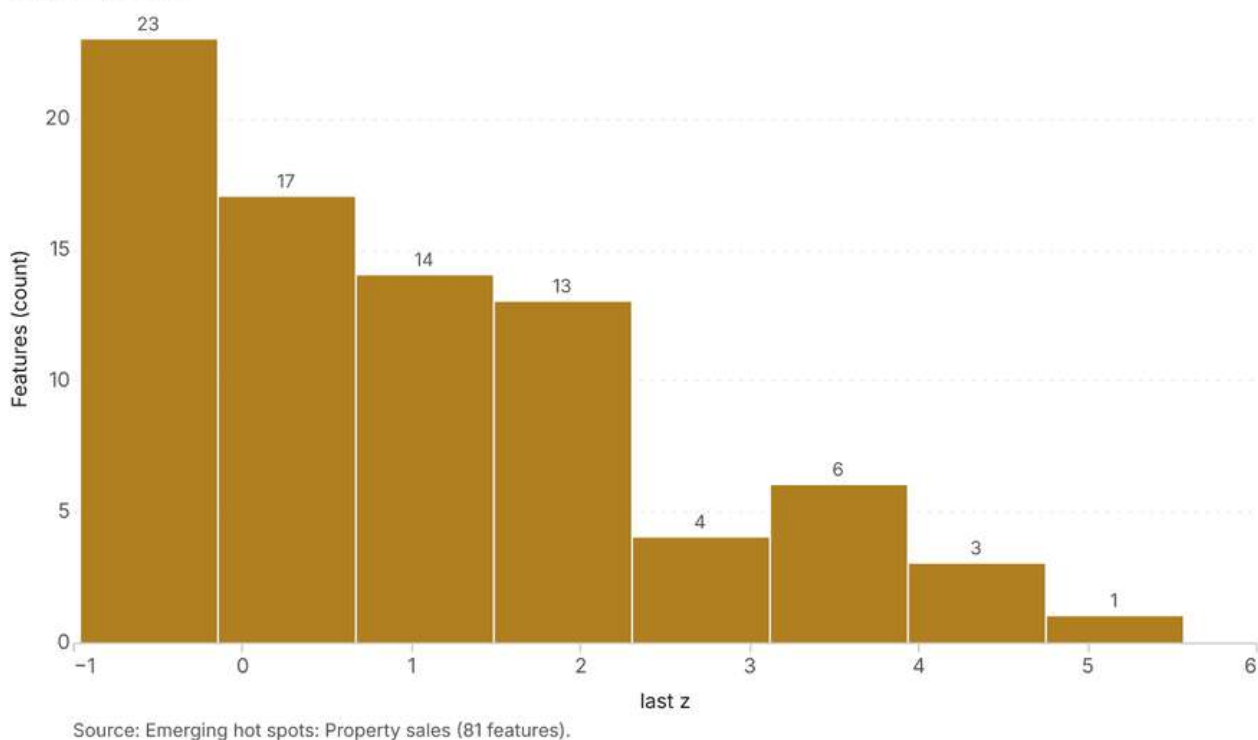
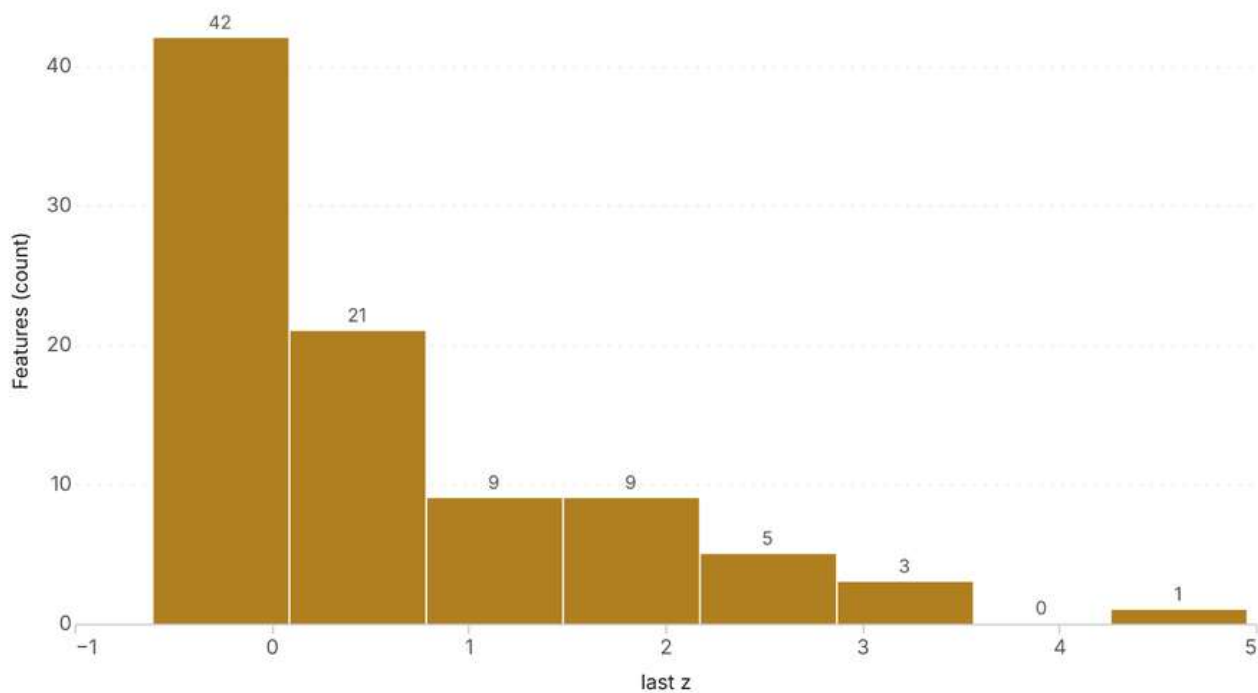


Figure 27. Emerging hot spots: Property sales [79]. Source: Emerging hot spots: Property sales (81 features). The data is in the appendix.

Distribution of last_z

90 values in 8 bins

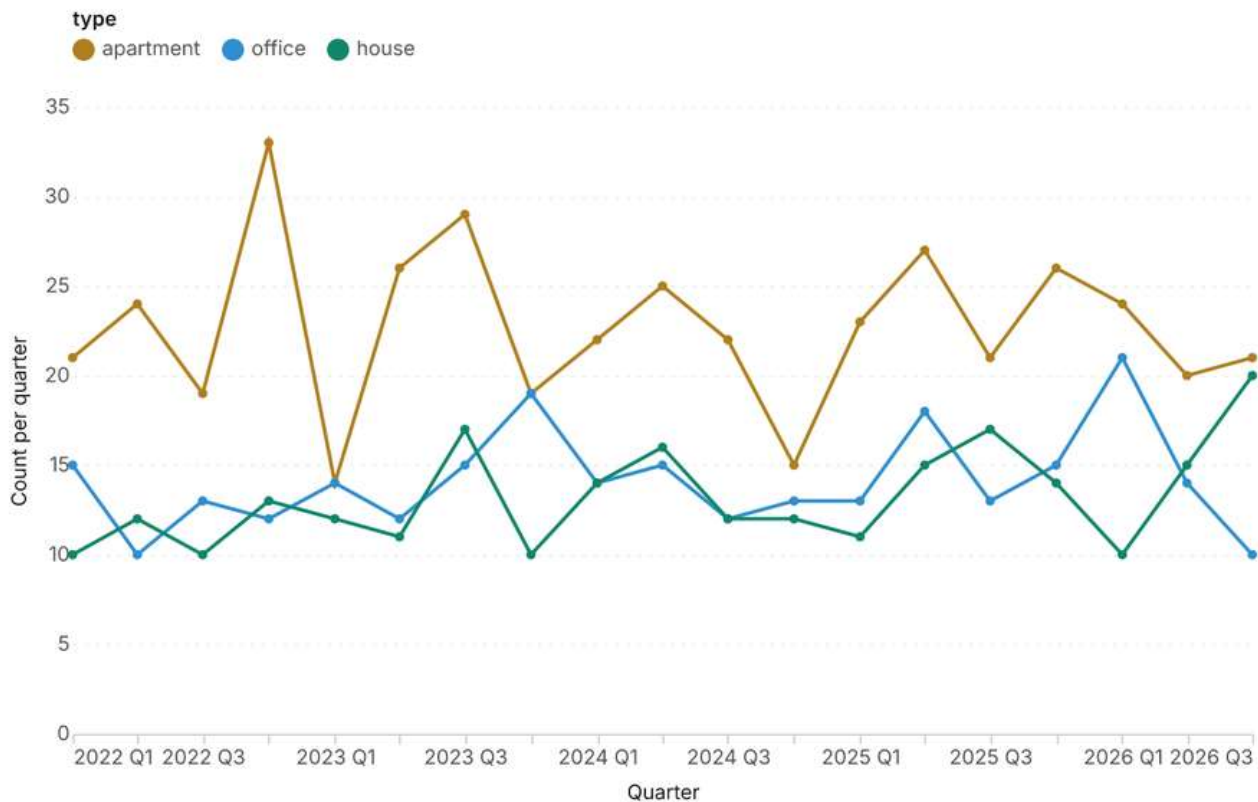


Source: Emerging hot spots: Building permits (90 features).

Figure 28. Emerging hot spots: Building permits [80]. Source: Emerging hot spots: Building permits (90 features). The data is in the appendix.

Count per quarter by date and type

Per quarter: 19 quarters from 2022-01-01 to 2026-07-01; trend +0.314 per quarter; first half 440, second half 454 (+3.2%)

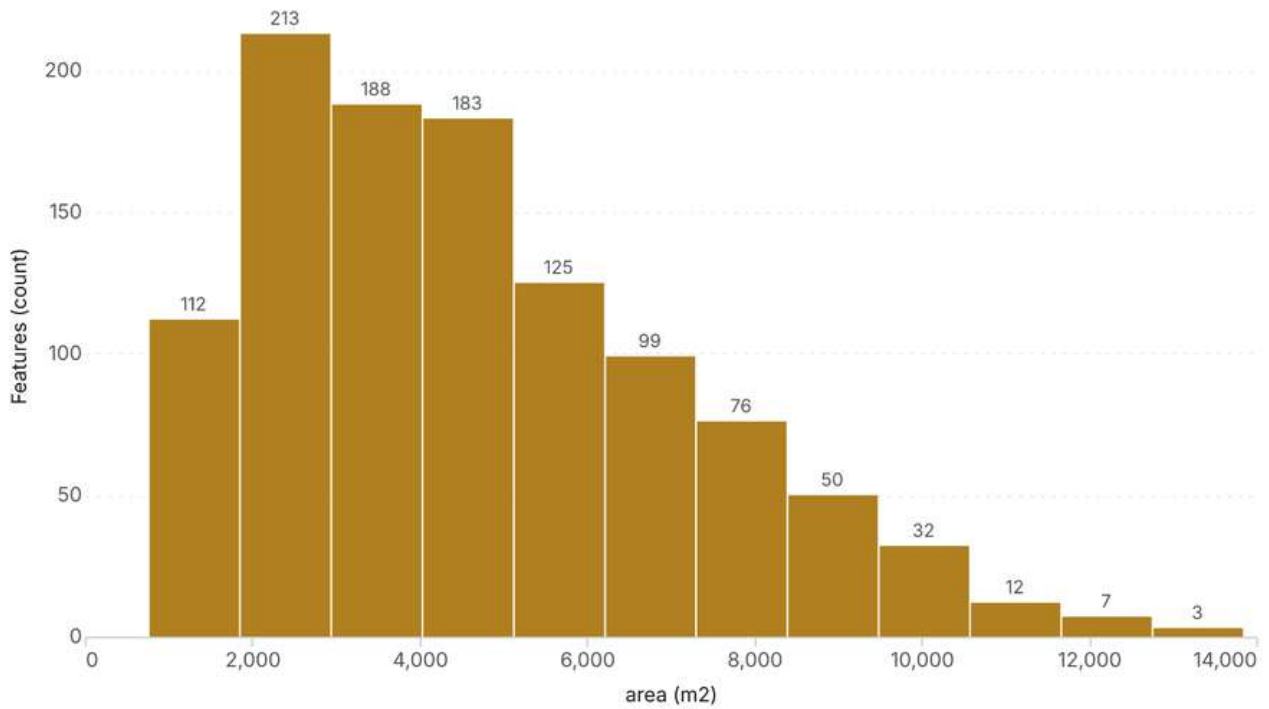


Per quarter, 2022-01-01 to 2026-07-01. Source: Repeat and near repeat classification: Property sales (950 features).

Figure 29. Repeat and near repeat classification: Property sales [81]. Per quarter, 2022-01-01 to 2026-07-01. Source: Repeat and near repeat classification: Property sales (950 features). The data is in the appendix.

Distribution of area_m2

1,100 values in 12 bins

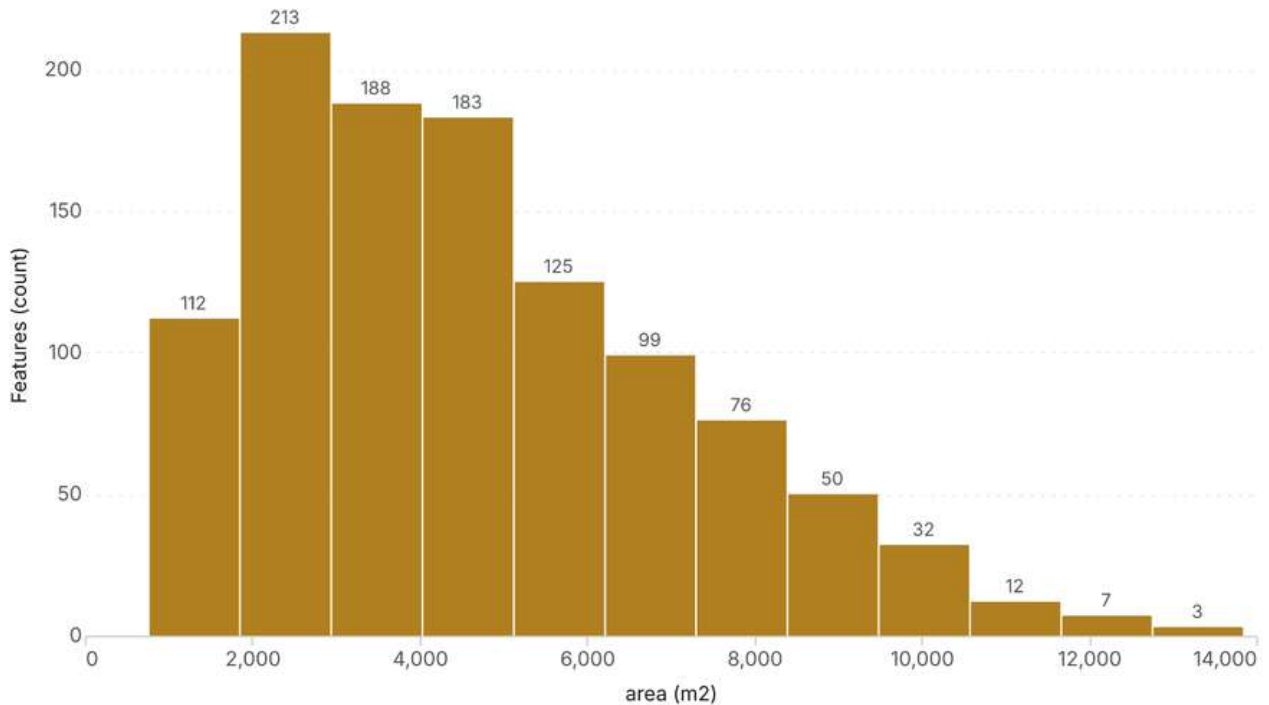


Source: Summarize within: Parcels (1,100 features).

Figure 30. Summarize within: Parcels [82]. Source: Summarize within: Parcels (1,100 features). The data is in the appendix.

Distribution of area_m2

1,100 values in 12 bins

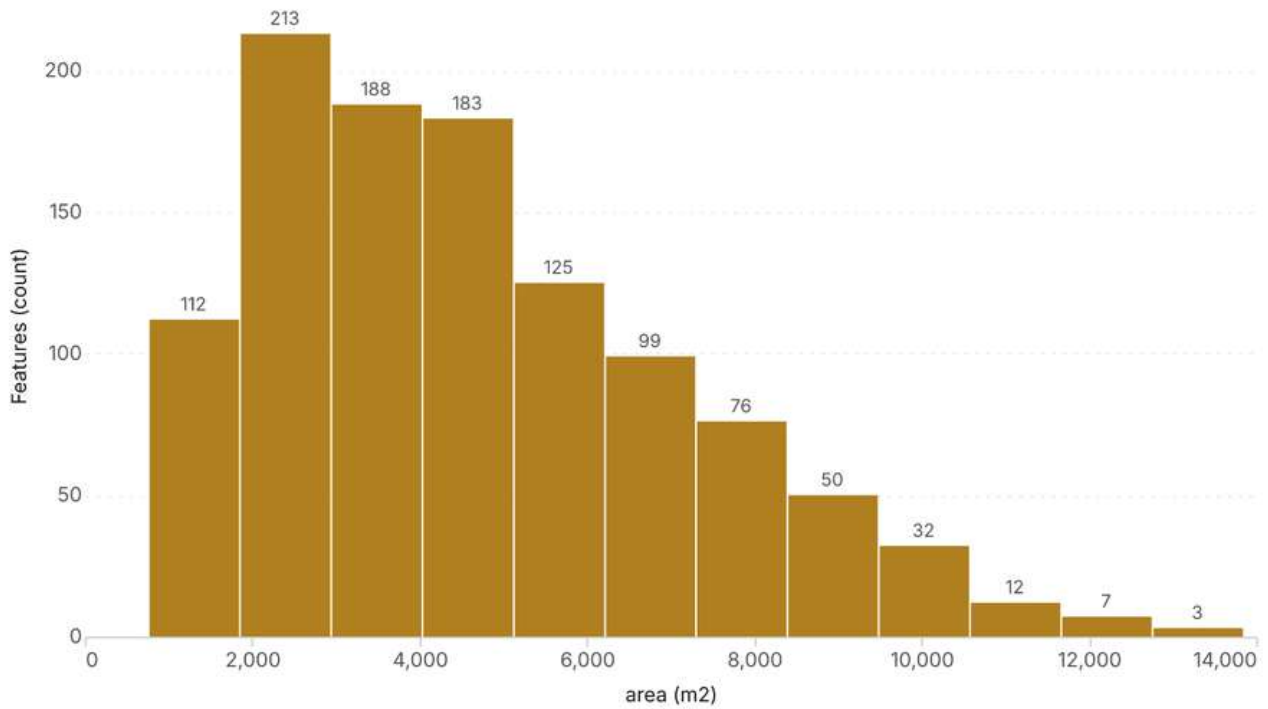


Source: Summarize within: Parcels (1,100 features).

Figure 31. Summarize within: Parcels [83]. Source: Summarize within: Parcels (1,100 features). The data is in the appendix.

