Statutory Consultation 2022

Preliminary Environmental Information Report

Volume 2: Main Report

Chapter 15: Major Accidents and Disasters

Contents

Tables

15 MAJOR ACCIDENTS AND DISASTERS

15.1 Introduction

15.1.1 This chapter presents the preliminary assessment of likely significant effects of the Proposed Development with regard to Major Accidents and Disasters (MA&D).

15.1.2 The EIA Scoping Report (refer to **Appendices 1.1 and 1.2** of Volume 3 of this PEIR) sets out the assessment scope for the MA&D topic. In summary, the assessment of MA&D focuses on likely significant effects arising from the 'vulnerability' of the Proposed Development to MA&D and the potential of the Proposed Development to result in new sources of major accidents. A summary of key terms used in this assessment is provided in **Table 15.1**.

15.1.3 In broad terms, risks associated with MA&D have been identified, qualitatively assessed in consultation with relevant stakeholders and the project team, and will be mitigated through the design, construction, operation and maintenance of the Proposed Development. The underlying objective of the assessment is to ensure that appropriate precautionary actions are taken as part of the Proposed Development to prevent or mitigate likely significant effects associated with MA&D.

15.1.4 The assessment of MA&D is supported by an Environmental Risk Record (ERR) (refer to **Appendix 15.1** of Volume 3 of this PEIR). The ERR contains a list of all MA&D hazards identified as relevant to the Proposed Development. The ERR has been utilised as an assessment tool, where each MA&D hazard is analysed in relation to its potential to pose a significant risk, with due regard to its severity, duration/ recoverability, likelihood, tolerability and mitigation measures proposed.

Table 15.1: Summary of key terms used in the MA&D assessment

Term	Definition
Major accident	A major accident, in the context of this assessment, means an uncontrolled event caused by a man-made activity or asset that may result in immediate or delayed serious damage to human health, welfare and/or the environment and requires the use of resources beyond those of Luton Rising (a trading name of London Luton Airport Limited) ('the Applicant'), London Luton Airport Operations Limited (LLAOL) (the operator) or its contractors to manage[1][2].
Disaster	A disaster in the context of this assessment, is a naturally occurring phenomenon such as an extreme weather event (e.g. storm, flood, extreme temperatures) or ground-related hazard events (e.g. subsidence, landslide, earthquake) with the potential to cause an event or situation that leads to immediate or delayed serious damage to human health, welfare and/or the environment and requires the use of resources

[1] Definition adapted from Seveso III Directive 2012/18/EU.
[2] It should be noted that malicious intent is not accidental, however, the outcome, e.g. aeroplane crash, may be the same and therefore the same mitigation measures will apply to both deliberate and accidental events.

Term	Definition
	beyond those of the Applicant, LLAOL (the operator) or its contractors to manage.[1]
MA&D	Combined, the term major accident and/or disaster (MA&D), captures events triggered both internally and externally to the Proposed Development, where the presence of the Proposed Development could contribute to serious damage.
Serious damage	Serious damage includes the potential loss of life or permanent injury and/or permanent or long-lasting damage to an environmental receptor which cannot be restored through minor clean-up and restoration efforts[1].
Vulnerability	Vulnerability describes the susceptibility of an individual, a community, assets or systems to the impacts of hazards (Ref. 15.1)[3].

15.1.5 The remainder of this chapter consists of:

a. **Section 15.2** Legislation, policy and guidance relevant to the scope and methodology of the MA&D preliminary assessment;
b. **Section 15.3** Scope of the assessment;
c. **Section 15.4** Stakeholder engagement undertaken to inform the preliminary assessment;
d. **Section 15.5** Methodology applied to the preliminary assessment;
e. **Section 15.6** Assumptions and limitations at this stage of work;
f. **Section 15.7** Baseline conditions;
g. **Section 15.8** Embedded and good practice mitigation;
h. **Section 15.9** Preliminary assessment;
i. **Section 15.10** Additional mitigation;
j. **Section 15.11** Residual effects;
k. **Section 15.12** In-combination climate change;
l. **Section 15.13** Monitoring;
m. **Section 15.14** Assessment summary; and
n. **Section 15.15** Completing the assessment - remaining work to complete the EIA for the Environmental Statement.

[3] Definition adapted from United Nations Office for Disaster Risk Reduction (UNODRR). Within this assessment, the term 'vulnerability' is used to describe the ability of the Proposed Development to plan, control, resist and recover from a MA&D event in a timely manner.

15.2 Legislation, policy and guidance

15.2.1 This section identifies the key legislation, policy and guidance relevant to the scope and methodology for the MA&D assessment which may influence the type of mitigation measures implemented.

15.2.2 **Table 15.2** to **Table 15.5** provide a description of the relevant legislation, policy and guidance, and where each of these have been considered in this chapter.

Legislation

Table 15.2: MA&D legislation

Legislation	How and where addressed in PEIR
The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (as amended) (Ref. 15.2) (hereafter referred to as the 'EIA Regulations'). (transposing the requirements of Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment (Ref. 15.3)).	The EIA Regulations include the requirement for "*expected significant effects arising from the vulnerability of the proposed development to major accidents or disasters that are relevant to that development*" (Regulation 5(4)) to be assessed within EIAs where the potential for significant effects has been identified. MA&D have been assessed as part of the EIA for the Proposed Development and this chapter reports the findings of this assessment.
Regulation (EC) No 216/2008 of the European Parliament and of the Council of 20 February 2008 on common rules in the field of civil aviation and establishing a European Aviation Safety Agency (Ref. 15.4) (Now repealed - see below)	The airport currently operates under an Aerodrome Certificate granted by the CAA pursuant to the Regulation (EC) No 216/2008 and Regulation (EU) No 139/2014. It is noted that Regulation (EC) No 216/2008 has now been repealed by Regulation (EU) 2018/1139. Compliance with the requirements of an Aerodrome Certificate pursuant to relevant legislation at the time has been assumed to form part of mitigation for the operation of the Proposed Development, as further discussed within **Section 15.8** of this chapter.
Regulation (EU) 2018/1139 of the European Parliament and of the Council of 4 July 2018 on common rules in the field of civil aviation and establishing a European Union Aviation Safety Agency, repealing Regulation (EC) No 216/2008 (Ref. 15.5) (Retained EU Legislation)	
EASA Easy Access Rules for Aerodromes (Regulation (EU) No 139/2014) (Ref. 15.75) (Retained EU Legislation)	
Regulation (EC) No 300/2008 of the European Parliament and of the Council of 11 March 2008 on common rules in the field	Compliance of the Proposed Development with regulatory instruments related to aviation security has been considered as a mitigation measure for MA&D risks. These

Legislation	How and where addressed in PEIR
of civil aviation security and repealing Regulation (EC) No 2320/2002 (Ref. 15.6) (Retained EU Legislation)	are further discussed in **Section 15.8** of this chapter.
Air Navigation Order 2016 (Ref. 15.7).	Compliance with the requirements of the Air Navigation Order has been considered as a mitigation measure for MA&D risks with regards to the operational safety and security management of the airport. These measures are further discussed in **Section 15.8** of this chapter.
Health and Safety at Work etc. Act 1974 (HSWA) (as amended) (Ref. 15.8).	Health and safety requirements at workplace have been considered as measures of prevention of accidents for staff employed for the construction and/or operation of the Proposed Development. Compliance with the requirements of this legislation is outlined in **Section 15.8** of this chapter.
Lifting Operations and Lifting Equipment Regulations 1998 (LOLER) (Ref. 15.9).	Health and safety requirements at workplace established by LOLER have been considered as measures of prevention of accidents for staff employed for the construction and/or operation of the Proposed Development. Compliance with the requirements of this legislation is outlined in **Section 15.8** of this chapter.
Construction (Design and Management) (CDM) Regulations 2015 (Ref. 15.10).	Construction health and safety requirements have been considered as measures of prevention of accidents for staff employed for the construction and/or operation of the Proposed Development, as well as for the protection of material assets. Compliance with the requirements of this legislation is outlined in **Section 15.8** of this chapter. Also, the assessment of the MA&D has been informed by the CDM risk register, which provided information of risks resulting from construction activities and associated mitigation measures.
The Management of Health and Safety at Work Regulations 1999 (Ref. 15.11).	Health and safety requirements at workplace have been considered as measures of prevention of accidents for staff employed for the construction and/or operation of the Proposed Development.

Legislation	How and where addressed in PEIR
	Compliance with the requirements of this legislation is outlined in **Section 15.8** of this chapter.
The Workplace (Health, Safety and Welfare) Regulations 1992 (Ref. 15.12).	Health and safety requirements at workplace have been considered as measures of prevention of accidents for staff employed for the construction and/or operation of the Proposed Development. Compliance with the requirements of this legislation is outlined in **Section 15.8** of this chapter.
Control of Major Accident Hazards (COMAH) Regulations 2015 (Ref. 15.13). (transposing the requirements of Directive 2012/18/EU of the European Parliament and of the Council of 4 July 2012 on the control of major-accident hazards involving dangerous substances, amending and subsequently repealing Council Directive 96/82/EC (Ref. 15.14)).	COMAH sites licenced under the COMAH Regulations have been considered a potential source of MA&D hazards in **Sections 15.7** and **15.9**. The Proposed Development includes a fuel storage facility which will require COMAH consent. Therefore compliance with safety requirements associated with COMAH consent have been considered as mitigation within **Section 15.8** this chapter.
Planning (Hazardous Substances) Regulations 2015 (Ref. 15.15).	Sites licenced under the Planning (Hazardous Substances) Regulations have been considered as a potential source of MA&D hazards in **Sections 15.7** and **15.9**. The Proposed Development includes a fuel storage facility which will require Hazardous Substances Consent (HSC) under the Planning (Hazardous Substances) Regulations. Therefore compliance with the safety requirements associated with HSC have been considered as a mitigation measure within **Section 15.8** of this chapter
Pipeline Safety Regulations 1996 (Ref. 15.16).	Pipelines supplying oil and gas have been considered as a potential source of MA&D hazards in **Sections 15.7** and **15.9**. The Proposed Development will include a connection to an existing fuel pipeline to supply fuel storage facilities within the Proposed Development. Therefore, compliance with the safety requirements of this legislation has been considered as mitigation within **Section 15.8** of this chapter.

Legislation	How and where addressed in PEIR
Control of Asbestos Regulations 2012 (Ref. 15.17).	The Main Application Site includes part of a historic landfill with potential for asbestos-containing material to be present. This has been assessed as a MA&D hazard within **Section 15.9**. Compliance with the requirements of the Control of Asbestos Regulations has been considered as mitigation within **Section 15.8** of this chapter.
Control of Substances Hazardous to Health Regulations 2002 (COSHH) (Ref. 15.18).	The requirements of COSHH Regulations have been considered as measures of prevention of accidents for the construction of the Proposed Development. Compliance with the requirements of this legislation is set out in **Section 15.8** of this chapter.
The Regulatory Reform (Fire Safety) Order 2005 (FSO) (Ref. 15.19).	Risk of fire has been considered a source of MA&D. The Proposed Development includes a number of buildings and facilities susceptible to fire. Therefore, compliance with safety requirements of this legislation for managing the risk of fire has been considered as mitigation within **Section 15.8** of this chapter.
The Civil Contingencies Act (CCA) 2004 (Contingency Planning) Regulations 2005 (Ref. 15.20).	Local authorities are required to prepare for emergencies under the Civil Contingencies Act. The Bedfordshire and Hertfordshire Risk Registers have been prepared and are maintained in accordance with this act, and have informed the baseline assessment of MA&D. Also, Local Resilience Forums, formed under the Civil Contingencies Act, have been consulted.
The Building Regulations 2010 (Ref. 15.21).	Compliance with the Building Regulations has been considered as MA&D prevention measure within **Section 15.8** of this chapter for risks associated with damage to building structures.

Policy

Table 15.3: MA&D policy

Policy	How and where addressed in PEIR
National Planning Policy Framework (NPPF) (2021) (Ref. 15.22).	Paragraph 45 of the NPPF states that *"Local planning authorities should consult the*

Policy	How and where addressed in PEIR
	appropriate bodies when considering applications for the siting of, or changes to, major hazard sites, installations or pipelines, or for development around them". Summary of consultation undertaken to inform the MA&D assessment is presented in **Section 15.4.** Paragraph 97 of the NPPF states that planning decisions *"should promote public safety and defence requirements by*", amongst others: *"anticipating and addressing possible malicious threats and natural hazards, especially in locations where large numbers of people are expected to congregate (…).This includes appropriate and proportionate steps that can be taken to reduce vulnerability, increase resilience and ensure public safety and security"*. Paragraph 183 establishes that *"Planning policies and decisions should ensure that:* *a) a site is suitable for its proposed use taking account of ground conditions and any risks arising from land instability and contamination. This includes risks arising from natural hazards or former activities such as mining, and any proposals for mitigation including land remediation (as well as potential impacts on the natural environment arising from that remediation); (…)"*. Malicious threats and natural hazards fall within the scope of the MA&D assessment and therefore have been considered within this chapter. Steps to taken to reduce vulnerability, increase resilience and ensure public safety and security as far as reasonably practicable are described within **Section 15.8** of this chapter.
National Policy Statement for National Networks – December 2014 (NPSNN) (Ref. 15.23) The NPSNN sets out the need for, and Government's policies to deliver, development of nationally significant infrastructure projects on the national	There are no elements of the Proposed Development that would be classified as a NSIP on the national road or rail network. However, the NPSNN remains a relevant consideration as works are proposed on the SRN at Junction 10 as part of the Proposed Development. As provisions relevant to

Policy	How and where addressed in PEIR
road and rail networks in England. It provides planning guidance for promoters of nationally significant infrastructure projects (NSIP) on the road and rail networks. The provisions of the NPSNN relevant to environmental assessment broadly mirror those as outlined in the ANPS.	environmental assessment broadly mirror those as outlined in the ANPS they have been appropriately considered in this preliminary assessment. Further consideration of the proposals against relevant NPSNN policies will take place following this consultation and in preparation of the application for development consent.
The emerging Aviation Strategy (published for consultation in December 2018 (Ref. 15.24), which concluded in June 2018. Consultation Outcome available at Ref. 15.24).	Section 6 of the Strategy is entitled *"Ensure a safe and secure way to travel"*. Compliance of the Proposed Development with regulatory instruments and standards related to aviation security has been considered as measure for the mitigation of MA&D risks. Compliance with relevant legislation and standards is outlined in **Section 15.8** of this chapter.
Aviation Policy Framework (APF) – March 2013 (Ref. 15.25).	Paragraphs 5.14-5.16 of the APF refer to Public Safety Zones (PSZ), areas within which development is restricted to limit the number of people living and working near airports. CAA undertook consultation to revise the PSZ policy in 2020 (Ref. 15.26), in order to introduce a new standardised shape for PSZs which replaces the previous risk-based model profile. The new policy for defining PSZs was adopted in October 2021 (Ref. 15.27). The PSZ associated with the airport infrastructure has been considered as a measure to mitigate risks in **Section 15.8** of this chapter.
Control of Development in Airport Public Safety Zones (Department for Transport (DfT)) (Ref. 15.27).	This DfT policy paper defines Public Safety Zones and sets out the criteria for their establishment. Development within PSZs is restricted so as to control the number of people on the ground at risk of death or injury should an aircraft accident occur during landing or take-off, thus the paper also provides directions on what is permissible within PSZs. A PSZ associated with the airport has been considered as a measure to mitigate risks in **Section 15.8** and within the assessment of MA&D in **Section 15.9**.
Luton Local Plan 2011-2031 (adopted November 2017) (Ref. 15.28).	Luton Local Plan 2011-2031 makes reference to local emergency planning primarily in the

Policy	How and where addressed in PEIR
	context of flooding and Flood Risk Assessments. Policy LLP36 A(ii) states *"ensuring that all new development addresses flood resilience, the effective management of flood risk including opportunities for appropriate dry access for emergency vehicles"*. Risks derived from extreme weather events, including flood risk, with capacity to result in MA&D have been considered in **Section 15.9** of this chapter. The Local Plan refers to the PSZ at the airport within paragraphs 4.48 and 11.19-11.23 *"Department for Transport Circular 01/2010 relates to the Control of Development in Public Safety Zones (PSZ). PSZ's are areas at either end of the runway within which development is restricted in order to control the number of people living, working or congregating on the ground in that area, in order to minimise the risk in the event of an accident on take-off or landing"*.[4] The PSZ associated with the airport infrastructure has been considered as a measure to mitigate risks in **Sections 15.8** and **15.9** of this chapter.
Luton Local Transport Plan 2011-2026 (Ref. 15.29).	Policy 11 of the Luton Transport Plan focusses on improving safety of the local community, and Policy 12 'Targeted Accident Reduction Measures' outlines the reduction of road traffic collisions as a priority. Measures embedded within the Proposed Development to reduce road traffic collisions are described within **Chapter 18** Traffic and Transport in Volume 2 of this PEIR. These have also been referred to within **Section 15.8** of this chapter.
Central Bedfordshire Local Plan 2015 - 2035 (adopted July 2021) (Ref. 15.30).	The following policies within the Central Bedfordshire Local Plan are of relevance to the MA&D assessment: a. Policy T2 Highway Safety and Design; b. Policy CC3 Flood Risk Management; and c. Policy CC8 Pollution and Land Instability.

[4] A new policy for defining the extent of the PSZs was adopted in October 2021 (Ref. 15.27).

Policy	How and where addressed in PEIR
	Measures embedded within the Proposed Development to minimise risks associated with highway safety, flood risk, pollution and ground instability are described within **Chapter 18** Traffic and Transportation in Volume 2 of this PEIR, **Chapter 20** Water Resources and Flood Risk in Volume 2 of this PEIR and **Chapter 17** Soils and Geology in Volume 2 of this PEIR. Where relevant, these measures have also been considered within this chapter.
North Hertfordshire District Local Plan No.2 With Alterations (Ref. 15.31)	Policy 47: General Aviation states that the Council would refuse development proposals for aviation airfields which could cause highway safety problems. Measures embedded within the Proposed Development to minimise risks associated with highway safety are described within **Chapter 18** Traffic and Transportation. Where relevant, these measures have also been considered within this chapter.
Draft North Hertfordshire District Council (NHDC) Local Plan 2011-2031 (Ref. 15.32).	The NHDC Submission Local Plan 2011-2031 predominant safety focus is associated with highways. Policies SP6 Sustainable Transport, ETC2 Employment development outside Employment Areas, and T1 Assessment of transport matters require developments to demonstrate safety precautions and ensure changes are not detrimental to the existing safety of highways. Measures embedded within the Proposed Development to reduce road traffic collisions are described within **Chapter 18** Traffic and Transportation. Where relevant, these have also been referred to within **Section 15.8** of this chapter.

15.2.3 The Airports National Policy Statement (ANPS) (Ref. 15.33) does not have effect in relation to an application for development consent for an airport development not comprised of an application relating to the Heathrow Northwest Runway. Nevertheless, as set out within paragraph 1.41 of the ANPS, the Secretary of State considers that the contents of the ANPS will be both important and relevant considerations in the determination of such an application, particularly where it relates to London or the south east of England.

15.2.4 Accordingly, whilst the ANPS does not have effect in relation to the Proposed Development, it will be an important and relevant consideration in the determination of the application for development consent. A summary of the

relevant provisions for the MA&D assessment and how these have been addressed in this PEIR is provided within **Table 15.4**.

Table 15.4: How relevant MA&D requirements of ANPS are addressed in the PEIR

ANPS Section	How and where addressed in PEIR
Airports National Policy Statement (ANPS) (Ref. 15.34) Section 4. Assessment Principles, paragraph 4.5 states *"safety, social and economic benefits and adverse impacts should be considered at national, regional and local levels. These may be identified in the Airports NPS, or elsewhere. The Secretary of State will also have regard to the manner in which such benefits are secured, and the level of confidence in their delivery."*	In line with the requirements of paragraph 4.5, potential risks to safety in the event of a MA&D during construction and operation of the Proposed Development across the study area have been assessed within this chapter. Hazards that may pose a risk to the safety of sensitive receptors, including airport infrastructure, passengers and personnel, construction workers, residential properties and surrounding environmental receptors, have been assessed and conclusions on the significance of the risk determined. The results of the assessment of hazards and significance of the risks are outlined in **Section 15.9**.
ANPS Section 4, paragraph 4.35 states *"The Examining Authority and Secretary of State will take into account the ultimate purpose of the infrastructure and bear in mind the operational, safety and security standards which the design has to satisfy."*	The requirements in paragraph 4.35 have been considered in **Section 15.8** of this chapter. Operational safety and security standards are identified in this section and are considered to form part of tertiary mitigation in the assessment of MA&D hazards in **Section 15.9**.
ANPS Section 4, paragraph 4.47 states in relation to climate change adaptation that *"Where transport infrastructure has safety-critical elements, and the design life of the asset is 60 years or greater, the applicant should apply the latest available UK Climate Projections high emissions scenario against the 2080 projections at the 10%, 50% and 90% probability levels, so as to include high impact, low likelihood scenarios."*	The assessment of natural hazards related to climate change, as presented within **Section 15.9** of this chapter, considers the reasonably foreseeable worst-case environmental consequence of these hazards. These natural hazards have been identified in line with the assessment of a high emissions scenario presented in **Chapter 9** Climate Change Resilience in Volume 2 of this PEIR.
ANPS Section 4, paragraphs 4.63 to 4.69 are concerned with national security and safety considerations, including in relation to terrorism. *Paragraph 4.63 states "National security considerations apply across all national infrastructure sectors. The Department for*	In accordance with paragraph 4.63, the project team has engaged with the Department for Transport (DfT) and the Civil Aviation Authority (CAA) on the design of the Proposed Development, as summarised within **Section 15.4** of this chapter. Throughout design development, safety and security considerations,

ANPS Section	How and where addressed in PEIR
Transport acts as the sector sponsor department for the aviation sector, and in this capacity has lead responsibility for security matters and for directing the security approach to be taken, working with the Civil Aviation Authority. The Department for Transport works closely with Government agencies, including the Centre for the Protection of National Infrastructure, to reduce the vulnerability of the aviation sector to terrorism and other national security threats".	including the threat of terrorism have been taken into account. MA&D risks resulting from safety and security incidents have been covered in the assessment of MA&D hazards in **Section 15.9** of this chapter.
Paragraph 4.64 states "Government policy is to ensure that, where possible, proportionate protective security measures are designed into new infrastructure projects at an early stage in the project development. The nature of the aviation sector as a target for terrorism means that security of the infrastructure project for which development consent may be sought under the Airports NPS".	The Proposed Development would comply with all UK aviation laws, industry guidance and standards, in order to comply with the Aerodrome Certificate that allows the airport to operate. The Aerodrome Certificate requires compliance with security measures, including in relation to terrorism. Security and safety measures are also taken into account in **Section 15.9** and as mitigation for hazards related to security, such as crime or terrorism.
Paragraph 4.65 states "Where national security implications have been identified, the applicant should consult with relevant security experts from the Centre for the Protection of National Infrastructure and the Department for Transport to ensure that physical, procedural and personnel security measures have been adequately considered in the design process, and that adequate consideration has been given to the management of security risks. If the Department for Transport, taking advice from the Civil Aviation Authority, Centre for the Protection of National Infrastructure and others it considers appropriate, forms the opinion that it is satisfied that current and potential future security needs are adequately addressed in the project and that relevant guidance on these matters has been appropriately taken into account in the application, it will provide confirmation of this to the Secretary of State, and the Examining Authority should	The requirements of paragraph 4.65 are considered in **Section 15.4**, where relevant technical engagement is identified, and in **Section 15.8,** where it is acknowledged how the design of the Proposed Development has been developed in accordance with legislative and industry requirements.

