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Greater Dublin Drainage Project

Irish Water

Environmental Impact Assessment Report: Volume 3 Part A of 6

Chapter 22 Risk of Major Accidents and/or Disasters

June 2018

Contents

22. Risk of Major Accidents and/or Disasters	1
22.1 Introduction	1
22.2 Risk of Major Accidents and/or Disasters	3
22.3 Methodology	3
22.3.1 Scope and Context	3
22.3.2 Guidelines and Reference Material	4
22.3.3 Risk Assessment Methodology	5
22.4 Predicted Impacts	7
22.5 Mitigation Measures	11
22.5.1 Mitigation Measures Embedded in the Proposed Project Design	12
22.5.2 Traffic Management Plans	13
22.5.3 Environmental Incident Response Plan	13
22.5.4 Odour Management Plan	14
22.5.5 Surface Water Management Plan	14
22.5.6 Vessel Management Plan	14
22.6 Residual Impacts	14
22.7 Monitoring	14
22.8 Conclusion	14
22.9 References	15

22. Risk of Major Accidents and/or Disasters

22.1 Introduction

The Greater Dublin Drainage Project (hereafter referred to as the Proposed Project) will form a significant component of a wider strategy to meet future wastewater treatment requirements within the Greater Dublin Area as identified in a number of national, regional and local planning policy documents. The plant, equipment, buildings and systems associated with the Proposed Project will be designed, equipped, operated and maintained in such a manner to ensure a high level of energy performance and energy efficiency.

The table below includes a summary of the Proposed Project elements. A full description of the Proposed Project is detailed within Volume 2 Part A, Chapter 4 Description of the Proposed Project of this Environmental Impact Assessment Report (EIAR).

Proposed Project Element	Outline Description of Proposed Project Element
Proposed Wastewater Treatment Plant (WwTP)	<ul style="list-style-type: none"> • WwTP to be located on a 29.8 hectare (ha) site in the townland of Clonshagh (Clonshaugh) in Fingal. • 500,000 population equivalent wastewater treatment capacity. • Maximum building height of 18m. • Sludge Hub Centre (SHC) to be co-located on the same site as the WwTP with a sludge handling and treatment capacity of 18,500 tonnes of dry solids per annum. • SHC will provide sustainable treatment of municipal wastewater sludge and domestic septic tank sludges generated in Fingal to produce a biosolid end-product. • Biogas produced during the sludge treatment process will be utilised as an energy source. • Access road from the R139 Road, approximately 400m to the southern boundary of the site. • Egress road, approximately 230m from the western boundary of the site, to Clonshaugh Road. • A proposed temporary construction compound to be located within the site boundary.
Proposed Abbotstown pumping station	<ul style="list-style-type: none"> • Abbotstown pumping station to be located on a 0.4ha site in the grounds of the National Sports Campus at Abbotstown. • Abbotstown pumping station will consist of a single 2-storey building with a ground level floor area of 305m² and maximum height of 10m and a below ground basement 17m in depth with floor area of 524m² incorporating the wet/dry wells. • The plan area of the above ground structure will be 305m² and this will have a maximum height of 10m. • A proposed temporary construction compound to be located adjacent to the Abbotstown pumping station site.
Proposed orbital sewer route	<ul style="list-style-type: none"> • The orbital sewer route will intercept an existing sewer at Blanchardstown and will divert it from this point to the WwTP at Clonshagh. • Constructed within the boundary of a temporary construction corridor. • 13.7km in length; 5.2km of a 1.4m diameter rising main and 8.5km of a 1.8m diameter gravity sewer. • Manholes/service shafts/vents along the route. • Odour Control Unit at the rising main/gravity sewer interface. • Proposed temporary construction compounds at Abbotstown, Cappoge, east of Silloge, Dardistown and west of Collinstown Cross to be located within the proposed construction corridor.
Proposed North Fringe Sewer (NFS) diversion sewer	<ul style="list-style-type: none"> • The NFS will be intercepted in the vicinity of the junction of the access road to the WwTP with the R139 Road in lands within the administrative area of Dublin City Council. • NFS diversion sewer will divert flows in the NFS upstream of the point of interception to the WwTP. • 600m in length and 1.5m in diameter. • Operate as a gravity sewer between the point of interception and the WwTP site.
Proposed outfall pipeline route (land based section)	<ul style="list-style-type: none"> • Outfall pipeline route (land based section) will commence from the northern boundary of the WwTP and will run to the R106 Coast Road. • 5.4km in length and 1.8m in diameter. • Pressurised gravity sewer. • Manholes/service shafts/vents along the route. • Proposed temporary construction compounds (east of R107 Malahide Road and east of Saintdoolaghs) located within the proposed construction corridor.
Proposed outfall pipeline route (marine section)	<ul style="list-style-type: none"> • Outfall pipeline route (marine section) will commence at the R106 Coast Road and will terminate at a discharge location approximately 1km north-east of Ireland's Eye. • 5.9km in length and 2m in diameter. • Pressurised gravity tunnel/subsea (dredged) pipeline. • Multiport marine diffuser to be located on the final section. • Proposed temporary construction compounds (west and east of Baldoyle Bay) to be located within the proposed construction corridor.
Proposed Regional Biosolids Storage Facility	<ul style="list-style-type: none"> • Located on an 11ha site at Newtown, Dublin 11. • Maximum building height of 15m. • Further details and full impact assessment are provided in Volume 4 Part A of this EIAR.

