West Yorkshire
Fire & Rescue Service

Integrated Risk Management Model

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Making West Yorkshire Safer
www.westyorksfire.gov.uk

Revision and Signoff Sheet

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Contents

1 Introduction

Understanding risk in our communities is crucial to achieving our ambition of Making West Yorkshire Safer. This model explains the risk assessment process that we use to achieve this.

Whilst attending emergencies across West Yorkshire is a statutory duty, our role is much broader than this. We aim to do everything we can to prevent an emergency response in the first place. We do this through prevention and protection activity. The residual risk that remains is managed through our response and resilience strategies.

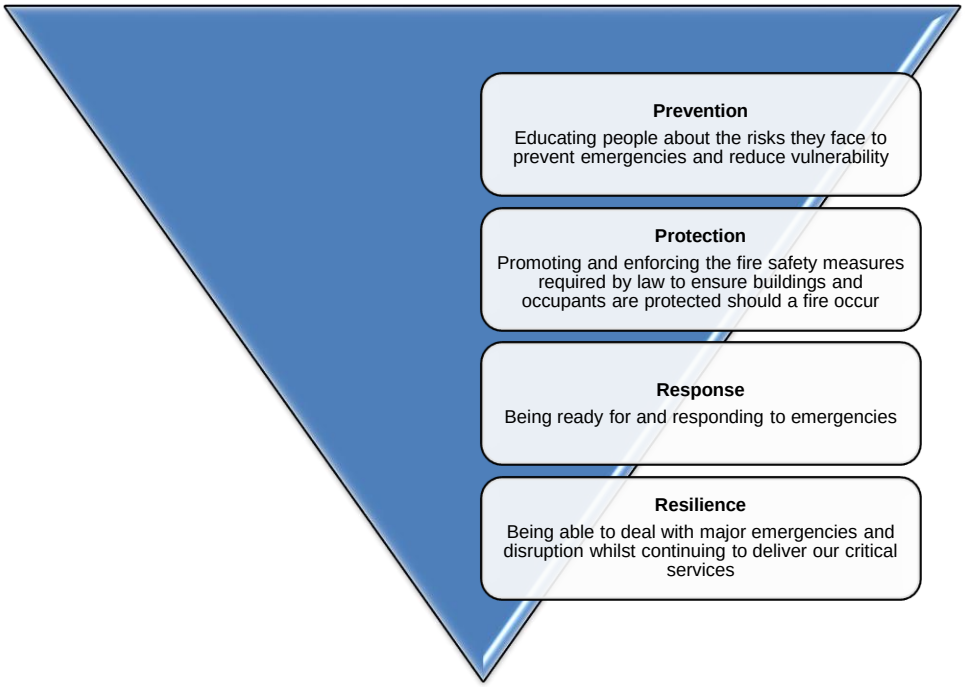


Figure 1. Hierarchy of risk management

Our Integrated Risk Management Plan (IRMP) is at the forefront of our decision-making and provides the coordination between our prevention, protection, response and resilience strategies. The risk faced by our communities is complex and although the numbers of fires have fallen over the last ten years, the demand on our prevention and protection services continues to grow. We aim to employ resources efficiently and effectively to reduce risk across West Yorkshire and build new capabilities where it is both necessary and reasonably practicable to do so.

This document details the methodology for the assessment of risk faced by the communities we serve.

Risk is constantly changing and varies across the county; therefore we need to be proportionate and flexible in how we align our resources to this risk.

2 Legal Responsibilities

The Fire & Rescue National Framework for England (2018) sets out the priorities for a Fire and Rescue Service. These are:

- Make appropriate provision for fire prevention and protection activities and response to fire and rescue related incidents
- Identify and assess the full range of foreseeable fire and rescue related risks their areas face
- Collaborate with emergency services and other local and national partners to increase the efficiency and effectiveness of the service they provide
- Be accountable to communities for the service they provide
- develop and maintain a workforce that is professional, resilient, skilled, flexible and diverse

3 Foreseeable Risk

To manage foreseeable risk we will develop and maintain a WYFRS foreseeable risk register. This register will be used to assess the full range of potential scenarios facing our communities and will be based on the following types of emergencies:

- Fire
- Transport
- Technical Rescue
- Hazardous Materials
- Environmental
- Terrorism

Our assessment utilises the outcomes from the National Risk Assessment (NRA), National Risk Register (NRR) and the Community Risk Register (CRR). See appendix 1. It will take into account the experience of incidents nationally, regionally and locally and will consider:

- Life loss
- Injury
- Property damage
- Heritage loss
- Business Interruption
- Environmental damage
- Social impact
- Economic impact
- Effect on community cohesion and sustainability

We will carry out an annual review our existing prevention, protection, response and resilience arrangements against this register and assess our effectiveness and readiness for these scenarios. The outcomes of this assessment will be considered within our IRMP. To mitigate these risks we may need to, where reasonably practicable, develop our existing provisions, enter into effective collaboration with partners or build new capability.

Experience tells us that certain incidents such as house fires and road traffic collisions are more likely to occur than more significant incidents such as a train crash or large industrial chemical release. Although the latter may have a more significant impact on the community, they are much less likely. Therefore, we direct our prevention, protection and response resources to provide the greatest possible return on investment by reducing the overall impact of the risks we face.

We use a number of operational planning assumptions to provide assurance that we are be able to respond safely and effectively to large scale, significant emergencies, whilst maintaining fire cover to respond to the more frequent, critical emergencies. We use these planning assumptions to understand at what point we would require assistance from our neighbouring FRS and the use of specialist national assets.

Operational Planning Assumptions:

- A 20 pump building fire
- Two simultaneous 8 pump incidents
- A CBRNe incident
- A large moorland fire
- A protracted incident requiring three pumps over a seven-day period

4 Assessment of Fire Risk

Although it is impossible to predict exactly when or where a fire may occur, we are able to profile the areas and people that are more at risk and vulnerable to fire. In simple terms, when we look at the outcomes of our risk analysis we see that some areas and people are much more at risk and vulnerable to fire than others.

Up until 2007 we attended over 40,000 incidents per year. From 2008 to 2012 numbers steadily reduced to around 22,000 per year. The incident rate has remained stable since 2012, and this has provided the opportunity to analyse our fire data and profile the underlying risk of fire.

Analysis of incident data and studies into what makes an individual vulnerable to fire shows that there is a very strong correlation between fire and deprivation, the more deprived an area, the larger the number of fire related incidents. Additionally, there is a strong correlation between severity of fire and deprivation. We class a severe fire as one requiring hospitalisation or resulting in a fatality. This strong correlation demonstrates that deprivation is very closely linked to both the likelihood and severity of fire and therefore risk. In summary, the higher the level of deprivation, the higher the likelihood of a severe fire.

This strong correlation between fire and deprivation is used to profile fire risk within West Yorkshire.

5 Assessment of Deprivation

The latest edition of the English Index of Multiple Deprivation (IMD) was published by the Department of Communities and Local Government on 30 September 2015 and is an update of the 2010 version.

IMD 2015 is based on Lower Super Output Areas (LSOAs). There are 32,844 LSOAs in England and they are designed to be of a similar population size with each one containing around 1,500 residents. There are 1267 LSOAs in West Yorkshire.

IMD 2015 uses 37 indicators, organised across seven distinct domains of deprivation (income, employment, education skills and training, health deprivation and disability, crime, barriers to housing and services, and living environment) which are weighted and combined to calculate the Index of Multiple Deprivation 2015.

IMD 2015 ranks all 32,844 LSOAs in England with one being the most deprived and 32,844 is the least deprived. Once ranked these are generally grouped into bands with the lowest 10% used to define the most deprived LSOAs in England.

6 Profiling Fire Risk

To determine the overall risk from fire to the communities of West Yorkshire we use the correlation between all our fire related incidents and deprivation.

