

CHAPTER TWENTY ONE RISK MANAGEMENT FOR MAJOR ACCIDENTS & DISASTERS

21.1 INTRODUCTION

This chapter describes the proposed development in respect of its potential vulnerability to major accidents / disasters, and its potential to give rise to the same. The assessment is carried out in compliance with the Directive on the assessment of the effects of certain public and private projects on the environment (Directive 2011/92 EU as amended by 2014/52 EU) which state Under Article 3 the need to assess: -

“the expected effects deriving from the vulnerability of the project to risks of major accidents and/or disasters that are relevant to the project concerned”.

The underlying objective of this assessment is to ensure that appropriate precautionary actions are taken for those projects which *“because of their vulnerability to major accidents and/or natural disasters, are likely to have significant adverse effects on the environment.* (EIA Directive (2014/52/EU).

The proposed development has been designed and will be constructed in line with best practice, as described in the Construction Environmental Management Plan (CEMP) submitted in support of the development proposal under separate cover.

21.2 ASSESSMENT METHODOLOGY

21.2.1 Guidance and Legislation

21.2.1.1 Legislative Requirements

The following paragraphs set out the requirements of the EIA Directive in relation to major accidents and / or disasters. Recital 15 of the EIA Directive states that: -

“In order to ensure a high level of protection of the environment, precautionary actions need to be taken for certain projects which, because of their vulnerability to major accidents, and/or natural disasters (such as flooding, sea level rise, or earthquakes) are likely to have significant adverse effects on the environment. For such projects, it is important to consider their vulnerability (exposure and resilience) to major accidents and/or disasters, the risk of those accidents and/or disasters occurring and the implications for the likelihood of significant adverse effects on the environment. In order to avoid duplications, it should be possible to use any relevant information available and obtained through risk assessments carried out pursuant to Union legislation, such as Directive 2012/18/EU of the European Parliament and the Council and Council Directive 2009/71/Euratom, or through relevant assessments carried out pursuant to national legislation provided that the requirements of this Directive are met.”

Article 3 of the EIA Directive requires that the EIAR shall identify, describe and assess in the appropriate manner, the direct and indirect significant effects on population and human health, biodiversity, land, soil, water, air and climate, material assets, cultural heritage and landscape deriving from (amongst other things) the *“vulnerability of the project to risks of major accidents and / or disasters that are relevant to the project concerned”.*

The information relevant to major accidents and/or disasters to be included in the EIAR is set out in Section 8 of

Annex IV of the EIA Directive as follows: -

“(8) A description of the expected significant adverse effects of the project on the environment deriving from the vulnerability of the project to risks of major accidents and/or disasters which are relevant to the project concerned. Relevant information available and obtained through risk assessments pursuant to 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.”

21.2.1.2 Guidance Documents

Best practice guidelines and policy have been adhered to in carrying out this assessment as described in the following sections; these include:

- *European Commission – Environmental Impact Assessment of Projects – Guidance on the preparation of the Environmental Impact Assessment Report (2017).*
- *Environmental Protection Agency (2022). Guidelines on the Information to be contained in Environmental Impact Assessment Reports.*
- *Guidance on Assessing and Costing Environmental Liabilities (EPA 2014).*
- *A Framework for Major Emergency Management Guidance Document 1-A Guide to Risk Assessment in Major Emergency Management (Dept of Housing Local Government & Heritage 2010).*
- *A National Risk Assessment for Ireland (Department of Defence 2108).*
- *A Guide to Risk Assessment in Major Emergency Management (Dept of Housing Local Government & Heritage 2010)*
- *Department of Environment, Heritage and Local Government (2010) Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities.*
- *Risk Assessment Methodology - classification of risk as per the Guide to Risk Assessment in Major Emergency Management (Department of the Environment, Heritage & Local Government, 2010).*

21.2.2 Assessment

The scope and methodology presented in the following sections are based on the provisions of the EIA Directive, the EPA Guidelines, EU Commission guidance, as well as professional judgement and best practice. A risk analysis-based methodology that covers the identification, likelihood and consequence of major accidents and / or disasters has been used for this assessment, including design risk review workshops, ongoing risk analysis and the preparation and tracking of issues recorded in the project wide risk register. (Refer to Section 21.6 Likelihood of Significant Effects for further detail on this approach.)

The assessment of the risk of major accidents and/or disasters considered all factors defined in the EIA Directive i.e. population and human health, biodiversity, land, land, soil, water, air, climate, material assets, cultural heritage and landscape.

The EIA Directive, the EPA Guidelines, EU Commission guidance, that the project characteristics should include a description of the risk of accidents having regard to substances or technologies used. They also state that the impact assessment should include the risks to human health, cultural heritage or the environment (for example due to accidents or disasters).

A number of other assessments submitted with this planning application also assess the risk of accidents and natural disasters. These include the Construction Environmental Management Plan (CEMP) and the Flood Risk Assessment (FRA). The risk registers shown in Section 21.6.1 for Construction Stage and 21.6.2 for Operational Stage are active documents and will be updated by the appointed contractor.

21.2.3 Site Specific Risk Assessment Procedure

A site-specific risk assessment identifies and quantifies risks by focusing on unplanned—but possible and plausible—events that may occur during the construction and operation of the Proposed Development. The procedure for identifying and assessing these risks is based on guidance set out by the Environmental Protection Agency (EPA) in *‘Guidelines on Information to be contained in Environmental Impact Statements’* (EPA, 2022) and the European Commission in relation to Environmental Impact Assessment of Projects (Directive 2011/92/EU, as amended by 2014/52/EU), namely *‘Guidance on the preparation of the Environmental Impact Assessment Report’*.

The Proposed Development will be designed, built and operated in line with best international current practice (refer to para 21.2.1.2 and, as such, the vulnerability of the Proposed Development to risks of major accidents and / or disasters is considered low.

Other documents submitted as part of this planning application assess potential accidents and disaster scenarios, such as pollution incidents affecting soil and watercourses, as well as flooding events. These are described in detail in the relevant EIAR chapters (*refer to Chapter 10.0: Land Soils & Geology and Chapter 11.0: Water & Hydrogeology for further information*). The Construction Environmental Management Plan (CEMP) will also play a key role in managing these risks and is informed by this assessment.

The criterion for categorising effects is derived from the DoEHLG guidance (Refer to tables 21.2, 21.2 & 21.3 below). The following steps were undertaken as part of the site-specific risk assessment:

- Risk identification.
- Risk classification, Likelihood and Consequences.
- Risk evaluation.

