Waterman Moylan
Engineering Consultants

Construction Environmental Management Plan

Proposed Strategic Housing Development at Belcamp, Dublin17

April 2022

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This document has been prepared and checked in accordance with
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Comments

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1. Introduction

Waterman Moylan in conjunction with the Applicant have prepared the following Construction Environmental Management Plan to accompany the planning application, for the implementation during the construction period of the proposed Strategic Housing Development (SHD) at Belcamp, Dublin 17.

The plan sets out typical arrangements and measures which may be undertaken during the construction phase of the project in order to mitigate and minimise the potential environmental impacts of the construction phase of the works associated with the proposed development. The purpose of this report is to identify potential receptors and vectors, summarise the possible impacts and measures to be implemented, and to guide the Contractor who will be required to develop and implement the Construction Stage Construction Environmental Management Plan on-site.

This report should be read in conjunction with the reports prepared by the Project Ecologist, Openfield, and the Project Arborist, The Tree File, and also in conjunction with the EIAR, and should not be construed as a full amalgamation of other specialist's reports. Similarly, mitigation measures noted throughout this report should be referred to in the specialists reports as appropriate for thoroughness.

This management plan is indicative only and should not be construed as representing the exact method or sequence in which the construction works shall be carried out.

As is normal practice, the Main Contractor for the project is responsible for the method in which the construction works are carried out and to ensure that best practices and all legal obligations including Local Authority requirements and Health and Safety legislation are complied with. The Main Contractor is also responsible for the design and installation of all temporary works required to complete the permanent works. The plan can be used by the Main Contractor to develop their final Construction Environmental Management Plan. The Applicant reserves the right to deviate from the contents of this Report as the construction of the development progresses on-site. Any such deviation from this report however shall still comply with all relevant Local Authority requirements and legislation.

2. Site Location & Description

2.1 Subject Site

The Belcamp lands are located centrally in the Dublin Fringe area, north of the Northern Cross Route, R139, to the east of the IDA lands, and to the west of the Malahide Road (R107). The IDA lands are zoned "High Technology" (HT), to provide for office, research and development and high technology/high technology manufacturing type employment in a high quality built and landscaped environment. The total site area of the subject Belcamp SHD lands is c.67.2 hectares.

The subject site is bounded to the north and west by agricultural lands, to the south by the R139 Regional Road and to the east by an existing mixed-use development, by Phase 1 of the Belcamp development, which is currently under construction by the Applicant, and by the Malahide Road (R107).

The Mayne River flows from west to east through the site. North of the river the subject site is within Fingal County Council's jurisdiction, while the southern portion is within Dublin City Council's jurisdiction, with the Mayne River forming the border between the two Local Authorities.

The site location is shown in the Figure below:

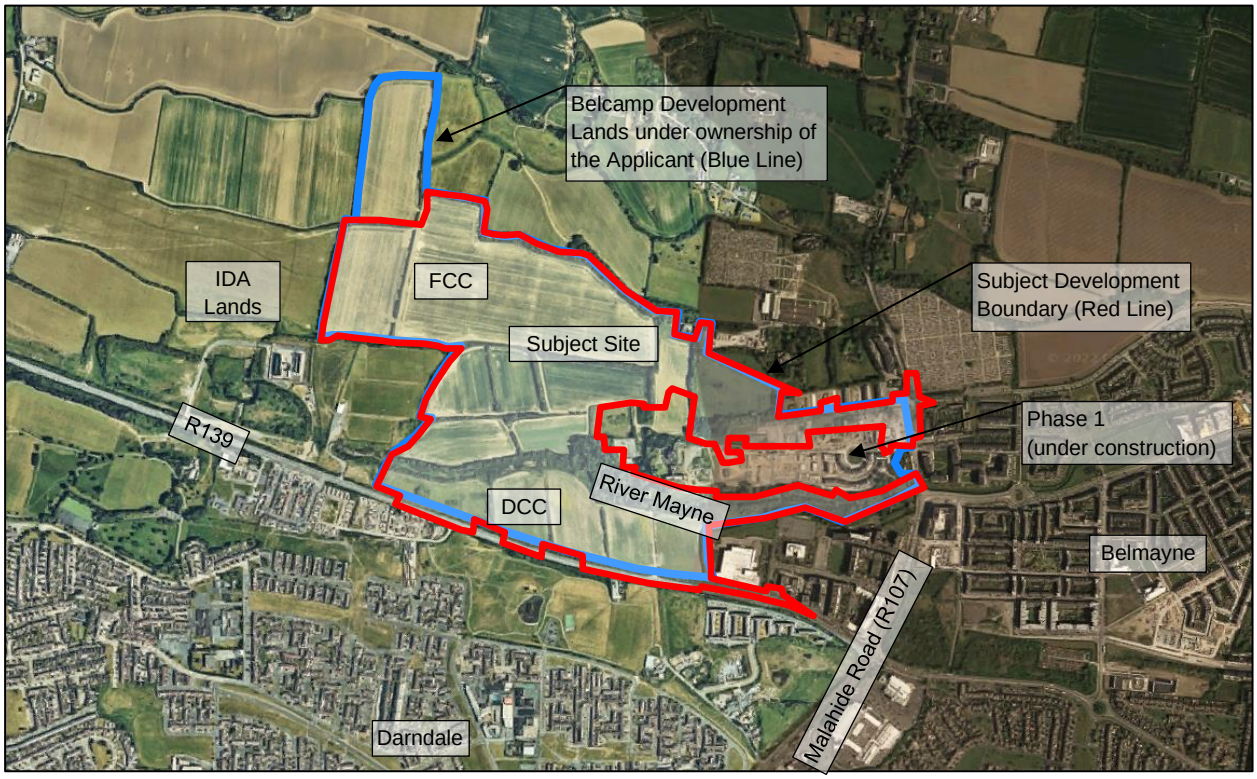

Figure 1 | *Site Location (Source: Google Maps)*

Topographic survey data shows that the southern portion of the site falls generally from south-west to north-east, towards the Mayne River, with a high point of c.35.5m OD Malin at the south-west of the site and a low point of c.26.5m OD Malin at the north-east of the main development area. The strip of land along the

Mayne River, proposed as a greenway, continues to fall to a low point of c.17m OD Malin close to the Malahide Road.

The northern portion of the site falls generally from north-west to south-east towards the Mayne River, though some of the lands at the north-east of the site fall to the north-east, away from the river and towards a ditch and culvert at the north-eastern boundary of the site.

2.2 Wider Development Area

The subject site is part of a larger proposed multi-phased development which includes lands to the east of the site, which are also under the ownership of the Applicant. Phase 1A of the Belcamp development was approved and is currently under construction under Planning Reference F15A/0609. Phase 1B of the development, immediately north of the Phase 1 lands and south of the Crosswaithe development (which is under construction by others under Planning Reference F18A/0092 and is to be named Belcamp Manor), has received a Decision to Grant permission under Planning Reference F21A/0401. Planning submissions have been made for Phase 1C under Reg. Ref. F22A/0136, located immediately north of the old Belcamp College building complex. Proposals to conserve the existing walled garden and provide for amenities within the enclosure are included as part of Phase 1C.

In addition to the development of the Applicant's Belcamp lands, there is development proposed and underway by others in the vicinity of the site, including development of the Belmayne – Belcamp Lane Masterplan area, located to the south and to the east of the subject lands.

2.3 Proposed Development

The proposed development comprises a total of 473 houses, 274 duplexes and 1,780 apartment units in 18 no. blocks, all on a c.67.2 Ha site. All of the proposed houses/duplexes are in the northern portion of the site, within Fingal County Council, and there are 550 apartment units proposed in this portion of the site, with 1,230 apartment units proposed in the southern portion of the site, within Dublin City Council. The schedule of accommodation is set out in the Table below:

Description		1-Bed	2-Bed	3-Bed	4-Bed	Total Residential	Commercial Space
Dublin City Council	Block 1	94	139	40	-	273	-
	Block 2	71	73	16	-	160	-
	Block 3	96	176	25	-	297	925.8m² Retail/Café and Childcare
	Block 4	70	178	37	-	285	-
	Block 5	37	51	8	-	96	-
	Block 6	19	80	20	-	119	-
	DCC Subtotal	***387***	***697***	***146***	***0***	***1,230***	***925.8m²***
Fingal County Council	Houses	-	16	385	72	473	-
	Duplexes	24	40	210	-	274	-
	Block A	8	15	-	-	23	-
	Block B	8	15	-	-	23	-
	Block C	7	20	-	-	27	-

Description		1-Bed	2-Bed	3-Bed	4-Bed	Total Residential	Commercial Space
	Block D	22	15	5	-	42	1,020.5m² Pub/Restaurant & Retail
	Block F	44	56	3	-	103	1,162.0m² Café/Bar/Restaurant & Retail
	Block G	29	36	-	-	65	140.0m² Retail
	Block H	20	26	-	-	46	-
	Block J	16	24	-	-	40	472.0m² Retail
	Block L	20	26	-	-	46	-
	Block M	24	32	-	-	56	-
	Block N	26	25	5	-	56	-
	Block P	5	18	-	-	23	-
	Crèche	-	-	-	-	-	606.7m² Childcare
	Clubhouse	-	-	-	-	-	97.0m² Changing Rooms
	FCC Subtotal	***253***	***364***	***608***	***72***	***1,297***	***3,498.2m²***
TOTAL		**640**	**1,061**	**754**	**72**	**2,527**	**4,424.0m²**