The chart below shows the strong correlation between deprivation and the number of all fire related incidents across West Yorkshire. In general terms, it shows the least deprived areas have lower numbers of fire related incidents than the more deprived.

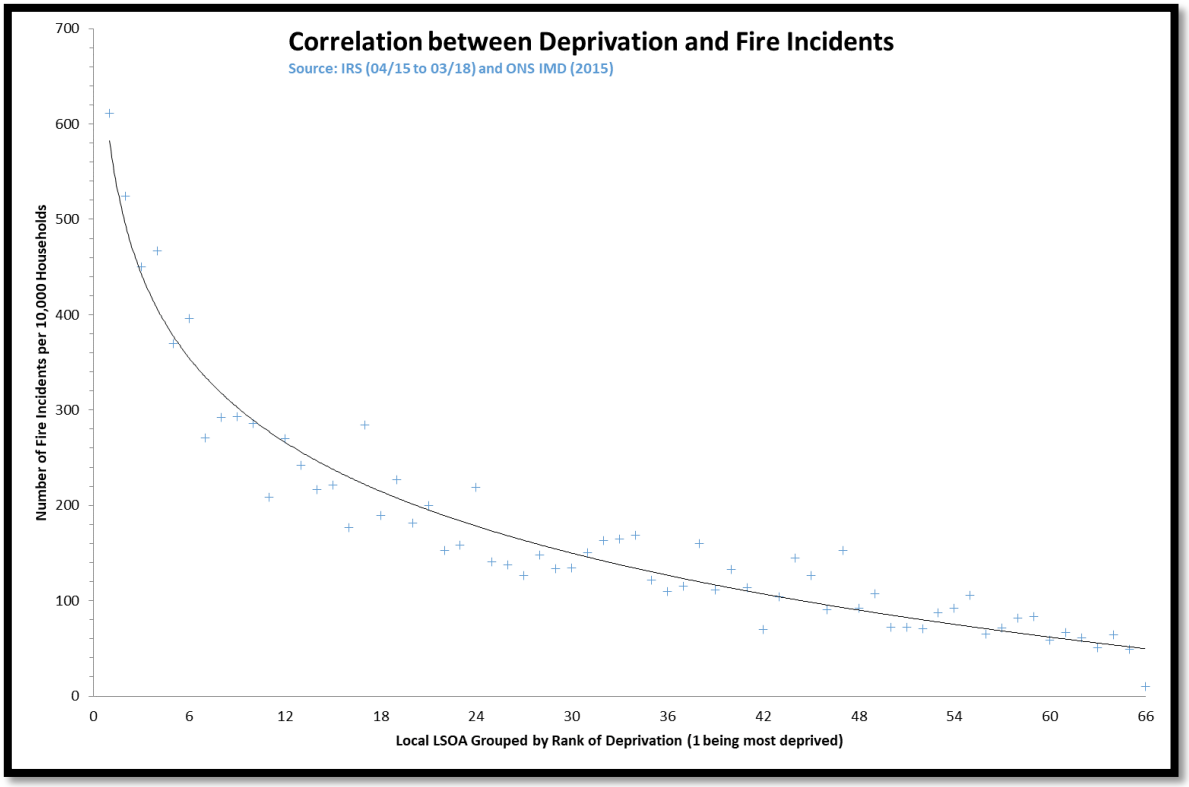


Figure 2. Relationship between deprivation and number of fires.

The chart below shows the strong correlation between deprivation and the number of fire related Injuries and deaths across West Yorkshire. In general terms, it shows that those in more deprived areas are more likely to have a fire leading to a serious injury or fatality.

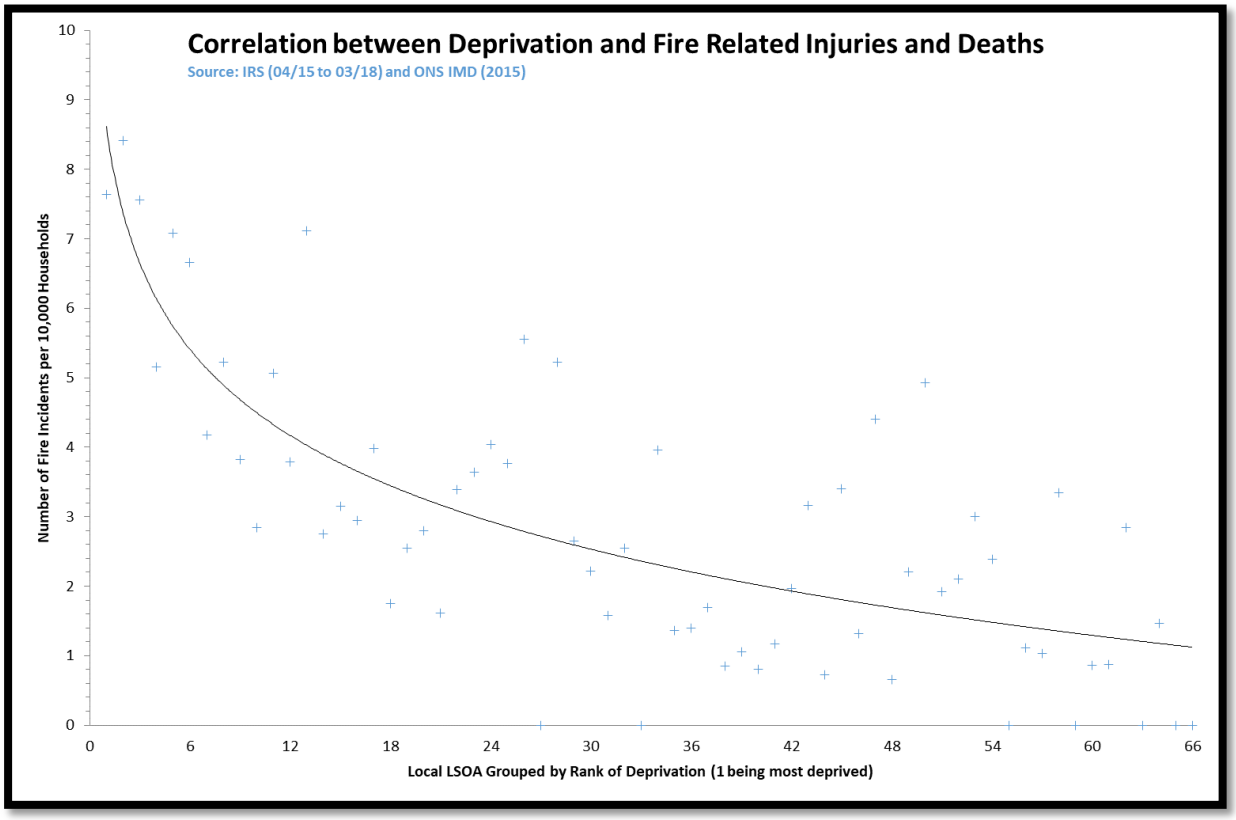


Figure 3. Relationship between deprivation and the serious injuries resulting from fire.

We use this profile of fire risk to prioritise our prevention activity and resource deployment. To support this prioritisation we categorise geographical areas based on their risk of fire into five bands ranging from very low to very high.

By dividing the likelihood into quintiles, we can divide areas within West Yorkshire into five, relative risk-bands. See overleaf.

