Planning Application for a Large-scale Residential Development (LRD) Land at Former Ford Distribution Site, fronting onto Centre Park Road, Ballintemple, Cork

VOLUME II

LRD EIAR

McCutcheon Halley
CHARTERED PLANNING CONSULTANTS

VOLUME II | List of Chapters

VOLUME II

CHAPTER 1
Introduction

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CHAPTER ONE
Table of Contents

CHAPTER ONE
Table of Figures

CHAPTER ONE
Table of Tables

Chapter One | Introduction

This Environmental Impact Assessment Report (EIAR) was prepared by McCutcheon Halley Planning Consultants together with a team of specialist consultants on behalf of Marina Quarter Ltd. (the "Applicant") to accompany a Large-scale Residential Development (LRD) application for permission for 176 apartment units on a proposed development site of 0.84 hectares, at the Former Ford Distribution Site, fronting onto Centre Park Road, Ballintemple, Cork. Article 1(a) of EIA Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment as amended by Directive 2014/52/EU (the "EIA Directive" provides the following definition:

> *"Environment impact assessment" means a process consisting of:*
>
> (i) The preparation of an environmental impact assessment report by the developer, as referred to in Article 5(1) and (2);
>
> (ii) The carrying out of consultations as referred to in Article 6 and, where relevant, Article 7;
>
> (iii) The examination by the competent authority of the information presented in the environmental impact assessment report and any supplementary information provided, where necessary, by the developer in accordance with Article 5(3), and any relevant information received through the consultations under Articles 6 and 7;
>
> (iv) The reasoned conclusion by the competent authority on the significant effects of the project on the environment, taking into account the results of the examination referred to in point (iii) and, where appropriate, its own supplementary examination; and
>
> (v) The integration of the competent authority's reasoned conclusion into any of the decisions referred to in Article 8a."

This EIAR identifies, describes and assesses the likely significant effects of the project as a whole, in accordance with the Directive 2011/92/EU, as amended by Directive 2014/52/EU, based on the guidance presented in the Guidelines on the Information to be contained in Environmental Impact Assessment Reports (EPA, 2022).

The Department of Housing, Planning and Local Government has issued an EIA Portal confirmation for the proposed project and the confirmation letter will be submitted as part of the planning application under separate cover.

This chapter describes the existing baseline condition of the proposed development site and its environs and briefly introduces the project. The detailed description is set out in Chapter 2. The descriptive terminology by individual contributors to accurately explain the full range of effects is set out in section 1.12. The consultation process, which was undertaken ahead of lodging the application, is outlined. The range of projects and plans deemed relevant for the purpose of the cumulative assessments provided for individual disciplines is provided in **Appendix 1-1**. It should be noted that the list is up to date as of 25th November 2024, one week before the application was lodged to Cork City Council.

1.1 Author Information and Competency

This chapter was prepared by Rachel Condon of McCutcheon Halley Chartered Planning Consultants. Rachel graduated from University College Cork with a BA Hons in Geography and Irish, obtained in 2010 and a master's degree in Planning and Sustainable Development, obtained in 2013. Rachel is currently an Associate Director in the Practice and is experienced in the field of planning and development consultancy which includes providing consultancy services in respect of major projects. Rachel has directed the preparation of EIAR's for a range of development types including residential, mixed use, and industrial developments.

Rachel has practised as a planning consultant for over 10 years and has directed the preparation of Environmental Impact Assessment Report (EIARs) for a range of development types including residential, commercial and industrial. Directly relevant experience to this proposed development is that Rachel has been involved in the direction and preparation of EIARs to accompany residential-led applications that received permission for development including:

- Connolly Quarter Reg. Ref: 3054/22 - The construction of 187 build-to-rent apartments and 4 office blocks with heights ranging from 5 to 16 storeys. The proposed development included works to a Protected Structure (RPS Ref. No. 130).
- Bailey Gibson (PL29S.307221) - Demolition of all structures, construction of 416 residential units (incl. 4 houses, 412 apartments) and associated site works.
- Southwest Gate (Reg. Ref. 3228/20) – Demolition of 4 no. existing buildings and surface car parking, and construction of a mixed-use scheme across 13 no. blocks comprising 1,123 no. residential units with supporting amenities, retail units, office accommodation, a primary healthcare centre, gym, cultural centre, childcare facility, hotel and a series of public open spaces.

1.2 The Applicant

Marina Quarter Ltd. is part of Glenveagh Homes, a leading Irish home builder founded in 2017, whose vision is to build high-quality homes that support sustainable communities. Their focus on people, homes and communities has created successful developments nationally by understanding that well planned, well designed and well-built homes is the essence of thriving communities.

Glenveagh are focused on three core markets - suburban housing, urban apartments and partnerships with local authorities and state agencies. Since the Initial Public Offering (IPO), the company have opened 23 sites, delivering more than 3,200 units (1,350 no. units in 2022). In the financial year of 2023, the Group received granted permissions for approximately 4,600 units across twenty applications. Glenveagh have projected the delivery of over 2,700 units in 2024 and as of September 2024 Glenveagh are on track to meet this target.

1.3 Reference to Guidelines Relevant to Discipline

This chapter has been prepared in accordance with the following guidelines:

- Guidelines on the Information to be Contained in Environmental Impact Reports (EIAR) (Environmental Protection Agency (EPA), May 2022).
- Environmental Impact Assessment of Projects: Guidance on the Preparation of the Environmental Impact Assessment Report (EU, 2017).
- Environmental Impact Assessment of Projects: Guidance on Scoping (EU, 2017).
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning and Local Government, 2018).

Each chapter of this EIAR contains a complete list of Guidelines and Policies relevant to specific disciplines.

1.4 Brief Project Description

A full description of the proposed development is outlined in Chapter 2 'of this EIAR.

The proposed development will include the construction of 176 no. 1, 2 and 3 bed apartment units in 2 no. blocks, 1 no. creche, 1 no. gym, a retail/café space and all associated ancillary development works. Block B, which is located to the north of the site, provides a height of 10 storeys over the podium, and block A, to the south, provides 7 and 8-storey blocks. The blocks overlook the Marina tree lined promenade on the south bank of the River Lee and adjoins the Lee Rowing Club and Marina Park to the east.

Between the two proposed blocks of apartments, a podium communal garden opens at each end north and south. The podium garden sits over the parking, cycle parking and service areas for the apartments and is also raised above the adjoining public realm space. These areas consist of grass lawns, garden bedding, an outdoor calisthenic gym, a play area, a canopy pergola feature, and several trees strategically located throughout the site.

56 car parking spaces including 3 accessible parking spaces (1 accessible space at grade and 2 accessible spaces at the podium/basement level) and 28 electric vehicle (EV) charging spaces, and 12 motorcycle spaces are proposed at the podium/basement level. A total of 427 bicycle parking spaces are proposed for the development including the provision of secure bicycle stores at podium/basement level. Pedestrians and cyclists can access the site via the proposed footpath running along the northwestern boundary of the development, adjacent to Centre Park Road as well as the shared vehicular and pedestrian access via Street C of the adjacent development (planning reference: ABP-309059-20). An integrated design with the upcoming Marina Promenade and adjacent Development is provided for connection. Vehicular access to the site is gained via a proposed street, approved under the SHD scheme, which adjoins Centre Park Road (L1002) in the south-west corner of the site. The Marina Promenade connects to the northeast corner of the site and provides the Cork Harbour Greenway (non-motorised) link to Mahon and, ultimately, Passage West.

See **Figure 1.1** below for the proposed development site layout.

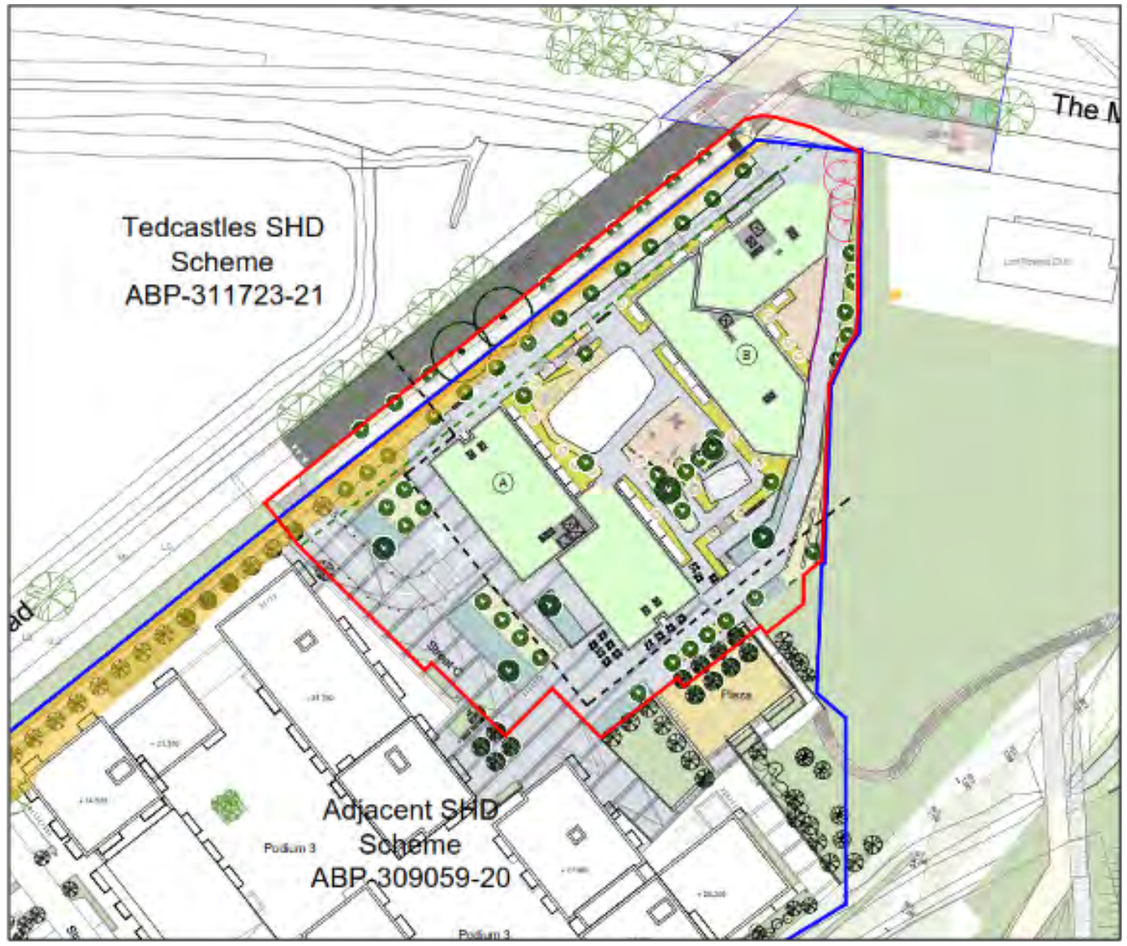


Figure 1.1 Proposed Development Site Layout (Source: John Fleming Architects (JFA))

1.5 Proposed Development Site & Context

The proposed development site comprises a 0.84ha site, located at Former Ford Distribution Site, fronting onto Centre Park Road, Ballintemple, Cork.

The proposed site, known as the Former Ford Distribution Site, is situated approximately 2km from Cork City Centre. It is situated on the south bank of the River Lee in the South Docks of Cork City. The proposed development falls within the Polder Quarter character area of the City Docks, as defined in the Cork City Development Plan 2022-2028 (CCDP). To the north, is the River Lee which provides a serene backdrop to this post-industrial setting. To the east, the site is bordered by

an area of wetlands Pairc Ui Chaoimh GAA Stadium and the adjoining amenities of Marina Park. To the south/south-west, is the remainder of the Former Ford Distribution site, which has received planning permission (Marina Quarter Development (also known as the South Docks Strategic Housing Development (SHD) (ABP Reg. Ref: 309059), which is currently under construction (see **Figure 1.4** below). This development includes 1,002 residential units, 5 retail units, 2 childcare facilities, a medical centre, a bar, a café, a venue and performance area and 2 community resource spaces. To the west, the site is bordered by Centre Park Road which links to the city centre and Marina Promenade. Beyond Centre Park Road to the west, the lands to the west of the site are currently undeveloped but are the proposed location of the mixed-use development of City Park SHD (ABP Reg. Ref: 313277), which remains an active case with An Bord Pleanála. City Park SHD is proposed to include 823 apartments, 3 café/restaurants, 2 public houses, 7 retail units, a convenience retail store, a library, a medical centre, a pharmacy, a post office, a dentist, 2 no. childcare facilities, resident car parking (at sub-podium level), and associated open spaces. Adjacent to the City Park SHD site is a site earmarked for the development of a primary and secondary school on a shared campus, as delineated in **Figure 1.4** below.

Further to the West are the Marina Power Station and the Marina 110Kv Substation. The area between these sites and Cork City Centre is currently largely under industrial use but is zoned for future residential and mixed-use development.

Figure 1.2 Application Area and Surrounding Context (Source: MHP GIS Team)

According to the CCDP, the subject site lies within the development boundary of the South Docks and is zoned ZO 02 'New Residential Neighbourhood' see **Figure 1.3** below. A small portion (118 sq.m) of the proposed development located in the north-western corner of the site falls into an Area of High Landscape Value (AHLV), as illustrated in **Figure 1.3**.

