

Chapter 14

Risk Management

14.0 RISK MANAGEMENT

14.1 INTRODUCTION

Article 3 of the EIA Directive, as amended, requires that the EIA 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 chapter identifies and assesses the likelihood and potential significant adverse impacts on the environment arising from the vulnerability of the proposed development to risks of major accidents and / or natural disasters. It considers whether the proposed development is likely to cause accidents and / or disasters and its vulnerability to them. This chapter of the EIAR was prepared by the project team with input from Niall Harrington, Managing Director of Linesight Safety Management. Niall is a Chartered Safety Practitioner with the Institute of Occupational safety and health (IOSH). Linesight are acting as Project Supervisor (Design Process)(PSDP) for this project. Niall has been involved in design and construction safety management for over 24 years, firstly as a senior construction safety manager for large scale construction projects and, for the previous 25 years with Linesight Safety Management providing services as Project Supervisor (Design Process) and related safety management services. Niall is a Chartered Safety Practitioner with the Institute of Occupational Safety & Health (IOSH) since 2005. Niall has acted as PSDP and Design safety Co-ordinator for large construction projects in the last 25 years both in Ireland and on projects across EMEA. Niall is qualified as a Temporary Work Co-ordinator, Appointed Person (AP) for crane lifting operations and possesses training accreditation in electrical safety (NFPA 70E). Niall leads the PSDP project safety team within the Linesight Group since 1996. The PSDP Team within Linesight include highly experienced safety practitioners and are supported within Linesight by the wide range of diverse and experienced support services within the overall Linesight Group

The purpose of the chapter is to ensure that the safety and precautionary measures necessary to protect the proposed development in the event of a major accident and / or natural disaster are identified and that appropriate mitigation measures are provided that would protect the environment in the event of such occurrences.

This chapter will identify the types of major accidents / natural disasters that the project is vulnerable to; whether major accidents or natural disasters and the responses to these give rise to significant adverse environmental impacts; the nature of these impacts and the measures needed to prevent or mitigate the likely adverse impact of such events on the environment.

14.2 STUDY METHODOLOGY

The starting point for the scope and methodology of this assessment is that the proposed development has been designed and will be constructed in line with best practice and, as such, major accidents and / or natural disasters will be very unlikely. The identification, control, and management of risk is an integral part of the design and assessment process throughout all stages of a project lifecycle. A Site Specific Flood Risk Assessment and Engineering Services Report Infrastructure have been prepared by DBFL. Measures to control risks associated with Construction Phase activities are incorporated into the DBFL's *Construction Environmental Management Plan*. A number of design safety reviews and risk analysis have also been completed in line with the provisions of the Safety Health at Work (Construction) Safety Regulations 2013 and supporting legislative requirements. The purpose of this review was to identify and highlight key safety

issues for further review during detailed design and construction. Issues identified have been incorporated into a design risk register and collectively reviewed by the design team as well as noted within individual design risk assessment information (as issued by each designer).

The following sections set out the requirements as stated in the EIA Directive, as amended, and in the EPA draft Guidelines on the information to be contained in an Environmental Impact Assessment Report (EIAR). The scope and methodology presented is based on the EIA Directive, as amended, the draft EPA guidelines, on other published risk assessment and on professional judgement of the consultants with this responsibility in the construction and operation of the proposed development. A risk analysis-based approach methodology which covers the identification, likelihood and consequence of major accidents and / or natural disasters has been used for the assessment. This type of risk assessment approach is an accepted methodology.

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 Council¹ and Council Directive 2009/71/Euratom², or through relevant assessments carried out pursuant to national legislation provided that the requirements of this Directive are met.

The intent of the directive is that a major accident and/or natural disaster assessment should be mainly applied to COMAH (Control of Major Accident Hazards involving Dangerous Substances) sites or nuclear installations. The proposed development in this instance is an urban regeneration project which when completed, will not give rise to ongoing significant risks in its operating environment.

The 2017 EPA Draft Guidelines on the information to be contained in an EIAR refer to major accidents and/or disasters in a number of sections:

Characteristics of the Project – the draft guidelines state that the project characteristics should “a description of the Risk of Accidents – having regard to substances or technologies used.”

