



Essex County
Fire & Rescue Service

Strategic Assessment of Risk 2022/23

INTRODUCTION

The Fire and Rescue National Framework sets out priorities, objectives and guidance relating to Fire and Rescue Service's (FRS) functions that the Secretary of State considers appropriate.

The 2018 Framework requires FRS **'to identify and assess the full range of foreseeable fire and rescue related risks their areas face**, whether they are local, cross-border, multi-authority and/or national in nature from fires to terrorist attacks'.

The Framework requires the Service must produce a Community Risk Management Plan (CRMP) which must **'reflect up to date risk analyses including an assessment of all foreseeable fire and rescue related risks that could affect the area of the authority'**.

The purpose of the Strategic Assessment of Risk (SAoR) is to identify potential risks to our communities and the mitigations currently in place to highlight any gaps in capabilities or capacity which need to be addressed in the Community Risk Management Plan (CRMP).

Following the proof-of-concept document produced by the National Fire Chiefs Council (NFCC) Essex County Fire and Rescue Service (ECFRS) are planning to create a similar risk model using the same techniques, which will form the basis for a way to measure units of risk. This will include elements of risks described in this document and will provide a consistent way for the service to measure reduction in risk over time as well as predict risks in the future at an aggregate level.

This will, in future versions, be supported by a working Risk Group to assess and rank the identified risks.

In chronological order the main legislative arms under which a Fire and Rescue Authority and a Service operate are:

- The Health and Safety (H&S) at Work etc. Act (1974) and accompanying H&S regulations
- Reservoirs Act (1975)
- Water Resources Act (1991)
- The Human Rights Act (1998)
- The Fire and Rescue Services Act (2004)
- The Civil Contingencies Act (2004)
- The Regulatory Reform (Fire Safety) Order (2005)
- Emergency Services (Obstruction) Act (2006)
- The Fire & Rescue Services (Emergencies)(England) Order (2007)
- Policing and Crime Act (2017)
- Data Protection Act (2018)
- Fire and Rescue Service Act (2004)

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- Building Safety Bill (Anticipated Autumn 2022)

The key strategy documents the established core objectives for delivery across the remits of People, Prevention, Protection, Response, and Digital and Data.

Prevention and Protection activities seek to reduce risk to the Essex communities and minimise the requirement for emergency response. Response activities ensure that through effective planning, appropriately trained and led Firefighters with the right equipment, in the right place and at the right time are able to respond.

This SAoR provides a wider context on the challenges that the Service faces in Greater Essex using the most up-to-date data available at the time of publication. The SAOR should be used by service personnel in, but not limited to:

- Informing the Strategic Risk Register.
- Gap analysis and the identification of improvements to capabilities.
- Future demands or reduction on the Service.
- The preparation of the Service's CRMP.
- The preparation of operational and procedural documents.
- The business-planning processes.
- Engagement with key partners.

MONITORING OF PERFORMANCE

The Service produces an [Annual Report and Statement of Assurance](#) which outlines the Service's performance against the objectives of the Fire & Rescue Plan.

Identified risks are managed in line with the services Risk Management Strategy and the CRMP outlines solutions to manage the identified risks and plan for future risks.

The activities that are required to enable delivery of the solutions outlined in the CRMP are incorporated within the Service's Annual Plan which is monitored through the continuous improvement board.

COLLABORATIVE WORKING

The UK Central Government's "Concept of Operations" sets out arrangements for responding to, and recovering from, emergencies including the relationship between the central, regional and local tiers within England.

In addition the "National Coordination and Advisory Framework" (NCAF) supports everyday assistance and collaboration between Fire and Rescue Services, including the provision of specialist assistance or additional resources, where an unforeseeable incident demands it because it is likely to overwhelm or is overwhelming a service's own resources.

ECFRS has arrangements with neighbouring FRS to support cross-border cooperation and mutual aid which are formalised via Section 13 and 16 agreements.

The Service has also adopted a nationally agreed incident management framework which provides appropriate command and control arrangements to the most dynamic and challenging of incidents.

The principles of Joint Emergency Services Interoperability Programme (JESIP) provides a platform for a common approach to risk management, information sharing and communication at the scene of the incident with joint training and exercising delivered for all levels of command across the services.

RISK MANAGEMENT

In pursuit of our vision of 'Making Essex a Safer Place to Live, Work and Travel', it is important that the risks faced by the communities of Essex and the challenges associated with these risks are fully understood.

To assist in the identification of the current and future risks facing our communities the Service is developing methodologies to ensure that we have the most up to date and relevant risk information from internal and external sources.

The identification of risk relies heavily on data but this must be supported by evidence in the form of academic research, reports and other resources available to us.

This SAoR supports the corporate planning process and the Community Risk Management Plan which we have a statutory duty to provide. Whilst the SAoR identifies potential risks it is the role of the Community Risk Management plan to determine the actions needed to ensure we are adequately prepared to deal with these risks.

All identified risks are recorded through the Service's risk management software to ensure visibility and provide assurance that risks are being managed effectively in line with the Service's Risk Management Strategy.

How the Service manages risk is set out in the [Risk Management Strategy](#).

The Service uses a range of methods to analyse risk information including, but not limited to, PESTLEO (Political, Economic, Societal, Technological, Legislative and Economic and Organisational analysis).

PESTLEO analysis is strengthened using a Hazard and Risk Model (HARM) which was created in house and the Accidental Dwelling Fire (ADF) dashboard produced in conjunction with the Essex Centre of Data and Analytics.

HARM incorporates incident data from ECFRS, RTC related information from Essex Police/CRASH and open-source data to create a model which shows the areas of Essex that contain comparatively more risk than other areas.

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The organisation uses HARM to inform and develop local level risk plans which will drive activity to ensure we target our resources to high-risk areas.

The Essex Centre of Data and Analytics Accidental Dwelling Fire Model is used by ECFRS to target areas known to be vulnerable to ADF based on Mosaic, IMD, ECFRS Incident Data and social care information.

When analysing external risk factors the Service considers: -

- What the world around us looks like.
- What drivers and trends are important
- Expectations of our external stakeholders
- How we engage with partners

The accuracy of identified risks relies heavily on the use of information gathered from a range of sources. The type of sources we use are outlined in the table below.

Internal Sources	External Sources
<ul style="list-style-type: none">• Historic results from KPIs (Key Performance Indicators)• Audit Outcomes• Quality Assurance Outcomes• Lessons Learned and Deep Dives• Compliments and Complaints from within the organisation.• Peer review• Business Continuity Exercising	<ul style="list-style-type: none">• Professional Bodies• External Consultants• International Organisations such as the World Health Organisation and The World Economic Forum,• Government agencies and associated guidance• Relevant Legislation and Regulations• Risk Events from similar organisations for example Grenfell, Manchester Bombings• Case Reviews

Table 1: Sources of Risk Information

ECFRS manages risk as part of a continuum of risk management which considers the work conducted at national and local level through the National Security Risk Assessment, the Essex Resilience Forum (ERF) Community Risk Register (CRR) and finally through to organisational risk registers.

THE NATIONAL SECURITY RISK ASSESSMENT

The Government published its National Security & Risk Assessment (NSRA) in 2019. This is an Official – Sensitive document with limited access. The NSRA is of vital operational importance as it focuses contingency planning requirements and provides a national context for risk management decision making. The NSRA includes 131 malicious and non-malicious risks, reflecting the current national risk profile, risks fall into ten risk categories. The ERF will amend the CRR to reflect any changes to risk data and numbering system in the NSRA due to EU Exit and Covid-19 pressures this is likely to be completed 2022/23.

ESSEX RESILIENCE FORUM

The Essex Resilience Forum (ERF) is a multi-agency group of Category 1 & 2 responders that oversees the resilience of Essex should a significant event (natural hazard, industrial accident or threat) occur. Currently the Chief Constable is the Chair of the Executive Programme Board of the ERF.

The Planning Assurance Group (PAG) sits directly under the Programme Board dealing with capability and capacity and provides the plans and exercises required to ensure Essex responds appropriately to a significant event.

The Risk Intelligence Group (RIG) compiles the Community Risk Register (CRR), which localises national risks from the national risk assessment guidance to Essex. The high and very high risks in the CRR are highlighted within the report.

The overarching plan for the ERF is the Combined Operating Procedures for Essex ([COPE](#)), which provides a multi-agency response and recovery framework.

OUR SERVICE

ECFRS covers the county of Greater Essex, which includes Essex County Council and the two unitary authorities of Southend and Thurrock.

Greater Essex currently has an estimated population of Over 1.8 Million.

Essex has a large commuting population both in and out of the county particularly with the areas which border Greater London.

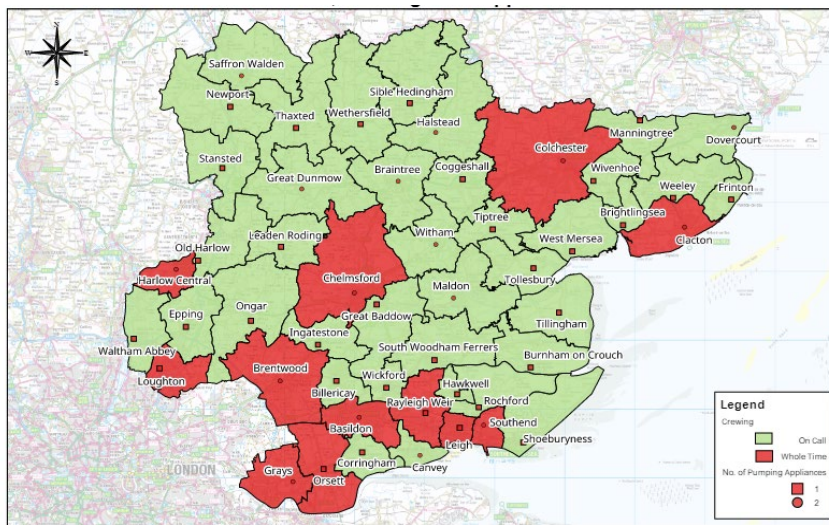


Figure 2: ECFRS Stations and Crewing

RESOURCING

Recruitment and retention of firefighters in the On-Call duty system continues to prove challenging for the Service. The key challenges in recruiting and retaining On-Call Fire Fighters are

1. The level of commitment requirement
2. Earning potential

On-Call availability is a key contributory factor in the Service not currently meeting its response standards.

In addition, the Working Time Directive, a European legal ruling on stand-by duty has opened the potential of a legal challenge from employees providing On Call cover. This could impact our On Call, Flexi-Duty Officers, and most significantly and the Day-crewed model if not carefully monitored and managed.

Strategic workforce planning means that we are aware of the need to develop more leaders of the future to support the Service in addressing a potential skills gap, in addition the Operational Resourcing Board provides strategic overview and leadership to ensure the Service's operational resources are appropriately deployed.

To provide assurance of the competence of our firefighters we have invested in operational training and competency recording. Aside from day-to-day watch-based training the service has specific assurance requirements for Core Skills, Incident Command, Driving and Breathing Apparatus.

The service is currently investing in the development of specialist training facilities.

CULTURE

We are committed to having a positive and kind culture to encourage a modern, forward-looking and innovative environment where we work together to anticipate and deliver the changing needs of our communities.

The Service has a Continued Cultural Improvement Plan which sits alongside the Service's People Strategy.

Over the last few years have increased our focus on creating a culture where we value health and wellbeing, this has included improved resources, flexible working and better support through improved leadership for our employees.

Investing in wellbeing helps us to provide value to our communities through better performance and increased productivity.

INCLUSION, DIVERSITY AND EQUALITY

Essex County Fire and Rescue aims to be an inclusive employer that attracts and retains a diverse workforce which represents the people of Essex.

The diversity of our people really does add value. With access to a greater range of experience and knowledge within our Service we can be more considerate of factors that impact people differently, improve our understanding of community risk and identify solutions that make a positive difference for our communities and our people.

Our people create our Service, we welcome and encourage openness about individual knowledge and experience of Faith, Culture, Language, being LGBTQ+, living with a disability or long-term health condition, or caring for someone that does.

We recognise the strengths of neurodivergent thinking, including dyslexia, dyspraxia, dyscalculia, ADHD, Autism and other neuro differences. We know that the creativity and experience that exists within our people is vital for innovation and continued improvement.

The positive action we have taken to improve the diversity of our workforce:

- Drop-in sessions at our On Call Stations allowing any members of the community to find out more about what we do, these are promoted within the local community.
- Community engagement to attract applicants that may not have considered our Service as an employer.
- Targeted advertising.
- 'Meet our Firefighters' sessions to provide an opportunity for questions to be directed to the people behind the uniform.
- We have created a dedicated Facebook page to support applicants with live Q&A sessions.
- Introduced buddies to be a point of contact throughout the recruitment process.
- Trained Firefighters to be interview assessors to improve the diversity of our panels.
- Myth busting videos.
- Attended Pride events.
- Engaged with Colleges that provide Public Service courses.

