



## **Havering Borough Resilience Forum**

# **HAVERING BOROUGH RISK REGISTER**

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Havering Borough Resilience Forum  
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### Acknowledgements:

The Havering Borough Risk Register is collectively owned by the Category 1 Responders (as defined by Schedule 1 to the Civil Contingencies Act 2004) within the London Borough of Havering area.

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## Record of Amendments

Date	Version	Author	Changes
July 2007	1.1	Havering EP and BC Service	Original Borough Risk Register produced in line with the North East London Local Resilience Forum Community Risk Register format.
May 2011	1.12	Havering EP and BC Service	Original Borough Risk Register produced by the Havering Emergency Services Liaison Panel transferred to the Havering Borough Resilience Forum with relevant changes made.
Jan 2012	2.00	Havering EP and BC Service	Six existing Community Risk Registers amalgamated into one London Community Risk Register. This Borough Risk Register has been reviewed and amended in line with the London Community Risk Register.
Feb 2014	2.1	Havering EP and BC Service	Control measures and review dates added to BRR. H22, H24a, H24b and HL102 removed. H54, H55, H56 and H58 added.
June 2014	2.2	Havering EP and BC Service	Malicious attacks added to BRR as X1 – X7. Risk positions amended in rating order within each category. HL 20 removed. L19 added.
Sept 2014	2.3	Havering EP and BC Service	BRR risk matrix aligned to the new NRA risk matrix, with some risks increasing and some decreasing in risk rating. H43 removed as per the NRA.
Jan 2015	2.4	Havering EP and BC Service	H5 and HL43 added. H49 removed.
Oct 2015	2.5	Havering EP and BC Service	H57 added.
Feb 2017	2.6	Havering EP and BC Service	H46 removed, HL 9b added
Feb 2018	2.7	Havering EP and BC Service	H46 re-instated. H30 removed. H62 Air quality added. H22 added and HL16/HL17/HL18/HL19 removed
June 2019	2.8	Havering CCRT	HL 28, HL14, HL12, HL43, H55, HL33, HL4 and HL25 removed. H60 Added
November 2019	2.9	Havering CCRT	Formatting of the Havering Risk Register adapted and hyperlinks added for ease.

Any queries or enquiries should be directed to [emergencyplans@havering.gov.uk](mailto:emergencyplans@havering.gov.uk)

## Distribution History

Date	Comments	Version
July 2007	Havering Emergency Services Liaison Panel membership	1.1
May 2011	Havering Borough Resilience Forum	1.12
Jan 2012	Havering Borough Resilience Forum	2.0

Feb 2014	Havering Borough Resilience Forum	2.1
June 2014	Havering Borough Resilience Forum	2.2
Sept 2014	Havering Borough Resilience Forum	2.3
Jan 2015	Havering Borough Resilience Forum	2.4
Oct 2015	Havering Borough Resilience Forum	2.5
Feb 2017	Havering Borough Resilience Forum	2.6
Feb 2018	Havering Borough Resilience Forum	2.7
June 2019	Havering Borough Resilience Forum	2.8

## Havering Borough Risk Register: High-Level Summary

Risk ID	Short Name	P g
H23	<a href="#">Influenza Pandemic</a>	25
L21	<a href="#">Severe inland flooding</a>	20
HL19	<a href="#">Major coastal and tidal flooding</a>	22
H41	<a href="#">National electricity failure (Blackstart)</a>	34
X5	<a href="#">Catastrophic unconventional attack</a>	39
H45	<a href="#">Technical failure of regional electricity network</a>	34
HL50	<a href="#">Severe Drought</a>	19
H54	<a href="#">Disruption to aviation as a consequence of volcanic ash</a>	30
H56	<a href="#">Severe space weather</a>	31
H22	<a href="#">Surface water flooding</a>	24
X3	<a href="#">Attacks on Transport Systems</a>	38
H62	<a href="#">Air Quality</a>	26
HL42	<a href="#">Industrial action by workers providing a service critical to the preservation of life</a>	36
L19	<a href="#">Flooding from other sources</a>	24
HL11	<a href="#">Railway Accident</a>	16
X1	<a href="#">Attacks on crowded places</a>	39
H44	<a href="#">Reservoir dam failure/collapse</a>	25
H38	<a href="#">Technical failure of a critical upstream oil/gas facility</a>	35

Risk ID	Short Name	P g
	<a href="#">Industrial accident involving small toxic release</a>	11
HL3	<a href="#">Storms and gales</a>	18
H17	<a href="#">Low temps and heavy snow</a>	18
H18	<a href="#">Emerging infectious diseases</a>	27
H24	<a href="#">Attacks on infrastructure</a>	39
X2	<a href="#">Small scale unconventional attacks</a>	39
X4	<a href="#">Fire or explosion at a fuel distribution site or a site storing flammable and/or toxic liquids</a>	11
H4	<a href="#">Heatwave</a>	19
HL48	<a href="#">Large toxic chemical release</a>	12
H9	<a href="#">Non availability of piped water supply</a>	35
H39	<a href="#">Land movement</a>	31
HL21	<a href="#">Biological substance release during an unrelated work activity</a>	11
H46	<a href="#">Building Collapse</a>	32
HL22	<a href="#">No notice loss of telecommunications</a>	36
H40	<a href="#">Influx of British Nationals not normally resident in the UK</a>	37
H37	<a href="#">Food chain contamination</a>	12
H14		

Risk ID	Short Name	P g
H31	<a href="#">Constraint on fuel supply at filling stations</a>	37
HL26b	<a href="#">Zoonotic animal diseases</a>	29
HL26a	<a href="#">Non-zoonotic animal diseases</a>	28
H58	<a href="#">Forest or moorland fire</a>	32
H12	<a href="#">Biological substance release</a>	13
HL9	<a href="#">Aviation accident</a>	16
HL22a	<a href="#">Large building collapse</a>	33
HL105	<a href="#">Complex built environments</a>	36
X6	<a href="#">Cyber security (infrastructure)</a>	39
H16	<a href="#">Aviation accident</a>	17
HL9b	<a href="#">Small aircraft incident</a>	17
HL23	<a href="#">Bridge Collapse</a>	33
H11	<a href="#">Accidental release of radioactive material</a>	14
H60	<a href="#">High consequence dangerous goods</a>	13
H7	<a href="#">Explosion at a high pressure natural gas pipeline</a>	14
HL30	<a href="#">Localised explosion at a natural gas main.</a>	15
HL34	<a href="#">Fire, flooding, stranding or collision involving a passenger vessel in or close to UK waters</a>	17

<b>Risk ID</b>	<b>Short Name</b>	<b>P g</b>
<a href="#">HL8</a>	<a href="#">Fire, flooding, stranding or collision involving a passenger vessel in or close to UK waters or on inland waterways</a>	18
<a href="#">HL7</a>	<a href="#">Industrial explosions and major fires</a>	14
<a href="#">H5</a>	<a href="#">Fire or explosion at an onshore fuel pipeline</a>	15
<a href="#">H35</a>	<a href="#">Industrial action by key rail or London Underground workers.</a>	36
<a href="#">H57</a>	<a href="#">Public Disorder</a>	37
<a href="#">X7</a>	<a href="#">Cyber security (Data confidentiality)</a>	39
<a href="#">HL10</a>	<a href="#">Local accident on motorways and major trunk roads</a>	15
<a href="#">H15</a>	<a href="#">Maritime Pollution</a>	15
<a href="#">HL37</a>	<a href="#">Release of hazardous chemicals as a result of shipping accident</a>	15

## **Introduction and Background**

This Risk Register is used by the Havering Borough Resilience Forum to help the prioritisation of resilience activities towards higher rated risks.

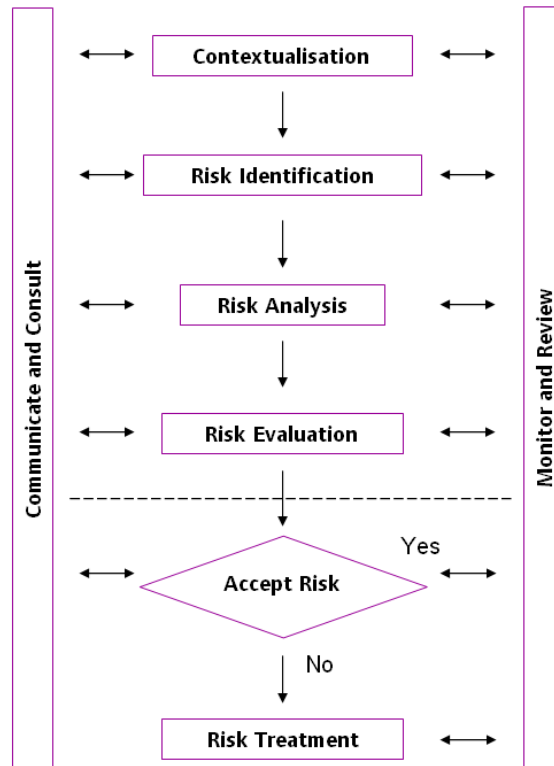
Communities and businesses are also encouraged to use the Borough Risk Register to inform their own resilience arrangements and business continuity plans. It is for this reason that the Borough Risk Register is made publically available.

The risks included in the Havering Borough Risk Register represent 'reasonable worst case scenarios' and their inclusion in the register does not mean that they are going to happen, or that if they did do that they would be as serious as the descriptions included here. The Reasonable Worst Case scenarios are nationally developed and informed by historical and scientific data, modeling and trend surveillance and professional expert judgment. The Havering Borough Risk Register provides an assessment of the likelihood and impact of these scenarios for Havering.

The Havering Borough Risk Register does not include reference to pre-planned events, which are covered under separate guidance and risk assessments.



## The 6 Stage Risk Assessment Process



### 1. Contextualisation

The London Risk Advisory Group have developed the *London Community Risk Register: Policy for Maintenance and Review*, which describes the scope and processes that will be used to undertake risk assessment and outlines the key stakeholders, for both the London Community and Borough Risk Registers.

The London Risk Advisory Group has also developed *London Risks In Context* – a document which summarises the characteristics of London which influence the assessment of Likelihood and Impact (through an awareness of inherent vulnerabilities and resilience factors), and subsequently is used when reviewing the Borough Risk Register.

### 2. Hazard Identification and allocation for assessment

In line with the Local Risk Assessment Guidance, the Havering Borough Resilience Forum Risk Advisory Working Group (HBRF-RAWG) identifies those threats and hazards that, in their view, could give rise to an emergency within Havering in the next 5 years.

The London Risk Advisory Group and the HBRF-RAWG has identified lead agencies to undertake the Individual Risk Assessment for each risk prior to multi-agency discussion and

agreement. The HBRF-RAWG has also developed a rolling review programme to ensure that each risk is revisited and, as necessary, updated within a 2-year period.

### **3. Risk analysis**

Drawing on generic assessments (provided by CCS), the London Community Risk Register, other research and local knowledge, the lead assessor considers the likelihood of the risk over the next five-year period.

The range of potential impacts arising from the risk, as well as any vulnerabilities surrounding these, is proposed and discussed with HBRF-RAWG.

Individual Risk Assessment is provided to HBRF-RAWG for evaluation

### **4. Risk evaluation**

HBRF-RAWG considers the Individual Risk Assessment and confirms or modifies assessments as appropriate.

Agreed assessments are collated and incorporated into the Borough Risk Register (BRR).

HBRF-RAWG incorporates into BRR threat statements provided by central government within the Local Risk Assessment Guidance, but does not assess likelihood or impact.

HBRF-RAWG highlights existing capabilities and mitigation plans for the hazards and threats and:

- considers the acceptability of risks;
- identifies and recommends options for risk treatment for the HBRF; and
- makes recommendations to the HBRF on risk priorities for hazards and threats.

HBRF reviews the BRR and recommendations from HBRF-RAWG and determines appropriate action.

### **5. Risk treatment**

Gaps in capability are assessed

Proposed options for additional risk treatment are developed, and agreed by HBRF for inclusion on the HBRF Delivery Plan, including the identification of lead agency

### **6. Monitoring and Review**

Formal review of risks on a rolling two year cycle but reviewed and updated as and when appropriate including in response to annual publications of the Local Risk Assessment Guidance, and as a result of exercises and incidents.