The total Construction Phase will be approximately 48 months, including a 12 month commissioning period to the final Operational Phase. The Proposed Project will serve the projected wastewater treatment requirements of existing and future drainage catchments in the north and north-west of the Dublin agglomeration, up to the Proposed Project's 2050 design horizon.

22.2 Risk of Major Accidents and/or Disasters

Article 3 of Directive 2014/52/EU of 16 April 2014 on the assessment of the effects of certain public and private projects on the environment (Environmental Impact Assessment (EIA) Directive) requires for the assessment of expected effects of major accidents and/or disasters within EIA. Article 3(2) of the Directive states that the 'effects referred to in paragraph 1 on the factors set out therein shall include the expected effects deriving from the vulnerability of the project to risks of major accidents and/or disasters that are relevant to the project concerned'.

The *Revised Guidelines on the Information to be Contained in Environmental Impact Statements* (EPA 2015a) refers to Accidents, recommending that 'Aspects of the proposal that could cause accidents with a likelihood of creating significant environmental impacts should be considered'. The *Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* (EPA 2017) elaborate on risk assessment further under Section 3.7.3: '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 Chapter of the EIAR identifies how the potential for accidents and disasters relevant to the Proposed Project have been identified and how those risks have been managed. This Chapter considers:

- Major accidents and/or natural disasters (MANDs) that the Proposed Project may be vulnerable to;
- The potential for significant adverse environmental impacts resulting from such a MAND; and
- Existing and proposed mitigation measures to prevent or mitigate the likely significant adverse impacts of such events on the environment.

For the purposes of this assessment, the following definitions have been adopted:

- Major Accident – incidents or events that threaten immediate or chronic serious damage to human health, welfare and/or the environment;
- Natural Disaster – naturally occurring extreme weather events (e.g. storm, flood, temperature) with the potential to cause an event or incident;
- Risk – defined as the likelihood of an incident occurring, combined with magnitude effect or consequence(s) of the impact on a receptor or surrounding area; and
- Significance – Significant impact resulting from MANDs are adverse impacts if they meet the criteria for 'Significant', 'Very Significant' or 'Profound' under the Draft EPA Guidelines (EPA 2017).