21.2.3.1 Risk Identification

The identification of risks has been carried out in consultation with relevant design team members. A Risk Register prepared the design team in Consultation with Limerick Twenty Thirty. during the design of the Proposed Development was also reviewed to inform the identification of risks for this assessment. Risks identification considered the vulnerability of the proposed development to the risk of major accidents and/or disasters which are relevant to it during both the Construction and Operation phases

In accordance with the European Commission Guidance risks are identified in respect of the developments:

1. Potential vulnerability to disaster risks.
2. Potential to cause accidents and / or disasters.

21.2.3.2 Classification of Likelihood

Having identified the potential risks, the likelihood of occurrence of each risk has been assessed. An analysis of safety procedures and proposed environmental controls was considered (refer to para 21.2.1.2) when estimating the likelihood of identified potential risks occurring. Table 21.1 defines the risk classifications that have been applied during this assessment.

The approach adopted has assumed a 'risk likelihood' where one or more aspects of the likelihood description are met for example, any risk to the Proposed Development less than extremely unlikely to occur has been excluded from the assessment. The likelihood rating assigned to each risk has assumed that all proposed mitigation measures and/or safety procedures are in place and have succeeded in reducing or preventing the major accident and/or disaster occurring.

Table 21.1: Risk Classification Table – Likelihood.

Ranking	Likelihood	Description
1	Extremely Unlikely	May occur only in exceptional circumstances; once every 500 or more years.
2	Very Unlikely	Is not expected to occur; and/or no recorded incidents or anecdotal evidence; and/or very few incidents in associated organizations, facilities or communities; and / or little opportunity, reason or means to occur. May occur once every 100-500 years.
3	Unlikely	May occur at some time; and /or few, infrequent, random recorded incidents or little anecdotal evidence; some incidents in associated or comparable organizations worldwide; some opportunity, reason or means to occur; May occur once per 10- 100 years.
4	Likely	Likely to or may occur; regular recorded incidents and strong anecdotal evidence and will probably occur once per 1-10 years.
5	Very Likely	Very likely to occur; high level of recorded incidents and/or strong anecdotal evidence. Will probably occur more than once a year.

21.2.3.3 Classification of Consequence

The consequence rating assigned to each risk has assumed that all proposed mitigation measures and/ or safety procedures have failed to prevent the major accident and / or disaster occurring. The consequence of the impact if the event occurs has been assigned as described in Table 21.2.

The consequence of a risk to the Proposed Development has been determined where one or more aspects of the consequence description are met, i.e. risks that have no consequence have been excluded from the assessment.

Table 21.2: Risk Classification Table – Consequence

Ranking	Consequence	Impact	Description
1	Minor	Life, Health, Welfare Environment Infrastructure Social	Small number of people affected; no fatalities and small number of minor injuries with first aid treatment. No contamination, localised effects <€0.5M. Minor localised disruption to community services or infrastructure (<6 hours).
2	Limited	Life, Health, Welfare Environment Infrastructure Social	Single fatality; limited number of people affected; a few serious injuries with hospitalisation and medical treatment required. Localised displacement of a small number of people for 6-24 hours. Personal support satisfied through local arrangements. Simple contamination, localised effects of short duration €0.5-3M. Normal community functioning with some inconvenience.
3	Serious	Life, Health, Welfare Environment Infrastructure Social	Significant number of people in affected area impacted with multiple fatalities (<5), multiple serious or extensive injuries (20), and significant hospitalisation. Large number of people were displaced for 6-24 hours or possibly beyond; up to 500 evacuated. External resources required for personal support. Simple contamination, widespread effects or extended duration. €3-10M. Community only partially functioning, some services available.
4	Very Serious	Life, Health, Welfare Environment Infrastructure Social	5 to 50 fatalities, up to 100 serious injuries, up to 2000 evacuated. Heavy contamination, localised effects or extended duration €10-25M. Community functioning poorly, minimal services available.
5	Catastrophic	Life, Health, Welfare Environment Infrastructure Social	Large numbers of people impacted with significant numbers of fatalities (>50), injuries in the hundreds, more than 2000 evacuated. Very heavy contamination, widespread effects of extended duration >€25M. Serious damage to infrastructure causing significant disruption to, or loss of, key services for prolonged period. Community unable to function without significant support.

21.2.4 Risk Evaluation

In accordance with the DoEHLG 2010 Guidelines, relevant major accidents and natural disasters (MANDs) will be subject to a risk matrix to determine the level of significance of each risk for each scenario. These have been grouped according to 3 categories: -

High Risk



Scenarios that have an evaluation score of 12 – 25, as indicated by the Red Zones in Table 21.3.

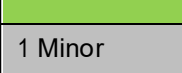
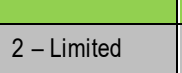
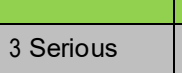
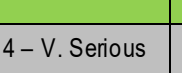
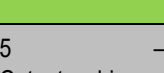
Medium Risk 

Scenarios that have an evaluation score of 8 – 11 as indicated by the Amber Zone in Table 21.3.

Low Risk 

Scenarios that have an evaluation score 1 – 7, of as indicated by the Green Zones in Table 21.3.

Table 21.3: Levels of Significance.

Likelihood	5 – V. Likely					
	4 – Likely					
	3 – Unlikely					
	2 – V. Unlikely					
	Ext. Unlikely					
		1 Minor	2 – Limited	3 Serious	4 – V. Serious	5 Catastrophic
Consequence of Impact						

Significant effects resulting from MANDs are adverse effects that are described as ‘Significant’, ‘Very Significant’ or ‘Profound’ under the EPA Guidelines (2022).. Consequently, MANDs that fall within Amber or Red Zones (Medium’ or ‘High’ Risk Scenarios) are brought forward for further consideration and assessment for further mitigation (refer to para 21.2.1.2)

21.3 RECEIVING ENVIRONMENT

The receiving environment has already been comprehensively described in Section 2.4 of Chapter 2.0. The Application Site has particular characteristics that inform the specific approach that needs to be taken to risk management. In summary these characteristics are:

- Site topography.
- The extent of demolitions.
- Flooding risk (fluvial & coastal) from the River Shannon.
- Nearby Seveso site.
- Character of area and what is around it in terms of the built environment.