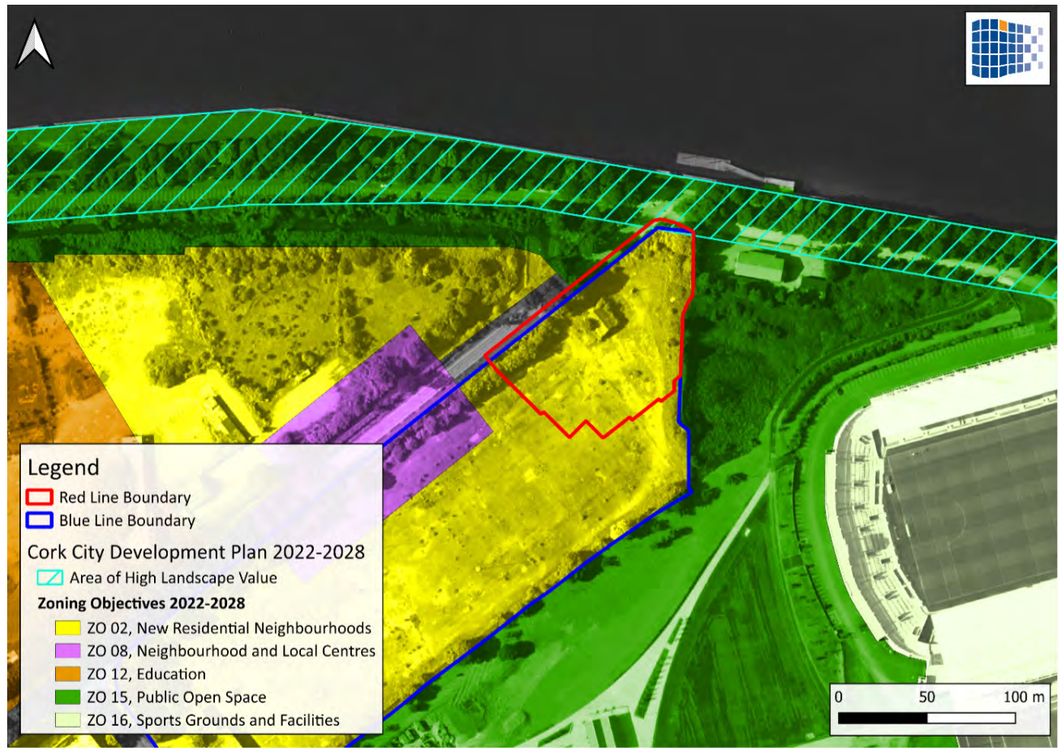


Figure 1.3 Land Use Zoning and Specific Objectives (Source: MHP GIS Team)

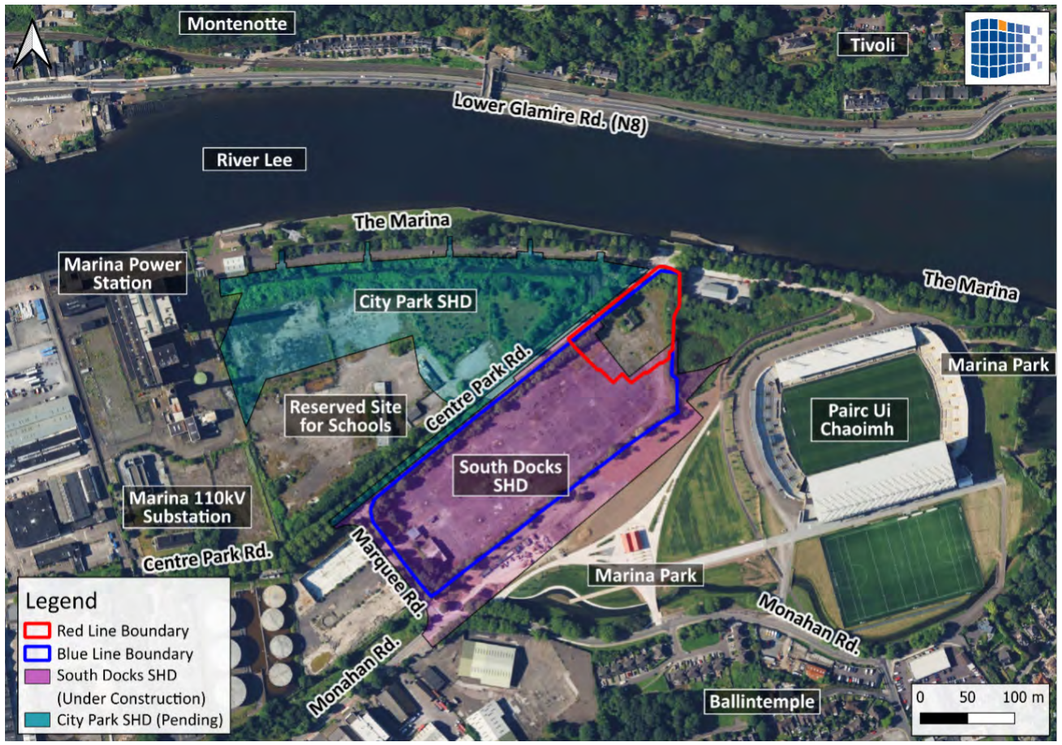


Figure 1.4 Surrounding Land Uses (Source: Bing Maps, edited by MHP)

1.5.1 Site Description

The proposed development is situated on an existing brownfield site that is zoned for new residential development. The site is located in the formerly industrial area known as the 'Former Ford Distribution Site' of South Docks, with current land uses reflecting the ongoing regeneration of this area. There is no existing access to the proposed development site from Centre Park Road, where new access is required (see **Figure 1.5**).

The site is situated in a low-lying area with a surface elevation of approximately 3 meters above Ordnance Datum (mOD). This region lies south of the Lee (Cork) Estuary Lower, a predominantly east-west oriented valley that gently slopes towards the east. As documented in the Infrastructure Design Report (DBFL Consulting Engineers, 2024. Infrastructure Design Report) accompanying the planning application documentation, the topography surrounding the site of the Proposed Development is generally sloping from the southwest to the northeast with elevations ranging from 1.8mOD in the southwest and rising to 3.9mOD in the northeast.

There are a total of 6 no. existing trees located within the red line boundary, of which 4 no. are located at the northeastern boundary adjacent to an existing wetland area. There are 2 trees located along the northwestern boundary along Centre Park Road, outside of the applicants' landholdings.

Figure 1.5 Site Access Strategy Map (Source: JFA)

The proposed development site is c.400m east of Shandon Boat Club (RPS ID: PS1242), c.400m north of Lindville House (RPS ID: PS821) and Chiplee House (RPS ID: PS513), all identified on the Record of Protected Structures (RPS) of the CCDP, as indicated in **Figure 1.6** below.

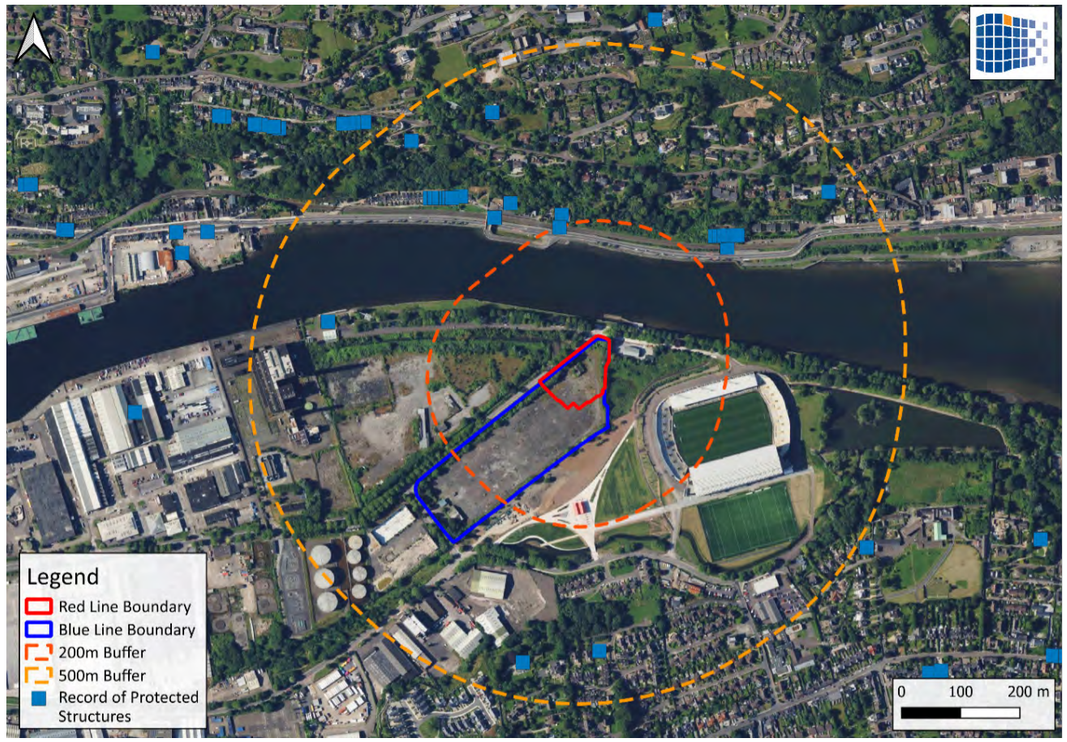


Figure 1.6 Protected Structures within 200m & 500m radius (Source: MHP GIS Team)

1.5.2 Wider Context

The site is within 30-minute walking distance of Cork City Centre and Blackrock/Mahon which provide several commercial and community facilities, including local shops, schools, eateries and services. The major employment hubs of Cork City Centre and Mahon are well connected by public transport. The area is served by the 202-,202A-, and 212-bus routes, which have numerous stops located within 300m and 650m of the site. The 212-bus route runs every 60 minutes Monday to Sunday (see **Figure 1.7** below). Whilst the 202- and 202A-bus routes runs every 20 minutes during peak hours and every 30 minutes during off-peak hours.

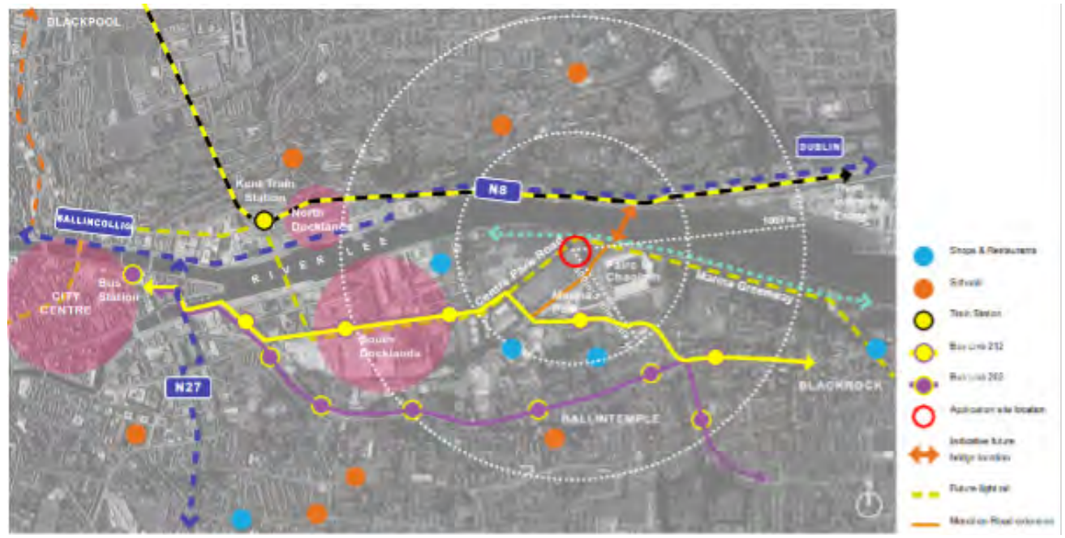


Figure 1.7: Local Context with Public Transport (Source: JFA)

The site will benefit from several pending improvements to transport services and infrastructure. This is due to the re-development of the South Docks area and the implementation of the Cork Metropolitan Area-Based Transport Strategy (CMATS). Within the metropolitan transport strategy the local road network surrounding the site was identified as a strategic transport corridor to incorporate high-frequency bus services along Monahan Road to the south, Marquee Road to the west, and the implementation of a mass transit system (light rail), indicatively located along Centre Park Road, immediately adjacent to the site. The Bus Rapid Transit system is proposed in the medium term and this will be eventually upgraded to a Light Rail Transit (LRT) in the long term. Moreover, the proposed Eastern Gateway Bridge will improve pedestrian and cyclist connection across the River Lee, once delivered. The area is well serviced with several large amenity areas located within walking distance of the site, such as the adjacent Marina Park, Pairc Ui Chaoimh, Holland Park as well as Kennedy Park within 1.5km of the site.

1.6 Environmental Impact Assessment

The Environmental Impact Assessment (EIA) of projects is a key instrument of European Union environmental policy to ensure a high level of protection of the environment and human health. The EIA Directive requires that public and private projects that are likely to have significant effects on the environment be made subject to an assessment by the competent authority, in this case Cork City Council, prior to development consent being given.

As outlined in the Introduction, the definition of EIA provides for a clear distinction between the process of environmental impact assessment to be carried out by the competent authority and the preparation by the developer of an Environmental Impact Assessment Report (EIAR).

EIAR is defined in the Planning and Development Act 2000, (as amended) as:

'a report of the effects, if any, which proposed development, if carried out, would have on the environment and

shall include the information specified in Annex IV of the Environmental Impact Assessment Directive'.

Projects requiring EIA are set out in Annex I and II of the EIA Directive. These Annexes are broadly transposed by way of the Planning and Development Regulations 2001, as amended, in Schedule 5, Parts 1 and 2.

EIA is a process and involves the following key steps:

i. Screening - decide if the project is EIA development;

ii. Scoping - decide on scope of the information to be included in the Environmental Impact Assessment Report (EIAR);

iii. Prepare the Environmental Impact Assessment Report to accompany the application;

iv. Competent Authority carries out consultation;

v. Competent Authority examines the EIAR and any other relevant information including information received from consultations;

vi. Competent Authority comes to a reasoned conclusion on the potential significant effects of the project on the environment; and

vii. Competent Authority integrates the reasoned conclusion into a decision to Grant consent for a development together with a description of measures to avoid, prevent, reduce or offset significant adverse effects and where necessary monitoring measures.

1.6.1 Screening for Environmental Impact Assessment

The first stage of Screening is to decide if a proposed development falls within a class set out in Annex I or II of the Directive or the Planning and Development Regulations 2001, as amended, in Schedule 5, Parts 1 and 2.

Part 1 developments meeting or exceeding the thresholds set out therein require mandatory EIA and, as such, there is no screening determination required. For Part 2 developments, in cases where thresholds are met or exceeded, or where no threshold is set, there is mandatory EIA; again, there is no screening determination required.

For all sub-threshold developments listed in Schedule 5 Part 2, a screening determination is required to be undertaken by the competent authority unless, on preliminary examination it can be concluded that there is no real likelihood of significant effects on the environment.

The proposed development does not fall within the development classes set out in Part 1 of Schedule 5.

The proposed development falls within the category of an 'Infrastructure Project' listed in Schedule 5, Part 2 (10) (b) of the PDRs, which provides that a mandatory EIA must be carried out for projects including inter alia:

'10b) (i) Construction of more than 500 dwellings'

The proposed development is for 176 residential units and is significantly below the 500 dwellings threshold. Accordingly, it does not meet or exceed the threshold of 500 dwellings and EIA is therefore not mandatory.

'10b) (iv) Urban development which would involve an area greater than 2 hectares in the case of a business district, 10 hectares in the case of other parts of a built-up area and 20 hectares elsewhere. (In this paragraph, "business district" means a district within a city or town in which the predominant land use is retail or commercial use.)'

The proposed development site is surrounded by residential development at an extended city boundary and within a business district. Therefore, the applicable area threshold is 2 hectares, and the proposed development site is 0.84 hectares. Accordingly, an EIA is not mandatory.

The proposed development is a continuation of the permitted SHD development on the adjoining site to the south-west. As a result, it is considered to trigger the need for an EIAR. Notwithstanding this, a sub threshold screening for EIA is undertaken below.

1.6.2 Sub-threshold Screening for EIA

In cases where a project is listed in Part 2 but is sub-threshold i.e. it does not meet stated criteria such as in this case the number of houses and area of the proposed development site, it is necessary for the competent authority, in this instance Cork City Council, to undertake a case-by-case examination to determine whether the proposed development is likely to have significant effects on the environment and therefore requires EIA. Where the assessment concludes that this is the case, the application for development must be accompanied by an EIAR.

The criteria for determining whether development listed in Part 2 of Schedule 5 should be subject to an EIA are set out in Schedule 7 of the PDRs, and the information to be provided by the Applicant to the Competent Authority for the purposes of screening sub-threshold development for EIA is set out in Schedule 7A. The requirements and information required are set out below.