22.3 Methodology

22.3.1 Scope and Context

The identification, control and management of risk is an integral part of the design and assessment process throughout all stages of a project lifecycle. For example, a Flood Risk Assessment was carried out during the site selection process to ensure that the selected site for the proposed WwTP at Clonshagh and the proposed Abbotstown pumping station were not located in areas vulnerable to flood risk. The Proposed Project will be designed, built and operated in line with current international best practice and guidelines. The elements of the Proposed Project incorporate technologies and measures that are designed to reduce and eliminate the occurrence of accidents. Measures to control risks associated with Construction Phase activities are incorporated

into the Outline Construction Environmental Management Plan. Measures to control risks associated with Operational Phase activities will be incorporated into Operational Phase plans by the appointed contractor(s).

The scoping criteria for this risk assessment is:

- Identify MANDs (i.e. unplanned incidents) that the Proposed Project may be vulnerable to; and
- Assess the consequent impacts and significance of such incidents in relation to the environmental, social and economic receptors that may be affected.

Such risks may be present at the Construction Phase, Operational Phase and Decommissioning Phase of the Proposed Project.

22.3.2 Guidelines and Reference Material

The development of the risk assessment methodology has been informed by the following guidelines:

- *Advice Notes for Preparing Environmental Impact Statements* (EPA 2015b);
- *Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* (EPA 2017);
- *National Risk Assessment 2017 Overview of Strategic Risks* (Department of the Taoiseach 2017);
- *Guidance on Assessing and Costing Environmental Liabilities* (EPA 2014);
- *A Guide to Risk Assessment in Major Emergency Management* (Department of Environment, Heritage and Local Government¹ (DoEHLG) 2010); and
- *A National Risk Assessment for Ireland 2017* (Department of Defence 2017).

The following plans and assessments have also informed the assessment:

- *Major Emergency Plan of Fingal County Council* (Fingal County Council 2011);
- *Maximum Aircraft Movement Data and the Calculation of Risk and PSZs: Dublin Airport* (Department of Transport and the Department of Environment, Heritage and Local Government 2005);
- *Huntstown Power Station – Accident Prevention and Emergency Response Plan* (Huntstown Power Company Limited 2006);
- *Huntstown Quarry – Environmental Contingency Plan* (Roadstone 2017);
- *Guide to Field Storage of Biosolids* (United States EPA 2000); and
- *The Fire and Explosion Hazards of Dried Sewage Sludge* (Manchester 2000).

In addition to the above guidelines, the following Irish Water procedures and protocols also informed the development of the risk assessment:

Irish Water Procedures:

- HSQE-SOP-024 – *Irish Water Incident Management Procedure* (the main document from which all other procedures and Standard Operating Procedures (SOPs) derive) (Irish Water 2014);
- HSQE-SOP-025 – *Irish Water Emergency Response Plan* (Irish Water 2014);
- HSQE-SOP-036 – *Irish Water Crisis Response Plan* (Irish Water 2017); and

¹ The Department of the Environment, Heritage and Local Government is now the Department of Housing, Planning and Local Government, and the environment is now covered under the Department of Communications, Climate Action and Environment

- CCS-SOP-01 – *Communications Incident Management Procedure* (Irish Water 2014).

Irish Water Policies:

- IW-PRT-IMT-001 – *Incident Management Governance* (Irish Water 2014);
- IW-PRT-IMT-002 – *Management of Drinking Water Incidents* (Irish Water 2013);
- IW-PRT-IMT-003 – *Management of Wastewater Incidents* (Irish Water 2016);
- IW-PRT-IMT-004 – *Management of Health & Safety Incidents* (Irish Water 2013); and
- IW-PRT-IMT-005 – *Management of Environmental Incidents* (Irish Water 2013).

22.3.3 Risk Assessment Methodology

The assessment is set out in three stages:

- Identification and Screening;
- Risk Classification; and
- Risk Evaluation.

Identification and Screening

The first stage of the assessment is to identify potential unplanned risks that the Proposed Project may be vulnerable to. An initial list of MANDs were sourced through consultation with relevant environmental specialists, and using the guidelines and reference documentation.