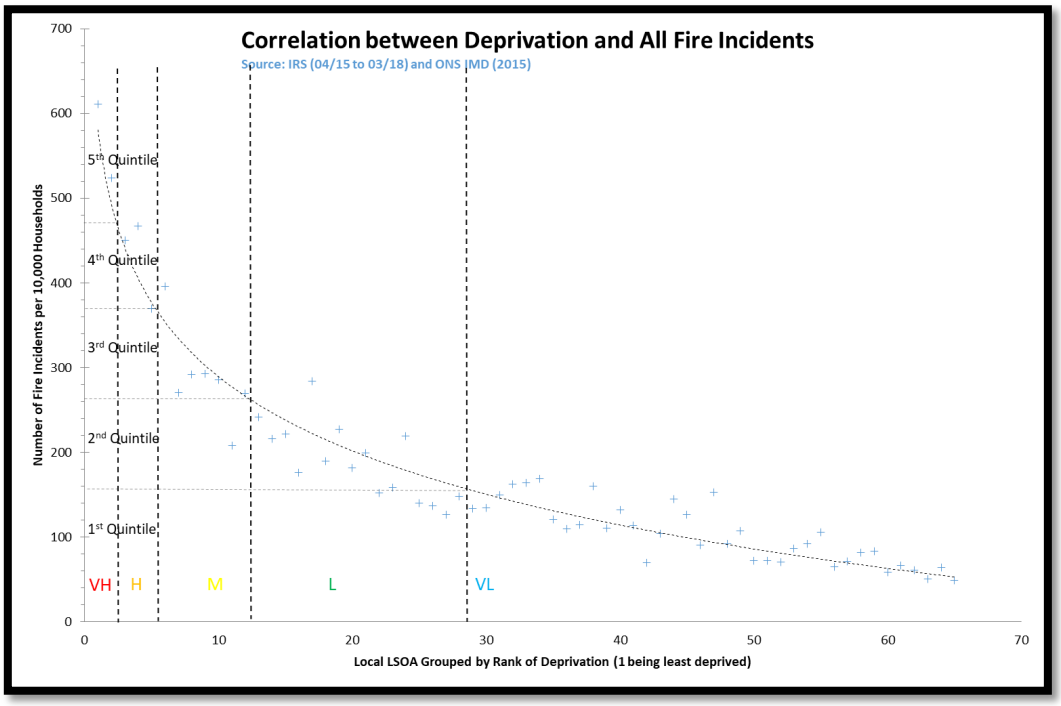


Figure 4 Grouping LSOA into fire risk bands

By transferring this information onto a map, we can identify these areas with a colour code ranging from the blue areas of lowest risk through to the red areas of greatest risk.

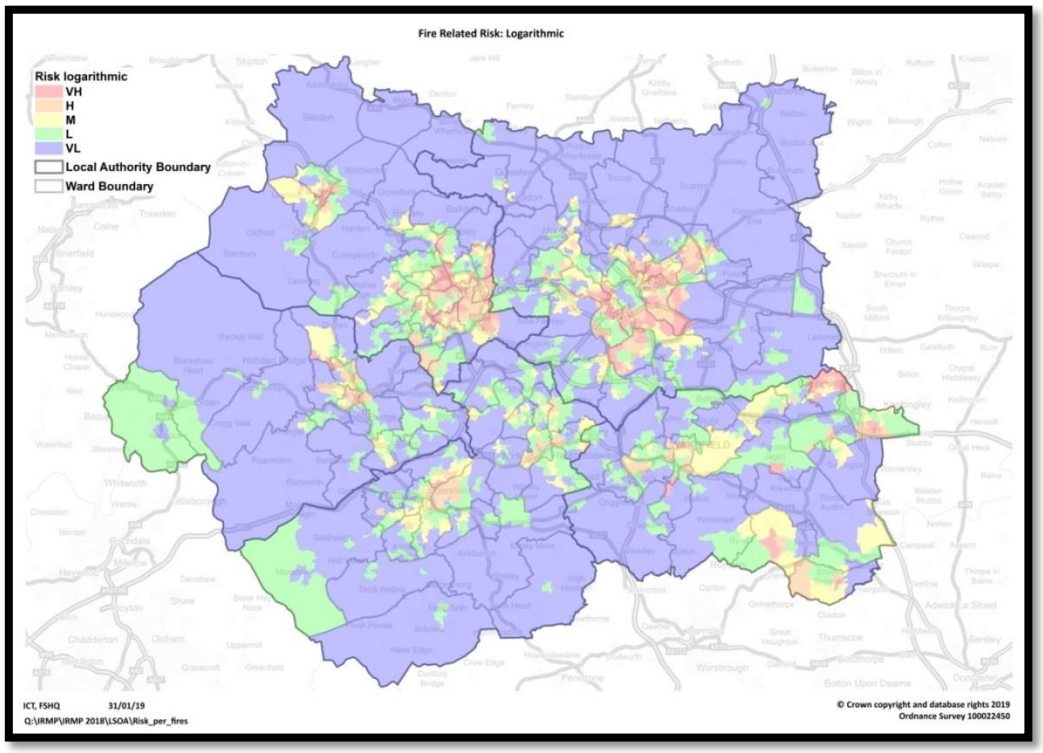


Figure 5 Lower Super Output Area by risk band

7 Assessment Profiling of Other Risk

As previously explained we attend a wide range of incidents other than fire, which must also be managed through the IRMP process.

These incidents are termed Special Service Calls (SSC). The majority of SSCs we attend are road traffic collisions (RTC). With high population density in our urban areas we can expect a significant number of road traffic incidents in a relatively small area.

The location of these incidents is more difficult to predict as analysis of our data shows that they do not necessarily correlate to areas of increased deprivation like fires do. We undertake specific risk modelling using historical incident data and specialist software to determine areas of higher risk for each SSC incident type. We will undertake partnership work with other agencies with the aim of reducing the number and severity of road traffic incidents in these areas.

Other SSCs types include extrications from collapsed buildings or machinery, flooding, water rescues, rescues from heights and lift rescues. Specific risk maps for any incident type can be produced to support targeted prevention work.