Table 1 | *Schedule of Accommodation*

The development includes significant commercial areas, much of it centred at a proposed Belcamp Town Square near the centre of the site, within the FCC portion of the lands. The schedule of commercial development areas is set out in the Table below:

Description			Commercial Area	
			Unit Area	*Total Per Block*
DCC	Block 3	Retail/Café 1	322.8m²	925.8m²
		Retail/Café 2	95.0m²	
		Childcare	508.0m²	
	DCC Subtotal			***925.8m²***
FCC	Block D	Pub/Restaurant	260.0m²	1,020.5m²
		Retail Unit 1	116.0m²	
		Retail Unit 2	141.0m²	
		Retail Unit 3	55.0m²	
		Retail Unit 4	96.0m²	
		Retail Unit 5	117.0m²	
		Retail Unit 6	103.0m²	
		Retail Unit 7	132.5m²	
	Block F	Café/Bar/Restaurant	219.0m²	1,162.0m²
		Retail Unit 8	152.0m²	

Description			Commercial Area	
			Unit Area	*Total Per Block*
		Retail Unit 9	196.0m²	
		Retail Unit 10	194.0m²	
		Retail Unit 11	193.0m²	
		Retail Unit 12	208.0m²	
	Block G	Retail Unit 13	140.0m²	140.0m²
	Block J	Retail Unit 14	144.7m²	472.0m²
		Retail Unit 15	91.3m²	
		Retail Unit 16	91.3m²	
		Retail Unit 17	144.7m²	
	Crèche	Childcare	606.7m²	606.7m²
	Clubhouse	Changing Rooms	97.0m²	97.0m²
	FCC Subtotal			***3,498.2m²***
TOTAL				**4,424.0m²**

Table 2 | *Schedule of Commercial Areas*

The eastern portion of the site, between the Mayne River to the north and existing development to the south, is proposed to be used as a greenway. It will serve as a connection for pedestrians and cyclists between the subject site and the Malahide Road (R107).

There is a large open space proposed at the north-west of the site, in addition to several smaller open spaces throughout the development.

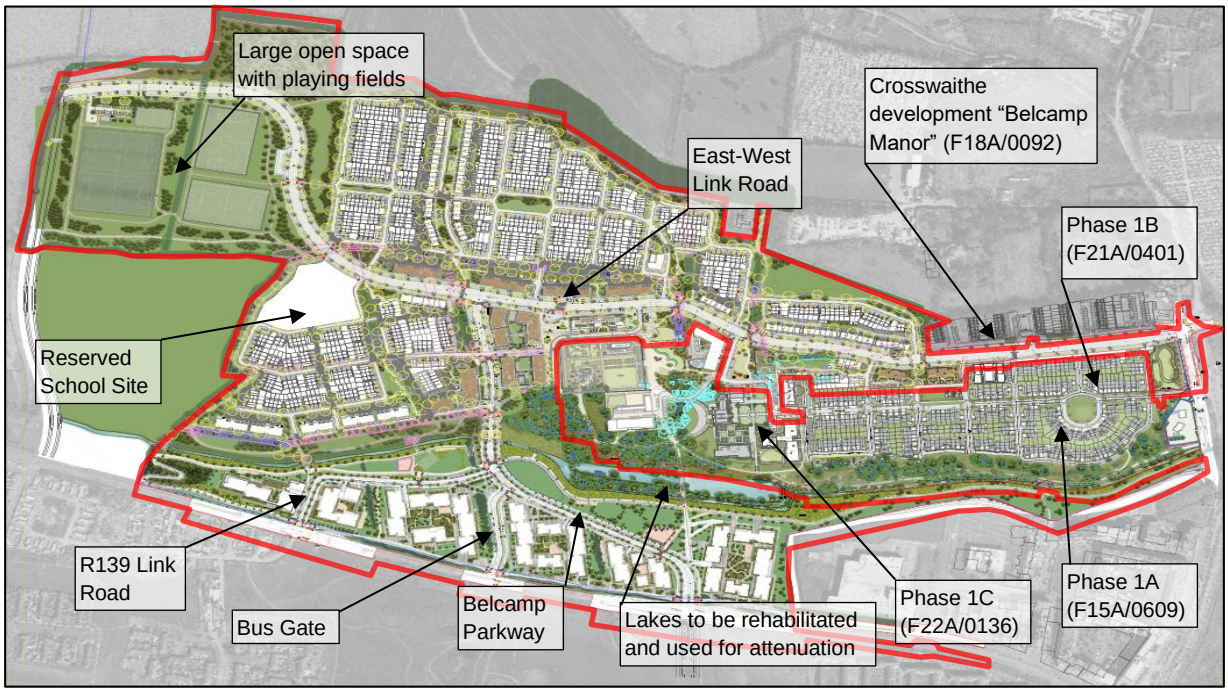

Figure 2 | *Proposed Site and Context*

3. Environmental Impact Receptors

The receptors that may be impacted by potential issues involved with the construction phase of the proposed development have been noted in the following list:

- Humans (Site staff, nearby residents, & passers-by).
- Soils (Topsoil and subsoil).
- Air.
- Flora (Plants, shrubs, hedgerows, grassland & trees).
- Fauna (including aquatic species and macro-invertebrates).
- Water (The Mayne River internal to and downstream of the site, and its internal tributary network of ditches, the onsite lakes, & groundwater)

For the purpose of this report, Biota such as fungi and bacteria have not been considered as receptors, unless identified by the project ecologist as protected, and warranting further attention.

As discussed in the below sections, the receptors noted above may also become vectors for pollution to further receptors. For example, Water may be a receptor for pollution either directly or from soil contamination, and may then become a vector for further contamination to Humans, Flora and Fauna.

In any situation where a receptor is affected by construction activity, the significance of this impact is dependent on a number of factors including, contaminant type and concentration, and duration of exposure. Should any incident occur, the main contractor will immediately implement their environmental response protocols as appropriate for the incident, and work to stop, and then further mitigate/remediate the issue. The Main Contractor will perform these responsibilities in accordance with the Best Practice Guidelines, Health & Safety legislation, and to the requirements of National and Local Authority policies.

3.1 Humans

Humans may be affected by contaminants/pollutants/emissions, either through direct or indirect contact, consumption or inhalation.

Humans may also be impacted by the amenity of the subject site during the course of construction; however, this will only be temporary in nature until completion of the works. Given the nature of the proposed development it is likely that amenity impacts to this receptor will only be localised on-site or in the immediate vicinity, should an impact occur.

3.2 Soils

Soil is considered a habitat for some macro-invertebrate species and provides the foundation for the root structure and rhizomes of Flora. It may also be considered as a vector, in that pollutants may seep through soils and contaminate groundwater.

Soils have the potential to become contaminated by pollutants via spills and leaks. Given the nature of the proposed development it is likely that impacts to this receptor will only be localised on-site or in the immediate vicinity, should an impact occur. Soils may also be considered a contaminant in themselves as when excavated or exposed, they have the potential to form dust or silt laden surface water run-off

3.3 Air

Air is a vector for particulate matter and soundwaves.

Air quality can be negatively impacted by emissions and dust in suspended particulate matter form during the course of construction works

Excessive sound levels can be produced during construction, especially from heavy and concentrated operations of site plant.

Given the nature of the proposed development it is likely that impacts to this receptor will only be localised on-site or in the immediate vicinity, should an impact occur.

3.4 Flora

Flora as a receptor may be negatively impacted by works on site during construction stage. Pollutants may harm plants/trees/hedgerows via contamination of water or soils. They may be further impacted by the physical site works such as ground clearance and preparation works. Given the nature of the proposed development it is likely that impacts to this receptor will only be localised on-site, should an impact occur.

It should be noted that while all types of Fauna may be impacted environmentally, in some scenarios a negative impact is actually proposed as part of the works. Please refer to Chapter 8 of this report for details on invasive species. We further politely request the reader to also refer to the Reports and drawings produced by The Tree File, who are the Project Aborists, for details of trees and hedgerows that require removal to facilitate the proposed development.

Flora may also be considered a vector to Fauna or macro-invertebrates that may consume berries or foliage that may contain concentrations of pollutions. This may happen swiftly, or over time, through the process of bioaccumulation.

3.5 Fauna

Fauna, including aquatic species and macro-invertebrates, may experience a negative impact during the course of construction works. This may arise from pollution/contamination to water and soils, demolition or disturbance of their habitat, or from air in the form of particulate or sound pollution. Given the nature of the proposed development it is likely that impacts to this receptor will only be localised on-site or in the immediate vicinity, should an impact occur.