Impact assessment - the draft guidelines state that the impact assessment should include “the risks to human health, cultural heritage or the environment (for example due to accidents or disasters)”.

Likelihood of Impacts - the draft guidelines state the following:

“To address unforeseen or unplanned effects the Directive further requires that the EIAR takes account of the vulnerability of the project to risk of major accidents and / or disasters relevant to the project concerned and that the EIAR therefore explicitly addresses this issue. The extent to which the effects of major accidents and / or disasters are examined in the EIAR should be guided by an assessment of the likelihood of their occurrence (risk). This

may be supported by general risk assessment methods or by systematic risk assessments required under other regulations e.g. a COMAH assessment.”

There are a number of mechanisms which manage the risk of accidents including the Construction Environmental Management Plan, which deals with pollution risks during construction (See Chapters 7 and 9 on Land and Soils, Air and Water) and risk of accidents during construction, including traffic accidents. The risk of flooding is dealt with in Chapter 8; Water. There is no risk of flooding. Separately, the risk of fire is managed through the Fire Safety Certification process, which is an integral part of the design of the proposed development.

14.3 SITE SPECIFIC RISK ASSESSMENT METHODOLOGY

This section identifies the potential of unplanned but potential events that could occur during construction and operation of the proposed development.

Risks are set out according to the classification of risk, taken from the Guide to Risk Assessment in Major Emergency Management (Department of the Environment, Heritage & Local Government, 2010).

Figure 14.1 Classification of Likelihood Extract (Department of the Environment, Heritage & Local Government, 2010).

Table 2 - Classification of Likelihood

Ranking	Classification	Likelihood
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 organisations, facilities or communicates; 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 organisations 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.

Hazard identification

As set out in the Flood Risk Assessment prepared by DBFL, the site is not in an area prone to natural disasters. Risks were reviewed through the identification of plausible risks in consultation with relevant specialists. Therefore, the risks set out below are considered the most relevant potential risks.

Table 14.1: Identification of Risks

Category	Risk Factor Type	Likelihood
Weather	Storms, snow	5
Hydrological	Risk from flooding	1
Geological	Made ground	3
Road	Traffic accident	3
Industrial accident	Seveso site	3
Explosion	Natural gas	1
Fire	Construction and operation	3
Building Collapse	Structural failure	2
Hazardous substance escape	Construction	3
Pollution	Construction	3

The risks are then tested in terms of consequences. It should be noted that when categorising the Consequence Rating, the rating assigned assumes that all proposed mitigation measures and safety procedures have failed to prevent the major accident and/or disaster. In addition, Fingal County Council have in place a 'Major Emergency Plan' which, if implemented as intended, will work to reduce the effect of any major accident or disaster.

The impact ratings are taken from the Guide to Risk Assessment in Major Emergency Management (Department of the Environment, Heritage & Local Government, 2010).

A risk matrix can be prepared against which the proposed development can be tested.

Figure 14.2 Risk Matrix Extract (Department of the Environment, Heritage & Local Government, 2010).

Likelihood Rating	Very likely	5					
	Likely	4					
	Unlikely	3					
	Very unlikely	2					
	Extremely Unlikely	1					
			Minor	Limited	Serious	Very Serious	Catastrophic
			1	2	3	4	5
			Consequence Rating				

14.4 THE PROJECT

14.4.1 LIKELY SIGNIFICANT EFFECTS

14.4.1.1 Do Nothing Scenario

In the do-nothing scenario, the potential risk of this scenario would be low due to the nature of the site and its former use as agriculture the site.

14.4.1.2 Construction Phase

The proposed development will involve the excavation of a basement, scaffolding and traffic management. The design and specification of materials has been reviewed with regard to their likely use based on experience from previous construction projects during the initial design phase so as to minimise potential impact during construction. Where required technical data information will be procured and assessed with reference in the developed Preliminary Safety Plan (which will be prepared at a later stage and does not form part of this application) for the project (Hazardous materials are a recognised 'Particular Risk' under safety legislation and as such is addressed in detail in design risk assessment information). A site layout drawing will be prepared by the lead designer indicating site access routes, indicative site compound, existing services and locations of material storage.