ANPS Section	How and where addressed in PEIR
not need to give any further consideration to the details of the security measures during the examination". *Paragraph 4.66 states "The applicant should only include such security-related information in the application as is necessary to enable the Examining Authority to examine the development consent issues and make a properly informed recommendation on the application".* *Paragraph 4.68 states "Air transport is one of the safest forms of travel, and the UK is a world leader in aviation safety. Maintaining and improving that record, while ensuring that regulation is proportionate and cost-effective, remains of primary importance to the UK. Since 2003, rules and standards for aviation safety in Europe have increasingly been set by the European Aviation Safety Agency. The UK will continue to work closely with the European Aviation Safety Agency to ensure that a high and uniform level of civil aviation safety is maintained across Europe."* *Paragraph 4.69 states "There remains a considerable threat to aviation security from terrorism. The UK meets this threat with a multi-layered aviation security regime built on intelligence, effective risk management and robust, proportionate measures, brought together under the National Aviation Security Programme. The regulations governing aviation security in the UK have their basis in UK and European law, and are enforced by the Civil Aviation Authority on behalf of the Secretary of State. There may also be other security considerations linked to any application for development consent under the Airports NPS".*	The requirements of paragraph 4.66 are considered within **Section 15.8,** where it is acknowledged how the Proposed Development will comply with security and safety regulations and industry standards to manage the risk of MA&D events occurring. The requirements of paragraphs 4.68 and 4.69 are considered in **Section 15.8**, where it is acknowledged that the airport will comply with all relevant UK aviation laws, guidance and standards. In particular, it is acknowledged that once operational, the Proposed Development will continue to operate in compliance with the Aerodrome Certificate, either under the existing airport operating procedures or equivalent.
ANPS Section 5. Assessment of Impacts includes a requirement for the	Geological hazards such as ground instability and landslides have been

ANPS Section	How and where addressed in PEIR
consideration of land instability, which can be considered to have the potential to result in a MA&D.	identified as a MA&D hazard and are assessed in **Section 15.9**. Further information on risks associated with ground instability is also presented within **Chapter 17** Soils and Geology.
ANPS Section 5. Assessment of Impacts includes a requirement for the consideration of flood risk, which can be considered to have potential to result in a MA&D.	Risks derived from extreme weather events that can result in flooding, with the capacity to result in a MA&D, are assessed in **Section 15.9**. Further information on flood risk is presented within **Chapter 20** Water Resources and Flood Risk.

Guidance

Table 15.5: MA&D guidance

Guidance	How and where addressed in PEIR
Reducing Risks, Protecting People: HSE's decision making process (Ref. 15.35).	The criteria followed for the assessment of MA&D risks has been based on the Tolerability of Risk (TOR) framework established in Part 3 of the document and the concept of tolerability provided in it. The TOR also sets out the principle of mitigating risks to 'as low as reasonably practicable' (ALARP) which has been applied to determine whether the risks assessed in the ERR (**Appendix 15.1** of Volume 3 of this PEIR) have been sufficiently addressed. The criteria followed for the assessment of MA&D is outlined in **Section 15.5** and the ERR (**Appendix 15.1** of Volume 3 of this PEIR).
HSE Major Hazard Regulatory Model: Safety Management in Major Hazard Sectors (Ref. 15.36).	The airport safety management systems must comply with the principles established in this document to prevent a major accident and to mitigate the consequences. Such principles have been considered in the form of the duty holder (the airport in this case) responsibilities to manage risks of major accidents.
HSE's Guidance on The Control of Major Accident Hazards (COMAH) Regulations 2015 (Ref. 15.37)	The Proposed Development includes a fuel storage facility which will require COMAH consent in line with this guidance. Compliance with safety requirements associated with COMAH consent have been considered as mitigation within **Section 15.8** this chapter and have been

Guidance	How and where addressed in PEIR
	considered where relevant within the assessment.
Annex G to PINS Advice Note 11 Working with public bodies in the infrastructure planning process: The Health and Safety Executive (Ref. 15.38)	This guidance note sets out the role of the HSE in considering Nationally Significant Infrastructure Projects, specifically consultation requirements. HSE have been consulted at all stages of the Proposed Development, as further described within **Section 15.4**.
Chemicals and Downstream Oil Industries Forum (CDOIF) Guidelines, Environmental Risk Tolerability for COMAH Establishments (Ref. 15.39).	The severity of harm and duration criteria applied for the assessment of MA&D hazards are based on the tolerability criteria set out in the CDOIF Guidelines. Particularly, Appendix 4 of the CDOIF Guidelines provided the severity of harm criterion, and duration was informed by Section 6.1 of the Guidelines.
Defra's The Green Leaves III Guidelines for Environmental Risk Assessment (Ref. 15.40).	The Defra's Green Leaves Guidelines apply a risk analysis approach that considers 'Consequences' and 'Likelihood' to determine the final level of risk for environmental factors. It also outlines the Source-Pathway-Receptor model and the multi-staged analysis that includes identification of hazard, assessment of consequences and probabilities and characterisation of risk. The ERR reproduces this approach for the assessment of MA&D hazards, as explained in **Section 15.5**.
The International Standards Organization's ISO 31000:2018 Risk Management – Guidelines (Ref. 15.41).	Section 6 of the ISO 31000:2018 provides a framework for the assessment and treatment of risks. The approach includes consideration of the likelihood of events, magnitude of consequences and effectiveness of controls, among others, and is also supported by the concept of risk acceptability. This framework has informed the methodology followed in the ERR for the assessment of MA&D, which is explained in **Section 15.5**.
European Union Aviation Safety Agency (EASA) Certification Safety Specification and Guidance for Aerodromes Design (Ref. 15.42).	The airport operates in compliance with an existing Aerodrome Certificate. Air carriers operating at the airport must also be licenced and certified with the CAA. These licences are subject to compliance with the

Guidance	How and where addressed in PEIR
(It is noted that in spite of the UK leaving the EU this certificate remains valid as the EASA requirements will be incorporated into UK law (Ref. 15.43)).	UK aviation law and CAA requirements including for the provision of adequate arrangements for safety and security. Safety Management Systems in compliance with these requirements have been considered as a mitigation measure for MA&D hazards in **Section 15.8** of this chapter.
Civil Aviation Authority (CAA) Guidance: Civil Aviation Publication (CAP) 760 on the conduct of Hazard Identification, Risk Assessment and the Production of Safety Cases (Ref. 15.44).	The CAP 760 provides risk assessment and mitigation guidance specific for the safety of air traffic safety and aerodrome operations. The approach set out in the guidance has informed the methodology for the assessment of MA&D hazards, as outlined in **Section 15.5**. Severity of harm and tolerability criteria utilised in the assessment provided in the ERR (**Appendix 15.1** of Volume 3 of this PEIR) have been based on the CAP 760.
EASA and CAA Guidance: various Civil Aviation Publications	As described within **Section 15.8,** the Proposed Development will be operated under Aerodrome Certificate in line with the requirements of relevant guidance, including but not limited to: a. EASA Easy Access Rules for Aerodromes (Regulation (EU) No 139/2014); b. CAP168 Licensing of Aerodromes; c. CAP670 ATS Safety Requirements, d. CAP738 Safeguarding of Aerodromes, e. CAP772 Wildlife Hazard Management at Aerodrome, f. CAP795 Safety Management Systems, g. CAP1223 Framework for an Aviation Security, h. CAP1273 Implementing a Security Management System, and i. CAP1616 Airspace Design.
DfT, Aviation Security in Airport Development 2017 (Ref. 15.45)	As described within **Section 15.8**, relevant DfT guidance, including Aviation Security in Airport Development 20175, has been referred to during design development to mitigate security risks.

[5] Note this document is not publicly available.

Guidance	How and where addressed in PEIR
Government guidance on Working safely during COVID-19 in construction and other outdoor work (Ref. 15.46)	This document sets out guidance on how to manage construction sites safely whilst minimising the risk of spreading COVID-19. This guidance sets out good practice measures during construction to reduce the risk of spreading infectious diseases or outbreaks specifically related to COVID-19. This guidance has therefore been referenced within **Section 15.8** of this chapter.
Construction Leadership Council: Protecting Your Workforce During Coronavirus (Ref. 15.47)	These Site Operating Procedures (SOP) are based on Government guidance on 'Working safely during Coronavirus (COVID 19): Construction and other outdoor work (Ref. 15.46). These SOP introduce consistent measures for construction sites of all types and sizes which employers and individuals should make every effort to comply with. These SOP set out good practice measures during construction to reduce the risk of spreading infectious diseases or outbreaks specifically related to COVID-19. This guidance has therefore been referenced within **Section 15.8** of this chapter.
IEMA (2020) IEMA Major Accidents and Disasters in EIA Guide (Ref. 15.48)	This document is a primer for outlining the current practice within the UK to undertaking MA&D assessments in EIA. It offers guidance and an assessment methodology for MA&D within EIA, and has been used to inform the assessment methodology described within **Section 15.5** of this chapter.

15.3 Scope of the assessment

15.3.1 This section describes the scope of the MA&D assessment, including how the assessment has responded to the Planning Inspectorate's Scoping Opinion. The temporal and spatial scope, the relevant receptors, and matters scoped in and out are identified. A description of engagement undertaken with relevant technical stakeholders to develop and agree this scope is provided in **Section 15.4**.

Scoping Opinion

15.3.2 The EIA Scoping Report set out the proposed scope and assessment methodologies to be employed in the EIA and is provided in **Appendices 1.1 and 1.2** in Volume 3 to this PEIR.

15.3.3 In response to that Scoping Report, a Scoping Opinion was received from the Planning Inspectorate on 9 May 2019 and is provided in **Appendix 1.3** in Volume 3 of this PEIR.

15.3.4 **Table 15.6** describes the main matters raised by the Planning Inspectorate in the Scoping Opinion and how these have been addressed in this PEIR. Final responses to all comments received during Scoping will be provided in an appropriate format in the ES.

15.3.5 In summary, matters scoped into the MA&D assessment include potentially significant effects arising from the vulnerability of the construction and operation of the Proposed Development to MA&D hazards. Matters scoped out include activities not altered by the Proposed Development or that do not affect the vulnerability of the Proposed Development to MA&D events; hazards generated by members of the public who wilfully trespass; events with a low consequence; expected or planned impacts; and hazards where no source-pathway-receptor linkage with the Proposed Development has been identified. Further detail is provided within sections below.

Table 15.6: MA&D Scoping Opinion comments

Scoping Opinion ID	Scoping Opinion comment	How is this addressed
3.2.15	The ES should include a description and assessment (where relevant) of the likely significant effects resulting from accidents and disasters applicable to the Proposed Development. The Applicant should make use of appropriate guidance (e.g. that referenced in the Health and Safety Executive's (HSE) Annex to Advice Note 11) to better understand the likelihood of an occurrence and the Proposed	This chapter presents the assessment of the likely significant effects resulting from potential major accidents and disasters relevant to the Proposed Development. The assessment considers both, the Proposed Development's vulnerability to MA&D hazards and the potential of the Proposed Development to give rise to new MA&D risks. Guidance relevant to understanding the likelihood of a MA&D occurring

Scoping Opinion ID	Scoping Opinion comment	How is this addressed
	Development's susceptibility to potential major accidents and hazards. The description and assessment should consider the vulnerability of the Proposed Development to a potential accident or disaster and also the Proposed Development's potential to cause an accident or disaster. The assessment should specifically assess significant effects resulting from the risks to human health, cultural heritage or the environment. Any measures that will be employed to prevent and control significant effects should be presented in the ES.	and the Proposed Development's susceptibility to potential MA&D hazards have been referenced throughout this chapter, where applicable, and is summarised in **Section 15.2.** HSE have been consulted at all stages of the Proposed Development in line with the guidance presented in Annex G to PINS Advice Note 11 (Ref. 15.49). The risk assessment referred to within the Advice Note 11, Annex G is to be submitted to HSE post-consent as part of the COMAH consent application, following the development of detailed design. Human health, cultural heritage and the environment have been considered as receptors of potential risks of MA&D, as explained in **Section 15.7.** Measures employed to prevent and control MA&D risks are outlined in **Sections 15.8** and **15.10.**
3.2.16	Relevant information available and obtained through risk assessments pursuant to European Union legislation such as Directive 2012/18/EU of the European Parliament and of the Council or Council Directive 2009/71/Euratom or relevant assessments carried out pursuant to national legislation may be used for this purpose provided that the requirements of this Directive are met. Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for and proposed response to such emergencies.	The MA&D assessment presented within this chapter has been informed by the consideration of potential hazards associated with the use and storage of hazardous substances, which would be subject to the requirements of COMAH Regulations[6]. A detailed risk assessment will be undertaken to obtain COMAH consent from HSE, following the development of detailed design and prior to hazardous substances being brought to site. The MA&D assessment presented within this chapter provides a summary of the types of hazards covered under the COMAH consenting regime, the reasonably foreseeable worst-case environmental consequence and a

[6] COMAH Regulations 2015 transpose the requirements of Directive 2012/18/EU into the UK legislation.

Scoping Opinion ID	Scoping Opinion comment	How is this addressed
		summary of the required mitigation, in the form of regulatory requirements, to reduce these risks to ALARP. Compliance with the COMAH consent is considered to form part of tertiary mitigation within this chapter. The requirements of Council Directive 2009/71/Euratom are not relevant to the Proposed Development, as this Directive applies to nuclear installations.
4.15.1	Events with no source-pathway-receptor linkages. The Scoping Report seeks to scope out matters where there is no source-pathway-receptor link, such as natural disasters unlikely to affect the Proposed Development site e.g. tsunamis and sea level rise. The Inspectorate is content that the impacts associated with such matters are unlikely to represent major accident and disaster significant events and can be scoped out of the assessment.	Noted.
4.15.2	Activities already undertaken by the Airport or within adjacent sites which are not altered by the Proposed Development or which do not affect the vulnerability of the Proposed Development. The Scoping Report seeks to scope out such matters on the basis that the severity and emergency response to the accidents and disasters associated with these activities would not be affected by the Proposed Development. The Inspectorate is uncertain of the full extent of matters to be scoped out on this basis. Furthermore, the Inspectorate does not consider that sufficient information regarding the existing emergency response procedures has been provided to	All major accident and disaster hazards relevant to the Proposed Development have been identified within **Section 15.9** and the ERR (**Appendix 15.1** of Volume 3 of this PEIR). Where relevant, the existing operational management systems at the airport implemented in compliance with the Aerodrome Certificate have been considered to form part of tertiary mitigation within the assessment. A summary of the current systems in place is provided within **Section 15.8**.

Scoping Opinion ID	Scoping Opinion comment	How is this addressed
	justify the scoping out of these matters. The ES should include a definition of the and the current systems in place to address impacts for these matters. Where significant effects are likely to occur, this should be assessed in the ES.	
4.15.3	Events which are not specific to the Proposed Development and which would not be altered by the Proposed Development. The Scoping Report seeks to scope out such matters and provides the example of disease outbreak. The Inspectorate is uncertain of the full extent of matters to be scoped out by this description. The ES should include a definition of these events and where significant effects are likely to occur, this should be assessed in the ES.	All major accident and disaster hazards relevant to the Proposed Development have been identified within **Section 15.9** and the ERR (**Appendix 15.1** of Volume 3 of this PEIR). Disease outbreaks have been scoped in, including spread of COVID-19.
4.15.4	Wilful trespassers in the Airport. The Scoping Report states that members of the public who wilfully trespass will not be considered as sensitive receptors as there are, and will continue to be, appropriate measures to provide a secure boundary to the Airport in line with appropriate standards of compliance. The Inspectorate notes that there is limited information regarding this matter in the Scoping Report. However, the Inspectorate is content that the ES should include an appropriate description of the current systems in place to address these matters and on that basis significant effects are unlikely to occur.	The safety and security procedures at the Proposed Development will be managed under an Aerodrome Certificate in line with the requirements of relevant regulations and guidance. A description of the operational management systems in place in compliance with the Aerodrome Certificate is provided in **Section 15.8**.
4.15.5	Events of any likelihood with a low consequence. The Scoping Report seeks to scope out matters where the consequence	Noted.

Scoping Opinion ID	Scoping Opinion comment	How is this addressed
	does not result in significant harm. The Inspectorate is content that the impacts associated with such matters are unlikely to represent major accident and disaster significant events and can be scoped out of the assessment.	
4.15.6	Expected or planned impacts. The Scoping Report seeks to scope out such matters as these will be covered by other aspect chapters within the ES. The Inspectorate is uncertain of the full extent of matters to be scoped out by this description. The Inspectorate is content that these matters are to be assessed elsewhere in the ES but there should be cross reference made to appropriate aspect chapters.	Cross references to relevant topic assessments have been provided throughout the MA&D chapter and the ERR (**Appendix 15.1** of Volume 3 of this PEIR), where appropriate.
4.15.7	The following risks during the construction phase of the Proposed Development: Vandalism/ crime/ terrorism leading to an increased risk to personal safety of members of the public; Cyber-attack and digital/ data security; and Civil unrest/ protests. The Scoping Report expressly scopes these matters into the assessment during the operational phase of the Proposed Development but excludes them from the assessment of construction impacts. The Inspectorate considers that insufficient information has been provided to justify a scoping out of these matters at this stage. The ES should assess impacts to these matters where significant effects are likely to occur. Furthermore, with regards to the risk of vandalism, crime and terrorism during both	The assessment of the risk of vandalism/ crime/ terrorism cyber-attack and digital/ data security; and civil unrest/ protests for the construction phase has been included within **Section 15.9** and the ERR (**Appendix 15.1**). Risks to both, airport staff and members of the public, have been considered. Refer to risks ID C26, C27, C29 in the ERR (**Appendix 15.1** of Volume 3 of this PEIR) and in **Section 15.9.**

Scoping Opinion ID	Scoping Opinion comment	How is this addressed
	construction and operation, the Inspectorate is of the view that the onsite safety of Airport staff should be taken into consideration, in addition to the onsite safety of members of the public.	
4.15.8	The following risks during both the construction and operational phases of the Proposed Development: Absent or deficient safety/ environmental management systems (e.g. inadequate planning, resource provision, procedures); Absent or deficient security provision (e.g. inadequate planning, resource provision, procedures); Importation of biological agents/ biohazard/ disease/ pathogen including disembarkation of passengers and/ or flight with controlled disease or biohazard; External aircraft interference (lasers, fireworks, sky lanterns, drones, wind turbine interaction with radar); Damage to artefacts of national or international importance during import or export; Space weather (e.g. geomagnetic storms, radiation storms and solar flares) leads to loss of systems (e.g. loss of primary navigation system or loss of communications); and Loss of essential air safety and airside systems or loss of safety critical workers. The Scoping Report does not appear to specifically address these matters as being scoped in to the assessment of major accidents and disasters. The Inspectorate does not consider that sufficient	**Section 15.9** and the ERR (**Appendix 15.1** of Volume 3 of this PEIR) includes an assessment of these risks, as follows: a. Absent or deficient safety/ environmental management systems (e.g. inadequate planning, resource provision, procedures): ID C20 and O20; b. Absent or deficient security provision (e.g. inadequate planning, resource provision, procedures): ID C21 and O21; c. Importation of biological agents/ biohazard/ disease/ pathogen including disembarkation of passengers and/ or flight with controlled disease or biohazard: ID C28 and O29; d. External aircraft interference (lasers, fireworks, sky lanterns, drones, wind turbine interaction with radar): ID C25 and O25; e. Space weather (e.g. geomagnetic storms, radiation storms and solar flares) leads to loss of systems (e.g. loss of primary navigation system or loss of communications): ID C9 and O9; and f. Loss of essential air safety and airside systems or loss of safety critical workers: ID C20 and O20. Artefacts of national or international importance during import or export have been considered as a receptor for MA&D effects in the assessment.

Scoping Opinion ID	Scoping Opinion comment	How is this addressed
	information has been provided to justify the scoping out of these matters at this stage. The ES should assess impacts to these matters where significant effects are likely to occur.	
4.15.9	Consultation bodies. The Scoping Report notes that key consultation bodies have been identified and that consultation will be undertaken and recorded throughout the pre-application stage. The ES should clearly evidence any such consultation that is undertaken, the consultation bodies that have taken part and the outcomes that have been decided upon.	A summary of consultation undertaken and the outcomes is provided in **Section 15.4**.
4.15.10	Study area. The Scoping Report states that the potential maximum impact extent will be determined during the assessment. The ES should clearly evidence and justify the final extent of the study area used in the assessment of this aspect. The study area should be sufficient to encompass the likely significant effects of the Proposed Development from the perspective of major accidents and disasters and effort should be made to agree the approach with relevant consultation bodies.	The study area is described within **Section 15.5** and shown on **Figure 15.1** in Volume 4 of this PEIR. The study area for each MA&D hazard is further detailed in the ERR (**Appendix 15.1** of Volume 3 of this PEIR).
4.15.11	Receptors and baseline conditions. The Scoping Report states that the baseline and receptors will be largely informed by other aspect chapters. The ES should provide a description of all receptors and baseline conditions to be considered as part of the major accidents and disasters assessment, including cross	A summary of baseline conditions is provided within **Section 15.7** of this chapter. This includes cross-references to other technical chapters that have been relied upon, where applicable. **Section 15.7** also includes baseline information on current susceptibility of the study area to natural disasters.