1. A description of the proposed development, including in particular—

a) a description of the physical characteristics of the whole proposed development and, where relevant, of demolition works.

The proposed development site is brownfield and provides a site area of 0.84 hectares (ha), of which 0.44 ha constitutes the net developable area.

Permission Large Scale Residential Development (LRD) comprising:

The construction of 176 no. apartments in 2 no. blocks which range in height from 7 storeys to 10 storeys over podium level;

- 1 no. retail/café unit;
- 1 no. gym
- 1 créche accommodating 35 children;
- all associated ancillary development works including:
- a new vehicular access;
- new pedestrian access;

- footpaths & cycle lanes;
- landscaping;
- amenity and open space areas;
- boundary treatments;
- bicycle and car parking;
- bin storage
- public lighting; and
- all other ancillary development

No demolition work would be required for this proposed development.

b) a description of the location of the proposed development, with particular regard to the environmental sensitivity of geographical areas likely to be affected.

The proposed development site is in an area of high environmental sensitivity in terms of inter alia landscape, wetlands and biodiversity.

A small portion (118sq.m) of the site falls within the Area of High Landscape Value (AHLV), which is an additional objective overlaying the land-use zoning objective. Areas of High Landscape Value display an intrinsic landscape character and a special amenity value.

The site is close to River Lee and east to several sensitive designations, such as Cork Harbour Special Protection Areas (SPA) [Site Code 004030] and three proposed Natural Heritage Areas (pNHA): the Great Island Channel pNHA [Site Code 001058], the Douglas River Estuary pNHA [Site Code 001046], and the Dunkettle Shore pNHA [Site Code 001082]. There is a connection between the proposed development site and Cork Harbour SPA via the stormwater network.

The site is adjacent to a small wetland located in the east. This wetland comprising scrub, treeline and wetland could afford suitable commuting and foraging habitat for bat and bird species which may be present in the area, providing connectivity between this Site and the wider landscape.

Based on investigations undertaken as part of the adjoining SHD development, it is understood that contaminated soils are contained within the subject site. It is noted that contaminated material not suitable for reuse from the adjoining proposed Strategic Housing Development (ABP Reference: ABP-309059-20) has been temporarily stockpiled at the Site pending removal offsite.

Centre Park Road is drained via road gulleys into the existing open channel network. The Atlantic Pond receives surface water drainage from a portion of the South Docks prior to discharging to the Lee Estuary. Along the northwestern boundary and within the curtilage of the site there is an open drainage channel which flows to the northeast. A second open drainage channel that flows to northeast is located along and inside of the southeastern edge of the site. The southern channel flows directly to the Atlantic Pond (around 0.4km east of the site), which in turn outfalls to the Lee Estuary Lower. In addition, groundwater flow within the vicinity of the site is likely to be to the north and northeast towards the Lee Estuary.

2. A description of the aspects of the environment likely to be significantly affected by the proposed development.

The aspects of the environment likely to be significantly affected by the proposed development are:

i. Water; and

ii. biodiversity.

As mentioned above, based on the previous land use history of the site is contaminated soil has been recorded on the site due to the previous land use as a Ford car distribution centre which may affect the nearby water bodies.

The Site is located in the Lee, Cork Harbour and Youghal Bay Catchment and in the Glasheen [Corkcity]_SC_010 Sub-catchment. The Lee Estuary Lower is located approximately 30m north of the site and flows east into Lough Mahon located approximately 3.1 km north-east of the Site. According to the Water Framework Directive (WFD) status, the Lee Estuary Lower is 'At Risk'.

Impacts arising from the proposed development may affect key ecological features. These key ecological features may occur within the subject lands or within the considered zone of influence (ZoI) of the proposed development. Typically, the ZoI of general construction activities (i.e. habitat loss, habitat fragmentation, risk of spreading/ introducing non-native invasive species and disturbance due to increased noise, vibration, human presence and lighting) is not likely to extend more than several hundred metres from the proposed development site. At this screening stage, key ecological receptors (KERs) for the proposed development are identified as:

- Watercourses and the downstream aquatic environment.
- European Designated sites located in the downstream receiving environment.
- There is a know presence of reeds and large sedge swamp/ 17 bird species and 4 bat species were recorded in the wider area with only two Amber-listed bird species.

At this screening stage, it is noted that the site is not within or adjacent to any designated Sites. However, there are potential impact-receptor pathways via surface-water links between the study site and several designated sites associated with Lough Mahon and Great Island Channel; Douglas River Estuary pNHA, Cork Harbour SPA, Dunkettle Shore pNHA, Great Island Channel pNHA and Great Island Channel SAC.

The site is located within Flood Zone A for tidal flood risk. However, it is protected to a high standard by the existing polder defences located along the quayside. Strategic Environmental Assessment (SEA) Environmental Report for the Cork City Development Plan 2022-2028 has stated the intention to raise this polder defence in the future to ensure the existing standard of protection is maintained or increased. Accordingly, it will be the primary flood protection measure for the Docklands.

3. A description of any likely significant effects, to the extent of the information available on such effects, of the proposed development on the environment resulting from—

a) the expected residues and emissions and the production of waste, where relevant,

It is proposed to deliver a residential development and emissions associated with this type of development are waste water effluent, storm water runoff and energy related emissions from energy consumption and emissions

associated with the use of private vehicles.

Foul Water Emissions
There is no existing foul network adjacent to the site boundary. However, it is intended to connect to the main foul sewer network along Marquee Road southwest of the site via the proposed foul water network within the adjacent Fords SHD development. At the time of undertaking this screening assessment, Uisce Éireann (UÉ) have confirmed the feasibility of this connection with the Applicant.

Foul water from the Proposed Development will be treated in the Carrigrennan (Cork City) WWTP before ultimately discharging to the Lough Mahon transitional waterbody, in accordance with the requirements from the UE CoF (UE Reference: CDS24001285) and other applicable statutory consents.

Surface Water Emissions
The management of surface water for the proposed development will be designed to comply with the policies and guidelines outlined in the Cork City Development Plan Objectives 2022-2028. Climate change factor will be included in the design of the surface water network.

As there are no open channels to discharge to within the vicinity of the site boundary, it is proposed that the surface water generated on site will be discharged to the proposed surface water network within the adjacent Fords SHD site (Ref. ABP-309059).

The adjacent SHD scheme (Ref. ABP-309059) is under the same land owner/developer as the subject site and this planning application is part of the wider site in regards to infrastructure. Therefore, design and coordination between the two proposed surface water networks is possible. The SHD surface water drainage strategy has been designed to accommodate the surface water discharge generated by the proposed development.

There will be no direct discharge to groundwater or surface water during the construction phase of the Proposed Development. Surface runoff will be managed during construction and there will be no unauthorised discharges of water from the site. However, in the event of a rainfall event, surface runoff entering the open excavations could result in mobilisation of identified hydrocarbon contamination in soil and leaching and migration to groundwater beneath the site. Therefore, there could be potential impact-receptor pathways to designated sites.

Emissions from Energy Usage
The proposed development will generate a need for energy, electricity and heating. The proposed development site will be designed to ensure compliance with the planning policy context for energy reduction, renewable energy contribution and carbon emissions in accordance with both the CCDP and the Technical Guidance Document (TGD) Part L 2022 of the Building Regulations.

Nearly Zero Energy Buildings (NZEB) means a building that has a very high energy performance, and in which *"the nearly zero or very low amount of energy required should be covered to a very significant extent by energy from renewable sources, including energy from renewable sources produced on-site or nearby".*

Three design aspects demonstrate compliance with Part L/NZEB:

i. The limitation of primary energy use and CO2 emissions

ii. Building fabric - to limit heat loss

iii. The use of renewable energy sources

At the time of screening the proposed development, it is understood that the proposed development will comply with the requirements of Part L 2022 of the Building Regulations. Accordingly, it is concluded that a positive likely significant effect will occur.

Emissions from Vehicles
The provision of housing at this location, served by bus routes and railway, would facilitate travel by alternative modes of transportation other than the private car. Car parking will also be required to serve the proposed development.

The 2018 Design Standards for New Apartments (updated 2023) promotes reducing car parking. Further the guidelines promote active travel modes through the provision of safe and secure cycle parking facilities. It is understood that it is intended to comply with these requirements and while increased vehicular movements may affect air quality locally, this will be balanced with a targeted focus on increasing active modes of transport and promoting more sustainable transport mode usage so there is no likely significant effect.

Waste
The site is currently brownfield in nature and the construction phase will give rise to the requirement to remove and bring quantities of various materials to and from the site. Construction and excavation related wastes will be created during the construction phase. This has the potential to impact on the local waste management network.

Sustainability is a key objective for the Applicant and the waste hierarchy principles of reduce, reuse, recycle will be implemented in the development phase. It is therefore anticipated that waste will be minimised during construction and likely significant effects will not arise.

During the operational stage, 4-bin systems to encourage waste segregation at source of organics. This will assist with meeting the EUs municipal waste recycling target and achieve a circular economy.

3. A description of any likely significant effects, to the extent of the information available on such effects, of the proposed development on the environment resulting from—

b) the use of natural resources, in particular soil, land, water and biodiversity.

Land Use
The development of the site for residential use will result in a land use change. However, this is considered positive where the existing site is a brownfield site and having regard to the site's location within the city suburb and built-up area, the availability of infrastructural services (drainage and water supply) with confirmed capacity to service the proposed development. The change in land use is compliant with the site's zoning and this designation would in itself have been confirmed as environmentally acceptable during the making of the CCDP that was itself subject to a Strategic Environmental Assessment (SEA) and appropriate assessment (AA).

Soil
Development of the site will necessitate the excavation of subsoils. Owing to the historical use of the site and the site investigations carried out, the material is classified as contaminated and it is anticipated that all excavated soil will require removal offsite in accordance with all statutory legislation. Additionally, an estimated 12,006m3 of remediated contaminated material is temporarily stockpiled at the site from the adjoining proposed Strategic Housing Development (ABP Reference: ABP-309059-20) which will also require removal offsite in accordance with all statutory legislation.

The proposed development will include the importation of aggregate fill materials (e.g., granular material beneath road pavement, under floor slabs and for drainage and utility bedding / surrounds etc.) and soil for landscaped areas during the Construction Phase of the Proposed Development. In the unlikely event that aggregate fill and soil materials are sourced from unlicensed or unauthorised sources, it may result in the importation of uncertified or material not suitable for use at the Proposed Development.

Water

The proposed development will require a connection to the water supply. At the time of screening the project it is known that the site is well served by the adjacent watermain network. Uisce Eireann records show the presence of both a 400mm and a 100mm ductile iron watermain located along Centre Park Road and the Marina. It is proposed to supply the site via a 150mm connection to a spur provided as part of the adjacent development ABP-309059-20. Irish Water have previously confirmed the feasibility of a connection to the 400mm diameter ductile iron watermain along Centre Park to the south-east of the site, however upgrade works will be required to make the connection. Although the proposed connection is no longer proposed to be direct to the existing 400mm watermain, and will now be fed via the adjacent development, the feed to the new watermain in the adjacent development will still be to the 400mm watermain. Accordingly, the supply of water to the proposed development is not anticipated to generate a likely significant effect.

Biodiversity

The proposed development site is predominantly brownfield site. It is estimated to provide an increase in both extent and variability of available habitats for local wildlife, offsetting some of the loss accrued by nearby developments (both permitted and planned). However, given the adjoining wetlands to the east, further investigations will be required such as habitat, flora and fauna studies, to understand the significance of the effect on biodiversity arising from the proposed development.

> ***4. The compilation of the information at paragraphs 1 to 3 shall take into account, where relevant, the criteria set out in Schedule 7.***

Schedule 7 of the PDRs sets out the criteria for determining whether development listed in Part 2 of Schedule 5 should be subject to an EIA.

It requires consideration of:

> ***The characteristics of the proposed development, in particular;***
>
> ***a) the size and design of the whole of the proposed development***

This is set out in the preceding section.

> ***b) cumulation with other existing development and/or development the subject of a consent for proposed development for the purposes of section 172(1A)(b) of the Act and/or development the subject of any development consent for the purposes of the Environmental Impact Assessment Directive by or under any other enactment***

To inform this screening, a review of existing and consented development has been undertaken. The proposed development is adjoining the permitted mixed-use SHD 'South Docks' (Ref: ABP-309059-20) west of the site (direct infrastructure connection to the Site). This permitted development includes the development of 1,002 apartments, 5 no. retail units, 1 no. Montessori school, a creche, a medical centre, bar, café, venue/performance area and 2 no. community resource spaces.

The construction phase of the proposed development may overlap with the development of the South Docks SHD. However, at this point, construction works are underway on the adjacent South Docks site at the time of writing (November 2024). According to the permitted phasing plan, overlapping is anticipated, it is not estimated that this will be for a significant amount of time when the assessment period of the proposed application and pre-commencement compliance for the proposed development is taken into consideration.

In addition, there is another recently granted Planning permission (Reg. Ref: 23/42106) for an LRD, which is known as the Goulding's Site LRD to the west of the site along Centre Park Road and Monahan Road.

There is a potential for a cumulative impact on the use of the Centre Park Road and Victoria Road Roundabout if both developments proceed at the same time. However, the impact from construction traffic would be temporary and the implementation of a Construction Traffic Management Plan would alleviate likely significant impacts, and the impact at the operational phase would be alleviated by the implementation of a MMP.

> ***c) the nature of any associated demolition works***

As outlined previously, no demolition works are required for this proposed development.

> ***d) the use of natural resources, in particular land, soil, water and biodiversity***

This aspect is dealt with above.

> ***e) the production of waste***

It has been concluded that where waste does arise it will be minimised and dealt with in accordance with the waste hierarchy.

> ***f) pollution and nuisances***

There is a risk of pollution of the local water environment during the construction phase but the application of standard proven construction practices for the protection of water will mitigate likely significant effects. Noise, vibration and dust nuisance during the construction phase are likely to occur and these will be mitigated using best industry practices. The duration of effects would be short-term.

> ***g) the risk of major accidents, and/or disasters which are relevant to the project concerned, including those caused by climate change, in accordance with scientific knowledge***

Having regard to the nature of the proposed development, consideration must be given to the risk of a natural disaster, specifically, flood risk. To inform this screening assessment, a search of the Office of Public Works (OPW) national flood information portal was undertaken and did not identify any historical flood events at or proximate to the site. However, according to the website, there is a documented report from Cork City Council noting the flooding of Centre Park Road which occurred on 12 January 1988 and concludes that it was a result of high-water levels in the River Lee. This is likely to have been caused by backing up of drains resulting in surface water flooding. Further, recurrent flooding is noted between Centre Park Road and Monohan Road. Similarly, predictive flood mapping (https://www.floodinfo.ie/map/floodmaps/) was examined; the site is at risk of fluvial flooding in the 1:1000 year event. However, the site is classified as defended due to the existing Polder defences to the North. The flood map indicates that the majority of the site is located within Flood Zone A (1 in 200 year flood extent). As previously

stated and as outlined in the CFRAM maps, the site is within a defended area due to the presence of the existing polder flood defences to the north of the site.