Distribution of area_m2

1,100 values in 12 bins

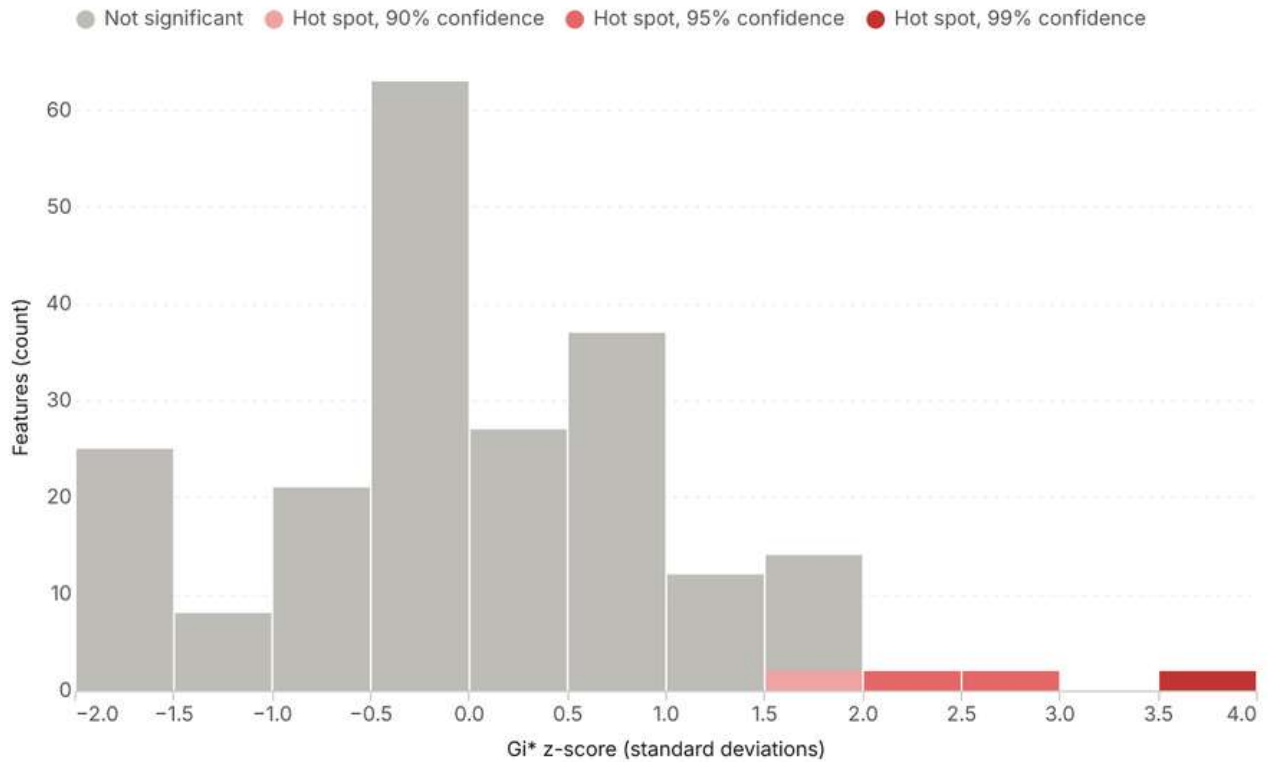


Source: Summarize within: Parcels (1,100 features).

Figure 32. Summarize within: Parcels [84]. Source: Summarize within: Parcels (1,100 features). The data is in the appendix.

Gi* z-score distribution

213 features: 8 hot and 0 cold at 90% confidence or more



Source: Hot spot analysis: Property sales (213 features).

Figure 33. Hot spot analysis: Property sales [85]. Source: Hot spot analysis: Property sales (213 features). The data is in the appendix.

Gi* z-score distribution

380 features: 19 hot and 12 cold at 90% confidence or more

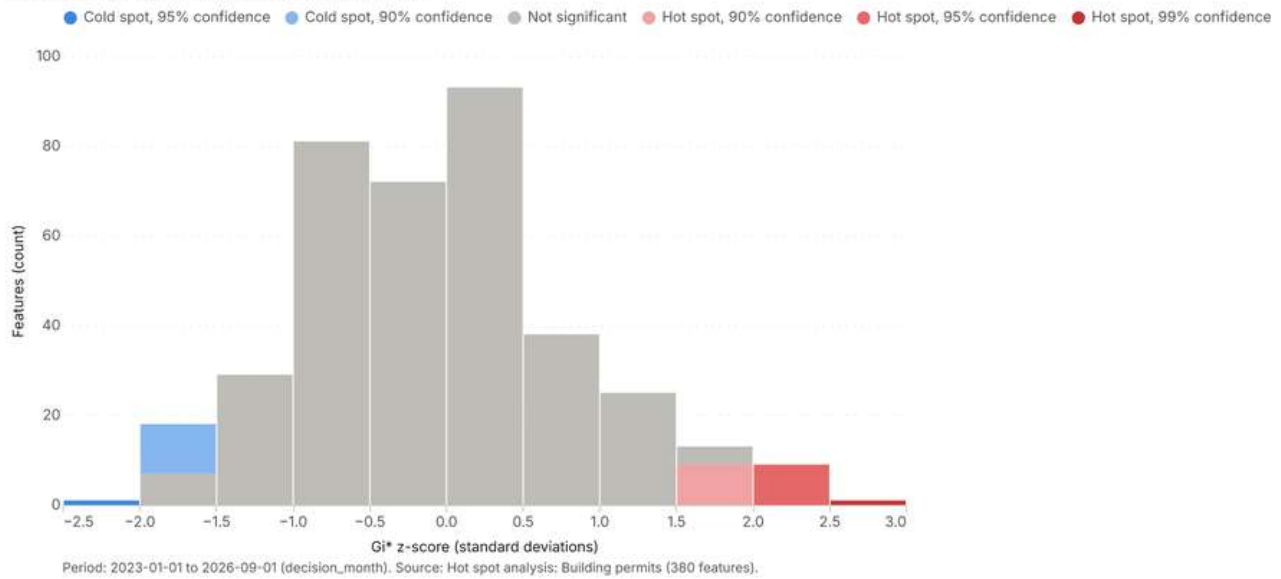


Figure 34. Hot spot analysis: Building permits [86]. Period: 2023-01-01 to 2026-09-01 (decision_month). Source: Hot spot analysis: Building permits (380 features). The data is in the appendix.

Distribution of col

867 values in 11 bins

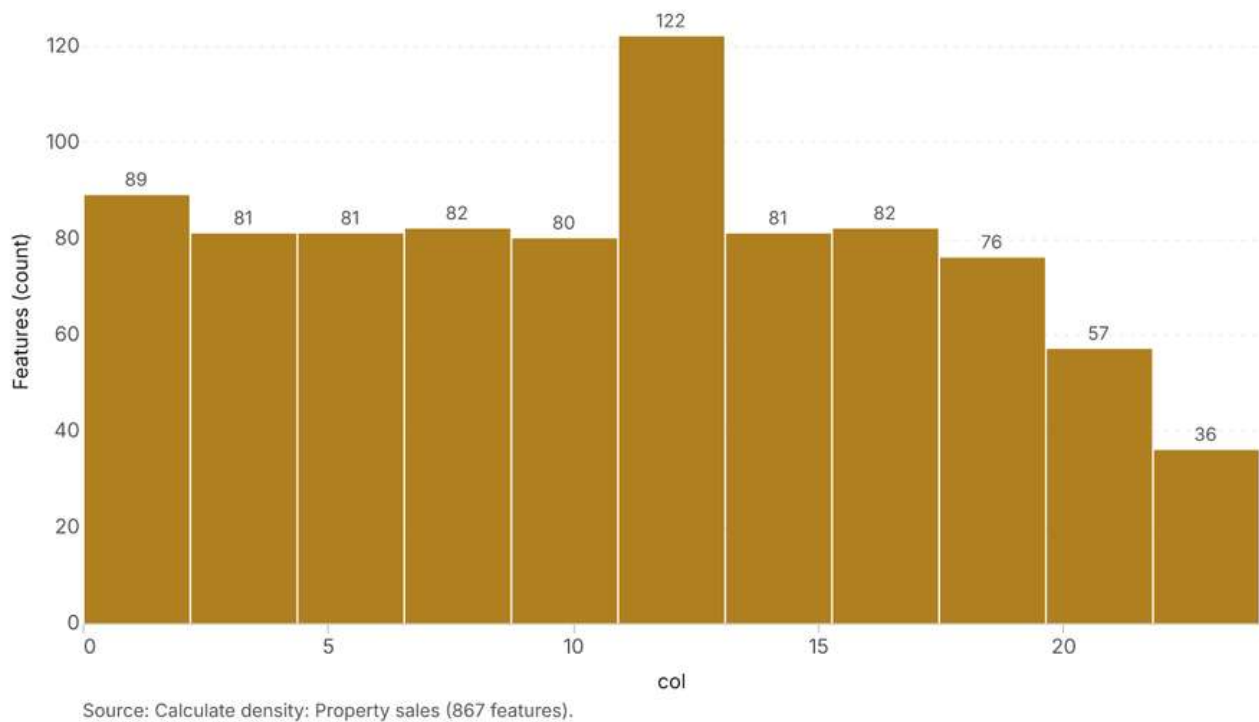


Figure 35. Calculate density: Property sales [87]. Source: Calculate density: Property sales (867 features). The data is in the appendix.

Distribution of col

1,211 values in 12 bins

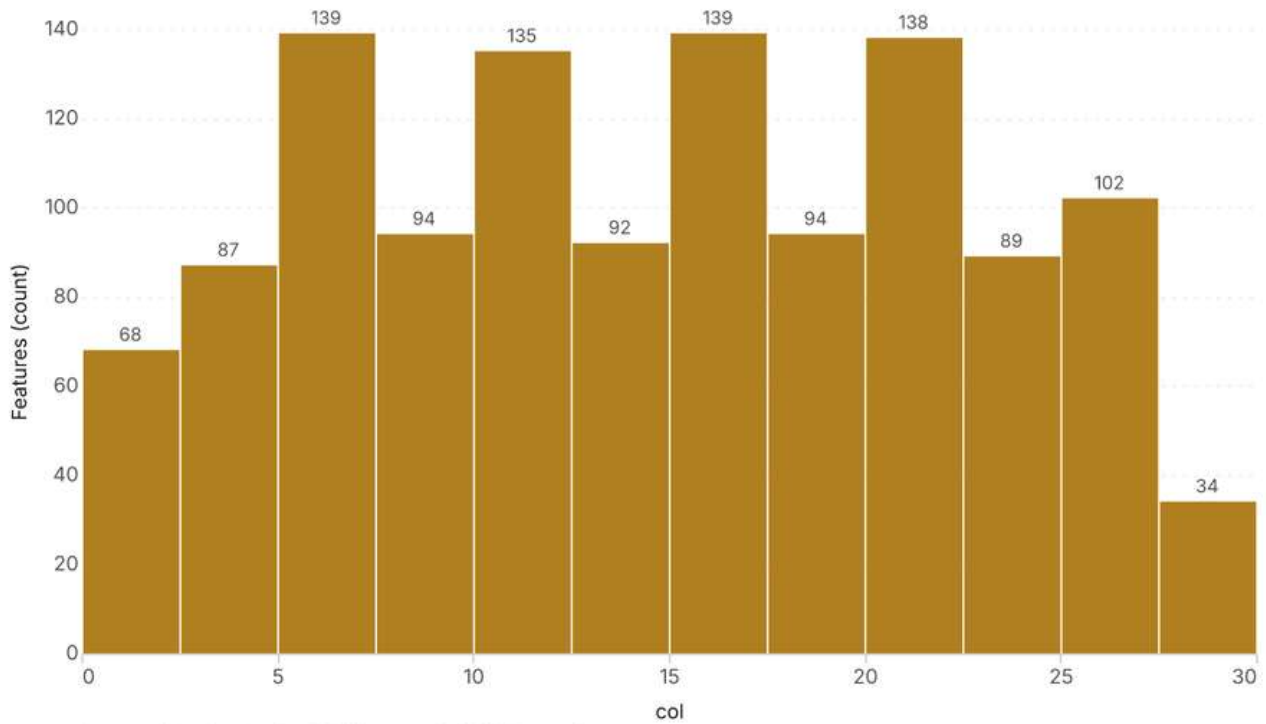


Figure 36. Calculate density: Building permits [88]. Source: Calculate density: Building permits (1,211 features). The data is in the appendix.

Cluster sizes

1 clusters over 12 features

cluster	features	share
0	12	100.0%

Source: Find point clusters: Transit stations (12 features).

Figure 37. Find point clusters: Transit stations [89]. Source: Find point clusters: Transit stations (12 features). The data is in the appendix.

Cluster sizes

1 clusters over 1 features

cluster	features	share
0	1	100.0%

Source: Find point clusters: cluster hulls (1 features).

Figure 38. Find point clusters: cluster hulls [90]. Source: Find point clusters: cluster hulls (1 features). The data is in the appendix.

Cluster sizes

0 clusters over 950 features

cluster	features	share
Noise	950	100.0%

Period: 2022-01-01 to 2026-09-30 (date). Source: Find point clusters: Property sales (950 fe...

Figure 39. Find point clusters: Property sales [91]. Period: 2022-01-01 to 2026-09-30 (date). Source: Find point clusters: Property sales (950 features). The data is in the appendix.

Cluster sizes

14 clusters over 380 features

cluster	features	share
Noise	126	33.2%
5	37	9.7%
6	33	8.7%
0	29	7.6%
10	20	5.3%
4	19	5.0%
2	18	4.7%
8	17	4.5%
1	16	4.2%
9	15	3.9%
3	13	3.4%
11	10	2.6%
12	10	2.6%
13	10	2.6%
7	7	1.8%

Period: 2023-01-01 to 2026-09-01 (decision_month). Source: Find point clusters: Building per...

Figure 40. Find point clusters: Building permits [92]. Period: 2023-01-01 to 2026-09-01 (decision_month). Source: Find point clusters: Building permits (380 features). The data is in the appendix.

Cluster sizes

14 clusters over 14 features

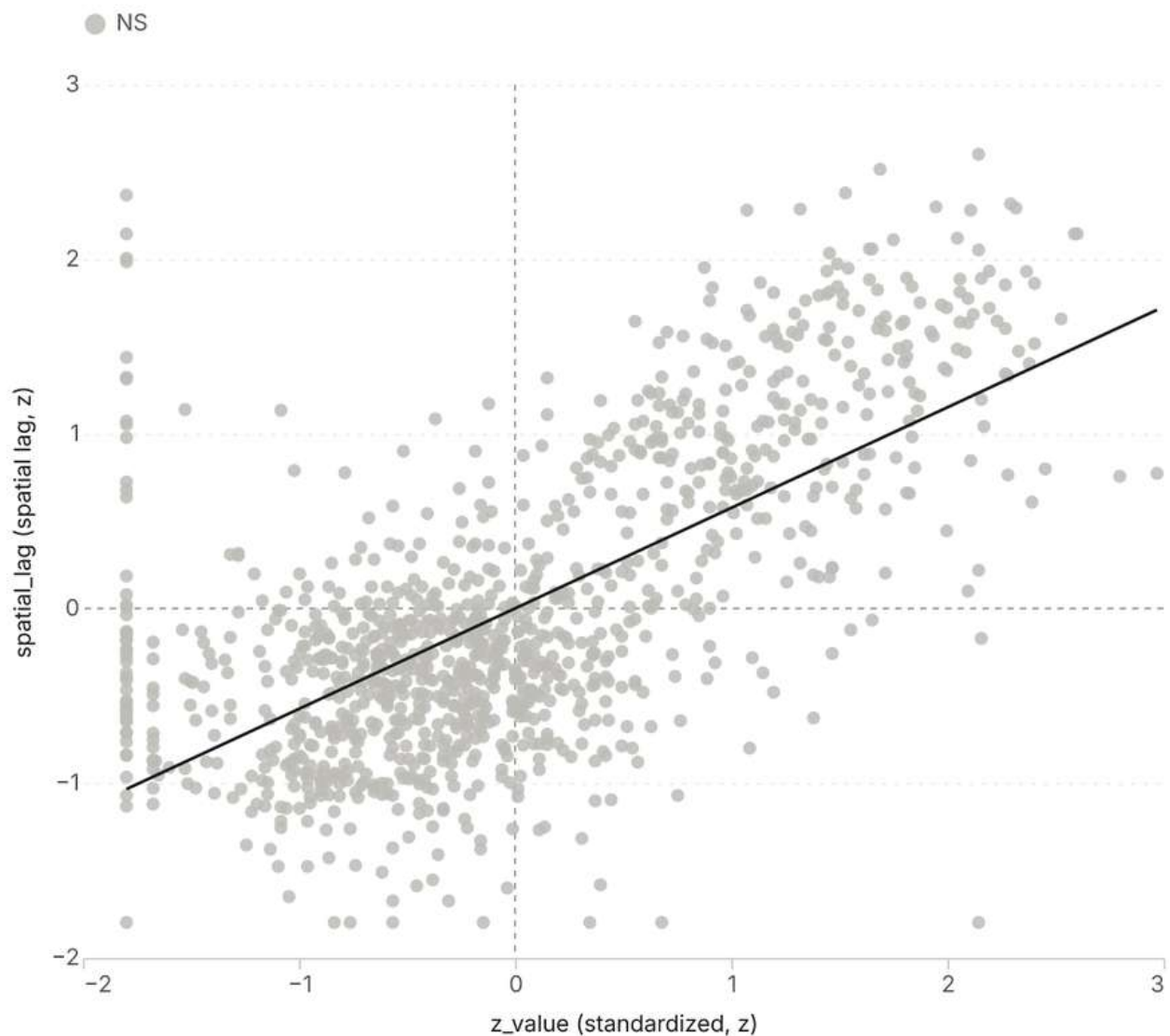
cluster	features	share
0	1	7.1%
1	1	7.1%
10	1	7.1%
11	1	7.1%
12	1	7.1%
13	1	7.1%
2	1	7.1%
3	1	7.1%
4	1	7.1%
5	1	7.1%
6	1	7.1%
7	1	7.1%
8	1	7.1%
9	1	7.1%

Source: Find point clusters: cluster hulls (14 features).

Figure 41. Find point clusters: cluster hulls [93]. Source: Find point clusters: cluster hulls (14 features). The data is in the appendix.

Moran scatter

1,100 features; slope 0.576 (the Moran's I of these standardized values)

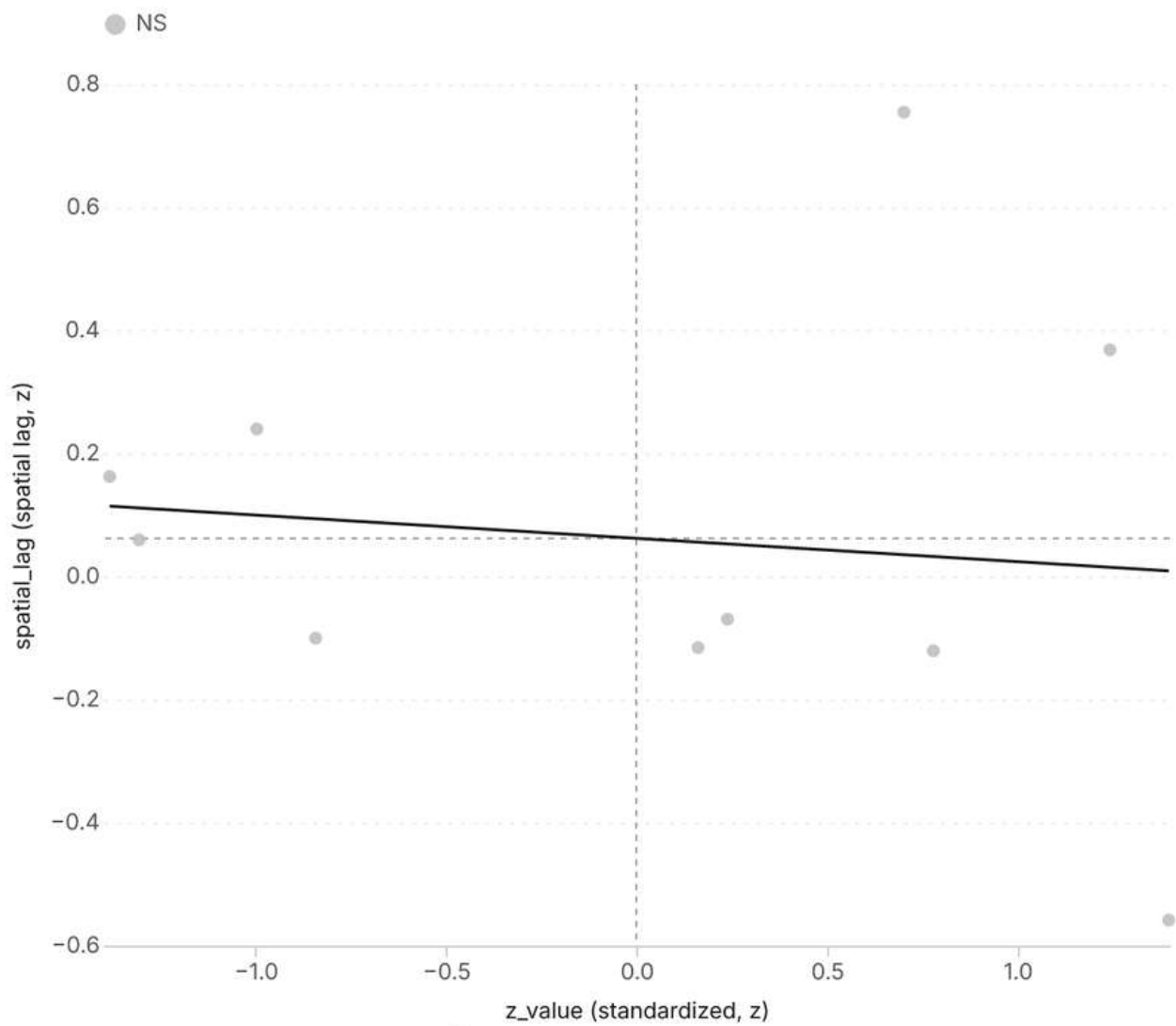


Source: Find outliers: Parcels (1,100 features).