Scoping Opinion ID	Scoping Opinion comment	How is this addressed
	referencing and signposting to the relevant sections of other aspect chapters that are being relied upon. In addition to the conditions set out in the other aspect assessments the ES should establish a baseline in respect of natural disasters, for example setting out the current susceptibility of the site to seismic movement, extreme storms, tornadoes, snow and fog.	
4.15.12	Baseline sources. The Scoping Report notes that baseline information relevant to the assessment of major accidents and disasters will be obtained from a number of sources. The ES should include a complete list of all sources that have been relied upon in establishing the baseline conditions.	References to the sources consulted to obtain baseline information have been provided within **Section 15.7**
4.15.13	Consultation distances. The Scoping Report refers to 'consultation distances' held by HSE in respect of COMAH sites and LPAs in respect of Hazardous Substances Consent sites, and states that further assessment may be required if an interaction between these sites and the Proposed Development is identified. The ES should clearly set out these consultation distances and the steps taken to identify any interaction between the sites and the Proposed Development. The Applicant should make effort to agree its approach with HSE and the LPAs.	It is noted that Consultation Zones are only applied to Upper Tier COMAH sites and major accident hazard pipelines. HSE's scoping response identifies that the Proposed Development is located within one major accident hazard pipeline Consultation Zone for an existing fuel pipeline. Risks ID C12, C14 and O14 within **Section 15.9** and the ERR (**Appendix 15.1** in Volume 3 of this PEIR) consider hazards associated with the existing fuel pipeline. A search for COMAH and HSC sites within 5km of the Proposed Development has been undertaken and with the exception of the existing fuel farm at the airport (which is a Lower Tier COMAH site), no other sites have been identified. The existing fuel farm at the airport has been considered under risk ID C12, C14 and O14 within **Section 15.9** and

Scoping Opinion ID	Scoping Opinion comment	How is this addressed
		the ERR (**Appendix 15.1** in Volume 3 of this PEIR).
4.15.14	Risk registers Reference is made throughout the Scoping Report to various risk registers that will list identified risks relevant to the assessment of major accidents and disasters. In the event that such registers are to be relied upon in assessing significance, copies of these should be provided as appendices to the ES.	The assessment presented within this chapter has been based on the risk register included within the ERR, refer **Appendix 15.1** in Volume 3 of this PEIR.
4.15.15	Additional consultation The Scoping Report states that further consultation will be undertaken to ensure that all risks are as low as reasonably practicable. The ES should provide an overview of any such consultation that is undertaken with the relevant consultation bodies and the outcomes that have been decided upon as they relate to the assessment of likely significant effects.	A summary of consultation undertaken, and the outcomes, is provided in **Section 15.4**
4.15.16	Significance criteria The Scoping Report refers to various factors that are relevant to the identification of a potential significant effect, to include: the sensitivity of receptors; the duration of effect; the geographic extent of effect; the severity of effect; and the effort required to restore an affected environment. However, no information is provided on how each of these factors will be taken into consideration to determine significance. The ES should clearly demonstrate how these factors are taken into consideration and combined to determine the overall significance of effects.	Assessment criteria is outlined in **Section 15.5.** Full details of the significance criteria for the assessment of MA&D risks is provided in the ERR (**Appendix 15.1** of Volume 3 of this PEIR).

Scoping Opinion ID	Scoping Opinion comment	How is this addressed
4.15.17	Tolerability criteria The Scoping Report states that reference will be made to the tolerability criteria of major accidents and disaster hazards as mentioned in 'Reducing Risks, Protecting People: HSE's decision making process'. The ES must clearly set out the risk tolerability criteria referred to and contain an explanation as to how it has been taken into consideration within the assessment in concluding on likely significant effects.	Assessment criteria is outlined in **Section 15.5.** Full details of significance criteria, including tolerability criteria, for the assessment of MA&D risks is provided in the ERR (**Appendix 15.1** of Volume 3 of this PEIR).
4.15.18	Operational impacts – increase in ATMs and interactions. The ES should take into account increased likelihood of aircraft related incidents that could arise from the proposed increase in ATMs, where likely significant effects could occur.	This risk has been assessed within **Section 15.9** and the ERR (**Appendix 15.1** of Volume 3 of this PEIR) (refer to risk ID O16).

Spatial scope

Study area and Zone of influence

15.3.6 The study area for the MA&D assessment has been defined on the basis of the reasonably foreseeable worst-case impact area of the MA&D hazards relevant to the Proposed Development. The extent of the study area for the MA&D assessment is shown on **Figure 15.1** in Volume 4 of this PEIR**.** The worst-case impact area also marks the Zone of Influence (ZOI) of the Proposed Development. Receptors within this study area are described in the **Section 15.5** of this chapter.

15.3.7 In order to establish the worst-case impact area, a likely impact area was determined for each hazard. For example:

a. The study area for natural disaster hazards that could impact the Proposed Development comprises the area within the site boundary.

b. The study area for road traffic collisions comprises the extent of the highway network impacted by the Proposed Development (refer to **Chapter 18** Traffic and Transportation).

c. The study area for flood risk comprises the catchment area used in flood risk modelling (refer to **Chapter 20** Water Resources and Flood Risk).

d. The study area for aircraft accidents comprises the PSZ.

e. The study area for other major accident hazards arising from the Proposed Development was determined on the basis of a similar incident that had previously been recorded on the European Commission's Major Accident Reporting System (eMARS) (Ref. 15.50), if available, or on the basis of professional judgement, if not available. For the Main Application Site, this was extended to a 10km radius from the site boundary for contamination hazards. For Off-site Car Parks, the study area was extended to a 2km radius. For Off-site Highway Intervention Works, this was limited to the site boundary, as these works are not considered likely to result in new potential sources of major accidents, with the exception of the potential for road traffic collisions within the site boundary, which have been considered within this chapter.

15.3.8 The worst-case impact area of each MA&D hazard scoped into the assessment is listed within the ERR (**Appendix 15.1** of Volume 3 of this PEIR).

Temporal Scope

15.3.9 The Proposed Development will be delivered over two phases (Phase 1 and Phase 2 within which construction and operation may take place simultaneously. For the purpose of assessment, three assessment phases are considered as described within **Chapter 4** The Proposed Development in Volume 2 of this PEIR.

15.3.10 MA&D hazards relevant to construction have been assessed across the whole of the construction period, as the phasing of works would not affect the reasonably foreseeable worst-case consequence or mitigation required.

15.3.11 For a worst-case assessment of the operational phase, the maximum proposed capacity of the Proposed Development following Phase 3 has been assessed, as with a reduced number of Air Traffic Movements and passengers, the risks associated with MA&D would also be reduced.

Receptors

15.3.12 A MA&D event could affect practically anything that exists within its worst-case impact area. Therefore, people and natural and man-made assets within the study area have been considered as receptors susceptible to potential MA&D effects.

15.3.13 A full description of the receptors considered in the MA&D assessment is provided in **Section 15.7**. These receptors are also illustrated in **Figure 15.2** in Volume 4 of this PEIR.

Matters scoped in

15.3.14 This chapter assesses the vulnerability of the Proposed Development to MA&D and the potential of the Proposed Development to result in significant environmental effects due to a MA&D event. This chapter is supported by the ERR included in **Appendix 15.1** of Volume 3 of this PEIR, which lists all MA&D hazards assessed.

15.3.15 MA&D hazards considered within this chapter include man-made causes and naturally occurring phenomenon, which are typically rare or low likelihood events with the potential to result in 'serious damage', as defined in **Section 15.1**. Threats or malicious attacks, such as crime, terrorism and vandalism, have also been considered under the definition of major accident hazards for the purposes of this assessment.

15.3.16 The assessment of effects related to road traffic safety, climate change and flood risk, as reported within **Chapter 18** Traffic and Transportation, **Chapter 9** Climate Change Resilience, **Chapter 20** Water Resources and Flood Risk have been referred to, where relevant, within this chapter

15.3.17 Matters have been scoped in with due consideration of the Planning Inspectorate's Scoping Opinion and consultation feedback from stakeholders, as reported in **Sections 15.3** and **15.4**, respectively.

Matters scoped out

15.3.18 Hazards where no source-pathway-receptor link with the Proposed Development has been identified have been scoped out of the assessment. These include natural disasters unlikely to affect the study area for MA&D assessment, e.g. tsunamis and sea level rise.

15.3.19 Low consequence events do not meet the definition for serious damage and, therefore, are also not considered in this chapter. For example, slips, trips and falls would be dealt with under contractors' management systems and do not fall within the scope of this assessment. Effects associated with minor spills or mobilising existing contamination within soils are assessed within **Chapter 17** Soils and Geology and **Chapter 20** Water Resources and Flood Risk.

15.3.20 Furthermore, expected or planned impacts associated with the construction or operation of the Proposed Development, such as those reported within **Chapters 6 to 20**, have not been considered further within this chapter.

15.3.21 It is noted that the assessment of effects on members of the public who are wilfully trespassing unauthorised areas has been scoped out on the basis of the safety and security measures and systems to be implemented by the Proposed Development (see **Section 15.8**) to avoid trespassing. Members of public who are wilfully accessing unauthorised areas are assumed to act purposefully to overcome these measures and therefore, are not considered a valid receptor in the context of this assessment.

15.3.22 Matters have been scoped out with due consideration of the Planning Inspectorate's Scoping Opinion and consultation feedback from stakeholders, as reported in **Sections 15.3** and **15.4**, respectively.

15.4 Stakeholder engagement and consultation

15.4.1 Engagement in relation to MA&D has been undertaken with a number of prescribed and non-prescribed stakeholders. Consultation on the MA&D assessment was completed through the following:

a. EIA Scoping process, where comments relevant to the MA&D assessment were received from the Planning Inspectorate (refer to **Section 15.3**) and the HSE and CAA with their consultation responses;

b. Non-statutory consultation in 2018 and statutory consultation in 2019, where comments relevant to the MA&D assessment were received as part of HSE, CAA, Public Health England and Bedfordshire Police consultation responses and as part of the joint response issued by Luton Borough Council (LBC), Central Bedfordshire Council (CBC), North Hertfordshire District Council (NHDC) and Hertfordshire County Council (HCC) (refer to the **2019 Statutory Consultation Feedback Report** for further information); and

c. individual meetings held with the existing airport emergency resilience officer and fire safety manager, emergency resilience officers at local authorities, emergency services, local resilience forums, CAA, Public Health England and others. A summary of meetings held is provided within **Table 15.7**.

15.4.2 This PEIR has been published for a further round of statutory consultation, as part of which all consultees are able to comment on the MA&D assessment presented within this chapter.

15.4.3 **Table 15.7** provides a summary of meetings held with relevant stakeholders, undertaken to inform the EIA to date, including the date and time of meetings and a summary of discussions to resolve matters raised. The main matters/themes raised during stakeholder engagement and consultation considered relevant to the MA&D assessment included:

a. design reviews of the masterplan, including a review of design principles related to the fire training ground, fuel farm and fire safety; and

b. approach to the assessment of MA&D.

Table 15.7:Stakeholder engagement relating to MA&D

Meeting name and date	Attendees (organisation)	Summary of discussion
14 March 2019	Luton Borough Council (LBC) and Central Bedfordshire Council (CBC) Emergency Resilience Officers	Introductory meeting, including a presentation on the Proposed Development. No concerns of relevance to the MA&D assessment were raised.
26 March 2019	North Hertfordshire District Council (NHDC) Emergency Resilience Officer	
7 May 2019	London Luton Airport Operations Limited (LLAOL) Emergency Resilience Officer and Fire Safety Manager	Design review of the masterplan, including a discussion around design principles related to the fire training ground, fuel farm and fire safety.

Meeting name and date	Attendees (organisation)	Summary of discussion
		No further concerns of relevance to the MA&D assessment were raised.
21 May 2019	Bedfordshire Local Resilience Forum, including representatives from Bedfordshire Police, Bedfordshire Fire and Rescue Service, British Transport Police, Highways England, Bedford Borough Council, Environment Agency, Luton and Bedfordshire Clinical Commissioning Group, CBC, BLEVEC emergency volunteers group, British Army, Met Office, and Public Health England.	Introduction to the Proposed Development and introductory discussion on the approach to the assessment of MA&D within EIA. No concerns of relevance to the MA&D assessment were raised.
28 June 2019	CAA	Introduction to the Proposed Development. Discussion on aerodrome design and flight paths. No further concerns of relevance to the MA&D assessment were raised.
3 July 2019	Emergency services, including Bedfordshire Police, Hertfordshire Police, Bedfordshire Fire and Rescue. LLAOL Head of Airside Operations and Compliance Manager.	Design review of the Proposed Development, including a design review of measures relating to safety and security. No further concerns of relevance to the MA&D assessment were raised.
23 August 2019	CAA	Introduction to the Proposed Development. Discussion on aerodrome design and flight paths. No further concerns of relevance to the MA&D assessment raised.
27 August 2019	NATS	
4 September 2019	Hertfordshire Local Resilience Forum	Introduction to the Proposed Development and introductory discussion on the approach to the assessment of MA&D within EIA. No concerns of relevance to the MA&D assessment raised.
17 September	Bedfordshire Local Resilience Forum Executive Group	Introduction to the Proposed Development. No concerns of relevance to the MA&D assessment raised.
	Bedfordshire Local Resilience Forum	Update on the Proposed Development and MA&D assessment.

Meeting name and date	Attendees (organisation)	Summary of discussion
24 September 2019		No concerns of relevance to the MA&D assessment raised.
	LLAOL Emergency Resilience Officer and Fire Safety Manager	Design review of the Proposed Development, including a discussion of design principles related to the fire training ground, fuel farm and fire safety. Update on the MA&D assessment. No further concerns of relevance to the MA&D assessment raised.
14 December 2020	Public Health England (PHE)	Review of the approach to MA&D assessment, including the approach to the risk assessment, hazards considered and types of mitigation. PHE queried the process with regards to establishing emergency response plans for the Proposed Development. It was confirmed that these would be implemented under the Aerodrome Certificate. PHE had no further comments on the approach to the MA&D assessment. No other concerns of relevance to the MA&D assessment raised.
16 September 2021	Hertfordshire Local Resilience Forum	Briefing on the updated scheme and upcoming statutory consultation. It was discussed that the scheme is mostly within the remit of the Bedfordshire Local Resilience Forum and further detailed discussion on the MA&D assessment would be held with local authority's emergency planning officers. No concerns of relevance to the MA&D assessment raised.
15 October 2021	Bedfordshire Police; Central Bedfordshire Emergency Planning Officer; and Luton Borough Council Emergency Planning Officer	A summary of the MA&D assessment methodology and results were presented. Questions were raised with regards to the provision of parking spaces. The information on parking for each phase of the Proposed Development was collated and circulated. A suggestion was made on terminology, specifically in relation to using 'road traffic collisions' instead of

Meeting name and date	Attendees (organisation)	Summary of discussion
		'road traffic accidents'. This MA&D chapter and ERR (**Appendix 15.1**) have been updated accordingly. Additional information on the testing of emergency plans was requested. Attendees also requested to review the ERR (**Appendix 15.1**), which was provided on 9 November 2021.

15.4.4 Stakeholder engagement will continue as the Proposed Development progresses and will include further meetings with the stakeholders listed in **Table 15.7** to discuss results of the PEIR and next steps for the ES.

15.5 Methodology

Overview

15.5.1 This section outlines the methodology employed for assessing the likely significant effects on MA&D from the construction and operation of the Proposed Development.

15.5.2 It is noted that by definition all MA&D hazards have the potential to result in serious damage that would result in a significant effect, however in most cases the likelihood of a MA&D occurring is low or very low. This assessment outlines the reasonably foreseeable worst-case consequence of a MA&D event (i.e. the significant effect) and then determines the likelihood of the significant effect occurring in the event of a MA&D. Risks that are considered to be unacceptable are assessed as 'significant' and risks that are considered as tolerable or tolerable if As Low As Reasonably Practicable (ALARP)[7] (TifALARP) are assessed as 'not significant'.

15.5.3 In summary, the assessment considers the risk of serious damage occurring as a result of the following:

a. Vulnerability of the Proposed Development to a natural disaster or to a major accident from an existing hazard source; and

b. Proposed Development creating a new source of a major accident.

Baseline methodology

15.5.4 The assessment of potential MA&D effects considers the vulnerability of the Proposed Development to MA&D and the potential of the Proposed

[7] As low as reasonably practicable (ALARP) is a term used to describe an expected level of residual risk involved with a system or set of operations, in case it is not possible to eliminate the risk. What this means, is that the Applicant, overseen by the regulatory authorities, is responsible for exercising good practice and judgement to ensure that necessary measures have been taken in order to reduce the levels of risk, such that the residual risk levels are 'as low as reasonably practicable'.

Development to result in significant environmental effects due to a MA&D event. Therefore, the baseline assessment for MA&D comprises two parts:

a. identifying the potential for the site of the Proposed Development to be impacted by existing MA&D hazards; and
b. identifying sensitive receptors within the study area of the MA&D assessment which could be impacted by hazards created by the Proposed Development.

15.5.5 The methodology to define the spatial scope of the MA&D assessment, that is, the study area and ZOI, is described in **Section 15.4** of this chapter.

15.5.6 The approach to defining future baseline is described in **Section 15.5**.

Baseline Vulnerability of the Application Site to MA&D Hazards

15.5.7 As part of the baseline assessment, a review of the potential MA&D hazards relevant to the study area without the Proposed Development was undertaken. This included a review of the potential for natural disasters and an identification of existing hazard sources related to major accidents which could impact the Main Application Site, Off-site Car Parks and Off-site Highway Intervention works.

15.5.8 Information from studies undertaken to inform the EIA or from publicly available data was reviewed with regards to the following hazards:

a. Potential for natural disaster hazards:
    i. Meteorological hazards, e.g. extreme rainfall events resulting in flooding, heat waves, drought, storms, etc. (with reference to **Chapter 9** Climate Change Resilience and **Chapter 20** Water Resources and Flood Risk);
    ii. Geological and seismic hazards, e.g. ground instability, landslides, ground collapse, sinkholes, earthquakes (with reference to **Chapter 17** Soils and Geology, where relevant);
    iii. Potential for other natural hazards, such as geomagnetic storms, solar flares, wildfires etc.;
b. Potential existing sources of major accidents within the study area:
    i. Sites managed under a Hazardous Substance Consent and/ or a COMAH consent;
    ii. Environment Agency permitted sites (landfill, mining waste, etc.);
    iii. Existing hazardous ground conditions due to man-made activities, such as historic landfill sites and Unexploded Ordnance (UXO);
    iv. Fuel pipeline and storage locations; and
    v. Aircraft incidents / existing airport operations.

15.5.9 Where a natural disaster or a major accident due to an existing hazard source was considered theoretically possible, these hazards were listed and assessed within the context of the Proposed Development in the ERR (**Appendix 15.1** of Volume 3 of this PEIR).

Identification of sensitive receptors

15.5.10 Relevant receptors for the MA&D assessment include:

a. airport users, workers and passengers;
b. construction workers;
c. Members of the public, local communities;
d. built environment, including existing airport facilities, off-site infrastructure, heritage assets, agricultural land and other built environment receptors; and
e. the natural environment, including sites designated for nature conservation, land and soil quality, surface and groundwater resources and landscape.

15.5.11 Baseline information collected for other disciplines included in the scope of the EIA has been used to define the receptors which could be impacted in the event of a MA&D. In particular, baseline information on soils and geology (**Chapter 17**), water resources (**Chapter 20**), health and community (**Chapter 13**), agricultural land (**Chapter 6**), biodiversity (**Chapter 8**) and cultural heritage (**Chapter 10**) in Volume 2 of this PEIR has been referred to.

15.5.12 The sensitivity of the identified receptors has been considered as part of the 'severity of harm' assessment (see section below on **'Assessment methodology'**).

Approach to future baseline

15.5.13 The approach to defining future baseline is described in **Section 5.4** of **Chapter 5** Approach to the Assessment in Volume 2 of this PEIR**.** The future baseline considered for MA&D is described **Section 15.7** of this chapter.

Assessment methodology

15.5.14 The methodology below applies to the assessment of effects for both construction and operational phases, although the results of the assessment for each phase are reported separately.

15.5.15 MA&D hazards relevant to construction have been assessed across the whole construction period, as the phasing of works would not affect the reasonably foreseeable worst-case consequence or mitigation required. For a worst-case assessment of the operational phase, the maximum proposed capacity of the Proposed Development has been assessed, as with a reduced number of Air Traffic Movements and passengers, the risks associated with MA&D would also be reduced.

15.5.16 The assessment methodology consists of a risk-based approach. The assessment identifies the reasonably foreseeable worst-case environmental consequence of a risk scenario (i.e. the potential significant effect), the likelihood of this consequence occurring, taking into account planned mitigation, and the tolerability of the subsequent risk.

15.5.17 The assessment is iterative but based on the following process:

a. definition of receptors (as described under Baseline methodology section above);
b. identification of hazards from existing baseline and the Proposed Development;
c. screening of the severity and duration of hazards to determine whether they constitute a MA&D hazard;
d. identification of mitigation; and
e. determination of significance of the risk event based on its likelihood, severity and the identified mitigation.

15.5.18 The above process has been based on a desk-based qualitative assessment of the MA&D hazards.

15.5.19 The assessment methodology refers to guidance relevant to the assessment of major accidents, including specific guidance related to airport safety and for facilities storing hazardous substances. Relevant guidance is listed in **Section 15.2**, with an explanation of how each guidance has been applied to the assessment of MA&D risks in this chapter.

Identification of hazards

15.5.20 For the identification of potential MA&D hazards relevant to the Proposed Development, the following information have been referred to:

a. baseline assessment for existing hazard sources and potential natural disasters, as described under Baseline methodology in **Section 15.5**;
b. risk registers for the Proposed Development at agreed design freeze stages, e.g. Construction Design and Management (CDM) hazard register;
c. the PSZ for airport operations;
d. airport specific safety records and certification;
e. National Risk Register 2020 (Ref. 15.51)[8];
f. European Commission's Major Accident Reporting System (eMARS) (Ref. 15.50);
g. European Commission's Overview of Natural and Man-made Disaster Risks the European Union may face (Ref. 15.52);
h. Bedfordshire Community Risk Register (Ref. 15.53)[9];
i. Hertfordshire Risk Register (Ref. 15.54);

[8] Note: This does not consider risks beyond five years, and therefore does not extend for the full lifespan of the Proposed Development. However, it has been used as a source of information of hazards with potential to pose a risk of MA&D to any development in the UK, including the Proposed Development. Provided there is no means of identifying to which hazards the UK may be exposed to in the future, this document is considered the best information available at the time of completing this assessment.
[9] Maintained in accordance with the Civil Contingencies Act 2004.

j. CAP1036 Global Fatal Accident Review 2002 to 2011 (Ref. 15.55); and

k. other PEIR chapters (such as **Chapter 18** Traffic and Transportation, **Chapter 9** Climate Change Resilience, **Chapter 17** Soils and Geology, and **Chapter 20** Water Resources and Flood Risk).

15.5.21 Identified MA&D hazards were then collated into the ERR (see **Appendix 15.1** of Volume 3 of this PEIR). This record acts as an evidence base of all the identified hazards relevant to the MA&D assessment.

Screening of hazards

15.5.22 Following the identification of potential MA&D hazards, each hazard was then reviewed to determine whether a source-pathway-receptor linkage exists to any of the identified receptors. This review typically involved a consideration of the source of the hazard, e.g. material which could escape, such as pollutants, or physical effects, such a blast from an explosion, the routes by which it could travel to a receptor (pathways), and the features of the environment that would be vulnerable to this impact (receptors). For environmental harm to occur, all three components of the source-pathway-receptor linkage must be present and linked together. Hazards with no linkages were screened out from the further assessment.

