

14.3.3.2 Operational phase

Agricultural Fertiliser Facility

Other noise sources which will be installed at the Belvelly Port site as part of the separate site demolition, infrastructure and utility upgrade works project include the following:

- A new WWTP will be installed near the southern end of the site. The only noise source of significance at the plant (air blowers) will be housed in a steel kiosk designed to achieve an $L_{Aeq,T}$ level of 43 dB at a distance of 3 m from the kiosk. These emissions will not be audible beyond the Belvelly Port site boundary.
- Three foul water pumping stations installed at the Belvelly Port site will include submerged pumps located in sumps approximately 3 m below ground level. Emissions from these are unlikely to be audible 5 m from the sump manholes.
- A new electrical substation will be constructed near the southern end of the Belvelly Port site. Noise emissions from same are highly unlikely to be audible beyond 50 m.

Noise emissions from the above will not contribute to cumulative impacts. In addition, noise emissions from the existing onsite MarinoChem facility are currently satisfactory and considerably lower than identified criteria at offsite locations. Cumulative impacts between MarinoChem emissions and those from the Gouldings facility will also be negligible. While the jetty is currently used at intervals to offload methanol from vessels, noise emissions from associated pumping equipment are negligible.

With respect to unloading of granular fertiliser at the jetty, the chief source of potential cumulative noise impacts relates to the existing quay at Passage West, used to import/export materials such as grain and woodchip. Observations made during the preparation of this chapter indicate that a typical worst case scenario at this site involves simultaneous operation of two material handling cranes and regular truck movements. This activity is confined to daytime hours.

Potential cumulative impacts between Gouldings jetty activity and the Passage West quay were assessed through predictive modelling. Scenario 3 identified in **Table 14.23** was rerun with Passage West quay plant identified in the previous paragraph. The model output is shown in **Figure 14.15**.

A comparison between **Figures 14.9** and **14.15** indicates an increase of 1 dB in the vicinity of the PACE centre, and an increase of 2 dB at Steampacket House, over noise levels predicted in the absence of Passage West quay operations. Cumulative daytime $L_{Aeq,1h}$ levels at these locations will be 45 dB near the PACE centre, and 45 dB at Steampacket House. These levels will remain considerably below the daytime 55 dB criterion.



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Figure 14.15 Predicted $L_{Aeq\ 1h}$ levels re scenario 3 plus Passage West quay activity.

Other jetty operations

Cumulative impacts between Passage West quay activity, and the loudest non-Gouldings noise sources at the BMDC jetty (scenario 7 identified in **Table 14.23** i.e. with the Gouldings facility in operation, but without any Gouldings-related activity at the jetty) were assessed by combining both sources in the noise prediction model. The model output is shown in **Figure 14.16**.

A comparison between **Figures 14.13** and **14.16** indicates an increase of 4 dB in the vicinity of the PACE centre, and an increase of 15 dB at Steampacket House, over noise levels predicted in the absence of Passage West quay operations. These increases are due entirely to Passage West operations. Cumulative daytime $L_{Aeq\ 1h}$ levels at these locations will reach 31-44 dB. These levels will remain considerably below the daytime 55 dB criterion.



Figure 14.16 Predicted $L_{Aeq\ 1\ h}$ levels re scenario 7 plus Passage West quay activity.

14.4 MITIGATION

14.4.1 Construction Phase

Construction phase noise emissions received at receptors throughout the proposed development will be less than criteria identified in **Section 14.1.3**. Received emissions from traffic associated with the project will also be satisfactory. No specific mitigation measures are required to achieve compliance with criteria. However, the applicant proposes to apply the following measures in order to further reduce offsite impacts:

- Onsite haul routes used by trucks will be maintained in good condition and free of potholes in order to avoid banging of empty truck bodies.
- Project specifications given to the appointed contractor(s) will include a provision that all plant and exhaust silencers will be maintained in a satisfactory condition at all times.
- Where it becomes necessary to introduce potentially noisy plant or processes which have not been assessed in this EIAR, noise impacts associated with same will be evaluated in advance.
- Any requirement to undertake concrete breaking outside of daytime hours will be assessed in advance.
- All plant and machinery used onsite will be maintained in accordance with manufacturer specifications.

- Construction phase operations will apply guidance and recommendations included in British Standard BS 5228:2009+A1:2014.
- A site liaison officer will be appointed to establish channels of communication between the contractor/developer, the local authority and residents.
- A complaints procedure will be established for the duration of the construction phase. Any complaints received regarding alleged noise and/or groundborne vibration will be investigated immediately. Details of the complainant, the complaint (time of occurrence and nature of noise/vibration) and follow up action will be logged in the complaints record.

The above measures are included in the CEMP contained in **Appendix 2.3**.

14.4.2 Operational Phase

The following mitigation measures are proposed with respect to the operational phase:

- All plant and machinery used onsite will be maintained in accordance with manufacturer specifications. In particular, exhaust silencers will be maintained in a satisfactory condition.
- No potentially noisy loading or unloading operations will be carried out during the period 1900-0700 h unless required for emergency or other purposes.
- Vessel captains will be advised that use of vessel fog horns while at the jetty is prohibited.
- Engines and fans on bulk carrier and other cargo vessels will be shut down while docked.
- Truck drivers will be advised that use of truck horns at the jetty is prohibited.
- Repair and maintenance activities which require hammering of metal (e.g. hulls) will not be permitted at the jetty.
- A site noise management plan will be drawn up prior to the commencement of operations.
- All Port of Cork personnel accessing the jetty will be required to undergo noise training at intervals. The training programme will include elements regarding the importance of noise control, the proximity of residential receptors, adherence to the noise management plan, and the importance of bringing potential noise issues to the attention of supervisors.
- A site liaison officer will be appointed to establish channels of communication between the applicant, the local authority and residents.
- A complaints procedure will be established. Any complaints received regarding alleged noise and/or groundborne vibration will be investigated immediately. Details of the complainant, the complaint (time of occurrence and nature of noise/vibration) and follow up action will be logged in the complaints record.

14.4.3 Monitoring

Construction and operational phases are highly unlikely to give rise to groundborne vibration, and thus vibration monitoring is not proposed. Construction noise monitoring is also not proposed, as construction noise levels at the nearest receptors will be considerably lower than identified criteria.

With respect to operational phase emissions, it is proposed to carry out noise monitoring at intervals, in accordance with any conditions attached to a grant of permission. As a minimum, monitoring will

be undertaken at receptors at Passage West and along the R624, and will be carried out during daytime, evening and night-time hours.

14.5 RESIDUAL IMPACTS

Residual noise impacts are summarised in **Tables 14.25** and **14.26** with respect to receptors. No vibration impacts are expected. Avian fauna at nearby designated areas are likely to become quickly accustomed to onsite activities.

Table 14.25 Residual impacts – Construction phase.

Aspect	Impact
Quality	Neutral to adverse (worst case scenario will be audible at receptors)
Significance	Will vary from imperceptible to slight, depending on receptor
Extent	Local, with a large number of receptors at Passage West
Context	Does not contrast with developing soundscape
Probability	Reasonably expected to occur
Duration	Temporary
Frequency	Impacts will arise some or all of the working days of each week, daytime hours
Reversibility	Entirely reversible on completion
Overall	Considered to be neutral to slight negative and temporary

Table 14.26 Residual impacts – Operational phase.

Aspect	Impact
Quality	Neutral at distant receptors, increasing to slight adverse during evening or night-time arrival/departure of larger vessels. Otherwise neutral during night-time hours.
Significance	Imperceptible
Extent	Local, with a large number of receptors at Passage West
Context	Does not contrast with developing soundscape
Probability	Reasonably expected to occur
Duration	Medium to long term
Frequency	Impacts will arise during daytime hours, with limited evening and night-time impacts (chiefly related to vessel arrival/departure)
Reversibility	Entirely reversible on cessation
Overall	Considered to be neutral

14.6 GLOSSARY

Air overpressure	Intensity of air pressure wave caused by blasting or explosion. Expressed as decibels without any A-weighting i.e. linear (dB_{lin}).
Ambient	Total noise environment at a location, including all sounds present.
A-weighting	Weighting or adjustment applied to sound level to approximate non-linear frequency response of human ear. Denoted by suffix A in parameters such as $L_{Aeq T}$, $L_{AF10 T}$, etc.
Background level	A-weighted sound pressure level of residual noise exceeded for 90 % of time interval T. Denoted $L_{AF90 T}$.
Broadband	Noise which contains roughly equal energy across frequency spectrum. Does not contain tones, and is generally less annoying than tonal noise.
Decibel (dB)	Unit of noise measurement scale. Based on logarithmic scale so cannot be simply added or subtracted. 3 dB difference is smallest change perceptible to human ear. 10 dB difference is perceived as doubling or halving of sound level. Examples of decibel levels are as follows: 20 dB: very quiet room; 30-35 dB: night-time rural environment; 55-65 dB: conversation; 80 dB: busy pub; 100 dB: nightclub. Throughout this report noise levels are presented as decibels relative to 20 μPa.
Emissions	Noise originating from source under consideration, spreading spherically, hemispherically or otherwise into surrounding environment.
Extraneous	Noise emissions unrelated to source under consideration.
Fast response	0.125 seconds response time of sound level meter to changing noise levels. Denoted by suffix F in parameters such as $L_{AF10 T}$, $L_{AF90 T}$, etc.
Free field	Measurement position removed from acoustically reflective surfaces other than ground.
Frequency	Number of cycles per second of a sound or vibration wave. Low frequency noise may be perceived as hum, while whine represents higher frequency. Range of human hearing approaches 20-20,000 Hertz.
Hertz (Hz)	Unit of frequency measurement.
Immissions	Inward noise received at receptor, whether from all sources (ambient) or source under consideration (specific).
Impact	Change resulting from an action, such as implementation of a project.
Impulse	Noise which is of short duration, typically less than one second, sound pressure level of which is significantly higher than background.
Incident level	Noise level at façade or other structure which would arise if façade was absent. Thus ignores façade reflections. May be measured directly, or calculated from measurements at specified distance from façade.
Interval	Time period T over which noise parameters are measured at position. Denoted by T in $L_{Aeq T}$, $L_{AF90 T}$, etc.
$L_{Aeq T}$	Equivalent continuous sound pressure level during interval T, effectively representing average A-weighted noise level of ambient noise environment.
$L_{AF10 T}$	Sound pressure level exceeded for 10% of interval T, usually used to quantify traffic noise.
$L_{AF90 T}$	Sound pressure level exceeded for 90% of interval T, usually used to quantify background noise. May also be used to describe noise level from continuous steady or almost-steady source, particularly where local noise environment fluctuates.
L_{AFmax}	Maximum A-weighted sound pressure level occurring during measurement interval.
$L_{Aeq T}$	Rating noise level, derived from $L_{Aeq T}$ plus specified adjustments for tonal and impulsive characteristics. Equivalent to $L_{Ar T}$ used by EPA.
L_{WA}	A-weighted sound power level generated by source due to conversion of work energy into noise energy.
Noise sensitive location	Any dwelling house, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other facility or area of high amenity which for its proper enjoyment requires absence of noise at nuisance levels.
1/3 octave band	Frequency spectrum may be divided into octave bands. Upper limit of each octave is twice lower limit. Each octave may be subdivided into thirds, allowing greater analysis of tones.
Peak particle velocity (PPV)	Rate of change of displacement of particles in solid medium due to vibration, measured as mm/s. Usually used to assess vibration in relation to activities such as blasting as correlates well with human perception of vibration and property damage.
Reflective field	Noise levels measured close to walls or other surfaces (apart from ground) will be increased due to reflections. Levels may be corrected to calculate incident level. Correction of 3 dB typically applies where

	distance to surface is 0.5 to 2 m. Other corrections may apply depending on location and source spectrum.
Residual level	Noise level remaining when specific source is absent or does not contribute to ambient.
Reverberant level	Sound pressure level in room where emitted acoustic energy is balanced by room surface absorption, resulting in steady noise level.
Sound pressure	Deviation over ambient atmospheric pressure due to passing sound wave. Human ear is sound pressure detector, and thus acoustic parameters ultimately relate to sound pressure. Sound pressure level is ratio of measured sound pressure to reference value.
Soundscape	Acoustic environment as perceived, experienced or understood by listeners, taking context into account.
Specific level	$L_{Aeq T}$ level produced by specific noise source under consideration during interval T, measured directly or by estimation or calculation.
Tone	Character of noise caused by dominance of one or more frequencies which may result in increased noise nuisance.
Z-weighting	Standard weighting applied by sound level meters to represent linear scale. Denoted by suffix Z in parameters such as $L_{Zeq T}$, $L_{ZF90 T}$, etc. Typically used to describe spectral band levels.

