GREATER MANCHESTER
FIRE AND RESCUE SERVICE

Strategic Assessment of Risk 2021/22

Service Development

January 2021

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Executive Summary

This is the first version of our Strategic Assessment of Risk (SAoR) and will be utilised to inform the development our Fire Plan and Annual Delivery Plan.

The Fire and Rescue National Framework (FRND) sets priorities and objectives for fire and rescue authorities (FRAs) across England. It also makes reference to the new challenges fire and rescue services face, such as the continuing threat of terrorism, the impact of climate changes, the impacts of an ageing population, and the need to cut the national deficit.

This document is split into a number of sections the details of which are covered briefly below:

Section one covers our response, the incidents we have attended and how they have changed over the past ten years. We classify incidents into three overall categories of Fire, False Alarm and Special Service Calls (SSC) and maps are provided for each incident type displaying the overall geographical spread of incidents, highlighting areas where they are particularly prevalent.

Section two covers the demographics and population and provides details on the ten metropolitan boroughs. This section highlights that the likelihood of dying in a fire is not uniform across all age groups. Generally, the likelihood increases with age, with those 80 and over by far the most likely to die in a fire. Projections show that the Greater Manchester population is due to increase by 9% in the next 25 years and this increase is much greater in Salford and Rochdale. It covers the broad diversity across Greater Manchester and the impact of language on our ability to engage with communities. It also covers deprivation and the long-standing correlation with this and the occurrence of dwelling fires.

Section three covers the Built Environment. It considers the impact of the Grenfell Tower fire as well as other recent incidents and building failure, and the measures Greater Manchester Fire and Rescue Service (GMFRS) has taken to continue to ensure an effective response. It also looks at the Building Safety Bill and Fire Safety reforms. It also covers Greater Manchester's spatial plan for homes, jobs and the environment, which will see growth in jobs, redevelopment of town centres and other sustainable locations, and an increase in the housing stock to address the housing crisis.

Section four covers the extensive transport infrastructure in Greater Manchester, including non-road transport and the future developments in this area. GMFRS now rescue as many people from Road Traffic Collisions (RTCs) as from dwelling fires and have attended more than 1,600 RTCs in the past two years. We have a large-scale transport infrastructure and as this develops, there is a risk this could impact on our response to emergency incidents.

Section five covers the environment and the climate emergency. It considers the impact of hotter, drier summers, and how incidents such as moorland fires and flooding increase the strain on our resources. These types of incidents can also have a damaging effect on local communities and economies, as well as major disruption to transport systems and continuity.

Section six covers sociocultural issues including the impact of the Covid-19 pandemic, the Manchester Arena Inquiry and further recommendations, and diversity in fire.

Section seven covers technology, how we should support a joined-up approach to share data, the Emergency Services Mobile Communication Programme (ESMCP) Airwave replacement programme and how electric vehicles and innovation can support service improvements.

Section eight considers the economic impact on the Service, specifically funding and financial pressures, Brexit implications and how social value will become more important in procurement.

Introduction

Greater Manchester's economic importance, diversity and infrastructure makes for a complex picture in terms of the risks that Greater Manchester Fire and Rescue Service (GMFRS) has to plan for, help prevent and look for opportunities to improve. This Strategic Assessment of Risk (SAoR) document enables us to create an accurate and up-to-date picture of the potential threats facing our communities and how these are considered in the production of our plans.

We understand the Service needs to respond to the changing environment and risks in Greater Manchester, and over the last two years we have consulted on and undertaken a significant transformation change programme to improve our ways of working and strengthen our resilience.

We have recently welcomed our new Chief Fire Officer (CFO) who is committed to making GMFRS the very best it can be. He will ensure that GMFRS continues to evolve and develop, focusing the Service's priorities on effectively responding to the needs of our communities.

Her Majesty's Inspectorate of Constabulary and Fire & Rescue Services (HMICFRS) inspection of GMFRS identified a number of areas requiring improvement and the Service is already taking action to address them. We are committed to becoming a learning service, that seeks opportunities to identify and implement best practice, and we will continue to build on the achievements so far. The priorities and commitments from GMFRS will be published in the forthcoming Fire Plan.

Governance

Our transition to the Greater Manchester Combined Authority (GMCA) in May 2017 saw the abolition of the Fire Authority and responsibility for GMFRS moved within the remit of the newly elected Mayor of Greater Manchester, Andy Burnham. The functions of the Fire Authority became functions of GMCA, the new legal entity and employer of the FRS and are exercisable by the Elected Mayor.

The Mayor is responsible for:

- Section 13/15/16 arrangements
- Appointing / dismissing the CFO and holding the CFO to account
- Approving the local risk plan and the FRS declaration
- Approving business continuity plans and local resilience arrangements.

The Mayor can delegate functions to the Deputy Mayor for Policing, Crime and Fire, bringing the police and fire functions closer together. The functions listed above remain the sole responsibility of the Mayor.

The Service is governed by the GMCA consisting of political leaders from each of the ten metropolitan borough councils.

Scrutiny of the fire service is provided by the Mayor and Deputy Mayor. Scrutiny of the Mayor's and Deputy Mayor's decisions regarding GMFRS is provided through the Police, Crime and Fire Panel, which is made up of elected members from each of the ten metropolitan borough councils.

The CFO is responsible for overseeing the running of the Service, supported by his Executive Board. There are seven members of the Board including the Chief and his Deputy (Figure 1).

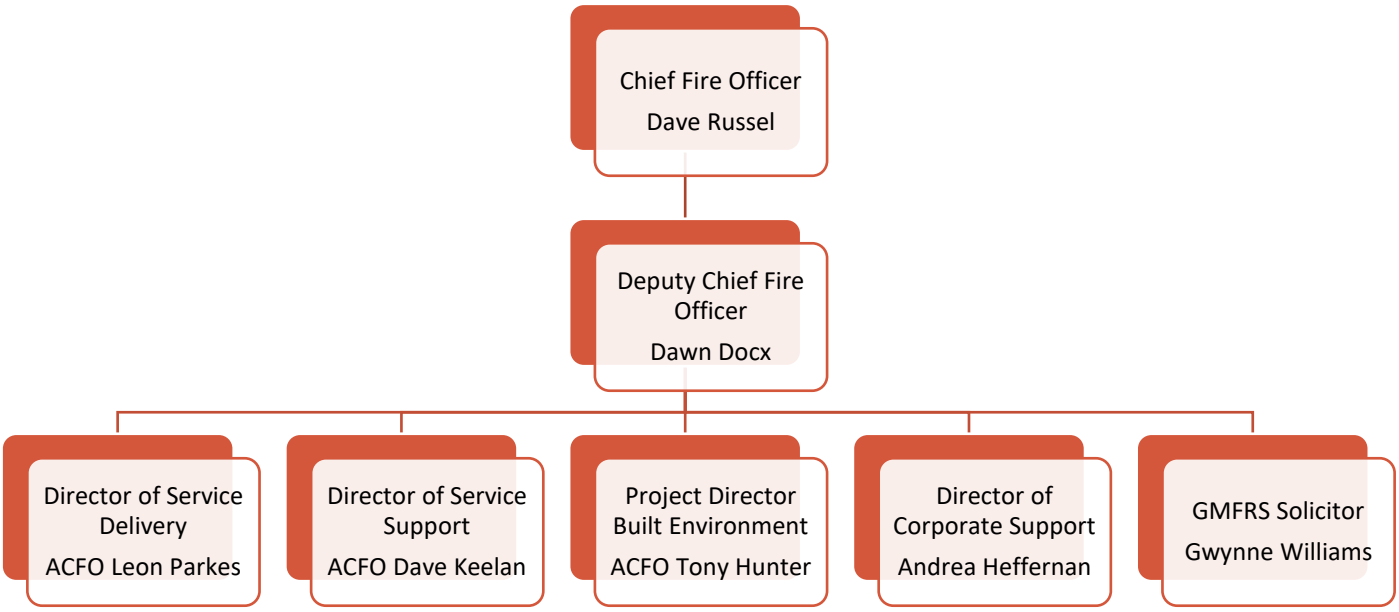

Figure 1: GMFRS Executive Board

Service Area Overview

GMFRS is one of the largest fire and rescue service in England, covering an area of 493 square miles and serving a population of 2.8 million residents, with many other people working or visiting the region.

Of that population of 2.8 million there are:

- 451,000 over 65s (set to increase 31% by 2043)
- 55,000 over 85s (set to increase 70% by 2043)
- 100,000 people receiving disability allowance
- 551,000 people living with long-term health conditions
- More than 200 different languages spoken, making Greater Manchester one of the most linguistically diverse cities in Europe [1].

GMFRS protects 1.22million households, a quarter of which are in areas that are in the 10% most deprived nationally. We attend thousands of incidents every year including fires, road traffic collisions, flooding and rescues. Greater Manchester is linked by a complex transport infrastructure; including roads, rail and trams, with the centre surrounded by the M60, one of three orbital motorways in the UK, and an international airport.

GMFRS has to plan for and mitigate numerous and complex risks including:

- 743 high-rise buildings (residential and commercial)
- 39 Control of Major Accident Hazards (COMAH) sites
- 130 miles of railways, 62 miles of Metrolink tracks, 468 miles of canals, ten motorways, Manchester International Airport (MIA)
- 57 town and city centres
- 1000s of acres of moorland
- Businesses, universities and internationally renowned research facilities.

GMFRS Overview

The Service is spread across 45 sites including a Training and Safety Centre, Training and Development Centre (TDC), Technical Services Centre, our headquarters in Swinton, and 41 fire stations aligned to the ten local authorities that fall within the GMFRS boundary split into five area teams, shown in Figure 2.

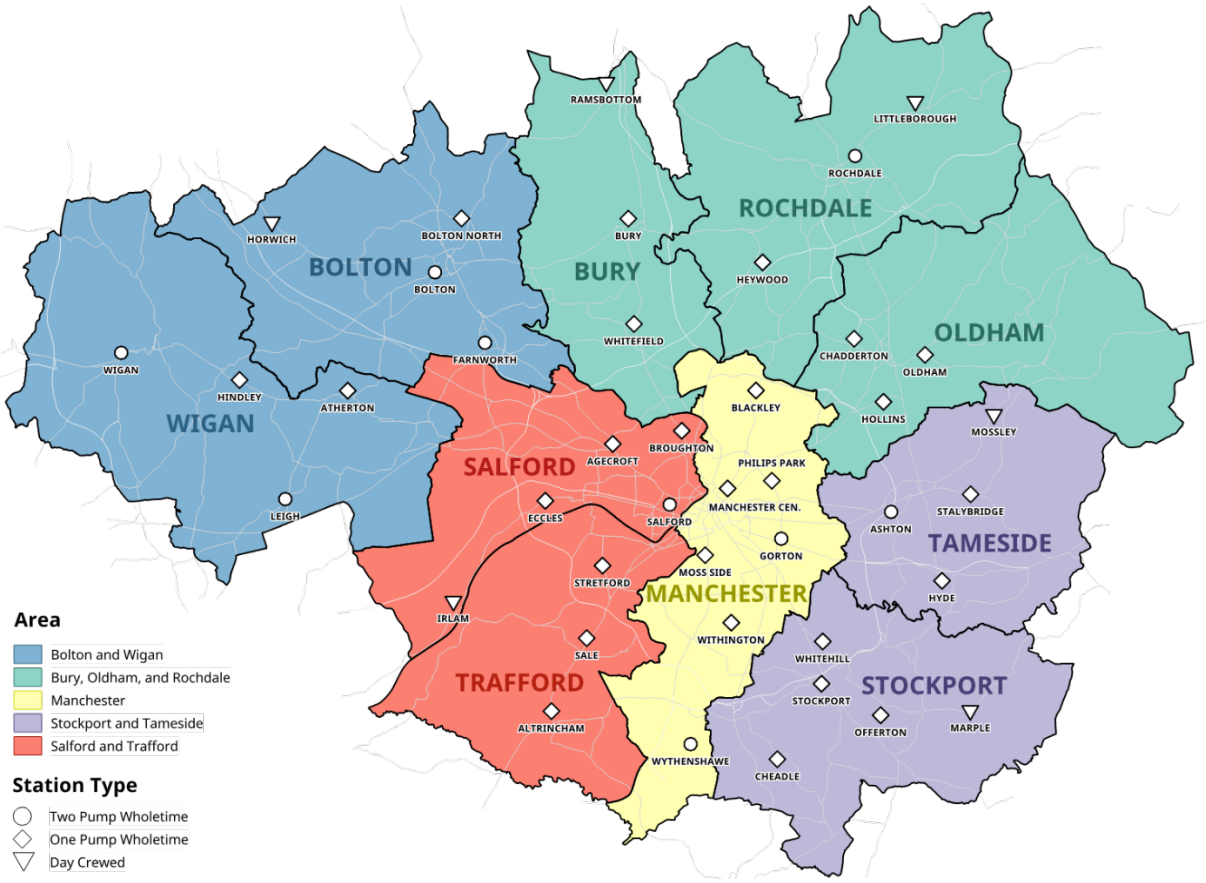

Figure 2: Overview of GMFRS stations and areas

Figure 3: GMFRS overview 2019/20

Equality Diversity and Inclusion

GMFRS serves one of the most culturally diverse areas in the United Kingdom, and with our proud history of embracing diversity, we have people coming to live, work and study here from all over the world. We continually strive to be an employer of choice to develop the diversity of our workforce at all levels of the organisation, to reflect the communities we serve.

In order to successfully reduce the threats our region faces, GMFRS must be able to understand and relate to all the diverse communities that make the region such a vibrant place to live. This is best achieved by an organisation that represents and listens to the communities it serves. In July 2019, we appointed a new Equality, Diversity and Inclusion (EDI) Manager to support our EDI ambitions, striving for excellence as a service, and to understand and reduce risk in our most vulnerable communities.

We have agreed a new Equality Diversity and Inclusion Governance Structure part of which includes the setting up of a new network of Equality and Inclusion Single Point of Contacts (SPOCs) based throughout the service to focus on implementing service level equality action plans and championing equality, with CFO Dave Russel as our senior equality and inclusion sponsor.

We have established new mechanisms for on-going EDI dialogue, more interconnected and joined up working internally and with stakeholders and created opportunities for sharing problems and good practice across services.

Our Equality and Inclusion Strategy sets out our commitment to continually develop an inclusive culture where people bring their whole self to work. Engaging more effectively with our diverse communities and challenging external perceptions with outreach work to attract, recruit and retain a workforce that is more representative of the people of Greater Manchester.

Section 1: Response Risk

Incidents

There is a strong relationship between where and when incidents, have occurred in the recent past and where GMFRS responds to incidents now. This is particularly applicable to fires. That is not to say there are not external factors and emerging risks which can impact upon our service, and these will be discussed in detail below. However, incident and mobilisation data provide a basis to understand what, where, when, why, how and to whom incidents occur.

Every year GMFRS respond to a broad range of incidents, which are classified into three overall categories of Fire, Special Service Calls (SSCs), and False Alarms. There are also a number of 'other' incidents which are not recorded by the Home Office and consist of incidents that we are mobilised to by North West Fire Control (NWFC) such as arson threat referrals, priority HFRAs, training incidents, and where we have been turned back en route to an incident. Figure 4 provides a breakdown of incidents from 2019/20; the size is relative to the proportion of incidents of that type.

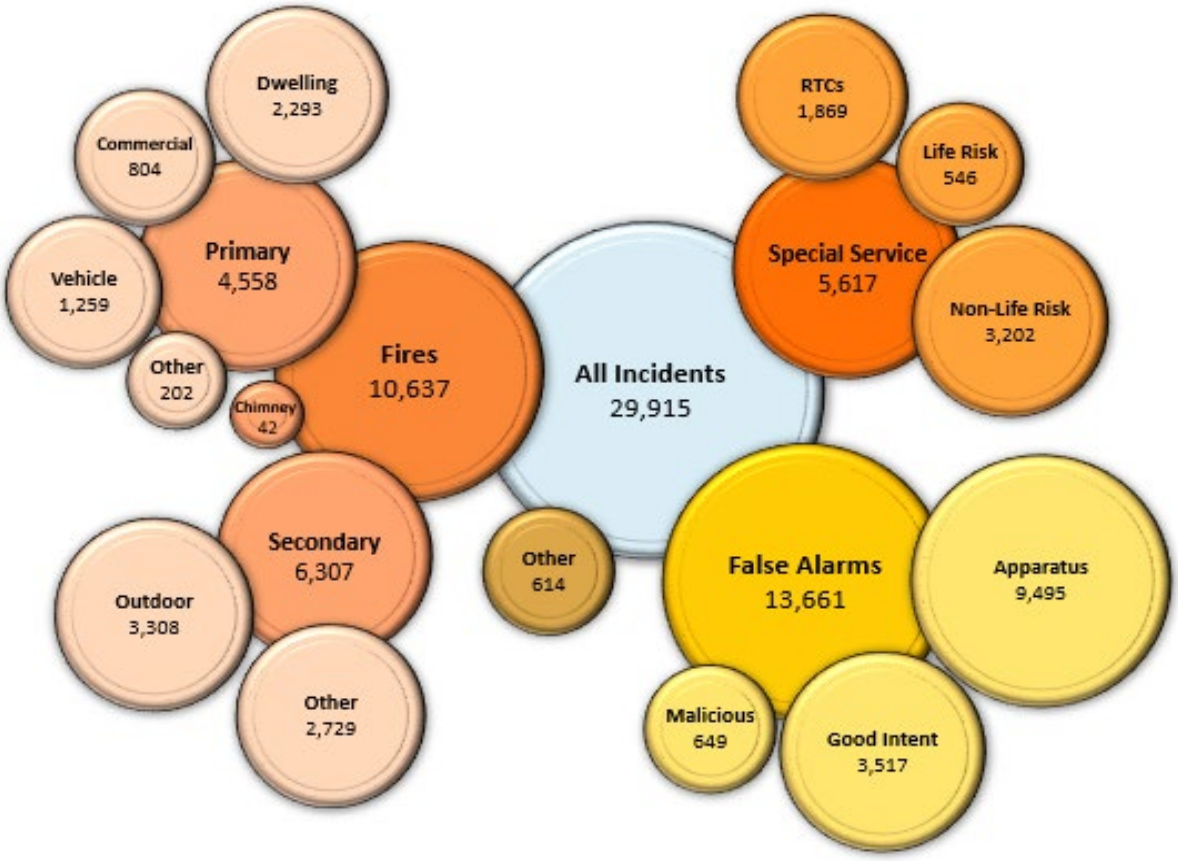

Figure 4: 2019/20 incident breakdown

This section will provide an overview of incidents that GMFRS have attended and how they have changed over the past ten years. It details the number of incidents and mobilisations, as well as the number of fatalities, rescues, and casualties that have occurred due to those incidents.

Incorporated into the incident column in these tables is a graphical representation of how the number of incidents has changed over time.

A map is also provided for each incident type displaying the overall geographical spread of incidents, highlighting any areas where they are particularly prevalent in number. The maps incorporate data from the past three years – from 1st April 2017 to 31st March 2020 and are displayed by showing the number by a standard area hexagon (500m), allowing comparison in demand across Greater Manchester.

In later sections, where appropriate, there are tables relating to specific incident types, which will be presented in the same fashion.

Since 2010/11, the overall number of incidents that GMFRS have attended has reduced from roughly 40,000 to roughly 30,000 (Figure 5). Not including the 'other' incidents, this represents a reduction of 21%, a reduction of 7% more than overall in England (14%).

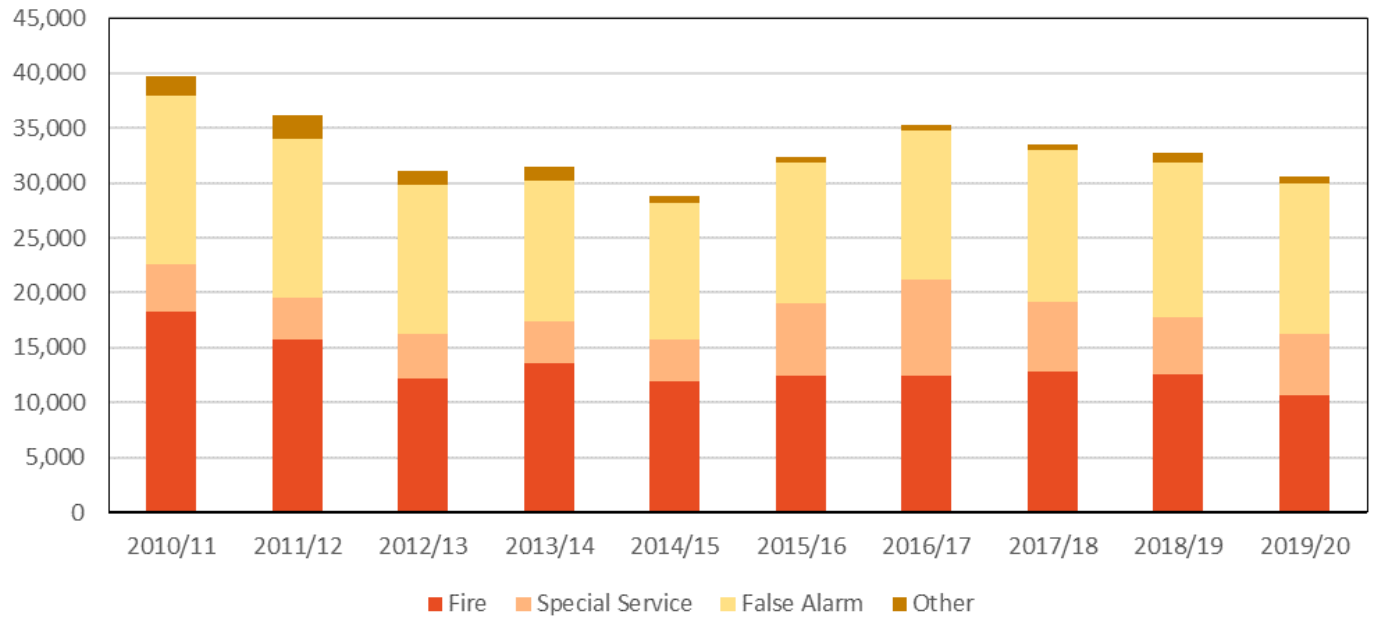

Figure 5: Number of incidents attended between 2010/11 and 2019/20

Life Risk Incidents

GMFRS classify incidents as life-risk or non life-risk. Life-risk largely comprises dwelling fires, non-residential fires, other residential fires, RTCs and other rescues where life is in immediate danger. Life-risk incident numbers have remained relatively static over the past ten years, with a slight rise in fatalities across the same time period (Table 1). Likely due to a high number of non-residential fires, life risk incidents are particularly prevalent in the city centre areas, the area on the Manchester/Salford northern border, as well as in the surroundings of major towns such as in Bolton and Rochdale (Figure 6).

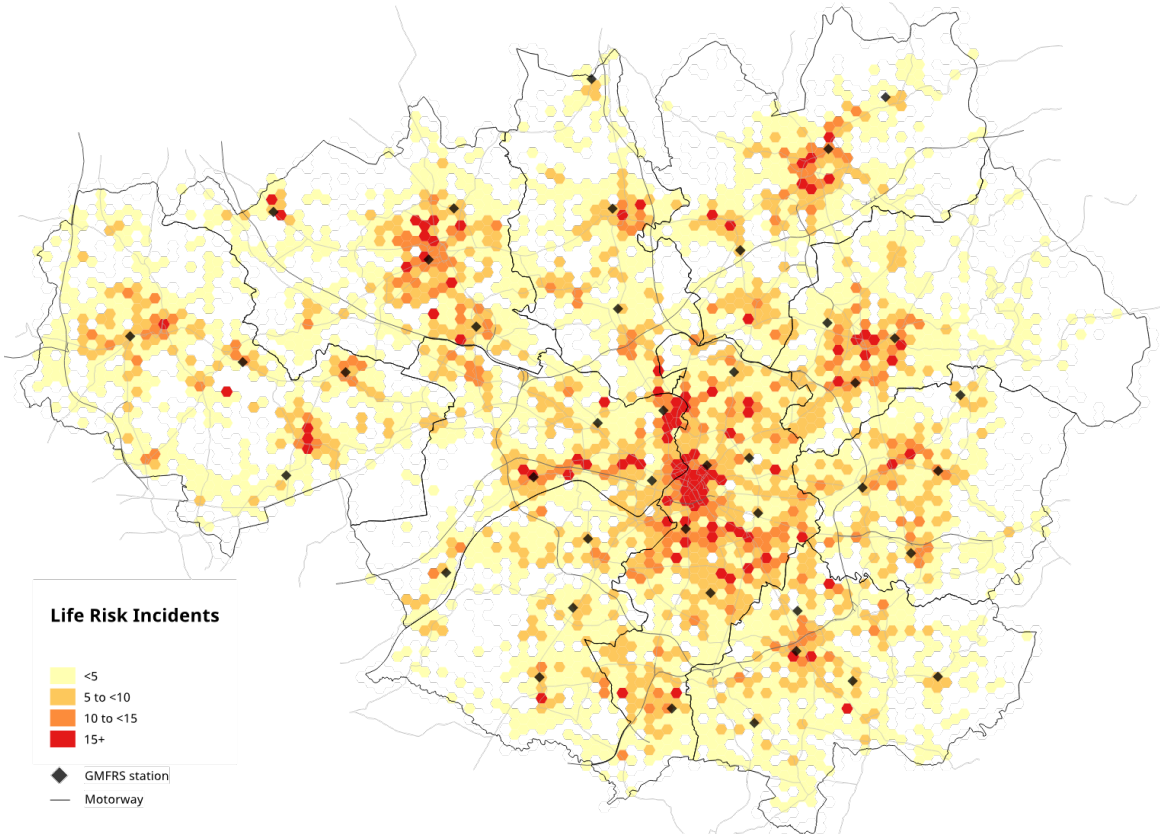

Figure 6: Map showing the number of life risk incidents per 500m area

FY	Incidents	Fatalities	Injuries	Rescues	Mobilisations
2010/11	5,154	34	1,890	261	10,863
2011/12	5,034	37	1,669	261	10,922
2012/13	4,580	35	1,547	300	9,855
2013/14	4,325	40	1,108	250	9,657
2014/15	4,167	45	1,087	347	8,497
2015/16	4,605	38	1,265	423	10,927
2016/17	4,600	43	1,285	470	11,369
2017/18	4,765	50	1,291	475	11,775
2018/19	4,635	51	1,431	417	11,015
2019/20	4,759	56	1,517	446	11,501
Total	46,624	429	14,090	3,650	106,381

Table 1: Life risk incidents 2010/11 - 2019/20

Dwelling fires

There has been a 21% reduction in the number of dwelling fires that GMFRS have attended since 2010, as well as a reduction in the number of fires standardised by population. Whilst this is positive, GMFRS has the highest rate of dwelling fires per 100,000 population in England, a continuing trend since 2010. Figure 7 shows that Manchester has a higher number of fires, particularly in areas surrounding the city centre such as Moss Side, Hulme, Fallowfield; in areas in Salford such as Broughton; and in the surroundings of other town centres such as Bolton, Rochdale, and Stockport. The number of fatalities has remained relatively static, as have injuries from 2013/14 onwards.

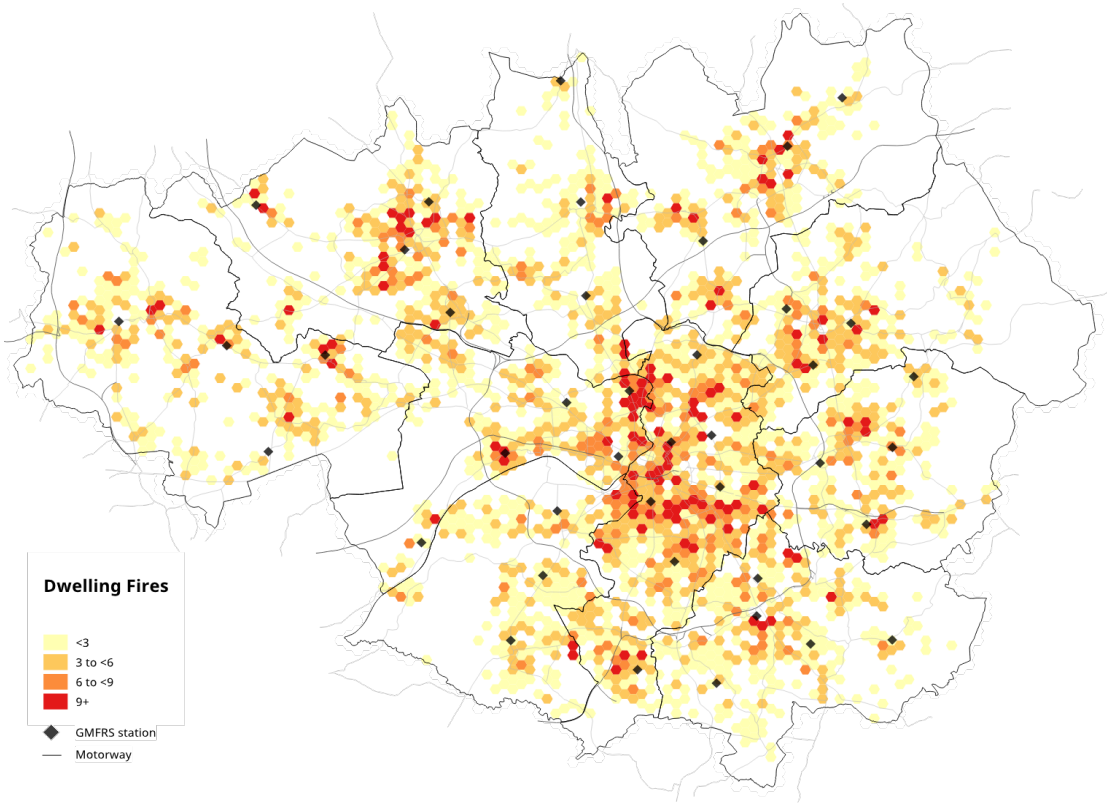

Figure 7: Map showing number of dwelling fires

FY	Incidents	Incs/100k Pop	Fatalities	Injuries	Rescues	Mobilisations
2010/11	2,907	109	15	1,047	99	5,983
2011/12	2,864	107	20	930	57	6,047
2012/13	2,572	95	16	805	59	5,453
2013/14	2,529	93	17	449	80	5,265
2014/15	2,441	89	15	481	122	5,077
2015/16	2,591	94	15	482	149	6,648
2016/17	2,468	89	17	491	149	6,571
2017/18	2,497	89	21	404	137	6,435
2018/19	2,318	82	18	455	98	6,097
2019/20	2,293	81	13	471	109	6,243
Total	25,480		167	6,015	1,059	59,819

Table 2: Dwelling fires 2010/11 - 2019/20

Accidental dwelling fires (ADFs) make up the largest proportion of dwelling fires, between 83% and 88% in the past ten years. As with all dwelling fires, the rate of incidents per 100,000 population is consistently higher in GMFRS compared to other FRSs, even though the rate has reduced from 91 to 71 per 100,000 population over this period.

FY	Incidents	Inc/100k Pop	Fatalities	Injuries	Rescues	Mobilisations
2010/11	2,432	91	13	913	60	4,933
2011/12	2,388	89	13	809	44	4,913
2012/13	2,213	82	15	716	43	4,612
2013/14	2,194	81	14	404	71	4,494
2014/15	2,115	77	14	417	100	4,309
2015/16	2,249	82	13	444	127	5,768
2016/17	2,135	77	14	448	131	5,654
2017/18	2,156	77	12	342	106	5,493
2018/19	2,041	73	15	413	88	5,348
2019/20	2,001	71	10	393	75	5,183
Total	21,924		133	5,299	845	50,707

Table 3: ADFs 2010/11 - 2019/20

Non-residential fires

High numbers of non-residential fires are largely concentrated in Manchester city centre and near to town centres, but other hotspots of incidents occur in outlying industrial areas, such as those near Leigh and Bolton town centres (Figure 8). Non-residential fires have reduced over 40% since 2010 and there are relatively few fatalities and injuries linked to these types of fires (Table 4).