15.5.23 Subsequently for each hazard with a linkage pathway, the reasonably foreseeable worst-case environmental effect on a receptor was identified (i.e. the potential significant effect) and categorised on the basis of the 'severity of harm' and 'duration' definitions set out within CDOIF Guidelines (Ref. 15.56) and CAP760 (Ref. 15.57). The categories used are summarised in **Table 15.8**. Detailed definitions for each of these categories are provided in the ERR (**Appendix 15.1** of Volume 3 of this PEIR).

Table 15.8: Severity of harm and duration / recoverability categories*

Severity of Harm categories	Duration/ Recoverability categories
Catastrophic	Very long-term or permanent
Major	Long-term
Severe	Medium-term
No serious damage	Short-term

*Note: Harm with no serious damage and a short recovery time is not considered a MA&D.

15.5.24 The severity of harm and duration categories were assigned in consultation with the project team regarding the reasonably foreseeable worst-case consequence of the hazard.

15.5.25 These worst-case effects were then screened to remove those which were not considered to result in serious damage, as defined for the purposes of the MA&D assessment (see **Section 15.1**). The COMAH Regulations (Ref. 15.13)

define criteria for notifying the European Commission of the occurrence of a major accident in Schedule 5 (see **Table 15.9**). These criteria are not absolute, but offer guidance to what might constitute serious damage, and have influenced the definition for this assessment.

15.5.26 The ERR (**Appendix 15.1** of Volume 3 of this PEIR) summarises criteria for the classification of hazards considered to result in serious damage, on the basis of the worst-case severity of harm, duration of the impact and environmental receptor category, in line with the criteria set out within CDOIF Guidelines.

15.5.27 Hazards with the potential to cause ‘serious damage’, and therefore the potential to fall within the definition of a MA&D were considered further.

Table 15.9 COMAH Regulations (Ref. 15.13) criteria for notification of a major accident to the European Commission

Paragraph	Consequence
1	Injury to persons and damage to property
a	a death;
b	six persons injured within the establishment and hospitalized for at least 24 hour;
c	one person outside the establishment hospitalised for at least 24 hours;
d	a dwelling outside the establishment damaged and unusable as a result of the accident;
e	the evacuation or confinement of persons for more than 2 hours where the value (persons × hours) is at least 500; or
f	the interruption of drinking water, electricity, gas or telephone services for more than 2 hours where the value (persons × hours) is at least 1,000.
2	Immediate damage to the environment
a	permanent or long-term damage to terrestrial habitats – i. 0.5 hectares or more of a habitat of environmental or conservation importance protected by legislation; or ii. 10 or more hectares of more widespread habitat, including agricultural land;
b	significant or long-term damage to freshwater and marine habitats – i. 10 km or more of river or canal; ii. 1 hectare or more of a lake or pond; iii. 2 hectares or more of delta; or iv. 2 hectares or more of a coastline or open sea; or
c	significant damage to an aquifer or underground water: 1 hectare or more.
3	Damage to property
a	damage to property in the establishment, to the value of at least EUR 2,000,000; or
b	damage to property outside the establishment, to the value of at least EUR 500,000.
4	Cross-border damage: any major accident directly involving a dangerous substance giving rise to consequences outside the territory of the Member State concerned.

Consideration of embedded and good practice mitigation

15.5.28 The aim of the assessment is to identify the measures that can be incorporated within the Proposed Development to avoid, minimise or mitigate significant

risks. An iterative approach has therefore been applied to reduce all risks associated with MA&D to be ALARP in consultation with stakeholders and the project team.

15.5.29 For example, if the risk event has been managed appropriately in terms of safety of staff and passengers, but the actions taken to manage this risk do not adequately mitigate the potential for long-term or irreversible harm to an environmental receptor, such as a water course, further mitigation might be required.

15.5.30 This may involve the identification of further embedded mitigation or changes to the Proposed Development, to ensure that all risks with the potential to lead to a significant effect are appropriately managed.

15.5.31 Prior to the assessment of the likelihood or probability of a hazard occurring, mitigation embedded within the Proposed Development design or required for compliance with legislation was therefore reviewed.

15.5.32 These measures would be implemented to reduce the vulnerability of the Proposed Development to MA&D hazards, the likelihood of the hazards occurring and to mitigate the environmental consequences should the risk event occur. A description of the measures envisaged to prevent or mitigate the effects of MA&D in the context of the Proposed Development is provided within **Section 15.8**.

15.5.33 A record of how each risk would be mitigated and managed is maintained in the ERR (**Appendix 15.1** of Volume 3 of this PEIR).

Identification of significant risks

15.5.34 Following the consideration of embedded and good practice mitigation, the likelihood of the hazard occurring was determined on the basis of the probability criteria set out within CAP760 (refer to **Table 15.10** below and the ERR, **Appendix 15.1** of Volume 3 of this PEIR).

15.5.35 Risk tolerability criteria set out within CDOIF Guidelines and CAP760 were used to determine risks that are considered broadly acceptable (or tolerable), tolerable if ALARP, and unacceptable (or intolerable). These criteria combine the likelihood of the risk event with its consequence (which in turn is a combination of severity of harm and its duration) (refer to **Table 15.10** and **Table 15.11**).

15.5.36 Tolerable and tolerable if ALARP risks were considered to be ‘not significant’ and intolerable risks were considered to be ‘significant’. Risks categorised ‘tolerable if ALARP’ would generally require further approval of the details for proposed mitigation by a regulatory body.

Table 15.10 MA&D assessment criteria

	Probability	Extremely improbable	Extremely remote	Remote	Reasonably probable	Frequent
	Quantitative definition	Should virtually never occur but is theoretically possible	Once in 1000 years to once in 100,000 years	Once in 10 years to once in 1000 years	Once per 40 days to once in 10 years	Once per hour to once in 40 days
	Qualitative definition	No further measures available to mitigate the risk any lower.	Very unlikely to occur	Unlikely to occur during the total operational life of the system	May occur once during total operational life of the system	May occur several times during operational life
Consequence* (CDOIF definition, refer to **Table 15.11** for further detail)	Consequence CAP760 definition					
Category D	Accidents	TifALARP**	**Intolerable**	**Intolerable**	**Intolerable**	**Intolerable**
Category C	Serious incident	Tolerable	TifALARP**	**Intolerable**	**Intolerable**	**Intolerable**
Category B	Major incident	Tolerable	Tolerable	TifALARP**	**Intolerable**	**Intolerable**
Category A	Significant incident	Tolerable	Tolerable	Tolerable	TifALARP**	**Intolerable**
Not a MA&D	No effect immediately	Not within the scope of MA&D assessment				

* Consequence is a combination of the severity of harm and duration of an impact. Refer to **Table 15.11** for consequence criteria.

** Tolerable if ALARP.

Table 15.11: Consequence criteria*

	Duration			
Severity of Harm	**Short term**	**Medium term**	**Long term**	**Very long term**
Catastrophic	Not MA&D	C	D	D
Major	Not MA&D	B	C	D
Severe	Not MA&D	A	B	C
No Serious Damage	Not MA&D	Not MA&D	Not MA&D	Not MA&D

* Refer to **Appendix 15.1** for definitions for severity of harm and duration categories. Harm with a short recovery time is not considered a MA&D.

15.5.37 In summary, a number of factors have been considered in the identification of significant risks, including:

a. the sensitivity of the identified receptors (considered as part of 'severity of harm' assessment);
b. the geographic extent of the effect (i.e. the assessment of the worst-case impact area);
c. the severity of harm (assessed in accordance with CDOIF Guidelines and CAP760 criteria). This considers the number of receptors affected, the degree of harm, and the response effort required;
d. the duration of the effect (assessed in accordance with CDOIF Guidelines). Effects which are long lasting or permanent (irreversible) are more likely to be considered significant;
e. mitigation embedded within the Proposed Development or required for compliance with existing legislation which will reduce the likelihood of the risk occurring or mitigate the environmental harm, should the event occur; and
f. probability or likelihood of the risk occurring on the basis of the criteria set out within CAP760.

Identification of additional mitigation

15.5.38 If a significant risk remained, additional mitigation was identified, so that all residual risks would be reduced to not significant. An iterative approach has therefore been applied to mitigate all significant risks associated with MA&D to be ALARP in consultation with stakeholders and the project team.

15.6 Assumptions and limitations

15.6.1 The following paragraphs provide a description of the assumptions and limitations relevant to the MA&D assessment:

a. no risk-modelling or detailed calculations have been considered necessary to determine the significance of MA&D risks in line with the methodology set out above, and a qualitative assessment approach has been adopted;
b. where information is not available (such as historical evidence on the likelihood and the environmental consequence of an event), professional judgement has been used to reach a conclusion; and
c. the assessment assumes that mitigation embedded within the design is implemented and that the Proposed Development will comply with the UK's civil aviation safety regime, regulated by the CAA, as set out within the operator's Aerodrome Manual and Emergency Orders approved under an Aerodrome Certificate. The Aerodrome Manual and Emergency Orders establish provisions to ensure that the aerodrome complies with all applicable UK aviation law, CAA requirements and the terms of the Aerodrome Certificate in relation to safety, as well as all other relevant health and safety and environmental legislation. Further information on

the existing Aerodrome Manual and Emergency Orders and all embedded mitigation is provided within **Section 15.8.**

Reasonable Worst Case

15.6.2 **Chapter 5** Approach to the Assessment in Volume 2 of this PEIR describes the general approach adopted to ensure that a reasonable worst case is assumed in this assessment including the use of parameters, accounting for uncertainty, and incorporating flexibility in design and demand forecasts.

15.6.3 Further relevant assumptions on worst case assessment specific to this chapter include:

a. The assessment methodology consists of a risk-based approach which identifies the reasonably foreseeable worst-case environmental consequence of a risk scenario. The specific study area for each hazard has been determined on the basis of a worst-case impact area (or ZOI), as described within **Section 15.3.**

b. Furthermore, for a worst-case assessment of the operational phase, the maximum proposed capacity of the Proposed Development has been assessed, as set out in **Section 15.5** of this chapter.

15.7 Baseline conditions

15.7.1 This section provides a description of:

a. potential natural hazards which may impact the Main Application Site, Off-site Car Parks and Off-site Highway Intervention works, including meteorological hazards, geological hazards and other types of hazards, such as space weather[10];

b. existing major accident hazard sources within the Main Application Site, Off-site Car Parks and Off-site Highway Intervention work sites or off-site within the study area; and

c. sensitive environmental receptors within the study area at risk of MA&D hazards arising from the Proposed Development.

15.7.2 **Figure 15.1** in Volume 4 of this PEIR shows the extent of the study area and installations that may pose MA&D hazards. Sensitive receptors are shown in **Figure 15.2** in Volume 4 of this PEIR.

Existing conditions

Natural Hazards

Meteorological Hazards

15.7.3 Although the UK climate is temperate, weather is often changeable and unsettled. The UK Meteorological Office's Weather Observation Website

[10] Space weather is a collective term used to describe a series of phenomena originating from the Sun, such as solar flares, solar energetic particles which cause solar radiation storms and coronal mass ejections which cause geomagnetic storms.

(WOW) (Ref. 15.58) includes records of weather events in and around Luton since 2011 which have led to the disruption of services, personal health and safety impacts or damage to property. Key hazards associated with weather events in the past have included fog, hail, ice, lightning, rain, snow, and strong winds.

15.7.4 As discussed in **Chapter 9** Climate Change Resilience in Volume 2 of this PEIR, according to the UK Climate Change Risk Assessment (Ref. 15.59), the main hazards for airport infrastructure in the future include the following:

a. Snow and ice, although this risk is expected to be reduced with climate change, as average temperatures will rise.
b. Changes in precipitation patterns can be expected with more precipitation leading to an increased number of flooding events.
c. General increase in temperatures may result in an increased number of heat waves and drought.
d. Changes in wind patterns may occur, with an increase in storm events being likely.
e. Fog is a perennial problem, but the projections for fog impacts with climate change are limited and of low certainty.

15.7.5 The Main Application Site, Off-site Car Parks and Off-site Highway Intervention Sites are currently at low risk of flooding from rivers. Areas of high surface water flood risk have been identified at the Main Application Site and at all of the Off-site Highway Intervention Sites. **Chapter 20** Water Resources and Flood Risk in Volume 2 of this PEIR provide further details regarding the risk of flooding. As discussed above, with climate change the risk of flooding is likely to increase due to changes in precipitation patterns.

15.7.6 Severe weather events and flooding have also been listed as key local natural hazards of ‘high’ risk within the Bedfordshire Community Risk Register (Ref. 15.53) and the Hertfordshire Risk Register (Ref. 15.54).

Geological Hazards

15.7.7 As discussed in **Chapter 17** Soils and Geology in Volume 2 of this PEIR, the Main Application Site, Off-site Car Parks and Off-site Highway Intervention works are not located within areas susceptible to geological hazards, such as landslides, ground collapse and sinkholes. Hazards associated with the existing landfill within the Main Application Site are discussed within the **Existing Major Accident Hazard Sources** section below due to the man-made nature of the hazard.

15.7.8 Data collated by British Geological Survey (Ref. 15.60) and Musson and Sargeant (2007) (Ref. 15.61) demonstrate that the Main Application Site, Off-site Car Parks and Offsite Highway Intervention works are located within an area with one of the lowest levels of seismic risk in the UK.

15.7.9 As discussed within the UK National Risk Register (Ref. 15.51), the UK is at risk of volcanic ash and gas from volcanoes in Iceland (such as Bárðarbunga and

Eyjafjallajökull), as they are close to the UK, erupt frequently and prevailing winds are more likely to blow ash and gas towards the UK. Effusive volcanic eruptions overseas are also listed as a key local risk within the Bedfordshire Community Risk Register (Ref. 15.53).

Other Natural Hazards

15.7.10 Space weather, such as solar flares, solar or geomagnetic storms, may cause electricity blackouts, loss or disruption of telecommunications systems and an increase in ionizing radiation exposure. The last geomagnetic storm which impacted the UK aviation sector occurred in 2003, resulting in a disruption of Global Positioning System (GPS) functions (Ref. 15.51).

15.7.11 The Main Application Site, Off-site Car Parks and Offsite Highway Intervention works sites are not considered to be at risk of wildfires, with no occurrences recorded within the vicinity in the past.

Existing Major Accident Hazard Sources

Existing Airport

15.7.12 The existing airport has an associated residual risk of aircraft accidents. The average rate of fatal aircraft accidents in the EU is 0.1 per million flights flown (Ref. 15.62).

15.7.13 Cargo handling and transportation centres (ports, airports, lorry parks, marshalling yards, etc.) are an industry with fewest reports of major accidents recorded on eMARS. A total of eight major accidents have been reported since 1979. This number doubles to 16 for centres with fuel storage facilities (Ref. 15.50).

15.7.14 The Public Safety Zone (PSZ) extends beyond the end of the runway along flight paths to the north-east and south-west. PSZs were introduced at airports to minimise the risk of aircraft accidents to third parties to ALARP. The PSZ identifies areas where development is restricted in order to control the number of people living, working or congregating on the ground in that area, to minimise the risk in the event of an accident on take-off or landing. The PSZs aim to minimise risk to people by reducing the concentration and dwell time of individuals within high risk areas. Requirements for PSZs are set out within the DfT PSZ Policy Paper (Ref. 15.27). The PSZ is illustrated on **Figure 15.3** in Volume 4 of this PEIR.

15.7.15 The proposed Off-site Car Parks are located within the south-western section of the PSZ. Provision of long stay and employee car parking within a PSZ is permitted under the DfT's PSZ Policy Paper.

15.7.16 Since 2015, the Air Accidents Investigation Branch (AAIB) has started investigating incidents associated with unmanned aircraft due to the rapid increase of drones in UK airspace over recent years. However, the most common factor in commercial air transport accidents and serious incidents in 2019 was system/component failure or malfunction (Ref. 15.63).

15.7.17 The airport also has an existing fuel farm which is registered as a Lower Tier site under the COMAH Regulations by Shell UK Oil Products Limited. There are no other COMAH licenced sites or sites with a Hazardous Substances Consent within the study area[11] (Ref. 15.64).

Below Ground Hazards

15.7.18 As described in **Chapter 17** Soils and Geology, a part of the Main Application Site includes a former landfill, which poses a risk to human health as a result of hazardous materials being exposed, including asbestos containing materials (ACM). Additionally, there is potential for contamination due to potential hazardous materials and ground gas within the landfill site and a risk of ground instability for the Proposed Development. Ground Investigations and desk-based studies have been undertaken, to characterise the historic landfill site and define measures required to mitigate the potential risks.

15.7.19 There is also a potential for Unexploded Ordnance (UXO) to be present within the Main Application Site area, as a result of the bombing of the airport and the surrounding area during World War II. **Chapter 17** Soils and Geology provides further details on the potential risk of UXO at the Main Application Site.

15.7.20 There are no electricity transmission lines (440Kv and 275Kv) or National Grid gas pipelines within or on the boundaries of the Main Application Site, Off-site Car Parks and Off-site Highway Intervention works (Ref. 15.65). However, the existing Prax fuel pipeline, classified as a major accident hazard pipeline by the HSE, crosses the eastern boundary of the Main Application Site.

Other Hazards

15.7.21 The Bedfordshire Community Risk Register has identified the following additional risks of particular relevance to Bedfordshire which can potentially lead to serious consequences:

a. pandemic Influenza style disease outbreak;
b. energy supply disruption; and
c. fuel disruption.

15.7.22 The Hertfordshire Risk Register identifies terrorism and malicious attacks, infectious outbreaks and diseases, road traffic collisions and infrastructure failure to be of relevance to the county of Hertfordshire.

15.7.23 Furthermore, the UK National Risk Register lists industrial action, public disorder, and malicious attacks (such as vandalism, terrorism, and cyber attacks) as key risks for the UK.

15.7.24 At the time of preparing this chapter, the whole of the UK is subject to travel restrictions associated with the COVID-19 pandemic. For the purposes of this chapter, the implications of the COVID-19 pandemic or the potential for other

[11] The COMAH 2015 Public Information Search tool produces results in 3 mile radius form a given post-code.

pandemics during the construction and operational phases of the Proposed Development have been considered.

Summary of existing major accident hazards

15.7.25 In summary, the following existing major accident hazard sources have been identified to be of relevance to the Proposed Development:

a. existing airport operations, including the existing fuel farm;
b. former landfill site, which may pose a risk due to hazardous materials, ground gas and ground instability;
c. potential for unexploded ordnance;
d. existing fuel pipeline;
e. outbreaks of infectious disease (including COVID-19);
f. loss of infrastructure (such as energy supply and fuel disruption);
g. road traffic collisions; and
h. industrial action, public disorder, and malicious attacks (such as vandalism, terrorism, and cyber attacks).

Sensitive receptors

15.7.26 The closest urban centre to the Proposed Development is Luton, with a total population of 213,500 (Ref. 15.66) according to the 2011 Census. The closest residential buildings are located immediately across the Eaton Green Road to the north of the airport.

15.7.27 There are a number of schools within the study area, as well as religious buildings, open space and sport and leisure facilities. Wigmore Valley Park will be directly affected by the Proposed Development. Further information on local population and community facilities is provided within **Chapter 13** Health and Community in Volume 2 of this PEIR.

15.7.28 The closest surface watercourse to the Main Application Site is the River Lee (or Lea), a designated main river, which is located approximately 450m to the south west. Furthermore, the Off-site Highway Intervention Works at the A505 Gipsy Lane/ Parkway Road and the Windmill Road / Manor Road / St. Mary's Road / Crawley Green Road also cross the River Lee. The River Mimram which is fed by the local groundwater catchment underlying the Main Application Site is located approximately 3.5km east of the Main Application Site.

15.7.29 The River Hiz, a designated 'ordinary watercourse' is located approximately 7km to the east of the boundary of the Main Application Site and approximately 500m from both the highway interventions along the A602 within Hitchin (at Pirton Road roundabout and Stevenage Road roundabout). The River Hiz a tributary of the River Ivel that in turn feeds the River Great Ouse.

15.7.30 The Main Application Site is underlain by two groundwater bodies, an extensive Chalk bedrock aquifer and a smaller superficial aquifer associated with head deposits in the upper reaches of the River Mimram catchment. In addition, the

proposed Off-site Highway Interventions at A1081/B653 junction are located above two superficial aquifers associated with alluvium and glaciofluvial deposits along the River Lee.

15.7.31 A number of licensed groundwater abstractions are located in the study area which abstract water from the chalk aquifer. These are for industrial use and public water supply. A part of the Main Application Site and a number of the Off-site Highway Interventions are located above Groundwater Source Protection Zones (SPZs) associated with these abstractions. This area is also designated as a Drinking Water Safeguard Zone. Groundwater vulnerability is classified as High and Intermediate within the Main Application Site and surrounding area (Ref. 15.67). Further information on the sensitive water environment receptors is provided within **Chapter 20** Water Resources and Flood Risk.

15.7.32 Agricultural land within the Main Application Site boundary and the surrounding area is classified under the Agricultural Land Classification (ALC) as being a mixture of Subgrades 3a and 3b. Subgrade 3a constitutes Best and Most Versatile agricultural land. Furthermore, the agricultural land within the Main Application Site and in the surrounding area is located within a Nitrate Vulnerable Zone. Further information on the agricultural receptors is provided within **Chapter 6** Agricultural Land Quality and Farm Holdings.

15.7.1 Sensitive ecological receptors include existing habitats and protected species using the Main Application Site and the surrounding area, including grassland, woodland, hedgerows and field margins, scrub, arable fields, ponds and a number of protected mammals, amphibian, reptile, bird and invertebrate species. Wigmore Park County Wildlife Site (CWS), Winch Hill Wood CWS and Local Wildlife Site (LWS), and Dairy Borne Scarp District Wildlife Site (DWS) are included within the Main Application Site.

15.7.2 There are 21 statutory designated nature conservation sites within 10km of the Proposed Development. Fifteen of these sites are SSSIs, one of which is also designated as a National Nature Reserve (NNR), another is also designated as a Local Nature Reserve (LNR), and eight further LNRs are present, as detailed in the Ecology Baseline Report in (**Appendix 8.1**, Volume 3 of this PEIR). The closest of these sites are:

a. Dallow Downs and Winsdon Hill SSSI/DWS, located approximately 3km west of the Main Application Site;

b. Cowslip Meadows SSSI/DWS, located approximately 3.8km north west of Main Application Site; and

c. Galley and Warden Hills SSSI/LNR, located approximately 3.8km north west of the Main Application Site.

15.7.3 There are a further 30 non-statutory designated wildlife sites (CWS, LWS or DWS) within 2km of the Main Application Site. Further information on the ecological receptors is provided within **Chapter 8** Biodiversity.