14.7 REFERENCES

Report RI 8507: Structural response and damage produced by ground vibration from surface mines blasting (US Bureau Of Mines, 1980).

British Standard BS 7385-02: 1993 Evaluation and measurement for vibration in buildings – Part 2: Guide to damage levels from ground borne vibration (1993).

International Standard ISO 9613-2:1996 Acoustics: Attenuation of sound during propagation outdoors – Part 2 General method of calculation (1996).

Guidelines on community noise (World Health Organisation, 1999).

Directive 2002/49/EC of the European Parliament and of the Council of 25 June 2002 relating to the assessment and management of environmental noise (2002).

Draft guidelines for noise impact assessment (Institute of Environmental Management and Assessment, and Institute of Acoustics, 2002).

Night noise guidelines for Europe (World Health Organisation, 2009).

British Standard BS 4142:2014 Methods for rating and assessing industrial and commercial sound (2014).

British Standard BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise (2014).

British Standard BS 5228-2:2009 Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration (2014).

Good practice guidance for the treatment of noise during the planning of national road schemes (National Roads Authority, 2014).

Draft advice notes on current practice in the preparation of environmental impact statements (Environmental Protection Agency, 2015).

NG4 Guidance note for noise: Licence applications, surveys and assessments in relation to scheduled activities (Environmental Protection Agency, 2016).

International Standard ISO 1996-2:2017 Acoustics – Description, measurement and assessment of environmental noise, Part 2: Determination of environmental noise levels (2017).

Draft guidelines on the information to be contained in environmental impact assessment reports (Environmental Protection Agency, 2017).

Noise Action Plan 2018-2023: Cork agglomeration area noise project (Cork City Council & Cork County Council, 2019).

15. RISK OF MAJOR ACCIDENTS AND DISASTERS

15.1 Introduction

This chapter of the EIAR presents an assessment of the vulnerability of the proposed development to be affected by major accidents and disasters. Furthermore, it will assess the potential of the proposed development to cause an increased risk of major accidents and disasters.

15.1.1 Scope of Assessment

The specific objectives of this assessment are as follows:

- Include the expected effects arising from the vulnerability of the project to risks of major accidents and/or disasters that are relevant to the project.
- Include details of the preparedness for and proposed response to emergencies, where appropriate.
- Consider the potential of the project to cause accidents and/or disasters.
- Assess the vulnerability of the project to potential accidents and/or disasters, including both natural disasters (e.g. flooding) and man-made disasters (e.g. technological disasters).

These considerations are separate to any assessment of the project required under the Seveso III Directive.

15.1.2 Assessment Methodology

The following section outlines the requirements as set out in EIA Directive 2014/52/EU and the EPA draft *Guidelines on the information to be contained in Environmental Impact Assessment reports (EIAR)*. The scope and methodology is based on these guidelines.

For the purpose of this assessment, major accidents or disasters are hazards which have the potential to affect the proposed development. These hazards may include accidents which occur during construction and operation caused by operational failures or natural hazards.

15.1.2.1 Major Accidents

Major accidents can relate to any incident, technological or otherwise, which has the potential to have a significant impact on the proposed development or on the receiving environment. Examples of major accidents which have such potential are fire, explosion, traffic collisions, contamination and pollution.

15.1.2.2 Natural Disasters

A natural disaster is an all-encompassing term which describes any severe natural event which has the potential to cause disturbance to an individual, development or population. The severity depends on the receptor and the type of disaster. Examples of natural disasters are earthquakes, tsunamis, lightning strikes, hurricanes or any other extreme natural event. This chapter has considered the potential increased risk of such events occurring as a result of climate change, such as sea-level rise and increased frequency in the occurrence of extreme weather events.

15.1.2.3 Legislation context

EIA Directive 2014/52/EU

The following section outlines the requirements of EIA Directive 2014/52/EU in relation to major accidents and/or natural disasters.

Recital 15 of the new EIA Directive states that:

(15) 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.

In the context of this EIAR, Article 3 of the new EIA Directive requires that the EIA shall identify, describe and assess in the appropriate manner, the direct and indirect significant effects on population and human health, land and soils, water, air and climate and traffic and transportation deriving from the “vulnerability of the project to risks of major accidents and/or disasters that are relevant to the project concerned”.

Annex IV of the new EIA Directive:

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 new 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”.

Control of Major Accident Hazards (COMAH)

The COMAH Regulations were developed under the Chemicals Acts 2008 and 2010 to transpose 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 (“the SEVESO III Directive”). The COMAH Regulations outlines guidelines for

the prevention of major accidents involving dangerous substances, and seeks to limit as far as possible the consequences for human health and the environment of such accidents when they occur, with the overall objective of providing consistent and effective protection.

The COMAH Regulations place an obligation on Seveso establishments to take all necessary measures to prevent major accidents and to limit the consequences for human health and the environment. Seveso establishments are certain institutions that store, handle or process dangerous substances above certain thresholds Under the Regulations. An establishment may qualify as upper tier or lower tier, depending on the inventory of dangerous substances; sites that store, handle or process dangerous substances below a certain threshold do not qualify as establishments under the Regulations.

The types of dangerous substance that contribute to an establishment's inventory include flammable substances (such as liquefied petroleum gas, gasoline / petrol, kerosene, and certain solvents), toxic substances, and substances that are hazardous to the aquatic environment. The types of establishment that may fall within the scope of the Regulations (depending on their inventories) include oil storage & distribution sites, LPG storage& distribution sites, pharmaceutical plants, and sites that manufacture and / or store certain types of fertiliser.

15.1.2.4 Relevant Guidance

EPA Draft Guidelines on the information to be contained in Environmental Impact Assessments (EIAR) 2017

The 2017 EPA *Draft guidelines on the information to be contained in EIAs* refer to major accidents and/or disasters on several occasions:

- Characteristics of the Project – the draft guidelines state that the project characteristics should include “*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 (Control of Major Accident Hazards involving Dangerous Substances) assessment.”

EPA Guidance on Assessing and Costing Environmental Liabilities 2014

The following steps outline the process of how site-specific risks are identified and quantified in relation to a given proposed development. The assessment is based on the *EPA Guidance on Assessing and Costing Environmental Liabilities 2014*. This approach has been implemented in this instance:

Step 1 – Risk Identification

The first step identifies the possible risks associated with the proposed development. Risks are identified based on (1) the potential of the proposal to cause major accidents/natural disasters, and (2) the potential vulnerability of the project to major accident/natural disasters. Major accidents may relate to both construction and operational incidents.

Step 2 – Likelihood of Risk

Risk assessment has been approached in such a manner whereby any risk to or from the proposed development is considered in terms of extremely unlikely to very likely. This likelihood of risk is outlined in **Table 15.1**, below.

Table 15.1 Risk Identification Table

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 organisations, 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 organisation's 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.

Step 3 – Risk Classification

Risk classification is an assessment of that risk based on a standardised classification of likelihood. This assessment is carried out having regard to the operational procedures in place as outlined in the Construction and Environmental Management Plan (CEMP) (**Appendix 2.3**). 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. The consequence ratings that have been applied are as set out in **Table 15.2**, below.

Table 15.2 Risk Classification Severity

Rank	Consequence	Impact	Description
1	Minor	Life, Health, Welfare	<ul style="list-style-type: none"> Small number of people affected; no fatalities and small number of minor injuries with first aid treatment.
		Environment	<ul style="list-style-type: none"> No contamination, localised effects
		Infrastructure	<ul style="list-style-type: none"> <€0.5M Euros
		Social	<ul style="list-style-type: none"> Minor localised disruption to community services or infrastructure (<6 hours).
2	Limited	Life, Health, Welfare	<ul style="list-style-type: none"> Single fatality; limited number of people affected, potential for serious injury with hospitalisation and medical treatment required. Localised displacement of a small number of people for 6-24 hours. Support through local arrangements.
		Environment	<ul style="list-style-type: none"> Simple contamination, localised effects of short duration.
		Infrastructure	<ul style="list-style-type: none"> €0.5-3M
		Social	<ul style="list-style-type: none"> Normal community functioning with some inconvenience.
3	Serious	Life, Health, Welfare	<ul style="list-style-type: none"> Significant number of people in affected area impacted with multiple fatalities (<5), multiple serious or extensive injuries (20), significant hospitalisation. Large number of people displaced for 6-24 hours or possibly beyond; up to 500 evacuated. External resources required for personal support.
		Environment	<ul style="list-style-type: none"> Simple contamination, widespread effects or extended duration
		Infrastructure	<ul style="list-style-type: none"> €3-10M
		Social	<ul style="list-style-type: none"> Community only partially functioning, some services available.
4	Very Serious	Life, Health, Welfare	<ul style="list-style-type: none"> 5 to 50 fatalities; up to 100 serious injuries, up to 2000 evacuated
		Environment	<ul style="list-style-type: none"> Heavy contamination, localised effects or extended duration
		Infrastructure	<ul style="list-style-type: none"> €10-25M Community functioning
		Social	<ul style="list-style-type: none"> Community functioning poorly, minimal services available
5	Catastrophic	Life, Health, Welfare	<ul style="list-style-type: none"> Large numbers of people impacted with significant numbers of fatalities (>50), injuries in the hundreds, more than 2000 evacuated.
		Environment	<ul style="list-style-type: none"> Very heavy contamination, widespread effects of extended duration.
		Infrastructure	<ul style="list-style-type: none"> >€25M
		Social	<ul style="list-style-type: none"> Serious damage to infrastructure causing significant disruption to, or loss of, key services for prolonged period. Community unable to function without significant support.

Step 4 – Assign Risk Significance

This is based on the assessment of likelihood and severity. A risk matrix has been developed which allows for the evaluation of the risk as follows;

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

15.2 Existing Environment

15.2.1 Site and Project Context

The proposed development site is located on the northwest of Great Island, within Cork harbour to the east of Cork City. The site is bound by Cork Harbour to the north, west and south. Passage West is situated approximately 1km from the centre of the site, across the harbour to the west.