SUDS features are incorporated into the drainage design for the scheme where feasible to manage surface water runoff from the development in accordance with the recommendations of the Cork City Development Plan 2022-2028.

h) the risks to human health (for example, due to water contamination or air pollution)

This is dealt with earlier in the screening and it is concluded that with best practice construction measures in place, the risk to human health is low. Owing to the nature of the proposed development and integrated design measures (energy efficiency, reduced car parking and promotion of active and sustainable transport modes) the risk to human health during the operational stage is imperceptible.

Location of proposed development, the environmental sensitivity of geographical areas likely to be affected by the proposed development, with particular regard to -

a) the existing and approved land use

The proposed development site is brownfield site. The proposed residential development is wholly contained within the area zoned for new residential. An area to the north of the site is highlighted as an Area of High Landscape Value (AHLV) and works in this area will mainly consist of active travel/pedestrian uses.

b) the relative abundance, availability, quality and regenerative capacity of natural resources (including soil, land, water and biodiversity) in the area and its underground

The confirmation of feasibility received from UÉ confirms that there is sufficient water supply and wastewater treatment capacity to service the proposed development.

The site has been mapped by the EPA (EPA, 2024) to be within the Lee, Cork Harbour and Youghal Bay WFD Catchment (I.D.: 19), the Glasheen [Cork City] SC 010 Sub-Catchment, (Sub-Catchment ID: 19 17) and the Glasheen (Cork City) 010 WFD River WFD River Sub Basin (EU Code: IE SW 19G040700). The Site is also within the Lee Valley Gravels Groundwater Body (GWB) (EU Code: IE EA G 094)

c) the absorption capacity of the natural environment, paying particular attention to the following areas: (i) wetlands, riparian areas, river mouths; (ii) coastal zones and the marine environment; (iii) mountain and forest areas; (iv)nature reserves and parks; (v) areas classified or protected under legislation, including Natura 2000 areas designated pursuant to the Habitats Directive and the Birds Directive and; (vi)areas in which there has already been a failure to meet the environmental quality standards laid down in legislation of the European Union and relevant to the project, or in which it is considered that there is such a failure; (vii)densely populated areas; (viii) landscapes and sites of historical, cultural or archaeological significance.

As identified earlier, the proposed development site is in an environmentally sensitive location with respect to landscape, biodiversity and European-designated sites. A precautionary approach is required in this instance to assess the ability of the site to absorb the proposed development without residual significant environmental impacts. This screening assessment was undertaken at the early stages of the design development and applying the precautionary principle, a worst-case outcome was applied, and it was recommended that EIA would be necessary.

Types and characteristics of potential impacts

The likely significant effects on the environment of proposed development in relation to criteria set out under paragraphs 1 and 2, with regard to the impact of the project on the factors specified in paragraph (b)(i)(I) to (V) of the definition of 'environmental impact assessment report' in section 171A of the Act, taking into account—

(a) the magnitude and spatial extent of the impact (for example, geographical area and size of the population likely to be affected),

(b) the nature of the impact,

(c) the transboundary nature of the impact,

(d) the intensity and complexity of the impact,

(e) the probability of the impact,

(f) the expected onset, duration, frequency and reversibility of the impact,

(g) the cumulation of the impact with the impact of other existing and/or development the subject of a consent for proposed development for the purposes of section 172(1A)(b) of the Act and/or development the subject of any development consent for the purposes of the Environmental Impact Assessment Directive by or under any other enactment, and

(h) the possibility of effectively reducing the impact

Based on the foregoing and the fact that the design of the proposed development is at an early stage when undertaking this screening assessment, it is concluded that the main likely potential effects of the proposed development on the environment are as follows:

i. Temporary potential effects locally on human health, air quality and noise and vibration from the construction phase.

ii. Temporary effects on the local road network from the construction phase and in particular if the proposed development overlaps with the construction phase of the adjacent South Docks development.

iii. Potential permanent effects on traffic and transport during the operational phase of the development.

iv. Potential temporary to permanent effects on key ecological features including European Designated Sites, downstream aquatic environment and species which commute/forage within the proposed development site and/or immediate vicinity.

v. Potential permanent effect on the landscape when viewed from elevated locations and in combination with the approved South Docks development.

To conclude with certainty that the proposed development, having regard to the nature, size and location would not result in likely significant effects on the environment, particularly when it is considered an extension of the permitted SHD

development immediately adjoining the site, it is our professional opinion that this sub-threshold project requires EIA to fully address the likely significant environmental effects identified in this screening stage.

1.7 Content of an Environmental Impact Assessment Report

This EIAR addresses the provides the following information:

a) A description of the project comprising information on the site, design, size and any other relevant features of the project;

b) A description of the likely significant effects of the project on the environment;

c) A description of the features of the project and/or measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment;

d) A description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics and an indication of the main reasons for the options chosen, taking into account the effects of the project on the environment;

e) A non-technical summary; and,

f) Any additional information specified in Annex IV of the Directive/Schedule 6 to the 2001 Regulations, as amended, relevant to the specific characteristics of the project and to the environmental features likely to be affected.

As is required by Annex IV of the EIA Directive, this EIAR addresses matters including proposed demolition works, risks to human health, major accidents / disasters, biodiversity, climate change and cumulative effects with other existing and / or approved projects.

1.8 Competency

It is a requirement that the EIAR must be prepared by competent experts. For the preparation of this EIAR, Marina Quarter Ltd. engaged McCutcheon Halley Chartered Planning Consultants to direct and coordinate the preparation of the EIAR and a team of qualified specialists were engaged to prepare individual chapters, the consultant firms and lead authors are listed in **Table 1.1** overleaf.

Details of competency, qualifications and experience of the lead author of each discipline is outlined in the individual chapters.

1.9 Format and Structure of the EIAR

This EIAR is prepared according to the 'Grouped' format structure as described in the *'Guidelines on the information to be contained in Environmental Impact Assessment Reports'* (EPA, 2022). This means that each environmental factor, it is considered as a separate section. The advantages of using this format are that it is easy to investigate a single topic and it facilitates easy cross-reference to specialist studies.

Table 1.1 Chapters of EIAR and Contributors

CHAPTER	ASPECT	SIGNIFICANCE	LEAD CONSULTANT
1	Introduction	McCutcheon Halley Planning Consultants	Rachel Condon
2	Development Description	McCutcheon Halley Planning Consultants	Rachel Condon
3	Alternatives	McCutcheon Halley Planning Consultants	Rachel Condon
4	Population & Human Health	McCutcheon Halley Planning Consultants	Rachel Condon
5	Landscape & Visual Impact	Enviroguide	Dara Hilliard, Rob Healy
6	Material Assets: Traffic	DBFL	Vivek Joy, Thomas Jennings
7	Material Assets: Built Services & Waste	Enviroguide	Louise Hewitt
8	Land & Soils	Enviroguide	Gareth Carroll, Warren Vokes
9	Water & Hydrology	Enviroguide	Gareth Carroll, Warren Vokes
10	Biodiversity	Enviroguide	Tom Ryan
11	Noise & Vibration	MKO	Damian Brosnan
12	Air Quality	Enviroguide	Laura Griffin
13	Climate	Enviroguide	Aoife Gillen
14	Cultural Heritage	John Cronin and Associates	John Cronin, Tom Cummins
15	Interactions of the Foregoing	McCutcheon Halley Planning Consultants	Rachel Condon
16	Risk Management	Enviroguide	Louise Hewitt
17	Summary of Mitigation Measures	McCutcheon Halley Planning Consultants	Rachel Condon

The EIAR is sub divided into **3 No. volumes** as follows:

- **Volume I** Non-Technical Summary;
- **Volume II** Environmental Impact Assessment Report; and
- **Volume III** Appendices to Environmental Impact Assessment Report.

Volume II is presented as 17 chapters, as outlined in Table 1.1 above.

1.10 Scoping

The purpose of scoping is to identify the information to be contained in an EIAR and the methodology to be used in gathering and assessing that information.

The scope of this EIAR is informed by the requirements of the EIA Directive and its transposition into national legislation in the Planning and Development Act 2000 (as amended) and the Planning and Development Regulations 2001 (as amended).

The scope was also informed by information provided by the Design Team, and specialists engaged in preparing the EIAR.

Guidance was provided by Cork City Council during the Section 247 pre-planning meeting, LRD Meeting and LRD Opinion. Matters discussed related to access, scale and massing, visual impact, permeability, interface with surrounding developments and amenities, public open space, traffic, daylight and sunlight and flooding. A detailed narrative of the pre-planning meetings and LRD Opinion is contained in the Planning Statement that accompanies this application under separate cover.

1.11 Cumulative Effects

Annex IV of the EIA Directive is to be read in conjunction with article 5(1) of the EIA Directive and sets out the information to be included in an EIAR. Annex IV was transposed into national law via article 97 of the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (the "2018 Regulations") which substituted a new Schedule 6 into the Planning and Development Regulations 2000, as amended.

The EIA Directive requires that the EIAR describes the cumulation of effects with other existing and/or approved projects.

Cumulative effects may arise from:

"- The interaction between the various impacts within a single project;

- The interaction between all the differing existing and / or approved projects in the same areas as the proposed project." [1]

In August 2018, the Department of Housing, Planning and Local Government issued Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment. The Guidelines summarise "cumulative effects" in the following way at page 40;

> *"Effects are not to be considered in isolation but cumulatively i.e., when they are added to other effects. A single effect on its own may not be significant in terms of impact on the environment but, when considered together with other effects, may have a significant impact on the environment. Also, a single effect which may, on its own, have a significant effect, may have a reduced and insignificant impact when combined with other effects.*

Paragraph 2(e)(i)(V) of Schedule 6 (paragraph 5(e) of Annex IV) provides as follows;

> *"the cumulation of effects with other **existing or approved developments, or both,** taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources." (emphasis added).*

Within the immediate environs (c. 200m) of the proposed development site, there are three relevant projects:

1. South Docks: This proposed development is adjoining and west of the subject site on the same brownfield site is the former Ford Distribution Centre. Received approval (Reg. Ref: ABP-309059-20) for a mixed-use development including 1,002 apartments, 5 no. retail units, 1 no. Montessori school, a creche, a medical centre, bar, café, venue/performance area and 2 no. community resource spaces across 12 buildings up to 14-storeys in height. This development is currently under construction.

2. Goulding's Site LRD: to the west of the site along Centre Park Road and Monahan Road. Planning permission (Reg. Ref: 23/42106) was issued for the Large-scale Residential Development LRD. This development includes 1,325 no. residential units, 2 no. standalone creches, 4 no. café/restaurants, 5 no. retail units, 1 no. convenience retail store and 4 no. offices/retail offices.

Accordingly, each chapter of this EIAR assesses the cumulative effect of this proposal in combination with the above-mentioned developments, as relevant.

Individually, each specialist consultant has reviewed under construction, permitted and or under consideration development in their defined zones of influence and, based on expertise, they have identified projects relevant to their discipline that may interact to produce a cumulative effect. A full list of 'cumulative projects' in is provided as **Appendix 1.1**, of Volume III.

The cumulative effect of the additional loading on the treatment plant is assessed in the Material Assets: Built Services chapter, Water Framework Directive Assessment, the Biodiversity Chapter and in the Appropriate Assessment Screening Report and Natura Impact Statement that accompanies this application under separate cover.

Cumulative effects are not limited to projects, and it is necessary to also consider relevant Plans. According to the Environment Protection Agency (2020), in Ireland, key cumulative effects – where environmental receptors are at, or near, their thresholds or their capacity to assimilate more change – include climate change, water quality, flood risk, air quality, biodiversity and landscape.

- **Cork City Development Plan 2022-2028 (CCDP)** – gives spatial expression to the city's economic, social, housing and cultural development. The CCDP has a key role in protecting the environment, heritage and amenities of the county and in mitigating the impacts of climate change. It includes policies and objectives for all of the aspects included in this EIAR. Accordingly, each chapter of the EIAR provides a narrative on the cumulative effect of the proposed development together with the Development Plan policies and objectives
- **The Climate Action Plan, 2024 (CAP24)** – climate change is the ultimate cumulative effect, nationally and internationally. The Climate Action Plan 2024 (CAP24) is the third annual update to Ireland's Climate Action Plan. The Plan was approved by the Government on 20 December 2023, subject to Strategic Environmental Assessment and

[1] Department of Housing, Planning and Local Government, "Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment" (August 2018), page 40.

Appropriate Assessment. Thresholds for greenhouse gas emissions are being exceeded. The Plan acknowledges that rapid and significant reductions in greenhouse gas (GHG) emissions are required if we are to meet the 2015 Paris Agreement Goals. The European Green Deal commits to delivering net-zero GHG emissions at EU level by 2050; with Ireland committed to achieving a 51% reduction in emissions from 2021 to 2030, and to achieving net-zero emissions no later than 2050. The cumulative effects of this Plan together with the proposed project are considered in the following chapters: Population & Human Health, Material Assets; Traffic & Transport and Air Quality & Climate.

- **The Cork City Climate Action Plan 2024-2029** – This Plan sets out 129 actions that Cork City Council will initiate in order to reduce emissions from its own buildings and operations. The actions that residents, businesses, community groups, and public sector institutions will have to take are a vital contribution to the achievement of our vision of Cork as a climate-neutral and resilient city. The cumulative effects of this Plan together with the proposed project is considered in the Air Quality, Climate, Material Assets; Traffic & Transport and Built services & Waste and Population & Human Health chapters.
- **The Cork City Heritage and Biodiversity Plan 2021-2026** – is an action plan and sets out a series of realistic and practical actions to protect conserve and manage our heritage over the next five years and a methodology on the implementation of these actions. The Cork City Heritage and Biodiversity Plan includes actions on Archaeology, Built, Cultural and Natural Heritage, so is a combination Heritage and Biodiversity Plan. The cumulative effects of this Plan, together with the proposed project, are considered in the Biodiversity chapter and Cultural Heritage.
- **Cork Metropolitan Area Transport Strategy 2040** – This Strategy will deliver an accessible, integrated transport network that enables the sustainable growth of the Cork Metropolitan Area as a dynamic, connected, and internationally competitive European city region as envisaged by the National Planning Framework 2040. The cumulative effects of this Plan, together with the proposed project, are considered in the Material Assets; Traffic & Transport chapter and Population and Human Health chapter.
- **4th National Biodiversity Plan** – The Plan sets out actions through which a range of government, civil and private sectors will undertake to achieve Ireland's 'Vision for Biodiversity'. It has been developed in line with the EU and International Biodiversity strategies and policies. The cumulative effects of this Plan, together with the proposed project, are considered in the Biodiversity chapter.
- **Standards in the EU Air Quality Directive and 'daughter' directives (1-4)** – lay down limits for air quality standards and specific pollutants. The cumulative effects of the Directives together with the proposed project are considered in the Population & Human Health Chapter and the Air Quality & Climate Chapter.
- **Water Framework Directive & The Draft River Basin Management Plan 2022-2027** – The EU Water Framework Directive (2000/60/EC) (WFD) requires all Member States to protect and improve water quality in all waters so that we can achieve good ecological status by 2015 or, at the latest, by 2027. It was given legal effect in Ireland by inter alia the European Communities (Water Policy) Regulations 2003 (S.I. No. 722 of 2003) (as amended), European Communities Environmental Objectives (Surface Waters) Regulations 2009 (as amended) . It applies to rivers, lakes, groundwater, and transitional coastal waters.

