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Strategic Assessment 2021

April 2021
Version 1.0

PREVENTING PROTECTING RESPONDING

Document history		
Review date	Version	Summary of changes
07/05/2020	0.1	Initial drafting
15/03/2021	0.2	Final drafting
30/03/2021	1.0	Taken out of draft

Document owner:	SM Integrated Risk Management Planning
Document authors:	SM Integrated Risk Management Planning IRMP Co-ordinator Risk Intelligence Interns

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Diversity, Inclusion, Cohesion and Equality Team, Avon Fire & Rescue Service, Police & Fire Headquarters, PO Box 37, Valley Road, Bristol, BS20 8JJ.

Telephone: 0117 926 2061

Email: DICE@avonfire.gov.uk

Notes:

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Executive Summary

Welcome to the Avon Fire & Rescue Service (AF&RS) Strategic Assessment 2021. This is a key document in our Corporate Planning process and documents our understanding of our Service area and its risks.

The Strategic Assessment enables AF&RS to identify issues which have the potential to affect the future strategic direction of the Service, as well as informing the Integrated Risk Management Plan, and underpinning our Service Plan.

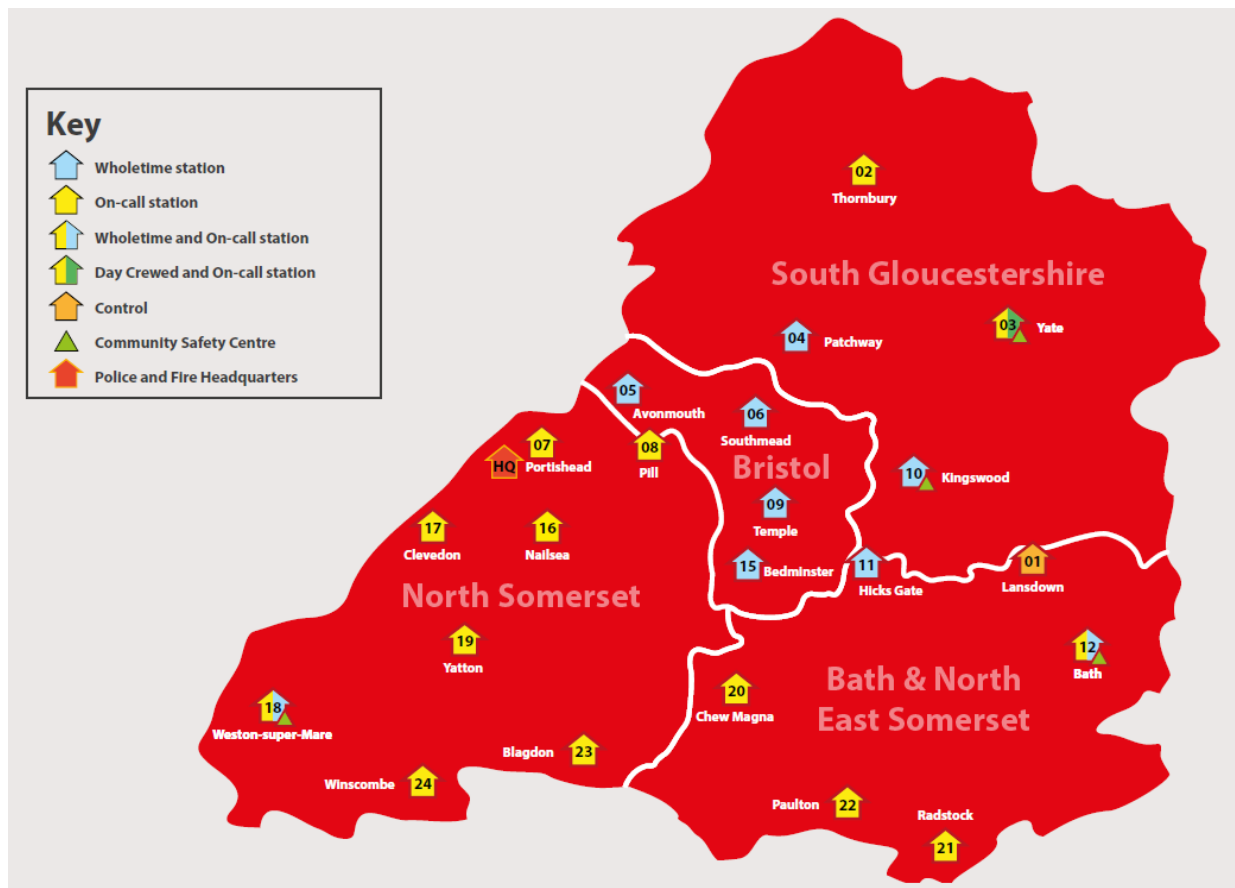
There will always be new elements that emerge which will have an impact on the Service, and the period since the Strategic Assessment 2019/2020 has been no exception. The last year has seen Climate Emergencies declared across the nation, the UK's departure from the European Union, the publication of the first stage of the Grenfell Tower Inquiry, and the global impacts of the COVID-19 pandemic. These events, amongst others, will be assessed in this document using the PESTELO approach to analyse the political, economic, social, technological, environmental, legal, and organisational factors that may affect the Service.

The Strategic Assessment 2021 will begin by identifying the existing and emerging issues within the AF&RS service area. It will then move on to the issues that impact AF&RS as an organisation. And finally, apply the issues contained within the [UK's National Risk Register](#) to the AF&RS context.

1. Our Service Area

1.1. Introduction

The AF&RS service area covers Bristol, Bath and North East Somerset (BANES), South Gloucestershire, and North Somerset. This area has a residential population of more than one million people living in over 450,000 homes, over an area of 512 square miles.



Located centrally within the service area, Bristol is the largest city covered by AF&RS, and the largest in the South West region (Bristol City Council, 2020). Other population centres covered by AF&RS are UNESCO World Heritage site Bath, and the seaside resort town Weston-Super-Mare. Beyond these principal urban areas, there are a number of market towns such as Nailsea, Radstock, Keynsham, Yate, and Thornbury, and the coastal towns of Clevedon and Portishead. As well as this, there are rural villages and hamlets scattered throughout the service area.

1.2. Demographics

1.2.1. Population

The latest population estimate of the AF&RS service area is 1,156,804 people (Office for National Statistics, 2020). This marks an estimated increase of over 87,000 people since the 2011 Census (Office for National Statistics, 2011).

As shown in Table 1.1 below, the largest percentage of the population are living in the Bristol Unitary Authority, making it the most densely populated area served by AF&RS.

Table 1.1 Population by Unitary Authority (Office for National Statistics, 2020).

Unitary Authority	Area (Hectares)	Area %	Population	Population %	Population Density
BANES	34,574	26%	193,282	16%	5.1
Bristol	10,961	8%	463,377	40%	39.1
North Somerset	37,379	28%	215,052	19%	5.4
South Gloucestershire	49,695	37%	285,093	25%	5.3
Total	132,609	100%	1,156,804	100%	Average = 13.7

By 2024, projections show a steady population increase over all four Unitary Authority areas. South Gloucestershire is projected a 6% population increase, and Bristol, BANES, and North Somerset are projected approximately 4% increases (Office for National Statistics, 2020).

1.2.2. Age Profile

As shown in Figure 1.1 below, each Unitary Authority has a different profile when it comes to age profiles. Bristol and BANES have younger populations, with the 15-29 year group making up the majority of the population. In contrast, in North Somerset the majority of the population are in the 45-59 year age group, and in South Gloucestershire the majority age group is equally 30-44 and 45-59 year olds.

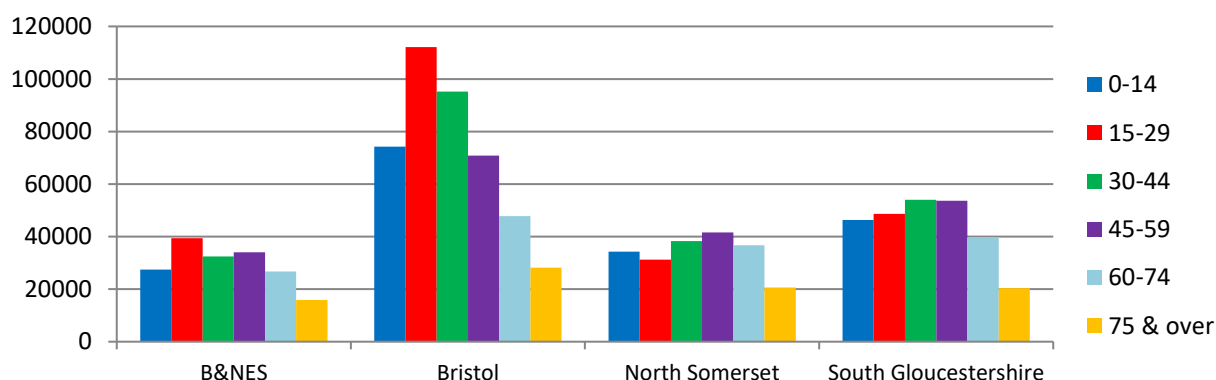


Figure 1.1 Age profile of each Unitary Authority (Office for National Statistics, 2020).

Children and young people make up a consistent proportion of each Unitary Authority, with around 18% of each areas population between the 0-15 year age ranges (Office for National Statistics, 2020).

Although over-75s make up the smallest demographic in all four Unitary Authorities, there are still 93,699 over-75s in the service area (Office for National Statistics, 2020). The National Fire Chiefs Council (NFCC) explain that people over 80 are 10 times more likely to die in a fire than someone under 30. Therefore, while the over-75s age group are not the biggest in AF&RS's area, the risk of fire deaths is greater (NFCC, 2013). Similarly, almost twice as many people over the age of 50 die in house fires as those under the age of 50, highlighting vulnerabilities for South Gloucestershire and North Somerset (NFCC, 2013).

1.2.3. Gender

The gender profile of the population within the AF&RS area shows an average of 49% male and 51% female (Office for National Statistics, 2020). As shown in Figure 1.2 below, this ratio is similar across all four Unitary Authorities.

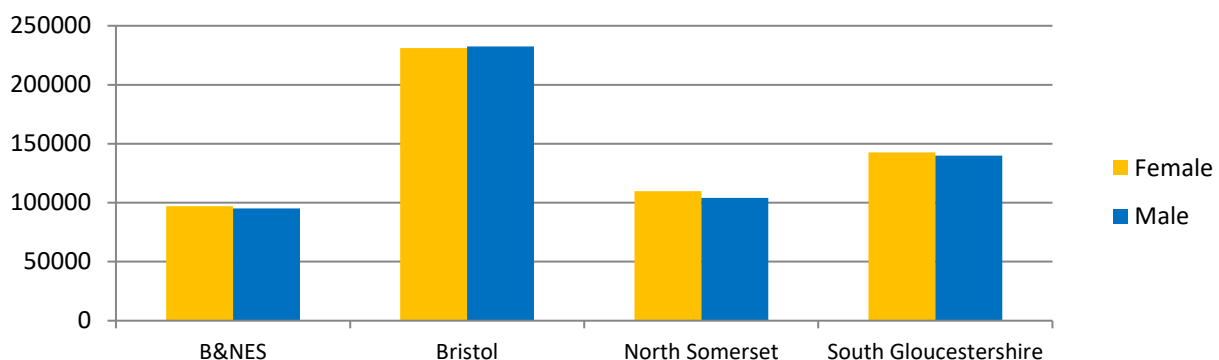


Figure 1.2 Gender profile across all Unitary Authorities (Office for National Statistics, 2020).

1.2.4. Religion

As shown in Figure 1.3 below, the 2011 Census identified that within the AF&RS area, 54% of the population identifies as Christian, and 2% as Muslim. Those who consider themselves as having no religion, or not stating one, are 34% and 8% respectively. In addition, another four religions, as well as those selecting 'other religion' account for up to 1% of the population each.

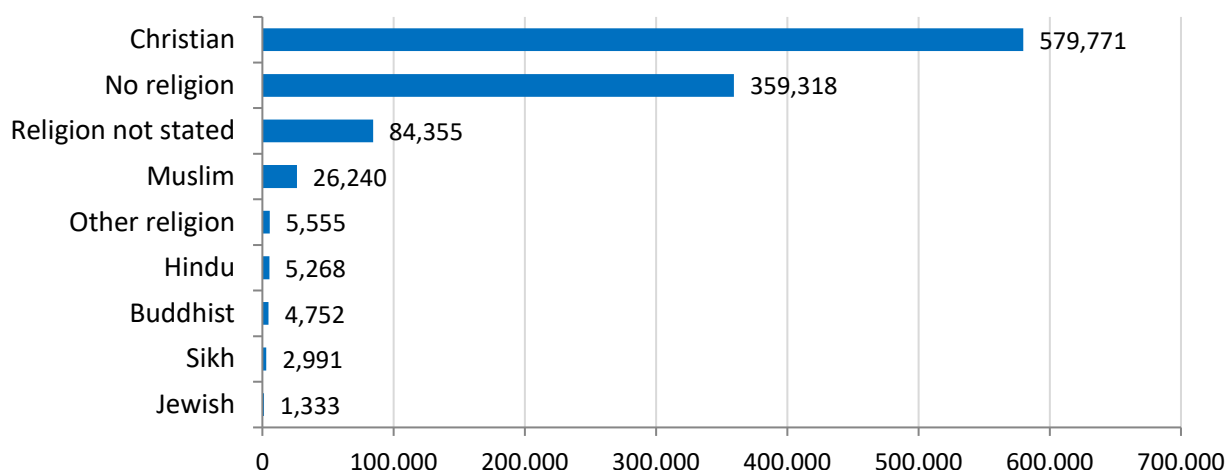


Figure 1.3 Religious profile of our Service Area (Office for National Statistics, 2011).

1.2.5. Ethnicity

The 2011 Census identified that over 90% of the population within AF&RS's four Unitary Authority areas were white. The remaining population were a mixture of other ethnic groupings, which are shown in Figure 1.4 below.

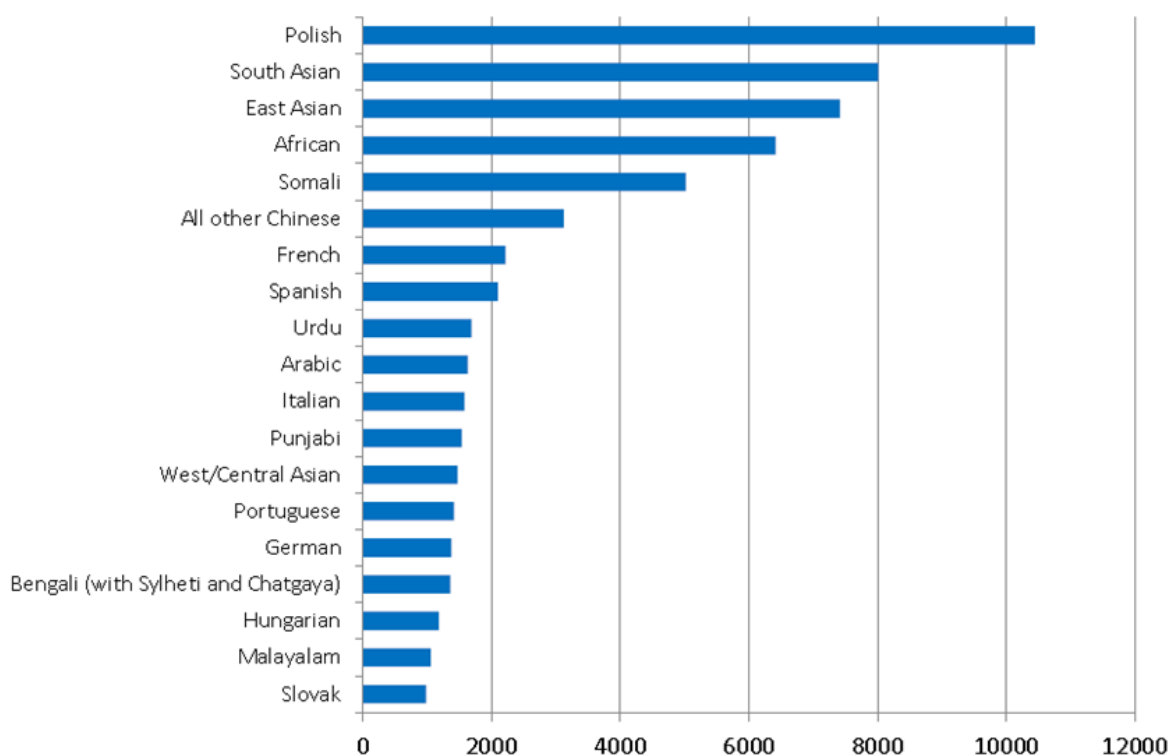


Figure 1.4 Ethnic profile of our Service Area (Office for National Statistics, 2011).

1.2.6. Language

The 2011 Census has a classification for 102 languages, many of which have less than 0.1% representation within the population of the AF&RS service area. The most

commonly spoken languages in the AF&RS service area, other than English, were Polish, Somali, Chinese (all dialects), French, and Spanish (Office for National Statistics, 2011).

Nearly three percent of households across the AF&RS service area do not have any members that speak English as a main language, an additional three percent have at least one but not all household members who speak English as a main language (Office for National Statistics, 2011).

1.2.7. Employment

In the AF&RS service area, 79.7% of the economically active population are in employment. Unemployment sits at 3.45% - higher than the average for the South West but below the national average (ONS, 2019). In 2019, there were 38,100 workless households in the service area (ONS, 2019).

Between October and December 2020, the National unemployment rate was 5.1%, meaning that 1.74 million people across the UK are unemployed. This figure is expected to continue to rise over the duration of the pandemic. The level of unemployment is similar to levels seen in the late 1970's and early 1980's (Office for National Statistics, 2021). As the COVID-19 pandemic continues, national unemployment levels are predicted to reach between 8.8% and 11.8% in 2021 (OECD, 2020). Young workers are most vulnerable to these changes (OECD, 2020).