Volume 2 (Section 2.2.1) identifies and describes the six different character areas defining the subject site, including the extent of built structures in each zone. The site is currently a brownfield site, mainly comprising of hardstanding and revegetating bare ground, with the Salesians school dominating the northwestern section. The levels within the site vary significantly, sloping from northwest to southeast towards O’Callaghan Strand and the River Shannon. An old quarry is located at the centre of the site, with a reservoir formed from part of the quarry

21.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

21.4.1 Plans and Procedures

A full description of the proposed development is detailed in Chapter 2.0.

In summary, the proposed development seeks, A. Demolition of a number of structures to facilitate development and B. Construction and phased delivery of (i) buildings within the site ranging in height from 3 – 7 stories (with screened plant at roof level) including (a) 232 no. residential units; (b) 270 no. student bedspaces (PBSA) with ancillary resident services at ground floor level; (c) 299sqm of commercial floorspace; and (d) a creche; (ii) extensive public realm works, riverside canopy and heritage interpretative panels (iv) 3 no. dedicated bat houses; (v) Mobility Hub with canopy; and (vi) all ancillary site development works including (a) water services, foul and surface water drainage and associated connections across the site and serving each development zone; (b) attenuation measures; (c) raising the level of North Circular Road; (d) car and bicycle parking; (e) public lighting; (f) telecommunication antennae; and (g) all landscaping works. Consent is also sought for use of the PBSA accommodation, outside of student term time, for short-term letting purposes.

21.4.2 Plans and Studies

The plans outlined in this section have been developed to effectively manage and minimise risk by ensuring that will be avoided or reduced, as far as practicable. Specific mitigation measures are also

Construction Environmental Management Plan (CEMP)

A CEMP has been prepared to demonstrate how the proposed construction works can be undertaken in a logical, sensible and safe sequence with the incorporation of specific environmental control measures relevant to construction works of this nature. The CEMP will be developed further by the appointed contractor to set out how environmental protection will be achieved during the construction phase of the development. The CEMP summarises the overall environmental management strategy that will be adopted and implemented during the construction phase of the development.

Resource Waste Management Plan

A Resource Waste Management Plan demonstrates how waste during the construction phase (including demolition works) and operational phase of the development will be managed and disposed of in a way that ensures compliance with the provisions of the Waste Management Act, 1996, as amended. The Resource Waste Management Plan (CDWMP) will be implemented the appointed contractor. Chapter 19.0 of this EIAR also addresses Waste Management and recommends mitigation measures to reduce impacts associated with waste both during construction and operational stages.

Construction Traffic Management

A Construction Traffic Management is addressed in the CEMP to demonstrate how the interface between public and construction related traffic will be managed and to control vehicular movements associated with the construction of the development. The Construction Traffic Management Plan will be developed by the appointed contractor(s) so that construction traffic will be managed and monitored safely and efficiently throughout the duration of the Construction Phase.

Surface Water Management

Surface Water Management is addressed in the CEMP and in Chapter 18.0 and 11.0 of this EIAR, summarising the procedures and technical practices for implementing effective sediment, erosion and pollution control that will

be adopted during the Construction Phase of the development. The Surface Water Management Plan will be developed by the appointed contractor.

Environmental Incident Response Plan

Environmental Incident Response is addressed in the CEMP, demonstrating how, in the unlikely event of an incident, response efforts will take place promptly, efficiently, and suitably for the particular circumstances. An Environmental Incident Response Plan will be developed by the appointed contractor in accordance with the Environmental Incident Response provided in the CEMP. The management of the risk of major accidents and / or disasters occurring will continue throughout the planning, design and construction phase and operation phase the proposed scheme. The CEMP details procedures that will and as such, risks are unlikely to be greater than those that have been assessed within this EIAR. However, activities on-site will be monitored and controlled to ensure that risk does not increase over time.

Site Specific Flood Risk Assessment

The Site-Specific Flood Risk Assessment (SSFRA) accompanying the application for approval under separate cover ensures that the proposed development is designed to take account of elsewhere addressed in Chapter 11.0 of this EIAR. It is proposed to raise the site as far as practicable and consider a series of measures to at least minimise flood risk as far as practicable. The mitigation measures to minimise the risk to life include emergency evacuation plans, and the mitigation measures to protect the buildings include building flood resistance measures. The mitigation measures proposed in the SSFRA ensure that the people using the proposed development have a suitable means of escape and that the likelihood and consequence of flooding is minimised as far as

21.5 LIKELIHOOD OF IMPACTS

As discussed above, the scope and methodology of this assessment is centred on the understanding that the proposed development would be designed, built and operated in line with best international current practice and, as such, the vulnerability of the proposed development to risks of major accidents and / or disasters is considered low.

Current EIA practice already includes an assessment of some potential accidents and disaster scenarios such as pollution incidents to ground and watercourses, as well as assessment of flooding events. These are described in detail in the relevant EIAR assessment Chapters.

The first stage of assessing the risks of a major accident or disaster on the proposed development was to carry out a screening and scoping exercise. The screening exercise was to determine whether the proposed project require further assessment for the risk of a major accident or disaster. The scoping exercise was to identify the key environmental issues and range of impacts to be assessed (refer to para 21.2.1.2). The findings of both these exercises are recorded in Appendix 21.1.

The screened in hazard classes were brought forward for further detailed assessment as shown in Table A1 in Appendix 21.1. As a result of this screening, this assessment focuses on risk event assessment is focused on risk events that have a low likelihood to occur but that have high consequence on environment, human health, infrastructure and/or cultural heritage.

The hazards are assessed based on their likelihood and impact and resulting level of significance, and scored and ranked as Low, Medium or High. The outcome of this assessment will highlight if hazards have been managed to an acceptable level, to as low as reasonably practicable (ALARP). Where hazards do not provide sufficient mitigation by embedded mitigation (mitigation by design), these hazards are taken forward and assessed in more detail, with additional “secondary mitigation” as shown Table 21-8.

21.5.1 Construction Phase

It is considered that the main risks associated with the proposed development will arise during the construction phase. The potential direct and indirect risks associated with the construction stage of the proposed development are contained in the risk register in Table 21.4.

Table 21.4 Construction Stage Risk Register

Category	Risk Factor Type	Likelihood
Weather	Extreme weather events including storms, snow affecting construction/ infrastructure.	4
Construction Accident	Construction vehicle collision with car, pedestrian/cyclist; accident when working, all site associated risks both to workers and the public.	3
Industrial Accident	Proximity to Seveso site	2
Fire / Explosion	Construction vehicle or machinery collision; ignition of fuel or other substances on site; strike to underground services	3
Structural Damage	Caused by vibrations from machinery/ works on site	3
Pollution / hazardous substance escape	Surface or ground water pollution due to accidental spillages or fuel leaks from construction vehicles. Diesel storage double skin tanks only with appropriate cut off.	3
Flooding	Majority of the site is at risk of flooding, but no reports of incidents of flooding within the site.	1

21.5.2 Operation Phase

The direct and indirect risks associated with the operation stage of the proposed development are contained in the risk register in Table 21.5.