The list of potential MANDs was subjected to an initial screening assessment to identify the potential risks that meet the scoping criteria. The risks were screened out of the assessment according to the following criteria:

- MANDs addressed in the Design Risk Assessment for the design and planning phase of the Proposed Project;
- MANDs that have already been assessed in other areas of this EIA. These are summarised and referenced in this Section;
- MANDs associated with Construction Phase and Operational Phase activities that fall within the scope of health and safety legislation and associated obligations;
- MANDs where no 'Source-Pathway-Receptor' linkage exists. Examples include incidents that cannot be plausibly associated with the Proposed Project, such as volcanic activity, earthquakes and risk of nuclear accidents; and
- MANDs that possess low likelihood/low consequence, as they do not meet the criteria of the assessment.

Risk Classification

Following the initial identification and screening process, remaining MANDs were evaluated with regard to the likelihood of occurrence and the potential impact. The rating criteria adopted for the assessment follows that used in *A Guide to Risk Assessment in Major Emergency Management* (DoEHLG 2010). The Draft EPA Guidelines (EPA 2017) state that the risk assessment must be based on a 'worst case' approach. Therefore, the consequent rating assumes that all proposed mitigation measures and safety procedures have failed to prevent the MAND.

The classification and rating of likelihood and consequence are provided in Table 22.1 and Table 22.2 below.

Table 22.1: Classification of Likelihood

Rating	Classification	Impact Description
1	Extremely Unlikely	May occur only in exceptional circumstances; once every 500 or more years
2	Very Unlikely	Is not expected to occur; no recorded incidents or anecdotal evidence; and/or very few incidents in associated organisations, facilities or communicates; and/or little opportunity, reason or means to occur. May occur once every 100 to 500 years.
3	Unlikely	May occur at some time; and/or few, infrequent, random recorded incidents or little anecdotal evidence; some incidents in associated or comparable organisations worldwide; some opportunity, reason or means to occur. May occur once every 10 to 100 years.
4	Likely	Likely to or may occur; regular recorded incidents and strong anecdotal evidence. Will probably occur once every one to 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.

Table 22.2: Classification of Consequence

Rating	Classification	Impact	Description
1	Minor	Life, Health, Welfare, Environment, Infrastructure, Social	<ul style="list-style-type: none"> • Small number of people affected; no fatalities and small number of minor injuries with first aid treatment • No contamination, localised effects • <0.5M Euro • Minor localised disruption to community services or infrastructure (<6 hours)
2	Limited	Life, Health, Welfare, Environment, Infrastructure, Social	<ul style="list-style-type: none"> • Single fatality; limited number of people affected; a few serious injuries with hospitalisation and medical treatment required. Localised displacement of a small number of people for 6-24 hours. Personal support satisfied through local arrangements • Simple contamination, localised effects of short duration • 0.5M-3M Euro • Normal community functioning with some inconvenience
3	Serious	Life, Health, Welfare, Environment, Infrastructure, Social	<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. • Simple contamination, widespread effects or extended duration • 3M-10M Euro • Community only partially functioning, some services available
4	Very Serious	Life, Health, Welfare, Environment, Infrastructure, Social	<ul style="list-style-type: none"> • 5 to 50 fatalities, up to 100 serious injuries, up to 2,000 evacuated • Heavy contamination, localised effects or extended duration • 10M-25M Euro • Community functioning poorly, minimal services available •

Rating	Classification	Impact	Description
5	Catastrophic	Life, Health, Welfare, Environment, Infrastructure, Social	<ul style="list-style-type: none"> • Large numbers of people impacted with a significant number of fatalities (>50), injuries in the hundreds, more than 2000 evacuated. • Very heavy contamination, widespread effects of extended duration. • >25M Euros • Serious damage to infrastructure causing significant disruption to, or loss of, key services for prolonged period. Community unable to function without significant support

Risk Evaluation

In accordance with the DoEHLG’s (2010) guidelines, the evaluated MANDs will be subject to a risk matrix to determine the level of significance of each risk for each scenario. These have been grouped according to three categories:

High Risk

Scenarios that have an evaluation score of 15 to 25, as indicated by the Red Zones in Table 22.3.