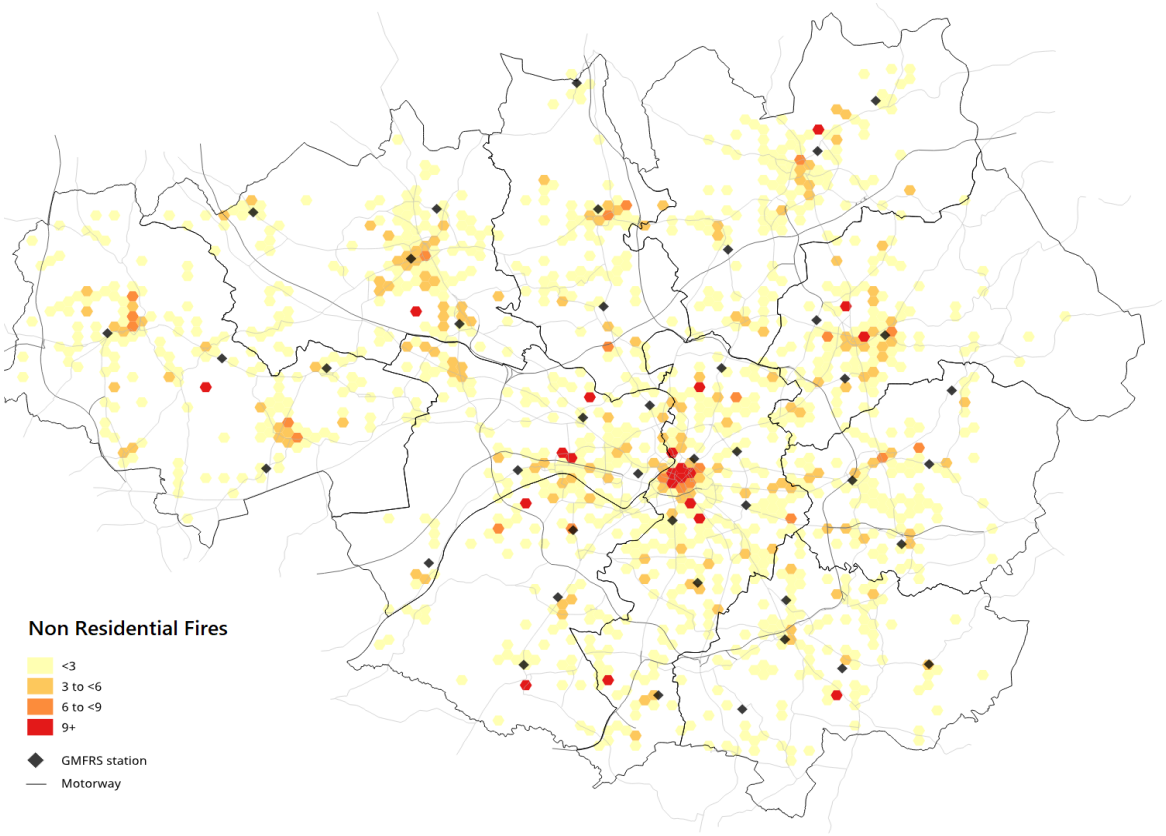

Figure 8: Non-residential fires per 500m

FY	Incidents	Fatalities	Injuries	Rescues	Mobilisations
2010/11	1,347	0	92	6	3,411
2011/12	1,236	1	70	1	3,309
2012/13	1,008	0	68	2	2,785
2013/14	918	0	37	4	2,920
2014/15	778	1	34	4	1,865
2015/16	874	2	44	16	2,431
2016/17	843	3	32	4	2,791
2017/18	898	0	42	18	3,228
2018/19	799	1	43	13	2,657
2019/20	804	0	29	5	2,730
Total	9,505	8	491	73	28,127

Table 4: Non-residential fires 2010/11 - 2019/20

Road Traffic Collisions (RTCs)

The number of RTCs that GMFRS attend has increased since 2010/11, as documented in Table 5. Understanding the true number of RTCs in Greater Manchester is difficult, as it is known that GMFRS only attend a small proportion of overall RTCs in Greater Manchester, tending to be more serious collisions requiring rescue or extrication. Additionally, over recent years GMFRS has voluntarily increased the number of RTCs it goes to in order to support other emergency services, with the overall aim of assisting in ensuring that roads are opened as soon as possible.

RTCs attended by GMFRS account for a higher number of fatalities, injuries and rescues than dwelling fires. RTCs can and do occur at all places on the road network, however Figure 9 highlights locations where collisions are relatively high – within the city centre and Mancunian Way, and at different locations on the motorway network, particularly at major junctions such as M60/M602, M60 J18.

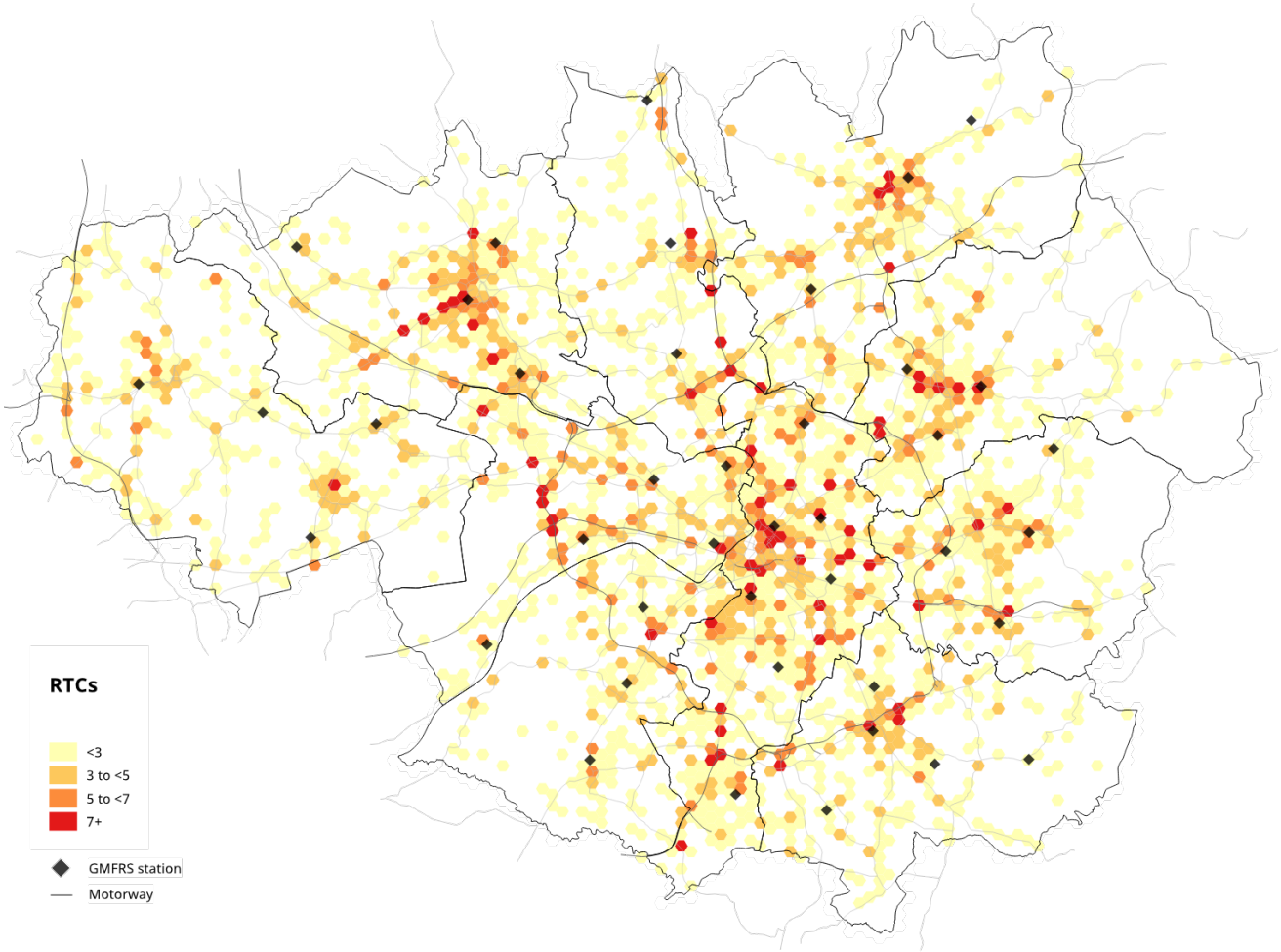

Figure 9: RTCs per 500m area

FY	Incidents	Fatalities	Injuries	Rescues	Mobilisations
2010/11	764	16	785	12	1,333
2011/12	751	12	659	23	1,328
2012/13	773	15	626	33	1,346
2013/14	784	11	551	36	1,368
2014/15	887	17	592	83	1,457
2015/16	1,046	15	742	72	1,653
2016/17	1,244	22	795	156	1,910
2017/18	1,339	11	865	125	2,036
2018/19	1,603	8	1,031	119	2,317
2019/20	1,869	28	1,147	126	2,626
Total	11,060	155	7,793	755	17,444

Table 5: RTCs 2010/11 – 2019/20

Other Life Risk Special Service Calls (LR SSCs)

Life risk SSC incidents encompass a wide range of incidents such as rescue from water, from height, medical emergencies, flooding evacuations etc. The number of life risk SSCs has increased by nearly 60% over this ten-year period, and the number of fatalities has also increased. There is little geographical pattern in where these incidents occur, but there is a small pocket of increased activity in Manchester city centre.

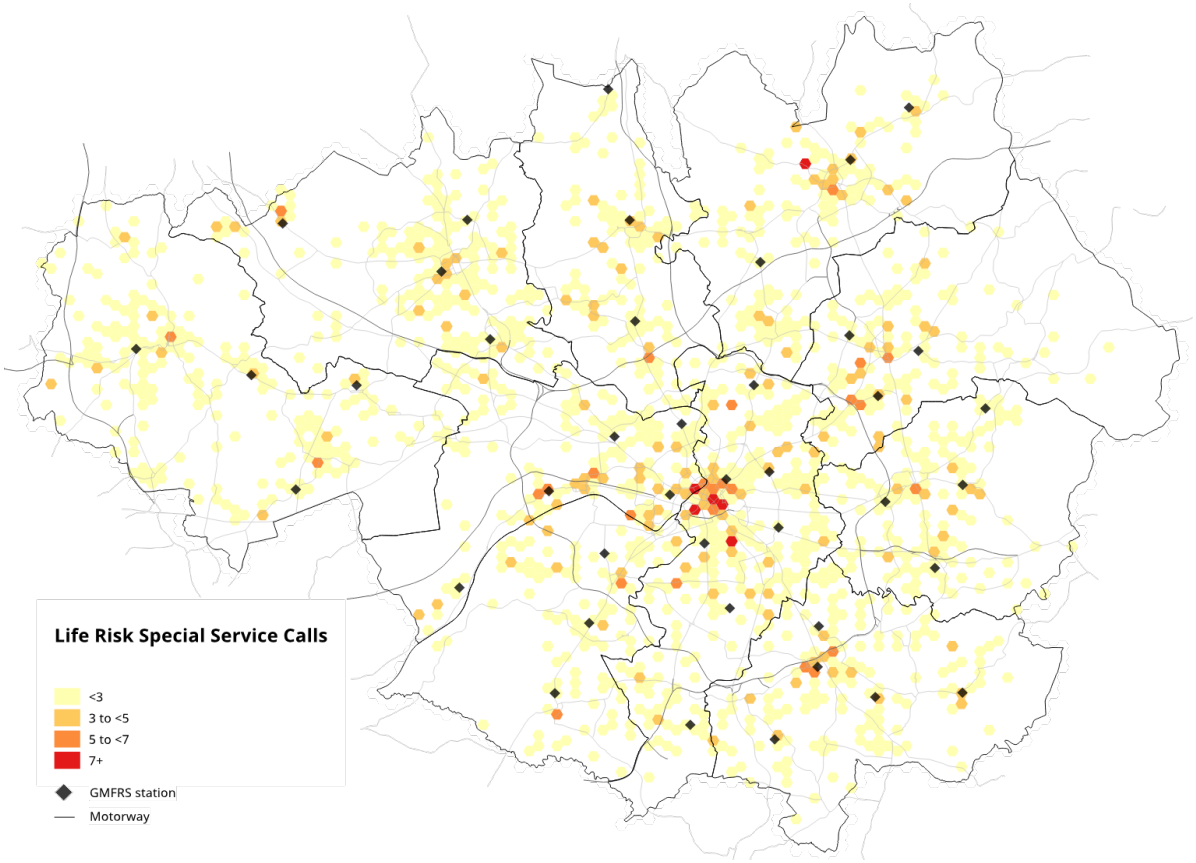

Figure 10: Life Risk SSCs per 500m area

FY	Incidents	Fatalities	Injuries	Rescues	Mobilisations
2010/11	340	9	123	146	467
2011/12	385	6	161	188	557
2012/13	427	6	141	213	599
2013/14	333	12	49	143	474
2014/15	361	15	36	156	543
2015/16	468	8	40	204	744
2016/17	506	11	56	235	753
2017/18	553	20	40	234	796
2018/19	556	27	43	233	787
2019/20	546	19	48	246	859
Total	4,475	133	1,477	1,998	6,579

Table 6: Life risk SSCs 2010/11 - 2019/20

Other Primary Fires

These incidents are predominantly vehicle fires (accidental or deliberate) with some outdoor structures, such as electricity pylons, substations, car parks etc. The numbers of these incidents have reduced and have a relatively low number of fatalities and injuries. Again, there is little geographical pattern other than they occur in mostly urban areas.

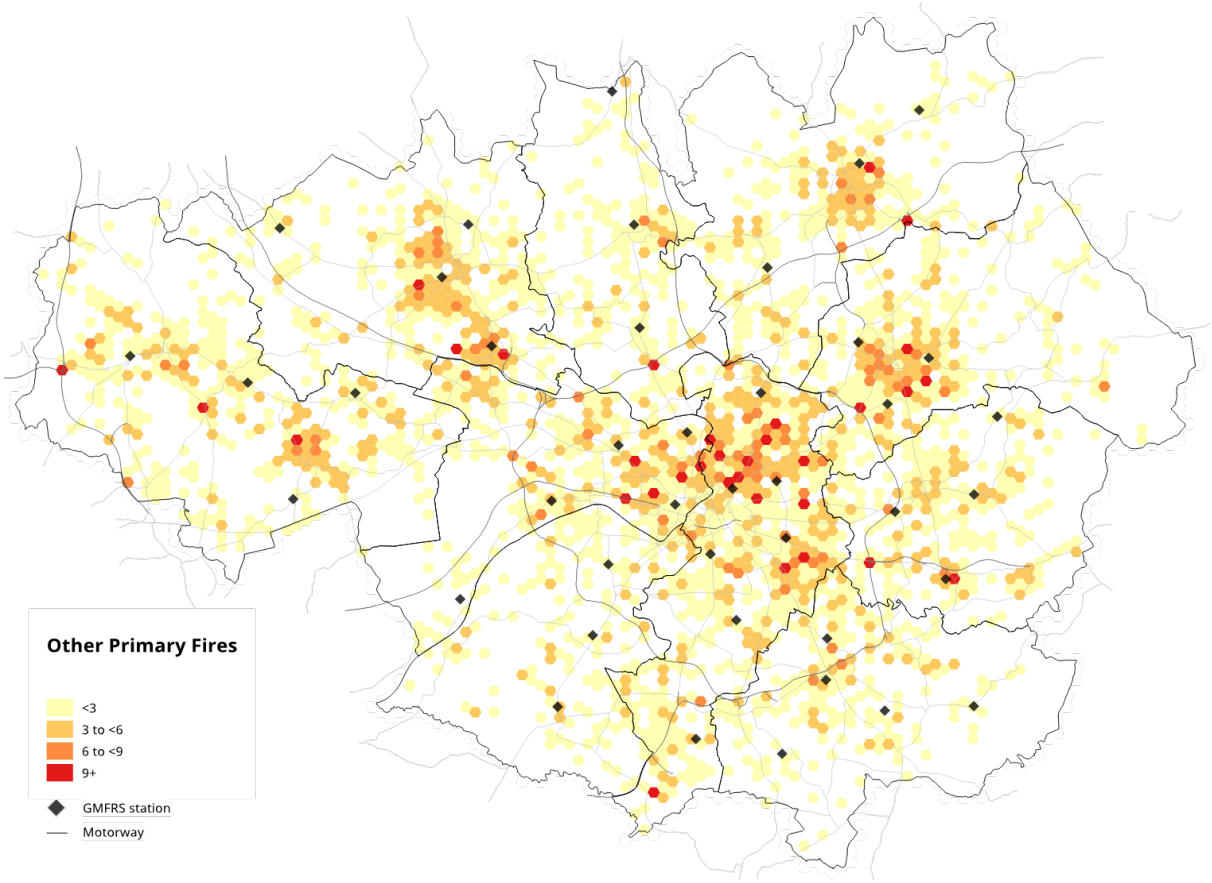

Figure 11: Other primary fires per 500m

FY	Incidents	Fatalities	Injuries	Rescues	Mobilisations
2010/11	2,183	5	88	2	3,014
2011/12	1,840	4	120	0	2,719
2012/13	1,489	7	83	0	2,220
2013/14	1,506	1	49	0	2,114
2014/15	1,429	2	36	2	1,947

2015/16	1,495	4	40	7	2,001
2016/17	1,822	3	56	7	2,399
2017/18	1,786	3	40	3	2,498
2018/19	1,608	1	43	4	3,748
2019/20	1,461	1	48	5	2,445
Total	16,619	31	603	30	25,105

Table 7: Other primary fires 2010/11 - 2019/20

Secondary fires

Secondary fires account for the largest proportion of all fires and are usually over double the number of dwelling fires (Table 8). They are predominately started deliberately in open spaces, in wheelie bins, abandoned cars etc. Their numbers have reduced by over a third in the past ten years. Whilst they occur all over Greater Manchester there are areas where they are much more prevalent, including near Leigh and Abram in Wigan, near Bolton town centre, parts of Salford such as Langworthy, small areas just south of Manchester city centre and in several locations in Oldham (Figure 12).

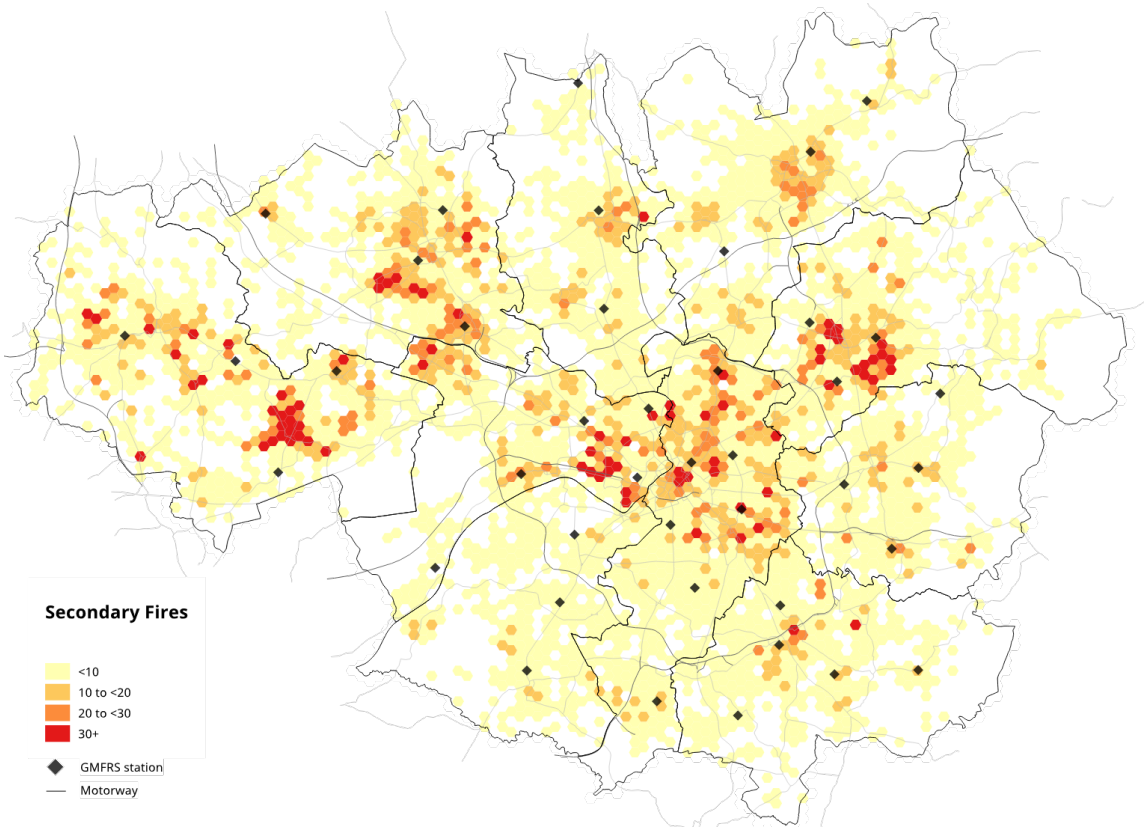

Figure 12: Secondary fires per 500m area

FY	Incidents	Fatalities	Injuries	Rescues	Mobilisations
2010/11	11,811	0	0	0	13,551
2011/12	9,723	0	0	0	11,170
2012/13	7,011	0	0	0	8,164
2013/14	8,526	0	0	0	9,670
2014/15	7,021	0	0	0	7,816
2015/16	7,395	0	0	0	8,560
2016/17	7,298	0	0	0	8,508
2017/18	7,564	0	0	0	8,691
2018/19	7,844	0	0	0	8,851
2019/20	6,037	0	0	0	6,873
Total	80,230	0	0	0	91,854

Table 8: Secondary fires 2010/11 - 2019/20

Non-Life Risk SSCs

These incidents are where life is not in immediate danger, such as domestic flooding, lift rescues, non-emergency entrapment, body recovery, but still accounts for a higher proportion of incidents compared to life-risk SSCs. The number of these type of incidents has remained relatively static over the past ten years (Table 9). The high prevalence of incidents in Manchester city centre are mostly lift rescues, whilst there is a small hotspot close to several stations, which will be ring removals.

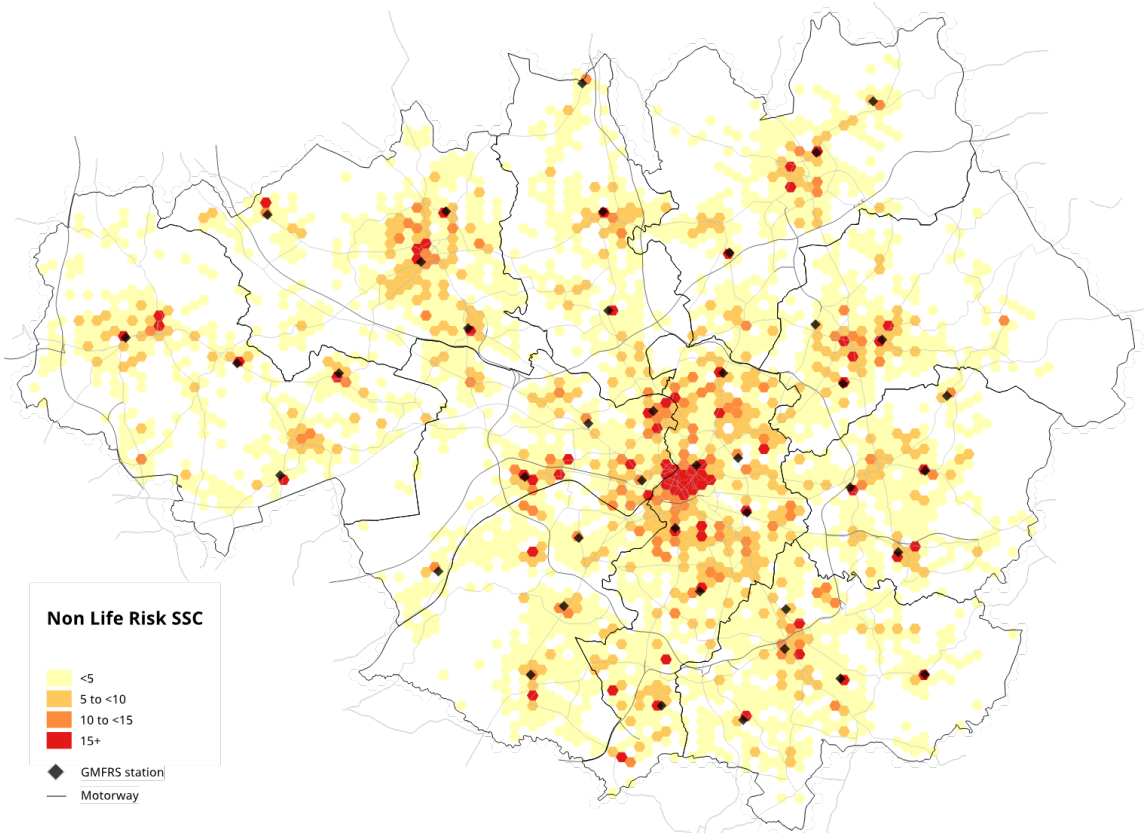

Figure 13: Non-life risk SSCs per 500m area

FY	Incidents	Fatalities	Injuries	Rescues	Mobilisations
2010/11	3,219	20	305	1,652	4,195
2011/12	2,746	26	287	1,425	3,738
2012/13	2,914	32	243	1,073	4,026
2013/14	2,744	20	201	1,042	3,527

2014/15	2,512	21	141	914	3,331
2015/16	3,601	51	223	1,010	3,613
2016/17	3,294	30	232	1,026	4,126
2017/18	3,243	57	294	1,145	4,190
2018/19	2,969	36	238	1,030	3,881
2019/20	3,202	24	273	1,163	4,207
Total	30,444	317	2,437	11,480	38,834

Table 9: Non-Life Risk SSCs 2010/11 - 2019/20

False Alarms

False alarms are the largest incident type that GMFRS respond to and are broadly split into two types – false alarms from Automatic Fire Alarms (AFA) which come via alarm receiving centres (ARCs), and those where the person rung 999 to report an emergency, either with good intent or maliciously, and it turned out not to be. The number of false alarms has remained high for several years. However recent AFA policy changes resulting in more effective call challenging at NWFC and a non-attendance policy to commercial premises doing the day, has started to reduce these incidents, the start of which can be seen in

2019/20 with work continuing.

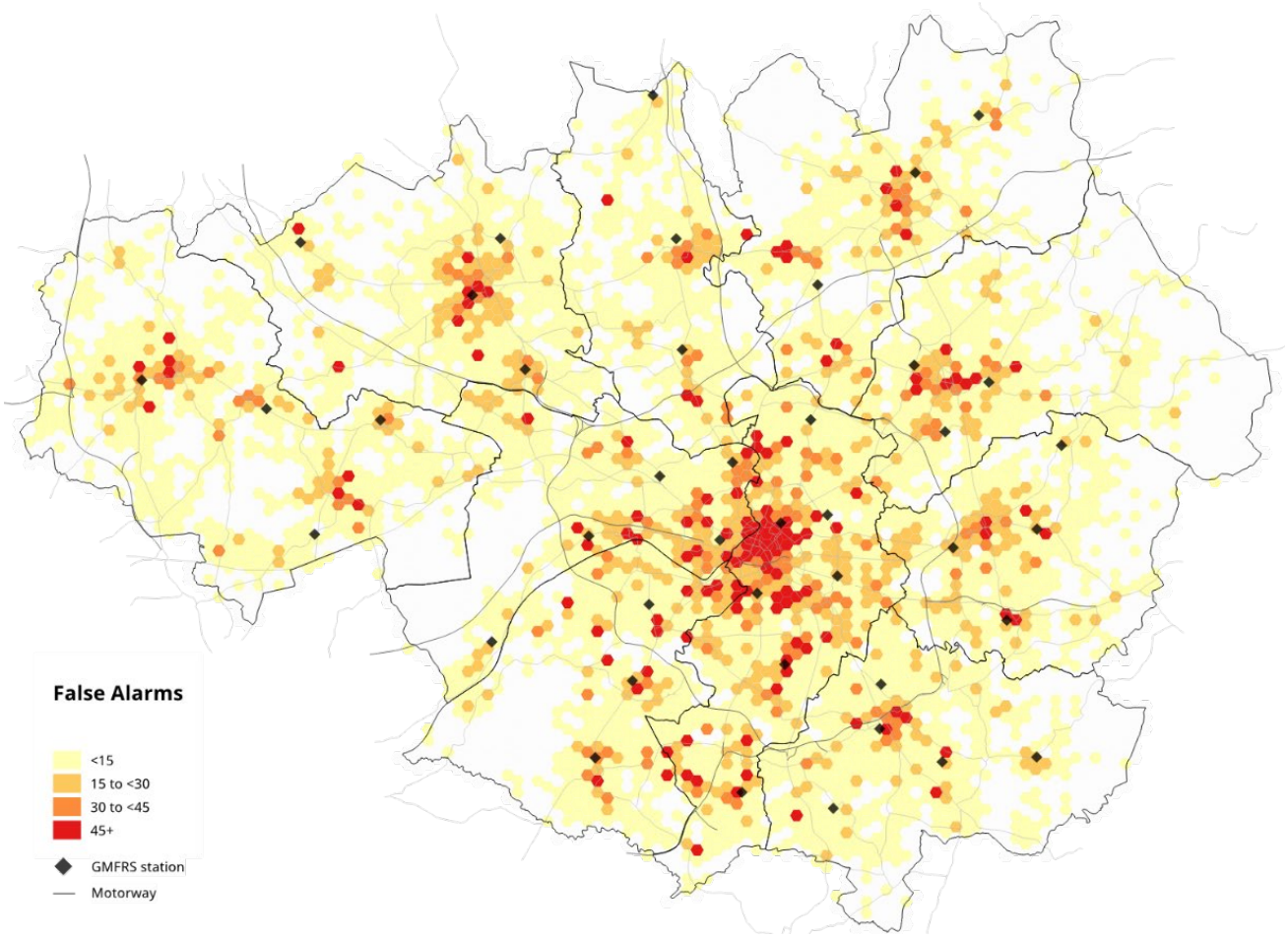

Figure 14: False alarms per 500m area

FY	Incidents	Fatalities	Injuries	Rescues	Mobilisations
2010/11	15,282	0	2	0	22,512
2011/12	14,413	0	0	0	18,679
2012/13	13,499	0	0	0	17,716
2013/14	12,822	0	1	0	17,466
2014/15	12,452	0	0	0	15,974
2015/16	12,800	0	0	0	19,005
2016/17	13,549	0	0	0	21,008
2017/18	13,944	0	0	0	21,213
2018/19	14,091	0	0	0	21,432
2019/20	13,661	0	0	0	23,475
Total	136,513	0	3	0	198,480

Table 10: False alarms 2010/11 - 2019/20

Cardiac Arrest (Red1) Incidents

Commencing September 2015 GMFRS attended cardiac arrest (Red 1) incidents on behalf of North West Ambulance Service (NWAS), with the agreement of NWAS, Unite and the Fire Brigades Union (FBU)

All GMFRS operational crews attended these incidents until August 2017 when the FBU withdrew from this agreement due to a national pay dispute. There is a possibility that GMFRS could resume attending Cardiac Arrest incidents in future as they form part of national discussions surrounding Broadening the Role of the Firefighter.

These incidents have been presented in isolation in Table 11, for data completeness, and because they represented a relatively large proportion of life risk incidents during the time when this agreement was in place. They also accounted for a much higher number of fatalities than all other incident types combined.

FY	Incidents	Fatalities	Injuries	Rescues	Mobilisations
2015/16	1,633	706	385	11	1,633
2016/17	3,831	1,466	745	32	3,831
2017/18	1,207	544	258	12	1,207
Total	6,671	2,716	1,388	55	6,671

Table 11: Cardiac arrest incidents attended by GMFRS

Response – Fire Engine Coverage

The last part of this section relates to our response coverage; that is how much of the county can be reached within a set period of time from our stations. This is calculated using automatic vehicle location (AVL) tracking data from all appliances for the past five years, based upon blue-light speeds.

Figure 15 is the current coverage for 50 fire engines, displaying how many fire engines can reach each location in Greater Manchester within 10 minutes. In the darkest areas such as the city centre and surroundings, 11 or more resources are able to get there within ten minutes, and this in general reduces in distance from the city centre. This isn't completely uniform, mainly due to the motorway network allowing quicker access to certain locations. The lightest areas, which are mostly around the edges of Greater Manchester are where no GMFRS responses can respond within 10 minutes.

There are some areas of white on the map – these are locations where there has not been a single incident in the past five years.