15.7.4 There is one scheduled monument (Someries Castle), two Registered Parks and Gardens (RPGs), six Conservation Areas and a number of listed buildings

within the study area. Archaeological remains may also be present within the Main Application Site and the surrounding area. Further information on heritage receptors is provided within **Chapter 10** Cultural Heritage.

15.7.5 Key existing infrastructure within the vicinity of the Main Application Site include the M1, which is located approximately 3.2km west of the airport, and Luton Airport Parkway railway station, which is on the Midland Mainline, located approximately 600m to the west of the existing runway. The airport and the M1 are connected via the A1081 dual-carriageway.

15.7.6 In addition to the sensitive receptors described above, the ERR (**Appendix 15.1** of Volume 3 of this PEIR) also assesses the potential risk of MA&D hazards on construction workers and airport users, workers, passengers, infrastructure and artefacts.

Future baseline

15.7.7 In the absence of the Proposed Development, there is likely to be a change to the future baseline conditions as a result of other factors and developments in proximity to the airport. These are the conditions that will prevail 'Without the Scheme' in place. The 'Without the Scheme' scenario is used, where appropriate, as a comparator for the assessed case, to show the effect of the Proposed Development against an appropriate reference point. The approach to defining future baseline and the developments identified for consideration are described in **Section 5.4** of **Chapter 5** Approach to the Assessment in Volume 2 of this PEIR.

15.7.8 The future baseline for the MA&D assessment assumes that population within the study area will increase with new residential development coming forward. For example, the following schemes are assumed to have been completed before the construction of the Proposed Development is proposed to start:

a. Napier Park (application ref. 13/00280/OUT and subsequent applications); and

b. Erection of a three storey building at Crawley Green Road (application ref. 19/01427/FUL).

15.7.9 Furthermore, a review of the cumulative schemes has been undertaken to identify additional critical infrastructure that could introduce new receptors and hazards within the study area during the construction and operation of the Proposed Development. These schemes are listed below:

a. M1-A6 Northern Link Road (application ref. CB/19/00887/FULL); and

b. Luton Direct Air-Rail Transit (Luton DART) (application ref. 17/00283/FUL).

15.7.10 Climate change may also affect the frequency of natural disaster hazards within the study area. Luton is predicted to experience an increased frequency and severity of flooding, more frequent and stronger storms, wetter winters and drier summers. However, the consideration of increased frequency and severity of natural hazards due to climate change is inherent to the assessment presented

within this chapter, as the reasonably foreseeable worst-case impact of each hazard has already been identified.

15.8 Embedded and good practice mitigation measures

15.8.1 This section describes the embedded and good practice mitigation for MA&D that has been incorporated into the Proposed Development design or assumed to be in place before undertaking the assessment. A definition of these classifications of mitigation and how they are considered in the EIA is provided in **Chapter 5** Approach to the Assessment in Volume 2 of this PEIR.

15.8.2 Health and safety risks during construction and operation of the Proposed Development are strictly regulated under various health and safety legislation. These are summarised below in addition to any specific measures embedded within the Proposed Development which will mitigate risks associated with MA&D hazards.

15.8.3 The mitigation measures summarised below have been taken into consideration in the assessment of the risk of a MA&D, particularly when determining the likelihood and tolerability of the risk (see **Appendix 15.1,** ERR of Volume 3 of this PEIR). Mitigation measures associated with MA&D hazards can influence the likelihood and consequence of the hazard, for example where the likelihood is reduced, the risk becomes more remote. If the risk likelihood has been reduced to be ALARP, it may be considered tolerable.

Embedded

Design Principles

15.8.4 The following measures incorporated within the design of the Proposed Development would mitigate risks associated with MA&D:

a. The Drainage Design Statement for the Proposed Development (refer to **Appendix 20.4** in Volume 3 of this PEIR) has been developed to accommodate surface water flows for up to a 1 in 100 years storm event, accounting for an increase in precipitation of 40% with climate change. The drainage design includes pollution prevention and control measures, as described within **Chapter 4** The Proposed Development and **Chapter 20** Water Resources and Flood Risk. Further information on measures embedded within design for climate resilience is included in **Chapter 9** Climate Change Resilience.

b. An analysis of engineered slopes has been undertaken as part of the earthworks design and slopes with a gradient have been specified which would mitigate the risk of slope failure on-site. Where this is not possible, an engineered solution would be provided.

c. To mitigate the risks associated with construction over the historic landfill site, a starter layer of granular material overlaid by geotextile is proposed across the earthworks footprint as part of the geotechnical design. Any new buildings over the landfill would be supported by piled foundation. A limited section of the proposed apron will be constructed over the landfill. Mitigation has been factored in the design to limit potential settlement,

including overburden of the ground prior to development to precipitate consolidation and increased life cycle maintenance. Furthermore, the design of hardstanding and road infrastructure accounts for the potential settlement of landfill material. Ground gas protection measures have been incorporated within the design of buildings constructed on top of the historic landfill site in compliance with British Standard (BS) 8485 (refer to **Chapter 4** The Proposed Development and **Chapter 17** Soils and Geology for further information).

d. The highway design of the Proposed Development has been developed to the standards set within the Design Manual for Roads and Bridges (DMRB). Road Safety Audits in line with the requirements of the DMRB would be carried out to inform further design development.

e. The layout of the Proposed Development has been developed in consultation with the existing airport fire safety and emergency resilience officers. A fire hydrant system will be provided during Phase 2 to connect to all new aircraft stands, and the existing number of emergency water tanks around the runway will be retained.

f. EASA standards and recommended practices require a response time of three minutes for the onsite rescue and firefighting service (RFFS) to access any location on the airfield. The Proposed Development maintains the RFFS ability to comply with this requirement as the new aprons are closer to the fire station than other parts of the existing airfield.

g. The design of the fuel farm complies with all relevant safety standards and incorporates measures to mitigate the risk of fire and explosion, for example electrical bonding and earthing of equipment, installation of remotely operated shut-off valves to isolate equipment in an emergency, fire safety shut off valves, inclusion of high integrity independent tank overfill protection systems, leak-tight bunds and fire resistant bund penetrations. An emergency access road is allowed for within the design to allow direct access from the platform to the fuel storage facility.

h. The Proposed Development includes a direct connection between the Fuel Storage Facility and the existing fuel pipeline to the east of the site. This will provide the opportunity for fuel to be delivered to site via pipeline, potentially eliminating the need for fuel to be transported to the airport via road, and therefore, removing hazardous loads from the public road network. From Terminal 2 fuel storage facility, fuel would be transported to Terminal 1 fuel storage facility via airport roads, and a pipeline connection between the existing Terminal 1 and Terminal 2 fuel storage facilities will be safeguarded.

i. The design of the Proposed Development incorporates uninterruptible power sources (UPS), which will provide emergency power for critical infrastructure, if mains power fails.

j. In line with legal requirements, a fire risk assessment will be undertaken, and a fire plan and evacuation strategy will be implemented on site, which sets out the emergency procedures and evacuation routes in case

of fire. A fire stopping systems specification will be developed at detailed design stage. A Luton DART fire strategy will be developed with escape routes and refuge zones identified.

k. Design of the Proposed Development has been developed not to attract birds in order to minimise the risk of bird strike, for example through the avoidance of open water features within the drainage design and via measures included within the landscape design. A bird strike risk assessment has been included within **Appendix 8.4** of Volume 3 of this PEIR.

l. The Proposed Development will provide facilities for the on-site police service and rendezvous points for emergency services. These facilities have been designed in consultation with emergency services.

m. An isolation bay has been incorporated within the airfield design, where aircraft can be directed, if required, in case of a threat or for disease control.

Compliance with Legislation and Guidance

15.8.5 The Proposed Development has been designed in compliance with relevant health and safety legislation, standards and guidance, including but not limited to: EASA Certification Safety Specification and Guidance for Aerodromes Design (Ref. 15.42), Construction (Design and Management) Regulations 2015 (Ref. 15.10), Building Regulations 2010 (Ref. 15.10), Regulatory Reform (Fire Safety) Order 2005 (Ref. 15.68), Electricity at Work Regulations 1989 (Ref. 15.69), BS EN/IEC 62305 for the installation of Lightning Protection systems (Ref. 15.70), BS7974 Application of fire safety engineering principles to the design of buildings (Ref. 15.71), National Counter Terrorism Security Office's Crowded Places Guidance (2017) (Ref. 15.72) and DfT's guidance on Aviation Security in Airport Development (Ref. 15.73).

Operation

15.8.6 The CAA works "*with industry to demonstrably reduce safety risk across the total aviation system*" (Ref. 15.74). The Proposed Development will be operated under an Aerodrome Certificate granted by the CAA in line with the requirements of relevant UK aviation law and CAA guidance at the time, such as:

a. Regulation (EU) 2018/1139, repealing Regulation (EC) No 216/2008 (Ref. 15.5);

b. EASA Easy Access Rules for Aerodromes (Regulation (EU) No 139/2014) (Ref. 15.75);

c. EC Regulation No 300/2008 (Ref. 15.6) on common rules in the field of civil aviation security;

d. The Air Navigation Order 2016 (Ref. 15.76);

e. CAP168 Licensing of Aerodromes (Ref. 15.77);

f. CAP670 ATS Safety Requirements (Ref. 15.78);

g. CAP738 Safeguarding of Aerodromes (Ref. 15.79);
h. CAP760 Safety case for aerodrome operators and air traffic service providers (Ref. 15.80) (including maintaining a risk register and implementing measures to minimise MA&D hazards);
i. CAP772 Wildlife Hazard Management at Aerodrome (Ref. 15.81);
j. CAP795 Safety Management Systems (Ref. 15.82);
k. CAP1223 Framework for an Aviation Security (Ref. 15.83);
l. CAP1273 Implementing a Security Management System (Ref. 15.84);
m. CAP1616 Airspace Design (Ref. 15.85);
n. CAP493 Manual of Air Traffic Services (Ref. 15.86), and
o. CAP791 Procedures for changes to aerodrome infrastructure (Ref. 15.87).

15.8.7 The airport currently operates within an existing Aerodrome Certificate (pursuant to EC Regulation No. 216/2008 and the Commission Regulation (EU) No. 139/2004; certificate reference EGGW – 001). The existing safety arrangements of the airport are set out within the Aerodrome Manual, Airport Operating Instructions and Emergency Orders.

15.8.8 The Aerodrome Manual is the means by which all airport staff and users are informed of the characteristics, policies and operational procedures for the safe operation of the airport. It includes general arrangements in relation to aerodrome management (such as requirements for qualifications and training, details of roles account for safety and safety committees, and details of the safety management system), particulars of the aerodrome, and particulars of the operating procedures, equipment and safety measures. The Aerodrome Manual also sets out the Operations Safety Instructions, which provide further information on the rules, regulations and procedures for the safe operation of airside (including but not limited to the management of airside traffic, refuelling, Foreign Object Debris (FOD) hazards, spillages, precautions during strong winds, low visibility procedures, accident and incident reporting etc.).

15.8.9 The Emergency Orders are published in conjunction with the Aerodrome Manual and set out in detail the procedures and roles and responsibilities for the management of emergencies and crises. The Emergency Orders include procedures for:

a. the management of aircraft incidents and accidents;
b. weather standby;
c. fire;
d. management of bomb threats, acts of aggression and unlawful seizure of aircraft;
e. management of dangerous goods;
f. management of deliberate attacks using chemical, biological, and radiological or nuclear weapons;

g. guidance on the assessment of suspected infectious diseases from inbound aircraft; and

h. protest and demonstration management and response.

15.8.10 Other key plans established under the Aerodrome Certificate and relevant to the control of MA&D hazards include the Winter Operations Plan, Terminal Evacuation Orders and Wildlife Strike Hazard Reduction Plan.

15.8.11 As discussed in **Section 15.6**, it is assumed that once operational, the Proposed Development will continue to operate in compliance with the Aerodrome Certificate and relevant regulations, either under the existing airport operating procedures or equivalent. The on-site rescue and firefighting service (RFFS) would remain the first-responders incidents within the airport boundary and the on-site Luton Airport Policing Unit would continue to police the airport. It is noted that the current RFFS is of suitable capability to accommodate the Fire Category for the proposed fleet mix that would use Terminal 2.

15.8.12 Other legislative controls relevant to the mitigation of MA&D risks during the operation of the Proposed Development, include the following:

a. The proposed fuel storage facility will be operated under a COMAH and Hazardous Substances Consent in compliance with the requirements of COMAH Regulations 2015 and Planning (Hazardous Substances) Regulations 2015.

b. Risks to workers at the airport will be managed in compliance with the Health and Safety at Work etc. Act 1974, the Management of Health and Safety at Work Regulations 1999 and the Workplace (Health, Safety and Welfare) Regulations 1992.

c. Fire safety will be managed in accordance with the Regulatory Reform (Fire Safety) Order 2005, including the preparation of a fire and evacuation strategy for the new infrastructure.

15.8.13 In addition, a PSZ has been established where planning restrictions apply (refer to **Figure 15.3** in Volume 4 of this PEIR) to minimise the number of people and properties at risk in case of an accident occurring during aircraft landing or take-off. Runway End Safety Areas are also provided for the protection of the aircraft and passengers on board during take-off and landing, as well as runway strips along the sides of the paved runway. This is to minimise hazards in event of aircraft having a 'runway excursion' during extreme weather events, e.g. strong winds or snow and ice.

15.8.14 The airport has currently measures in place to prevent the spread of COVID-19, e.g. enhanced cleaning in the terminal, provision of hand sanitiser units, floor markings and signage for one-way systems and safe distancing, protective screens at check-in points and provision of public health information throughout the airport. All passengers must wear a face covering, wash their hands regularly and keep a safe distance, wherever possible. The measures implemented are regularly reviewed and updated in line with the latest Government advice, with the most up to date list of measures published on airport's website (Ref. 15.88). London Luton Airport has also been awarded the

Airport Health Accreditation from the Airports Council International after the assessment of the new health measures and procedures implemented due to COVID-19.

15.8.15 Should the COVID-19 pandemic not be eradicated by the time that the Proposed Development starts operation or in the case of a future pandemic, measures in line with the latest Government guidance would be employed to minimise the risk of spreading infectious diseases.

Good Practice

Construction

15.8.16 Measures outlined below would be secured through compliance with the Draft Code of Construction Practice (CoCP) (refer to **Appendix 4.2** of Volume 3 of the PEIR).

15.8.17 Furthermore, all legislation relevant to health and safety and environmental protection will be identified and complied with, including but not limited to Construction Design and Management (CDM) Regulations 2015 (Ref. 15.10), Lifting Operations and Lifting Equipment Regulations 1998 (LOLER) (Ref. 15.9), Health and Safety at Work Act 1974 (Ref. 15.8), Pipeline Safety Regulations 1996 (as amended) (Ref. 15.16), Control of Substances Hazardous to Health (COSHH) Regulations (Ref. 15.18) and Control of Asbestos Regulations 2012 (Ref. 15.17).

Safe Systems of Work

15.8.18 A safe system of work will be established by the Contractor, so that all steps necessary for safe working can be identified. Measures identified as of relevance for the mitigation of risks for MA&D include the following:

a. A safe system of work will be established for the operation of lifting equipment, including the fitting of lifting equipment with anemometers and stopping work during strong winds, if required, in line with the requirements of Lifting Operations and Lifting Equipment Regulations 1998 (LOLER).

b. A safe system of work will be established for the operation of construction machinery and for undertaking works, which will consider risks associated with adverse weather conditions, such as snow (e.g. risks associated with frozen machinery, as well as any increased risk of slips, trips and falls for work at height).

c. A safe system of work will be established for the operation of equipment which may attract lightning or for any works at increased risk (e.g. roofing, pipework etc.).

d. The contractor is required to comply with the provisions of the Health and Safety at Work Act 1974, ensuring occupational health and safety arrangements are in place.

e. Fire safety risks at the construction site will be managed in compliance with CDM Regulations 2015 and Regulatory Reform (Fire Safety) Order

2005. A Fire Risk Assessment will be completed and implemented to manage the risks throughout construction, including emergency plans and procedures and measures for the safe storage and handling of fuel.

f. Any hot work operations will be completed under a Hot Work Permit.

g. Fuel pipeline connection to the existing Prax pipeline will be constructed in compliance with Pipeline Safety Regulations 1996 (as amended).

h. A safe system of work will be established by the Contractor for earthworks and to secure any temporary slopes from collapse. Furthermore, earthworks sequence would be planned to avoid large vertical drops and unprotected edges. Work areas would be clearly identified to prevent access to workers in areas of excavation with the use of heavy plant machinery. Newly formed earth banks will be seeded and/ or planted to secure slopes.

i. A Construction Phase Plan will be established, which outlines construction methods and equipment that comply with restrictions, such as height of equipment, so that they do not infringe taxiway, apron or runway regulated clearances. These heights and safe working constraints will have regard to the Obstacle Limitation Surface (OLS) heights[12] (Ref. 15.89). Restrictions on working will also be implemented due to jet blast and wingtip clearance. For example the phasing of construction on the airfield apron has been proposed so that aircraft can manoeuvre at regulated safe working distances from construction. A full safety plan will be developed and implemented, setting out the appropriate distances for workforce and plant to operate.

j. Crane operations would be managed through the use of advance notifications and, if required, the fitting of aviation warning lighting.

k. Procedures for safe traffic management would be specified during the detailed construction phasing planning. Phases of construction that are near to existing live taxiways and taxiing aircraft, such as on the additional taxiways, may require revised or curtailed taxiing routes to avoid being in close proximity to live construction areas. Alternatively, construction activities would be limited to reduced periods of time, typically overnight. Appropriate measures would be agreed during the construction planning phase with the airport's Air Navigation Service Provider (ANSP) in accordance with the Manual for Air Traffic Services Part 1 (Ref. 15.90) and with the CAA as part of the change approval process (Ref. 15.91). The volume of airside traffic would be minimised, where possible. Security and vehicle cleanliness of construction traffic to airside areas would be tightly controlled. Furthermore, construction traffic would be segregated with separate entry and exit routes.

l. Adequate signal interference risk assessment and control would be implemented.

[12] The purpose of the Obstacle Limitation Surfaces (OLS) is to define the airspace around aerodromes that is to be maintained free from obstacles to permit the intended air system operations at the aerodromes to be conducted safely. It is permissible however to exceed the OLS for construction activities, i.e. for installation of cranes, subject to compliance with other CAA requirements relating to crane permits.

m. Services critical to the airport operations would be protected at all times during the construction works. Inspection pits for the buried utilities would be performed and clearances clearly demarcated on site.

n. The Contractor will be required to manage the risk of construction activities attracting birds, e.g. during the excavation and sorting of landfill materials.

o. The Contractor will be required to set up and implement accredited safety and environmental management systems (e.g. certified to ISO 45001 and 14001 standards or equivalent). Regular audits will be undertaken to monitor compliance against the management systems, with actions identified for continuous improvement.

p. Security for the construction site will be provided with access only provided to those who have passed relevant induction and security clearance, as required.

q. Construction workers will use appropriate Personal Protective Equipment suitable to the work activity and safe working practices.

r. The Contractor will liaise with emergency services and the airport operator to ensure that emergency access routes, muster points and parking for emergency services vehicles are not impeded during construction.

s. Relevant Government guidance on working safely during epidemics/ pandemics will be implemented to prevent the spread of infectious disease (e.g. such as Ref. 15.46 and Ref. 15.47).

Construction Environmental Management

15.8.19 The following measures set out within the Draft CoCP (**Appendix 4.2** in Volume 3 of this PEIR) for construction environmental management will mitigate MA&D hazards:

a. A surface water management plan for the control of runoff and to prevent pollution from the construction site until permanent drainage has been established;

b. All materials and equipment stored on site will be covered and secured to minimise the risk of debris from site during strong winds.

c. Weather forecast will be monitored throughout construction to plan for extreme weather events.

d. Dust suppression measures will be implemented to dampen down surfaces and minimise the risk of dust from the construction site.

e. Control measures for earthworks have been specified, including a watching brief for UXO during construction; and a requirement for an UXO Emergency Response Plan and UXO Safety and Awareness briefings for groundworks contractors.

f. Any hazardous substances stored on site for construction (e.g. fuel, oils etc.) are to be located landside and at distance from hazardous

substances stores associated with the operating airport to minimise the risk of a domino effect in case of fire or explosion.

g. A set of pollution and contamination control measures, including a pollution incident response plan would be implemented in compliance with Control of Substances Hazardous to Health Regulations (COSHH).

h. All hazardous substances would be double bunded to at least 110% of the stored capacity and located away from drainage infrastructure.

i. Temporary leachate collection sumps are proposed to be installed. These sumps will be regularly monitored during works and where significant quantities of leachate is collected in the wells, this will be pumped and disposed of off-site.

j. Off-site construction traffic movements would be managed in compliance with a Construction Traffic Management Plan (CTMP).

k. Site security arrangements, including site hoarding around the construction site perimeter, and controlled access for those who have passed relevant induction and security clearance, if required.

15.9 Preliminary assessment

15.9.1 This section presents the results of the preliminary assessment of likely significant effects with the embedded and good practice mitigation measures, described in the previous section, in place.

15.9.2 An assessment of MA&D hazards relevant to the construction and operation of the Proposed Development is provided in **Appendix 15.1,** ERR of Volume 3 of this PEIR. A total of 30 hazards were identified for both construction and operation of the Proposed Development and assessed in line with the methodology set out in **Section 15.5.**

15.9.3 Out of the identified 30 hazards, the following natural disaster hazards were screened out of further assessment both during construction and operation as no credible source-receptor-pathway linkage was established (i.e. the Main Application Site, Off-site Car Parks, and Off-site Highway Intervention works sites are not affected by the below hazard sources):

a. wildfires; and

b. sea level rise and tsunamis.

15.9.4 Furthermore, the off-site planting areas were not considered to result in serious damage to sensitive receptors in the event of a MA&D nor result in any new MA&D hazards. As such, these areas were screened out of further assessment.

15.9.5 A summary of the construction assessment is provided within **Table 15.12** and operational assessment in **Table 15.13**. Further details of the risk assessment can be found in the ERR (**Appendix 15.1** of Volume 3 of this PEIR). The criteria applied for the assessment of risk of MA&D are introduced in **Section 15.5** and provided in full detail in **Appendix 15.1** of Volume 3 of this PEIR. Not applicable (N/A) hazards are those which due to their low severity or duration do not meet the consequence criteria for a MA&D. All risks are considered to be **tolerable or tolerable if ALARP (not significant)** with the implementation of the embedded and good practice mitigation measures summarised in **Section 15.8**.

