Reading Borough Council

Private Rented Sector: Housing Stock Condition and Stressors Report

January 2024

Executive Summary

Metastreet were commissioned by Reading Borough Council to review housing stock in the Town and assess housing stressors related to key tenures, particularly the private rented sector (PRS) and Houses in Multiple Occupation (HMO).

The detailed housing stock information provided in this report will facilitate the development and delivery of Reading's housing strategy and enable a targeted approach to tackling poor housing.

The main aim of this review was to investigate and provide accurate estimates of:

- Current levels of private rented sector (PRS) properties and tenure change over time
- Levels of serious hazards that might amount to a Category 1 or 2 hazard (Housing Health & Safety Rating System (HHSRS))
- Other housing related stressors, including antisocial behaviour (ASB), service demand, population and deprivation linked to the PRS
- Assist the council to make policy decisions, including the possible introduction of property licensing schemes under Part 2 and Part 3 of Housing Act 2004

Metastreet has developed a stock-modelling approach based on metadata and machine learning to provide insights about the prevalence and distribution of a range of housing factors. This approach has been used by a wide range of housing authorities to understand their housing stock and relationships with key social, environmental and economic stressors.

The models are developed using unique property reference numbers (UPRN) and a large range of council held and open-source data, which when combined, provide detailed analysis at the property level.

Data records used to form the foundation of this report include but are not limited to:

Council tax	Electoral register	Other council interventions records	Tenancy deposit data
Housing benefit	Private housing complaints and interventions records	ASB complaints and interventions records	Energy Performance data

Key Findings

- Reading's PRS is now calculated to be 39.9% of all housing stock.
- The PRS in Reading is distributed across all 16 wards.
- Reading has a mixture of high and low deprivation wards. 8 of 16 wards have aggregated IMD rankings below the national average.
- Reading has a lower proportion in fuel poverty (10.3%) than the national average.
- Reading has above average rents for England (£1,006).
- Reading has above average rented property possession rate nationally, with 11.5 claims per 10,000 households in 2023
- There are 4,297 private rented properties in Reading that are likely to have at least 1 serious housing hazard distributed across all wards.
- Reading recorded 3,117 complaints and service requests from private tenants and others linked to PRS properties over 5-years.
- 1,084 PRS properties are likely to fail the basic energy efficiency requirement.
- The council has recorded a total of 1,980 ASB incidents related to PRS properties over the past five years.
- Reading's HMO population has been estimated to comprise a total of 3,272 properties.
- Analysis shows that 1,230 HMOs in Reading are predicted to have at least one serious hazard.
- During inspections, officers identified 701 Category 1 and 2 hazards (HHSRS).
- 697 ASB incidents have been linked to all HMOs in Reading distributed across all wards.
- HMOs have by far the highest rates of ASB (21.3 per 100 dwellings), when compared to other tenures.

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Introduction & Project Objectives

Metastreet were commissioned by Reading Borough Council to review its housing stock with a focus on the following key areas:

- Residential property tenure changes
- Distribution of the PRS and HMO
- Condition of housing stock in the PRS
- Housing related stressors, including Noise Anti-Social Behaviour (ASB), regulatory interventions and deprivation.

The report provides the council with the evidence base for developing housing policy and service interventions. The report also helps satisfy the council's responsibility to review its housing stock as set out under Part 1, Section 3 of the Housing Act 2004.

The second section of the report details the findings of the stock and tenure modelling, including an introduction to the methodology. A combination of Reading's data warehouse, machine learning, and modelling techniques have been used to pinpoint tenure and predict property conditions within its PRS housing stock. An advanced property level data warehouse has been developed to underpin the process.

For the purposes of this review, it was decided that a ward-level summary is the most appropriate basis to assess housing conditions across Reading, built up from property level data.

Four separate predictive tenure models (Ti) have been developed as part of this project which are unique to Reading, they include:

- Private rented sector (PRS)
- Houses in multiple occupation (HMO)
- Owner occupiers
- Serious PRS housing hazards (Category 1 & high Category 2, HHSRS A-D)

The appendices to the report contain a summary of the data and a more detailed report methodology.

1 Reading overview

Reading is an ancient town in Berkshire, England. Most of its built-up area lies within the Borough of Reading. This report relates only to the areas overseen by Reading Borough Council Housing Authority.

Located in the Thames Valley at the meeting of the rivers Thames and Kennet, Reading is 40 miles (64 km) east of Swindon, 25 miles (40 km) south of Oxford, 40 miles (64 km) west of London and 16 miles (26 km) north of Basingstoke. [1]

1.1 Population

The Office of National Statistics (ONS) Census 2021 population estimates for Reading was 174,200[2]. Reading has seen significant population growth over the last 30 years (Figure 1).

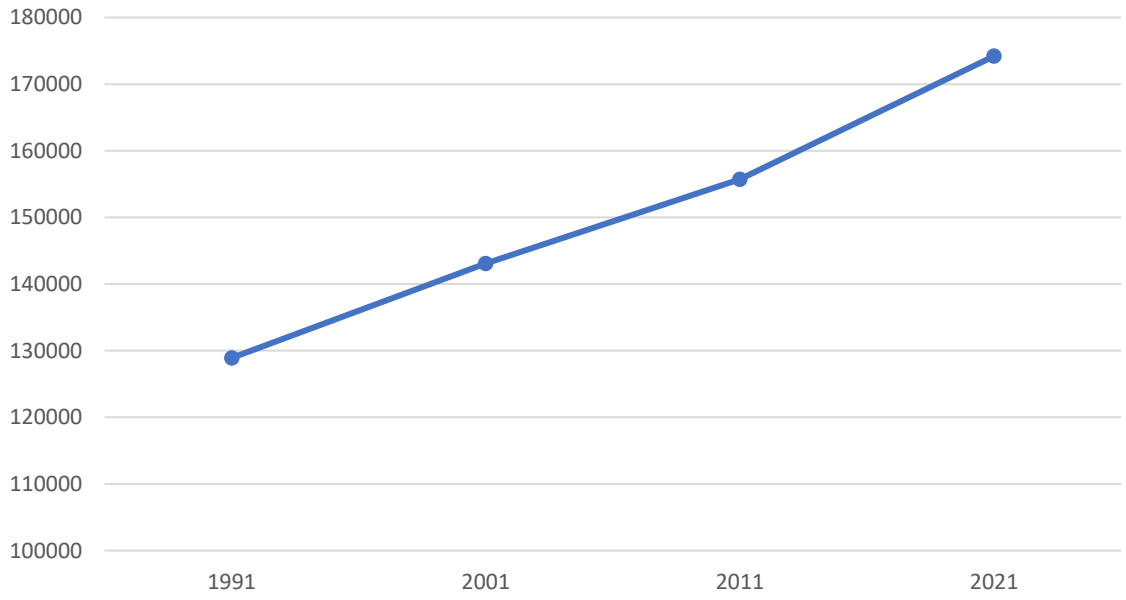


Figure 1. Population estimates, 30 years (Census 1991,2001,2011,2021) (Source: Census ONS).

[1] Wikipedia, November 2023, https://en.wikipedia.org/wiki/Reading_Borough_Council
[2] Office for National Statistics – Census 2021, https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/bulletins/populationandhouseholdestimatesenglandandwales/census2021

1.2 Household size

Household size (all tenures) provides an insight into how dwellings are occupied (Figure 2)[3].

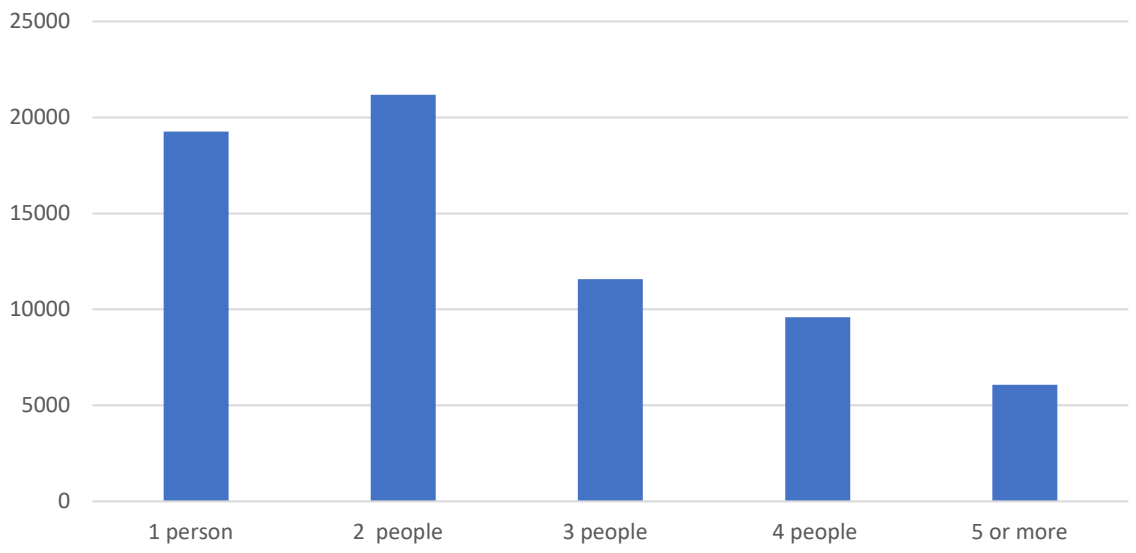


Figure 2. Reading household size (all tenures) (Source: Census 2021).

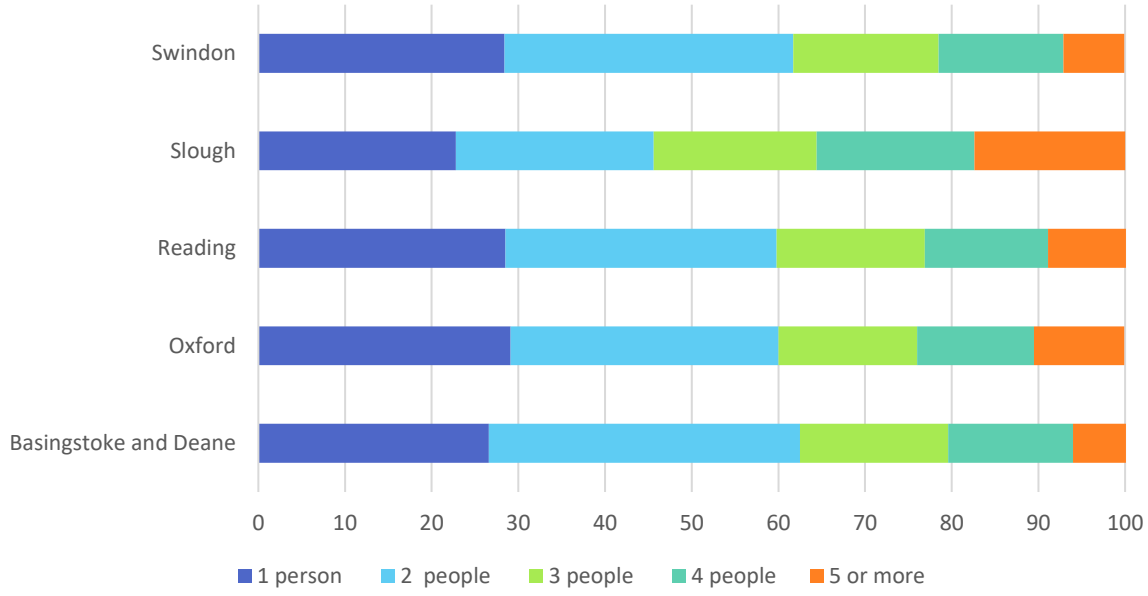


Figure 3. Household size (percent) (all tenures) by selected comparable authorities (Source: Census 2021).

[3] Office for National Statistics – Census 2021, https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/bulletins/populationandhouseholdestimatesenglandandwales/census2021

1.3 Deprivation

The Indices of Multiple Deprivation 2019 (IMD 2019) provide a set of relative measures of deprivation for LSOAs (Lower-layer super output areas) across England, based on seven domains of deprivation[4].

To produce the ward level data, LSOAs have been matched to new wards using an Open Geoportal lookup table. It should be noted that LSOA areas that fit all or part in the new wards have been included in that ward. Therefore, some LSOAs have been included within more than one ward due to the poor match between LSOA and new ward areas. An average decile of LSOAs linked to new wards is then calculated. The ward results have not been weighted for population. Average IMD 2019 decile aggregated at ward level reveals a clear picture of ward level deprivation (Figure 4 & Map 1). 1.0 on the graph represents the most deprived 10% areas and 5.0 represents 50% most deprived.

Reading has a mixture of high and low deprivation wards. 8 of 16 wards have aggregated IMD rankings below the national average (Figure 4).

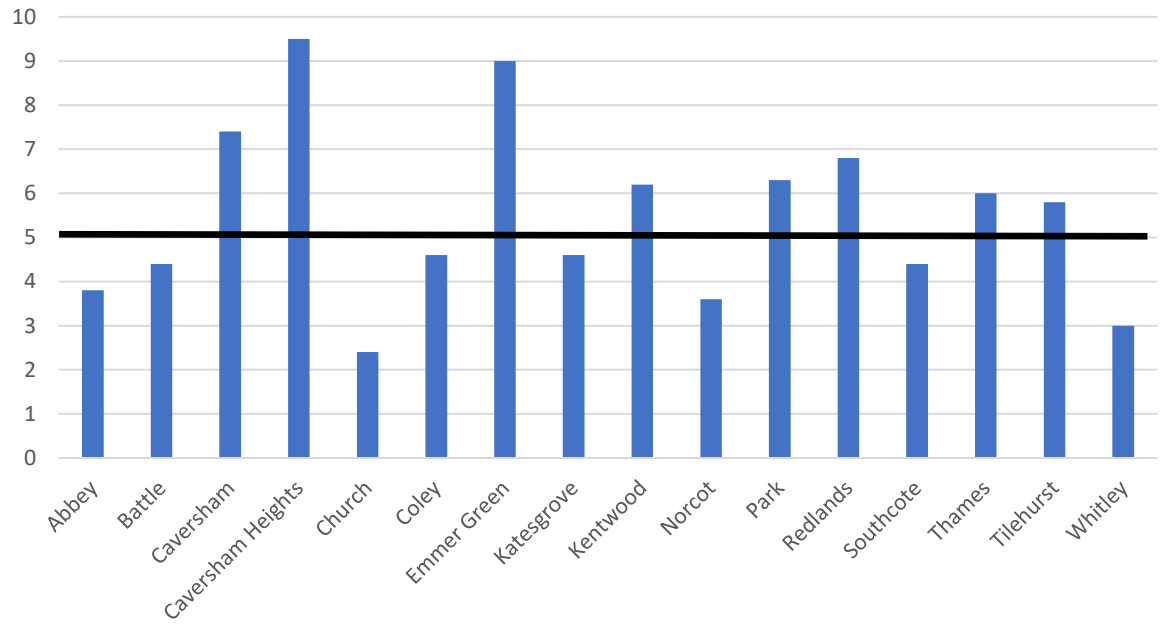
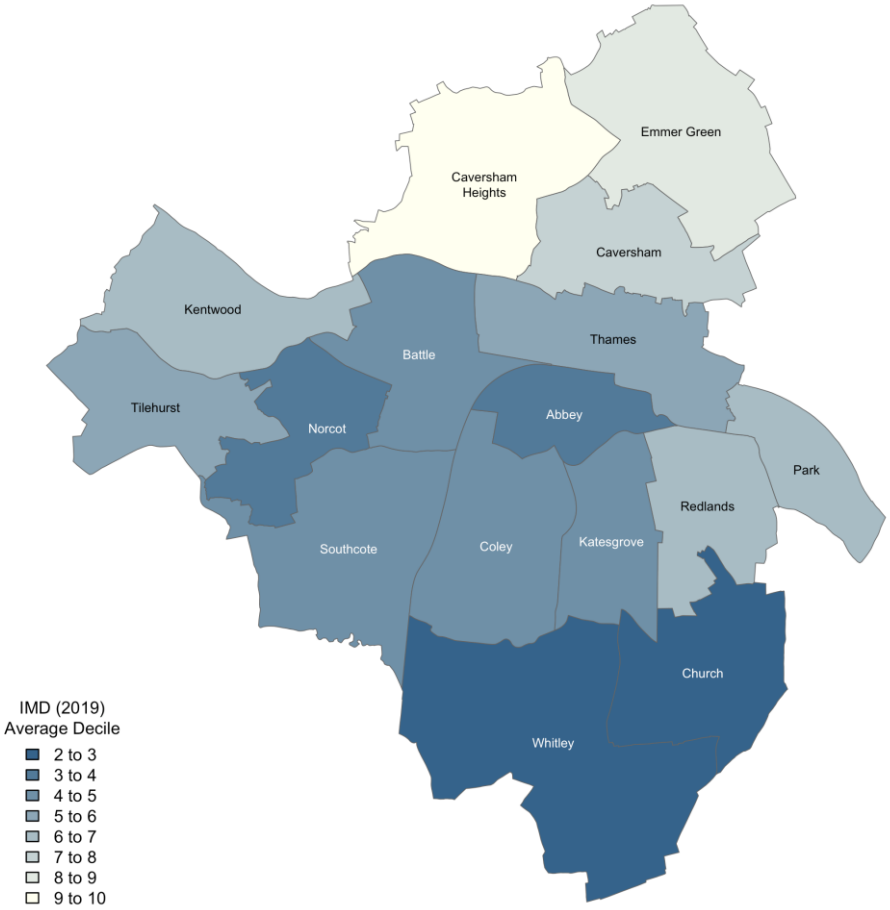


Figure 4. Average IMD (2019) decile by ward (Source: IMD 2019). Horizontal line shows the national average (5). Figures not population weighted.

[4] ONS 2019 https://www.gov.uk/government/statistics/english-indices-of-deprivation-2019,



Map 1*. Distribution of Average IMD (2019) decile by ward (Source: ONS 2019, Map by Metastreet).*

1.4 Fuel Poverty

Fuel poverty is defined by the Warm Homes and Energy Conservation Act. A household is considered to be fuel poor if they have required fuel costs that are above average (the national median level); and were they to spend that amount, they would be left with a residual income below the official poverty line.

The fuel poverty score was produced by the Department for Business, Energy & Industrial Strategy using 2019 data and published in 2021. Over the next 12 months these figures are likely to change

significantly because of acute fuel price increases. Notwithstanding this, Reading has a lower proportion in fuel poverty (10.3%) than the national average (13.4%) (Figure 5) [5].

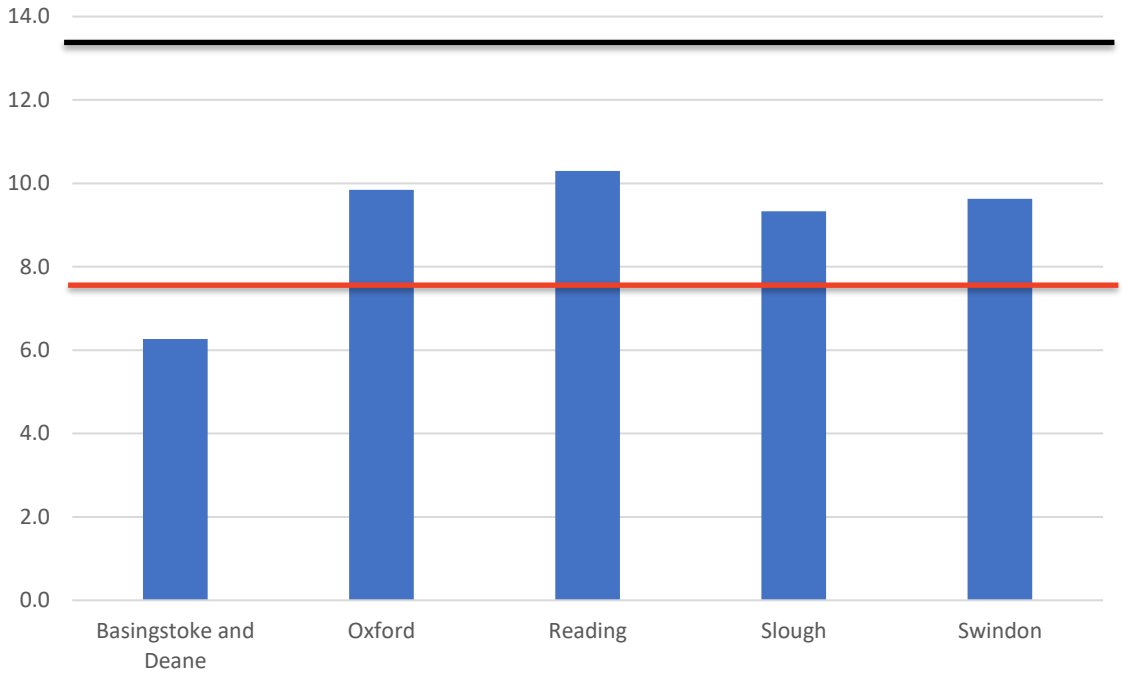


Figure 5. Proportion of households in fuel poverty (%) by selected comparable authorities (BEIS 2019). Horizontal black line shows England average (13.4%), Horizontal red line shows Southeast England average (7.5%).