1.2.8. Housing

The 2011 Census shows that within the AF&RS area there are 468,167 households, the majority of which (67%) are owner-occupied properties (Office for National Statistics, 2011).

As shown in Figure 1.5 below, those living in rented accommodation make up 15.5% of households, a larger proportion of these live in the Bristol Unitary Authority area. There are similar levels of households living in private or social rented accommodation (Office for National Statistics, 2011).

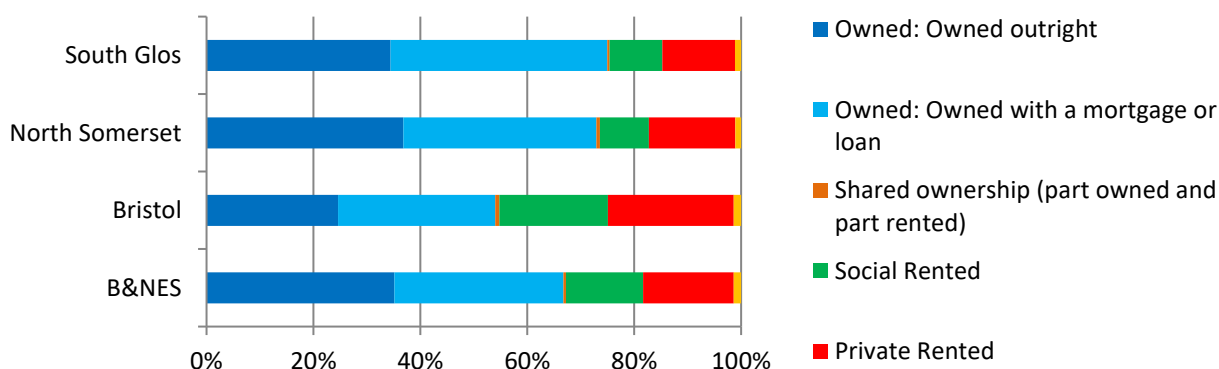


Figure 1.5 Tenure profile of Unitary Authorities (Office for National Statistics, 2011).

Single occupant households make up 31% of households in the service area; 40% of those households are occupied by a person over the age of 65; a group identified as more vulnerable to fire in *section 1.2.2 Age Profile*.

1.2.9. Transient Population

The transient population in the AF&RS service area refers to those who are living here temporarily.

1.2.9.1. Students

Students make up a large proportion of AF&RS's transient population. There are several universities in the Service area, with more than 84,000 students enrolled for the 2019/20 academic year.

Table 1.2 Students enrolled at universities in our Service area (University of Bristol, 2020; UWE Bristol, 2020; Higher Education Statistics Agency, 2019).

University	Number of Students
Bath University	18,065
Bath Spa University	7,770
Bristol	27,513
UWE	30,732
Totals	84,080

University Centre Weston, in Weston-Super-Mare, was established in 2016 and now has over 1000 students enrolled on degree programs, a figure that has grown each year since its establishment (University Centre Weston, 2020).

1.2.9.2. Travelling Communities

The 2011 Census included an ethnicity category which collected data on 'Gypsy or Irish Traveller' communities. This identified 58,000 people who are part of 'Gypsy or Irish Traveller' communities living in England and Wales (Office for National Statistics, 2011). As a minority ethnic group, the communities are legally protected under the Race Relations Act.

Those identifying as 'Gypsy or Irish Traveller' experience inequalities in education, health, and economic activity (ONS, 2014). There is also a disproportionately high representation of people who are at increased risk of becoming severely ill from COVID-19 (FFT, 2020). The lack of suitable, secure residential and transit accommodation is an inequality experienced by many, with health hazards (such as vermin), decayed sewage and water fittings, poor-quality utility rooms, and failings in fire safety being prevalent in most sites. In many cases there has been considerable waiting periods for older or disabled Gypsies or Irish Travellers to obtain adaptations to their caravans on public sites, increasing their vulnerability to fire (Equality and Human Rights Commission, 2009).

1.2.9.3. Tourism

The COVID-19 pandemic will have unprecedented impacts on tourism in the Service area. As this is a fast-moving and uncertain situation, forecasts on these impacts are

subject to constant change. However, an early estimate estimates a drop of 24% in domestic visitor spending (overnight and same-day trips), and that in 2021 we are unlikely to be back to pre-COVID-19 levels because of economic factors, supply loss, continued social distancing, and traveller sentiment (Visit Britain, 2020).

The latest data, from 2018, shows that for day-trips, Bath has been the most popular part of the AF&RS service area, with 419,000 trips, making it the 5th most popular city in the UK. Bristol makes the top 20 in the UK, and 2nd most popular in the Service area, with 120,000 day-trips in 2018 (Visit Britain, 2018).

In contrast, Bristol is the most popular area for overnight visits from international visitors, with 636,000 in 2019; Bath follows closely with 401,000. Up to 2019, prior to the COVID-19 pandemic, there was a notable rise in these figures (Visit Britain, 2020).

Weston-Super-Mare is a largely domestic tourism hub, at 250,000 visits in 2017, with visitor numbers peaking over the summer months (NSC, 2017). Despite the forecast decline in domestic visitor spending due to COVID-19, Weston-super-Mare has experienced an influx in visitors throughout lockdown, prompting North Somerset Council to issue statements requesting people to not visit the town until lockdown restrictions had eased (Visit Weston, 2020).

As well as hosting tourists, the Service area is also dissected by the main arterial routes for holiday makers, the M4 and M5, and as a result of this, seasonal holiday traffic causing congestion along these routes is common (Bristol Post, 2020).

These fluctuations in population, footfall and traffic density during busy periods can change the status of the risk profile for the service area, increasing road and life risk, especially in Bristol, Bath, and Weston–super–Mare.

1.3. Social

1.3.1. Health

This section of the Strategic Assessment will explore the risks to health in the AF&RS service area.

1.3.1.1. Weight and Obesity

A 2019 NHS report showed 29% of adults were obese, a rise of 3% since 2016 (NHS, 2019). Nearly two-thirds of adults in England are overweight or obese, a figure that has tripled since 1975 (NHS, 2018). The prevalence of obesity was over twice as high in the most deprived areas, which will be outlined in *section 1.3.4.1 Index of Multiple Deprivation*, than the least deprived areas (NHS, 2019).

As shown in Table 1.3 below, Bristol has the highest levels of hospital admissions for people with a primary or secondary diagnosis of obesity. All four Unitary Authority areas have similar percentages of their population classed as overweight or obese.

Table 1.3 Obesity levels across the four Unitary Authorities (NHS, 2019).

Area	Hospital admissions per 100,000 of population	% of the population classed as overweight or obese
Bristol	2009	56%
BANES	1091	62%
North Somerset	1539	59%
South Gloucestershire	1881	59%
Average	1630	59%

Obesity and poor diet can cause type 2 diabetes, high blood pressure, high cholesterol and increased risk of respiratory, musculoskeletal and liver diseases. Risk of certain cancers also increases, including being three times more likely to develop colon cancer (NHS, 2018).

Reducing obesity, particularly among children, is one of Public Health England's (PHE) aims. One in three children leaves primary school overweight or obese and children from the most deprived areas are more than twice as likely to be obese (NHS, 2019). Childhood obesity is associated with a higher chance of premature death and disability in adulthood. Overweight and obese children are more likely to stay obese into adulthood and to develop non-communicable diseases, as mentioned above, at a younger age (WHO).

AF&RS needs to be aware of the steady rise in obesity and weight-related ill-health and continue to look at how they can support Public Health England's aim to reduce obesity. Work has already begun in this area with AF&RS supporting the [Reach](#) programme in South Gloucestershire. Additionally, if weight-related ill health continues to rise across the Service area, AF&RS could expect to receive increasing requests for medical assistance and/or specialist resources from South West Ambulance Service Trust (SWAST).

1.3.1.2. Alcohol and Drug Abuse

The presence of alcohol and drugs in the body increases the risk and severity of injuries from accidents. Research suggests that nationally more than 50% of fire fatalities within the home involve a drink or drug-related behaviour (NHS, 2018).

In England in 2018, there were 5,698 alcohol-specific deaths, a drop of 2% on 2017 and an increase of 7% on 2008. The death rate is highest in the most deprived areas and lowest in the least deprived areas (NHS, 2020).

In 2017, between 230 and 270 people were killed in the UK in road traffic accidents where at least one driver was over the drink-drive limit, this is about 14% of all road

accident deaths. This is a similar level to the previous recorded figures in 2015 and continues a period of stability that has taken place since 2013 (NHS, 2020).

PHE have released [Advancing our health: prevention in the 2020s](#) where they outline their aims to encourage people to move towards alcohol-free products.

1.3.1.3. Smoking

Nationally, 14% of adults are classified as smokers and 16% of all deaths are attributed to smoking. These most recent figures represent a drop of around 1.8 million smokers in the adult population in the last nine years (NHS, 2019).

Table 1.4 shows that Bristol has the highest smoking levels in the Service area, and is AF&RS's only Unitary Authority with smoking levels above the national average.

Table 1.4 Smoking levels by Unitary Authority (ONS, 2018).

Area	Percentage of the adult population classified as smokers
Bristol	16.3
BANES	11.7
North Somerset	12.0
South Gloucestershire	10.6
Average	12.65

Adults of Black, Asian, or Chinese ethnicities were less likely to be current smokers than those of Mixed, White, or Other ethnicities. Younger age groups are also more likely to smoke, with adults aged 25 to 34 most likely to smoke (19%), and those aged 65 and over the least likely (8%) (NHS, 2019).

There is a trend in smokers wanting to, or successfully, quitting, with 60.8% of people aged 16 years and above who currently smoked saying they wanted to quit, and 59.5% of those who have ever smoked saying they had quit (ONS, 2017).

There has been a consistent rise in e-cigarette use, also known as vaping, with 6.3% of adults now using e-cigarettes, double the 2014 level (NHS, 2019). In 2016, 113 fires caused by e-cigarettes were reported over three years; over the same period, there were over 16,000 smoking related fires. Because of this, the NFCC have stated that e-cigarettes are the safer option from both a health and fire perspective and e-cigarettes are a safer alternative to smoking, especially for those at highest risk from fire (NFCC, 2017).

Despite the decline in smoking levels and increase in e-cigarette consumption, AF&RS has seen a minor increase in accidental fires where the ignition source has been smoking-related materials.

The PHE document [Advancing our health: prevention in the 2020s](#), announces an ambition to go 'smoke-free' in England by 2030. The Government has recently released the [Tobacco control plan: delivery plan 2017 to 2022](#), which included the goal of further reducing smoking in England to 12% by 2022.

1.3.1.4. Physical Health

Age

Ageing societies pose challenges for health and social care systems (WHO, 2018). Age UK (2019) have highlighted in its fact sheet [Later Life in the United Kingdom](#) a number of areas where the impacts of physical health in an ageing population can impact the safety and wellbeing of these members of the community.

Research has shown that physical activity has been identified as a key factor in promoting and enhancing health related quality of life. Physical activity can help improve muscle strength, balance and coordination which can further help to prevent falls, maintain bone health and preserve physical fitness (PHE, 2018).

1.3.1.5. Mental Health

There are over 200 classified forms of mental illness; mixed anxiety and depression are the most common mental health disorder in Britain, with 7.8% of people meeting criteria for diagnosis (Mental Health Foundation, 2016). 1 in 4 adults experience a mental health condition in any given year, and mental health conditions are the largest single cause of disability in the UK. Those who have severe mental illness are at risk of dying much earlier than others, early intervention is recommended to improve this outcome (Mental Health Foundation, 2016).

Ethnicity

Those in the 'Black or Black British' ethnic group are four times more likely to be detained under the Mental Health Act than those of the 'White' group, and eight times more likely to be recalled to hospital for assessment and treated in the community (NHS, 2019).

Children and Young People

In terms of children and young people, in 2017, 1 in 9 children aged 5-15 had a mental health disorder (emotional, behavioural, hyperactive, or other). In children and young people aged 5-19, 1 in 8 have at least one mental health disorder. Risky health behaviours (smoking, alcohol use, illicit drug use) are more common in young people aged 11-16 with a mental disorder (NHS, 2018).

COVID-19

The measures that have been introduced in response to the COVID-19 pandemic (such as self-isolation and social distancing) have restricted access to usual coping methods such as visiting friends and family, engaging in the community, and outdoor activities (BMA, 2020). Emerging evidence suggests that people are now resorting to unhealthy coping methods, such as the reported rise in problem drinking amongst Britons during lockdown, exacerbating prior mental health illnesses (BMA, 2020).

People who have been hospitalised by COVID-19 are at greater risk of developing mental health conditions such as depression, anxiety and post-traumatic stress disorder (Rogers, Chesney, & Oliver, 2020). There are concerns the pandemic could increase suicide rates, and there are calls for a stronger, multi-agency public health response to prevent this (BMA, 2020; Univeristy of Bristol, 2020).

1.3.1.6. Hoarding Disorder

A hoarding disorder is where:

“... someone acquires an excessive number of items and stores them in a chaotic manner, usually resulting in unmanageable amounts of clutter” (NHS, 2018).

It is thought that around 1 or 2 people in every 100 have a problem with hoarding that seriously affects their life (Smith et al., 2016). Hoarding is considered a significant problem if:

- The amount of clutter interferes with everyday living – for example, the person is unable access or use rooms;
- The clutter is causing significant distress or negatively affects the person or their family (NHS, 2018).

Hoarding has been associated with mental health problems such as severe depression, psychotic disorders, such as schizophrenia, and obsessive compulsive disorder (OCD) (NHS, 2018). Hoarding also increases the risk of fire occurring and makes it more difficult for people living within the property to evacuate safely. There is often increased fire loading, potential for flammable items (such as gas containers) to be stored, which will therefore reduce AF&RS's ability to operate.

AF&RS use a Clutter Image Rating Scale (CIRS) that allows crews to recognise any hoarding behaviour that they encounter. This allows crews to select the appropriate safeguarding measure.

1.3.2. Children and Young People

1.3.2.1. Adverse Childhood Experiences (ACEs)

ACEs are potentially traumatic events that occur in childhood (0-17 years). For example, experiencing violence, abuse, or neglect; witnessing violence in the home or community; or having a family member attempt or die by suicide. Also included are aspects of the child's environment that can undermine their sense of safety, stability, and bonding – such as growing up in a household with substance misuse, mental health problems or instability due to parental separation or household members being in jail or prison (EIF, 2020).

As a child's ACE score increases, so does the risk of disease, social and emotional problems. ACEs are linked to chronic health problems, mental illness, and substance misuse in adulthood. ACEs can also negatively impact education and job opportunities (EIF, 2020).

Children and young people with high ACE scores are more likely to undertake risky health behaviours such as drug use, smoking, and overeating. These behaviours can lead to longer term issues. For example, smoking can lead to chronic obstructive pulmonary disease (COPD) or lung cancer. Overeating can lead to obesity and diabetes. In addition, there is increasing research that shows that severe and chronic stress leads to bodily systems producing an inflammatory response that leads to disease (CDC, 2020).

Ongoing research continues to add to an understanding of ACEs and associated risk factors; this includes the significance of community environments like poverty and poor quality housing and how these can affect resilience and the impact of ACEs (Bristol Health Partners, nd).

In Bristol, North Somerset, and South Gloucestershire there is an ACE Health Intervention Team developing policy and practice approaches to prevent ACEs and mitigate their impacts. Partners with this team include Avon and Somerset Police, PHE, various NHS representatives and the respective local authorities (Bristol Health Partners, nd).

1.3.2.2. Young Carers

According to the most recent census, there are 1,384 young carers (children aged 5 - 15) in Bristol and South Gloucestershire and 16,118 unpaid carers aged 5 to 17 years old in the South West (Office for National Statistics, 2011) .

A Nottingham University study found that nationally 22% of children provide some care for a family member with an illness or disability. Of those children, 32% were classed as doing a high level of caring, with nearly a tenth (9%) carrying out the highest amount of care (Carers Support Centre, nd).

Young carers have been severely impacted by the effects of the COVID-19 pandemic, with 59% reporting a decline in their mental health since the outbreak (Carers Trust, 2020).

1.3.3. Social Isolation

Social isolation is 'an imposed isolation from normal social networks caused by loss of mobility or deteriorating health'. More than 9 million people always or often feel lonely and anyone can experience social isolation; however it is more common in later life (Prime Minister's Office, 2017).

Social isolation is a strong risk factor for poor mental health and is experienced by one million older people in the UK. Frequency of contact with people declines with age, and some older people will not see anyone for days and do not have support networks available to them. It is known that socially isolated people are harder for the public services to reach; they become excluded and do not feel part of society (NFCC, 2013).

1.3.3.1. COVID-19

The lockdown restrictions introduced in England to combat the COVID-19 pandemic have created enforced social isolation of households.

A recent review highlighted that similar quarantine events in the past had impacted negatively on well-being and mental health causing post-traumatic stress symptoms, confusion, and anger. The effects were exacerbated by longer quarantine duration, infection fears, frustration, boredom, inadequate supplies, inadequate information, financial loss, and stigma (BMA, 2020).

As mentioned above in *section 1.3.1.5 Mental Health*, the impacts of COVID-19, including the effects of enforced isolation, are expected to have significant mental health impacts.

1.3.4. Deprivation

1.3.4.1. Index of Multiple Deprivation

The Index of Multiple Deprivation (IMD) is an official measure of relative deprivation for areas in England. The dimensions of deprivation used to classify households are indicators based on seven selected household characteristics which are calculated using the weights below:

- Income Deprivation (22.5%)
- Employment Deprivation (22.5%)
- Education, Skills and Training Deprivation (13.5%)
- Health Deprivation and Disability (13.5%)
- Crime (9.3%)
- Barriers to Housing and Services (9.3%)
- Living Environment Deprivation (9.3%)

Table 1.5 below provides summaries of these indicators for the Unitary Authorities in the service area. The score given is the national rank of the Unitary Authority for the specified indicator. The local authority district with a rank of 1 is the most deprived, and the area ranked 317 is the least deprived.