Figure 42. Find outliers: Parcels [94]. Source: Find outliers: Parcels (1,100 features). The data is in the appendix.

Moran scatter

10 features; slope -0.038 (the Moran's I of these standardized values)

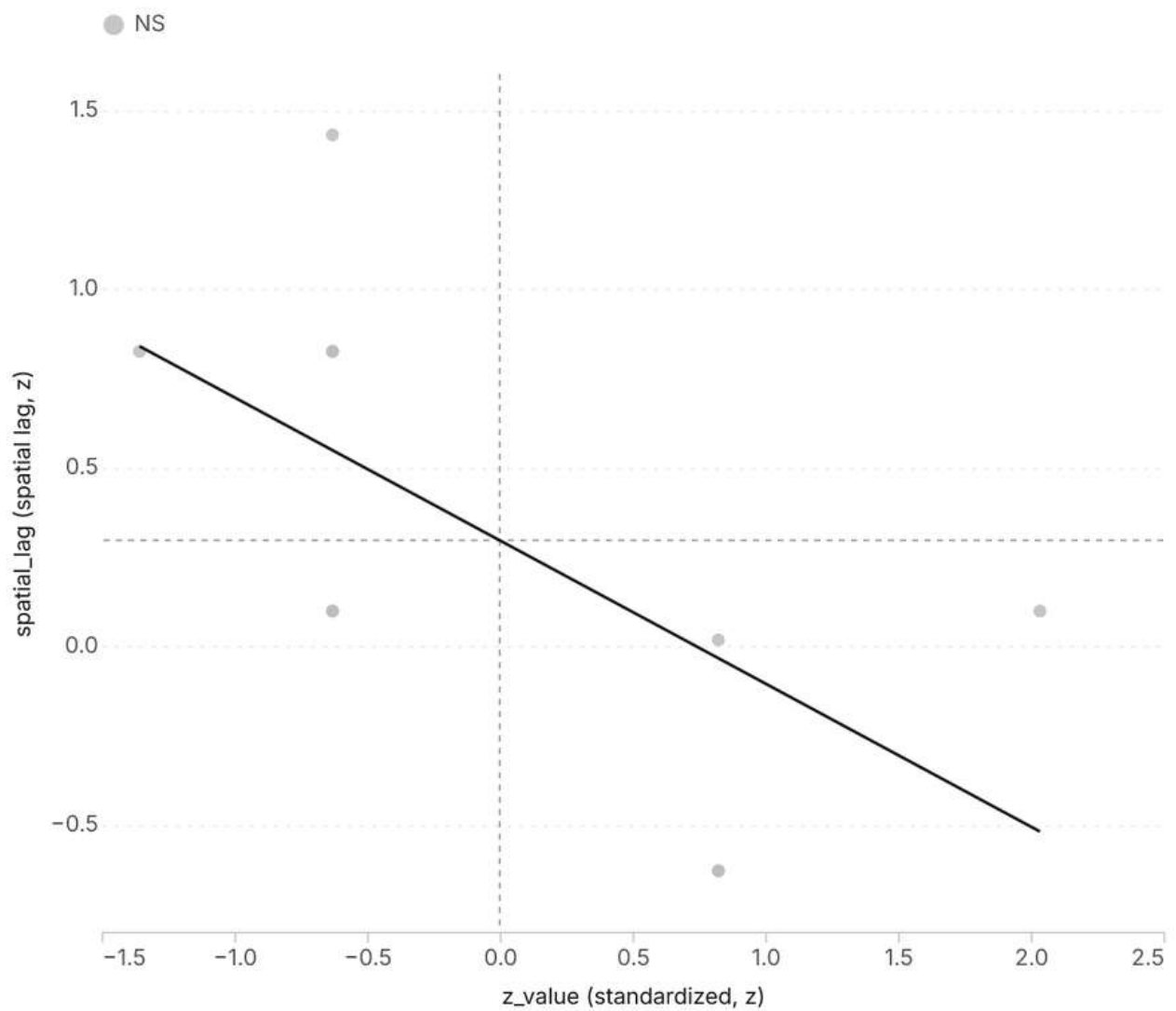


Source: Find outliers: Green spaces (10 features).

Figure 43. Find outliers: Green spaces [95]. Source: Find outliers: Green spaces (10 features). The data is in the appendix.

Moran scatter

10 features; slope -0.400 (the Moran's I of these standardized values)



Source: Find outliers: Zoning districts (10 features).

Figure 44. Find outliers: Zoning districts [96]. Source: Find outliers: Zoning districts (10 features). The data is in the appendix.

Count per month by decision_month and type

Per month: 45 months from 2023-01-01 to 2026-09-01; trend +0.138 per month; first half 155, second half 214 (+38.1%)

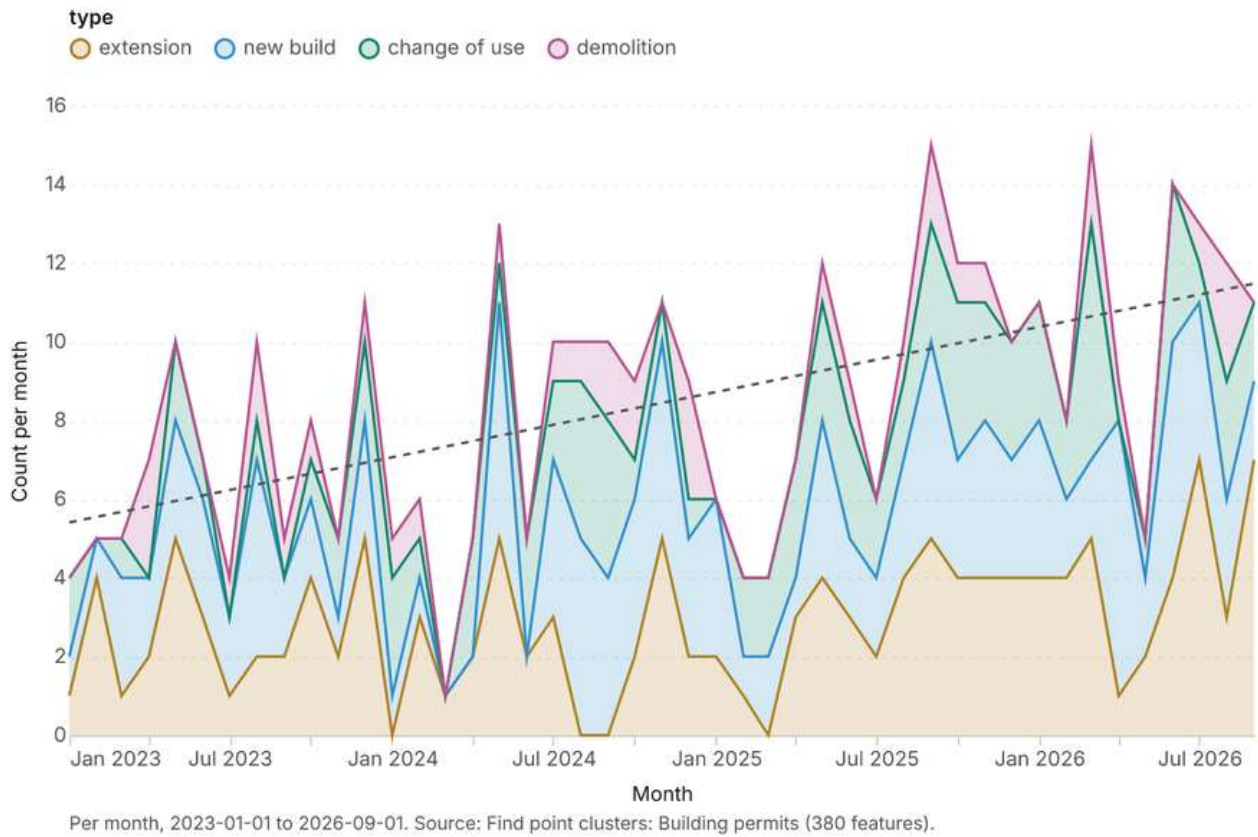


Figure 45. Find point clusters: Building permits over time [97]. Per month, 2023-01-01 to 2026-09-01. Source: Find point clusters: Building permits (380 features). The data is in the appendix.

Count per quarter by date and type

Per quarter: 19 quarters from 2022-01-01 to 2026-07-01; trend +0.314 per quarter; first half 440, second half 454 (+3.2%)

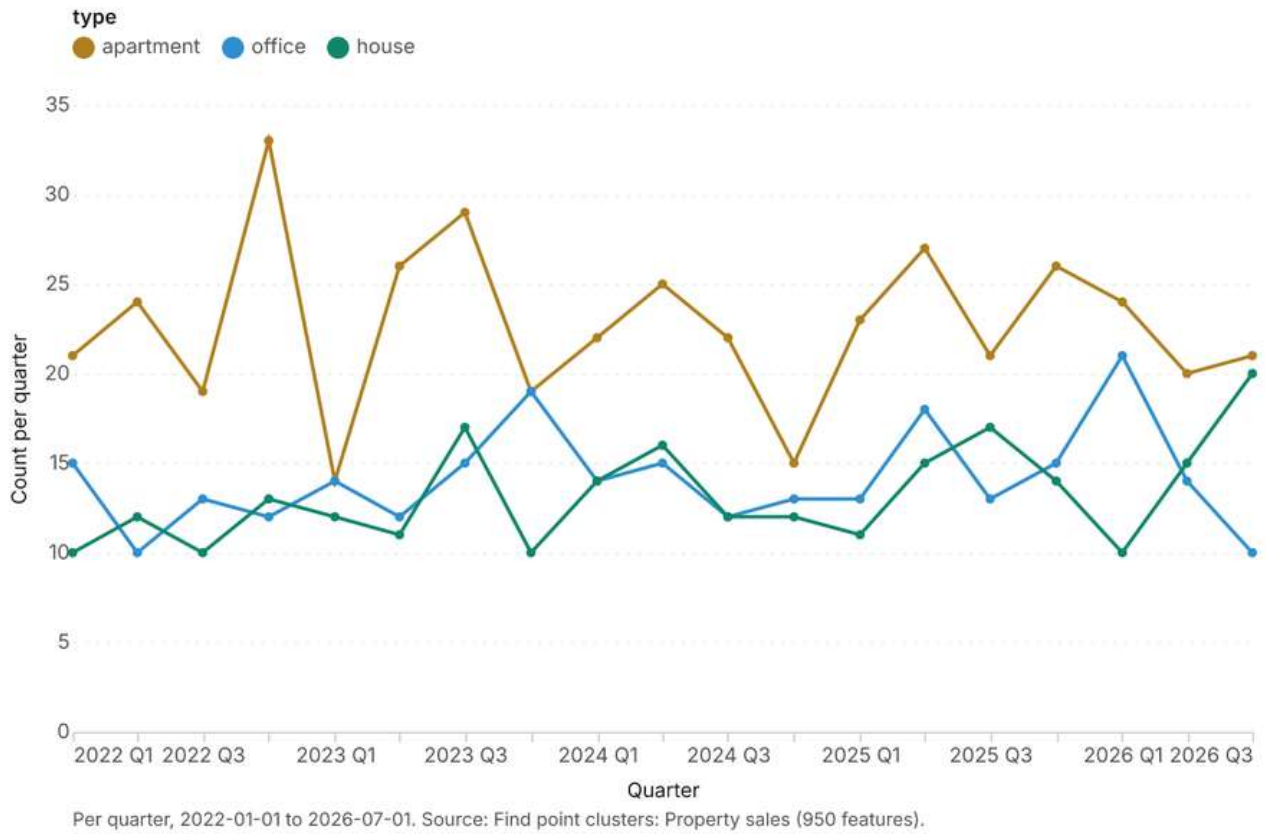


Figure 46. Find point clusters: Property sales over time [98]. Per quarter, 2022-01-01 to 2026-07-01. Source: Find point clusters: Property sales (950 features). The data is in the appendix.

Count per month by decision_month and type

Per month: 45 months from 2023-01-01 to 2026-09-01; trend +0.138 per month; first half 155, second half 214 (+38.1%)

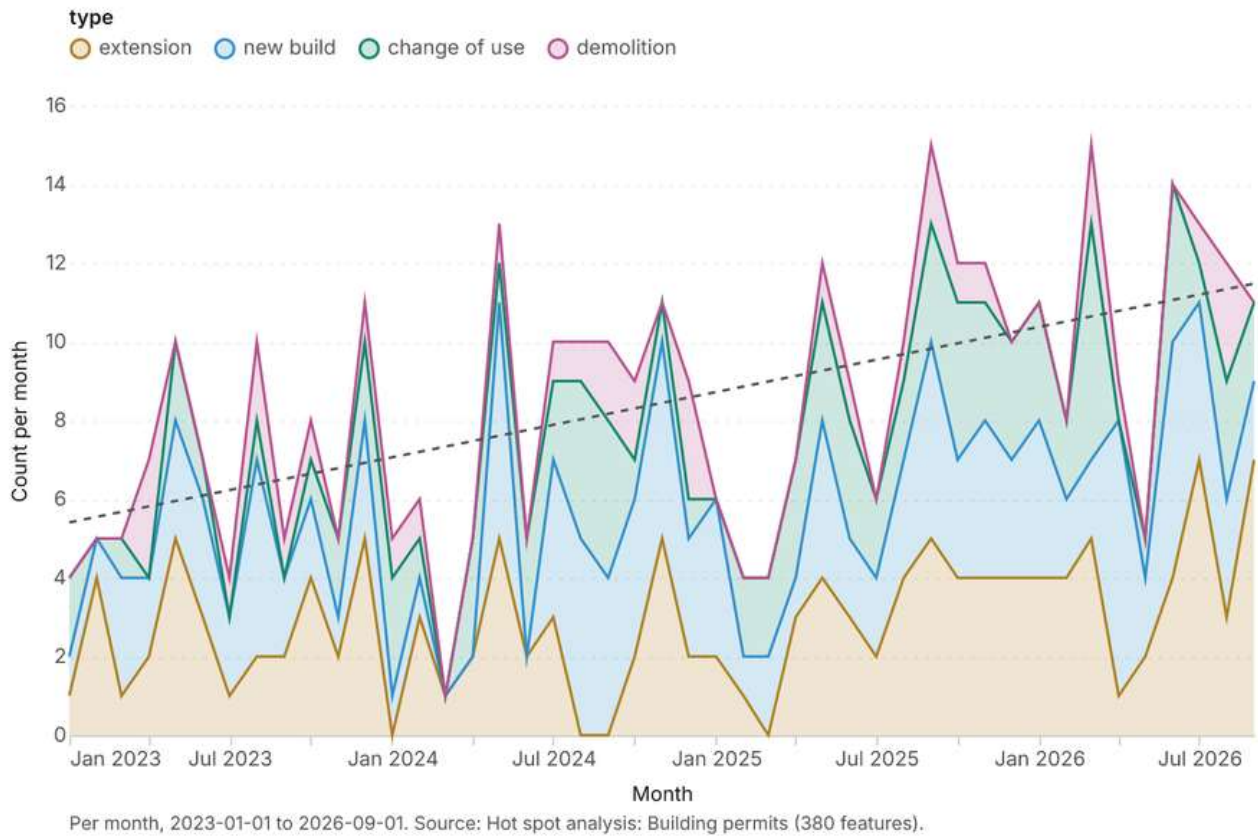


Figure 47. Hot spot analysis: Building permits over time [99]. Per month, 2023-01-01 to 2026-09-01. Source: Hot spot analysis: Building permits (380 features). The data is in the appendix.

Count per quarter by date and type

Per quarter: 19 quarters from 2022-01-01 to 2026-07-01; trend +0.314 per quarter; first half 440, second half 454 (+3.2%)

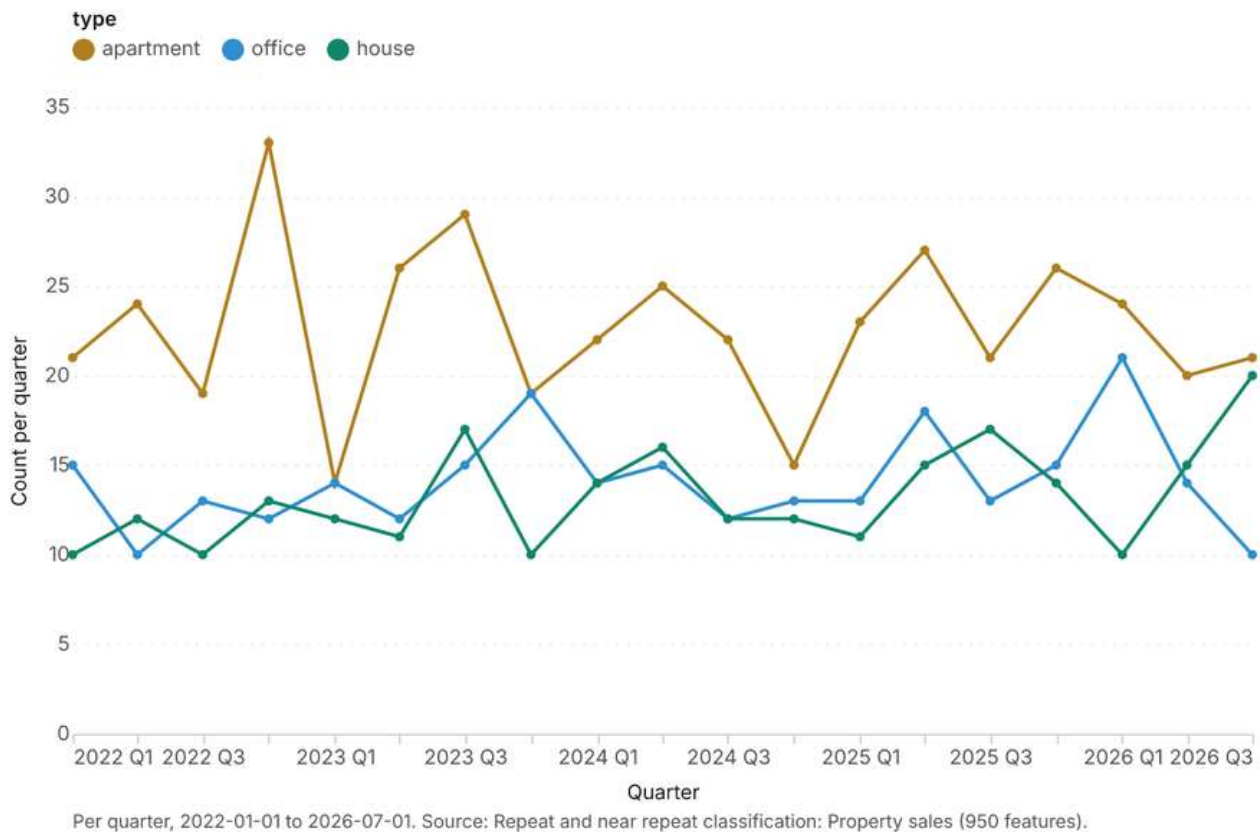


Figure 48. Repeat and near repeat classification: Property sales over time [100]. Per quarter, 2022-01-01 to 2026-07-01. Source: Repeat and near repeat classification: Property sales (950 features). The data is in the appendix.