Reading have been compared to a number of comparable authorities the national and subregional average where appropriate.

1.5 Rented property possession claim rates

Reading has above average rented property possession rate nationally, with 11.5 claims per 10,000 households in 2023[6] (**Error! Reference source not found.**). The average number of claims for authorities in England was 8.7 per 10,000.

[5] Department for Business, Energy & Industrial Strategy 2021 https://www.gov.uk/government/statistics/sub-regional-fuel-poverty-data-2021

[6] MOJ Possession claims by local authority (2023) https://lginform.local.gov.uk/reports/lgastandard?mod-metric=3498&mod-area=E06000031&mod-group=AllSingleTierAndCountyLaInCountry_England&mod-type=namedComparisonGroup

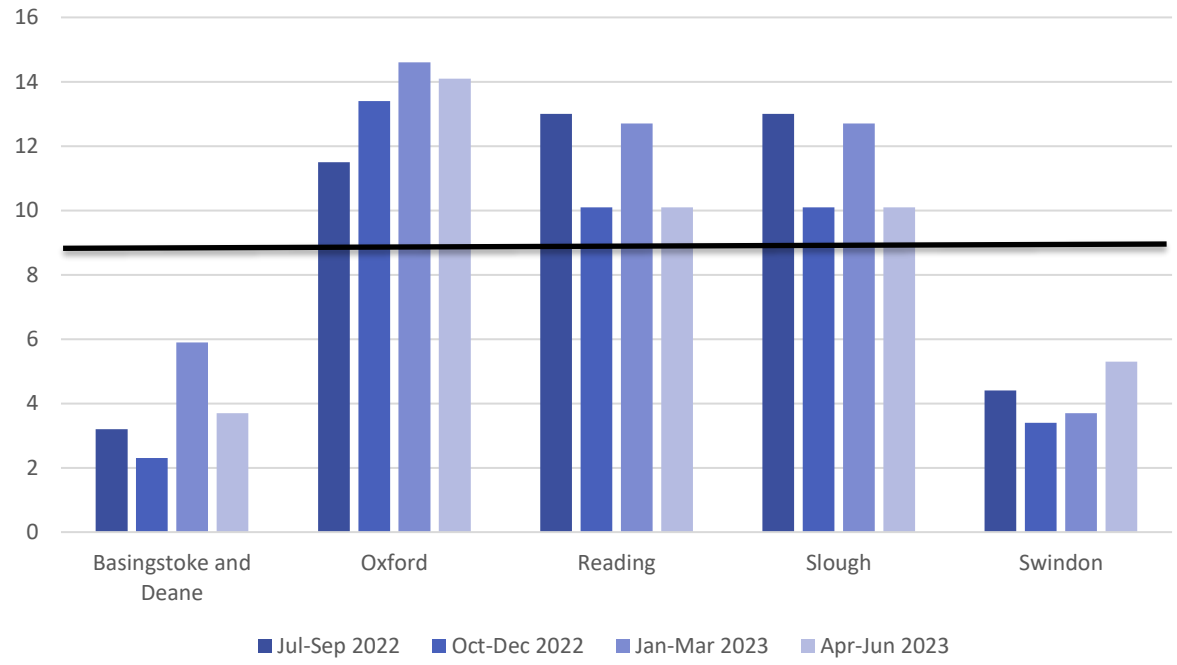


Figure 6. Number of possession claims issued by landlords per 10,000 households (selected comparable authorities) 2022/23 (MOJ 2023) ***Black line equals English authorities mean average 8.7 per 10,000 households (last 4 quarters).***

1.6 Homelessness Duty

Local authorities are required by law to either provide accommodation to homeless households (the main homelessness duty), work to stop households becoming homeless (the homelessness prevention duty) or relieve homelessness when it does occur (the homelessness relief duty).

1,084 households were owed a prevention or relief duty in the financial year 2022/2023 (Figure 7) [7].

[7] Department for Levelling Up, Housing and Communities, Homelessness, https://www.gov.uk/government/statistical-data-sets/live-tables-on-homelessness https://data.london.gov.uk/dataset/homelessness

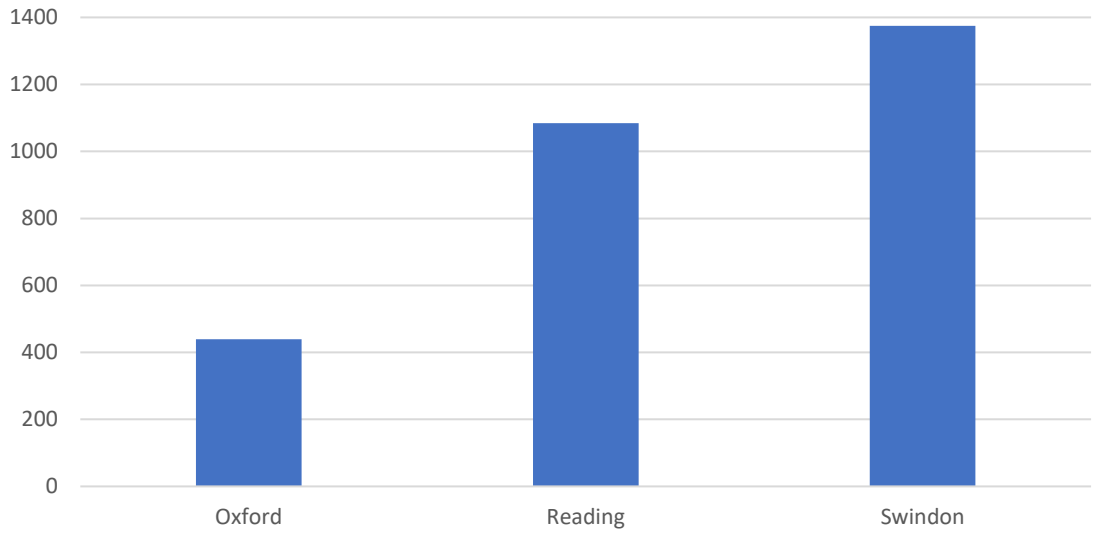


***Figure 7. Households owed a prevention or relief duty for financial year 2022/2023** (no data available for Basingstoke and Deane & Slough)*

36.6% homelessness prevention or relief duty result from private rented tenancy ending (assured shorthold tenancies) for financial year 2022/2023. This Is slightly below the national average (38.6%)

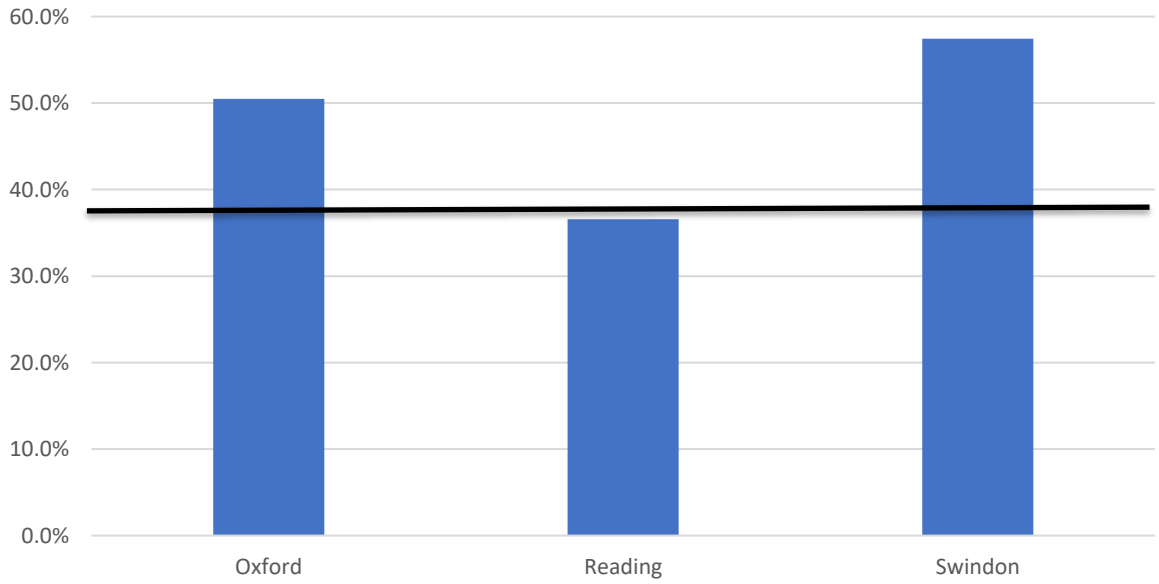


Figure 8. Percent homelessness prevention or relief duty rates as a result private rented tenancy ending - assured shorthold financial year 2022/2023 (no data available for Basingstoke and Deane & Slough)
Black line equals English authorities mean average (38.6%)

1.7 Rents and affordability

Private rents vary by area. As this report is concerned with housing conditions and other housing stressors, we have looked at the average (median) rents for all dwelling types (categories). Reading has above average rents for England (£1,006) (Figure 9)[8]. The national average is £889.

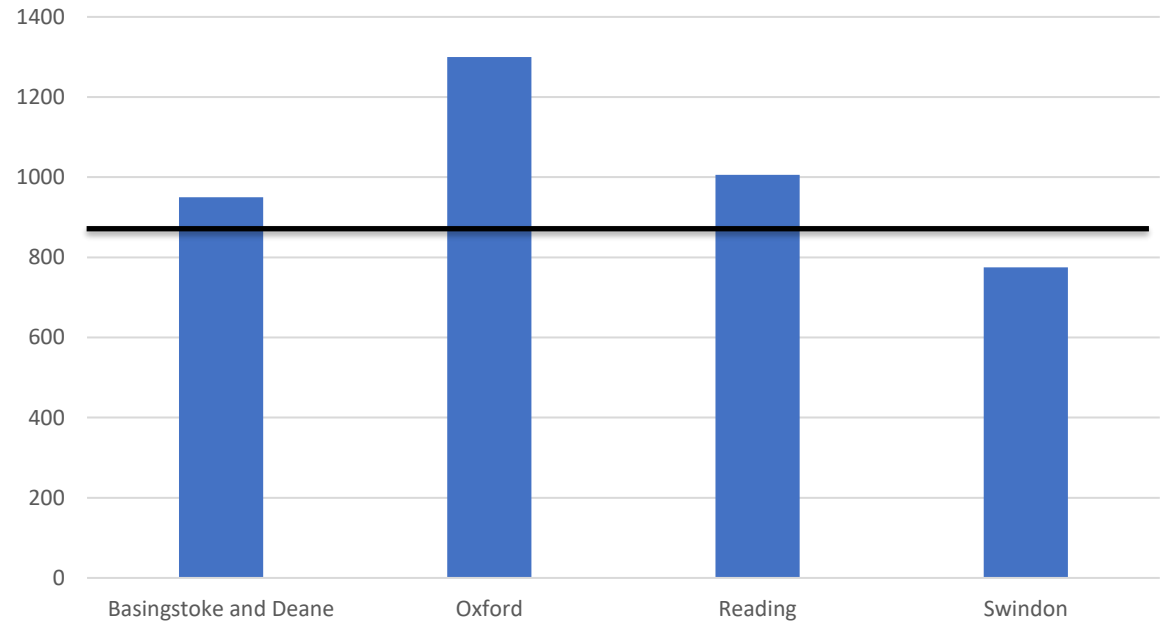


Figure 9. Median monthly rents (1 April 2022 to 31 March 2023) (all categories) (Source: VOA 2023). Horizontal black line shows national average (£889)

[8] ONS Private rental market summary statistics in England: April 2022 to March 2023
https://www.ons.gov.uk/peoplepopulationandcommunity/housing/bulletins/privaterentalmarketsummarystatisticsinengland/april2022tomarch2023

2 Results of housing stock and stressor modelling

2.1 Methodology

Tenure Intelligence (Ti) uses council held and publicly available data to identify tenure and analyse property stressors, including property conditions and ASB.

Data trends at the property level are analysed using machine learning to help predict the tenure of individual properties where they are not already known. Metastreet has worked with the council to create a residential property data warehouse. This has included linking millions of cells of council and externally held data to 77,643 unique property references (UPRN), excluding parent (shell properties) and non-dwellings. Therefore only properties that are dwellings have been included in this study, common parts and ancillary properties have been excluded.

Machine learning is used to make predictions for each tenure and property condition based on a sample of known tenures and outcomes. Results are analysed to produce a summary of housing stock, predictions of Category 1 & 2 hazards (HHSRS) and other stressors. To achieve the maximum accuracy, unique models are built for each council and tenure, incorporating individual authority data and using local known outcomes to train predictive models. Where a tenure or outcome is already known by the authority, this will be added to the final model.

Once the data warehouse was created, statistical modelling was used to determine tenure using the methodology outlined below. All specified and requested council held longitudinal data is 5 consecutive years, from April 2018 – March 2023.

Different combinations of risk factors were systematically analysed for their predictive power in terms of key outcomes. Risk factors that duplicated other risk factors but were weaker in their predictive effect were systematically eliminated. Risk factors that were not statistically significant were also excluded through the same processes of elimination.

For each UPRN a risk score was calculated using logistic regression. The selected risk factors have a better or worse than evens chance of being predictive. A decision tree model is then used to allocate properties to predefined outcomes.

Several predictive models have been developed as part of this project which are unique to Reading. Known stressors linked to individual properties have been modelled to calculate population level incidences and rates.

It is important to note that this approach can never be 100% accurate as all large datasets and statistical models include some level of error. A more detailed description of the methodology and the specific factors selected to build predictive models for this project can be found in Appendix 2.

2.2 Results - Private rented sector

2.2.1 Population and distribution

The private rented sector (PRS) in Reading has grown steadily since 2011 [9].

Based on tenure modelling (2023), Reading's PRS is now calculated to be 39.9% of all housing stock (Figure 10). The 2021 Census reports the PRS in Reading to be 32.1%. The difference is likely to be a result of absent student households (national & international) and migrant worker households from the Census data as a result of the March 2021 government-imposed coronavirus lockdown measures [10]&[11]. Further details of the differences between the Census 2021 and Ti 2023 results can be found in Appendix 2. It's important to note that Census tenure data is based on reported households, while Ti data is based on known dwellings within a local authority area. Some dwellings have multiple households (Table 9).

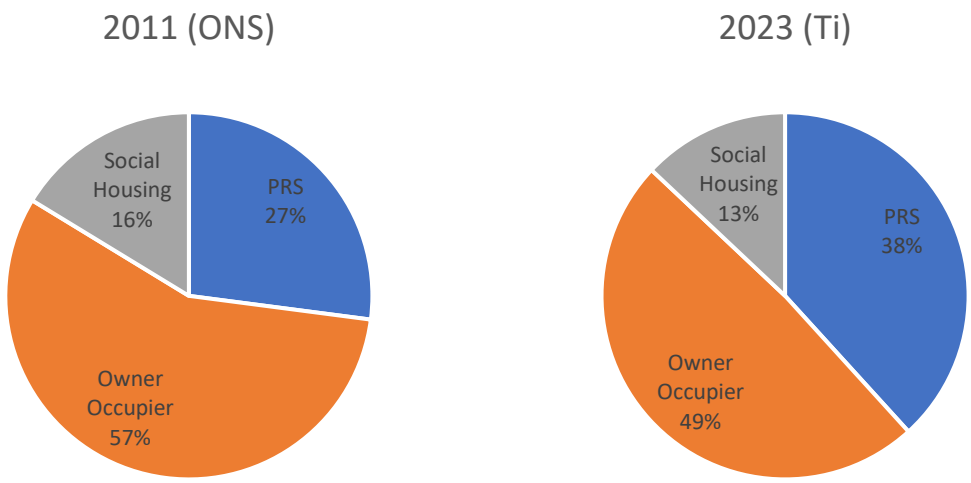


Figure 10. Tenure profile 2011 & 2023 (Source: ONS & Metastreet Ti model).

[9]Census 2021 https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates
[10]Timeline of UK government coronavirus lockdowns and restrictions, https://www.instituteforgovernment.org.uk/data-visualisation/timeline-coronavirus-lockdowns
[11]Onlondon Article (July 2022) https://www.onlondon.co.uk/london-councils-briefing-warns-that-census-may-have-significantly-undercounted-capitals-population/

Tenure percentage change over the last two decades in Reading has been consistent with the national trend (Figure 11), owner occupation as a proportion of housing stock decreasing while private renting increasing. This PRS increase is part of a long term nationwide and regional trend.

The PRS in the UK has grown from 9.4% of housing stock in 2000 [12] to 19% of households 2021 [13]. The PRS remains the second largest housing tenure in England. [14] .

In line with the UK average, Reading's PRS stock has continued to grow steadily since 2011. Social rented housing stock has been stable over the last decade (Figure 11).

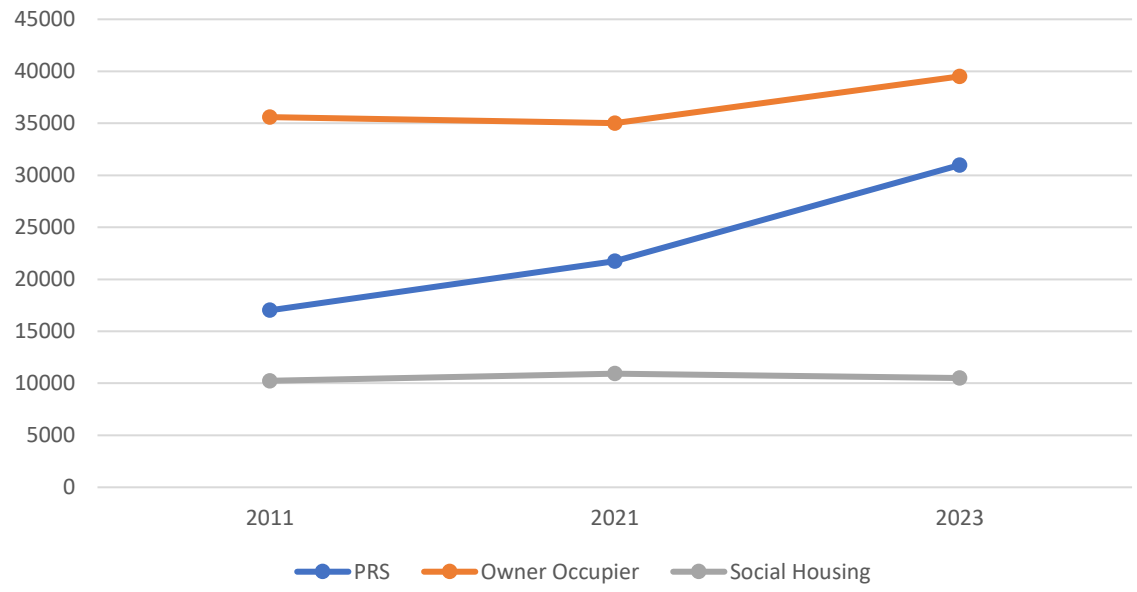


Figure 11. Reading tenure change and total housing stock, 2011, 2021 & 2023 (Source: ONS & 2023 Ti).

[12] The profile of UK private landlords Scanlon K & Woodhead C CML research. LSE London. December 2017 www.cml.org.uk
[13] EHS Headline 2021-2022, https://www.gov.uk/government/statistics/english-housing-survey-2021-to-2022-headline-report/english-housing-survey-2021-to-2022-headline-report#section-2-housing-stock
[14] EHS Headline 2021-2022, https://www.gov.uk/government/statistics/english-housing-survey-2021-to-2022-headline-report/english-housing-survey-2021-to-2022-headline-report#section-2-housing-stock

Tenure	**2011 (ONS)** (households)	**2021 (ONS)** (households)	**2023 (Ti)** (properties)
PRS	17,018	21,740	30,982
Owner Occupier	35,609	35,017	36,143
Social Housing	10,242	10,925	10,507
Totals	62,869	67,682	77,632

Table 1. Number of households & dwellings by tenure 2011, 2021 & 2023 by ward (Source: ONS & Ti 2023).