In relation to Section 3 of this BRR, the inclusion of the hazard or the particular scenario (ie the outcome description) does not mean that the HBRF-RAWG believes the risk will materialise, or that if it were to do so that it would be at that scale. The risk scenarios are rather reasonable worst case assumptions upon which our risk assessments are based.

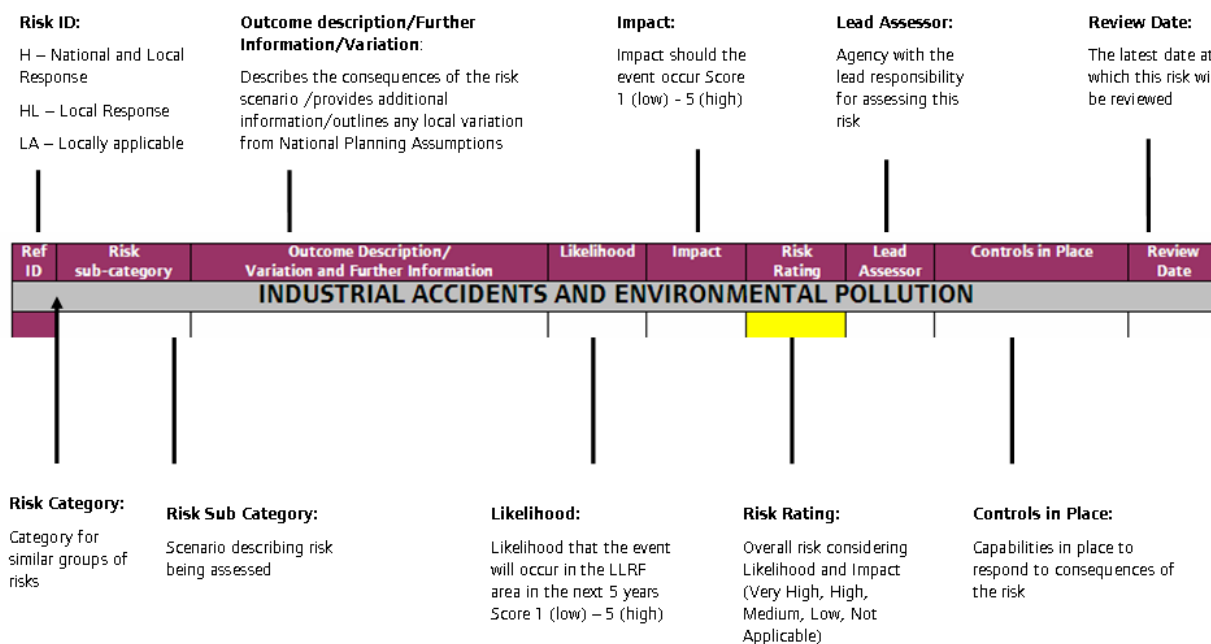
The likelihood assessments relate to the risk occurring over a five-year period at the magnitude reflected within the outcome description. The magnitude is based on an assessment of a reasonable worst case scenario.

As part of the risk assessment process, the HBRF-RAWG has been considering the likelihood and impact of a range of hazards occurring.

Risk assessment is not a static process and is subject to constant review. The information contained in this BRR will, as a result, be regularly updated.

## Havering Borough Risk Register Explained

Each risk identified on the London Community Risk Register is supported with an Individual risk Assessment. These risk assessments are highly detailed and the Community Risk Register presents summary information only.



### Havering Profile

Havering is London's 3<sup>rd</sup> largest borough, covering an area of 11,235 hectares (43 square miles). 809 hectares are parks and open spaces, and 54% is green belt. The borough is bordered by the London Borough's of Redbridge and Barking and Dagenham, Essex County and 3 miles/5 km of River Thames frontage. The borough is made up of several suburban towns, a regional shopping centre at Romford, and an even distribution of commercial and industrial premises generally located on estates and retail/office parks. There is one COMAH site (Flogas) located in Rainham.

There are several major trunk roads crossing the borough including the M25/A12/A13 and A127. The District London Underground line, C2C and National Rail lines all cross and have stations located within the borough, with the Channel Tunnel Rail Link passing through over ground.

The Rivers Rom, Ravensbourne and Ingrebourne run north-south across the borough towards the Thames, with the Rom joining the Beam at the Barking and Dagenham border. These rivers all feature on the EA Flood Maps.

The population is approximately 249,085, with 88% being White British, 1.4% White Irish, 2.4% Other White and 8.3% Black and Minority Ethnic. Havering has the highest number of over 60 residents in London (23%) with 0-4 being 6%, 5-15 being 14% and 16-59 being 57%. There are 93,200 households, the majority of which are privately owned. The Council house portfolio is predominantly housing, with some low and medium rise and 23 high rise residential blocks. Health care is delivered through 1 major hospital, 1 local hospital, a polyclinic and 3 health centres as well as GP surgeries. Education is provided through 89 schools and 2 colleges.

## Havering Borough Risk Register

Ref ID	Risk sub-category	Outcome Description/ Variation and Further Information	Likelihood	Impact	Risk Rating	Lead Assessor	Controls in Place	Review Date
<b>Major industrial accidents/industrial and environmental pollution incidents</b>								
H46	Biological substance release during an unrelated work activity/industrial process (e.g. Legionella release due to improperly maintained building environmental control systems)	<p><b>Outcome Description</b> Up to 10 fatalities and serious injuries or off site impact requiring up to 1000 casualties.</p> <p><b>Variation and Further Information</b> Specifically related to Legionella disease during an unrelated work activity or industrial process. Inadvertent Legionella contaminant of wet cooling systems such as cooling towers and evaporative condensers, and air conditioning systems such as humidifiers and industrial air scrubbers.</p>	Medium High (4)	Minor (2)	Medium	PHE	Health and Safety at Work Act 1974 / Control of Substances Hazardous to Health Regs 2000 / Management of Health and Safety at Work Regs 1999 / Reporting of Injuries, Diseases and Dangerous Occurrences Regs / HSE Approved Code of Practise and Guidance 2001 (not fully complied with) / HSE and Local Authority inspections of cooling towers (not uniform) / London Resilience Partnership Plans.	Last Apr 2019  Next Apr 2021
HL3	Localised industrial accident involving small toxic release	<p><b>Outcome Description</b> Up to 1km from site causing up to 10 fatalities and up to 100 casualties.</p> <p><b>Variation &amp; Further Information</b> Plant of this nature is randomly located across Havering in industrial areas and some agricultural sites.</p>	Medium (3)	Moderate (3)	High	LFB	COMAH Regs 1999 / Regulatory Reform (Fire Safety) Order 2005 / London Resilience Partnership Plans.	Last July 2019  Next Apr 2021

Ref ID	Risk sub-category	Outcome Description/ Variation and Further Information	Likelihood	Impact	Risk Rating	Lead Assessor	Controls in Place	Review Date
H4	Fire or explosion at a fuel distribution site or a site storing flammable and/or toxic liquids in atmospheric pressure storage tanks (Includes HL28)	<p><b>Outcome Description</b> Up to 3km around site causing (from 10) up to 150 fatalities and (100 to) 2000 casualties. Might be disruption to air transport in the short-term until fuel supply re-directed. Short-term regional excessive demands on health care services. Closure of roads in locality for a short period of time.</p> <p><b>Variation and Further Information</b> A large industrial complex or fuel storage site near to a populated (ie urban area) e.g. Stolthaven in Dagenham.</p>	Low (1)	Catastrophic (5)	High	LFB	COMAH Regs 1999 / The Dangerous Substances and Explosive Atmosphere Regs 2002 / Petroleum Regs / Regulatory Reform (Fire Safety) Order 2005 / Site Operators on-site contingency plans / Emergency Services specialist resources.	Last July 2019  Next Apr 2021
H9	Large toxic chemical release	<p><b>Outcome Description</b> Up to 3km from site of toxic chemical release causing up to 50 fatalities and up to 2000 casualties. This risk could result in environmental contamination with associated environmental impacts. Depending on the nature and extent of the contamination there could be impacts on air, land water, animal welfare, agriculture and waste management. This risk might require remediation and/or decontamination. Excessive demands on health care services locally both short and long term. Water supplies might be at risk. Contamination of farm land could lead to avoidance of certain foodstuffs.</p> <p><b>Variation and Further Information</b> Eg a chlorine release or large industrial complex or bulk storage of chemicals near to a populated (i.e. urban) area. There are some sites of this nature near to Havering.</p>	Low (1)	Catastrophic (5)	High	LFB	COMAH Regs 1999 / Regulatory Reform (Fire Safety) Order 2005 / Emergency Services and other responder specialist resources / London Resilience Partnership Plans.	Last July 2019  Next Apr 2021

Ref ID	Risk sub-category	Outcome Description/ Variation and Further Information	Likelihood	Impact	Risk Rating	Lead Assessor	Controls in Place	Review Date
H14	Major contamination incident with widespread implications for the food chain, arising from: 1. Industrial accident (chemical, microbiological, nuclear) affecting food production areas eg Chernobyl, Sea Empress oil spill, animal disease. 2. Contamination of animal feed eg dioxins, BSE. 3. Incidents arising from production processes, eg adulteration of chilli powder with Sudan	<p><b>Outcome Description</b> There may be direct animal and consumer health effects arising from this incident. We assume a small number of fatalities (5) and casualties (50), although the public health implications of food incidents vary widely. Additionally, there may be food production/marketing implications, depending on the scale and area affected. Consumer confidence may also be affected leading to lost markets and, where staple products (eg bread or milk) are affected, potential panic buying.</p> <p><b>Variation and Further Information</b> An incident similar to that which occurred in Belgium in which animal feed is contaminated with Dioxins, resulting in contamination of animals and animal products.</p>	Medium High (4)	Minor (2)	Medium	Local Auth's	EC Directives and Regulations: Regulation (EC) 852/2004 Regulation (EC) 853/2004 Regulation (EC) 854/2004 Food Safety Act 1990 / Imports monitored / Local Authority Environmental Health Sampling / Public Health England monitoring and surveillance / Foods Standards Agency Plans.	Last July 2019 Next Apr 2021

Ref ID	Risk sub-category	Outcome Description/ Variation and Further Information	Likelihood	Impact	Risk Rating	Lead Assessor	Controls in Place	Review Date
	I dye or melamine contamination of milk.							
H12	Biological substance release from facility where pathogens are handled deliberately (e.g. pathogen release from containment laboratory)	<p><b>Outcome Description</b> Up to 10 fatalities and serious injuries or off-site impact causing up to 1,000 casualties.</p> <p><b>Variation and Further Information</b> Assume release in an urban area. Biological agent (mainly HG3 &amp; 4 human &amp; animal pathogens) release from containment (e.g. infection of laboratory worker or animal) – example SARS release from lab in China resulted in 2 deaths &amp; several hundred people quarantined. This type of release could be the source of an outbreak that leads to H23-H26 risks.</p>	Medium Low (2)	Moderate (3)	Medium	Health	Animal Health Act 1981 / Specified Animal Pathogens Order 1998 / Health and Safety at Work Act 1974 / Control of Substances Hazardous to Health Regs 2000 / Management of Health and Safety at Work Regs 1999 / Reporting of Injuries, Diseases and Dangerous Occurrences Regs / Carriage of Dangerous Goods (Classification, Packaging, and Labelling Regs / Genetically Modified Organisms (Contained Use) Regs 2000 / Regulations, audit and enforcement of legislation by the HSE / London Resilience Partnership Plans	Last Apr 2019  Next Apr 2021
H60	High Consequence dangerous Goods (includes HL12 and HL14)	<p>A road or rail tanker containing dangerous goods and/or “high consequence” dangerous goods is involved in an accident leading to fire and an explosion.</p> <p>The RWCS assumes up to 200 fatalities and up to 500 people requiring medical treatment. The explosion will cause varying degrees of damage to property and infrastructure depending on their distance from the incident. This risk would result in a toxic plume/gas cloud which would be harmful to the</p>	Medium Low (2)	Minor (2)	Medium	LFB	Health & Safety at Work etc Act 1974 Control of Substances Hazardous to Health Regulations 2002 Management of Health & Safety at Work Regulations 1999 Reporting of Injuries Diseases and Dangerous Occurrences Regulations	Last July 2019  Next July 2021