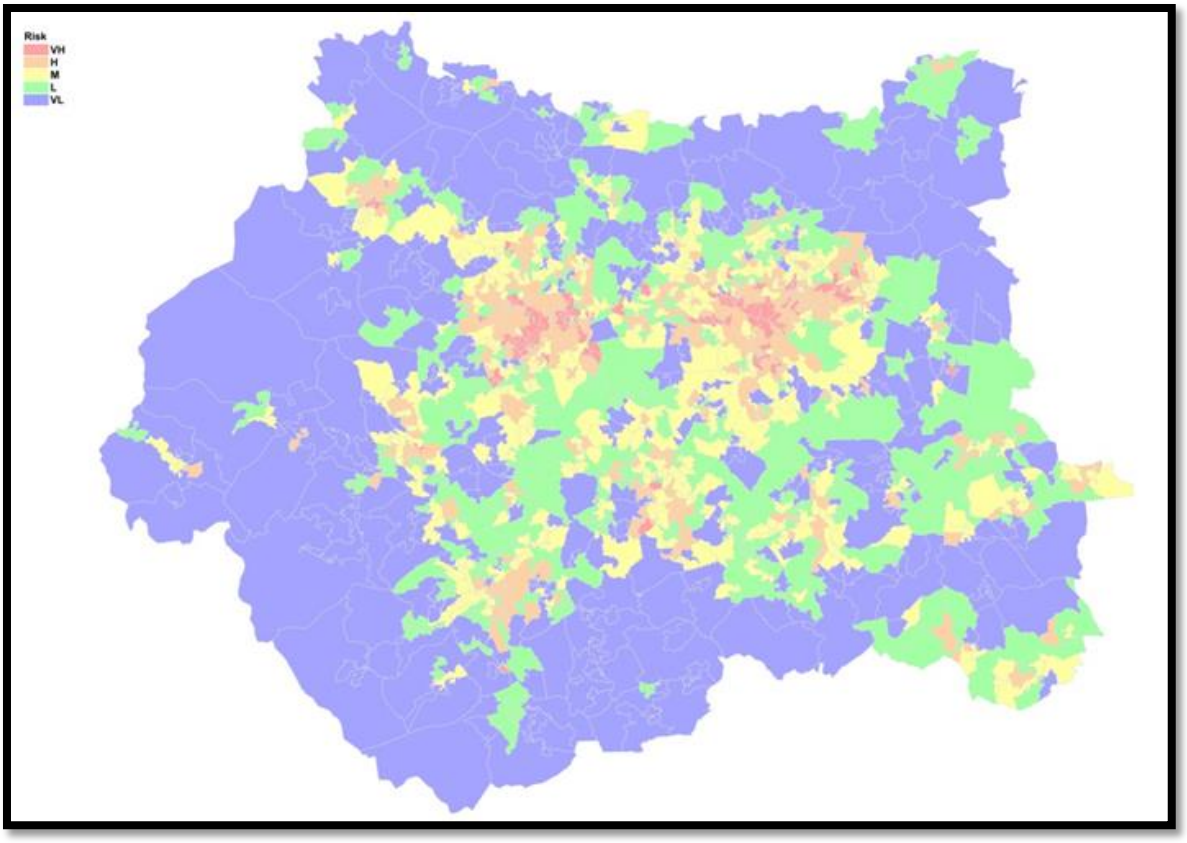


Figure 6 RTC Map 2017 / 18

Profiling Risk in the Future

The first iteration of risk profiling within West Yorkshire was at a fire station area level, this was refined to electoral ward level (approximately 5,500 people) and is now profiled at LSOA level (approximately 1,500 people). As and when relative risk reduces further within West Yorkshire, this methodology can be applied to the smaller geographical unit of Output Areas (around 600 people).

The use of deprivation to assess risk will support integrated risk management planning for a period of at least three years. To underpin the currency of this process, the IMDs from 2007 and 2015 have been compared to show that the indices of deprivation remain consistent over a long period of time. This provides assurance that LSOAs are highly unlikely to change risk banding without significant external intervention.

8 Prevention Strategy

The success of our community safety programme has seen a significant decrease in the number of fire related incidents and a dramatic increase in the number of homes with fitted smoke detectors. Moving forward, our ability to target the highest risk and most vulnerable is now key to preventing fires and reducing fire related injuries and deaths.

We use this risk assessment process to direct our preventative activity to the areas of greatest risk. Using the information from the IMD and fire risk, the proportion of fire risk in each of our five districts is:

District	Proportion Of Fire Risk (%)	Proportion Of Dwelling Fire Risk (%)
Leeds	33%	37%
Bradford	29%	26%
Kirklees	15%	16%
Wakefield	14%	13%
Calderdale	8%	9%

However, this assessment alone does not show individual vulnerability. We know from analysis of our fire related deaths and injuries that age and lifestyle factors are key to determining individuals most at risk. Lifestyle factors that increase the likelihood and severity of a fire are (but not limited to):

- Living alone
- Smoker in property
- Mental health concerns
- Working smoke detection
- Hearing impairment / visual impairment
- Medication that causes drowsiness
- Disability compromising escape
- Oxygen therapy
- Housekeeping / hoarding issue

To effectively target individuals vulnerable to fire, we have to first identify them.

Our primary method of identifying higher risk groups and individuals is through intelligence sharing arrangements with partner agencies such as health, social care and housing providers.

To support prevention initiatives specifically aimed at fire we can also use profiling software called Mosaic Public Sector. Mosaic breaks down the population into 66 classifications which can be seen in appendix 2. By linking all incidents involving fire to one of these classifications we are able to assess their likelihood of fire.

This allows us to plot the location of households likely to fall into the higher likelihood groups which can then be targeted for prevention activities. This information will underpin the development of district prevention plans.

Mosaic complements the IMD risk assessment in two ways:

1. It allows us to identify the highest risk households in areas already deemed high risk

2. It allows us to identify the high risk households in generally low or very low risk areas. The people living in these properties have previously been difficult to identify.

IMD allows us to represent the underlying risk from fire and set organisational strategies. Mosaic allows us to target the risk at a local level and produce plans to manage it.

The classifications with the highest likelihood of fire within West Yorkshire are:

Mosaic Type	Incidents per 100k Households per year
I38 Asian Heritage Large extended families in neighbourhoods with a strong South Asian tradition	527
M55 Families with Needs Families with many children living in areas of high deprivation and who need support	525
L49 Disconnected Youth Young people endeavouring to gain employment footholds while renting cheap flats and terraces	505
L50 Renting a Room Transient renters of low cost accommodation often within subdivided older properties	455
A02 Scattered Homesteads Older households appreciating rural calm in stand-alone houses within agricultural landscapes	454

The classifications with the lowest likelihood of fire within West Yorkshire are:

Mosaic Type	Incidents per 100k Households per year
J41 Central Pulse Youngsters renting city centre flats in vibrant locations close to jobs and night life	89
E19 Fledgling Free Pre-retirement couples with respectable incomes enjoying greater space and spare cash since children left home	87
F24 Bungalow Haven Seniors appreciating the calm of bungalow estates designed for the elderly	86
B05 Empty-Nest Adventure Mature couples in comfortable detached houses who have the means to enjoy their empty-nest status	82
D15 Modern Parents Busy couples in modern detached homes balancing the demands of school-age children and careers	73

The highest groups are six times more likely to have a fire than the lowest risk groups.

9 Protection Strategy

The National Framework requires us to have a fire protection management strategy and a risk-based inspection programme, which enables us to enforce the provisions of the Regulatory Reform (Fire Safety) Order 2005 (RRO).

Our Risk Based Inspection Programme (RBIP) details how we will meet the requirements of the current National Framework. The current document covers the period 1 April 2017 – 31 March 2020.

The Fire Safety Inspection Programme demonstrates that the Authority that is meeting its enforcement responsibilities in respect of the RRO.

The RRO makes risk assessment central to determining the necessary level of fire precautions in all non-domestic premises. The statutory responsibility for ensuring an adequate level of fire safety lies with the Responsible Person for individual premises – usually the employer, or occupier (person in control of the premises) or the owner.

We have a statutory duty to enforce the compliance requirements of the RRO in the majority of premises, although the Health & Safety Executive (HSE), the Crown Premises Inspection Group of the Chief Fire and Rescue Adviser's Unit and local authorities also have enforcement responsibilities in some specific types of premises.

The development of our inspection programme allows us to demonstrate that we are focusing our resources on those premises that represent the greatest risk to life in the event of fire through failure to comply with fire safety law.

Fire Protection Inspectors (FPI) are specifically trained and authorised to carry out audits as defined by IRMP Note 4 as a full in-depth inspection in relation to whether the responsible person of the premises is complying with the RRO.

To ensure effective service delivery to the communities of West Yorkshire we priorities our work to ensure that our inspectors visit premises where we receive intelligence to suggest that compliance with the RRO is significantly poor.

The fire protection inspection programme is underpinned by a determination of the level of risk presented by premises through non-compliance. Inspections will be determined by their priority when set against other similar premises which may present a greater or lesser risk due to poor compliance with the RRO. The focus of the RRO is life safety.

The inspection programme is delivered by specialist fire protection inspectors who target those premises that present the greatest risk within West Yorkshire. We will do this by utilising various mechanisms in a hierarchal order from top to bottom:

- Intelligence received that indicates poor compliance of fire safety law which is likely to put relevant persons at risk of death or serious injury in case of fire
- Referrals from Operational Crews
- Complaints
- The effectiveness of passive and active fire precautions
- Local and national incidents
- The frequency of fires nationally by type of premises
- The impact of fire safety management and the societal risk presented by the type of occupancy, e.g. less mobile occupants
- The relative risk score which is calculated by our Premises Risk Database (PRD)

We direct our resources to concentrate on those premises that present the highest risk to relevant persons through intelligence of poor compliance, we would expect these premises to fall within the relative risk bands of “well above average” and “above average” however as we have no control over which these premises are they may fall outside of these bands.