Changes since the last run

This is the first report of this project.

Sources

- [1] Rendering: Chart: Timeline: events per quarter by dataset. 140 rows (id efe17a86-8fd3-4c8e-aed1-29ebb025af6d)
- [2] Dataset: Property sales. vector, 950 rows (id 8f893170-c6db-4826-83e8-09af6dc89e27)
- [3] Dataset: Building permits. vector, 380 rows (id aa79bba6-c73f-4b2f-a79e-176493aa4621)
- [4] Dataset: Land values by zone and year. table, 90 rows (id 7cee65a2-b1e0-47a4-98b2-10d181fb8423)
- [5] Dataset: Planning applications. table, 160 rows (id ae83bb58-05b5-4b51-b3f8-ca020020f1d5)
- [6] Catalog: Emerging hot spots (operation catalog, gp_space_time_hot_spots). Where hot spots are new, consecutive, intensifying, persistent, diminishing, sporadic, oscillating or historical over time. ArcGIS: Emerging Hot Spot Analysis, Create Space Time Cube. (id gp_space_time_hot_spots)
- [7] Plan: Space time hot spots of Property sales (the Start plan's candidate c_37c352605313). Property sales carry dates in 'date': emerging hot spot analysis finds new, intensifying and fading hot spots per month. (id f8db5acb-8be1-4e6d-8904-9ee8c04e791a:c_37c352605313)
- [8] Tool result: gp_space_time_hot_spots, step 0. Emerging hot spots: 1 layer saved: Emerging hot spots: Property sales (81 features). (id 3b547b3d-4c3c-4444-9020-8c97986c7155:0)
- [9] Layer: Property sales. 950 features (id a421b4df-eece-4b35-a40f-e8daf4e77a1e)
- [10] Plan: Space time hot spots of Building permits (the Start plan's candidate c_cd867438faaa). Building permits carry dates in 'decision_month': emerging hot spot analysis finds new, intensifying and fading hot spots per month. (id f8db5acb-8be1-4e6d-8904-9ee8c04e791a:c_cd867438faaa)
- [11] Tool result: gp_space_time_hot_spots, step 1. Emerging hot spots: 1 layer saved: Emerging hot spots: Building permits (90 features). (id 3b547b3d-4c3c-4444-9020-8c97986c7155:1)
- [12] Layer: Building permits. 380 features (id c9732c3b-7527-455c-bfff-16e282af4bf8)

- [13] Catalog: Repeat and near repeat classification (operation catalog, gp_near_repeat). Classify incidents as originators, repeats (same place) or near repeats within a distance and time window, with a Knox test table. ArcGIS: Repeat and Near Repeat Classification, Near Repeat Calculator. (id gp_near_repeat)
- [14] Plan: Near repeat of Property sales (the Start plan's candidate c_71042b703d0d). Near repeat analysis tests whether Property sales close in space also follow each other within 30 days. (id f8db5acb-8be1-4e6d-8904-9ee8c04e791a:c_71042b703d0d)
- [15] Tool result: gp_near_repeat, step 2. Repeat and near repeat classification: 1 layer saved: Repeat and near repeat classification: Property sales (950 features). (id 3b547b3d-4c3c-4444-9020-8c97986c7155:2)
- [16] Catalog: Summarize within (operation catalog, gp_summarize_within). Count and aggregate the features inside each polygon (or bin), proportionally for lines and polygons. ArcGIS: Summarize Within, Aggregate Points. QGIS: native:countpointsinpolygon, native:sumlinelengths. (id gp_summarize_within)
- [17] Plan: Transit stations per feature of Parcels (the Start plan's candidate c_2a92a76984e1). Count Transit stations inside each feature of Parcels; the counts map as a choropleth (natural breaks, sequential colors). (id f8db5acb-8be1-4e6d-8904-9ee8c04e791a:c_2a92a76984e1)
- [18] Tool result: gp_summarize_within, step 0. Summarize within: 1 layer saved: Summarize within: Parcels (1100 features). (id 029a787d-7030-40ee-8bec-78edb55a4233:0)
- [19] Layer: Transit stations. 12 features (id 400e1561-f1f1-481c-b9bc-1ac817459feb)
- [20] Layer: Parcels. 1,100 features (id ccc22cc1-2735-4cb4-aa2f-5cc33be687bf)
- [21] Tool result: gp_summarize_within, step 1. Summarize within: 1 layer saved: Summarize within: Parcels (1100 features). (id 029a787d-7030-40ee-8bec-78edb55a4233:1)
- [22] Tool result: gp_summarize_within, step 2. Summarize within: 1 layer saved: Summarize within: Parcels (1100 features). (id 029a787d-7030-40ee-8bec-78edb55a4233:2)
- [23] Catalog: Zonal statistics (analysis catalog, rs_zonal_statistics). count/min/max/mean/std/sum/median/majority per polygon as a table and as GeoJSON. ArcGIS: Zonal Statistics as Table (polygons). (id rs_zonal_statistics)
- [24] Plan: Zonal statistics of City terrain model (DEM) and Parcels (the Start plan's candidate c_223f208b883c). Statistics of City terrain model (DEM) inside each feature of Parcels. (id f8db5acb-8be1-4e6d-8904-9ee8c04e791a:c_223f208b883c)
- [25] Tool result: rs_zonal_statistics, step 0. Zonal statistics: 1100 row(s). zones 1100. (id e1b6768a-3792-454a-b224-e267bd9b2d98:0)
- [26] Tool result: rs_zonal_statistics, step 1. Zonal statistics: 10 row(s). zones 10. (id e1b6768a-3792-454a-b224-e267bd9b2d98:1)
- [27] Tool result: rs_zonal_statistics, step 2. Zonal statistics: 10 row(s). zones 10. (id e1b6768a-3792-454a-b224-e267bd9b2d98:2)
- [28] Catalog: Hot spot analysis (operation catalog, gp_hot_spots). Getis-Ord Gi* hot and cold spots with z-scores, p-values and confidence bins. ArcGIS: Find Hot Spots, Hot Spot Analysis (Getis-Ord Gi*). QGIS: qgis:hotspot (plugin). (id gp_hot_spots)
- [29] Plan: Hot spots of Property sales (the Start plan's candidate c_acf84d8d58c2). 950 points: Getis-Ord Gi* tests whether the concentrations in Property sales are statistically significant. (id f8db5acb-8be1-4e6d-8904-9ee8c04e791a:c_acf84d8d58c2)
- [30] Tool result: gp_hot_spots, step 0. Hot spot analysis: 1 layer saved: Hot spot analysis: Property sales (213 features). (id ba41b9e6-74d7-45fb-bad3-3f51fe7fca0d:0)
- [31] Plan: Hot spots of Building permits (the Start plan's candidate c_3746fcbd31f7). 380 points: Getis-Ord Gi* tests whether the concentrations in Building permits are statistically significant. (id f8db5acb-8be1-4e6d-8904-9ee8c04e791a:c_3746fcbd31f7)
- [32] Tool result: gp_hot_spots, step 1. Hot spot analysis: 1 layer saved: Hot spot analysis: Building permits (380 features). (id ba41b9e6-74d7-45fb-bad3-3f51fe7fca0d:1)
- [33] Catalog: Calculate density (operation catalog, gp_calculate_density). Kernel density per square kilometer on a grid. ArcGIS: Calculate Density, Kernel Density. QGIS: native:heatmapkerneldensityestimation. (id gp_calculate_density)
- [34] Plan: Kernel density of Property sales (the Start plan's candidate c_18bfb4d14078). 950 points in Property sales: a density surface shows where they concentrate. (id f8db5acb-8be1-4e6d-8904-9ee8c04e791a:c_18bfb4d14078)
- [35] Tool result: gp_calculate_density, step 0. Calculate density: 1 layer saved: Calculate density: Property sales (867 features). (id 9ca81de6-468a-4ffe-86a2-5163eb3bafa7:0)
- [36] Plan: Kernel density of Building permits (the Start plan's candidate c_2c9614b6c24c). 380 points in Building permits: a density surface shows where they concentrate. (id f8db5acb-8be1-4e6d-8904-9ee8c04e791a:c_2c9614b6c24c)
- [37] Tool result: gp_calculate_density, step 1. Calculate density: 1 layer saved: Calculate density: Building permits (1211 features). (id 9ca81de6-468a-4ffe-86a2-5163eb3bafa7:1)
- [38] Catalog: Find point clusters (operation catalog, gp_find_point_clusters). Density-based clusters (DBSCAN, HDBSCAN or OPTICS, optionally space-time) with hulls and noise. ArcGIS: Find Point Clusters, Density-based Clustering. QGIS: native:dbscanclustering, native:stdbscanclustering. (id gp_find_point_clusters)
- [39] Plan: Cluster points of Transit stations (the Start plan's candidate c_5a6f63bcd73b). DBSCAN finds dense groups of Transit stations and separates noise. (id f8db5acb-8be1-4e6d-8904-9ee8c04e791a:c_5a6f63bcd73b)
- [40] Tool result: gp_find_point_clusters, step 0. Find point clusters: 2 layers saved: Find point clusters: Transit stations (12 features); Find point clusters: cluster hulls (1 feature). (id f445c7d5-e1f8-40ba-b66a-b6f77ff14617:0)

[41] Plan: Cluster points of Property sales (the Start plan's candidate c_4f023019863a). DBSCAN finds dense groups of Property sales and separates noise. (id f8db5acb-8be1-4e6d-8904-9ee8c04e791a:c_4f023019863a)

[42] Tool result: gp_find_point_clusters, step 1. Find point clusters: 1 layer saved: Find point clusters: Property sales (950 features). (id f445c7d5-e1f8-40ba-b66a-b6f77ff14617:1)

[43] Plan: Cluster points of Building permits (the Start plan's candidate c_8d2b732415a9). DBSCAN finds dense groups of Building permits and separates noise. (id f8db5acb-8be1-4e6d-8904-9ee8c04e791a:c_8d2b732415a9)

[44] Tool result: gp_find_point_clusters, step 2. Find point clusters: 2 layers saved: Find point clusters: Building permits (380 features); Find point clusters: cluster hulls (14 features). (id f445c7d5-e1f8-40ba-b66a-b6f77ff14617:2)

[45] Catalog: Find outliers (operation catalog, gp_outliers). Anselin local Moran's I: HH, LL clusters and HL, LH outliers. ArcGIS: Find Outliers, Cluster and Outlier Analysis (Anselin Local Moran's I). (id gp_outliers)

[46] Plan: Local morans i of Parcels (the Start plan's candidate c_c7bf78360ddf). Local Moran's I maps clusters and outliers of 'built_far'. (id f8db5acb-8be1-4e6d-8904-9ee8c04e791a:c_c7bf78360ddf)

[47] Tool result: gp_outliers, step 0. Find outliers: 1 layer saved: Find outliers: Parcels (1100 features). (id 60b5f86e-cffb-436f-9438-0ad7618a186f:0)

[48] Plan: Local morans i of Green spaces (the Start plan's candidate c_f5f393a93740). Local Moran's I maps clusters and outliers of 'area_ha'. (id f8db5acb-8be1-4e6d-8904-9ee8c04e791a:c_f5f393a93740)

[49] Tool result: gp_outliers, step 1. Find outliers: 1 layer saved: Find outliers: Green spaces (10 features). (id 60b5f86e-cffb-436f-9438-0ad7618a186f:1)

[50] Layer: Green spaces. 10 features (id 448e3c1b-11d3-4dc1-ad29-15c041e2af35)

[51] Plan: Local morans i of Zoning districts (the Start plan's candidate c_c8c9fa0162f0). Local Moran's I maps clusters and outliers of 'max_far'. (id f8db5acb-8be1-4e6d-8904-9ee8c04e791a:c_c8c9fa0162f0)

[52] Tool result: gp_outliers, step 2. Find outliers: 1 layer saved: Find outliers: Zoning districts (10 features). (id 60b5f86e-cffb-436f-9438-0ad7618a186f:2)

[53] Layer: Zoning districts. 10 features (id f84e0e45-37e6-4f41-b7d9-ceb30bbc840a)

[54] Rendering: Map: Emerging hot spots: Property sales (id be66919c-5ac4-46fc-9303-3b6ae32d215e)

[55] Rendering: Map: Emerging hot spots: Building permits (id 10e5f0c6-f9d0-4087-bebf-3a342415f755)

[56] Rendering: Map: Repeat and near repeat classification: Property sales (id 3c1c183a-14b4-4c01-b623-ce0905573f25)

[57] Rendering: Map: Summarize within: Parcels (id f5aabb2-9d66-4cde-936d-0fd21fa0e47f)

[58] Rendering: Map: Summarize within: Parcels (id cf2850e2-e68b-4fe5-9668-bc39c1717ddc)

[59] Rendering: Map: Summarize within: Parcels (id c7c3fa96-6cbc-43c6-9c0d-fe80010b2209)

[60] Rendering: Map: Parcels by built_far (id 225b0a21-d925-4a9c-830d-a8ff465d85f3)

[61] Rendering: Map: Green spaces by area_ha (id d835f68f-d836-45cb-bc1c-330e22a1a5a5)

[62] Rendering: Map: Zoning districts by max_far (id 5c925f5e-357f-42ad-a25b-84fd46efdb28)

[63] Rendering: Map: Hot spot analysis: Property sales (id 27148a64-8d81-466d-ba61-2ae85cfd1868)

[64] Rendering: Map: Hot spot analysis: Building permits (id 5b6f2580-842f-4994-a302-a3bb1b0bf448)

[65] Rendering: Map: Calculate density: Property sales (id 9c3290f3-cc57-4600-9529-82ee062fb61c)

[66] Rendering: Map: Calculate density: Building permits (id 91b2edc2-2bf7-4663-bb16-12595287149f)

[67] Rendering: Map: Find point clusters: Transit stations (id 5608ea02-b2ac-4e51-a075-0e201a1bc4ed)

[68] Rendering: Map: Find point clusters: cluster hulls (id 9864ff42-febc-4252-a0ba-b1ca69720112)

[69] Rendering: Map: Find point clusters: Property sales (id 0d51172d-775f-4364-998b-1f2614c6d6c6)

[70] Rendering: Map: Find point clusters: Building permits (id 450b8dd1-0c4b-4bbf-8e03-6cff33e001f4)

[71] Rendering: Map: Find point clusters: cluster hulls (id 0eabad24-1821-4dea-a840-3e1ce29b5fcb)

[72] Rendering: Map: Find outliers: Parcels (id 32f0c9a9-217e-4701-b234-c3234c26ff02)

[73] Rendering: Map: Find outliers: Green spaces (id bbac1884-3dfd-41d5-99a3-a3dc22b9372a)

[74] Rendering: Map: Find outliers: Zoning districts (id 1ed7248f-0b15-4174-8c9d-e4fcc7ad2031)

[75] Rendering: Chart: Parcels over time (year_built). 12 rows (id a56a4586-993b-4959-8f12-cda5bdc8c1bc)

[76] Rendering: Chart: Property sales over time (date). 57 rows (id d7dcbaa6-e88d-4c73-b1bc-4c18320c9e9e)

[77] Rendering: Chart: Building permits over time (decision_month). 180 rows (id 803ff097-0db7-4dd0-bf88-08718e9b6106)

[78] Rendering: Chart: Land values by zone and year over time (year). 198 rows (id a51cb267-2b59-4303-a275-1b299891614b)

[79] Rendering: Chart: Emerging hot spots: Property sales. 8 rows (id cddb02b3-4f62-47c6-9df5-dead122811ae)

[80] Rendering: Chart: Emerging hot spots: Building permits. 8 rows (id 9b5c350e-1c14-438a-9d63-489450edc2a3)

[81] Rendering: Chart: Repeat and near repeat classification: Property sales. 57 rows (id e0196faa-807f-4c10-88ff-a378a575498f)

[82] Rendering: Chart: Summarize within: Parcels. 12 rows (id 1dbcaea9-a5e4-4882-a88f-ea90a1a7bd7b)

[83] Rendering: Chart: Summarize within: Parcels. 12 rows (id ed9ee8e2-4579-417f-8013-81e91e4a0afb)

[84] Rendering: Chart: Summarize within: Parcels. 12 rows (id 73d109a5-5d83-481d-981e-0be9ffa57bd5)

[85] Rendering: Chart: Hot spot analysis: Property sales. 12 rows (id 517b4c71-81b6-42fe-9408-26c588875b42)

[86] Rendering: Chart: Hot spot analysis: Building permits. 13 rows (id 7a0cc108-0105-4152-b9f4-1796dc1e0c64)

[87] Rendering: Chart: Calculate density: Property sales. 11 rows (id 201493fb-714c-40d2-9a76-ddb22527f9a5)

[88] Rendering: Chart: Calculate density: Building permits. 12 rows (id 741b541a-642f-4d11-af05-b4f10e12c13e)

[89] Rendering: Chart: Find point clusters: Transit stations. 1 rows (id df5f4fbc-f176-4563-8792-c439140abf7d)

[90] Rendering: Chart: Find point clusters: cluster hulls. 1 rows (id ec35aed0-af92-4b16-987b-bc0bb9edc445)

[91] Rendering: Chart: Find point clusters: Property sales. 1 rows (id 420829ca-242a-4203-a03e-1d3c30f92be2)

[92] Rendering: Chart: Find point clusters: Building permits. 15 rows (id a75725d0-4a42-4c03-b775-4841e49a974a)

[93] Rendering: Chart: Find point clusters: cluster hulls. 14 rows (id 19c0352e-e8ce-4b43-b68c-e5d9e727c6d8)

[94] Rendering: Chart: Find outliers: Parcels. 1100 rows (id 22928ec9-70d1-47be-8138-15ef9ace47fc)

[95] Rendering: Chart: Find outliers: Green spaces. 10 rows (id 986b9bba-697e-48c7-ad92-e4319618143d)

[96] Rendering: Chart: Find outliers: Zoning districts. 10 rows (id 74b1b0e7-13ca-4b67-abac-f0beab687357)

[97] Rendering: Chart: Find point clusters: Building permits over time. 180 rows (id f5fafb9d-4abc-4967-900a-fe4195579060)

[98] Rendering: Chart: Find point clusters: Property sales over time. 57 rows (id 633faacd-1c67-43fc-92f7-c5b129144335)

[99] Rendering: Chart: Hot spot analysis: Building permits over time. 180 rows (id 63728d45-bd6d-408e-b13d-19cba683b84d)