Ref ID	Risk sub-category	Outcome Description/ Variation and Further Information	Likelihood	Impact	Risk Rating	Lead Assessor	Controls in Place	Review Date
		population, resulting in evacuation of the immediate area. This risk could result in environmental contamination with associated environmental impacts. Depending on the nature and extent of the contamination there could be impacts on air, land, water, animal welfare, agriculture and waste management. This risk may require remediation and/or decontamination.						
H11	Accidental release of radioactive material from incorrectly handled or disposed of sources.	<p><b>Outcome Description</b> Up to five fatalities and up to 100 contaminated people requiring medical monitoring. Many worried people may present at hospitals. Radiation may be spread over several km but concentration where source is opened. This risk could result in environmental contamination with associated environmental impacts. Depending on the nature and extent of the contamination there could be impacts on air, land, water, animal welfare, agriculture and waste management. This risk may require remediation and/or decontamination.</p> <p><b>Variation &amp; Further Information</b> Assume radioactive material is a medical source from radiotherapy machine, located at various NHS sites across Havering. Source could also be mobile by road, rail, river or air, and is covered under transport accidents.</p>	Medium Low (2)	Minor (2)	Medium	EA	Environmental Permitting Regulations EPR2010. Arrangements for safe handling and disposal of radioactive sources / Radiation detectors at high risk sites / EA inspections of all major sources / Emergency Services specialist resources / London Resilience Partnership Plans	Last July 2019  Next Apr 2021

Ref ID	Risk sub-category	Outcome Description/ Variation and Further Information	Likelihood	Impact	Risk Rating	Lead Assessor	Controls in Place	Review Date
HL7	Industrial explosions and major fires (includes HL25)	<p><b>Outcome Description</b> Up to 1km around site, causing up to 20 casualties, some of a serious nature. Explosions would cause primarily crush / cuts and bruise-type injuries, as well as burns.</p> <p><b>Variation and Further Information</b> Industrial plant of this nature is distributed around Havering Borough., with 3 high fire risk waste sites located in the south of the borough.</p>	Medium Low (2)	Minor (2)	Medium	LFB	COMAH Regs 1999 / Regulatory Reform (Fire Safety) Order 2005 / Building design and fire protection systems to prevent or limit the spread of fire / Emergency Services and other specialist resources.	Last July 2019  Next Apr 2021
H7	Explosion at a high pressure natural gas pipeline	<p><b>Outcome Description</b> Local to site causing up to 200 fatalities and up to 200 casualties.</p> <p><b>Variation &amp; Further Information H7 &amp; HL30</b> Risk is based on the release point close to a populated (i.e. urban) area. Impact on environment, including persistent/widespread impact on air quality. Plant of this nature traverses the Havering area.</p>	Low (1)	Moderate (3)	Medium	LFB	Pipeline Safety Regs 1996 / Regulatory and industry measures including provision of maps for evacuation / Emergency Services and other responder specialist resources. Major Accident Hazard Pipeline (MAHP) Plan / Barking to Horndon Pipeline Plan.	Last July 2019  Next Apr 2021
HL30	Localised explosion at a natural gas main.	<p><b>Outcome Description</b> Causing up to 100 fatalities and up to 100 casualties. Plant of this nature is evenly distributed across Havering with some clustering in industrial areas.</p>	Low (1)	Moderate (3)	Medium	LFB	Pipeline Safety Regs 1996 / Regulatory and industry measures including provision of maps for evacuation / Emergency Services and other responder specialist resources.	Last July 2019  Next Apr 2021
H5	Fire or explosion at an onshore fuel pipeline	<p><b>Outcome Description</b> Up to 1 km around site causing up to 100 fatalities and 500 casualties. A release point close to a populated (i.e. urban) area. Impact on environment, including persistent /widespread impact on air quality.</p> <p>There is an onshore fuel pipeline crossing the NE of Havering.</p>	Low (1)	Moderate (3)	Medium	LFB	Requisitioned Land and War Works Act 1948/The Land Powers(Defence) Act 1958/ Shell Mex and BP (London Airport Pipeline) Act 1959/ Esso Petroleum Company Act 1961/Pipelines Act 1962/Pipeline Safety Regs	Last July 2019  Next Apr 2021

Ref ID	Risk sub-category	Outcome Description/ Variation and Further Information	Likelihood	Impact	Risk Rating	Lead Assessor	Controls in Place	Review Date
							1996/COMAH Regs 1999/Emergency services specialist resources	
H15	Maritime pollution	<p><b>Outcome Description</b> Spillage of 100,000 tonnes of crude oil into the Thames Estuary polluting up to 200 km of coastline. Release of sufficient pollutant into the river, with contamination of embankments and river structures, to result in a Tier 2 or Tier 3 pollution response within the port. Pollution may arise from an incident within the London Resilience area, or from an incident further east with pollution being spread upriver on a series of tidal cycles.</p> <p><b>Variation and Further Information</b> A large fully laden oil super tanker sinks in the approach to a UK port, e.g. the Thames Estuary, fully laden and with strong north-easterly winds and with the tide flowing up the Thames Estuary.</p>	Low (1)	Minor (2)	Low	MCA	Dangerous Substances in Harbour Areas Regs 1987 / Merchant Shipping (Oil Pollution Preparedness, Response and Cooperation Convention) Regs 1998 / Port State Control Checks coordinated in European Waters / All vessels navigating on the tidal Thames requiring a PLA License / PLA Vessel Traffic Service / National Contingency Plan for Marine Pollution from Shipping and Offshore Installations (2000) / Oil Spill Contingency Plan Guidelines for Ports, Harbours and Oil Handling Facilities / Specialist equipment for response.	Last July 2019  Next Apr 2021
HL37	Release of significant quantities of hazardous chemicals/materials as a result of major shipping accident	<p><b>Outcome Description</b> Fatalities and casualties unlikely. Significant environmental/ecological damage.</p> <p><b>Variation and Further Information</b> The extent of the impact would depend on substance involved, quantity, nature and location of accident</p>	Low (1)	Minor (2)	Low	MCA	Port of London River Byelaws 1978 / Dangerous Substances in Harbour Area Regs 1987 / Dangerous Substances in Bulk Byelaws 1991 / Merchant Shipping (Oil Pollution Prevention, Response, and Cooperation Convention) Regs 1998 / Navigation safety monitored by Vessel Traffic System at the	Last July 2018  Next July 2020

Ref ID	Risk sub-category	Outcome Description/ Variation and Further Information	Likelihood	Impact	Risk Rating	Lead Assessor	Controls in Place	Review Date
							Thames Barrier Navigation Centre / Specialist response equipment and resources.	
<b>Major transport accidents/incidents</b>								
HL11	Railway Accident	<p><b>Outcome Description</b> Up to 30 fatalities and up to 100 casualties (fractures, internal injuries – burns less likely). Possible loss of freight. Major disruption to rail line including possible closure of rail tunnel.</p> <p><b>Variation and further information</b> The high speed CTRL runs above ground through Havering, with C2C/Greater Anglia operating main line services through the borough, and the district underground line runs through and terminates in sidings at Cranham. Hazmat freight also crosses the borough by rail.</p>	Medium (3)	Moderate (3)	High	BTP	Railway and Transport Safety Act 2003 / Railways (Access and Management) Regs 2005 / Railways (Accident Investigation and Reporting) Regs 2005 / Railways (Licensing of Railway Undertakings) Regs 2005 / Railways Act 2005 and 1993 / The Railway Safety Levy Regs 2006 / Transport Act 2000 / Health and Safety at Work (etc) Act 1974 / The Railway (Safety Case) Regs 2000 / Improved inspection regimes to detect track defects / Train Protection Warning Systems / ATOC Guidance and Directives / Specialist Emergency Services and other responder procedures and resources.	Last July 2018  Next July 2020
HL9	Aviation accident	<p><b>Outcome Description</b> Aviation accident causing up to 50 fatalities and up to 250 casualties.</p> <p><b>Variation and Further Information</b> Accident involving one commercial aircraft, probably on take off or landing. As per H16, including Air Ambulances using Queens Hospital.</p>	Medium Low (2)	Moderate (3)	Medium	LFB	Stringent controls on aircraft entering UK Airspace including the mandatory use of Aircraft Collision Avoidance Systems on heavy aircraft / UK flight separation rules / CAA Maintenance and	Last July 2018  Next July 2020

Ref ID	Risk sub-category	Outcome Description/ Variation and Further Information	Likelihood	Impact	Risk Rating	Lead Assessor	Controls in Place	Review Date
							Flight Safety Standards / Airline maintenance regimes / London Resilience Partnership Plans.	
H16	Aviation accident over a semi-urban area	<p><b>Outcome Description</b> Loss of up to two aircraft and passengers, with debris over a semi-urban area.</p> <p><b>Variation and Further Information</b> Collision of two commercial airliners - death of all passengers and crew on aircraft (600 fatalities), up to 50 fatalities and 300 casualties on the ground. No significant damage to key infrastructure. Havering is on the London City Airport flightpath, and stacking from the London airport(s) occurs over the borough during busy periods. Damyns Hall airfield in Upminster and Stapleford Tawney airfield both service light aircraft flights.</p>	Low (1)	Significant (4)	Medium	LFB	Stringent controls on aircraft entering UK Airspace including the mandatory use of Aircraft Collision Avoidance Systems on heavy aircraft / UK flight separation rules / CAA Maintenance and Flight Safety Standards / Airline maintenance regimes / London Resilience Partnership Plans.	Last July 2018  Next July 2020
HL9b	Small aircraft incident	A light aircraft is an aircraft that has a maximum gross take off weight of 12,500 lb (5,670 kg) or less. Many light aircraft are used commercially for passenger and freight transport, sightseeing, photography, and other similar roles as well as personal use. This covers an accident involving one commercial aircraft, probably on take off or landing. Local risk as per H9/H16	Medium Low (2)	Minor (2)	Medium	LFB	Stringent controls on aircraft entering UK Airspace including the mandatory use of Aircraft Collision Avoidance systems on heavy aircraft /UK flight separation rules/CAA maintenance and flight safety standards/Airline maintenance regimes	Last April 2019  Next April 2021
HL34	Fire, flooding, stranding or collision involving a passenger vessel in or close to UK waters leading to	<p><b>Outcome Description</b> Up to 50 fatalities and up to 100 casualties.</p> <p><b>Variation and Further Information</b> The risk is based on an accident to a</p>	Low (1)	Moderate (3)	Medium	MCA	Port of London Act 1968 (As amended) / General Directions for Navigating in the Port of London 2009 / Port of London River Byelaws 1978 / Port State	Last July 2018  Next July 2020

Ref ID	Risk sub-category	Outcome Description/ Variation and Further Information	Likelihood	Impact	Risk Rating	Lead Assessor	Controls in Place	Review Date
	the ship's evacuation or partial evacuation at sea	typical passenger vessel visiting London, or a large Class V vessel (<600 passengers) operating on the River Thames.					Control Checks Coordinated in European Waters / Compulsory PLA pilotage for visiting cruise ships / PLA Vessel Management System and coordination with Thames Barrier Navigation Centre / Provision of life saving equipment on river banks and specialist response resources.	
HL8	Fire, flooding, stranding or collision involving a passenger vessel in or close to UK waters or on inland waterways, leading to the ship's evacuation.	<p><b>Outcome Description</b> Up to 50 fatalities and up to 100 casualties</p> <p><b>Variation and Further Information</b> The risk is based on an accident to a smaller passenger vessel on the River Thames or inland waterways.</p>	Low (1)	Moderate (3)	Medium	MCA	Port of London Act 1968 (As amended) / General Directions for Navigating in the Port of London 2009 / Port of London River Byelaws 1978 / PLA Vessel Management System and coordination with Thames Barrier Navigation Centre / Provision of life saving equipment on river banks and specialist response resources	Last July 2018  Next July 2020
HL10	Local accident on motorways and major trunk roads	<p><b>Outcome Description</b> Multiple vehicle incident causing up to 10 fatalities and up to 20 casualties (internal injuries, fractures, possible burns); closure of lanes or carriageways causing major disruption and delays.</p> <p><b>Variation and Further Information</b> There is a 6 mile stretch of the M25 and 3 major trunk roads A12, A13 and A127 running through Havering, all of which are high speed-high risk roads with routine accidents occurring.</p>	Medium High (4)	Limited (1)	Low	MPS	Road Traffic Act 1988 / Road Vehicle (Construction and Use) Regs 1986 / Traffic Management Act 2004 / VOSA patrols to enforce legislation / London Resilience Partnership Plans.	Last July 2018  Next July 2020