Table 1.5 IMD rank for each Unitary Authority (National Statistics, 2019).

Area name	Income	Employment	Education	Health	Crime	Barriers	Living
Bristol	92	105	80	82	10	113	111
BANES	238	244	236	251	195	248	241
North Somerset	180	150	200	180	171	228	292
South Gloucestershire	253	246	172	268	183	191	295
Average	191	186	172	195	140	195	235

In all indicators Bristol is the most deprived Unitary Authority; the area is in the top ten areas for crime deprivation nationally. Persons in that area, potentially including Operational and Corporate staff, are at a far higher risk of 'personal and material

victimisation at local level', such as violent crimes, burglaries, thefts and criminal damage, than any other Unitary Authority area (National Statistics, 2019).

1.3.4.2. Fuel Poverty

A household is fuel poor when its occupants cannot afford to keep adequately warm at a reasonable cost, given their income. It is driven by income, energy prices, and energy efficiency of the home (PHE, 2014). In the South West, 9.4% of households experience fuel poverty (ONS, 2020).

There is clear evidence between cold temperatures and respiratory, circulatory problems and other health issues. This can be particularly troublesome for children and younger people as well as older people and may cause increased pressure on other emergency services (PHE, 2014).

Home temperatures are also linked to mental health. Studies have found that increases in room temperature were associated with a reduced likelihood of experiencing depression or anxiety, and young people living in cold homes were more likely to be at risk of experiencing four or more mental health symptoms (EU Fuel Poverty Observatory, 2008; PHE, 2014).

1.3.5. Homelessness

There are several types of homelessness, including statutory homelessness, single homelessness, hidden homelessness and rough sleepers (Crisis, 2020).

Many people who become homeless do not show up in official figures. This is known as hidden homelessness. This includes people who become homeless but find a temporary solution by staying with family members or friends, living in squats or other insecure accommodation (Crisis, 2020).

When people are forced to move into temporary accommodation, the uncertainty of their situation, often combined with poor living conditions, can impact both physically and mentally on homeless individuals and families (LGA, 2018). Impacts of this are depression, developing colds and flu, isolation and loneliness, being unsettled, and increased anxiety and stress (Shelter, 2004).

The number of children in Britain that are homeless and living in temporary accommodation has risen by 51% in the last five years. Whilst the experiences of children in temporary accommodation can vary quite widely, research suggests that there are a number of common themes:

- Lack of privacy and space;
- Lack of security and safe places to play;
- Impact on friendships and family relations;
- Difficulty in cooking and eating together as a family;
- Impact on well-being and mental health;
- Difficulties getting to and from school;
- Poor sleep; and
- Early taking on of adult roles and responsibilities (Shelter, 2019).

Over 1000 children in the Service area are living in temporary accommodation, with 869 of these in Bristol – the second-highest level of child homelessness in the South West (Shelter, 2019).

Under the most recent estimate, there are 127 people sleeping rough in the Service area, 98 of which are in Bristol (Ministry of Housing, Communities & Local Government, 2020). The number of homeless people in Bristol has risen by 128% over the past three years (Emmaus Bristol, n.d.).

It can be difficult to work out the number of people sleeping rough for several reasons. People bed down at different times, move around, and can be hidden away in derelict buildings (Shelter, nd). The government's [Rough Sleeping Strategy](#), published in 2018, commits to halving rough sleeping by 2022 and ending it by 2027.

1.3.6. Human Trafficking and Modern Day Slavery

Human trafficking is the trade and exploitation of humans who are often brought to the UK from abroad. However, trafficking also occurs within the UK and children in particular are increasingly vulnerable to exploitation (HM Government, 2011).

There is no typical victim of human trafficking or modern slavery. Some victims do not understand they are being exploited and many do not speak English. The person might:

- Be working against their will;
- Not be allowed to go where they want, when they want;
- Not have their identity documents;
- Have been threatened or hurt;
- Not know their address;
- Be living in an overcrowded house or flat;
- Not be registered with a GP, school or other local services;
- Be living with people they're not related to;
- Not be able to talk or write to other people or appear frightened (Bristol City Council, nd).

1.3.7. Assistive Technology

Assistive technology is the definition given to services or products that can help support the independence, wellbeing and safety of individuals. It allows them to perform a task that they would not otherwise be able to do, or it can increase the safety and ease of completing these tasks (NHS, 2019).

There is a link between the profile of individuals that would benefit from assistive technology and an increase in the risk of fire. During the delivery of a home fire safety visit, it may be identified that the resident would benefit from further assistance.

AF&RS already have access and provide some forms of assisted technology such as:

- Alarms for deaf or hard of hearing,
- Linked smoke or heat detectors,
- Fire retardant throws/ bedding.

1.3.8. Online Community Engagement

The South West population has shown a dramatic increase in internet usage over the last three years suggesting that online community engagement could allow AF&RS to reach more of its population (Bristol City Council, 2018).

While there is an increase in internet usage across all age groups, many older or disabled people are still not online, with two-thirds of women over 75 having never used the internet. The most recent estimate of the total number of adults that have never used the internet in Bristol was estimated to be 18,000 (Bristol City Council, 2018).

So while online community engagement offers the ability to reach increasing numbers in the community, and is particularly powerful during social distancing measures such as those experienced during the COVID-19 pandemic, it cannot be the only solution.

1.4. Environment

1.4.1. Climate Change

Climate change is caused by increased levels of greenhouse gas emissions, largely from the use of fossil fuels. In 2019, record high temperatures and extreme weather events were linked to climate change across the world – the partial collapse of Whaley Bridge dam after days of heavy rainfall; Australian bushfires; accelerated melting of polar ice caps; widespread flooding; and heatwaves across Europe (McGrath, 2020).

The Government's 2018 UK Climate Change Projections analysis (UKCP18) shows that climate change will present the country with new challenges both in the short and longer term (Met Office, 2020). Extreme weather events in the UK are likely to increase in frequency and severity, causing:

- **Warmer projected summers in all of the UK.** By 2070, the average frequency of hot spells (defined as maximum daytime temperatures exceeding 30 °C for two or more consecutive days) is projected to rise to about four times per year.
- **Future increases in the intensity of heavy summer rainfall events.** By 2070, extreme hourly rainfall intensity associated with an event that typically occurs once every two years will increase by 25%. For urban areas particularly, this will impact on the frequency and severity of surface water flooding.
- **Sea level around the UK will continue to rise to 2100.** Increases to extreme coastal water levels will be driven mainly by increases in mean sea level rise, although there may also be additional changes in storm surges (Met Office, 2020).

At an international level, the Intergovernmental Panel on Climate Change (IPCC) issued guidance in 2018 stating that global warming must be limited to 1.5°C by 2030 in order to avert a global climate crisis (2018 IPCC). In response, the UK Climate Change Act was amended to establish a new UK target to deliver net zero greenhouse gas emissions by 2050. This will cascade into five yearly budgets and stronger policies and statutory responsibilities for climate change mitigation and adaptation, including the Government's 25 Year Environmental Plan (HM Government, 2018).

1.4.1.1. Climate Emergency

In 2019, all four Unitary Authorities in the Service area declared a climate emergency and committed to 'Net Zero by 2030'. This commitment is shared by the Environment Agency, West of England Combined Authority (WECA), Fire Brigades Union and Unison.

As an emergency responder, AF&RS will be on the front line responding to the impacts of climate change. This will require better resilience of Service functions and buildings, and capabilities to respond to climate-change related events. It will also require a strengthening of its prevention role to mitigate the release of greenhouse gases as a result of fire.

As a responsible public sector organisation, AF&RS should also demonstrate leadership by actively mitigating its impacts and reduce greenhouse gas emissions from its buildings, fleet and other activities. This is reflected in AF&RS's recently declared commitment to be Net Zero Carbon by 2030, relating to the carbon emissions from all the activities, operations and sites over which it has direct control. For more information on this see the [Environmental Strategy 2020 – 2030](#).

There are increasing calls at international, national and local levels, and from business and civil society leaders, to 'Build Back Better' in the recovery from COVID-19. To seize the opportunity by creating clean, green, healthy, safe and more resilient societies to ensure that recovery spending does not lead to soaring emissions and the 'locking in' of high carbon infrastructure that would undermine the goals of the Paris Agreement ahead of COP26. With UK government commitments to net zero and support for a green economy, it is likely that future government funding will be conditional on climate-responsible decision making.

1.4.2. Ecologically Sensitive Areas Pollution & Incidents

The Service area contains a large number of ecologically sensitive areas. There are 97 Sites of Special Scientific Interest (SSSI), with a number of these also being designated as Special Areas of Conservation (SACs), Special Protection Areas (SPAs) or Ramsar sites (Natural England, 2020). There are also 30 Nature Reserves in the Service area (Avon Wildlife Trust, n.d.).

1.4.3. Marine Pollution & Sea Borne Incidents

The Service area's coastline is designated as a marine protected area. Marine pollution and seaborne incidents could have a number of issues that could have an impact on AF&RS:

- **Potential health risk to local residents and tourists** – Increase on demand for health services, and potentially AF&RS.
- **Large quantities of contaminated or highly flammable waste** – Potential for protracted or major incidents which could require specialist equipment, resources, and staff.

- **Economic** – Could have an impact on the UK economy and tourism, which could potentially affect AF&RS funding. The Deepwater Horizon oil spill in the Gulf of Mexico cost an estimated \$65 billion in response and recovery, with BP themselves paying only \$11.6 billion towards this (Vaughan, 2018)

The South West has had a number of smaller marine pollution incidents which have resulted in the deaths of 2,400 sea birds and 500 taken into care (RSPB, 2013).

1.4.4. Heritage Buildings

As shown in below in Table 1.6, there are a large number of listed buildings in the Service area. Additional to these, there are 516 buildings in Bristol which have been identified as heritage assets which are not yet listed.

Table 1.6 Listed buildings by Unitary Authority (Historic England, 2020).

Area	Listed buildings
Bristol	2,143
BANES	3,736
North Somerset	1,078
South Gloucestershire	2,089
Total	9,046

The effects of fire in heritage buildings can lead to significant cultural and architectural losses. Difficulties for AF&RS lie in the buildings' complex designs, and in ensuring they are fully fire protected but still maintain the historic and/ or protected status.

1.4.5. High Rise Buildings

Incidents in high-rise buildings potentially pose a greater risk to occupants and emergency workers than other residential buildings; this is due to their height, construction and a greater number of occupants affected.

AF&RS has a large number of residential high-rise blocks in its Service area, as well as many purpose-built flats, hotels and industrial buildings that fall into the medium and high-rise category. The service should ensure it continues to provide suitable resources and training to its operational staff to deal with potential incidents in high rise buildings

Following the tragic incident at Grenfell Tower in London on 14 June 2017, the risk of fire to cladding has emerged and Aluminium Composite Material (ACM) has been the focus of safety concerns. A large amount of work has been done to identify buildings which have this dangerous cladding. National work has also focused on building standards and changes that need to be made.

1.4.6. Underground Mines and Workings

All of the four Unitary Authorities in the AF&RS service area have disused underground coal mines; the boxed areas of *Figure 1.6* show where these mines are located. It also shows the 'Development High Risk Areas' which contain the potential for instability or risk to the surface from the legacy of coal mining operations, in these areas there is a higher risk of sinkholes and subsidence (The Coal Authority, 2014).

In 2008, mine workings collapsed in Yate under private woodland, taking the Coal Authority several months to rectify (Grudgings, 2008).

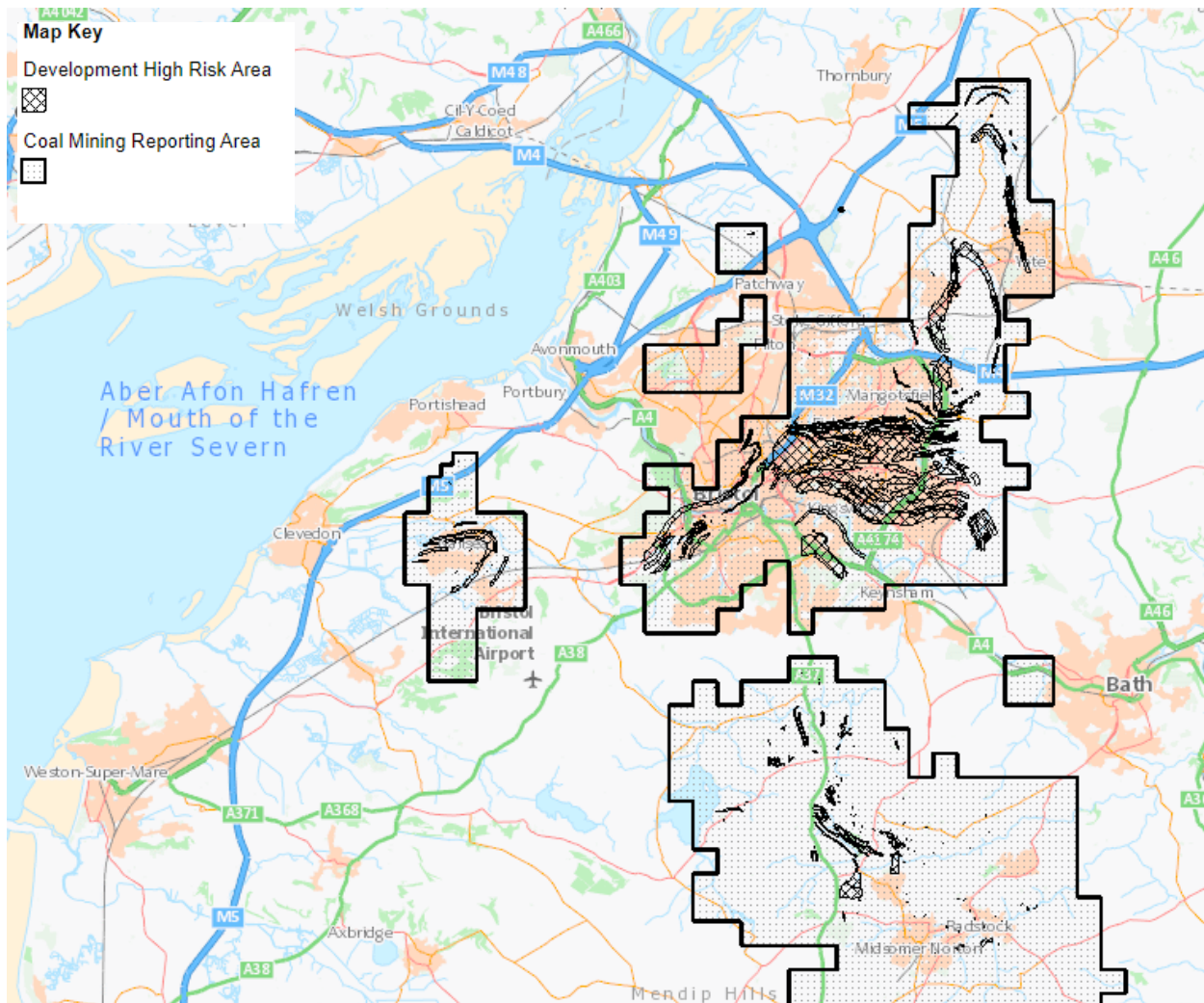


Figure 1.6 Mine workings and risk in our Service Area (The Coal Authority, 2020).

1.5. Economy

1.5.1. Economic Cost of Fire

In 2011, the Department for Communities and Local Government published a report looking into the economic cost of fire in England. The report found that the total cost of the fire was an estimated £8.3 billion to the economy in 2008; taking inflation into consideration this equates to just over £10.9 billion a year in 2018 (DCLG, The economic cost of fire, 2011). The report noted that between 2006 and 2008 that estimated cost had

only changed by 1% from £8.2 billion to £8.3 billion; however, the way in which those funds were spent had changed significantly.

The report found that the increase in the number of hours spent on community fire safety and fire investigations added to Fire and Rescue Service (FRS) resource costs. While the fire safety labour cost per hour rose with inflation, the actual number of hours FRSs devoted to fire safety activities increased much more rapidly. According to the report, this increase in costs had been offset by the overall decrease in the number of fatalities, each costing an estimated £1.65 million (£2.18 million in 2018 with inflation), as well as non-fatal casualties each costing an estimated £185,000 (£244,000 in 2018 with inflation) and the reduction in arson which saw a decrease from £1.9 billion to £1.7 billion.

The NFCC are currently working on the 'The Economic and Social Value of the UK Fire and Rescue Service Project', working with the Home Office, they aim to provide a refresh of the Economic Cost of Fire report, and supply a digital toolset to improve risk management planning; the report is on track to be published in June 2021, and delivery of the toolset by July 2021.

1.5.2. Local Industry & Businesses

Between December 2020 and January 2021, most economic sectors were below their February 2020 levels due to the economic impact of the COVID-19 pandemic (ONS, 2021).

The only sectors to see significant growth over the first year of the pandemic were the repair of computers (12.7%), postal and courier services (12%), human health activities (8.6%), auxiliary of financial services (7.7%) and real estate services (5.6%) (ONS, 2021). The sectors with the biggest decline were air transport (-93.6%), travel agency tour operators (-88.7%), rail transport (-79.6%), accommodation (-79.3%) and creative arts and entertainment (-68.7%). These figures are compared with February 2020 (ONS, 2021).

February 2020 figures showed there was roughly a 60/40 split across all industries decline/ growth, whereas January 2021 shows around 75% of industries declined in their growth with a select few industries experiencing minimal growth.