The relative risk score of premises can remain high even though the premises are fully compliant with the RRO. We maintain the concept of improving the ‘regulatory compliance level’ within premises subject to inspection. Although in some premises the relative risk score will remain high, by improving the regulatory compliance level there will be less chance that a fire starts and, should this occur, the risk to life and property will be significantly reduced.

10 Response Strategy

Fundamentally, our emergency response strategy organises the deployment of firefighters, appliances and equipment to provide the most effective response to emergencies across West Yorkshire. We refer to this as fire cover.

Speed and weight of attack

Having an appropriate speed (the time it takes us to get there) and weight (the number of resources we send) of response to fire incidents has a significant impact on fire development, risk to life, property loss, and firefighter safety.

We assign a standardised level of response known as the pre-determined attendance (PDA) for each different category of emergency call. The PDA ensures that the correct level of resource is mobilised to the incident and is, on the majority of occasions sufficient to deal with the incident without requesting additional resources. Our PDAs continue to reflect the unique nature of specific risks and information gathered by operational crews during operational risk visits at commercial properties.

Some of the county's highest risk buildings currently require several fire engines as the PDA. Examples of such premises include large chemical sites, hospitals and sites where water supplies are sparse. Other types of emergencies demand mobilising a specialist capability such as an aerial appliance or our technical rescue unit as part of the initial response.

We aim to ensure that the speed and weight of our emergency response is proportionate to the level of risk and each category of emergency. No two fires are the same. Every situation is different and these differences can have a significant effect on the severity of the fire. However, for the purpose of planning, some generalisations have to be made and these have been based on experience.

Experience tells us that the chances of survival for a person trapped in the room where the fire started is very low. In these circumstances it is very unlikely we will be able to respond in time to save life. Therefore, when determining how quickly we need to arrive, we consider the likely scenario that a person

may be trapped in a room above or adjacent to the room on fire. Evidence suggests that an average room should contain a fire for between 15 and 20 minutes with the door closed.

Risk Based Planning assumptions

Our guide response times reflect the risk bandings for each LSOA and emergency type. There are three main categories of emergencies included as part of the Risk Based Planning Assumptions (RBPAs). The following is a brief description of these:

1. **Life risk incidents** are those that have potential for deaths, injuries, or that may require rescues. Typical examples of life risk incidents are therefore dwelling fires and road traffic collisions.

2. **Property risk incidents** are those involving valuable assets, not falling within the Life Risk criteria. They typically include fires in non-derelict buildings and vehicles, including factories, offices, and shops. Although such emergencies may affect people, they present significantly less threat to human life. This is because people are unlikely to be asleep in such properties and the fire protection measures incorporated into places of work and public buildings.

3. **Other Risk incidents** are those, which do not match the descriptors for Life or Property risk. Typical examples of such incidents are refuse, grass fires or response to Automatic Fire Alarm Actuations (AFAs).

When setting our response standards we take into account the likelihood and severity of a fire, this is the risk. It is therefore reasonable to assume that if you live in a high risk area and have one or more of the lifestyle factors linked to fire related deaths, you are more likely to have a fire. If you do experience a fire, the consequences of the fire in terms of injury, death and property loss is likely to be greater.

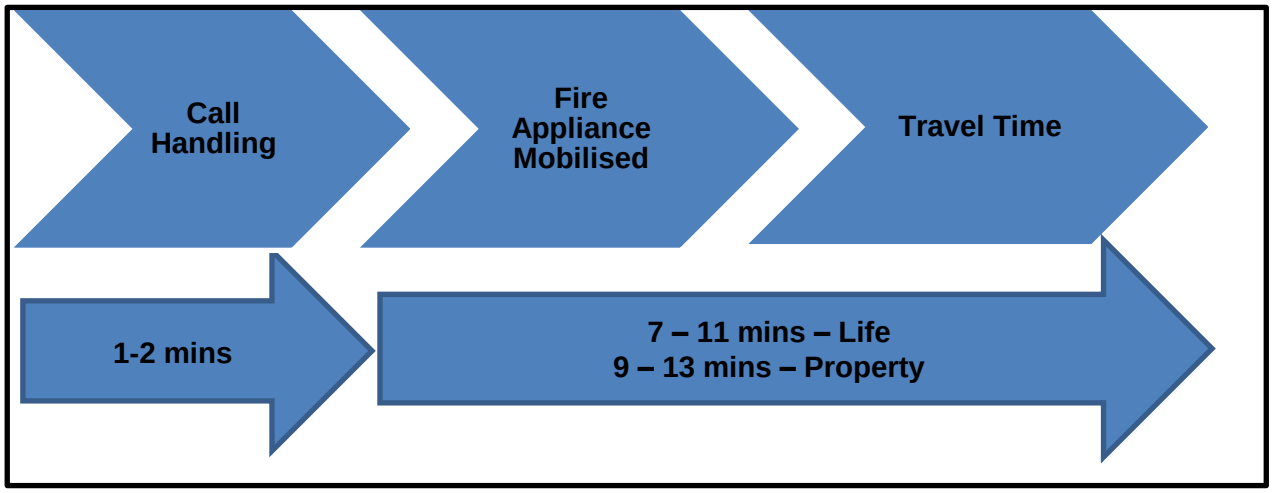
Understanding this relationship between location and demographics allows us to provide emergency response resources where they can provide the quickest response to incidents of a more serious nature and where they are more likely to occur. It is not an exact science, so professional judgement, or ‘critical thinking’ prevails throughout our decision making process.

The tables below summarise our RBPAs. They highlight the incremental increase in guide emergency response times in respect of the five risk bandings and categories of emergency. We work on the premise that the more at risk an area is from fire the quicker the emergency response that is required in order to mitigate the impact of fire. The response times in this table do not include call-handling time.

We have an equal response time to Other incident types of 15 minutes as speed of response is much less likely to have an impact on the severity of these incident types.

Risk Band	Emergency Type		
	Life Risk	Property Risk	Other
Very High Risk	7 minutes	9 minutes	15 Minutes
High Risk	8 minutes	10 minutes	15 Minutes
Medium Risk	9 minutes	11 minutes	15 Minutes
Low Risk	10 minutes	12 minutes	15 Minutes
Very Low Risk	11 minutes	13 minutes	15 Minutes

↑ Increasing likelihood and vulnerability to fire



As well as the location of our fire stations, WYFRS employs four primary staffing models to match operational resource to risk, as a guide:

Staffing Model	Response
224	Immediate response
Day Crewing Close Call	Immediate response
Day Crewing	Immediate response between 08:00 and 17:00 Maximum five minute delay to response between 17:00 and 08:00
On - Call	Maximum five minutes delay to response when appliance is available

These staffing models provide a response to the majority of our emergency incidents. WYFRS also has more specific staffing arrangements in place to respond to incidents that can be described as very low likelihood. These staffing models are used to provide capabilities such as National Resilience assets.

The fire cover provided across West Yorkshire is fluid. The WYFRS Fire Cover Policy describes how we aim to maintain the highest level of fire cover with the resources available. To achieve this, Fire Control will manage both appliance availability and overall fire cover by ensuring that resources are available in appropriate geographical locations so that attendance times are maintained.

11 Resilience Strategy

We deliver our day-to-day services by using normal procedures and activities. We do however acknowledge that risk can sometimes change in an unpredictable manner and that major incidents and events can occur at any time and without warning. Although major incidents happen infrequently, the backdrop of extreme climate change and a continual terrorism threat mean that we need to be ready to respond whenever the need arises.

The Civil Contingencies Act 2004 requires fire and rescue authorities to have effective business continuity arrangements in place. These plans need to identify, assess and address any gaps between existing capability and that required for local and national resilience. Business Continuity Management is therefore fundamental to how we operate as a service and enables us to meet our legal obligations.