Ref ID	Risk sub-category	Outcome Description/ Variation and Further Information	Likelihood	Impact	Risk Rating	Lead Assessor	Controls in Place	Review Date
<b>Severe weather</b>								
H17	Storms & Gales.	<p><b>Outcome Description</b> Storm force winds affecting most of the South East England region for at least 6 hours. Most inland, lowland areas experience mean speeds in excess of 55 mph with gusts in excess of 85 mph. Up to 50 fatalities and 500 casualties with short term disruption to infrastructure including power, transport networks, homes and businesses.</p> <p><b>Variation and Further Information</b> The wind storm event definition is based on Oct 1987 and Burns Day 1990 type events, but more severe than either.</p>	Medium (3)	Moderate (3)	High	Local Auth's	Regular inspection of trees and highways for maintenance / Met Office Hazard Manager service / Responder specialist resources.	Last Apr 2018  Next Apr 2020
H18	Low temperatures and heavy snow.	<p><b>Outcome Description</b> Snow falling and lying over most of the area for at least one week. After an initial fall of snow there is further snow fall on and off for at least 7 days. Most lowland areas experience some falls in excess of 10cm, a depth of snow in excess of 30cm and a period of at least 7 consecutive days with daily mean temperature below -3°C. Up to 1000 fatalities (excess deaths) and thousands of casualties, mainly amongst the elderly and there is likely to be some disruption to transport networks, businesses, power supply and water supply, and also school closures.</p> <p><b>Variation and Further Information</b> The cold/snow event definition is based on a February 1991 type event bearing in mind the impact more recent events such as Feb 2009 and Dec/Jan 2009/10</p>	Medium (3)	Moderate (3)	High	Local Auth's	Highways Act 1980 / Railways and Transport Act 2003 / Government's Snow Code / Specific plans for traffic management / Coordination of gritting and salt stocks / National Severe Weather Warning Service / Responder specialist resources/Havering Winter Service Plan.	Last Apr 2018  Next Apr 2020

Ref ID	Risk sub-category	Outcome Description/ Variation and Further Information	Likelihood	Impact	Risk Rating	Lead Assessor	Controls in Place	Review Date
		have had. Excess winter deaths (EWD) are the difference between expected numbers of deaths and the actual number of deaths during a winter period. In Havering, an additional 1 in 5 deaths occur in winter compared to non-winter months, with people aged 85 and over being most vulnerable. Among the over 85's more than 1 in 4 additional deaths occur in winter months, mostly attributable to influenza and pneumonia (60%). Among the over 65's, Havering has a higher EWD ratio compared to London, and England.						
HL50	Drought	<b>Outcome Description</b> Periodic water supply interruptions affecting 385, 000 businesses in London for up to 10 months. Emergency Drought Orders in place authorising rota cuts in supply according to needs of priority users as directed by Secretary of State. The 2.24 million households in London would not be subjected to supply interruptions. A drought of this severity is unprecedented and would take at least 3 dry winters to develop.	Medium (3)	Significant (4)	Very High	EA	Water Resources Act 1991 / Flood and Water Management Act 2010 / Progressive restraints on consumption to preserve supply for critical services / Storage reservoirs.	Last Apr 2018  Next Apr 2020
HL48	Heat Wave.	<b>Outcome Description</b> Daily maximum temperatures in excess of 32°C and minimum temperatures in excess of 15°C over most of a region for at least 5 consecutive days. Up to 1000 fatalities and 5000 casualties mainly amongst the elderly. There could be disruption to power supply and transport infrastructure. The heatwave event definition is based on an August 2003 type event, but more severe. There will be subsequent impact on electricity	Medium High (4)	Moderate (3)	High	Health	Health and Safety at Work Act 1974 / Public Health Act / Heatwave Plan for England and supporting London Resilience Partnership Plans / Climate Change Adaption Strategy for London / Heat-Health watch.	Last Apr 2018  Next Apr 2020



Ref ID	Risk sub-category	Outcome Description/ Variation and Further Information	Likelihood	Impact	Risk Rating	Lead Assessor	Controls in Place	Review Date
		<p>generation and cooling systems. Currently in the London area the summer peak demand is higher than winter due to building air conditioning systems.</p> <p><b>Variation and further information</b> Heatwave can cause illness and death, mainly as a result of respiratory and cardiovascular disease. The groups that are most vulnerable during heatwave are (a) older people, especially women over 75 years old, living on their own or in a care home (b) people with chronic and severe illness (c) those unable to adapt behaviour to keep cool (eg Alzheimers, people with disability, babies etc) (d) those affected by environmental factors (eg living in a top floor flat, homeless, jobs that are outdoors/require exertion).</p>						
<b>Flooding</b>								
L21	Severe inland flooding affecting more than 2 UK regions	<p><b>Outcome Description</b> A single massive inland event or multiple concurrent regional events following a sustained period of heavy rainfall extending over two weeks (perhaps combined with snow melt or intense summer rainfall leading to widespread surface water flooding). The event would include major fluvial flooding affecting a large, single urban area.</p> <p>Across urban and rural areas (with a greater proportion occurring in urban areas) flooding of up to 50,000 properties (homes &amp; businesses) for up to 10 days. Up to 10 fatalities and 500</p>	Medium (3)	Significant (4)	Very High	EA	Flood and Water Management Act 2010 / Land Drainage Act 1991 / Water Resources Act 1991 / EA and Met Office flood warning services / EA inspection of flood defences / London Resilience Partnership Plans / Havering Multi-agency Flood Plan.	Last Apr 2018 Next Apr 2020

Ref ID	Risk sub-category	Outcome Description/ Variation and Further Information	Likelihood	Impact	Risk Rating	Lead Assessor	Controls in Place	Review Date
		<p>casualties and 20 missing persons (“missing” means: not accounted for during the first 48 hrs). Up to 55,000 people needing assistance with evacuation. Up to 6,000 people in need of rescue or assistance in-situ. (H2O in earlier assessments).</p> <p><b>Effects include:</b> Closure of primary transport routes. Infrastructure failure. Loss of essential services (water, gas, electricity &amp; telecom) to 250,000 homes and businesses for up to 14 days. Sediment movement and disruption to water supplies. Significant regional economic damage.</p> <p><b>Variation &amp; Further Information - Assumes:</b></p> <ul style="list-style-type: none"> <li>• Up to 4 days of advanced severe weather alerts from the Met Office</li> <li>• Hazard is not evenly distributed across the UK</li> <li>• Rescue can only be by boat, helicopter, or high-clearance vehicles</li> <li>• Emergency services affected if located in the flood zone</li> <li>• Evacuation warnings given to emergency services (up to 12 hrs lead time)</li> <li>• Multiple failure (breaches) of flood defence systems and significant overtopping. This could involve the Rivers Thames, Rom, Beam, Ingrebourne, and Ravensbourne which cross</li> </ul>						

Ref ID	Risk sub-category	Outcome Description/ Variation and Further Information	Likelihood	Impact	Risk Rating	Lead Assessor	Controls in Place	Review Date
		<p>Having.</p> <ul style="list-style-type: none"> <li>• Damage or failure at several sites of telecommunications, electrical sub-stations, water and sewage treatment works, road bridges and rail embankments, rendering these essential services inoperable for up to 14 days</li> <li>• Closure of key and essential transport routes for up to 5 days leading to national disruption to commuters and supplies of goods and services</li> <li>• There are hospitals, schools, shops and industrial/commercial premises in the flooded area (&amp; possibly rest centres)</li> </ul> <p>For evacuation and emergency sheltering and accommodation, the following assumptions are made:</p> <ul style="list-style-type: none"> <li>• Of all evacuees, 60% leave the affected area and stay with relatives/friends or visitors return home. 30% use available hotels in safe areas [may need visitors to vacate rooms for local residents]</li> </ul> <p>142,000 (22%) of people flooded need assisted sheltering for up to 5 days and 25% of displaced households need temporary accommodation for up to 12 months.</p>						
HL19	Major coastal and tidal flooding affecting more than	<p><b>Outcome Description</b></p> <p>Major sea surge, tides, gale force winds and potentially heavy rainfall. Many</p>	Medium Low (2)	Significant (4)	High	EA	Thames Barrier and Flood Prevention Act 1972 / Flood and Water	Last Apr 2018

Ref ID	Risk sub-category	Outcome Description/ Variation and Further Information	Likelihood	Impact	Risk Rating	Lead Assessor	Controls in Place	Review Date
	two UK regions	<p>coastal regions and tidal reaches of rivers affected. Excessive tide levels and many coastal and/or estuary defences overtopped or failing (breaches). Drains 'back-up'. Inundation from breaches in defence systems would be rapid and dynamic with minimal warning and no time to evacuate. Inundation from over-topping of defences would allow as little as 1 hour to evacuate, widespread structural damage. Flooding of up to 300,000 properties (homes &amp; businesses) for up to 14 days. People stranded over a large area. Up to 150 fatalities, 2000 'missing' persons (ie not accounted for during first 24 hrs) and 2000 casualties. Up to 0.4m evacuees (the people requiring assistance with evacuation is less, 130,000). Up to 40,000 people in need of rescue or assistance in-situ over a 36 hour period.</p> <p><b>Variation and further information</b></p> <p><b>Assumes:</b></p> <ul style="list-style-type: none"> <li>Up to 4 days of advanced severe weather alerts from the Met Office.</li> <li>Storm tide forecasting service shows risk of over-topping (up to 8hrs lead time). Havering has 3 miles of tidal River Thames risk.</li> <li>Rescue can only be by boat, helicopter or high-clearance vehicles.</li> <li>Emergency services affected if located in the flood zone.</li> <li>Evacuation warnings given to</li> </ul>					Management Act 2010 / Metropolis Management (Thames River Prevention of Flood Amendment Act 1879) / EA and Met Office flood warning services / EA inspection of flood defences / London Resilience Partnership Plans / Havering Multi-agency Flood Plan.	Next Apr 2020

Ref ID	Risk sub-category	Outcome Description/ Variation and Further Information	Likelihood	Impact	Risk Rating	Lead Assessor	Controls in Place	Review Date
		<p>emergency services (as little as 1 hour).</p> <ul style="list-style-type: none"> <li>• Multiple failure (breaches) of flood defence systems and significant overtopping.</li> <li>• Damage or failure (at several sites) of telecommunications, electrical sub-stations, water and sewage treatment works, road bridges and rail embankments rendering these essential services inoperable for up to 14 days.</li> <li>• Closure of key and essential transport routes for up to 5 days leading to national disruption to commuters and supplies of goods and services.</li> <li>• There are hospitals, schools, shops and industrial/ commercial premises in the flooded area (&amp; possibly rest centres).</li> <li>• 'Properties' includes occupied mobile homes.</li> </ul> <p>For evacuation and emergency sheltering and accommodation the following assumptions are made:</p> <ul style="list-style-type: none"> <li>• Of all evacuees, 60% leave the affected area and stay with relative/friends or visitors return home. 30% use available hotels in safe areas [may need visitors to vacate rooms for local residents]. 142,000 (22%) of people flooded need assisted sheltering for up to 5 days and 25% of displaced households</li> </ul>						