The data in Table 1 shows a clear discrepancy between Census recorded households (2021) and the number of known dwellings (Ti 2023), with at least 9,950 households missing from the Census data.

The PRS in Reading is distributed across all 16 wards (Figure 12). The number of PRS dwellings per ward ranges from5,014 (Abbey) to 627 (Caversham Heights).

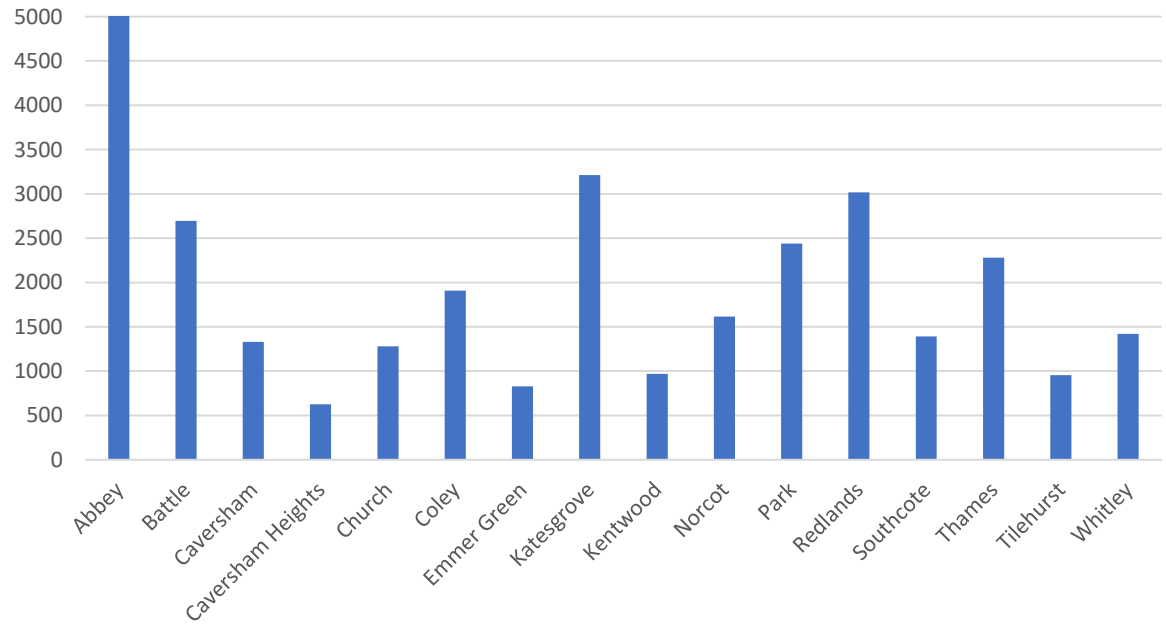


Figure 12. Number of PRS dwellings by ward (Source: Ti 2023).

The percentage of PRS properties in each ward ranges between 69.4% (Abbey) and 16.1% (Caversham Heights) (Figure 13). Therefore, 15 out of 16 Reading wards have an equal or higher percentage PRS than the national average in 2022 (19%)[15].

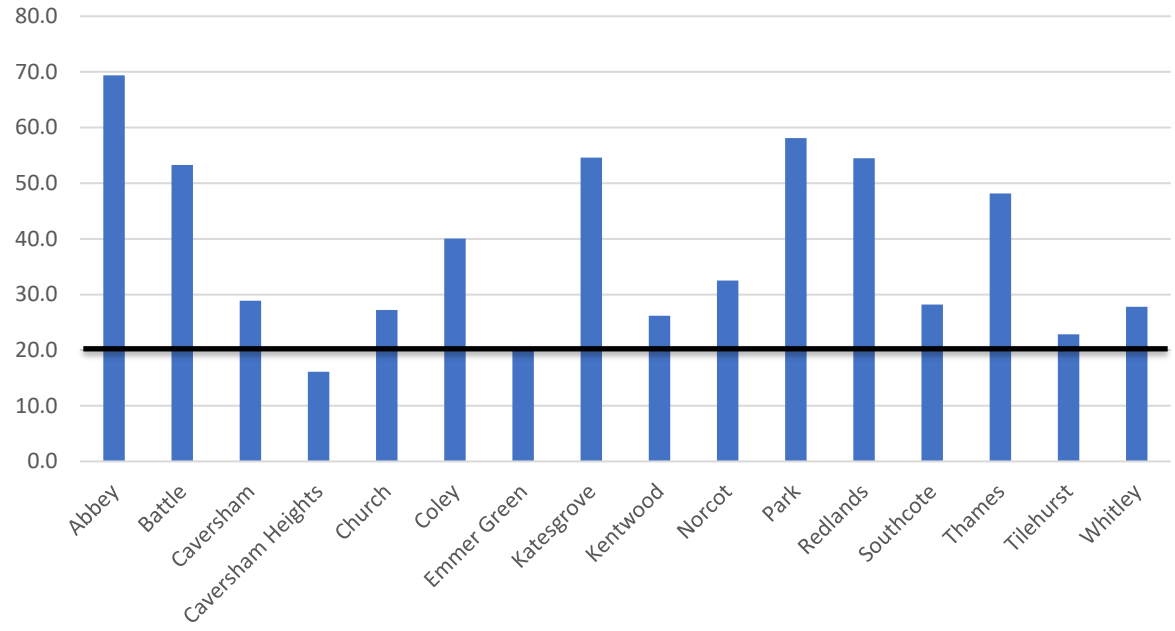


Figure 13. Percentage of PRS dwellings by each ward (Source Ti 2023). ***Horizontal black line shows national average 2021 (19%)***

The table below shows the total PRS dwellings in each ward and the percentage PRS compared to the total housing stock.

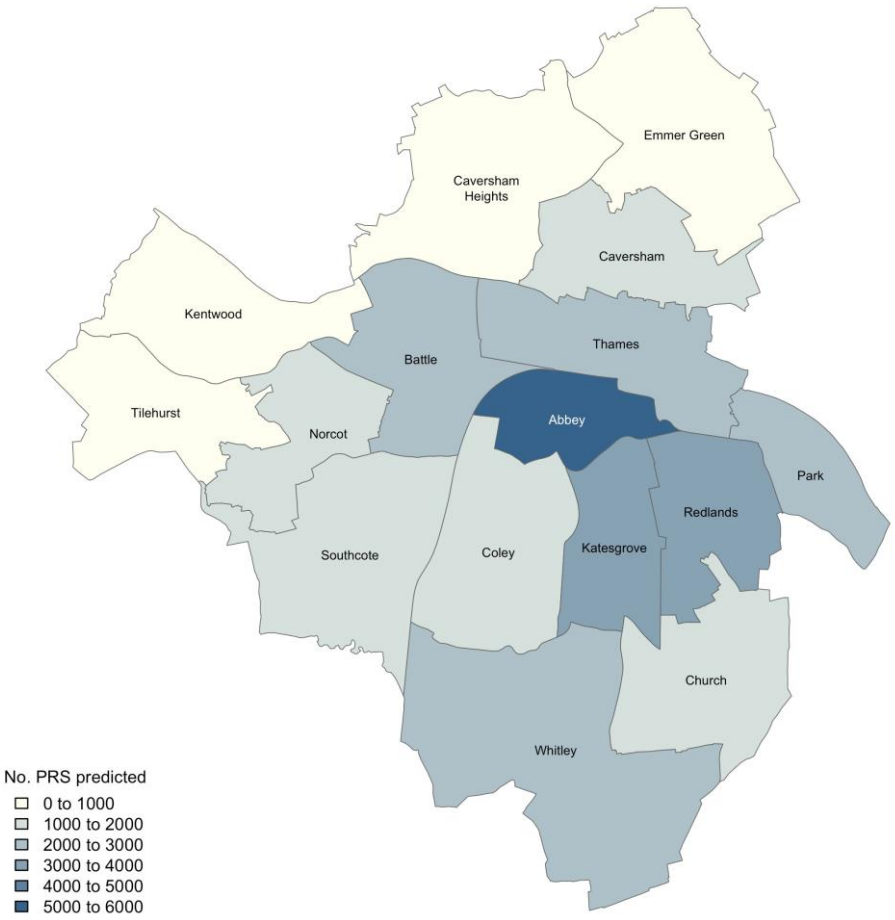
Wards	PRS dwellings	% PRS
Abbey	5,014	69.4
Battle	2,694	53.3
Caversham	1,332	28.9
Caversham Heights	627	16.1
Church	1,280	27.2
Coley	1,910	40.0
Emmer Green	828	19.9
Katesgrove	3,213	54.6
Kentwood	968	26.2
Norcot	1,614	32.5
Park	2,439	58.1
Redlands	3,016	54.5
Southcote	1,392	28.2

[15] EHS Headline 2021-2022, https://www.gov.uk/government/statistics/english-housing-survey-2021-to-2022-headline-report/english-housing-survey-2021-to-2022-headline-report#section-2-housing-stock

Thames	2,279	48.2
Tilehurst	955	22.8
Whitley	1,421	27.8

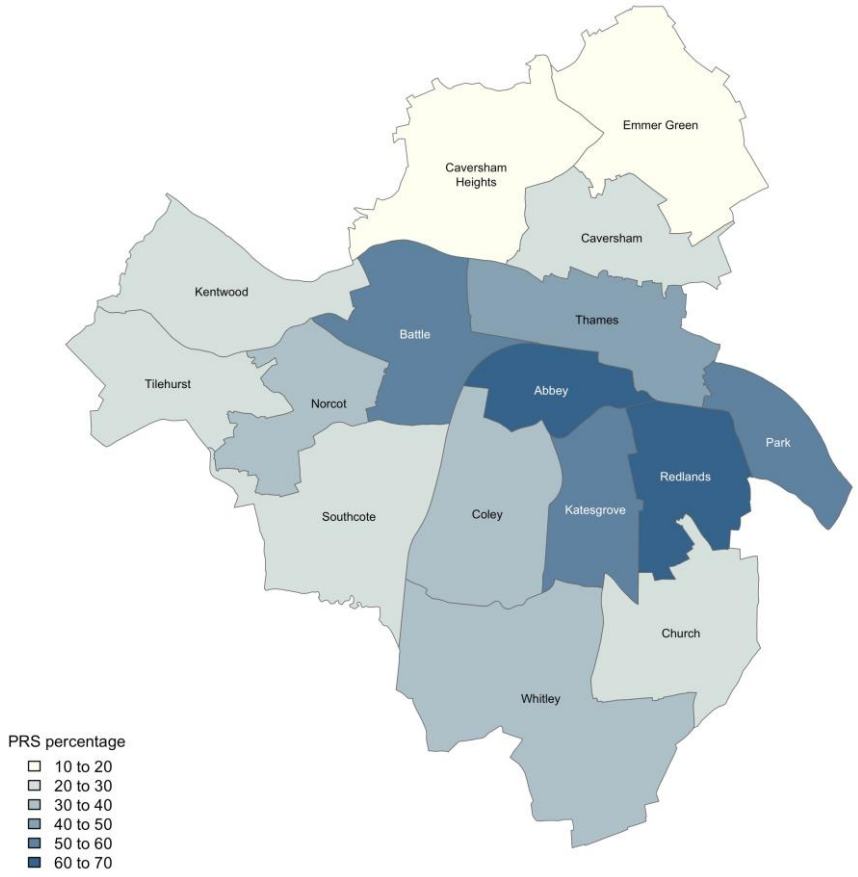
Table 2. Number and percentage of PRS properties by ward (Source Ti 2023).

PRS properties are distributed across Reading (Map 2 & 3). There is a clear concentration of PRS dwellings in some central wards.



Map 2. Number of PRS properties in Reading (Source: Ti 2023, Map by Metastreet).

Abbey has the highest percent PRS (69.4%) and Caversham Heights has the lowest concentration (16.1%) (Map 3).



Map 3. PRS properties as percentage of dwellings in Reading (Source: Ti 2023, Map by Metastreet).

2.2.2 Housing conditions

Housing conditions are affected by the level of maintenance and quality of repair, the age of the property, thermal efficiency, and type of construction. Category 1 (HHSRS) hazards have a physiological or psychological impact on the occupant and may result in medical treatment. [16] There is also serious impact on public services, hazardous conditions in the PRS are estimated to cost the NHS £340 million a year. [17]

[16] Housing Health and Rating System, Operation Guidance, 2006, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/15810/142631.pdf

[17] House of Commons Committee of Public Accounts: https://committees.parliament.uk/committee/127/public-accounts-committee/news/165326/pac-private-rented-housing-failing-far-too-often-to-provide-safe-and-secure-homes/

In 2022, 14% of private rented dwellings in England had at least one Category 1 hazard; this was a higher proportion than the average for the total housing stock (10%). Furthermore, the private rented sector had the highest proportion of non-decent homes (23%)[18]. It is notable that there is a gradient of risk with age of the property, the risk being greatest in dwellings built before 1900, and lowest in the more energy efficient dwellings built after 1980[19].

A local authority's property age profile can have an impact on housing conditions. Reading has a high number of residential properties (40.1%) built pre-Second World War [20]. The council tax band provides an indication of relative distribution of property value in each ward. (Figure 14).

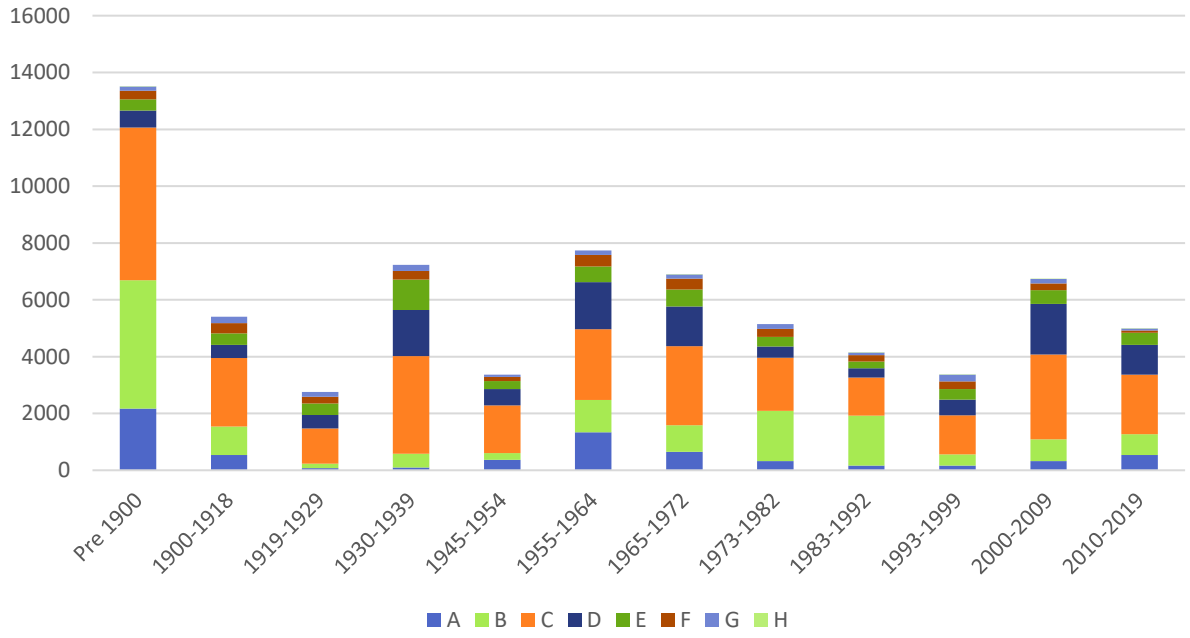


Figure 14. All housing stock age profile and council tax band (Source: VOA 2019).

A local authorities property type profile offers an indication of housing density, construction type and other population factors. The most common private rented property type in Reading are houses (51%), while bungalow is the least common property type (1%) (Figure 15).

[18] EHS Headline 2021-2022, https://www.gov.uk/government/statistics/english-housing-survey-2021-to-2022-headline-report/english-housing-survey-2021-to-2022-headline-report#section-2-housing-stock
[19] Housing Health and Rating System, Operation Guidance, 2006, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/15810/142631.pdf
[20] VOA 2019 https://www.gov.uk/government/statistics/council-tax-stock-of-properties-2019

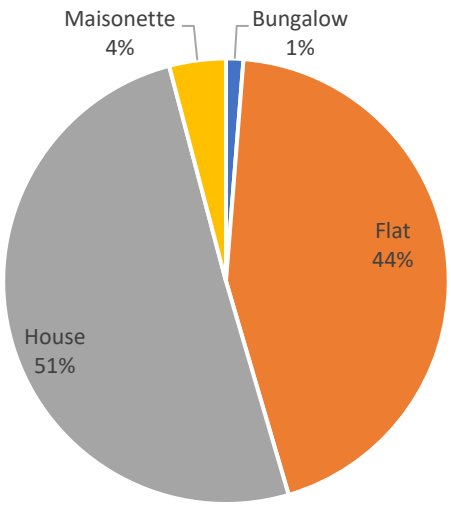


Figure 15. Private rented property type as a percent of total (Source: RBC matched EPC records 2023).

Using a training sample of properties that are known to have at least one serious housing hazard (Category 1 and high scoring Category 2, HHSRS), it is possible to predict the number of PRS properties with at least one serious hazard across the area (Figure 16), further details of the methodology can be found in Appendix 2.

There are 4,297 private rented properties in Reading that are likely to have at least 1 serious housing hazard (Category 1 and high scoring Category 2, HHSRS). PRS properties with serious hazards are distributed across all wards. Redlands (605) and Park (490) have the highest number of properties with at least one Category 1 & 2 hazard (Figure 16 & Map 4).