Table 15.12: Assessment of major accident and/or natural disaster risks during construction

ID	Risk Event	Pre-mitigation worst-case effect			Summary of Mitigation	Post-mitigation	
		Severity of harm	Duration	Consequence		Likelihood of a MA&D	Tolerability
Natural Disasters							
C1	Extreme rainfall events and subsequent flooding resulting in damage to construction equipment, existing airport infrastructure, damage to artefacts of national or international importance during import/export, risk of injury. Refer to risk ID C14 for consideration of contamination risk due to run-off from construction site.	Major	Medium-term	Category B	**Draft CoCP** The Draft CoCP sets the requirement for a surface water management plan to be prepared to manage surface water runoff from the construction site prior to the installation of permanent drainage infrastructure. If the installation of permanent drainage impacts on the existing airport drainage network, a temporary drainage system may be required. Furthermore, a survey of the existing drainage system to inform design development would be undertaken. This will mitigate the risk of flooding at the site and downstream of the construction site before permanent drainage is installed. Furthermore, any construction works within areas at risk of flooding will be limited, as set out within the Draft CoCP. **Drainage strategy** During later phases of construction, permanent drainage infrastructure would have been installed which can accommodate for surface water flows during 1 in 100 years storm event, accounting for an increase in precipitation of 40% due to climate change.	Remote	Tolerable if ALARP (TifALARP) (Not significant)
C2	Strong winds resulting in damage to construction equipment, collision	Catastrophic	Very long term or	Category D	**Draft CoCP** All materials and equipment stored on site will be covered and secured to minimise the risk of debris from site during strong winds.	Extremely improbable	TifALARP (Not significant)

ID	Risk Event	Pre-mitigation worst-case effect			Summary of Mitigation	Post-mitigation	
		Severity of harm	Duration	Consequence		Likelihood of a MA&D	Tolerability
	of aircraft with foreign object debris (FOD) from construction site, damage to existing airport infrastructure, damage to artefacts of national or international importance during import/export, risk of injury or death.		permanent		Furthermore, weather forecast will be monitored throughout construction to plan for extreme weather events. In line with the Draft CoCP, dust suppression measures will be implemented to dampen down surfaces and minimise the risk of dust from the construction site. **Safe system of work** A safe system of work will be established for the operation of lifting equipment, including the fitting of lifting equipment with anemometers and stopping work during strong winds, if required, in line with the requirements of Lifting Operations and Lifting Equipment Regulations 1998 (LOLER).		
C3	High temperatures, heat waves, and drought resulting in heat exhaustion of construction workers, increased dust and reduced visibility, dust deposition, damage to artefacts of national or international importance during import/export, and adverse effect on human health. This hazard is not considered to have the potential to	No serious damage	Short-term	Not a MA&D.	Not a MA&D.	N/A	N/A Consequence not classified as 'serious damage' (i.e. irrecoverable damage).

ID	Risk Event	Pre-mitigation worst-case effect			Summary of Mitigation	Post-mitigation	
		Severity of harm	Duration	Consequence		Likelihood of a MA&D	Tolerability
	result in serious damage during construction, as defined within **Appendix 15.1,** considering that any outdoor work would stop in extreme weather conditions.						
C4	Extreme cold weather, including snow and ice, posing a risk to the health of construction workers, failure of construction equipment, reduced visibility, snow and ice leading to an aircraft or construction vehicle accident. Contaminated run-off from melting snow and ice is considered under ID C14.	Catastrophic	Very long term or permanent	Category D	**Safe system of work** The contractor is required to comply with the provisions of the Health and Safety at Work Act 1974, ensuring occupational health and safety arrangements are in place. A safe system of work will be established for the operation of construction machinery and for undertaking works, which will consider risks associated with adverse weather conditions, such as snow (e.g. risks associated with frozen machinery, as well as any increased risk of slips, trips and falls for work at height). **Operational Safety Management System** The airport is required under Article 212 of the Air Navigation Order (ANO) to maintain an Aerodrome Manual containing among other things details of the airports safety management system. At the airport, this safety management system includes various Airfield Operating Procedures which detail the procedural safety management for different adverse weather conditions. The airport will continue to use the Aerodrome Manual and all of its safety management procedures	Extremely improbable	TifALARP (Not significant)

ID	Risk Event	Pre-mitigation worst-case effect			Summary of Mitigation	Post-mitigation	
		Severity of harm	Duration	Consequence		Likelihood of a MA&D	Tolerability
					including a Winter Operations Plan to ensure all operations on the airfield are safe. **Draft CoCP** Weather forecast will be monitored throughout construction to plan for extreme weather events, including snowfall and ice, as set out within the Draft CoCP. Pollution prevention measures are described in hazard ID C14.		
C5	Lightning striking the construction site resulting in damage to construction equipment and risk of injury or death. Fire hazard has been considered in risk ID C12. Loss of utilities has been considered in risk ID C17.	Major	Very long term or permanent	Category D	**Safe system of work** A safe system of work will be established for the operation of equipment which may attract lightning or for any works at increased risk (e.g. roofing, pipework etc.). **Draft CoCP** Furthermore, weather forecast will be monitored throughout construction to plan for extreme weather events, including thunderstorms, as set out in the Draft CoCP.	Extremely improbable	TifALARP (Not significant)
C6	Volcanic ash, sand, fog resulting in reduced visibility limiting construction works and deposition of ashes, sand on construction areas and equipment. This hazard is not considered to have	No serious damage	Short term	Not a MA&D	Any work assumed to stop if visibility was seriously impacted. Therefore, no mitigation is required.	N/A	N/A Consequence not classified as 'serious damage' (i.e. irrecoverable damage).

ID	Risk Event	Pre-mitigation worst-case effect			Summary of Mitigation	Post-mitigation	
		Severity of harm	Duration	Consequence		Likelihood of a MA&D	Tolerability
	the potential to result in serious damage during construction, as defined within **Appendix 15.1** of Volume 3 of this PEIR, considering that any outdoor work would stop in extreme weather conditions.						
C7	Natural geological hazards, e.g. ground instability, landslides, ground collapse and sinkholes following heavy rainfall leading to damage to property and risk of injury or death.	Catastrophic	Very long term or Permanent	Category D	The geotechnical design takes into account existing ground conditions which may affect the stability, settlement and integrity of the platform to ensure they do not impact the Proposed Development, including but not limited to ground improvement works, appropriate foundation design and slope stability analysis. Refer to **Chapter 17** Soils and Geology for further details.	Extremely improbable	TifALARP (Not significant)
C8	Earthquakes, tremors resulting in physical damage to construction equipment and existing airport infrastructure, damage to artefacts, risk of injury. This hazard is not considered to have the potential to	No serious damage	Short term	Not a MA&D	Data collated by British Geological Survey (Ref. 15.60) and Musson and Sargeant (2007) (Ref. 15.61) demonstrate that the Main Application Site, Off-site Car Parks and Offsite Highway Intervention works are located within an area with one of the lowest levels of seismic risk in the UK. Therefore, no mitigation is required.	N/A	N/A Consequence not classified as 'serious damage' (i.e. irrecoverable damage).

ID	Risk Event	Pre-mitigation worst-case effect			Summary of Mitigation	Post-mitigation	
		Severity of harm	Duration	Consequence		Likelihood of a MA&D	Tolerability
	result in serious damage, as defined within **Appendix 15.1** of Volume 3 of this PEIR, considering the reasonably foreseeable worst-case consequence of this hazard in the study area.						
C9	Extreme space weather resulting in disruption of telecommunications and increased radiation. This hazard is not considered to have the potential to result in serious damage, as defined within **Appendix 15.1** of Volume 3 of this PEIR, for construction works, considering that any works would stop if communication systems were seriously impacted.	No serious damage	Short term	Not a MA&D	Any work assumed to stop if communications systems were seriously impacted. Therefore, no mitigation is required.	N/A	N/A Consequence not classified as 'serious damage' (i.e. irrecoverable damage).
Major accidents							

ID	Risk Event	Pre-mitigation worst-case effect			Summary of Mitigation	Post-mitigation	
		Severity of harm	Duration	Consequence		Likelihood of a MA&D	Tolerability
C12	Fire and/ or explosion at the construction site resulting in damage to construction equipment, existing infrastructure, off-site properties, heritage receptors, agricultural land, risk of injury or death, and contamination of environmental receptors.	Catastrophic	Very long term or permanent	Category D	**Draft CoCP** As set out in the Draft CoCP, control measures for earthworks have been specified, including a watching brief for UXO during construction; and a requirement for an UXO Emergency Response Plan and UXO Safety and Awareness briefings for groundworks contractors. Any hazardous substances stored on site for construction (e.g. fuel, oils etc.) are to be located landside and at distance from hazardous substances stores associated with the operating airport to minimise the risk of a domino effect in case of fire or explosion. **Geotechnical design** Gas protection measures will be incorporated into the design in compliance with the British Standard 8485, where required. **Safe systems of work** Fire safety risks at the construction site will be managed in compliance with CDM Regulations 2015 and Regulatory Reform (Fire Safety) Order 2005. A Fire Risk Assessment will be completed and implemented to manage the risks throughout construction, including emergency plans and procedures and measures for the safe storage and handling of fuel. Any hot work operations will be completed under a Hot Work Permit. Fuel pipeline connection to the existing Prax pipeline will be constructed in compliance with	Extremely improbable	TifALARP (Not significant)

ID	Risk Event	Pre-mitigation worst-case effect			Summary of Mitigation	Post-mitigation	
		Severity of harm	Duration	Consequence		Likelihood of a MA&D	Tolerability
					Pipeline Safety Regulations 1996 (as amended).		
C13	Instability of excavations and construction over the landfill, resulting in damage to equipment, existing infrastructure, property, damage to artefacts of national or international importance during import/export, risk of injury of death.	Catastrophic	Very long term or permanent	Category D	**Geotechnical design** An analysis of cut slopes has been undertaken as part of the earthworks design and slopes with a stable gradient have been specified in order to mitigate risks on and off-site. Where this is not possible, an engineered solution would be provided. **Safe system of work** A safe system work will be established by the Contractor for earthworks and to secure any temporary slopes from collapse. Furthermore, earthworks sequence would be planned to avoid large vertical drops and unprotected edges. Work areas would be clearly identified to prevent access to workers in areas of excavation with the use of heavy plant machinery. Newly formed earth banks will be seeded and/ or planted to secure slopes. **Geotechnical design** In order to mitigate the risk of ground settlement, careful treatment of the formation materials will be essential and a starter layer of granular material overlaid by geotextile is proposed across the earthworks footprint as part of the geotechnical design. Construction over the landfill will require piling for any new buildings. A limited section of the proposed apron will be constructed over the landfill. Mitigation has been factored in the design to limit potential settlement, including overburden of the ground prior to	Extremely improbable	TifALARP (Not significant)

ID	Risk Event	Pre-mitigation worst-case effect			Summary of Mitigation	Post-mitigation	
		Severity of harm	Duration	Consequence		Likelihood of a MA&D	Tolerability
					development to precipitate consolidation and increased life cycle maintenance. Furthermore the design of hardstanding and road infrastructure would account for the potential settlement of landfill material. The need for short term mitigation measures (e.g. dynamic compaction) would be reviewed. Long term estimated settlement profile will be prepared and reviewed. It is considered that all practicable mitigation has been incorporated within the Proposed Development.		
C14	Major leaks and spillages from the construction works resulting in serious damage of sensitive environmental receptors and impacting on human health.	Major	Long-term	Category C	**Draft CoCP** A set of pollution and contamination control measures, including a pollution incident response plan would be implemented as required by the Draft CoCP and in compliance with Control of Substances Hazardous to Health Regulations (COSHH). All hazardous substances would be double bunded to at least 110% of the stored capacity and located away from drainage infrastructure. Temporary leachate collection sumps are proposed to be installed. These sumps will be regularly monitored during works and where significant quantities of leachate is collected in the wells, this will be pumped and disposed of off-site. **Safe Systems of Work** Fuel pipeline connection to the existing Prax pipeline will be constructed in compliance with	Extremely remote	TifALARP (Not significant)

ID	Risk Event	Pre-mitigation worst-case effect			Summary of Mitigation	Post-mitigation	
		Severity of harm	Duration	Consequence		Likelihood of a MA&D	Tolerability
					Pipeline Safety Regulations 1996 (as amended).		
C15	Road traffic collisions involving Proposed Development's construction traffic resulting in death or injury of road users and damage to property.	Catastrophic	Very long term or permanent	Category D	**CTMP** Construction traffic movements would be managed in line with a Construction Traffic Management Plan (CTMP). Refer to **Chapter 18** Traffic and Transportation for further details.	Extremely improbable	TifALARP (Not significant)
C16	Accidents resulting from the interface of existing airport operations and the construction activities associated with the Proposed Development, resulting in death or injury and damage to property (under normal or emergency conditions – refer to **Appendix 15.1** of Volume 3 of this PEIR for examples)	Catastrophic	Very long term or permanent	Category D	**Safe systems of work** A Construction Phase Plan will be established, which outlines construction methods and equipment that comply with restrictions, such as height of equipment, so that they do not infringe taxiway, apron or runway regulated clearances. These heights and safe working constraints will have regard to the Obstacle Limitation Surface (OLS) heights. Restrictions on working will also be implemented due to jet blast and required safety clearances form both parked and moving aircraft. For example the phasing of construction on the airfield apron has been proposed so that aircraft can manoeuvre at regulated safe working distances from construction. A full safety plan will be developed and implemented, setting out the appropriate distances for workforce and plant to operate. Procedures for safe traffic management would be specified during the detailed construction phasing planning. Phases of	Extremely improbable	TifALARP (Not significant)

ID	Risk Event	Pre-mitigation worst-case effect			Summary of Mitigation	Post-mitigation	
		Severity of harm	Duration	Consequence		Likelihood of a MA&D	Tolerability
					construction that are near to existing live taxiways and taxiing aircraft, such as on the additional taxiways, may require revised or curtailed taxiing routes to avoid being in close proximity to live construction areas. Alternatively, construction activities would be limited to reduced periods of time, typically overnight. Appropriate measures would be agreed during the construction planning phase with the airport's Air Navigation Service Provider (ANSP) in accordance with the Manual for Air Traffic Services Part 1 and with the CAA as part of the change approval process. The volume of airside traffic would be minimised, where possible. Security and vehicle cleanliness of construction traffic to airside areas would be tightly controlled. Furthermore, construction traffic would be segregated with separate entry and exit routes. Careful construction phase planning would be undertaken to allow the airport to remain operational throughout construction. This may include temporary taxiway diversions, for example for the construction of Luton DART extension to Terminal 2. Adequate signal interference risk assessment and control would be implemented. Crane operations would be managed through the use of advance notifications and, if required, the fitting of aviation warning lighting.		

ID	Risk Event	Pre-mitigation worst-case effect			Summary of Mitigation	Post-mitigation	
		Severity of harm	Duration	Consequence		Likelihood of a MA&D	Tolerability
C17	Disruption of utilities on and off-site due to construction works. This hazard is not considered to have the potential to result in serious damage, as defined within **Appendix 15.1** of Volume 3 of this PEIR, considering that construction works would stop if utilities were disrupted.	No serious damage	Short-term	Not a MA&D	**Safe Systems of Work** Services critical to the airport operations would be protected at all times during the construction works. Inspection pits for the buried utilities would be performed and clearances clearly demarcated on site.	N/A	N/A Consequence not classified as 'serious damage' (i.e. irrecoverable damage).
C18	Contamination of sensitive environmental receptors due to runoff from emergency response activities, e.g. from fire fighting. This hazard is not considered to have the potential to result in serious damage, as defined within **Appendix 15.1** of Volume 3 of this PEIR, considering the limited amount of potential runoff.	No serious damage	Medium-term	Not a MA&D	As per mitigation set out under ID C14.	N/A	N/A Consequence not classified as 'serious damage' (i.e. irrecoverable damage).

ID	Risk Event	Pre-mitigation worst-case effect			Summary of Mitigation	Post-mitigation	
		Severity of harm	Duration	Consequence		Likelihood of a MA&D	Tolerability
C19	Increased risk of bird strike due to construction activities resulting in aircraft accident, damage to artefacts of national or international importance during import/export, and subsequently risk of injury or death.	Catastrophic	Very long term or permanent	Category D	**Safe Systems of Work** The Contractor will be required to manage the risk of construction activities attracting birds, e.g. during the excavation and sorting of landfill materials.	Extremely improbable	TifALARP (Not significant)
C20	Absent or deficient safety/ environmental management systems increasing any of the identified risks for construction.	Catastrophic	Very long term or permanent	Category D	**Draft CoCP and Safe Systems of Work** The Contractor will be required to set up and implement accredited safety and environmental management systems (e.g. certified to ISO 45001 and 14001 standards or equivalent). Regular audits will be undertaken to monitor compliance against the management systems, with actions identified for continuous improvement.	Extremely improbable	TifALARP (Not significant)
C21	Absent or deficient security provision increasing risks associated with vandalism/ crime/ terrorism.	Catastrophic	Very long term or permanent	Category D	**Draft CoCP and Safe Systems of Work** Security for the construction site will be provided with access only provided to those who have passed relevant induction and security clearance, if required. As set out in the Draft CoCP site hoarding will be provided around the construction site perimeter and regularly inspected.	Extremely improbable	TifALARP (Not significant)
C22	Fire at a neighbouring site impacting on the	Catastrophic	Very long term or	Category D	**Safe systems of work** Fire safety risks at the construction site will be managed in compliance with CDM	Extremely improbable	TifALARP (Not significant)

ID	Risk Event	Pre-mitigation worst-case effect			Summary of Mitigation	Post-mitigation	
		Severity of harm	Duration	Consequence		Likelihood of a MA&D	Tolerability
	construction of the Proposed Development and resulting in damage to construction equipment, injury of death, reduced visibility, damage to artefacts of national or international importance during import/export, effects on human health and sensitive environmental receptors due to smoke and ash deposition.		permanent		Regulations 2015 and Regulatory Reform (Fire Safety) Order 2005. A Fire Risk Assessment will be completed and implemented to manage the risks throughout construction, including emergency plans and procedures and measures for the safe storage and handling of fuel.		
C23	Explosion and structural collapse at neighbouring sites impacting on the construction of the Proposed Development due to falling debris, damage to artefacts of national or international importance during import/export, impeded access. (Loss of utilities is assessed under	No serious damage	Short-term	Not a MA&D	It is considered that any impact from an off-site source would be very short-term and unlikely to result in serious damage on the construction of the Proposed Development. Therefore, no mitigation is required.	N/A	N/A Consequence not classified as 'serious damage' (i.e. irrecoverable damage).

ID	Risk Event	Pre-mitigation worst-case effect			Summary of Mitigation	Post-mitigation	
		Severity of harm	Duration	Consequence		Likelihood of a MA&D	Tolerability
	Risk ID C17). This hazard is not considered to have the potential to result in serious damage, as defined within **Appendix 15.1** of Volume 3 of this PEIR, as any impact from an off-site source would be very short-term and likely to be of limited magnitude for construction works.						
C24	Contamination or release of hazardous substances from off-site source impacting on the construction of the Proposed Development due to contact with the hazardous substance by construction workers or contamination of sensitive environmental receptors as a	Major	Long-term	Category C	As per mitigation set out under ID C14.	Extremely remote	TifALARP (Not significant)

ID	Risk Event	Pre-mitigation worst-case effect			Summary of Mitigation	Post-mitigation	
		Severity of harm	Duration	Consequence		Likelihood of a MA&D	Tolerability
	result of new drainage pathways.						
C25	External interference of construction works with lasers, fireworks, drones, sky lanterns. No potential for serious damage in addition to those summarised for Risk ID C12 regarding fire hazard and Risk ID C26 regarding vandalism/ crime/ terrorism have been identified.	No serious damage	Short-term	Not a MA&D	None required.	N/A	N/A Consequence not classified as 'serious damage' (i.e. irrecoverable damage).
C26	Vandalism/ crime/ terrorism resulting in death or injury, damage to construction equipment and airport infrastructure and damage to artefacts of national or international importance during import/export.	Catastrophic	Very long term or permanent	Category D	**Safe Systems of Work** Security for the construction site will be provided with access only provided to those who have passed relevant induction and security clearance, if required. **Draft CoCP** As set out in the Draft CoCP site hoarding will be provided around the construction site perimeter and regularly inspected. **Luton Airport Policing Unit** The existing airport will continue to be policed by the Luton Airport Policing Unit.	Extremely improbable	TifALARP (Not significant)

ID	Risk Event	Pre-mitigation worst-case effect			Summary of Mitigation	Post-mitigation	
		Severity of harm	Duration	Consequence		Likelihood of a MA&D	Tolerability
C27	Civil unrest or protest resulting in disruption to construction and damage of equipment. No serious damage, as defined within **Appendix 15.1** of Volume 3 of this PEIR, considered from protesting, refer to Risk ID C26 for vandalism/ crime/ terrorism.	No serious damage	Short term	Not a MA&D	Any vandalism or crime has been considered under ID C26. Protesting is not considered to result in serious damage.	N/A	N/A Consequence not classified as 'serious damage' (i.e. irrecoverable damage).
C28	Disease outbreak (including the spread of COVID-19) or infestation resulting in death or injury, contamination of sensitive environmental receptors.	Catastrophic	Very long term or permanent	Category D	**Safe Systems of Work** Construction workers will use appropriate Personal Protective Equipment suitable to the work activity and safe working practices. Government guidance on working safely during pandemics / epidemics will be implemented in the construction site to prevent spread of infectious disease. See Risk ID C14 for the management of contaminated runoff.	Extremely improbable	TifALARP (not significant)
C29	Cyber-attack resulting in loss of data confidentiality and integrity, unauthorised access to the construction site. No serious damage	No serious damage	Short-term	Not a MA&D	It is noted that the construction of the Proposed Development will not affect the integrity of the existing airport's cyber security system. Attacks on the contractor's cyber security are not considered to result in serious damage as defined for the purposes of this assessment.	N/A	N/A Consequence not classified as 'serious damage' (i.e. irrecoverable damage).