As part of our commitment to be an inclusive employer, to attract, retain, develop and progress talent, we have achieved the following:

- Inclusive Employers Standard Bronze Accreditation
- Introduced Texthelp Read and Write software to support people with dyslexia

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- Disability Confident Employer
- Introduced Individual Needs Plans to support reasonable adjustments
- Signed the BITC Race at Work Charter
- Corporate Members of Inclusive Employers
- Corporate Members of Business Disability Forum
- Established a range of Employee Forums
- Empowered our Employee Forums to create learning events
- Trained Mental Health First Aiders
- Trained Dignity at Work Supporters
- Dignity in our Workplace training provided for all employees
- Trained our Managers in Inclusive Leadership
- Flexible and agile working options
- Use of People Impact Assessments to identify opportunities for improvement and minimise risk of discrimination

EE Group	Gender % that are Female ¹	Majority Age Band	% LGBTQ+ ¹	% Ethnic Minority ¹	% Disability
Wholetime	7.2%	46-55	6.2%↑	4.5%↑	4.1%
On-Call	3.4%↑	25-35	3.8%↑	1.6%↓	4.0%↑
Control	85.0%	36-45	2.9%↓	2.7%	2.5%
Support	50.9%↓	56-65	5.4%↑	2.9%	5.9%
Overall	17.5%↓	36-45	5.2%↑	3.1%	4.4%↑

Figure 3: April 2022 Employment Rates

- Number of female employees has decreased slightly compared to the number of male employees.
- The average age of the workforce has decreased, this is due to a decrease in age across the support category and increase in age for the Control Category.
- There was no change to age of Whole-Time and On-Call.
- Slight increase in the number of employees who identify as LGBTQ+
- An increase in declared Disability - 3.9% in 2020 increased to 4.4% in 2022.

OUR SERVICE RISK SUMMARY

- Whilst incidents have been reducing, the Service has not been meeting its response standards.
- Proportionately, Special Service calls are increasing, leading to a more diverse types of operational incidents to plan for.
- Increase funding pressure on the Service leading to the Service needing to identify efficiencies in future years.
- On Call recruitment and retention challenges.

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- Contract challenges which could impact upon On-Call, Day-crewed and flexi-duty contracts.
- Succession planning over the coming years will be challenging with a lot of experience leaving the Service.
- Changes to pension schemes and tax liability attached to pension may discourage individuals from seeking promotion and lead to a higher turnover of staff than previously experienced.

OUR SERVICE RISK MITIGATION

- Service quarterly performance report
- The Services Medium Term Financial Plan and Reserves strategy
- People Strategy – Fair, kind, and inclusive workplace and Equality Objectives
- Dignity at work policy
- People Strategy – Wellbeing, safety, and health
- People Strategy – Resourcing
- People Strategy – Leadership and Development
- People Strategy – Training
- The Culture Change Strategy
- Operational Training Strategy
- On-Call development Programme
- People strategy action plan
- Service Business Continuity Plans

INCIDENTS

ECFRS responds to a range of incidents each year, these are classified into three broad categories which can be further broken down to provide detailed incident analysis. The percentage breakdown for each of the three response areas are:

- False Alarm 41.85%
- Fire 24.28%
- Special Service 33.86%

Figure 2 shows the Services Key Performance Indicators, assessing our target against what was achieved during the past 12 months.

Activity 2021/22	Target KPI	Actual KPI
Appliance Availability	85%	77%
Attendance within 15 Minutes	90%	85%
Prevention Visits Completed on Time	95%	85%
Protection Inspections	5844	1152

Figure 4: Key Performance Indicators 2021/22

Information Requests 2021/22	Total
Freedom of Information	130
Subject Access	12
Environmental Information	409

Figure 5: Information Requests 2021/22

DWELLING FIRE

The Essex County Council Strategy, Insight and Engagement Team have recently built on work previously conducted by Essex University into Accidental Dwelling Fires. The research combined data from the following sources:

- Essex County Fire and Rescue Service
- Mosaic
- Indices of Deprivation
- Fuel Poverty

Essex County Council Social Care Database

The study concludes:

The highest areas of Accidental Dwelling Fires occur in deprived urban settings. In Essex these are Southend, Basildon, Tending, Colchester, Thurrock and Chelmsford respectively.

The research identified four cluster types:

Clusters:	1	2	3	4
Number of wards in cluster	7	37	83	142
Number of ADFs since 2017	366	1032	1265	872
Proportion of all ADFs	10%	29%	35%	24%
Proportion of all Essex wards	2.5%	13.4%	30.1%	51.4%
Average number of ADFs by ward	52.3	27.9	15.2	6.1
Average IMD decile	2.43	3.94	5.76	6.75
% of ADFs in buildings known to social care	42%	34%	36%	39%

Figure 6: Cluster Groups (Essex County Council Strategy, Insight and Engagement Team)

Four of the seven areas identified in Cluster One (Deprived urban centres with significant challenges) are in Basildon, with Southend, Colchester and Castle Point each having one area in cluster one.

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These areas in cluster one accounted for 10.4 percent of all Accidental Dwelling Fires since 2017. 42 percent of the ADFs occurred in buildings known to Social Care but account for only 2.5 percent of the wards in Essex.

Cluster Two (Deprived town centres and outskirts) account for 37 of the total wards, with the highest number concentrated across Thurrock, Tendring, Southend, Colchester and Basildon.

Cluster Two accounted for 29.1 percent of ADFs since 2017, 34 Percent occurred in buildings known to Social Care but account for only 13.4 percent of the wards in Essex.

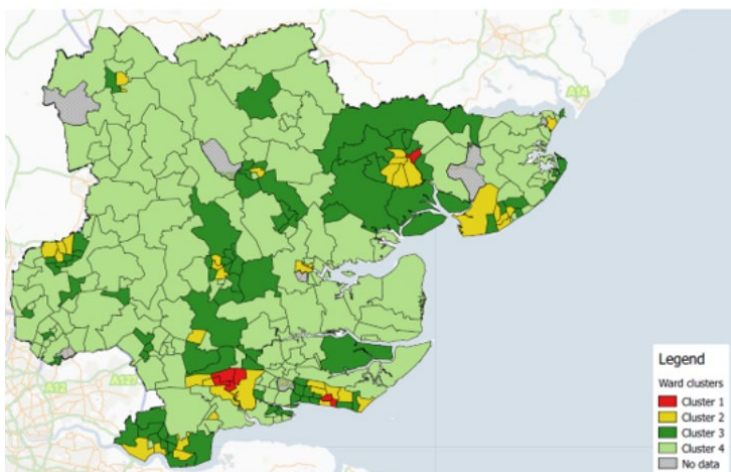


Figure 7: Ward Cluster for Greater Essex (Essex County Council Strategy, Insight and Engagement Team)

The report identified three common at risk household types across all four clusters:

- Couples with dependent children
- Lone person over pensionable age
- Lone person under pensionable age

The most common ignition sources were identified as starting in the kitchen:

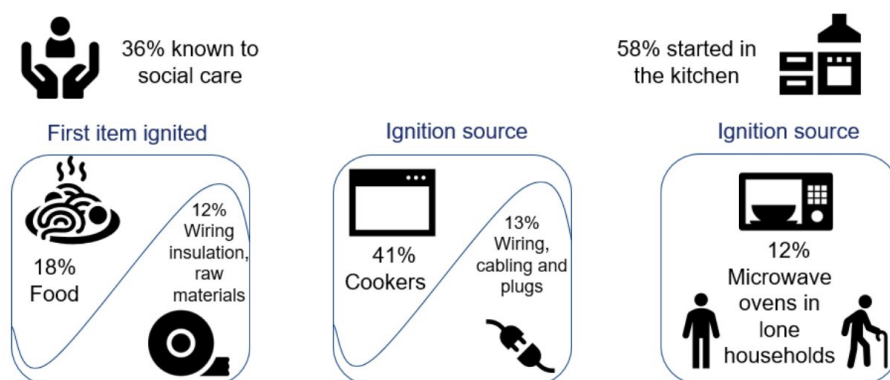


Figure 8: Dwelling Fire Statistics (Essex County Council Strategy, Insight and Engagement Team)

In addition, the research identified that those at highest risk of injury from accidental dwelling fires were those under the influence of substances, likely due to reduced perception of the fire taking hold in the first place and reduced capacity to react in the correct way.

Broad categories of Fire, Special Service Calls (SSCs), and False Alarms.

FATAL FIRE FINDINGS 2020-2021

Following each Fatal Fire, an after-incident investigation was completed identifying the causes and context for each incident. In January 2022, these investigations were considered as part of a wider learning paper that included the following findings:

- 10 of the 11 properties involved in fatal fires in 2021 were privately owned.
- The majority of people who died in fires during 2021 (72%) were living with challenges to their safety in more than one of the following areas, physical health and wellbeing, mental health and wellbeing, home environment.
- In four of the incidents hoarding was a factor.
- In two of the incidents, the individual who died was the recipient of a formal care package.
- In 8 of the 11 cases, the individual who died was living on their own.
- All of the individuals who died were over the age of 50, and 10 of the 11 were over the age of 65.

- None of the fatal fires occurred in wards, classified as highest risk of fire, using ECFRS Essex Centre of Data Analytics (ECDA).

The paper has been turned into a presentation that can be shared with partner agencies to improve their understanding of fire safety.

ROAD TRAFFIC COLLISIONS (RTC)

Young drivers are at five times greater risk of being the primary contributor to a road traffic collision than drivers of other ages.

Those aged 16-30 account for a relatively large proportion of casualties compared to other groups of drivers, despite improved rates in younger drivers over the last 15 years, those aged 17-20, remain the most at risk group particularly males in those age groups.

Below outlines the following reasons as to why younger drivers are more at risk:

Brain Development

Young people underestimate certain high-risk behaviours. For example research has shown that young drivers are less likely than older drivers to rate speeding as high-risk.

Over-Confidence

Young drivers who show overconfidence in self-assessment of their skills are more likely to crash in their first two years of driving than those who are insecure about their driving skills.

Poor Assessment of Hazards

Young drivers show poorer attention, visual awareness, hazard recognition and avoidance and are less able to judge appropriate speed for circumstances.

Key Risk Factors include:

Carrying passengers

Newly qualified drivers with a car full of passengers of similar age are four times more likely to be in a fatal crash compared with when driving alone. However, when carrying older adult passengers, young drivers are less likely to crash indicating it is peer pressure rather than simply the presence of passengers that raises the risk.

Driving with peers can also impact the wearing of seatbelts leading to higher risk or serious injury in the event of a collision.

Speeding

The younger the driver the more likely they are to be involved in a crash caused by speed, particularly with young men, who are much more likely to be involved in a fatal crash caused by speeding than young female drivers. This is especially the case with night driving with a tendency to view quieter roads are easier to drive on when they require higher levels of care and attention.

Mobile Phones

The RAC has found that around half of young people (aged 17-24) admit to using their mobile phone behind the wheel, the highest proportion of all age categories.

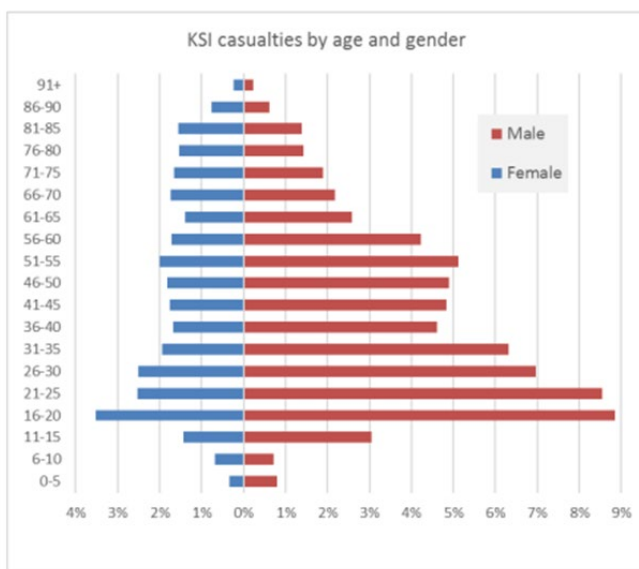


Figure 9: Killed or Seriously Injured by Age and Gender

The age tree above shows an increase in casualty numbers at age 11 when children first travel unaccompanied to school, but a much larger increase in the 16–25 year old age group when people start travelling in cars and on P2Ws, driven either by themselves or their peers. The number of casualties is much higher for males than it is for females.

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According to the national travel survey males account for:

- 54% of all miles travelled by private transport
- 79% of miles cycled
- 94% of miles by powered two wheelers
- 61% of miles by car or van as the driver and 39% by car or van as passenger
- 50% of miles walked

Males have higher exposure than females and higher mode-vulnerability (Bicycles and Powered Two Wheelers).

Males account for 61% of miles driven but 70% of contributory factors in killed or seriously injured collisions.

Older drivers (26 plus) are among the lowest risk age group but their risk level has changed by very little in recent years.

Furthermore, those older drivers who are involved in a collision have the highest proportion of contributory factors.

Drivers aged 70+ are relatively safe in comparison, but those who do have a collision are highly likely to have a contributory factor attributed to them. Cognitive and sensory impairments and misjudgement of traffic are the most characteristic factors for the over 70s.

With Contributory Factor	Under 16	16-25	26-69	70 Plus
Car		14%	35.5%	8.0%
P2W		6.1%	9.9%	0.2%
Cycle	1.5%	0.8%	2.9%	0.2%
Pedestrian	3.3%	1.6%	4.8%	1.7%
Heavy Commercial			7.18%	

Figure 10: Contributory Factors

There is a combination of factors that determine risk of being a casualty.

This includes:

- Exposure: amount of time spent on the road and exposed to traffic.
- Mode vulnerability: how likely a given mode of transport is to be involved in a collision, and how much protection the vehicle offers in the event of a crash.

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- Physical vulnerability: differences in age and underlying health can result in more severe injury outcomes for those more physically prone to injury.
- Behaviour: risk taking behaviour increases the likelihood of being involved in a collision.
- Experience: more experienced road users are generally better able to avoid situations where collisions are most likely, anticipating risk, giving them more time to take countermeasures.