Figure 15.1, below shows the site relative to the greater Cork Harbour area. The northern end of the peninsula was reclaimed post 1938 and currently contains the operational MarinoChem facility, redundant car parking areas and the lagoon at the northeast corner.

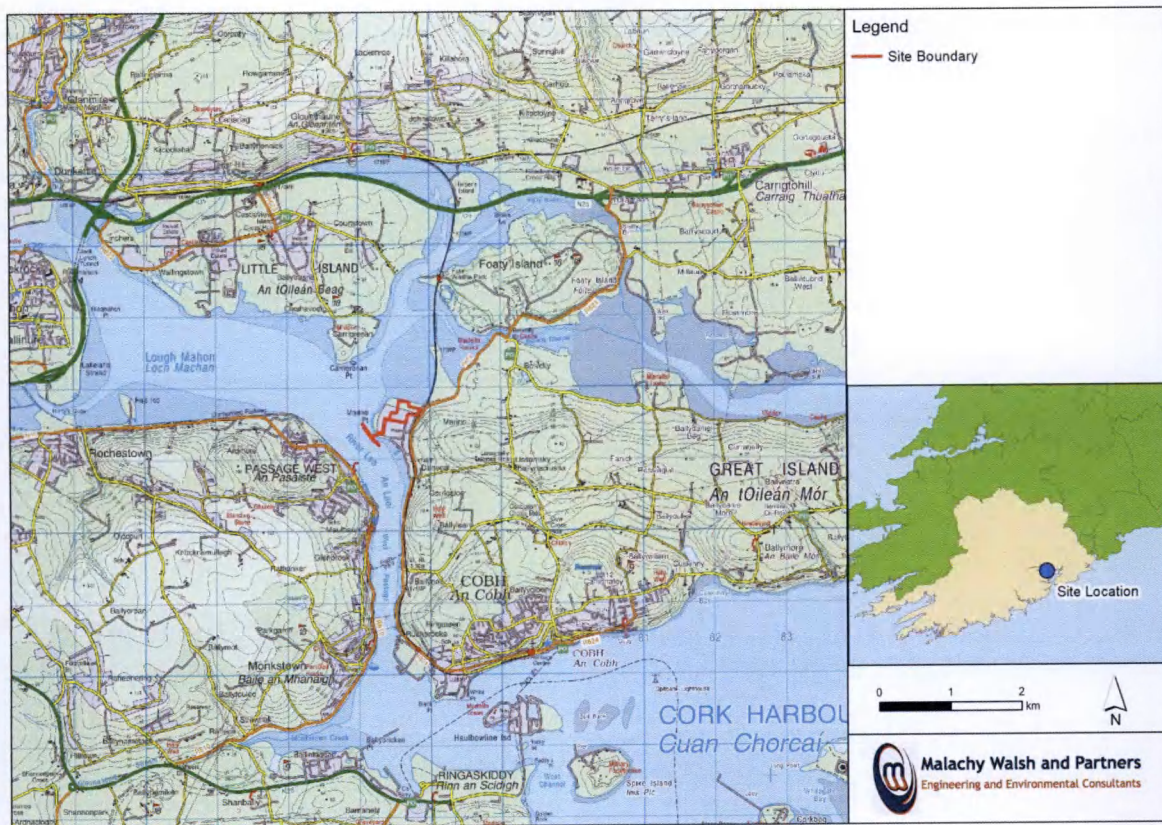


Figure 15.1 Site location relative to Cork Harbour OSI (2019)

15.2.2 Baseline Conditions at the Proposed Development Site

15.2.2.1 Do- Nothing Scenario

If the proposed development does not proceed, the potential risk of the proposed development causing, or being affected by a major accident or disaster is eliminated.

15.2.2.2 Disasters

Natural disasters are earthquakes, tsunamis, lightning strikes, hurricanes or any other extreme natural event which has the potential to cause major disruption. Ireland is generally not prone to such large scale disasters, particularly earthquakes and tsunamis. Nevertheless, Ireland has seen an increase in

severe weather, particularly storms which have the potential to cause disruptions through flash flooding, snow and strong wind gusts.

15.2.2.3 Major Accidents

Examples of major accidents are fire, explosions, traffic collisions, contamination and pollution. Such accidents are relatively common across the country.

Licensed facilities

The European Communities (Control of Major Accident Hazards involving Dangerous Substances) Regulations, 2015 (SI 209 of 2015) implement the requirements of the Council Directive 2012/18/EU on the control of major accident hazards involving dangerous substances. These Regulations require operators of establishments where dangerous substances are used or stored in large quantities to take all measures necessary to prevent and mitigate the effects of major accidents to man and the environment.

There is one Seveso site operating within a 1 km radius of the proposed development, namely the MarinoChem Upper-Tier Seveso facility. Such facilities have the potential to cause major disruptions in the event of an accident i.e. fire, explosion or spill. However, MarinoChem operates under strict safety and environmental standards and requirements required by the Health and Safety Authority and Environmental Protection Agency.

15.3 Likely Significant Impacts

This section addresses the potential of the proposed development to cause and/or be affected by a major accident or disaster and makes a determination on the likelihood of occurrence.

15.3.1 Summary of Proposed Development

The proposed development at the Belvelly Port Facility, covering an approximate area of 7.6 hectares will consist of the following main elements:

15.3.1.1 Proposed Agricultural Fertiliser Facility

- The construction and operation of an agricultural fertiliser blending and bagging facility which facilitates the relocation of Goulding Chemicals Limited from Cork City to the Belvelly Port Facility. The proposed facility will consist of:
 - a storage warehouse;
 - a bagging and palletising facility;
 - an office building to support customer service and weighbridge operations;
 - external storage bays with associated circulation space, weigh-bridges, access control and security facilities; and
 - importation of raw materials at the existing jetty.

The primary use of the proposed fertiliser facility will be for blending and bagging of dry bulk materials for storage and distribution. All finished fertiliser product will be distributed from the facility by road.

The facility will operate as a lower-tier Seveso site, qualifying due to the storage of qualifying material on-site.

15.3.1.2 Additional Operational Port Uses

The jetty at the Belvelly Port Facility site is currently used to export dry cargo (wooden logs), the importation of Methanol for MarinoChem, as a stand-by berth for Port work vessels, and to moor occasional vessels for lay-by or minor maintenance work. The proposed additional port operational use of the jetty will consist of servicing other cargo vessels, which will include the relocation of vessels displaced from the Cork City Quays. The additional cargo types proposed will include woodchip, machinery parts, deep sea maintenance and exploratory vessel engineering cargo, and other miscellaneous dry cargo.

Refer to **Chapter 2 Description of The Proposed Development** for further details on the proposed development.

15.3.2 Construction Phase

15.3.2.1 Proposed Agricultural Fertiliser Facility

In assessing the risks from the construction phase of the proposed agricultural fertiliser facility, the receiving environment and the proposed activities have been considered. The principal risks identified relate to flooding, fire and explosion, traffic and release of contaminants. These risks are described in detail in **Table 15.3**, below. In addition, a risk assessment is undertaken for each risk, mitigation measures are proposed and residual risks identified.

There are no construction works associated with the additional operational port use.

15.3.3 Operational Phase

15.3.3.1 Proposed Agricultural Fertiliser Facility

The proposed Gouldings agricultural fertiliser facility will operate as a lower-tier Seveso site. In light of this, a quantitative risk assessment (QRA) relating to Seveso Land-use planning was undertaken and submitted to the Health and Safety Authority (HSA). The QRA details the planned environmental controls that are in place in order to mitigate the potential risks of operating as a lower-tier Seveso site.

In assessing the risks from the operational phase of the proposed agricultural fertiliser facility, the receiving environment and the proposed activities have been considered. The principal risks identified relate to flooding, fire and explosion, traffic and release of contaminants. These risks are described in detail in **Table 15.4**, below. In addition, a risk assessment is undertaken for each risk, mitigation measures are proposed and residual risks identified.

15.3.3.2 Additional Operational Port Use

In assessing the risks from the operational phase of the proposed additional operational port use to facilitate cargo vessels at the Belvelly Port Facility, the receiving environment and the proposed activities have been considered. The principal risks identified relate to flooding, fire and explosion, traffic, cargo vessels and release of contaminants. These issues are described in detail in **Table 15.5**,

below. In addition, a risk assessment is undertaken for each risk, mitigation measures are proposed and residual risks identified.

15.3.4 Cumulative Impacts

Any future developments within the Belvelly Port Facility site will be undertaken in accordance with the relevant planning and regulatory requirements.

As referenced throughout this EIAR, there is one known development proposal currently under consideration by An Bord Pleanála for the Belvelly Port Facility site, planning application ref. no. 19/06783, regarding proposed demolition, site infrastructure and utility upgrade works. The construction period for this application is expected to overlap for a period with the construction of the agricultural fertiliser facility. Both projects will be compliant with best practice construction practices and the requirements of the respective CEMPs. **Appendix 2.3** contains the CEMP for this project. No potential cumulative impacts relating to the risk of major accidents and disasters on or because of the proposed development are expected due to the proposed concurrent works.

There is currently one active industrial facility located in the north-west corner of the main site which is owned by MarinoChem Limited (formerly Dynea Ireland Limited). The proposed Gouldings facility will be located adjacent to MarinoChem. Materials, including methanol are imported to the facility over the jetty by pumping from tankers. Facilities are located at the jetty, with main pipes connecting the MarinoChem facility to the jetty via a viaduct. MarinoChem is an Upper Tier Seveso site.

The combination of developing the proposed Gouldings facility alongside the existing MarinoChem facility increases the risk of a domino effect occurring with regard to the occurrence of a major accident. There is an increased risk of fire or explosion occurring at one or both facilities, which could potentially have an impact on human health and/or the environment.

Both facilities will operate under strict safety and environmental standards and requirements imposed on operators of such facilities by the relevant regulators (HSA and EPA). This will ensure that the risk of such an incident occurring is minimised.

15.4 Mitigation

15.4.1 Construction

15.4.1.1 Proposed Agricultural Fertiliser Facility

Mitigation measures regarding the risk of major accidents to and because of the construction phase of the proposed agricultural fertiliser facility are outlined in **Table 15.3**, below. A detailed CEMP will be prepared by the contractor and implemented throughout the works. The CEMP will be a live document and continuously updated to ensure that potential risks of major accidents and/or disasters are identified, avoided and mitigated as necessary. Refer to **Appendix 2.3** for the CEMP.

15.4.2 Operation

15.4.2.1 Proposed Agricultural Fertiliser Facility

Gouldings follow standard precautions across all of their Seveso sites. These precautions will be implemented in the proposed agricultural fertiliser facility. Precautions are as follows:

- Regular maintenance of loading shovels
- Precautions for conveyor belt fires / elevator belt fires in bulk store intake systems, blending and bagging areas. These include rotation sensors and trips to protect against frictional heating and auto-extinguish conveyor and elevator belts to ISO 340
- Hot work permit systems.
- No smoking regulations with appropriate signage at main gate, entrance to buildings, etc.
- Minimising truck presence on site,
- Security precautions such as robust site fencing, locked buildings, building alarms, perimeter intruder detection systems.
- While COMAH qualifying material will not be handled in the bagging plant or stored in the yard, standard precautions used in the other Gouldings sites will be implemented.
- Sawdust (or other organic or combustible material) will not be permitted to be used to dry floors etc.
- Loading shovels will be stored in a separate shed outside at night time.
- Take precautions against oil spills from conveyors and elevators motor/gearboxes. Depending on the particular situation this would be by ensuring leaks will not spill on product, having the gearboxes over bays used for non-hazardous material or containment of leaks.
- Lightning Protection is required for the bulk store building.