ID	Risk Event	Pre-mitigation worst-case effect			Summary of Mitigation	Post-mitigation	
		Severity of harm	Duration	Consequence		Likelihood of a MA&D	Tolerability
	considered, as defined within **Appendix 15.1** of Volume 3 of this PEIR, see Risk ID C27 for vandalism/ crime/ terrorism.						
C30	Full or partial obstruction to the operation of emergency services, leading to a slow response time and increased number of deaths/ injuries or spread of contamination, and potential for damage to artefacts of national or international importance during import/export.	Catastrophic	Very long term or permanent	Category D	**Safe Systems of Work** The Contractor will liaise with emergency services and the airport operator to ensure that emergency access routes, muster points and parking for emergency services vehicles are not impeded during construction. Emergency access and safe evacuation routes will be maintained at the airport and construction site throughout the works. A Luton DART fire strategy will be developed with escape routes and refuge zones identified.	Extremely improbable	TifALARP (not significant)

Table 15.13: Assessment of major accident and/or natural disaster hazards during operation

ID	Risk Event	Pre-mitigation worst-case effect			Summary of Mitigation	Post-mitigation	
		Severity of harm	Duration	Consequence		Likelihood of a MA&D	Tolerability
Natural Disasters							
O1	Extreme rainfall events and subsequent flooding resulting in damage to airport infrastructure, off-site properties and built heritage assets, agricultural land and contamination of environmental receptors, and damage to artefacts of national or international importance during import/export.	Major	Medium-term	Category B	**Drainage Strategy** The drainage strategy of the Proposed Development can accommodate for surface water flows during 1 in 100 years storm event, accounting for an increase in precipitation of 40% due to climate change. The new drainage system will be monitored in terms of levels of contamination and volume and will be diverted into storage tanks when trigger levels are reached – for either volume or contamination levels. From the storage tanks, the water will be treated by an effluent treatment plant (ETP) before discharging into an infiltration basin. The new drainage system will also divert some of the existing drainage runs at the airport away from the current soakaways to ensure the collected surface water has the opportunity of being monitored and if required stored and treated before discharging into the infiltration basin.	Remote	Tolerable if ALARP (TifALARP) (Not significant)

ID	Risk Event	Pre-mitigation worst-case effect			Summary of Mitigation	Post-mitigation	
		Severity of harm	Duration	Consequence		Likelihood of a MA&D	**Tolerability**
					The infiltration basin has been located underground to reduce the risk of bird strikes. It is important to note that the infiltration basin has been sized such that it should remain dry in all but the most severe storms. The Fire Training Ground (to be located to the south of the runway) would be wholly self-contained and not drain to ground under any circumstance. Effluent generated from fire training activities (containing foam and hydrocarbon breakdown constituents) will be tankered away for treatment off-site, or subject to securing the necessary consents, discharged into the existing public foul sewerage systems. See Risk ID O14 for a description of mitigation measures incorporated within design for pollution prevention.		
O2	Strong winds resulting in an aircraft accident on approach or take off, death or injury, damage to artefacts of national or international importance during	Catastrophic	Very long term or permanent	Category D	**Operational Safety Management** The airport is required under Article 212 of the ANO to maintain an Aerodrome Manual containing among other things details of the airport's safety management system. At the airport, this	Extremely improbable	TifALARP (Not significant)

ID	Risk Event	Pre-mitigation worst-case effect			Summary of Mitigation	Post-mitigation	
		Severity of harm	Duration	Consequence		Likelihood of a MA&D	Tolerability
	import/export, damage to airport infrastructure or off-site properties.				safety management system includes various Airfield Operating Procedures which detail the procedural safety management for different adverse weather conditions. The airport will continue to use the Aerodrome Manual and all of its safety management procedures to ensure all operations on the airfield are safe. **Rescue and Firefighting Service (RFFS)** An on-site rescue and firefighting service operates within the airport boundary and is available to provide emergency response 24/7. **Public Safety Zone (PSZ) and Runway End Safety Areas** The PSZ has been established to restrict development off-site at either end of the runway, to minimise the number of people on ground at risk of death or injury in the event of an aircraft accident on take-off or landing. Furthermore, Runway End Safety Areas are provided for the protection of the aircraft and passengers on board during take-off and landing, as well as runway strips along the sides of the paved runway.		

ID	Risk Event	Pre-mitigation worst-case effect			Summary of Mitigation	Post-mitigation	
		Severity of harm	Duration	Consequence		Likelihood of a MA&D	**Tolerability**
					This is to minimise hazards in event of aircraft having a 'runway excursion' during extreme weather events, e.g. strong winds or snow and ice.		
O3	High temperatures, heat waves, and drought resulting in heat exhaustion, overheating of equipment and buildings. This hazard is not considered to have the potential to result in serious damage for the operation of the Proposed Development, as defined within **Appendix 15.1** of Volume 3 of this PEIR.	No serious damage	Medium term	Not a MA&D	The effects of high temperatures are unlikely to result in serious damage as defined for the purposes of this assessment. Refer to **Chapter 9** Climate Change Resilience for a description of measures incorporated within design to prevent overheating.	N/A	N/A Consequence not classified as 'serious damage' (i.e. irrecoverable damage).
O4	Extreme cold weather, resulting in snow and ice on runway or taxiways and leading to an aircraft or vehicular accident. Contaminated run-off from melting snow and ice. Damage to artefacts of national or	Catastrophic	Very long term or permanent	Category D	**Operational Safety Management; RFFS PSZ, and Runway End Safety Areas** See Risk Event O2 for further detail on these mitigation measures. Refer to Risk ID O14 on drainage strategy for pollution prevention measures.	Extremely improbable	TifALARP (Not significant)

ID	Risk Event	Pre-mitigation worst-case effect			Summary of Mitigation	Post-mitigation	
		Severity of harm	Duration	Consequence		Likelihood of a MA&D	**Tolerability**
	international importance during import/export.						
O5	Lightning striking the airport resulting in an aircraft accident or loss of telecommunications, as well as potential for damage to artefacts of national or international importance during import/export.	Catastrophic	Very long term or permanent	Category D	**Operational Safety Management; RFFS, PSZ and Runway End Safety Areas** See Risk Event O2 for further detail on these mitigation measures. **Embedded Design Measures** The Proposed Development has been designed in compliance with the Electricity at Work Regulations 1989 and BS EN/IEC 62305 for the installation of Lightning Protection systems.	Extremely improbable	TifALARP (Not significant)
O6	Volcanic ash, sand, fog resulting in reduced visibility and aircraft accident, with potential also for damage to artefacts of national or international importance during import/export.	Catastrophic	Very long term or permanent	Category D	**Operational Safety Management; RFFS, PSZ and Runway End Safety Areas** See Risk Event O2 for further detail on these mitigation measures.	Extremely improbable	TifALARP (Not significant)
O7	Natural geological hazards, e.g. ground instability, landslides, ground collapse and sinkholes following	Ground instability at the Main Application Site due to existing geology has been considered under Risk ID C7.					

ID	Risk Event	Pre-mitigation worst-case effect			Summary of Mitigation	Post-mitigation	
		Severity of harm	Duration	Consequence		Likelihood of a MA&D	**Tolerability**
	heavy rainfall leading to damage to property and risk of injury or death.						
O8	Earthquakes, tremors resulting in physical damage to the airport infrastructure, risk of injury or death due to collapse of buildings, damage to artefacts of national or international importance during import/export. This hazard is not considered to have the potential to result in serious damage, as defined within **Appendix 15.1** of Volume 3 of this PEIR, considering the reasonably foreseeable worst-case consequence of this hazard in the study area.	No serious damage	Short-term	Not a MA&D	Data collated by British Geological Survey (Ref. 15.60) and Musson and Sargeant (2007) (Ref. 15.61) demonstrate that the Main Application Site, Off-site Car Parks and Offsite Highway Intervention works are located within an area with one of the lowest levels of seismic risk in the UK. Therefore, no mitigation is required.	N/A	N/A Consequence not classified as 'serious damage' (i.e. irrecoverable damage).
O9	Extreme space weather resulting in disruption of telecommunications and an aircraft	Catastrophic	Very long term or permanent	Category D	**Operational Safety Management; RFFS, PSZ and Runway End Safety Areas**	Extremely improbable	TifALARP (Not significant)

ID	Risk Event	Pre-mitigation worst-case effect			Summary of Mitigation	Post-mitigation	
		Severity of harm	Duration	Consequence		Likelihood of a MA&D	**Tolerability**
	accident, with potential also for damage to artefacts of national or international importance during import/export.				See Risk Event O2 for further detail on these mitigation measures.		
Major Accidents							
O12	Fire and/ or explosion at the Main Application Site resulting in damage to airport infrastructure, airport users and workers, infrastructure and aircrafts, off-site infrastructure and properties, injury or death, and contamination of environmental receptors	Catastrophic	Very long term or permanent	Category D	**Embedded Design Measures** The design of Proposed Development has been developed in accordance with Building Regulations, Regulatory Reform (Fire Safety) Order, and BS7974 Application of fire safety engineering principles to the design of buildings. In line with legal requirements, a fire risk assessment will be undertaken, and a fire plan and evacuation strategy will be implemented on site, which sets out the emergency procedures and evacuation routes in case of fire. A fire stopping systems specification will be developed at detailed design stage. The airport layout has been developed in consultation with the existing airport fire safety and emergency resilience officers. A hydrant system will be provided during Phase 2 to	Extremely improbable	TifALARP (Not significant)

ID	Risk Event	Pre-mitigation worst-case effect			Summary of Mitigation	Post-mitigation	
		Severity of harm	Duration	Consequence		Likelihood of a MA&D	**Tolerability**
					connect to all new aircraft stands and the existing number of emergency water tanks around the runway will be retained. Measures to minimise the risk of fire and explosion at the fuel farm include electrical bonding and earthing of equipment, installation of Remotely Operated Shut-Off Valves (ROSOV) in the fuel transfer pipelines/ storage tanks to isolate the equipment in an emergency, and installation of fire safe shut off valves, inclusion of high integrity independent tank overfill protection systems, leak-tight bunds and all bund penetrations would be fire resistant as well as being leak-tight. An emergency access road is allowed for within the design to allow direct access from the platform to the fuel storage facility. Ground gas protection measures are summarised under Risk ID C12. **COMAH and HSC Consents** Storage and handling of fuels within the fuel farm will be carried out in accordance with its COMAH and Hazardous Substances Consents.		

ID	Risk Event	Pre-mitigation worst-case effect			Summary of Mitigation	Post-mitigation	
		Severity of harm	Duration	Consequence		Likelihood of a MA&D	Tolerability
					RFFS An on-site rescue and firefighting service operates within the airport boundary and is available to provide emergency response 24/7. A three-minute response time across the airport will be maintained.		
O13	Instability of excavations and construction over the landfill, resulting in damage to airport infrastructure, property, risk of injury of death.	Ground instability at the Main Application Site associated with the ground settlement of the built up platform and construction on the landfill has been considered under Risk ID C13.					
O14	Major leaks and spillages from the operation of the Proposed Development resulting in serious damage of sensitive environmental receptors and impacting on human health.	Catastrophic	Long term	Category D	**Drainage strategy** A number of pollution prevention measures are being considered for inclusion within the drainage design. These include the following: • Full retention separators for all runoff from aprons, taxiways and the runway. Bypass separators would only be used in areas for short term parking or road ways that receive light contamination. • An Effluent Treatment Plant (ETP) for the de-icing agents. • Automated and real time monitoring of volume and chemical content pre and post	Extremely improbable	TifALARP (Not significant)

ID	Risk Event	Pre-mitigation worst-case effect			Summary of Mitigation	Post-mitigation	
		Severity of harm	Duration	Consequence		Likelihood of a MA&D	Tolerability
					treatment that will control the actuated inlet valves to storage chamber upstream from the ETP to divert water above the contamination trigger levels to storage for treatment. • Emergency isolation valves have been positioned strategically for use in the event of severe pollutant spillages. If high levels of TOC (Total Organic Compound) have entered the storage tanks, access points will be provided to allow the effluent to be tankered away, for treatment off site. • Permeable paving is proposed which will include a bio membrane that will treat the fuel and oils leaks and include storage in the paving build up. • Leachate from the area of landfill to be built on will be controlled by capping the area with a water proof membrane in order to prevent water ingress. Hence the area will be impermeable and surface water will be channelled towards the Thames Water sewer network or soakaways. • Effluent generated from fire training activities at the Fire		

ID	Risk Event	Pre-mitigation worst-case effect			Summary of Mitigation	Post-mitigation	
		Severity of harm	Duration	Consequence		Likelihood of a MA&D	Tolerability
					Training Ground will be tankered away for treatment off-site, or subject to securing the necessary consents, discharged into the existing public foul sewerage systems. • The fuel farm will be surrounded by a bund. Surface water will drain through petrol interceptors with sensors to measure water quality. If contamination reaches high enough levels to trigger the actuated inlets valves, the water will be diverted away from the infiltration basin and towards the ETP. If a significant leak occurred from the tanks, the actuated inlet valves would close the drainage completely and the fuel spill would be tankered away for treatment off-site. • The pollution prevention strategy for the use of de-icers will include: - Improved controls and spill reporting, - All refuelling vehicles will carry spill kits to limit the amount from spills reaching the drainage system, - Improved controls and management of the application of ground de-icers,		

ID	Risk Event	Pre-mitigation worst-case effect			Summary of Mitigation	Post-mitigation	
		Severity of harm	Duration	Consequence		Likelihood of a MA&D	**Tolerability**
					- Improved controls and management for application of de-icers to aircraft, - No products used for de-icing will be classified as hazardous. **COMAH and HSC Consents** Storage and handling of fuels within the fuel farm will be carried out in accordance with its COMAH and Hazardous Substances Consents and safety management system.		
O15	Road traffic collisions on and off-site due to increase in traffic movements associated with the Proposed Development resulting in death or injury of road users, damage to artefacts of national or international importance during import/export, and damage to property.	Catastrophic	Very long term or permanent	Category D	**Road Safety Audits** Improvements on the highway network have been carried out to minimise the effects of increased traffic derived from the increased airport capacity. Road Safety Audits of the junctions to be improved and the new Airport Access Road will to be completed to inform detailed design development. **Compliance with DMRB** Where applicable, the highway design of the Proposed Development will be developed to the standards set within the Design Manual for Roads and Bridges (DMRB). **Connection to the fuel pipeline** The Proposed Development includes a direct connection between the Fuel Storage	Extremely improbable	TifALARP (Not significant)

ID	Risk Event	Pre-mitigation worst-case effect			Summary of Mitigation	Post-mitigation	
		Severity of harm	Duration	Consequence		Likelihood of a MA&D	**Tolerability**
					Facility and the existing Prax fuel pipeline to the east of the site. This will provide the opportunity for fuel to be delivered to site via pipeline, potentially eliminating the need for fuel to be transported to the airport via road, and therefore, removing hazardous loads from the public road network. From Terminal 2 fuel storage facility, fuel would be transported to Terminal 1 fuel storage facility via airport roads, and a pipeline connection between the existing Terminal 1 and Terminal 2 fuel storage facilities will be safeguarded. Further information on the assessment of the effects of operational traffic on road safety is provided within **Chapter 18** Traffic and Transportation.		
O16	Aircraft accidents, injury or death, damage to infrastructure and disruption of the operation of the airport due to changes to the airport layout, increased number of aircraft using the	Catastrophic	Very long term or permanent	Category D	**Embedded Design Measures** The Proposed Development has been designed in compliance with EASA and CAA guidance and the UK aviation regulations. **Operational Safety Management; RFFS, PSZ and Runway End Safety Areas**	Extremely improbable	TifALARP (Not significant)

ID	Risk Event	Pre-mitigation worst-case effect			Summary of Mitigation	Post-mitigation	
		Severity of harm	Duration	Consequence		Likelihood of a MA&D	**Tolerability**
	airport and failure of safety systems.				See Risk Event O2 for further detail on these mitigation measures.		
O17	Loss or disruption of utilities connections, disrupting the operation of airport and emergency response, potentially leading to an increased risk or ability to respond to an incident.	Major	Medium term	Category B	**Embedded Design Measures** Emergency water tanks located adjacent to the runway will store water for the rescue and firefighting service regardless of a disruption to water supply. The design of the Proposed Development incorporates uninterruptible power sources (UPS), which will provide emergency power for critical infrastructure, if mains power fails.	Extremely remote	Tolerable (Not significant)
O18	Emergency response activities resulting in contaminated runoff or smoke from Fire Training Ground reducing the visibility on runway, and damage to artefacts of national or international importance during import/export.	Catastrophic	Long term	Category D	**Drainage Strategy** Refer to risk ID O14 for a summary of the measures incorporated within the drainage strategy to mitigate the risk of contaminated run off from the site. **Operational Safety Management** See Risk Event O2 for further detail on this mitigation measure.	Extremely improbable	TifALARP (Not significant)
O19	Increased risk of bird strike due to changes to the airport layout and surrounding areas	Catastrophic	Very long term or permanent	Category D	**Embedded design measures** Design of the Proposed Development has been developed not to attract birds in order to minimise the risk of	Extremely improbable	TifALARP (Not significant)

ID	Risk Event	Pre-mitigation worst-case effect			Summary of Mitigation	Post-mitigation	
		Severity of harm	Duration	Consequence		Likelihood of a MA&D	**Tolerability**
	attracting birds, resulting in aircraft accident, and subsequently risk of injury or death.				bird strike, for example through the avoidance of open water features within the drainage design and via measures included within the landscape design. **Operational Safety Management; RFFS, PSZ and Runway End Safety Areas** See Risk Event O2 for further detail on these mitigation measures.		
O20	Absent or deficient safety/ environmental management systems increasing any of the identified risks for operation	Catastrophic	Very long term or permanent	Category D	**Operational Safety and Environmental Management** The existing airport environmental and safety management procedures will be followed. These are subject to regular audits and inspection by the CAA.	Extremely improbable	TifALARP (Not significant)
O21	Absent or deficient security provision increasing risks associated with vandalism/ crime/ terrorism, cyber-attack and digital data security, and civil unrest or protest.	Catastrophic	Very long term or permanent	Category D	**Operational Safety Management** The existing airport security management procedures will be followed. These are subject to regular audits and inspection by the CAA. **Airport Policing Unit** The existing London Luton Airport Policing Unit will continue policing the airport. On-site facilities will be provided for the police as part of the Proposed Development.	Extremely improbable	TifALARP (Not significant)

ID	Risk Event	Pre-mitigation worst-case effect			Summary of Mitigation	Post-mitigation	
		Severity of harm	Duration	Consequence		Likelihood of a MA&D	Tolerability
O22	Fire at a neighbouring site impacting on the operation of the airport and resulting in damage to infrastructure, damage to artefacts of national or international importance during import/export, injury of death, reduced visibility, effects on human health and sensitive environmental receptors due to smoke and ash deposition.	Catastrophic	Very long term or permanent	Category D	Risk mitigation measures set out under Risk ID O12 will apply, if the fire was to spread to the airport. The airport rescue and firefighting service can also respond to incidents in the immediate vicinity of the airport.	Extremely improbable	TifALARP (Not significant)
O23	Explosion and structural collapse at neighbouring sites impacting on the operation of the airport due to falling debris and impeded access. (Loss of utilities is assessed under Risk ID O17)	Severe	Medium term	Category A	Refer to mitigation summarised under Risk ID O12.	Remote	Tolerable (not significant)
O24	Contamination or release of hazardous substances impacting on the operation of the	Major	Medium term	Category B	Refer to mitigation summarised under Risk ID O14.	Extremely improbable	Tolerable (Not significant)

ID	Risk Event	Pre-mitigation worst-case effect			Summary of Mitigation	Post-mitigation	
		Severity of harm	Duration	Consequence		Likelihood of a MA&D	**Tolerability**
	Proposed Development due to contact with the hazardous substance by airport users/ workers or contamination of sensitive environmental receptors as a result of new drainage pathways						
O25	External interference of airport operations by with lasers, fireworks, drones, sky lanterns, resulting in an aircraft accident and with potential for damage to artefacts of national or international importance during import/export. (Refer to Risk ID O12 regarding fire hazard and Risk ID O28 regarding vandalism/ crime/ terrorism)	Catastrophic	Very long term or permanent	Category D	**Operational Safety Management and RFFS** See Risk Event O2 for further detail on these mitigation measures. **Airport Policing Unit** The existing London Luton Airport Policing Unit will continue policing the airport.	Extremely improbable	TifALARP (Not significant)
O26	Cyber-attack resulting in loss of data confidentiality and integrity,	No serious damage.	Short term	Not a MA&D	Cyber-attacks on their own are considered to result in a	N/A	N/A Consequence not classified

ID	Risk Event	Pre-mitigation worst-case effect			Summary of Mitigation	Post-mitigation	
		Severity of harm	Duration	Consequence		Likelihood of a MA&D	**Tolerability**
	unauthorised access to the airport or bypassed security systems. No serious damage, as defined within **Appendix 15.1** of Volume 3 of this PEIR, has been identified, refer to risk ID O28 for vandalism / crime/ terrorism.				MA&D. See Risk ID O28 for vandalism/ crime/ terrorism.		as 'serious damage' (i.e. irrecoverable damage).
O27	Civil unrest or protest resulting in disruption to operation and damage of equipment and/or artefacts of national or international importance during import/export. No serious damage, as defined within **Appendix 15.1** of Volume 3 of this PEIR, has been identified, see Risk ID O28 for vandalism/ crime/ terrorism.	No serious damage.	Short term	Not a MA&D	Civil unrest or protesting on its own is not considered to result in a MA&D. See Risk ID O28 for vandalism/ crime/ terrorism.	N/A	N/A Consequence not classified as 'serious damage' (i.e. irrecoverable damage).
O28	Vandalism/ crime/ terrorism resulting in death or injury, damage to the	Catastrophic	Very long term or permanent	Category D	**Embedded Design Measures** Measures have been embedded within design in line with National Counter	Extremely improbable	TifALARP (Not significant)

ID	Risk Event	Pre-mitigation worst-case effect			Summary of Mitigation	Post-mitigation	
		Severity of harm	Duration	Consequence		Likelihood of a MA&D	Tolerability
	airport infrastructure.				Terrorism Security Office's Crowded Places Guidance (2017) and DfT's Aviation Security in Airport Development to minimise threats to the Proposed Development. An isolation bay has been incorporated within the airfield design, where aircraft can be directed, if required. **Operational Safety Management and RFFS** See Risk Event O2 for further detail on these mitigation measures. **Airport Policing Unit** The existing London Luton Airport Policing Unit will continue policing the airport. On-site facilities will be provided for the police as part of the Proposed Development.		
O29	Disease outbreak (including COVID-19) or infestation resulting in death or injury, contamination of sensitive environmental receptors.	Catastrophic	Very long term or permanent	Category D	**Embedded Design Measures** An isolation bay has been incorporated within the airfield design, where aircraft can be directed, if required. **Operational Safety Management** The existing airport environmental and safety management procedures will continue to be followed across the airport, including measures	Extremely improbable	TifALARP (Not significant)

ID	Risk Event	Pre-mitigation worst-case effect			Summary of Mitigation	Post-mitigation	
		Severity of harm	Duration	Consequence		Likelihood of a MA&D	**Tolerability**
					to minimise risks from biohazard or disease outbreaks. These are subject to inspection by the CAA. The airport will continue to have in place measures in line with up-to-date government advice to prevent spread of Covid-19 or any other contagious disease, should any be present during operation of the airport, applicable to airport staff and passengers operations.		
O30	Full or partial obstruction of emergency services, leading to a slow response time and increased number of deaths/ injuries or spread of contamination with potential also for damage to artefacts of national or international importance during import/export.	Catastrophic	Very long term or permanent	Category D	**Embedded Design Measures** On-site emergency access routes to enable a suitable response time by the rescue and firefighting service and rendezvous points, as required by the CAA, have been established by the layout of the Proposed Development. These facilities have been designed in consultation with emergency services. **Operational Safety Management** Emergency plans and procedures, access and safe evacuation routes will be maintained throughout operation.	Extremely improbable	TifALARP (Not significant)

Sensitivity Analysis

15.9.6 There are certain known scenarios or risks that may occur that could influence the conclusions of the core assessment. These scenarios and the general approach to considering them in this assessment are described in **Section 5.4** of **Chapter 5** Approach to the Assessment.