Fauna may also be considered a vector for contaminants. Macroinvertebrates may ingest levels of contaminants that build over time in the process of bioaccumulation as noted above. These macroinvertebrates may then be eaten by shrews, voles & mice etc., who may then be eaten by animals higher on the food chain such as owls or foxes. Persistent long-term pollution would be required from the project, which is highly unlikely to occur, but the potential for bioaccumulation through the food chain should still be noted as a potential consequence, nonetheless.

3.6 Water

Natural watercourses provide a habitat to aquatic and some macro-invertebrate species. It may be further utilised by other species of Fauna as a water source for consumption. It also provides a habitat to Flora that grow adjacent to it. Water is also considered a vector for pollution in the form of biological and chemical compounds, including silt-laden surface water run-off.

The Mayne River traverses the site, flowing from west to east. There are two existing off-line lakes at the northern edge of the Mayne River that part of the existing Belcamp Lands discharge to.

There is an existing causeway separating the two lakes, and water discharges from the western lake to the eastern lake via a culvert under the existing causeway. Water discharges from the eastern lake to the Mayne River via a weir structure. The lakes are substantially higher than the Mayne River at the discharge point from the eastern lake.

The AA Screening Report, produced by Openfield and submitted under a separate cover, notes that: "*The development site is not located within or directly adjacent to any Natura 2000 site (SAC or SPA). This part of north Dublin is a built-up residential zone and is predominantly composed of surfaces that are sealed with tar macadam and concrete".* The location of further Natura 2000 sites was also considered within a 15km radius of the subject site, as is typical for projects of this type, but there was found to be no potential connectivity between the subject site and the Natura 2000 sites identified.

The same report further notes that: "*The River Mayne provides a direct hydrological connection between the development site and the Baldoyle Estuary, which is designated for its intertidal habitats and coastal bird communities. Habitats on the development site are not suitable for populations of wetland/wading/wintering birds which are qualifying interests of the Baldoyle Bay SPA or other Natura 2000 sites (either for foraging or nesting). The surveys in January 2021 and February 2022 were undertaken during the optimal period for wintering birds and no such species were recorded*.".

The River Mayne is a monitored waterbody, as per information available from the website www.watermaps.wfdireland.ie website, and is shown as having a poor overall status. It has a poor macroinvertebrate status, moderate general physio-chemical status, and a poor overall ecological status. There is no description of the overall chemical status. It is further classified as 1a – at risk of not achieving good status. No information was found as to the status of the lakes internal to the site.

Groundwater and the River Mayne may become contaminated by chemical, biological or sediment pollution either directly, or indirectly via groundwater or surface water flows over land, or from the tributary ditches located on-site.

The River Mayne has been identified as a receptor for negative environmental impacts however it is also a vector as it has the ability to convey pollution/impacts well downstream of the subject site.

A negative environmental impact to the natural surface watercourses (the River Mayne, on-site tributary ditches, and on-site lakes), may lead to subsequent impacts on other receptors such as Flora, Fauna, Humans, and the general amenity and aesthetic value, not only on-site or in the immediate vicinity, but also well downstream from the subject lands.

A further environmental impact associated with surface water is the potential for flooding, this topic has been dealt in full in the Flood Risk Assessment report, produced by Waterman Moylan Consulting

Engineers, and submitted under a separate cover, but is also discussed in the Design Mitigation Measures Chapter of this report

3.7 Protection of Potential Receptors

The solution to prevent impact to the potential receptors is to eliminate any potential issues at the design stage. While this has been done as far as possible, as discussed in the next section, there is no way of avoiding all potential issues. As such, where it has not been possible to design potential impacts out of the project, mitigation measures are noted in later chapters of this report, that will either individually or cumulatively address these topics.

These mitigation measures in specific address the vectors (Air, soil, and water), with the aim to prevent or mitigate the potential for pollution at source, and thus the subsequent removal/mitigation of these impacts cannot then transfer to the receptors (Humans, Soils, Flora, Fauna, & Water), via the vector pathways.

4. Design mitigation measures

4.1 Design Mitigation for Soils

The excavations for the drainage pipes, water supply, utilities, and foundations of buildings have been designed to be as shallow as possible in order to reduce excavation depths.

This optimisation will reduce the volume of soils excavated, and thus the volume of soils stored in stockpiles or sent for disposal. This will have a subsequent reduction on the number of vehicular movements associated with the transport of soil, lowering emissions and dust particles becoming airborne. Smaller scale stockpiles will have a reduced surface area, which will consequently reduce the area exposed to weather elements, which can create sit-laden surface water run-off or become airborne.

4.2 Design Mitigation for Flooding

This section of the report should be read in conjunction with the Flood Risk Assessment (FRA) report, submitted under a separate cover.

The site has been identified as at risk of flooding during heavy weather events as per the CFRAM Map extract included in the FRA. It is also noted that there are areas further downstream on the River Mayne also subject to flooding during these scenarios. When the site topographic survey is compared to the CFRAM flood map, it can be observed that the reason for flooding on-site owes to the existing culverts creating choke-points to the water flow rates on the River Mayne. The culverts do not have the hydraulic capacity to allow the excessive flow volumes generated upstream on the river during heavy weather event to pass.

It was considered as to whether to undertake work on the existing culverts to alleviate this issue however, this would significantly alter the morphology of the river and would exacerbate the flood scenarios experienced downstream. It is instead proposed to retain the existing culverts as-is. The areas identified as at risk of flooding on-site will not be developed, but will instead be appropriately rehabilitated and landscaped, so as to form an ecological corridor along the River Mayne.

Due to the nature of the development, it is required to increase vehicular and pedestrian/cyclist permeability. It is proposed to introduce a number of bridges across the River Mayne to facilitate this. These bridges will be constructed as box culverts. The proposed box culverts have a hydraulic capacity in excess of that of the flow rate of the River Mayne during heavy weather events, so as not to change the morphology of the river, or impact the CFRAM flood areas as currently mapped, both internal to and downstream of the subject site.

4.3 Design Mitigation for Groundwater

As noted above, the depth of building and other structural foundations has been minimised as far as possible. This will reduce the potential for groundwater seepage into the excavations which would then require treatment and disposal. It is noted that the site is located in an area of low to moderate groundwater vulnerability.

4.4 Design Mitigation for Water Networks

This section should be read in conjunction with Chapters 2 & 4 of the Engineering Assessment Report, which deal with the foul and watermain networks respectively.

A Confirmation of Feasibility Letter has been received from Irish Water for the project. This letter is included as an appendix to the Engineering Assessment Report. This letter confirms that there is sufficient capacity in the public networks to both accept foul water volumes (for treatment at Ringsend wastewater treatment plan) and provide potable water (extraction point on the River Liffey at Leixlip), to serve the development.

A Statement of Design Acceptance has also been received from Irish Water and is also included as an appendix to the Engineering Assessment Report. This confirms that Irish Water have reviewed and accepted the proposed layouts for the watermain and foul networks to serve the development, subject to any required amendments at connection application stage.

Foul and surface water networks located in the private domain are required to be constructed in accordance with the Building Regulations. Inspections and certifications will be required from the Design Engineers, which confirm that the workmanship and materials used, meet these requirements.

The surface water drainage network has been designed in accordance with methodology and recommendations as set out in the Greater Dublin Strategic Drainage Study (GDSDS) and in the SuDS Manual (Ciria C753).

The surface water network will be constructed in accordance with the Greater Dublin Regional Code of Practice for Drainage Works, and also in accordance with the Fingal County Council and Dublin City Council requirements for Taking in Charge as applicable.

4.5 Design Mitigation for Surface Water

This section should be read in conjunction with Chapter 3 of the Engineering Assessment Report.

As noted earlier there are new culverts proposed to serve the development. On the instruction of the project ecologist, these culverts have been designed to incorporate an otter ledge. Consultations have also taken place with Inland Fisheries Ireland (IFI). IFI have requested that the proposed box culverts incorporate a split-level design to facilitate the migratory movement of fish species to spawning grounds. This has been incorporated and can be seen on the culverts cross section drawings 19-114-P1161 & P1162. IFI have noted that while the river currently has a poor water quality status and it is non-salmonoid, that with future improvements to the river water quality, it is hoped that fish species can be later reintroduced.

A Section 50 application will be required to be submitted to the Office of Public Works (OPW) for the proposed culverts. The OPW were contacted for feedback on the design proposals and the project has been assigned a reference number of 174-2022. However, a formal Section 50 application cannot be submitted until planning permission has been granted.

As is typical of all projects containing watercourses, the River Mayne has been afforded significant attention and detail, not only at design stage, but as the reader will note in the following chapters at the planned construction stage, so that all pollution sources have been considered and all mitigation measures to prevent the impacts of potential sources of pollution have been noted, to be implemented by the Main Contractor. These design and mitigation measures will not only preserve the current water quality status of the Mayne, but through the associated proposed rehabilitation measures and the introduction of SuDS features to treat the water quality, also aims to enhance the quality status of the River Mayne. This approach

ensures that the environmental and amenity properties of the River Mayne will not be negatively impacted and will actually be enhanced.