The River Basin Management Plan sets out the actions that Ireland will take to improve water quality and achieve 'good' ecological status in water bodies by 2027, as per the WFD. The cumulative effect of the Directive and Plan together with the proposed project is considered in the Material Assets – Built Services & Waste chapter and the Water & Hydrology chapter.

The transposing legislation that should be referred to is as follows:

- European Communities (Water Policy) Regulations 2003, as amended
- European Communities Environmental Objectives (Surface Waters) Regulations 2009, as amended
- European Communities Environmental Objectives (Ground Waters) Regulations 2010, as amended.

1.12 Impact Assessment Methodology

Each chapter of this EIAR assesses the direct, indirect, cumulative, and residual effects of the proposed development for both the construction and operational stage of the proposed development.

The identified quality, significance, and duration of effects for each aspect is largely based on the terminology set out in the *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* (EPA, 2022) reproduced in **Table 1.2** following.

Table 1.2 Impact Rating Terminology

QUALITY OF EFFECT	
Positive	A change which improves the quality of the environment (for example, by increasing species diversity; or the improving reproductive capacity of and ecosystem, or by removing nuisances or improving amenities.
Neutral	No effects of effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
Negative/Adverse Effects	A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property or by causing nuisance).
SIGNIFICANCE OF EFFECT	
Imperceptible	An effect capable of measurement but without significant consequences.
Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences
Slight Effect	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate Effect	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
Significant Effect	An effect which, by its character, magnitude, duration, or intensity alters a sensitive aspect of the environment.

QUALITY OF EFFECT	
Very Significant Effect	An effect which, by its character, magnitude, duration, or intensity significantly alters most of a sensitive aspect of the environment.
Profound Effect	An effect which obliterates sensitive characteristics.
DURATION OF EFFECTS	
Momentary	Seconds to minutes
Brief	Less than 1 day
Temporary	Less than 1 year
Short-term	1-7 years
Medium-term	7-15 years
Long-term	15-60 years
Permanent	Over 60 years
EXTENT AND CONTEXT OF EFFECTS	
Extent	Describe the size of the area, the number of sites, and the proportion of a population affected by an effect.
Context	Describe whether the extent, duration, or frequency will conform or contrast with established (baseline) conditions (is it the biggest, longest effect ever?).
PROBABILITY OF EFFECTS	
Likely	The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.
Unlikely	The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.
TYPE OF EFFECTS	
Indirect	Impacts on the environment, which are not a direct result of the project, often produced away from the project site or because of a complex pathway.
Cumulative	The addition of many minor or significant effects, including effects of other projects, to create larger, more significant effects.
Do Nothing	The environment as it would be in the future should the subject project not be carried out.

QUALITY OF EFFECT	
Worst Case	The effects arising from a project in the case where mitigation measures substantially fail.
Indeterminable	When the full consequences of a change in the environment cannot be described.
Irreversible	When the character, distinctiveness, diversity or reproductive capacity of an environment is permanently lost.
Residual	The degree of environmental change that will occur after the proposed mitigation measures have taken effect.
Synergistic	Where the resultant effect is of greater significance than the sum of its constituents, (e.g. combination of SOx and NOx to produce smog).

1.13 Consultation

A dedicated website for this proposed development is established and all application documents, including this EIAR, are available at www.thesouthdockslrd.ie.

Additionally, prior to lodging this application, the required information has been issued to the Department of Housing, Planning and Local Government's EIA Portal. The purpose of this tool is to inform the public, in a timely manner, of applications that are accompanied by an EIAR.

Pre-planning consultation and LRD meetings were held with Cork City Council in April and August 2024 in advance of lodging this application. An LRD Opinion was received on the 28th of August 2024. Guidance received has been integrated into the proposed design and, in turn, is assessed in this EIAR.

Where relevant specialists engaged with prescribed bodies individually, the details of advice received are provided in the individual chapters of this EIAR.

VOLUME II

CHAPTER 2

Development Description

McCutcheon Halley
CHARTERED PLANNING CONSULTANTS

CHAPTER TWO
Table of Contents

CHAPTER TWO
Table of Figures

CHAPTER TWO
Table of Tables

Chapter Two | Development Description

2.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) sets out the proposed development and provides details in relation to the construction and operational phases of the proposed development. The chapter was prepared based on information provided by the Design Team, and it should be read in conjunction with the submitted drawings together with supporting reports.

The proposed development seeks to deliver a high quality, high density residential development, that makes sustainable use of a strategically located zoned development site, being:

- A focal point for the Polder Quarter character area, contributing to the regeneration of the south docklands area;
- Within approx. 2km walking distance of Cork City Centre;
- Directly adjacent to high quality open space amenities and a wealth of social infrastructure in the wider context.

The feedback provided by Cork City Council (CCC) during the pre-planning meeting and in their formal Large-scale Residential Development (LRD) opinion has been considered and the design has evolved in response to those discussions. The changes implemented are set out in the Response to the LRD Opinion, included under separate cover.

2.1.1 Expertise and Qualifications

This chapter was prepared by Rachel Condon of McCutcheon Halley Chartered Planning Consultants.

Rachel graduated from University College Cork with a BA Hons in Geography and Irish, obtained in 2010 and a master's degree in Planning and Sustainable Development, obtained in 2013. Rachel is currently an Associate Director in the Practice and is experienced in the field of planning and development consultancy which includes providing consultancy services in respect of major projects. Rachel has directed the preparation of EIAR's for a range of development types including residential, mixed use, and industrial developments.

Rachel has practised as a planning consultant for over 10 years and has directed the preparation of EIARs for a range of development types including residential, commercial and industrial. Directly relevant experience to this proposed development is that Rachel has been involved in the direction of EIARs to accompany residential led applications that received permission for development including:

- Connolly Quarter Reg. Ref: 3054/22 - The construction of 187 build to rent apartments and 4 office blocks with heights ranging from 5 to 16 storeys. The proposed development included works to a Protected Structure (RPS Ref. No. 130).
- Bailey Gibson (PL29S.307221) - Demolition of all structures, construction of 416 residential units (incl. 4 houses, 412 apartments) and associated site works.
- Southwest Gate (Reg. Ref. 3228/20) – Demolition of 4 existing buildings and surface car parking, and construction of a mixed use scheme across 13 blocks comprising 1,123 residential units with supporting amenities, retail units, office accommodation, a primary healthcare centre, gym, cultural centre, childcare facility, hotel and a series of public open spaces.

2.2 Proposed Development Site

The proposed development site is situated at the former Ford Distribution facility, which is strategically located on the southern side of the River Lee approximate 2km east of Cork City Centre. The site is 0.84 hectares and avails of extensive road frontage onto Centre Park Road, to the west.

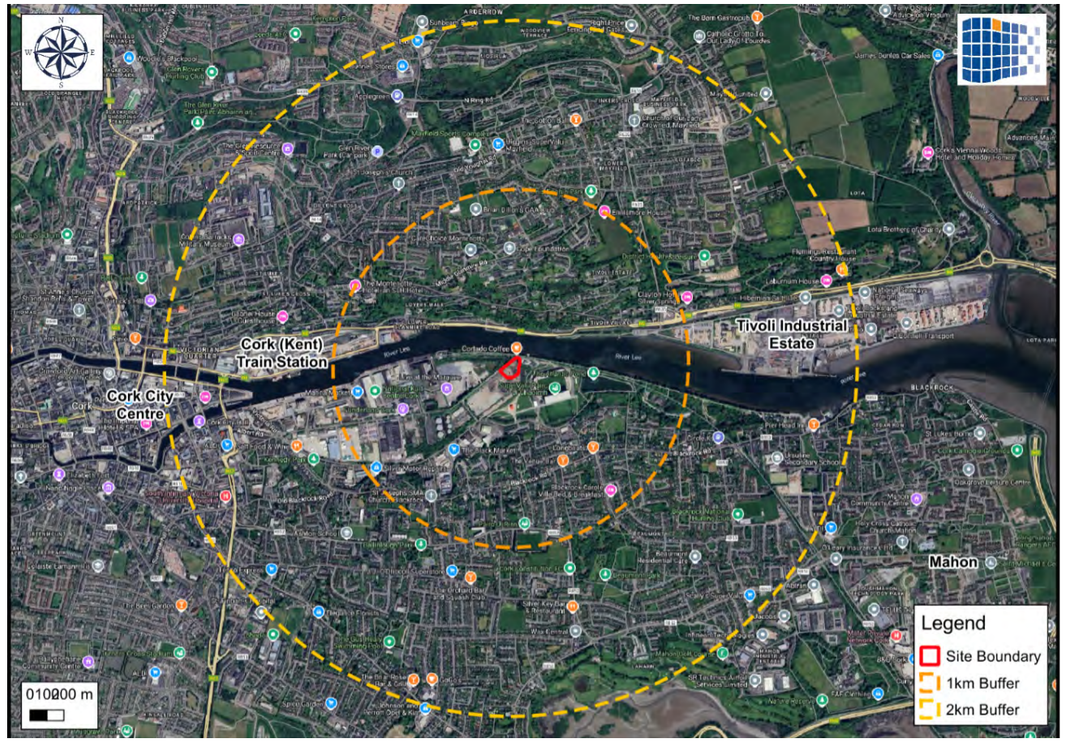


Figure 2.1 Site Location and the Surrounding (Source: MHP GIS Team)

The site is advantageously located east of Cork City Centre which is approx. 30-minutes' walk, providing residents with convenient access to the central business district, retail areas and key cultural amenities. This proximity ensures that the development will benefit from excellent connectivity to the city's core while offering a distinct urban living experience removed from the high density of the central area.

The proposed development is situated within close proximity to several of Cork's major employment centres. Notably, the South Docklands and Mahon Point are key employment zones within a 10-minute drive from the site and are well connected by public transport. These areas are home to a concentration of multinational corporations and local businesses, particularly within the technology, pharmaceutical, and financial services sectors. The site's location offers future residents' easy access to employment opportunities, contributing to Cork's economic vibrancy.

The site is well-served by existing transportation infrastructure. It is within a short walking distance of multiple

bus routes that offer direct services to the city centre and other significant urban areas. Furthermore, Kent Railway Station, Cork's primary rail hub, is located approx. 2 km from the site, facilitating regional and national connectivity. The site's integration with existing pedestrian and cycling routes will further enhance sustainable transportation options, promoting active travel and reducing reliance on private car ownership.

Public transportation connections are robust, with multiple bus routes accessible within a 5 to 10-minute walk from the site, providing direct links to major employment hubs. This connectivity supports Cork's sustainable transport policies and aligns with the city's goal of reducing traffic congestion and lowering carbon emissions. The area is served by the 202-,202A-, and 212-bus routes which have numerous stops located within 300m and 650m of the site (see **Figure 2.2**). The 212-bus route runs every 60 minutes Monday to Sunday. Whilst the 202- and 202A-bus routes runs every 20 minutes during peak hours and every 30 minutes during off-peak hours.

The site will benefit from several pending improvements to transport services and infrastructure. This is due to the re-development of the South Docks area and the implementation of the Cork Metropolitan Area-Based Transport Strategy (CMATS). Within the metropolitan transport strategy the local road network surrounding the site was identified as a strategic transport corridor to incorporate high-frequency bus services along Monahan Road to the south, Marquee Road to the west, and the implementation of a mass transit system (light rail), indicatively located along Centre Park Road, immediately adjacent to the site. The Bus Rapid Transit system is proposed in the medium term and this will be eventually upgraded to a Light Rail Transit (LRT) in the long term. Moreover, the proposed Eastern Gateway Bridge will improve pedestrian and cyclist connection across the River Lee, once delivered (see **Figure 2.2**). The area is well serviced with several large amenity areas located within walking distance of the site, such as the adjacent Marina Park, Pairc Ui Chaoimh, Holland Park as well as Kennedy Park within 1.5km of the site.

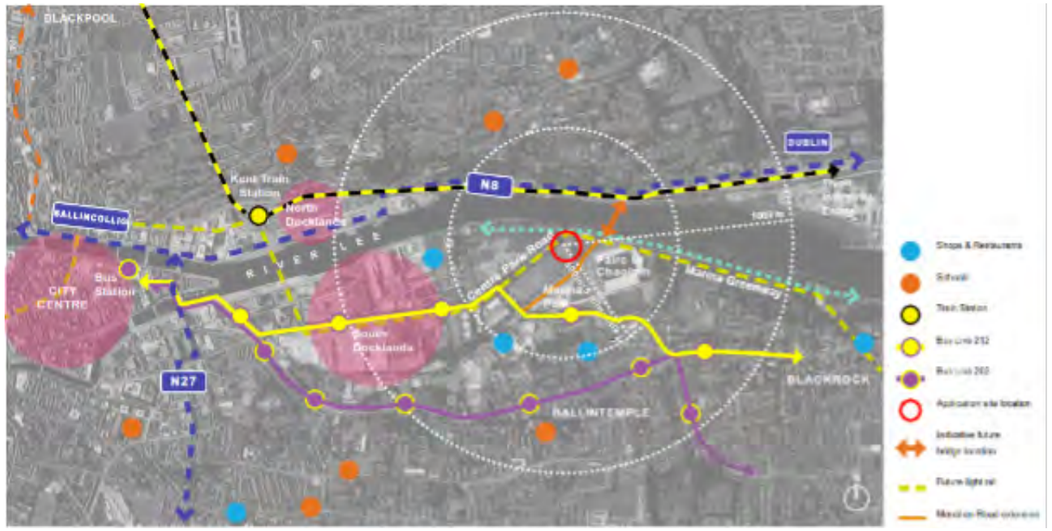


Figure 2.2: Local Context with Public Transport (Source: JFA)

The site is in proximity to a diverse range of retail and service amenities. Essential services, including the Marina Commercial Park and Marina Market, are accessible within a 10 to 15-minute walk distance. Additionally, Douglas Village and Douglas Court Shopping Centre and Mahon Point Shopping Centre are located approx. 3 km from the site both of which provide an extensive array of retail, dining, and entertainment options. This ensures that the development will meet the everyday needs of its residents without necessitating lengthy commutes.

The site is well-positioned relative to key educational institutions, catering to both primary and secondary education, as detailed in Chapter 1. University College Cork (UCC) is located approx. 4 km west of the site.

The site falls under the ZO 02 – New Residential Neighbourhoods land use zoning as per the Cork City Development Plan (2022-2028) (CCDP), as depicted in **Figure 2.3** below. The zoning aims to:

'*provide for new residential development in tandem with the provision of the necessary social and physical infrastructure'.*

A small portion (118 sq.m) of the proposed development site falls into an Area of High Landscape Value (AHLV). An AHLV is an additional objective overlaying the ZO 02 land-use zoning objective. New development in an AHLV must *"respect the character and the primacy and dominance of the landscape"*, with *"a presumption against development where it causes significant harm or injury to the intrinsic character"* of the AHLV. Further detail in this regard is detailed in the landscape and visual assessment provided within Chapter 5 of this EIAR.