Mitigation measures regarding the risk of major accidents to and because of the operational phase of the proposed agricultural fertiliser facility are outlined in **Table 15.4**, below.

15.4.2.2 Additional Operational Port Uses

Mitigation measures regarding the risk of major accidents to and because of the operation phase of the proposed additional port uses to facilitate cargo vessels at the Belvelly Port Facility development are outlined in **Table 15.5**, below.

Major Emergency Plan

The Port of Cork Company (POCC) implements controls and measures in line with the existing POCC Major Emergency Plan. This plan is consistent across all Port facilities throughout the harbour

Relevant POCC Emergency Procedures are as follows:

- Port of Cork's Major Emergency Plan
- Port of Cork's Major Oil Spill Response Plan
- SEMS 08.01 General Principal for dealing with a Marine Emergency
- SEMS 08.02 Port Emergency Response Plan
- SEMS 08.03 Procedure to assess risks in the Port
- SEMS 08.04 Criteria for risk assessment

- SEMS 08.05 Criteria for risk assessment (continued)
- SEMS 08.06 Procedure to plan annual drills and exercises
- SEMS 08.07 Procedure to do a drill or exercise
- SEMs 08.09 Site operatives spill response instruction
- SEMS 08.10 Spill Response - statutory reporting instruction
- SEMS 08.14 Port of Cork Register of Emergency Drills & Exercises

15.5 Residual Impacts

The residual impacts relating to the risk of major accidents and disasters to and because of the proposed development are identified **Tables 15.3, 15.4 and 15.5**, below. The residual impacts relating to flooding, fire and explosion, traffic, cargo vessels and release of contaminants are identified.

Table 15.3 Identification of potential hazards during construction

Risk	Description of potential hazard	Construction phase			Mitigation	Residual Risk (after mitigation)		
		Likelihood	Severity	Risk		Likelihood	Severity	Risk
Flooding	<p>There is a potential risk of flooding occurring during construction, causing:</p> <ul style="list-style-type: none"> Health and safety risk to workers Contamination of surface waters from spread of fuels/oils/other hazardous construction materials Damage to construction materials and machinery 	1	1		Based on the Flood Risk Assessment (FRA) undertaken for the proposed development, it is not considered that the project is vulnerable or has the potential to cause an increased risk of flooding. A suitable drainage design will be implemented prior to construction works being undertaken. Refer to the CEMP.	2	1	
Fire	<p>There is a potential risk of fire occurring during construction, causing:</p> <ul style="list-style-type: none"> Health and safety risk to workers Contamination of surface waters from fire water release Damage to construction materials and machinery Atmospheric pollution from emissions to air Incident at the MarinoChem Upper Tier Seveso site 	3	3		<p>A Health and Safety Plan will be prepared which will address health and safety issues from the design stages through to the completion of the construction and maintenance phases as required by the Safety, Health and Welfare at Work (Construction) Regulations 2013.</p> <p>Staff training undertaken prior to construction works:</p> <ul style="list-style-type: none"> All construction workers will receive a H&S induction prior to commencing work on site. The induction will outline the various hazards, procedures for working on site and the various Emergency procedures and protocols. Emergency evacuation drills will take place on a quarterly basis <p>MarinoChem operates under strict safety and environmental standards and requirements imposed on operators of such facilities by the relevant regulators (Health and Safety Authority and Environmental Protection Agency).</p>	2	3	
Explosion	<p>There is a potential risk of explosion occurring during construction, causing:</p> <ul style="list-style-type: none"> Health and safety risk to workers Hearing damage to people in the locality Damage at nearby receptors due to noise from explosion i.e. window breakage Contamination of surface waters from fire water release Damage to construction materials and machinery Atmospheric pollution from emissions to air Incident at the MarinoChem Upper Tier Seveso site 	3	4		<p>Staff training undertaken prior to construction works:</p> <ul style="list-style-type: none"> All construction workers will receive a H&S induction prior to commencing work on site. The induction will outline the various hazards, procedures for working on site and the various Emergency procedures and protocols. Emergency evacuation drills will take place on a quarterly basis <p>MarinoChem operates under strict safety and environmental standards and requirements imposed on operators of such facilities by the relevant regulators (Health and Safety Authority and Environmental Protection Agency).</p>	2	3	
Traffic	<p>There is a potential risk of traffic accidents occurring during construction, causing:</p> <ul style="list-style-type: none"> Health and safety risk to construction workers from vehicle collisions Health and safety risk to local commuters due to increased traffic volumes 	4	3		<p>A detailed Construction Traffic Management Plan will be prepared by the main contractor prior to works commencing. This Plan will comprise the construction traffic mitigation measures which are set out in this EIAR and any additional measures which are required by the conditions attached to the Planning Authority's decision. The Construction Traffic Management Plan will also include any specific requirements of Cork County Council during the construction phase including any monitoring and reporting requirements. This Plan will be submitted to and agreed with Cork County Council prior to construction commencement.</p> <p>Proposed mitigation measures include restricting the hours for exportation and importation of vehicle loads to avoid coinciding with the existing weekday morning and evening peak traffic periods on the R624 and surrounding road network. Subject to the approval of Cork County Council, warning signs advising of large vehicles in the middle of the road at the horizontal bend on the south side of Belvelly Bridge and on Belvelly Bridge, are recommended.</p>	3	2	
Spillages, leaks or accidental release of contaminants	<p>There is a potential risk of spillage, leaks or accidental release of contaminants occurring during construction, causing health and safety risk to workers, flora or fauna from:</p> <ul style="list-style-type: none"> contact with contaminated soils i.e. from excavated materials/pile arisings contact with hazardous construction materials i.e. oils, fuels, concrete etc. 	4	2		<p>The following procedures will be implemented to ensure that any potential release of contaminants is eliminated as far as possible:</p> <ul style="list-style-type: none"> Fuel/oil management plan implemented Handling procedures carried out safely and to the highest standards Staff training and awareness undertaken prior to construction Construction vehicles inspected regularly Construction vehicle wheel washing done prior to vehicles leaving the site 	2	2	

Table 15.4 Identification of potential risks during operation - proposed Agricultural Fertiliser Facility

Risk	Description of potential hazard	Operation Phase		Mitigation	Residual Risk (after mitigation)	
		Likelihood	Severity		Likelihood	Severity
Flooding	<p>There is a potential risk of flooding occurring during operation, causing:</p> <ul style="list-style-type: none"> Health and safety risk to workers Contamination of surface waters from spread of fuels/oils/other hazardous materials Damage to materials and machinery 	2	1	<ul style="list-style-type: none"> Based on the FRA undertaken for the proposed development, it is not considered that the project is vulnerable or has the potential cause an increased risk of flooding A flood protection revetment will be installed as part of planning application ref. no. 19/06783 A suitable storm drainage system including interceptors and waste water treatment system has been designed and will be installed 	2	1
Fire	<p>There is a potential risk of fire occurring during construction, causing:</p> <ul style="list-style-type: none"> Health and safety risk to workers Contamination of surface waters from fire water release Damage to construction materials and machinery Atmospheric pollution from emissions to air Incident at the MarinoChem Upper-Tier Seveso site Incident at the Goulding's Lower-Tier Seveso site 	3	4	<p>A Health and Safety Plan will be prepared which will address health and safety issues as required by the Safety, Health and Welfare at Work (Construction) Regulations 2013.</p> <p>Fire hydrants will be located along internal access roads for ease of access by emergency services. The exact setting out of the hydrants will be agreed with the fire officer during the fire certification process.</p> <p>Buildings will be installed with appropriate fire safety equipment i.e. smoke detection, and fire extinguishers etc.</p> <p>Fire safety evacuation drills and staff training undertaken.</p> <p>Installation of fire water attenuation tank for the storage of contaminated surface water, and for the containment of diesel and oil spills.</p>	2	2
Explosion	<p>There is a potential risk of explosion occurring during construction, causing:</p> <ul style="list-style-type: none"> Health and safety risk to workers Hearing damage to people in the locality Damage at nearby receptors due to noise from explosion i.e. window breakage Contamination of surface waters from fire water release Damage to construction materials and machinery Atmospheric pollution from emissions to air Incident at the MarinoChem Upper Tier Seveso site Incident at the Goulding's Lower Tier Seveso site 	2	4	<p>Gouldings will implement standard precautions for the prevention of fire or explosion occurring at the facility. Refer to Section 15.3.1.1, above for the list of precautionary measures.</p> <p>The relevant Seveso facilities will operate under strict safety and environmental standards and requirements imposed on operators of such facilities by the relevant regulators (Health and Safety Authority and Environmental Protection Agency).</p>	2	3
Traffic	<p>There is a potential risk of traffic accidents occurring during operation, causing:</p> <ul style="list-style-type: none"> Health and safety risk to staff Health and safety risk to local commuters due to increased traffic volumes 	4	2	<p>A Health and Safety Plan will be prepared which will address health and safety issues as required by the Safety, Health and Welfare at Work (Construction) Regulations 2013.</p> <p>Appropriate speed limits of 30km km/hr will be implemented on site</p> <p>Staff training and awareness will be undertaken</p> <p>Appropriate site lighting will ensure good visibility across the site.</p> <p>Subject to the approval of Cork County Council, warning signs advising of large vehicles in the middle of the road at the horizontal bend on the south side of Belvelly Bridge and on Belvelly Bridge, are recommended.</p>	3	2
Spillages, leaks or accidental release of contaminants	<p>Health and safety risk to workers, flora or fauna from:</p> <ul style="list-style-type: none"> Contact with contaminated soils i.e. from excavated materials/pile arisings Contact with hazardous fertiliser based materials i.e. ammonia, phosphorous etc. Spillage of coating oil into marine environmental 	2	3	<p>The following procedures will be implemented in order to ensure that potential spread of contaminants is limited:</p> <ul style="list-style-type: none"> Oil Spill Response Plan. Oil interceptors installed Bunding of fuel tanks etc. Handling procedures carried out safely Staff training and awareness Products stored on-site will be managed appropriately to limit the spread of contaminants Stored product will be double wrapped in waterproof plastic material 	2	2

Table 15.5 Identification of potential risks during operation - Additional Operational Port Uses