5. Management of Environmental Impacts

5.1 Roles and Responsibilities

5.1.1 Main Contractor

The Main Contractor will have overall responsibility for the production and implementation of the project's Construction Stage Construction Environmental Management Plan (CEMP), either as a standalone document or as part of a consolidated Construction Management Plan (CMP). The appointed person from the Main Contractors team will be appropriately trained and assigned the authority to instruct all site personnel to comply with the specific provisions of the plan(s). At the operational level, a designated person from each subcontractor on the site shall be assigned the direct responsibility to ensure that the operations stated in the plan(s) are performed on an ongoing basis.

Copies of the plan(s) will be made available to all relevant personnel on-site. All site personnel and sub-contractors will be instructed about the objectives of the plan(s) and informed of the responsibilities which fall upon them because of its provisions.

The responsibilities of the appointed person will be as follows;

- Updating the plan(s) as necessary to reflect activities on site.
- Advise site management (including, but not limited to, the site Construction Manager) on environmental matters.
- Ensure pre-construction checks for protected species, if any, are undertaken.
- Review method statements of the sub-contractors to ensure that these method statements incorporate all aspects of plans(s).
- Provide toolbox talks and other training and ensure understanding by all involved of all mitigation measures.
- Assess the effectiveness of mitigation, check the weather forecast and site conditions where trigger levels are required.
- Ensure adherence to the specific measures listed in the Planning Conditions.
- Provide advice on the production of written method statements and site environmental rules and on the arrangements to bring these to the attention of the workforce.
- Investigate incidents of significant, potential, or actual environmental damage, ensure corrective actions are carried out and recommend means to prevent recurrence.
- Be responsible for maintaining all environmental-related documentation.
- Ensure plant and equipment proposed for use on the project are environmentally suited to the task in hand.
- Coordinate environmental planning of the construction activities to comply with environmental authorities' requirements and with minimal risk to the environment. Give contractors precise instructions as to their responsibility to ensure correct working methods where the risk of environmental damage exists.

5.1.2 Construction Waste Manager

A Construction Waste Manager shall be appointed from the Contractor's Staff and have overall responsibility for the implementation of the project Waste Management Plan (WMP) during the construction

phase. The Construction Waste Manager will be appropriately trained and assigned the authority to instruct all site personnel to comply with the specific provisions of the WMP. At the operational level, a designated person from the main contractor and each subcontractor on the site shall be assigned the direct responsibility to ensure that the operations stated in the WMP are performed on an ongoing basis.

Copies of the Waste Management Plan will be made available to all relevant personnel on-site. All site personnel and sub-contractors will be instructed about the objectives of the Waste Management Plan and informed of the responsibilities which fall upon them as a consequence of its provisions. Where source segregation, selective demolition and material reuse techniques apply, each member of staff will be given instructions on how to comply with the Waste Management Plan. Posters will be designed to reinforce the key messages within the Waste Management Plan and will be displayed prominently for the benefit of site staff.

Further details on Construction Waste Management are included in the Preliminary Construction Demolition & Waste Management Plan, produced by Waterman Moylan Consulting Engineers, and submitted with the SHD application documentation under a separate cover.

5.1.3 Environmental Officer

The Environmental Officer will be responsible for, but not limited to, the following activities:

- Ensuring that the requirements of the plan(s) are developed and environmental system elements (including procedures, method statements and work instructions) are implemented and adhered to with respect to environmental requirements.
- Reviewing the Environmental responsibilities of other managed Contractors in scoping their work and during Contract execution.
- To ensure that advice, guidance, and instruction on all plan(s) matters are provided to all their managers, employees, construction contractors, and visitors on-site.
- Report to the Construction Manager on the environmental performance of the Line Management, Supervisory Staff, Employees, and Contractors.
- Advise Site Management (including, but not limited to, the site Construction Manager) on environmental matters.

5.1.4 Project Environmental Consultant

The Project Environmental Consultant will be responsible for, but not limited to, the following activities:

- Preparation of the environmental plans, environmental control plans and supporting procedures.
- Advise Site Management (including, but not limited to, the Site Construction Manager) on environmental matters.
- Ensure adherence to the specific measures listed in the Planning Conditions and in the Natura Impact Statement (NIS) Mitigation measures.
- Provide advice on the production of written method statements and site environmental rules and on the arrangements to bring these to the attention of the workforce.
- Investigate incidents of significant, potential, or actual environmental damage, ensure corrective actions are carried out and recommend means to prevent recurrence.
- Be responsible for maintaining all environmental-related documentation.

5.1.5 Project Ecologist

The Project Ecologist is required to:

- Undertake pre-construction checks for protected species.
- Review method statements of the contractor to ensure that it incorporates all aspects of the environmental plan(s).
- Provide toolbox talks and other training and ensure understanding by all involved of all mitigation measures.
- Assess the effectiveness of mitigation, check the weather forecast and site conditions where trigger levels are required.
- Check for adequacy of infiltration where water is being pumped.

5.1.6 Site Supervisor

Site Supervisors are required to:

- Read, understand, and implement the environmental plans(s).
- Know the broad requirements of the relevant law in environmental matters and take whatever action is necessary to achieve compliance. Where necessary seek the advice of the Environmental Officer.
- Ensure that the environmental matters are taken into account when considering contractors' construction methods and materials at all stages.
- Be aware of any potential environmental risks relating to the site, plant, or materials to be used on the premises and bring these to the notice of the appropriate management.
- Ensure plant proposed is environmentally suited to the task in hand.
- Coordinate environmental planning of the construction activities to comply with the environmental authorities' requirements and with minimal risk to the environment. Give contractors precise instructions as to their responsibility to ensure correct working methods where the risk of environmental damage exists.
- Where appropriate, ensure the Contractor's method statements include correct waste disposal methods.
- Be aware of any potential environmental risks relating to the Contractors and bring these to the notice of the appropriate management.

5.1.7 Site Personnel

All Contractors, and other site personnel, on the project will adhere to the following principal duties and responsibilities:

- To co-operate with the Construction Management Team and the Environmental Officer in the implementation and development of the environmental plan(s) at the site.
- To conduct all their activities in a manner consistent with regulatory and best environmental practice.
- To participate in the environmental training programme and provide management with any necessary feedback to ensure effective environmental management at the site.
- Adhere to the requirements of the site environmental rules.

6. General Site Set Up and Pre-Commencement Measures

A detailed condition survey (including photographs) will be carried out on the boundaries surrounding the site. The purpose of the survey would be to record the condition of the hedgerows and watercourses around the site prior to the works commencing. This survey will also extend to the River Mayne which traverses the site, the existing lakes, and the ditches internal to the site.

Site compound including offices, storage, and welfare facilities will be set up by the main contractor in locations to be decided. The site compound will have a negative aesthetic impact, but the compound will only be in place for the duration of the construction works.

Prior to any site works commencing, the main contractor will meet on site and liaise with the project arborist (The Tree File) & project ecologist (Openfield) to identify items (trees, hedgerows, watercourses etc.) to be preserved and maintained and other ecological sensitivities can be reviewed. These will be identified on site and protective fencing erected to the separation requirements of the arborist/ecologist. Mitigation measures detailed throughout this report will also be agreed by programme, as appropriate.

A programme will be agreed between the Main Contractor, Project Ecologist & Project Arborist, for undertaking the works specific to their expertise, and implementation of protective and mitigation measures, and arranging of supervision if required, before commencement of any works on site.

Typical working hours for the site would be 08.00 to 19.00 from Monday to Friday and 08.00 to 14.00 on Saturday. No Sunday or Bank Holiday work will generally be permitted. The above working hours are typical; however, special construction operations may need to be carried out outside these hours in order to minimise disruption to the surrounding area.

Weather restrictions may apply to certain site activities, i.e., no concrete pouring during heavy rainfall. To be determined by the project ecologist.

Hoarding lines and site security will be set up within the development site as required.

Internal fencing may further be required to protect Arboricultural/Environmental features. This may extend to include root protection zones. It should also be further noted that there may be the requirement to trim some hedges/trees prior to protective fencing being erected, this will be coordinated with the arborist.

7. Environmental Management for Site Preparation and Construction

As noted earlier there are historic culverts and weir structures on-site. A rehabilitation plan is in place for the existing culvert between the two lakes. This plan has been developed by CORA, Conservation Engineers, as part of this subject application. Prior to any demolition or refurbishment works on the existing structures on-site, a refurbishment/Demolition Asbestos Survey (RDAS) will be undertaken.

Prior to construction work the site will need to be prepared. This will involve the scraping and stockpiling of topsoil, removal and/or cutting back of hedgerows and trees.

Topsoil scraping, subsoil excavations, and their stockpiling will be required. This topic, including Legal Obligations, Best Practices and Mitigation Measures are discussed in full in the Preliminary Construction, Demolition and Waste Management Plan, prepared by Waterman Moylan Consulting Engineers which is submitted under a separate cover as part of the subject SHD application

A tree survey was undertaken by the project arborist. The details of this survey have been used to create a Tree Impacts Plan, compiled by The Tree File and submitted under a separate cover. This plan indicates the tress and hedgerows surveyed and their classification as either Category A, B, C, or U which translates as High, Moderate, and Low quality, as well as in being in such a poor condition that they warrant removal, respectively.