Medium Risk

Scenarios that have an evaluation score of 8 to 12, as indicated by the Amber Zone in Table 22.3.

Low Risk

Scenarios that have an evaluation score 1 to 6, of as indicated by the Green Zones in Table 22.3.

Table 22.3: Levels of Significance

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

Significant impacts resulting from MANDs are adverse impacts that are described as ‘Significant’, ‘Very Significant’ or ‘Profound’ under the Draft EPA Guidelines (EPA 2017). Consequently, MANDs that fall within the Amber or Red Zones (‘Medium’ or ‘High’ risk scenarios) are brought forward for further consideration and assessment for further mitigation.

22.4 Predicted Impacts

As mentioned in Section 22.3 the predicted impacts in this Section assume a worst-case scenario, which does not consider the implementation of mitigation measures or Emergency Plans that are implemented to reduce the impact of any MANDs.

A Risk Register has been developed which contains all the plausible scenarios identified during the Construction Phase and Operational Phase of the Proposed Project, and has been evaluated using the criteria in Section 22.3. This is provided in Table 22.4.

Table 22.4: Rating of Major Accidents and Disasters in the Absence of Mitigation

Risk ID	Event	Proposed Project Element	Likelihood	Rating	Consequence	Rating
Construction Phase and Operational Phase						
A	Tunnelling during construction leading to subsidence of land, with the potential to lead to an accident, particularly on major roads and rail lines traversed by the proposed pipeline routes	Various crossings along the proposed orbital sewer route and the proposed outfall pipeline route (land based section)	Unlikely	3	Potentially Serious with potential fatalities and injuries	3
B	Fire resulting in significant or widespread damage on-site	Proposed WwTP/Abbotstown pumping station/RBSF.	Unlikely	3	Potentially Serious with potential fatalities and injuries Potential to discharge deleterious material to adjacent watercourse Hazards associated with smoke to neighbouring residents, businesses and activities	3
C	Damage to high voltage overhead lines that cross the Proposed Project	All elements of the Proposed Project	Unlikely	3	Potentially Serious with potential fatalities and injuries, Potential to lead to fire and associated effects	3
D	Pollution event leading to environmental damage, particularly associated with the potential release of silt to the aquatic environment	Elements of the Proposed Project near to watercourses	Likely	4	Potentially Serious with the potential to cause environmental damage to the aquatic environment and associated species and to designated Natura 2000 sites	3
E	Road traffic accidents on-site or resulting from Construction Phase and Operational Phase traffic	All land based elements of the Proposed Project	Likely	4	Potentially Serious, resulting in a number of fatalities and/or injury Simple localised contamination of area or minor structural damage	3
F	Discharge of untreated wastewater during Commissioning and Operational Phase	Proposed outfall pipeline route (marine section) discharge point in the Irish Sea	Likely	4	Limited – the potential impact as a result of this scenario has been modelled as part of the water quality assessment for Chapter 8 Marine Water Quality in Volume 3 Part A of this EIAR.	2
G	Incident at adjacent Industrial Emissions Directive sites leading to shutdown/evacuation	Proposed RBSF.	Unlikely	3	Limited – potentially localised displacement of a small number of people or simple contamination, localised effects of short duration	2
H	Gas explosion due	Proposed WwTP	Likely	4	Potentially Serious with	3

Risk ID	Event	Proposed Project Element	Likelihood	Rating	Consequence	Rating
	to the release of biogas generated on-site during the anaerobic digestion				potential fatalities and injuries Potential to discharge deleterious material to adjacent watercourse Hazards associated with explosion to neighbouring residents, businesses and activities	
I	Significant release of odour during the Operational Phase	Proposed WwTP and Abbotstown pumping station	Likely	4	Limited – potentially localised release of odours from the proposed Abbotstown pumping station which will convey untreated wastewater and from the treatment of untreated wastewater at the proposed WwTP	2
J	Aircraft related accident	Proposed WwTP	Extremely Unlikely	1	Potentially Very Serious	4
K	Marine accident resulting from collision of construction vessels with local fishing/leisure vessels during Construction Phase	Proposed outfall pipeline route (marine section)	Likely	4	Potentially Serious, resulting in a number of fatalities and/or injury	3

The results from the evaluation have been applied to Table 22.5 below to determine the Levels of Significance.