Ref ID	Risk sub-category	Outcome Description/ Variation and Further Information	Likelihood	Impact	Risk Rating	Lead Assessor	Controls in Place	Review Date
		need temporary accommodation for up to 12 months.						
L19	Flooding from other sources	A rapid increase in volume of water in a localised area due to either heavy rainfall, groundwater emergence or a burst water main which overwhelms the local drainage or river system, collects in low lying areas resulting in flooding of property or infrastructure.	Medium High (4)	Moderate (3)	High	EA	Flood and Water Management Act 2010 / Land Drainage Act 1991 / Water Resources Act 1991 / EA Floodline and public warnings/Met Office National Severe Weather Warning Service /Flood Guidance Statements/Havering Multi-agency Flood Plan.	Last Apr 2018 Next Apr 2020
H22	Surface water flooding	Surface water flooding in a large metropolitan area caused by a warm unstable atmosphere, most likely to occur in summer due to the warmer atmosphere having a greater water holding capacity, causes a pattern of convective rainfall events. These events result in a pocket of exceptionally high rainfall in the south east. The event includes rain gauges in London and just outside of London recording exceptional levels of rainfall over a short duration. The most severe impacts occur in the London Local Resilience Forum (LRF) area, although further impacts also occur in Hertfordshire and the Thames Valley (over £100 million property damages in each). Over 314,000 people are located in residential areas, of which 25,000 are identified as more vulnerable and potentially requiring assistance. Total damage to property amounts to £1.6 billion affecting a total 108,000 properties. In addition, there may be	Medium (3)	Significant (4)	Very High	LA	Flood and Water Management Act 2010 The Flood Risk Regulations 2009 Land Drainage Act 1991 Water Resources Act 1991 The London Plan Civil Contingencies Act 2005 Environment Agency operates a 24 hour, 365 day flood warning service (Floodline) to media, professional partners, and the public for flood warning areas. Flood Advice Guides available in printed or audio format through the EA website - Met Office, National Severe Weather Warning Service - FFC – Flood Guidance Statements	Last Apr 2018 Next Apr 2020

Ref ID	Risk sub-category	Outcome Description/ Variation and Further Information	Likelihood	Impact	Risk Rating	Lead Assessor	Controls in Place	Review Date
		over 200,000 people in the flooded area during the day due to the high working population: 184,000 weekday workers are located in 10,000 businesses modelled to flood in the London LRF. Severe disruption to critical infrastructure and transport, including the closure of around 17 underground stations and 73 railway stations is expected. 427km of road and 218km of railway are estimated to be impacted.					<ul style="list-style-type: none"> <li>- Flood risk alleviation and maintenance projects</li> <li>- New building developments controlled through planning guidelines</li> <li>Multi Agency Flood Plans</li> <li>- London Strategic Flood Framework</li> <li>- London Emergency Services Liaison Panel (LESLP) - Major Incident Procedure Manual</li> <li>- National Flood Emergency Plan</li> </ul>	
H44	Major reservoir dam failure/collapse	<p>Collapse without warning resulting in almost instantaneous flooding. Significant movement of debris (including vehicles) and sediment. Complete destruction of some residential and commercial properties and serious damage of up to 500 properties. Several thousand other properties could be flooded. Up to 200 fatalities, up to 1000 casualties. Up to 50 missing persons and people stranded. Hazardous recovery amongst collapsed infrastructure and debris. Water supply to homes and businesses is lost. Up to 200 people need temporary accommodation for 2 – 18 months.</p> <p><b>Variation and Further Information</b> Assumes: No time to evacuate, flooding lasts less than 24 hours. Emergency services not pre-warned. Extent of downstream effect could reach 50-60km. Significant damage to gas, electricity</p>	Low (1)	Significant (5)	High	EA	<ul style="list-style-type: none"> <li>Reservoirs Act 1975 / Water Act 2003 / Regular statutory inspections / Severe Weather Warning System / London Resilience Partnership Plans</li> <li>Havering Multi-Agency flood Plan.</li> </ul>	<p>Last July 2019</p> <p>Next Apr 2021</p>

Ref ID	Risk sub-category	Outcome Description/ Variation and Further Information	Likelihood	Impact	Risk Rating	Lead Assessor	Controls in Place	Review Date
		supplies, telecommunications, road and rail links. Havering has 2 sites designated under the Reservoirs Act.						
<b>Human diseases/human health incidents</b>								
H23	Influenza Type Disease (Pandemic).	<p><b>Outcome Description</b> Each pandemic is different and the nature of the virus and its impacts cannot be known in advance. Previous pandemics have led to markedly different outcomes. Based on understanding of previous pandemics, a pandemic is likely to occur in one or more waves, possibly weeks or months apart. Each wave may last between 12 - 15 weeks. Up to half the population could be affected. All ages may be affected, but until the virus emerges we cannot know which groups will be most at risk.</p> <p><b>Variation and Further Information</b> Clinical attack rate of 25 to 50% spread over one or more waves with case fatality of up to 2.5%. This means, at the upper end of assumptions, up to some 750,000 excess deaths in the UK across the whole period of the pandemic and over 10,000 healthcare contacts per 100,000 population per week at peak. Probable peak in weeks 6 to 8 following first case, with 22% of total cases occurring at this time.</p>	Medium High (4)	Significant (4)	Very High	PHE	NHS constitution provides for vaccination programmes / Capacity planning in NHS Trusts / Comprehensive surveillance systems / London Resilience Partnership Plans. Havering Multi-Agency Pandemic Influenza Plan.	Last Jan 2018  Next Jan 2020
H62	Health impacts of poor air quality from either high ground level ozone or fine particulate matter	<p><b>Outcome Description</b> Air pollution harms human health and the environment. During an air quality event high pollution can lead to significant health risks including</p>	Medium High (4)	Moderate (3)	High	PHE	Air Quality Standards Regs 2010/UK Air Quality Strategy / Environmental Permitting Regs 2010/ European directive on	Last Jan 2018  Next Jan 2020



Ref ID	Risk sub-category	Outcome Description/ Variation and Further Information	Likelihood	Impact	Risk Rating	Lead Assessor	Controls in Place	Review Date
	(PM).	<p>premature mortality and hospital admissions. To illustrate this risk this document assesses the impacts of a prolonged episode (of up to 20 days) of either high ground level ozone or elevated fine particulate matter (PM2.5) concentrations. (Particles less than 2.5 micrometers in diameter are called "fine" particles, particles between 2.5 and 10 micrometers in diameter are referred to as "coarse").</p> <p>Ozone is a secondary pollutant formed from photochemical reactions, however it is often chemically suppressed in urban-centres through titration with vehicle emitted Nitrous Oxide. In an ozone event, highest exposure is likely to occur in suburban and rural locations, in contrast to primary pollutants such as nitrogen dioxide (NO2) and PM10 which tend towards urban maxima. Public advice and health service provision must reflect the geographically distinct impacts of ozone compared to other pollutants.</p> <p>Less severe ozone episodes may occur at other times of the year, e.g. during spring, or whenever high pressure weather systems dominate over the British Isles, due to low winds and clear skies although most episodes take place during the summer.</p> <p>Elevated PM2.5 concentrations are most common in the spring and coincide with a potential peak in ammonia emissions from agricultural sources in upwind regions of Europe. Episodes of elevated PM can also occur during the summer,</p>					ambient air quality and cleaner air for Europe (2008/50/EC) Mayor of London and Havering Air Quality Action Plans/Strategies.	

Ref ID	Risk sub-category	Outcome Description/ Variation and Further Information	Likelihood	Impact	Risk Rating	Lead Assessor	Controls in Place	Review Date
		<p>although concentrations are typically somewhat lower than in the spring as a result of the volatility of Ammonium Nitrate. It is noted that the impact of summertime PM episodes has been included in the analysis of ozone episodes above.</p> <p><b>Specific Assumptions</b> The main assumption is that either event would last for up to 20 days. This is roughly the duration of the ozone event in 2006 (although there was a week between the two periods of high ozone) and the PM event in 2011. The impacts would be mainly on the elderly and people with existing illnesses. The quantitative estimates provided below have been derived for these specific examples.</p>						
H24	Emerging infectious diseases	<p><b>Outcome Description</b> Precise impact will depend upon the effectiveness of antibiotics and antivirals in fighting infection. Based upon the experience of the outbreak of Severe Acute Respiratory Syndrome (SARS) in 2002, the worst case likely impact of such an outbreak originating outside the UK would be cases occurring amongst returning travelers and their families and close contacts, with spread to health care workers within hospital setting.</p> <ul style="list-style-type: none"> <li>• Short term disruption to local hospital intensive care facilities</li> <li>• Possible disruption of several</li> </ul>	Medium (3)	Moderate (3)	High	PHE	NHS constitution provides for vaccination programmes / Capacity planning in NHS Trusts / Comprehensive surveillance systems / London Resilience Partnership Plans.	Last Jan 2018  Next Jan 2020

Ref ID	Risk sub-category	Outcome Description/ Variation and Further Information	Likelihood	Impact	Risk Rating	Lead Assessor	Controls in Place	Review Date
		<p>weeks to elective procedures</p> <ul style="list-style-type: none"> <li>Public concern about travel, within and beyond the UK and possible international travel restriction advice.</li> </ul> <p><b>Variation &amp; Further Information</b></p> <ul style="list-style-type: none"> <li>New infection can spread rapidly from person to person and has done so before the first case(s) is identified</li> <li>The new infection does not originate within the UK but rapid global spread to UK via air travel</li> <li>Viral infection for which there is no effective treatment other than patient management through some effect from antivirals if given swiftly</li> <li>The possibility of spread within a hospital setting, prior to the infection being identified in the patient</li> </ul> <p>For an outbreak of a new infection such as H5N1 avian influenza, which does not spread rapidly from person to person, this is equally likely and will give a lower level of casualties, but could have a higher fatality rate amongst cases of around 50%. Such an infection gives a longer period in which to put effective control measures in place to prevent spread.</p>						

Ref ID	Risk sub-category	Outcome Description/ Variation and Further Information	Likelihood	Impact	Risk Rating	Lead Assessor	Controls in Place	Review Date
<b>Animal diseases/animal health incidents</b>								
HL26a	Non-zoonotic Notifiable animal diseases (e.g. foot and mouth disease (FMD), classical swine fever, blue tongue and Newcastle disease of birds).	<p><b>Outcome Description</b></p> <p>The most serious disease in this category is FMD which drives the risk and outcome descriptions. Assessment based on the need to cull and dispose up to 4 million animals across GB with up to 900 infected premises.</p> <p>For FMD whole of Great Britain is likely to be declared a 'controlled area', prohibiting the movement of all susceptible livestock unless licensed. Disruption to rural communities, local economies and the environment. Significant impact on farm incomes and allied industries. For a major outbreak many rural industries, including tourism will be affected, impacts on tourism believed to have been overstated in previous assessments and current assessments assess this impact at £100 million. £400 million losses to the agriculture and food chain industry. Loss of disease free status resulting in EU and third country import bans on livestock and livestock products from susceptible animals. The major outbreak and realistic worst case scenarios are of much greater scale than that experienced in the most recent outbreak in 2007 but less than that experienced in 2001 due to changes in movement regimes and control policies.</p> <p><b>Variation &amp; Further Information</b></p> <p>Although the impact of a disease</p>	Medium (3)	Minor (2)	Medium	LA's	Animal Health Act 1981/ Animal Health Act 2002 / Other secondary legislation and EU directives / National Disease Control Strategies / Havering Notifiable Animal Diseases Contingency Plan.	Last July 2019  Next July 2021

Ref ID	Risk sub-category	Outcome Description/ Variation and Further Information	Likelihood	Impact	Risk Rating	Lead Assessor	Controls in Place	Review Date
		<p>outbreak will vary between areas, the likelihood of a disease incursion cannot be differentiated between areas. FMD is one of the most infectious animal diseases known to man and spread by direct and indirect contact it may be also spread by windborne means. For the realistic worst case scenario, disease is introduced into a predominantly sheep area and infected animals which are not yet exhibiting clinical symptoms are sold at market or moved to other premises before disease is detected resulting in widely dispersed multiple outbreaks. Economic assessments are based on a major incident; minor incidents (most likely) would have a much lower economic impact. Havering has large areas of farmland with its inherent livestock.</p>						
HL26b	Zoonotic Notifiable animal diseases (e.g. Highly Pathogenic Avian Influenza (HPAI), rabies and West Nile virus).	<p><b>Outcome Description</b> The most significant disease in this category is Highly Pathogenic Avian Influenza (HPAI) which drives the outcome descriptions, although all these diseases can result in human death: AI is largely a disease of birds. The virus does not easily cross from birds to infect humans, although there is a theoretical risk of influenza virus reassortment if people with seasonal flu become co-infected with AI.</p> <p>Potential human health threat (255 deaths from 408 cases worldwide since December 2003[correct at 24/02/09]). Realistic worst case scenario based on the need to cull and dispose of up to 30 million poultry across GB. Loss of</p>	Medium (3)	Minor (2)	Medium	LA's	Animal Health Act 1981/ Animal Health Act 2002 / Other secondary legislation and EU directives / National Disease Control Strategies / Havering Notifiable Animal Diseases Contingency Plan.	Last Jul 2019  Next July 2021