Risk	Description of potential hazard	Risk before mitigation			Mitigation			Residual Risk (after mitigation)		
		Likelihood	Severity	Risk	Likelihood	Severity	Risk	Likelihood	Severity	Risk
Flooding	There is a potential risk of flooding occurring during jetty operations, causing: <ul style="list-style-type: none"> Health and safety risk to workers Contamination of surface waters from spread of fuels/oils/other hazardous materials Damage to imported materials and machinery 	2	1		- Based on the FRA undertaken for the proposed development, it is not considered that the project is vulnerable or has the potential cause an increased risk of flooding <ul style="list-style-type: none"> A suitable storm drainage system including interceptors and waste water treatment system has been designed and will be installed on the jetty 	1	1	1		
Fire (on Jetty or on board a vessel)	There is a potential risk of fire occurring during operation, causing: <ul style="list-style-type: none"> Health and safety risk to workers on cargo vessels Health and safety risk to workers on the jetty Contamination of surface waters from fire water release Damage to materials and machinery on the jetty Damage to materials or machinery on board cargo vessels Atmospheric pollution from emissions to air Nuisance caused to nearby residents from smoke and disruption to local traffic 	2	2		- BMDC has developed an Emergency Management Plan which will be implemented in the event of fire or explosion occurring on the jetty or on board a vessel. <p>Refer to Section 15.3.2.2, above for Emergency Management Plan procedures.</p>	1	2			
Explosion (on Jetty or on board a vessel)	There is a potential risk of explosion occurring during operation, causing: <ul style="list-style-type: none"> Health and safety risk to workers on cargo vessels Health and safety risk to workers on the jetty Hearing damage to people in the locality Damage at nearby receptors due to noise from explosion i.e. window breakage Contamination of surface waters from fire water release Damage to materials and machinery on the jetty Damage to materials or machinery on board cargo vessels Atmospheric pollution from emissions to air Nuisance caused to nearby residents from smoke and disruption to local traffic 	2	4			2	3			
Traffic	There is a potential risk of traffic accidents occurring during operation, causing: <ul style="list-style-type: none"> Site workers Delivery drivers Users of the regional road network 	4	2		-BMDC has developed an Emergency Management Plan which will be implemented in the event of a traffic related incident occurring. Refer to Section 15.3.2.2 , above for Emergency Management Plan procedures. <p>A speed limit of 30km/hr will be implemented at all times</p> <ul style="list-style-type: none"> Only one vessel will be docked at the jetty at any one time, limiting the amount of traffic present on the jetty or coming to/from the jetty. 	3	2			
Collision of vessels with fixed object (i.e. the jetty) or another vessel	There is a potential risk of vessel collision occurring during operation, causing: <ul style="list-style-type: none"> Health and safety risk to workers on cargo vessels Health and safety risk to workers on the jetty Contamination of surface waters from contaminant release due to breach Damage to materials and machinery on the jetty Damage to materials or machinery on board cargo vessels Atmospheric pollution from emissions to air in the event of a collision related fire/explosion Nuisance caused to nearby residents from smoke and disruption to local traffic in the event of a collision related fire/explosion 	2	4		BMDC has developed an Emergency Management Plan which will be implemented in the event of a traffic related incident occurring. Refer to Section 15.3.2.2 , above for Emergency Management Plan procedures. <ul style="list-style-type: none"> Only one vessel will be docked at the jetty at any one time. Therefore there will be little to no potential for collision of vessels at the jetty 	1	3			
Spillages, leaks or accidental release of contaminants	Health and safety risk to workers, flora or fauna from: <ul style="list-style-type: none"> Contact with hazardous materials i.e. fuels/oils etc. Release of contaminants to surface waters 	2	2		BMDC has developed an Emergency Management Plan which will be implemented in the event of a traffic related incident occurring. Refer to Section 15.3.2.2 , above for Emergency Management Plan procedures.	1	2			

15.6 References

Chemicals Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2015 (S.I. No. 209 of 2015)

Environmental Protection Agency draft *Guidelines on the information to be contained in Environmental Impact Assessment reports (EIAR)*

European Union Directive 82/501/EEC (Seveso III-Directive)

European Union Environmental Impact Assessment (EIA) Directive 2014/52/EU

Environmental Protection Agency Guidance on assessing and costing environmental liabilities (2014)

16. INTERACTION OF EFFECTS

16.1 INTRODUCTION

This chapter addresses the main interactions and cumulative impacts between different aspects of the environment which are likely to be significantly affected by the proposed development. These interactions, which can result in direct or indirect impacts, may be positive or negative. They include interactions and inter-relationships between environmental aspects such as noise and ecology, for example.

Only topics that could reasonably be linked to the proposed development have been examined in detail. Accordingly, when a topic is not mentioned, the authors have concluded that no potential for significant impact exists. Where relevant, interactions between specific environmental aspects and effects are already addressed within each of the individual assessment topic areas of this EIAR.

16.1.1 Assessment Methodology

16.1.1.1 Legislative Requirements

The EIAR has considered and assessed the interactive effects and cumulative impacts arising from the construction and operation of the proposed development based on best scientific knowledge. Interactive effects (or interactions), specifically refer to any direct or indirect effects caused by the interaction of environmental factors as outlined in Part 1(e) in Article 3 of the EIA Directive S.I No. 296/2018 which states:

“The environmental impact assessment shall identify, describe and assess in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of a project on the following factors:

- (a) *population and human health;*
- (b) *biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC;*
- (c) *land, soil, water, air and climate;*
- (d) *material assets, cultural heritage and the landscape;*
- (e) ***the interaction between the factors referred to in points (a) to (d).”***

Additionally schedule 6, article 94 2.e part (ii) /a footnote to Annex IV of the amended Directive states that a description of impacts should include:

*“...the direct effects and any indirect, secondary, **cumulative**, short, medium and long-term, permanent and temporary, positive and negative effects of the project”*

16.1.2 Interaction of the Environmental Effects

Where relevant, interactions between specific environmental aspects and effects are already addressed within each of the individual assessment topic areas of this EIAR. The preceding chapters

of this EIAR identify the potential environmental effects that may occur in terms of Biodiversity, Population and Human Health, Land and Soil, Hydrology, Hydrogeology, Air Quality and Climate, Archaeological, Architectural and Cultural Heritage, Landscape and Visual, Noise and Vibration and Traffic and Transportation. All of the potential impacts of the proposed development and measures proposed to mitigate them have been outlined in the preceding chapters. The result of interactive effects may either exacerbate the magnitude of the impact or ameliorate it. The purpose of this chapter is to draw attention to significant interactions and interdependencies between one topic and another.

The relevant interactions and interdependencies between specific environmental aspects have been summarised in the matrix set out in **Table 16.1** below. The matrix contains two axes outlining each of the environmental topics which have been considered as part of this EIAR. Interactions have been identified for both the construction and operational phases of the proposed development.

Table 16.1 Potential Interaction of Effects Matrix (C = Construction, O = Operational. If there is considered to be no potential for an effect, the box is left blank.)

	Population and Human Health	Biodiversity	Land and Soils	Surface Water	Groundwater	Air Quality and Climate	Material Assets	Archaeological, Architectural and Cultural Heritage	Landscape and Visual Resource	Noise and Vibration	Traffic and Transportation
Population and Human Health			C			CO	CO		CO	CO	CO
Biodiversity			C	CO	CO	CO			CO	CO	CO
Land and Soils	C	C		C	C			C	C		
Surface Water		CO	C		CO		CO				
Groundwater		CO	CO								
Air Quality & Climate	CO	CO									CO
Material Assets	CO			CO		CO				CO	
Archaeological, Architectural and Cultural Heritage											
Landscape and Visual resource	CO	CO									CO
Noise and Vibration	CO	CO	C								CO
Traffic and Transportation	CO	CO	C			CO			CO	CO	

16.1.2.1 *Population and Human Health*

The additional employment of staff workers during the construction and operation of the Goulding facility and the additional port use will have a positive impact on the local economy, impacting on material assets and traffic. All potential impacts associated with each individual aspect are addressed in the preceding chapters.

16.1.2.2 *Land and Soils*

The construction works associated with the proposed development will have the potential to impact on surface water and groundwater, population and human health, landscape and visual, noise and vibration and traffic and transportation. The associated impacts for each aspect are addressed individually in the preceding chapters.

16.1.2.3 *Water*

There is potential for the impacts associated with surface and groundwater to interact with population and human health and land and soils. The potential impacts associated with surface and ground waters due to the construction and operational phases of the proposed development are addressed individually and in detail within **Chapter 7 Water Hydrology** and **Chapter 8 Hydrogeology**.

16.1.2.4 *Air Quality and Climate Change*

There is potential for emissions to air during the construction phase in the forms of temporary fugitive dust and vehicle emissions. The berthing of cargo vessels associated with the importation of raw materials for the proposed agricultural fertiliser facility and the importation of dry break bulk cargo associated with the additional port operational uses of the jetty will also result in a slight increase in emissions. Both scenarios have the potential to impact population and human health and biodiversity in the vicinity of the site. The potential and predicted effects of emissions associated with the project are addressed in **Chapter 9 Air Quality and Climate**.

16.1.2.5 *Landscape and Visual Resource*

The changes in landscape due to the construction and operation of the proposed agricultural fertiliser facility have the potential to impact on population and human health through local residents and the general public. The potential impacts associated with landscape and visual due to the construction and operational phases of the proposed development are addressed individually and in detail within **Chapter 11 Landscape and Visual**.

16.1.2.6 *Noise and Vibration*

Noise impacts will occur during the construction phase of the project as a result of increased levels of site related traffic and use of construction machinery during the works. An increase in noise will also be associated with the operation of the Goulding facility, the importation of raw fertiliser material and the importation of cargo associated with the proposed additional port operational uses. Noise and vibration has the potential to impact on population and human health and biodiversity, which are addressed individually and in detail within the **Chapter 5 Biodiversity** and **Chapter 4 Population and Human Health**.

16.1.2.7 Traffic and Transportation

The increase in traffic associated with the construction and operation of the proposed agricultural fertiliser facility and additional port operational use have the potential to impact on air quality and climate change, landscape and visual, population and human health and biodiversity. The impacts associated with each aspect are addressed individually within **Chapter 4 Population and Human Health**, **Chapter 5 Biodiversity**, **Chapter 11 Landscape and Visual** and **Chapter 9 Air Quality and Climate**.

16.1.3 References

Department of Housing, Planning and Local Government (2018) Circular PL 05/2018 -Transposition into Planning Law of Directive 2014/52/EU amending Directive 2011/92/EU on the effects of certain public and private projects on the environment (the EIA Directive);

Department of Housing, Planning, Community and Local Government (2017) Key Issues Consultation Paper on the Transposition of 2014 EIA Directive (2014/52/EU) in the Land Use Planning and EPA Licensing Systems;

Department of Housing, Planning, Community and Local Government (2017) Circular PL 1/2017 - Implementation of Directive 2014/52/EU on the effects of certain public and private projects on the environment (EIA Directive): Advice on the Administrative Provisions in Advance of Transposition;

Department of the Environment, Community and Local Government (2013) Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment;

Environmental Protection Agency (2017) Draft Guidelines on the Information to be contained in Environmental Impact Assessment Reports (Draft August 2017);

European Commission (1999) Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions;

European Commission (2017) Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report; and

Government of Ireland (2018) Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (August 2018).

17. SUMMARY AND SCHEDULE OF ENVIRONMENTAL MITIGATION MEASURES

17.1 INTRODUCTION

This Schedule of Environmental Mitigation has been prepared as part of the EIAR for the proposed agricultural fertiliser facility and additional port operational use of the jetty to facilitate cargo vessels at the Belvelly Port Facility in Marino Point. Where unavoidable environmental effects have been identified, measures have been proposed to mitigate against these effects as much as reasonably possible.

The schedule sets out the implementation programme of all mitigation measures contained within the EIAR. The recommended mitigation measures and predicted impacts are comprehensively detailed in the relevant chapters of the EIAR and summarised in **Table 17.1** below.

17.2 FORMAT OF THE MITIGATION SCHEDULE

The mitigation schedule on the following pages is structured in accordance with the following project phases:

- Pre-construction
- During construction
- Operational phase



The mitigation schedule is presented in table format which, for each of the above-mentioned project phases, outlines the environmental aspect or resource for which mitigation is required, the required or proposed mitigation measure, and outlines any residual impacts where relevant.