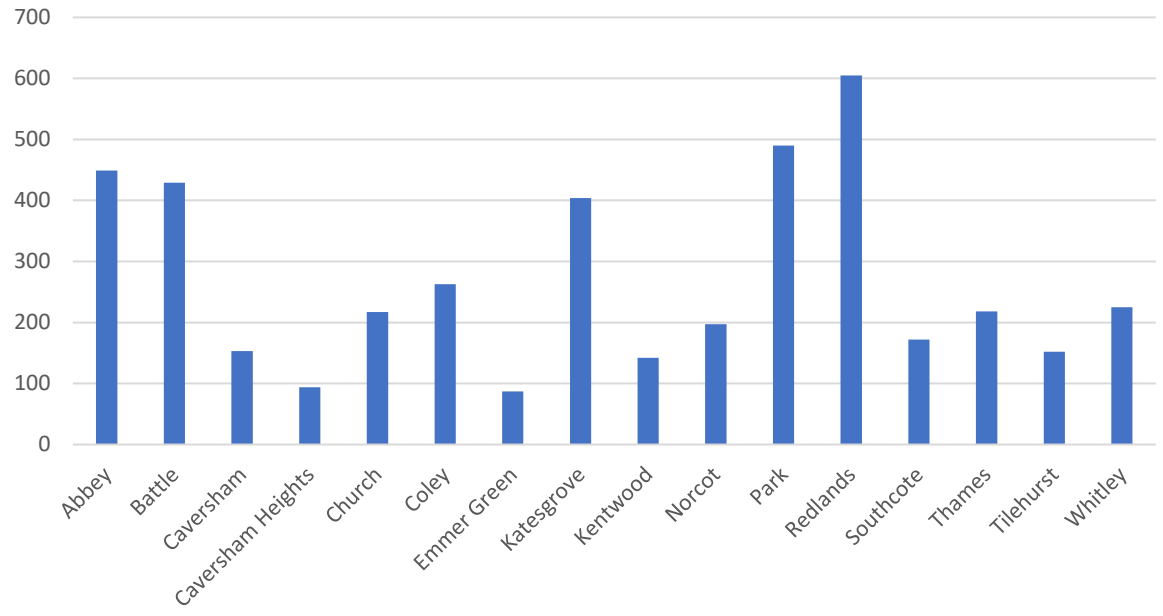
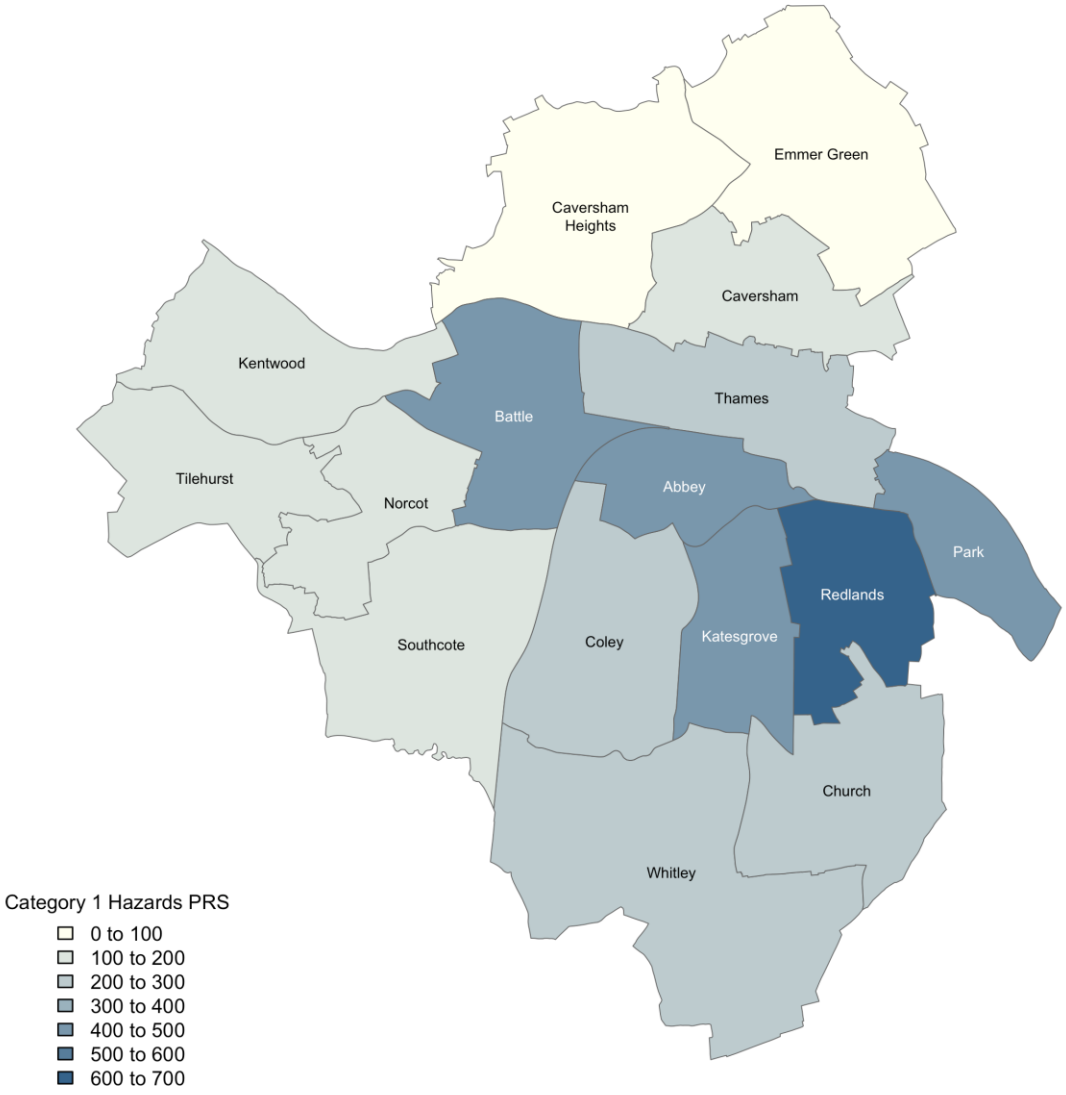


Figure 16. Predicted number of dwellings with serious hazards by ward (Source: Ti 2023).

Category 1 & 2 hazards in the PRS are distributed across Reading with concentrations of hazards in some central wards (Map 4).



Map 4. Distribution of PRS dwellings with predicted Category 1 & 2 hazards (HHSRS) (Source: Ti 2023, map by Metastreet).

The rates of Category 1 & 2, HHSRS hazards per 100 PRS properties reveals a wide distribution across Reading (Figure 16 & Map 4). Whitley (25.8 per 100) & Redlands (21.4 per 100) have the highest rates of predicted PRS properties with Category 1 & 2, HHSRS hazards. The national average for category 1 hazards in the PRS is 14%[21]. It's important to note that rates are significantly impacted by the denominator, in this case total PRS numbers in each ward.

[21] EHS Headline 2021-2022, https://www.gov.uk/government/statistics/english-housing-survey-2021-to-2022-headline-report/english-housing-survey-2021-to-2022-headline-report#section-2-housing-stock

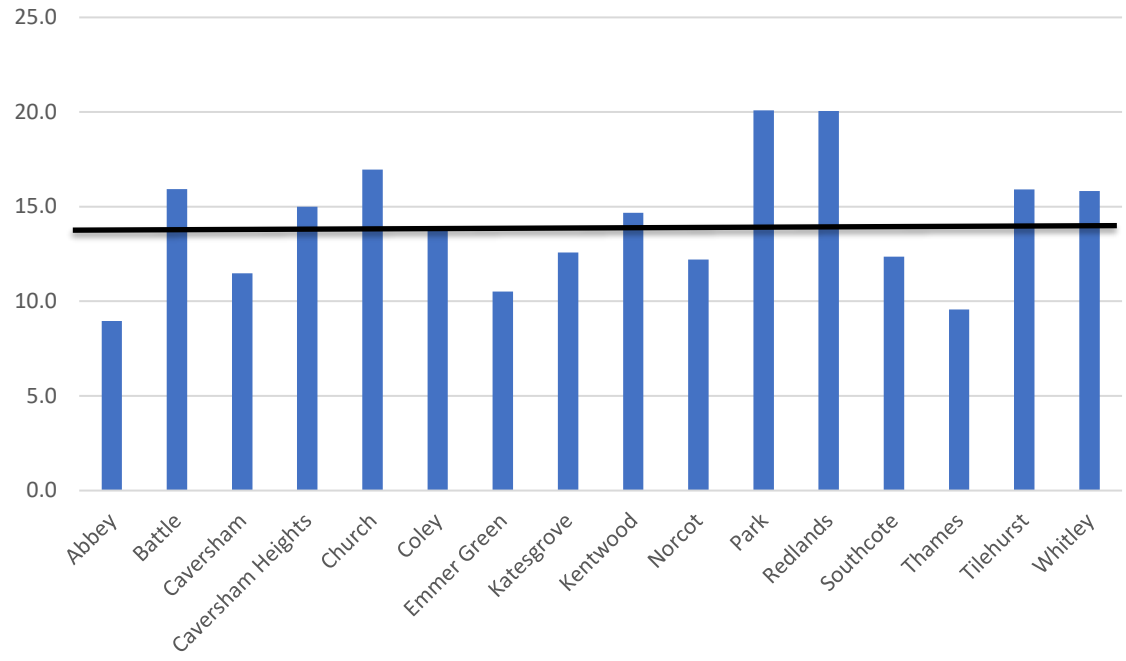


Figure 17 Rates per 100 PRS properties of predicted Category 1 & 2, HHSRS hazards by ward (Source: Ti 2023). Horizontal black line shows national average for Category 1 hazards 2022 (14 per 100) [22]

Complaints and service requests made by PRS tenants to the council about poor property conditions and inadequate property management are a direct indicator of low quality PRS. Reading recorded **3,117** complaints and service requests from private tenants and others linked to PRS properties over a 5-year period (Figure 18).

[22] EHS Headline 2021-2022, https://www.gov.uk/government/statistics/english-housing-survey-2021-to-2022-headline-report/english-housing-survey-2021-to-2022-headline-report#section-2-housing-stock

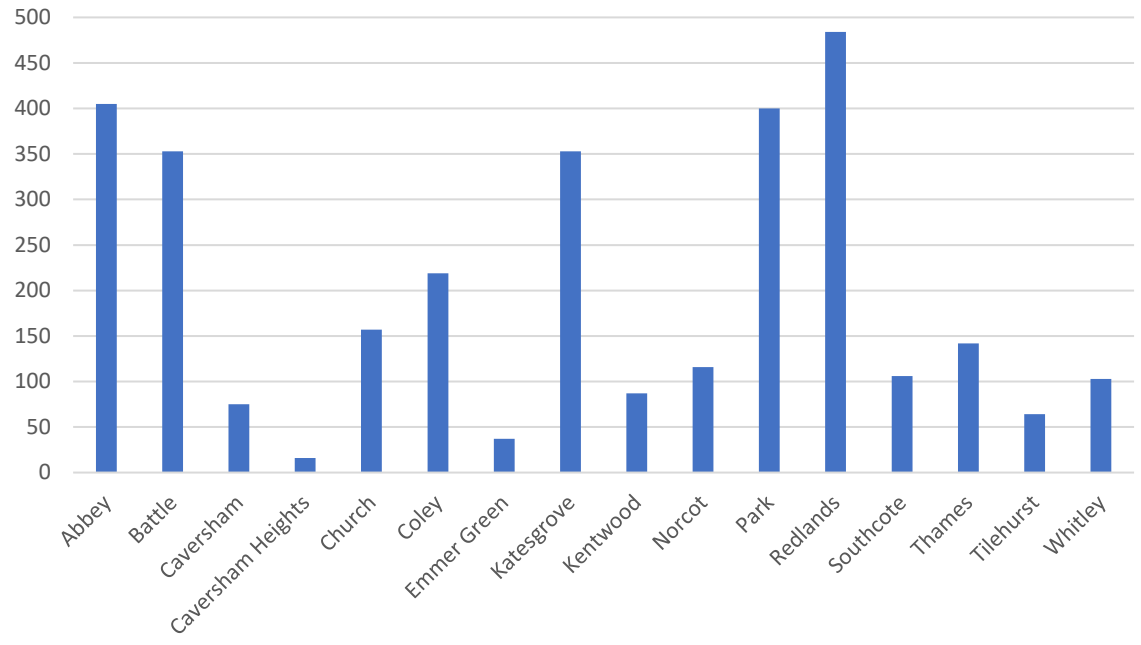
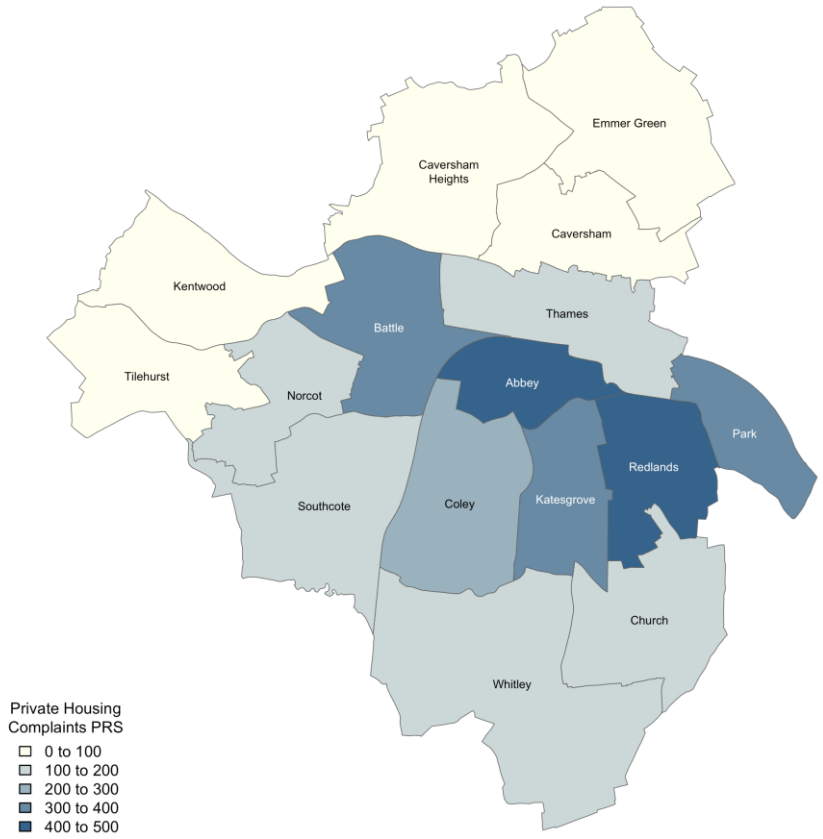


Figure 18. PRS complaints and service requests made by private tenants and others to the Council (Source Ti 2023)

Redlands (484) and Abbey (405) received most private tenant service requests and complaints by private tenants and others to the Council (Figure 18 & Map 5).



Map 5. Distribution of PRS service requests and tenant complaints (Source: Ti 2023, Map by Metastreet).

An EPC rating is an assessment of a property's energy efficiency. It's primarily used by buyers or renters of residential properties to assess the energy costs associated with heating a house or flat. The rating is from A to G. A indicates a highly efficient property, G indicates low efficiency.

The energy efficiency of a dwelling depends on the thermal insulation of the structure, on the fuel type, and the size and design of the means of heating and ventilation. Any disrepair or dampness to the dwelling and any disrepair to the heating system may affect efficiency. The exposure and orientation of the dwelling are also relevant.

As part of this project **24,779** EPC ratings were matched to PRS properties (Figure 19). All figures have been modelled from this group.

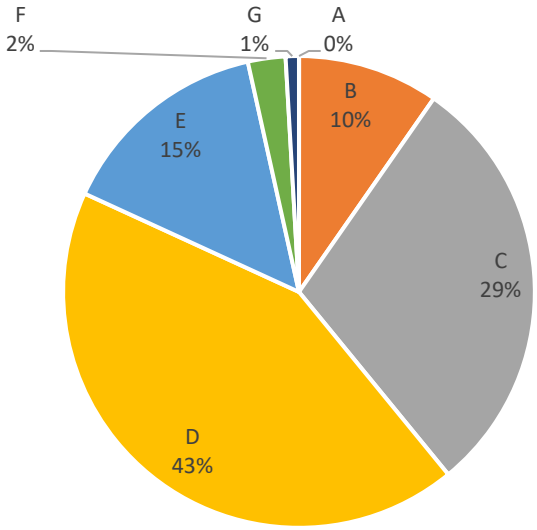


Figure 19. Distribution of Energy Performance Certificate ratings in PRS (Rating A-G) (Source: Ti 2023).

The Minimum Energy Efficiency Standard (MEES) came into force in England and Wales on 1 April 2018. The regulation applies to PRS properties and mandates that all dwellings must have an EPC rating of E and above to be compliant. It has been calculated using the matched addresses that 18.1% of PRS properties in Reading have an E, F, and G rating. 3.5% of PRS properties have an F and G rating (Figure 19). Extrapolated to the entire PRS, 1,084 PRS properties are likely to fail the MEES statutory requirement.

The statistical evidence shows that there is a continuous relationship between indoor temperature and vulnerability to cold-related death [23]. The colder the dwelling, the greater the risk. The percentage rise in deaths in winter is greater in dwellings with low energy efficiency ratings. Children in cold homes are twice as likely to suffer from a variety of respiratory problems [24]. There is a gradient of risk with age of the property, the risk being greatest in dwellings built before 1850, and lowest in the more energy efficient dwellings built after 1980[25]. Therefore, the F and G properties present a serious risk to the occupants' health, particularly if over the age of 65 (Figure 19 & 20).

[23] Housing Health and Rating System, Operation Guidance, 2006 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/15810/142631.pdf
[24] Health Equity in England: The Marmot Review 10 Years On, 2020 https://www.health.org.uk/publications/reports/the-marmot-review-10-years-on

[25] Housing Health and Rating System, Operation Guidance, 2006 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/15810/142631.pdf

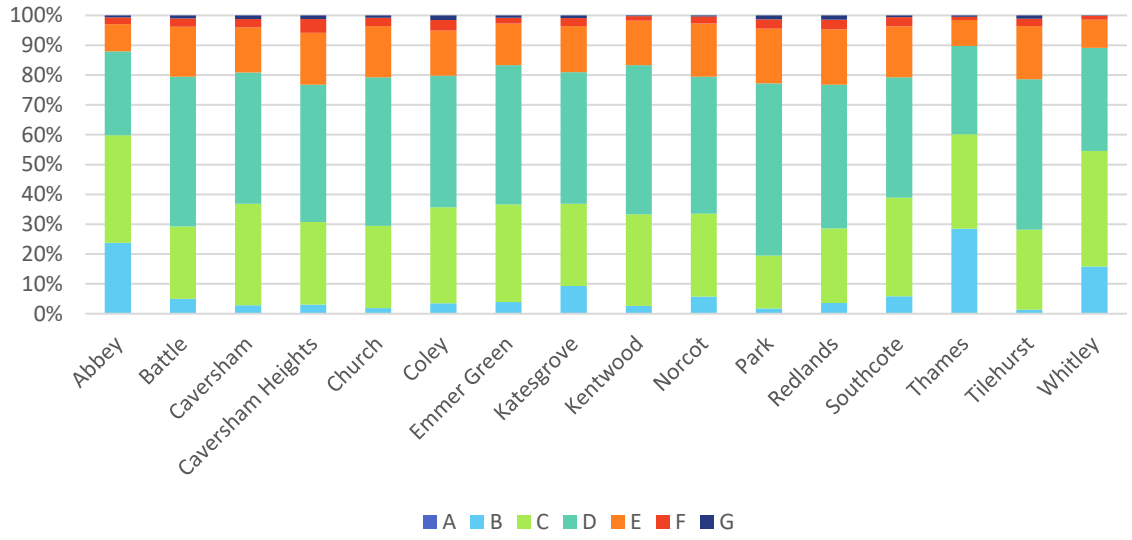


Figure 20. Energy Performance Certificate ratings in PRS by ward (Rating A-G) (Source: Ti 2023).

The difference between the current and potential energy performance score (EPC) helps owners of residential property understand what practicable improvements can be made to improve a properties energy performance. The gap between current and potential EPC scores represents the opportunity to improve energy performance within a reasonable economic envelope (Figure 21 & 22).

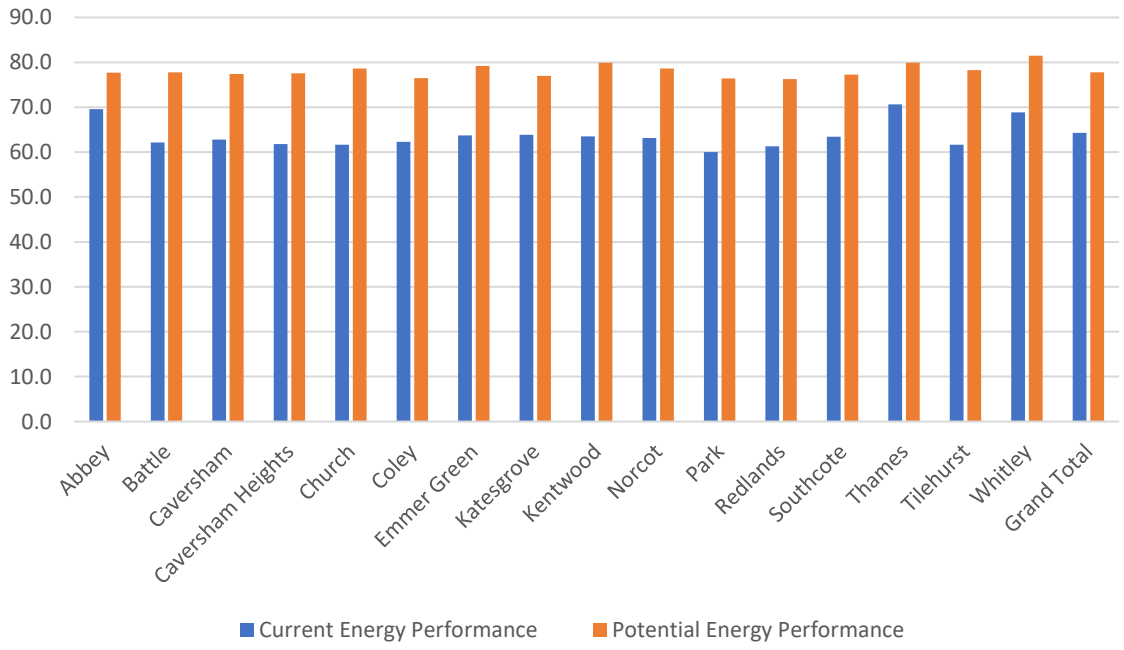


Figure 21. Current and Potential Energy Performance Certificate score (mean average) in PRS by ward (Source: Ti 2023).