1.6. Planned Developments

1.6.1. Hinkley Point

Hinkley Point is on the edge, but outside, of the Service area. Hinkley Point B is currently the only nuclear power station in or near the Service area which is operational; the adjacent Hinkley Point A together with Oldbury and Berkeley power stations are being decommissioned.

1.6.1.1. Hinkley Point C

Hinkley Point C is currently under construction and is predicted to be completed in 2025; it is expected to produce nuclear power for 60 years. The construction will produce 25,000 employment opportunities, and up to 1,000 apprenticeships (EDF,

2020). This indicates a potential for an increase in transient workers living in, or commuting through, the Service area over the construction period.

Through the construction the road, rail, and port infrastructure in the Service area will be used for the transportation of construction materials, including hazardous or abnormal loads. Bristol Port has invested in measures to meet the ongoing requirements of the Hinkley Point C development, including plans to barge abnormal indivisible loads to the project site where they are too big to move by road (Sarens, 2019). However, abnormal loads have in the past, and may still be, transported by road causing traffic delays in the Service area (Malloy, 2018). Nuclear waste from Hinkley has also routinely passed by rail through the Service area since the mid-1960s (Office for Nuclear Regulation, 2013).

1.6.1.2. Connecting Hinkley Point C to Seabank

This proposed new transmission project will allow for Hinkley Point C to become safely connected to the GB transmission network, making it one of the largest extensions of the transmission network in recent decades (OFGEM, 2020). The project will also provide additional capability and relieve transmission constraints in the South West of England (National Grid, 2019).

National Grid are proposing to remove 65 kilometres (40 miles) of existing 132,000-volt overhead line between the Bridgwater and Avonmouth substations and put up 46.6 kilometres (29 miles) of 400,000-volt overhead line. Over eight kilometres (five miles) of the new connection passes underground through and either side of the Mendip Hills Area of Outstanding Beauty (AONB), leaving this part of the Mendip Hills free from pylons for the first time in more than 40 years. Eight kilometres (five miles) of existing 132,000-volt overhead line from Nailsea to Portishead substation is to be underground (National Grid, 2019).

1.6.2. Nuclear Fusion Plant

In 2020, the UK Government announced £220 million of funding for the UK Atomic Energy Authority (UKAEA) to design and build a prototype fusion power plant, with operations to begin in 2040 (UKAEA, 2020). Fusion power offers the opportunity to deliver safe, carbon-free, abundant, base-load power; which is said to avoid the risks associated with fission power (Windsor, 2019).

A bid is being launched for the decommissioned sites at Oldbury and Berkeley to house a fusion plant prototype. UK Fire and Rescue Services will need to consider the risk posed by this new technology and, along with partner agencies, ensure they are able to respond to emergencies.

1.6.3. Battery Energy Storage Systems

Battery energy storage systems (BESS) are experiencing rapid technological development, presenting an evolving range of significant risks. These risks include fire and explosion, chemical hazards, physical hazards, electrical hazards, and stranded or stored energy (UK Government, 2020).

The number of installed units of domestic BESSs is still limited, and there are currently no statistics for fires involving domestic systems. However, industrial, domestic and transportation incidents involving BESSs are reported in the public domain (UK Government, 2020). These include fires in Samsung smartphones, the Boeing 787 Dreamliner jet fire at Heathrow Airport, and fires at BESS facilities (AIG, n.d.).

1.6.4. Road Developments

1.6.4.1. Infrastructure

The M4 and M5 motorways run directly through the AF&RS area. At peak times, these main arterial routes to Wales and the South West often run close to, or at capacity. Should a major road traffic collision occur on one of these motorways, the impact will be felt across the Service area as traffic will attempt to migrate through the Bristol and 'A' roads with the potential to cause disruption. Situations such as this are fortunately rare but can have a massive impact on how AF&RS deploys its assets effectively to maintain the response standards.

There are a number of planned road developments in the Service area to address the pressures on the road infrastructure. The West of England's Joint Local Transport Plan is led by the Unitary Authorities to create "a well-connected sustainable transport network that works for residents across the region" by 2036. It will provide better travel choices and encourages walking, cycling and public transport (Travelwest, 2020). Figure 1.7 below shows the major schemes planned by the Joint Transport plan up to 2036.

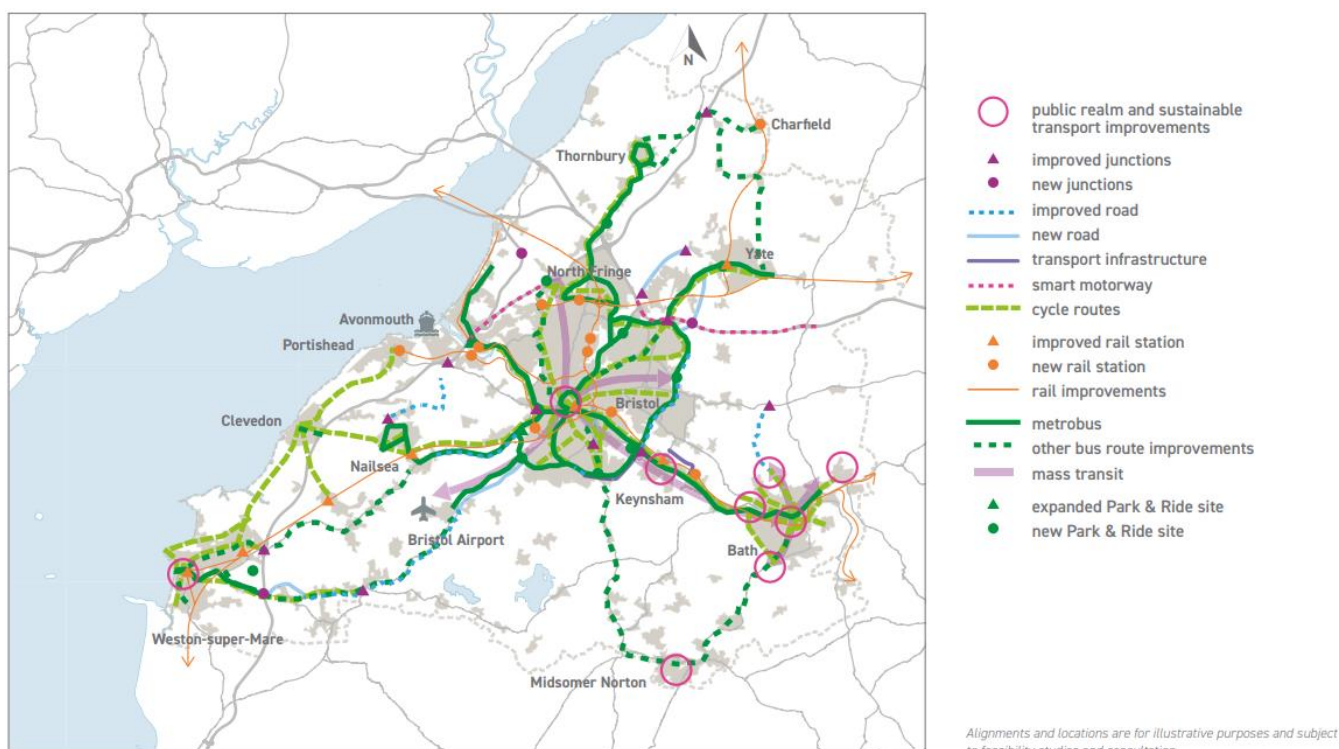


Figure 1.7 South West Joint Local Transport Plan Major Schemes (Travelwest, 2020).

In addition, Highways England's construction of the new junction of the M49 near Avonmouth has now been completed, and is now awaiting the developers to build in the connecting roads (Highways England, 2020).

This developing nature of road transport places new demands on AF&RS. These include:

- **Vehicle risks** – AF&RS need to ensure operational crews are up to date with technical knowledge of vehicle construction and the hazards and risks associated with rescue in the event they are involved in a collision.
- **Emerging vehicle technologies** – *See also 1.6.4.3 Electric Vehicles.* The application of water onto burning lithium batteries in vehicles can produce toxic Hydrogen Fluoride Gas; this has a lethal dose of 100mg per cubic metre of air. There can be between 2 and 20kg of gas released when these vehicle batteries are involved in fire (Larsson et al., 2018). Specialist extinguishing media is required to minimise the release of this gas.
- **Service road usage profile** – AF&RS need to have a good understanding of the potential hazards and volume of these hazards travelling on roads within its service area to ensure sufficient pre-planning, staff, equipment, and resources are available to deal with any potential incidents. AF&RS should also be aware of the potential changes to road usage as a result of the COVID-19 pandemic's 'new normal', with the normalisation of home working expected to reduce the number of road users. Whilst this has the benefit of alleviating congestion, there is also potential for more cars to be parked on-street through the day, creating access issues for appliances responding to incidents through narrower streets.
- **Spills/pollution from Road Traffic Collisions (RTCs)** – need to prevent pollution and protect the environment as per Environment Agency best practice.

Work to develop and improve the road transport infrastructure inevitably means more roadworks, which, if not managed appropriately, have the potential to slow down the response times of all the emergency services.

1.6.4.2. Clean Air Zones

Concern over air quality issues in our cities has now been declared a public health emergency. Both Bristol and Bath have long-standing air quality issues which cause harm to people's health.

Recent research shows that the high levels of air pollution in Bristol contribute to five people dying prematurely each week. It also estimates that children born in 2011 in Bristol will die up to six months early due to lifetime exposure to air pollution. The most concerning pollutants within Bristol are nitrogen dioxide (NO₂) and very small particulates, which are invisible. The main source of NO₂ pollution is road traffic with diesel vehicles contributing around 95% in Bath and Bristol combined. Of this, diesel

cars are responsible for 40%, followed by buses and coaches (23%) and diesel vans (22%) (Kings College London, 2019).

The levels of nitrogen dioxide (NO₂) in parts of Bristol and Bath exceed EU and national standards. To address this, the local authorities have developed plans for Clean Air Zones (CAZ), in consultation with local communities, which will reduce pollution levels in the shortest possible time.

Bath has implemented a Class C CAZ across the city centre. Under this scheme, all non-compliant commercial vehicles will be charged to enter the zone: £100/day (bus, coach, HGV) & £9/day (taxi, van, LGV). All cars and Euro 6 diesel, Euro 4-6 petrol, electric & hybrid commercial vehicles are exempt (BANES, 2020). AF&RS have signed an MOU with BANES which gives concessions for emergency vehicles until 1 Jan 2025, subject to compliant emergency vehicles being stationed at Bath Fire Station from the start of the scheme.

Bristol has proposed a hybrid scheme combining a wider area Class C CAZ (with the same charges and exemptions as Bath) and a city-centre ban on all private diesel cars from 07:00-15:00 every day. This is due to be introduced by the end of March 2021. However, this scheme is currently under review and a full business case still needs to be submitted to central government for approval. The proposed Bristol CAZ provides a permanent exemption for emergency service vehicles from charges ‘to minimise impacts to essential services’. However, all exemptions and concessions will be considered further to ensure consistency between CAZ schemes (Bristol City Council, 2020). As there are now established precedents for time-limited exemptions for emergency service vehicles in both the London ULEZ and Bath CAZ, we need to consider that the Bristol CAZ scheme might be revised to take a similar approach. Temple Fire Station is in the CAZ & diesel car ban area, and Bedminster Fire Station is on edge of the Class C CAZ.

AF&RS latest Fleet Strategy takes account of CAZs, to ensure that they address compliance requirements and put appropriate measures in place. All new fleet vehicles will achieve or exceed Clean Air Zone standards during replacement, with the newest being located at stations in and near the CAZ areas. However, due to the length of vehicle life, some of the frontline fleet actions will not be replaced until after 2025. AF&RS will also continue to keep abreast of the development of zero emissions-capable frontline vehicles, including involvement in the London Fire Brigade led Zero Emissions Fire Appliance project.

1.6.4.3. Electric Vehicles

With the growth in environmental awareness and global warming, the use of electric cars/vehicles is increasing. They emit less greenhouse gases and pollutants over the duration of their life, providing major improvements of the air quality in towns and cities. Over a year, one electric car on the road can save an average of 1.5 million grams of CO₂ – the equivalent of four return flights from London to Barcelona (EDF, 2021; HSE, 2021). These environmental benefits, plus the rapid mass adoption thanks to the plummeting costs of batteries, have led to a global rise in sales of 43% in 2020 (Carrington, 2021).

This technology introduces new hazards, such as the storage of electrical energy with the potential to cause explosion or fire, or the releasing of explosive gases and harmful liquids if batteries are damaged (HSE, 2021). Additionally, with the rising adoption of electric vehicles, there is potential this could lead to a surge in congested areas when accessing public charging ports. This rise in traffic may impact the ability to access certain roads or have a knock on effect to response times.

1.6.4.4. Transportation of Hazardous Materials

There are a significant number of vehicles that carry hazardous materials every day on the roads within the AF&RS area. Risks associated with this are:

- **Casualties** – Depending on the hazardous material, this could potentially cause injury or respiratory problems, with numbers affected depending on geography, wind direction conditions and the time of day.
- **Environmental damage** – Potential to cause damage to the immediate local environment or damage that is more widespread by entering the watercourses.
- **Damage to local infrastructure** – Potential to cause damage to local infrastructure, the road network is the most likely.

To mitigate risks associated with this, Bristol City Council has predetermined designated tanker routes that direct the hazardous material away from densely populated area. Additionally, Avon and Somerset Police carry out routine stop-checks on vehicles carrying hazardous materials to ensure they are operating safely.

1.6.5. Aviation Developments

1.6.5.1. Bristol Airport

Bristol Airport sits within North Somerset and is the third largest regional airport. It recently reported its busiest year on record, with 8.6 million passengers. This figure is predicted to reach the current cap of 10 million passengers a year by 2021 (Bristol Airport, nd). Bristol Airport currently supports an estimated 15,000+ regional jobs, and this number has forecast to increase to 21,000 in the next 15 years (Bristol Airport, nd). However, due to travel restrictions implemented as a result of the COVID-19 pandemic, air travel has reduced by 97% in 2020, and the future of air travel is now uncertain (House of Commons, 2020).

To meet the predicted pre-COVID-19 rise in passenger numbers, Bristol Airport is currently looking to expand its facilities. Planned developments to drive business and increase capacity are increased car parking, adding a new Silver Zone reception, and additional aircraft stands. These changes highlight the importance of AF&RS preparing to respond effectively to airport emergencies, and the value of close partnership working with the airport's own fire and rescue service.

1.6.5.2. Flying Taxis Bristol

Flying taxis are an initiative to find new ways for local travel, achieving greener flights and reduced congestion. This project is being developed in Bristol by a company called

‘Vertical Aerospace’ who will be manufacturing giant people carrying, manually piloted drones and have recently received a £2.5 million grant from the Government.

The timeline of this project estimates that trials could be operational by 2023. Until then it will undergo a feasibility study, comprising of an assessment of the demand for an air taxi service and an evaluation of the integration and impact on the regions existing transport network (Ryan, 2020).

1.6.6. Sea Developments

Bristol Port will continue to expand in the 2021-2024 period. Planned developments include a Deep Sea Container Terminal, expansion of land for onsite storage and warehousing, and the development of a £140 million plasterboard manufacturing facility (Bristol Port Company, 2020; Etex, 2020). AF&RS will need to take into account the skills, knowledge, and expertise required by crews for responding to maritime incidents (including ship firefighting) and continued effective liaison with the Harbourmaster.

Bristol Harbourside and the city of Bath are utilised for many social events that attract large numbers of people. The majority of the riverside and wharf areas have no barriers that separate the public from the water, leading AF&RS to engage in ongoing leaflet and media campaigns. Despite this, there have been five drowning fatalities a year on average in the AF&RS service area over the last four years. In April 2019, collaboration between Bristol City Council and the University of Bristol saw the installation of thermal cameras along the waterfront. This new system alerts a council control room should someone pass a threshold along the water’s edge allowing rapid notification and earlier deployment of emergency services (University of Bristol, 2019).

A private company is currently developing two hydrogen-powered passenger ferries to operate on a Bristol – Cardiff route. The ferries will carry 100 people and use solar panels and wind turbines (BBC, 2020). AF&RS must consider the additional firefighting risks accompanied with this emerging technology.

1.6.7. Rail Developments

Network Rail have multiple developments planned across the Service area.

1.6.7.1. Bristol Temple Meads

As Bristol Temple Meads railway station nears 10 million passengers each year, Network Rail are planning station upgrades to meet this growing demand. Planned developments are:

- Full refurbishment of the roof, involving extensive metal and woodwork repairs and the complete re-glazing of the roof and platform canopies. Scaffolding will be erected towards the end of 2020 and work will continue to 2023.
- From 2020 until early spring 2022, the electricity supply will be rewired to separate it into three independent supplies to improve capacity and resilience.
- A new eastern entrance is planned to offer better access to the new university campus and is scheduled for completion in 2022 (Network Rail, 2020).

1.6.7.2. Bristol Portway Station

A proposed new railway station for the Severn Beach line, between Shirehampton and Avonmouth stations, will be built on land adjacent to the existing Portway park and ride site off the A4. Funding has been secured and plans are in development with the aim of completion in 2021 (Network Rail, 2020).

1.6.7.3. Electrification

The electrification of Bristol Parkway to Bristol Temple Meads and Bath Spa to Bristol Temple Meads has been 'deferred indefinitely' due to budget issues (Rail Journal, 2020).

1.6.7.4. Portishead

As the population of Portishead increases, there are plans to reconnect the disused railway line in Portishead, and build new stations at Portishead and Pill. This development is predicted to be completed in 2024 (North Somerset Times, 2020).