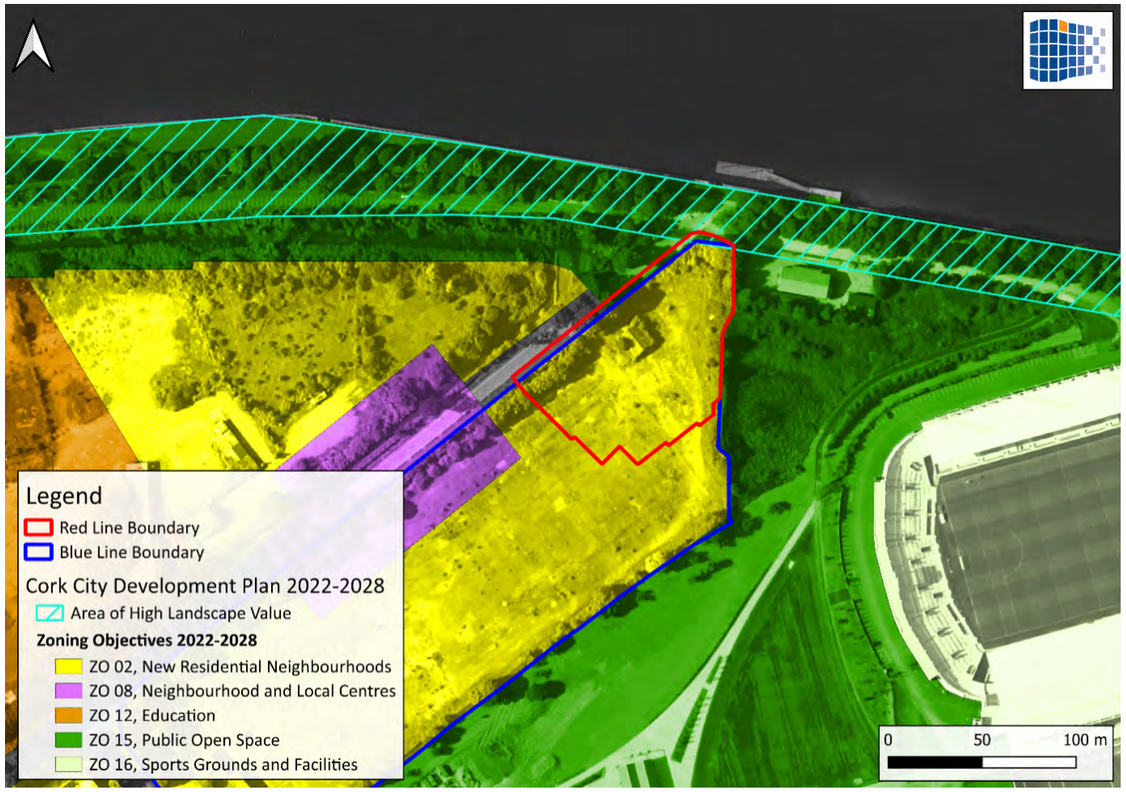


Figure 2.3 Land Use Zoning and Specific Objectives (Source: MHP GIS Team)

It is mainly surrounded by public open spaces together with sports grounds and facilities. The subject site is not within any other sensitive heritage designations such as Architectural Conservation Area (ACA), however, it is approx. 425m north of the Blackrock Road ACA Sub Area A. There are no other cultural heritage designations relative to the site. The nearest protected structure (NIAH Reg.no. 20863156) is located approx. 200m north of the site, across the River Lee. This is a railway crossing footbridge for residents at Bellevue Villas.

The proposed site does not contain any existing buildings or structures and presently consists of disturbed ground. There is a group of near mature sycamore trees (4) in the northern end of the site adjacent the Lee rowing club. On Centre Park Road there are two mature Lime Trees in the soft verge in front of the site. The proposed development site does not contain any habitats listed on Annex I of the EU Habitats Directive. Further detail in regard to the extent of surveys undertaken is provided within Chapter 10.

2.3 Proposed Development

The development consists of a proposed Large Scale Residential Development (LRD) comprising the construction of 176 apartment units in 2 blocks ranging in height from 7 to 10 storeys, over podium level, located at The Former Ford Distribution Site, fronting on to Centre Park Road, Ballintemple, Cork.

The residential units will comprise a mix of 1, 2 and 3 bed units. A creche providing 35 childcare spaces, retail/café and gym are also proposed. 56 car parking spaces are proposed, including 11 EV parking spaces which are generally located below the podium level with the exception of one accessible space proposed at grade. 11 motorcycle spaces are proposed below the podium level and 427 bicycle parking spaces are proposed below the podium level and throughout the site. The development also includes a new vehicular access from Centre Park Road, new pedestrian access, footpaths & cycle lanes, landscaping, amenity and open space areas, boundary treatments, bicycle and car parking, bin storage, public lighting and all associated ancillary development works.

The proposed development will serve as a focal point for the Polder Quarter character area and will complement the strategic housing development (SHD) permitted and currently under construction, located to the southwest of the site.

2.3.1 Design Approach

The proposed apartments have been positioned to take full advantage of natural light and heat, optimising energy efficiency and creating comfortable living environments. The design of these apartments is deeply informed by the local vernacular, featuring simple yet refined details that are well-proportioned and balanced. In particular, the design thoughtfully incorporates elements from the strategic housing development to the south, ensuring consistency with the future urban character of the area. To this end, the proposed architecture utilises materials, proportions, and features that not only respect but enhance the existing local setting.

The external finishes and materials have been carefully selected to make a positive contribution to the locality, reflecting a modern aesthetic while maintaining harmony with the surrounding context. Generous open spaces, complemented by thoughtfully designed landscaping, will elevate the overall visual appeal and functionality of the development. The design of the buildings and public spaces is intentionally crafted to facilitate enhanced permeability through the site providing clear connections to the adjoining park and SHD development.

The proposed layout is designed to function as a sustainable and successful residential neighbourhood, drawing on principles from the Urban Design Manual 2009 and adhering to various national and county design guidelines. The 176 residential units are strategically oriented towards primary open space areas and shared space zones, creating a community-focused environment. Access to the development is provided via Centre Park Road (L1002), following a thorough assessment by DBFL Consulting Engineers, which determined that this was the most viable access point.

Figure 2.4: Site Layout Plan (Source: JFA)

The layout of the development encourages passive surveillance, a key factor in creating a safe and secure neighbourhood. By positioning public and open space zones in highly visible areas, the design naturally deters anti-social behaviour, fostering a sense of security and community. Open spaces serve as the focal points of this layout,

with buildings oriented towards these communal areas. This orientation reduces the potential for overlooking between units, thereby enhancing privacy for residents. The layout also promotes a strong sense of ownership and community by situating open and shared spaces in the most accessible locations, effectively making these areas extensions of individual garden spaces. A comprehensive network of footpaths will further enhance the accessibility of these communal spaces, ensuring that they are seamlessly integrated into the daily lives of residents.

The proposed development is not only a carefully designed residential project but also a strategic addition to the area's evolving urban fabric. It balances modern living requirements with respect for the local environment, all while fostering a vibrant and sustainable community.

The layout has been carefully considered to ensure that connectivity is at the forefront of the development. Pedestrian and cyclist permeability through the site and to adjoining public amenities has been facilitated, as highlighted in **Figure 2.5** below.

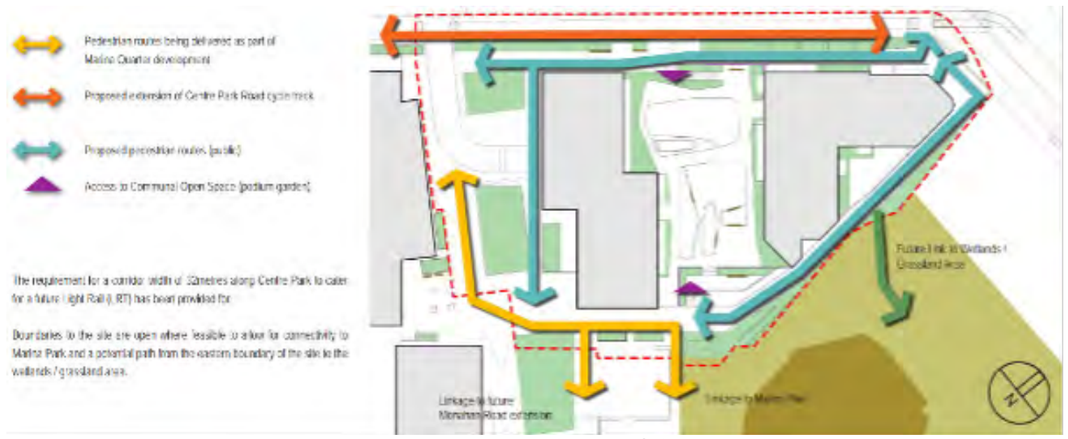


Figure 2.5: Proposed pedestrian and bicycle connectivity (Source: Áit)

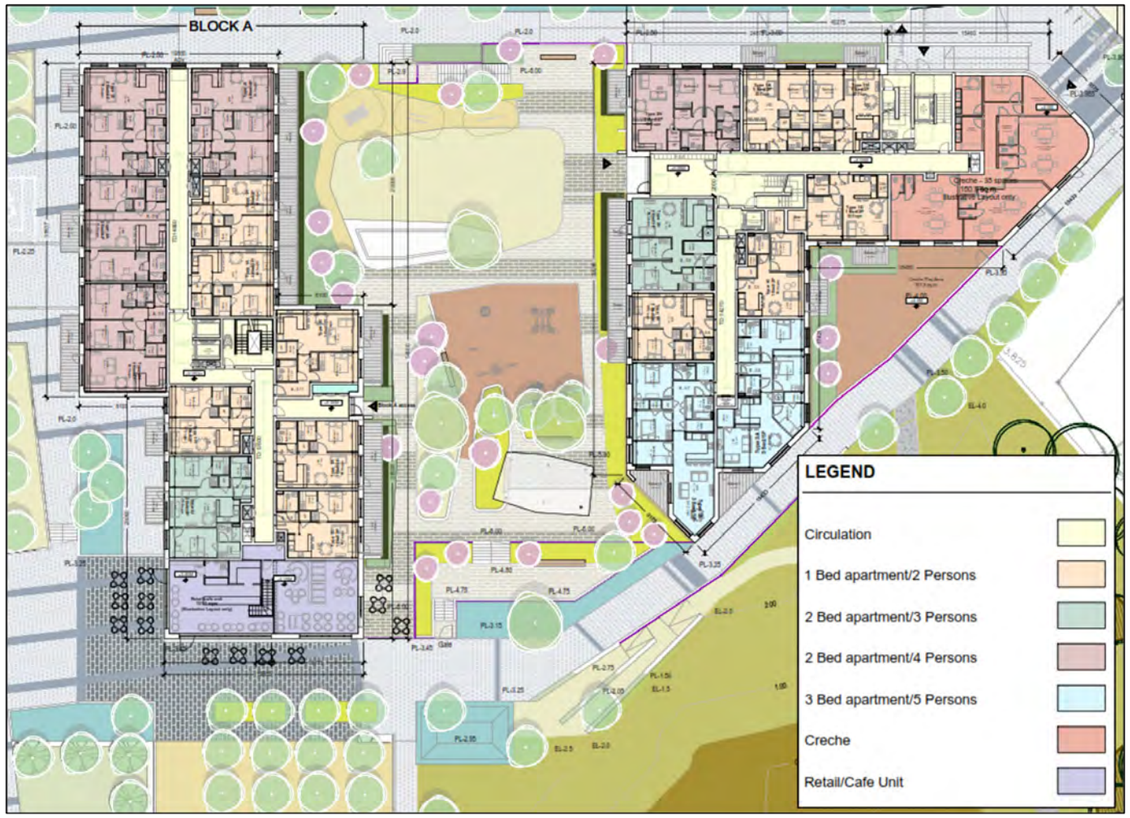


Figure 2.6 Ground Floor Layout Plan (Source: JFA)

The proposed development is designed to accommodate two distinct blocks, as depicted in **Figure 2.7** below. Block B is positioned at the front of the site, adjacent to the waterfront, while Block A is approximately 25-33 meters from Block B. Block A includes a gym to the north, below the podium level, fronting Centre Park Road. A café/retail unit is proposed along the southern boundary of Block A providing an active street frontage with direct interface with the permitted SHD development. Block B provides a créche along the west, north and eastern boundary. An external play area is located immediately to the south, as depicted in **Figure 2.6** above.

Figure 2.7: Proposed Site Layout (Source: JFA)

Block A consists of a residential apartment block ranging in height from 7 to 8-storeys, harmonizing with the scale of nearby waterfront developments and contributing to the area's urban character.

Block B, designed as a landmark building for the site, comprises a mix of residential units with a striking 10-storey component located within the front volume and a 7-storey volume towards the rear, as illustrated in **Figure 2.7** above. The building's architectural design emphasises its prominence, intended to serve as a visual focal point both within the development and the surrounding area. The front volumes of Block B are characterised by recessed balconies along the northern façade, which have been oriented to provide expansive views in both northwestern and northeastern directions.

The proposed building will sit adjacent to Marina Park, the banks of the River Lee as well as Páirc Uí Chaoimh stadium and Lee Rowing Club which serve a variety of functions including public open green spaces, quiet spaces, leisure spaces, exercise areas and sports and recreational spaces.

Currently, the Marina Promenade is under construction which will serve to integrate the recently upgraded Marina Park to provide a greenway and infrastructure for cyclists and pedestrians which greatly increase the recreation and amenity value.

The proposed site would have multi access points from all directions, including the vehicle and public access from Centre Park Road, access from Marina Park and the Marina Promenade, as depicted in **Figure 2.7** above.

The communal open space is located between the two blocks. The central communal courtyard garden includes a retractable roof pergola allowing for social gatherings to occur year-round, the outdoor gym, the lawn area and play space, thereby increasing the functionality of this space. The open spaces are linked using a shared surface approach to facilitate pedestrian/cyclist movement and permeability.

Although there are level differences within the site and with the interface of adjoining land holdings, the open spaces have been creatively linked via steps and permeable fencing treatments to ensure visual connectivity between the site and surrounding public open spaces.


Figure 2.8 Communal Open Space, view from the South East (Source: JFA)

The proposed development will be served via a shared vehicular, pedestrian and cyclist access off the Centre Park Road, located at the southern side of the north-western boundary. The proposed access accords with the Planning Authority's preference, to utilise the Street C access which was permitted as part of the adjoining SHD development (ABP Ref: ABP309059-20) to reduce the number of access points from Centre Park Road. This two-way access point will form a priority-controlled junction with Centre Park Road and will serve as the sole vehicular entrance to the proposed development. The design also includes pedestrian and cyclist connections to the north and south of the site, which are designed to integrate with the Marina Promenade and adjacent development.