Table 21.5 Operation Stage Risk Register

Category	Risk Factor Type	Likelihood
Weather	Risk to life due to extreme weather events including storms, snow	4
Road Accident	Collision with car, pedestrian/cyclist	3
Industrial Accident	Proximity to Seveso site	2
Fire / Explosion	Electrical faults/use of flammable/combustible materials	3
Accidents on site	Maintenance: Falls i.e. when window cleaning, maintenance of attenuation tanks	3
Crime	Robbery or assault	3
Structural failure	Building Collapse	3
Pollution of watercourses	Equipment failure or power outage leading to uncontrolled discharge from foul sewer	3
Flooding	Coastal flooding	1
Diesel Storage	Bunding and Controls including fire and explosion protection.	3

21.5.3 Seveso Site

The Limerick City and County Major Emergency Plan 2014 identifies Grasslands Agro Dock Road (Lower Tier) as a Chemicals Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2015 (COMAH) establishment in the Limerick area. The Plan states that there are site specific External Emergency Plans for the COMAH establishments which function as sub-plans to the Major Emergency Plan.

The potential risk of the proposed development on the COMAH establishments or conversely the potential risk of the COMAH establishments on the proposed development are dictated by the relative proximities between each site.

A “consultation distance” is very broadly defined under Regulation 2 of the Chemicals Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2015 as “a distance or area relating to an establishment, within which there are potentially significant consequences for human health or the environment from a major accident at the establishment. The consultation distance for some types of COMAH facility ranges from 300m for establishments where the risk is from flammable non-pressurised materials to 1 km for establishments where chemical processing involving flammable or toxic substances takes place, to 2km for establishments with bulk storage of pressurised or toxic substances, triggering an obligation on the Planning Authority to notify the HSA.”

The HSA prepared a land use planning diagram for the Grassland Fertiliser site in 2012 and identified an inner, middle and outer zone. The Applicant Site is circa 3.5 km from the site and is well outside the outer zone and therefore was not assessed for risk mitigation.

21.5.4 Assessment of Effects

Table 21-7 Assessment of Effects

Construction Phase								
No	Hazard Type	Source and / or pathway receptor linkage	Reasonable worst consequence if event did occur	Mitigation by design	Risk Evaluation		Level of Significance	Secondary mitigation required?
					Likelihood	Potential Impact		
C1	1. Transport Incident: Major public road traffic accident.	Interface of construction traffic with pedestrians and vehicles arriving at the adjacent primary school.	Death / injury to workforce and/or the public. Major delays and congestion along the road network.	The project tender documents will set out the requirement that the Construction Phase of the Proposed Development will be carried out, in accordance with all relevant health and safety guidance and legislation. The contractor shall prepare a comprehensive site-specific Construction Environmental Management Plan taking account of provisions addressed in the Outline CEMP prepared for the project. That the contractor must prepare a comprehensive site-specific Traffic Management Plans (TMP) for all elements of construction traffic movement on and in the vicinity of the Proposed Development prior to commencement of works. In particular, the TMP must take account of the pedestrian and vehicular traffic to the adjacent Primary School, and to pedestrians on the heavily used riverside walk on O'Callaghan Strand.	4 – Likely	2 – Limited	8- Medium	Yes – to achieve ALARP
C2	2. Transport Incident: Major public road traffic accident.	Proposed modifications to North Circular Road (NCR) levels.	- Severe congestion and delays caused by changes to the road network. - Major traffic accidents resulting in injury or death. - Disruption to emergency response vehicles (fire, ambulance and police)	The project tender documents will set out the requirement that for the Construction Phase of the Proposed Development that the contractor, taking account of provisions addressed in the Outline CEMP prepared for the project, must prepare a comprehensive site-specific Traffic Management Plans for all elements of construction traffic movement on and in the vicinity of the Proposed Development prior to commencement of works.	4 – Likely	2 – Limited	8 -Medium	Yes – to achieve ALARP

No	Hazard Type	Source and / or pathway receptor linkage	Reasonable worst consequence if event did occur	Mitigation by design	Risk Evaluation		Level of Significance	Secondary mitigation required?
					Likelihood	Potential Impact		
C3	3. Transport Incident: Traffic accident within the site	- Construction traffic on site passing through narrow roadway adjacent to the chimney. - Potential interface of construction traffic and PBSA occupants while other future works on the CRQ are occurring	Death / injury to member of the public.	Create a separate construction access point to the Purpose-built Student Accommodation (PBSA) off the North Circular Road (NCR), west of the Infiltration Gallery	4 – Likely	2– Limited	8-medium	Yes – to achieve ALARP
C4	Accidents when working on electrical equipment the development site.	- Decommissioning existing sub-station on the development site. - Installation of electrical equipment for buildings	Accidents when handling electrical equipment can lead to injury or death.	Implementation of measures set out in codes and standards for installation of electrical equipment: EN 61140 Protection against electric shock - Common aspects for installation and equipment. I.S. 10101:2020 National Rules for Electrical Installations EN 60364 Electrical installations for buildings. BS 7671 Requirements for electrical installations. IET Wiring Regulations	3 – Unlikely	2 – Limited	6 – Low	No – mitigation by design achieves ALARP.