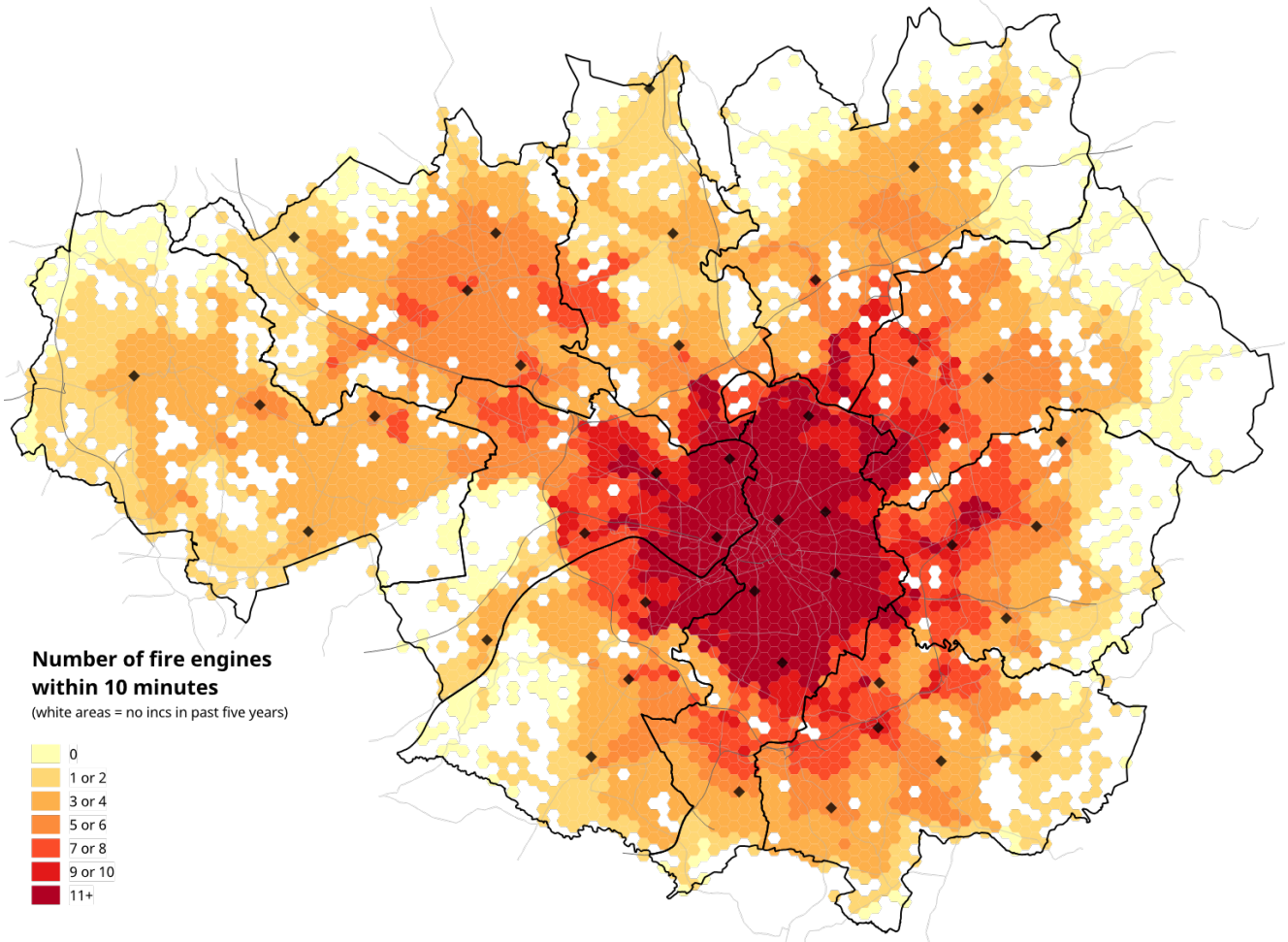

Figure 15: 10-minute coverage from 50 fire engines

Section 2: Demographics & Population

2.836 million	15.9 %	18.9 %
GM Population (mid-2018)	**GM Residents Age 65+**	**GM Population Increase Between (2018-2043)**

Greater Manchester is a metropolitan county and combined authority area, with a population of just over 2.8 million; the third largest in England after Greater London and the West Midlands. This fast-growing population is made up of people from all walks of life, cultures, religions and backgrounds, with a changing age-profile, and inherent environmental and long-standing factors relating to deprivation. Some of the characteristics found within the population of Greater Manchester are known to lead to increased risk of fire, therefore it is important to fully understand the underlying population.

This section utilises data predominately available via Office of National Statistics (ONS) and Census 2011 to provide a profile of those people who live within Greater Manchester. It will present a series of tables and information, with accompanying maps which show the geography of different population characteristics, highlighting that not all boroughs or local areas are the same. Maps are displayed at a Lower Super Output Area (LSOA) level, which is a standard national geography for Census output, enabling comparison between areas. They have a mean population of 1,500.

Where appropriate and possible due to data collected, a comparison has been drawn between the population and people who have been involved in incidents. This is an important link for looking at where the risks lie within the Greater Manchester population, and to inform future prevention and/or protection strategies.

This is most pertinent in the latter part of this section which discusses ‘learning from fatal fires’, which will crystallise the reason why the information presented in this section is important.

Overall Population

The mid-year 2018 estimated population of Greater Manchester is 2,835,686, which is an increase of 23,000 since mid-year 2017 estimates and is further broken down by borough in Table 12.

Manchester borough has the largest population in the County followed by Wigan.

Borough	Population
Bolton	287,550
Bury	190,990
Manchester	552,858
Oldham	237,110
Rochdale	222,412
Salford	258,834
Stockport	293,423
Tameside	226,493
Trafford	237,354
Wigan	328,662
Total	2,835,686

Table 12: Mid-year estimated population of Greater Manchester (ONS)

Population Density

Population density is an important indicator of where demand is going to occur – quite simply more incidents happen where more people are. Figure 16 displays the population density based upon the 2018 mid-year estimates. Naturally, density is higher in town and city centres, the largest densities being in two main locations in Manchester – that on the outskirts of the city centre, but within the inner ring road, and a little further south, close to Fallowfield.

The LSOA with highest population density is in the city centre with over 450 persons per hectare.

It is of note, that with a couple of exceptions, most of our fire stations are close to where population density is higher.

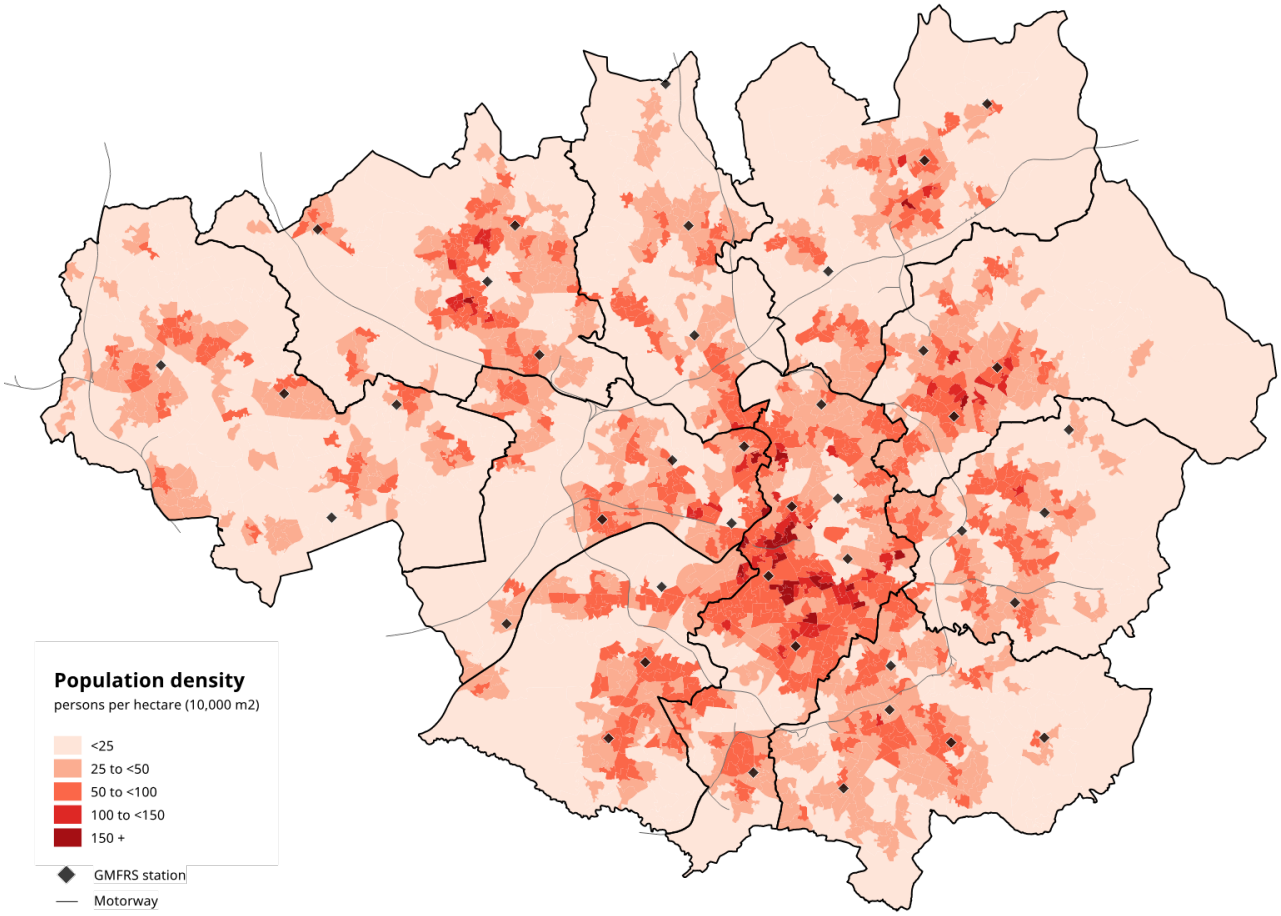

Figure 16: Population density in Greater Manchester (ONS)

Age

Figure 17 displays the population age profile for the ten boroughs individually. It demonstrates that most boroughs have a broadly similar profile, apart from Manchester and Salford. Manchester has a large young population, particularly between the ages of 20 and 35, and falls away quite sharply as the population gets older. Salford has a similar increase in the same range between 20 and 35, but not to the same extent as in Manchester. Stockport and Wigan have the largest relative proportion of people in the 45-65 age range.

An important note here is that Manchester City Council (MCC) has developed its own population forecasting model (MCCFM) as they believe the national ONS estimates to undercount the population in Manchester. The MCC population estimate for 2019 is 576,500,

which is much higher than that from ONS. This higher figure from the MCCFM take account of local intelligence such as the high level of construction, rising number of international students and increasing demand for school places.

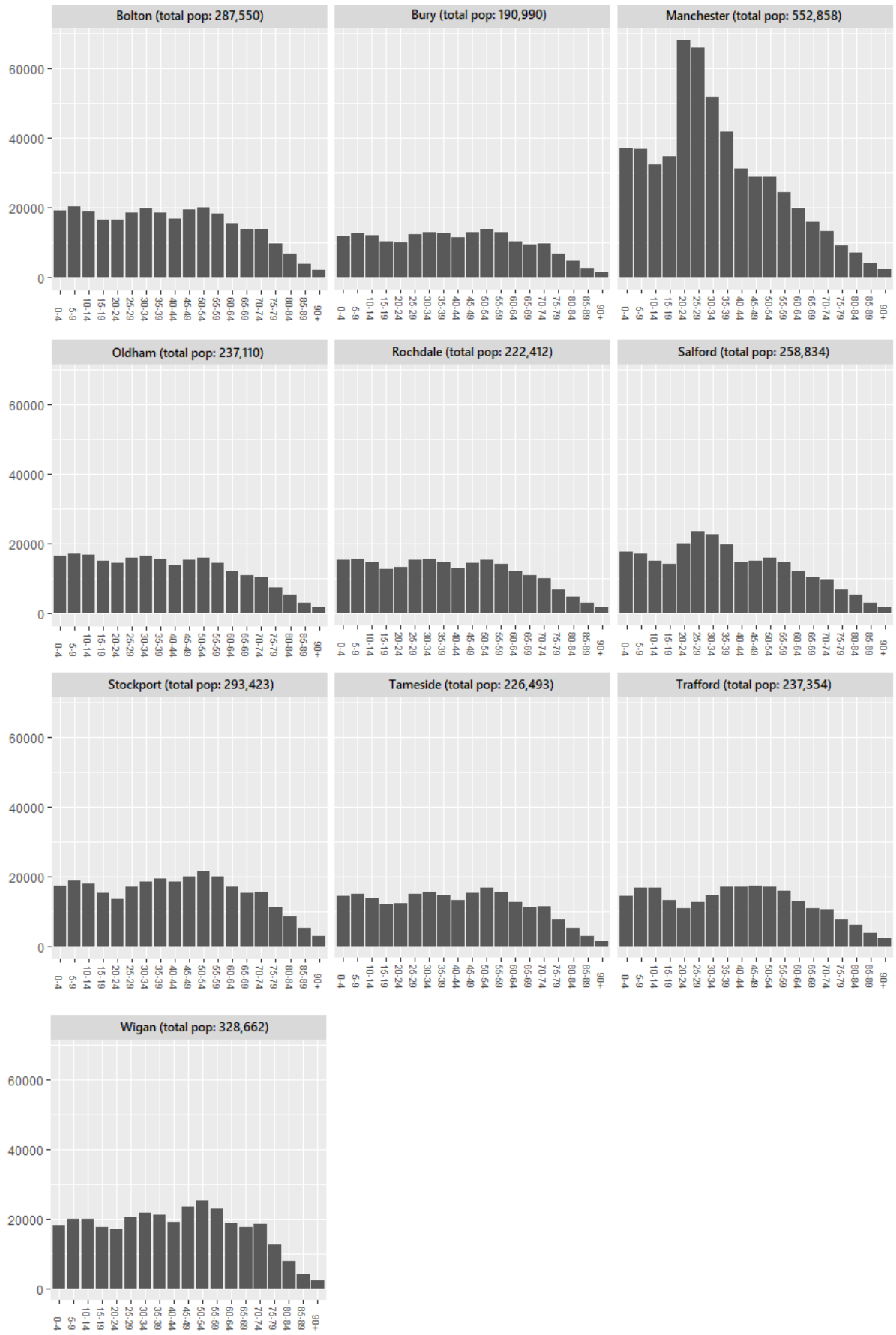

Figure 17: Population age profiles for each borough (ONS)

Age is an important factor in the likelihood of people having a fire and becoming a casualty or fatality in a fire. GMFRS collects age information where there is a victim (casualty, rescue, or fatality) in any incident. Table 13 shows the proportion of people who have been a casualty or a fatality in accidental dwelling fires in the past ten years with a comparison to the overall population.

The final column compares the fatalities against the population. Any value over 1 indicates that people of that age group are over-represented in fire fatalities, compared to the population. The bigger the number, the more likely they are to be a fire fatality compared to the population, and this table demonstrates that this likelihood increases with age.

Age Group	Casualties	Fatalities	GM Pop	Fatality Index
0-9	4%	4%	13%	0.30
10-19	7%	2%	12%	0.13
20-29	11%	6%	14%	0.43
30-39	11%	6%	15%	0.40
40-49	12%	15%	13%	1.16
50-59	12%	15%	13%	1.17
60-69	10%	11%	9%	1.22
70-79	10%	16%	7%	2.27
80-89	10%	20%	3%	6.14
90+	5%	5%	1%	8.43
Unknown	8%	0%	0%	0.00
Total	817	132	2,835,686	

Table 13: Over 65+ and 85+ populations in Greater Manchester (ONS)

This is not unique to Greater Manchester; findings from the most recent analysis of national fire statistics by Home Office report that the fire fatality rate is highest among older people: 8.4 people per million for those aged 65 to 79 years old and 16.9 for those aged 80 years and over, compared to 4.3 people per million overall [2].

They also note that although the overall number of fire-related fatalities is relatively low, and so prone to fluctuation, these general patterns have been consistent since data became available in 2009/10.

Borough	65+ Pop	85%+ Pop
Bolton	17.3%	2.0%
Bury	18.3%	2.2%
Manchester	9.3%	1.2%
Oldham	16.2%	1.9%
Rochdale	16.5%	2.0%
Salford	14.2%	1.8%
Stockport	20.0%	2.8%
Tameside	17.7%	1.9%
Trafford	17.4%	2.6%
Wigan	19.1%	1.9%
Total	15.9%	2.0%

Table 14: Over 65+ and 85+ populations in Greater Manchester (ONS)

Further analysis into age shows that older persons do not have an even geographical spread across Greater Manchester. Table 14 demonstrates that these populations of 65+ are comparatively low in Manchester and to a certain extent in Salford, but are higher in Stockport, Wigan, and Bury. The percentage of persons aged 85+ is generally low, but there is higher 85+ populations in Stockport and Trafford.

The 2018 mid-year estimates show there are currently 450,787 people aged 65+ and 55,336 people aged 85+ in Greater Manchester. The prevalence of older populations is distributed differently across the County, shown in Figure 18 for over 65s and Figure 19 for over 85s.

The low percentage of over 65s in Manchester borough is very evident, with the exception of Didsbury area in the south, as well as central/east Salford. The location of over 65s has a

fairly distinct pattern and are more prevalent in suburban areas surrounding town and city centres, rather than within them.

Populations are particularly high in Stockport and in northern areas of Bury and Bolton.

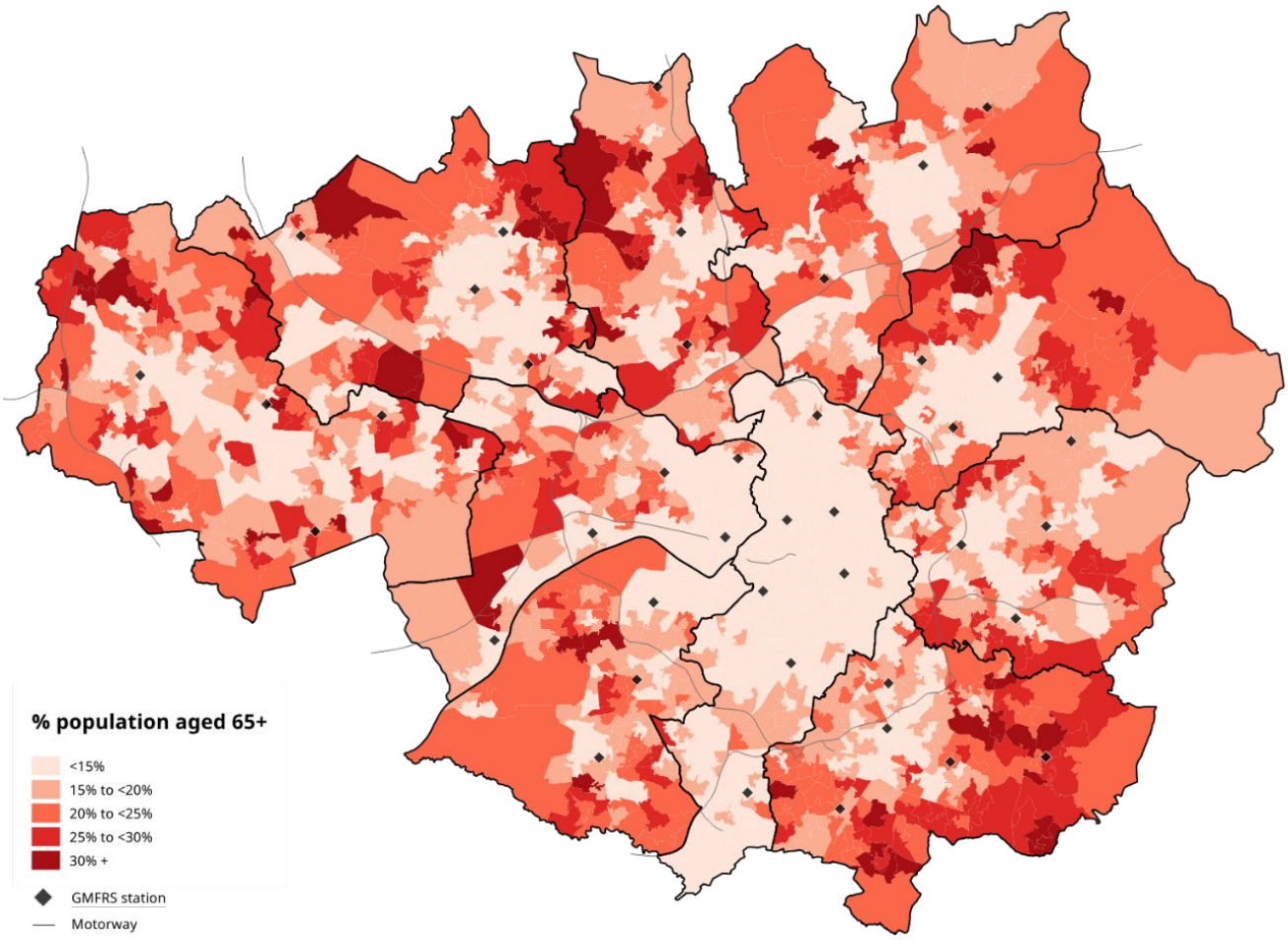

Figure 18: Percentage of persons aged 65 and over by LSOA

Persons aged 85+ account for a small but growing percentage of the population. There is a very low number in most town and city areas, with pockets of populations more prevalent in small areas in Stockport, Trafford, and Salford/Bury border.

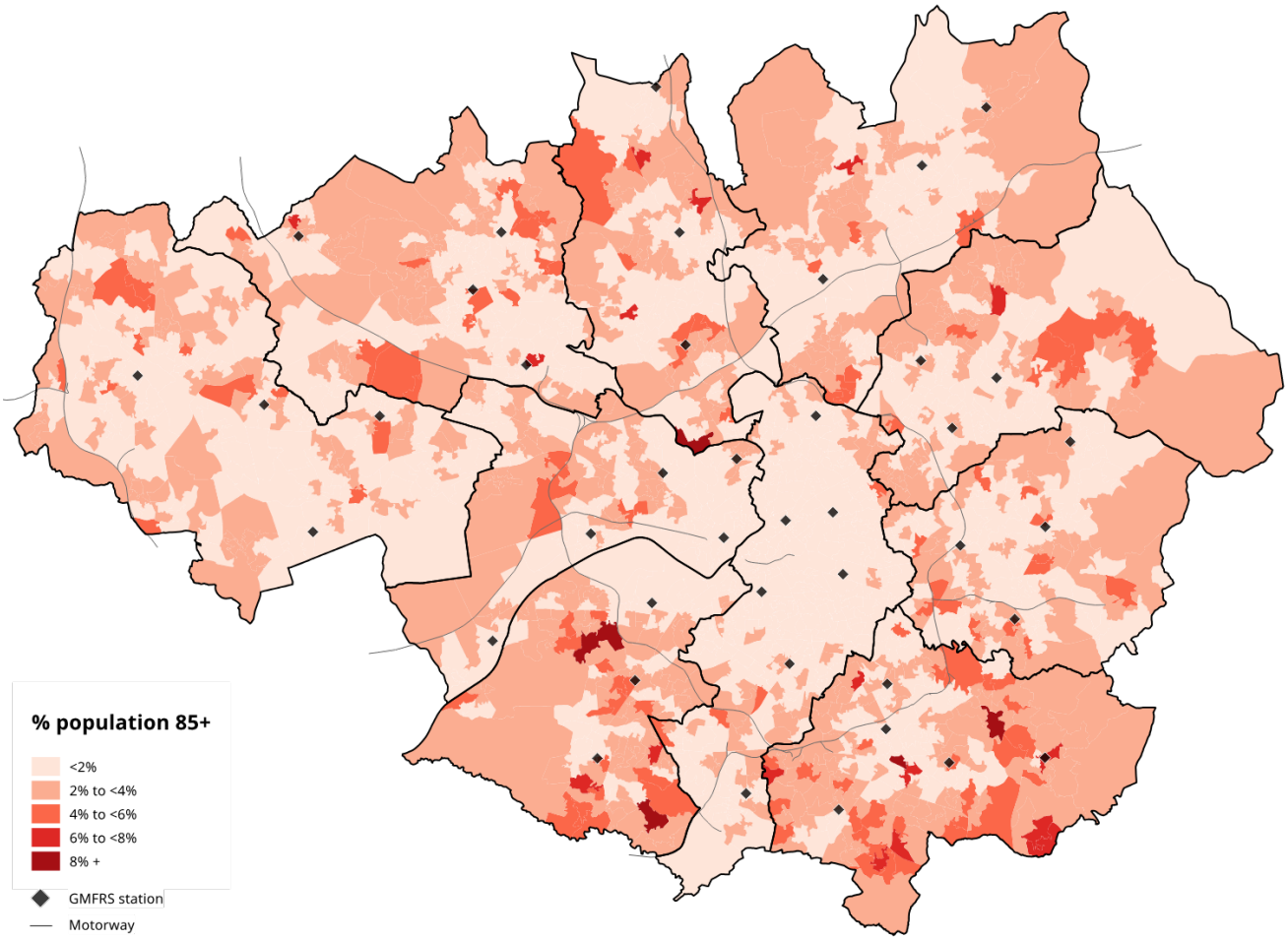

Figure 19: Percentage of persons aged 85 and over by LSOA

Population Projections

The latest population projections are based upon 2018 estimates and are projected until 2043. The figures in Table 15 show that overall population in Greater Manchester is due to increase by 9% in the next 25 years, to a figure of 3,079,000, with the greatest increases projected to be in Salford and Rochdale.

It is clearly evident that the over 65 population is expected to increase by a large proportion in the future. This is particularly the case in Manchester, Rochdale and Wigan.

The under-20 population is set to decline within the next 25 years in both Bolton and Wigan.

Borough`	Under 20	20-34	35-65	Over 65	All ages
Bolton	-1.1%	0.3%	-0.7%	27.4%	4.3%
Bury	2.9%	5.5%	4.3%	24.8%	7.9%
Manchester	2.4%	4.8%	6.2%	41.1%	8.0%
Oldham	2.0%	5.7%	9.2%	32.7%	10.4%
Rochdale	3.7%	6.1%	11.4%	35.3%	12.3%
Salford	13.3%	12.4%	15.4%	32.5%	16.5%
Stockport	2.4%	2.5%	5.0%	24.2%	7.9%
Tameside	5.0%	6.0%	3.6%	29.5%	9.0%
Trafford	1.9%	5.1%	5.6%	30.8%	9.0%
Wigan	-3.5%	0.6%	0.9%	33.8%	6.2%
Greater Manchester	2.7%	4.9%	5.8%	31.2%	8.9%

Table 15: Projected population change by 2043 within different age groups

Single Person Households

Historical data shows that people who live alone, both over and under the age of 65, account for a high proportion of incidents, casualties, and fatalities. This information is collected within IRS for dwelling fires and is displayed in Table 16, where the two lone person categories clearly outnumber of the others.

Household Composition	ADF Incidents	Incs with Casualty	Incs with Fatalities
Lone person over pensionable age	21.5%	28.8%	36.3%
Lone person under pensionable age	18.2%	23.6%	23.1%
Couple with dependent child/ren	16.9%	12.0%	9.9%
Lone parent with dependent child/ren	9.4%	6.9%	0.0%
Couple both under pensionable age with no children	8.4%	8.1%	3.3%
3 or more adults under pensionable age, no child/ren	4.5%	4.0%	1.1%
Other	4.0%	4.1%	2.2%
Couple one or more over pensionable age, no child/ren	3.8%	5.3%	6.6%
3 or more adults with dependent child/ren	3.1%	3.5%	1.1%
Not known	2.6%	0.1%	1.1%
NULL	7.6%	3.4%	15.4%
Total	6233	677	91

Table 16: Household composition of ADF incidents, incidents with casualties and incidents with fatalities in dwellings

Figure 20 provides the geographical distribution of lone occupants over age 65.

Several areas such as Stockport, Bolton, Trafford and Salford have higher proportions of lone occupants, but there is in general a relatively even spread of people across Greater Manchester.

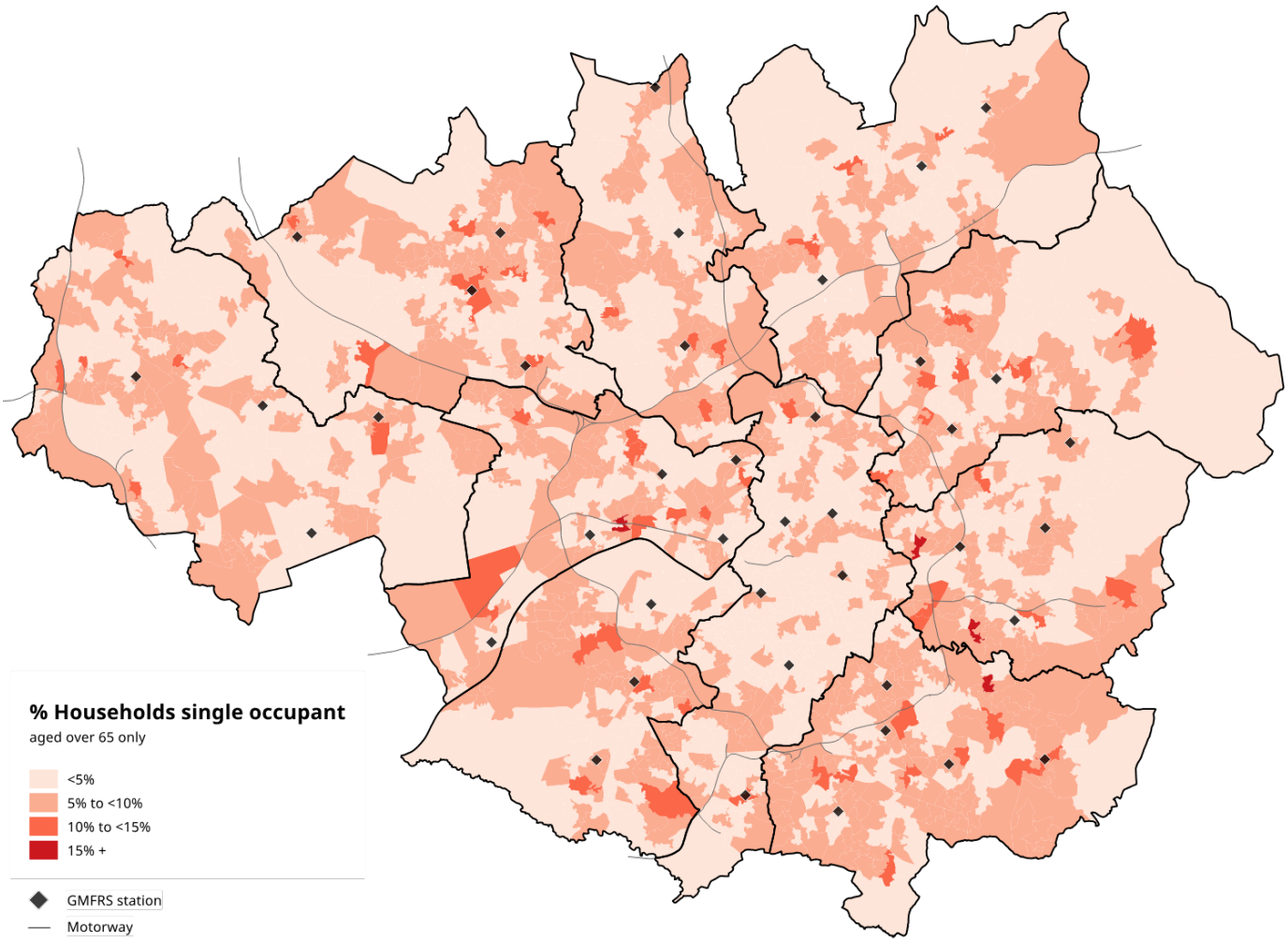

Figure 20: Single occupancy households – persons over 65 by LSOA

Figure 21 displays single occupant households but for all ages, which has quite a different geographical pattern. There is a larger proportion of these households within Manchester and Salford city centres, Salford Quays, and close to town centres such as Bolton, Stockport and Rochdale.

This is likely due to younger people living in city and town centre locations in flats/apartments and student accommodation.