[100] Rendering: Chart: Repeat and near repeat classification: Property sales over time. 57 rows (id c2cc74df-5240-4117-b8b3-c351a9f1deb5)

[101] Dataset: Zoning districts. vector, 10 rows (id e41da161-19b5-48ad-9ac1-ec14aba11071)

[102] Dataset: Parcels. vector, 1100 rows (id 334e7daf-16c0-41ea-bad4-945a00366679)

[103] Dataset: Transit stations. vector, 12 rows (id 26d28a13-4955-415e-8c92-76eac9333571)

[104] Dataset: Green spaces. vector, 10 rows (id 3c7e642e-5612-4d39-9522-1784d7abf668)

[105] Dataset: Streets. vector, 151 rows (id 4db290a4-42c5-4245-8ecd-06ec0d874f2a)

[106] Dataset: City terrain model (DEM). raster, ? rows (id b4ace474-faad-4e75-8a4c-267a0401808c)

[107] Dataset: Planning committee brief. document, ? rows (id b40a0012-69f3-4624-bf05-59a0379f41f9)

[108] Record: Sample: Real estate and urban planning, Lisbon (id acfed0f6-9df9-4775-9325-30c0bbbed70e9)

[109] Layer: Emerging hot spots: Property sales. 81 features (id dc34ccf4-38d7-4643-8ab2-86b694e35b9c)

[110] Layer: Emerging hot spots: Building permits. 90 features (id a26af55a-a693-4e98-b7a5-ccf061c4b3dd)

[111] Layer: Repeat and near repeat classification: Property sales. 950 features (id e13509b5-d34e-404a-8352-c51480e7869b)

[112] Layer: Summarize within: Parcels. 1,100 features (id d5217ead-227b-4720-8179-db14e5edc246)

[113] Layer: Summarize within: Parcels. 1,100 features (id 7342e67c-cd62-400b-8ac8-e6893f4004f8)

[114] Layer: Summarize within: Parcels. 1,100 features (id 1cffb229-6c6c-459d-afd2-b27e02cafa7a)

[115] Layer: Hot spot analysis: Property sales. 213 features (id e5e5e574-adff-45f1-a500-025bf5057582)

[116] Layer: Hot spot analysis: Building permits. 380 features (id ce1fd16e-c432-424b-8b6e-95c7442a25ea)

[117] Layer: Calculate density: Property sales. 867 features (id f054cd23-8647-44c1-ad3f-df8046f553c7)

[118] Layer: Calculate density: Building permits. 1,211 features (id a54dd906-1fba-477a-b3b4-4b2b57a69d8c)

[119] Layer: Find point clusters: Transit stations. 12 features (id 712ec0c3-8dd4-4826-b637-a5959f8a8bc2)

[120] Layer: Find point clusters: cluster hulls. 1 features (id 8f02c57f-8442-4514-8c69-ad2c271b02b5)

[121] Layer: Find point clusters: Property sales. 950 features (id 060168a0-b1c4-4161-8cf4-2e5e7e616489)

[122] Layer: Find point clusters: Building permits. 380 features (id 1828d446-6bee-4fc7-8d2a-1e9162eab56b)

- [123] Layer: Find point clusters: cluster hulls. 14 features (id 1280d1a9-f52c-4411-9b1a-bfe208cf113c)
- [124] Layer: Find outliers: Parcels. 1,100 features (id 83bec88a-063d-4158-a3b1-83369d40e2c4)
- [125] Layer: Find outliers: Green spaces. 10 features (id e9005658-d31f-457a-bf22-d38615856ba0)
- [126] Layer: Find outliers: Zoning districts. 10 features (id 940a4302-ccf6-4dc6-ae17-c77fc0e39f96)

Appendix: the data behind the charts

Figure 1. Timeline: events per quarter by dataset [1]

period	series	value
2018-01-01	Property sales	0
2018-01-01	Building permits	0
2018-01-01	Planning applications	0
2018-01-01	Land values by zone and year	10
2018-04-01	Property sales	0
2018-04-01	Building permits	0
2018-04-01	Planning applications	0
2018-04-01	Land values by zone and year	0
2018-07-01	Property sales	0
2018-07-01	Building permits	0
2018-07-01	Planning applications	0
2018-07-01	Land values by zone and year	0
2018-10-01	Property sales	0
2018-10-01	Building permits	0
2018-10-01	Planning applications	0
2018-10-01	Land values by zone and year	0
2019-01-01	Property sales	0
2019-01-01	Building permits	0
2019-01-01	Planning applications	0
2019-01-01	Land values by zone and year	10
2019-04-01	Property sales	0
2019-04-01	Building permits	0
2019-04-01	Planning applications	0
2019-04-01	Land values by zone and year	0
2019-07-01	Property sales	0
2019-07-01	Building permits	0
2019-07-01	Planning applications	0
2019-07-01	Land values by zone and year	0
2019-10-01	Property sales	0
2019-10-01	Building permits	0
2019-10-01	Planning applications	0
2019-10-01	Land values by zone and year	0
2020-01-01	Property sales	0
2020-01-01	Building permits	0
2020-01-01	Planning applications	0
2020-01-01	Land values by zone and year	10
2020-04-01	Property sales	0

period	series	value
2020-04-01	Building permits	0
2020-04-01	Planning applications	0
2020-04-01	Land values by zone and year	0
2020-07-01	Property sales	0
2020-07-01	Building permits	0
2020-07-01	Planning applications	0
2020-07-01	Land values by zone and year	0
2020-10-01	Property sales	0
2020-10-01	Building permits	0
2020-10-01	Planning applications	0
2020-10-01	Land values by zone and year	0
2021-01-01	Property sales	0
2021-01-01	Building permits	0
2021-01-01	Planning applications	0
2021-01-01	Land values by zone and year	10
2021-04-01	Property sales	0
2021-04-01	Building permits	0
2021-04-01	Planning applications	0
2021-04-01	Land values by zone and year	0
2021-07-01	Property sales	0
2021-07-01	Building permits	0
2021-07-01	Planning applications	0
2021-07-01	Land values by zone and year	0
2021-10-01	Property sales	0
2021-10-01	Building permits	0
2021-10-01	Planning applications	0
2021-10-01	Land values by zone and year	0
2022-01-01	Property sales	46
2022-01-01	Building permits	0
2022-01-01	Planning applications	0
2022-01-01	Land values by zone and year	10
2022-04-01	Property sales	46
2022-04-01	Building permits	0
2022-04-01	Planning applications	0
2022-04-01	Land values by zone and year	0
2022-07-01	Property sales	42
2022-07-01	Building permits	0
2022-07-01	Planning applications	0
2022-07-01	Land values by zone and year	0
2022-10-01	Property sales	58
2022-10-01	Building permits	0
2022-10-01	Planning applications	0
2022-10-01	Land values by zone and year	0

period	series	value
2023-01-01	Property sales	40
2023-01-01	Building permits	14
2023-01-01	Planning applications	0
2023-01-01	Land values by zone and year	10
2023-04-01	Property sales	49
2023-04-01	Building permits	24
2023-04-01	Planning applications	0
2023-04-01	Land values by zone and year	0
2023-07-01	Property sales	61
2023-07-01	Building permits	19
2023-07-01	Planning applications	0
2023-07-01	Land values by zone and year	0
2023-10-01	Property sales	48
2023-10-01	Building permits	24
2023-10-01	Planning applications	0
2023-10-01	Land values by zone and year	0
2024-01-01	Property sales	50
2024-01-01	Building permits	12
2024-01-01	Planning applications	0
2024-01-01	Land values by zone and year	10
2024-04-01	Property sales	56
2024-04-01	Building permits	23
2024-04-01	Planning applications	0
2024-04-01	Land values by zone and year	0
2024-07-01	Property sales	46
2024-07-01	Building permits	30
2024-07-01	Planning applications	0
2024-07-01	Land values by zone and year	0
2024-10-01	Property sales	40
2024-10-01	Building permits	29
2024-10-01	Planning applications	0
2024-10-01	Land values by zone and year	0
2025-01-01	Property sales	47
2025-01-01	Building permits	14
2025-01-01	Planning applications	51
2025-01-01	Land values by zone and year	10
2025-04-01	Property sales	60
2025-04-01	Building permits	28
2025-04-01	Planning applications	45
2025-04-01	Land values by zone and year	0
2025-07-01	Property sales	51
2025-07-01	Building permits	31
2025-07-01	Planning applications	28

period	series	value
2025-07-01	Land values by zone and year	0
2025-10-01	Property sales	55
2025-10-01	Building permits	34
2025-10-01	Planning applications	36
2025-10-01	Land values by zone and year	0
2026-01-01	Property sales	55
2026-01-01	Building permits	34
2026-01-01	Planning applications	0
2026-01-01	Land values by zone and year	10
2026-04-01	Property sales	49
2026-04-01	Building permits	28
2026-04-01	Planning applications	0
2026-04-01	Land values by zone and year	0
2026-07-01	Property sales	51
2026-07-01	Building permits	36
2026-07-01	Planning applications	0
2026-07-01	Land values by zone and year	0

Figure 23. Parcels over time (year_built) [75]

bin_start	bin_end	count
0	0.3225	82
0.3225	0.645	63
0.645	0.9675	166
0.9675	1.29	200
1.29	1.613	194
1.613	1.935	103
1.935	2.257	92
2.257	2.58	71
2.58	2.902	62
2.902	3.225	45
3.225	3.547	18
3.547	3.87	4

Figure 24. Property sales over time (date) [76]

period	series	value
2022-01-01	apartment	21
2022-01-01	office	15
2022-01-01	house	10
2022-04-01	apartment	24
2022-04-01	office	10
2022-04-01	house	12
2022-07-01	apartment	19
2022-07-01	office	13
2022-07-01	house	10

period	series	value
2022-10-01	apartment	33
2022-10-01	office	12
2022-10-01	house	13
2023-01-01	apartment	14
2023-01-01	office	14
2023-01-01	house	12
2023-04-01	apartment	26
2023-04-01	office	12
2023-04-01	house	11
2023-07-01	apartment	29
2023-07-01	office	15
2023-07-01	house	17
2023-10-01	apartment	19
2023-10-01	office	19
2023-10-01	house	10
2024-01-01	apartment	22
2024-01-01	office	14
2024-01-01	house	14
2024-04-01	apartment	25
2024-04-01	office	15
2024-04-01	house	16
2024-07-01	apartment	22
2024-07-01	office	12
2024-07-01	house	12
2024-10-01	apartment	15
2024-10-01	office	13
2024-10-01	house	12
2025-01-01	apartment	23
2025-01-01	office	13
2025-01-01	house	11
2025-04-01	apartment	27
2025-04-01	office	18
2025-04-01	house	15
2025-07-01	apartment	21
2025-07-01	office	13
2025-07-01	house	17
2025-10-01	apartment	26
2025-10-01	office	15
2025-10-01	house	14
2026-01-01	apartment	24
2026-01-01	office	21
2026-01-01	house	10
2026-04-01	apartment	20

period	series	value
2026-04-01	office	14
2026-04-01	house	15
2026-07-01	apartment	21
2026-07-01	office	10
2026-07-01	house	20

Figure 25. Building permits over time (decision_month) [77]

period	series	value
2023-01-01	extension	31
2023-01-01	new build	14
2023-01-01	change of use	22
2023-01-01	demolition	0
2023-02-01	extension	54
2023-02-01	new build	28
2023-02-01	change of use	0
2023-02-01	demolition	0
2023-03-01	extension	34
2023-03-01	new build	47
2023-03-01	change of use	28
2023-03-01	demolition	0
2023-04-01	extension	65
2023-04-01	new build	13
2023-04-01	change of use	0
2023-04-01	demolition	41
2023-05-01	extension	82
2023-05-01	new build	53
2023-05-01	change of use	45
2023-05-01	demolition	0
2023-06-01	extension	26
2023-06-01	new build	84
2023-06-01	change of use	3
2023-06-01	demolition	0
2023-07-01	extension	15
2023-07-01	new build	43
2023-07-01	change of use	0
2023-07-01	demolition	8
2023-08-01	extension	32
2023-08-01	new build	102
2023-08-01	change of use	8
2023-08-01	demolition	24
2023-09-01	extension	57
2023-09-01	new build	57
2023-09-01	change of use	0
2023-09-01	demolition	31

period	series	value
2023-10-01	extension	70
2023-10-01	new build	3
2023-10-01	change of use	37
2023-10-01	demolition	17
2023-11-01	extension	42
2023-11-01	new build	39
2023-11-01	change of use	36
2023-11-01	demolition	0
2023-12-01	extension	94
2023-12-01	new build	67
2023-12-01	change of use	65
2023-12-01	demolition	2
2024-01-01	extension	0
2024-01-01	new build	19
2024-01-01	change of use	34
2024-01-01	demolition	30
2024-02-01	extension	99
2024-02-01	new build	21
2024-02-01	change of use	32
2024-02-01	demolition	39
2024-03-01	extension	23
2024-03-01	new build	0
2024-03-01	change of use	0
2024-03-01	demolition	0
2024-04-01	extension	12
2024-04-01	new build	0
2024-04-01	change of use	45
2024-04-01	demolition	0
2024-05-01	extension	105
2024-05-01	new build	110
2024-05-01	change of use	7
2024-05-01	demolition	6
2024-06-01	extension	46
2024-06-01	new build	0
2024-06-01	change of use	58
2024-06-01	demolition	0
2024-07-01	extension	69
2024-07-01	new build	28
2024-07-01	change of use	71
2024-07-01	demolition	32
2024-08-01	extension	0
2024-08-01	new build	81
2024-08-01	change of use	89

period	series	value
2024-08-01	demolition	8
2024-09-01	extension	0
2024-09-01	new build	96
2024-09-01	change of use	98
2024-09-01	demolition	39
2024-10-01	extension	43
2024-10-01	new build	77
2024-10-01	change of use	32
2024-10-01	demolition	56
2024-11-01	extension	175
2024-11-01	new build	176
2024-11-01	change of use	26
2024-11-01	demolition	0
2024-12-01	extension	49
2024-12-01	new build	80
2024-12-01	change of use	15
2024-12-01	demolition	41
2025-01-01	extension	41
2025-01-01	new build	64
2025-01-01	change of use	0
2025-01-01	demolition	0
2025-02-01	extension	24
2025-02-01	new build	28
2025-02-01	change of use	53
2025-02-01	demolition	0
2025-03-01	extension	0
2025-03-01	new build	32
2025-03-01	change of use	28
2025-03-01	demolition	0
2025-04-01	extension	41
2025-04-01	new build	33
2025-04-01	change of use	55
2025-04-01	demolition	0
2025-05-01	extension	67
2025-05-01	new build	76
2025-05-01	change of use	57
2025-05-01	demolition	27
2025-06-01	extension	87
2025-06-01	new build	47
2025-06-01	change of use	73
2025-06-01	demolition	4
2025-07-01	extension	16
2025-07-01	new build	47

period	series	value
2025-07-01	change of use	30
2025-07-01	demolition	0
2025-08-01	extension	62
2025-08-01	new build	69
2025-08-01	change of use	43
2025-08-01	demolition	26
2025-09-01	extension	116
2025-09-01	new build	90
2025-09-01	change of use	63
2025-09-01	demolition	65
2025-10-01	extension	70
2025-10-01	new build	54
2025-10-01	change of use	119
2025-10-01	demolition	18
2025-11-01	extension	55
2025-11-01	new build	64
2025-11-01	change of use	80
2025-11-01	demolition	10
2025-12-01	extension	108
2025-12-01	new build	23
2025-12-01	change of use	23
2025-12-01	demolition	0
2026-01-01	extension	130
2026-01-01	new build	117
2026-01-01	change of use	39
2026-01-01	demolition	0
2026-02-01	extension	108
2026-02-01	new build	22
2026-02-01	change of use	28
2026-02-01	demolition	0
2026-03-01	extension	80
2026-03-01	new build	35
2026-03-01	change of use	85
2026-03-01	demolition	3
2026-04-01	extension	21
2026-04-01	new build	140
2026-04-01	change of use	0
2026-04-01	demolition	32
2026-05-01	extension	55
2026-05-01	new build	65
2026-05-01	change of use	17
2026-05-01	demolition	0
2026-06-01	extension	63

period	series	value
2026-06-01	new build	112
2026-06-01	change of use	93
2026-06-01	demolition	0
2026-07-01	extension	167
2026-07-01	new build	112
2026-07-01	change of use	9
2026-07-01	demolition	14
2026-08-01	extension	66
2026-08-01	new build	65
2026-08-01	change of use	67
2026-08-01	demolition	104
2026-09-01	extension	130
2026-09-01	new build	34
2026-09-01	change of use	66
2026-09-01	demolition	0

Figure 26. Land values by zone and year over time (year) [78]

period	series	value
2018-01-01	C06	1
2018-01-01	I07	1
2018-01-01	M05	1
2018-01-01	M08	1
2018-01-01	M10	1
2018-01-01	Other	5
2018-04-01	C06	0
2018-04-01	I07	0
2018-04-01	M05	0
2018-04-01	M08	0
2018-04-01	M10	0
2018-04-01	Other	0
2018-07-01	C06	0
2018-07-01	I07	0
2018-07-01	M05	0
2018-07-01	M08	0
2018-07-01	M10	0
2018-07-01	Other	0
2018-10-01	C06	0
2018-10-01	I07	0
2018-10-01	M05	0
2018-10-01	M08	0
2018-10-01	M10	0
2018-10-01	Other	0
2019-01-01	C06	1
2019-01-01	I07	1

period	series	value
2019-01-01	M05	1
2019-01-01	M08	1
2019-01-01	M10	1
2019-01-01	Other	5
2019-04-01	C06	0
2019-04-01	I07	0
2019-04-01	M05	0
2019-04-01	M08	0
2019-04-01	M10	0
2019-04-01	Other	0
2019-07-01	C06	0
2019-07-01	I07	0
2019-07-01	M05	0
2019-07-01	M08	0
2019-07-01	M10	0
2019-07-01	Other	0
2019-10-01	C06	0
2019-10-01	I07	0
2019-10-01	M05	0
2019-10-01	M08	0
2019-10-01	M10	0
2019-10-01	Other	0
2020-01-01	C06	1
2020-01-01	I07	1
2020-01-01	M05	1
2020-01-01	M08	1
2020-01-01	M10	1
2020-01-01	Other	5
2020-04-01	C06	0
2020-04-01	I07	0
2020-04-01	M05	0
2020-04-01	M08	0
2020-04-01	M10	0
2020-04-01	Other	0
2020-07-01	C06	0
2020-07-01	I07	0
2020-07-01	M05	0
2020-07-01	M08	0
2020-07-01	M10	0
2020-07-01	Other	0
2020-10-01	C06	0
2020-10-01	I07	0
2020-10-01	M05	0

period	series	value
2020-10-01	M08	0
2020-10-01	M10	0
2020-10-01	Other	0
2021-01-01	C06	1
2021-01-01	I07	1
2021-01-01	M05	1
2021-01-01	M08	1
2021-01-01	M10	1
2021-01-01	Other	5
2021-04-01	C06	0
2021-04-01	I07	0
2021-04-01	M05	0
2021-04-01	M08	0
2021-04-01	M10	0
2021-04-01	Other	0
2021-07-01	C06	0
2021-07-01	I07	0
2021-07-01	M05	0
2021-07-01	M08	0
2021-07-01	M10	0
2021-07-01	Other	0
2021-10-01	C06	0
2021-10-01	I07	0
2021-10-01	M05	0
2021-10-01	M08	0
2021-10-01	M10	0
2021-10-01	Other	0
2022-01-01	C06	1
2022-01-01	I07	1
2022-01-01	M05	1
2022-01-01	M08	1
2022-01-01	M10	1
2022-01-01	Other	5
2022-04-01	C06	0
2022-04-01	I07	0
2022-04-01	M05	0
2022-04-01	M08	0
2022-04-01	M10	0
2022-04-01	Other	0
2022-07-01	C06	0
2022-07-01	I07	0
2022-07-01	M05	0
2022-07-01	M08	0

period	series	value
2022-07-01	M10	0
2022-07-01	Other	0
2022-10-01	C06	0
2022-10-01	I07	0
2022-10-01	M05	0
2022-10-01	M08	0
2022-10-01	M10	0
2022-10-01	Other	0
2023-01-01	C06	1
2023-01-01	I07	1
2023-01-01	M05	1
2023-01-01	M08	1
2023-01-01	M10	1
2023-01-01	Other	5
2023-04-01	C06	0
2023-04-01	I07	0
2023-04-01	M05	0
2023-04-01	M08	0
2023-04-01	M10	0
2023-04-01	Other	0
2023-07-01	C06	0
2023-07-01	I07	0
2023-07-01	M05	0
2023-07-01	M08	0
2023-07-01	M10	0
2023-07-01	Other	0
2023-10-01	C06	0
2023-10-01	I07	0
2023-10-01	M05	0
2023-10-01	M08	0
2023-10-01	M10	0
2023-10-01	Other	0
2024-01-01	C06	1
2024-01-01	I07	1
2024-01-01	M05	1
2024-01-01	M08	1
2024-01-01	M10	1
2024-01-01	Other	5
2024-04-01	C06	0
2024-04-01	I07	0
2024-04-01	M05	0
2024-04-01	M08	0
2024-04-01	M10	0

period	series	value
2024-04-01	Other	0
2024-07-01	C06	0
2024-07-01	I07	0
2024-07-01	M05	0
2024-07-01	M08	0
2024-07-01	M10	0
2024-07-01	Other	0
2024-10-01	C06	0
2024-10-01	I07	0
2024-10-01	M05	0
2024-10-01	M08	0
2024-10-01	M10	0
2024-10-01	Other	0
2025-01-01	C06	1
2025-01-01	I07	1
2025-01-01	M05	1
2025-01-01	M08	1
2025-01-01	M10	1
2025-01-01	Other	5
2025-04-01	C06	0
2025-04-01	I07	0
2025-04-01	M05	0
2025-04-01	M08	0
2025-04-01	M10	0
2025-04-01	Other	0
2025-07-01	C06	0
2025-07-01	I07	0
2025-07-01	M05	0
2025-07-01	M08	0
2025-07-01	M10	0
2025-07-01	Other	0
2025-10-01	C06	0
2025-10-01	I07	0
2025-10-01	M05	0
2025-10-01	M08	0
2025-10-01	M10	0
2025-10-01	Other	0
2026-01-01	C06	1
2026-01-01	I07	1
2026-01-01	M05	1
2026-01-01	M08	1
2026-01-01	M10	1
2026-01-01	Other	5