Trees and hedgerows proposed for removal in conjunction with development works are shown in purple, with trees and hedgerow intended for retention shown in green on the Tree Impacts Plan. Root protection areas are also indicated on this plan. Also shown in Cyan are the trees and hedgerows of the adjacent permitted developments with previous grants of permission for removal.

The Main Contractor will implement the requirements of the Arborists Method Statement and organise a pre-commencement site meeting with the Arborist, prior to commencement of the site clearance works.

8. Invasive species

The AA Screening Report prepared by the project ecologist, Openfield, advises that:

> "*There are no plant species growing on the site which are listed as alien invasive under SI No. 477 of 2011. The developments lands have been subject to invasive species surveys by Peter Cuthbert since 2018 with the most recent survey in spring 2022. Growths of Giant Hogweed Heracleum mantegazzianum along the Mayne River have been subject to on-going treatment, most recently in 2021. It is believed that recolonisation of the Belcamp lands may be arising from seed sources upstream of the development site*".

The aforementioned Giant Hogweed does feature in SI No. 477 of 2011 in the Third Schedule, which lists Non-native species subject to restrictions under Regulations 49 & 50.

The project Ecologist has specified as part of the Natura impact Statement that:

> "*On-going monitoring for Giant Hogweed will be a part of the landscaping maintenance programme. This will include annual surveys of the riparian zone of the River Mayne for signs of the plant (not currently growing on the development site). Should the plant be recorded, it will be treated with standard herbicide during the optimal growing season but before flower heads set seed."*

9. Construction and Waste Management for Soils

This Chapter discusses the requirements and guidelines applicable to soil and general earthworks, which will be incorporated into the plan(s) to be prepared and implemented by the Main Contractor as the construction progresses.

In the event that contaminated soil is encountered, this soil will be removed by an appropriately accredited contractor and disposed of at an appropriately accredited facility.

9.1 Policy and Legislation

The principles and objectives to deliver sustainable waste management for this project have been incorporated in the preparation of this report and are based on the following strategic objectives:

- National Policy: The Waste Management Acts 1996 to 2011
- Local Policy: The Eastern-Midlands Region (EMR) Waste Management Plan 2015-2021

This Waste Management Plan is also in accordance with the following:

- Waste Management Acts 1996 to 2011
- Waste Management (Collection Permit) Regulations 2007 (SI No. 820 of 2007)
- Waste Management (Collection Permit) (Amendment) Regulations 2008
- Department of the Environment, Heritage, and Local Government
- Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects – July 2006
- The Eastern-Midlands Region Waste Management Plan 2015-2021
- EPA “Guidance on Soil and Stone By-Products in the context of Article 27 of the European Communities (Waste Directive) Regulations – Version 3 June 2019.
- EPA Draft Best Practice Guidelines for the preparation of resource management plans for construction and demolition projects, April 2021
- The Final County Development Plan 2017 – 2023 Construction and Demolition waste
- The Dublin City Development Plan

The hierarchy of waste management sets out the guiding principles in order of importance as follows:

1. Reduction of the amount of waste generated by the construction process.
2. Segregation of waste is a key concept that will be implemented during the course of the construction phase of the development to enable ease of re-use and recycling, wherever appropriate.
3. Recycle waste material where feasible, including the use of excess excavations as fill material.

9.2 On-Site Construction Waste Management

Any hazardous material encountered will be disposed of to a suitably licenced facility. See Section 9.3 for a detailed outline of how hazardous waste shall be dealt with.

9.3 Off-Site Waste Management Licensing/Permitting

All waste materials (where necessary, after in-situ reuse and recycling options have been fully considered), shall be disposed of off-site, under the appropriate duty of care and subject to approvals/consents from the relevant statutory bodies. It is the responsibility of the Main Contractor to ensure that any company to whom waste is transferred is legally permitted to do so and that the facility they bring the waste to is licensed to handle that type of waste as outlined in the Waste Management Acts 1996-2005. The Waste Collection Permit Register, in accordance with the Waste Management (Collection Permit) Regulations 2001 will be consulted to ensure that waste carriers hold the appropriate permit.

The relevant waste collection permits and waste licences shall be provided by the Main Contractor and shall be amended to this report upon availability.

The Main Contractor will ensure that the excavation works are carried out in accordance with best standard practice and excavation materials are well segregated to minimize any potential cross-contamination.

The Main Contractor shall carry out appropriate environmental chemistry testing in order to determine the waste classification of the soils that are to be excavated and that shall include Waste Acceptance Criteria testing. The test regime shall be agreed with the receiving landfill operator and the testing shall be carried out by an accredited laboratory.

Should excavation materials be assessed to be hazardous, the Main Contractor shall carry out pre-treatment of the waste soils to a methodology that is agreed with the receiving landfill operator and in accordance with Environmental Protection Agency guidance.

The Main Contractor is encouraged to reuse and recycle any waste materials as far as is reasonably practicable.

The Main Contractor shall manage and carry out the works in accordance with best environmental practice and in accordance with the requirements of Local Authority, EPA and all requirements as specified in this document.

9.4 C&D Record Keeping

It is the duty of the C&D Waste Manager to ensure that necessary licenses have been obtained as needed. Each consignment of C&D waste taken from the site will be subject to documentation which will conform with *Table 3* along with Transportation Dockets to ensure full traceability of the material to its final destination.

Detail	Particulars
Project of Origin	*Belcamp, Malahide Road, Dublin 17*
Material being Transported	*Soil*
Quantity of Material	*To be completed by C&D Waste Manager*
Date of Material Movement	*To be completed by C&D Waste Manager*
Name of Carrier	*To be completed by C&D Waste Manager*
Destination of Material	*To be completed by C&D Waste Manager*
Proposed Use	*To be completed by C&D Waste Manager*

Table 3 | *Details of materials taken from site*

9.5 Topsoil

Careful planning and on-site storage can ensure that topsoil is reused on-site as much as possible. Any surplus of soil not reused on site can be sold. However, topsoil is quite sensitive and can be rendered useless if not stored and cared for properly.

- It is important that topsoil is kept completely separate from all other construction waste as any cross-contamination of the topsoil can render it useless for reuse.
- It is important to ensure that topsoil is protected from all kinds of vehicle damage and kept away from site-track, delivery vehicle turning areas and site plant and vehicle storage areas.

If topsoil is stored in piles of greater than two metres in height the soil matrix (internal structure) can be damaged beyond repair. It should also be kept as dry as possible and used as soon as possible to reduce any deterioration through lengthy storage and excess movements around the site.

Records of topsoil storage, movements and transfer from site will be kept by the C&D Waste Manager.

9.6 Earthworks – Cut and Fill Policy

Earthworks for the basement/under-croft parking and structure foundations form a major part of the quantity of waste that will be generated by the construction phase of this project. In order to optimise the impact of the generation of surplus material due to excavation the following principles shall be considered during the detail design and construction phase:

- The quantity of excavated materials to be removed from or imported to the site has been greatly reduced by establishing levels of the proposed buildings which optimise the volume of cut and fill.
- Surplus subsoil excavated from the site will be reviewed for possible reuse as engineering fill.
- Unsuitable sub-soils generated by excavations on site will be reviewed for reuse as landscaping or non-engineering fills on adjoining or other construction sites within the region.
- Careful separation of builder's rubble packaging and contaminated waste from re-usable material will result in the minimisation of the disposal of material to landfill.

9.7 Earthworks – General

All excavations on site will be battered back open-cut excavations to a safe angle of repose using conventional methods. The new foundations shall be kept shallow (strip and pad footings) to minimise the depths of excavation where possible. Rock breaking is not anticipated. However, the removal of boulders/cobbles will likely be required within the clay strata. Dewatering of the excavations is not anticipated.

An article 27 notification to the EPA will be required in the future should any top-/sub-soil transfers be made between sites, but this is not currently anticipated.

10. Dust and Dirt Control

Nuisance dust emissions from construction activities are a common and well recognised problem. Fine particles from these sources are recognised as a potential significant cause of pollution.

The Main Contractor will be required to demonstrate that both nuisance dust and fine particle emissions from the site are adequately controlled and are within acceptable limits.

Dust and fine particle generation from construction and demolition activities on the site can be substantially reduced through carefully selected mitigation techniques and effective management. Once particles are airborne it is very difficult to prevent them from dispersing into the surrounding area. The most effective technique is to control dust at source and prevent it from becoming airborne, since suppression is virtually impossible once it has become airborne.