15.9.7 However, the assessment of MA&D is based on a worst-case scenario in which the consequences of a MA&D would occur. Therefore, the different scenarios considered would not change the worst-case consequences assessed, receptors affected or the resulting effect set out within **Table 15.12** and **Table 15.13**.

15.10 Additional mitigation

15.10.1 The following additional mitigation measure has been identified to keep the likelihood of a MA&D occurring as low as reasonably practicable:

a. The detailed design of façade treatments and photovoltaic panels will be subject to a glint and glare assessment prior to their installation.

15.11 Residual effects

15.11.1 With the implementation of the mitigation measures identified in **Sections 15.8** and **15.10**, no significant residual risks associated with MA&D in the context of the Proposed Development have been identified. The effects are as set out within **Section 15.9.**

15.12 In-combination climate change effects

15.12.1 The impact of climate change resulting in more frequent extreme weather conditions has been considered as part of the natural hazards assessment within this chapter (also refer to ERR in **Appendix 15.1** of Volume 3 of this PEIR). Therefore, the assessment of in-combination climate change effects has been completed as part of the assessment of MA&D effects and is not considered independently.

15.13 Monitoring

15.13.1 Monitoring relevant to the MA&D assessment is associated with the monitoring of embedded and good practice mitigation measures. A number of construction and operation monitoring measures have been identified, which are summarised below.

Construction monitoring

15.13.2 Construction monitoring measures relevant to the MA&D assessment include:

a. monitoring measures required within the Draft CoCP for its effective implementation; and

b. monitoring and regular audits associated with the accredited safety and environmental management systems adopted by the Contractor.

Operational monitoring

15.13.3 Operational monitoring measures relevant to the MA&D assessment include:

a. monitoring and regular audits of the operational management system, to ensure compliance with the requirements of the Aerodrome Licence; and,

b. monitoring of the operation of the proposed fuel farm, in compliance with COMAH and Hazardous Substances Consent requirements.

15.14 Preliminary assessment summary

15.14.1 **Table 15.14** provides a summary of the identified impacts, mitigation and likely effects of the Proposed Development with regards to MA&D. Additional mitigation and how it will be secured are also described.

Table 15.14: MA&D preliminary assessment summary

Impact	Embedded/ Good Practice Mitigation	Magnitude	Receptor Sensitivity	Description of effect and significance	Additional Mitigation	Residual Effect
Construction						
Natural disaster hazards: a. Extreme rainfall events and subsequent flooding; b. Strong winds; c. Snow and ice; d. Lightning; e. Geological hazards (sinkholes, ground collapse).	Measures described and implemented through: a. Draft CoCP b. Safe Systems of Work c. Compliance with legislation d. Geotechnical design	n/a	n/a	Tolerable or Tolerable if ALARP Not significant	None required	Not significant
Major accident hazards: a. Fire and/ or explosion at the construction site; b. Ground instability; c. Major leaks and spillages;	Measures described and implemented through: a. Draft CoCP b. Safe Systems of Work c. Compliance with legislation and	n/a	n/a	Tolerable or Tolerable if ALARP Not significant	None required	Not significant

Impact	Embedded/ Good Practice Mitigation	Magnitude	Receptor Sensitivity	Description of effect and significance	Additional Mitigation	Residual Effect
d. Impacts on road safety; e. Accidents resulting from the interface of existing airport operations and the construction activities; f. Increased risk of bird strike; g. Absent or deficient safety or environmental management systems; h. Absent or deficient security management systems; i. Fire at a neighbouring site; j. Contamination or release of hazardous	Government guidance d. Geotechnical design e. CTMP					

Impact	Embedded/ Good Practice Mitigation	Magnitude	Receptor Sensitivity	Description of effect and significance	Additional Mitigation	Residual Effect
substances by off-site sources; k. Vandalism/ crime/ terrorism; l. Disease outbreak (including COVID-19) or infestation; m. Limiting the ability of an emergency response plan to be implemented.						
Operation						
Natural disaster hazards: a. Extreme rainfall events and subsequent flooding; b. Strong winds; c. Snow and ice; d. Lightning;	Measures described and implemented through: a. Environmental and Safety Management Systems b. Public Safety Zone	n/a	n/a	Tolerable or Tolerable if ALARP Not significant	None required	Not significant

Impact	Embedded/ Good Practice Mitigation	Magnitude	Receptor Sensitivity	Description of effect and significance	Additional Mitigation	Residual Effect
e. Volcanic ash, sand, fog; f. Space weather.	c. Rescue and Fire Fighting Service d. Drainage strategy e. Compliance with legislation and Government guidance					
Major accident hazards: a. Fire and/ or explosion at the operational site; b. Major leaks and spillages; c. Impacts on road safety; d. Accidents at airport due to new layout and increased air traffic; e. Loss/ disruption of utilities;	Measures described and implemented through: a. Environmental and Safety Management Systems under the Aerodrome Certificate b. Auditing of management systems c. Public Safety Zone d. Rescue and Fire Fighting Service	n/a	n/a	Tolerable or Tolerable if ALARP Not significant	The detailed design of façade treatments and photovoltaic panels will be subject to a glint and glare assessment prior to their installation.	Not significant

Impact	Embedded/ Good Practice Mitigation	Magnitude	Receptor Sensitivity	Description of effect and significance	Additional Mitigation	Residual Effect
f. Emergency response activities implemented on Main Application Site; g. Bird strike; h. Absent or deficient safety or environmental management systems; i. Absent or deficient security management systems; j. Fire or explosion at a neighbouring site; k. External aircraft interferences (e.g. drones); l. Contamination or release of hazardous	e. Luton Airport Policing Unit f. Drainage strategy g. Measures embedded within design as set out within **Section 15.8**. h. Compliance with legislation, Government guidance, CAA Guidance and DMRB					

Impact	Embedded/ Good Practice Mitigation	Magnitude	Receptor Sensitivity	Description of effect and significance	Additional Mitigation	Residual Effect
substances by off-site sources; m. Vandalism/ crime/ terrorism; n. Disease outbreak (including COVID-19) or infestation; **o.** Limiting the ability of an emergency response plan to be implemented.						

15.15 Completing the assessment

15.15.1 The following activities will be undertaken to complete the assessment, the results of which will be presented in the ES:

a. Review of the final design, and how mitigation and monitoring measures would be secured.

b. Further technical engagement with stakeholders is required to review the risk assessment and proposed mitigation.

COMPETENT EXPERTS

Topic	Role	Company	Qualifications/competencies/experience of author
Major Accidents and Disasters	Author	AECOM	BSc MPhil CEnv MIEnvSc PIEMA Associate Director, 10 years of experience
Major Accidents and Disasters	Technical Reviewer	York Aviation	BA (Soc Sci Hons), Master of Transport Design (MTD). Managing Partner, 40 years experience.

GLOSSARY AND ABBREVIATIONS

Term	Definition
AAIB	Air Accidents Investigation Branch
ACM	Asbestos containing material
ALARP	As Low As Reasonably Practicable (ALARP) is a term used to describe an expected level of residual risk involved with a system or set of operations, in case it is not possible to eliminate the risk. What this means, is that the applicant, overseen by the regulatory authorities, is responsible for exercising good practice and judgement to ensure that necessary measures have been taken in order to reduce the levels of risk, such that the residual risk levels are 'as low as reasonably practicable'.
ALC	Agricultural Land Classification
ANO	Air Navigation Order
ANPS	Airports National Policy Statement
APF	Aviation Policy Framework
BLRF	Bedfordshire Local Resilience Forum
CAA	Civil Aviation Authority
CAP	Civil Aviation Publication
CBC	Central Bedfordshire Council
CCA	The Civil Contingencies Act
CDM	Construction Design and Management Regulations 2015
CDOIF	Chemicals and Downstream Oil Industries Forum
CoCP	Code of Construction Practice
COMAH	Control of Major Accidents Hazards
COSHH	Control of Substances Hazardous to Health Regulations 2002
CPAR	Century Park Access Road
CTMP	Construction Traffic Management Plan
CWS	County Wildlife Site
DART	Direct Air-Rail Transit
DCO	Development Consent Order
DfT	Department for Transport
Disaster	Naturally occurring phenomenon such as an extreme weather event (e.g. storm, flood, extreme temperatures) or ground-related hazard events (e.g. subsidence, landslide, earthquake) with the potential to cause an event or situation that leads to immediate or delayed serious damage to human health, welfare and/or the environment and requires the use of resources beyond those of the Applicant, LLAOL (the operator) or its contractors to manage.

Term	Definition
DMRB	Design Manual for Roads and Bridges
DWS	District Wildlife Site
EASA	European Aviation Safety Agency
EC	European Commission
EIA	Environmental Impact Assessment
EIA Regulations 2017	Infrastructure Planning (Environmental Impact Assessment) Regulations 2017
eMARS	European Commission's Major Accident Reporting System
ERR	Environmental Risk Record
ES	Environmental Statement
FOD	Foreign Object Debris
FSO	The Regulatory Reform (Fire Safety) Order 2005
GPS	Global Positioning System
Hazard	Source of harm
HSE	Health and Safety Executive
HSWA	Health and Safety at Work etc. Act 1974
Kv	Kilovolts
LBC	Luton Borough Council
LLAOL	London Luton Airport Operations Limited
LOLER	Lifting Operations and Lifting Equipment Regulations 1998
LPA	Local Planning Authority
LWS	Local Wildlife Site
MA&D	Major accidents and disasters
Major accident	Uncontrolled event caused by a man-made activity or asset that may result in immediate or delayed serious damage to human health, welfare and/or the environment and requires the use of resources beyond those of the Applicant, LLAOL (the operator) or its contractors to manage.
NATS	National Air Traffic Services
NHDC	North Hertfordshire District Council
NPPF	National Planning Policy Framework
NSIP	National Significant Infrastructure Projects
OLS	Obstacle Limitation Surface
PSZ	Public Safety Zone
RFFS	Rescue and Fire Fighting Service
Risk	Chance, high or low, that a receptor could be harmed by a hazard, together with an indication of how serious the harm could be.

Term	Definition
RPG	Registered Park and Garden
Serious damage	Includes the potential loss of life or permanent injury and/or permanent or long-lasting damage to an environmental receptor which cannot be restored through minor clean-up and restoration efforts.
SPZ	Source Protection Zone
Threat	Malicious attack. Considered as a hazard source within the MA&D assessment.
TifALARP	Tolerable if ALARP
TWAO	Transport and Works Act Order
TOR	Tolerability of Risk
UPS	Uninterruptible power sources
UXO	Unexploded Ordnance
Vulnerability	Describes the susceptibility of an individual, a community, assets or systems to the impacts of hazards.
WOW	Weather Observation Website
ZOI	Zone of Influence

REFERENCES

Ref. 15.1 United Nations Office for Disaster Risk Reduction (UNDRR), 2017.
Ref. 15.2 UK Statutory Instruments 2017 No. 572, The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017. Her Majesty's Stationery Office, Richmond, UK.
Ref. 15.3 Directive 2014/52/EU of the European Parliament and of The Council of 16 April amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment. Strasbourg, European Parliament and European Council..
Ref. 15.4 Regulation (EC) No 216/2008 of the European Parliament and of the Council of 20 February 2008 on common rules in the field of civil aviation and establishing a European Aviation Safety Agency
Ref. 15.5 Regulation (EU) 2018/1139 of the European Parliament and of the Council of 4 July 2018 on common rules in the field of civil aviation and establishing a European Union Aviation Safety Agency, repealing Regulation (EC) No 216/2008.
Ref. 15.6 Regulation (EC) No 300/2008 of the European Parliament and of the Council of 11 March 2008 on common rules in the field of civil aviation security and repealing Regulation (EC) No 2320/2002.
Ref. 15.7 Air Navigation Order 2016, Her Majesty's Stationery Office, Richmond, UK.
Ref. 15.8 UK Public General Acts1974 c. 37. Health and Safety at Work etc. Act 1974. Her Majesty's Stationery Office, Richmond, UK.
Ref. 15.9 UK Statutory Instruments1998 No. 2307. The Lifting Operations and Lifting Equipment Regulations (LOLER) 1998. Her Majesty's Stationery Office, Richmond, UK.
Ref. 15.10 UK Statutory Instruments 2015 No. 51. The Construction (Design and Management) Regulations 2015. Her Majesty's Stationery Office, Richmond, UK.
Ref. 15.11 UK Statutory Instruments1999 No. 3242. The Management of Health and Safety at Work Regulations 1999. Her Majesty's Stationery Office, Richmond, UK.
Ref. 15.12 UK Statutory Instruments1992 No. 3004. The Workplace (Health, Safety and Welfare) Regulations 1992. Her Majesty's Stationery Office, Richmond, UK.
Ref. 15.13 UK Statutory Instruments2015 No. 483. The Control of Major Accident Hazards Regulations 2015. Her Majesty's Stationery Office, Richmond, UK.
Ref. 15.14 Directive 2012/18/EU of the European Parliament and of the Council of 4 July 2012 on the control of major-accident hazards involving dangerous substances, amending and subsequently repealing Council Directive 96/82/EC Text with EEA relevance. Strasbourg, European Parliament and European Council.
Ref. 15.15 UK Statutory Instruments 2015 No. 627. The Planning (Hazardous Substances) Regulations 2015. Her Majesty's Stationery Office, Richmond, UK.
Ref. 15.16 UK Statutory Instruments1996 No. 825. The Pipelines Safety Regulations 1996. Her Majesty's Stationery Office, Richmond, UK.
Ref. 15.17 UK Statutory Instruments2012 No. 632. The Control of Asbestos Regulations 2012. Her Majesty's Stationery Office, Richmond, UK.
Ref. 15.18 UK Statutory Instruments2002 No. 2677. Control of Substances Hazardous to Health Regulations 2002 (COSHH). Her Majesty's Stationery Office, Richmond, UK.
Ref. 15.19 UK Statutory Instruments2005 No. 1541. The Regulatory Reform (Fire Safety) Order 2005. Her Majesty's Stationery Office, Richmond, UK.
Ref. 15.20 UK Statutory Instruments2005 No. 2042. The Civil Contingencies Act 2004 (Contingency Planning) Regulations 2005. Her Majesty's Stationery Office, Richmond, UK.
Ref. 15.21 UK Statutory Instruments2010 No. 2214. The Building Regulations 2010. Her Majesty's Stationery Office, Richmond, UK.
Ref. 15.22 Ministry of Housing, Communities and Local Government (2021). National Planning Policy Framework.
Ref. 15.23 Department for Transport (2014) National Policy Statement for National Networks – December 2014.
Ref. 15.24 Department for Transport (2019). Aviation 2050. The Future of UK Aviation. A Consultation.
Ref. 15.25 UK Government (2013). Aviation Policy Framework.
26 CAA (2020) Consultation on Public Safety Zones.
Ref. 15.27 Department for Transport (2021). Control of Development in Airport Public Safety Zones [online].
Ref. 15.28 Luton Borough Council (2017). Luton Local Plan 2011 – 2031. Planning and Economic Growth, Place and Infrastructure.
Ref. 15.29 Luton Borough Council (2011) Luton Local Transport Plan 3.

Ref. 15.30 Central Bedfordshire Council (2021). Central Bedfordshire Local Plan 2015 – 2035.
Ref. 15.31 North Hertfordshire District Council (2007) District Local Plan No.2 With Alterations.
Ref. 15.32 North Hertfordshire District Council (2016). Local Plan 2011 – 2031. Proposed Submission.
Ref. 15.33 Department for Transport (June 2018) Airports National Policy Statement (ANPS).
Ref. 15.34 Department for Transport (2018). Airports National Policy Statement: new runway capacity and infrastructure at airports in the South East of England.
Ref. 15.35 Health and Safety Executive (2001). Reducing risks, protecting people. HSE's decision-making process.
Ref. 15.36 Health and Safety Executive (2003) Major Hazard Regulatory Model: Safety Management in Major Hazard Sectors.
Ref. 15.37 The Health and Safety Executive (HSE) (2015). Guidance on The Control of Major Accident Hazards Regulations 2015.
Ref. 15.38 The Planning Inspectorate (2017). Advice note eleven: Working with public bodies in the infrastructure planning process, Annex G – The Health and Safety Executive.
Ref. 15.39 Chemical and Downstream Oil Industries Forum (n.d.). Guideline: Environmental Risk Tolerability for COMAH Establishments v2.0.
Ref. 15.40 Department for Environment, Food and Rural Affairs (Defra) (2011). Guidelines for Environmental Risk Assessment and Management Green Leaves III, Defra.
Ref. 15.41 The British Standards Institution (2018). ISO 31000:2018: Risk management — Guidelines. BSI Standards Limited 2018.
Ref. 15.42 European Union Aviation Safety Agency (EASA), (2021). Certification Safety Specification and Guidance for Aerodromes Design. CS- ADR-DSN Issue 5.
Ref. 15.43 Civil Aviation Authority (CAA) (2021). UK EU transition [online].
Ref. 15.44 Civil Aviation Authority (2010). CAP760 Guidance on the conduct of Hazard Identification, Risk Assessment and the Production of Safety Cases.
Ref. 15.45 Department for Transport (DfT) (2017) Aviation security in airport development.
Ref. 15.46 Her Majesty Government (2020). Working safely during COVID-19 in construction and other outdoor work. COVID-19 secure guidance for employers, employees and the self-employed.
Ref. 15.47 Construction Leadership Council (2020). Construction Sector Site Operating Procedures Protecting Your Workforce During Coronavirus (Covid 19). Version 6, 20 October 2020.
Ref. 15.48 Institute of Environmental Management and Assessment (IEMA) (2020). Major Accidents and Disasters in EIA Guide.
Ref. 15.49 The Planning Inspectorate (2017). Advice note eleven: Working with public bodies in the infrastructure planning process, Annex G – The Health and Safety Executive.
Ref. 15.50 European Commission (2020). The Major Accident Reporting System (eMARS) [online].
Ref. 15.51 Cabinet Office (2020) National Risk Register 2020.
Ref. 15.52 European Commission (2017) Overview of Natural and Man-made Disaster Risks the European Union may face.
Ref. 15.53 Bedfordshire Prepared (2017). Know Your Risks. Risks and Plans for Bedfordshire.
Ref. 15.54 Hertfordshire Local Resilience Forum. Hertfordshire Risk Register.
Ref. 15.55 Civil Aviation Authority (CAA) (2013) Global Fatal Accident Review 2002 to 2011.
Ref. 15.56 Chemical and Downstream Oil Industries Forum (CDOIF) (unknown date). Environmental Risk Tolerability for COMAH Establishments. 2nd ed.
Ref. 15.57 Civil Aviation Authority (2010). CAP760 Guidance on the conduct of Hazard Identification, Risk Assessment and the Production of Safety Cases.
Ref. 15.58 Met Office WOW website..
Ref. 15.59 Climate Change Committee (CCC) (2017) UK Climate Change Risk Assessment (CCRA).
Ref. 15.60 British Geological Survey (BGS) Seismic Hazard in the UK.
Ref. 15.61 Musson and Sargeant (2007). Eurocode 8 seismic hazard zoning maps for the UK.
Ref. 15.62 Civil Aviation Authority (CAA) (2013). Global Fatal Accident Review 2002 to 2011 (2013).
Ref. 15.63 Air Accidents Investigation Branch (AAIB) (2019). Annual Safety Review 2019.
Ref. 15.64 Health and Safety Executive (HSE) (n.d.). COMAH 2015 Public Information Search.
Ref. 15.65 National Grid Transmission Network maps and shapefiles
Ref. 15.66 Office for National Statistics (2021). NOMIS Local Authority profiles.
Ref. 15.67 Environment Agency (2019) Groundwater Vulnerability Maps.
Ref. 15.68 UK Statutory Instruments, 2005 No. 1541. Regulatory Reform (Fire Safety) Order 2005.
Ref. 15.69 UK Statutory Instruments, 1989 No. 635 Electricity at Work Regulations 1989

Ref. 15.70 BS EN/IEC 62305 for the installation of Lightning Protection systems
Ref. 15.71 BS7974 Application of fire safety engineering principles to the design of buildings
Ref. 15.72 National Counter Terrorism Security Office (2017) Crowded places guidance.
Ref. 15.73 Department for Transport (DfT) (2017) Aviation security in airport development.
Ref. 15.74 Civil Aviation Authority (CAA) (2015). Performance Based Regulation. Our Vision. Available at:
Ref. 15.75 European Aviation Safety Agency (2021). Easy Access Rules for Aerodromes (Regulation (EU) No 139/2014).
Ref. 15.76 Her Majesty´s Stationery Office (HSMO) (2016). The Air Navigation Order 2016.
Ref. 15.77 Civil Aviation Authority (CAA) (2019). CAP168 Licensing of Aerodromes.
Ref. 15.78 Civil Aviation Authority (CAA)(2014) ATS Safety Requirements. 3rd ed.
Ref. 15.79 Civil Aviation Authority (CAA)(2006) Safeguarding Aerodromes 2nd ed..
Ref. 15.80 Civil Aviation Authority (CAA)(2010) Guidance on the Conduct of Hazard Identification, Risk Assessment and the Production of Safety Cases, 1st ed.
Ref. 15.81 Civil Aviation Authority (CAA)(2017) Wildlife Hazard Management at Aerodrome 2nd ed.
Ref. 15.82 Civil Aviation Authority (CAA)(2015) Safety Management Systems - Guidance to Organisations. 1st ed.
Ref. 15.83 Civil Aviation Authority (CAA)(2018) Framework for an Aviation Security. 2nd ed.
Ref. 15.84 Civil Aviation Authority (CAA)(2018) Implementing a Security Management System: An Outline. 2nd ed,
Ref. 15.85 Civil Aviation Authority (CAA)(2018) Airspace Design: Guidance on the regulatory process for changing airspace design including community engagement requirements. 2nd ed,
Ref. 15.86 Civil Aviation Authority (CAA) (2021). Manual of Air Traffic Services. Ninth edition May 2021.
Ref. 15.87 Civil Aviation Authority (CAA) (2016). Manual of Air Traffic Services. Ninth edition May 2021.
Ref. 15.88 London Luton Airport (LLA) (2020). Safer Travel [online].
Ref. 15.89 European Aviation Safety Agency (EASA). Certification Specifications and Guidance Material for Aerodrome Design (CS-ADR-DSN — Issue 5) 23 June 2021. Chapter J: Obstacle Limitation Requirement.
Ref. 15.90 CAA (2021) CAP493 Manual of Air Traffic Services – Part 1..
Ref. 15.91 CAA (2016) CAP791 Procedures for changes to aerodrome infrastructure.