Table 22.5: Evaluation of Levels of Significance in the Absence of Mitigation

Likelihood	5 – V. Likely					
	4 – Likely		[F][I]	[D][E][H][K]		
3 – Unlikely		[G]	[A][B][C]			
2 – V. Unlikely						
1 – Ext. Unlikely				[J]		
		1 – Minor	2 – Limited	3 – Serious	4 – V. Serious	5 – Catastrophic
Consequence of Impact						

From examining the plausible risks presented in Table 22.4, Risk IDs G and J are considered as being below the threshold of significance set for the purposes of this assessment. It is noted that for Risk ID J (aircraft related accidents), the site fringes the southern boundary of the outer public safety zone and is consequently not considered significant. The scenarios with the highest risk score relate to pollution from the potential release of silt, traffic accidents, gas explosions and marine accidents associated with the Proposed Project.

Risk IDs A, B, C, D, E, F, H, I and K fall within Amber Zone ('Medium' risk scenario) and are therefore brought forward for further consideration and assessment of mitigation measures.

22.5 Mitigation Measures

The design of the Proposed Project incorporates mitigation measures that have been embedded into the design of the Proposed Project elements.

No 'High' risk (Red Zone) scenarios have been identified for the Proposed Project. Risk IDs A, B, C, D, E, F, H, I and K have been identified as being of 'Medium' risk (Amber Zone) and, as a result, are subject to further assessment and determination of risk, post-implementation of mitigation measures. The results are presented in Table 22.6 and Table 22.7.

Table 22.6: Major Accidents and/or Disasters – Assessment of Mitigation Measures

Risk ID	Event	Pre-Mitigation Risk Score	Mitigation Measures [Including Confirmatory Studies]	Post-Mitigation Likelihood	Post-Mitigation Consequence of Impact
A	Tunnelling during construction leading to subsidence of land, with the potential to lead to an accident, particularly on major roads and rail lines traversed by the proposed pipeline routes	Medium	Refer to Section 22.5.1.	3 Unlikely	2 Limited
B	Fire resulting in significant or widespread damage on-site	Medium	Refer to Section 22.5.1.	2 Very Unlikely	2 Limited
C	Damage to high voltage overhead lines that cross the Proposed Project	Medium	Refer to Section 22.5.1.	3 Unlikely	2 Limited
D	Pollution event leading to environmental damage, particularly associated with the potential release of silt to the aquatic environment	Medium	Refer to Sections 22.5.1 and 22.5.5.	2 Very Unlikely	2 Limited
E	Road traffic accidents on-site or resulting from Construction Phase and Operational Phase traffic	Medium	Refer to Section 22.5.2.	2 Very Unlikely	3 Serious
F	Discharge of untreated wastewater during Commissioning and the Operational Phase	Medium	Refer to Sections 22.5.1 and 22.5.5.	3 Unlikely	2 Limited
H	Gas explosion due to the release of biogas generated on-site during the anaerobic digestion of sludge	Medium	Refer to Section 22.5.1.	2 Very Unlikely	3 Serious
I	Significant release of odour during the Operational Phase	Medium	Refer to Section 22.5.4.	2 Very Unlikely	2 Limited
K	Marine accident resulting from collision of construction vessels with local fishing/leisure vessels during Construction Phase	Medium	Refer to Section 22.5.6.	2 Very Unlikely	3 Serious

Table 22.7: Evaluation of Levels of Significance Post-Mitigation

Likelihood	5 – V. Likely					
	4 – Likely					
	3 – Unlikely		[A][C][F]			
	2 – V. Unlikely		[B][D][I]	[E][H][K]		
	1 – Ext. Unlikely					
		1 – Minor	2 – Limited	3 – Serious	4 – V. Serious	5 – Catastrophic
Consequence of Impact						

22.5.1 Mitigation Measures Embedded in the Proposed Project Design

Regulation 15 of the Safety, Health and Welfare at Work (Construction) Regulations 2013 (S.I. No. 291 of 2013) places a duty on designers carrying out work related to the design of a project to take account of the General Principles of Prevention as listed in Schedule 3 of the Safety, Health and Welfare at Work Act 2005.