Ref ID	Risk sub-category	Outcome Description/ Variation and Further Information	Likelihood	Impact	Risk Rating	Lead Assessor	Controls in Place	Review Date
		<p>disease free status resulting in EU and third country import bans on poultry, captive birds and poultry products. Disruption to rural communities, local economies, tourism and the environment. Economic impacts for a major outbreak assessed at £60 million.</p> <p>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 has been limited to one or two infected premises plus associated contact premises.</p> <p><b>Variation &amp; Further Information</b> The realistic worst case scenario involves Highly Pathogenic Avian Influenza (H5N1) being found widely in birds resulting in numerous outbreaks on poultry (particularly ducks and geese) farms throughout the country. Economic assessments are based on a major incident; minor incidents, (most likely) would have a much lower economic impact.</p>						
<b>Volcanic hazards</b>								
H54	Disruption to aviation as a consequence of volcanic ash	Volcanic ash incursions for up to 25 days resulting in sporadic and temporary closures of significant parts of UK airspace for up to a total of 15 days during a 3 month eruption period. The entire UK mainland and potentially other parts of Europe could be affected for up to 10 of these days. A single period of closure within the 3 month eruptive episode may last for up to 12	Medium (3)	Significant (4)	Very High	GLA	Met Office Volcanic Ash Advisory Centre forecasting.  Airline Response Plans.	Last Jan 2019  Next Jan 2021

Ref ID	Risk sub-category	Outcome Description/ Variation and Further Information	Likelihood	Impact	Risk Rating	Lead Assessor	Controls in Place	Review Date
		consecutive days, depending on meteorological conditions.						
<b>Structural incidents</b>								
HL21	Land movement (i.e. caused by tremors or landslides)	<p><b>Outcome Description</b> Roads and access routes impassable for a time. Emergency access into/out of large populated areas difficult or impossible; severe congestion over wide geographical area. Loss of power and other essential services over wide geographical area. Potential for a number of persons to be trapped or missing either in landslides itself and/or in collapsed structures. Up to 5 fatalities depending on the size and location of land movement.</p> <p><b>Variation and further information</b> Such incidents are rare within the UK with some areas being more prone to landslides than others. Geography and climatic conditions will determine likelihood.</p>	Medium (3)	Minor (2)	Medium	LFB	Land use planning restrictions / Building Control Regs enforced by Local Authorities / Construction, renovation, maintenance and demolition standards	Last July 2019  Next July 2021
<b>Severe space weather</b>								
H56	Severe Space Weather	Disruption to two coastal electrical substations serving approximately 100,000 customers each for 2 or more months. Consumers would experience a loss of supply for up to half of this period, and rota disconnections may be used during the following 4 weeks. Disruption to satellite services for several days including interruptions and degradations to GPS, potentially	Medium (3)	Significant (4)	Very High	GLA	Electricity Industry monitoring and analysis of GIC / Space Weather is assessed as part of the Daily Hazards assessment / National Grid design standards and response arrangements / Alternative positioning, navigation and timing signal systems /	Last Jan 2019  Next Jan 2021

Ref ID	Risk sub-category	Outcome Description/ Variation and Further Information	Likelihood	Impact	Risk Rating	Lead Assessor	Controls in Place	Review Date
		<p>resulting in casualties and fatalities.</p> <p>Up to 2 weeks disruption to aviation (including increased error rates in flight control and air traffic systems) and temporary loss of wireless systems including mobile phones and internet.</p> <p>Increase in error rate in ground based unprotected digital control systems which are ubiquitous in modern technology, for the duration of the storm.</p>					Forecasting through Met Office Space Weather Operations Centre.	
<b>Severe wildfires</b>								
H58	Forest or moorland fire (includes HL33)	<p><b>Outcome Description</b></p> <p>H58: Forest or moorland fire across up to 1500 hectares over a period of 7-10 days. Evacuation of between 100 and 3000 homes. Up to 10 fatalities and 100 casualties.</p> <p>HL33: Forest or moorland fire across up to 50 hectares. Evacuation of up to 100 residential homes required. Up to 5 fatalities and 20 casualties.</p> <p><b>Variation and further information</b></p> <p>The country parks and open spaces in Havering have become more developed in terms of forest and vegetation, and some have been built on landfill areas creating additional fire spread risk from gas and combustibles within the ground. There is a growing number of housing developments being built adjacent to these parks/open spaces, which with more common dry spells and the additional fire loading means the risk of</p>	Medium Low (2)	Moderate (3)	Medium	LFB	London Fire Brigade borough specific rural strategies / Specialist fire fighting equipment and resources.	Last July 2019  Next April 2021



Ref ID	Risk sub-category	Outcome Description/ Variation and Further Information	Likelihood	Impact	Risk Rating	Lead Assessor	Controls in Place	Review Date
		fire spread to residential areas is increasing.						
<b>Major industrial accidents/major structural accidents</b>								
HL22	Building Collapse.	<p><b>Outcome Description</b> Collapse of low rise building, or part thereof. Potential for a number of persons to be trapped or missing. Localised loss of power and other essential services. Local access routes affected due to road closures. Up to 5 fatalities and 20 casualties depending on the size and construction of building, and occupation rates.</p> <p><b>Variation and Further Information</b> A number of such incidents occur annually within London. Some areas will be more at risk than others due to age of local building stock, construction techniques like timber framing etc. Cause of collapse could be fire, explosion, structural failure etc.</p>	High (5)	Minor (2)	Medium	LA's	Building Control Regs enforced by Local Authorities / Construction, renovation, maintenance and demolition standards and enforcement / Emergency Services and other responders specialist resources / London Resilience Partnership Plans.	Last July 2019 Next July 2021
HL22a	Large Building Collapse	<p><b>Outcome Description</b> Collapse of a large building (high-rise block, shopping mall etc). Up to 100 fatalities depending on the size and construction of building, and occupation rates, and 350 casualties. Potential for a number of persons to be trapped or missing. Localised loss of power and other essential services. Local access routes affected due to road closures.</p>	Low (1)	Moderate (3)	Medium	Local Auth's	Building Control Regs enforced by Local Authorities / Construction, renovation, maintenance and demolition standards and enforcement / Emergency Services and other responders specialist resources / London Resilience Partnership Plans.	Last July 2019 Next July 2021

Ref ID	Risk sub-category	Outcome Description/ Variation and Further Information	Likelihood	Impact	Risk Rating	Lead Assessor	Controls in Place	Review Date
HL105	Complex Built Environments	<p><b>Outcome Description</b> A consequence of a major incident affecting large buildings / complex built environments. Incidents in these facilities have the potential to trigger a complex chain of events that lead to serious consequences for public.</p>	Medium Low (2)	Moderate (3)	Medium	Local Auth's	Health and Safety at Work Act 1974 / Management of Health and Safety at Work Regs 1999 / Fire and Rescue Services Act 2004 and guidance pursuant to the Regulatory Reform (Fire Safety ) Order 2005 / Safety at Sports Grounds Act 1975 and Fire Safety and Safety of Places of Sport Act 1987 / Local building safety systems and practises / Safety Advisory groups in place at major sports grounds / London Resilience Partnership Plans.	Last July 2019  Next July 2021
HL23	Bridge Collapse	<p><b>Outcome Description</b> Roads, access roads and transport infrastructure impassable for considerable length of time. Severe congestion over wide geographical area. Emergency access into / out of large populated areas severely restricted. Potential for a number of persons to be trapped or missing.</p> <p><b>Variation and Further Information</b> It is considered that such incidents are rare within the UK.</p>	Low (1)	Moderate (3)	Medium	LA's	Building Control Regs enforced by Local Authorities / Highways Act regular inspections / Height and weight restrictions and signs reduce the likelihood of an incident / London Resilience Partnership Plans.	Last July 2019  Next July 2021
<b>Major industrial accidents/technical failures</b>								
H41	Technical failure of national electricity network (Blackstart)	<p><b>Outcome Description</b> Total blackout for up to 3-5 days due to loss of the National Grid. Three days is best time. If there is damage to the network (i.e. from storms) this timescale could be extended up to 5 days.</p>	Medium (3)	Catastrophic (5)	Very High	LFB-EP	Testing and maintenance regime / National Emergency Plans / London Resilience Partnership plans.	Last Oct 2018  Next Oct 2020

Ref ID	Risk sub-category	Outcome Description/ Variation and Further Information	Likelihood	Impact	Risk Rating	Lead Assessor	Controls in Place	Review Date
		<p>Possible loss of life support machines, civil unrest, no alarms, street lighting, gas heating, rail transport, water supplies and mobile (PMT) telecommunications etc. Back up generators available for limited time for individual businesses and emergency services in some instances.</p> <p><b>Variation and Further Information</b> Occurs in winter and blackout lasts for up to 3 days. Isolated rural areas reconnected within a few hours. "Power Islands" created over the first day. Most of the country reconnected within three days, London late on in the process. Peak demand not able to be met after three days.</p>						
H45	Technical failure of electricity network due to operational error or bad weather causing damage to the system.	<p><b>Outcome Description</b> Total shutdown of the electricity supply over an entire region of the UK occurring during working week and lasting for 24hours.</p> <p><b>Variation and Further Information</b> Assume Greater London as a reasonable worst case scenario. Impact would vary depending on the region involved and the availability of resources within that region to maintain vital services. Mutual aid would be available from other regions therefore it is unlikely that resources/services would be overwhelmed.</p> <p>An event of this kind occurred in October 1987 when severe storms led to the electricity transmission network in the south east being shut down. Stations in the affected area were able to perform a</p>	Medium  (3)	Significant (4)	Very High	LFB-EP	Testing and maintenance regime / National Emergency Plans / Mutual aid resources available / London Resilience Partnership Plans.	Last Oct 2018  Next Oct 2020

Ref ID	Risk sub-category	Outcome Description/ Variation and Further Information	Likelihood	Impact	Risk Rating	Lead Assessor	Controls in Place	Review Date
		black start and the transmission network was re-established within 24 hrs. it should be noted that widespread damage to distribution overhead lines meant that many customers remained without a supply for several days before repairs could be completed.						
H38	Technical failure of a critical upstream oil/gas facility, gas import pipeline terminal, or Liquefied Natural Gas (LNG) import reception facility leading to a disruption in upstream oil and gas production	<b>Outcome Description</b> Catastrophic accident destroying all parts of a critical upstream facility and, in the worst case, taking months or more to restore to normal levels of service. This could potentially result in <11% loss of gas supply to the UK which could impact on power generation if demand were high. As 40% of power is generated by gas fired stations then a reduction in generation might be felt. Downstream oil would not be immediately or adversely affected given alternative means of supply.	Medium Low (2)	Significant (4)	High	LFB-EP	National Emergency Plan for Fuel / National Blackstart Plan / London Resilience Partnership Plans	Last Oct 2018  Next Oct 2020
H39	Non-availability of piped water supply	<b>Outcome Description</b> Non-availability of piped water supply for up to 50,000 people, for between 1- 3 days.  <b>Variation and Further Information</b> Domestic, industrial, commercial and agricultural premises without piped water. Fire tenders cannot be refilled from hydrants within the affected area. Resupply via bowsers or bottled water. Priority given to vulnerable customers. Liaison with local health and social services ensures that details of such customers are complete at the time of	Medium Low (2)	Moderate (3)	Medium	LFB	Water Industry Act 1991 / Security and Measures Direction 1998 / Water Companies mutual aid arrangements in place / London Resilience Partnership Plans.	Last Oct 2018  Next Oct 2020