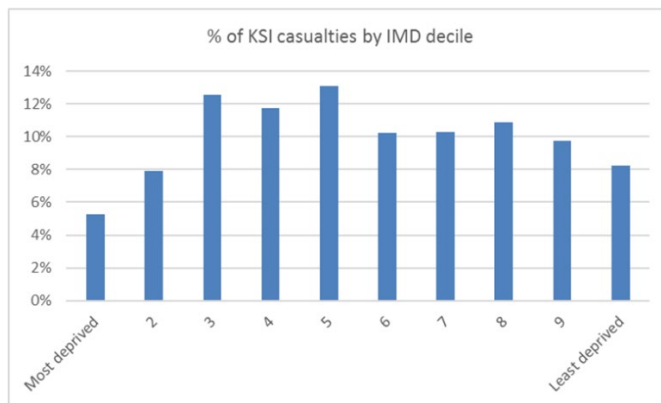


Figure: 11 Distribution of KSI casualties by IMD deprivation decile for collisions in Essex.

Havering and Redbridge are the only non-Essex local authority areas home to more than 1% of Essex casualties.

As Essex is a fairly affluent county, the most deprived deciles are under-represented for the Essex population, although the county is home to the most deprived area in England – Golf Green in Tendring, covering the area of Jaywick Sands.

The table above shows deciles 3-5 are the largest in terms of casualty numbers. These areas have moderate to higher deprivation and casualty reduction initiatives must therefore include people living in these types of area.

WATER RESCUE

Essex has one of the longest coastlines in England with 350 miles, much of this is made up of shallow creeks, estuaries, mudflats and salt marshes.

In parts of Essex there is a high risk from deep mud and rapidly advancing tides which can be a danger to those unfamiliar with the area. This is particularly important when recognising that Essex attracts many tourists to the seaside for day trips, holidays and water-based activities particularly around the coastal towns of Southend, Clacton, Frinton and Walton.

Essex also has several rivers and canals which are frequently used for leisure activities as well as a number of active ports and docks.

Rescue of Animals from Water or Mud	Total: 19
Flooding Incident	Total: 617
Non-Flooding Incidents	Total: 27
Other Water Based Incidents	Total:10
Grand Total	Combined:674

Figure 12: Water Rescue 2021

On average, around 400 people drown in the UK every year and a further 200 people take their own lives on the water. This does not include those that suffer serious injury or get into difficulty and escape unharmed.

Many of these deaths are preventable and more can be done through collaborative work to reduce drowning and improve water safety.

However, whilst there was a total of 674 incidents in Essex during 2021, a high portion of these were in relation to flooding, ECFRS works with the Essex Resilience Forum to plan for prevention of flooding within Essex.

To prevent water incidents Essex County Fire and Rescue Service works to develop and deliver public-facing interventions and programmes within schools that aim to increase safety in and around water.

Essex County Fire and Rescue works closely with the RNLI and established district-level water safety forums, that have a diverse representation of stakeholders, to ensure our collective activities target high-risk areas.

In addition a diverse group of organisations, including the National Fire Chiefs Council, established the National Water Safety Forum (NWSF) in 2004 to work together in reducing water related deaths and associated harm. The NWSF developed and published the UK Drowning Prevention Strategy (2016 – 2026) that

set out to reduce drowning fatalities by 2026 and reduce risk amongst the highest risk populations, groups, and communities. ECFRS has aligned with this strategy under the pillar 'Be Water Safe'.

INCIDENTS RISK SUMMARY

- RTCs in Essex have been steadily falling over the last 5 years and, as the Safer Essex Roads partnership embarks on its safe system approach to achieve Vision Zero, some of the more traditional approaches to road safety may be adapted to support the person-centred approach.
- The number of Deaths and Serious injury (DSI) are still unacceptable and the Service remains committed to preventing harm on Essex roads as people travel through the County.
- With reference to 'Road' it is the highest transportation risk for the Service with powered 2 wheelers remaining the highest risk KSI group in Essex.
- Young car drivers between 17 and 25 years continue to be a high-risk group in Essex. There are also considerable freight movements along Essex major link roads due to its ports and airports.
- Dwelling fires present a higher risk to couples with dependent children and those living alone.
- Risk of injury in dwelling fires is highest amongst those who have taken a substance.
- Most dwelling fires still start in the kitchen.
- The risk of fire being fatal appears to be greatest in those aged over 65 or who are known to social care. As the majority of the fatal fires were not in our high-risk areas a review of the methodology of high-risk areas is required.

INCIDENTS RISK MITIGATION

- Attendance at Community Safety Partnerships
- Contribute and lead on elements of the Community Safety Partnership's Strategic Plan.
- Attendance at Local Strategic Partnerships
- Prevention Strategy – Live Safe
- Prevention Strategy – Safeguarding
- Protection Strategy – Consultation and Licensing Arrangements
- Development of the HARM model and targeting resources based on this.
- Development of the ECDA AFD Model and targeting resources based on this.
- Operational delivery by the Operational Community Risk team.
- Partnership research into accidental dwelling fire causation and victimology.
- Completion of 7(2)d visits and collation of operational risk information.
- Partnership volunteering work

- Attendance at Southend, Essex and Thurrock Domestic Abuse Board (SETDAB)
- Attendance at Safeguarding Boards
- Attendance at Safer Essex meetings
- Attendance at Prevent and Channel Boards.
- Attendance and lead on elements for partnership Tactical Co-ordinating Group (TCG)
- Attendance and lead on elements for partnership Strategic Co-ordinating Group (SCG)

POPULATION AND DEMOGRAPHICS

Greater Essex has an estimated population of 1.8 million people (mid-2019), 3.3% of the population of England, an increase of 6.8% (117.5k) since the 2011 census (1.72 million people).

ONS projections suggest Greater Essex could grow by 298,700 people between 2016 and 2036.

This growth is distributed unevenly across Greater Essex with the greatest increases currently projected in Thurrock, Colchester and Basildon. Maldon and Castlepoint are forecast to see the lowest growth in population.

AGE

The average median age for the population of Greater Essex is 43, which is higher than the East of England region (41.7) and England average (40).

51% of the Essex population is female whilst 49% are male, this is just above the average for females in England (50.6%).

When comparing ages to gender when slit into 5 years, most notably there are more males in the ranges up to 29, whilst there are more females aged for all the ranges past 65.

Projections for age proportions up to 2043 suggest higher proportions in +65 age group meaning Greater Essex will have an ageing population.

Population estimates indicate that 19.9% of Greater Essex's population are estimated to be over 65 and 2.7% are over 85. This is projected to increase to 24% aged 65 and over, and 4.44% over 85 by 2035.

Essex's old age dependency ratio (OADR), 327.7, is higher than the England average (286.6), equating to 3 work age people to every person over 65. The OADR is expected to rise to over 400 by 2040 in greater Essex.

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With increasing age higher proportions of people are living alone, especially women. Lesbian, gay, bisexual, and transgender (LGBT) elderly people are less likely to be married, less likely to have children, and are more likely to live alone.

According to the Institute of Public Care the total population aged 65 and over that is predicted to live alone in 2020 in Greater Essex is 436,930 and expected to increase to 596,392 by 2035.

District / Unitary Authority	Area (sq. km)	People per sq. km	Projected Population 2025	Projected Population 2040	Median Age	OADR 2019	OADR predicted 2040
Basildon	110	1702	192,537	204,014	39.3	279.3	325.5
Braintree	612	249	154,464	160,561	43.6	337.2	468.7
Brentwood	153	503	76,282	78,002	43.3	334.4	400.1
Castle Point	45	2023	91,654	95,041	46.9	440.9	512.2
Chelmsford	339	527	186,966	201,404	41.6	312.0	379.5
Colchester	328	593	206,470	225,086	37.8	270.0	322.4
Epping Forest	339	388	134,898	141,036	42.7	321.6	425.2
Harlow	31	2851	88,958	92,217	37.5	248.7	308.3
Maldon	358	181	67,489	72,756	49.2	434.4	592.8
Rochford	167	522	91,069	97,958	46.2	389.8	478.9
Southend-on-Sea	42	4394	190,424	203,587	41.8	319.2	409.6
Tendring	336	436	155,297	172,352	50.8	554.9	696.1
Thurrock	164	1064	185,247	202,327	36.9	219.5	265.8
Uttlesford	641	142	96,781	106,972	43.9	324.7	460.0

Figure 13: Population predictions (Office National Statistics)

HOUSEHOLD COMPOSITION

Households can consist of a single family, more than one family, or a group of unrelated people.

It is estimated that Greater Essex had 763,287 households in 2019 and is expected to contain around 896k by 2043, an increase of over 17%.

- Over 82% of the current housing stock in Greater Essex is single family homes.
- Home Ownership 73 %
- Renting 14%
- Social Housing (11%)

ETHNICITY

93% of the resident population of Greater Essex that responded to the 2011 Census self-identified as white and 6% self-identified as Black, Asian or Mixed/Multiple Ethnic (as asked in the last census 2011). ONS currently does not produce modelled population estimates by ethnic group at local authority level for the years between censuses; caution is advertised when generalising to the current population.

'London and Greater Essex are increasingly interconnected, with people frequently migrating between them. From 2002 to 2014, twice as many people moved from London to Greater Essex as moved from Greater Essex to London, resulting in a net increase in Greater Essex's population of 181,620 during this period.'

Continuation of and growth is generally likely to increase within Greater Essex.

Deprivation in Essex

According to the English Indices of Deprivation (2019), Greater Essex compares favourably with other areas.

Overall Essex has lower levels of deprivation than 70% of upper tier authority areas. However, when compared to the rest of the South East, greater Essex has higher levels of deprivation 20%, only Kent and East Sussex are higher.

The percentage of Essex residents living in the most deprived 20% of areas is amongst the highest in the South East – behind only Kent and East Sussex.

Deprivation in Essex comes from the following sources predominately, barriers to housing and local services, health outcomes, and levels of crime.

Castle Point Borough and Tendring District have seen sustained increases in deprivation with Tendring District, in particular, is falling further behind the rest of the county.

The Essex IMD REPORT 2019 suggests that Greater Essex has a high area of deprivation at the neighbourhood level with 75 of neighbourhoods (LSOAs) are among the 20% most deprived nationally. They are home to over 120,000 Essex residents, a figure which has doubled since 2007.

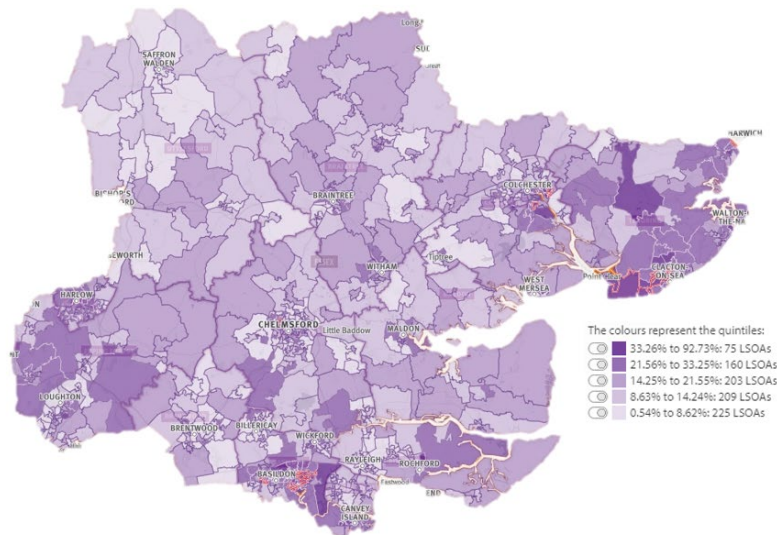


Figure 14: Deprivation Map (Essex IMD 2019 Report)

COMMUNITY HEALTH AND WELLBEING

The Marmot Report 2020 States 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 Northeast 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.

Within Greater Essex:

Basildon, Chelmsford, Colchester, Southend-on-Sea and Thurrock currently have the highest numbers of those with a personal care and/or mobility disability in the under 65 age brackets.

Tendring, Southend-on-Sea and Chelmsford had the highest number of over 65's who required help with Activities of Daily Living (ADLs) which relate to personal care

and mobility around the home that are basic to daily living in 2020. The lowest rates were recorded in Harlow.

There are similar patterns for those aged 65 and over who needed help during 2020 with at least one domestic task, otherwise known as Instrumental Activities of Daily Living (IADLs) not fundamental to functioning but are important aspects of living independently are used to measure functional status and health.

It was estimated that 217,000 people required IADLs, over double that of the ADL's.

Projections to 2025 suggest those aged 65 and over who will require help with both ADLs and IDALs will be highest in Tendring and Southend-on-Sea.

Colchester, Braintree, Chelmsford and Basildon will also have high numbers of people falling into both groups of people, these areas are likely to be at similar levels to Tendring by 2030, with Epping Forest experiencing a slower but notable increase up to 2035.

LIMITING LONG-TERM CONDITIONS AND MULTI-MORBIDITY

Long term conditions or chronic diseases are conditions for which there is currently no cure (limiting an individual's daily activities) and are managed with drugs and other treatment.

An estimated 5.1 million people aged 65 and over in England have a limiting long-standing illness and this is expected to increase to 7 million people by 2035.

Multi-morbidity is when a person has two or more long term conditions or diseases at the same time.

Research to date indicates that such conditions are more prevalent in older people and among deprived populations, especially those experiencing the effects of poor mental health.

Tendring has the highest estimated number of people in Essex over 65 who are 'limited a lot', projections suggest this will reach over 15,500 by 2035, 4,000 more than any other district.

In addition, it is predicted that by 2035 the number of people experiencing mental health conditions will increase in most districts and unitary authorities.

Projections indicate that there will be a significant increase in dementia by 2035, specific data gather by ECFRS in December 2021 noted that.