Figure 27. Emerging hot spots: Property sales [79]

bin_start	bin_end	count
-0.963	-0.1466	23
-0.1466	0.6697	17
0.6697	1.486	14
1.486	2.303	13
2.303	3.119	4
3.119	3.935	6
3.935	4.752	3
4.752	5.568	1

Figure 28. Emerging hot spots: Building permits [80]

bin_start	bin_end	count
-0.609	0.08612	42
0.08612	0.7812	21
0.7812	1.476	9
1.476	2.171	9
2.171	2.867	5
2.867	3.562	3
3.562	4.257	0
4.257	4.952	1

Figure 29. Repeat and near repeat classification: Property sales [81]

period	series	value
2022-01-01	apartment	21
2022-01-01	office	15
2022-01-01	house	10
2022-04-01	apartment	24
2022-04-01	office	10
2022-04-01	house	12
2022-07-01	apartment	19
2022-07-01	office	13
2022-07-01	house	10
2022-10-01	apartment	33
2022-10-01	office	12
2022-10-01	house	13
2023-01-01	apartment	14
2023-01-01	office	14
2023-01-01	house	12
2023-04-01	apartment	26
2023-04-01	office	12
2023-04-01	house	11
2023-07-01	apartment	29
2023-07-01	office	15
2023-07-01	house	17
2023-10-01	apartment	19

period	series	value
2023-10-01	office	19
2023-10-01	house	10
2024-01-01	apartment	22
2024-01-01	office	14
2024-01-01	house	14
2024-04-01	apartment	25
2024-04-01	office	15
2024-04-01	house	16
2024-07-01	apartment	22
2024-07-01	office	12
2024-07-01	house	12
2024-10-01	apartment	15
2024-10-01	office	13
2024-10-01	house	12
2025-01-01	apartment	23
2025-01-01	office	13
2025-01-01	house	11
2025-04-01	apartment	27
2025-04-01	office	18
2025-04-01	house	15
2025-07-01	apartment	21
2025-07-01	office	13
2025-07-01	house	17
2025-10-01	apartment	26
2025-10-01	office	15
2025-10-01	house	14
2026-01-01	apartment	24
2026-01-01	office	21
2026-01-01	house	10
2026-04-01	apartment	20
2026-04-01	office	14
2026-04-01	house	15
2026-07-01	apartment	21
2026-07-01	office	10
2026-07-01	house	20

Figure 30. Summarize within: Parcels [82]

bin_start	bin_end	count
752	1,843	112
1,843	2,934	213
2,934	4,024	188
4,024	5,115	183
5,115	6,206	125
6,206	7,296	99

bin_start	bin_end	count
7,296	8,387	76
8,387	9,478	50
9,478	1.057e+04	32
1.057e+04	1.166e+04	12
1.166e+04	1.275e+04	7
1.275e+04	1.384e+04	3

Figure 31. Summarize within: Parcels [83]

bin_start	bin_end	count
752	1,843	112
1,843	2,934	213
2,934	4,024	188
4,024	5,115	183
5,115	6,206	125
6,206	7,296	99
7,296	8,387	76
8,387	9,478	50
9,478	1.057e+04	32
1.057e+04	1.166e+04	12
1.166e+04	1.275e+04	7
1.275e+04	1.384e+04	3

Figure 32. Summarize within: Parcels [84]

bin_start	bin_end	count
752	1,843	112
1,843	2,934	213
2,934	4,024	188
4,024	5,115	183
5,115	6,206	125
6,206	7,296	99
7,296	8,387	76
8,387	9,478	50
9,478	1.057e+04	32
1.057e+04	1.166e+04	12
1.166e+04	1.275e+04	7
1.275e+04	1.384e+04	3

Figure 33. Hot spot analysis: Property sales [85]

bin_start	bin_end	band	band_label	count
-2	-1.5	not_significant	Not significant	25
-1.5	-1	not_significant	Not significant	8
-1	-0.5	not_significant	Not significant	21
-0.5	0	not_significant	Not significant	63
0	0.5	not_significant	Not significant	27
0.5	1	not_significant	Not significant	37

bin_start	bin_end	band	band_label	count
1	1.5	not_significant	Not significant	12
1.5	2	hot_90	Hot spot, 90% confidence	2
1.5	2	not_significant	Not significant	12
2	2.5	hot_95	Hot spot, 95% confidence	2
2.5	3	hot_95	Hot spot, 95% confidence	2
3.5	4	hot_99	Hot spot, 99% confidence	2

Figure 34. Hot spot analysis: Building permits [86]

bin_start	bin_end	band	band_label	count
-2.5	-2	cold_95	Cold spot, 95% confidence	1
-2	-1.5	cold_90	Cold spot, 90% confidence	11
-2	-1.5	not_significant	Not significant	7
-1.5	-1	not_significant	Not significant	29
-1	-0.5	not_significant	Not significant	81
-0.5	0	not_significant	Not significant	72
0	0.5	not_significant	Not significant	93
0.5	1	not_significant	Not significant	38
1	1.5	not_significant	Not significant	25
1.5	2	hot_90	Hot spot, 90% confidence	9
1.5	2	not_significant	Not significant	4
2	2.5	hot_95	Hot spot, 95% confidence	9
2.5	3	hot_99	Hot spot, 99% confidence	1

Figure 35. Calculate density: Property sales [87]

bin_start	bin_end	count
0	2.182	89
2.182	4.364	81
4.364	6.545	81
6.545	8.727	82
8.727	10.91	80
10.91	13.09	122
13.09	15.27	81
15.27	17.45	82
17.45	19.64	76
19.64	21.82	57
21.82	24	36

Figure 36. Calculate density: Building permits [88]

bin_start	bin_end	count
0	2.5	68
2.5	5	87
5	7.5	139
7.5	10	94
10	12.5	135
12.5	15	92
15	17.5	139
17.5	20	94
20	22.5	138
22.5	25	89
25	27.5	102
27.5	30	34

Figure 37. Find point clusters: Transit stations [89]

cluster	features	fraction	share
0	12	1	100.0%

Figure 38. Find point clusters: cluster hulls [90]

cluster	features	fraction	share
0	1	1	100.0%

Figure 39. Find point clusters: Property sales [91]

cluster	features	fraction	share
Noise	950	1	100.0%

Figure 40. Find point clusters: Building permits [92]

cluster	features	fraction	share
Noise	126	0.3316	33.2%
5	37	0.09737	9.7%
6	33	0.08684	8.7%
0	29	0.07632	7.6%
10	20	0.05263	5.3%
4	19	0.05	5.0%
2	18	0.04737	4.7%
8	17	0.04474	4.5%
1	16	0.0421	4.2%
9	15	0.03947	3.9%
3	13	0.03421	3.4%
11	10	0.02632	2.6%
12	10	0.02632	2.6%
13	10	0.02632	2.6%
7	7	0.01842	1.8%

Figure 41. Find point clusters: cluster hulls [93]

cluster	features	fraction	share
0	1	0.07143	7.1%

cluster	features	fraction	share
1	1	0.07143	7.1%
10	1	0.07143	7.1%
11	1	0.07143	7.1%
12	1	0.07143	7.1%
13	1	0.07143	7.1%
2	1	0.07143	7.1%
3	1	0.07143	7.1%
4	1	0.07143	7.1%
5	1	0.07143	7.1%
6	1	0.07143	7.1%
7	1	0.07143	7.1%
8	1	0.07143	7.1%
9	1	0.07143	7.1%

Figure 42. Find outliers: Parcels [94]

value	lag	type
-1.428	-0.8778	NS
-0.8984	-0.9939	NS
-0.615	-1.065	NS
-1.12	-0.8688	NS
-0.2331	-0.615	NS
-0.615	-0.2331	NS
-1.133	-0.6335	NS
-0.7752	-0.9292	NS
-0.4918	-0.9764	NS
-0.27	-0.8203	NS
-1.527	-0.4015	NS
-0.2208	-0.4548	NS
-0.923	-0.1037	NS
0.0133	-0.5719	NS
-0.7998	-0.7259	NS
-0.5288	-0.8614	NS
-0.923	-0.6643	NS
-1.675	-1.12	NS
-0.5657	-1.675	NS
-1.675	-1.03	NS
-0.3316	-1.157	NS
-1.317	-0.6314	NS
-0.9969	-0.7382	NS
-0.5657	-1.371	NS
-0.3809	-1.034	NS
-1.034	-0.6889	NS
-1.219	-0.96	NS
-0.96	-1.219	NS

value	lag	type
-0.8121	-1.004	NS
-0.5904	-1.003	NS
-1.798	-0.5616	NS
-0.2824	-1.018	NS
0.0996	-0.3316	NS
-0.0852	-0.2392	NS
-0.578	-0.2413	NS
-0.7259	-1.083	NS
-1.391	-0.7259	NS
-0.4425	-0.9846	NS
-1.675	-0.4918	NS
-0.4672	-0.8943	NS
-0.5657	-1.071	NS
-0.8737	-1.268	NS
-1.675	-0.7957	NS
-0.8614	-1.067	NS
-0.652	-1.05	NS
1.381	0.6417	NS
0.5554	1.054	NS
0.7279	0.884	NS
1.036	1.412	NS
0.7156	1.165	NS
2.108	0.847	NS
0.7895	1.229	NS
0.4938	0.2105	NS
-0.2577	0.6868	NS
0.6786	0.3747	NS
0.9374	0.3829	NS
0.3829	0.9497	NS
-1.28	-0.0206	NS
-0.578	-0.1961	NS
0.3706	-0.4333	NS
0.6293	0.001	NS
-0.5041	-0.4179	NS
-0.7136	-0.7197	NS
-0.9353	-0.7875	NS
-1.022	-0.9271	NS
-0.9723	-0.9415	NS
-0.96	-0.9446	NS
-0.8491	-0.8214	NS
-1.157	-1.133	NS
-1.305	-1.083	NS
-0.9477	-1.114	NS

value	lag	type
-1.145	-1.065	NS
-0.8491	-0.9641	NS
-0.7752	-0.6458	NS
-0.4425	-1.005	NS
-1.798	-0.6479	NS
-0.3563	-1.41	NS
-1.022	-1.018	NS
-0.9969	-0.8429	NS
-0.652	-1.009	NS
-1.022	-0.7752	NS
-0.8614	-0.1715	NS
-0.1715	-1.015	NS
-0.6643	-0.652	NS
-1.022	-0.6643	NS
-0.7382	-0.5626	NS
-0.5534	-0.716	NS
-0.578	-0.7423	NS
-0.5411	-0.6427	NS
-0.7013	-0.5411	NS
-1.108	-0.7937	NS
-0.8861	-0.9045	NS
-0.7013	-0.9969	NS
-0.615	-0.1407	NS
0.3706	-0.3994	NS
-0.1838	0.3706	NS
-0.4672	-0.2639	NS
0.038	-0.5575	NS
-0.5657	-0.3563	NS
-0.6397	-0.2639	NS
0.7279	1.122	NS
1.122	0.7279	NS
1.085	-0.7998	NS
-1.798	0.7238	NS
0.1981	0.0585	NS
0.8881	-0.4015	NS
0.1242	0.9312	NS
0.5924	0.654	NS
1.27	0.4281	NS
0.962	0.5801	NS
0.8018	0.6601	NS
0.3583	0.8819	NS
0.8634	0.8203	NS
0.8511	1.116	NS

value	lag	type
0.8881	0.3337	NS
0.5801	0.8881	NS
0.962	0.8922	NS
1.097	0.9045	NS
1.196	0.8716	NS
0.5554	0.9086	NS
1.997	1.362	NS
2.095	0.0996	NS
-1.798	1.073	NS
-1.145	-0.9969	NS
-0.9969	-1.145	NS
-0.3316	-0.7813	NS
-0.7136	-0.4672	NS
-0.8491	-0.6971	NS
0.001	-0.5842	NS
-1.391	-1.058	NS
-1.675	-0.7136	NS
-0.8984	-1.04	NS
-1.058	-0.8984	NS
-0.8984	-1.071	NS
-0.8121	-1.075	NS
-1.379	-0.8861	NS
-0.9477	-1.079	NS
-1.169	-0.9846	NS
-1.798	-0.578	NS
-1.798	-0.7629	NS
-0.7629	-1.798	NS
-0.6889	-0.9477	NS
-1.034	-0.8787	NS
-0.8984	-0.9939	NS
-1.675	-0.5565	NS
-1.342	-0.2947	NS
-0.1838	-0.8409	NS
-0.4056	-1.025	NS
-0.7752	-0.229	NS
-0.0976	-0.6397	NS
-0.5041	-0.3193	NS
-0.5411	-1.151	NS
-1.798	-0.2392	NS
-0.8614	-0.1653	NS
0.4199	-0.5329	NS
-0.7505	-0.1427	NS
0.0133	-0.4015	NS

value	lag	type
-0.3563	-0.0976	NS
-0.0976	-0.153	NS
-0.2331	-0.5103	NS
-0.8861	-0.27	NS
-0.1345	-0.2454	NS
-0.2577	-0.0483	NS
0.038	-0.7834	NS
-0.2947	-0.1386	NS
-0.3193	-0.2146	NS
-0.1345	-0.2824	NS
-0.2331	-0.424	NS
-0.7136	-0.2331	NS
-0.2084	0.1797	NS
-0.1715	0.1612	NS
0.5308	-0.076	NS
-0.5657	0.5862	NS
0.6417	0.0215	NS
-1.798	-1.798	NS
-1.798	0.079	NS
1.196	-0.4795	NS
0.8388	0.1735	NS
0.3953	1.19	NS
1.849	0.8059	NS
1.356	0.9702	NS
0.6663	1.162	NS
0.5677	1.192	NS
1.714	0.5677	NS
1.097	0.7033	NS
0.7033	0.7217	NS
1.369	0.4445	NS
0.038	0.8758	NS
0.3829	0.038	NS
1.763	0.8634	NS
0.8511	1.167	NS
0.962	1.13	NS
0.7772	1.192	NS
0.4322	0.9928	NS
1.43	0.7977	NS
0.0503	-0.2084	NS
0.1489	0.2885	NS
0.3829	0.2269	NS
0.4322	-0.2762	NS
-0.2454	-0.3132	NS

value	lag	type
-1.058	0.0934	NS
-0.6027	-0.4343	NS
0.5677	-0.8799	NS
-1.157	-0.3316	NS
-0.3193	-0.4713	NS
-0.6397	-0.6643	NS
-0.7752	-0.6191	NS
-0.8984	-0.7074	NS
-0.036	-1.601	NS
-1.527	-0.9169	NS
-1.798	-1.071	NS
-0.307	-1.675	NS
-1.675	-0.2885	NS
-1.046	-0.8861	NS
-0.8245	-0.3932	NS
-0.8861	-0.3727	NS
0.7526	-1.071	NS
0.0133	-1.077	NS
-0.3563	0.0133	NS
-1.317	0.309	NS
0.309	-1.317	NS
0.3953	-1.582	NS
-1.49	-0.424	NS
-1.243	-1.354	NS
-1.798	-0.5842	NS
-0.7629	-1.262	NS
-0.7259	-0.7629	NS
-0.3563	-0.6643	NS
-1.403	-0.3152	NS
-0.4425	-0.6355	NS
-0.1468	-0.7341	NS
0.0626	-0.7136	NS
-0.1222	-0.652	NS
-0.2208	-0.6735	NS
-1.798	-0.3932	NS
-0.1961	-0.0791	NS
-0.4548	0.0503	NS
0.2967	-0.5863	NS
-0.2331	-0.0852	NS
-0.0852	-0.2331	NS
-0.8737	-0.1438	NS
-0.923	-0.1797	NS
0.7649	-0.6427	NS

value	lag	type
-0.4302	-0.344	NS
0.0503	-0.1037	NS
-0.1099	-0.4302	NS
-0.9107	-0.2885	NS
-0.307	-0.4179	NS
0.0503	-0.2516	NS
-0.1961	-0.8737	NS
-1.798	0.0215	NS
0.0133	-0.5945	NS
0.0133	-0.5945	NS
0.001	0.0133	NS
0.2228	-0.8121	NS
-0.8121	0.0873	NS
-0.0483	-0.8121	NS
-0.3316	-0.5164	NS
-0.5164	-0.4918	NS
0.1242	-0.153	NS
0.001	-0.4056	NS
-0.307	-0.3029	NS
0.0996	0.2782	NS
-0.0852	-0.2146	NS
-0.27	-0.1838	NS
-0.1838	-0.27	NS
1.122	1.042	NS
1.245	1.171	NS
1.221	1.332	NS
1.048	0.6725	NS
0.6786	0.8634	NS
0.6786	0.2474	NS
0.3583	-0.2577	NS
-0.2577	0.3829	NS
0.346	0.6663	NS
0.6293	0.9497	NS
1.553	0.6293	NS
0.038	0.5924	NS
0.8018	0.6088	NS
0.5924	1.073	NS
1.073	0.5924	NS
1.295	1.024	NS
0.6663	1.233	NS
0.9743	0.9805	NS
0.4815	0.8758	NS
1.578	0.5739	NS