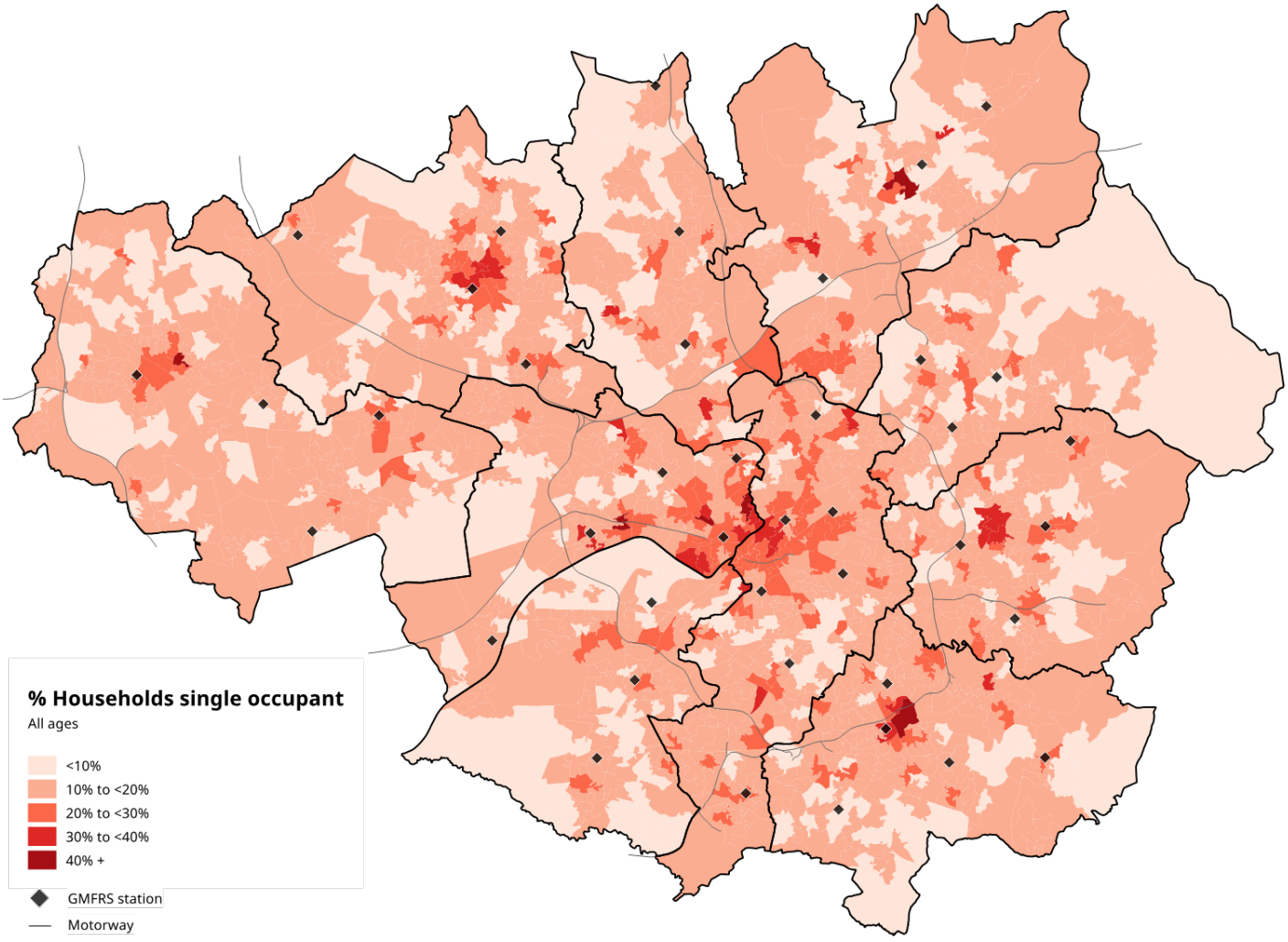

Figure 21: Single occupancy households - all ages by LSOA

Student Population

Following on from this, Greater Manchester has a large university student population. Table 17 documents the number of students at each university, showing that there are nearly 75,000 students in Manchester.

The majority of students live within the vicinity of the university, either in student accommodation provided by the university or privately, or in multiple occupancy housing nearby.

University	Students
The University of Bolton	6,945
The Manchester Metropolitan University	33,050
The University of Manchester	40,250
Royal Northern College of Music	880
The University of Salford	20,815
Total	101,940

Table 17: Number of students at Greater Manchester universities

Persons Not in Education, Employment, or Training (NEETs)

Based on data published for the end of 2018, the proportion of 16-17 year olds in Greater Manchester who were classed as NEET or categorised as 'not known' was 6.1% – proportionately higher than the national average of 5.5%, albeit with a slight improvement compared to the previous year's performance of 6.3%. Overall, this equated to more than 3,700 young people.

Spending a sustained period of time NEET during adolescence increases the likelihood of an individual experiencing significant socio-economic problems as an adult, such as lower wages, poorer physical and mental health, reduced self-confidence and an increased risk of criminality and anti-social behaviour.

Nearly 40% of young people who have been long-term NEET also live in households where no one else is working (compared to 8% of all 16-24 year olds).

Table 18 indicates the percentage of 16 and 17 year old NEETs across each borough in Greater Manchester. Salford has the highest percentage known to be NEET, followed by Bury and Rochdale. However, when including those people who are not known, there is a greater percentage in Manchester, Salford, and Bolton.

Borough	NEET	Not known	Total
Bolton	3.5%	3.8%	7.2%
Bury	3.6%	0.4%	4.0%
Manchester	3.4%	5.3%	8.8%
Oldham	3.5%	1.6%	5.1%
Rochdale	3.6%	2.1%	5.7%
Salford	5.9%	1.8%	7.7%
Stockport	2.3%	0.8%	3.1%
Tameside	3.5%	1.6%	5.2%
Trafford	2.3%	3.7%	6.0%
Wigan	2.7%	4.3%	7.0%
Greater Manchester	**3.4%**	**2.9%**	**6.3%**
England	2.7%	3.3%	6.0%

Table 18: percentage of NEET 16 and 17 year olds in Greater Manchester (Dept. of Education)

Workday Population

Another population consideration is that of working day population. Manchester in particular has a huge commuter pull, both from within Greater Manchester and from surrounding counties. Figure 22 shows the areas which lose over 25% of population during the day, and those which gain more than 25% population during the day. The areas in white do also have a change in population, but to a lesser degree.

It shows that the population in Manchester city centre, areas around Salford Quays, Manchester Airport, Middlebrook near Horwich, and areas close to town centres are the places which have the increase in daytime population. Again, this is explainable by the location of workplaces.

Manchester city centre has the greatest population increase during the day, with some parts having between a 14x and 30x increase in population.

This data is from 2011 Census which is the latest available count for workday population, however two things could impact upon this. First, it is likely there has been increased number of commuters particularly into Manchester during the past nine years, but to counter that, there has been an increase in the number of people who live in city centre areas in this same time period.

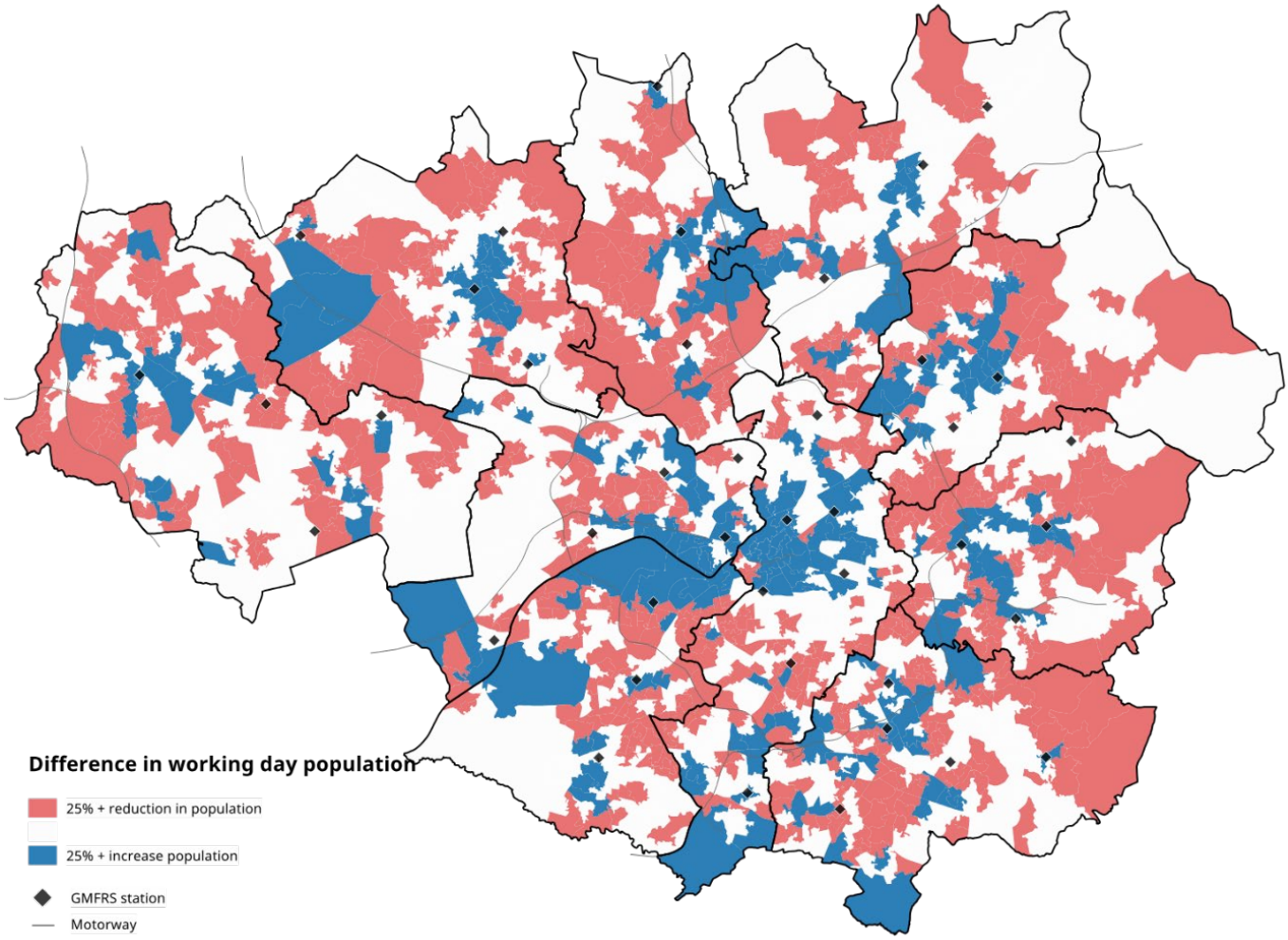

Figure 22: Difference in working day population by LSOA (Census 2011)

Ethnicity

Greater Manchester is a very diverse county, with many different ethnicities, nationalities and languages being spoken.

Table 19 documents the proportion of ethnicity group found within each borough. White is the predominant ethnicity in all boroughs in Greater Manchester, however this proportion is lowest in Manchester. Just over 10% of the Greater Manchester population is Asian, with larger concentrations in Oldham, Manchester, Bolton and Rochdale.

Borough	White	Mixed/ multiple ethnic groups	Asian/Asian British	Black/African/ Caribbean/ Black British	Other ethnic groups
Bolton	81.9%	1.8%	14.0%	1.7%	0.7%
Bury	89.2%	1.8%	7.2%	1.0%	0.7%
Manchester	66.6%	4.6%	17.1%	8.6%	3.1%
Oldham	77.5%	1.8%	19.2%	1.2%	0.2%
Rochdale	81.7%	1.7%	14.9%	1.3%	0.4%
Salford	90.1%	2.0%	4.0%	2.8%	1.1%
Stockport	92.1%	1.8%	4.9%	0.7%	0.6%
Tameside	90.9%	1.4%	6.6%	0.8%	0.2%
Trafford	85.5%	2.7%	7.9%	2.9%	1.0%
Wigan	97.3%	0.9%	1.1%	0.5%	0.2%
Total	83.8%	2.3%	10.1%	2.8%	1.0%

Table 19: Ethnicity in Greater Manchester

Figure 23 indicates that non-white British populations tend to be concentrated in particular areas. It can be seen that there are large populations in North Manchester, around central Manchester near Moss Side, Rusholme and Longsight, and in Bolton, Bury, Rochdale and Oldham town centres.

Wigan has a very small population of non-white British people, whilst Stockport and Salford also have smaller populations of non-white British people.

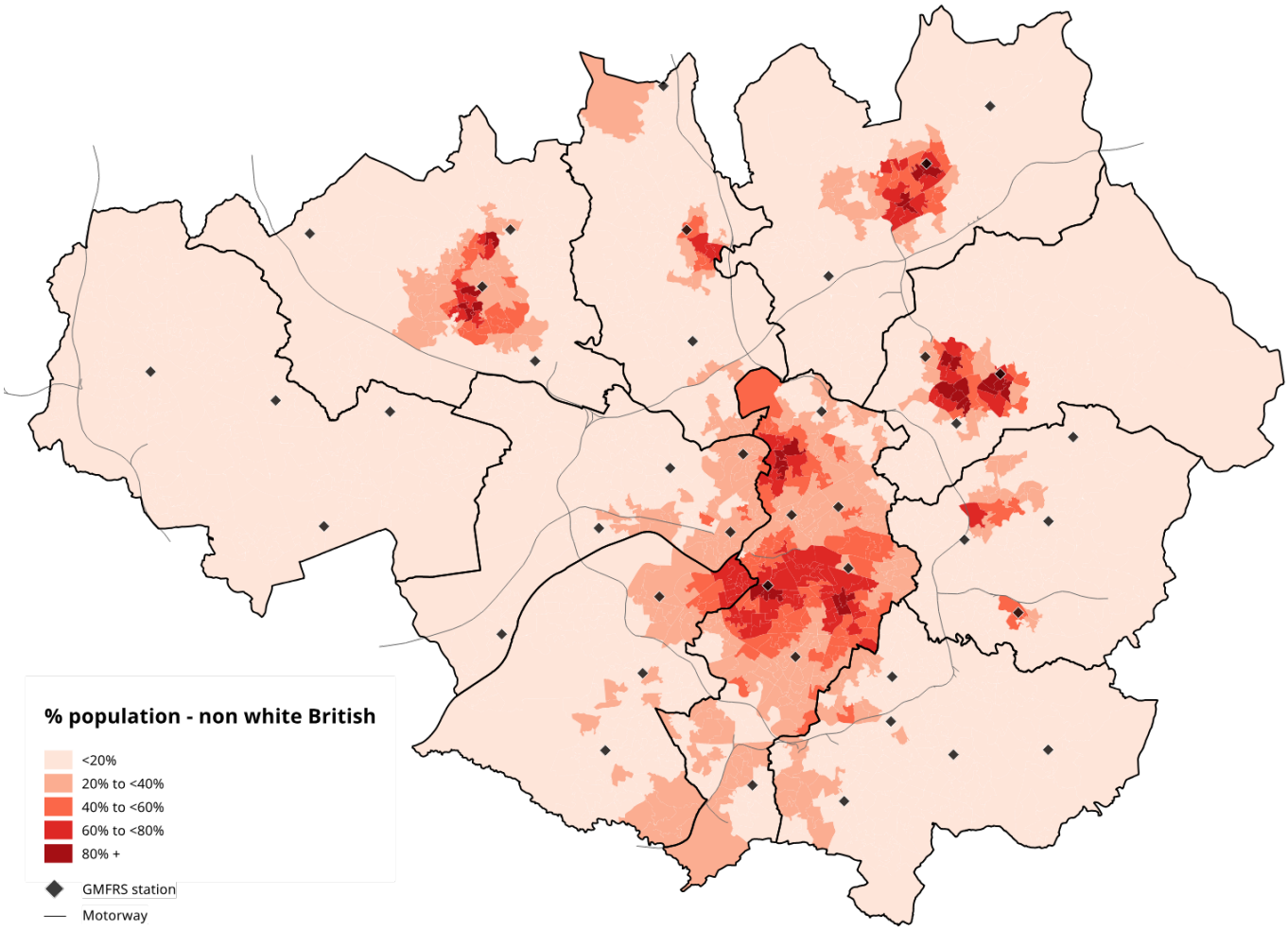

Figure 23: Non-white British populations in Greater Manchester by LSOA (Census 2011)

When there is a victim (casualty, rescue, or fatality) at an incident, their ethnicity will be recorded as part of the IRS record by the Officer in Charge (OIC). Like age, ethnicity is not recorded for incidents without a victim. Whilst caution should be utilised with these statistics as the number of fatalities, in particular, is small, and over 20% of casualty ethnicities are not known, the information can still be used to help target different communities with prevention advice.

Table 20 documents the ethnicity of casualties and fatalities in ADFs and compares them to the overall Greater Manchester population. Whilst White British is clearly the majority ethnicity, it is still over-represented in fire deaths. Other ethnicities which are over-represented are Asian – Indians, Black – Caribbean and Black – Other.

Ethnic Group	Casualties	Fatalities	GM Population
Asian or Asian British - Bangladeshi	0.0%	0.8%	1.3%
Asian or Asian British - Indian	1.2%	5.3%	2.0%
Asian or Asian British - Other Asian	0.2%	1.5%	1.1%
Asian or Asian British - Pakistani	1.7%	2.3%	4.8%
Black or Black British - African	1.5%	0.0%	1.7%
Black or Black British - Caribbean	1.2%	0.8%	0.7%
Black or Black British - Other Black	0.2%	0.8%	0.4%
Chinese	0.4%	0.0%	1.0%
Mixed - Other Mixed	0.1%	0.0%	0.4%
Mixed – White and Asian	0.0%	0.8%	0.6%
Mixed - White African	0.0%	0.0%	0.4%
Mixed - White Caribbean	0.2%	0.8%	0.9%
Other Ethnic group - Arab	0.0%	0.0%	0.6%
Other Ethnic group	0.4%	0.0%	0.5%
White - British	67.2%	84.8%	79.8%
White - Gypsy or Traveller	0.0%	0.0%	0.1%
White - Irish	1.6%	0.0%	1.3%
White - Other White	1.1%	2.3%	2.6%
Not known/stated	22.9%	0.0%	0.0%
Total	817	132	2,835,686

Table 20: percentage of casualties and fatalities in ADFs by ethnic group

Language

Relative to its population size, Manchester is one of the most linguistically diverse cities in the UK. Current research by the University of Manchester's Multilingual Manchester programme finds that around 200 different languages are spoken in the city, and that more than half of the city's residents are estimated to know and use more than one language.

Language is particularly important regarding spreading fire safety information and prevention messages. Close to 20% of Manchester's adult population declared a language other than English to be their main language, added to which, data from the Education Services shows that more than 40% of Manchester's primary school children speak an additional language to English in their homes. Community languages with the largest number of speakers in Manchester are Urdu, Arabic, Chinese, Bengali, Polish, Punjabi and Somali.

Across all of Greater Manchester, the top 10 languages spoken in Greater Manchester in addition to English are Urdu, Polish, Bengali, Punjabi, Gujarati, Arabic, Persian, French and Somali.

Figure 24 displays the percentage of households where the principle of the household is non-English speaking. It has a very similar pattern to the ethnicities map, which is logical, although the proportion of people who cannot speak English is lower.

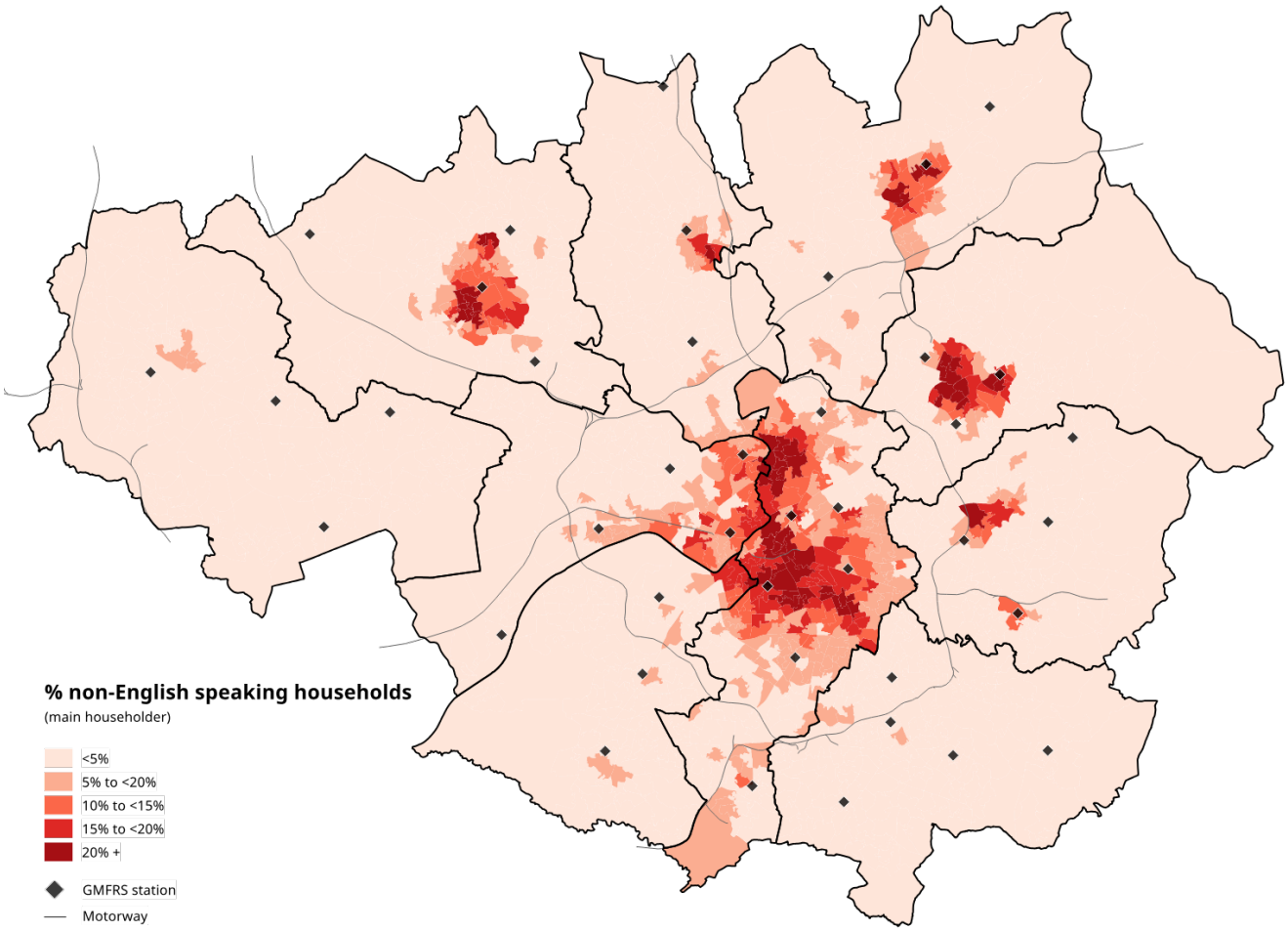

Figure 24: non-English speaking households in Greater Manchester (Census 2011)

Deprivation

Deprivation is measured across England through the combined Index of Multiple Deprivation 2019 (IMD 2019) which is the official measure of relative deprivation for small areas known as LSOAs. It follows an established methodological framework in broadly defining deprivation to encompass a wide range of an individual's living conditions. People may be considered to be living in poverty if they lack the financial resources to meet their needs, whereas people can be regarded as deprived if they lack any kind of resources, not just income. [3]

The English Indices of Deprivation are based on 39 separate indicators which are organised across seven distinct domains:

- Income Deprivation
- Employment Deprivation
- Health Deprivation and Disability
- Education, Skills and Training Deprivation
- Barriers to Housing and Services
- Crime
- Living Environment Deprivation

These indicators are combined and weighted to calculate IMD 2019, which is an overall measure of the multiple deprivation experienced by people living in an area.

All LSOAs in England are then ranked according to their level of deprivation relative to that of other areas. There is no absolute score threshold above which an area can be classed as deprived, but the scores and rank can be used to relatively compare all areas of England. In both cases, an area with a higher score or higher rank can be said to be more deprived.

Manchester borough is the 2nd most deprived Local Authority overall based upon rank and has the 5th highest proportion of LSOAs in the top decile of deprivation.

Figure 25, based upon the IMD score, shows that the most deprived areas in Greater Manchester are located in the north and east of Manchester, in the area of Philips Park fire station, as well as some areas in Wythenshawe in the south. Other boroughs also have smaller pockets of higher deprivation, tending to be on the outskirts of town centres.

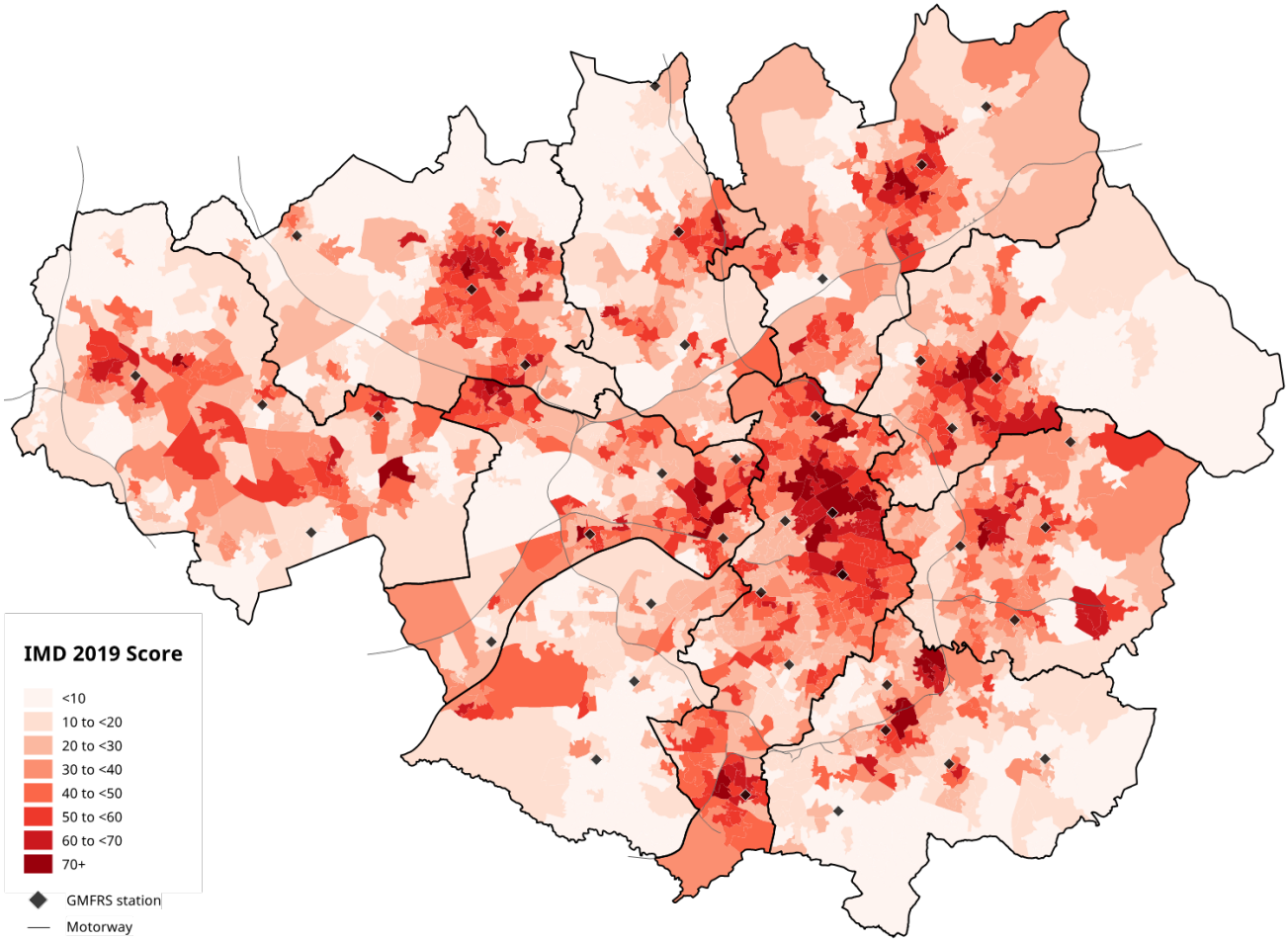

Figure 25: IMD2019 scores in Greater Manchester indicating areas of higher deprivation (Ministry of Housing, Communities & Local Government)

There is a long-standing correlation between dwelling fires and IMD.

Table 21 shows the count of fires by their associated IMD score. It shows that a large number of fires are occurring across the mid to high range of IMD scores. The final column compares the fires which have occurred to the population in general. Any value over 100 shows there is a higher likelihood that households will have a fire. Dwellings in areas with very high IMD score (70-80) are over twice as likely to have a dwelling fire than expected given their population.

IMD Score	Dwelling Fires	% Dwelling Fires	% LSOAs in GM	Fire likelihood
0-10	487	6.90%	16.20%	42
11-20	891	12.60%	21.50%	59
20-30	1,304	18.40%	18.90%	97
30-40	1,136	16.00%	14.70%	109
40-50	1,169	16.50%	12.00%	137
50-60	1,098	15.50%	10.00%	155
60-70	611	8.60%	4.60%	187
70-80	398	5.60%	2.20%	261
Total	7,094	100.00%	100.00%	100

Table 21: Dwelling fire likelihood by IMD score

Tenure

Analysis using tenure data from Experian shows that households which are social rented are more likely to have a fire than those which are rented privately and owned. Based against 100, Table 22 demonstrates that in some boroughs such as Stockport and Wigan social rented households are more than twice as likely to have a fire than would be expected.

Borough	Owned	Rented (private)	Rented (social)
Bolton	56	141	191
Bury	76	109	192
Manchester	56	111	133
Oldham	72	105	175
Rochdale	65	170	150
Salford	71	123	127
Stockport	66	137	255
Tameside	70	103	181
Trafford	79	92	193
Wigan	56	132	225
Total	62	135	171

Table 22: likelihood of ADFs by tenure

Figure 26 shows how social rented households are distributed across Greater Manchester, showing that there are distinct pockets where there is a higher prevalence of household but no discernible pattern. This is understandable as social housing was traditionally built in defined estates within towns and cities

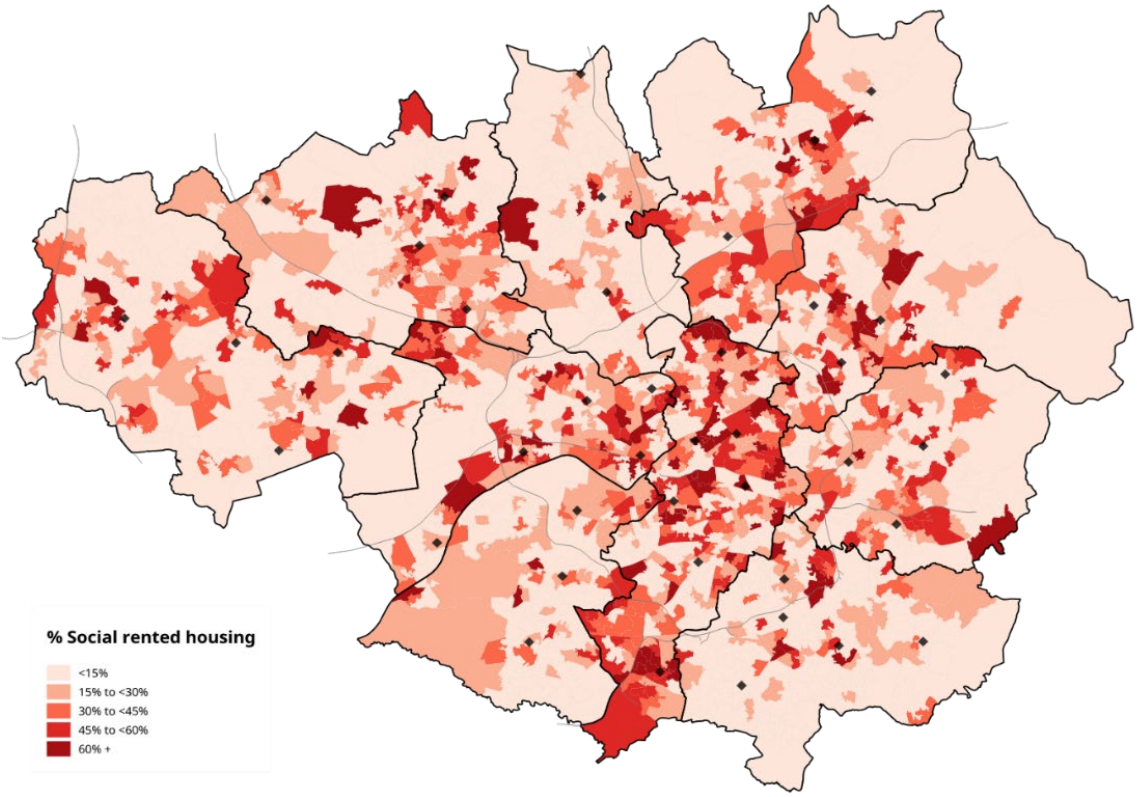

Figure 26: social rented housing in Greater Manchester (Census 2011)

Fuel poverty

A household is considered to be fuel poor if it has higher than typical energy costs and would be left with a disposable income below the poverty line if it met those energy costs. This could leave to potential increased fire risk if people instead use unsafe methods to provide heating within the home. Table 23 documents that nearly 140 thousand households are said to be in fuel poverty in Greater Manchester, accounting for 11.8% of the total households.

Borough	Hh. in fuel poverty	% households
Bolton	14,433	11.9%
Bury	8,662	10.6%
Manchester	33,216	15.5%
Oldham	11,023	11.7%
Rochdale	11,200	12.2%
Salford	12,171	11.2%

Stockport	12,564	9.8%
Tameside	10,601	10.7%
Trafford	10,327	10.4%
Wigan	15,394	10.8%
Total	139,591	11.8%

Table 23: Number and percentage of households in fuel Poverty in Greater Manchester (Department for Business, Energy & Industrial Strategy)

The areas where greater number of households are considered to be fuel poor are highlighted in Figure 27. There is a large concentration of households in the Hulme/Moss Side/Longsight area of Manchester, as well as in the areas to the north of Manchester city centre. In Manchester this is a different geographical pattern than normally seen for similar measures such as deprivation or unemployment.