- 15,109 people are recorded as having a dementia diagnosis.

- It is estimated that 24,420 people in the area have dementia.

FRAILITY

Frailty refers to a person’s mental and physical resilience or their ability to recover from events like illnesses or injury.

Evidence indicates that the proportion of people living with frailty increases with age, this impacts approximately 10% of people aged 65 and over, rising to between 25% and 50% for those aged over 85.

SENSORY LOSS

Hearing loss is a major public issue in the UK, it is estimated that one in six people are deaf or have some level of hearing loss, rising to 14.2 million people by 2035.

It was estimated that in 2020, 382,750 people aged 18 and over within Greater Essex had a hearing impairment, nearly 10% of this number experienced severe hearing loss.

In line with national predictions all districts/unitary authorities are expected to see a rise in those with hearing loss over the next 15 years.

Hearing loss is a major public issue in the UK, it is estimated that one in six people is deaf or has some level of hearing loss and by 2035 there will be around 14.2 million people with hearing loss (currently 12 million people). In 2020 it is estimated that 382,750 people aged 18 and over within Greater Essex have a hearing impairment, nearly 10% of which have severe hearing loss³⁸. In line with national predictions all districts/unitary authorities are expected to see a rise over the next 15 years.

In the UK there are almost 2 million people living with sight loss, of which 360,000 are registered as blind or partially sighted. Like hearing, sight loss is closely linked to ageing and, as the number of older people is set to increase, so will the number of blind and partially sighted people. In 2020, 45,155 people in Greater Essex are predicted to have a visual impairment, 98.4% predicted to be people aged 65 and over.

Tendering, Southend-On-Sea and Chelmsford areas have the higher amounts within Essex.

Locality	Sight loss and percentage of which are 65 or over	Moderate severely and profoundly hearing impaired and percentage of which are 65 or over	Dual sensory loss	Severe dual sensory loss in the estimated numbers (2021)

Essex	53,700	82%	175,840	79%	10,300	39%
Southend	6,450	81%	20,760	78%	1,250	39%
Thurrock	4,340	73%	14,590	70%	860	37%
Total	64,490	80%	211,190	78%	12,410	33%

Figure 15: Sight Loss

SUBSTANCE ABUSE

Estimates suggest over 36,000 people aged between 18 - 64 in Greater Essex are dependent on drugs:

This is projected to increase by over 2,000 by 2035.

The data indicates that a high portion of these are in the 18-34 age range, with particularly high rates amongst the 18 – 24-year-olds residing in Colchester.

This is particularly significant when considered in the context of accidental dwelling fires and the increased risk of injury associated with intoxication through alcohol or drugs.

INFECTIOUS DISEASES

The risk posed by infectious diseases on the human population and the associated impact on the Service is rated high. As such the Service maintains an Infectious Diseases Plan to ensure appropriate preparation and mitigation measures are considered in relation to emerging information. These diseases will have a high impact on staffing as well as the need to limit or enhance control measures with Service public interactions. The Service's planning for infectious diseases has triggers in relation to the data indicators used by the UK Health Security Agency. The impact of the countermeasures in any given pandemic is difficult to predict as it will depend on the nature of the virus.

Included within this category are –

- COVID-19 - the emergence of the coronavirus COVID-19 happened in late 2019. Following the initial response phase the Infectious Diseases Plan was updated in relation to new ways of working. An additional COVID-19 specific Business Continuity Plan was approved in August 2021 incorporating the specifics known in relation to coronavirus.
- Other Influenza type infections - Planning assumptions for this suggest up to 50% of the population may experience symptoms with a fatality rate of up to 2.5%.
- Emerging Infectious Diseases - Over the past 30 years, more than 30 new or newly recognised diseases have been identified. Most of these have been zoonoses, i.e., diseases that are naturally transmissible directly or indirectly from animals to humans. An emerging or re-emerging infection would

not necessarily be spread by the respiratory route (as are influenza and SARS/MERS) but could instead be transmitted directly between people through the gastro-intestinal (e.g., E. coli) or blood routes (e.g., Ebola), or indirectly via vectors such as insects (Zika virus).

Based upon the experience of the outbreak of COVID-19 the worst-case impact of such an outbreak originating outside the UK could lead to national, regional and/or local lockdowns with significant pressures on Health and other key sector workers over a prolonged period of months or years.

- Non-Zoonotic Notifiable Animal Diseases - Disease introduced by infected animals. Assessment based on the need to cull and dispose up to 4 million animals with up to 900 infected premises across UK. Will lead to strong controls on the movement of stock and impacts upon food chain industry. Loss of disease-free status resulting in EU and third country import bans on livestock and livestock products from susceptible animals.
- Of the zoonotic notifiable animal diseases Avian Influenza is the most significant. The major outbreak scenario is of much greater scale than that experienced in any of the recent outbreaks of avian influenza in the UK, where the disease has been contained and limited to one or two infected premises plus associated contact premises.

COMMUNITY HEALTH AND WELL BEING RISK SUMMARY

- Tendring and Southend-On-Sea will have the largest number of people aged 65 and over who will need help with ADLs (Activities of Daily Living) and IADLs (Instrumental Activities of Daily Living) by 2025, they are also the highest for mobility issues, with Uttlesford due to have the biggest increase in the coming years.
- When considering long term conditions or chronic diseases, Tendring has the highest estimated number of people in Essex over 65 and 'limited a lot' (projections 15.5K by 2035), over 4K more than any other district.
- Proportion of people living with frailty rises with increasing age considered in the context of an aging population.
- Hearing loss, visual impairment, dementia suffers, mental health conditions and substance misuse are all expected to increase in the coming years.
- The long-term impact from COVID-19 is still unknown with additional phases expected in winter months.
- Aside from COVID-19, having to manage an influenza type disease (pandemic) is rated as a very high risk by the ERF CRR
- Impacts from a pandemic planning escalation point are loss of up to 20% of and worse case assume the loss of up to 50% of staff, this includes illness, the need to self-isolate and caring responsibilities.
- Learning from COVID-19 suggest other partners (Health in particular) will be put under extreme pressure with requests for support forthcoming.

- The ERF highlights the risk from Animal disease as damage to the agricultural economy, mass cull/disposal of animal carcasses, loss of livelihood for farm owners/workers and health risk to farm workers. It could also lead to the Service needing extra controls in place to protect staff and stop the spread of any disease when attending incidents.

HEALTH CURRENT RISK MITIGATION

- ECFRS involvement in the ERF
- Infectious Disease Plan
- Business Continuity Planning
- Prevention Strategy – Live safe
- Attendance at Community Safety Partnerships
- Attendance at Local Strategic Partnerships
- Prevention Strategy – Safeguarding
- Attendance at SETDAB
- Attendance at Safeguarding Boards
- Partnership health meetings.
- Systemic volunteer work with partners.
- Attendance at Safer Essex meetings

ADDITIONAL CONTROL MEASURES FOR CONSIDERATION

Additional work to be carried out on the impact on COVID-19 on the Service

Research into rising obesity levels and the impact this may have on our communities in an incident.

THE BUILT ENVIRONMENT

According to Ernst and Young the East of England will be one of the three fastest growing regions in England, with the main driver being increased levels of activity in the ICT and service sectors:

The projected percentage population change for the region is 5% which equates to approximately 311,000 residents by 2028, it is estimated that 340,000 new homes will be needed per year up to 2031 to support population growth.

The Thames Gateway, South Essex is a national priority area for growth and regeneration. 45,000 new homes to be built in “growth corridors”.

Developments will occur in the following areas (with approximate numbers):

- Basildon – 17k – 19k
- Castle Point – 7k – 9k
- Rochford – 7k – 9k
- Southend-on-Sea – 21k – 26k

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- Thurrock – 32K, up to 46k if dwelling shortfall elsewhere.

Other projected new housing in Essex

- Brentwood - 7,600k
- Chelmsford – 22k by 2037
- Colchester - 14,720 by 2033
- Epping Forest – 12k (2011 – 2033)
- Harlow – 13k (2011 – 2033)
- Maldon - 4,650k by 2029
- Tendring – 10k – 11k (by 2031/32)
- Braintree – 16k – by 2033
- Uttlesford – 13k (2011 – 2033)

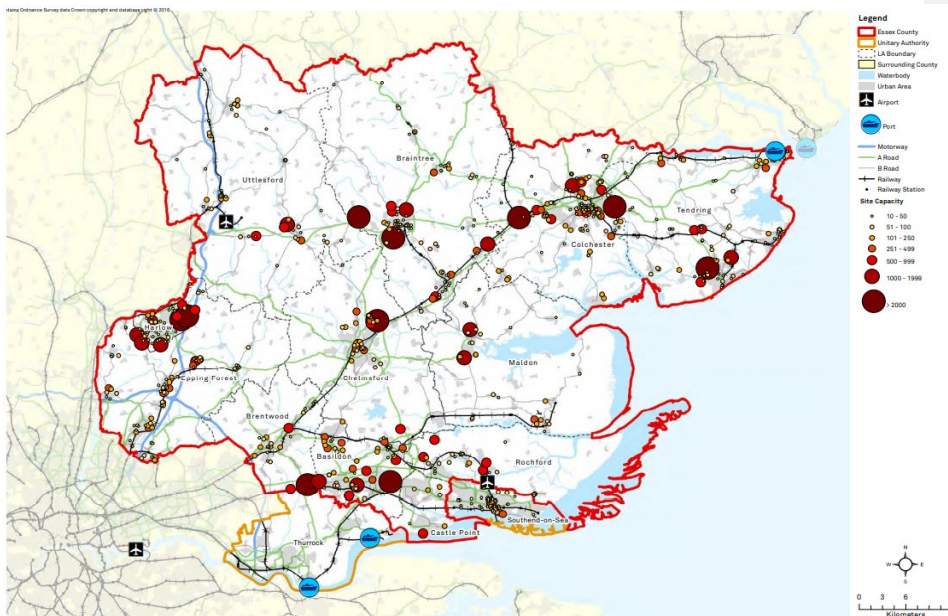


Figure 16: Proposed Developments

The proposed increase in housing will lead to other infrastructure developments in these areas such as additional roads, sewage, schools and hospitals.

It should be noted that most of the developments above are already being built with some new estates completed.

Several possible housing development sites have been identified in neighbouring authorities as likely to impact on the strategic infrastructure that also serves Greater Essex, in particular transport, those are -

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- Ebbsfleet Garden City, North Kent
- Ipswich Northern Fringe, Suffolk
- Cambridge Urban Extensions (North West, East Cambridge and Southern Fringe)
- Northstowe New Town, Cambridgeshire
- Alconbury Weald Garden Settlement, Huntingdonshire
- Cambourne New Town, Cambridgeshire
- Meridian Water, Enfield
- Gilston Area, North of Harlow, East Herts
- Land North and East of Ware, East Herts
- Bishops Stortford/Broxbourne sites, East Herts

The Gilston Development is to be built just north of Harlow, discussions with Hertfordshire Fire and Rescue Service have been taking place since 2018 due to the consensus that there will be a high reliance on Harlow appliances being called on as part of the Section 13/16 arrangements.

MEDIUM AND HIGH-RISE DWELLINGS

All the main urban areas in Greater Essex have high and medium rise buildings in varying numbers.

Medium rise new builds appear to have been a popular choice by developers in recent years and often include Sheltered Housing schemes. There is a notable increase in retirement villages, which typically are for 55 and over, given the increased risk associated with increased age and health complaints in fire situations it would be beneficial to be aware of these types of accommodation.

GRENFELL FIRE

The Grenfell Tower fire in 2017 graphically and tragically illustrated the issues of poor construction coupled with difficult access to both the hi-rise block and to the flats within.

Following the release of the phase one recommendations in in October 2019, The Service has engaged with the National Fire Chiefs Council (NFCC) and completed a gap analysis on those recommendations.

An action plan has been developed to implement the phase one recommendations with completion of all actions expected by March 2023, this is dependent on national guidance and legislation being in place and enacted in order to be finalised.

In addition the Service is undertaking a building risk review of high-rise premises with a view towards understanding the inherent risks which these premises may pose

because of the failure in the building safety systems highlighted by Dame Judith Hackett.

The Service has completed inspections of high-rise residential buildings as detailed in the Government's Building Risk Review (BRR) exercise. This was completed/returned in December 2021.

HOSPITALS

Essex has five NHS acute hospitals situated in major population centres. All have Accident and Emergency facilities. These are:

- Basildon & Thurrock University Hospitals NHS Foundation Trust General Hospital. (608 beds).
- Southend University Hospital NHS Foundation Trust General Hospital. (320 beds).
- Mid Essex Hospital Services NHS Trust, Broomfield, Chelmsford General Hospital and provides the Regional Burns & Plastic Centre. (396 beds).
- Princess Alexandra Hospital NHS Trust General Hospital, Harlow. (364 beds)
- Colchester University Hospital NHS Foundation Trust General Hospital. (560 beds)

In addition to those beds stated above there is provision for additional commissioned escalation beds during periods of significant surges. Other NHS sites are located in Maldon, Braintree, Epping and Clacton used for day admissions.

There are also private hospitals located in Brentwood, Buckhurst Hill, Chelmsford, Colchester, Leigh and Southend.

EDUCATION

There are 525 primary schools in Greater Essex, and 100 Secondary Schools, in most areas, particularly Maldon, Braintree, Chelmsford and Colchester where there are large housing developments schools are increasing under pressure due to overcapacity.

Universities present a challenge in that they tend to house large numbers of students leaving home for the first time with no local support.

It can often be the case that those attending university, particularly new admissions, are taking on responsibilities such as cooking for the first time.