value	lag	type
0.6663	0.8634	NS
0.9866	0.962	NS
1.467	0.6951	NS
0.4569	1.032	NS
0.6417	0.962	NS
-0.96	-0.9785	NS
-0.7998	-0.96	NS
-1.798	-0.1468	NS
-0.1468	-1.798	NS
-0.615	-1.51	NS
-1.058	-1.145	NS
-1.675	-0.9189	NS
-0.27	-0.6602	NS
-0.344	-0.116	NS
0.038	-0.4548	NS
-1.502	-0.5534	NS
-0.7382	-1.471	NS
-1.675	-0.8676	NS
-0.2331	-1.206	NS
-0.7382	-0.7505	NS
-0.8861	-0.9353	NS
-1.133	-0.8121	NS
-1.219	-1.163	NS
-1.083	-1.219	NS
-0.7629	-0.6807	NS
0.0873	-0.7752	NS
-1.403	-0.5863	NS
-0.4795	-0.96	NS
-0.5164	-0.9723	NS
-0.8368	-1.163	NS
-1.034	-0.9538	NS
-1.601	-0.9107	NS
-0.8614	-1.428	NS
-1.798	-0.8368	NS
-0.8368	-1.798	NS
-1.108	-0.0606	NS
-0.4179	-0.9785	NS
-0.5041	0.1119	NS
0.1119	-0.5041	NS
-0.344	-0.0575	NS
-0.652	0.2803	NS
0.0873	0.0339	NS
1.097	-0.2824	NS

value	lag	type
-0.4672	-0.3481	NS
-0.0852	-0.2577	NS
-0.0483	-0.0647	NS
-1.798	-0.4672	NS
-0.7382	-0.8245	NS
-0.1222	0.0256	NS
0.0256	-0.96	NS
0.1612	-0.5288	NS
-0.5288	-0.1407	NS
-0.2331	-0.385	NS
-0.9107	-0.1622	NS
0.2721	-0.4384	NS
-0.1715	-0.2618	NS
-1.034	-0.0976	NS
0.0133	-1.034	NS
-0.5288	-0.9415	NS
-1.798	-0.5288	NS
-0.0236	-0.9969	NS
-0.9969	0.1981	NS
0.4199	-0.8429	NS
1.418	1.171	NS
0.6663	1.523	NS
1.627	1.11	NS
-0.1838	0.9004	NS
1.319	0.2597	NS
0.7033	0.5677	NS
0.4076	0.2228	NS
0.7033	0.5102	NS
0.2228	0.4528	NS
0.2474	0.6232	NS
1.024	0.6786	NS
0.6786	0.9558	NS
1.11	0.8727	NS
0.9866	0.7772	NS
1.024	0.654	NS
0.654	1.042	NS
0.999	0.7526	NS
0.7526	1.122	NS
0.5308	0.9558	NS
1.245	0.6417	NS
0.5185	0.4322	NS
0.4322	-0.6397	NS
-0.0236	-0.0113	NS

value	lag	type
-0.0113	0.0318	NS
-0.9723	-0.1345	NS
0.309	-0.7752	NS
-0.578	-0.5	NS
-1.083	-1.256	NS
-0.8368	-0.9436	NS
-1.169	-0.8368	NS
-0.7505	-0.7197	NS
-1.477	-0.6397	NS
-1.44	-0.4487	NS
-0.1592	-1.379	NS
-1.317	-0.1653	NS
-0.8245	-0.9477	NS
-0.9477	-0.7813	NS
-0.652	-0.4302	NS
-0.4302	-0.8553	NS
-1.798	-1.133	NS
-1.133	-1.379	NS
-0.7875	-0.8902	NS
-0.96	-1.025	NS
-1.798	-0.7095	NS
-0.96	-1.477	NS
-1.477	-1.028	NS
-1.095	-1.477	NS
-1.65	-0.9538	NS
-1.046	-1.65	NS
-0.2947	-0.96	NS
-0.96	-0.2947	NS
-0.8491	-0.2824	NS
-0.1468	-0.5041	NS
-1.798	-0.1838	NS
0.1365	-1.252	NS
-0.5041	-0.7875	NS
-1.453	-0.1345	NS
0.5431	-0.7998	NS
-0.7998	-0.0236	NS
0.3583	-0.4425	NS
-0.8368	-0.7197	NS
-1.798	-0.8429	NS
0.1489	-0.3255	NS
0.0873	0.1612	NS
-1.798	0.1858	NS
0.346	-1.798	NS

value	lag	type
-0.4425	-1.173	NS
-1.194	-1.12	NS
-1.798	-0.6355	NS
-0.1468	-0.5472	NS
-0.923	-0.036	NS
-1.798	-0.1386	NS
-0.307	-0.6355	NS
0.1119	-0.7752	NS
-0.2208	-0.6643	NS
0.0133	-0.1345	NS
0.4692	-0.1222	NS
-0.7382	0.2803	NS
-0.6889	-0.1879	NS
-0.1838	-0.7444	NS
-0.7998	-0.3152	NS
1.245	0.962	NS
1.393	0.6909	NS
0.1489	1.11	NS
0.6786	0.9774	NS
0.7649	1.005	NS
0.8511	1.011	NS
1.159	0.9086	NS
1.11	0.2936	NS
0.9004	0.8326	NS
0.962	0.0708	NS
-1.798	0.9784	NS
1.147	-0.3686	NS
-0.3686	1.085	NS
0.4445	0.8142	NS
0.6417	0.3152	NS
0.1858	0.5862	NS
1.061	0.7279	NS
0.8018	1.061	NS
1.553	-0.1222	NS
-0.1222	1.171	NS
0.7895	0.6725	NS
1.147	1.073	NS
1.073	0.8018	NS
0.9743	0.6786	NS
-1.798	0.6376	NS
0.5554	-0.4364	NS
0.925	-0.3111	NS
0.0873	0.1181	NS

value	lag	type
0.2474	0.0873	NS
-1.145	-0.4179	NS
-0.4179	-0.7813	NS
-0.4179	-0.8614	NS
-0.8121	-0.5103	NS
-0.5534	-0.6397	NS
-0.4672	-0.6314	NS
-0.5288	-0.6355	NS
0.038	-0.4856	NS
-0.1715	-0.6828	NS
-0.5041	-0.3604	NS
-0.6273	-0.3193	NS
-0.2824	-0.4343	NS
-0.7382	-1.052	NS
-1.157	-0.9107	NS
-1.058	-0.3604	NS
-0.3193	-0.7546	NS
-0.3316	-0.8429	NS
-1.157	-0.5842	NS
-0.8368	-0.7444	NS
-0.3809	-1.554	NS
-1.662	-0.8737	NS
-1.798	-0.5934	NS
-0.4425	-1.116	NS
-1.675	-0.4548	NS
-0.4548	-1.588	NS
0.1981	-0.7711	NS
-0.2208	-0.6314	NS
-0.4179	-0.5657	NS
-1.675	-0.193	NS
-0.1715	-0.1838	NS
-0.1838	-0.3809	NS
-0.1592	-0.2084	NS
-0.27	-0.1592	NS
-0.036	-0.845	NS
-0.578	-0.036	NS
-0.5904	-0.5	NS
-0.1961	-0.5472	NS
-0.5041	-0.1509	NS
-0.8491	-0.6766	NS
-0.4795	-0.0688	NS
0.2474	-0.3111	NS
0.3953	-0.1427	NS

value	lag	type
0.1735	-0.2741	NS
-0.6766	-0.0298	NS
-0.2331	-0.3357	NS
-0.4056	-0.3378	NS
0.4938	-0.7875	NS
-1.169	0.0441	NS
-0.27	-0.6848	NS
0.1489	-0.4015	NS
-0.4056	-0.2167	NS
0.0749	-0.1181	NS
-0.0483	0.346	NS
0.617	0.0133	NS
-0.2947	-0.0791	NS
-0.0606	-0.1961	NS
-0.0976	-0.3809	NS
0.3583	-0.27	NS
-0.5411	0.3583	NS
-0.0729	-0.3039	NS
-0.1468	-0.114	NS
-0.8614	0.1242	NS
0.5924	-0.4795	NS
1.122	0.5144	NS
0.7156	0.845	NS
0.5677	0.2721	NS
0.3953	0.8388	NS
0.3337	0.8593	NS
0.925	0.3183	NS
1.258	0.1513	NS
0.8634	0.2721	NS
0.9743	1.252	NS
1.64	0.884	NS
1.024	0.4281	NS
0.999	0.8593	NS
0.654	0.9743	NS
0.9004	0.8265	NS
0.5308	0.192	NS
0.1981	0.5308	NS
0.9004	0.5801	NS
0.5801	0.9004	NS
1.467	-0.2577	NS
0.2351	-0.1653	NS
-1.798	1.052	NS
0.2844	0.8049	NS

value	lag	type
0.4445	0.654	NS
0.7279	0.5595	NS
0.309	0.7443	NS
0.3337	0.7484	NS
0.9743	0.7433	NS
0.962	0.8922	NS
0.1489	1.319	NS
1.319	1.135	NS
-1.022	0.7895	NS
1.405	0.1797	NS
1.381	0.192	NS
-1.28	0.3152	NS
-1.083	1.135	NS
1.714	0.2022	NS
2.97	0.7731	NS
-0.4425	-0.0154	NS
0.1365	-0.3316	NS
-0.2208	-0.153	NS
-1.034	-0.4056	NS
-0.4056	-1.157	NS
-1.083	-1.137	NS
-1.268	-1.034	NS
-0.9846	-0.8573	NS
-0.8737	-0.9969	NS
-1.675	-0.8737	NS
-0.7259	-0.3686	NS
-0.1715	-0.385	NS
-0.5657	-0.2536	NS
0.1365	-0.4631	NS
0.1119	-0.923	NS
-0.5288	-0.19	NS
-1.502	-0.4179	NS
-0.3809	-1.25	NS
-0.3316	-0.8737	NS
-0.7382	-0.27	NS
-0.2084	-0.5411	NS
-0.5904	-0.5616	NS
-0.5904	-1.058	NS
-0.9107	-0.9518	NS
-1.675	-0.7505	NS
-0.5041	-0.6643	NS
-1.44	-0.1961	NS
0.1119	-0.8614	NS

value	lag	type
-1.009	-0.3378	NS
-0.2208	-0.7321	NS
-0.4548	-0.4877	NS
0.3337	-0.3316	NS
-0.1592	0.5924	NS
0.8511	-0.0421	NS
-0.1961	0.3521	NS
0.309	-0.1961	NS
-0.5041	-0.2947	NS
-0.3563	-0.5041	NS
0.2474	0.0318	NS
-0.1592	-0.0318	NS
0.2228	-0.1592	NS
-0.5657	0.0318	NS
-0.5288	-0.0893	NS
-0.0113	-0.5288	NS
-0.1099	0.5554	NS
0.5554	-0.4179	NS
-0.7875	-0.039	NS
-0.27	-0.192	NS
0.1858	-0.344	NS
0.0256	-0.3932	NS
-0.1715	-0.0052	NS
-0.4302	0.1242	NS
0.4199	-0.3008	NS
-0.8368	0.0133	NS
0.0996	-0.4918	NS
-0.1592	-0.4056	NS
-0.4795	-0.3119	NS
-0.1715	-0.2536	NS
-0.8984	-0.0976	NS
-0.4302	-0.2536	NS
0.309	-0.5452	NS
-0.7136	0.3491	NS
-0.1838	-0.0514	NS
-0.6027	-0.3481	NS
-0.1468	-0.6089	NS
0.8142	0.8018	NS
0.617	0.1037	NS
0.1489	-0.0236	NS
-0.652	-0.1592	NS
1.418	1.061	NS
0.8265	1.356	NS

value	lag	type
1.295	1.065	NS
0.9497	1.036	NS
0.7772	1.56	NS
-0.1222	0.7217	NS
0.5308	0.5472	NS
0.9127	0.4199	NS
0.8511	0.7217	NS
1.455	0.1797	NS
2.157	-0.1715	NS
-1.798	1.985	NS
0.9497	0.9949	NS
1.812	1.504	NS
2.058	1.812	NS
1.369	0.9702	NS
0.9743	1.504	NS
1.64	1.229	NS
2.12	1.683	NS
2.046	2.12	NS
2.268	1.344	NS
1.344	1.763	NS
1.689	2.514	NS
2.058	1.886	NS
2.095	1.775	NS
1.492	1.843	NS
1.59	1.278	NS
-1.28	0.3029	NS
1.011	0.5472	NS
1.332	1.301	NS
-0.2208	-1.256	NS
-1.527	1.139	NS
1.812	0.6622	NS
1.824	0.6581	NS
-0.4302	-0.4056	NS
-0.4056	0.5431	NS
-0.652	-0.3932	NS
-0.923	-0.652	NS
-0.4918	-0.3152	NS
0.3706	-0.6397	NS
-0.7875	-0.0606	NS
-0.9969	-0.7218	NS
-0.8121	-0.6766	NS
-0.9723	-0.6232	NS
-0.0606	-0.923	NS

value	lag	type
-0.5534	-0.4425	NS
-0.5288	-0.5719	NS
-0.5904	-0.5411	NS
-0.1838	-0.5164	NS
-0.8984	-0.2865	NS
-0.1345	-0.5657	NS
-0.6397	-0.2577	NS
-0.7505	-0.6397	NS
-0.2331	-0.578	NS
-0.7013	-0.3132	NS
0.0749	0.115	NS
-0.3686	0.0174	NS
0.6047	-0.1592	NS
-0.6273	-0.0705	NS
-0.8121	-0.4261	NS
0.1489	-0.7464	NS
-0.7998	-0.2208	NS
0.001	-0.3686	NS
0.0626	0.001	NS
-1.33	-0.3686	NS
-0.1592	-1.33	NS
-0.578	-0.8399	NS
-0.9723	-0.5452	NS
-0.2577	-0.7834	NS
-0.7998	-0.6027	NS
-0.1838	-0.1345	NS
-0.96	0.1242	NS
0.001	-0.5719	NS
-0.7013	-0.2423	NS
0.1365	-0.6109	NS
-0.7013	-0.3316	NS
-0.4302	-0.3624	NS
-1.798	-0.7136	NS
-0.7136	-1.015	NS
-0.615	-0.2741	NS
-0.0483	-0.7967	NS
-0.2947	-0.8203	NS
-1.798	-0.3029	NS
-0.307	-0.4179	NS
-1.145	-0.1222	NS
0.1489	-0.7197	NS
-1.798	-0.2331	NS
-0.2331	-0.7834	NS

value	lag	type
-0.7013	-0.4179	NS
-0.8737	-0.2651	NS
-0.5288	-0.4548	NS
-0.2824	-0.4713	NS
-0.0113	-0.5411	NS
-0.5657	-0.7957	NS
-0.0606	-0.9641	NS
-0.5288	-0.4487	NS
-1.798	-0.1314	NS
2.169	1.042	NS
1.307	1.566	NS
1.824	1.295	NS
1.135	1.865	NS
1.442	0.8265	NS
1.652	-0.0668	NS
2.145	0.2187	NS
-1.798	1.313	NS
1.184	0.6909	NS
0.6293	1.231	NS
1.677	1.603	NS
2.083	1.467	NS
2.095	1.635	NS
1.196	1.808	NS
1.516	1.8	NS
2.268	1.603	NS
1.64	2.058	NS
2.058	1.64	NS
1.258	1.352	NS
0.8881	1.541	NS
1.824	1.073	NS
1.874	1.75	NS
1.442	1.8	NS
0.6786	-1.798	NS
-1.798	0.6786	NS
2.404	1.516	NS
1.492	1.972	NS
1.541	1.948	NS
1.689	1.644	NS
1.295	1.689	NS
1.516	0.8388	NS
1.085	1.677	NS
1.837	0.9825	NS
-0.6766	-0.4918	NS

value	lag	type
-0.5411	-0.7136	NS
-0.4425	-0.5442	NS
-1.539	-0.1222	NS
-0.1468	-0.6232	NS
-0.0976	-0.3963	NS
-0.9846	-0.2167	NS
-0.7382	-0.4179	NS
0.1489	-0.7793	NS
-0.615	-0.424	NS
-0.9969	-0.615	NS
-0.5411	-0.347	NS
-0.3809	-0.2577	NS
0.0256	-0.5452	NS
-0.7136	0.0256	NS
-0.2454	0.4938	NS
0.4938	-0.2454	NS
-0.3932	-0.1407	NS
0.4199	-0.3932	NS
0.2844	0.2289	NS
-0.1468	-0.1222	NS
0.2597	-0.8491	NS
-0.8491	0.2597	NS
0.4199	0.2043	NS
0.5308	0.0092	NS
-0.1222	0.2269	NS
-0.27	-0.0052	NS
-0.4302	-0.1345	NS
0.001	-0.3501	NS
-0.2084	-0.3316	NS
-0.3316	-0.3871	NS
0.1365	-0.0544	NS
-0.5411	-0.0934	NS
0.4322	-0.4179	NS
-0.1838	-0.4836	NS
-0.3932	-0.4056	NS
-0.6273	-0.2885	NS
-0.2331	-0.3727	NS
-0.4918	-0.0688	NS
0.0873	-0.2618	NS
-0.5657	-1.798	NS
-1.798	-0.6089	NS
-0.652	-0.6951	NS
0.0626	-0.3029	NS

value	lag	type
0.1858	0.0564	NS
0.0503	0.1242	NS
0.2105	-0.4579	NS
-0.6027	-0.1058	NS
0.0133	-0.0483	NS
-0.5411	0.0903	NS
-0.4795	-0.1468	NS
-0.2824	-0.5596	NS
-0.6397	-0.2824	NS
0.6293	-0.6766	NS
0.2967	0.1858	NS
0.7033	1.582	NS
1.985	1.377	NS
1.455	1.609	NS
1.972	1.738	NS
2.33	1.473	NS
1.812	1.892	NS
1.455	1.812	NS
0.8265	-0.0052	NS
-1.798	2.005	NS
2.391	0.6088	NS
2.798	0.7567	NS
0.617	1.245	NS
1.245	1.079	NS
1.196	1.208	NS
0.5554	1.644	NS
1.861	1.131	NS
1.208	1.553	NS
1.849	1.233	NS
1.258	1.5	NS
1.442	1.535	NS
1.812	1.442	NS
1.726	1.424	NS
1.405	1.792	NS
1.935	1.56	NS
1.714	1.67	NS
1.073	2.28	NS
2.28	1.332	NS
-1.798	1.323	NS
1.467	0.2351	NS
1.344	0.4692	NS
1.159	0.5154	NS
2.601	2.145	NS

value	lag	type
2.145	2.601	NS
0.346	0.9682	NS
0.0996	0.192	NS
0.038	-0.2762	NS
-1.022	-0.3021	NS
0.0626	-0.5134	NS
0.0626	-0.537	NS
-0.652	-0.1622	NS
-0.2331	0.1335	NS
0.3337	0.1119	NS
0.4445	0.1304	NS
0.5185	0.2628	NS
-0.0729	0.1283	NS
0.3583	-0.19	NS
-0.307	0.1427	NS
0.0503	-0.615	NS
0.0873	-0.6335	NS
-1.317	-0.5534	NS
-0.9723	-0.2146	NS
-0.3316	-0.5349	NS
-0.0976	-0.2916	NS
-0.0113	0.0256	NS
0.1489	-0.1633	NS
0.2967	-0.4795	NS
-0.4795	0.2967	NS
-0.5288	-0.1099	NS
0.2228	-0.4672	NS
-0.4056	0.0215	NS
0.4445	-1.095	NS
-1.095	-0.0113	NS
-0.2824	-0.5534	NS
-0.5534	-0.2824	NS
-0.3932	-0.7875	NS
-0.7875	-0.3932	NS
-0.5657	-0.1058	NS
0.1981	-0.3748	NS
-0.1838	-0.1838	NS
-0.8491	-0.2848	NS
-0.615	-0.5164	NS
-0.7752	-0.4754	NS
0.0749	-0.4641	NS
0.1981	-0.1386	NS
-0.5904	0.1242	NS