In addition to the duties imposed by Regulation 15 of the Health and Welfare at Work (Construction) Regulations 2013 (S.I. No. 291 of 2013), designers must comply with Section 17(2) of the Safety, Health and Welfare at Work Act 2005 which requires persons who design a project for construction work to ensure, so far as is reasonably practicable, that the project is designed and is capable of being constructed to be safe and without risk to health, can be maintained safely and without risk to health during use, and complies in all respects, as appropriate, with other relevant legislation. This includes the Building Regulations 2012 (S.I. No. 138 of 2012) and, if the works being designed are intended for use as a workplace, the relevant parts of the Safety, Health and Welfare at Work (General Application) Regulations 2007 (S.I. No. 299 of 2007).

In accordance with these requirements, the Proposed Project design team established a consistent and appropriate means of assessing the risks that may arise from design decisions and of applying the General Principles of Prevention, mitigation measures that are to be embedded into the design and operational activities through Design Risk Assessments.

[Embedded Mitigation by Design for Tunnelling Works](#)

The potential for subsidence as a result of tunnelling works will be mitigated by design and selection of appropriate construction methodologies. Subsidence and vibration monitoring will be undertaken before the commencement of the Construction Phase, during the tunnelling works and for a period of time after the completion of the tunnelling works.

[Embedded Mitigation for a Total Failure Event at the Proposed Wastewater Treatment Plant](#)

To mitigate against total or partial failure events at the proposed WwTP, a number of embedded measures have been included in the design of the Proposed Project:

- Power supply at the proposed WwTP: the proposed WwTP will have three power supply sources (electricity, natural gas and biogas) and will be capable of running off any single one or off a combination of sources;
- Power supply at proposed Abbotstown pumping station: a standby/backup diesel generator will be provided;
- Planned maintenance: the proposed WwTP will be designed to accommodate a planned maintenance regime whereby individual treatment units can be taken offline for maintenance without impacting treatment capacity;

- Backup equipment: all pumps will be installed in duty/standby configurations in case of pump failure;
- Telemetry system: a telemetry system will be installed within the control room located in the proposed WwTP. This will allow operators to control the flows passed forward from the proposed Abbotstown pumping station and the existing Ballymun pumping station. As a result, in the event of a problem arising at the proposed WwTP, flows from the two pumping stations can be slowed or stopped for a period of time, with the large storage volumes available in the network mobilised to retain flows; and
- Alarm system: all key items of mechanical plant will incorporate alarms to warn of malfunction/failure.

Embedded Mitigation for a Failure of Sludge Treatment at the Proposed Wastewater Treatment Plant

To mitigate against total or partial failure of the sludge treatment stream at the proposed WwTP, a number of embedded measures have been included in the design of the Proposed Project. In the event of a problem with the sludge treatment stream, all imports of sludge will be halted. Sludge will be temporarily stored at the satellite centres and the WwTP also will have the facility to store its own sludge temporarily on-site.

Embedded Mitigation by Design for Pipelines

The construction of all proposed pipeline routes will be carried out in accordance with best practice and design. Appropriate watertight pipeline materials for the safe transfer of wastewater will be utilised during the construction of the proposed pipeline routes and pipelines will have a limited number of joints to minimise potential leaks. The rising main will be pressurised and will be fitted with a pressure monitor that will stop flows in the event of a burst along the proposed orbital sewer route. A flow meter will be included in the design at the proposed Abbotstown pumping station and at the inlet works for the proposed WwTP, which will allow for flow balance calculations to be monitored. This will aid in the early detection of any potential leaks or bursts along the proposed orbital sewer route.