Church (16.9) PRS stock has the largest difference between current and potential energy efficiency score (Figure 22).

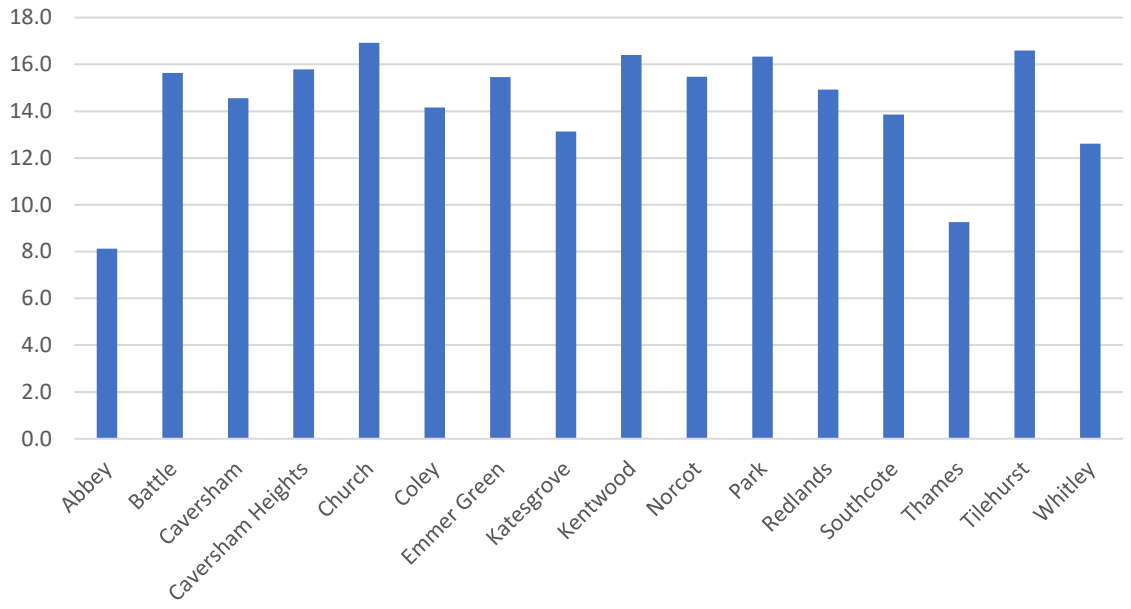


Figure 22. Difference between Current and Potential Energy Performance Certificate score (mean average) in PRS by ward (Source: Ti 2023).

EPC ratings E, F, & G represent properties with the poorest energy efficiency scores. Redlands (479) and Katesgrove (414) have the highest number of EPC ratings E-G (Figure 23).

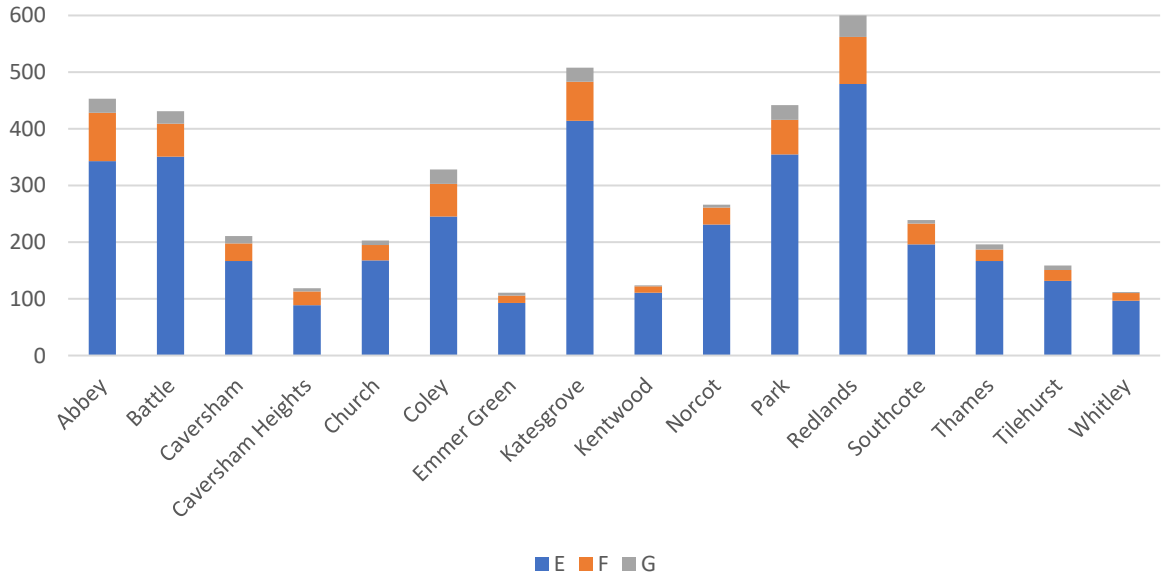


Figure 23. Energy Performance Certificate ratings in PRS by ward (Rating A-E) (Source: Ti 2023).

2.2.3 PRS enforcement and regulation interventions

Reading uses a range of statutory housing and public health notices to address poor housing standards in the PRS. Interventions can be a result of a complaint being made by a tenant about their accommodation or as a result of a proactive inspection. Over a 5-year period (2018-23) Reading served 273 housing and public health notices (Figure 24).

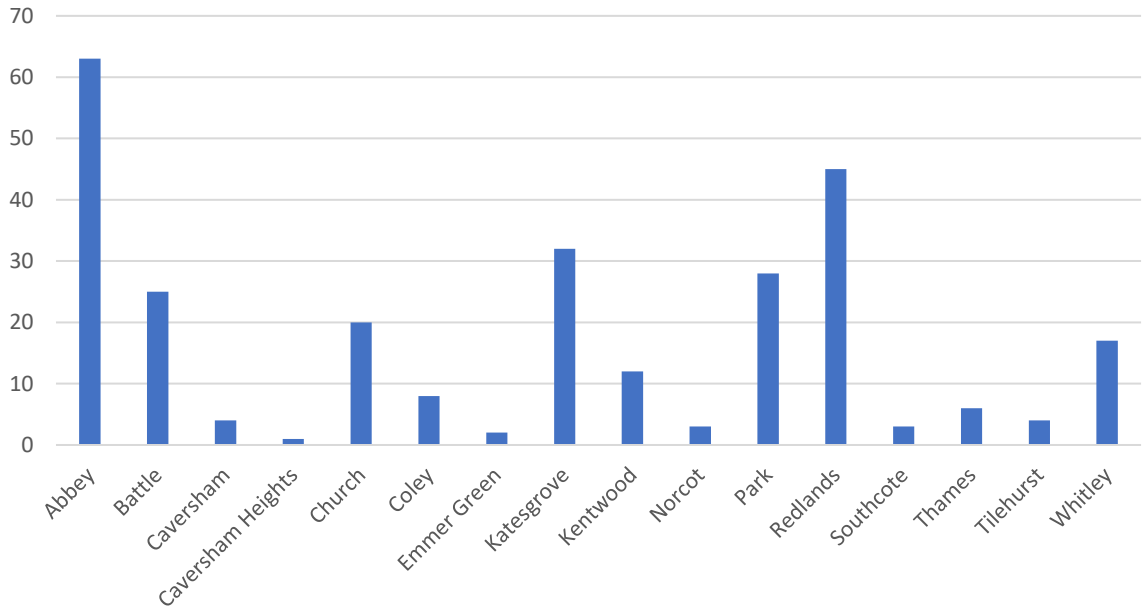
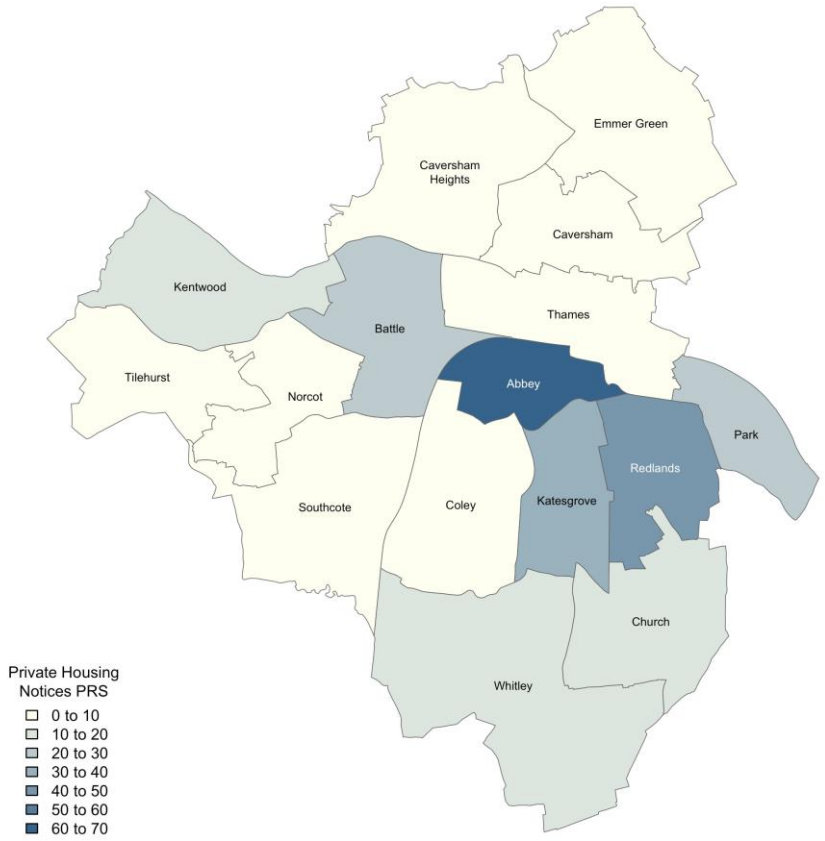


Figure 24. Statutory housing notices served on PRS properties (Source: Ti 2023).

Abbey (63) and Redlands (45) received the highest number of statutory notices for housing and public health related issues (Figure 22 & Map 6).



Map 6. Distribution of statutory housing notices served on PRS properties (Source: Ti 2023, Map by Metastreet).

The local housing authority's enforcement strategy involves taking serious enforcement action against individuals who control rented property to ensure compliance with minimum standards. The type of action taken depends on the nature of the offense and various factors. Between 2018 – 2023 Reading Borough Council instigated 34 financial penalty notices, prosecutions, or a simple caution to address poor housing conditions. Park (9) and Redlands (9) received the highest number of serious enforcement interventions (Figure 23).

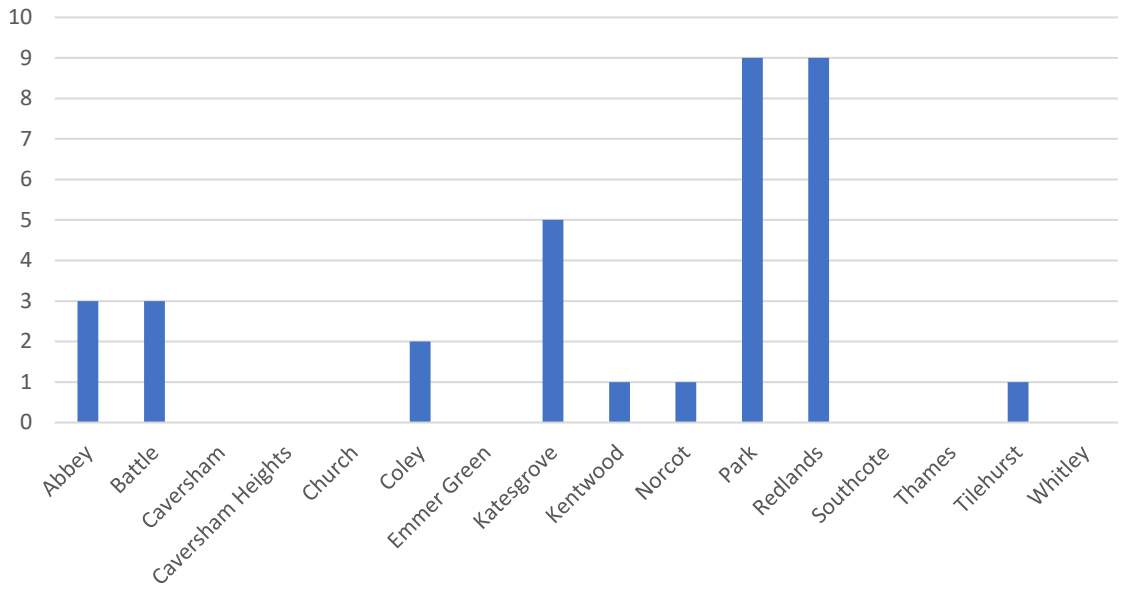


Figure 25. Private housing prosecutions, simple cautions, and Financial Penalty Notices (Source: Ti 2023).

2.2.4 PRS & anti-social behaviour (ASB)

It's important to note that the study focuses exclusively on ASB associated with residential premises. Incidents, such as those investigated on a street corner, which cannot be linked to a residential property, are excluded from the study.

ASB incidents (over 5 years) have been linked to all main residential tenures. Across the borough, owner occupiers have the lowest ASB incident rates (1.8 per 100 dwellings). Social housing (10.7 per 100 dwellings) and Private rented housing (6.4 per 100 dwellings) have higher rates. Known and predicted HMOs have by far the highest rates (21.3 per 100 dwellings) (Figure 26).

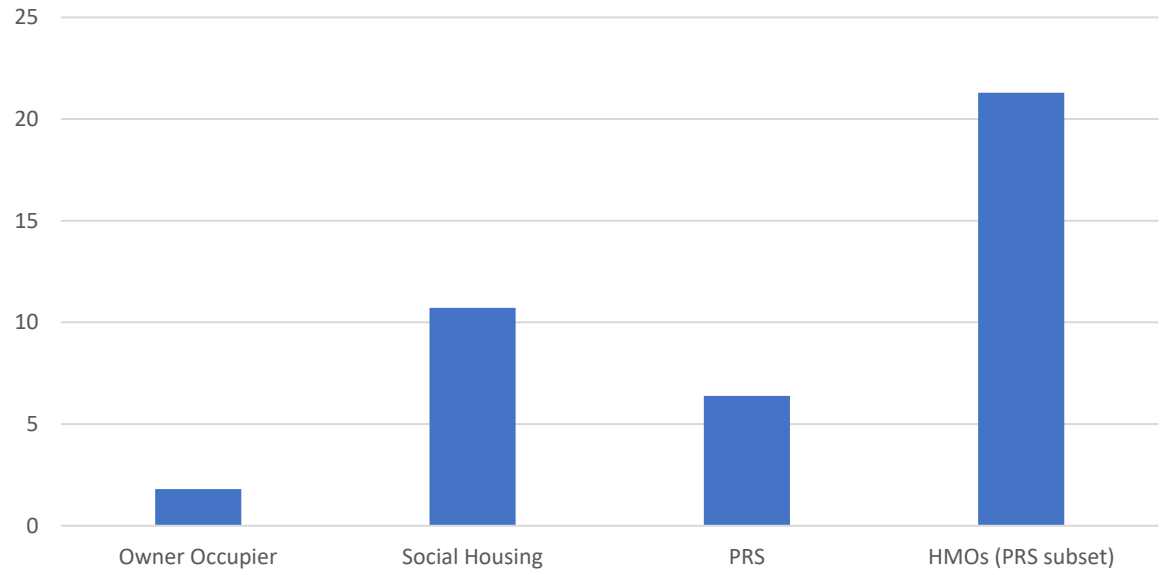


Figure 26. Rates per 100 properties ASB incidents linked to key tenures (Source Ti 2023).

The council has recorded a total of 1,980 incidents related to anti-social behaviour (ASB) and nuisance linked to PRS properties over the past five years. Battle (247) has the highest levels of PRS ASB incidents Emmer Green (33) has the lowest (Figure 24 & Map 7).

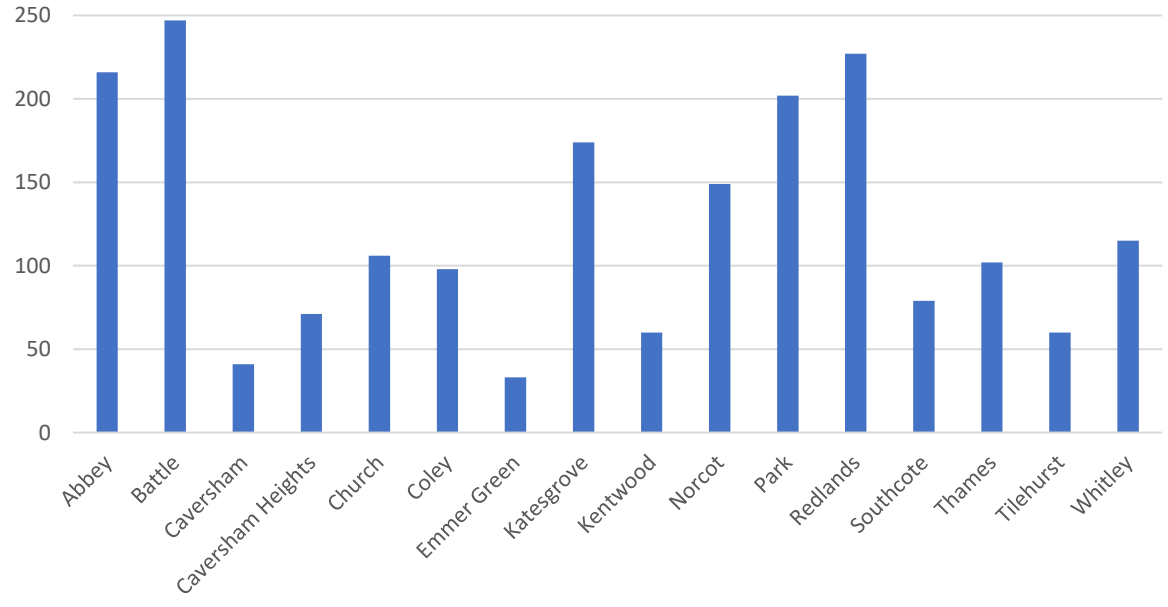
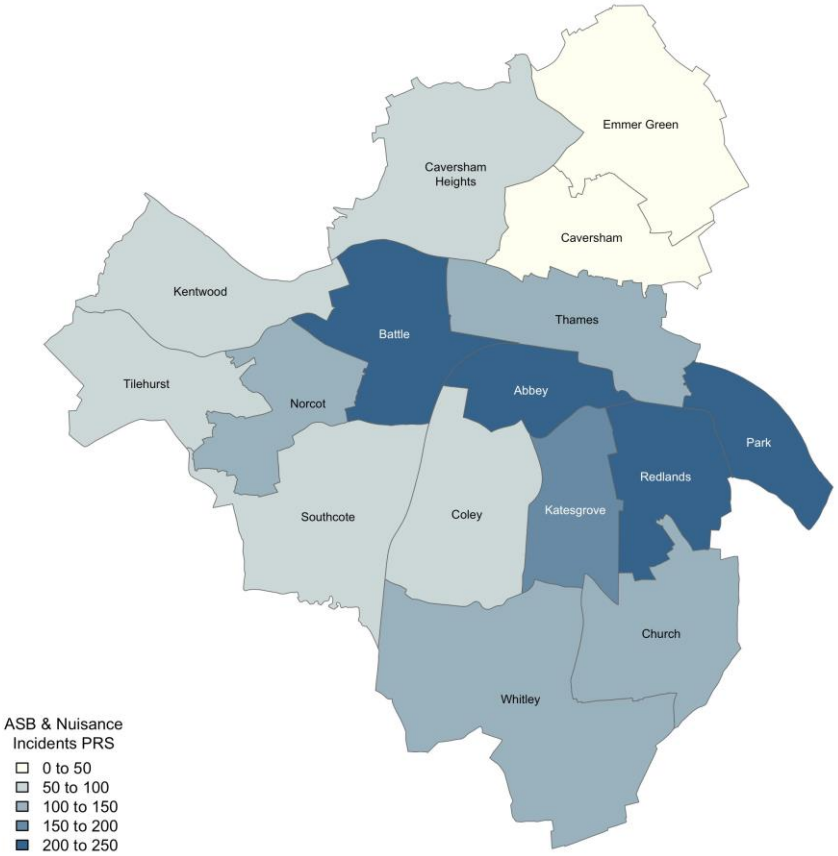


Figure 27. Number of ASB incidents linked to PRS by ward (Source Ti 2023).