value	lag	type
0.0996	-0.1961	NS
-0.0606	-0.229	NS
-0.2824	-0.0606	NS
0.4076	-0.8203	NS
-0.0113	-0.5904	NS
-1.798	0.0051	NS
-0.3809	-0.4117	NS
0.1242	-0.307	NS
-0.6643	0.1242	NS
0.7402	-0.3891	NS
-0.6397	-0.3378	NS
-0.4179	-0.307	NS
-0.307	-0.4179	NS
-0.2577	-0.3501	NS
-0.9969	-0.2577	NS
1.775	1.489	NS
1.615	1.344	NS
0.9127	1.52	NS
-1.798	2.145	NS
2.145	-1.798	NS
1.677	1.824	NS
1.8	1.644	NS
0.8758	1.952	NS
1.541	1.525	NS
1.714	1.59	NS
1.615	0.768	NS
1.615	0.8819	NS
1.874	1.218	NS
0.9004	1.763	NS
1.553	1.387	NS
-1.798	2.366	NS
2.28	0.7649	NS
2.453	0.7988	NS
1.64	1.883	NS
1.997	1.722	NS
1.159	1.558	NS
1.48	1.451	NS
2.527	1.658	NS
1.319	2.286	NS
2.046	1.486	NS
1.59	1.705	NS
0.9127	1.837	NS
1.923	1.584	NS

value	lag	type
1.788	1.627	NS
1.048	1.278	NS
1.332	1.621	NS
2.194	1.72	NS
1.381	-0.6273	NS
-0.6273	0.0256	NS
-0.652	-0.4138	NS
-0.652	-1.026	NS
-1.798	-0.27	NS
0.2474	-0.2002	NS
-0.4425	0.3706	NS
0.4938	-0.1592	NS
-0.0976	0.2135	NS
0.3706	-0.0195	NS
-0.4795	0.0749	NS
-1.022	-0.8614	NS
-0.7752	-0.9846	NS
-0.9477	-0.8984	NS
-1.798	-0.9661	NS
-0.615	-1.001	NS
-0.8491	-0.4856	NS
-0.3563	-0.7321	NS
-0.7998	-0.3008	NS
-0.1715	-0.615	NS
-0.4302	-0.4856	NS
-0.3809	0.0688	NS
-0.0113	-0.7321	NS
-1.083	-0.0113	NS
0.3706	-0.8737	NS
-0.4179	-0.7136	NS
-1.798	-0.1797	NS
-0.4672	0.1653	NS
0.8388	0.0544	NS
0.7526	0.0996	NS
-0.1222	0.3614	NS
0.1858	0.0914	NS
-0.3316	0.2638	NS
0.7279	-0.2639	NS
0.0256	-0.2208	NS
-0.2208	0.0215	NS
-0.6889	0.038	NS
-1.182	-0.2454	NS
-0.2454	-0.578	NS

value	lag	type
0.038	-0.2988	NS
-0.1715	0.0441	NS
0.0503	-0.0668	NS
-0.1838	-0.0606	NS
-0.0606	-0.1838	NS
0.3213	-0.6643	NS
-0.6643	-0.0421	NS
-0.0483	-0.3193	NS
0.2105	-0.384	NS
-0.4056	-0.2799	NS
-0.7013	-0.1099	NS
0.0749	-0.4733	NS
-0.9723	0.0503	NS
0.0256	-0.6181	NS
-1.416	-0.2577	NS
-0.1592	-0.6951	NS
-0.0606	-0.1099	NS
0.0133	-0.1345	NS
-0.1345	-0.0852	NS
-0.2084	-0.1961	NS
-0.2577	-0.3748	NS
-0.5411	-0.155	NS
1.171	1.067	NS
1.221	1.171	NS
1.43	1.541	NS
1.8	1.41	NS

100 more rows in the chart's JSON (chart-22928ec9-70d1-47be-8138-15ef9ace47fc.json in the bundle).

Figure 43. Find outliers: Green spaces [95]

value	lag	type
1.243	0.3681	NS
-1.382	0.1622	NS
-0.9962	0.2394	NS
-0.8417	-0.1004	NS
-1.305	0.0592	NS
0.78	-0.121	NS
1.398	-0.5586	NS
0.2394	-0.0695	NS
0.1622	-0.1158	NS
0.7027	0.7542	NS

Figure 44. Find outliers: Zoning districts [96]

value	lag	type
-0.6299	0.8237	NS

value	lag	type
-0.6299	1.429	NS
-0.6299	0.8237	NS
-0.6299	0.0969	NS
0.8237	0.0162	NS
2.035	0.0969	NS
-1.357	0.8237	NS
0.8237	-0.6299	NS
-0.6299	0.0969	NS
0.8237	-0.6299	NS

Figure 45. Find point clusters: Building permits over time [97]

period	series	value
2023-01-01	extension	1
2023-01-01	new build	1
2023-01-01	change of use	2
2023-01-01	demolition	0
2023-02-01	extension	4
2023-02-01	new build	1
2023-02-01	change of use	0
2023-02-01	demolition	0
2023-03-01	extension	1
2023-03-01	new build	3
2023-03-01	change of use	1
2023-03-01	demolition	0
2023-04-01	extension	2
2023-04-01	new build	2
2023-04-01	change of use	0
2023-04-01	demolition	3
2023-05-01	extension	5
2023-05-01	new build	3
2023-05-01	change of use	2
2023-05-01	demolition	0
2023-06-01	extension	3
2023-06-01	new build	3
2023-06-01	change of use	1
2023-06-01	demolition	0
2023-07-01	extension	1
2023-07-01	new build	2
2023-07-01	change of use	0
2023-07-01	demolition	1
2023-08-01	extension	2
2023-08-01	new build	5
2023-08-01	change of use	1
2023-08-01	demolition	2

period	series	value
2023-09-01	extension	2
2023-09-01	new build	2
2023-09-01	change of use	0
2023-09-01	demolition	1
2023-10-01	extension	4
2023-10-01	new build	2
2023-10-01	change of use	1
2023-10-01	demolition	1
2023-11-01	extension	2
2023-11-01	new build	1
2023-11-01	change of use	2
2023-11-01	demolition	0
2023-12-01	extension	5
2023-12-01	new build	3
2023-12-01	change of use	2
2023-12-01	demolition	1
2024-01-01	extension	0
2024-01-01	new build	1
2024-01-01	change of use	3
2024-01-01	demolition	1
2024-02-01	extension	3
2024-02-01	new build	1
2024-02-01	change of use	1
2024-02-01	demolition	1
2024-03-01	extension	1
2024-03-01	new build	0
2024-03-01	change of use	0
2024-03-01	demolition	0
2024-04-01	extension	2
2024-04-01	new build	0
2024-04-01	change of use	3
2024-04-01	demolition	0
2024-05-01	extension	5
2024-05-01	new build	6
2024-05-01	change of use	1
2024-05-01	demolition	1
2024-06-01	extension	2
2024-06-01	new build	0
2024-06-01	change of use	3
2024-06-01	demolition	0
2024-07-01	extension	3
2024-07-01	new build	4
2024-07-01	change of use	2

period	series	value
2024-07-01	demolition	1
2024-08-01	extension	0
2024-08-01	new build	5
2024-08-01	change of use	4
2024-08-01	demolition	1
2024-09-01	extension	0
2024-09-01	new build	4
2024-09-01	change of use	4
2024-09-01	demolition	2
2024-10-01	extension	2
2024-10-01	new build	4
2024-10-01	change of use	1
2024-10-01	demolition	2
2024-11-01	extension	5
2024-11-01	new build	5
2024-11-01	change of use	1
2024-11-01	demolition	0
2024-12-01	extension	2
2024-12-01	new build	3
2024-12-01	change of use	1
2024-12-01	demolition	3
2025-01-01	extension	2
2025-01-01	new build	4
2025-01-01	change of use	0
2025-01-01	demolition	0
2025-02-01	extension	1
2025-02-01	new build	1
2025-02-01	change of use	2
2025-02-01	demolition	0
2025-03-01	extension	0
2025-03-01	new build	2
2025-03-01	change of use	2
2025-03-01	demolition	0
2025-04-01	extension	3
2025-04-01	new build	1
2025-04-01	change of use	3
2025-04-01	demolition	0
2025-05-01	extension	4
2025-05-01	new build	4
2025-05-01	change of use	3
2025-05-01	demolition	1
2025-06-01	extension	3
2025-06-01	new build	2

period	series	value
2025-06-01	change of use	3
2025-06-01	demolition	1
2025-07-01	extension	2
2025-07-01	new build	2
2025-07-01	change of use	2
2025-07-01	demolition	0
2025-08-01	extension	4
2025-08-01	new build	3
2025-08-01	change of use	2
2025-08-01	demolition	1
2025-09-01	extension	5
2025-09-01	new build	5
2025-09-01	change of use	3
2025-09-01	demolition	2
2025-10-01	extension	4
2025-10-01	new build	3
2025-10-01	change of use	4
2025-10-01	demolition	1
2025-11-01	extension	4
2025-11-01	new build	4
2025-11-01	change of use	3
2025-11-01	demolition	1
2025-12-01	extension	4
2025-12-01	new build	3
2025-12-01	change of use	3
2025-12-01	demolition	0
2026-01-01	extension	4
2026-01-01	new build	4
2026-01-01	change of use	3
2026-01-01	demolition	0
2026-02-01	extension	4
2026-02-01	new build	2
2026-02-01	change of use	2
2026-02-01	demolition	0
2026-03-01	extension	5
2026-03-01	new build	2
2026-03-01	change of use	6
2026-03-01	demolition	2
2026-04-01	extension	1
2026-04-01	new build	7
2026-04-01	change of use	0
2026-04-01	demolition	1
2026-05-01	extension	2

period	series	value
2026-05-01	new build	2
2026-05-01	change of use	1
2026-05-01	demolition	0
2026-06-01	extension	4
2026-06-01	new build	6
2026-06-01	change of use	4
2026-06-01	demolition	0
2026-07-01	extension	7
2026-07-01	new build	4
2026-07-01	change of use	1
2026-07-01	demolition	1
2026-08-01	extension	3
2026-08-01	new build	3
2026-08-01	change of use	3
2026-08-01	demolition	3
2026-09-01	extension	7
2026-09-01	new build	2
2026-09-01	change of use	2
2026-09-01	demolition	0

Figure 46. Find point clusters: Property sales over time [98]

period	series	value
2022-01-01	apartment	21
2022-01-01	office	15
2022-01-01	house	10
2022-04-01	apartment	24
2022-04-01	office	10
2022-04-01	house	12
2022-07-01	apartment	19
2022-07-01	office	13
2022-07-01	house	10
2022-10-01	apartment	33
2022-10-01	office	12
2022-10-01	house	13
2023-01-01	apartment	14
2023-01-01	office	14
2023-01-01	house	12
2023-04-01	apartment	26
2023-04-01	office	12
2023-04-01	house	11
2023-07-01	apartment	29
2023-07-01	office	15
2023-07-01	house	17
2023-10-01	apartment	19

period	series	value
2023-10-01	office	19
2023-10-01	house	10
2024-01-01	apartment	22
2024-01-01	office	14
2024-01-01	house	14
2024-04-01	apartment	25
2024-04-01	office	15
2024-04-01	house	16
2024-07-01	apartment	22
2024-07-01	office	12
2024-07-01	house	12
2024-10-01	apartment	15
2024-10-01	office	13
2024-10-01	house	12
2025-01-01	apartment	23
2025-01-01	office	13
2025-01-01	house	11
2025-04-01	apartment	27
2025-04-01	office	18
2025-04-01	house	15
2025-07-01	apartment	21
2025-07-01	office	13
2025-07-01	house	17
2025-10-01	apartment	26
2025-10-01	office	15
2025-10-01	house	14
2026-01-01	apartment	24
2026-01-01	office	21
2026-01-01	house	10
2026-04-01	apartment	20
2026-04-01	office	14
2026-04-01	house	15
2026-07-01	apartment	21
2026-07-01	office	10
2026-07-01	house	20

Figure 47. Hot spot analysis: Building permits over time [99]

period	series	value
2023-01-01	extension	1
2023-01-01	new build	1
2023-01-01	change of use	2
2023-01-01	demolition	0
2023-02-01	extension	4
2023-02-01	new build	1

period	series	value
2023-02-01	change of use	0
2023-02-01	demolition	0
2023-03-01	extension	1
2023-03-01	new build	3
2023-03-01	change of use	1
2023-03-01	demolition	0
2023-04-01	extension	2
2023-04-01	new build	2
2023-04-01	change of use	0
2023-04-01	demolition	3
2023-05-01	extension	5
2023-05-01	new build	3
2023-05-01	change of use	2
2023-05-01	demolition	0
2023-06-01	extension	3
2023-06-01	new build	3
2023-06-01	change of use	1
2023-06-01	demolition	0
2023-07-01	extension	1
2023-07-01	new build	2
2023-07-01	change of use	0
2023-07-01	demolition	1
2023-08-01	extension	2
2023-08-01	new build	5
2023-08-01	change of use	1
2023-08-01	demolition	2
2023-09-01	extension	2
2023-09-01	new build	2
2023-09-01	change of use	0
2023-09-01	demolition	1
2023-10-01	extension	4
2023-10-01	new build	2
2023-10-01	change of use	1
2023-10-01	demolition	1
2023-11-01	extension	2
2023-11-01	new build	1
2023-11-01	change of use	2
2023-11-01	demolition	0
2023-12-01	extension	5
2023-12-01	new build	3
2023-12-01	change of use	2
2023-12-01	demolition	1
2024-01-01	extension	0

period	series	value
2024-01-01	new build	1
2024-01-01	change of use	3
2024-01-01	demolition	1
2024-02-01	extension	3
2024-02-01	new build	1
2024-02-01	change of use	1
2024-02-01	demolition	1
2024-03-01	extension	1
2024-03-01	new build	0
2024-03-01	change of use	0
2024-03-01	demolition	0
2024-04-01	extension	2
2024-04-01	new build	0
2024-04-01	change of use	3
2024-04-01	demolition	0
2024-05-01	extension	5
2024-05-01	new build	6
2024-05-01	change of use	1
2024-05-01	demolition	1
2024-06-01	extension	2
2024-06-01	new build	0
2024-06-01	change of use	3
2024-06-01	demolition	0
2024-07-01	extension	3
2024-07-01	new build	4
2024-07-01	change of use	2
2024-07-01	demolition	1
2024-08-01	extension	0
2024-08-01	new build	5
2024-08-01	change of use	4
2024-08-01	demolition	1
2024-09-01	extension	0
2024-09-01	new build	4
2024-09-01	change of use	4
2024-09-01	demolition	2
2024-10-01	extension	2
2024-10-01	new build	4
2024-10-01	change of use	1
2024-10-01	demolition	2
2024-11-01	extension	5
2024-11-01	new build	5
2024-11-01	change of use	1
2024-11-01	demolition	0

period	series	value
2024-12-01	extension	2
2024-12-01	new build	3
2024-12-01	change of use	1
2024-12-01	demolition	3
2025-01-01	extension	2
2025-01-01	new build	4
2025-01-01	change of use	0
2025-01-01	demolition	0
2025-02-01	extension	1
2025-02-01	new build	1
2025-02-01	change of use	2
2025-02-01	demolition	0
2025-03-01	extension	0
2025-03-01	new build	2
2025-03-01	change of use	2
2025-03-01	demolition	0
2025-04-01	extension	3
2025-04-01	new build	1
2025-04-01	change of use	3
2025-04-01	demolition	0
2025-05-01	extension	4
2025-05-01	new build	4
2025-05-01	change of use	3
2025-05-01	demolition	1
2025-06-01	extension	3
2025-06-01	new build	2
2025-06-01	change of use	3
2025-06-01	demolition	1
2025-07-01	extension	2
2025-07-01	new build	2
2025-07-01	change of use	2
2025-07-01	demolition	0
2025-08-01	extension	4
2025-08-01	new build	3
2025-08-01	change of use	2
2025-08-01	demolition	1
2025-09-01	extension	5
2025-09-01	new build	5
2025-09-01	change of use	3
2025-09-01	demolition	2
2025-10-01	extension	4
2025-10-01	new build	3
2025-10-01	change of use	4

period	series	value
2025-10-01	demolition	1
2025-11-01	extension	4
2025-11-01	new build	4
2025-11-01	change of use	3
2025-11-01	demolition	1
2025-12-01	extension	4
2025-12-01	new build	3
2025-12-01	change of use	3
2025-12-01	demolition	0
2026-01-01	extension	4
2026-01-01	new build	4
2026-01-01	change of use	3
2026-01-01	demolition	0
2026-02-01	extension	4
2026-02-01	new build	2
2026-02-01	change of use	2
2026-02-01	demolition	0
2026-03-01	extension	5
2026-03-01	new build	2
2026-03-01	change of use	6
2026-03-01	demolition	2
2026-04-01	extension	1
2026-04-01	new build	7
2026-04-01	change of use	0
2026-04-01	demolition	1
2026-05-01	extension	2
2026-05-01	new build	2
2026-05-01	change of use	1
2026-05-01	demolition	0
2026-06-01	extension	4
2026-06-01	new build	6
2026-06-01	change of use	4
2026-06-01	demolition	0
2026-07-01	extension	7
2026-07-01	new build	4
2026-07-01	change of use	1
2026-07-01	demolition	1
2026-08-01	extension	3
2026-08-01	new build	3
2026-08-01	change of use	3
2026-08-01	demolition	3
2026-09-01	extension	7
2026-09-01	new build	2

period	series	value
2026-09-01	change of use	2
2026-09-01	demolition	0

Figure 48. Repeat and near repeat classification: Property sales over time [100]

period	series	value
2022-01-01	apartment	21
2022-01-01	office	15
2022-01-01	house	10
2022-04-01	apartment	24
2022-04-01	office	10
2022-04-01	house	12
2022-07-01	apartment	19
2022-07-01	office	13
2022-07-01	house	10
2022-10-01	apartment	33
2022-10-01	office	12
2022-10-01	house	13
2023-01-01	apartment	14
2023-01-01	office	14
2023-01-01	house	12
2023-04-01	apartment	26
2023-04-01	office	12
2023-04-01	house	11
2023-07-01	apartment	29
2023-07-01	office	15
2023-07-01	house	17
2023-10-01	apartment	19
2023-10-01	office	19
2023-10-01	house	10
2024-01-01	apartment	22
2024-01-01	office	14
2024-01-01	house	14
2024-04-01	apartment	25
2024-04-01	office	15
2024-04-01	house	16
2024-07-01	apartment	22
2024-07-01	office	12
2024-07-01	house	12
2024-10-01	apartment	15
2024-10-01	office	13
2024-10-01	house	12
2025-01-01	apartment	23
2025-01-01	office	13
2025-01-01	house	11

period	series	value
2025-04-01	apartment	27
2025-04-01	office	18
2025-04-01	house	15
2025-07-01	apartment	21
2025-07-01	office	13
2025-07-01	house	17
2025-10-01	apartment	26
2025-10-01	office	15
2025-10-01	house	14
2026-01-01	apartment	24
2026-01-01	office	21
2026-01-01	house	10
2026-04-01	apartment	20
2026-04-01	office	14
2026-04-01	house	15
2026-07-01	apartment	21
2026-07-01	office	10
2026-07-01	house	20