There are other smaller pockets of higher numbers of fuel poor households concentrated in Oldham, Rochdale and Bolton town centres.

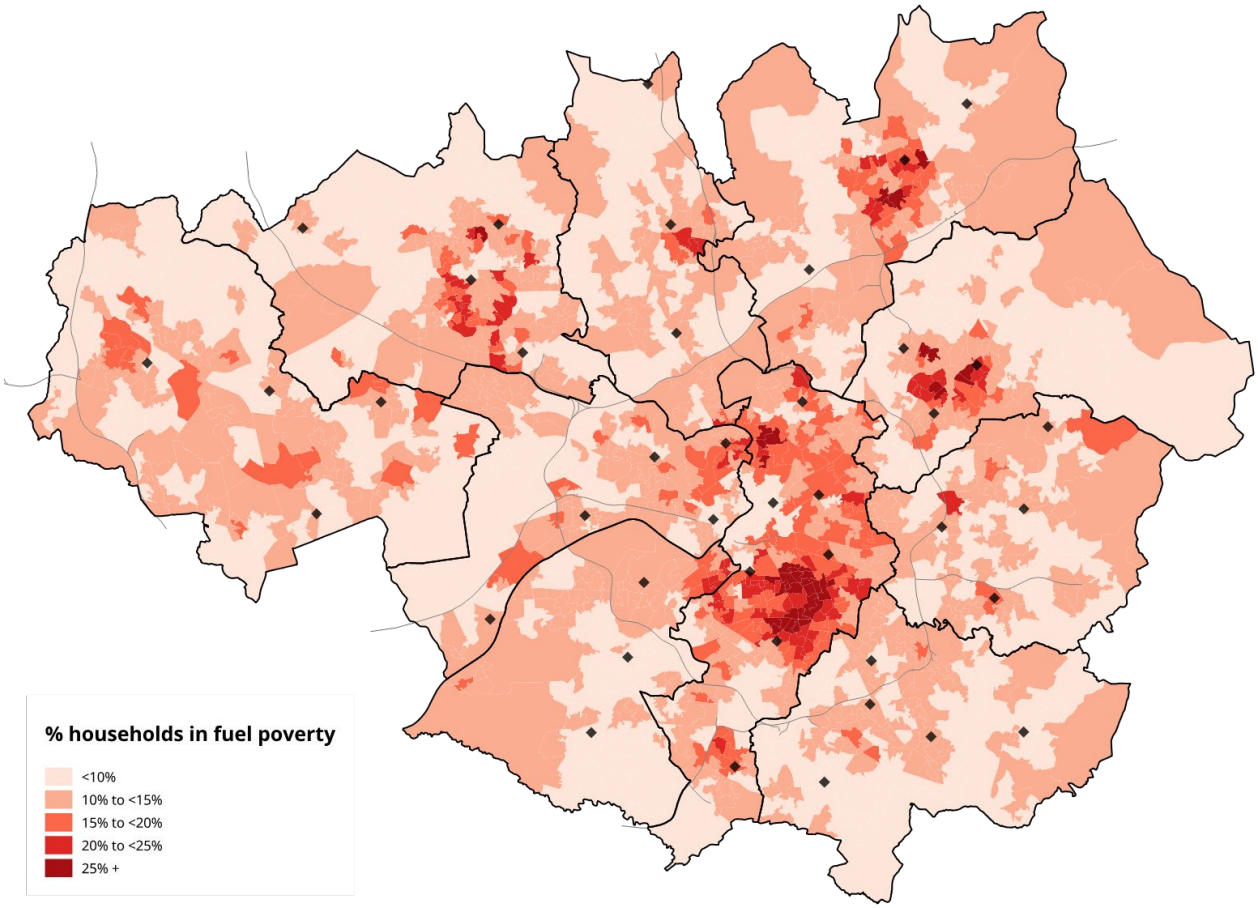

Figure 27: Households in fuel poverty by LSOA

Base Fire Risk Model

The GMFRS base risk model has been in existence for eight years and is intended to provide an overall fire risk score for each LSOA to identify pockets of at risk communities in order to target resources. The methodology is derived from the Lancashire FRS risk model and uses the same formula to calculate a risk score, as follows:

The final score is then put into bands and the resulting risk levels for the 2020/21 risk model are displayed in Figure 28. It can be seen that Manchester has the highest number of high and very high-risk areas, whilst there are smaller pockets of very high risk throughout Greater Manchester.

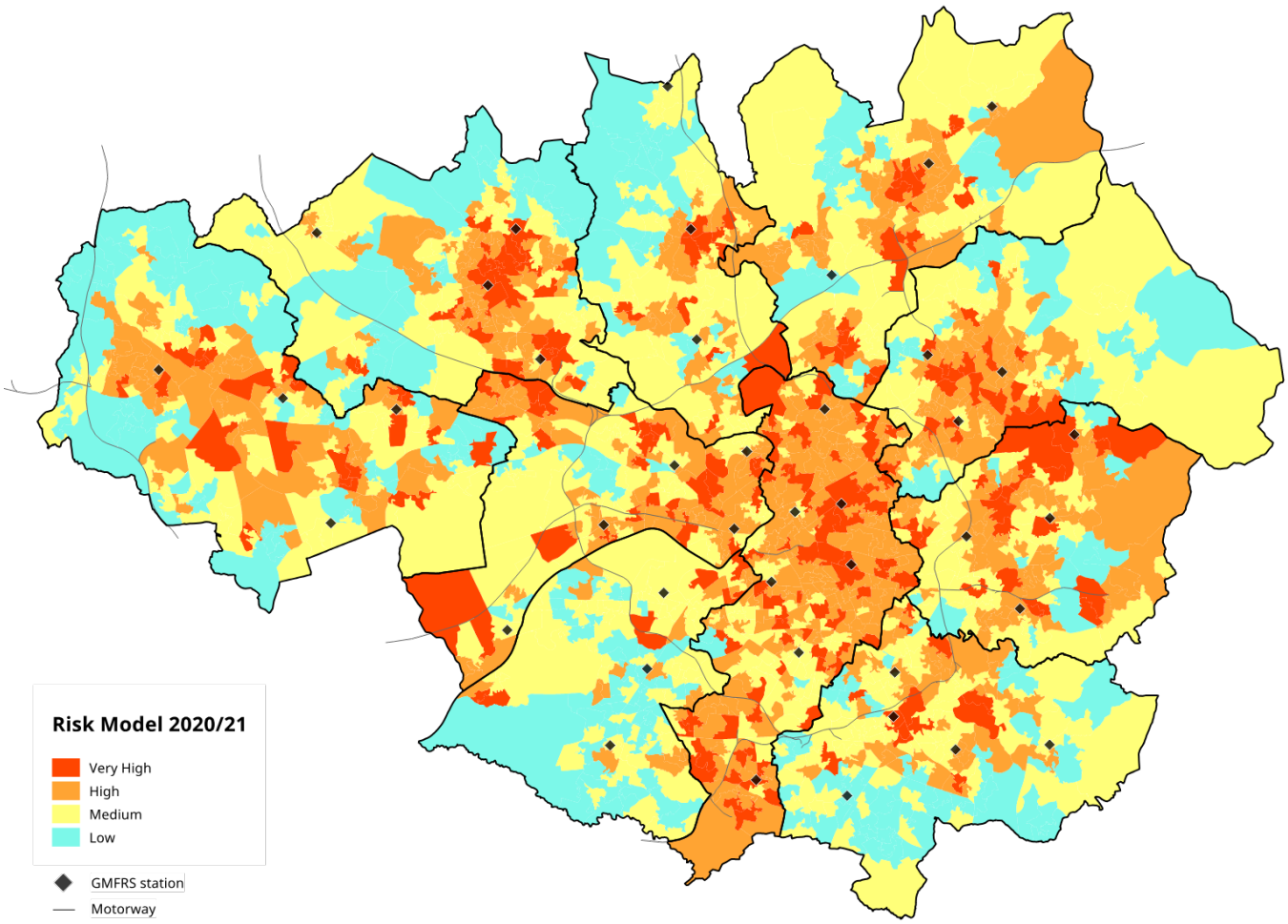

Figure 28: Fire base risk model

The final bandings within this model are now changed on a yearly basis to be reflective of the data within the model, therefore making it a relative model. This is different to in previous years where the same bandings were kept for five years to show progression.

However, we can still check progress over the years by re-banding previous models. Figure 29 demonstrates how the number of LSOAs within each risk category has changed over time, based upon the 2020/21 bands. It is evident that very high risk LSOAs have reduced over time.

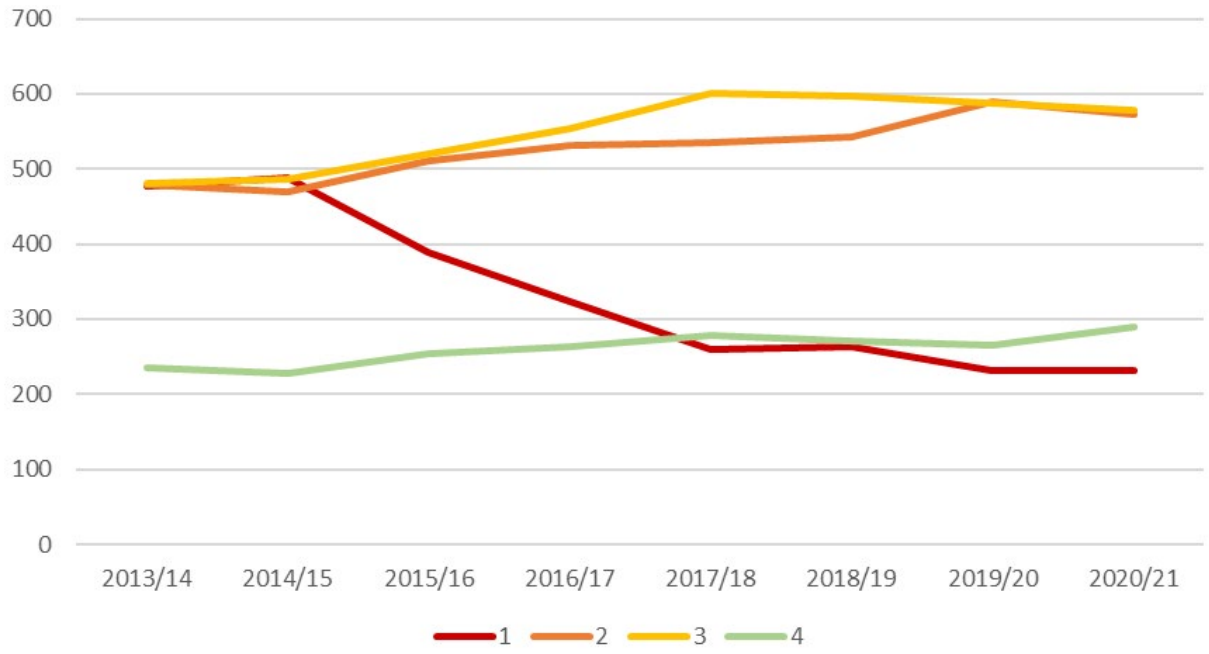

Figure 29: change in number of LSOAs in each risk category

That said, by looking at each historical version of this risk model, we can see those areas which have remained at very high risk for a prolonged period of time. Areas which have been classified as very high risk for the past eight years are indicated in Figure 30. There is no particular geographical pattern to these areas.

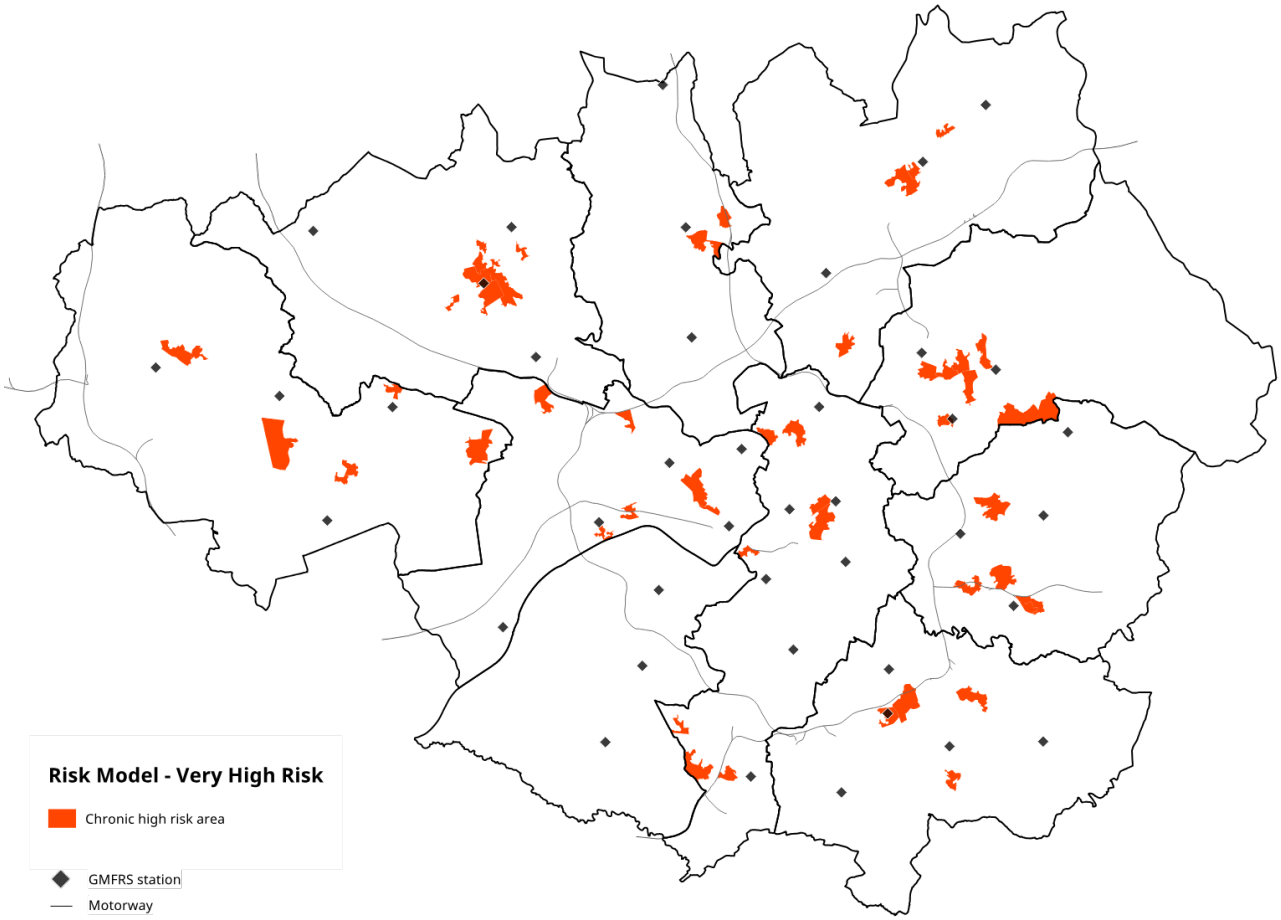

Figure 30: map showing areas of chronic fire risk

People - Learning from Fatal Fires

The information above highlights some of the population characteristics where certain groups of people are at higher risk of fire. Further research is often undertaken to provide a deeper understanding of fire death incidents and the circumstances surrounding those incidents.

Recently, the Building Research Establishment (BRE) have completed the first phase of an investigation into the underlying conditions associated with fire deaths and serious fire injuries in domestic dwellings in Scotland. From this investigation fourteen recommendations have been made to address the highlighted fire safety issues and concerns that current technologies and approaches may not provide sufficient protection for vulnerable people. The recommendations are targeted at further developing existing technologies to safeguard vulnerable people, and generally reducing fire-related fatalities and serious injuries in the future.

GMFRS also produce a ‘Learning from Fatal Fires’ report which looks at the fire deaths which have occurred in Greater Manchester. The latest version, currently in draft, runs up to 2018/19 and the summary findings for fire deaths in accidental fires are presented below. As already suggested, the demographic information which has been documented earlier in this section can be reasons causing higher risk of fire and becoming a fire fatality.

- Smoking related fires only accounted for 10% of accidental dwelling fires in Greater Manchester yet represented 49% of accidental fire deaths. This compares with cooking related fires which accounted for 41% of accidental dwelling fires, but only 6% of accidental fire deaths. Although the proportion of the population who smoke is projected to continue to decline, smoking remains an important area to continue to focus prevention activities due to the high fatality rate in this type of fire.
- Fires most frequently started in rooms where people spend a lot of their time; the lounge, the bedroom and the kitchen. These were also the rooms where the deceased were most commonly found.
- Smoke alarm ownership in fires which resulted in accidental deaths is relatively low at 73%, compared with 95% of all households in England that had smoke detection during 2016/17. Smoke alarms operated in 58% of the accidental fires which resulted in a fatality. This is somewhat lower than the 90% of households in England with working smoke detection during 2016/17.
- Fatal fires where the smoke alarm failed to operate were largely due to issues with the battery (either having been removed, flat or incorrectly fitted), the fire being too far away, or the smoke detector head being removed or disconnected. As a result, continuing to encourage households to own and maintain smoke alarms remains an important area for fire safety in Greater Manchester.
- The likelihood of dying in a fire is not uniform across all age groups. Generally, the likelihood increases with age, with those aged 80 and over by far the most likely to die in a fire. The ageing population is therefore expected to present a significant future challenge for GMFRS with people aged 80 and over projected to increase by 42% by 2043.
- People living alone are almost twice as likely to die in an accidental fire than would be expected given their population.
- Over half of the people who died in accidental fires in Greater Manchester were already known to other agencies, particularly Adult Social Care. Furthermore, over a

third of the people who were already known, were known to multiple services, reiterating the importance of effective partnership working.

- In addition to living alone, smoking, and being known to other services, other factors common in the profiles of people who died in accidental fires included; the use of prescribed or over the counter medication, alcohol use and physical impairment/mobility issues. The profile factors are not mutually exclusive and 86% of people who died in accidental fires displayed multiple factors.

People – Risk Factors

One of the key parts of the Learning from Fatal Fires report is to interrogate the information available to look at the person's circumstances or situation for possible reasons why they became a fatality, known as 'risk factors'.

Whilst there are many caveats to this data, it is nevertheless useful to consider these factors.

A risk factor is defined as a characteristic of an individual relating to either the person, their environment or their behaviours. For the purposes of the report, risk factors have been recorded in all instances where they were mentioned in the IRS record. However, for the fatal fires report, they have also been recorded if mentioned in GMFRS fire investigation reports, antecedence and/or HM Coroner records. For this reason, it is obvious from the tables, particularly in the number of factors, that the risk factors recorded as part of the fatal fires is much more comprehensive than for the incidents.

The presence of a risk factor does not assert that it was the cause of the fire (although could have been), just that it was noticed and recorded by crews in attendance. The recording of profile factors is highly variable and subjective.

Of note, in Table 24 which displays data relating to accidental fires and fatalities, a high proportion of people were noted to have risk factors of smoker, prescribed medication, alcohol use and hoarding.

Risk Factors		All Incidents	Incidents with Casualty	Fatalities
Substance Use	Smoker	7.6%	10.5%	55.3%
	Alcohol use	4.8%	8.3%	47.7%
	Takes prescribed/OTC medication	0.8%	1.2%	50.8%
	Takes illicit drugs	1.8%	2.5%	12.1%
Physical Health	Mobility issues	1.0%	2.7%	38.6%
	Sensory impaired	1.1%	1.0%	7.6%
	Oxygen user	1.1%	1.0%	4.5%
	Other physical illness, impairment or disability	1.1%	1.0%	31.1%
Mental Health	Dementia / memory impairment	2.1%	2.5%	10.6%
	Other mental illness, impairment or disability	2.0%	4.1%	15.2%
Other	Learning disability	0.2%	0.1%	1.5%
	Clutter/hoarding	2.1%	2.7%	56.8%
	Total Number	6233	677	132

Table 24: risk factors of people involved in accidental fires

Health data is difficult to publicly acquire at a small level, but a brief analysis of some measures relating to risk factors, shows that in almost all Public Health measures, Greater Manchester is higher/worse than the national average, as demonstrated in Table 25.

Risk Factor	Measure Description	Greater Manchester	England
Dementia	Recorded prevalence (aged 65 years and over) 2019 %	4.64	4.34
Smoking	Smoking Prevalence in adults (18+) - current smokers (APS)2019 %	15.65	13.88
Mental Health	Estimated prevalence of common mental disorders: % of population aged 16 & over	18.63	16.92
Alcohol	Admission episodes for alcohol-related conditions: per 100,000	719	664

Table 25: public health statistics related to risk factors (Public Health England)

At Risk Households

Detailed information as shown above is only available for a small number of incidents where a fatality has occurred, and limited information (age, gender, ethnicity) is only collected when there is a casualty at an incident. These incidents represent a small proportion of all incidents, so GMFRS also utilise Experian's Mosaic geodemographic classification to determine what types of people have fires and who to target for prevention activities.

Mosaic is a geodemographic classification which utilises over 400 pieces of information about each person in the UK, which is all processed and clustered to assign each household into one of 13 groups and 66 types. To assess which types of households are more likely to have a fire, the Mosaic type is appended onto each dwelling that has a fire, and then the types of households having fires can be compared to the types of people in the whole GM population.

Table 26 shows the Fire Index 2020, highlighting the types of households most likely to have a fire. Based against 100, the redder the cell, the more likely that type of household is to have a fire.

This analysis is carried out separately for each borough, which helps to further stratify the types of households. Most boroughs have the same general trends, with household types in the L, M, N and O groups being more likely to have fires than would be expected given their population. There are, however, individual types in boroughs which have a high score which should not be discounted. This is usually where the population of that type is small, but there have still been fires in this type of household, for example C10 World Class Wealth in Manchester, or A04 Village Retirement in Trafford.

The types which are overall most prevalent are N58 Pocket Pensions, N60 Flatlet Seniors, O66 Inner City Stalwarts. Behind this initial data, Experian provide breakdowns into the characteristics of each Mosaic type, comprising more than 400 pieces of information about each. However, a single sentence summary description can be useful to give an idea of those who are more likely to have fires. For example:

N58 Pocket Pensions: Penny-wise elderly singles renting in developments of compact social homes

N60 Flatlet Seniors: Ageing singles with basic income renting small flats in centrally located developments

O66 Inner City Stalwarts: Long-term renters of inner-city social flats who have witnessed many changes

Mosaic Type Index	Bolton	Bury	Manchester	Oldham	Rochdale	Salford	Stockport	Tameside	Trafford	Wigan	GM
A01 Rural Vogue	0	0	0	0	0	0	0	0	0	0	0
A02 Scattered Homesteads	0	0	0	0	0	0	0	0	0	0	0
A03 Wealthy Landowners	0	239	0	59	360	0	85	0	0	0	57
A04 Village Retirement	0	0	0	254	0	0	0	0	853	0	109
B05 Empty-Nest Adventure	15	38	0	43	36	99	44	75	30	0	34
B06 Bank of Mum and Dad	29	80	59	53	59	51	91	68	69	24	60
B07 Alpha Families	82	76	0	26	0	58	39	0	68	98	50
B08 Premium Fortunes	66	47	46	0	0	152	141	0	72	532	87
B09 Diamond Days	78	42	0	0	0	92	76	0	54	0	57
C10 World-Class Wealth	0	0	332	0	0	0	0	0	0	0	216
C11 Penthouse Chic	0	0	0	0	0	0	0	0	0	0	0
C12 Metro High-Flyers	0	0	82	0	0	0	0	0	0	0	99
C13 Uptown Elite	0	4658	59	0	0	153	0	0	89	0	86
D14 Cafes and Catchments	0	224	42	769	0	337	58	0	59	0	86
D15 Modern Parents	69	53	0	25	49	44	164	0	200	25	38
D16 Mid-Career Convention	61	11	105	128	0	59	42	100	68	80	57
D17 Thriving Independence	42	23	58	126	0	49	67	0	66	70	57
E18 Dependable Me	33	73	55	51	25	44	49	33	18	49	41
E19 Fledgling Free	34	21	22	27	0	40	39	76	39	34	34
E20 Boomerang Boarders	46	98	19	19	100	19	42	18	44	39	38
E21 Family Ties	96	183	107	39	115	77	32	29	81	0	62
F22 Legacy Elders	43	80	65	59	0	129	61	86	102	61	70
F23 Solo Retirees	63	45	92	87	0	72	49	104	118	61	68
F24 Bungalow Haven	69	94	794	30	0	53	43	118	0	76	62
F25 Classic Grandparents	0	50	62	45	36	67	49	46	34	40	39
G26 Far-Flung Outposts	0	0	0	0	0	0	0	0	0	0	0
G27 Outlying Seniors	0	0	0	0	0	0	0	0	0	0	0
G28 Local Focus	0	0	0	331	0	0	0	0	0	0	94
G29 Satellite Settlers	0	0	0	88	0	0	0	0	0	0	27
H30 Affordable Fringe	39	11	68	70	61	59	65	65	32	67	52
H31 First-Rung Futures	56	41	66	41	66	52	93	84	84	65	61
H32 Flying Solo	43	101	157	77	146	106	30	45	98	42	75
H33 New Foundations	0	0	10	0	0	19	0	0	0	0	10
H34 Contemporary Starts	66	0	87	0	101	21	45	47	0	41	40
H35 Primary Ambitions	98	77	57	53	39	7	75	49	47	108	58
I36 Culture and Comfort	0	359	70	54	0	319	0	0	66	0	108
I37 Community Elders	110	100	90	98	0	89	0	0	47	0	94
I38 Large Family Living	71	152	88	108	89	261	0	135	179	0	97
I39 Ageing Access	128	40	159	0	0	53	17	0	80	0	107
J40 Career Builders	92	83	66	217	0	41	66	0	98	0	80
J41 Central Pulse	196	0	64	0	0	53	175	0	74	0	80
J42 Learners & Earners	148	0	112	0	0	93	0	0	0	0	141
J43 Student Scene	0	0	106	0	0	141	0	0	0	0	140
J44 Flexible Workforce	296	278	94	0	0	115	0	0	232	0	135
J45 Bus-Route Renters	98	90	94	0	0	65	123	124	242	57	110
K46 Self Supporters	50	82	64	48	104	73	57	32	67	60	56
K47 Back with the Folks	67	69	57	32	74	121	72	77	0	71	66
K48 Down-to-Earth Owners	33	35	38	65	27	17	34	56	108	31	37
L49 Youthful Endeavours	230	213	153	126	110	152	304	144	237	241	182
L50 Renting Rooms	131	112	115	146	194	137	127	152	54	131	139
L51 Value Rentals	138	119	103	139	102	102	143	104	170	169	119
L52 Midlife Renters	107	97	108	81	23	103	61	94	185	82	90
M53 Budget Generations	65	134	88	165	0	101	175	34	51	66	85
M54 Economical Families	58	119	38	56	94	66	102	85	71	97	69
M55 Families on a Budget	204	211	152	115	171	147	202	195	184	233	175
M56 Solid Economy	65	84	117	222	0	32	237	189	184	91	149
N57 Seasoned Survivors	57	107	68	102	136	69	111	104	144	88	83
N58 Retirement Communities	77	168	345	71	0	314	392	487	235	0	279
N59 Pocket Pensions	282	278	172	459	395	448	534	336	297	396	328
N60 Flatlet Seniors	325	453	296	298	346	240	413	289	622	289	328
N61 Estate Veterans	73	137	94	254	0	98	241	173	130	71	126
O62 Mature Workers	128	159	85	68	62	70	155	118	140	161	106
O63 Single Essentials	265	221	156	273	364	188	362	179	179	303	227
O64 High Rise Residents	142	0	102	266	164	239	342	154	184	220	213
O65 City Diversity	0	0	99	0	0	321	0	0	298	0	165
O66 Inner City Stalwarts	435	1025	159	391	0	42	489	0	374	0	214
Total	100	100	100	100	100	100	100	100	100	100	100

Table 26: Mosaic index 2020, highlighting the types of households which are more likely to have an accidental dwelling fire

Section 3: Built Environment

The Built Environment

The fire at Grenfell Tower claimed the lives of 72 people. The fire was caused by a faulty fridge-freezer and spread rapidly up the exterior of the building due to the use of combustible cladding and materials and throughout the interior of the building because of deficiencies with compartmentation.

There is increasing evidence of construction failures resulting in buildings failing to perform to expected standards when a fire occurs – Grenfell Tower, The Cube, the Beechmere Care Home, the Brentford Travelodge, the Worcester Park flats, the Barking flats. Fire service resourcing is built on presumptions, one of which is how a building behaves in a fire and this informs how many fire engines should be required to deal with fire incidents. But the catastrophic failure of buildings has shown these presumptions can no longer be relied upon. The new procedure utilised by GMFRS at the Cube fire require more resources to attend a fire than previously planned or budgeted for. If fire and rescue services are to manage the evacuation of people when a fire causes catastrophic building failure, they will have to commit more resources to them than they have done previously. It is important to note that these challenges are not necessarily defined by the height of the building.

The scale of the Cube fire and the adoption of new approaches to tackling such fires implemented in response to the Grenfell fire, stretched GMFRS resources:

- GMFRS has up to 50 fire engines available. During its peak, 27 pumps were committed to the Cube fire at the same time. The peak number of GMFRS pumps in use across the region at one time was 45. There were multiple other incidents including a gas leak, a vehicle fire, and two domestic fires with reported threats to life.
- At one time, there was a total of 19 officers committed to incidents across Greater Manchester leaving just one other officer available.
- For a short while, there were just two other fire engines available in the whole of Greater Manchester, until support was provided by other brigades.

Grenfell and Building Safety – ministerial statement: recap from Robert Jenrick on combustible materials, remediation, the Fire Protection Board, Stay Put, building safety, the Fire Safety Bill, lessons for FRSs.

The Government response to Grenfell is wide-ranging and includes proposals for new legislation that will impact on the regulation of buildings as well as changes to the way fire and rescue authorities operate.

Building Safety Bill

The Government accepted in principle all of the recommendations of the Independent Review of Building Regulations and Fire Safety and is addressing these through the Building Safety Bill. This will introduce a new regulator for high rise residential buildings established in the HSE and will require local authorities and fire and rescue authorities to work as part of a multi-disciplinary team with the HSE in relation to new and existing buildings. This will result in additional and changing work for fire and rescue authorities and will likely result in a requirement to train some staff to an enhanced level to undertake this activity.

The Building Safety Bill will impact on the cost to develop and build high rise buildings which may consequently impact on sales prices and financial viability assessments for affordable housing. For existing buildings there will be additional costs to comply with the new regulatory regime and this will likely fall to individual flat owners.

Fire Safety Reform

The Government has introduced a Fire Safety Bill to clarify the scope of the Fire Safety Order in relation to external wall systems. This follows advice issued by the Government that requires responsible persons for all multi-occupied multi-storey residential buildings to identify and assess the risk posed by materials in the external wall construction. There are thousands of buildings under 18metres which may require work to be undertaken to address the risk of external fire spread.

The Home Office has also consulted on making changes to strengthen the Fire Safety Order as it applies to all premises and fire and rescue authorities will need to adapt to any changes in legislation and provide additional training for regulatory staff.

The Government accepted in principle all of the recommendations of Grenfell Tower Inquiry Phase 1 Report and will be introducing these through legislation. This will impact on the way that fire and rescue authorities will need to plan and train for incidents and have wide reaching implications for the management and regulation of fire safety in high rise buildings in addition to the changes proposed in the Building Safety Bill.

New Planning Proposals

There is currently ongoing Consultation on the proposals to change the planning system. In the new system local areas will develop plans for land to be designated into three categories:

- Growth areas will back development, with development approved at the same time plans are prepared, meaning new homes, schools, shops and business space can be built quickly and efficiently, as long as local design standards are met.
- Renewal areas will be suitable for some development – where it is high-quality in a way which meets design and other prior approval requirements the process will be quicker. If not, development will need planning approval in the usual way.
- Protected areas will be just that – development will be restricted to carry on protecting our treasured heritage like Areas of Outstanding Natural Beauty and National Parks.

The proposed reforms have already met with negativity –

- RIBA: "While there's no doubt the planning system needs reform, these shameful proposals do almost nothing to guarantee the delivery of affordable, well-designed and sustainable homes. While they might help to 'get Britain building' – paired with the extension of Permitted Development – there's every chance they could also lead to the creation of the next generation of slum housing. The housing crisis isn't just about numbers, and deregulation won't solve it."
- The Guardian: "Race to the bottom: reform to planning system in England could be catastrophic."