10.1 Mitigation Measures

The following are techniques and methods that will be implemented to ensure that dust and dirt are not emitted from the site:

1. The roads in the vicinity of the site are all surfaced, and no dust is anticipated arising from unsealed surfaces outside the site.
2. A regime of 'wet' road sweeping will be set up to ensure the roads around the immediate site are as clean and free from dirt / dust arising from the site, as is reasonably practicable. This cleaning will be carried out by approved mechanical sweepers.
3. Footpaths immediately around the site will be cleaned by hand regularly, with damping as necessary.
4. High level walkways and surfaces such as scaffolding will be cleaned regularly using safe 'wet' methods, as opposed to dry methods.
5. Vehicle waiting areas or hard standings will be regularly inspected and kept clean by brushing or vacuum sweeping and will be regularly sprayed to keep moist, if necessary.
6. Vehicle and wheel washing facilities will be provided at site exit(s) where practicable. If necessary, vehicles can be washed down before exiting the site.
7. Netting will be provided to enclose scaffolding in order to mitigate escape of air borne dust from the existing and new buildings.
8. Vehicles and equipment shall not emit black smoke from exhaust system, except during ignition at start up.
9. Engines and exhaust systems shall be maintained so that exhaust emissions do not breach stationary emission limits set for the vehicle / equipment type and mode of operation.
10. Servicing of vehicles and plant will be carried out regularly, rather than just following breakdowns.
11. Internal combustion plant will not be left running unnecessarily.
12. Where possible fixed plant such as generators will be located away from residential areas.

13. The number of handling operations for materials will be kept to a minimum in order to ensure that dusty material is not moved or handled unnecessarily.
14. The transport of dusty materials and aggregates will be carried out using covered / sheeted lorries.
15. Material handling areas will be clean, tidy, and free from dust.
16. Vehicle loading will be dampened down and drop heights for material to be kept to a minimum.
17. Drop heights for chutes / skips will be kept to a minimum.
18. Dust dispersal over the site boundary will be minimised using static sprinklers or other watering methods as necessary.
19. Stockpiles of materials will be kept to a minimum and if necessary, they should be kept away from sensitive receptors such as residential areas etc.
20. Stockpiles, where necessary, will be sheeted or watered down.
21. Methods and equipment will be in place for immediate clean-up of spillages of dusty material.
22. No burning of materials will be permitted on site.
23. Earthworks excavations will be kept damp where necessary and where reasonably practicable.
24. Cutting on site will be avoided where possible by using pre-fabrication methods.
25. Equipment and techniques for cutting / grinding / drilling / sawing / sanding etc., which minimise dust emissions and which have the best available dust suppression measures, will be employed.
26. Where scabbling is to be employed, tools will be fitted with dust bags, residual dust will be vacuumed up rather than swept away, and areas to be scabbled will be screened off.
27. Wet processes will be used to clean building facades if possible. If dry grit blasting is unavoidable then ensure areas of work are sealed off and dust extraction systems used.
28. Where possible, pre-mixed plasters and masonry compounds will be used to minimise dust arising from on-site mixing.
29. Prior to commencement, the Main Contractor will identify the construction operations which are likely to generate dust and to draw up action plans to minimise emissions. Furthermore, the Main Contractor will prepare environmental risk assessments for all dust generating processes, which are envisaged.
30. The Main Contractor will allocate suitably qualified personnel to be responsible for ensuring the generation of dust is minimised and effectively controlled.

11. Noise Assessment and Control Measures

11.1 Air Quality Monitoring and Noise Control Unit's Good Practice Guide for Construction and Demolition

Prior to the commencement of work on the site a construction and demolition plan will be developed. When developing the construction and demolition plan reference must be made to the requirements of the Air Quality Monitoring and Noise Control Unit's Good Practice Guide for Construction and Demolition.

This Guide has been produced with reference to the London Good Practice Guide: Noise and Vibration Control for Demolition and Construction produced by the London Authorities Noise Action Forum, July 2016.

11.2 Environmental Noise Mitigation Measures

General:

1. All site staff shall be briefed on noise mitigation measures and the application of best practicable means to be employed to control noise.
2. Site hoarding shall be erected to maximise the reduction in noise levels.
3. The contact details of the Main Contractor and site manager shall be displayed to the public, together with the permitted operating hours, including any special permissions given for out of hours work.
4. In the event that the Main Contractor gets a complaint about noise from a neighbour he will act immediately to remedy the situation.
5. The site entrance shall be located to minimise disturbance to noise sensitive receptors.
6. Internal haul routes shall be maintained, and steep gradients shall be avoided.
7. Material and plant loading and unloading shall only take place during normal working hours unless the requirement for extended hours is for traffic management (i.e., road closure) or health and safety reasons (written approval, must be obtained from the planning authority prior to this activity being undertaken).
8. Rubber linings shall be used in chutes, dumpers, and hoppers to reduce impact noise.
9. Opening and shutting of gates shall be minimised through good coordination of deliveries and vehicle movements.

Plant:

1. Each item of plant and equipment shall comply with the noise limits quoted in the relevant European Commission Directive 2000/14/EC.
2. All plant and equipment shall be fitted with appropriate mufflers or silencers of the type recommended by the manufacturer.
3. All plant and equipment shall be used only for the tasks for which it has been designed.

4. All plant and equipment shall be shut down in intermittent use in the intervening periods between work or throttle down to a minimum.
5. All plant shall be powered by mains electricity where possible rather than generators.
6. Screening from existing features or structures shall be maximised and employ the use of partial or full enclosures for fixed plant.
7. Movable plant shall be located away from noise sensitive receptors where possible
8. All plant operators shall be qualified in their specific piece of plant.
9. Compressors and generators will be sited in areas least likely to give rise to nuisance where practicable.

Vehicle activity:

1. All vehicle movement (on site) will occur within normal working hours. (Other than where extension of work requiring such movements has been granted in cases of required road closures or for health and safety reasons).
2. Deliveries and vehicle movements will be planned so that vehicles are not waiting or queuing on the public highway, if unavoidable engines shall be turned off.
3. The site layout will ensure that reversing is kept to a minimum.
4. Where reversing is required broadband reverse sirens will be used, or where it is safe to do so banksmen will be used, and sirens disengaged.
5. Rubber/neoprene or similar non-metal lining material matting will be used to line the inside of material transportation vehicles to avoid first drop high noise levels.
6. Wheel washing of vehicles prior to exiting the site shall take place to ensure that adjoining roads are kept clean of dirt and debris. Regular washing of adjoining streets should also take place as required by road sweepers.

Demolition Phase (none anticipated):

1. The use of acoustic screening shall be employed; this can include planning the demolition sequence to utilise screening afforded by buildings to be demolished.
2. If working out of hours for Health and Safety reasons (following approval by the respective council) demolition activities will be limited to low level noise activity (unless absolutely unavoidable).
3. Low impact demolition methods such as non-percussive plant will be used where practicable.
4. Rotary drills and ‘bursters’ will be activated by hydraulic or electrical power or chemically based expansion compounds to facilitate fragmentation and excavation of hard material.
5. The transfer of noise and vibration from demolition activities to adjoining occupied buildings will be avoided through cutting any vibration transmission path or by structural separation of buildings.
6. The removal of larger sections will be considered by lifting them out and breaking them down either in an area away from sensitive receptors or off site.

Ground Works and Piling Phase:

1. The following hierarchy of groundwork/piling methods should be used if ground conditions, design and safety allows;
    - Pressed in methods, e.g., hydraulic jacking
    - Auger/bored piling
    - Diaphragm walling
    - Vibratory piling or vibro-replacement
    - Driven Piling or dynamic consolidation
2. The location and layout of the piling plant should be designed to minimise potential noise impact of generators and motors.
3. Where impact piling is the only option, utilise a non-metallic dolly between the hammer and driving helmet or enclose the hammer and helmet with an acoustic shroud.
4. Consider concrete pour sizes and pump locations. Plan the start of concrete pours as early as possible to avoid overruns.
5. Where obstructions are encountered, work should be stopped, and a review undertaken to ensure that work methods that minimise noise are used.
6. When using an auger piling rig do not dislodge material from the auger by rotating it back and forth. Use alternate methods where safe to do so.
7. Prepare pile caps using methods which minimise the use of breakers, e.g., use hydraulic splitters to crack the top of the pile.

Monitoring:

1. Carry out regular on-site observation monitoring and checks/audits to ensure that BPM is being used at all times. Such checks shall include;
    - Hours of work
    - Presence of mitigation measures
    - Number and type of plant
    - Construction methods
2. In the event that the Main Contractor gets a complaint about noise from a neighbour he will act immediately to remedy the situation.
3. A sound level digital meter will be employed as necessary to monitor noise, with results recorded to inform the contractor of noise level.
4. Site reviews must be recorded and made available for inspection.
5. Appraise and review working methods, processes, and procedures on a regular basis to ensure continuous development of BPM.

Communication and Liaison:

1. A Community Liaison Plan will be developed by the developer in consultation with local residents/businesses and a single point of contact nominated to engage with Fingal County

Council, Dublin City Council and the residents/businesses and to handle complaints and communication of site information.

2. All site staff will be briefed on the complaints procedure and mitigation requirements and their responsibilities to register and escalate complaints received.

11.3 Risk Assessment & Mitigation

The Main Contractor shall deal with the immediate dangers to hearing etc. associated with high noise levels and the impact of same on construction operatives, by means of risk assessment and mitigation / precautionary measures and equipment, all pursuant to the current health and safety legislation.