1.7. Politics

1.7.1. Central Government

1.7.1.1. Departure from the European Union (EU)

On the 31st January 2020 the UK left the European Union (EU) and entered into a transition period. On the 31st December 2020, the UK completed its formal separation from the EU. As part of this separation the EU and UK negotiated a new trade deal, this new deal sets out the buying and selling of goods tax limits and outlining rules and standards on workers' rights and social and environmental regulations that will remain shared. The new trade deal may have an impact on procurement, compliance with legislation and UK FRS budgets, see *section 2.13 Legal*.

1.7.1.2. General Elections

The next General Election will be in May 2022 under the Fixed-term Parliaments Act 2011. AF&RS should be aware of any changes to central Government which could lead to changes in policy and funding.

1.7.2. Local Government

1.7.2.1. Elections

Local Government elections take place at least every four years, however not all Local Government elections will take place at the same time.

Bristol last held local elections in May 2016, with the next election due in May 2020. However, due to the COVID-19 pandemic this was postponed until May 2021, alongside the Police & Crime Commissioner (PCC) elections. BANES, South Gloucestershire and North Somerset all last held local elections in May 2019, and while no dates have been confirmed, the expectation is that elections will be held in May 2023, as previously elections had run every four years.

Local councillors are key to responding to queries, issues, planning and regulation requests, and developing council strategies and policies.

1.7.2.2. West of England Combined Authority

West of England Combined Authority (WECA) was established in 2017. The concept was to deal with local decision-making that had previously been handled by Central Government. WECA was originally to include the four Unitary Authorities that make up the AF&RS area; however, North Somerset rejected the proposal. Therefore, WECA comprises of Bath & North East Somerset, Bristol, and South Gloucestershire.

While WECA does not have a direct impact on the Fire and Rescue Service, its running or budgets, it does make decisions on homes, transport and adult education/skills required in its area to ensure economic growth. With this in mind, AF&RS must be aware of proposals and decisions the WECA makes as this can have an impact on the risk profiling of its Service area, and how effectively it matches its resources to the identified risks.

1.7.2.3. Fire Authority

In 1996, following the abolition of Avon County Council, the Avon Fire Authority (AFA) was formed. Avon Fire Authority is a corporate body and for many purposes has the status, rights and duties of a Local Authority under the Local Government Act 1972 and other local government legislation.

The Authority provides governance to AF&RS and consists of Elected Members who are Councillors appointed by the four Unitary Authorities in the former County of Avon area and is referred to as the Combined Fire Authority to reflect its legal status. The number of Councillors is chosen in proportion to the number of people entitled to vote in their respective area.

Unitary Authority	Allocated Members
Bath & North East Somerset	3 members
Bristol	8 members
North Somerset	4 members
South Gloucestershire	5 members

In December 2020, the Fire Authority granted an application of the current incumbent of the post of PCC for Avon & Somerset to join the Fire Authority with voting rights, which brings the current Fire Authority membership to 21 individuals. Following local elections in May 2021, the new PCC will have to be re-invited to the Fire Authority to maintain its voting rights.

Local elections are due to be held in May 2021, which may result in a change in the local political landscape. The Elected Members between themselves reach a consensus on who should fulfil the role of Chair to the Fire Authority, and share between the political

parties the role of Chair for each of the three Committees and Local Pension Board and attempt to achieve as far as possible political equilibrium in Committee membership.

1.7.2.4. Health and Wellbeing Board

The Health and Social Care Act 2012 required the establishment of a Health and Wellbeing Board for each upper-tier local authority in England. The core purpose of the board is to join-up commissioning across the NHS, Social Care, Public Health and other services that it agrees are related to health and wellbeing.

Each Unitary Authority Health and Wellbeing Board must also annually produce a Joint Strategic Needs Assessment to determine and address health and wellbeing needs within its authority.

2. Our Organisation

2.1. Introduction

Avon Fire & Rescue Service delivers a wide range of fire, rescue and community safety services across its Service area. In order to reduce the risk in its communities, we must ensure there are sufficient levels of staff and equipment available to provide those services. This is in line with AF&RS's mission:

*To improve public safety through **Prevention, Protection, Response and Resilience.***

This section of the Strategic Assessment will explore the issues that impact AF&RS as an organisation, and those which must be considered to ensure AF&RS can continue to achieve its mission and vision.

2.2. Operational Preparedness and Resilience

2.2.1. Crewing/Resource Levels - People Capacity, Capability, and Representation

The Local Government Association (LGA) produced a report called 'An Inclusive Service Twenty-First Century Fire and Rescue Service (February 2017)'. The report identifies that the Home Office has made increasing the diversity of the firefighter workforce a key priority as part of the fire reform program; it suggests that the ageing workforce would present opportunities for FRS's to fulfil this ambition.

Recruitment is happening for both on-call and whole-time firefighters over the next five years. For whole-time, this will be particularly over the next two years. This makes it even more important to take what opportunities AF&RS do have to recruit a more representative operational response workforce (Local Government Association, 2017).

2.2.2. Reduced Crewing Levels – Contingency Measures

Occasionally, when large and protracted incidents have a high demand on resources, AF&RS has contingency measures in place to ensure fire cover across the Service area. These can include, but are not limited to the relocation of mobile assets to strategic places in order to maintain response standards. Monitoring the need to invoke FRS Act 2004 13/16 'cross-border' arrangements. An example of a specific use of 13/16 arrangements was during the Strachan and Henshaw fire in May 2019 which saw AF&RS augment its aerial appliance capability with help from Gloucestershire FRS.

It is expected that a number of different scenarios could result in high absence levels, including but not limited to Severe Weather Events, Pandemic Flu and Severe Fuel Shortage Events. It is anticipated that any of these events could impact on AF&RS's ability to provide the same level it would under normal conditions.

As seen during the COVID-19 pandemic, the Service has remained resilient working in accordance to its Degradation Plan. The Degradation Plan exists to maintain, as far as is reasonably practicable, a work force to fulfil AF&RS's statutory duties in the event of a

high loss of staff. For example, the Control Degradation Plan was successfully used during the COVID-19 pandemic, where serving or retired groups of staff who were competent enough to deliver a control room function were identified and trained as a resilience measure.

2.2.3. Industrial Action

The impacts of industrial action by Grey or Green Book staff presents direct and indirect risks to AF&RS's service provision. To a lesser extent, industrial action outside the Service can present a risk to property and the potential for public disorder, *see section 3.5.1 Public Disorder & Protests*.

AF&RS also need to be aware that industrial action could cause a number of issues for example:

- **Disruption to essential services** – Services that AF&RS provide, or rely on.
- **Disruption to business** – Via lost working hours.
- **Potential for the public disorder** – AF&RS, while not involved in policing, still have the statutory responsibility to save lives and, where the situation permits, to save property.
- **Economical** – Disruption to services/businesses could have financial implications that have an impact on businesses and the UK economy, which could potentially affect fire service funding.

2.2.4. Fuel Shortages

All organisations rely to some extent on fuel, whether it is for getting staff to work, distributing products or providing services. The availability of fuel within the UK is generally very good; however, there have been brief disruptions to supply on both a regional and national basis.

A disruption can be caused by a number of factors, including scarcity of supply, a technical problem with part of the fuel supply infrastructure, industrial action or public protest. In the event of such a disruption to supply, it is also possible that stocks are further depleted through increased panic buying.

There is a history of fuel shortage events in the UK. In 2000, blockades at key oil distribution points caused nationwide fuel shortages for over one week (BBC, 2000). Threats of similar action in 2005 led to panic buying which caused localised disruptions across the country (BBC, 2012). The industrial action taken by Shell tanker drivers in 2008 had a widespread effect on fuel distribution throughout the UK resulting in some filling stations running out of fuel (Weaver, Lewis, & Macalister, 2008).

Fuel shortages could mean we are unable to provide essential services to the public without sufficient resilience in place. AF&RS has business continuity plans in place to cover fuel shortages, which are periodically under review. Furthermore, the National Emergency Plan for Fuel sets out AF&RS's approach to maintaining its fuel supplies in an emergency (NRR, 2020).

2.3. Operational Response

2.3.1. National Operational Guidance

The National Operational Guidance (NatOG) programme, referred to in AF&RS documentation as NatOG, is a partnership between the National Fire Chiefs Council (NFCC), the Local Government Association, Home Office's Chief Fire and Rescue Adviser and the London Fire Brigade. It creates and delivers an online framework that delivers policy and tactical guidance, and supports local FRS's to develop safe systems of work that are interoperable between Services. In April 2018, the programme delivered its last piece of guidance and will continue under the NFCC Central Programme Office (CPO), who will continue to review guidance and incorporate any learning identified by the fire sector.

National Operational Guidance spans a wide range of activity. A framework created to navigate guidance considers the hazards encountered at incidents and the measures used to control or eliminate them. The guidance is structured so that it starts with the elements that affect all incidents, then explore the environments in which we work and, finally, the activities that we do.

In implementing NatOG, AF&RS will need to take account of any limitations in the information contained within the guidance framework and ensure that these areas are covered through locally produced detailed procedural guidance. Opportunities should be explored through regional collaboration to achieve this.

2.3.2. Medical Response

There is an on-going national debate regarding FRS's as a potential 'health asset'. The debate revolves around co-responding and the wider Emergency Medical Response, which is currently not a statutory function for Fire and Rescue Services.

As a result of the COVID-19 pandemic, personnel have further supported AF&RS's partners within South West Ambulance Service Trust (SWAST) by driving ambulances as per the Tripartite Agreement, to further increase their response capacity during the pandemic. As the pandemic developed, crews' involvement moved from Phase 1 where they were supporting Emergency Care Assistance to lower risk calls, up to Phase 2 where crews were riding with fully trained Paramedics.

AF&RS will in all probability return to normal working once the UK has moved out of recovery phase of the pandemic. However, the response during this time may add to any debates regarding the role of the FRS within medical response.

2.3.3. Operational Attendance Response Times

Response standards by FRS's across the country vary due to the local assessment of risk. The Government monitor performance of all FRS's and provide annual performance data.

There is no straightforward relationship between response times and the outcomes of a fire, as the type of fire and the time elapsed before the fire was discovered (both outside

the control of FRS's), as well as other factors will also have an influence on the outcome. However, it is sometimes assumed that slower response times would be associated with greater instances of casualties/rescues and larger areas of damage due to the later starting of firefighting activity.

On 1st April 2020, AF&RS launched their new response standards, which aligned the speed of response by the risk posed by an incident. This was achieved by categorising incidents into 'Emergency: critical', 'Emergency: non-critical' and 'Non-emergency' categories.

2.4. Pensions

2.4.1. Unfunded Pension Schemes

The Firefighters' Pension Scheme (FPS) and the New Firefighters' Pension Scheme (NFPS) are both statutory, tax-approved unfunded occupational pension schemes. Unfunded pension schemes receive monies from a combination of employer and employee contributions. Unfunded public sector pension contributions increased from 2019. This estimated increase in employer contributions for 2019/20 equates to an assumed approximate of 3% of pay, costing an additional £900k across the Service.

In June 2019, the Supreme Court refused the Government's application to appeal a court case which ruled that changes made to judges and firefighters' pension schemes were discriminatory. The chief secretary to HM Treasury, revealed that if the Government lost it could cost around £4bn a year if extended to all applicable public service pension schemes. On the 4th February 2021, the Government addressed the discrimination case by publishing its consultation response on how to remove the discrimination identified by the courts in the 2015 pension reforms through changes to primary legislation and Firefighters Pension Schemes regulations.

2.4.2. Funded Pension Schemes and Local Government Pension Schemes

Bath & North East Somerset Council administer the Local Government Pension Scheme (LGPS), known as the Avon Pension Fund. All AF&RS employees, other than those who are eligible to be members of the Firefighters' pension scheme, can join the LGPS. The LGPS is a defined benefit pension scheme, which means that your pension is calculated using a set formula. How your pension is calculated depends on when you joined the scheme. The scheme was a final salary one before 1 April 2014, and a Career Average Revalued Earnings (CARE) scheme after 1 April 2014.

The Fund's Actuary carries out a valuation of the Fund every three years in accordance with Government regulations. If the valuation indicates that there are insufficient assets to meet future liabilities, employer contribution rates are elevated to make up the shortfall. The latest valuation was on the 31st March 2019 with a total funding of 98% (LGPS 2019).

2.5. Pay Awards

The current budget for 2021/22 gained approval from Members of the Fire Authority at their meeting on 10 February 2021 and the Medium Term Financial Plans 2021/22 to

2024/25 gained approval from Members of the Fire Authority at their meeting on 24 March 2021.

The pay budgets have been reviewed and rebased for 2021/22.

From the 1 April 2020 Green Book (Corporate staff) were awarded a 2.75% pay increase and from 1 July 2020 Grey Book (Operational staff) were awarded a 2% pay increase.

2.6. Gender Pay Gap Reporting

In April 2017, it was enacted into legislation that all employers with more than 250 staff must annually report their gender pay gap information in the following four areas:

- Gender pay gap (mean and median averages),
- Gender bonus gap (mean and median averages),
- The proportion of men and women receiving bonuses,
- The proportion of men and women in each quartile of the organisation's pay structure.

On 31 March 2018, the reported AF&RS gender pay gaps were 2.6% average, 0% median. The mean and median gender pay gaps at AF&RS are relatively small which indicates that women at AF&RS are not significantly disadvantaged compared to their male colleagues on the issue of pay. However, AF&RS cannot be complacent about improving gender equality within its workforce and must continue to monitor and strive for equality.

The deadline for reporting in 2019/2020 was 30th March 2020. However, the enforcement of reporting deadlines were eased due to the COVID-19 pandemic.

"We recognize that employers across the country are facing unprecedented uncertainty and pressure at this time. Because of this we feel it is only right to suspend enforcement of gender pay gap reporting this year" - Minister for Women & Equalities, Liz Truss, and EHRC Chair, David Isaac.

The next report must be submitted by the 30th March 2021.

2.7. National Fire Chiefs Council (NFCC)

The NFCC came into effect on 1 April 2017 and is the professional voice of the UK FRS's and the co-ordinating body for all matters in relation to the Fire Sector.

The NFCC drives improvement and development throughout the UK FRS's and supports strong leadership of the UK FRS's, including the devolved administrations. The NFCC enables locally accountable Chief Fire Officers, or their representatives, to coordinate the work of the UK FRS's to protect the public and improve community safety.

2.8. The Formation of Fire Standards Board

The Fire Standards Board was formed in January 2019, their role will be to oversee the identification, organisation, development, and maintenance of professional standards for FRS in England. They will provide oversight and approval of standards, monitor the effectiveness supporting continuous improvement and engage with key stakeholders.

The Fire Standards will seek to state, 'What good looks like'. It will work with the inspectorate to develop and to ensure their judgment criteria, reflect the standards as they are approved.

"The aim is to look at the standards in two ways. Those, which enhance the profession and therefore are very specific to the trade and those, which help it, run as an efficient and effective service." - Joy Flannagan, Head of National Portfolio Quality & Standards NFCC.

AF&RS must monitor the works of the Fire Standards Board so we can ensure operations reflect changes in professional standards.

2.9. Procurement

AF&RS, along with many public sector organisations, rely on effective procurement within its supply chain to deliver the efficiencies and outcomes it requires and that its stakeholders require.

The regulations that apply to public sector contracts pertain to value, or 'threshold'. Thus public procurement methods are different from those used by private companies.

These public sector regulations are in place to make sure the procurement process is fair for all involved; there is, therefore, an added pressure on AF&RS to have policies and systems that ensure procurement procedures are followed, and employees have sufficient knowledge and training to carry procurement and have sufficient contingency planning in place to support service delivery.

2.10. Technology

2.10.1. Emergency Services Network

The Emergency Services Network (ESN) will be the new communication system used by all emergency services and other public safety users in the UK. It is based on the latest technology, delivering voice communication and broadband data services. The new ESN will be an essential part of Britain's critical national infrastructure. It will enable Police, FRS, and Ambulance Services to keep up with the latest technological developments rather than locked into using a proprietary product.

During the transition period, there will be no risk to public safety. The existing communications network, Airwave, will continue to operate until the emergency services have completed transition onto the new ESN. Airwave will cease at the end of 2022 (with a further one-year contract extension until 31 December 2023 if required). The ESN product containing all the required functionality (called 'ESN Prime') will be

available at the end of 2020. While some FRS's intend to take earlier products, AF&RS intend to wait until others prove the products, prior to migration.

In May 2019, the development and roll out of ESN were heavily criticised in a report by the National Audit Office for delays and cost over-run. AF&RS are actively taking part in preparing for implementation of the ESN, but need to be cognisant of the comments of the National audit office and any knock on impacts that this may have throughout the life of the project.

2.10.2. IT systems

See also 3.6.4 Cyber Attacks

IT systems and digital technologies offer the opportunity to deliver better outcomes for AF&RS staff and the community. Digitisation can provide smarter, more effective ways for the Service to operate. This can be through streamlined efficient management systems that enable effective, efficient communication, document management and creation and tools that securely record data to name but a few. IT systems are now also enhancing operational capability on the fire ground with many emerging technologies that have been developed to improve firefighter safety and reduce the risk to members of the public.

An example of the potential offered by digitisation is the introduction of a replacement Incident Command Unit which will be used at large incidents providing commanders with access to the complete range of AF&RS system from the fire ground. Likewise, the introduction of a new Mobile Data Terminal (MDT) on all appliances providing risk critical information to fire crews throughout the Service area.

2.10.3. Remote working

It has been predicted that following the COVID-19 pandemic, the remote working arrangements implemented in line with the government's lockdown guidance may continue in some capacity as part of the 'new normal' (Hern, 2020). A preference for continuing some, or all, remote working has already been identified in AF&RS staff Response & Recovery Debrief form submissions.

Remote working has its own benefits of:

- Higher attendance rates for meetings;
- Lower environmental impact;
- Improved work life balance, and in turn improved mental health for employees;
- Increased productivity;
- Higher retention rates;
- Reduced costs for office space (Farrer, 2020; Quenqua, 2020).