There are three universities based in Essex, in addition to the school and college offer. The University of Essex supports more than 12,000 students across three locations in Essex, with all offering accommodation to students. The campuses are

in Colchester, Loughton and Southend. The University of Essex Student numbers are forecast to grow to 20,000 by 2025 (principally on the Colchester campus).

Anglia Ruskin University has one campus located in Chelmsford which supports around 6,000 students and offers accommodation.

The third university is Writtle University College.

HERITAGE AND SIMILAR PROPERTIES

Essex has several Grade I and Grade II* listed buildings, historic houses and thatched properties.

The Service does not respond to any automatic fire alarm for schools or sleeping risks without confirmation from an occupant or call centre that there is an incident but the Service does respond immediately to heritage sites. Policies, procedures, and processes inform the responding crews of any specific information these sites through the Operational Risk Information System, (PORIS).

MAJOR RETAIL SITES

All the major towns in Essex have a large retail footprint. In addition, there is a rising number of retail parks located throughout Essex including Chelmsford, Braintree, Basildon, Thurrock and Colchester.

Lakeside in Thurrock is a major indoor retail outlet, which attracts visitors throughout the East and Southern parts of the UK. The site accommodates parking for 12k cars, has 3 floors with 250 retailers and services.

LARGE EVENTS OF NOTE IN ESSEX

Colchester United Football Club is situated at the Weston Homes Community Stadium. The ground has a crowd capacity of just over 10,000. The Stadium is accessible from the A12 (J28 Colchester bypass) via a purpose built on and off slip road system. The venue is also used to host pop concerts as well as other events. Southend United Football Club's current ground is at Roots Hall, just outside Southend town centre. The ground has a crowd capacity of just over 12,000.

Essex County Cricket Club, County Ground, Chelmsford (capacity approx. 6,000) is just located outside of the town centre. Essex County Cricket Club also play a limited number of matches at Colchester and Southend.

Chelmsford City Racecourse at Great Leighs, approximately five miles north of Chelmsford, provides day and night all-weather horseracing. The attendance license is for up to 30,000, (non-racing event). However, the Thursday night race meetings attract between 800-1200 racegoers. The highest attendance to date was for a concert after horse racing that attracted 12,000 people.

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There are a number of other Essex towns which have local football clubs with small and enclosed grounds. An Example is Chelmsford City Football Club, Melbourne Stadium, Chelmsford (capacity approx. 3,000).

PENAL ESTABLISHMENTS

Chelmsford Prison is situated in Springfield Road, Chelmsford. It is a Category B Prison for males, including young offenders, convicted or on remand direct from courts within its local catchment area. The Prison had an operational capacity of 700 as at October 2018.

RISK BASED INSPECTION PROGRAMME

There are many commercial properties throughout Essex, and a number of business estates. The Service monitors these via their Risk Based Inspection Programme (RBIP) which it uses for premises that are regulated under the Regulated Reform (Fire Safety) Order. The formulation of a new Business Engagement Team enables closer working with our county businesses.

The [Risk Based Inspection Programme](#) RBIP allows the Service to identify and target risk from fire premises across Essex which are regulated under the Regulatory Reform (Fire Safety Order) 2005.

The Service quantifies the risk that premises pose considering

- the historical likelihood of fire
- the vulnerability of occupants
- and buildings that are identified as high risk through our operational risk information system (PORIS).

This establishes the nature of the inspections that the Service carries out. The outcome of this initial assessment determines the type of inspection carried out and the frequency of inspection.

In addition to this ECFRS collates Site Specific Risk Information (SSRI) on defined premises, with the guidance for this set out in [Operational Risk Information](#) system which provides robust yet flexible guidance on developing and maintaining a consistent approach to managing, processing and using strategic and tactical operational risk information.

Currently there are 56 industrial or business premises that are the subject of Tactical Fire Plans, (TFPs)

BUILT ENVIRONMENT RISK SUMMARY

High-rise incidents are reasonably frequent and represent a risk to the Service from the difficulties in access and egress and to firefighters having to work in a challenging and arduous environment.

A major fire at any location such as school or hospital has long-term consequences on surrounding communities due to closure and the need to relocate vital services.

Due to the number and frequency of inspections required to meet the legislative requirements the Protection Teams require a specific investment in training and resourcing to enable targets to be met and work carried out to an adequate standard.

A significant risk due to the changes in the built environment have been identified post Grenfell. What we previously knew about the built environment may not now be the case and the risks from our buildings has increased.

The Greater Essex Growth and Infrastructure Framework 2016-2036 identified the following key findings; -

- Greater Essex authorities are required to accommodate housing and economic growth over the 20-year period to 2036 delivering on average 8,980 dwellings per annum, or 179,660 dwellings over the 20-year period. This compares to average annual completions of 4,630 dwellings per year across Essex from 2004 to 2015.
- The Office of National Statistic (ONS) Population projections forecast a population increase of 298,700 people (an increase of 17%).
- 79,000 additional jobs are forecast by the East of England Forecasting model (2016 run), an increase of 10%.
- Local authorities across Greater Essex have identified housing supply trajectories for approximately 137,660 homes between 2016 and 2036.
- Delivering the necessary infrastructure to support that growth from now to 2036 is estimated to cost at least £10.4 billion in 2016 terms. This represents an estimate of capital delivery costs only and does not include the additional annual revenue requirements and maintenance costs.
- The study has reviewed the potential costs of delivery alongside currently identified secured funding, potential funding from public, private and developer contributions highlighting a remaining funding gap estimate of over £4.4 billion at 2016 prices.

BUILT ENVIRONMENT RISK MITIGATIONS

- Protection Strategy
- Prevention Strategy
- Operational Community Engagement
- Site Specific Risk Assessments
- Risk Based Inspection Programmes
- Engagement with developers and planning departments
- Prosecutions
- Education Team
- Fire Break
- Training

RISK MITIGATIONS FOR CONSIDERATION

- Methodology for capturing new developments
- Risk Group
- Additional Resourcing for Protection
- Mapping new developments against response times

LAND, AIR AND SEA

Regional projects which will impact upon Greater Essex in the future are -

- A14 improvements in Cambridgeshire - and connectivity to A1
- Lower Thames Crossing
- Felixstowe to Peterborough – rail freight and passenger connectivity improvements
- Potential new river crossings at Silvertown, London
- West Anglia Mainline 4 tracking
- Cross Rail 2 developments
- Widening of the A12

SIGNIFICANT ROADS

The Department for Transport (DfT) regards the M25, M11, A12 and A13 (as far as Tilbury) to be transport routes of national significance.

The A120 provides an important link between the M11, the A12 and the East Coast Port of Harwich and is part of the Trans-European Network (TEN) connecting east coast ports with the rest of the UK, as far as Holyhead and the Republic of Ireland.

The A13 and the A127 provide the two primary routes between London and the south of Essex.

The A130 provides a cross county link off the A13 at Benfleet to the A12 with a link to the Fairglen Interchange near Rayleigh, through Chelmsford to link with the A120 near Braintree.

The A12 provides the main London to East Coast ports route. There are schemes in place to widen the A12 and A120.

All major routes in Essex are working at, or near to, their capacity. Journeys can be unreliable, especially at peak times. With the increase in traffic through urban areas, necessitated by diversions, there is also an enhanced risk of accidents involving vehicles carrying hazardous cargos.

Detailed highways development information can be examined via [Highway Schemes | Essex County Council \(essexhighways.org\)](https://www.essexhighways.org)

TUNNELS AND CROSSINGS

The main transport tunnels in use for Essex are:

Dartford River Crossing

Two, two-lane road tunnels flowing Kent to Essex under the River Thames. Usually both tunnels operate northbound, but one in each direction if the QE2 Bridge (Essex to Kent) is unavailable. Usually the control to tunnel access is on the Kent side; however, if one tunnel is for Essex-Kent traffic, there is no ability to control traffic into the tunnel in the event of an incident. The tunnels are 1.4km long.
High Speed 1 Thames Tunnel: 2.9km long, carrying separated twin bores "to" and "from" London.

Stansted Rail Tunnel

Carries the Stansted Express rail line on a short branch line from the West Anglia Main Line. The tunnel is a bi-directional rail tunnel, approx. 1.7km in length. Also known as Cooper's Lane Tunnel.

Stansted Transit Tunnel

This tunnel is 3km long and completely within the boundary of Stansted Airport. It runs between the main terminal and the satellite terminals. It is only accessible after passing through security in the airport.

Bell Common Tunnel: Carries the M25 between Epping (Junction 27) and Waltham Abbey (Junction 26). It is 505m long, is four lanes and is fitted with a forced ventilation system.

ECFRS is likely to mobilise to an incident at the **Holmesdale Tunnel**, also situated on the M25, and a very short distance across the County border into Hertfordshire.

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The western end of the tunnel is part of Junction 25 and is 684m long. A revised emergency plan was issued in August 2019.

Operational hazards of tunnels, include:

Construction features.

Inherent fire loading of the structure and facilities.

Fire loading of the transport system and vehicles using it.

Access to large numbers of the public (who may be unfamiliar with the tunnel).

Effect of ventilation to the access structures.

Communications.

The Lower Thames Crossing will be the longest road tunnel in the UK, stretching 2.6 miles, and including 14.3 miles of new road connecting the M2/A2, A13 and M25

Around 50 new bridges and viaducts will be built.

The tunnel crossing will be located near to East Tilbury and link to the A13 in Thurrock and the M25 in Havering.

The route from the crossing passes by Tilbury, Chadwell St Mary, Linford, Orsett and Ockendon.



Strategic Assessment of Risk 2022/23

Figure 17: Thames Crossing Map

Nine Tunnel Design Safety Coordination Groups have been held since 2018, covering: -

- Planning, safety, general design considerations, tunnel maintenance and tunnel operations
- Hazard identification
- Fire safety engineering

Areas of consideration for the Service fall into two categories, the construction phase and when the crossing becomes operational.

Identified risks to date include -

- Increased traffic in the Thurrock area
- Incidents and accident within the tunnel complex
- All lanes running at 70mph through the tunnels.
- Cross passage spacing.
- Currently no Fire suppression system planned.
- Some areas where we may be unlikely to reach our attendance times.
- Construction phase will involve several sites each estimating up to 4500 LGV movements per week.
- Construction workers village for Tilbury for up to 900 workers.
- Movement of utilities which include electricity pylons.
- Impacts on current road infrastructure considering the slide below.

RAIL

There are 343kms of railway line in Essex and 79 railway stations, including seven on the London Underground network.

There are plans for a new station as part of the North Chelmsford development. Network Rail is responsible for the overground track network with Train Operating Companies (TOCs) operating passenger services on the network.

Network Rail routes carry a heavy volume of passenger traffic, especially commuters to and from London.

The routes between London and Manningtree/Harwich carry a high volume of freight traffic to and from the ports at Harwich and Felixstowe. Much of this traffic is containerised and includes a wide variety of cargos, including hazardous substances.

High-Speed 1 (HS1), operates from London St. Pancras through Stratford to Ebbsfleet (Kent), and into Europe (Eurostar) at speeds of up to 186mph. A large proportion of the route is underground, including the 2.9km long tunnel under the River Thames at Thurrock, with an access point to this tunnel in Purfleet. Additionally a short section runs above ground in Purfleet.

AIR

The holding areas for Heathrow, Gatwick and London City Airports are in Essex air space. In addition there are two major civil airports in Essex, namely London Stansted and London Southend.

There are several locations in Essex from which Flying Clubs and/or private pilots fly, including a site used by Essex Police and Essex Air Ambulance.

London Stansted serves more European destinations than any other airport worldwide.

With a single runway operating all year round some 20 airlines fly to over 190 destinations in 31 countries.

A number of enhancement works on the airfield are planned to accommodate more traffic.

Stansted is one of the UK airports that accommodate hijacked aircraft or aircraft that otherwise have a need for an emergency services/security response on landing.

London Southend Airport is base to a wide range of aviation support companies, airlines and operators.

The Airport has a 129-room onsite hotel and its own rail station for passenger convenience.

In addition to the two airports there are a number of locations around Essex from which Flying Clubs and/or private pilots fly, including a site used by Essex Police and Essex Air Ambulance.

The Clacton Air show, (Tendring District Council) is an annual event (currently suspended due to COVID-19), that usually takes place around the August Bank Holiday weekend. Reported attendance figures over the two days are in the region of 200,000.

North Weald Airfield is an operational general aviation aerodrome in North Epping Forest District Council. The airfield is home to several flying organisations offering flight training, flight experiences and regular trips. Fixed and rotary wing aircraft operate from this location. The airfield also hosts a large Saturday Market, vehicle shows and track days for cars and bikes. The site is now used as an inland border facility post EU exit. No added congestion at the moment because of this, however this has only currently been open since COVID-19 restrictions have been in place.

Stapleford Aerodrome is an operational general aviation aerodrome near Abridge, (Epping Forest District Council). It is about 3.4 nautical miles south of North Weald Airfield and 4.5 nautical miles north of Romford. This location offers flying training, business charter, London sightseeing flights, and aircraft engineering services.

Essex has no military air assets based in it. However, Wattisham Airfield is just outside Essex and rotary wing aircraft frequently fly in the north Essex area, with exercises involving 16 Air Assault Brigade based at Colchester.

There is evidence of 58 light aircraft incidents in Essex since 1960, resulting in 19 fatalities to the pilot and/or passengers, with three seriously injured reported. No great property damage occurred with airframes largely going down onto open country. None appeared to require a major involvement of ECFRS.

There was one major air incident in December 1999 which involved a Korean Airline Boeing 747 cargo aircraft that crashed shortly after take-off from Stansted Airport. In that instance the aircraft fell onto farmland.