In the event of storms or snow, construction activity will be suspended and the site secured. The construction activity will involve a number of potential risks as set out in the construction management plan. The risks identified include, flood risk, movement of site vehicles and contractors with regard to traffic management, design and construction of temporary support works to ensure the stability of partially erected structures, working at height, and fire strategy. In addition, a fire safety management plan and risk assessment will be prepared by the main contractor and reviewed by the PSDP as part of the overall construction safety plan. This will reduce hot works on site and management remaining fire safety issues through a formal permit to work system. The safety plan will also highlight emergency preparedness and planning throughout the construction phase.

Hazardous materials used during construction will be appropriately stored so as not to give rise to a risk of pollution.

In the event of storms or snow, construction activity can be halted, and the site secured. The construction activity will involve a number of potential risks as set out in the Construction and Environmental Management Plan. The risks identified include traffic management, working at height, and fire strategy.

14.4.2 OPERATION PHASE

The proposed development comprises 345 no. residential units comprising of 84 no. 1-bed units, 104 no. 2-bed units (68 no. 2-bed apartments and 36 no. 2-bed duplexes), 157 no. 3-bed units (118 no. 3-bed duplexes and 39 no. 3 - bed houses) ranging in height from 2 no. – 4 no. storeys.

The proposed development is set out in 8 blocks which comprise the following:

- Block A1 comprises 39 No. units at 4 storeys in height (Comprising a mix of 26 No. apartments & 13 No. Duplexes)

- Block A2 comprises 33 No. units at 4 storeys in height (Comprising a mix of 22 No. apartments & 11 No. Duplexes)
- Block B1 comprises 16 No. units at 3 storeys in height (Comprising all 3 bed Duplexes)
- Block B2 comprises 16 No. units at 3 storeys in height (Comprising all 3 bed Duplexes)
- Block C comprises 42 No. units at 2-3 storeys in height (Comprising 15 No. apartments & 27 No. Duplexes)
- Block D comprises 32 No. units at 2-3 storeys in height (Comprising 12 No. apartments and 20 No. houses)
- Block E comprises 62 No. units at 2-3 storeys in height (Comprising 38 No. apartments & 24 No. Duplexes)
- Block F comprises 66 No. units at 2-3 storeys in height (Comprising 39 No. apartments & 27 No. Duplexes)
- Block G comprises 25 No units at 2-3 storeys in height. (Comprising 20 No. Duplexes and 5 No. houses)
- Block H comprises 14 No units at 2-3 storeys in height. (Comprising 14 No. houses)
- Public Open Space of c.16,670 sqm (25% of net developable area) is proposed including the parkland and main public square, in addition to the linear park of c.2,427 sqm;
- c.2,272 sqm communal open space is proposed to serve the apartments;
- 414 car parking spaces in total are proposed including 40 visitor spaces, 3 for creche set down and 2 for creche staff parking within undercroft and at surface level.
- 802 No. bicycle parking spaces comprising including 128 No. visitor spaces and 10 No. to serve the creche;
- Childcare and community facility of c.377 sqm. located in Block C;
- Upgrades to the Golf Links Road including new pedestrian and cycle infrastructure with frontage on Golf Links Road;
- Vehicular access off the Golf Links Road is to be provided to the south east of the subject site;
- In addition the proposal will provide a new internal link road. This internal link road will connect to the adjacent lands to the north, for which a separate planning application has been made to Fingal County Council under Reg. Ref. F21A/0287 (ABP Reg. Ref. 312189-21);

The proposed apartments include the provision of private open space in the form of balconies to elevations of the proposed buildings. The development also includes vehicular, pedestrian, and cycle accesses, bicycle stores, lighting, landscaping, amenity spaces, drop off areas, boundary treatments, refuse facilities, services, utilities, substations, internal roads, footpaths and shared surfaces and all associated ancillary and site development works.

The main risk identified during operation is the risk of fire, and the potential impact of the SEVESO sites nearby. the potential impact of accidents. A schedule of Residual Risks will be prepared by designers appointed to the project and reviewed by Linesight as PSDP. This will set out risk associated with the management and maintenance of the completed buildings and how these can be safely mitigated with reference to the Safety File (operations and maintenance information) for the project

With regard to fire, the proposed uses are considered normal hazard fire risks as would be encountered in most developments and do not include any hazards which would be regarded as presenting an exceptional environmental fire hazard.