No	Hazard Type	Source and / or pathway receptor linkage	Reasonable worst consequence if event did occur	Mitigation by design	Risk Evaluation		Level of Significance	Secondary mitigation required?
					Likelihood	Potential Impact		
C5	Utilities: Impact on Critical Infrastructure	Impact on underground utilities.	- Damage to Limerick City Main Drain running under O'Callaghan Strand. - Contact with damage to low voltage power lines, buried telecoms and/or fibre optic cables. - Contact with damage to mains water supplies.	- The location of the Limerick City Main Drain has been identified and will be included in the Tender Documents. - Contractor will be required to liaise with Limerick City & County Council prior to proceeding with any works in the vicinity of the Main Drain - Contractor will be required to liaise with all utility companies prior to proceeding with any works excavation works.	3 – Unlikely	2 – Limited	6 - Low	No – mitigation by design achieves ALARP.
C6	Collapse / Damage to structures	- Vibratory works in vicinity of sensitive buildings / structures, such as buildings of architectural significance. - Demolitions of existing buildings/structures is an activity with structural collapse risk.	- Risk of proposed building or structure, infrastructure collapsing, resulting in injury or death to workers and the public. - Collapse/ Damage to protected structures. - Damage to adjacent occupied buildings resulting in injury or death to the general public	- Tender documents will include the requirement for vibration monitoring to be carried out during construction works adjacent to sensitive buildings. - Compliance with design standards that include, but are not limited to, the following: - EN 1990 Eurocode - Basis of structural design - EN 1993 Eurocode 3. Design of steel structures - EN 1993-1 Design of steel structures. General rules and rules for buildings	2 – V. Unlikely	4 – V. Serious	8 – Medium	Yes - to achieve ALARP

No	Hazard Type	Source and / or pathway receptor linkage	Reasonable worst consequence if event did occur	Mitigation by design	Risk Evaluation		Level of Significance	Secondary mitigation required?
					Likelihood	Potential Impact		
C7	Ground Collapse	Deep excavations for construction may lead to fluctuations to the groundwater table resulting in settlement collapse of soil in the construction site.	• Collapse of the proposed structure during construction resulting in property damage and injury or death to workers. • Based on the limited and isolated incident of encountering possible karst features beneath the site we do not believe karst poses a risk to the construction of foundations.	• Geophysical surveys have been carried out, indicate that solution hollows have been infilled with clay. • The GSI karst dataset does not indicate any karst features within the site or surrounding area, however karstic features may be obscured due to urban development of the site and surrounding area. The previous site-specific ground investigations encountered minor evidence of cavities within the bedrock as well clay infilled fractures, which may indicate the possible presence of karstic features at the site.	2 – V. Unlikely	4 – v. Serious	8 – Medium	Yes - to achieve ALARP.
C8	Chemical exposure Release of asbestos	• Demolition of buildings which have been identified to be contaminated with asbestos.	• Exposure of workers to asbestos containing materials. • In extreme cases, an uncontrolled release of asbestos containing materials and the subsequent exposure of the material to the general public.	• A demolition & refurbishment asbestos survey has carried out by Phoenix Environmental which has identified asbestos containing materials (ACM) in buildings on the site, some of which will be subject to demolition, partial demolition or refurbishment works. • Prior to any works taking place in/on buildings identified to contain asbestos containing materials the recommendations contained in the Phoenix Environmental report will be included in the tender documents for either an enabling works package or for demolition.	3 – Unlikely	2 – Moderate	6 – Low	No – mitigation by design achieves ALARP.

No	Hazard Type	Source and / or pathway receptor linkage	Reasonable worst consequence if event did occur	Mitigation by design	Risk Evaluation		Level of Significance	Secondary mitigation required?
					Likelihood	Potential Impact		
C9	Fire / Explosion	- The Proposed Development will require the use of flammable substances such as fuel stored at construction compounds. - Electrical accidents (as discussed under C2). - Construction works requiring hot work e.g., cutting, welding, soldering.	- Death or injury to workers when handling flammable materials, carrying out hot work. - Fire/ explosion at construction site leading to damage or collapse to proposed structures and/ or nearby property affecting members of the public. - Theft of explosive/ flammable material.	The project tender documents will set out the requirement that the contractor shall prepare a comprehensive site-specific Construction Environmental Management Plan taking account of provisions addressed in the Outline CEMP prepared for the project.	3-Unlikely	3-Serious	9 Medium	Yes - to achieve ALARP.
C10	Works near or on surface groundwater	- Unknown groundwater level or regime. - An uncontrolled release of silty sediment during construction. - Excavations and below ground utilities during construction could be vulnerable to groundwater inundation and flooding. - SUDs solutions would need to be considered in terms of the overall ground conditions of the site. With shallow bedrock in a number of areas, and made ground, the viability of infiltration to ground may be questionable	- Death or injury to workers and/or the general public. - Release of large quantities of water within construction site.	Site water management at all earthworks sites will be implemented to prevent waterlogging of freshly excavated soil, prevent silty runoff from entering watercourses and drainage systems, and to alleviate rutting of haul routes.	3 – Unlikely	2 – Moderate	6 – Low	No – mitigation by design achieves ALARP.

No	Hazard Type	Source and / or pathway receptor linkage	Reasonable worst consequence if event did occur	Mitigation by design	Risk Evaluation		Level of Significance	Secondary mitigation required?
					Likelihood	Potential Impact		
C11	Extreme Weather (Flooding) Events	- Weather events leading to flooding such as heavy/ prolonged rainfall/ tidal event. - Prolonged heavy rain / flooding directly over construction sites. - Prolonged heavy rain resulting in breach of embankments in nearby waterbodies. - Extreme/ prolonged rainfall events causing sediment runoff during construction. - Extreme/ prolonged rainfall events over open or deep excavations	Extreme flood events can lead to: - Hazardous working conditions for workers. - Flooding on construction sites, specifically within high flood risk areas. - Breach of embankments on nearby waterbodies. - Damage of construction materials, collapse of temporary and permanent structures. - Sediment runoff / release of contaminants into watercourses from construction sites, specifically those within high flood risk areas.	- A Flood Risk Assessment has been completed for the Proposed Development. Refer to the Flood Risk Assessment Report (Appendix A.10). - Construction works in areas prone to flooding are to take place during dry seasons (and are avoided where possible). - The Contractor must take account of the weather forecast prior to commencing instream works and concrete pouring. - The appointed contractor will prepare a Surface Water Management Plan (SWMP) as part of the Construction Environmental Plan (CEMP) which will outline appropriate mitigation measures for the Construction Stage. An emergency response plan may be drawn up including appropriate response measures for such Extreme Weather (Flooding) situations.	3 - Unlikely	3 – Serious	9 – Medium	Yes - to achieve ALARP

No	Hazard Type	Source and / or pathway receptor linkage	Reasonable worst consequence if event did occur	Mitigation by design	Risk Evaluation		Level of Significance	Secondary mitigation required?
					Likelihood	Potential Impact		
C12	Groundwater Contamination	- Ground disturbance activities which have wells and aquifers. - Contamination of surface water - In terms of connections to the SAC, a more likely and impactful linkage would be from the reservoir to the SAC.	Contamination of public drinking water supply.	- Groundwater levels have been determined from recent ground investigation works carried out along the extents of the Proposed Development. - Further ground investigation surveys will be undertaken during detailed design stage prior to construction. - Measures will be implemented (e.g., identifying suitable areas for batching activities and storage of potential pollutants, and good housekeeping practices) to minimise the risk of spills and contamination of soils and waters. - Sediment control methods are outlined in the Surface Water Management Plan (refer to the Outline CEMP prepared for the project), and these will be implemented by the appointed contractor	3-Unlikely	3 - Serious	9 - Medium	No – mitigation by design achieves ALARP.