However, considerations must be made so that:

- Staff have the equipment and technology needed to work safely;
- Managers keep in regular contact with employees;
- Staff do not become isolated and experience negative impacts on their mental health;
- Reasonable adjustments are made where appropriate;

- IT systems can handle the increased levels of remote working (ACAS, 2020).

2.10.4. System Failures

System failure is a broad category of risk, it includes; utilities, financial and telecommunication systems. Loss of these services can cause disruption, physical and psychological casualties, damage to infrastructure and economic damage (NRR, 2020).

System failure for AF&RS could have dire consequences on response times, situational awareness, and a lack of capacity to respond to an incident.

2.11. Health, Wellbeing and Morale

Research carried out by the FireFighters Charity found that there were 41,000 shifts lost nationally in the past year because of mental health issues (Firefighters Charity, n.d.) An AF&RS review highlighted that just over half of staff agreed or strongly agreed that they found work mentally exhausting (Avon Fire and Rescue Service, 2018).

The new findings substantiate research undertaken last year by the Mind mental health charity's Blue Light Programme which found that 27% of firefighters had contemplated suicide due to stress or poor mental health, with post-traumatic stress disorder (PTSD) commonplace (Mind, 2016).

AF&RS has recently recruited an additional Health and Wellbeing Advisor to address these risks. Other strategies in use by AF&RS are:

- The review and updating of the Mental Health and Wellbeing Action Plan.
- Launching the Wellbeing Assessment which will replace the current stress risk assessment as a tool to assess and evaluate individual mental health and wellbeing, including:
 - Developing a suitable Wellbeing Assessment template and associated guidance which supports the completion of the assessment;
 - Training and guidance for managers concerning mental health and managing/holding conversations around mental health and wellbeing;
 - E-learning module for all staff concerning mental health and wellbeing;
 - Developing a welfare case management procedure which outlines how cases will be supported between both Health and Wellbeing Advisers.
- Mental Wellbeing awareness campaigns:
 - Developing a campaign calendar concerning health and wellbeing events;
 - Launch of podcasts which share staff experiences of mental ill health;
 - Hosting of wellbeing drop in sessions;
 - Hosting of monthly wellbeing workshops.

2.12. Her Majesty's Inspectorate of Constabulary and Fire & Rescue Services (HMICFRS)

In 2017, the role of HM Inspectorate of Constabulary (HMIC) was widened to include inspection of fire and rescue services in England. This was one element of the Government's fire reform programme announced in 2016 and uses legal powers created in the Policing and Crime Act 2017 that amended the Fire and Rescue Services Act 2004.

The first round of FRS inspections in 2018/19 provided a baseline assessment of their current performance against the three pillars of effectiveness, efficiency and people. These were summarised in HM Chief Inspector's inaugural annual State of Fire & Rescue report published in January 2020. For Avon Fire & Rescue Service, the Inspectorate's graded judgments resulted in a significant improvement action plan consisting of 102 actions including those included in our commitment to cultural change published in March 2019. The impact of COVID-19 then led to a 12-month delay in HMICFRS' second round of 'all service' inspections but the results of a thematic review of our work during the first months of the pandemic undertaken in the autumn of 2020 were extremely positive.

Avon Fire & Rescue Service has been allocated to Tranche 1 of Round 2 of HMICFRS inspections and virtual fieldwork commences in May 2021. The results are due to be published in winter 2021.

HMICFRS inspection activity is strategically important to Avon Fire Authority and Avon Fire & Rescue Service as any adverse conclusions can ultimately lead to formal intervention measures under section 22 of the Fire and Rescue Services Act 2004 (as detailed in the Fire and Rescue National Framework for England), a loss of confidence in the Service from the communities we serve, and potentially significant reputational damage. However, the inspection process also provides important opportunities to promote continual improvements in our service delivery and highlight best practice across English fire and rescue services.

2.13. Legal

This section of the Strategic Assessment 2021 will detail the legislation that AF&RS is bound by.

⚠ Important information ⚠

Legislation changes as a result of leaving EU

The UK is no longer member of the European Union (EU). Any EU legislation which applied directly or indirectly to the UK before 11.00 p.m. on 31 December 2020 ("EU exit day") has been retained in UK law as a form of domestic legislation known as 'retained EU legislation'.

AF&RS staff who work in areas of the Service where compliance with any legislation is part of their role should check and monitor their particular legislation to ensure changes are considered. [Legislation.gov.uk](https://legislation.gov.uk) is a useful resource as it tracks changes made, and notifies users if legislation is affected by EU change.

Due to the high volume of changes being made upon the UK's departure from the EU, there may be legislation covered in this section of the assessment that has experienced, or will experience, amendments (UK Government, 2021).

2.13.1. Fire & Rescue Services Act 2004

The Fire & Rescue Service Act 2004 covers various aspects of UK Fire and Rescue authorities (FRA) and UK Fire and Rescue Services (FRS):

Part 1 - FRAs (sections 1 to 5); determines the body of an FRA for an area.

Part 2 - Functions of FRAs (sections 6 to 20); defining statutory functions, discretionary powers, provision of assistance, discharging of function by others, an authority's ability to charge for services, and powers at or under sea.

Part 3 - Administration (sections 21 to 31); provides for the preparation of a Fire and Rescue National Framework setting out the strategic priorities of the FRS and the supervision. It makes supplementary provision for the Secretary of State to provide equipment and training centres.

Part 4 - Employment (sections 32 to 37); deals with the employment of the FRS, particularly creation of negotiating bodies for terms and conditions and pension schemes.

Part 5 - Water Supply (sections 38 to 43); imposes duty on FRA's to ensure adequate supply of water is maintained for fire-fighting activities.

Part 6 – Supplementary (sections 44 to 54); concerns the powers of FRA to undertake rescue work, investigations and consequential provision and repeals.

Part 7 – General (sections 55 to 64); indicates the general provision in relation to pre-commencement consultation, interpretation, statutory instruments and territorial extent.

Sections 6-9 outline the core functions of FRAs are responsible for, and would be considered statutory:

Fire safety - A fire and rescue authority must make provision for the purpose of promoting fire safety in its area.

Fire-fighting – Make provisions for the purpose of extinguishing the fire, and protecting life and property in the event of fires in its service area.

Road Traffic Collisions – Make provisions for the purpose of rescuing people in the event of road traffic collisions, and protect people from serious harm to the extent that is reasonable to do so within its area.

Emergencies - The Secretary of State may by order confer on a fire and rescue authority functions relating to emergencies, other than fires and road traffic accidents. An order under the emergencies section may require functions conferred on a fire and rescue authority under this section to be discharged outside the authority's area.

Two additional responsibilities were added with the *Fire and Rescue Services (Emergencies) (England) Order 2007*:

Chemical, Biological, Radiological and Nuclear (CBRN) - Removing chemical, biological, or radio-active contaminants from people in the event of an emergency involving the release or potential release of such contaminants; and containing any water used for a reasonable period of time.

Rescue and protection in case of certain emergencies - Freeing people from collapse structures and non-transport wreckages.

Section 11 states that a FRA may take action it considers appropriate at an event or situation that has risk of one or more individuals to die, be seriously injured or become seriously ill, and/or; cause serious harm to the environment, including the life to health of plants and animals; this would be discretionary functions such as flooding.

Another key element of the Fire & Rescue Services Act 2004 is the Reinforcement Schemes and Arrangements for Discharge of Functions by Others, often referred to as the 13/16 arrangements referring to the two sections that define the collaborative working between FRAs to support and reinforce one another.

The Fire & Rescue Services Act 2004 sets out that a FRA must, as far as practicable, enter into a reinforcement scheme with other FRAs for securing mutual assistance for response and rescue duties (Fire Safety, 2019).

FRSs are also permitted to enter into arrangements with any other person or persons to carry out response and rescue duties, with a caveat written in the Act that specifies any arrangements for the function of firefighting can only be put in place if the person or persons employs firefighters.

2.13.2. Health & Safety at Work Act etc. 1974

The Health and Safety at Work etc Act 1974 (HSWA) is the primary piece of legislation that places a duty on all employers "to ensure, so far as is reasonably practicable, the health, safety and welfare at work" of all their employees. The Act also places a duty on employers to ensure, as far as reasonably practicable, people not employed by them who may be affected by their activities, are not exposed to risk.

The Health and Safety Executive (HSE) recognises that firefighters and managers "face difficult moral dilemmas and have to make decisions in what are sometimes extremely hazardous, emotionally charged and fast-moving situations" during the emergency response (Health and Safety Executive, 2010). In Great Britain, the HSWA applies to all activities of FRA's as the employers of FRS staff.

The HSWA requires employers to ensure the health, safety, and welfare at work of their employees and that their operations do not adversely affect the health and safety of other people. These health and safety duties are not absolute and each, qualified by the test of what is reasonably practicable, striking the balance between operational and health and safety duties in the FRS. The HSWA, therefore, does not require all risks to be eliminated, and Health and Safety Executive recognises that *"even when all reasonably practicable precautions have been taken to deal with foreseeable risks, harm could still occur"* (Health and Safety Executive, 2010).

While the HSWA outlines the primary responsibility for AF&RS in relation to health and safety of its workplace, it should be used in conjunction with other relevant legislation such as:

- The Management of Health and Safety at Work Regulations 1999
- The Provision and Use of Work Equipment Regulations 1998
- The Health and Safety (Display Screen Equipment) Regulations 1992
- The Manual Handling Operations Regulations 1992
- The Workplace (Health, Safety and Welfare) Regulations 1992
- The Personal Protective Equipment at Work Regulations 1992

2.13.2.1. Driving

AF&RS utilise heavy goods vehicles, commercial vehicles, and cars for both blue light and normal driving. Consequently, there is risk for damage to vehicle and property, but primarily injury or even death to employees. More than a quarter of all road traffic incidents involve somebody who is driving for work (HSE, 2019). Failure to comply with the HSWA for work-related driving could result in prosecution under the Corporate Manslaughter and Corporate Homicide Act 2007 and non-compliance with Management of Health and Safety at Work Regulations 1999.

2.13.2.2. Remote Working – COVID-19

Through the rise of remote working due to COVID-19, the Service must maintain the standards required by **The Workplace (Health, Safety and Welfare) Regulations 1992** – including equipment, devices and systems, appropriate ventilation, temperature, lighting, cleanness – at remote workplaces of employees. AF&RS should continue to provide all the necessary software and hardware equipment to meet these regulations for its employees.

The impacts of AF&RS not complying with the HSWA are staff injuries, impacts to AF&RS operations, reputational damage, and prosecution.

2.13.3. Civil Contingencies Act 2004

The Civil Contingencies Act 2004 (CCA) is the framework for emergency response in the UK, the CCA separates responders into Categories 1 and 2. Category 1 responders have a greater set of duties than Category 2. AF&RS falls into Category 1, which sets out the following duties:

- *Assess the risk of emergencies occurring and use this to inform contingency planning.*
- *Put in place, emergency plans.*
- *Put in place, business continuity arrangements.*
- *Put in place, arrangements to make information available to the public about civil protection matters and maintain arrangements to warn inform and advise the public in the event of an emergency.*
- *Share information with other local responders to enhance coordination.*
- *Co-operate with other local responders to enhance coordination and efficiency.*
- *Provide advice and assistance to businesses and voluntary organisations about business continuity management (Local Authorities only).*

2.13.4. Control of Major Accident Hazards Regulations 2015 (COMAH)

See also 3.4.1 Industrial Site Incidents

The Control of Major Accident Hazards (COMAH) Regulations 2015 came into effect on 1 June 2015, with the aim to ensure businesses take all necessary measures to prevent and mitigate the effects of major accidents involving dangerous substances causing serious damage and harm to people and the environment. COMAH treats environmental risk as seriously as it does risk to people. COMAH regulations apply to all sites which have qualifying quantities of dangerous substances; sites can be either upper tier or lower tier, depending on the quantities of those hazardous substances (HSE, 2015).

Under COMAH all on-site emergency planning is the responsibility of the individual organization operating the COMAH site; any off-site emergency planning is the responsibility of the competent Local Authority in consultation with the site operator.

Plans for a system of managing information in the event of a major accident must ensure that necessary information is available to people on and off-site, and the

emergency services and other Authorities identified within the plan as having a role to play and requiring information.

2.13.4.1. Upper Tier – Internal Emergency Planning

The responsibility of identifying, profiling, and managing the major hazard risks lays on duty-holders within the site whom create these risks. They are also responsible for systematic assess and legal compliance (HSE , n.d.).

Upper Tier COMAH sites need to test their emergency plans annually. AF&RS should be consulted with during the preparation of the plan and have confirmed that adequate arrangements are in place (HSE, 2009). Testing an emergency plan may consist of a live exercise or a tabletop exercise supported by the testing of other components (which may be done at separate times), including the communication arrangements. If the plan at any time is inspected by the Competent Authority (CA) as seriously deficient the CA can prohibit the operation of that establishment.

AF&RS staff with a role to play in emergency response should also arrange to undertake site familiarisation visits.

2.13.4.2. Upper Tier – External Emergency Plan

The external emergency plan details the roles for emergency services, Local Authorities, and other external organisations in the event of a major accident. This includes the arrangements established to help with the emergency response on site. The degree of planning should be proportionate to the probability and consequences of the accident occurring.

The local authority should develop these arrangements in consultation with the emergency services and health bodies for the area near the establishment. The arrangements should give directions for coping with any incidents with off-site consequences. AF&RS must be consulted during the preparation of the plan and they must confirm that adequate arrangements are in place. If an operator anticipates that an external emergency service would provide firefighting foam media it should be confirmed that the emergency service supplies this.

It is important that the public receive general information about how they, in the event of a major accident are alerted. For upper-tier establishments, this agreed process with the emergency planners and emergency services may be involved in dealing with an accident.

2.13.5. Regulatory Reform (Fire Safety) Order 2005 (RRO)

The RRO 2005 is the current legislation enforcing fire safety standards. This has given FRS's control of fire safety legislation in all types of building uses. Previously FRSs relied on other Authorities to enforce the fire safety measures after consultation with the Service.

The exemption to that is fire safety within Houses in Multiple Occupation (HMO). In this case, AF&RS must operate through an agreed protocol with the Environmental Health Department, as the RRO does not extend to the private areas of HMO's.

AFA must enforce these regulations and part of that enforcement role is to carry out an audit of the relevant risk assessment. The audit result produces five compliance levels, starting at level one (above average) to level five (prohibition likely). Under the RRO, there is also the ability for the AFA to prosecute, where appropriate.

Failure to enforce these regulations carries legal and financial consequences, for AF&RS. In addition, this could lead to an increase in fires, incidents, and death or injury because of fire and incidents within the AF&RS area.

2.13.5.1. Amendment to Regulatory Reform (Fire Safety) Order 2005

After the conclusion of a 'call for evidence', the Fire Safety Bill (FSB) will amend the Regulatory Reform (Fire Safety) Order 2005 (Home Office, 2020).

The FSB is to ensure building owners of multi-occupied, residential buildings fully consider structure, external walls, balconies and flat entrance doors to ensure the reduction of fire risk (UK Government, 2020). The FSB will also allow Secretary of State for Housing, Communities and Local Government to amend the list of qualifying premises that falls under the scope of RRO by way of secondary legislation to trigger a quick response to developments in the design and construction of buildings (UK Government, 2020) This therefore will empower AF&RS to take enforcement action to hold building owners to account if they are not compliant (UK Government, 2020)

The FSB was under the third reading in the House of Lords on 24th of November 2020 and the date of the next event is expected to be announced in 2021 (UK Parliament, 2021).

2.13.6. Building Act 1984 & Building Regulations 2010

As the enforcing authority for the RRO 2005, the FRSs role is to continue to provide assured advice and guidance to enable the business community to create an environment within which people can live and work safely (UK Government, 2020). AF&RS will need to work collaboratively with its partners in a number of key areas, namely licensing, building regulations, and housing. This consultative process will ensure that AF&RS meet its statutory responsibilities in engagement with local authority departments and the RRO 2005 (UK Government, 2021).

AF&RS need to provide support and guidance to its business community through inspections and consultations. AF&RS must make businesses aware of their responsibilities, and provide them with help and support so they understand their own risk and the importance of business continuity. In the event of serious non-compliance, where 'coach to comply' is insufficient, enforcement action taken in accordance with the requirements of the RRO and in line with AF&RS enforcement policy and procedures (UK Government, 2021).

2.13.7. Building Safety Bill

As part of “Building a Safer Future”, on the 20th July 2020, the Government published the Draft Building Safety Bill (BSB). The bill is currently in draft form to enable consultation and scrutiny before being introduced to Parliament, where it will be examined by a Parliamentary committee who will report with feedback and recommendations before the bill is finalised (MHCLG, 2018).

Reflecting on the large and complex reforms needed the BSB will fundamentally reform the building safety systems (UK Government, 2020). This will be achieved through greater accountability and responsibility for fire and structural safety.

The new Building Safety Bill will:

- Oversee the new more stringent regime for higher-risk building.
- Drive improvements in building safety and performance standards in all buildings (New Homes Ombudsman).
- Ensure that residents have strong voice in the system (Accountable Person).
- Drive industrial cultural change and incentivising compliance, and;
- Provide stronger and clearer national framework for oversight of construction products (UK Government, 2020).

This will give AF&RS and Local Authorities the power to ensure building owners manage fire risks in their buildings.

2.13.8. Data Protection

There are two over-arching data protection legislations that all UK businesses and organisations must comply with, these are Data Protection Act (DPA) 2018 and the UK General Data Protection Regulation (GDPR) 2021. These have replaced the Data Protection Act 1998 and the EU General Data Protection Regulation 2016. This legislation provides individuals with a number of rights regarding their data, as well as controlling how AF&RS can use and store it.