High Rise Buildings (Residential and Non-Residential)

The map shows where all the high-rise buildings (over 18m) are in Greater Manchester, highlighting residential buildings with interim measures in place as of September 2020. Interim measures are defined as ‘urgent temporary measures which are to be put in place to address an unacceptable risk to occupants of a building’ (NFCC Guidance).

Figure 31 shows that the high-rise buildings are mostly concentrated around Manchester city centre and surrounding areas into Salford, and Salford Quays, shown in the inset, with other buildings in close proximity to urban centres such as in Bolton, Stockport and Rochdale.

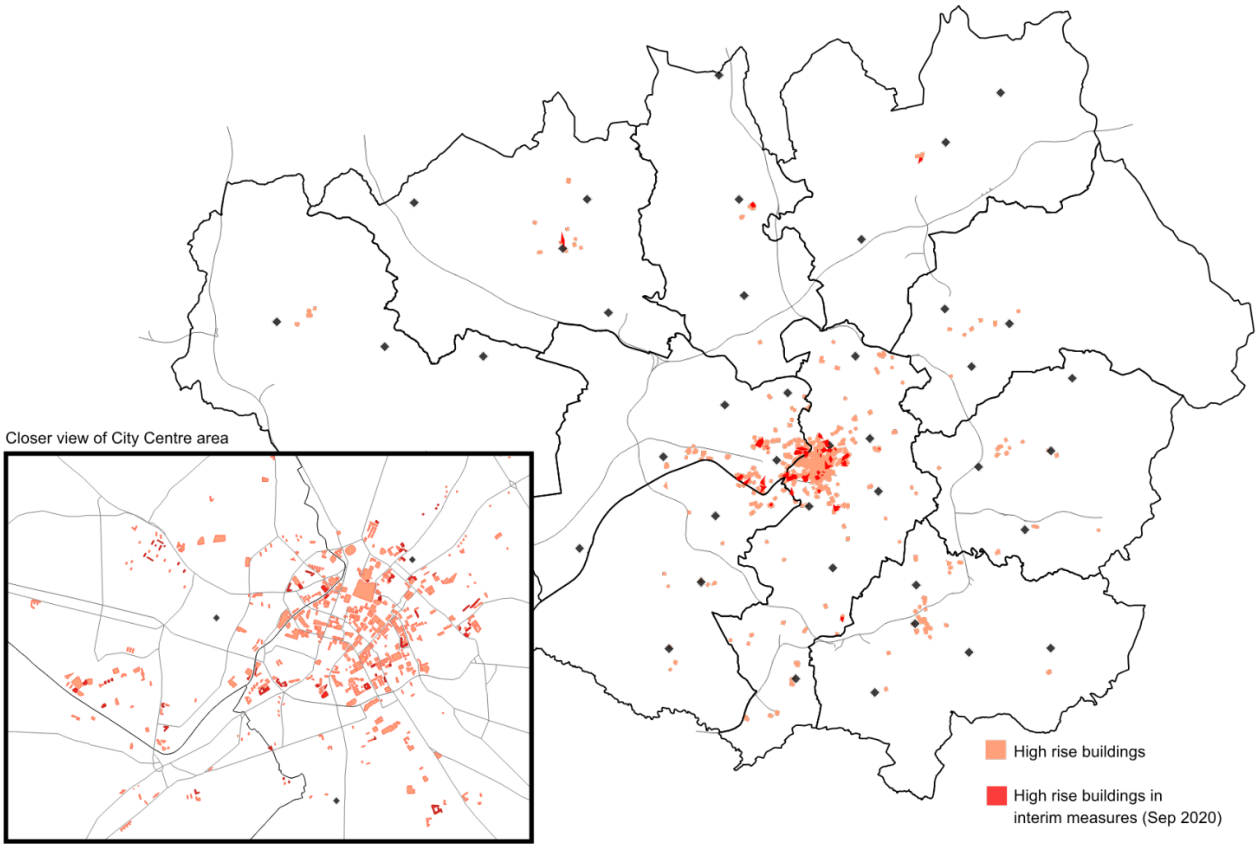

Figure 31: high rise buildings (residential and non-residential)

High rise buildings are stored within GMFRS systems as a polygon, or shape, which denotes the extent of the building. This means that when an incident occurs and its location falls within a polygon, it can be correctly classified as a high-rise incident. Tables 27 and 28 display the number of fire incidents which have occurred within high rise polygons, split by dwelling and non-residential fires as denoted in IRS.

Slight caution should be used when considering these numbers as the high-rise classification has been imposed based upon the current high-rise polygons regardless of the date of the incident.

The tables show that non-residential high-rise fires have reduced, whilst dwelling high-rise fires have remained relatively static, although the number of buildings has continued to increase.

FY	Incidents	Fatalities	Injuries	Rescues	Mobilisations
2010/11	59	0	5	0	147
2011/12	51	0	1	0	108
2012/13	37	0	2	0	89
2013/14	26	0	0	0	126
2014/15	18	0	0	0	50
2015/16	20	0	0	0	72
2016/17	36	0	0	0	136
2017/18	22	0	0	0	80
2018/19	23	0	1	0	79
2019/20	27	0	1	0	95
Total	319	0	10	0	982

Table 27: Non-residential fire incidents in high rise buildings

FY	Incidents	Fatalities	Injuries	Rescues	Mobilisations
2010/11	139	0	40	6	340
2011/12	127	0	52	7	336
2012/13	111	0	49	4	318
2013/14	127	0	20	6	448
2014/15	135	1	29	3	478
2015/16	152	1	25	6	612
2016/17	138	0	26	10	515
2017/18	138	0	18	12	587
2018/19	146	0	22	6	618
2019/20	141	1	28	4	801
Total	1,354	3	309	64	5,053

Table 28: Dwelling fire incidents in high rise buildings

Whilst the incident numbers look relatively low, Table 29 provides a comparison of dwelling fires, that have occurred in high-rise buildings compared to not, indicating that fires occur at a higher rate in high rise dwellings.

Further analysis is required to ascertain the type of ownership, as it is known those living in social or housing association dwellings have a higher likelihood of fire.

High Rise	Fires	Dwellings	Rate per 1000 dwellings
Yes	361	48,747	7.4
No	5,872	1,195,811	4.9

Table 29: rate of dwelling fires in high rise and non high-rise buildings

Greater Manchester Spatial Framework (GMSF)

The GMSF 2020 spatial strategy seeks to deliver sustainable, inclusive growth with key spatial elements:

- Significant growth in jobs and housing at the core – continuing development in the 'core growth area' encompassing the city centre and beyond to the Etihad in the east, through to the Quays, Trafford Park and Port Salford in the west. The majority of commercial employment growth is proposed in this area;
- Inner Area Regeneration of those parts of Manchester, Salford and Trafford surrounding the Core Growth Area. Together with the Core Growth Area, around 40% of overall housing supply is found here;
- Boosting the competitiveness of the northern districts – addressing the disparities by the provision of significant new employment opportunities and supporting infrastructure, and a commitment that collectively, the northern districts meet their own local housing need;
- Sustaining the competitiveness of the southern districts – supporting key economic drivers, for example around Wythenshawe hospital and the Airport, Stockport Town Centre (including the Mayoral Development Corporation), realising the opportunities offered by national infrastructure investment, e.g. HS2, whilst recognising the important green infrastructure assets in the area.

The majority of new jobs will be in the city centre and wider Core Growth Area stretching from Port Salford in the west to the Etihad campus in the east as well as around Manchester Airport. This area encompasses established employment areas such as Trafford Park, locations such as MediaCityUK which has seen strong growth over more recent times and our Universities which are driving growth in world leading research and development.

A key objective of GMSF 2020 is to meet our Local Housing Need – using the Government's standard methodology this equates to almost 180,000 homes over the plan period (2020-2037). The plan focuses on making the most of Greater Manchester's brownfield sites, prioritising redevelopment of town centres and other sustainable locations. It will also help to address the housing crisis with a minimum target of 50,000 additional affordable homes – 30,000 of which will be social housing.

Future High-Rise Developments

Greater Manchester, in particular the city centre and Salford Quays, is going through a period of fast growth, with an aim to build in excess of 10,000 extra homes each year for the next 20 years (Spatial Framework). There are many new developments planned in the city centre, including many new tall buildings.

Figure 32 displays the current high-rise buildings within the city centre, and then imposes the locations of future tall buildings (over 50m) which are either under construction, approved, or proposed.

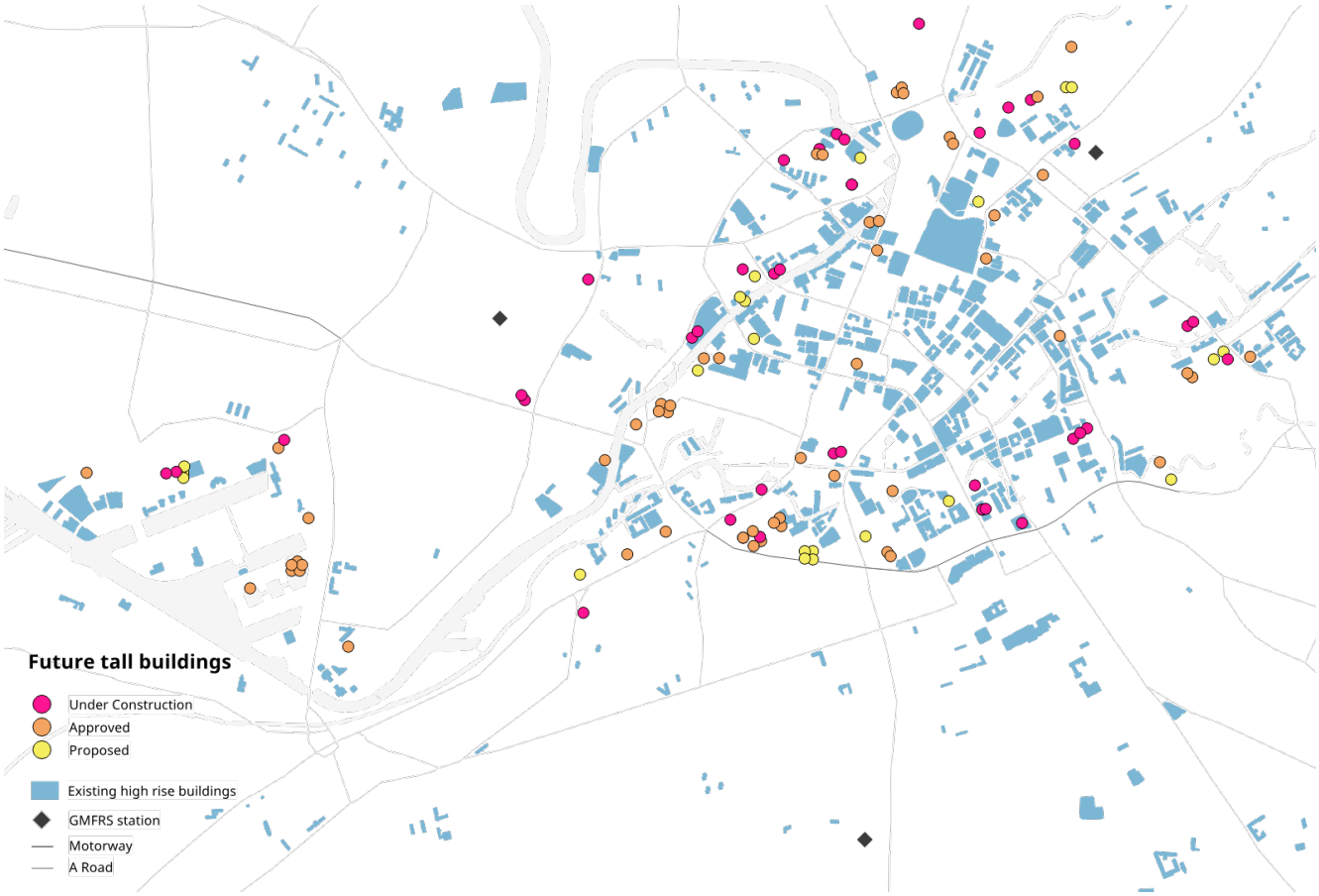

Figure 32: future high-rise developments

Built Environment – Heritage Buildings

Within the UK there are three categories of listed buildings:

Grade I buildings are of exceptional interest, nationally only 2.5% of listed buildings are Grade I.

Grade II* buildings are particularly important buildings of more than special interest; nationally 5.5% of listed buildings are Grade II*

Grade II buildings are of special interest; 92% of all listed buildings in the UK are in this class and it is the most likely grade of listing for a homeowner.

There are over 3000 listed buildings within Greater Manchester in all locations across the county, with 49 Grade I and 241 Grade II* building's, which are displayed on Figure 33. Whilst these buildings are distributed across the county, some of note in the city centre include John Rylands Library, Manchester Art Gallery, and former Liverpool Road Railway Station (MOSI).

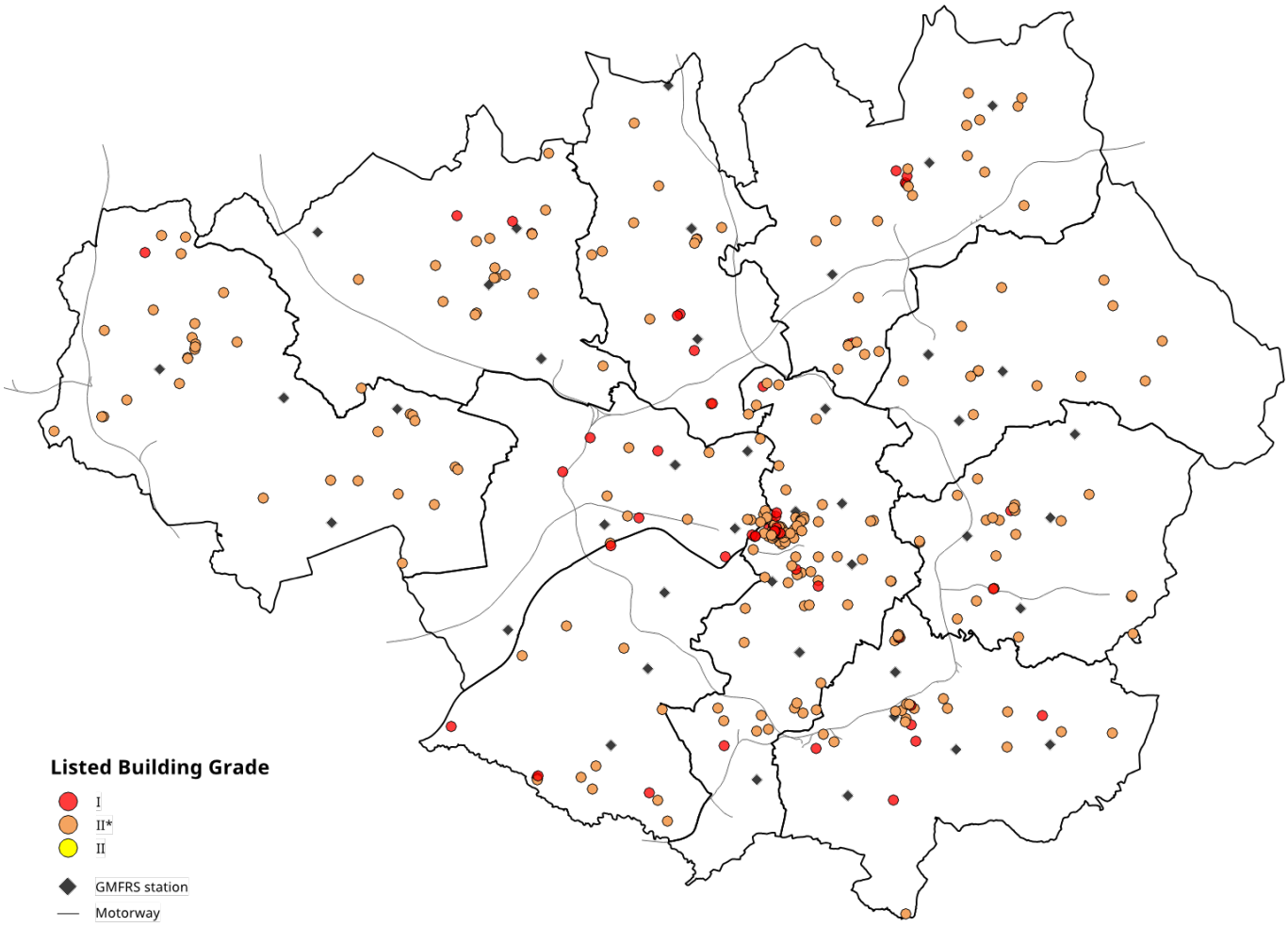

Figure 33: Grade I and II listed buildings in Greater Manchester (English Heritage)*

Built Environment - Regulated Premises

There are approximately 115,000 regulated premises within Greater Manchester. These are non-domestic properties and include locations such as hospitals, schools, leisure facilities, care homes, hotels, offices, shops and premises such as factories and chemical plants. Their geographical distribution is shown in Figure 34. These types of buildings are found all across Greater Manchester but naturally they are highly concentrated in town and city centre areas.

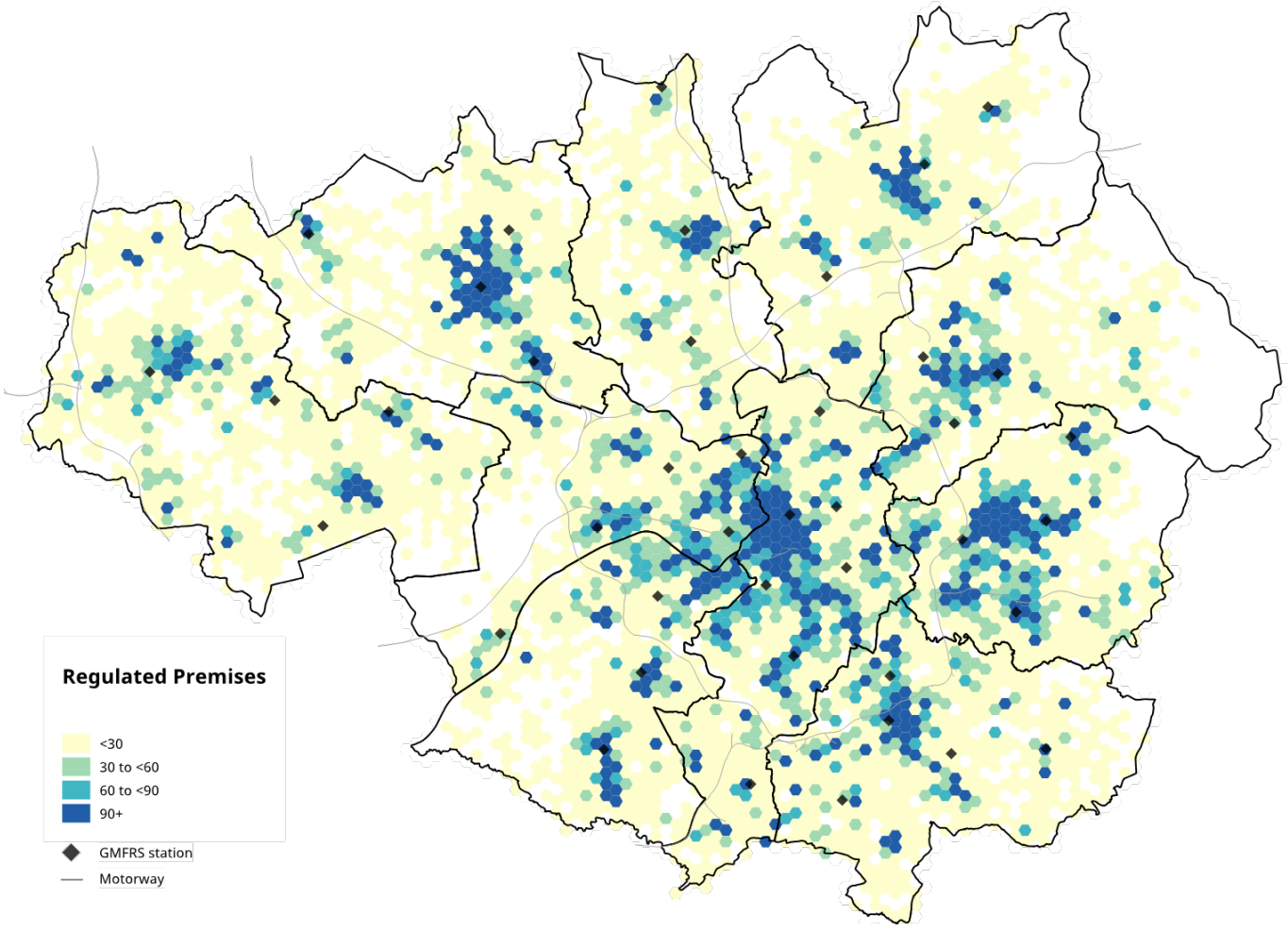

Figure 34: regulated premises in Greater Manchester

In order to prioritise these premises in terms of risk, a Risk Based Inspection Profile (RBIP) was created in 2016/17 combining a severity score built up from the categories of harm – public life, emergency responder, environment, heritage, economic, social and community - and a likelihood score based upon previous enforcement activity and previous fires in these premises.

Using this methodology, each premises was given a risk score with 16,000 premises with the highest scores forming the Risk Based Inspection Programme. The distribution of these premises is shown in the Figure 35.

It can be seen that there are concentrations of these premises in Manchester city centre, to the north of the city centre and into Salford, as well as distinct concentrations in Sale, Stockport, Bury and Rochdale.

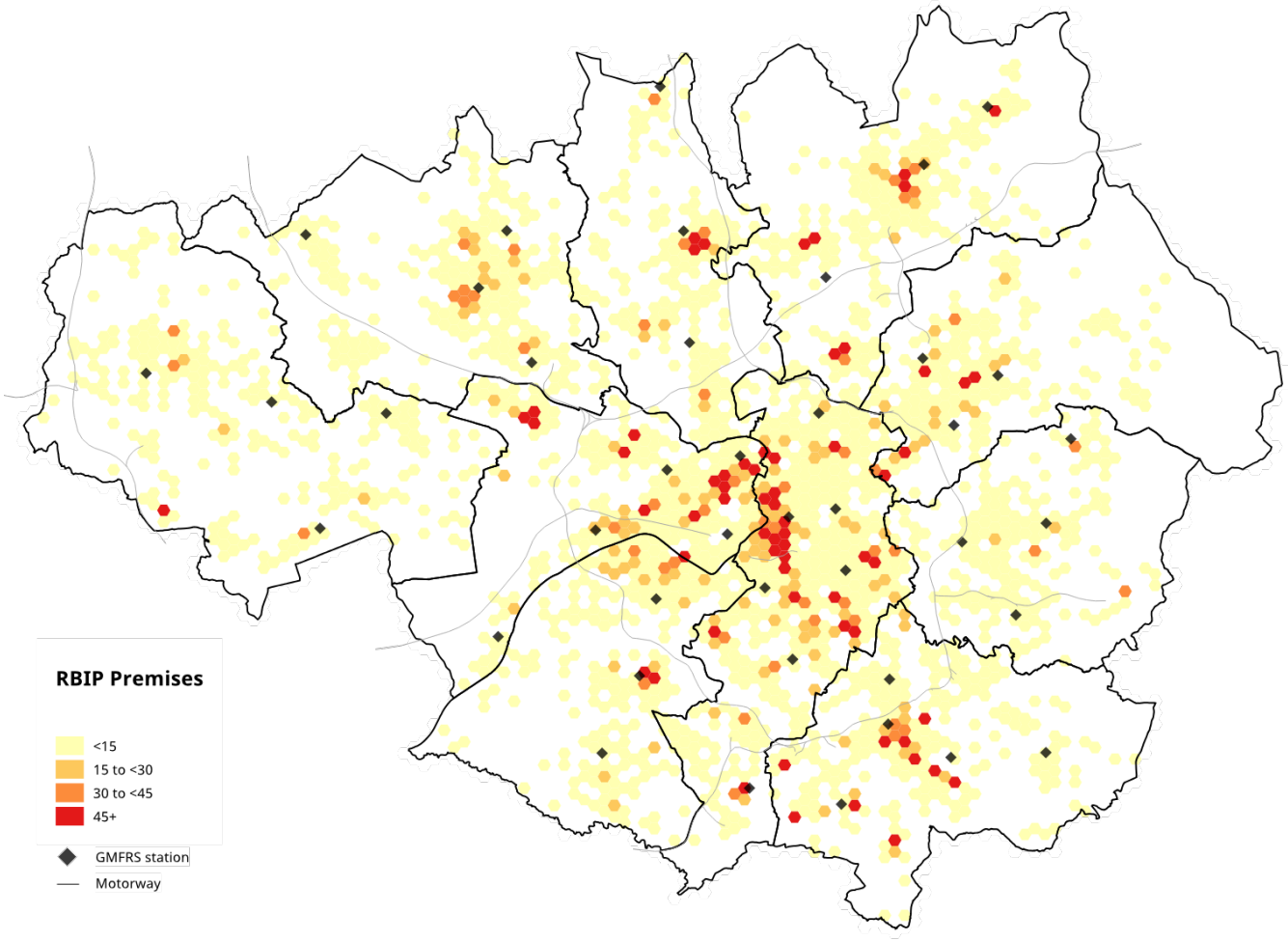

Figure 35: Location of premises in the RBIP

Starting in 2019/20 work has been undertaken to make changes to the RBIP and programme, building upon the initial version from 2016/17. These changes included a review of the attributes building up to the categories of harm, aligning the risks to the competency framework, and creating a review schedule for visited premises. These changes are yet to be implemented.

COMAH sites

All businesses in the UK are required by law to protect their employees, third parties and members of the public who may be affected by their work activities; additionally, they must take into consideration the many legal requirements that are in place to protect the environment. Sites that store or use dangerous substances must have in place further processes to meet the regulations that aim to prevent or limit the consequence to people and the environment should an incident occur.

Greater Manchester has 39 COMAH (The Control of Major Accident Hazards) sites, breaking down into 17 upper tier sites and 22 lower tier sites. The tiers relate to the amount of hazardous material on site.

A further upper tier COMAH site will be in operation at Manchester Airport as the airport expansion develops.

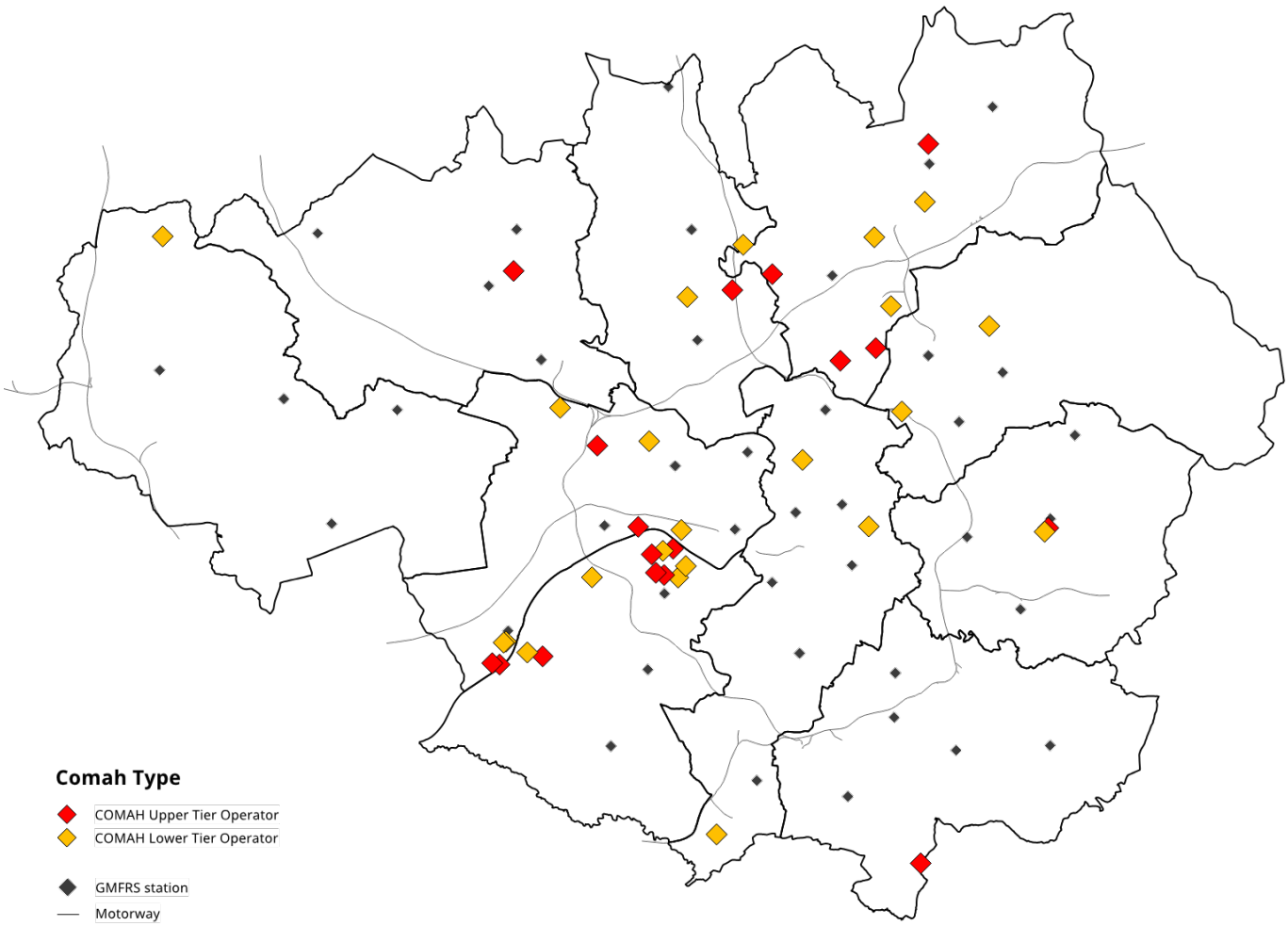

Figure 36: COMAH sites in Greater Manchester

Section 4: Infrastructure

Transport Infrastructure

Greater Manchester has an extensive public transport network, with the main provision coming by rail and Metrolink. Figure 37 shows all the non-road transport infrastructure within Greater Manchester.

There are several proposed future developments to this infrastructure displayed on the map:

- Metrolink: three new sections are proposed extending the new line from the Trafford Centre to the AJ Bell Stadium, a second route to Manchester Airport, and from East Didsbury to Stockport.
- Manchester Airport expansion: the new Terminal 2 is due to open in March 2021 which will allow the passenger capacity to increase to 45 million per year. Airport City is intended to provide large scale manufacturing, logistics, hotel and retail capacity next to the airport.
- Port Salford: opened for shipping in 2016 and will expand warehouse capacity
- HS2: will result in two new stations; one at Manchester Airport and one next to Manchester Piccadilly station. HS2 is planned to travel via a 7.5km bored tunnel, which will be the longest in the UK, from Manchester Airport before resurfacing near Ardwick. A second line is intended to split before Manchester Airport and join up with the West Coast Mainline south of Wigan.