Current legislation limits, assessment period of 8 hours of one week (noisiest 8 hours likely to experience):

- Lower Action Value (LAV) – 80 dBA $L_{EX,8}$, 135 dB Peak – Hearing Protection shall be made available and information shall be provided.
- Upper Action Value (UAV) – 85 dBA $L_{EX,8}$, 137 dB Peak – Use of Hearing Protection is mandatory, measures to eliminate the noise as much as possible shall be applied.
- Exposure Limit Value (ELV) – 87 dBA $L_{EX,8}$, 140 dB Peak – Not to be exceeded

Protection by ear plugs/muffs given by their Signal-to-Noise Ratio (SRN) or Noise Reduction Rating (NRR) is typically 20 – 30 dB.

- Exposure = $L_{EX,8}$ – (SNR - 10)

As a guide, if it is difficult to hear a normal conversation at a distance of 2m or if a workplace is consistently noisier than a busy street, it is likely that the noise levels in the area are above 80 dBA.

Noise due to the normal operation of the proposed development shall not cause a noise nuisance to nearby noise sensitive locations and in general shall not exceed the background level by 10dB(A) or exceed the limits set out in the EPA's Guidance Note for Noise (NG4), as measured from the nearest noise sensitive location.

11.4 Potential Noise Sources

It is not envisaged that any excessively noisy activities will need to be carried out over extended periods of time during the construction stage. However, due to the nature of the construction works, exposure to noise levels in excess of 80 dBA (Safe Working Limit) may occur occasionally. The Main Contractor will carry out a noise assessment in relation to the proposed works at construction stage. The noise assessment shall identify, but not limited to, the following steps in its analysis; -

1. Potentially Hazardous Activities: Use of site machinery and power tools. For example, concrete saws, angle grinders, vibratory plate compactors etc.
2. Potential Hazards: Excessive noise
3. Persons as Risk: People in the vicinity of the work generating an excessive noise. These persons include employees, contractors, and members of the public.
4. Risk of Exposure to the Potential Hazard: Temporary or permanent hearing loss.
5. Risk Assessment before the Implementation of Control Measures: Medium

6. Risk Assessment after the Implementation of Control Measures: Low
7. Control Measures Implemented by: Site Manager / Works Supervisor

11.5 Mitigation Measures

The following control measures are to be implemented: -

1. Site Manager shall monitor a likelihood of prolonged exposure to excessive noise and commission noise surveying/monitoring programme where necessary.
2. Works Supervisor shall assess risk arising from noise prior to each particular activity taking place and determine appropriate action. The aim shall be to minimise the exposure to excessive noise levels.
    a. If it is likely that the noise exposure exceeds Lower Action Value, then hearing protection must be made available.
    b. If it is likely that the noise exposure exceeds Upper Action Value, then hearing protection is mandatory to be used. Work Supervisor shall decide on the most suitable hearing protection to be used based on Exposure (see formula above) and worker's personal preference (earmuffs or earplugs).
3. Works Supervisor shall ensure proposed measures are put in place and that their effectiveness and suitability is evaluated on regular bases.
4. Site management shall minimise noise at work by looking for alternative processes and/or working methods, which would make the work quieter and/or exposure times shorter.
5. Site Manager shall liaise with all site contractors in order to effectively control noise exposure.
6. Number of people working near source of the noise shall be minimised.
7. Plant and machinery will be compliant with current legislation and fitted with silencers where possible.
8. Employees must use hearing protection where its use is made compulsory.
9. Hearing protection zones shall be identified where necessary.
10. Spot checks on appropriate use of hearing protection shall be carried out.
11. Operators of rock breaking machines and workers nearby must wear adequate ear protection.

11.6 Proper Use of Hearing Protection

- Earmuffs: Workers must make sure that they totally cover their ears, fit tightly and that there are no gaps around the seals. Hair, glasses, jewellery, hats etc. shall not interfere with the seal. Seals and insides of earmuffs shall be kept clean. Workers shall make sure that any headband keeps its tension.
- Earplugs: Workers shall make sure that they are wearing them properly. They shall practice fitting them and get help if they are having trouble. Hands shall be clean before fitting earplugs. Earplugs must not be shared with other workers.

- Semi-inserts/caps: Same applies as for earplugs. Workers shall make sure that any headband keeps its tension.

All workers are expected to:

- Co-operate: Help the Company to do what is needed to protect their hearing. Make sure that they use properly any noise control device and follow any working methods that are put in place.
- Wear any hearing protection they are given: Make sure that they are wearing it properly. They shall wear it all the time when they are exposed noisy environment (over UAV). Removing hearing protection in a noisy environment, even for a short period, can result in hearing damage.
- Look after their hearing protection.
- Report any problems: Report any problems with the hearing protection or effectiveness of the measures to the work supervisor.

12. Watercourse Management

Protection of the River Mayne, and by association the lakes and tributary ditches on-site, are of paramount importance to the project. The details contained within the Surface Water section of the Engineering Assessment Report, The Flood Risk Assessment Report, and the Arborist's & Ecologist's Reports and Drawings should also be consulted, in order to protect and enhance the water quality, both during the construction and thus subsequently operational phase of the development.

The Main Contractor will not be permitted to have any storage area within the vicinity of the River Mayne.

Fingal County Council objective: DMS171 instructs that: "*Ensure that no development, including clearance and storage of material, takes place within 10m-15m as a minimum, measured from each bank of any river, stream or watercourse in the County*".

The following Mitigation Measures are to address potential impacts to water quality and are required to protect the River Mayne. All works will be undertaken with reference to the following guidelines:

- CIRIA C532: Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors (Masters-Williams et al., 2001).
- CIRIA C692: Environmental Good Practice on Site, (Audus et al., 2010).
- BPGCS005: Oil Storage Guidelines.
- CIRIA C648: Control of Water Pollution from Linear Construction Projects: Technical Guidance (Murnane et al., 2006a).
- CIRIA C648: Control of Water Pollution from Linear Construction Projects: Site Guide (Murnane et al., 2006a).
- Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (IFI 2016).
- Guidelines for Planning Authorities – Architectural Heritage Protection – Guidance on Part IV of the Planning and Development Act 2000. (Part 2, Chapter 7) and ICOMOS Principles.
- Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Water, Inland Fisheries Ireland (IFI, 2016).

Emergency contact numbers for the Local Authority Environment Section, Inland Fisheries Ireland, the Environmental Protection Agency and the National Parks and Wildlife Service will be displayed in a prominent position within the site compound. These agencies will be notified immediately in the event of a pollution incident.

The schedule of mitigation presented within *Table 4* summarises measures that will be undertaken to reduce impacts on ecological receptors within the zone of influence of the proposed development. This table should be read in conjunction with the Preliminary Construction Demolition & Waste Management Plan.

No.	Risk	Possible Impact	Mitigation	Result of Mitigation
1	Hydrocarbons from carparking area entering the watercourse.	Water quality impacts Reduction in habitat quality Mortality of aquatic key ecological receptors/qualifying interests	Designated parking at least 50m from any watercourse.	Ensures no soil disturbance or hydrocarbons leak near aquatic zone
2	Pollutants from site compound areas entering the watercourse.	Water quality impacts Reduction in habitat quality Mortality of aquatic key ecological receptors/qualifying interests	The site compound will be located at least 50m from any watercourse.	Prevents pollution of the aquatic zone from toxic pollutants
3	Pollutants from material storage areas entering the watercourse.	Water quality impacts Reduction in habitat quality Mortality of aquatic key ecological receptors/qualifying interests	Fuels, oils, greases, and other potentially polluting chemicals will be stored in bunded compounds at the Contractor's compound or a location at least 50m from any body of water. Bunds are to be provided with 110% capacity of the storage container. Spill kits will be kept on-site at all times and all staff trained in their appropriate use. Method statements for dealing with accidental spillages will be provided by the Contractor for review by the Employer's Representative.	Prevents contamination of aquatic zone by toxic pollutants
4	Concrete/cementitious materials entering the watercourse from washdown.	Water quality impacts Reduction in habitat quality Mortality of aquatic key ecological receptors/qualifying interests	A designated wash down area within the Contractor's compound will be used for cleaning of any equipment or plant, with the safe disposal of any contaminated water.	Prevents contamination of aquatic zone by suspended solids or pollutants, ensures invasive species material is not transported off-site
4	Concrete/cementitious materials entering the watercourse from concrete pours.	Water quality impacts Reduction in habitat quality Mortality of aquatic key ecological receptors/qualifying interests	Pouring of cementitious materials will be carried out in the dry.	Prevents contamination of aquatic zone by suspended solids or pollutants, ensures invasive species material is not transported off-site

5	Leaching of contaminated soil into groundwater.	Water quality impacts Reduction in habitat quality Mortality of aquatic key ecological receptors/qualifying interests	Spill kits will contain 10 hr terrestrial oil booms (80mm diameter x 1000mm) and a plastic sheet, upon which contaminated soil can be placed to prevent leaching to groundwater	Prevents contamination of aquatic zone by petrochemicals
6	Pollutants from equipment storage/refuelling area entering the watercourse.	Water quality impacts Reduction in habitat quality Mortality of aquatic key ecological receptors/qualifying interests	Any refuelling and maintenance of equipment will be done at designated bunded areas with full attendance of plant operative(s) within contained areas at least 50m from any watercourse	Prevents contamination of aquatic zone by petrochemicals
7	Runoff from exposed work areas and excavated material storage areas entering the watercourse.	Water quality impacts Reduction in habitat quality Mortality of aquatic key ecological receptors/qualifying interests	Contractor to prepare a site plan showing the location of all surface water drainage lines and proposed discharge points to the sewer. The plan will include the location of all surface water protection measures, including monitoring points and treatment facilities.	Prevents contamination of aquatic zone by suspended solids or pollutants.