Map 7. Distribution of ASB linked to PRS properties (Source: Ti 2023, Map by Metastreet).

Properties subject to repeat ABS incident (2 or more incidents) begin to demonstrate a lack of tenancy management or other underlying issues. Redlands (40) has the highest number of repeat ASB incidents (Figure 25).

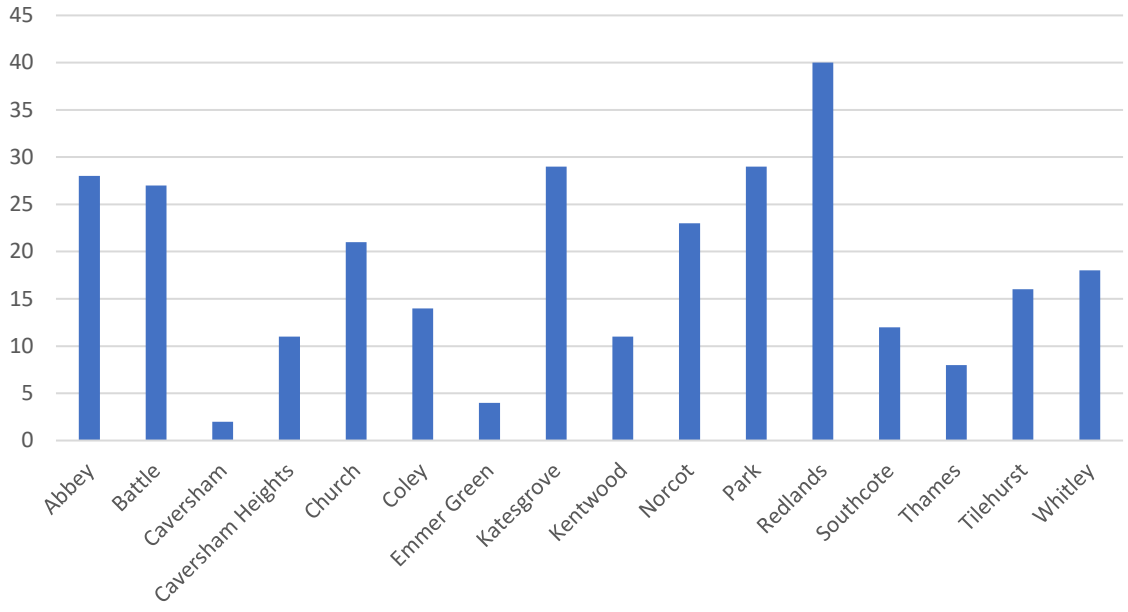


Figure 28. PRS properties with 2 or more ASB incidents by ward (Source Ti 2023).

2.3 Results - Houses in Multiple Occupation (HMO)

For the purposes of this study shared amenities HMO (section 254) are categorised as buildings or flats that are occupied by two or more households and 3 or more persons that share a basic amenity, such as bathroom, toilet, or cooking facilities.

This type of rented property typically represents the cheapest rental accommodation; rented by room with the sharing of amenities (usually kitchen/bathroom). The Housing Act 2004 defines HMOs of this type as a "dwelling of 3 or more persons not forming a single household" [26].

2.3.1 Population and distribution

Reading's HMO population has been estimated to comprise a total of 3,272 properties. For this study, the HMO population has been categorised into two distinct groups. The first group consists of known HMOs across 16 wards, which amounts to 1,184 properties These HMOs have obtained licences from the council in compliance with the mandatory HMO licensing requirements as outlined in the Housing Act 2004, Part 2. The second group is made up of predicted HMOs, which are properties anticipated to meet the standard HMO criteria described above and amounts to 2,088 properties (Figure 26). These are likely to be mainly 3-4 person HMO properties.

Abbey (770) has the highest number of HMOs and Kentwood (40) has the lowest. The known and predicted HMO population is distributed across all wards with concentrations in central and eastern wards (Map 8 & Map 9).

[26] Housing Act 2004
https://www.legislation.gov.uk/ukpga/2004/34/section/254

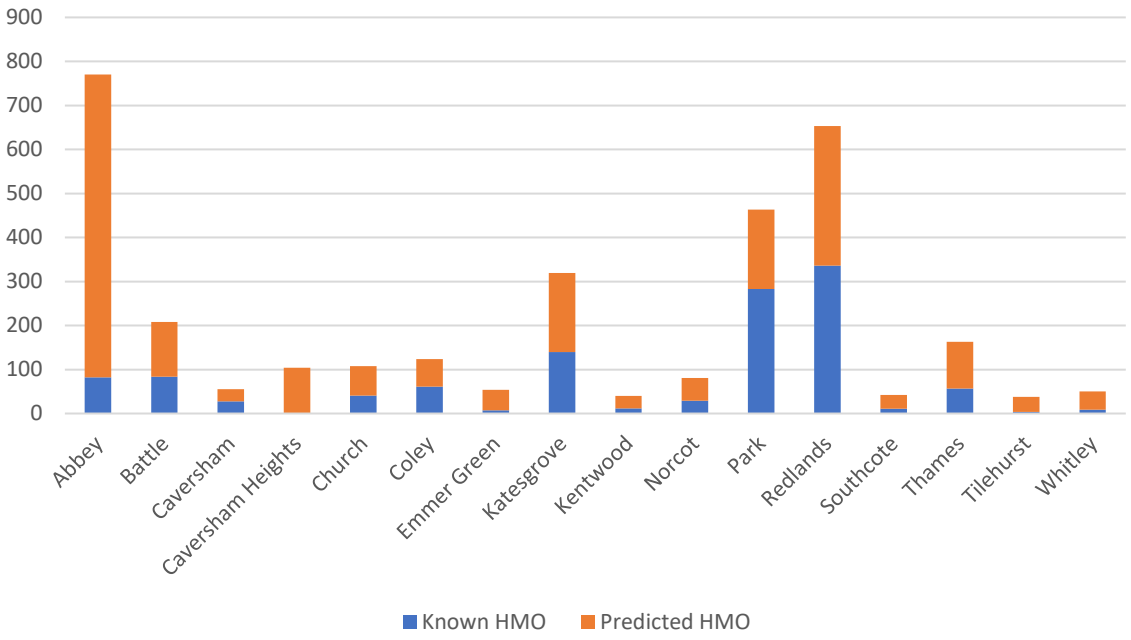
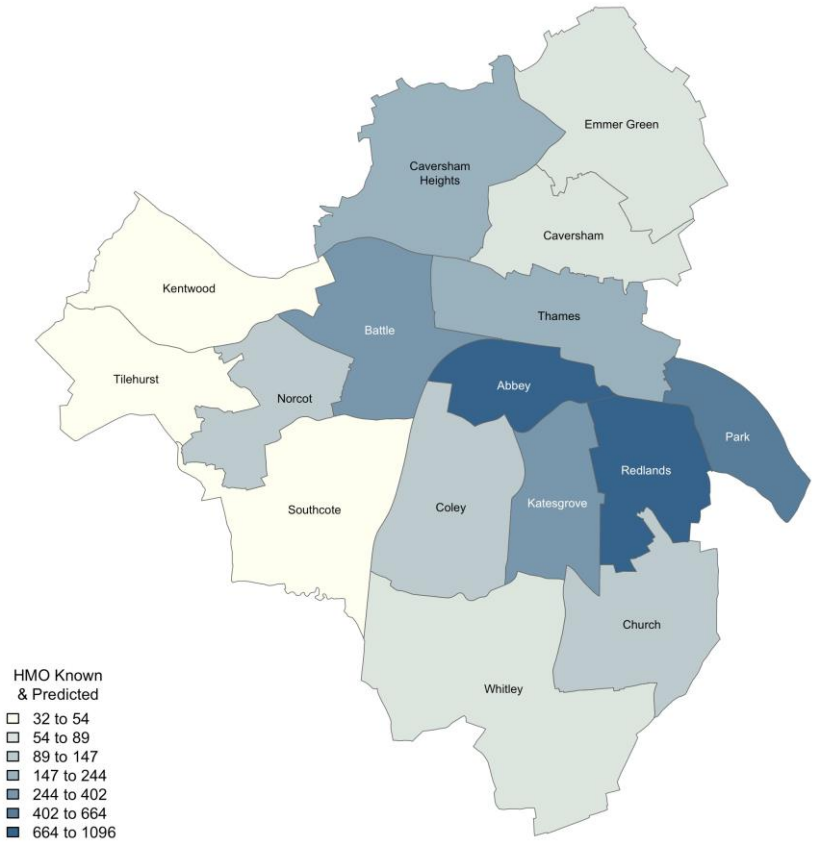


Figure 29. Number of known HMOs by ward (Source Ti 2023)



Map 8: Distribution of known and predicted HMOs by ward (Source Ti 2023, Map by Metastreet)

Map 9: Location of known and predicted HMOs (Source Ti 2023, Map by Metastreet)

Shared HMOs tend to be the cheapest form of private housing per unit and have traditionally been occupied by single adults, however in recent years many more couples and children reside in HMOs. Pressure on affordable housing and higher rates of homelessness has driven demand for this type of dwelling. [27]

[27] Regulating the Privately Rented Housing Sector, Evidence into Practice, Jill Stewart, Russell Moffatt (2022)

2.3.2 HMO & housing conditions

HMOs tend to have some of the poorest housing conditions of any tenure [28]. Analysis shows that 1,230 of 3,272 HMOs in Reading are predicted to have at least one serious hazard (Category 1 and 2, HHSRS).

The number of predicted serious hazards is highest in HMOs in Redlands (312) & Park (207) wards (Figure 30 & Map 10). All wards have HMOs with Category 1 & 2 hazards.

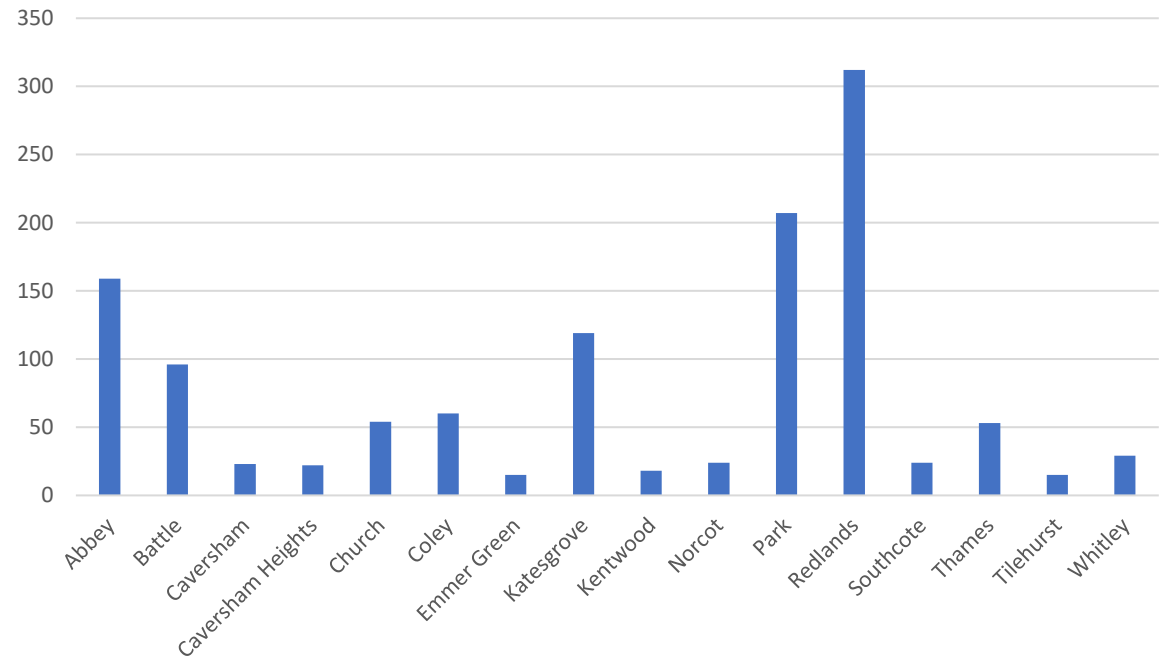


Figure 30. Number of HMOs with Category 1& 2 hazards by ward (Source Ti 2023).

The rates of Category 1 & 2, HHSRS hazards per 100 HMO properties reveals a wide distribution across Reading (Figure 30). Whitley (58% per 100) & Southcote (51.7% per 100) have the highest rates of predicted HMO properties with Category 1 & 2, HHSRS hazards. The national average for Category 1 hazards in the PRS is 14%[29]. Hazards in HMOs are distributed across all wards (Map 10).

[28] Regulating the Privately Rented Housing Sector, Evidence into Practice, Jill Stewart, Russell Moffatt (2022)
[29] EHS Headline 2021-2022, https://www.gov.uk/government/statistics/english-housing-survey-2021-to-2022-headline-report/english-housing-survey-2021-to-2022-headline-report#section-2-housing-stock

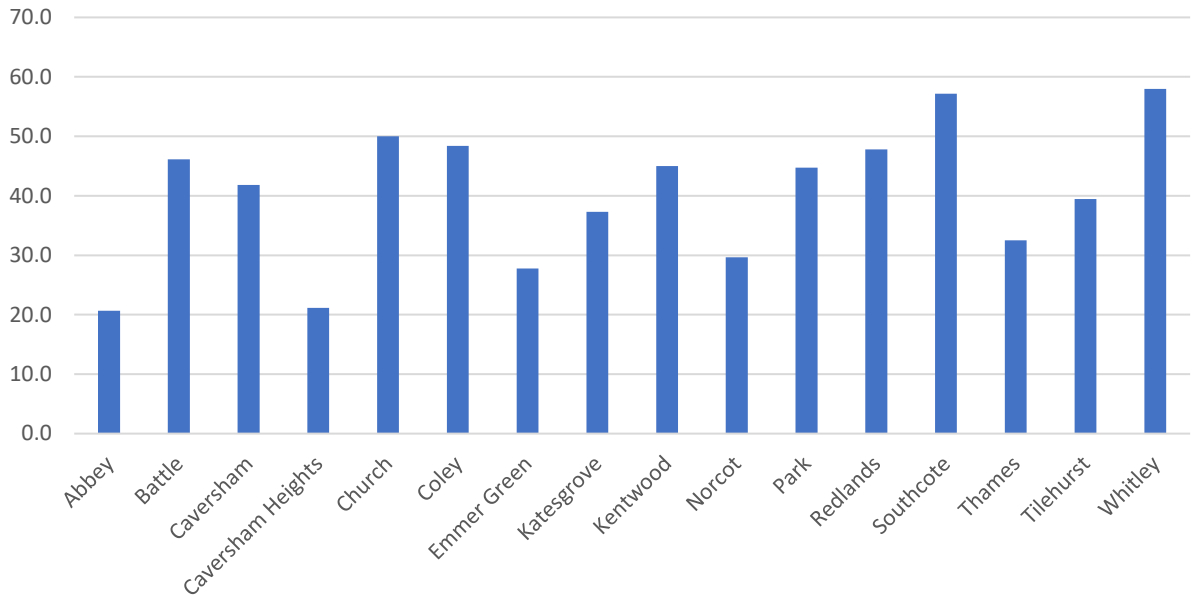
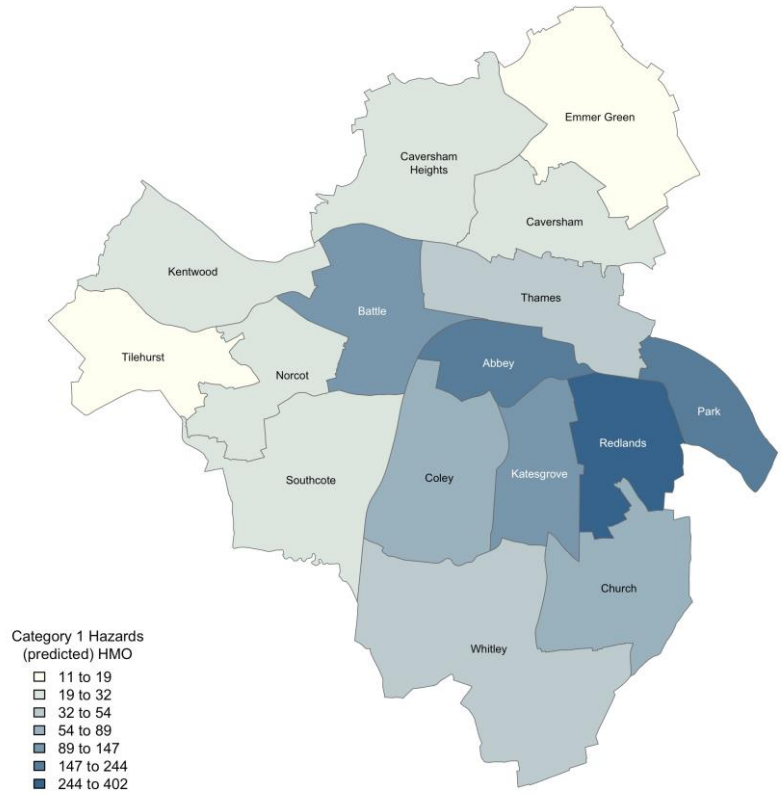


Figure 31. HMOs with Category 1& 2 hazards rate per 100 by ward (Source Ti 2023).



Map 10: Distribution of HMOs with Category 1 & 2 hazards by ward (Source Ti 2023, Map by Metastreet).

Complaints and service requests made by HMO tenants and others to the council about poor property conditions and inadequate property management are a direct indicator of low-quality HMOs. Reading recorded 1,421 complaints and service requests from tenants and others linked to HMO properties over a 5-year period (Figure 28).

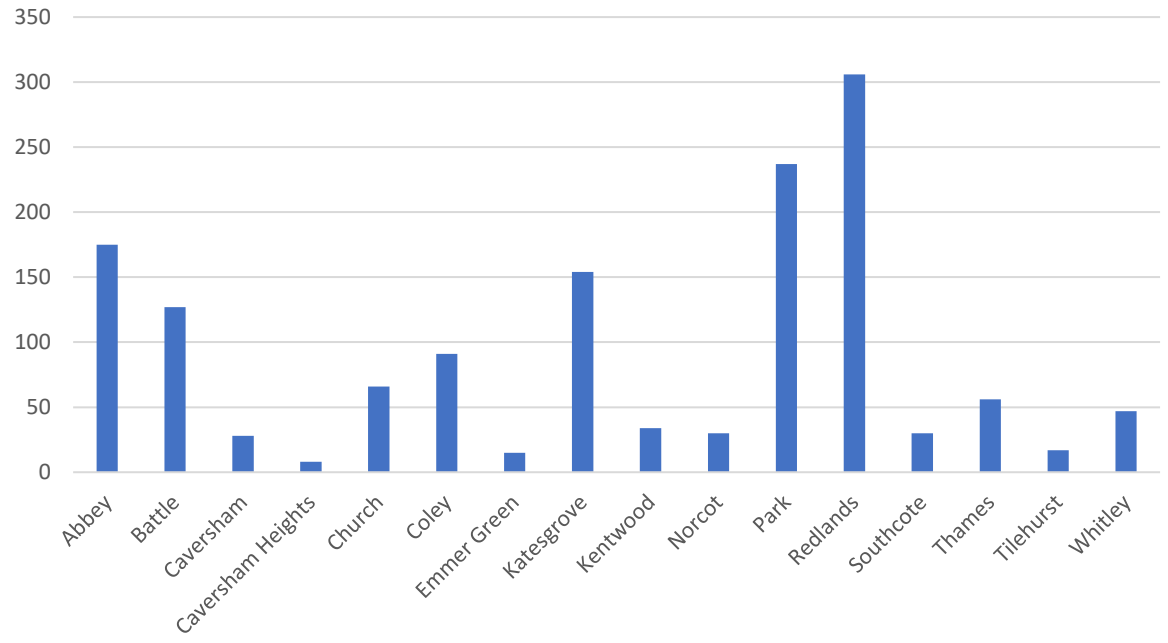
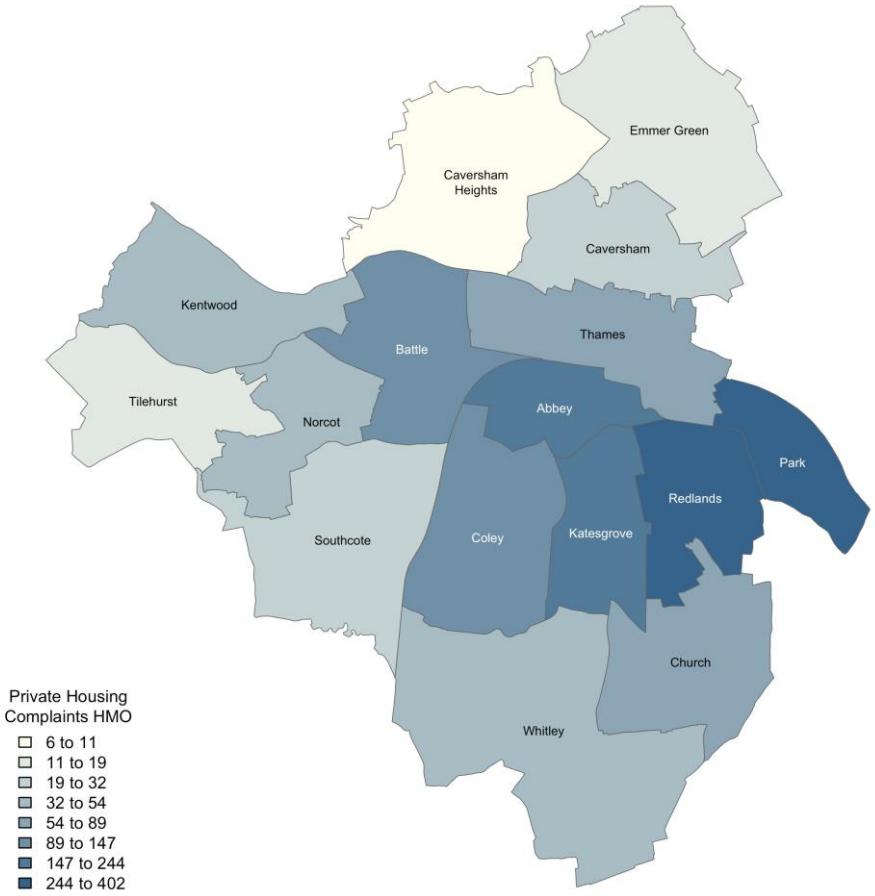


Figure 32. Number of HMOs service requests and complaints by ward (Source Ti 2023).