Our plans reflect risks and threats identified through a horizon scanning and intelligence sharing process and focus upon arrangements that help us to continue delivering our core functions. We develop them in conjunction with other partners and stakeholders, for example, the Local Resilience Forum. They also address risks identified on the National Risk Register, Community Risk Register and those bespoke to WYFRS. The associated severity and likelihood for these risks and threats is determined by our Risk Management Strategy Group and transferred onto a corporate risk matrix. Our Business Continuity Plans address a wide range of emergency events.

We are fortunate to have several national and regional assets available for use in West Yorkshire. These assets provide an enhanced capability to respond to wide-scale floods, complicated search and rescue operations, chemical releases and large scale decontamination requirements. These assets were initially provided for national and regional resilience but we have now integrated them into normal emergency response arrangements.

Major incidents place a significant burden upon emergency response resources and can require more resources than a single fire and rescue service can provide. In common with other fire and rescue services, we provide and receive mutual aid to and from other fire authority areas. The Fire and Rescue Services Act 2004 also places a legal requirement on fire authorities to agree reinforcement arrangements with their neighbouring fire authorities. Our plans therefore support such arrangements and these help to improve our response resilience.

Locally we can support emergency response by standing up additional fire engines called ‘resilience pumps’. These fire engines will not be continually staffed and will only be activated under the following circumstances:

- To respond to unanticipated or unexpected high level of emergency calls
- To provide additional resources during a major emergency; for example wide area flooding, or at large protracted fires
- As part of a pre-planned response to organised, or anticipated events; for example, public demonstrations and inclement weather

There are a number of methods available to staff ‘resilience pumps’:

- personnel in non-operational roles who maintain competence to staff fire engines can be relocated during their normal working hours
- surplus retained duty personnel
- recall to duty (off duty operational staff voluntarily responding at short notice)

12 Performance Monitoring

Effective performance monitoring provides the basis for continuous improvement in the services we provide.

We monitor performance against the base risk map (figure 5). We look for LSOAs that are performing outside the normal expected levels of incident rate. Where we identify LSOAs that are below the normal expected levels we can similarly interrogate prevention and protection databases for successful examples of initiatives (targeting, partnerships etc.) to enable us to replicate these efforts in other areas.

The aim of this monitoring is to reduce the number of fires across West Yorkshire. Successful prevention and protection strategies will focus on higher risk areas and individuals and this should lead to a reduction in the risk profile.

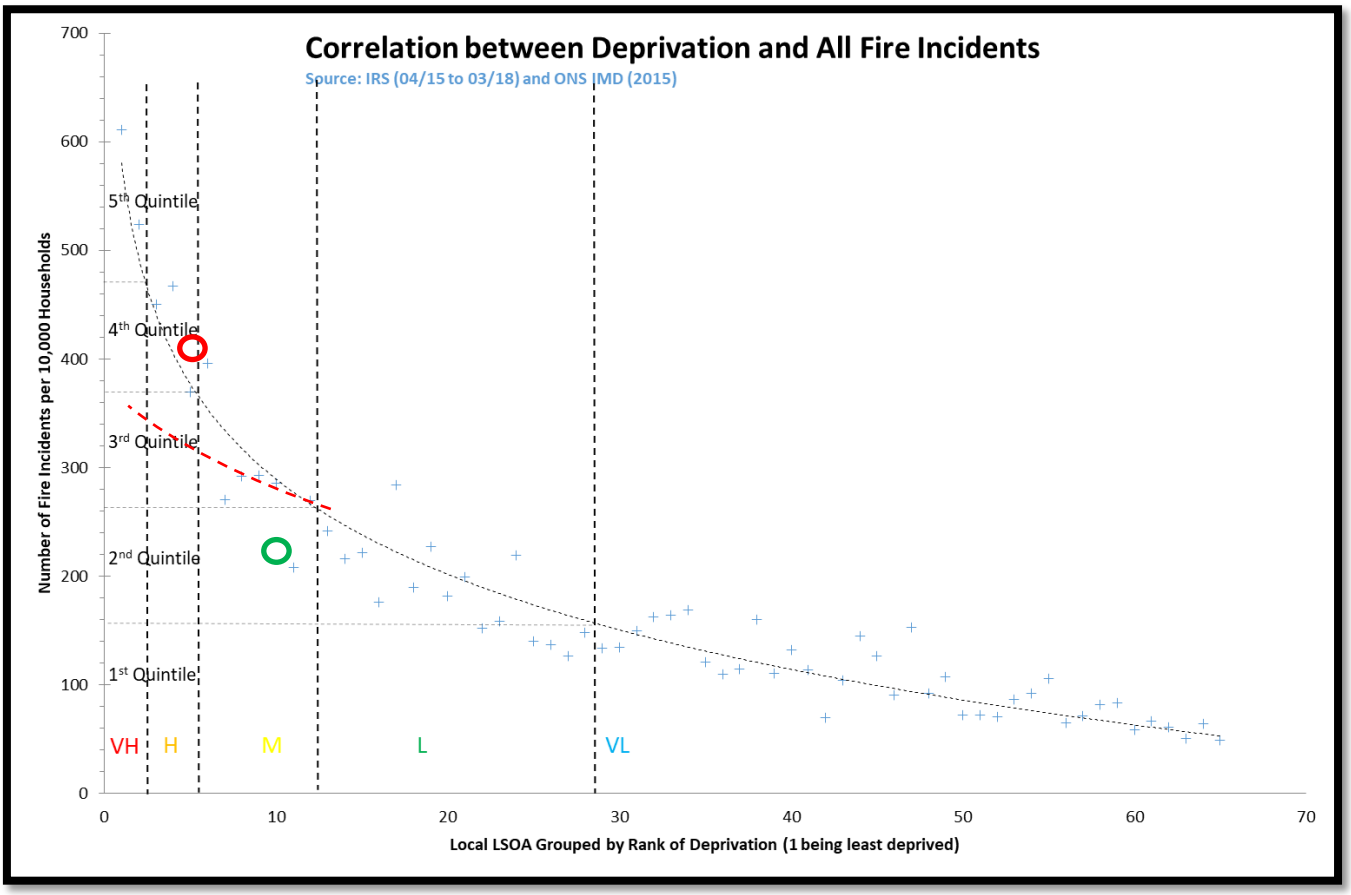


Figure 7 Identifying Outliers

If a particular LSOA (such as the one circled in red) is experiencing a higher number of fires than the profile suggests, this will be looked at in detail and new interventions will be put in place where appropriate.

We will also look at LSOA (such as the one circled in green) which are experiencing better than expected performance to try and understand what prevention and protection activity has occurred that can be shared in other areas. This may also be due to interventions delivered by partner agencies.

Our overall intention is to flatten the line as indicated by the red dashed line in figure 7 by reducing the number of incidents in the highest risk LSOA.

We will review both the base map for fire and the foreseeable risk register annually. Performance will be compared against the results to the same period from the previous year. This will be used to assess the effectiveness of the response, prevention and protection strategies and inform the IRMP.

13 Assurance and Audit

We will demonstrate assurance in risk management by achieving the following objectives:

- Demonstrate compliance of the National Framework priorities
- Undertake a full and comprehensive risk assessment of the communities of West Yorkshire
- Have suitable Prevention, Protection and Response strategies detailing how we will manage and reduce this risk
- Demonstrate we have proportionately allocated resource to risk
- Undertake an annual evaluation of risk within West Yorkshire and respond accordingly

On an annual basis a report will be produced which demonstrates how effective we have been against these objectives. This will demonstrate our confidence levels in our assessment of risk and our allocation of our resources.