Table 17.1 Programme of Mitigation Measures

TIME FRAME / SCHEDULE	ASPECT/ RESOURCE	ENVIRONMENTAL MITIGATION / RECOMMENDATION	RESIDUAL IMPACT FOLLOWING MITIGATION
PRIOR TO COMMENCEMENT OF CONSTRUCTION WORKS	BIODIVERSITY	<p>A suitable qualified project ecologist will be employed for the duration of the construction works to ensure that mitigation measures and relevant ecological planning conditions are implemented in full. The project ecologist will also have a role in reviewing and approving all work method statements. The project ecologist will have the authority to stop works should an unforeseen issue arise.</p>	Permanent slight to imperceptible negative
		<p>Habitats To prevent incidental damage by machinery or by the deposition of spoil during the site clearance stage, any habitats earmarked for retention will be securely fenced early in the construction phase. The fencing will be clearly visible to machine operators. Any habitats earmarked for retention that are damaged and disturbed will be left to regenerate naturally or will be rehabilitated and landscaped, as appropriate, once construction is complete.</p>	
		<p>Vegetation Removal Any vegetation removal required to accommodate the works will be done outside of the bird breeding period, March to August, inclusive.</p>	

TIME FRAME / SCHEDULE	ASPECT / RESOURCE	ENVIRONMENTAL MITIGATION / RECOMMENDATION	RESIDUAL IMPACT FOLLOWING MITIGATION
		<p>Wintering Birds and Bird Protection during breeding season It has been assumed for the purposes of this assessment that standard construction site screening will be erected local to construction works undertaken in the most northern part of the site, which will minimise visual stimuli and subsequent visual disturbance to birds of SCI roosting on the adjacent rock armour, wetland, nearby mudflats and shorelines and foraging on nearby mudflats and subtidal areas. Any vegetation which includes suitable nesting habitat around the site will be removed during winter months and before 1st of March. This will ensure no impact on nesting birds during construction. Lighting will be provided with the minimum luminosity sufficient for safety and security purposes. Lights will be focused away from the intertidal areas which support feeding birds. Lights will be as low as possible and light spillage will be minimised. Designs to luminaires to help reduce light spillage and to direct light to the intended area only, particularly along the northern boundary, are by using accessories such as hoods, cowls, louvres and shields. It is important to maintain Dark Zones for roosting intertidal bird species in areas where lighting is not necessary. However, where lighting is required, this lighting should be placed at a minimum height using the lowest lux value permitted for health and safety.</p> <p>Common Tern and Peregrine Falcon In order to avoid disturbing breeding Common Tern and Peregrine Falcon in the vicinity of the construction area, it is necessary that construction works at the proposed Gouldings site do not start within the breeding period April to July, so as not to introduce a new disturbance during the breeding cycle. Works should already be underway by April so birds are acclimatised before egg laying, or start in August.</p> <p>Bats While no bats have been recorded on the proposed construction site, external lighting should be kept to a minimum during construction and operation, at locations where it is likely to disturb bats, and where possible will follow the Bat Conservation Ireland Lighting Guidelines and the Bat Conservation Trust 'Bats and artificial lighting in the UK' 2018 Guidelines, if applicable.</p>	<p>Permanent slight to imperceptible negative</p> <p>Permanent slight to imperceptible negative</p>

TIME FRAME / SCHEDULE	ASPECT/ RESOURCE	ENVIRONMENTAL MITIGATION / RECOMMENDATION	RESIDUAL IMPACT FOLLOWING MITIGATION
		<p>A CEMP has been developed to ensure that proposed construction works will not deteriorate the water quality and will safeguard the existing water quality status of the adjacent Lough Mahon. The key to avoid impacts to water during the construction works is good site management practices, tight controls, regular inspections and ongoing vigilance with staff and employees on site. These measures are outlined in the CEMP in Appendix 2.3, Volume 3 of the EIA/R. No additional mitigation is proposed here.</p>	

	<p><u>Control of in-situ Invasive Plant Species</u></p> <p>The large open bare paved areas and road side edges that dominate the overall Belvelly Port Facility site have become colonised by opportunistic plant species and are now significantly overgrown due to disuse. The dominant species is butterfly bush (<i>B. davidii</i>), a Medium Impact invasive species Error! Bookmark not defined. which is dominant and extensive in its distribution to the point of ubiquity.</p> <p>Significant sections of the treelines in the eastern boundary of the site are infected with old man's beard (<i>C. vitalba</i>), a Medium Impact invasive species Error! Bookmark not defined. which is also present in the shrubby growth adjacent to the south of the marsh in the northern annexe.</p> <p>The scrub to the south of the man-made lagoon and along the northeastern boundary of the Gouldings site is also dominated by butterfly bush (<i>B. davidii</i>) and an area of ca. 35m², adjacent to the southern bank of the lagoon, has been colonised by winter heliotrope (<i>P. fragrans</i>), a Medium Risk invasive species Error! Bookmark not defined.</p> <p>In order to appropriately manage these invasive species as part of the BMDC application (Planning Ref. 19/06783), Invasive Plant Management Plans and species specific Control Programmes will be consulted and adhered to. Invasive species management methodologies and plans outlining Best Available Techniques (BAT) will be sourced from current best practice/TII (The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads).</p> <p>Bio -security</p> <p>To prevent the transfer of in situ invasives off site and the introduction of ex-situ invasive plant species to the site, the following measures are proposed:</p> <ul style="list-style-type: none"> - To reduce the likelihood of invasive species being introduced to the site from quarries, the aggregate will be crushed stone which will be biologically inert and would not be expected to have a seed bank. - To reduce the likelihood of invasive species spreading throughout the site, the construction personnel involved in works will be trained in basic relevant invasive species prevention and management. - Invasive species management methodologies and plans outlining Best Available Techniques (BAT) will be sourced from current best practice/TII (The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads). <p>5.4.7 Monitoring</p> <p>Bird monitoring will be undertaken prior to construction works commencing, during</p>	<p>Permanent slight to imperceptible negative</p>
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TIME FRAME / SCHEDULE	ASPECT/ RESOURCE	ENVIRONMENTAL MITIGATION / RECOMMENDATION	RESIDUAL IMPACT FOLLOWING MITIGATION
		<p>construction work and following completion of the construction works. The survey design should be developed by a suitably qualified ecologist.</p> <p><u>Otter</u></p> <p>Prior to any works being carried out, a pre-construction otter survey will be undertaken to ensure that no otters have taken up residence within 150m of the proposed development. Should any holts be identified within the proposed zone of influence of the project, additional surveys will be undertaken under the appropriate NPWS licence. Any holts found to be present will be subject to monitoring and mitigation as set out in the NRA Guidelines for the Treatment of Otter prior to the Construction of National Road Schemes (2006).</p>	Permanent slight to imperceptible negative
	LAND AND SOILS	Drainage and associated pollution control measures will be implemented on site before the main body of construction activity commences.	No residual impact
	HYDROLOGY	<p>Specific details of the arrangements for the storage of liquids and hydrocarbons on site shall be submitted to, and agreed in writing with the planning authority prior to the commencement of development.</p> <p>A silt fence will be installed between the works and sensitive aquatic receptors. A single cut off drain will be installed around the proposed footprint of the fertiliser facility which will divert surface water to a silt collection pond for treatment.</p> <p>A surface water management plan will be prepared which will minimise the volume of water requiring treatment. The full details can be found in the CEMP, Appendix 2.3</p>	
	LAND AND SOILS	Drainage and associated pollution control measures will be implemented on site before the main body of construction activity commences.	No residual impacts
	MATERIAL ASSETS	The Contractor will be obliged to put measures in place to ensure that there are no interruptions to existing services unless this has been agreed in advance with the relevant service provider.	No residual impacts
	LANDSCAPE & VISUAL RESOURCES	Mature trees will be retained along western and southern boundaries as part of planning application 19/06783. Further retention of vegetation has been proposed within the confines of Marino House and Orangery as part of the proposed implementation of the Green Infrastructure Plan under planning application 19/06783. No mature trees have been recorded within the proposed development area assessed in this EIA/R.	No residual impacts

TIME FRAME / SCHEDULE	ASPECT/ RESOURCE	ENVIRONMENTAL MITIGATION / RECOMMENDATION	RESIDUAL IMPACT FOLLOWING MITIGATION
	TRAFFIC AND TRANSPORTATION	Preparation of a Construction Traffic Management Plan which will be submitted to and agreed with Cork County Council prior to construction commencement.	No residual impacts

TIME FRAME / SCHEDULE	ASPECT/ RESOURCE	ENVIRONMENTAL MITIGATION / RECOMMENDATION	RESIDUAL IMPACT FOLLOWING MITIGATION
DURING CONSTRUCTION PHASE	POPULATION AND HUMAN HEALTH	<p>A code of construction practice will be established which will have regard to Health and Safety on site and off site.</p> <p>During construction, no members of the public should be allowed onto the site without the permission of the developer.</p>	Slight to moderate short-term negative
	BIODIVERSITY	<p>Bats External lighting should be kept to a minimum during construction and operation, at locations where it is likely to disturb bats, and where possible will follow the Bat Conservation Ireland Lighting Guidelines and the Bat Conservation Trust 'Bats and artificial lighting in the UK' 2018 Guidelines, if applicable.</p> <p>Water Quality Controls A CEMP has been developed to ensure that works will not deteriorate the water quality and will safeguard the existing water quality status of the adjacent Lough Mahon. The key to avoid impacts to water during the construction works is good site management practices, tight controls, regular inspections and ongoing vigilance with staff and employees on site.</p> <p>Bio -security To prevent the transfer of in situ invasive plant species off site and the introduction of ex-situ invasive plant species to the site, the following measures are proposed:</p> <ul style="list-style-type: none"> To reduce the likelihood of invasive species being introduced to the site from quarries, the aggregate will be crushed stone which will be biologically inert and would not be expected to have a seed bank. To reduce the likelihood of invasive species spreading throughout the site, the construction personnel involved in works will be trained in basic relevant invasive species prevention and management. Invasive species management methodologies and plans outlining Best Available Techniques (BAT) will be sourced from current best practice/TII (The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads). 	Permanent slight to imperceptible negative
	HYDROLOGY	<p>Pollution Surface water pollution will be minimised by the implementation of good construction practices. The contractor will develop and implement a detailed construction</p>	Long term moderate positive impacts on surface water environment.

TIME FRAME / SCHEDULE	ASPECT / RESOURCE	ENVIRONMENTAL MITIGATION / RECOMMENDATION	RESIDUAL IMPACT FOLLOWING MITIGATION
		<p>environmental management plan (CEMP). Refer to Appendix 2.3 for the site-specific CEMP prepared as part of this planning application. At a minimum, the manual will be formulated in consideration of standard best practice</p> <p>Excavation works</p> <ul style="list-style-type: none"> • Temporary excavations during the construction stage will be backfilled as soon as reasonably practicable. • Surface water management will be required during excavation works and during piling. It is possible that there will be some surface water or ground water ingress into excavations. Any pumping from these works area will discharge to a silt collection pond to allow for settlement of suspended solids prior to discharge. • In the event that contaminated soils or subsoils containing other potentially contaminated material are discovered during excavation activities (identified through staining, discoloration, or odour), this soil will be segregated, stockpiled, sampled for waste classification purposes sufficient to meet the requirements of the applicable waste disposal facility, transported off-site by a licensed waste contractor, and disposed of in an approved waste treatment or disposal facility. <p>Drainage and Sediment Control</p> <p>Surface water managed by the implementation of good construction practices. A silt fence will be installed down gradient of terrestrial site works i.e. between the works and sensitive aquatic receptors during construction. A single cut off drain will be installed around the proposed footprint of the fertiliser facility. This drain will divert surface water to a silt collection pond for treatment. The full details are contained in the preliminary CEMP contained in Appendix 2.3.</p> <p>Waste</p> <ul style="list-style-type: none"> • Standard good waste management practices will be employed on the site during the construction and operational stages to ensure that waste management activities do not pose a risk to water quality. <p>Temporary Construction Compound</p> <ul style="list-style-type: none"> • Drainage within the temporary site compound will be directed to an oil interceptor to prevent pollution if any spillage occurs. • Temporary toilet facilities will be managed by the Contractor during the construction phase. 	