Redlands (306) and Park (237) received most service requests and complaints by HMO tenants and others to the Council (Figure 28). Complaints and service requests were received from all wards (Map 10).



Map 11: Distribution of HMOs service requests and complaints by ward (Source Ti 2023, Map by Metastreet).

Reading has a proactive and reactive HMO inspection programme. During those inspections (375), officers identified 701 Category 1 and 2 hazards (HHSRS). HMOs in Redlands were found to have the highest number of hazards (225) followed by Park (152) (Figure 29).

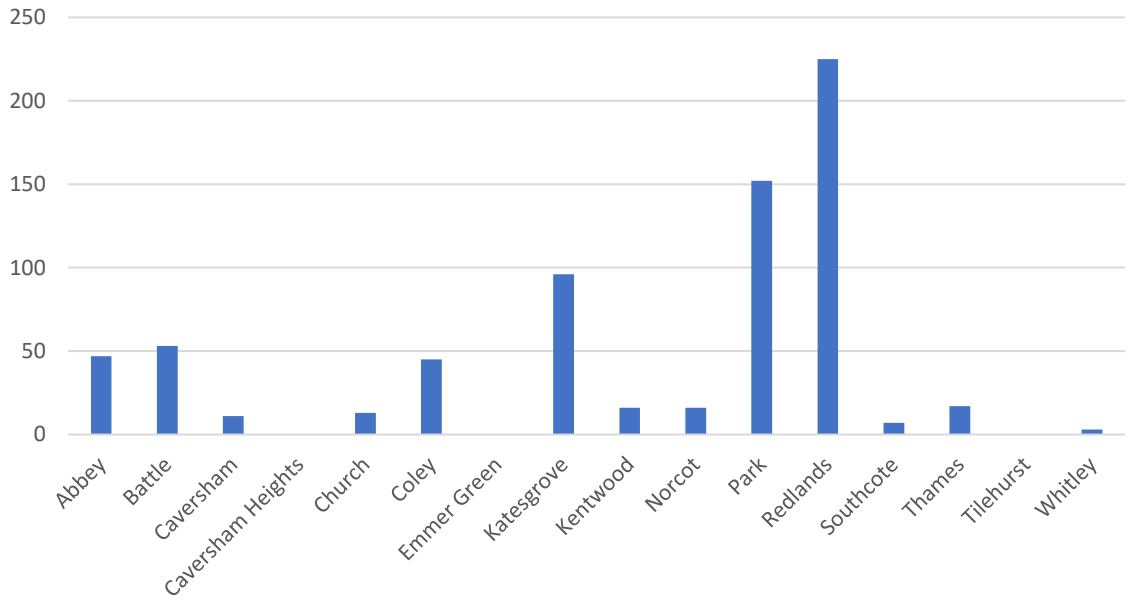
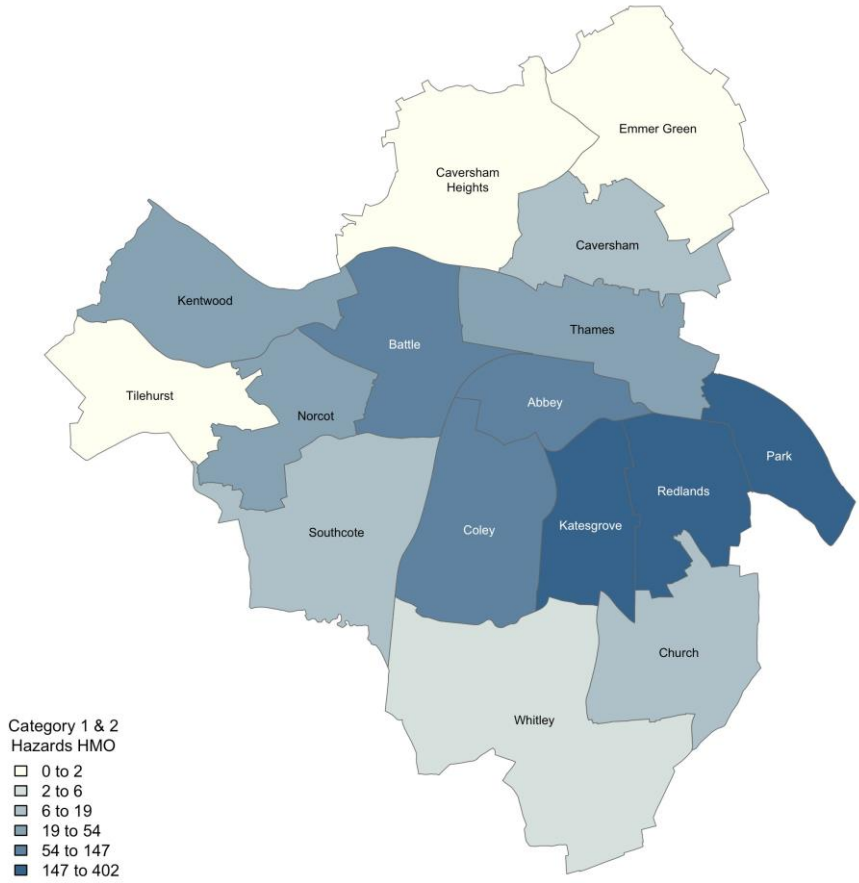


Figure 33. Inspected HMOs with Category 1 & 2 hazards (Source: Ti 2023).



Map 12. Distribution of inspected HMOs with Category 1 & 2 hazards (Source: Ti 2023, Map by Metastreet).

2.3.3 HMO enforcement and regulation interventions

Reading uses a range of statutory housing and public health notices to address poor housing standards in the HMO. Over a 5-year period (2018-23) Reading served 150 housing and public health notices (Figure 34 & Map 13).

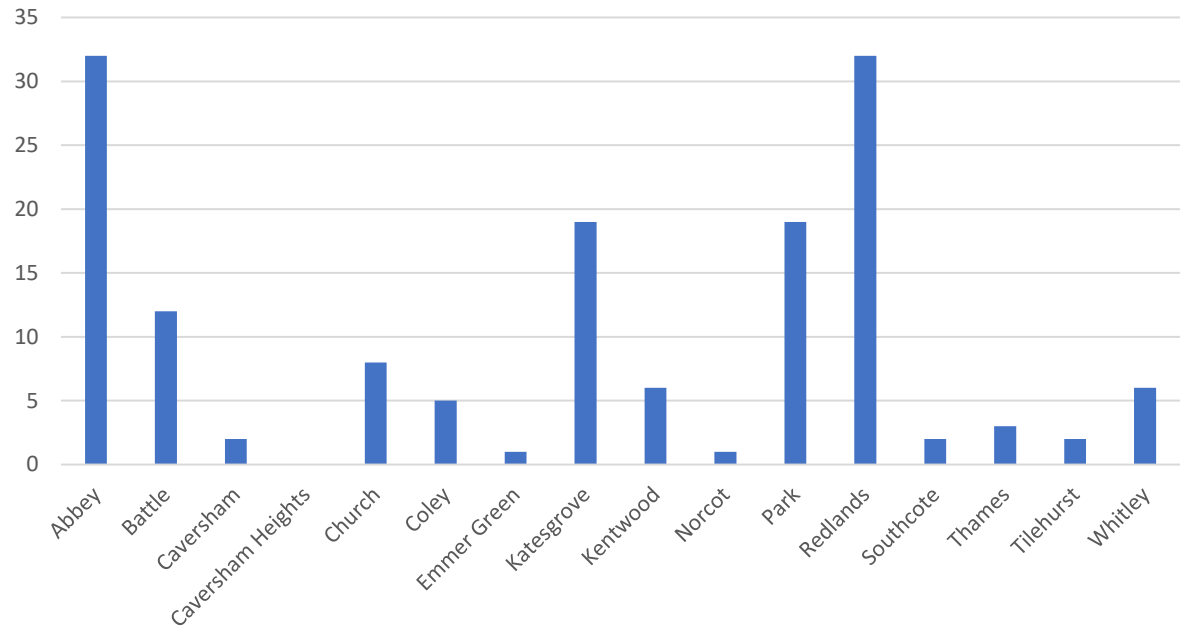
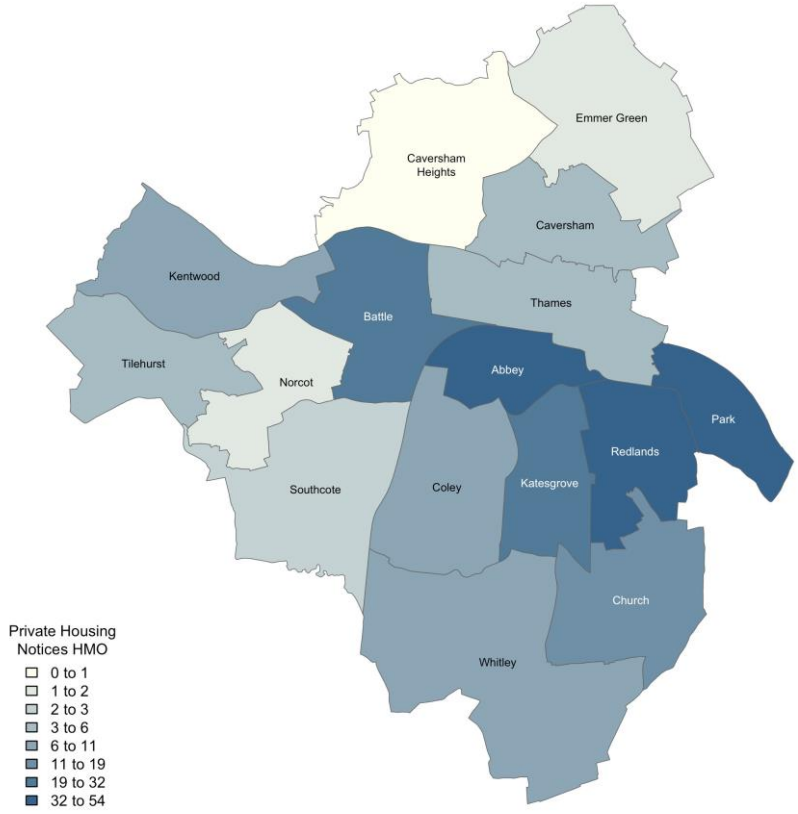


Figure 34. Statutory housing notices served on HMO properties (Source: Ti 2023).

HMOs in Abbey (32) and Redlands (32) received the most housing notices. Notices were served on HMOs in all wards except for Caversham Heights.



Map 13. Distribution of statutory housing notices served on PRS properties (Source: Ti 2023, Map by Metastreet).

2.3.4 HMO & anti-social behaviour (ASB)

Different types of ASB incidents recorded by the council over a 5-year period (April 2018 – March 2023) have been linked to known and predicted HMO properties and analysed. 697 ASB incidents have been linked to all HMOs in Reading (Figure 31).

Please note, this study focuses exclusively on ASB associated with residential premises. Incidents, such as those recorded on a street corner or adjacent to a park, which cannot be linked to a residential property, are excluded from the study. For the purposes of this study, ASB includes noise and other nuisances identified or reported to the council.

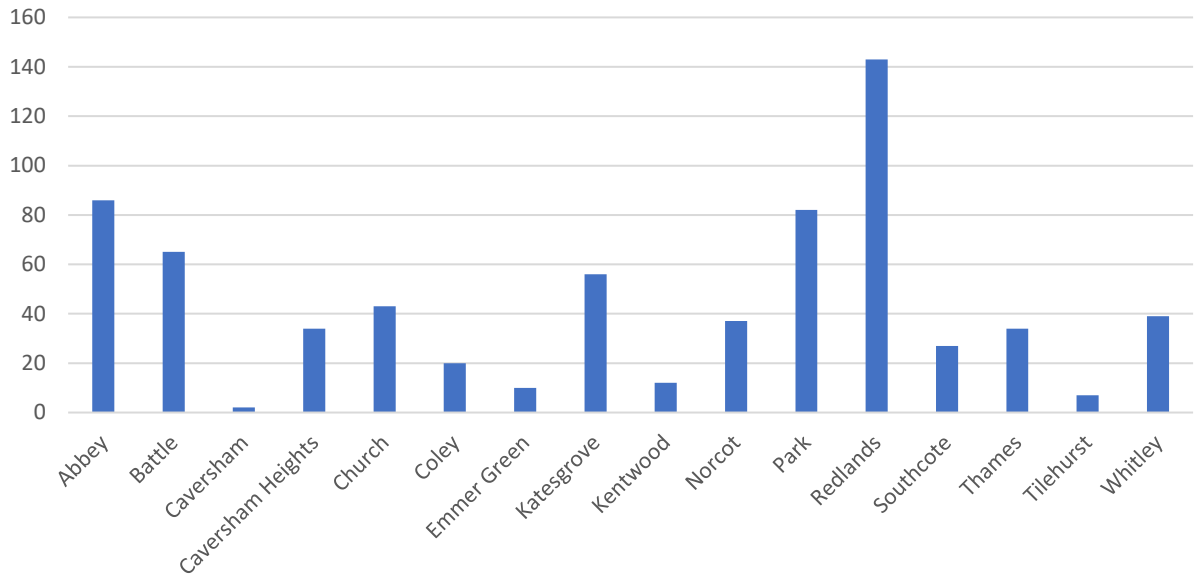
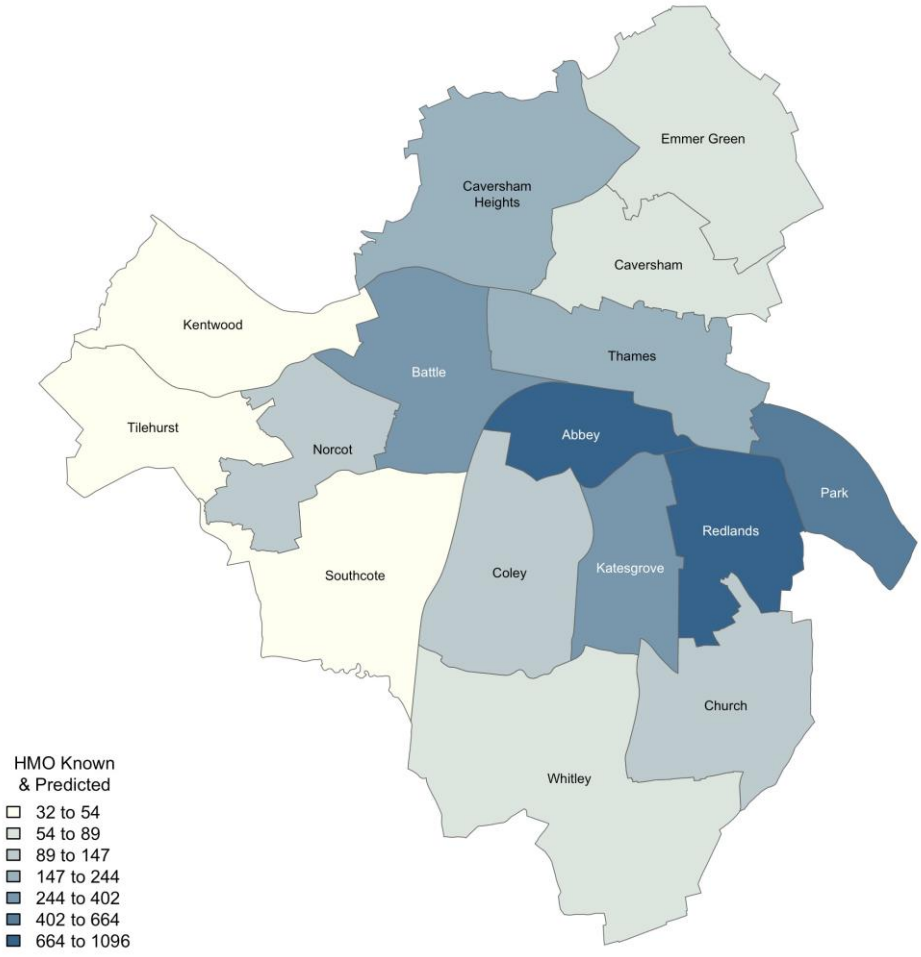
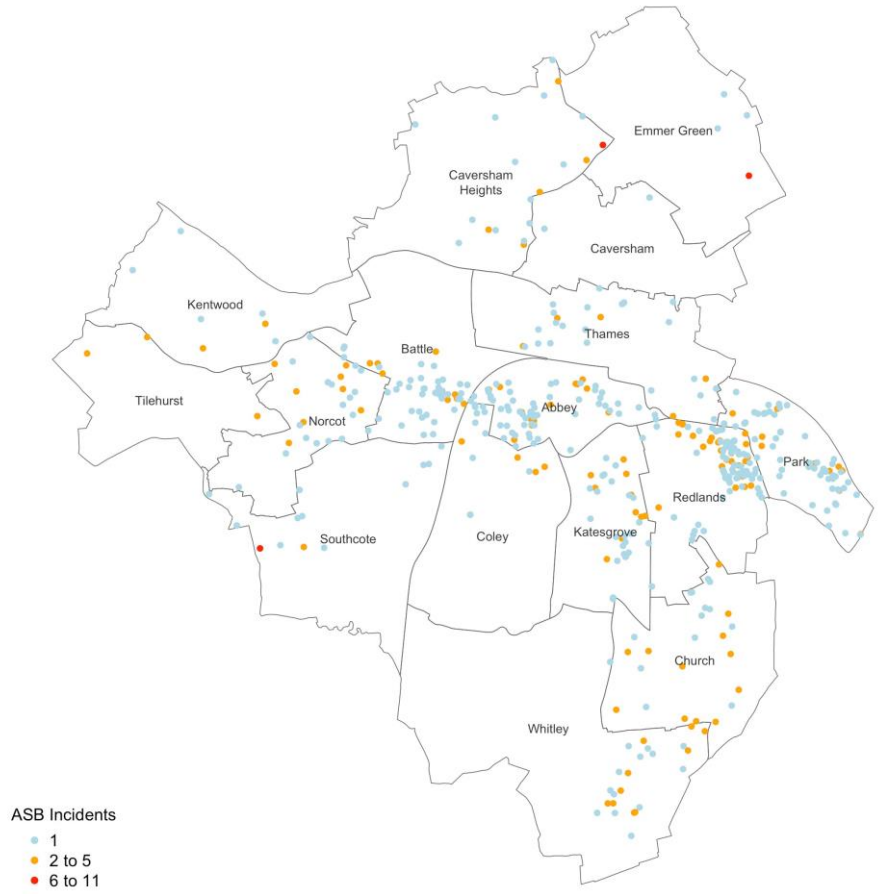


Figure 35. Number of ASB incidents linked to HMOs by ward (Source Ti 2023).