A total of 56 car parking spaces are provided at grade, located below the podium level and throughout the site. Additionally, 11 motorcycle parking spaces and 427 bicycle parking spaces, along with bicycle storage, are proposed at various points around the site, adjacent to entrances for ease of access and enhanced passive surveillance.

Figure 2.9 View of the North West along Centre Park Road and the proposed development (Source: JFA)

The key development statistics are set out in the following Table:

Table 2.1 Development Overview

DEVELOPMENT STATISTICS	
Site Area	0.84ha
Site coverage	0.44 ha
Total GFA	16,190 sq.m
No. of Units	176
Unit Mix	62 no. 1 bedroom units (35.2%) – 2 person 4 no. 2 bedroom units (2.3%) – 3 person 78 no. 2 bedroom units (44.3%) – 4 person 32 no. 3 bedroom units (18.2%)
Plot Ratio	1.54
Site Coverage	52%
Tenant Amenities & Facilities	Internal Bike and Bin Storage External covered pergola seating area External Bike Storage buildings Play areas
Density	210 units per hectare (uph)
Building Height	7-10 storeys
Car Parking	56 spaces (incl. 11 EV spaces)
Bicycle Parking	427 spaces (incl. visitor spaces)
Public Open Space	1,846 sq.m
Communal Amenity Space	1,400 sq.m

Figure 2.10 Aerial view from North East looking south west (Source: JFA)

2.3.2 Landscaping

There are 4 no. sycamore trees located at the north eastern corner of the site which are proposed to be removed to accommodate the development. Two near mature trees located along Centre Park Road, which are included within the red line boundary, will be retained and will be reinforced with additional lines of trees on the soft landscape verges.

Within the proposed development 65 no. of trees and shrubs have been carefully selected to enhance local overall biodiversity within the development. Consisting of native trees and shrubs and other species recognised as being beneficial for pollinating insects (All-Ireland Pollinator Plan).

The podium garden is a generously dimensioned space and can incorporate a range of recreational functions and soft landscape. Being higher than the surrounding public realm it is also well suited to the semi-private character of a space set out for the use of residents.

Figure 2.11 Landscape Plan (Source: Áit Urbanism + Landscape Ltd.)

2.3.3 Height

The proposed Blocks, A and B, were carefully positioned on site to not only complete Centre Park Road in terms of scale and massing, but also to provide connections to the plaza proposed in the neighbouring approved SHD application. The heights range from 7-10 storeys as depicted in Figure 2.12 below. The proposed scheme follows the rhythm of the neighbouring scheme, providing high quality private and public open spaces (see Figure 2.13).

Figure 2.12 Building height view from the South East (Source: JFA)

Figure 2.13: Proposed and permitted elevation (Source: JFA)

As depicted in **Figure 2.12** above, the tower in this prominent corner serves as a crucial focal point for both the design and architectural language of the scheme.

A full description of the height strategy is contained within the Design Statement and architectural drawings prepared by JFA Architects that form part of the planning application documentation and should be read in conjunction with this chapter.

The layout would create a strong built frontage to the waterfront and to Centre Park Road, while retaining a visual connection between the permitted SHD development located to the southwest of the site. The spacing of the proposed blocks has been optimised to ensure an efficient use of land, while also protecting privacy between blocks and ensuring adequate sunlight & daylight penetration to internal spaces and external amenity areas.

This is confirmed in the Daylight and Sunlight Assessment undertaken by Model Works which demonstrates that all units meet or exceed the BRE recommendations for internal daylight provision. The proposed development performs very well with respect to sunlight exposure, with 87% of the units meeting the criteria, 83% in Block A and 91% in block B. All large-scale developments include a portion of units where their Living/Kitchen/Dining (LKDs) face predominantly north and therefore will receive minimal daylight on the BRE assessment date of 21st March.

Summary of the Daylight and Sunlight Assessment stated that:

Proposed Development

- *Daylight*

93% for the rooms meet the BRE criteria for daylight, 89% for Block A and 96% for Block B.

- *Sunlight*

87% of the units meet the criteria for sunlight, 83% of units in Block A and 91% in Block.

- *Amenities*

There are three amenity areas included in the proposal and all easily meet the BRE criteria for sunlight on the ground.

Neighbouring Environment

Only Blocks 11 and 12 of the earlier phases of the scheme required a detailed assessment for potential loss of daylight and sunlight.

- *Daylight*

70% for the windows meet the BRE criteria for Vertical Sky Component (VSC), 49% for Block A and 95% for Block B.

In situation such as this when a neighbouring building with balconies has a weak performance, the BRE Guide recommends that an additional calculation of VSC be made without the balconies. When this test was conducted, 87% of the Block 11 windows and 100% Block 12 windows meet the BRE criteria. Therefore, the impact on these buildings can be assessed as Minor and Negligible respectively.

- *Sunlight*

87% of the windows meet the BRE criteria for Annual Probable Sunlight Hours and 100% meet the Winter Probable Sunlight Hours. The impacts on Blocks 11 and 12 were assessed as Minor and Negligible respectively.

- *Amenities*

Only three existing amenity areas required assessment, two areas adjacent to Block 12 of the previously approved scheme and the wetlands area between the proposal and Páirc Uí Chaoimh. All three experienced negligible impacts.

As demonstrated in **Figure 2.14** below, both open spaces receive in excess of 50%, achieving 83% (Area A) and 93% (Area B). This assessment also outlined that neither the SHD Spaces nor the adjoining wetlands will be impacted by the proposed development as illustrated in **Figure 2.15**.

The results show that the proposed development site will have a negligible impact on surrounding buildings with respect to:

- access to skylight,
- access to sunlight, and
- sunlight to gardens/open spaces.

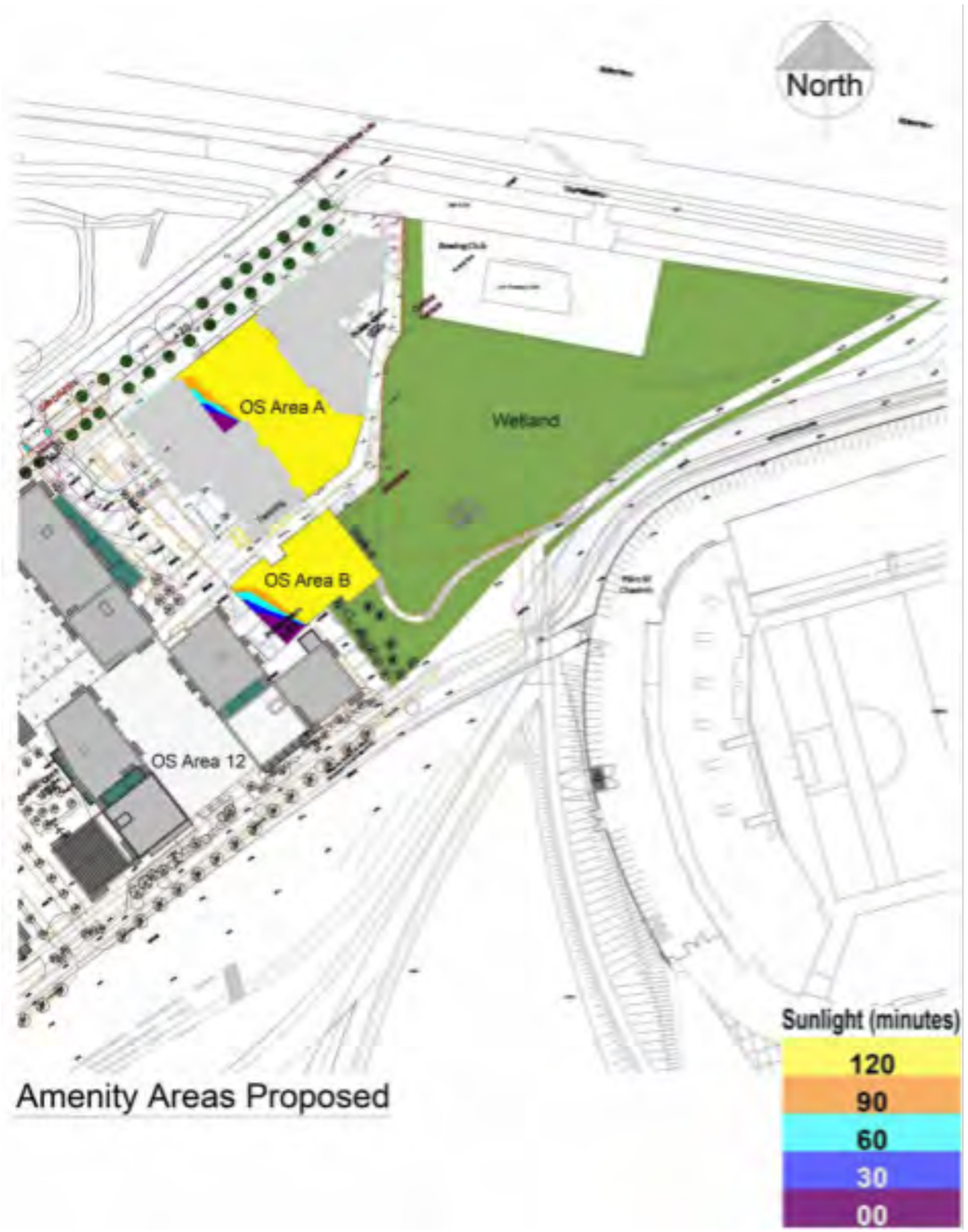


Figure 2.14: Sunlight to Proposed Amenity Spaces (Source: Model Works)

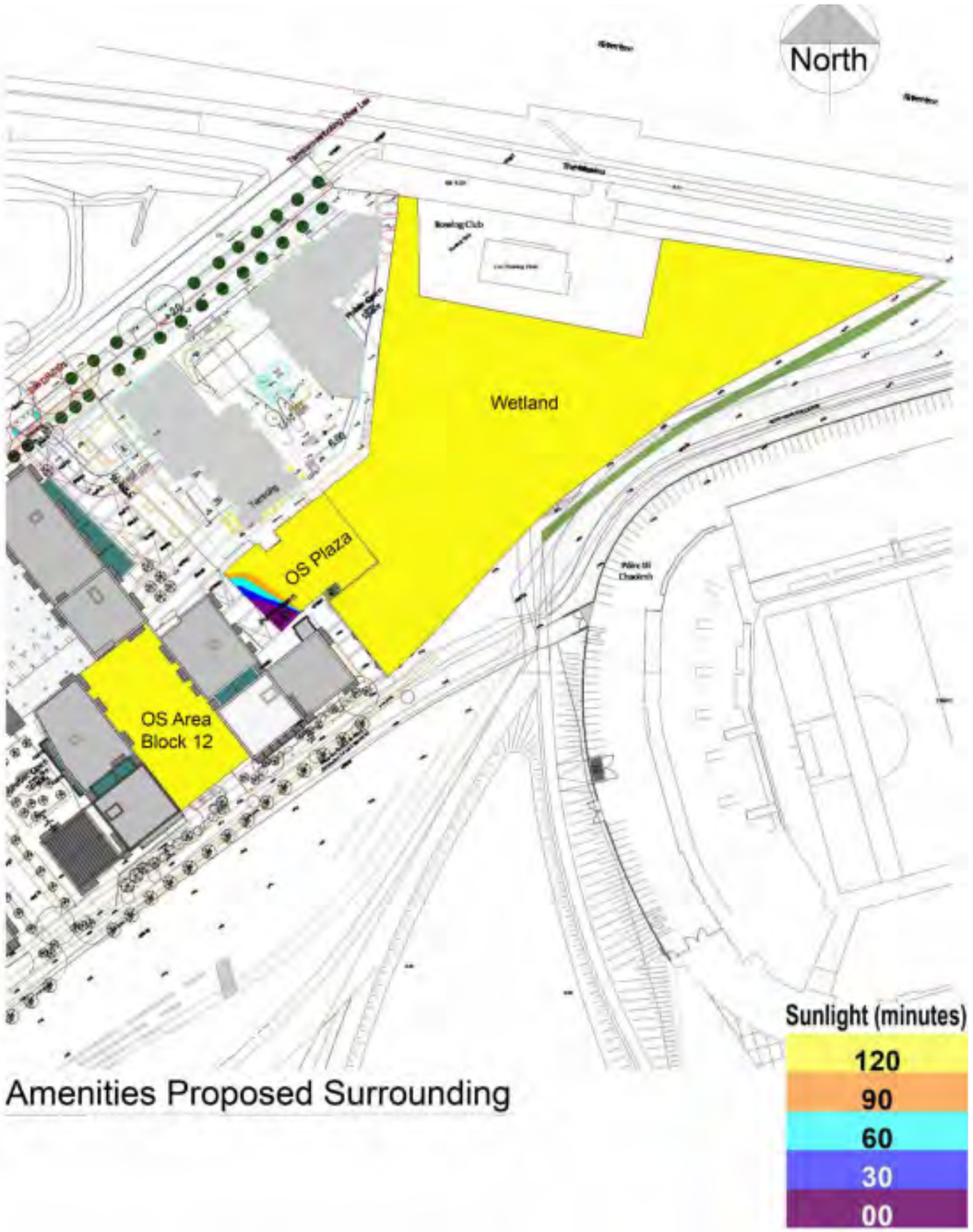


Figure 2.15: Sunlight to Surrounding Amenity Spaces (Source: Model Works)

2.3.4 Materiality

A feature of the proposed buildings is large window openings, intended to take maximum advantage of views including the visual amenities of the site environs and also to benefit from maximising daylighting internally for the proposed units.

The selected materials were chosen to sit harmoniously within the area, cognisant of the adjacent approved development that has employed light-coloured finishes (see **Figure 2.16**).

The proposed scheme will comprise primarily high-quality buff and cream brick, and simple horizontal stone finish bands, aimed at creating a coherent and bright environment. White render will be used periodically, creating a subtle transition to the brick (see **Figure 2.16**). Dark balconies and the curtain walling design will introduce an element of contrast. The project brief sought that all materials were durable, easily cleaned and maintained, and of high quality. A further key consideration was the non-combustible specification requirement of tall buildings, which was carefully examined prior to selecting finishes.

Figure 2.16 Design examples (Source: JFA)

Panel above window | reference image

Horizontal bands effect | reference image

Dark balconies & window side panel | reference image

Inset balconies | reference image

Figure 2.17 Material Finishes Examples (Source: JFA)

Please see the Architectural Design Statement prepared by JFA Architects which accompanies the planning application for further detail in this regard.

2.3.5 Access

The proposed development's podium/basement car park will be accessed by vehicles via a permitted access point (Street C)' which previously obtained permission as part of the adjoining SHD development (ABP reference: ABP309059-20), located to the west of Block A onto Centre Park Road. This two-way access point will form a priority-controlled junction with the Centre Park Road and will serve as the sole vehicular entrance, as illustrated in **Figure 2.18** below.