Ref ID	Risk sub-category	Outcome Description/ Variation and Further Information	Likelihood	Impact	Risk Rating	Lead Assessor	Controls in Place	Review Date
		the incident. Water companies are also required to give priority to hospitals and schools. Due regard required for livestock and essential food industries. May not be possible to continue a full service at hospitals, schools and businesses etc that do not maintain their own on-site water storage.						
H40	No notice loss of significant telecommunications infrastructure in a localised fire, flood or gas incident.	<p><b>Outcome Description</b> Loss of service to up to 100,000 people for up to 72 hours</p> <p><b>Variation and Further Information</b> Building damage to a large urban telecoms facility. Possible impact on emergency services including disruption to proposed Emergency Services Control Centres. Possible accidental cutting of subterranean cables.</p>	Medium Low (2)	Minor (2)	Medium	MPS	Civil Contingencies Act 2004 / Telephone provider demand and network capacity management strategies / National Emergency Alert for Telecoms / London Resilience Partnership Plans.	Last Oct 2018  Next Oct 2020
<b>Disruptive industrial action</b>								
HL42	Loss of cover due to industrial action by workers providing a service critical to the preservation of life (such as emergency service workers).	<p><b>Outcome Description</b> A number of three day strikes with significant support over a two month period affecting a single emergency service.</p> <p><b>Variation and further information:</b> Likelihood and impact will vary between, and geographically within, emergency services.</p>	High (5)	Moderate (3)	High	GLA	Police Act (1996) / RCN Code on Industrial Action / Standards of conduct, performance and ethics for nurses and midwives / Alternative emergency cover protocols for the Fire Brigade / Organisational Business Continuity Arrangements.	Last Jan 2018  Next Jan 2020
H31	Significant or perceived significant constraint on fuel supply at filling	<p><b>Outcome Description</b> Filling stations, depending on their locations, would start to run dry between 24 - 48 hours. Panic buying would exacerbate the situation. Replenishment</p>	Medium (3)	Minor (2)	Medium	MPS	Legal requirements re: conduct of industrial disputes / Stocks of contingency fuel to varying degrees / National	Last Jan 2018  Next Jan 2020

Ref ID	Risk sub-category	Outcome Description/ Variation and Further Information	Likelihood	Impact	Risk Rating	Lead Assessor	Controls in Place	Review Date
	stations e.g. industrial action by tanker drivers, or effective fuel blockades at key refineries/ terminals by protesters, due to the price of fuel	of sites would take between 3 - 10 days depending on location, much would depend on whether drivers from other companies would be prepared to cross picket lines, whether companies judged that they were able to maintain safe operations in the presence of picket lines or protests, and the extent of the supply of fuel from other locations.					Emergency Plan for Fuel / London Resilience Partnership Plans	
H35	Industrial action by key rail or London Underground workers.	<b>Outcome Description</b> Strike action resulting in the total shut down of either London Underground or the rail network on a national scale (e.g. action by key rail workers, e.g. infrastructure workers such as signallers) for > 3 days. Greater impact if action occurs in a co-ordinated manner. L Underground. Industrial action lasting a week.	Medium (3)	Minor (2)	Medium	BTP	Health and Safety at Work (etc) Act 1974 / Employment Act 1980 and 1988 / Public Order Act 1986 / Trade Union and Labour Relations (Consolidation) Act 1992 / Anti-social behaviour Act 2003 / Organisational Business Continuity Arrangements.	Last Jan 2018  Next Jan 2020
<b>Public and Crowd Events</b>								
H37	Influx of British Nationals who are not normally resident in the UK.	<b>Outcome Description</b> Up to 10,000 British nationals not normally resident in the UK, returning to UK within a 4 – 6 week period following conventional war, widespread civil unrest or sustained terrorism campaign against British and other Western nationals.	Medium High (4)	Minor (2)	Medium	Local Auth's	Local authority: Standard social care and emergency housing arrangements. Existing mutual aid agreements in place across London. Other organisations: Full time officer located at	Last July 2018  Next Jul8 2020

Ref ID	Risk sub-category	Outcome Description/ Variation and Further Information	Likelihood	Impact	Risk Rating	Lead Assessor	Controls in Place	Review Date
							Heathrow (alongside Heathrow TravelCare) to consider the issue of repatriation at ports. Position funded by the Foreign & Commonwealth Office. Heathrow Travel Care – a team of social workers. Red Cross and FCO agreement on repatriation; Meet & greet returning passengers at airport, arrange onward transport, supported by the FCO	
H57	Large scale public disorder in multiple sites in a single city occurring concurrently over several days	<b>Outcome Description</b> Disorder assumes criminal nature in urban centre with satellite disorder in suburbs potentially triggered by existing community tensions. Multi media coverage prevents isolation of disorder in single location, leading to perception of lack of police control.	Medium Low (2)	Limited (1)	Low	MPS	Specific riot and public order legislation/Riot Damages Act 1886/Public Order Act 1986	Last Jan 2019  Next 2021
<b>Malicious attacks</b>								
X3	Attacks on transport system	Conventional attacks on transport systems are judged to be the more likely (however the likelihood of them affecting any one individual is still extremely low). This is supported by evidence from	High (5)	Medium (3)	High		Regulation and security processes of individual public transport sectors / Contingency plans	Last Jan 2019  Next Jan 2021

Ref ID	Risk sub-category	Outcome Description/ Variation and Further Information	Likelihood	Impact	Risk Rating	Lead Assessor	Controls in Place	Review Date
		around the world. Attacks on transport can take different forms and result in different levels of impact. Stringent security measures are in place at airports. Most rail and underground systems are more open and therefore attractive potential targets. To date no attack against maritime interests in the UK has been mounted by terrorists.					developed by operators in conjunction with responders.	
X1	Attacks on crowded places	Crowded places remain an attractive target for a terrorist attack. Crowded places by their nature are easily accessible and offer the prospect for an impact beyond the loss of life alone. Attacks are often (but not always) carried out without prior warning.	Medium High (4)	Medium (3)	High		Work of counter terrorism security advisors to raise awareness and provide training/ Physical security measures where appropriate/ <input type="checkbox"/> Emergency services response plans/ Emergency services specialist resources	Last Oct 2017  Next Oct 2019
X2	Attacks on infrastructure	Many of the impacts which could result from industrial accidents, technical failure or severe weather could also result from a terrorist attack on infrastructure. The risk and impact vary according to the criticality of the infrastructure assets affected. Cyber attacks are not incorporated in this risk assessment (see subsequent section).	Medium (3)	Medium (3)	High		Business continuity plans for loss of essential services helps minimise disruption / <input type="checkbox"/> Well established programme of work to protect infrastructure from terrorism including protective security advice from Centre for the Protection of National Infrastructure and local Police services.	Last Oct 2017  Next Oct 2019



Ref ID	Risk sub-category	Outcome Description/ Variation and Further Information	Likelihood	Impact	Risk Rating	Lead Assessor	Controls in Place	Review Date
<b>Unconventional attacks</b>								
X5	Catastrophic unconventional attacks	Mass impact terrorist attacks, whilst unlikely, cannot be ruled out. The likelihood of terrorists successfully undertaking an attack against a nuclear or chemical facility or obtaining chemical, biological, radiological (CBR) or nuclear materials remains low, but not negligible. If such attacks were successful, their potential impact on the UK would be severe and significantly greater than a conventional attack. The potential impacts of an incident involving CBR agents will depend on a range of factors including type and quantity of CBRN materials used. This could range from small-scale (assassination or poisoning) to mass-impact (widespread dispersion and contamination) which is reflected in the scores.	Medium low (2)	Catastrophic (5)	Very High		Well developed specialist response capability / Access to medical-countermeasures	Last Oct 2017  Next Oct 2019
X4	Small scale unconventional attacks		Medium (3)	Medium (3)	High			
<b>Cyber security</b>								
X6	Cyber security (infrastructure)	Increasing reliance on cyber space brings new opportunities and new threats. The very openness of the networks presents a vulnerability of compromise or damage to networks from the actions of hackers, criminals or foreign intelligence services. The two assessments cover risks of cyber attack against infrastructure and cyber attacks resulting in a loss of data confidentiality. Impacts of both types of cyber attack	Medium low (2)	Medium (3)	Medium		National Cyber Security Programme / <input type="checkbox"/> outreach to businesses and public regarding cyber threats and security / <input type="checkbox"/> National Cyber Crime Unit / <input type="checkbox"/> Centre for Protection of National Infrastructure providing security advice	Last Oct 2017  Next Oct 2019
X7	Cyber security (Data confidentiality)		High (5)	Limited (1)	Low			

Ref ID	Risk sub-category	Outcome Description/ Variation and Further Information	Likelihood	Impact	Risk Rating	Lead Assessor	Controls in Place	Review Date
		could include economic and societal disruption. While terrorists can be expected to continue to favour high profile physical attacks, the possibility that they might also use cyber space to facilitate or mount an attack is growing.						

A number of risks are currently considered by the London Risk Advisory Group to be not applicable to the London Local Resilience Area at the current time, these are listed below. As risk assessment is a dynamic process the status of these risk is re-assessed on a regular basis.

ID	Risk category	Risk sub-category	Rationale for Not Applicable Status	Last Reviewed
H1	Industrial Accident & Environmental Pollution	Fire or explosion at a gas LPG or LNG terminal or flammable gas storage site.	Deemed not applicable to London as no sites meeting this description.	
HL1	Industrial Accident & Environmental Pollution	Fire or explosion at a gas terminal or involving a gas pipeline.	Covered by H7 assessment.	
H2	Industrial Accident & Environmental Pollution	Fire or explosion at an onshore ethylene gas pipeline.	Deemed not applicable to London due to no ethylene gas pipelines	April 2008
HL26	Industrial Accident & Environmental Pollution	Localised fire or explosion at an onshore ethylene gas pipeline	Deemed not applicable to London due to no ethylene gas pipelines	April 2008
H3	Industrial Accident & Environmental Pollution	Fire or explosion at an oil refinery	Deemed not applicable to London due to no oil refineries	Sept 2011
HL27	Industrial Accident & Environmental Pollution	Localised fire or explosion at an oil refinery	Deemed not applicable to London due to no oil refineries	Sept 2011
H6	Industrial Accident & Environmental Pollution	Fire or explosion at an offshore oil/gas platform	Deemed not applicable to London due to no offshore Oil or gas platforms	Sept 2011
H103	Industrial Accident & Environmental Pollution	Fire or explosion at a gas LPG or LNG terminal (or associated onshore feedstock pipeline)	The nearest gas terminal to a London LRF is Bacton, Norfolk, Therefore this risk is not applicable to London.	May 2008
HL104	Industrial Accident & Environmental Pollution	Fire or explosion at a gas LPG or LNG terminal (or associated onshore feedstock pipeline)	The nearest gas terminal to a London LRF is Bacton, Norfolk, Therefore this risk is not applicable to London.	May 2008
H8	Industrial Accident & Environmental Pollution	Very large toxic chemical release	No such facilities in the London area.	
HL2	Localised industrial accident involving large toxic release	Localised industrial accident involving large toxic release (e.g. from a site storing large quantities of chlorine).	Not Applicable as incorporated in H4, H9 and HL3	Sept 2011
H10	Industrial Accident & Environmental Pollution	Radioactive substance release from a nuclear reactor.	Deemed not applicable to London due to no nuclear reactors	Sept 2011
HL31	Industrial Accident & Environmental Pollution	Limited radioactive substance release from a nuclear accident.	Deemed not applicable to London due to no nuclear reactors	Sept 2011
H42	Transport Accidents	Rapid accidental sinking of a passenger vessel in or close to UK waters.	This outcome covered in Risk Assessments for HL34 and HL8.	
HL	Transport Accidents	Maritime accident or deliberate blockage resulting	This risk deemed not applicable to London by	





13		in blockage of access to key port, estuary, maritime route for more than one month	London Risk Advisory Group.	
H 22	Human Diseases/Human Health	Influenza epidemic	Removed 2013. Advice from Public Health England is that this would be considered a “bad seasonal flu outbreak” and would be dealt with under normal arrangements.	
H 24 a	Human Diseases/Human Health	Legionnaires Disease	Removed 2013. Advice from Public Health England is that this would be dealt with using normal outbreak arrangements.	
H 24 b	Human Diseases/Human Health	Meningococcal Disease	Removed 2013. Advice from Public Health England is that this would be dealt with using normal outbreak arrangements	
HL 10 2	Human Diseases/Human Health	Oak Processionary Moth	Removed 2013. Advice from Public Health England is that there is minimal human health risk and this can be removed from the London Risk Register.	
HL 20	Flooding	Flash flooding	Removed June 2014, as advice from EA is this is not geographically possible in any parts of London.	
H 43	Telecommunications failure	Human error	Removed Sept 2014 as per the NRA.	
H4 9	Major industrial accidents/technical failures	Failure of water infrastructure	Removed Jan 2015: consequences amalgamated into H39 assessment.	
H3 0	Industrial action	Emergency Services: loss of emergency fire and rescue cover because of industrial action	Removed Jan 2018. H30 has been removed from the NRA due to the impact score being reduced to 0. Lrag and HRAG agreed to merge H30 and H42.	
HL 16 HL 17 HL 18 HL 19	Flooding	Local flood risks	Removed Jan 2018. Local flooding risks removed from LRR and Havering BRR. HL19, L21 and L19 added in place.	
HL 14 HL 12	Major Industrial Accidents	Local accidents involving the transport of dangerous chemicals/fuel and explosives removed.	HL14 and HL12 now merged with H60 High Consequence Dangerous Goods as they all require a similar response. Lrag decision Feb 2019.	
HL 28	Major Industrial Accidents	Localised fire or explosion at a fuel distribution site	Merged with H4. Lrag decision Feb 2019.	