The likelihood of an air related incident is low however the potential of impact of such an incident could be high as other incidents have demonstrated.

MAJOR PORTS

Essex has three major ports within the county. Another major port – Felixstowe is in Suffolk across the river Stour from Harwich. Tilbury, the London Container Port, and DP World (see below) are part of the Port of London.

Tilbury and Tilbury 2

Both Tilbury and Tilbury 2 are independent Port authorities managed by the Port of Tilbury. The ports have a wide range of berths and the ability to handle almost all cargo types. The Port of Tilbury is a significant distribution centre with access to the M25 orbital motorway and therefore the UK motorway network. In addition there are direct rail connections within the Port for access to the UK at large. The Port includes 130 companies employing 4000 people, handling 16M tonnes of cargo including containers, paper, cruise, wood and cars.

Tilbury 2 has been developed to the east of the existing Port and Tilbury Fort. The Lower Thames Crossing will have a link to Tilbury 2. Tilbury 2 comprises of:

- A roll on/roll off ferry terminal for importing and exporting containers and trailers to northern Europe in partnership with P&O Ferries
- A facility for importing, processing, manufacturing and distributing construction materials.
- A strategic rail terminal which can accommodate the longest freight trains of 775m.
- Storage areas for a variety of goods including exported and imported cars.

Tilbury has doubled the size of its business in the past 10 years and is projected to double the volume of cargo across the quay from 16 million to 32 million tonnes and increase direct employment from 3,500 to 12,000 jobs over the next 10-15 years.

The port includes -

- London Container Terminal – this is Europe largest terminal for refrigerated containers and operates 24/7.
- Tilbury is the UK's leading port for handling paper products with volumes of over 3 million tonnes per annum. The Port also handles significant quantities of forest products and there is an on-site Wood Treatment Plant for sheet materials and timber.
- General Cargo and Ro-Ro
- Grain and animal feed - The grain terminal at the Port is the largest in the UK, with 120,000 tonnes in capacity with over 200 separate silos for product segregation. Expansion is planned to increase this to 136,000 tonnes.
- Purpose built 'bulks' warehouse.
- London cruise terminal.
- Dubai Port London Gateway– parts are still under construction; this has the capacity to handle ultra large container ships. It is largely automated. Once completed the Port will have the largest logistics park.
- The port owns the Enterprise Distribution Centre - a fully automated terminal that handles 700,000 tonnes per year.
- The port has capacity to handle non-hazardous liquid bulks for customers through bespoke silos but also has licensing to handle all classes of dangerous goods in container form.
- The port handles 2 million tonnes of recycled products each year.

Harwich International Port

Harwich International Port is a multi-purpose freight and passenger port with road and rail links to the Midlands, London, and the Southeast.

Approximately 1 million passengers pass through Harwich International Port every year.

Speciality hydrocarbons are imported and exported via Harwich to Haltermann Carless Ltd site next to the Port, this site is the only fuel refining facility within Essex.

Every year Petrochem Carless distils up to 500,000 tonnes of condensates, mainly naphtha, kerosene, and gas oils. Other similar products are imported for processing alongside these products to create a range of speciality products for industry.

Storage capacity totals 150,000 tonnes in 175 storage tanks ranging from 5 tonnes to 1,300 tonnes. A direct pipeline links the berth to the site.

A long-term project is the proposed Bathside Bay development of Harwich International Container Terminal, a £300 million deep-water container terminal, currently at the planning stage.

Crouch Harbour Authority

The Crouch Harbour Authority is the statutory harbour and navigation authority for the Rivers Crouch and Roach controlling both pleasure and commercial use of the rivers. The Harbour Authority passes by-laws to regulate use and employs staff to enforce the by-laws. The Authority provides weather forecasts, tide tables and other important sailing information.

Freeports

In 2021 the chancellor announced several freeports to simplify export and import taxes and tariffs. In these ports, goods can be imported, manufactured and re-exported without being subject to customs checks, paperwork, or import taxes, known as tariffs. Freeport East is planned to be situated at Harwich and Felixstowe with an additional site to be developed 'Gateway 12'.

Other Ports

There are a number of smaller ports around the Essex coastline. These handle a variety of traffic including coal, grain, timber, chemicals, oil, fertilisers and general products.

In addition pleasure craft and yachts use the many marinas on the Essex coastline. (Fingringhoe, Rowhedge, and Wivenhoe on the River Colne, where there is a flood barrage, Maldon, at the confluence of the Rivers Chelmer and Blackwater, Mistley Quay on the River Stour, and Wallasea on the River Crouch.)

Several dedicated jetties exist at industrial sites on the Thames which handle a range of materials including petroleum-based products.

MARITIME RELATED INCIDENTS

The responsibility for fighting fires on ships at sea rests with the ship operating company. Neither the Maritime and Coastguard Agency (MCA) nor any shore-based Fire and Rescue Service are under a statutory duty to tackle such fires. Each ship operating company is obliged to have a safety management system, commensurate with the Articles of the International Convention for the Safety of Life at Sea (SOLAS) and as accepted by the vessel's Flag State. Once the fire is contained the ship operating company could make an application to coastal states for a Port of Refuge allowing the vessel to enter port so that shore FRS could tackle the fire.

In addition to port facilities, the River Thames has a number of locations on the Essex side that provide berths for petrochemical tankers. The Port of London

Authority is a Trust port and the Custodian of the tidal Thames covering 95 miles of the River Thames. In 2018, the PLA (Port of London Authority) saw 54m tonnes of goods handled, 9.9m passenger journeys and 4.79m tonnes of inland waterways freight moved. Thames Oil Spill Clearance Association (TOSCA)⁴⁰ provides a 24-hour response to oil spills between Tower Bridge and Canvey Island. Funded in part by the terminals that handle oil and oil products the service has two purpose-built craft each designed to collect and/or contain oil in the first critical hours after a spillage.

THAMES ESTUARY & THE SS RICHARD MONTGOMERY

In 1944 the SS Richard Montgomery went aground in the Thames Estuary. The wreck contains 1,400 tonnes of explosives and lies in approximately 15m of water, some 2km off Sheerness. The MCA (Maritime and Coastguard Agency) monitors the wreck, registered as dangerous under the Protection of Wrecks Act 1973. The MCA believes that the cargo is stable. Nonetheless, there are concerns that if an explosion took place, parts of the Isle of Sheppey, the Isle of Grain and more pertinent to Essex, Canvey Island and Southend could be impacted by a tidal wave causing flood.

LAND, AIR AND SEA RISK SUMMARY

- The ERF has outlined the impacts and consequences of a transport incident. Aside from the incident itself the impact to travel, people stranded in vehicles, impacts on the environment, significant damage to buildings/infrastructure and impact on the economy if long term damage is sustained.
- Despite having 2 major airports the likelihood of an aircraft incident remains low with most involving smaller aircraft. Should a larger aircraft incident be realised the impact is likely to be high with high numbers of death/casualties. Stansted Airport accounts for several mobilisations each year.
- There have been no significant rail incidents within Essex recently, however, there is significant rail travel through Essex each year and historically derailments have led to high casualties.
- In Essex there has been only one recent incident of note at sea, in January 2018, where a fire started in a refrigerator lorry and spread to other vehicles on a ship with 400 people on board. The ship's crew extinguished the fire. The risk to the Service from ships exists around fighting an along-side fire at a port.

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- In general the impact of a maritime incident depends upon the cargo/number of passengers not just from the potential of loss to life but also for the environmental pollution impact.
- Essex's transport infrastructure is already at capacity in some areas, with the potential of an increase in population increasing this still further.

LAND, AIR AND SEA RISK MITIGATION

- Participant of the [Safer Essex Road Partnership](#) (SERP)
- Prevention Strategy – Live Safe
- Prevention Strategy – Be Road Safe
- Prevention Strategy – Delivery – intelligence and data led approach
- Targeting P2W RTC KSI incidents through the Fire Bike
- Prevention Strategy – Be water safe
- Community Speed Watch
- Vision Zero and link to Annual Plan
- SAIB
- Waterside Responder Scheme
- Response Strategy – PORIS
- Response Strategy – Training and Exercising
- Heavy Rescue Pumps
- Urban Search and Rescue
- External expertise in LGV vehicles and access to additional heavy-duty equipment
- Protection Strategy – Risk Based Inspection Programme
- People Strategy – Training
- Operational Training Strategy

Commented [WN1]: @Andrea MacAlister added these here?

Commented [AM2R1]: Hi Will - Not sure Waterside responder should be under transportation risk? Rather than SAIB. driving for better business or internal road safety activity might be a better description of the work.

NATIONAL INFRASTRUCTURE

The national infrastructure is comprised of the facilities, systems, sites and networks necessary for the delivery of the essential services upon which daily life in the UK depends.

There are nine national infrastructure sectors providing these essential services:

- Communications
- Emergency Services
- Energy
- Finance
- Food
- Government
- Health
- Transport
- Water

In the sectors, there are certain 'critical' elements of infrastructure of which the loss or compromise would have a major detrimental impact on the availability or integrity of essential services leading to severe economic or social consequences or to loss of life.

These 'critical' assets make up the nation's critical national infrastructure (CNI) referred to individually as 'infrastructure assets. Infrastructure assets may be physical (e.g., sites, installations, pieces of equipment) or logistical (e.g., information networks, systems). Relevant Statute & Regulations to protecting national infrastructure are -

- **Pipelines Safety Regulations 1996:** which relate to hazardous oil and gas pipelines and pipelines installations.
- **Radiation (Emergency Preparation and Public Information) Regulations 2019 (REPPPIR):** which relate to radiation hazards at locations including nuclear power. Bradwell Power Station is the only site that falls under these regulations in Essex.
- **Control of Major Accident Hazard Regulations (COMAH) 2015:** The purpose of the COMAH Regulations is to prevent major accidents involving dangerous substances and limit the consequences to people and the environment of any accidents that do occur. A 'competent authority' enforces the Regulations. In England the competent authority is one of the HSE, the Office for Nuclear Regulation (ONR) for nuclear establishments, and the Environment Agency (EA).
- **Civil Contingencies Act (2004)** establishes a clear set of roles and responsibilities for those involved in emergency preparation and response at the local level. Identifying levels of responders. ECFRS is a category 1 responder. Category 1 responders have specific responsibilities.

COMAH SITES

A number of locations in Essex require site-specific plans under the COMAH, REPPPIR and Pipeline Regulations. Others form part of important infrastructure both locally and nationally.

Whilst responses to these sites are "business as usual" the size of an incident might cause a responding authority to use nationally agreed arrangements.

COMAH requires on-site and off-site emergency plans to deal with potential major accidents for those sites with the greatest hazards.

The Regulations operate at two levels Upper-tier and Lower-tier depending on the quantities of dangerous substances at an establishment. A full list of COMAH sites can be found via this link - [COMAH sites](#)

The local authority for the area where an upper-tier establishment is located deals with off-site emergency plans.

The plan must be suitable for dealing with the consequences of major accidents beyond the establishment. As with the on-site plan it should be in writing. The off-site emergency plan details the roles carried out by emergency services, local authorities and other external organisations in the event of a major accident. This includes the arrangements established to help with the emergency response on site. The degree of planning should be proportionate to the probability and consequences of the accident occurring. On-and off-site plans must be tested at least once every three years.

UTILITIES

The provision of water, gas and electricity is essential to any community. The loss of any utility infrastructure will have a negative effect, and generally, highly localised losses.

Water companies

Around 1.8 million consumers are provided with water services in Essex, the main suppliers are -

- Essex and Suffolk which is a 'water only' supplier.
- Anglian Water and Thames Water provide sewerage within its areas of supply.

Storage and Distribution of Water

The prediction is that water demand in Essex will rise by 6% by around 2035, almost entirely due to an increase in population, assuming that growth in housing development occurs as planned.

Essex is the driest county in the UK receiving on average less than 600 mm of rain a year, two thirds of the average for England and Wales. Only half the water supplied comes from Essex.

In a dry year up to one third of the required water transfers from Norfolk through pipelines and pumping stations to the River Stour and River Blackwater to fill the reservoirs at Abberton and Hanningfield.

Hanningfield and Abberton Reservoirs, owned by Northumbrian Water Limited trading as Essex & Suffolk Water, are direct supply reservoirs. Both contain about 25,000 megalitres. They are pumped storage reservoirs involving pumped water from the rivers Chelmer, Blackwater and Stour to fill them rather than simply relying on rainfall from their limited catchment area.

Abberton Reservoir is about 6.5 km south of Colchester, less than 8 km from the coast, and is the fourth largest in England at 4.9 sq. km. It is a Ramsar Site (Wetland of International Importance for Birds), a Special Protection Area (SPA) designated under the EU Birds Directive, and a Site of Special Scientific Interest (SSSI) due to wildfowl. It is the largest freshwater body in Essex, with 485 hectares covered by water.

Hanningfield Reservoir is the second largest reservoir in Essex, situated about 4.8 km south of Chelmsford. Its main scientific interest lies in its breeding and wintering wildfowl.

The National Drought Risk R84, involves three consecutive dry winters in the south and southeast. This is in line with those encountered in 1976 which appear to provide the background to unprecedented drought risk. Both reservoirs must have a flood plan.

Hydrants

There are 34,830 fire hydrants and associated bypass valves in Essex (July 2018), some capped (a common situation in London.) Increasingly the Water industry is finding it difficult to maintain these.

Electricity

The design of the electricity network makes it robust with varying levels of resilience built into the various parts of the system to limit the impact of faults on the customer in accordance with national standards of security of supply.

The safe interruption of power takes place on other parts of the network, usually the lower voltages, to minimise the damage to the network and because there are no alternative routes to the customer, until a repair team can be dispatched to carry out repairs and restore supplies.