The fire risk mitigation for the project will comprise all fire safety measures necessary to comply with the requirements of Part B (Fire) of the Second Schedule to the Building Regulations 1997, as amended. It is

noted that these measures will be validated under the Building Control Act 1990 to 2020 through the obtaining, in due course, of statutory Fire Safety Certificates under Part III of the Building Control Regulations 1997 as amended from Fingal County Council/Dublin Fire Brigade.

The risk of the SEVESO sites in the vicinity have also been assessed as part of this application. As evident from Fingal Development Plan Zoning maps and information available on HSA¹, the proposed development is located outside of any zone of influence from the SEVESO sites. The nearest site is located at Watery Lane, Swords, Co. Dublin which is 13.5 km to the south west.

The Fingal Development Plan lists Seveso sites in the County:

Establishment	Tier	Consultation Distance
Barclay Chemicals Manufacturing Ltd, T/A Barclay Corp Protection, Damastown Industrial Park, Mulhuddart, Dublin 15	Upper Tier	1,000m
Chemco (Ire) Ltd. T/A Macetown North, Damastown Industrial Estate, Mulhuddart, Dublin 15	Upper Tier	700m
Contract & General Warehousing Ltd. Westpoint Business Park, Navan Rd, Mulhuddart	Upper Tier	700m
Mallinckrodt Medical Imaging-Ireland T/A Convidien Damastown, Mulhuddart	Upper Tier	1,000m
Astellas Ireland Co., Ltd., Damastown, Mulhuddart	Lower Tier	1,000m
Clarochem Ireland Ltd., (formally Helsinn), Damastown, Mulhuddart	Lower Tier	1,000m
Gensys Power Ltd., T/A Huntstown Power Station, Huntstown Quarry, Finglas, D11	Lower Tier	300m
Swords Laboratories, Watery Lane, Swords	Lower Tier	1,000

(Source HSA June 2016)

Figure 14.1: Extract from Table 12.3 of the Fingal Development Plan (Source: FCC, 2017).

The cleaning of windows in the buildings will be undertaken by specialist contractor. Window cleaning infrastructure has been designed into the scheme.

A risk arises from the provision of communal roof gardens. There is the potential for falls. The parapet height has been designed to ensure that all users of this space are safely secured. Signage will be provided to warn residents and their visitors.

14.5 PREDICTED IMPACTS - RISK OF MAJOR ACCIDENTS AND/OR DISASTERS

A Risk Register has been developed which contains the main risks identified with the construction and operation of the Proposed Project. These have been identified as follows:

¹

https://www.hsa.ie/eng/Your_Industry/Chemicals/Legislation_Enforcement/COMAH/List_of_Establishments/

Table 14.2 Risk Impacts

Risk No.	Risk Event	Possible Cause
1	Accidents during construction	<ul style="list-style-type: none"> - Traffic accident - Working at height - Risk of fire - Groundwater pollution
2	Fire following occupation	<ul style="list-style-type: none"> - Inappropriate use of electrical devices / cooking etc.
3	Falls	<ul style="list-style-type: none"> - Falling from communal gardens - Window cleaning
4	SEVESO Sites	<ul style="list-style-type: none"> - Major Accident Hazard

14.6 RISK ANALYSIS

Following identification of risks, the next stage is to analyse how likely this is to occur and the consequences, should the risk arise. This will provide a risk score, i.e. the consequences versus the likelihood of the event taking place.