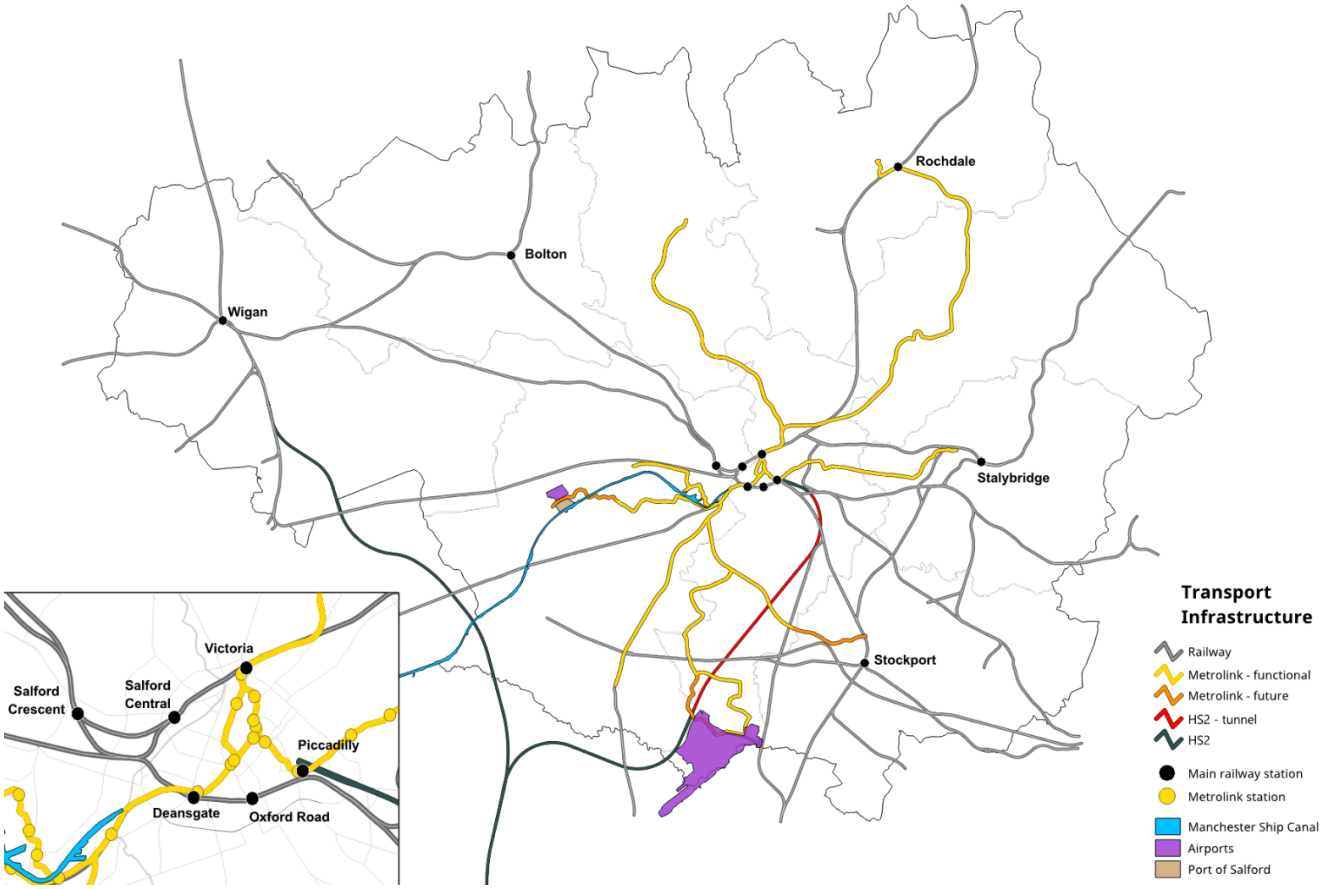

Figure 37: Transport infrastructure in Greater Manchester (TfGM)

Road Network and Travel Speeds

Greater Manchester has an extensive road network, incorporating seven motorways and 400km of the key route network.

Figure 38 indicates the speeds at which GMFRS resources currently travel. As expected in city centre and areas near to the town centres, this can be relatively slow. Compared to travel speeds in general, GMFRS resources travel about 1.8x faster than normal traffic. This information is used within modelling and by NWFC to determine resource allocation.

The road network within Greater Manchester does change relatively often, but more so than ever in 2020. Mainly as a response to Covid-19 social distancing measures, several parts of Manchester city centre were pedestrianised, including a section of Deansgate and several roads through the Northern Quarter. Several town centres also implemented similar measures temporarily.

At present, it is unknown as to the long-term future of such schemes, but it could impact on our ability to travel in and around these locations.

Figure 38: GMFRS road speeds across Greater Manchester

Smart Motorways

A definite change to Greater Manchester's travel infrastructure is that large sections of the motorway network is now a managed motorway system, with more planned for the future. Figure 39 shows the current and planned 'smart' motorway sections.

The new section between M62 J10-J12 is planned to be 'all lanes running'.

Smart motorways can have an impact on how GMFRS respond to incidents on these sections of motorway due to the new layout. There is also currently debate on whether smart motorways actually pose more of a risk to drivers because of a lack of a safe space to stop on these sections.

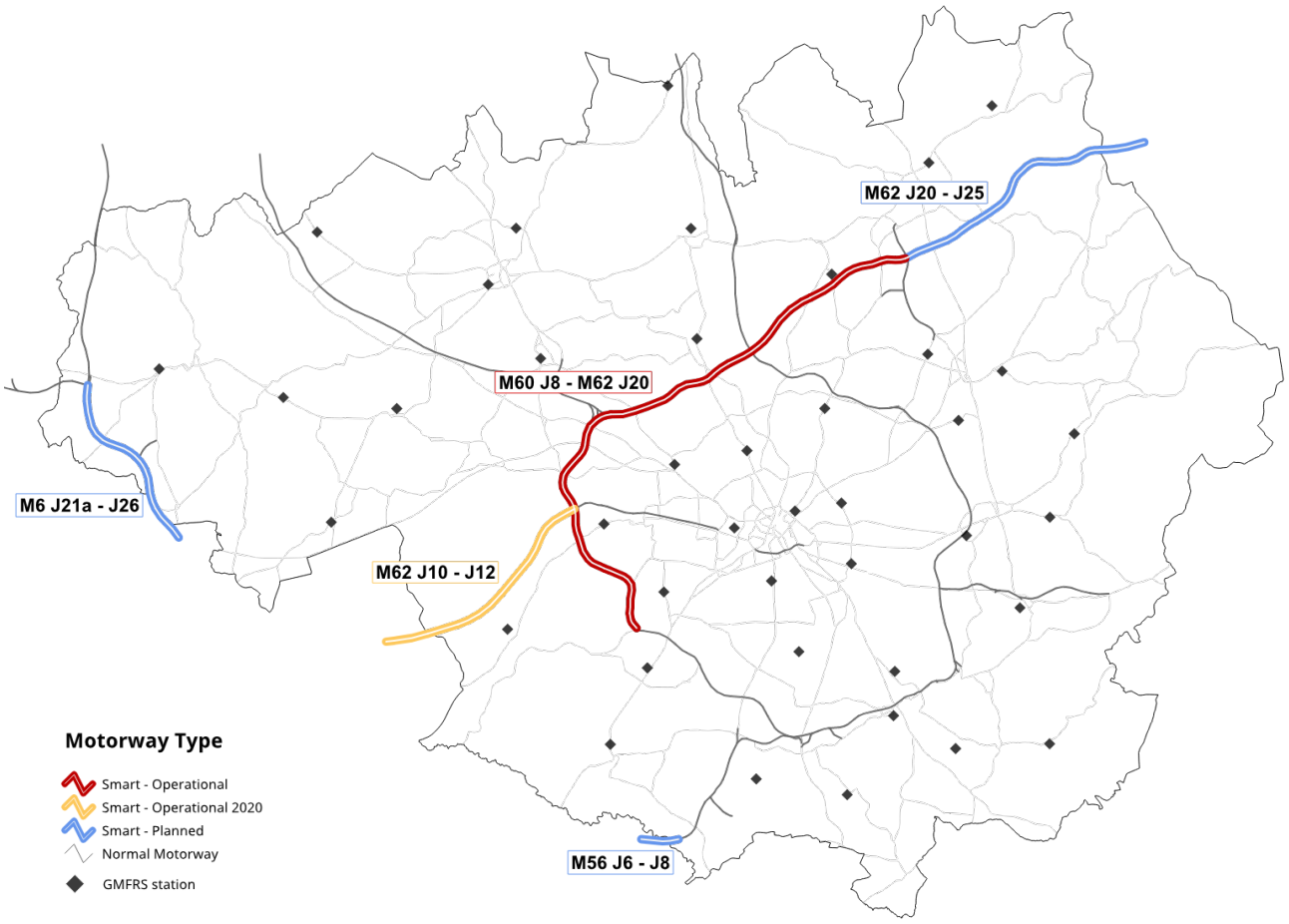

Figure 39: Smart motorways in Greater Manchester

Section 5: Environment

Climate change and its impact is a challenge faced by all emergency services, and whilst we cannot control it, we can adapt, ensuring that we have the necessary measures in place to effectively respond operationally, but also reduce our impact on the environment.

Recent years have seen a variety of extreme weather patterns, particularly flooding, all of which are becoming more frequent putting pressures on fire services to respond accordingly. As climate change continues the impact on all FRS will become more pronounced. In 2019, a number of stand-out weather events occurred from extreme hot temperatures, to heavy rainfall resulting in flash flooding, causing millions of pounds worth of damage and misery to many people across Greater Manchester.

A key piece of legislation, to assist in tackling climate change, is the Climate Change Act 2008, setting clear targets to reduce greenhouse gas emissions and introducing five-yearly carbon budgets. It also requires the Government to produce the Climate Change Risk Assessment every five years, which assesses the current and future risks to the UK as well as looking at opportunities from climate change.

Flooding

Flooding is one of the most devastating impacts of climate change with future increases in rainfall significantly impacting emergency response. Care homes, sheltered accommodation, nurseries and schools would likely be among the most vulnerable locations, with older people in rural areas also likely to be worst hit.

Nearly 90% all flooding related incidents attended by GMFRS are domestic floodings.

Of the remainder, very few incidents are caused by natural processes. The more recent trend in flooding is caused by heavy rainfall followed by accumulation of surface water which cannot enter the drainage system quickly enough.

Figure 40 shows the flood zones around rivers, denoting a 1:100-year flood and 1:1000-year flood. In the background is an experimental dataset from the Environment Agency which shows areas likely to be susceptible to surface water flooding.

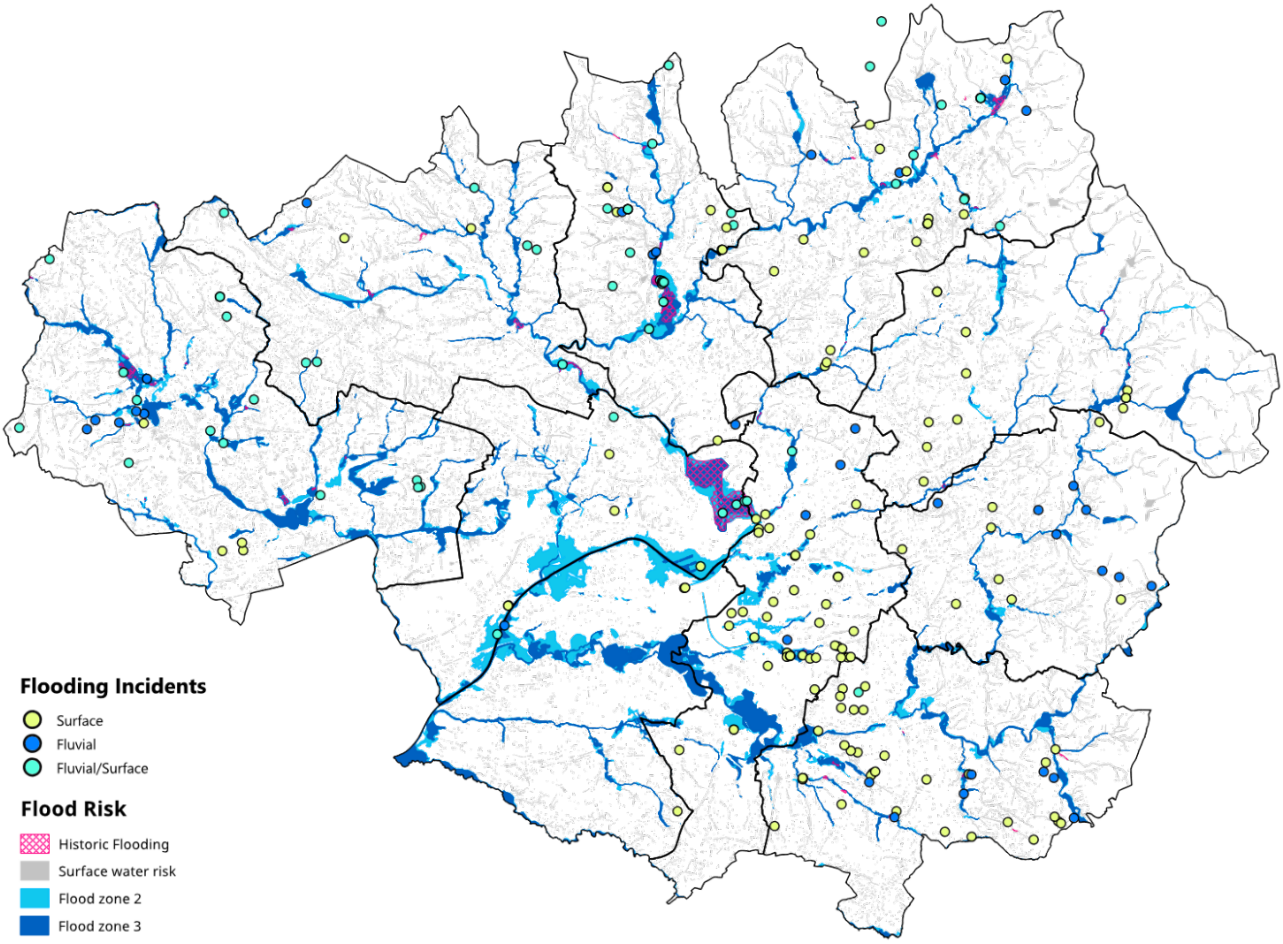

Figure 40: map of flood zones and surface water risk in Greater Manchester and historical non-domestic flooding incidents (Environment Agency)

The number of dwellings which fall into the different flood zones are as follows:

- 1.36% households in Flood zone 3
- 4.32% households in Flood zone 2
- 13.5% households within 25m of areas susceptible to surface water flooding

Water Rescues

Rescue from water is one of the most common life risk SSCs that GMFRS attend, other than RTCs, and accounts for a relatively high number of fatalities and casualties. The number of incidents has increased in recent years as highlighted in Table 30.

FY	Incidents	Fatalities	Injuries	Rescues	Mobilisations
2010/11	35	7	13	13	83
2011/12	40	2	27	19	111
2012/13	49	3	14	23	126
2013/14	46	5	16	16	118
2014/15	50	6	10	20	145
2015/16	66	6	16	28	175
2016/17	64	5	11	49	152
2017/18	77	7	24	28	188
2018/19	59	8	15	25	140
2019/20	92	7	23	43	219
Total	578	56	169	264	1,457

Table 30: water rescue incidents in Greater Manchester

Figure 41 displays all the surface water in Greater Manchester, including rivers, canals, and reservoirs, and rescue from water incidents. There is a definite hotspot of incidents occurring in the city centre, particularly along the canal areas. The other areas with high number of incidents are in Wigan, near to Haigh Hall and the Leeds-Liverpool canal.

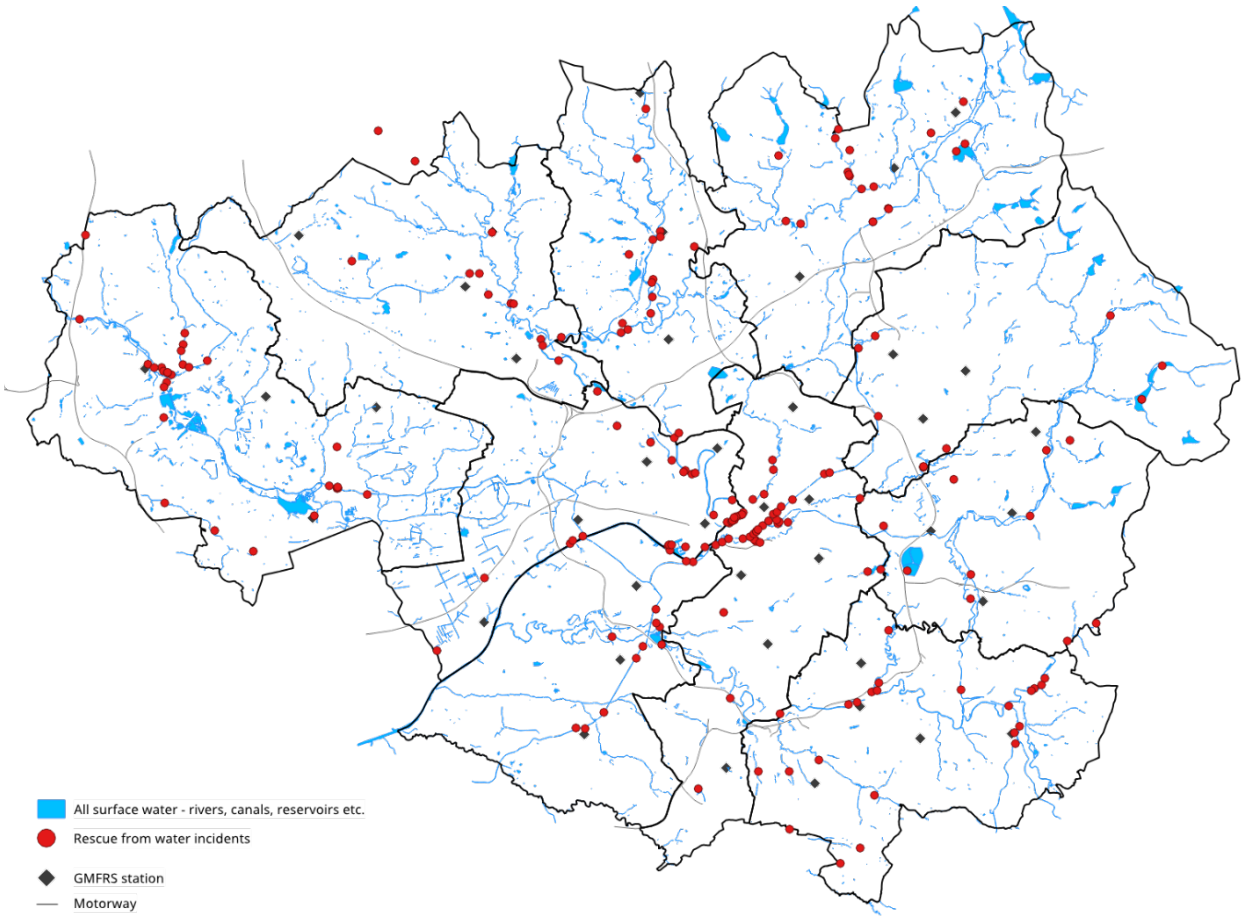

Figure 41: map of surface water in Greater Manchester and historical rescue from water incidents

Wildfires

Whilst Greater Manchester is often thought of as a predominately urban location, there is a surprisingly large area of green space within much of the county, with the exception of Manchester. There are areas of moorland to the north and east of Greater Manchester, and in the immediate surroundings.

Wildfires have increased in number in the past years, most notably in summer 2018 when there were concurrent wildfires both in the Saddleworth area, and at Winter Hill near to the border with Lancashire. Warmer temperatures in the summer and associated drier conditions desiccate plant materials and create more vegetation litter, providing more fuel for wildfires. Studies have shown that increases in rainfall during winter and spring provide more favourable conditions for plant growth and therefore more potential fuel for the fires later in the summer, with devastating events like Saddleworth Moor more likely to happen in the future.

Figure 42 shows the moorland areas along with other green space, and the incidents which meet the wildfire criteria as per the Wildfire National Operational Guidance (NOG) definition. It can be seen that whilst these incidents are concentrated mainly in the east of Oldham, Rochdale and Tameside, close to the moorlands and border, they do occur in other locations with open land.

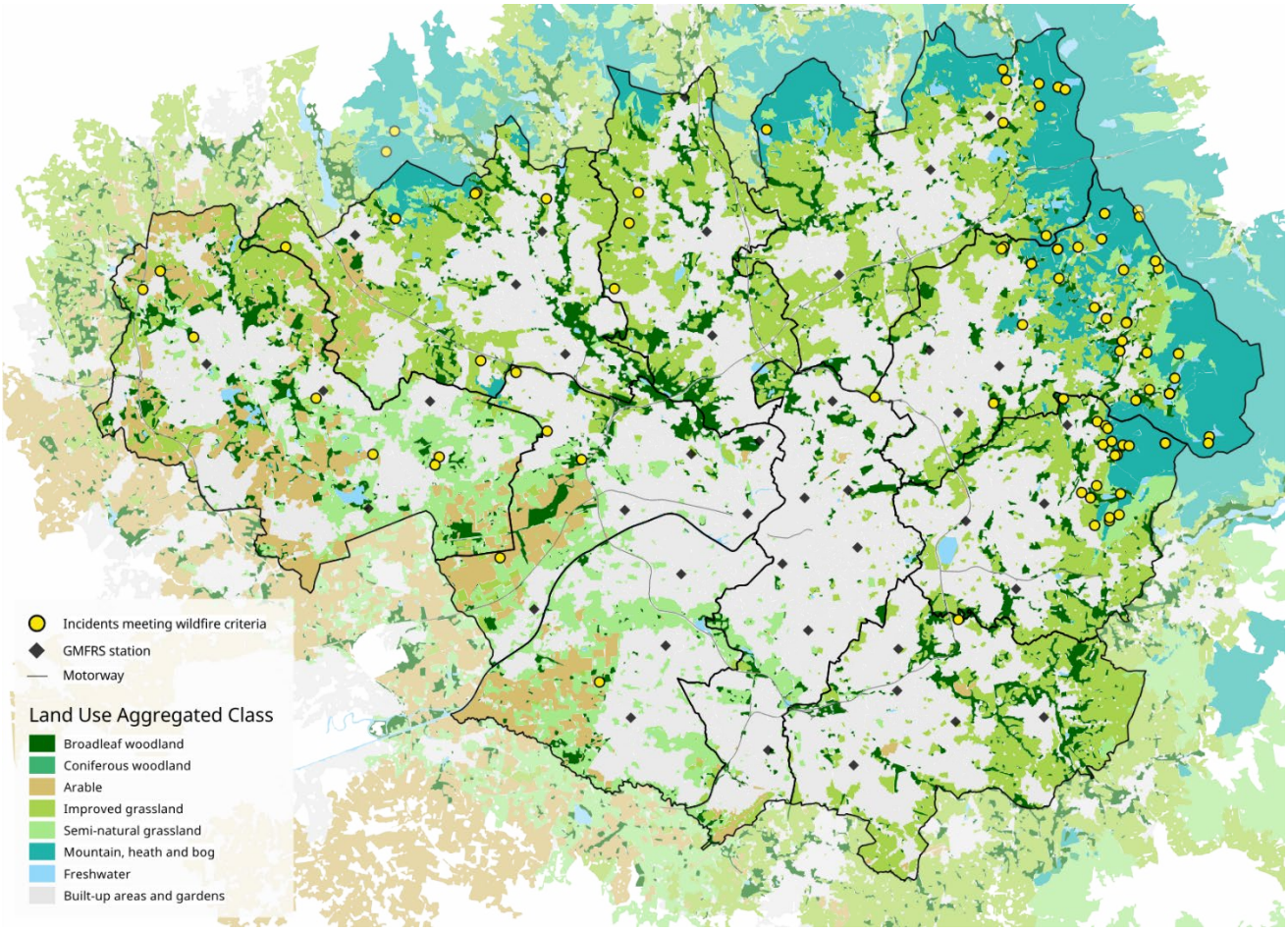

Figure 42: – map of land use in Greater Manchester denoting areas of moorland and displaying historical wildfire incidents (Morton, R. D.; Marston, C. G.; O'Neil, A. W.; Rowland, C. S. (2020). Land Cover Map 2019 (20m classified pixels, GB). NERC Environmental Information Data Centre)

Whilst the incidents meeting the criteria are relatively small in number, they cause a huge impact on the service as they tie up huge amounts of resources for extended periods. This is highlighted in Table 31 where it can be seen that the number of mobilisations in 2018/19 was 40x the number of incidents, whereas this ratio is overall about two mobilisations per incident.

FY	Incidents	Fatalities	Injuries	Rescues	Mobilisations
2010/11	21	0	0	0	170
2011/12	15	0	2	0	118
2012/13	4	0	0	0	32
2013/14	8	0	0	0	76
2014/15	7	0	0	0	29
2015/16	5	0	0	0	53
2016/17	12	0	0	0	75
2017/18	20	0	1	0	160
2018/19	46	0	6	0	1636
2019/20	21	0	0	0	216
Total	159	0	9	0	2,565

Table 31: wildfire incidents in Greater Manchester

At the time of the wildfires in 2018, GMFRS had 56 fire engines available at any one time, however mutual aid support was required from 15 other fire and rescue services, the military, and the United Utilities helicopter.

Peat fires burn underground making them very difficult and resource-intensive to tackle. GMFRS committed resources to the 2018 fires for almost three weeks before they were finally extinguished.

Moorland and peatland fires have a hugely negative impact on the environment and the impact of the 2018 fires on the air quality could be felt as far away as Manchester city centre and there were numerous reports of ash raining down in Chadderton and Mossley. There is a growing body of evidence that air pollution has also significantly worsened the Covid-19 outbreak and has increased the number of deaths during the pandemic.

As a result of a number of moorland fires in 2019/20 we worked closely with Oldham and Tameside councils in a bid to ban lighting barbecues and fires on the moors. A Public Safety Protections Order (PSPO) has been agreed and was enforced on the 1st November 2019.

EnviroSAR (linked to University of Manchester) is a monitoring and detection tool of peat moorland and heathland wildfires using Earth Observation data to help understand patterns of wildfire occurrence and UK wildfire regimes and mitigate against wildfire risks; target land management, peat restoration, and reseeding, and model carbon losses; reduce water discolouration and associated costs.

Moorland and peatland fires have a hugely negative impact on the environment, particularly in the following ways.

Air pollution: During the fires in 2018, the impact on air quality caused the closure of local schools. The impact on the air quality could be felt as far away as Manchester city centre and there were numerous reports of ash raining down in Chadderton and Mossley.

Research published in March 2020 found that the 2018 fires exposed 4.5 million people to fine particulate matter (PM2.5) levels above the daily World Health Organisation (WHO) guidelines. This significantly increased the number of excess deaths in the region.

There is a growing body of evidence that air pollution has also significantly worsened the Covid-19 outbreak and has increased the number of deaths during the pandemic.

C02 emissions: Peat on the moors and other peatlands constitute vital carbon sinks that need protecting to help reduce the amount of carbon dioxide in the atmosphere. Moorland and peatland fires not only release the carbon that has already been trapped in huge volumes, but also drastically reduce the amount of carbon the peat is able to capture in the future.

Flooding: The vegetation and the peat on the moorlands around GM absorb significant levels of rainfall, reducing the threat of flooding. The greater the amount of peat and vegetation destroyed in moorland fires, the greater the risk of subsequent flooding across the region.

Natural habitats: moorland fires have a significant and long-lasting negative impact on wildlife, habitats and biodiversity. There are reports that the recent fire on Darwen Moor in Lancashire may have destroyed more than 300 pairs of rare birds that were breeding on the site as well as thousands of young chicks. Alan Wright of The Wildlife Trust said: “Moorland fires spread quickly and will take wildlife by surprise, destroying nests and killing chicks, and many of the insects they feed on. Many thousands of creatures will have died in [the Darwen

Moor] fires." Lancashire Fire and Rescue Service (FRS) believes that the blaze was caused a barbecue.

Community Risk Register

The Civil Contingencies Act 2004 places a legal duty on all emergency responder services to carryout risk assessments of the hazards each geographical area may face. The range of hazards that are assessed is prescribed by the Cabinet Office and is supplied to the Chairperson of each Local Resilience Forum across England and Wales.

Throughout Greater Manchester the assessments of hazards are carried collectively and with mutual agreement between all services, namely; Greater Manchester Fire & Rescue Service (Chair), Greater Manchester Police and British Transport Police, North-West Ambulance Service and National Health Service sectors with responsibilities within Greater Manchester, all ten Local Authorities and the Environment Agency. All significant risks are recorded on the Community Risk Register. The register itself is a restricted document for purposes of national security.

The purpose of the register is to inform and prioritise contingency/emergency planning arrangements at an organisational level and, aligned to requirements of the Civil Contingencies Act, contingency plans written and shared between all responding services, thus creating a common and mutually understood response. The emergency planning arrangements that result from the Community Risk Register are incorporated into GMFRS risk-based planning process and suitable resources made available to satisfy requirements.

Business Continuity

Business Continuity Management (BCM) is an integral part of our strategic management and our commitment is to invest into BCM processes based on both a moral and legal obligation. In relation to BCM processes and procedures, fire and rescue authorities have to satisfy the requirements of both the Civil Contingencies Act 2004 and Fire & Rescue Services Act 2004.

We are legally required to 'write and maintain plans for the purpose of ensuring, so far as reasonably practicable, that if an emergency occurs the Service is able to continue its functions'. In order to ensure GMFRS is compliant with both pieces of legislation, we have adopted the processes and procedures contained in the British Standards 25999 Parts I and II (BS 25999) for Business Continuity Management and Systems and the new BS ISO 22301:2012.

Through mechanisms of horizon scanning, structured meetings, generic and bespoke plans, training of personnel, exercises and an audit process, then we are able to ensure the minimum and acceptable level of service is available to the communities of Greater Manchester at all times. The resources provided and the plans written for the potential challenges and emergencies faced by the Service are constantly reviewed by the Corporate Leadership Team and tested throughout the organisation by the Contingency Planning Unit based at Fire Service Headquarters.

Regional & National Resilience

Fire and rescue authorities must make provision to respond to incidents such as fires, road traffic accidents and emergencies within their area and in other areas in line with mutual aid agreements. These agreements are reinforcement schemes.

Fire and rescue authorities must enter into reinforcement schemes as far as is practicable for securing mutual assistance as between fire and rescue authorities for the purpose of discharging their functions. GMFRS holds mutual agreements for reinforcements with all its surrounding fire and rescue authority areas. We have formal, written agreements with Lancashire, Cheshire, Merseyside and West Yorkshire and are in the process of formalising what was previously an informal agreement, with Derbyshire.

Following the move to North West Fire Control our previous mutual aid arrangements still remain in force. In addition, resources from within the NWFC consortium respond in accordance with a NWFC statement of operations.

At a national level, the arrangements contained within a Fire & Rescue Circular (National Mutual Aid Protocols for Serious Incidents) provides resilience to Greater Manchester Fire & Rescue Service.

The participation of all Fire & Rescue Authorities (FRAs) in the protocol is essential to ensure the ready availability of fire and rescue service resources in the event of large-scale emergencies, wherever they occur.

Terrorism

The current threat level for terrorism in the UK is currently SEVERE. This means an attack is highly likely.

In their response to the consultation on the National Framework, the Government states,

“Responding to acts of terrorism is an agreed function of FRSs as set out in the Grey Book and is encompassed within the broad descriptions within the existing agreed firefighter role maps: to save and preserve endangered life, and safely resolve operational incidents.

To ensure no misunderstanding we have re-drafted this section to distinguish between terrorist attacks in general and Marauding Terrorist Firearm Attacks (MTFA) so now the Framework does not assert that MTFA has specifically been agreed as part of the Grey Book. Additionally, the Response section of the framework has been redrafted to clarify the position that FRAs must make every endeavour to meet the full range of service delivery risks and national resilience duties - including MTFA duties - at all times, including periods when business continuity arrangements are in place.”

Following a national dispute, the policy position of the FBU is that responding to marauding terrorist firearm attacks is not within the role map of firefighters. Some of GMFRS’s capability in this area is currently provided by Merseyside FRS. This was of particular concern to HMICFRS during their inspection of the Service,

Extensive discussions have taken place with the Fire Brigades Union at both a national and local level and an agreement has now been reached to re-introduce a Marauding Terrorist Attack [MTA] Specialist Responder Capability into GMFRS.

This is the first step in re-introducing this capability back into Greater Manchester, which given the level of risk in the context of terrorism across our City-Region the case for the capability is compelling. Whilst there is significant work to be done ahead of the capability going live, we are currently finalising our MTA SR Implementation Plan and will continue work with the FBU during this implementation.

Section 6: Sociocultural

Covid-19

The Covid-19 pandemic has led to a dramatic loss of human life worldwide and presents an unprecedented challenge to public health, the economy and social disruption. The ongoing Covid-19 situation has affected communities across Greater Manchester, with more than 156,00 confirmed cases and nearly 5,000 have died since March (figures correct 21st December 2020).

GMFRS has implemented significant measures to minimise the impact on our services. In line with central government, NFCC guidance and our business continuity plans we are continuing to respond to emergencies and focus on fire safety where there is risk to life, providing Safe and Well advise over the phone to our most vulnerable residents or where there is an urgent threat to life from fire, and scaling back non-emergency work in an attempt to reduce the exposure of our staff and protect residents from any potential infection risk. It is important that our frontline firefighters and staff are protected so that an effective service can be provided to the communities of Greater Manchester.

Evidence is mounting that some people who have had relatively mild symptoms at home may also have a prolonged illness. Overwhelming Long-term fatigue, palpitations, muscle aches, pins and needles and many more symptoms are being reported as after-effects of the virus. Around 10% of the 3.9 million people contributing to the COVID Symptom Study app have effects lasting more than four weeks.

The NFCC recently published an article on a new report by King's College London and The Open University looking at the mental health and wellbeing of emergency responders. The report identified a need to better understand several areas of wellbeing in those who respond to emergencies, such as self-harm, suicide, alcohol and substance misuse, sleep, bullying, financial concerns and the positive outcomes of working in this sector.

Recovery from Covid-19

Through combined efforts, we are working, towards a 'new normality', one that will see us living with Covid-19 until the vaccine has been effectively distributed.