The following can affect electricity supplies:

- Third party damage such as from roadwork teams damaging cables, metal theft etc.
- Severe weather, e.g., strong winds causing trees and branches to fall into overhead lines down overhead cables etc.

There is a link between thefts of copper wiring and the value of scrap metal with recent prices being very high. The loss of electricity, recognised as a national risk (R76 NSRA 2019), will have a severe impact on society and the economy if the loss is over a prolonged period.

Tilbury Power Station

The Tilbury Greenpower project comprises two separate phases of development: Phase 1 is a waste wood power plant; and Phase 2 is a Solid Recovered Fuel power plant. There is no decision whether to proceed with phase 2. Phase 1 utilises around 270,000 tonnes of waste wood sourced from the region. Electricity generated by the plant will be transferred by underground cable to the plant's 132 kV Electricity Substation and subsequently along a 4.5 km underground cable to the existing 132kV substation at Tilbury.

Bradwell B Power Station

The Power Station Permanent Development - the proposed new nuclear power station on land within the main development site (adjacent to the existing Bradwell station) will be developed with two UK HPR1000 nuclear reactors together with associated plant and ancillary structures and features of the power station.

Temporary Construction Facilities - these are temporary facilities required for construction on the main development site and for the duration of the construction period.

Off-site Power Station Facilities - these are permanent facilities away from the main development site, which are essential for the safe operation of the power station.

Associated Development - development on and off-site to support the construction and/or operation of the power station, for example park and ride facilities for construction workers, freight management facilities, temporary worker accommodation and road and junction improvements.

Identified risks include:

- Concern has been raised around the potential disruption to the road network during the construction phase including along the A12.
- The proposals include changes to the road layout in the Dengie Peninsular.
- Proposals for park and ride and freight storage facilities near to villages in the area.
- The site itself is likely to include extensive workers accommodation.
- Proposals outline use of Rail and Marine transport

OIL AND GAS PIPELINES

There are two Calor Gas facilities at Canvey Island and Coryton. In addition, there are in excess of 750 km of high-pressure gas pipelines in Essex. They are:

National and Transmission Systems (NTS) operated by Transco used to distribute natural gas to users throughout Essex.

Horndon to Barking (power station) operated by Thames Power Services Ltd (18 km).

Epping Green to Enfield pipeline operated by Enfield Energy Centre Ltd (12.8 km).

Oil Pipelines

Pipelines transport petroleum, and its derivatives, to and from refineries, shipping terminals and storage terminals. Typically these products are:

Petrol

Diesel Fuel

Dyed Diesel Fuel (red. Diesel)

Aviation Fuel

Crude oil of varying viscosity.

Increasingly Biofuels (e.g., ethanol), are being transported by pipelines as well as slurries suspended in water and other liquids.

There are two oil pipelines flowing out of Essex and one that flows into Essex. Three companies, the British Pipeline Agency, SERCO Gulf Engineering and Unipen, operate them.

The British Pipeline Agency (BPA) is responsible for approximately 700 km of pipeline on behalf of oil, gas and chemical companies. This includes the United Kingdom Oil Pipeline (UKOP), part of which is in Essex.

The system is operated and maintained by the BPA and is routed from Canvey Island to the River Mersey with a spur to Heathrow/Gatwick Airports. It passes through Essex from Canvey Island to Fishers Green, near Waltham Abbey, by way of Corringham, Great Warley and Stapleford Abbots.

The Thames Estuary Pumping Station is near the former Shell Haven site. At any time the pipeline can be transporting several petroleum products including motor

spirit, at pressures up to 80 bars, with a flow rate of approximately 300 tonnes per hour.

Whilst the pipeline is operating there will always be a controller in attendance at the Control Centre. Pipelines from Canvey Island and oil installations at Coryton of 265mm and 305mm diameter supply the pumping station known as the Thames Gathering System.

SERCO maintains a system on behalf of the Department of Energy. The route of this system is from Thames Haven to Saffron Walden then to Sandy (Bedfordshire) with branches elsewhere, including Stansted Airport.

Pumps are fitted with an automatic cut-out that would come into operation immediately a rise in pressure occurred.

NATIONAL INFRASTRUCTURE RISK SUMMARY

Total failure of GB's National Electricity Transmission Network is rated as very high by the ERF's CRR. Generally the most likely risk leading to a loss of electricity will be damage to cables either through another accident or severe weather. If over a prolonged period it can have a severe impact on society and the economy.

Actual or threatened significant disruption to fuel supplies including because of industrial action by tanker drivers or refinery staff, or effective blockades at key refineries/terminals by protestors and large toxic chemical release are rated as high by the ERF in its CRR.

The ERF outlines the risks from a loss of utilities as being disruption to essential services and activities, people exposed to poor sanitation or limited drinking water, homes without heating, the ability to cook and/or keep food cold and limited telecommunications.

The ERF outlines those impacts could be filling stations being exhausted within 48 hours and taking up to 10 days to return to normal supplies.

The consequences of long-term power outages over a significant area and for a prolonged period could affect mobilisation and response at an incident site. In addition, it may not be possible to refuel appliances as pumps will not work either at a Fire Station or at a fuel station on the appliance's ground. Fire Stations could experience a range of issues e.g., working in the dark, lack of heating, ICT failure, no Mobile Data Terminal updates etc. and water shortages as the pumps require

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electricity. This is a National Risk, (R76) that is receiving greater attention following a review.

The ERF highlights the impact that an industrial accident could have on local residents.

The risk spectrum can range from minor fire or chemical spill to larger incident involving explosion and chemical discharge effect off site locations and wider areas. Historically those sites requiring extra regulation are relatively low risk with incidents largely remaining on-site.

Fortunately, incidents at events involving large numbers of people have a low likelihood though the Service does do significant planning for any potential terrorist incident in such areas.

The fall-out from incidents have a negative impact on the environment either through water run off or discharge of chemicals.

INFRASTRUCTURE RISK MITIGATION

The Response Strategy – Training and Exercising

Response strategy – engagement with all COMAH sites and Local Authorities, involvement with on-and off-site plans exercises

Protection Strategy – Risk Based Inspection Programme

Protection Strategy – Business Engagement

Protection Strategy – Enforcement

Protection Strategy – Consultation and licensing arrangements

The Service's Hazardous Materials and Environmental Protection Officers, (HMEPO)

The Services Petrochemical Officers,

The Service's National Inter-agency Officer (NILO) level,

Participants of the Essex Resilience Forum and each of the Emergency Planners situated within each Local Authority.

Fuel Business Continuity Plan

CYBER ATTACK

Cyberattacks have become a common hazard for individuals and businesses and can take a multitude of forms—from data theft and ransomware to the takeover of systems with potentially large-scale harmful consequences.

It should be noted that cyber-attack features high on the National Reasonable Worst-Case scenarios (RWCS) and that the public sector has already experienced several attacks.

The requirement for the protection of personal data is clearly set out in the Data Protection Act (2018). Local Authorities and the public sector have been targeted by criminals often demanding ransoms to not share data they have accessed.

The UK has one of the world's most open and most digital economies, making it vulnerable to attack from hostile countries, criminal gangs and individuals. Attempts to steal information or disrupt services continue to grow and evolve.

The pandemic has led to a huge increase in employees working from home with many making rapid adjustments to their new "office". With more people using personal devices for work purposes came an increased vulnerability to cyber fraud as criminals sought to exploit the changing circumstances.

CYBER ATTACK RISK SUMMARY

The Service business continuity arrangements have an increasing reliance on network access. Aside from the need for power cyber-attacks are on the increase to either hold local authorities to ransom or as an act of terrorism.

CYBER ATTACK RISK MITIGATIONS

- Disaster Recovery Plans
- Business Continuity Plans
- Training and awareness for employees in ICT Security
- Cyber Plan
- Reporting Guidelines in the event of a potential security breach
- Digital and Data Strategy
- Digital and Data Programme

ELECTRIC VEHICLES

Due to the growth in the use of electric vehicle usage and the ban in 2030 on the production of petrol and diesel vehicles Essex and other Fire and Rescue Services have seen an increase in attendance at incidents with electric vehicles.

Electric vehicles tend to use Lithium-Ion batteries which in most cases are deemed a safe and stable means of providing energy.

When batteries do overheat there is a risk that the temperature will reach a level where the structure of the battery breaks down leading to thermal runaway and the production of a range of toxic gases, which is potentially flammable and explosive in nature. These types of fire are extremely difficult to extinguish safely.

In addition, there are several complexities involved in designing specialist vehicles in the fleet which can run with electric batteries. The specialist fleet will be the most difficult and expensive to replace with a possible increase in repair cost and more vehicles being written off due to cost of batteries if damaged.

The service currently repairs vehicles in-house and will need to develop the capacity to repair electric vehicles.

Considerations around the development of infrastructure to support electric vehicle technology will need to consider among other things the type of charging points and number that are needed and how to safely dispose of vehicles and batteries.

ELECTRIC VEHICLES RISK SUMMARY

Operational considerations include,

- Fire Intensity (thermal runaway, electrolyte leaks, venting etc) Increased risk to nearby property and vehicles if the battery is damaged battery is damaged.
- Removal of casualties from a battery fire – difficult to extinguish.
- Driving electric vehicles.
- Range anxiety - will drivers be distracted if the vehicle has been unable to charge due to short time between call outs.

ELECTRIC VEHICLES RISK MITIGATIONS

- Engagement is currently taking place through, the Radicale group to discuss innovation and sustainability of assets.
- The NFCC transport officers' group (TOG) where alternative fuel vehicles are discussed and experiences shared - the service has also adopted the operational recommendations issued around electric vehicles.

- Training operational employees in responding to electrical vehicle incidents.

THE NATURAL ENVIRONMENT

Essex has an area of approximately 3,670 sq. km, with large areas of flat, low-lying land, about half of which are in agricultural use. Also within this are multiple internationally protected habitats and landscapes including the Dedham Vale Area of Outstanding Natural Beauty. These include -

- 10 Ramsar sites, three of which extend into other administrative areas.
- Seven Nature Reserves.
- 24 nationally important sites of geological conservation
- 86 Sites of Special Scientific Interest
- 49 Local Nature Reserves.
- 236 designated Conservation Areas.

THE ESSEX COASTLINE AND RIVER SYSTEM

Essex has 515 km of coastline, one of the longest coastlines of any English county; the coastline includes many estuaries and islands. The coast is low-lying and has sizeable flood defence structures, particularly the extensive lengths of sea wall. The eastern side of the coastline is characterised by saltmarshes, muddy estuaries, and isolated islands, most notably Mersea Island, accessed by a causeway often submerged at high tide.

Rivers

The River Stour to the North, the North Sea to the East and the Thames Estuary to the South provide Essex with three of its boundaries. The County is highest to the North and West with the major river systems draining eastwards into the North Sea (e.g., Rivers Stour, Colne, Blackwater, Chelmer, Crouch and Roach) or the Thames Estuary (Rivers Mardyke, Beam, Roding, and Lee) although the area around Saffron Walden flows northwards via the River Cam to eventually reach the sea at Kings Lynn.

Estuaries

The Essex Estuaries European Marine Site, (EMS), is the second largest estuarine site on the east coast of England. It contributes to the range and variation of estuaries in the UK as the best example of a coastal plain estuary system on the British North Sea coast. Covering an area of 472 square kilometres, this estuary complex contains the major estuaries of the Rivers Colne, Blackwater, Crouch and Roach, as well as extensive open coast tidal flats at Foulness, Maplin and the Dengie. The intertidal mudflats and sandflats within the European marine site support a wide range of typical estuarine and marine communities. The Essex

Estuaries are a Special Area of Conservation and Essex has several Special Protection Areas and Sites of Special Scientific Interest.

FLOOD RISK

The risk of coastal flooding is one of the most significant risks on the National Risk Assessment. Essex is vulnerable to flooding from the sea, rivers, surface water or a combination of these. Coastal inundation becomes a concern when low pressure and a north-westerly wind combine to lift the prevailing sea height. This worsens when spring tides are due, particularly in the spring and autumn months, when significantly high spring tides are experienced.

The creation of flood barriers and the increase in height of some sea defences around Essex has improved the resilience of areas vulnerable to tidal flooding. Even so, in recent years, there have been a series of river and coastal flooding events within Essex which resulted in several residential and commercial properties being flooded. Additionally there has also been a rise in the number of flash flooding events. The map below shows the coastal and inland areas at risk from tidal flooding.



Figure 18: Essex Flood Risk. Copyright Environment Agency

It is projected that by 2030 much of the UK could be under water due to rising sea levels if climate change continues at current rate.

WATER MANAGEMENT

Outcomes from the Pitt Review of the floods in 2007 brought about The Flood & Water Management Act 2010. In addition the following Acts of Parliament apply:

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- The Water Resources Act 1991.
- The Land Drainage Act 1991.
- The Environment Act 1995 (that created the Environment Agency).

The Environment Agency (EA) is responsible for carrying out flood risk management activities in England and Wales as established by the afore mentioned Acts, this means the EA is responsible for dealing with coastal (Tidal) flooding and flooding from main rivers (Fluvial). Local Authorities are accountable for ensuring effective management of the groundwater flooding, surface water flooding (Pluvial) and ordinary watercourses (streams and ditches not designated by the EA as a main river). The ERF provides an overview of the risk from Inland flooding (Pluvial and Fluvial) and Coastal (Tidal) on their webpage. Assessment of flooding risk should include:

- Local flood maps including flash flood areas and specific risks such as fords and flooded roads, and specific hydrology.
- Geographic and demographic areas of highest need involving vulnerable members of the community and critical national infrastructure.
- Previous incident data.
- Links to weather patterns and historical flood data.
- Response capability in line with the Flood Rescue Emergency Plan

Waste Management

There are 15 licenced landfill sites within Essex. Over the past few years there have been increased amounts of fires occurring at non-licenced waste sites. Traditionally these are difficult to extinguish and often lead to service resources needing to be on site for many weeks.