22.5.2 Traffic Management Plans

The risk of MANDs resulting from a road traffic accident associated with the Proposed Project will be reduced by the development and implementation of Traffic Management Plans as detailed in Section 13.11.1 of Chapter 13 Traffic and Transport in Volume 3 Part A of this EIAR and in Section 13.5 of Chapter 13 Traffic in Volume 4 Part A of this EIAR.

22.5.3 Environmental Incident Response Plan

An Environmental Incident Response Plan will be developed by the appointed contractor/operator of the facility, in consultation with the emergency services and other relevant third parties, and will be submitted to Irish Water for approval.

The Environmental Incident Response Plan will contain Incident Response Procedures which will outline the detailed procedures for dealing with any potential emergency and shall include the following:

- Initial response procedures;
- List of emergency numbers;
- Records and sharing of records with prescribed bodies;
- Training; and

- Emergency response equipment list on-site.

The Environmental Incident Response Plan will ensure that resources necessary to make safe and/or deal with situations in the first instance are available to respond to emergencies at all times during the Construction Phase and Operational Phase. It will also ensure that suitably qualified personnel ('Duty Officers') will be available at all times to manage the response of the contractor/operator to emergencies. A schedule of the telephone numbers for Duty Officers shall be provided to an Garda Síochána and other relevant authorities so that contact can be made with the Duty Officers at all times.

22.5.4 Odour Management Plan

The risk of MANDs resulting from the release of odours associated with the Proposed Project will be reduced by ensuring that all gases pass through Odour Control Units prior to venting to the atmosphere. This will be augmented by the development and implementation of an Odour Management Plan as detailed in Section 14.8 of Chapter 14 Air Quality, Odour and Climate in Volume 3 Part A of this EIAR and Section 10.2.7 of Chapter 10 Odour in Volume 4 Part A of this EIAR.

22.5.5 Surface Water Management Plan

The risk of MANDs resulting from the potential release of pollutants associated with the Proposed Project to watercourses, including the potential release of sediments and untreated wastewater, will be reduced by the development and implementation of a Surface Water Management Plan as appended to the Outline Construction Environmental Management Plan which forms part of the planning application for the Proposed Project.

22.5.6 Vessel Management Plan

The risk of MANDs resulting from potential marine accidents will be reduced by the implementation of the Proposed Project Vessel Management Plan which is included in Appendix A10.2 in Volume 3 Part B. The Vessel Management Plan includes an exclusion zone for fishing vessels and leisure craft during the Construction Phase.

22.6 Residual Impacts

There are no identified incidents or examples of MANDs that present a sufficient combination of risk and consequence that would lead to significant residual impacts or environmental effects.

22.7 Monitoring

The Environmental Incident Response Plan is a live document that undergoes monitoring, review and update throughout the lifetime of the Proposed Project. The risk management assessment of MANDs will be continued on an ongoing basis throughout the planning, design, Construction Phase and Operational Phase of the Proposed Project. Activities on-site will be monitored to ensure that risk does not increase over time on the site.

22.8 Conclusion

Table 22.4 lists 11 plausible MAND incidents that have the potential to occur during both the Construction Phase and Operational Phase of the Proposed Project. In a worst-case scenario (i.e. without the implementation of mitigation measures), two were determined to be of 'Low' risk and nine were determined to be of 'Medium' risk.

The nine potential 'Medium' risk scenarios were subsequently assessed with regard to the embedded mitigation measures, including those in the design phase and the implementation of a Traffic Management Plan,

Environmental Incident Response Plan, Odour Control Plan, Surface Water Management Plan and Vessel Management Plan.

These Management Plans contain mitigation measures and action plans designed to limit the loss of life or injury to employees, appointed contractor(s), visitors and local residents, damage to facilities and damage to the environment.

Through the implementation of mitigation measures, there are no identified incidents or examples of MANDs that present a sufficient combination of risk and consequence that would lead to significant residual impacts or environmental effects.

22.9 References

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