TIME FRAME / SCHEDULE	ASPECT/ RESOURCE	ENVIRONMENTAL MITIGATION / RECOMMENDATION	RESIDUAL IMPACT FOLLOWING MITIGATION
		<ul style="list-style-type: none"> • A bunded containment area will be provided within the compound for the storage of fuels, lubricants, oils etc. • The compound will be in place for the duration of the construction phase and will be removed once commissioning is complete. <p>Storage and Stockpiles</p> <ul style="list-style-type: none"> • Temporary stockpiles of excavated earth will be constructed within the lands made available. • Stockpiles will be located away from drainage systems and silt retaining measures (silt fence / silt curtain or other suitable materials) to reduce risk of silt run-off shall be installed along the downgradient edges of stockpiled earth materials. • All excavated materials from the site or introduced materials for construction will be either used or removed from the site. • No permanent spoil or stockpiles will be left on site, other than those materials required for landscaping, berm construction and construction generally. • Temporary storage areas for fuels and other hazardous materials required by the contractor during construction will be stored in appropriately bunded facilities to prevent the accidental spillage of hazardous liquids that could cause soil and groundwater contamination. • Collision with oil stores will be prevented by locating oils within a steel container in a designated area of the site compound away from vehicle movements. • Long term storage of waste oils will not be allowed on site. These waste oils will be collected in leak-proof containers and removed from the site for disposal or recycling by an approved service provider. • On-site washing of concrete truck barrels should not be allowed. The washing of the chutes at the rear of the trucks may be permitted. A designated wash area will be required. <p>Refuelling of Construction Plant On-Site</p> <ul style="list-style-type: none"> • Refuelling will be carried out using 110% capacity double bunded mobile bowsters. The refuelling bowser will be operated by trained personnel. The bowser will have spill containment equipment which the operators will be fully trained in using. • Plant nappies or absorbent mats to be placed under refuelling point during all refuelling to absorb drips. 	

TIME FRAME / SCHEDULE	ASPECT/ RESOURCE	ENVIRONMENTAL MITIGATION / RECOMMENDATION	RESIDUAL IMPACT FOLLOWING MITIGATION
		<ul style="list-style-type: none"> • Mobile bowsters, tanks and drums should be stored in secure, impermeable storage area, away from drains and open water. • To reduce the potential for oil leaks, only vehicles and machinery will be allowed onto the site that are mechanically sound. An up to date service record will be required from the main contractor. • Should there be an oil leak or spill, the leak or spill will be contained immediately using oil spill kits; the nearby dirty water drain outlet will be blocked with an oil absorbent boom until the fuel/oil spill has been cleaned up and all oil and any contaminated material removed from the area. This contaminated material will be properly disposed of in a licensed facility. • The site Environmental representative will be immediately informed of the oil leak/spill, and will assess the cause and the management of the clean-up of the leak or spill. They will inspect nearby drains for the presence of oil, and initiate the clean-up if necessary. • Immediate action will be facilitated by easy access to oil spill kits. An oil spill kit that includes absorbing pads and socks will be kept at the site compound and also in site vehicles and machinery. • Correct action in the event of a leak or spill will be facilitated by training all vehicle/machinery operators in the use of the spill kits and the correct containment and cleaning up of oil spills or leaks. This training will be provided by the Environmental Manager at site induction. In the event of a major oil spill, a company who provide a rapid response emergency service for major fuel spills will be immediately called for assistance, their contact details will be kept in the site office and in the spill kits kept in site vehicles and machinery. 	
		<p>Construction Wheel Wash</p> <ul style="list-style-type: none"> • A Construction Wheel Wash will be used to wash truck tyres leaving the construction site. Water residue from the wheel wash will be fed through a settlement pond, interceptor and then discharge to the stormwater drainage network. The wheel wash area will be cleaned regularly so as to avoid the build-up of residue. 	

TIME FRAME / SCHEDULE	ASPECT / RESOURCE	ENVIRONMENTAL MITIGATION / RECOMMENDATION	RESIDUAL IMPACT FOLLOWING MITIGATION
	HYDROGEOLOGY	<ul style="list-style-type: none"> The contractor will develop and implement a detailed construction environmental management plan (CEMP) which will outline standard best practices of surface water pollution prevention and control. Groundwater abstracted during dewatering will be treated in settlement lagoons to remove suspended sediment prior to discharge. Use of best practice construction management as detailed within the CEMP to prevent spillages and their environmental consequences. Groundwater monitoring wells that require decommissioning should follow best practice methods to prevent the creation of vertical preferential pathways to groundwater. Groundwater wells that will be retained for future monitoring should be protected with physical protective measures and clearly signposted to avoid potential damage by construction activities. Groundwater monitoring will be undertaken throughout. Well head protection should be evaluated following completion of construction and new protective head works installed if needed to facilitate long term well protection and facilitate safe access for future monitoring. 	Neutral impact on groundwater quality, flow direction and contaminant transport.
	LAND AND SOILS	<p>Standard mitigation</p> <p>The following mitigation measures are recommended:</p> <ul style="list-style-type: none"> Sustainable use of materials on site. Workers on-site should be briefed prior to commencing work with regard to appropriate use and disposal of waste; Tight control on material required to avoid waste. Incoming materials should be of a suitable quantity so as to ensure a minimum amount of waste is generated; Temporary storage areas for fuels and other hazardous materials required by the contractor during construction will be stored in appropriately bunded facilities to prevent the accidental spillage of hazardous liquids that could cause soil and groundwater contamination. 	No Residual Impacts
	AIR QUALITY AND CLIMATE	<ul style="list-style-type: none"> Cognisance would be taken of the guidelines published by the Institute of Air Quality Management (IAQM), "Assessment of dust from demolition and construction 2014" Material handling systems will be designed to minimise exposure to wind Stockpiles of materials will be laid out to minimise exposure to wind 	No Residual Impacts

TIME FRAME / SCHEDULE	ASPECT/ RESOURCE	ENVIRONMENTAL MITIGATION / RECOMMENDATION	RESIDUAL IMPACT FOLLOWING MITIGATION
		<ul style="list-style-type: none"> • Prolonged storage of materials at the site will be avoided • A 15kph speed limit will be implemented for all traffic at the site • Vehicles that transport materials to and from the site will be fitted with covers to prevent material loss • Public roads outside the site would be regularly inspected for cleanliness and cleaned as necessary using a road sweeper or other effective measures • Any un-surfaced roads would be restricted to essential construction site traffic only • While the natural recolonisation of exposed areas of soil during reinstatement activities is preferred, re-seeding would be undertaken where required to promote the rapid stabilisation of soils • Regular visual inspections will be undertaken around the site to monitor the effectiveness of dust control measures. • Water misting plant, such as bowsers and sprays will be used as required and where necessary • Wheel-wash facilities would be provided for vehicles exiting the site to reduce track-out of potential dust materials onto public roads. 	
	NOISE AND VIBRATION	<ul style="list-style-type: none"> • Onsite haul routes used by trucks will be maintained in good condition and free of potholes in order to avoid banging of empty truck bodies. • Project specifications given to the appointed contractor(s) will include a provision that all plant and exhaust silencers will be maintained in a satisfactory condition at all times. • Where it becomes necessary to introduce potentially noisy plant or processes which have not been assessed in this E/AR, noise impacts associated with same will be evaluated in advance. • Any requirement to undertake concrete breaking outside of daytime hours will be assessed in advance. • All plant and machinery used onsite will be maintained in accordance with manufacturer specifications. • Construction phase operations will apply guidance and recommendations included in British Standard BS 5228:2009+A1:2014. • A site liaison officer will be appointed to establish channels of communication between the contractor/developer, the local authority and residents. 	Neutral to slight negative and temporary

TIME FRAME / SCHEDULE	ASPECT / RESOURCE	ENVIRONMENTAL MITIGATION / RECOMMENDATION	RESIDUAL IMPACT FOLLOWING MITIGATION
		<ul style="list-style-type: none"> A complaints procedure will be established for the duration of the construction phase. Any complaints received regarding alleged noise and/or groundborne vibration will be investigated immediately. Details of the complainant, the complaint (time of occurrence and nature of noise/vibration) and follow up action will be logged in the complaints record. 	
	LANDSCAPE AND VISUAL	Mature trees will be retained along western and southern boundaries as part of planning application 19/06783. Further retention of vegetation has been proposed within the confines of Marino House and Orangery as part of the proposed implementation of the Green Infrastructure Plan under planning application 19/06783. No mature trees have been recorded within the proposed development area assessed in this E.IAR.	No residual impact
	TRAFFIC AND TRANSPORTATION	<ul style="list-style-type: none"> Exportation and importation traffic hours will be kept to between 9.00 a.m. and 4.00p.m. Monday to Friday, and 8.00 a.m. to 5.00 p.m. on Saturdays to avoid coinciding with peak traffic. 	On the basis of the EPA Guidelines, the proposed works will have slight to moderate short-term negative effects.
	ARCHITECTURE AND CULTURAL HERITAGE	<ul style="list-style-type: none"> Intermittent archaeological monitoring will be carried out on the site during construction. Archaeological monitoring will be focussed on those areas where the installation of necessary underground services (drains etc.) will exceed the depth of fill material. The areas to be archaeologically monitored will be established in advance by the appointed archaeologist when the full construction details are in place. 	No Residual Impacts

TIME FRAME / SCHEDULE	ASPECT/ RESOURCE	ENVIRONMENTAL MITIGATION / RECOMMENDATION	RESIDUAL IMPACT FOLLOWING MITIGATION
PRIOR TO FIRST OPERATION	HYDROLOGY	The offices, toilet and any temporary storage container will be removed from site at the end of the construction period.	No residual impacts
	LANDSCAPE AND VISUAL	Retention of mature trees along western and southern boundaries. Further retention of vegetation within the confines of Marino House and Orangery. Implementation of Green Infrastructure Plan. All above undertaken under planning application 19/06783	No residual impacts
	NOISE AND VIBRATION	A site noise management plan will be drawn up prior to the commencement of operations.	No residual impacts