PROTECTING THE ENVIRONMENT

The Service has to deal with pollution arising from accidents involving hazardous materials. ECFRS is also required to consider and mitigate pollution arising from an incident either because of the accident or because of ECFRS actions to deal with it. The scale of operation can vary enormously.

The Service has a duty to reduce pollution wherever it can. In addition to the impact of a pollutant on the environment the additional risk is one of reputation if the Service fails to manage its business appropriately. In operational terms there are three significant drivers for operational commanders all of which must be in place to be effective:

- There is a life risk.
- The service took all reasonable preventative measures.
- The service informed the EA at the earliest possible opportunity.

CLIMATE CHANGE

The last five years globally are the warmest on record with climate related natural disasters such as hurricanes, droughts and wildfires are becoming more intense and more frequent. Polar ice is melting more quickly than anticipated with drastic implications for sea levels and coastal populations and increasing instances where severe and extreme weather occur. The Met Office provide a National Severe Weather Warning service.

Biodiversity is declining faster than it has at any other time in human history. How we grow food, produce energy, dispose of waste, and consume resources is destroying nature's delicate balance that all living creatures depend on for survival.

The destruction of nature will inevitably disrupt supply chains and cause economic losses from disasters such as flooding and the loss of potential new sources of medicine.

UK ENVIRONMENTAL RISKS

The UK Government is required, under the 2008 Climate Change Act, to publish a Climate Change Risk Assessment (CCRA) every five years which is published on the Government website. The headlines are -

- The average annual UK temperature is around 1.2°C warmer than the pre-industrial period.
- The chances of experiencing hot summers like in 2018 have doubled in recent decades and are now about 10-25% per year. This will rise to 50% by 2050, i.e., on average every other summer will be as hot or hotter than 2018. The ERF has further detail on the risk from heatwave.
- UK average sea level has risen by 16cm since 1900 and will continue to rise for centuries due to time lags in the climate system.

In July 2018 the Government published the latest National Adaptation Programme to address the risks identified in 2017. Six priority areas of climate change risks for the UK were identified, three of which are particularly important to ECFRS.

- Flooding and coastal change risks to communities, businesses and infrastructure is a high risk now and is expected to remain a high risk in the future.
- Risks to health, wellbeing, and productivity from elevated temperatures.
- Risks of shortages in the public water supply for agriculture, energy generation and industry

Accurate predictions around climate change and its impact/likelihood are difficult to provide as they are dependent on variable factors. Nonetheless, there is an increased likelihood of severe, localised flooding in urban areas, where storm drain capacity and capability to deal with heavy and sustained rainfall will be challenged – as experienced in Essex in August 2013, and rural areas surrounding waterways and coastal areas.

Drought

The Environment Agency has four stages of drought incident management, normal, prolonged dry weather, drought, and severe drought. Prolonged Dry Weather (PDW) is referred to when there has not been sufficient rainfall to recharge the groundwater and rivers with sufficient winter reserves to allow such activities as abstraction for agriculture and business.

Coastal Erosion and Rising Sea Levels

Sea level rise will increase coastal flooding and erosion. Current projections indicate an increase in flooding. Higher tides and storm related flooding may affect coastal areas more frequently. Standing water depths may prevent standard Fire Service response vehicles from entering, leaving, and moving around flooded areas. If sea levels rise in line with expert predictions the Essex coastline will face serious threat. Average sea levels off the Essex coast could rise by 26-86cm by 2080, with sea levels in extreme conditions potentially rising by 80-140cm, meaning flood management schemes may become compromised and less likely to mitigate or control the impact of flooding.



THE NATURAL ENVIRONMENT RISK SUMMARY

- Tidal Flooding is identified as a very high risk by the ERF in its CRR
- The impacts of substantial increases in rainfall are wide-ranging, particularly if rain does not fall evenly (i.e. very heavy rain over a 24-hour period). The frequency of fluvial and pluvial flooding is expected to increase.
- Increased flooding incidents and levels could lead to damage to infrastructure (i.e. bridges and roads) in addition to shorter term impacts such as disruption to travel and schools/business closures.
- Floods 2007 – Pitt Report – The possible impact is that of a major and prolonged incident that requires the deployment of other Fire Services into Essex or Essex deploying out of County to support a major and prolonged incident.
- Heatwave, low temperatures and heavy snow, poor air quality and Severe space weather are all assessed as high by the ERF CRR.
- The climate for Essex is getting wetter and warmer and this is likely to continue to increase. Expectations are that winters will become wetter and summers warmer.
- With hotter winters insufficient water availability could seriously hamper fire-fighting operations. If longer, hotter and drier summers are expected this will lead to reduced water availability from open water supplies such as watercourses, lakes, and ponds. As most of the distribution network in Essex is gravity fed from elevated storage (water towers) reduction in pressure is likely to be a consequence of increased usage rather than a strategy employed by the Water Supply Companies to reduce consumption. In areas where pressure is already managed as a means of both leakage and consumption control it is at a point where further reduction would result in an inability to meet the existing statutory minimum.
- Grassland secondary fires may increase in number with the potential for more large-scale incidents. In the event of more frequent and larger fires proportionate attendances would be required or dramatic changes to firefighting response and attitudes. In rural areas this will place greater demand on On-Call fire fighters.
- Wind speeds associated with extremes of weather are predicted to rise almost certainly increase the incidence and experience of severe wind related incidents. Attendance times to incidents might increase and prioritising of emergency calls in spate conditions become more common.
- Firefighting operations may require more resources to attend the same incident over a longer period. Increased incidents of flooding may require more operational attendances including On-Call crews. Specialist equipment and training will be necessary to execute rescues and to mitigate the impact of flooding.
- Firefighting is an arduous activity particularly during hot weather. Attending fires for long periods may have health and welfare implications for crews.
- The ERF sets out the impact from Coastal pollution as damage to Sites of Special Scientific Interest, wildlife and the environments as well as posing a health risk.

Strategic Assessment of Risk 2022/23

- Fire at large waste sites have increased over the past few years leading to Service resources being at locations for days and sometimes weeks.

THE NATURAL ENVIRONMENT RISK MITIGATION

- Engagement with the ERF
- The Service's Hazardous Material and Environmental Protection Officers
- The Service's Environmental Unit
- The Service's Water the Service's hose laying lorry
- The Service's High Volume Pumps the Prevention Strategy – Be Water Safe.
- The Service's water rescue teams and equipment
- The Service's Water Incident Manager officers
- Response Strategy – PORIS - determined dedicated water plans with extra resources added to any incident at that location.
- The Service's Environmental Strategy 2021-31
- ECFRS Flood plan
- Attendance at Executive Flood Officers Meeting

ADDITIONAL CONTROL MEASURES FOR CONSIDERATION

- Review of water rescue to ensure that it is fit for purpose with the potential for increase of flooding and review the service's response arrangements to tidal flooding.

ECONOMIC ESSEX

Through its location and transport links into London Essex is deemed a significant driver of the UK economy, also providing significant labour resource into the capital, particularly from the west, central and southern districts of Essex.

As well as London another key factor to Essex's economy is its location for international travel links from ports and airports.

- Its Gross Value Added per head recent growth lags behind the national average.
- Essex faces a skills deficit with a below-average share of residents holding advanced qualifications and in some areas a high rate of residents with no qualifications.
- There are wide disparities between different areas of Greater Essex, including in economic performance (e.g., employment base) and in the labour market (e.g., qualification rates, employment rates and resident earnings).
- Employment is strongly concentrated in districts of Chelmsford, Basildon and Colchester with the forecast being that this will increase in those districts in addition to Thurrock.

Essex has four well-established growth corridors:

- A127 and A13 Corridors (London-Basildon-Southend / Thurrock-Canvey Island)
- A12 & Great Eastern Mainline Corridor (Brentwood-Chelmsford-Colchester)
- A120 Haven Gateway Corridor (Stanstead-Harwich-Braintree-Colchester)
- M11 London Stansted Cambridge Corridor (LSCC) (London-Harlow-Stansted-Cambridge)

The Southeast Local Enterprise Partnership, SELEP, is the largest partnership between private and public sector bodies outside London working to develop and deliver sustainable economic growth across all parts of the SELEP area.

The SELEP brings together business, local government and education partners from the counties of Kent, Essex and East Sussex and the unitary authorities of Medway, Thurrock and Southend-on-Sea. The Southeast Growth Deal aims to contribute to the Local Enterprise Partnership's Strategic.

ECONOMIC RISK SUMMARY

- It is currently unknown the long-term impacts of COVID-19 and the EU exit on the Essex economy, however, it is envisaged that much of the longer-term planning and forecasts for both the Essex and UK economy will need to be revised.
- Increases in the populations, and the consequences of that, require significant investment in the Essex infrastructure for Essex's economic growth.
- With jobs concentrated in London and major cities, and links to London and Europe, transport is important.
- In the short term, post COVID, it is likely that more people will work from home more regularly – this is different from a lot of planning assumptions used in future projections.
- Challenges to the local and UK economy will have funding implications for the Service.

ECONOMIC RISK MITIGATION

- Protection Strategy – engagement with business
- Prevention Strategy – evaluation process (to form the business case for funding)
- The Service's medium and long-term financial plans
- Representation on the NFCC Economic and Social Value Fire Projects

TERRORISM

The government publishes a national threat level and provides a counter terrorism strategy.

The latest version is based on four main work stream each with a clear objective to reduce the risk to the UK from international terrorism:

- Pursue: stopping terrorist attacks
- Prevent: stopping people becoming terrorists or supporting violent extremism
- Protect: strengthening our protection against terrorist attack
- Prepare: where an attack cannot be stopped, mitigating its impact

The National Risk Register 2020 ([NRR](#)) includes the threat of terrorist attacks and the current risk register identifies the following risk areas:

- Attacks on crowded places
- Attacks on infrastructure
- Attacks on Transport Systems
- Small scale (Chemical, Biological, Radiological) attacks,
- Cyber security (infrastructure and data confidentiality)
- Catastrophic attacks

The New Dimension programme provided the Fire and Rescue Service with the specialist equipment and training needed to respond to terrorist and other large-scale major and catastrophic incidents. The programme provided several specialist transport vehicles, Prime Movers, equipment to deal with mass decontamination, modules for Urban Search & Rescue, high volume pumps and larger diameter hoses together with hose boxes for extra length hose laying.

CBRNe Resilience

The resilience planning assumptions estimate that the expected consequences from a CBRNe event will be beyond those that any single FRS can manage. Work has been done on the Initial Operational Response whereby crews can provide initial actions to mitigate the initial effects of an incident. The Service has Gold and Silver CBRNe officers trained. The Service has officers trained as CBRNe Hazardous Material Advisors. These resources can be deployed outside Essex to assist other FRSs (Fire and Rescue Service) with tactical and operational incident management. Hazardous Material Advisors (HMAs) from another Fire Services could support ECFRS if a CBRNe incident occurred in Essex.

National Inter-Agency Liaison Officers & Marauding Terrorist Incidents

All managers at Group Manager level are trained as National Inter-Agency Liaison Officers (NILOs) who have been qualified to a national standard to advise Incident and Strategic Commanders at multi-agency terrorist incidents. There are two declarations that can and will be made in the event of certain types of incidents. Operation RED DISCUS identifies the move to CRITICAL.

Operation PLATO will occur when a Police Force identifies a major incident involving an actual or suspected terrorist incident, often referred to a Marauding Terrorist Attack (MTA).

For both RED DISCUS and PLATO the Service NILOs will become involved at some level of incident management, the Service also has specifically trained personnel provided with additional PPE (Personal Protective Equipment) and trained to attend a PLATO incident.

Whilst this is most likely in Essex, cross-border support may be called for, e.g. an incident in London.

DETECTION, IDENTIFICATION AND MONITORING OFFICERS

Part of the New Dimension programme is the provision of an advanced Detection, Identification and Monitoring (DIM) capability. A team of 12 DIM Advisors, utilising a bespoke vehicle equipped with a range of advanced scientific equipment, deliver the capability.

The DIM vehicle is part of a national capability covering the Eastern Region with support of four DIM Advisors from Cambridgeshire FRS, available for accidental hazardous materials incidents in Essex and neighbouring counties.

Terrorist Incident - Impact

The impacts on ECFRS of a worst-case terrorist event may require:

- Supporting London Fire Brigade (LFB) (London target) with resources.
- Responding to an Essex based event on land.
- Responding to a marine based incident.
- Supporting regional partners (event outside Essex).
- Responding to an Essex based event on land following an air incident, (e.g. Lockerbie).

The people impact is initially on the victims directly involved and subsequently their families and incident responders. The secondary impact involves the multi-agency recovery process in the immediate aftermath and over the days and weeks that follow.

Whilst this will be similar to a large-scale natural hazard event, by its nature, a terrorist incident is likely to invoke different feelings and potential divides in the community.

TERRORISM RISK SUMMARY

- Crowded places with Essex such as major shopping facilities and travel hubs offer attractive targets for acts of terrorism.
 - More recent attacks have been a move away from explosives to the use of knife and vehicles attacks as these are more readily available.
 - Key areas of the Critical National Infrastructure are within Essex and may be targets.
 - The Service hold National resources and may need to support other FRS.
 - Station/appliance security is important as potential 'trojan horse' attack.
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