Information must be:

- processed lawfully, fairly and reasonably
- accurate, kept up to date, and kept no longer than necessary
- only collected if necessary and relevant for the procedure
- kept securely, and disposed of safely as soon as no longer required.

There have been significant enhancements as well as new elements since the publication of newer legislation, such as a new accountability requirement for organisations, higher fines for non-compliance, and mandatory requirements for some policies and processes (including a Record of Processing Activity (ROPA), a Retention Policy, impact assessments, and the provision of regular staff training).

While the consequences of non-compliance could potentially be legal and financial, they will also carry the risk of reputational damage with data breaches and misuse of data receiving high levels of media coverage. A recent example of this is the Facebook and Cambridge Analytical data scandal, which resulted in negative media coverage, a loss of customers, and multiple lawsuits.

2.13.9. Freedom of Information Act 2000

The Freedom of Information Act (FoIA) 2000 and the Environmental Information Regulations (EIR) 2004 are part of a commitment to 'Open Government'. Broadly speaking the aim is to make it easier for anyone to ask to see what information public services hold, and use it to check on what they are doing with a view to seeing if they are delivering good 'value for money'. The FoIA and EIR currently only apply to public authorities and not to private businesses.

2.13.10. Emergency Workers Obstruction Act of 2006

The Government recognises the essential work carried out by the emergency services, and the need to operate unimpeded, without encountering abuse or violence introduced The Emergency Workers Obstruction Act 2006. The act makes it an offence to obstruct or hinder persons who provide emergency services, and for connected purposes.

2.13.11. Localism Act 2011

The Localism Act 2011 changes the powers of local government in England. The aim of the Act is to give effect to the government's ambition to decentralize powers into the hands of local councils, communities, and individuals to act on local priorities. The Act gives councils more freedom and confidence to do more creative and innovative things to meet people's needs.

2.13.12. The Equalities Act 2010

The Equalities Act 2010 brought together what was previously 116 separate pieces of legislation into one single legal framework to protect the rights of individuals and advance equality of opportunity for all.

The Act protects everyone in the UK against discrimination. Discrimination can be broken down into four main types; direct and indirect discrimination, harassment and victimisation.

The Equalities Act covers nine protected characteristics; these are:

- age
- disability
- gender reassignment
- marriage and civil partnership
- pregnancy and maternity
- race
- religion or belief
- sex and
- sexual orientation

AF&RS are aware that language is always evolving, and it has been argued that the use of 'gender reassignment' in this legislation is 'outdated' and 'misleading'. Stonewall (2016) argues the term should instead be 'gender identity' to be more inclusive and understanding. Additionally, AF&RS have an ongoing commitment to Diversity, Inclusion, Cohesion and Equality (DICE), and creating a more inclusive workplace. Its DICE approach includes closing the gender and ethnicity pay gap, and continued support for LGBTQ+ communities.

AF&RS complies with equality law and implements good practice in all aspects of employment including recruitment, pay, working hours, managing staff and developing policies. Consequences for breaching equality laws could lead to actions such as unfair dismissal; it is worth noting that there is no limit on compensation awards in discrimination cases. This would also have a negative reputational impact and be in contradiction to the values held by AF&RS:

- Inclusive
- Transparent
- Respectful
- Ambitious
- Courageous
- Honest

The Equality Act also sets out a Public Sector Equality Duty (PSED) which requires public bodies to have due regard to the need to eliminate discrimination, advance equality of opportunity, and foster good relations between different people when carrying out their activities. As a public sector employer, AF&RS must ensure it complies with the law for all the aforementioned reasons.

2.13.13. Safeguarding

See also 1.3.2 Children and Young People

The Care Act 2014 came into force in England on 1 April 2015. The Act introduced new duties and responsibilities on local authority adult social services as the lead agencies in protecting adults at risk.

This gives AF&RS a clear responsibility, as a public authority, to ensure that the adults and children it interacts with are safe from harm.

AF&RS undertake on a daily basis, a wide range of public facing roles, which often direct contact with children, young people and vulnerable adults. AF&RS have the legal and moral obligation to recognise and report any concerns about abuse and or neglect to protect of those most vulnerable.

AF&RS ensures it has robust inter-agency arrangements to promote the welfare of children, young people and adults at risk and ensures their effectiveness throughout the Children and Young Persons department and Vulnerable Adults department under the coordination of Risk Reduction Unit.

2.13.14. Environmental Protection

A number of legal instruments apply to AF&RS with regard to biodiversity and ecologically sensitive areas including:

- **The Natural Environment and Rural Communities Act 2006:** This requires all public authorities to pay regard to the conservation of biodiversity in exercising their functions.
- **The Wildlife and Countryside Act 1981:** This states that it is an offence to carry out potentially damaging operations on a Site of Special Scientific Interest (SSSI) without Natural England consent or reasonable excuse.
- **The Environmental Damage (Prevention and Remediation) (England) Regulations 2015:** Under these regulations, Fire and Rescue Services must take steps to prevent or reduce environmental damage, particularly to sites of special scientific interest, and to species and habitats outside SSSIs that are protected by EU legislation.

AF&RS can be financially liable if they cause pollution and it is demonstrated that the appropriate steps have not been taken.

2.13.15. Policing & Crime Act of 2017 and the Combined Fire and Rescue Authorities Regulation 2020

The Policing & Crime Act 2017 (PCA 2017) amends the Fire and Rescue Services Act 2004 to enable Police and Crime Commissioners (PCC's) to take on governance of their local FRS's through the creation of new PCC-style FRA's. The PCA 2017 also defines opportunities for closer working across emergency services through a new statutory duty for blue light services collaboration and makes provision for PCC's to be represented on their local FRA.

Following the publication of the Statutory Inspection in July 2017 (UK Government Home Office, 2017), the Chair of AFA put forward 63 recommendations addressing criticisms made in the report. Members voted to approve 62 of the 63 suggested actions and 5 additional resolutions – the only amendment was the removal of a recommendation to hold discussions with the Police and Crime Commissioner (PCC) to review the potential of passing governance of AF&RS to the PCC. Members did however; retain a suggestion to consider further collaboration opportunities with all blue light services, including Avon & Somerset Constabulary.

In March 2020, the Combined Fire and Rescue Authorities (Membership and Allowances) Amendment Regulations 2020 (Legislation, 2020) came into force which enabled Police and Crime Commissioners to sit as full Members of Combined Fire Authorities in their area. The PCC for Avon and Somerset decided to submit a formal request to join AFA as a full voting Member and that application was approved at AFA's meeting in December 2020. This means that the current incumbent of the role of PCC for Avon and Somerset is a Member of Avon Fire Authority during their tenure, and, upon the election of a new PCC for Avon and Somerset, it would be for that new PCC to submit a fresh application to be a Member of the Fire Authority.

2.13.16. Local Government Act 1999

The Part I of the Act is two-fold, first to make arrangements for the achievement of the *best value* for the performance and of functions of most bodies within the local government, including FRSs. Secondly, to provide ending of previous legislations.

AF&RS must also comply with the requirements for bodies to secure continuous improvement in the way in which its functions are exercised, having regard to a combination of economy, efficiency and effectiveness.

3. National Risk Register

3.1. Introduction

The National Risk Register is the publically available version of the National Security Risk Assessment (NSRA), a classified document which lists and assesses the impact and likelihood of the most serious risks facing the UK. The Government encourages a ‘whole-of-society’ approach to resilience to these risks, which AF&RS must give consideration to.

AF&RS should be aware that a review of the NSRA methodology is currently underway by the Government, and that the way they address their underlying methodology, accounting for interdependencies, and assessment of cascading and compound risks may be subject to change over the 2021-2024 period (HM Government, 2021).

3.2. Environmental Hazards

The Government is supporting the adoption of an approach to preparedness and risk which recognises that environmental hazards can be as disruptive as security threats (HM Government, 2021).

3.2.1. Space Weather

Space weather is:

“A collective term used to describe a series of phenomena originating from the Sun (NRR, 2020)”.

Space weather has a probable likelihood and could have a moderate impact on the UK through either solar flares, solar energetic particles, or coronal mass ejections (Cabinet Office, 2015).

The consequences of a space weather event have potential to disrupt AF&RS’s activity, as well as wider infrastructure. These consequences include:

- electricity blackouts,
- loss of global navigation and satellite services,
- widespread radio disruption, and
- increases in background radiation (Royal Academy of Engineering, 2013).

Additionally, the knock-on effects of disrupting essential services can cause fatalities and physical/psychological casualties, as well as an increase in the error rate of ground-based unprotected digital control systems – e.g. computers, internet, mobile phones, and MDTs (Cabinet Office, 2015).

3.2.2. Volcanic Eruptions

Volcanic eruptions do not pose a direct risk to the UK, as there are no active volcanoes in the UK. However, there are a number of volcanoes internationally that pose a substantial risk if ash and gas reaches the UK (NRR, 2020).

There are two types of volcanic eruptions, explosive and effusive. Both types of eruptions have the potential to affect crops and human health, especially of those with existing respiratory conditions. The impacts of such an event are:

- **Casualties (from poor air quality)** – Greater demand on supporting services could potentially reduce the availability of those services for AF&RS operations.
- **Disruption to essential services** – Disruption to the aviation industry is likely. This has the potential to have a knock-on effect on AF&RS's ability to deliver its core services.
- **Economical** – Disruption to transport could have financial implications that impact local businesses and the UK economy, which could potentially affect AF&RS funding.
- **Environmental contamination** – This could impact water and agriculture (NRR, 2020).

The UK was affected by volcanic eruption in April 2010 following the explosion of the Icelandic volcano, Eyjafjallajökull, which resulted in the disruption of air travel for six days.

3.2.3. Poor Air Quality

See section 1.6.4.2 Clean Air Zones

Poor air quality can be exacerbated by weather conditions preventing pollution from dispersing. The impacts of this are the worsening of pre-existing health conditions e.g. asthma (and other respiratory illnesses), and increases in respiratory and cardiovascular hospital admissions (NRR, 2020).

There are a number of indirect issues that poor air quality could cause to AF&RS:

- **Increase of resources** – This could challenge AF&RS capabilities, in areas where higher pollution is pre-existing such as communities closer to busy roads.
- **Environmental contamination** – This could impact wildlife and consequently animal rescue resourcing.

To highlight the national potential impact, a poor air quality event occurred in the UK in 2006 when an extended period of hot weather was compounded by poor air quality, which exacerbated pre-existing health conditions and contributed to 630 deaths and up to 830 hospital admissions (NRR, 2020).

AF&RS maintains an awareness of this risk and makes use of existing tools and forecasting to ensure sufficient staff, resources, and equipment remains resilient. The Service's Environmental Strategy 2020-2030 is enhanced by the Government's Clean Air Strategy (DEF&RA, 2019).

3.2.4. Earthquakes

Earthquakes in the UK are moderately frequent however very rarely result in severe damage (NRR, 2020). In 2020, the UK had 430 earthquakes in total, with the largest having a magnitude of 3.3, but none of these earthquakes resulted in any severe damage (British Geological Survey, n.d.).

Consequences of a “damaging” earthquake may include physical fatalities and psychological casualties, damage to properties, infrastructure and older buildings, as well as minor disruption to essential services (NRR, 2020).

3.2.5. Adverse Weather

The UK often experiences adverse weather due to its temperate maritime climate and occasional continental and arctic influences. The frequency and severity of adverse weather is exacerbated by climate change. AF&RS need to plan for the following four main categories of severe weather:

- storms and gales;
- low temperatures;
- heavy snow;
- heat wave and drought.

3.2.6. Flooding

Although AF&RS does not have a statutory duty for rescue from flood waters – historical precedent and increasing societal expectations combine with our Service’s strategic mission to make communities safer, and has meant AF&RS have responded to these types of incident.

Climate change, see *section 1.4.1 Climate Change*, is predicted to increase the frequency and intensity of events for:

- Riverine (fluvial) flooding;
- Surface water and sewer flooding;
- Tidal flooding;
- Ground water flooding.

3.2.6.1. Riverine (Fluvial) Flooding

A fluvial, or river, flood occurs when the water level in a river, lake, or stream rises and overflows onto the surrounding banks, shores, and neighbouring land. This rise could be due to excessive rain or snowmelt, the intensity of which impacts the severity of the flooding (Zurich, 2020). Fluvial flood management is the responsibility of the Environment Agency, under the Environment Act 1995.

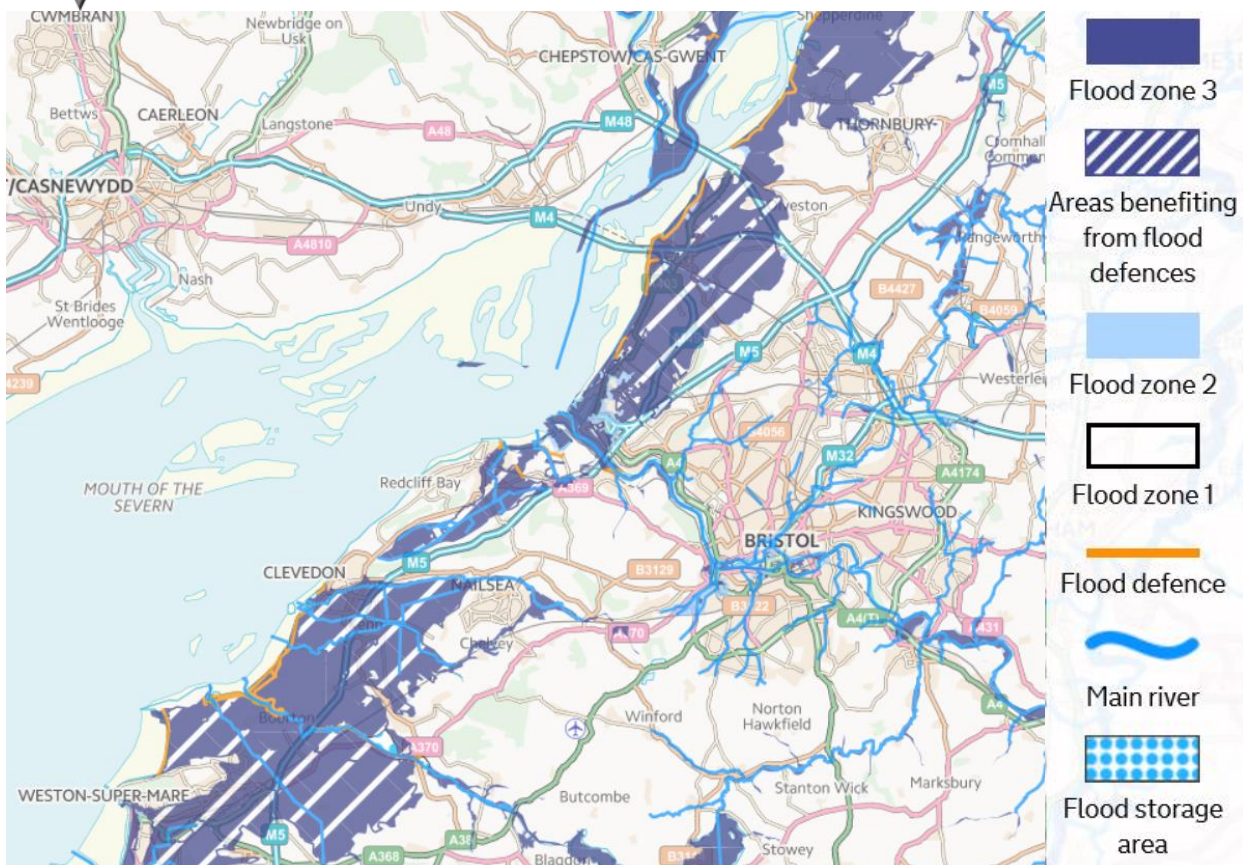


Figure 3.1 Fluvial flood risk in the AF&RS Service Area (Crown Copyright, 2021).

3.2.6.2. Surface Water and Sewer Flooding

This occurs when heavy rainfall overwhelms drainage systems, also known as hydraulic incapacity. Bristol has an above average risk for sewer incapacity and has frequent spilling storm overflows. This is exacerbated by sewer misuse, which leads to blockages and further reduces sewer capacity. Other risks include climate change increasing the intensity of rainfall and urban creep – this is when existing households extend or build over gardens for car parking; this contributes to fast runoff to the sewer drainage system (Wessex Water, 2021)

3.2.6.3. Tidal Flooding

Tidal flooding typically effects low-lying areas near the coast and occurs through the combination of wind and offshore storms. At-risk areas can experience this type of flooding multiple times a year. For example, March 2020, Bristol received multiple flood warnings and high tide predictions for the River Avon, breaking the 1981 tide level record by 0.01m. Places inundated with flood water consisted of residential areas and highways infrastructure (Bristol City Council, 2020).

3.2.6.4. Ground Water Flooding

Flooding from ground water occurs when the level of water within the rock or soil underground, known as the water table, rises. When the water table rises and reaches ground level, water starts to seep through to the surface causing flooding. This is much slower to occur than river flooding – it usually happens days, weeks or even months after prolonged rainfall, and then it may last weeks or even months. Groundwater flooding is most likely to occur in subsurface structures such as basements and cellars, or in low lying areas where groundwater is close to surface. It can be difficult to mitigate this type of flooding and may contribute to surface water flooding (Environment Agency, 2019).

3.2.7. Wildfires

Wildfires can damage eco-systems, buildings, and properties, as well as present risk to life. They occur both from natural hazards (lightning or hot, dry weather), or by human influence (camp fires, barbecues, bonfires, catalytic converters on cars, sparks from farm machinery, and arson) (National Geographic, 2020). This risk will be exacerbated by climate change, and wildfire events are becoming more frequent in the UK (NRR, 2020).