No	Hazard Type	Source and / or pathway receptor linkage	Reasonable worst consequence if event did occur	Mitigation by design	Risk Evaluation		Level of Significance	Secondary mitigation required?
					Likelihood	Potential Impact		
C13	Spillage or long-term seepage of pollutants into a watercourse	• Works near and over watercourses. • Accidental pollution/ long-term seepage of pollutants from construction materials into watercourses during construction. • In terms of connections to the SAC, a more likely and impactful linkage would be from the reservoir to the SAC.	• Impacting the water quality status of watercourses from accidental pollution event/ sediment runoff from construction sites into the waterbody. • Pollution event to the river and downstream sites. • Pollution to surface water which connects with groundwater, potentially affecting drinking water supply	• There are no mitigation by design measures that can completely prevent the risk of accidental spillage or long-term seepage of pollutants into a watercourse during construction. • Surface water control measures will be implemented to ensure that silt laden or contaminated surface water run-off from construction compounds does not discharge directly to surface waters.	3 – Unlikely	3 – Serious	9 – Medium	Yes – to achieve ALARP
C14	Animal and Plant Disease	Presence of invasive species at construction sites and compounds.	Spread of invasive species during construction works.	• Ecological surveys consisting of invasive species surveys, and protected species surveys has been undertaken and has identified Japanese Knotweed • An Invasive Species Management Plan (ISMP) for the control of invasive species on the Proposed Development is within the Outline CEMP prepared for the project.	3 – Unlikely	3 – Serious	9 – Medium	Yes – to achieve ALARP
C15	Human Disease	Construction workers working on construction sites for the project.	• Spread of disease amongst workers on site and in worst case, to members of the community. • Weil's disease may be contracted at any location.	• There are no mitigation measures by design to alleviate / eliminate the risk of human disease.	3 – Unlikely	2 – Moderate	6 – Low	No – No mitigation by design achieves ALARP

No	Hazard Type	Source and / or pathway receptor linkage	Reasonable worst consequence if event did occur	Mitigation by design	Risk Evaluation		Level of Significance	Secondary mitigation required?
					Likelihood	Potential Impact		
C16	Structural Failure	- Inadequate / poor design of works to existing structure(s). - Poor quality of materials used for construction. - New buildings and structures proposed as part of the development. - Historical chimney structure within the development curtilage	- Death or injury to staff and / or members of the public. - Collapsing structures.	All new structures have been designed to be fully compliant with: Eurocode I.S. EN 1990 Basis of structural design. Eurocode I.S. EN 1991-1-7 Actions on structures – Part 1-7: General actions Accidental actions (Including Irish National Annex). I.S. EN 1992-2 Design of concrete structures – EN 1990 Eurocode - Basis of structural design. EN 1993 Eurocode 3. Design of steel structures. EN 1993-1 Design of steel structures. General rules and rules for buildings. The above list is non-exhaustive.	3 – Unlikely	3 – Serious	9 – Medium	Yes – to achieve ALARP
C17	Extreme weather (Gale force winds / storms) event	Extreme weather events such as storms / gale force winds causing structural damage to temporary structures or partially constructed elements of buildings.	- Collapsing structures. - Wind blown debris or building materials falling on adjacent public streets.	The project tender documents will set out the requirement that the contractor shall prepare a comprehensive site-specific Construction Environmental Management Plan taking account of provisions addressed in the Outline CEMP prepared for the project, including procedures to address extreme weather affecting the site	3 – Unlikely	2 – Limited	6 - Low	No – mitigation by design achieves ALARP.
C18	Power failure on the local ESB Networks grid.	- Extreme weather events. - Mishandling of electrical equipment.	Power failure may lead to: - Power outage within the construction site. - De watering pump failure. - Blackouts.	The project tender documents will set out the requirement that the contractor shall prepare a comprehensive site-specific Construction Environmental Management Plan taking account of provisions addressed in the Outline CEMP prepared for the project, including back-up generation for essential site equipment.	3 – Unlikely	2 – Limited	6 - Low	No – mitigation by design achieves ALARP.

No	Hazard Type	Source and / or pathway receptor linkage	Reasonable worst consequence if event did occur	Mitigation by design	Risk Evaluation		Level of Significance	Secondary mitigation required?
					Likelihood	Potential Impact		
C19	Safety Protection for members of the public in the vicinity of the works.	Pedestrian traffic on the adjacent heavily used riverside walk	Risk of injury or death to the members of the public	The project tender documents will set out the requirement that the contractor shall prepare a comprehensive site-specific Construction Environmental Management Plan taking account of provisions addressed in the Outline CEMP prepared for the project, including site safety signage and security fencing.	3 – Unlikely	3 – Serious	9– Medium	No – mitigation by design achieves ALARP.

Operational Phase								
No	Hazard Type	Source and / or pathway receptor linkage	Reasonable worst consequence if event did occur	Mitigation by design	Risk Evaluation		Level of Significance	Secondary mitigation required?
					Likelihood	Potential Impact		
O1	Extreme weather (flood) events	Extreme flooding causing breach of embankments of watercourses. Surcharge of storm infrastructure including storm drains and gullies.	Localised flood on road network and possible inundation of car park areas.	- New infrastructure has been designed take account of climate change. - Drainage design includes allowance for climate change. - A Flood Risk Assessment (Stage 2) has been completed for the Project. Refer to the Flood Risk Assessment Report prepared by ARUP.	2 – V. Unlikely	3 – Serious	6 – Low	Yes - to achieve ALARP.
O2	Lightning strikes	The Proposed Development does have the potential to cause such an event due to the heights relative Flaxmill Building and the Chimney	In event of lightning strikes, there is a risk of: - Fire in the Flaxmill - Collapse or partial collapse of the chimney	- The design will be based on the methods contained in IEC 62305 'Protection Against Lightning, Part 2, Risk Management'. - In relation to buildings, measures included in BS EN 62305 - Protection against lightning and BS 7430 Code of practice for protective earthing of electrical installations will be complied with.	2 – V. Unlikely	3 – Serious	6 - Low	No – mitigation by design achieves ALARP.