Appendix 1 Risk Registers

National Risk Register and Community Risk Register

The government aims to ensure all organisations have clear and effective risk assessment processes in place. It works at all levels to assess and mitigate the risk from emergencies facing the country as a whole.

The risks the UK faces are continually changing. The government monitors the most significant emergencies that the UK and its citizens could face over the next five years using the National Risk Assessment (NRA). This is a confidential annual assessment that draws on expertise from a wide range of departments and agencies of government. The National Risk Register (NRR) is the public version of the assessment.

A number of risks in the NRA have been grouped together into more generic categories for the purpose of producing the NRR. This is partly to bring thematic risks together and also due to the sensitivity of the NRA. The position of each category on the risk matrices is an estimate based on the positions of all the different constituent risks from the NRA, taking care not to undervalue the most serious risks.

The NRR confirms a number of existing national risks on two risk matrices. One includes risks from natural hazards, disease, major accidents and societal risk and the other is risk from malicious attack.

The main risks identified on the national risk registers:

- Pandemic influenza
- Major coastal & river flooding
- Cold and snow
- Widespread electrical failure
- Large scale chemical, biological, radiological or nuclear attacks
- Attacks on crowded places
- Attacks on transport

Long-term Trends

In addition to the risks above there are longer term trends that are likely, over the coming decades, to change the overall risk landscape. These could make the current risk more severe or more likely and in time they could lead to the emergence of completely new risks, for example:

- Climate change
- Antimicrobial resistance (AMR)

The risks we face depend on where we live and work. For example, risks such as coastal flooding will be limited to specific parts of the country, whilst the likelihood and impact of major industrial accidents will depend upon the type of industry in an area. Alongside the national level risk assessments, local tiers are

required to produce a specific risk assessment that reflects, as far as possible, the unique characteristics of each area.

The government provides guidance to Local Resilience Forums (LRFs) on how to interpret the risks in the NRA and NRR to help with their local assessment of risk. This ensures that risk assessment at all levels of government is integrated, so it can underpin coherent emergency planning throughout the country.

The Civil Contingencies Act 2004 requires emergency responders in England and Wales to co-operate in maintaining a public community risk register. These are approved and published by LRFs, which include representatives from local emergency responders as well as public, private and voluntary organisations.

The West Yorkshire LRF has produced the West Yorkshire Community Risk Register (CRR), which identifies the main risks that residents and businesses in West Yorkshire face.

The CRR forms the basis for multi-agency emergency planning; each risk in the register has its own risk assessment. The LRF looks at the risks and how best to ensure issues are prevented or addressed as appropriate. It is accepted that the CRR does not cover all eventualities. However, there is no need to assess every single risk, particularly those of a very low likelihood of occurring, and many risks are assessed on their impact across the entire LRF area.

Undertaking an assessment of risk in this way will support decision making when developing future IRMP strategies.

Appendix 2 Index of Multiple Deprivation

1. Income Deprivation Domain

The Income Deprivation Domain measures the proportion of the population in an area experiencing deprivation relating to low income. The definition of low income used includes both those people that are out-of-work, and those that are in work but who have low earnings (and who satisfy the respective means tests).

The indicators:

- Adults and children in Income Support families
- Adults and children in income-based Jobseeker's Allowance families
- Adults and children in income-based Employment and Support Allowance families
- Adults and children in Pension Credit (Guarantee) families
- Adults and children in Working Tax Credit and Child Tax Credit families not already counted, that is those who are not in receipt of Income Support, income-based Jobseeker's Allowance, income-based Employment and Support Allowance or Pension Credit (Guarantee) and whose equalised income (excluding housing benefit) is below 60 per cent of the median before housing costs
- Asylum seekers in England in receipt of subsistence support, accommodation support, or both

2. Employment Deprivation Domain

The Employment Deprivation Domain measures the proportion of the working-age population in an area involuntarily excluded from the labour market. This includes people who would like to work but are unable to do so due to unemployment, sickness or disability, or caring responsibilities.

The indicators:

- Claimants of Jobseeker's Allowance (both contribution-based and income-based), women aged 18 to 59 and men aged 18 to 64
- Claimants of Employment and Support Allowance (both contribution-based and income-based) , women aged 18 to 59 and men aged 18 to 64
- Claimants of Incapacity Benefit, women aged 18 to 59 and men aged 18 to 64
- Claimants of Severe Disablement Allowance, women aged 18 to 59 and men aged 18 to 64
- Claimants of Carer's Allowance, women aged 18 to 59 and men aged 18 to 64.

3. Education, Skills and Training Deprivation Domain

The Education, Skills and Training Domain measures the lack of attainment and skills in the local population. The indicators fall into two sub-domains: one relating to children and young people and one relating to adult skills. These two sub-domains are designed to reflect the 'flow' and 'stock' of educational disadvantage within an area respectively. That is, the 'children and young people' sub-domain measures the attainment of qualifications and associated measures ('flow'), while the 'skills' sub-domain measures the lack of qualifications in the resident working-age adult population ('stock').

The indicators:

Children and Young People sub-domain

- Key Stage 2 attainment: The average points score of pupils taking reading, writing and mathematics Key Stage 2 exams
- Key Stage 4 attainment: The average capped points score of pupils taking Key Stage 4
- Secondary school absence: The proportion of authorised and unauthorised absences from secondary school
- Staying on in education post 16: The proportion of young people not staying on in school or non-advanced education above age 16
- Entry to higher education: A measure of young people aged under 21 not entering higher education

Adult Skills sub-domain

- Adult skills: The proportion of working-age adults with no or low qualifications, women aged 25 to 59 and men aged 25 to 64
- English language proficiency: The proportion of working-age adults who cannot speak English or cannot speak English well, women aged 25 to 59 and men aged 25 to 64

4. Health Deprivation and Disability Domain

The Health Deprivation and Disability Domain measures the risk of premature death and the impairment of quality of life through poor physical or mental health. The domain measures morbidity, disability and premature mortality but not aspects of behaviour or environment that may be predictive of future health deprivation.

The indicators:

- Years of potential life lost: An age and sex standardised measure of premature death
- Comparative illness and disability ratio: An age and sex standardised morbidity/disability ratio
- Acute morbidity: An age and sex standardised rate of emergency admission to hospital
- Mood and anxiety disorders: A composite based on the rate of adults suffering from mood and anxiety disorders, hospital episodes data, suicide mortality data and health benefits data.

5. Crime Domain

Crime is an important feature of deprivation that has major effects on individuals and communities. The Crime Domain measures the risk of personal and material victimisation at local level.

The indicators:

- Violence: The rate of violence per 1,000 at-risk population
- Burglary: The rate of burglary per 1,000 at-risk properties
- Theft: The rate of theft per 1,000 at-risk population
- Criminal Damage: The rate of criminal damage per 1,000 at-risk populations.

6. Barriers to Housing and Services Domain

The Barriers to Housing and Services Domain measures the physical and financial accessibility of housing and local services. The indicators fall into two sub-domains: ‘geographical barriers’, which relate to the physical proximity of local services, and ‘wider barriers’ which includes issues relating to access to housing such as affordability.

The indicators:

Geographical Barriers sub-domain

- Road distance to a post office: A measure of the mean distance to the closest post office for people living in the Lower-layer Super Output Area
- Road distance to a primary school: A measure of the mean distance to the closest primary school for people living in the Lower-layer Super Output Area
- Road distance to a general store or supermarket: A measure of the mean distance to the closest supermarket or general store for people living in the Lower-layer Super Output Area
- Road distance to a GP surgery: A measure of the mean distance to the closest GP surgery for people living in the Lower-layer Super Output Area

Wider Barriers sub-domain

- Household overcrowding: The proportion of all households in a Lower-layer Super Output Area which are judged to have insufficient space to meet the household's needs
- Homelessness: Local authority district level rate of acceptances for housing assistance under the homelessness provisions of the 1996 Housing Act, assigned to the constituent Lower-layer Super Output Areas
- Housing affordability: Difficulty of access to owner-occupation or the private rental market, expressed as the inability to afford to enter owner-occupation or the private rental market.