The vast majority of wildfires in the UK have been smaller, business as usual, fires. Larger fires, such as the Saddleworth Moor fire, required mutual aid and the use of high-volume pumps (HVPs) in a sustained response. AF&RS must be mindful of the large potential resource requirements for wildfires. Additionally, as 85% of grassland fires AF&RS attend are of 'deliberate' origin, meaning the risk can be reduced through Service intervention strategies.

3.2.8. Landslides

Ultimately, landslides occur due to the effect of gravity, although there are a number of factors that can contribute to the stability of a slope, such as:

- Geology
- Topography
- Weathering
- Drainage
- Construction (British Geological Survey, 2021).

British Geological Survey mapping shows a significant landslide risk around the Bath area, as well as smaller areas from Bristol to Patchway, with moderate risks found in the South Gloucestershire area (British Geological Survey, 2021).

3.2.9. Drought/ Water Insecurity

See section 3.4.2.1 Water Infrastructure Failure

Water shortage and drought have been identified as increasing risks. Droughts are a result of a lack of rainfall over several years, leading to water shortages. Over the last 40 years, England has only experienced five long-duration and two shorter periods of droughts; these were during 2010-2021 when parts of the UK had their lowest rainfall total in over 100 years (NRR, 2020).

3.3. Human and Animal Health

3.3.1. Infectious Diseases

3.3.1.1. Measles in Europe and the UK

Measles is a highly contagious vaccine preventable disease which was identified in 1954, with the first vaccine introduced in 1963 (ECDC, 2020).

The vaccination effort over the last 20 years has reduced global deaths from measles by 73%, preventing the loss of 23 million lives. However, due to decreasing trends in vaccination coverage, outbreaks of measles continue to occur in the UK and around the world (ECDC, 2020). Recent measles outbreaks in the UK, linked to outbreaks in Europe, have resulted in the number of confirmed cases tripling from their 2017 levels (PHE, 2018). These outbreaks have seen the UK lose its 'measles-free' status from the World Health Organisation (WHO) (PHE, 2019).

A decrease in measles infections as a result of the social contact restrictions in place from the COVID-19 pandemic has been observed by PHE, however AF&RS still need to be mindful of the increased risk of measles infection and of the work by PHE and the NHS to tackle this issue, especially as COVID-19 restrictions ease (PHE, 2020).

3.3.1.2. Animal Diseases

Animal or 'zoonotic' diseases can spread from animals to humans. Diseases with animal origins account for 60% of all human disease, and 75% of all new and emerging infectious diseases (HM Government, 2018). 'Non-zoonotic' diseases cannot be spread to humans. However, they can impact humans through animal welfare impacts, and losses on biodiversity and the environment (NRR, 2020).

The risk of animal diseases is constantly changing, while the continuing global trend for migration towards urban centres and the expansion of international travel increase the potential for diseases to spread. These diseases are not limited by international borders and can very quickly spread, affecting the UK (HM Government, 2018). The pace of global technological change and democratisation of scientific knowledge has potential to shape the biological risk picture in the future, both negatively and positively. The growth of biological sciences increases the likelihood of an accidental release of hazardous biological virus (HM Government, 2018).

Climate change, see *Section 1.4.1 Climate Change*, over the long term can increase the likelihood of animal and vector-borne diseases, as well as facilitate the spread of viruses to new areas of the globe where the changed climate allows virus survivability (HM Government, 2018).

3.3.1.3. Pandemic Influenza

Forecasting the spread and impact of a new influenza strain can be difficult until it starts circulating, however pandemic influenza is likely to occur in the future (NRR, 2020).

Pandemic influenza planning should be based on the ‘reasonable worst case’ assumptions established by the Department of Health (DH&SC, 2011). These assumptions include that the influenza pandemic will emerge at anytime, anywhere in the world, including in the UK, and at any time of the year. Local planners should expect a rate of up to 210,000-315,000 additional deaths possibly over as little as a 15 week period, and half of those over the three weeks period at the height of the outbreak (DH&SC, 2011).

3.3.1.4. COVID-19

The first case of COVID-19 was confirmed in the UK on 31 January 2020 after the virus was imported by overseas travelers (NRR, 2020). At the time of publication, the subsequent transmission of the virus within the UK has resulted in 4,333,042 total cases and 126,592 deaths. Thirty million people have received their first vaccination, and three and a half million have received their second.

3.3.1.5. Summary

AF&RS need to be aware of the risk posed by infectious diseases as this could have both direct and indirect impacts on the service such as:

- Disruption to essential services – Essential services may be impacted by staff shortages. Increased demand for supporting services, particularly SWAST and local NHS trusts, may reduce availability to support AF&RS in the emergency response.
- Economic disruption – Disruption to the economy, including local businesses and tourism, could affect funding and demand for AF&RS.
- High-staff absence levels – Pandemic illness could result in high absence levels amongst staff.

In response to how COVID-19 has demonstrated the connection between environmental and human health, the UN Environment Program and International Livestock Research Institute recommends a ‘One Health’ approach be adopted which aligns protection and restoration of natural environments with the public health response (UNEP, 2020). Through understanding this connection, AF&RS can enhance its actions and policies.

AF&RS must consider that it is possible that more than one pandemic could occur at the same time. For example, a new high consequence strain of influenza as well as COVID-19. Should there be two simultaneous infectious disease outbreaks, the impact on AF&RS will be compounded (NRR, 2020).

3.3.2. Antimicrobial resistance

Antimicrobial resistance (AMR) occurs over time when the pathogens that cause infection – including bacteria, fungi, viruses and parasites – become resistant to the drugs used to treat them. Resistance can occur naturally, however, the overuse/misuse of antimicrobials in medicine and agriculture is accelerating this process (NRR, 2020).

Globally, AMR infections are estimated to cause 700,000 deaths. In the UK this will cause difficulty treating infectious illnesses, and a rise in both the number of human

deaths, and the socio-economic costs associated with treating infectious illnesses (HM Government, 2019).

The nature of AF&RS's involvement in, and contact with, the community increases the risk of exposure of staff to AMR illnesses, this is something AF&RS should be mindful of.

3.4. Major Accidents

3.4.1. Industrial Site Incidents

See Section 2.13.4 *Control of Major Accident Hazards Regulations 2015 (COMAH)*

Industrial incidents present a number of issues that could affect AF&RS:

- **The risk to life** – Greater risks taken to save saveable life, thus increasing the risk to staff and supporting services.
- **Reducing resources** – The commitment of multiple resources to one incident could potentially reduce the availability of AF&RS's services for other FRS operations, with the knock-on effect of affecting the public even further.
- **Damage to property** – This has the potential to create very different incidents that may require special services such as Urban Search and Rescue (USAR), which could potentially have greater impacts on AF&RS resources.
- **Hazardous chemicals or pollution to the environment** – Potential for resource heavy protracted or major incidents.
- **Impact to UK oil and gas supplies** – This could impact AF&RS's own reserves of oil and gas, having an impact on delivering core services.
- **Economical** – A large incident could have financial implications that impact the UK economy, which could potentially affect Service funding.
- **Evacuation** – Large scale evacuations could have an impact on population geography, potentially changing AF&RS risks and risk mapping.

Outside of the COMAH sites, the term 'industrial' covers an array of business and building types. These risks vary considerably in both scale and nature.

3.4.2. System Failures

See also Section 3.6.2 *Critical National Infrastructure*

3.4.2.1. Water Infrastructure Failure

Wessex Water and Bristol Water supply water to AF&RS's combined unitary authority areas. They have a statutory duty to review their drought plans every five years, as well as identify and mitigate risks to their infrastructure (Water, 2021). A complete catastrophic failure of the region's water supply is unlikely but may be the result of a knock-on effect from separate infrastructure failure (NRR, 2020).

The impacts of water infrastructure failure on AF&RS can impact the staff welfare as well as the ability to supply the operational response. Contingency plans should consider that natural water supplies may fall in times of prolonged drought.

3.4.2.2. Food Infrastructure Failure

There are no current realistic scenarios within the UK which would lead to a shortage of food supplies; however, if a large area of local agricultural land was affected by an incident it would affect the local economy as well as impacting on food prices nationally (Avon and Somerset Local Resilience Forum, 2016).

3.4.2.3. Gas & Electricity Infrastructure Failure

Wide-scale loss of electricity or gas would have a direct or indirect impact on all other infrastructure sectors. In the event of a major gas or electricity supply emergency, both industry and Government will have significant roles to play in managing the incident and its consequences. The Energy Emergencies Executive (E3) is the joint industry and government emergency planning body to manage these risks (DBE&IS, 2019)

The Department of Business, Energy and Industrial Strategy with Ofgem and National Grid will ensure that detailed emergency planning activities are undertaken to deal with the threat levels of their crisis status (DBE&IS, 2019).

Gas and electricity failure can occur at a local, entire region and national level. The impacts will vary with the scale and season; however widespread consequences will be felt especially to essential services that we rely on such as transport, finance, food, telecommunications and fuel. A knock-on effect will potentially lead to physical and psychological casualties.

Also, AF&RS manages any business disruptions through its business continuity framework which aligns to the ISO 22301 standard. Within this approach the Service operates a critical 5, which enables the organisation to focus its activities and people during any significant business disruption to continue to deliver its statutory duties.

3.5. Societal Risks

3.5.1. Public Disorder & Protests

AF&RS work closely with partner agencies to anticipate triggers for public disorder and protests and prepare for them.

3.5.1.1. Public Disorder

Public disorder can take many forms including rioting, looting, vandalism, violence, and arson (Cabinet Office, 2018). Recently operational crews have come under attack from youths intentionally launching fireworks and throwing stones at crews attending minor incidents. In March 2021, protests and public disorder in Bristol caused damage to property, arson, and injuries to Avon & Somerset Police colleagues and members of the public.

3.5.1.2. Protests

Recent years have seen regular mass protests addressing issues across the Service area, notably Extinction Rebellion, climate strikes, anti-airport expansion, and Black Lives Matter demonstrations. During some of these events, roads and bridges were blocked to all traffic, including AF&RS vehicles.

By law, organisers of public marches must inform the police of the date, time, and route of the march; in most cases this allows for the notification of road closures and disruption to crews. However, AF&RS needs to be mindful for the potential of further similar protests and the impact spontaneous road closures could have on response times.

3.6. Malicious Attacks

3.6.1. Deliberate Fires

Nationally, since 2011/12, deliberate fires have reduced by 30%. However, since 2014/15, an increase of 15% has been observed. Deliberate fires accounted for 48% of all fires attended in 2017/18 by FRSs in England (NFCC, 2019).

Locally, there have been several attacks, including the arson attack at Avon & Somerset Constabulary's Black Rock training facility (BBC, 2015).

In line with the NFCC Arson Reduction Strategy, AF&RS will aim to work collaboratively with partners, and when required as a standalone service, to enhance its efforts in prevention, protection, and response.

3.6.2. Critical National Infrastructure

See also Section 3.4.2 System Failures – 3.4.2.3 Gas & Electricity Infrastructure Failure
Critical National Infrastructure refers to the facilities, systems, and networks needed to keep the UK running and provide essential services. These services could be essential to basic human needs, or to keeping other infrastructure and the UK economy running. As an emergency service, AF&RS are included as part of the 13 National Infrastructure sectors identified by the Centre for the Protection of National Infrastructure (CPNI) (CPNI, 2021; CPNI, 2016).

Ensuring AF&RS continues to consult with CPNI guidance on mitigating risk to critical national infrastructure will enable the Service to continue protecting its key assets.

3.6.3. Counter Terrorism

At the time of publication (April 2021), the National threat level is substantial. This means an attack is likely.

The Joint Terrorism Analysis Centre and the Security Service (MI5) can change this at any time as different information becomes available (NCTSO, 2021). The main sources of terrorist threat are from Islamist and Northern Ireland-related terrorism, and far-right, far-left, anarchist and single-issue terrorism (HM Government, 2021).

AF&RS should be mindful of the new Counter Terrorism Operations Centre (CTOC) which will create a single, integrated counter terrorism centre to support joint working (HM Government, 2021).

3.6.3.1. Attacks on Crowded Places

Crowded places are recognised by the National Counter Terrorism Security Office (NCTSO) as an attractive target for terrorism. Crowded places in the AF&RS service area include shopping centres, sports stadia, bars, pubs and clubs which are easily accessible to the public (NCTSO, 2020). Attacks could use improvised explosive devices, vehicle bombs, chemical, biological and radiological (CBR) materials, marauding terrorists, and vehicles used as weapons (NCTSO, 2020).

3.6.3.2. Attacks on Transport

Road

The Service area has by road an east-west axis from London to Wales by the M4 motorway, and on a north-southwest axis from Birmingham to Exeter by the M5 motorway. Also within the authority area is the M49 motorway, a shortcut between the M5 in the south and M4 Severn Crossing in the west.

Rail

There are two principal railway stations in Bristol. In Stoke Gifford, there is Bristol Parkway, and Temple Meads is in the city centre, there are 11 additional suburban stations. There are also scheduled coach links to most major UK cities. As crowded places, rail stations must be considered as vulnerable to the risks outlined earlier in *Section 3.6.3.1 Attacks on Crowded Places*.

Air

The region is served by, Bristol Airport (BRS) at Lulsgate, which has seen substantial improvements to its runway, terminal, and other facilities to handle up to 12 million passengers a year by the mid of 2020s, from the past limit of 10 million passenger per year (Bristol Airport, 2021). *See also Section 3.6.3.1 Attacks on Crowded Places*.

Sea

Bristol has two seaports: Avonmouth Docks and The Royal Portbury Docks owned and operated by the Bristol Port Company. The features of the company are providing direct motorway access to M4, M5 and M49 with direct linking to London, Birmingham, Manchester and South Wales. The port annually handles 27% of all UK aviation fuel imports and 10% of UK coal imports for electricity generation (Bristol Port Company, 2021).

Multi-site

On 7 July 2005, London's transport system suffered attacks with four explosions, three on underground trains, and one on a bus, resulting in 52 fatalities and hundreds more injured. Two weeks later further attacks were unsuccessfully attempted (BBC, 2017).

Summary

AF&RS will be directly involved in any attack on transport due to the nature of its work, and therefore needs to ensure it has the appropriate measure in place to do so.

3.6.3.3. Chemical, Biological, Radiological, Nuclear, and Explosive (CBRN(e))

CBRN(e) terrorism is:

“the actual or threatened dispersal of CBRN materials (either on their own or in combination, or with explosives) with deliberate criminal, malicious or murderous intent (NFCC, 2021)”.

CBRN(e) attacks can kill, injure and cause wide-ranging harm. Impacts have the potential to be catastrophic and can result in blast damages, contamination of people, water supplies, environment, buildings, food, and widespread infection. Attacks can vary from small, targeted incidents to largest catastrophic events (NRR, 2020).

CBRN(e) attacks can take many forms:

- **Chemical** – Combined with explosives, chemicals may be used as small-scale (assassination or poisonings) or large-scale (mass-casualty) weapons. Some chemical weapons have used toxic industrial compounds; others have deployed agents specifically developed for warfare. For example, the Novichok nerve agent used in Salisbury (NCTSO, 2018).
- **Biological** – These incidents can take different forms and may target people or infrastructure (e.g. food and water supplies). In 2021, a failed cyber-attack attempted to alter the chemical levels in the drinking water in Florida, United States (RUSI, 2021).
- **Radiological** – This form can be combined with explosives to produce a Radiological Dispersion Device (RDD), sometimes called a ‘dirty bomb’. These devices are designed to disperse radioactive material to cause destruction, contamination, and injury. Radiological materials are colourless and odourless (UKFRS, 2021).
- **Nuclear** – Nuclear or fissile material may be used to develop an Improvised Nuclear Device (IND), creating a nuclear explosion. An IND could consist of diverted nuclear weapon components, a modified nuclear weapon or indigenous-designed device (UKFRS, 2021). An IND remains the most potentially devastating of all CBRN(e) devices. Contamination makes recovery from a CBRN attack significantly more challenging than recovery from other terrorist attacks. The clean-up process may be protracted as well as unfamiliar and untested (NRR, 2020).

At the time of this publication, a large-scale CBRN(e) attack has not occurred in the UK (NRR, 2020). Alternative methods of attack, such as MTA or conventional explosive devices, are more likely, however, an attack of this type remains possible (NRR, 2020).

AF&RS will face challenges responding to CBRN(e) incidents due to the potential health impacts and widespread environmental contamination. Continued collaboration with other emergency services and responder organisations maintains a robust, efficient and effective planning framework (UKFRS, 2021). While the likelihood of a larger-scale CBRN(e) attack in the UK is low, AF&RS will need to maintain its capabilities to cope with CBRN(e) incidents.

3.6.4. Cyber Attacks

The integration of internet into our lives has been a continuous trend in the 21st century and the public sector is no exception. Individual, charities and businesses are all relying on digital technologies and online capabilities (NRR, 2020).

While cyber technology presents increasing opportunities and benefits for individuals and businesses, vulnerability to cyber-attack becomes greater too. The range of malicious actors and targets is continually expanding, with additional potential for state and state-sponsored external threats attempting to cause disruption to strategic systems such as the electoral system, central and local government, the wider public sector and other key sectors (NRR, 2020).

AF&RS need to continue to maintain its IT security policies and ensure training is in place to mitigate this risk to its IT infrastructure.

3.6.5. Disinformation

Disinformation is the spread of false or misleading information in order to deceive/manipulate for personal, political or financial gain. Disinformation often targets social media platforms and exploits them to spread false information which can damage the image and trust of an organisation (NRR, 2020).

AF&RS heavily relies on information to appropriately allocate resources to incidents and for situational awareness. False information can have a negative impact on the services performance and puts both the public and the responder's lives at further risk.

Therefore, AF&RS should ensure they utilise trusted platforms or formats, consideration should be given to content moderation, verification of suppliers or profiles to authenticate content and policies in place to mitigate against the risk of disinformation.

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