21.5.5 Assessment of Major Accidents and Disasters with Secondary Mitigation Measures in Place

Table 21-8

No	Hazard Type	Receptors	Secondary mitigation	Post Mitigation Likelihood	Post Mitigation Potential Impact	Level of Significance (Residual Effect)
Construction Phase						
CM1	Major Road Traffic Accident	- Human Health - Biodiversity - Hydrology - Population - Material Assets Non-Agricultural.	- The project tender documents will set out the requirement for the Construction Phase of the Proposed Development that the contractor, taking account of provisions addressed in the outline CEMP in this EIAR, must prepare a comprehensive site-specific Traffic Management Plans for all elements of construction traffic movement on and in the vicinity of the Proposed Development prior to commencement of works. - A Mobility Management Plan has been included within the Traffic and Transport Assessment and will be further developed as part of the CTMP and will address all modes of transport and travel required to deliver the project during the Construction Phase. This will include details regarding construction workers travelling to site, car-parking, haulage routes and construction compounds to reduce potential effects (incl. traffic accidents) caused due to construction traffic and residential neighbourhoods. - All accesses to the worksite and the compounds will be signposted, and anyone outside the work will be prohibited, installing the necessary perimeter fences and the necessary warning signs. - The necessary traffic signs will be placed outside the work to warn pedestrian and vehicle traffic of the risks involved in the work. Similarly, the necessary protections and notices will be placed, in specific cases in which the circulation through the annexed streets is affected. - All HGV drivers will be provided with appropriate safety awareness training.	3 – Unlikely	2– Limited	6- Low
CM2	Collapse / Damage to structures	- Human Health - Material Assets Non-Agricultural - Architectural Heritage	- Monitoring of existing historic / sensitive structures during construction to ensure their stability and durability. - Where appropriate, sensitive structures at risk from construction works will be protected by specifically designed physical interventions appropriate to the level of protection required. - The contractor shall prepare a comprehensive site-specific Construction Environmental Management Plan taking account of provisions addressed in the Outline CEMP prepared for the project. The CEMP shall include an Incident Response Plan (IRP) that will be further developed and implemented during construction so as to manage the risk of collapse / damage to structures. - Mitigation measures in relation to vibration identified in EIAR Chapter 14 (Noise & Vibration) will be adhered to.	2 – V. Unlikely	3 – Serious	6 – Low

No	Hazard Type	Receptors	Secondary mitigation	Post Mitigation Likelihood	Post Mitigation Potential Impact	Level of Significance (Residual Effect)
CM3	Ground Collapse	- Human Health - Material Assets Non-Agricultural	The contractor shall prepare a comprehensive site-specific Construction Environmental Management Plan taking account of provisions addressed in the Outline CEMP prepared for the project. The CEMP shall include an Incident Response Plan (IRP) that will be further developed and implemented during construction so as to manage the risk of collapse / damage to structures.	2 – V. Unlikely	4 – V. Serious	8 – Medium
CM4	Fire / explosion	- Human Health - Population - Material Assets Non-Agricultural - Architectural Heritage	- The risk is managed through the CEMP and IRP. - Hot Work Permit procedure will be followed. - All construction compounds and construction sites will have 24/7 security. - Discharge of the fire water runoff will be prevented from entering the Lower River Shannon SAC through the surface water drainage network by operation of a shut-off valve on the discharge pipe at the exit from the reservoir. An Emergency Water Management Plan will be prepared and implemented during the operational phase.	3 – Unlikely	3 – Serious	9 – Medium
CM5	Extreme Weather (Flooding) Events	- Biodiversity, - Material assets agricultural - Material Assets Non-Agricultural - Population - Human Health - Water - Hydrogeology	- As is best with infrastructure projects, a CEMP - Monitoring of weather forecasts to ensure that necessary actions will be implemented at construction sites prior to prolonged / extreme weather events. - An emergency response plan will be drawn up including response measures for such Extreme Weather (Flooding) situations.	3 – Unlikely	2 – Moderate	6 – Low

CM6	Spillage or long-term seepage of pollutants into a watercourse	- Population - Human Health - Water - Hydrogeology	As is normal practice with infrastructure projects, a CEMP has been prepared for the Proposed Development. This will be further developed prior to construction will include procedures to be undertaken in the event of spillage of chemical, fuel or other hazardous waste, non-compliance with any permit or license, or other such risks that could lead to a pollution incident, including flood risks. The CEMP will be fully implemented during the Construction Phase.	3 – Unlikely	2– Moderate	6 - Low
		Biodiversity	An Incident Response Plan is included as part of the CEMP detailing the procedures to be undertaken in the event of spillage of chemical, fuel or other hazardous waste, non-compliance with any permit or license, or other such risks that could lead to a pollution incident, including flood risks. - The Environmental Manager will prepare Method Statements for construction works as detailed in the CEMP to be undertaken on, over or near water in consultation with Inland Fisheries Ireland (IFI) and other relevant authorities as necessary. - Mitigation measures identified in Chapter 85 (Biodiversity), Chapter 10 (Water & Hydrogeology) of this EIAR will be fully implemented. - During construction account will the following guidance documents for construction work on, over or near water: - Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites. - CIRIA C532 Control of Water Pollution from Construction Sites Guidance for Consultants and Contractors. - CIRIA C648 Control of Water Pollution from Construction Sites.			
CM7	Human Disease	Human Health. Population	The contractor will provide site operatives with appropriate first aid material. All site operatives will be advised to wear steel toe cap boots with trousers to be tucked inside along with appropriate PPE such as gloves and headwear. All site operatives should be advised of the importance of washing hands before eating to avoid the risk of contracting Weil's disease and other water borne diseases.	2 – V. Unlikely	3 - Serious	6 - Low
CM8	Structural Failure: Historical Structure	- Human health - Material Assets Non-Agricultural	- Structural inspection of the upper levels of the chimney in advance of construction - Updates on condition will be sought every 3-5 years	2 – V. Unlikely	3 – Serious	6 - Low