HL 25	Major Industrial Accidents	Fire or explosion at a flammable gas terminal	Merged with HL7. Lrag decision Feb 2019.	
HL 43	Plant Disease	Plant Disease	Did not get adopted onto LRR.	
HL 4	Environmental Pollution	Major Pollution of inland waters	Removed by Lrag June 2019	

## Summary of Risk Ratings:

	Low (1)	Medium Low (2)	Medium (3)	Medium High (4)	High (5)
Catastrophic (5)	H4 H9 H44	X5	H41		
Significant (4)	H16	H38 HL19	H45 L21 H56 H54 HL50 H22	H23	
Moderate (3)	H7 HL8 HL30 HL34 H5 HL22a HL23	H12 HL9 HL105 H58 X6 H39	H17 H18 H24 HL3 X2 X4	HL48 X1 L19 HL20 H62	X3 HL42
Minor (2)	H15 HL37	HL7 H40 HL9b H60 H11	H31 HL26b H35 HL21 HL26a	H14 H37 H46	HL22 H40
Limited (1)		H57		HL10	X7

**Key**

VH		Very High
H		High
M		Medium
L		Low

## Appendix 1 – Likelihood and Impact Scoring Scales

### Impact scoring scale – qualitative measures

Level	Descriptor	Categories of Impact	Description of Impact
1	Limited	Health	<ul style="list-style-type: none"> <li>Limited number of injuries or impact on health.</li> </ul>
		Social	<ul style="list-style-type: none"> <li>Limited number of persons displaced and insignificant personal support required.</li> <li>Limited disruption to community services, including transport services and infrastructure.</li> </ul>
		Economic	<ul style="list-style-type: none"> <li>Limited impact on local economy.</li> </ul>
		Environment	<ul style="list-style-type: none"> <li>Limited impact on environment.</li> </ul>
2	Minor	Health	<ul style="list-style-type: none"> <li>Small number of people affected, no fatalities, and a small number of minor injuries with first aid treatment.</li> </ul>
		Social	<ul style="list-style-type: none"> <li>Minor damage to properties.</li> <li>Minor displacement of a small number of people for &lt; 24 hours and minor personal support required.</li> <li>Minor localised disruption to community services or infrastructure &lt; 24 hours.</li> </ul>
		Economic	<ul style="list-style-type: none"> <li>Negligible impact on local economy and cost easily absorbed.</li> </ul>
		Environment	<ul style="list-style-type: none"> <li>Minor impact on environment with no lasting effects.</li> </ul>
3	Moderate	Health	<ul style="list-style-type: none"> <li>Sufficient number of fatalities with some casualties requiring hospitalisation and medical treatment and activation of MAJAX, the automated intelligent alert notification system, procedures in one or more hospitals.</li> </ul>
		Social	<ul style="list-style-type: none"> <li>Damage that is confined to a specific location, or to a number of locations, but requires additional resources.</li> <li>Localised displacement of &gt; 100 people for 1-3 days.</li> </ul>
		Economic	<ul style="list-style-type: none"> <li>Limited impact on local economy with some short-term loss of production, with possible additional clean-up costs.</li> </ul>
		Environment	<ul style="list-style-type: none"> <li>Limited impact on environment with short-term or long-term effects.</li> </ul>
4	Significant	Health	<ul style="list-style-type: none"> <li>Significant number of people in affected area impacted with multiple fatalities, multiple serious or extensive injuries, significant hospitalisation and activation of MAJAX procedures across a number of hospitals.</li> </ul>
		Social	<ul style="list-style-type: none"> <li>Significant damage that requires support for local responders with external resources.</li> <li>100 to 500 people in danger and displaced for longer than 1 week. Local responders require external resources to deliver personal support.</li> <li>Significant impact on and possible breakdown of some local community services.</li> </ul>

		Economic	<ul style="list-style-type: none"> <li>• Significant impact on local economy with medium-term loss of production.</li> <li>• Significant extra clean-up and recovery costs.</li> </ul>
		Environment	<ul style="list-style-type: none"> <li>• Significant impact on environment with medium- to long-term effects.</li> </ul>
5	Catastrophic	Health	<ul style="list-style-type: none"> <li>• Very large numbers of people in affected area(s) impacted with significant numbers of fatalities, large number of people requiring hospitalisation with serious injuries with longer-term effects.</li> </ul>
		Social	<ul style="list-style-type: none"> <li>• Extensive damage to properties and built environment in affected area requiring major demolition.</li> <li>• General and widespread displacement of more than 500 people for prolonged duration and extensive personal support required.</li> <li>• Serious damage to infrastructure causing significant disruption to, or loss of, key services for prolonged period. Community unable to function without significant support.</li> </ul>
		Economic	<ul style="list-style-type: none"> <li>• Serious impact on local and regional economy with some long-term, potentially permanent, loss of production with some structural change.</li> <li>• Extensive clean-up and recovery costs.</li> </ul>
		Environment	<ul style="list-style-type: none"> <li>• Serious long-term impact on environment and/or permanent damage.</li> </ul>

### Explanation of categories of impact

Category	Explanation
Health	Encompassing direct health impacts (numbers of people affected, fatalities, injuries, human illness or injury, health damage) and indirect health impacts that arise because of strain on the health service.
Social	Encompassing the social consequences of an event, including availability of social welfare provision; disruption of facilities for transport; damage to property; disruption of a supply of money, food, water, energy or fuel; disruption of an electronic or other system of communication; homelessness, evacuation and avoidance behaviour; and public disorder due to anger, fear, and/or lack of trust in the authorities.
Economic	Encompassing the net economic cost, including both direct (eg loss of goods, buildings, infrastructure) and indirect (eg loss of business, increased demand for public services) costs.
Environment	Encompassing contamination or pollution of land, water or air with harmful biological / chemical / radioactive matter or oil, flooding, or disruption or destruction of plant or animal life.



**Note:**

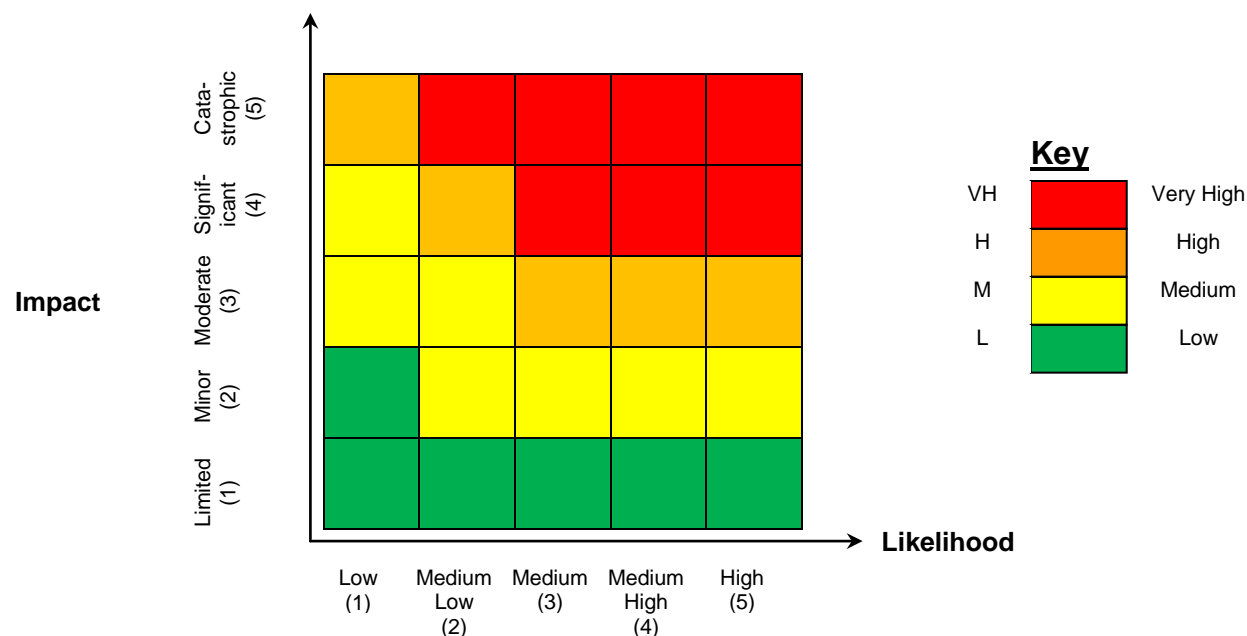
Strictly, levels 1 and 2 of the impact scale are likely to fall below the threshold for an emergency. Consequently, there may be no statutory requirement to plan for events that score 1 or 2 on the impact scale. This scale recognises that, to demonstrate a thorough analysis, Category 1 responders will wish to include in their risk assessment certain risks with impacts at these levels.

**Likelihood scoring scale**

Level	Descriptor	Likelihood Over 5 Years	Likelihood Over 5 Years
1	Low	> 0.005%	> 1 in 20,000 chance
2	Medium Low	> 0.05%	> 1 in 2,000 chance
3	Medium	> 0.5%	> 1 in 200 chance
4	Medium High	> 5%	> 1 in 20 chance
5	High	> 50%	> 1 in 2 chance

*Based on the model likelihood and impact scoring scales published in Annex 4D of "Emergency Preparedness" (HM Government, 2005)*

## Appendix 2 – Risk Rating Matrix



Definitions of Nationally Approved Risk Ratings	
Very high (VH) risk	These are classed as primary or critical risks requiring immediate attention. They may have a high or low likelihood of occurrence, but their potential consequences are such that they must be treated as a high priority. This may mean that strategies should be developed to reduce or eliminate the risks, but also that mitigation in the form of (multi-agency) planning, exercising and training for these hazards should be put in place and the risk monitored on a regular frequency. Consideration should be given to planning being specific to the risk rather than generic.
High (H) risk	These risks are classed as significant. They may have a high or low likelihood of occurrence, but their potential consequences are sufficiently serious to warrant appropriate consideration after those risks classed as 'very high'. Consideration should be given to the development of strategies to reduce or eliminate the risks, but also that mitigation in the form of at least (multi-agency) generic planning, exercising and training should be put in place and monitored on a regular frequency.
Medium (M) risk	These risks are less significant, but may cause upset and inconvenience in the short term. These risks should be monitored to ensure that they are being appropriately managed and consideration given to their being managed under generic emergency planning arrangements.
Low (L) risk	These risks are both unlikely to occur and not significant in their impact. They should be managed using normal or generic planning arrangements and require minimal monitoring and control unless subsequent risk assessments show a substantial change, prompting a move to another risk category.

Based on the model risk rating matrix published in Annex 4F of "Emergency Preparedness" (HM Government, 2005)