There is a growing body of evidence that the way to recover economically from the pandemic is to invest in infrastructure. Green infrastructure jobs are some of the cheapest to invest in, and obviously the most effective in tackling the climate emergency. Build back better sets out what it might mean for the green economy including a new approach to travel, green homes, and green skills. The Greener and fairer economics article details how reshaping the economy post-pandemic could be a once-in-a-lifetime opportunity to create a system that's fundamentally fairer and more sustainable.

Kerslake Arena Review

The review into the emergency services' response to the Manchester Arena was published in March 2018. The review recommended that GMFRS should:

- Review Service Level Agreements (SLAs) with North West Fire Control
- Revise policies and procedures relating to terrorist attacks
- Review procedures regarding communications and links between the Inter-Agency Liaison Officers (NILOs) and GMP
- Review NILO protocols, procedures and training
- Ensure suitable training and equipment for firefighters RE multi-agency rendezvous points during terrorist incidents
- Ensure suitable levels of competence, experience, training and preparation RE multi-agency command, control and communication for all relevant staff.

GMCA report considers the progress made against the Kerslake recommendations following the Arena attack. It identifies the work carried out by the Resilience Forum, GMFRS, NWFC and the Police. There is significant progress in all areas, notably:

- Clarification of command roles and responsibilities within GMFRS, alongside a major transformation programme (PFC) to ensure the service is fit for the future
- GMP enhancing its senior officer capacity and resilience during major incidents
- NWAS procuring additional stretchers for response vehicles to assist in casualty evacuation, alongside creating dedicated incident notification channels

- Mental Health Trusts throughout the city-region developing a joint response plan, currently with Trust Boards for final approval, to improve provision of mental health services to support adults and children who experience trauma
- A guarantee to Government by Vodafone that the failure of the National Mutual Aid Telephony system, which hampered the timely activation of the Casualty Bureau on the night of the attack, will not happen in future.

The Inquiry into the Arena attack is currently underway and will include further recommendations for the emergency services.

Diversity in Fire

The lack of firefighter diversity was criticised by Theresa May back in May 2016 and later by Brandon Lewis. The Adrian Thomas review in November 2016 made the same criticism. In March 2017, Mayor Andy Burnham's manifesto pledged to, "ensure that our police and firefighters are representative of GM's diverse population – encouraging more women, and people from under-represented communities to consider training as police or firefighters."

In March 2017, the LGA published Inclusivity and the fire service - a report that sets out the changes in the role of a firefighter, outlines activities that are underway in FRAs and suggests further areas of work to develop the recruitment and retention of a more diverse firefighter workforce. In March 2018, the LGA published some inclusivity case studies, identifying different FRS's approaches to recruitment and inclusion.

There is specific reference to diversity in the Framework. Each FRA needs to produce a People Strategy that amongst other things will identify how an FRA intends to continuously improve the diversity of the workforce to ensure it represents the community it serves.

In the HMICFRS State of Fire Report in 2019, FRAs were criticised for a lack of progress, "Diversity remains an aspiration but change in the sector is woefully inadequate". GMFRS's individual report was particularly critical, and the Service's work to ensure fairness and diversity was judged to be inadequate, "GMFRS has no strategy, visible leadership and limited training on equality, diversity and inclusion. This is affecting watch culture and undermining positives steps to attract new entrants from diverse backgrounds."

NFCC publishes Equality, Diversity and Inclusion Strategy: The vision of the strategy and plan is to support FRSs in their work towards inclusive workplaces and services by assuring

diversity and inclusion is designed into everything they do, whether that is service delivery, people development or future innovation.

Health

The Marmot Review 2020: report has been produced by the Institute of Health Equity and commissioned by the Health Foundation to mark 10 years on from the study *Fair Society, Healthy Lives* (The Marmot Review). The report highlights that:

- people can expect to spend more of their lives in poor health
- improvements to life expectancy have stalled, and declined for the poorest 10% of women
- the health gap has grown between wealthy and deprived areas
- place matters – living in a deprived area of the North East is worse for your health than living in a similarly deprived area in London, to the extent that life expectancy is nearly five years less.

Firefighters and Cancer Risk

Research published by UCLan in February 2018 concludes that skin absorption, rather than inhalation, is firefighters' leading cause of exposure to cancerous gases created during a fire, known as polycyclic aromatic hydrocarbons (PAHs).

UCLan researchers discovered that the methods used to clean firefighters' protective clothing and equipment are not effectively implemented. This causes the protective gear to be contaminated for its next use and means the length of time that skin is exposed to fire toxins is increased.

The research concluded that the risk of developing cancer in UK firefighters caused by skin absorption of toxic chemicals is as high as 350 times above the level that would action immediate government intervention in the US.

Section 7: Technology

Technologies continue to develop at an accelerated pace. Digitalisation of almost all sectors has been the dominant trend for quite some time and will continue to challenge conventional solutions by offering increased capacity and lower costs.

Data

There is an increasing government drive for publicly transparent performance and procurement data and data sharing between organisations. Further sharing of data will facilitate a more joined-up approach to tackling crime and extremism and protecting the vulnerable. There is a specific emphasis on data sharing in the Framework – stating that FRS are expected to develop partnerships to support risk reduction services to those identified as vulnerable, including from exploitation or abuse, and wherever possible to share intelligence and relevant risk data.

Airwave Replacement (Emergency Service Mobile Communication Programme – ESMCP)

This is a national programme, due to replace the current Airwave System, with a new communications system, including an emergency services network (ESN). Once implemented, this system will provide emergency services with integrated critical voice, mobile broadband data and significantly more capabilities that the current Airwave system.

Numerous delays to this programme have been experienced and a recent report from the National Audit Office states that the Airwave replacement continues to fall behind schedule and over budget. The delays mean introducing ESN is now forecast to cost £3.1 billion more than planned, and this forecast is highly uncertain. There is currently a lack of clarity as to the financial impact at a local level, and whether the distributed costs at an individual FRS level could be higher.

GMFRS is continuing its programme of work to replace the mobile data terminals in appliances and activities to support smarter and more flexible ways of working, which will complement the ESMCP. We will also continue to work at a local and regional level to provide input and feedback to the programme, sharing information as required with the Service Leadership Team.

Electric Vehicle

Recent studies have shown that air pollution is linked to 1,200 premature deaths in Greater Manchester alone every year and disproportionately impacts certain groups, including the very young, older people and people with a lung condition. We want to reduce this and to do so we will need to continue to embrace new technologies and new ways of working.

Electric Heavy-Duty Vehicles

Volvo, which make many of our fire engines, has unveiled a new electric truck designed for heavy-duty roles such as transporting waste in urban environments. Volvo says its new electric vehicle will enable cities to reduce many of the problems and issues associated with heavy goods vehicles driving around on their roads. The low carbon truck will produce no emissions, be quieter and even improve safety, due to its low-entry cab, which makes it easier to enter and exit the vehicle.

West Midlands Ambulance Service has launched the UK's first fully Electric ambulance. This is the first step to ensure their fleet of vehicles are the lightest and most technologically advances in service anywhere in the world. The next step of that development is the introduction of the first zero emissions e-ambulance to be used on the roads.

The vehicle is powered by lithium-ion batteries sited in the underside of the ambulance floor pan. The design has a low centre of gravity and is powered by a 96kW battery pack which provides a top speed of 75mph and can achieve a range of 105-110 miles with a recharge time of four hours. Further developments to the vehicle will be introduced to increase its capability, including two-hour charge time.

Electric Vehicle Fires

As more and more electric vehicles are being purchased, there is a growing concern regarding the risk if these vehicles set on fire. Whilst fundamentally, electric vehicles are extremely safe, the main danger occurs when the lithium-ion battery is damaged, which might happen if it is exposed to extreme heat or something penetrates the battery cell wall. The risks are significant as over 100 organic chemicals can be produced including toxic gases such as carbon monoxide and hydrogen cyanide. Many manufacturers advise for controlled burn, but this is not always feasible. Extinguishing Electric vehicle (EV) fires often requires vast quantities of water and will produce a harmful water run-off."

Recent incidents experienced by GMFRS have identified that when the lithium-ion battery cells begin to react, sufficient heat can be generated to cause an exothermic reaction called 'Thermal Runaway'. When these batteries have entered the 'Thermal Runaway' process, and even if they appear to have been fully extinguished, there is a risk of re-ignition during the subsequent period of approximately 24 hours, or in extreme cases even longer. Due to this, vehicles should not be moved or transported for a prolonged period, resulting in appliances remaining in attendance for long periods. GMFRS have introduced guidance to support operational crews dealing with such incidents.

Electric Fire Engine

The LA Fire Department has committed to purchasing an electric fire appliance from Rosenbauer. The vehicle will have 2 batteries that have a 100kW charge capacity enabling full electric operation for around 2 hours. The vehicle also has a diesel powered 200kW range extender installed to allow for longer operations. The vehicle is expected to be delivered in 2021 and be operational in Hollywood.

Firefighter PPE

The Qwake helmet allows firefighters to "see through" smoke. Qwake helmet uses thermal imaging and real-time augmented reality projected onto the visor of the helmet to make navigation in extreme environments quicker and safer.

Robotics

The use of robots in firefighting continues to increase, from unmanned drones to a robot that can be used remotely to tackle fires in hazardous conditions. GMFRS are committed to utilising new technologies and we continue to explore and embrace developments to find new and better ways to improve firefighter safety and protect the communities of Greater Manchester.

Los Angeles Fire Department is the first in the nation to add a robotic firefighting vehicle to its fleet. Almost as big as a Smart car the RS3, has treads like a tank, a V-shaped plough capable of pushing debris, including vehicles, out of it way and a winch that can pull up to 8,000lbs. The vehicle, which is remote controlled by trained firefighters, is equipped with cameras. Going forward insect-sized flying robots are being tested for use in search-and-rescue operations.

The Internet of Things

By linking the physical world to the Internet, Internet of Things (IoT) wireless sensor technology can improve resilience in such areas as civil protection; telecommunications; energy, electricity; water supply; urban maintenance; traffic management.

Things Network: In Amsterdam the Things Network uses low-power, low-bandwidth LoRaWAN technology to cover the city with a wireless signal that allows objects like boats, trashcans and streetlights to become tools for developers. Unlike other 'smart city' projects, this one is entirely crowdsourced by citizens and was put together in just six weeks. A pilot project demonstrating the Things Network's potential allows boat owners in the city to place a small bowl in the base of their vessel. If the boat develops a leak and starts taking on water, the bowl will use the network to send an SMS alert to a boat maintenance company that will come along and fix the problem.

An interactive map monitoring Oxford's river levels has been launched online to act as an early-warning system for flood-prone areas**.** The initiative between Oxford-based company Nominet and the Oxford Flood Network is designed to enable people to take action when water levels rise. Sensors around the city give real time data which is then displayed online.

This technology could be utilised by the fire service to provide data to support home fire safety visits. Sensors in people's homes could transmit live data regarding temperature and movement. This could be used to identify cold homes, the beginning of a fire in someone's home, a prolonged period without movement in a home suggesting an occupant has fallen or is incapacitated. At incidents sensors could monitor water for chemical levels and predict where flooding is likely to happen next.

what3words

British technology company what3words has announced the rollout of its location technology to a number of emergency services across the UK. Using three-word addresses gives callers a simple way to describe precisely where help is needed and allow these forces to get resources straight to the scene. what3words has divided the globe into 3m x 3m squares and given each one a unique three-word address – ///kite.chats.dine, for example, will take you to a precise spot in a field next to the River Ouse in York. The app is free to download for both iOS and Android, or by browser, and works offline – making it ideal for use in areas with an unreliable data connection.

NWFC currently has in use the what3words technology within their Control Room. Emergency call handlers may ask callers, unsure of their location, to download the app and report the three words designated to their location to assist in sending an appliance to their exact location. It has also used by crews on the incident ground to provide their location to NWFC, which was then conveyed to other resources en-route as a rendezvous point.

Section 8: Economic

Fire Service Funding

The Framework places an emphasis on how FRAs manage their finances, to "ensure the efficient and effective use of their resources...FRAs should regularly review the numbers and deployment of firefighters and other staff to ensure that their FRS has a workforce that is commensurate with the risks that they face."

Baseline funding, the largest element of central funding for GMFRS is provided by MHCLG. The funding supporting the 2020/21 Budget represents a one-year settlement with no further details provided beyond 2020/21. Future funding is dependent of the outcome of latest Spending Review, due to be announced in November 2020, with specific allocations to GMFRS anticipated in December.

Further funding is received from the Home Office covering Pensions related costs and Department-specific Fire and Rescue programmes including National Resilience. The funding allocations beyond 2020/21 have not been confirmed.

The Local Government Settlement 2017/18 included the introduction of the 100% retention of Business Rates for pilot authorities, including GM. The pilot authorities each retain 100% of locally raised Business Rates, of which the local authorities retain 99% and 1% is retained by the GMCA in respect of GMFRS. GMFRS also receives funding from local Council Taxpayers, as part of the Mayoral General precept.

Financial pressures facing the Fire and Rescue Service

The issues facing the Fire sector focus on the following areas:

- Securing an inflationary increase for FRSs to maintain firefighter numbers
- Incorporating additional Protection funding into the baseline funding
- Providing ongoing funding to cover the Pensions Grant
- Implications of Covid19 on Tax base / Collection Fund

- Local flexibility around Council Tax for Fire and Rescue Services

Whilst the impacts of the pandemic and subsequent lockdown are yet to be fully understood, it will undoubtedly affect households' and business' ability to pay their Council Tax and Business Rates. Analysis indicates a significant negative impact on Council Tax Collection, which will affect the GMFRS budget beyond 2020/21, with GMFRS having a share of any Collection fund deficits and implications around calculating tax base.

Brexit

Following the finalisation of the Brexit deal there is still uncertainty regarding the medium / long-term impact on UK businesses and whether it will increase or decrease the amount of taxes collected from UK businesses by the government to pay for public services such as fire

- Trade with the EU may be more difficult and expensive, increasing costs of goods and services.
- Regulation. Exiting the EU will mean an end to EU regulations. Public sector organisations will need to adapt as employers and in their role as policy makers, potentially designing new regulations reflecting any new freedoms or constraints.
- Foreign Investment. Exiting the EU will potentially impact on business decisions to invest and trade with the UK. This means that devolved administrations and local governments will need to re-double their efforts to attract business regionally and locally.

Funding Review

Before the CV-19 pandemic, national government was reviewing how it funds FRSs. This is unlikely to see an increase in our budget and has the potential to see further cuts being implemented. As part of its review, the Government was looking to change the fire funding formula. The formula currently has a greater negative impact on Metropolitan / urban FRSs such as GMFRS. However, such a change is unlikely to see GMFRS receive more funding.

Fire funding is currently calculated on risk rather than demand, so that when a large incident happens FRSs have the resources to tackle it. There is a risk that Government will place more emphasis on demand rather than risk and cite falling incidents as justification for further cuts. However, incidents such as wide-scale flooding, terror attacks and large-scale fires, demonstrate that FRSs need to maintain sufficient resources to respond effectively and keep people safe.

FRSs will likely continue to be unprotected services, meaning that they will not be exempt from central government funding cuts. With the uncertainty of pandemic recovery and Brexit on public finances, there will be continued pressure on FRSs in the short to medium term.

Resilience

Large-scale incidents demand resilience and resilience requires appropriate resourcing. This has never been more apparent than it is during the current pandemic, with the Service introducing measures to protect its staff to ensure statutory function of prevention, protection and response can be maintained, despite operating in a unique and challenging environment.

Before the Cube fire in 2019, other incidents in Greater Manchester stretched GMFRS resources:

- At the height of the moorland fires in 2018, 57 fire engines were in operation across Greater Manchester, requiring mutual aid support from 15 other FRSs, some 100 soldiers, and the United Utilities helicopter. The fire spread across 11km² forcing the evacuation of 34 homes and the closure of four schools.
- In 2017, the fire at Christie Hospital demanded 32 fire engines to ensure we could save decades worth of world-leading cancer research and equipment.
- Wide-area flooding in the region is now a common occurrence and GMFRS has had to adapt its response function accordingly. Last year's flooding in South Yorkshire and the Whaley Bridge dam emergency show the scale of the challenges that face fire and rescue services beyond fire incidents.

Social Value

From 1 January 2021, demonstrating social value will become more important for winning tenders for public sector contracts. The government's updated procurement model will take greater account of a bidder's social value score in assessments; evaluating them by the wider positive benefits they bring to society. This will include:

- Supporting the COVID-19 recovery, including helping local communities
- Tackling economic inequality, including creating new businesses, jobs and skills, as well as increasing supply chain resilience
- Fighting climate change and reducing waste
- Driving equal opportunity, including reducing the disability employment gap, tackling workforce inequality and improving health & wellbeing and community integration.

Welsh FRSs could soon support the NHS by responding to medical emergencies under a new vision set out by the Welsh Government. The FBU said the basis of the plans are 'ludicrous' - Emergency Medical Response.

Section 9: Responding to our SAoR: Evolving Our Fire and Rescue Service

How is this information used?

The data presented in this document is used in a multitude of ways within the organisation, such as:

- The majority of data can be broken down into station and borough areas, which is used by station and borough management teams to assess and review the risks in their own area, along with their local knowledge, to form station action plans to mitigate those risks. The station action plans capture the key deliverables that demonstrate progress against the priorities set out in the Service's Annual Delivery Plan. This process is part of the Community Risk Management model, enabling area-based teams to plan and direct their resources.
- The data can also be used it its entirety for strategic planning and targeting by directorates, for example the demographic information, details of historical ADFs, Mosaic, and fatal fires report, underpins the direction of prevention activity for reducing ADFs.
- This information sometimes forms the basis of further analysis into a specific topic, such as a detailed analysis of persons and reasons surrounding water accidents, the usage of particular pieces of equipment at incidents, or investigating the reasons for spikes in particular incident types.
- Risk information is incorporated into the workload modelling process, which is utilised for response planning, assessing the impact of any proposed changes to resources.

Responding to risks in 2021/22

Following a review of our Strategic Assessment of Risk 2021/22, GMFRS will in the year ahead make the following changes to our Service aimed at further improving our existing capacity and capability to meet the levels of foreseeable risk identified within our SAoR and within Greater Manchester.

Accidental Dwelling Fires

We will look to reduce the impact of fire on the people, communities, economy and environment of Greater Manchester by working to reduce the number of accidental dwelling fires.

To do this we will review, and look to improve, our current prevention advice and education practices, benchmarking against national exemplars. We will look to adopt best practice, update our current processes, and make appropriate change as necessary.

A wide range of activities are undertaken to reduce the risk of fires occurring in the home, such as campaigns and social media, age appropriate safety education, community engagement as well as person centred advice through our Home Fire Risk Assessment interactions. Post incident activities and reassurance campaigns support this approach and help to embed safety messaging within our communities. 'Safe4' campaigns are delivered during spring, summer, autumn and winter and focus on a variety of safety messages dependant on the time of year, including safety in the home.

Built Environment - Buildings

GMFRS has agreed proposals to develop a structure and supporting mechanisms to lead on the coordination of its response to identified risks and learning in respect of the built environment, in particular response to incidents such as Grenfell Tower and The Cube.

This capability will seek to build on the existing coordinated and collaborative approach by GMFRS, to implement further measures to support the coordination, analysis and routes for mitigation, following significant learning identified.

Commercial Fires

GMFRS is committed to reducing the impact of commercial fires within premises in Greater Manchester. We will continue to engage with business owners and those responsible persons through our dedicated fire safety teams, providing guidance, education and advice.

Our Risk Based Inspection Programme highlights premises with the highest risk of fire, and our fire Safety teams continue to target those premises. We will continue to utilise our Powers, principally under the Fire Safety Order 2005 and where appropriate will undertake enforcement action to ensure acceptable fire safety standards are maintained. After fires occur in commercial premises, we will carry out engagement activity to identify common themes and ways in which we can support businesses.

Road Traffic Collisions (RTCs)

Whilst we have seen a decrease in RTCs during the Covid-19 pandemic, the number of vehicles on our roads are increasing and road getting busier. GMFRS actively works with partners to reduce the impact of RTCs on the people, communities, and economy of GM.

Young drivers (aged 17 to 24) make up only nine per cent of the driving population but are involved in 16 per cent of fatal or serious collisions in 2019/20. Many collisions our crews attend involve young drivers and their passengers, often involving life-changing injuries. We run several initiatives with partners, supporting the aims and objectives of the Safer Roads Greater Manchester Partnership, to try and change this and help to make sure that young people know how to enjoy the freedom driving brings, but also the responsibility it carries.

Wildfires

Following the review of our wildfire capability an implementation plan is underway to progress capability improvements ahead of the next wildfire season, alongside our vehicle replacement programme.

We have introduced new specialist all-terrain vehicles at Stalybridge and Bolton North stations, as well as flail mowers (in order to create fire breaks), with fully trained crews. These two stations will be complemented with a further four wildfire support stations that have a Mercedes Sprinter wildfire vehicle. These vehicles all have brush cutters, again to create fire breaks. All staff at each of these six stations will also be issued with wildfire specific PPE, which is a light weight design, affording protection against radiated heat, whilst allowing an individual to work for longer periods without suffering the effects of heat exhaustion. This advantage is quite unique to a wildfire incident, where operational crews will invariably be working for protracted periods of time.

This new capability will allow the service to deal with wildfire incident in both an offensive and defensive manner. It is envisaged that this approach will be much less resource intensive and allow incidents to be brought under control and dealt with in a less protracted way.

Terrorism

GMFRS forms part of National arrangements to respond to incidents of terrorism, particularly the necessity to act in order to save life. The Service responds to all foreseeable fire and rescue related risks and this extends to terrorism related incidents irrespective of the type, nature and/or basis of the attack.

GMFRS Officers are continually linked in with National and Regional Counter Terrorism Policing (CTP); local planning is undertaken with CTP (Northwest) which is consistent with local planning and the National Security Risk Assessment. When responding to such an attack GMFRS has arrangements in place that align to National doctrine, known as

Marauding Terrorist Attack (MTA) Joint Operational Principles, and undertakes regular multi-agency training, awareness and exercising.

Extensive discussions have taken place with the Fire Brigades Union at both a national and local level and an agreement has now been reached to re-introduce a Marauding Terrorist Attack [MTA] Specialist Responder Capability into GMFRS. This is the first step in re-introducing this capability back into Greater Manchester, which given the level of risk in the context of terrorism across our City-Region the case for the capability is compelling. Whilst there is significant work to be done ahead of the capability going live, we are currently finalising our MTA Implementation Plan and will continue work with the FBU during this implementation.

Automatic Fire Alarms

GMFRS is committed to reducing the impact of false alarms related to automatic fire alarm (AFA) systems. We continue to engage with business owners and those responsible for fire alarm systems at the time of attendance and afterwards through our dedicated fire safety teams.

GMFRS is committed to an ongoing review of its approach to false alarms and will review its policy and continue to consult with key stakeholders. Engaging and educating individuals and businesses is a priority for GMFRS, to help reduce the impact of false alarms on businesses, the community and the Fire Service such as lost time and unnecessary emergency fire engine movements.

Our teams will promote responsibility for system maintenance and best practice in the management and reduction of false alarms. We will support those responsible for premises and fire alarm systems to achieve an appropriate response to alarm activations in businesses and other buildings where they occur.

Built Environment Infrastructure

GMFRS will actively consider all matters pertaining to the built environment that have the potential to impact on the functions of GMFRS including, Greater Manchester Spatial Framework, HS2 and the development of Manchester International Airport (MIA).

Officers from GMFRS are represented in an established HS2 engagement group for involved FRSs, which provides the opportunity for FRS input on emergency services provision and emergency protocols when the line is completed.

GMFRS also have a Manchester Airport Liaison Officer who works with MIA FRS for currently provision and future developments.

Flooding

GMFRS recognises the risk from climate change and flooding that exists both within Greater Manchester and nationally, and we will continue to maintain and further develop our operational capabilities to deal with these types of incidents. GMFRS already have dedicated water incident capabilities at Heywood, and Eccles along with support from Technical Response stations at Ashton and Leigh. This is further enhanced with all of our firefighters being trained in water awareness and being competent in flood rescue techniques. Each fire engine is provided with equipment for the firefighters to deal with incidents such as these. GMFRS also hosts two dedicated High-Volume Pump units at Bolton and Stretford, capable of moving significant amounts of water at flooding incidents which can also be deployed nationally to support wider response to these incidents.

Water Safety

The Manchester Water Safety Partnership, focussing on the city centre, is chaired by an Officer from GMFRS, and we are embedded in the Wigan Water Safety Partnership. Ambitions for the coming year are to create a standard framework, and multi-agency working across all of Greater Manchester for water safety. In June 2020 we re-launched the water safety campaign with the help of families affected by water related deaths and have provided lifesaving equipment in key locations across the county.

GMFRS will continue to work with bar and restaurant owners in high-risk areas of Manchester city centre to help prevent accidents in water from happening.

Appendix 1 - Data Capture and Incident Types

The bulk of the internal information contained within this document is derived from data exported from the Incident Recording System (IRS). IRS is completed following the resolution of each incident by the main officer in charge at that incident. Some of this information is sent to the Home Office for reporting purposes, but all information inputted can be used for internal analysis.

Table 32 provides a breakdown of the different incident types and incident related terms found throughout this document.

Incident	An event that occurs requiring the intervention of a Fire and Rescue Service.
Mobilisation	Each individual resource which is sent to an incident is known as a mobilisation. Unless otherwise specified, in this document number of mobilisations are just counting fire appliances which booked in attendance at incidents (i.e. did not get stood down en-route), but otherwise a mobilisation can also be of a special appliance, such as the Water Incident Unit or Aerial Appliance, or an Officer.
Fire	A reportable fire is 'an event of uncontrolled burning involving flames, heat or smoke which was attended by a fire and rescue authority, or which was a late fire call'
Primary Fire	Includes all fires in buildings, vehicles and most outdoor structures or any fire involving casualties, rescues or fires attended by five or more appliances.
Secondary Fire	An incident that did not occur at a Primary location, was not a chimney fire in an occupied building, did not involve casualties (otherwise categorised as a Primary incident) and was attended by four or fewer appliances (otherwise categorised as a Primary incident). These are reportable fires that: • were not chimney fires and • did not occur at primary locations and • did not involve casualties, rescues or escapes and

	• were attended by four or fewer appliances (an appliance is counted if either the appliance, equipment from it or personnel riding on it, were used to fight the fire)
Chimney fire	Any fires in buildings where the fire was contained within the chimney structure and did not involve casualties, rescues or attendance by five or more appliances
Accidental Fire	Caused by accident or carelessness (not thought to be deliberate). Includes fires, which accidentally get out of control for example, fire in a grate or bonfires. Fires started by children unless there is evidence to suggest otherwise
Deliberate Fire	Where a fire is started deliberately. This can include where the person responsible is the normal occupier of the building or not, or if it cannot be determined who started the fire.
Unknown Fire	Use where there is general uncertainty about the cause or motivation of the fire. 'Not known' should only be used if absolutely necessary.
Dwelling	Include all types of private residences and homes. It covers houses, flats, houses in multiple occupation (HMOs) and self-contained sheltered housing. In this document, 'other residential' has also been included in this category which covers places of communal living and where people receive care, like residential care homes. It also includes short term accommodation residential accommodation like student halls, hostels and hotels, but only where the fire occurred in the individual living area.
Non-residential	includes all types of commercial building as well as private outdoor structures and outhouses.
Outdoor	includes grass, open land and woodland
Special Service Call	Non-fire incidents which require the attendance of an appliance or officer and include: Local emergencies e.g. road traffic incidents, rescue of persons, 'making safe' etc; Major disasters; Domestic incidents e.g. water leaks, persons locked in or out etc;

	Prior arrangements to attend incidents, which may include some provision of advice and inspections. The training of individuals should not be recorded as a special service incident. In addition, some tasks that should not be included are performing dry riser tests, charging cylinders, loaning or testing equipment and interviewing or other fire safety activities.' Where more than one activity is carried out, the incident should be recorded under the most resource intensive part or what was the most appropriate e.g. a railway incident with persons trapped is likely to be recorded under 'railway accident' even though the FRS may be involved in 'first aid', 'other rescue' and possibly 'making safe'.
Fire False Alarm	Where the FRS attends a location believing there to be a fire incident, but on arrival discovers that no such incident exists, or existed. If the appliances are 'Turned around' by Command & Control before arriving at the incident – then the incident is not classed as having been attended and does not need to be reported.
Malicious False Alarms	Are calls made with the intention of getting the FRS to attend a non-existent incident, including deliberate and suspected malicious intentions.
Good Intent False Alarms	Are calls made in good faith in the belief that the FRS really would attend an incident
False Alarm due to Apparatus	Are calls initiated by fire alarm and fire-fighting equipment operating (including accidental initiation of alarm apparatus by persons).
Special Service False Alarm Good Intent	These are calls made in good faith in the belief that the FRS really would attend a special service incident

Table 32: Incident types and incident related terms

Appendix 2 – Glossary

Community Risk Management (CRM) Model	A concept that links the processes GMFRS has in place to identify and respond to risks facing local communities. The model is a proactive approach that supports area-based teams to plan how to direct their resources.
Control of Major Accident Hazards Regulations 1999 (COMAH)	Major accident hazard sites as defined under the COMAH Regulations (COMAH sites) are required to prepare and submit a safety report to the Competent Authority for assessment which should contain certain information as specified by the regulations in order to allow the Competent Authority to assess the overall safety of the site.
Coroner	A Coroner is an independent judicial office holder, appointed by a local council. Coroners usually have a legal background but will also be familiar with medical terminology. Coroners investigate deaths that have been reported to them if it appears that: • the death was violent or unnatural • the cause of death is unknown, or • the person died in prison, police custody, or another type of state detention.
Fire related death (fatality)	Any death that is directly caused by the presence of fire and/or the products of combustion (including chemical suicide following the deliberate ignition of a BBQ, carbon monoxide inhalation, smoke inhalation, burns and injuries sustained escaping from the fire). Or any death where the person died as a result of a condition that was caused by or exacerbated by the presence of fire. Simply put, no fire = no death.
Geographical Information System (GIS)	A system designed to capture, store, manipulate, analyse, manage, and present all types of geographical data.
Greater Manchester	Established in April 2011 and comprising leaders from the ten local authorities in Greater Manchester, the formation of the Greater Manchester Combined Authority gave the GMCA formal power to co-

Combined Authority (GMCA)	ordinate the region's regeneration, economy and transport priorities under the elected Mayor.
Home Fire Risk Assessment	A home visit delivered by the Fire and Rescue Service. The purpose of the visit is to undertake a person-centred fire risk assessment and provide fire safety advice and interventions that are tailored to the needs of the household in order to effectively reduce the risk of fire in the home.
House in Multiple Occupation (HMO)	A property with at least three tenants who are not all members of the same family, forming more than one household, and where tenants share the toilet, bathroom or kitchen facilities.
Incident Recording System (IRS)	The Incident Recording System (IRS) collects detailed information on every incident attended by Fire and Rescue Services. In addition to fire incidents, it contains records of false alarms, and non-fire incidents. The system is maintained by the Home Office and information is entered by FRSs, using information collected by automatic systems and those present at the time of the incident.
Indices of Multiple Deprivation (IMD)	The Indices of Deprivation provide a relative measure of deprivation at small area level across England. Areas are ranked from least deprived to most deprived on seven different dimensions of deprivation and an overall composite measure of multiple deprivation. The domains used in the Indices of Deprivation are income deprivation; employment deprivation; health deprivation and disability; education deprivation; crime deprivation; barriers to housing and services deprivation; and living environment deprivation. Each of these domains has its own scores and ranks, allowing users to focus on specific aspects of deprivation.
Lower Super Output Area (LSOA)	An area of geography containing approximately 700 households. Greater Manchester comprises 1,673 LSOAs.
Middle Layer Super Output Area (MSOA)	An area of geography containing approximately 3,500 households. Greater Manchester comprises 346 MSOAs.

North West Fire Control (NWFC)	North West Fire Control (NWFC) is a joint control centre covering Cumbria, Lancashire, Greater Manchester and Cheshire, which replaced GMFRS separate control centre in May 2014.
Ordnance Survey (OS)	Ordnance Survey is Great Britain's (GB) national mapping agency. It carries out the official surveying of GB, providing the most accurate and up-to-date geographic data, relied on by government, business and individuals.
Regulated premises	Premises that fall within the scope of the Regulatory Reform (Fire Safety) Order 2005. The Order concerns all parts of buildings (and other structures) other than those occupied as single private dwellings.
Response Standards	Response time target to life risk incidents of 10 minutes on at least 80% of occasions, from the time NWFC receives the call to the time the first fire appliance arrives.
Response Time	The duration from the time NWFC receives the call, to the time taken for the first appliance to arrive at the incident.
Risk Modelling	The process of creating a standard representation of risk for imitation or comparison.
Workload Modelling	A process of assessing future what if scenarios such as changing shift patterns, moving a station etc. This utilises historical incident data and risk information to assess the impact of changes on our ability to respond.