Operational Phase						
No	Hazard Type	Receptors	Secondary mitigation	Post Mitigation Likelihood	Post Mitigation Potential Impact	Level of Significance (Residual Effect)
OM1	Building Failure / Fire	- Human Health. - Population	- Fire Safety Strategies outlining measures to be implemented in the event of a fire in all buildings on the CRQ. - Discharge of the fire water runoff will be prevented from entering the Lower River Shannon SAC through the surface water drainage network by operation of a shut-off valve on the discharge pipe at the exit from the reservoir. An Emergency Water Management Plan will be prepared and implemented during the operational phase.	2 – V. Unlikely	3 – Serious	6 - Low
OM2	Extreme weather (flood) events	- Biodiversity - Material assets agricultural - Material Assets Non-Agricultural - Population - Human Health - Water - Hydrogeology	- Ongoing consultation and cooperation with local authorities and the Office of Public Works (OPW). - Inspections and maintenance (as applicable) of the drainage system and the compensatory storage areas.	2 – V. Unlikely	3 - Serious	6 - Low
OM3	Increased traffic	- Biodiversity - Material assets agricultural - Material Assets Non-Agricultural - Population - Human Health - Water - Hydrogeology	- Ongoing consultation and cooperation with local authorities and the Office of Public Works (OPW). - Inspections and maintenance (as applicable) of the drainage system and the compensatory storage areas.	2 – V. Unlikely	3 - Serious	6 - Low

The results from the evaluation have been applied to Table 21.9

From examining the risks presented in Table 21-7 & 21-8 Risk IDs C4, C5, C8, C17, C18, CM1, CM5, CM6, C10, C15, O2, CM2, CM7, O1, OM1, OM2 and OM3 are considered as being below the threshold of significance set for the purposes of this assessment (Green Zone or 'Low' risk event).

No risks have been assessed to fall within the Red Zone ('High' risk scenario).

Risk ID C1, C2, C3, C9, C11, C12, C13, C14, C19, CM4, C16, C6, C7 and CM3 fall within the Amber Zone ('Medium' risk event) and were therefore brought forward for further consideration and assessment of risk once secondary mitigation measures are applied in table 21-8. These thirteen Risk IDs fall within the Construction Phase.

No Operational Phase risks fell within the Amber Zone and are therefore not considered further.

21.5.6 Do-Nothing Impact

In the event that the proposed development does not proceed, the site would remain in its current undeveloped, brownfield state. In absence of an increased number of people residing, working or visiting the site, there would be no increase in the risk of major accidents occurring due to human interaction, should a disaster take place.

However, there will be ongoing deterioration of the existing buildings and structures on the site which will require monitoring and appropriate remedial works to make safe where it is considered to pose a health and safety risk to persons entering the site.

21.6 CUMULATIVE DEVELOPMENT & IMPACTS

21.6.1 Masterplan

Appendix 1.1 of the EIAR provides a list of all permitted, but as yet unconstructed, developments within 1km of the site. The vast majority of the developments are of a small to very small scale and pose no major risk major accident/disaster. The Gas Works development by Land Development Agency for residential 285 residential units on the Dock Road (Planning Ref: 2560780) is a significant development and which lies on one of the key routes from the N18 to the application site. At times, there will be a combination of construction traffic serving both sites, however it is not considered that this increased volume will pose a risk of major accident / disaster.

As outlined in Sections 21.6.4 and 21.6.5 above, no likely risks of a major accident / disaster occurring are identified during construction stage. A medium risk of major accident / disaster in respect of the proposed development during the construction phase. No cumulative effects are identified.

As outlined in Sections 21.6.4 and 21.6.5 above, no likely risks of a major accident / disaster occurring are identified during operation stage. A low risk of major accident / disaster in respect of the proposed development during the operational phase. No cumulative effects are identified.

21.7 REMEDIAL & MITIGATION MEASURES

21.7.1 Incorporated Design Mitigation

The design of the proposed development has evolved through comprehensive design iteration, with particular emphasis on avoiding or reducing the potential for environmental impacts, where practicable, whilst ensuring the objectives of the overall development are attained. The design of the proposed development has been developed in compliance with best practice design standards which include provisions to reduce the likelihood of risk events occurring (e.g. structures have been designed to avoid the risk of collapse, drainage systems have been designed to cater for increased rainfall events etc.).

Regulation 15 of the Safety, Health and Welfare at Work (Construction) Regulations place a duty on designers carrying out work related to the design of a project to take account of the 'General Principles of Prevention' as listed in Schedule 3 of the Safety, Health and Welfare at Work Act 2005. In addition to the duties imposed by Regulation 15 of the Safety, Health and Welfare at Work (Construction) Regulations, designers must comply with Section 17(2) of the Safety, Health and Welfare at Work Act which requires persons who design a project for construction work to ensure, so far as is reasonably practicable, that the project is designed and is capable of being constructed to be safe and without risk to health, can be maintained safely and without risk to health during use, and complies in all respects, as appropriate, with other relevant legislation.

21.7.2 Construction Phase Mitigation

The mitigation measures relevant to each environmental factor outlined in Chapters 6.0 to 20.0 of the EIAR, as well as the CEMP, will be implemented during the Construction Phase of the development and will collectively mitigate the risk of major accidents and disasters during this time. A structural condition assessment of the historical chimney shall be undertaken prior to commencement of development, in line with best practice.

The Construction Phase of the Proposed Development will be carried out in accordance with best practice site management measures relating to health and safety and emergency response. These measures are described in the CEMP.

21.7.3 Operational Phase Mitigation

As already outlined, no likely risks of a major accident / disaster occurring have been identified during operation stage.

21.8 RESIDUAL IMPACTS

The risk of a major accident and / or disaster during the construction phase of the proposed development is generally considered low. Where the residual risk for a small number of activities is considered medium the controls set out in the CEMP and IRP are considered adequate to mitigate the risk. The risk of a major accident and / or disaster during the operational phase of the proposed development is considered low. As such, major accidents and / or disasters resulting from the proposed development would be very unlikely.

21.9 MONITORING

Appropriate assessment of the chimney and quarry during construction and developmental phases are proposed to reduce the risk of major accident and / or disaster.

21.10 REFERENCES

Limerick Development Plan 2022 - 2028

Limerick City & County Council Major Emergency Plan 2014

Policy & Approach of the Health & Safety Authority to COMAH Risk – based Land-Use Planning, HSA 2010

A Framework for Major Emergency Management. Guidance Document 10, DECLG 2015

A Framework for Major Emergency Management. A Guide to Risk Assessment in Major Emergency Management, DEHLG 2010

Guidance on Assessing and Costing Environmental Liabilities, EPA 2014

A National Risk Assessment for Ireland, Government of Ireland 2020

EPA Guidance on Retention, Requirements for Firewater Run-off, 2019