Table 14.3: Risk Analysis

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score
1a	Accidents during construction	Movement of vehicles	Injury or loss of life	3	Construction accident statistics A traffic management plan and risk assessment will be prepared for the project identifying and addressing the movement of site vehicles along shared access routes Compliance will be required under the code of practice for overhead electrical lines	3	Could result in loss of life	9
1b		Manual handling	Injury or loss of life	3	Construction accident statistics	3	Could result in loss of life	9
1c		Slips or falls	Injury or loss of life	3	Construction accident statistics	3	Could result in loss of life	9
1d		Ground water pollution	Impact on aquatic life, illness	1	Lack of direct pathways, controls of run-off during construction	3	Could result in environmental pollution	3
2	Fire following occupation	Electrical equipment / cooking	Injury or loss of life	1	Causes of fire statistics Specification of materials will be reviewed during design and in submittals from the contractor with the objective of ensuring compliance with current standards and minimising fire load	3	Could result in loss of life	3
3	Falls	Loss of balance	Injury or loss of life	1	CSO statistics How the buildings can be used, maintained safely is addressed during the design phase and communicated in the Safety File	3	Could result in loss of life	3
4	SEVESO Sites	Major Accident	Injury or loss of life	1	Fingal Development Plan, HSA Statistics.	2	Could result in loss of life	2

5	Flood Risk Assessment	Major Accident	Impact on aquatic life, illness	1	The risk of flooding has been assessed By SFRA prepared by DBFL and communicated within the Safety File for the completed works	2	Could result in environmental pollution	2
	Impact with existing Services	Future works, operation and / or construction	Fire, explosion	Very unlikely	Information on existing services and new services installed and connected for the project works will be included in the Safety File. These will include 'as-built' drawings indicating the locations and routes as well as physical identification and signage of all services to enable safety procedures to be adopted for any works	Serious	Fire, disruption	
	Contamination	Encountering contamination and/or existing hazardous materials during excavation works	Contact with hazardous materials and/ or pollution	Very Unlikely	Full site investigation surveys and reports completed during the design phase of the project. reports are updated as required during construction with all information included in the safety file	Limited		

14.7 RISK EVALUATION

Taking the above table, and applying it below, the red zone represents ‘high risk’ scenarios’, the amber zone represents ‘medium risk scenarios’ and the green zone represents ‘low risk scenarios.’

Table 14.4 : Risk Evaluation

Likelihood Rating	Very Likely	5					
	Likely	4					
	Unlikely	3			1a – 9, 1b – 9 1c – 9, 1d – 3, 5 – 2		
	Very Unlikely	2				3 - 3	
	Extremely Unlikely	1		4-2		2 - 3	
			Minor	Limited	Serious	Very Serious	Catastrophic
			1	2	3	4	5
Consequence Rating							

14.8 MAIN RISKS

The main risks arise during the construction period. Consequences may be limited but severe for the individuals concerned. Geographical widespread environmental consequences are not anticipated, however due to the location of the site, the potential risk from a SEVESO site is unlikely given there are none in close proximity.

14.9 MITIGATION MEASURES

The Construction Management Plan as well as good housekeeping practices will limit the risk of accidents during construction.

14.10 INTERACTIONS

There are interactions with Population and Human Health, Land and Soils, Water, Noise, Climate and Air, Material Assets, Traffic and Transport. However, subject to implementation of mitigation measures, good working practices and codes, the interactions between these areas have been sufficiently considered in relation to risk management.

14.11 CONCLUSION

Through the implementation of mitigation measures, there are no identified incidents or examples of major accidents and or natural disasters that present a sufficient combination of risk and consequence that would lead to residual significant effects. Subject to implementation of mitigation measures, good working practices and codes, the interactions between these areas have been sufficiently considered in relation to risk management.

14.12 References:

- DD *A National Risk Assessment for Ireland* 2017
- DHPLG: *Causes of Fire Attended by Brigades* 2015
- DHPLG: *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment* 2018
- DOELG: *A Framework For Major Emergency Management Guidance Document 1: A Guide To Risk Assessment In Major Emergency Management* 2010
- Department of the Taoiseach *National Risk Assessment Overview of Strategic Risks* 2017
- EPA: *Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* 2017
- EPA: *Guidance on Assessing and Costing Environmental Liabilities* 2014
- European Commission *Guidance Environmental Impact Assessment of Projects Guidance on the preparation of the Environmental Impact Assessment Report* (2017)
- Irish Water Safety: *Analysis of Drowning* 2014
- Jacobs Tobin *Greater Dublin Drainage Project for Irish Water* 2018
- https://www.hsa.ie/eng/Topics/Statistics/Infographics/2013_Injury_Fatality_Statistics_Infographic.gif