7. Living Environment Deprivation Domain

The Living Environment Deprivation Domain measures the quality of the local environment. The indicators fall into two sub-domains. The 'indoors' living environment measures the quality of housing; while the 'outdoors' living environment contains measures of air quality and road traffic accidents.

The indicators:

Indoors sub-domain

- Houses without central heating: The proportion of houses that do not have central heating
- Housing in poor condition: The proportion of social and private homes that fail to meet the Decent Homes standard.

Outdoors sub-domain

- Air quality: A measure of air quality based on emissions rates for four pollutants

Appendix 3 - Mosaic Classifications

A City Prosperity	A01	World-Class Wealth	Global high flyers and families of privilege living luxurious lifestyles in London's most exclusive boroughs
	A02	Uptown Elite	High status households owning elegant homes in accessible inner suburbs where they enjoy city life in comfort
	A03	Penthouse Chic	City suits renting premium-priced flats in prestige central locations where they work hard and play hard
	A04	Metro High-Flyers	Ambitious 20 and 30-somethings renting expensive apartments in highly commutable areas of major cities
B Prestige Positions	B05	Premium Fortunes	Influential families with substantial income established in distinctive, expansive homes in wealthy enclaves
	B06	Diamond Days	Retired residents in sizeable homes whose finances are secured by significant assets and generous pensions
	B07	Alpha Families	High-achieving families living fast-track lives, advancing careers, finances and their school-age kids' development
	B08	Bank of Mum and Dad	Well-off families in upmarket suburban homes where grown-up children benefit from continued financial support
	B09	Empty-Nest Adventure	Mature couples in comfortable detached houses who have the means to enjoy their empty-nest status
C Country Living	C10	Wealthy Landowners	Prosperous owners of country houses including the rural upper class, successful farmers and second-home owners
	C11	Rural Vogue	Country-loving families pursuing a rural idyll in comfortable village homes while commuting some distance to work
	C12	Scattered Homesteads	Older households appreciating rural calm in stand-alone houses within agricultural landscapes
	C13	Village Retirement	Retirees enjoying pleasant village locations with amenities to service their social and practical needs
D Rural Reality	D14	Satellite Settlers	Mature households living in expanding developments around larger villages with good transport links
	D15	Local Focus	Rural families in affordable village homes who are reliant on the local economy for jobs
	D16	Outlying Seniors	Pensioners living in inexpensive housing in out of the way locations
	D17	Far-Flung Outposts	Inter-dependent households living in the most remote communities with long travel times to larger towns
E Senior Security	E18	Legacy Elders	Time-honoured elders now mostly living alone in comfortable suburban homes on final salary pensions
	E19	Bungalow Haven	Peace-seeking seniors appreciating the calm of bungalow estates designed for the elderly
	E20	Classic Grandparents	Lifelong couples in standard suburban homes enjoying retirement through grandchildren and gardening
	E21	Solo Retirees	Senior singles whose reduced incomes are satisfactory in their affordable but pleasant owned homes
F Suburban Stability	F22	Boomerang Boarders	Long-term couples with mid-range incomes whose adult children have returned to the shelter of the family home
	F23	Family Ties	Active families with teens and adult children whose prolonged support is eating up household resources
	F24	Fledgling Free	Pre-retirement couples with respectable incomes enjoying greater space and spare cash since children left home
	F25	Dependable Me	Single mature owners settled in traditional suburban semis working in intermediate occupations

G Domestic Success	G26	Cafés and Catchments	Affluent families with growing children living in upmarket housing in city environs
	G27	Thriving Independence	Well-qualified older singles with incomes from successful professional careers in good quality housing
	G28	Modern Parents	Busy couples in modern detached homes juggling the demands of school-age children and careers
	G29	Mid-Career Convention	Professional families with children in traditional mid-range suburbs where neighbours are often older
H Aspiring Homemakers	H30	Primary Ambitions	Forward-thinking younger families who sought affordable homes in good suburbs which they may now be out-growing
	H31	Affordable Fringe	Settled families with children owning modest, 3-bed semis in areas where there's more house for less money
	H32	First-Rung Futures	Pre-family newcomers who have bought value homes with space to grow in affordable but pleasant areas
	H33	Contemporary Starts	Fashion-conscious young singles and partners setting up home in developments attractive to their peers
	H34	New Foundations	Occupants of brand new homes who are often younger singles or couples with children
	H35	Flying Solo	Bright young singles on starter salaries choosing to rent homes in family suburbs
I Family Basics	I36	Solid Economy	Stable families with children renting better quality homes from social landlords
	I37	Budget Generations	Families supporting both adult and younger children where expenditure can exceed income
	I38	Childcare Squeeze	Younger families with children who own a budget home and are striving to cover all expenses
	I39	Families with Needs	Families with many children living in areas of high deprivation and who need support

J Transient Renters	J40	Make Do & Move On	Yet to settle younger singles and couples making interim homes in low cost properties
	J41	Disconnected Youth	Young people endeavouring to gain employment footholds while renting cheap flats and terraces
	J42	Midlife Stopgap	Maturing singles in employment who are renting short-term affordable homes
	J43	Renting a Room	Transient renters of low cost accommodation often within subdivided older properties
K Municipal Challenge	K44	Inner City Stalwarts	Long-term renters of inner city social flats who have witnessed many changes
	K45	Crowded Kaleidoscope	Multi-cultural households with children renting social flats in over-crowded conditions
	K46	High Rise Residents	Renters of social flats in high rise blocks where levels of need are significant
	K47	Streetwise Singles	Hard-pressed singles in low cost social flats searching for opportunities
	K48	Low Income Workers	Older social renters settled in low value homes in communities where employment is harder to find
L Vintage Value	L49	Dependent Greys	Ageing social renters with high levels of need in centrally located developments of small units
	L50	Pocket Pensions	Penny-wise elderly singles renting in developments of compact social homes
	L51	Aided Elderly	Supported elders in specialised accommodation including retirement homes and complexes of small homes
	L52	Estate Veterans	Long-standing elderly renters of social homes who have seen neighbours change to a mix of owners and renters
	L53	Seasoned Survivors	Deep-rooted single elderly owners of low value properties whose modest home equity provides some security

M Modest Traditions	M54	Down-to-Earth Owners	Ageing couples who have owned their inexpensive home for many years while working in routine jobs
	M55	Offspring Overspill	Lower income owners whose adult children are still striving to gain independence meaning space is limited
	M56	Self Supporters	Hard-working mature singles who own budget terraces manageable within their modest wage
N Urban Cohesion	N57	Community Elders	Established older households owning city homes in diverse neighbourhoods
	N58	Cultural Comfort	Thriving families with good incomes in multi-cultural urban communities
	N59	Asian Heritage	Large extended families in neighbourhoods with a strong South Asian tradition
	N60	Ageing Access	Older residents owning small inner suburban properties with good access to amenities
O Rental Hubs	O61	Career Builders	Motivated singles and couples in their 20s and 30s progressing in their field of work from commutable properties
	O62	Central Pulse	Entertainment-seeking youngsters renting city centre flats in vibrant locations close to jobs and night life
	O63	Flexible Workforce	Self-starting young renters ready to move to follow worthwhile incomes from service sector jobs
	O64	Bus-Route Renters	Singles renting affordable private flats away from central amenities and often on main roads
	O65	Learners & Earners	Inhabitants of the university fringe where students and older residents mix in cosmopolitan locations
	O66	Student Scene	Students living in high density accommodation close to universities and educational centres

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