Table 4 | *Schedule of Surface Water Mitigation Measures*

12.1 Surface Water Monitoring Programme and Parameters

The Main Contractor will be required to develop a surface water monitoring programme as part of the environmental plan(s).

Daily visual inspections will be incorporated for signs of hydrocarbon sheens and general turbidity conditions (changes in colour/clarity due to suspended solids), unusual odours may also be a sign of potential contamination.

The Local Authorities may require that a periodic sampling and analysis programme be undertaken during the construction programme. Project specific parameters will be set out by the Authority, however, indicated overleaf in *Table 5*, are a list of parameters and limits as defined in the Fresh Water Quality Regulations (EU Directive 2006/44/EEC), which may possibly be implemented.

Parameter	Guide limit	Mandatory Limit
Temperature		1.5 ^{0}C
Dissolved oxygen	50% of Samples ≥ 9 (mg/l O_2) 100% of Samples ≥ 7 (mg/l O_2)	
pH		6-9
Nitrites	≤0.01 (mg/l $N0_2$)	
Suspended Solids	≤25 (mg/l)	
BOD5	≤3 (mg/l)	
Phenolic Compounds		
Petroleum Hydrocarbons	5 (mg/l)	
Non-Ionized Ammonia	≤ 0.005 (mg/l NH_3)	
Total Ammonium	≤ 0.004 (mg/l NH_4)	
Total Residual Chlorine		≤ 0.005 (mg/l HOCl)
Electrical Conductivity		

Table 5 | *Monitoring Guidelines (Fresh Water Quality Regulations*)

13. Ground Water

The excavations for the drainage pipes, water supply, utilities and foundations have been designed to be as shallow as possible in order to reduce excavation depths. This will reduce the potential for groundwater seepage to excavations. The subject site is located in an area with low to moderate groundwater vulnerability.

Careful attention will be required to maintain the excavations clear of ground water.

A discharge licence will be required for all water pumped from the excavations to any public water course or sewer.

All water pumped from the excavations will require to be treated for silt and deleterious matter. During any discharge of surface water from the excavations, the quality of the water will be regularly monitored visually for hydrocarbon sheen and suspended solids. Periodic laboratory testing of discharge water samples will be carried out in accordance with the requirements of the discharge licence obtained from the Local Authority.

14. Runoff Pollution and Sediment Control

14.1 Runoff Pollution Control

Significant quantities of waste and potential pollutants can be generated during construction. Controls must be put in place to prevent these pollutants from washing into the local storm water system during storm events.

The recommendations as outlined in the Eastern Regional Fisheries Board document outline the following seven items to be considered for the protection of adjacent water courses during the construction stage. The contractor will be required to :

1. Fuels, oils, greases, and hydraulic fluids must be stored in bunded compounds well away from the watercourse/ditches. Refuelling of machinery, etc., should be carried out in bunded areas.

2. Runoff from machine service and concrete mixing areas must not enter the watercourse.

3. Stockpile areas for sands and gravel should be kept to minimum size, well away from the watercourse.

4. Runoff from the above should only be routed to the watercourse via suitably designed and sited settlement ponds/filter channels.

5. Settlement ponds should be inspected daily and maintained regularly.

6. Temporary crossings should be designed to the criteria laid down for permanent works.

7. Watercourse banks should be left intact if possible. If they have to be disturbed, all practicable measures should be taken to prevent soils from entering the watercourses.

The main pollutants of site water are silt, fuel/oil, concrete, and chemicals. See *Table 6* below for a list and brief description of pollution prevention measures.

Source	**Action**
Detergents	Use of detergents should be carried out in designated areas draining to the foul sewer.
Fuel/Oil	Fuel/oil stores must be located away from the site drainage system and the edge of watercourses.
Fuel/Oil	Ensure adequate measures are identified to prevent or contain any spillage such as creating a fall away from any drainage grid or blocking drainage points.
	Prevent oil pollution by • Suitable bunded storage of fuel/oil, and use of drip trays under plant, and • An oil separator, and/or • On-site spill-kit

	• Commercially available absorbent granules, pads, or booms.
Material Storage	Store drums, oil, and chemicals on an impervious base and within a secured bund.
	Ensure topsoil and/or spoil heaps are located at least 10m away from water courses. Consider seeding them or covering with a tarpaulin to prevent silty runoff and losses due to wind.
Leaks and Spills	Storage facilities are to be checked on a regular basis to ensure any leaks or drips are fixed to prevent loss and pollution.
	Ensure appropriate spill response equipment is located near to the material in case of containment failure or material spills, and ensure site staff know how to use it.
	Adequate stocks of absorbent materials, such as sand or commercially available spill kits and booms should be available at all times.
Litter	Provide waste bins on-site as appropriate.
Construction Vehicles	Provide vehicle wheel washing.
Concrete, Cement and Bentonite	Washout of these materials should be carried out in a designated, impermeable contained area. The washout water itself should be disposed of off-site, or discharged to the foul sewer if authorised.

Table 6 | *Pollution Protection Measures*

14.2 Sediment Control

Construction runoff is heavily laden with silt which can block road gullies and reduce the hydraulic capacity in pipes and watercourses, contributing to ponding and flooding. Continued development without appropriate controls will ultimately keep maintenance costs elevated, whether that be in cleaning gullies, jetting pipes, or dredging. Sediment control plans can be implemented on-site to mitigate these issues.

Sediment basins and traps will be installed before any major site grading takes place. Additional sediment traps and silt fences will be installed as grading takes place to keep sediment contained on site at appropriate locations.

Key runoff-control measures will be located in conjunction with sediment traps to divert water from planned undisturbed areas, and instead divert the sediment laden waters into the traps. Diversions will be installed above the areas to be disturbed before any grading operations. Any perimeter drains will be installed with stable outlets before opening major areas for development. Any additional facilities needed for runoff control will be installed as grading takes place.

During grading operations temporary diversions, slope drains, and inlet and outlet protection installed in a timely manner can be very effective in controlling erosion and sediment build up.

The main run-off conveyance system with inlet and outlet protection measures will be installed early and used to convey stormwater run-off through the development site without creating gullies or channels. Install inlet protection for storm drains as soon as the drain is functional to trap sediment on site in shallow pools and to allow the flood flows to enter the storm drainage system safely. Install outlet protection at the same time as the conveyance system to prevent damage to the receiving watercourse.

During the final stages of construction unstable sediment from sediment basins and traps will be removed and if possible incorporated into the topsoil, not just spread on the surface.

14.2.1 Sediment Control Measures

Sediment entrapment facilities are necessary to reduce sediment discharges to downstream properties and receiving waters. All run-off leaving a disturbed area will pass through a sediment entrapment facility before it exits the site and flows downstream.

Straw Bales:

Straw bales can be placed at the base of a slope to act as a sediment barrier. These are not recommended for use within a swale or channel. Straw bales are temporary in nature and may perform for only a period of weeks or months. Proper installation and maintenance is necessary to ensure their performance.

Silt Fencing

A silt fence is made of a woven synthetic material, geotextile, and acts to filter run-off. Silt fencing can be placed as a temporary barrier along the contour at the base of a disturbed area but is not recommended for use in a channel or swale. The material is durable and will last for more than one season if properly installed and maintained. Silt fencing is not intended to be used as a perimeter fence or in area of concentrated flow. If concentrated flow conditions exist, a more robust filter should be considered.

Silt Barriers

Silt barriers can also be temporarily installed in any road gullies of partially constructed roads to prevent sediment movement into downstream drainage systems or SUDS components.

When the catchment area is greater than that allowed for straw bale barriers or silt fences, runoff will be collected in diversion drains and routed through temporary sediment basins.

Diversion Drains

Diversion drains are simple linear ditches, often with an earth bund, for channelling water to a desired location. If the drains are being eroded, they can be lined with geotextile fabric or large stones or boulders.

15. Sources and References

The following sources and references were utilised in the preparation of this report and are included as part of the planning pack submitted as submissions under separate covers, unless noted otherwise.

- Engineering Assessment Report, produced by Waterman Moylan Consulting Engineers
- Flood Risk Assessment, produced by Waterman Moylan Consulting Engineers
- Preliminary Construction Demolition and Waste Management Plan, produced by Waterman Moylan Consulting Engineers.
- AA Screening Report, produced by Openfield.
- Natura Impact Statement, produced by Openfield.
- Arborist Method Statement, produced by The Tree File.
- Tree Impact Plan, produced by The Tree File.
- The Environmental Impact Assessment Report (EIAR), this document is a cumulation of contributions by the multi-disciplinary design team.
- SI No. 477 of 2011 (not included).

UK and Ireland Office Locations