Map 14: Distribution of ASB linked to HMOs (Source Ti 2023, Map by Metastreet)

Elevated levels of ASB can be an indicator of poor property management. HMO properties often have higher levels of transience which can result in higher waste production and ASB. [30] ASB linked to HMOs is distributed across all wards. Redlands (143) and Abbey (86) have the highest recorded ASB incidents linked to known HMOs (Figure 35 and Map 14 & 15).



Map 15: Location of ASB linked to HMOs (Source Ti 2023, Map by Metastreet)

ASB rates per 100 HMOs reveals a wide range across all wards. Whitley (78 per 100 HMOs) and Southcote (64.3 per 100 HMOs) have the highest ASB rates (Figure 36).

[30] Regulating the Privately Rented Housing Sector, Evidence into Practice, Jill Stewart, Russell Moffatt (2022)

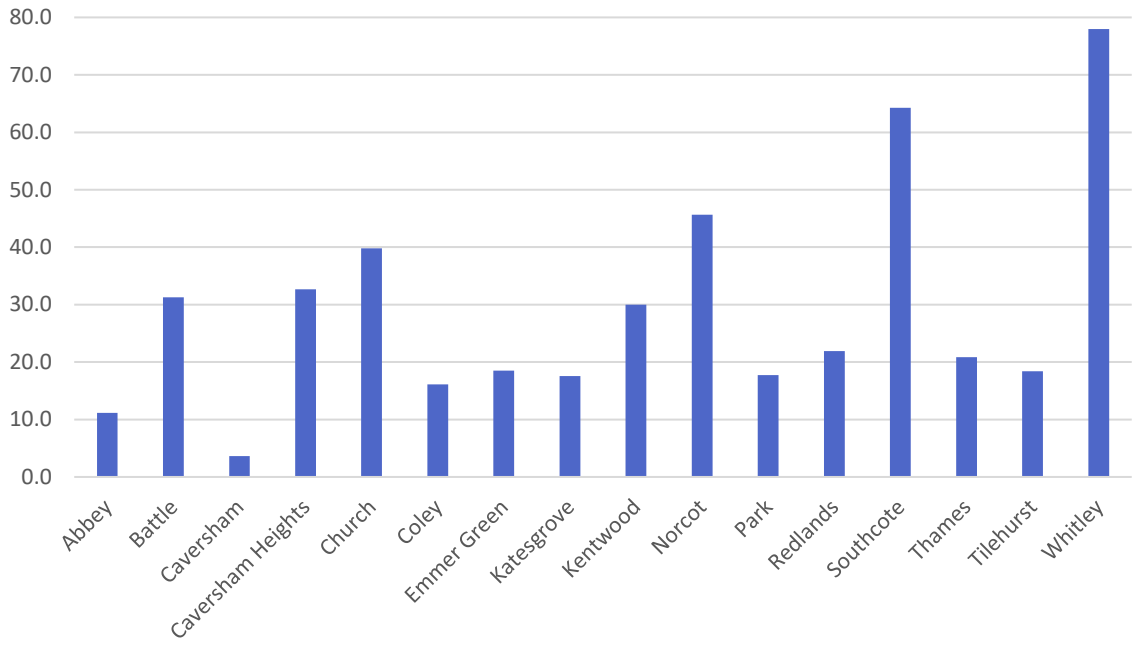


Figure 36. ASB incidents rate per 100 HMOs by ward (Source Ti 2023).

Properties subject to repeat ASB incidents (2 or more incidents) demonstrates poor property management. Redlands (30) has the highest number of repeat ASB incidents (Figure 37).

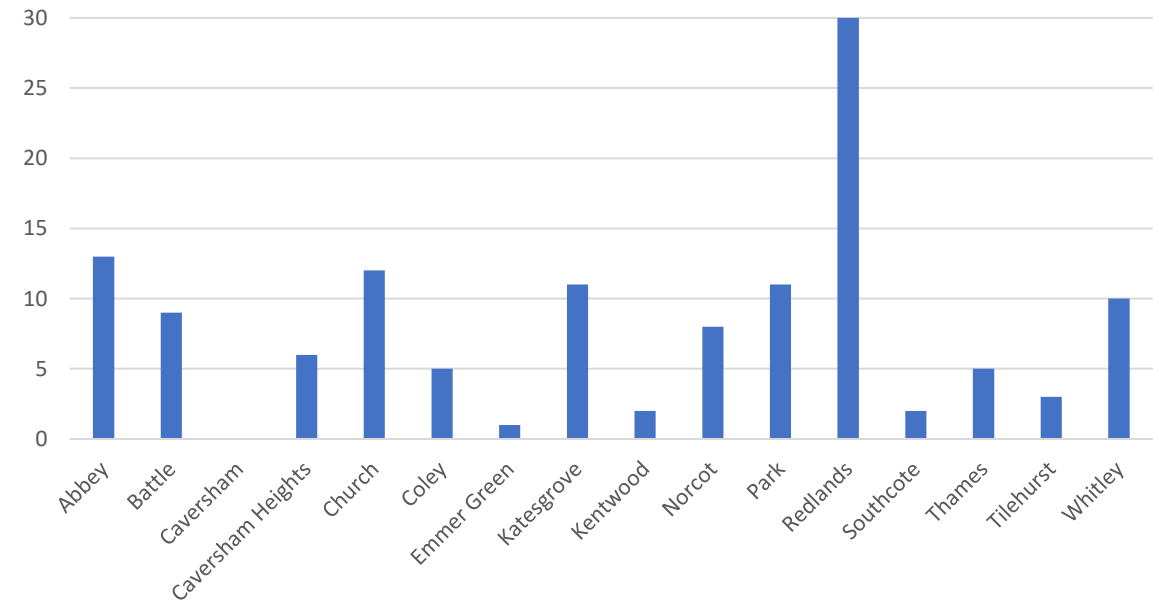


Figure 37. Two or more ASB incidents linked to HMO by ward (Source Ti 2023).

3 Conclusions

The private rented sector (PRS) in Reading has grown steadily since 2011. Based on tenure modelling (2023), Reading's PRS is now calculated to be 39.9% of all housing stock (Figure 10).

The PRS in Reading is distributed across all 16 wards (Figure 12). The number of PRS dwellings per ward ranges from5,014 (Abbey) to 627 (Caversham Heights). The percentage of PRS properties in each ward ranges between 69.4% (Abbey) and 16.1% (Caversham Heights) (Figure 13 & Map 3). Therefore, 15 out of 16 Reading wards have an equal or higher percentage PRS than the national average in 2022 (19%).

Reading has a mixture of high and low deprivation wards. 8 of 16 wards have aggregated IMD rankings below the national average (Figure 4).

Reading has a lower proportion in fuel poverty (10.3%) than the national average (13.4%) (Figure 5).). Reading has above average rents for England (£1,006) (Figure 9).

Reading have above average rented property possession rate nationally, with 11.5 claims per 10,000 households in 2023 (Figure 6). 1,084 households were owed a prevention or relief duty in the financial year 2022/2023 (Figure 7). 36.6% homelessness prevention or relief duty result from private rented tenancy ending (assured shorthold tenancies) for financial year 2022/2023. This Is slightly below the national average (38.6%)

Reading has a high number of residential properties (40.1%) built pre-Second World War (Figure 14). The most common private rented property type in Reading are houses (51%), while bungalow is the least common property type (1%) (Figure 15).

There are 4,297 private rented properties in Reading that are likely to have at least 1 serious housing hazard (Category 1 and high scoring Category 2, HHSRS). PRS properties with serious hazards are distributed across all wards. Redlands (605) and Park (490) have the highest number of properties with at least one Category 1 & 2 hazard (Figure 16 & Map 4).

Reading recorded 3,117 complaints and service requests from private tenants and others linked to PRS properties over a 5-year period (not including ASB) (Figure 18). Redlands (484) and Abbey (405) received most private tenant service requests and complaints by private tenants and others to the Council (Figure 18 & Map 5).

It has been calculated using the matched addresses that 18.1% of PRS properties in Reading have an E, F, and G rating. 3.5% of PRS properties have an F and G rating (Figure 19). Extrapolated to the

entire PRS, 1,084 PRS properties are likely to fail the MEES statutory requirement. Church (16.9) PRS stock has the largest difference between current and potential energy efficiency score (Figure 21).

Over a 5-year period (2018-23) Reading served 273 housing and public health notices. Abbey (63) and Redlands (45) received the highest number of statutory notices for housing and public health related issues (Figure 24 & Map 6). Between 2018 – 2023 Reading Borough Council instigated 34 financial penalty notices, prosecutions, or a simple caution to address poor housing conditions. Park (9) and Redlands (9) received the highest number of serious enforcement interventions (Figure 25).

Across the borough, owner occupiers have the lowest ASB incident rates (1.8 per 100 dwellings). Social housing (10.7 per 100 dwellings) and Private rented housing (6.4 per 100 dwellings) have higher rates. Known and predicted HMOs have by far the highest rates (21.3 per 100 dwellings) (Figure 26). The council has recorded a total of 1,980 incidents related to anti-social behaviour (ASB) and nuisance in the PRS over the past five years. Battle (247) has the highest levels of PRS ASB incidents Emmer Green (33) has the lowest (Figure 24 & Map 7). Redlands (40) has the highest number of repeat ASB incidents (Figure 25).

Reading's HMO population has been estimated to comprise a total of 3,272 properties (Figure 29). Abbey (770) has the highest number of HMOs and Kentwood (40) has the lowest. The known and predicted HMO population is distributed across all wards with concentrations in central and eastern wards (Map 8 & Map 9).

Analysis shows that 1,230 of 3,272 HMOs in Reading are predicted to have at least one serious hazard (Category 1 and 2, HHSRS).

The number of predicted serious hazards is highest in HMOs in Redlands (312) & Park (207) wards (Figure 30 & Map 10). All wards have HMOs with Category 1 & 2 hazards. Reading recorded 1,421 complaints and service requests from tenants and others linked to HMO properties over a 5-year period (Figure 32).

Redlands (306) and Park (237) received most service requests and complaints by HMO tenants and others to the Council (Figure 32). Complaints and service requests were received from all wards (Map 11). During inspections, officers identified 701 Category 1 and 2 hazards (HHSRS). HMOs in Redlands were found to have the highest number of hazards (225) followed by Park (152) (Figure 33). Over a 5-year period (2018-23)

Reading served 150 housing and public health notices (Figure 34 & Map 13). HMOs in Abbey (32) and Redlands (32) received the most housing notices. Notices were served on HMOs in all wards except for Caversham Heights.

697 ASB incidents have been linked to all HMOs in Reading (Figure 35). ASB linked to HMOs is distributed across all wards. Redlands (143) and Abbey (86) have the highest recorded ASB incidents linked to known HMOs. Redlands (30) has the highest number of repeat ASB incidents (Figure 35 and Map 15 & 16).

Appendix 1 – Ward summaries

Wards	PRS dwellings	% PRS	Category 1 hazards (predicted)
Abbey	5,014	69.4	374
Battle	2,694	53.3	420
Caversham	1,332	28.9	193
Caversham Heights	627	16.1	107
Church	1,280	27.2	245
Coley	1,910	40.0	258
Emmer Green	828	19.9	167
Katesgrove	3,213	54.6	395
Kentwood	968	26.2	173
Norcot	1,614	32.5	297
Park	2,439	58.1	480
Redlands	3,016	54.5	644
Southcote	1,392	28.2	269
Thames	2,279	48.2	305
Tilehurst	955	22.8	168
Whitley	1,421	27.8	367

Table 3. Ward PRS summary overview (Source Ti 2023)

Wards	HMO (known & predicted)	Category 1 hazards (Predicted)	ASB & nuisance incidents
Abbey	770	159	86
Battle	208	96	65
Caversham	55	23	2
Caversham Heights	104	22	34
Church	108	54	43
Coley	124	60	20
Emmer Green	54	15	10
Katesgrove	319	119	56
Kentwood	40	18	12
Norcot	81	24	37
Park	463	207	82
Redlands	653	312	143
Southcote	42	24	27
Thames	163	53	34
Tilehurst	38	15	7
Whitley	50	29	39

Table 4. HMO summary overview (Source Ti 2023).

Appendix 2 - Tenure Intelligence (Ti) – stock modelling methodology

This Appendix explains at a summary level Metastreet's Tenure Intelligence (Ti) methodology (Figure 38).

Ti uses big data and machine learning in combination with expert housing knowledge to accurately predict a defined outcome at the property level.

Council and external data have been assembled as set out in Metastreet's data specification to create a property data warehouse comprising millions of cells of data.

Machine learning is used to make predictions of defined outcomes for each residential property where the outcome is not already known, using known outcome data provided by the council.

Results are analysed by skilled practitioners to produce a summary of housing stock, predictions of levels of property hazards and other property stressors. The results of the analysis can be found in the report findings chapter.

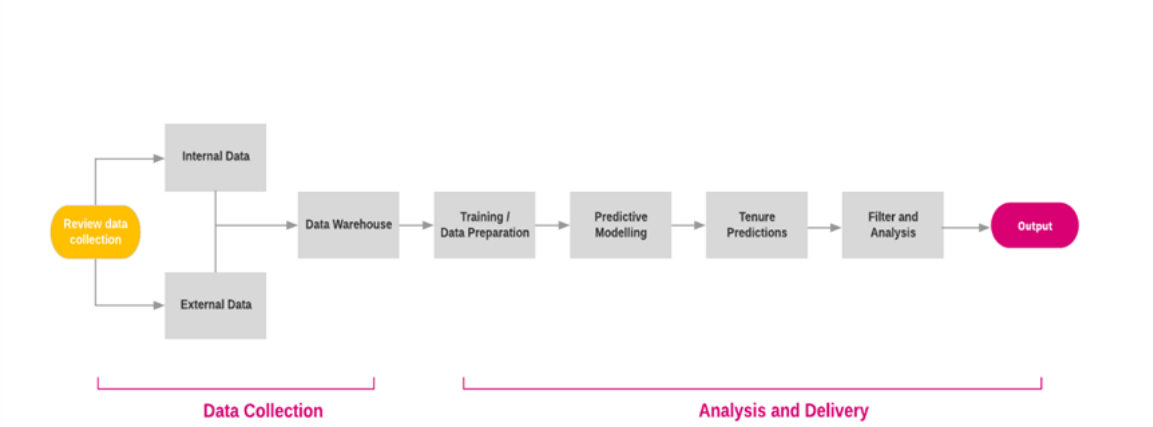


Figure 38. Summary of Metastreet Tenure Intelligence methodology.

Methodology

Metastreet has worked with Reading Borough Council to create a residential property data warehouse based on a detailed specification. This has included linking millions of cells of data to 77,643 unique property references, including council and externally sourced data. All longitudinal data requested from council departments is 5 consecutive years, from April 2018 – March 2023

Once the property data warehouse was created, the Ti model was used to predict tenure and stock condition using the methodology outlined below.

Machine learning was utilised to develop predictive models using training data provided by the council. Predictive models were tested against all residential properties to calculate risk scores for each outcome. Scores were integrated back into the property data warehouse for analysis.

Many combinations of risk factors were systematically analysed for their predictive power using logistic regression. Risk factors that duplicated other risk factors but were weaker in their predictive effect were eliminated. Risk factors with low data volume or higher error are also eliminated. Risk factors that were not statistically significant are excluded through the same processes of elimination. The top 5 risk factors for each model are utilised to produce the strongest predictive combination of factors.

Four predictive models have been developed as part of this project. Each model is unique to Reading, they include:

- Owner occupiers
- Private rented sector (PRS)
- PRS housing hazards (HHSRS, Category 1 and high scoring Category 2 A-D).
- HMO

Using a D^2 constant calculation it is possible to measure the theoretical quality of the model fit to the training data sample. This calculation has been completed for each model. The D^2 is a measure of "predictive capacity", with higher values indicating a better model.

Based on the modelling each residential property is allocated a probability score between 0-1. A probability score of 0 indicates a strong likelihood that the property tenure type is *not* present, whilst a score of 1 indicates a strong likelihood the tenure type *is* present.

Predictive scores are used in combination to sort, organise and allocate each property to one of 3 categories described above. Practitioner skill and experience with the data and subject matter is used to achieve the most accurate tenure split possible.

It is important to note that this approach cannot be 100% accurate because mathematical models can include error for a range of reasons. The D^2 value is one measure of model "effectiveness". The

true test of predictions is field trials by the private housing service. However, error is kept to a minimum through detailed post analysis filtering and checking to keep errors to a minimum.

A continuous process of field testing and model development is the most effective way to develop accurate tenure predictions.

The following tables include detail of each selected risk factors for each model. Results of the null hypothesis test are also presented as shown by the Pr(>Chi) results. Values of <0.05 are generally considered to be statistically significant. All the models show values much smaller, indicating much stronger significance.

Owner occupier model

The owner occupier model shows each of the 5 model terms to be statistically significant, with the overall model showing a "predictive capacity" of around 91% (Table 5).

Table 5. Owner occupier predictive factors.

Risk factors selected	**Pr (>Chi)***
Accounts.over.5.years	2.2e-16
Account.balances.for.all.liabilities	3.503e-08
Bens.Flag	2.2e-16
Council.Tax.band	2.2e-16
Ten.Sum	2.2e-16
Training data, n= 502	
D^2 test = 0.91**	

* Pr(>Chi) = Probability value/null hypothesis test, ** D^2 test = Measure of model fit

PRS predictive model

The PRS model shows that each of the 5 model terms is statistically significant, with the overall model having a "predictive capacity" of around 90% (Table 6).

Table 6. PRS predictive factors.

Risk factors selected	Pr(>Chi)
Accounts.over.5.years.	0.003949
Length.of.current.liability.account	2.2e-16
Historical.HB	2.2e-16
TDS	2.2e-16
Total.service.requests	0.0004034
Training data, n= 502	
D^2 test = 0.90	

HMO (House in Multiple Occupation) model

This model predicts the likelihood that a UPRN will be a HMO (***Table 7***). Each of the 5 model terms is statistically significant and the overall model has a "predictive capacity" of around 69%.

Table 7. HMO predictive factors.

Risk factors selected	Pr(>Chi)
TOTAL_FLOOR_AREA	2.2e-16
Student.exemption	2.2e-16
ASB.count	0.03926
Total.service.requests	2.2e-16
Private.Housing.complaint.count	2.2e-16
Training data, n= 579	
D^2 test = 0.69	

Category 1 (HHSRS) hazards model

Numerous properties where the local housing authority has recently taken action to address serious hazards were sampled for training data. Specifically, this included Housing Act 2004 Notices served on properties to address Category 1 hazards. It's important to note that due to the complex risk-based approach to HHSRS scoring model and assessment, predictions are likely to include both properties with Category 1 hazards and properties with high scoring Category 2 hazards. It is reasonable to conclude that properties identified are likely to include hazards that would be scored A-D, using HHSRS scoring matrix and therefore be considered serious. The model results show that each of the model terms is statistically significant, with the overall model having a "predictive capacity" of around 76% (Table 8).

Table 8. Category 1 (HHSRS) hazard predictive factors.

Risk factors selected	**Pr (>Chi)**
CURRENT_ENERGY_EFFICIENCY	2.2e-16
Accounts.over.5.years.	1.624e-10
ASB.count	0.0005042
Private.Housing.complaint.count	2.2e-16
Account.balances.for.all.liabilities	1.187e-05
Training data, n= 861	
D^2 test = 0.76	

Ti 2023 – Census 2021 data comparison

Reading	Ti April 2015 – March 2022		Census 2021		Diff (Ti vs Census 2021)	
Tenure	No. dwellings	%	No. households	%	No. (dwellings - households)	Percentage difference (% Ti - % Census)
Social Housing	10,507	13.5%	10925	16.1%	-418	-2.6%
Owner occupiers	36,143	46.6%	35017	51.7%	1,126	-5.2%
PRS	30,982	39.9%	21740	32.1%	9,242	7.8%
ToT	77,632		67682		9,950	12.8%

Table 9. Ti dwelling data compared to Census household data.

Version, Final

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