TIME FRAME / SCHEDULE	ASPECT/ RESOURCE	ENVIRONMENTAL MITIGATION / RECOMMENDATION	RESIDUAL IMPACT FOLLOWING MITIGATION
DURING OPERATIONAL PHASE	HYDROLOGY	<p>Proposed Agricultural Fertiliser Facility</p> <ul style="list-style-type: none"> • During operation of the proposed agricultural fertiliser facility, an environmental management plan (EMP) will be in place to ensure compliance with environmental legislative requirements and planning consent. This will include full containment of potential pollutant sources, site-specific emergency response measures and management of surface water run-off and wastewater discharge. • The unloading and handling of bulk granular fertiliser at the existing jetty will be undertaken following agreed operational procedures that minimises the potential for the generation of contaminated run –off. Mobile cranes with clamshell grabs will be used to prevent loss of material, the grab will be lowered into a hopper and the fertiliser will be transferred in covered trailers to the facility. In addition to the controlled handling of the bulk granular fertiliser, road sweepers and manual sweeping will be employed on the jetty as required. The jetty drainage network will be operated to ensure no release of contaminated water into the harbour takes place. Full details of the jetty drainage are provided below in Section 7.4.2.2 of Chapter 7 Hydrology. • Surface water from the fertiliser facility will be discharged to Lough Mahon via the existing outfall and in accordance with a discharge licence which will be obtained from Cork County Council. • Foul wastewater from the facility will be conveyed to the Belvelly Port Facility WWTP which is to be constructed under planning application 19/06783. The treated foul effluent will be discharged to Lough Mahon via an existing outfall and in accordance with a discharge licence which will be obtained from Cork County Council. 	No residual impact

TIME FRAME / SCHEDULE	ASPECT/ RESOURCE	ENVIRONMENTAL MITIGATION / RECOMMENDATION	RESIDUAL IMPACT FOLLOWING MITIGATION
		<p>Operational Use of the Jetty</p> <p>Operational procedures will be employed during the handling of bulk cargo at the jetty that minimises the potential generation of contaminated run off. In addition to controlled handling of cargo, road sweepers and manual sweeping will be employed on the jetty as required. During operation, the jetty drainage network system will be operated to ensure no risk of pollution of the receiving waters exists. The following operating procedures are proposed:</p> <ul style="list-style-type: none"> • The valves in the pumping station are closed during offloading; • If the offloading is in dry weather, the jetty is swept clean and then washed down as required; • The resulting wash water will be manually tested and, if clear, discharged through the oil interceptor. If contaminated it is diverted for treatment or disposal; • If the offloading takes place in wet weather, then the collected storm water will be manually tested before release or diversion; • At all times, other than offloading, the valve to the oil interceptor will be left open so that storm water can discharge normally; • Where there is a risk of a contamination incident due to the type of cargo being handled at the jetty, surface water will be pumped to a retention tank. The pumping station will be positioned underground on the main Belvelly Port Facility site at a depth of 4.5m. An isolator switch situated at the pumping station will be used to manually divert any runoff to this tank either as an operational procedure at the time of loading/unloading cargo or as a procedure to be carried out in the event of a spill or possible contamination. Once the surface water in the tank has been tested for contaminants it will either be transferred through the oil interceptor to the outfall or will require collection and appropriate disposal off site • The individual users of the jetty will be responsible for the proper implementation of these operating procedures; <ul style="list-style-type: none"> • A 150mm high kerb around the perimeter of the jetty and access bridge provides an extra safeguard. • If storm water is found to be contaminated and is diverted, the jetty user will be responsible for the appropriate management of the contamination. Contaminated water should be dealt with within two days so that the diversion tank is available for the next user of the jetty. 	

TIME FRAME / SCHEDULE	ASPECT / RESOURCE	ENVIRONMENTAL MITIGATION / RECOMMENDATION	RESIDUAL IMPACT FOLLOWING MITIGATION
	HYDROGEOLOGY	<ul style="list-style-type: none"> • Appropriate storage and handling of hazardous liquids (e.g. bunding). • Use of standard operating procedures and training to minimise potential spillage and loss of materials to ground. • Use of spill kits to enable efficient clean-up operations in the event of spills. • Maintenance of spill logs to track incidents, improve performance and ensure that all spillages are adequately remediated. • Investigations following major spillage that are suspected to have bypassed surface protection systems to assess potential impacts to soil and groundwater and remediate as necessary 	<p>Cumulative positive slight to moderate impact on groundwater quality (improvement) as less recharge and leaching of residual nitrogen in the unsaturated zone occurs over the long term.</p> <p>Neutral to imperceptible impact to groundwater flow directions.</p>
	BIODIVERSITY	<p>Bats External lighting should be kept to a minimum during construction and operation, at locations where it is likely to disturb bats, and where possible will follow the Bat Conservation Ireland Lighting Guidelines and the Bat Conservation Trust 'Bats and artificial lighting in the UK' 2018 Guidelines, if applicable.</p>	<p>Permanent slight to imperceptible negative</p>
	LAND AND SOILS	<ul style="list-style-type: none"> • Diesel, kerosene and coating oil will be stored in bunded containment areas. Best practice controls will be used for the both the diesel tank and coating oil tank operations. These will include appropriate design codes for the tanks, flexible hoses and solid pipework, bunding to an appropriate code, level monitoring and independent automatic overflow protection on the tanks and an appropriate mechanical integrity programme for the tank, hoses and fixed pipelines. The diesel and kerosene tanks will double-contained tanks and the coating oil tank will be a pressure rated ISO steel tank. • Fire water retention will be provided on site which will also act as tertiary containment for these materials. 	<p>No residual impact</p>

TIME FRAME / SCHEDULE	ASPECT/ RESOURCE	ENVIRONMENTAL MITIGATION / RECOMMENDATION	RESIDUAL IMPACT FOLLOWING MITIGATION
	<p>NOISE AND VIBRATION</p>	<ul style="list-style-type: none"> All plant and machinery used onsite will be maintained in accordance with manufacturer specifications. In particular, exhaust silencers will be maintained in a satisfactory condition. No potentially noisy loading or unloading operations will be carried out during the period 1900-0700 h unless required for emergency or other purposes. Vessel captains will be advised that use of vessel fog horns while at the jetty is prohibited. Engines and fans on bulk carrier and other cargo vessels will be shut down while docked. Truck drivers will be advised that use of truck horns at the jetty is prohibited. Repair and maintenance activities which require hammering of metal (e.g. hulls) will not be permitted at the jetty. A site noise management plan will be drawn up prior to the commencement of operations. All Port of Cork personnel accessing the jetty will be required to undergo noise training at intervals. The training programme will include elements regarding the importance of noise control, the proximity of residential receptors, adherence to the noise management plan, and the importance of bringing potential noise issues to the attention of supervisors. A site liaison officer will be appointed to establish channels of communication between the applicant, the local authority and residents. A complaints procedure will be established. Any complaints received regarding alleged noise and/or groundborne vibration will be investigated immediately. Details of the complainant, the complaint (time of occurrence and nature of noise/vibration) and follow up action will be logged in the complaints record. 	<p>Neutral residual impact</p>
<p>LANDSCAPE AND VISUAL</p>		<p>Retention of mature trees along western and southern boundaries. Further retention of vegetation within the confines of Marino House and Orangery. Implementation of Green Infrastructure Plan. All above done under planning application 19/06783. No additional mitigation required as part of this EIAR.</p> <p>The siting, layout and design of the development will seek to minimise landscape and visual impact by utilising an existing industrial site and jetty.</p>	<p>The proposed development will be visible from several locations during both the construction and operational phases. Specific residual impacts relating to the landscape and visual aspect of the proposed development as experienced from several viewpoints are described in Section 11.5 of Chapter 11 Landscape and Visual.</p>

TIME FRAME / SCHEDULE	ASPECT/ RESOURCE	ENVIRONMENTAL MITIGATION / RECOMMENDATION	RESIDUAL IMPACT FOLLOWING MITIGATION
	<p>AIR QUALITY AND CLIMATE</p>	<p>Emissions from the proposed operation of the Belvelly Port Facility will be minimised and managed through the implementation of good proactive cargo handling procedures. Abatement includes standard operating procedures (SOPs) for minimising the likelihood of dust particles becoming airborne including:</p> <p>Material handling crane operation such as:</p> <ul style="list-style-type: none"> • Ensure that grab is operating properly and does not leak when full. • When grabbing fertiliser, grab shall not be lifted clear of hold until excess fertiliser has fallen or been shaken off. • Avoid overfilling grab. • Grab is lowered into the hopper before discharge to the trailer • Keep grab as low as possible over the hopper to minimise drop height before opening. • Do not over fill trailer. <p>Hopper operation:</p> <ul style="list-style-type: none"> • Ensure that hopper is positioned as close to ship as possible to minimise crane movement and maximise distance to facility boundary. • Fully lower grabs into hopper. • Ensure that any screens on hopper are positioned correctly. • Check condition of curtains on hopper for integrity. • Position trucks centrally under hopper. • Communicate with driver to move truck forward as required. • Avoid fully emptying hopper. • Trucks shall not be overfilled. Avoid spillages. 	<p>Negligible residual impact</p>

TIME FRAME / SCHEDULE	ASPECT/ RESOURCE	ENVIRONMENTAL MITIGATION / RECOMMENDATION	RESIDUAL IMPACT FOLLOWING MITIGATION
		<p>Truck operation</p> <ul style="list-style-type: none"> • Tailgate to be securely closed after tipping at the store and BEFORE leaving the store and returning to the weighbridge/hopper. No trailer with defective or leaking tailboard is to be employed. • Trucks to be driven at moderate speeds. (less than 30Km/hr) • Any truck which is departing the facility is to be covered immediately. <p>Housekeeping to minimise emissions:</p> <ul style="list-style-type: none"> • All spills to be cleaned up immediately and removed. • Road sweeper to be used if fertiliser spillage and dust are noted on roads and open areas. • Clean hoppers after use. <p>Abatement also includes standard operating procedures (SOPs) for dust abatement including:</p> <ul style="list-style-type: none"> • The use of water sprays to control dust emissions downwind of operations while grabbing/dischARGE is underway. • Operate road sweeper at more regular intervals. <p>Operational site management including the use of weather forecasts to plan operations to minimise emissions.</p> <p>All bulk materials that have been unloaded from ships will be transferred to an enclosed building for storage, stockpiling, blending and bagging. Enclosing these activities within a building will significantly reduce emissions of dust to the atmosphere from these activities. This has been demonstrated as an effective method for controlling emissions of dust at the existing agricultural fertiliser blending and bagging facility in Cork City. It should be noted that the existing facility has no history of complaints from the existing community that lives in much closer proximity than the nearest community to the proposed development at Marino Point.</p>	<p>Slight to moderate negative impact</p>

TIME FRAME / SCHEDULE	ASPECT/ RESOURCE	ENVIRONMENTAL MITIGATION / RECOMMENDATION	RESIDUAL IMPACT FOLLOWING MITIGATION
	TRAFFIC AND TRANSPORTATION	<p>The proposals for improvement for road users submitted for consideration by Cork County Council Cork as part of planning reference: 19/06783 have been conditioned by the Council as part of their planning permission notification for the proposed demolition and site infrastructure works.</p> <p>As part of the sample planning reference 19/06783, a proposed reservation for the provision of a four metres wide route for pedestrians and cyclists connecting to the R624 to the north and south of the proposed development, was submitted to Cork County Council, and has been conditioned by the Council as part of their planning permission notification.</p> <p>These proposals would support the plans of Cork County Council to enhance sustainable travel between Cobh, Marino Point and Cobh Cross. The proposals and those of Cork County Council would also support a link for public transport users, between Marino Point and the existing public transport services at Cobh.</p>	Slight to moderate negative impact