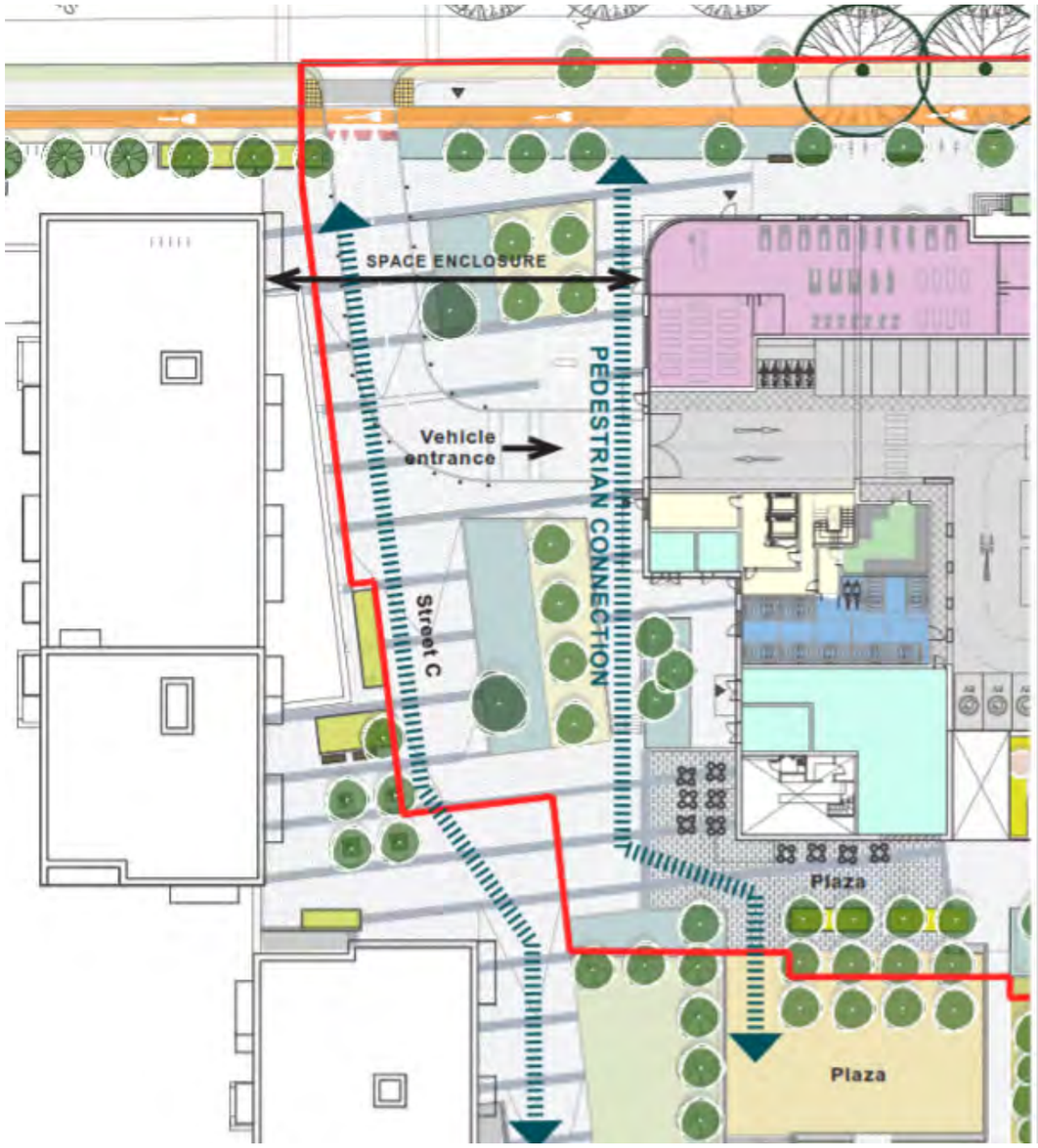


Figure 2.18 Vehicle Access (Source: JFA)

Sustainable and Active Travel is identified as one of the key strategic principles of Cork City Council's Development Plan 2022-2028. The principle seeks to implement the CMATS and develop a sustainable transport system with a significant shift towards walking, cycling and public transport and to enshrine this principle in all developments across the city. The Development Plan emphasises the importance of making active travel an attractive option such that the provision of high-quality and permeable pedestrian and cycle networks is required to achieve uptake.

A dedicated one-way cycle lane is proposed along the northwest site frontage of the subject development site, as highlighted in orange in **Figure 2.18** above. Cyclists will be able to access the cycle parking in the podium/ basement via a dedicated cycle access provided to the north elevation linking street level and the proposed cycle lane, as illustrated in **Figure 2.19** below. Cyclists can also access the site via a cycle access provided to the northeast of subject site.

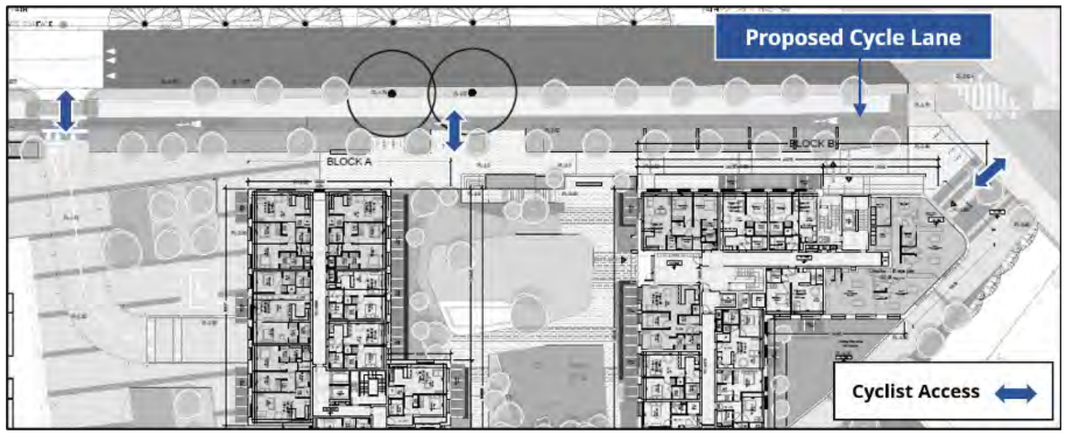


Figure 2.19: Cyclist Access (Source: DBFL Consulting Engineering)

Furthermore, pedestrians can access Block A, Block B, the retail/café and the creche through various access points, as illustrated in Figure2.20 below. The retail/café unit located to the south of Block A, facing the public plaza provides access to numerous locations to ensure permeability with Marina Park and the adjoining permitted SHD development, ensuring active spaces are created.

Figure 2.20: Pedestrian Access in Ground Floor (Source: JFA, edited by MHP)

The new Monahan Road extension aligns with the Council's transport infrastructure strategy for the Docklands and the need for improved transport infrastructure to serve the area. The proposal aims to provide facilities for all road users, bus users, cyclists and pedestrians, while also integrating with the future residential developments in the Former Ford Distribution site.

The works will primarily consist of:

- Provision of a new road (Monahan Road Extension) from the junction of Monahan Road-Marquee Road, north-eastwards along the northern boundary of Marina Park towards the River Lee
- Upgrading of the existing priority junction at Monahan Road-Marquee Road to a fully signalised four-arm junction (Marquee Road, Monahan Road (west), Monahan Road (east) and Monahan Road Extension)

The proposed development site is also served by urban bus services, Bus Route 212 with the nearest stops located c. 300 & 600 metres (5 minutes' walk) away from the site.

2.3.6 Confirmation of Feasibility

A Confirmation of Feasibility (COF) and Statement of Design Acceptance has been received from Uisce Éireann (UÉ) and is included in the Infrastructure Design Report prepared by DBFL Consulting Engineering, which forms part of the planning application documentation.

2.3.7 Wastewater

A review of the Uisce Eireann records show that there is no existing foul network adjacent to the site. The nearest connection point would be a foul sewer running along Marquee Road to the southwest, as outlined in **Figure 2.21** below.

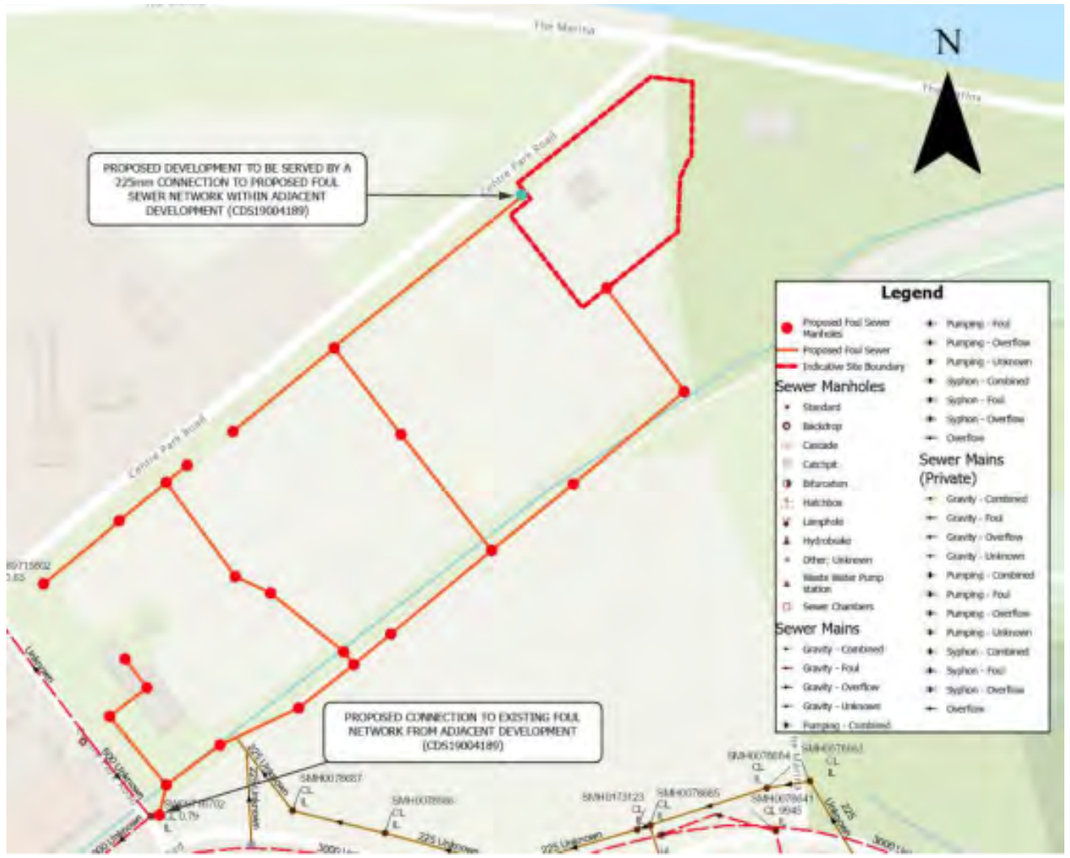


Figure 2.21 Existing Foul Network records (Source: DBFL Consulting Engineering)

The proposed development's wastewater will be discharged to the Uisce Eireann 225 mm diameter foul sewer on Marquee Road via the proposed foul water network within the adjacent Ford SHD development (which is in the ownership of the Applicant). All matters relating to wastewater will be agreed upon with Úisce Eireann. Úisce Eireann confirmed feasibility without the need for any upgrade works.

All new main foul sewers are designed to discharge by gravity. Minimum gradients and pipe diameters for gravity collector and main sewers are designed in accordance with the Building Regulations and Irish Water's Code of Practice for wastewater infrastructure and Standard Details for wastewater infrastructure.

The sewer network is designed in accordance with the principles and methods set out in Úisce Eireann 's Code of Practice for Wastewater Infrastructure 2020, IS EN 752 (2008), IS EN12056: Part 2 and Building Regulations Part H.

2.3.8 Surface Water

The surface water strategy for the proposed development area will incorporate SuDS features to reduce run-off and provide biodiversity benefits. Storm water from the contributing catchment will be attenuated and discharged into the adjacent development (ABP reference: ABP-309059-20) which has accounted for the inclusion of runoff from the proposed development. Discharge rates from the adjacent development accounting for the overall surface water strategy are in accordance with the South Docks Drainage and Levels Strategy (2022) with storm-water storage facilities and SuDS elements incorporated to allow infiltration and reduction of run-off volumes and rates where possible.

The surface water network will be attenuated at one attenuation location using 'Stormtech' type systems to provide the attenuation storage volume required for a 100-year plus 20% climate change storm event. All surface water discharges will be controlled using a vortex flow control (Hydrobrake or equivalent).

The surface water strategy is aligned to the requirements of the Cork South Docklands Levels Strategy, as set out in ABP reference: ABP-309059-20. As there are no open channels to discharge to within the vicinity of the site boundary, it is proposed that the surface water generated on site will be discharged to the proposed surface water network within the adjacent Ford SHD site (ABP reference: ABP-309059).

The adjacent SHD scheme (Ref. ABP-309059) is owned by the same landowner as the proposed subject site and this planning application is part of the wider site in regard to infrastructure. Therefore, design and coordinate between the two proposed surface water networks is possible. The SHD surface water drainage strategy has been designed to accommodate the surface water discharge generated by the proposed development. Discharge from the subject site into the adjacent SHD drainage network will be restricted to 5l/s via flow control.

2.3.9 Sustainable Urban Drainage Systems (SuDS)

In accordance with the CCDP it is proposed to provide SUDS for managing surface water from the facility. The aim of the SUDS strategy for the site will be to:

- Attenuate surface water runoff;
- Reduce surface runoff;
- Reduce pollution impact; and
- Replicate the natural characteristics of rainfall runoff for the site.

An assessment of the potential SUDS that could be incorporated within the site was conducted using the SUDS Manual, CIRIA 753. The SUDS elements applicable to the proposed scheme design and layout include the following:

1. Extensive green roofs, bioretention areas, green podiums and filter drains have been included in the scheme to provide attenuation, treatment and where possible, infiltration. The interception and treatment benefits of bioretention systems are a major benefit within the treatment train and a vital part of the surface water management of the site. The location of bioretention has been selected in more level areas of the site to ensure these are as effective as possible.

2. Attenuation storage will be an online infiltration/filtration type (Stormtech or similar approved) system with an isolator row to encourage infiltration and treatment of run-off.

3. A planted roof area with low growing, low maintenance plants consisting of self-sustaining mosses, sedums, succulents, herbs or grasses over a drainage layer and waterproofing membrane will be provided. Extensive green roofs provide ecological, aesthetic and amenity benefits and intercept, treat and retain rainfall, reducing the volume of runoff and attenuation of peak flows. The extensive roof will only be accessed for maintenance.

The incorporation of the above SUDS elements will provide a sustainable way to disperse surface water from the site, encourage groundwater recharge and provide treatment of run-off and subsequent improvement of discharge quality.

The SuDS features proposed above for the site will require the following maintenance:

Permeable Paving: Regular brushing and removal of leaves, removal of weeds as necessary. Stabilise and mow contributing and adjacent landscaped areas regularly. Repair any depressions, rutting, cracked or broken blocks considered detrimental to the structural performance or a hazard to users.

Bypass Separator: Systems should be inspected every 6 months (or in line with the manufacturer's instructions) to verify the appropriate level of maintenance. Floating debris and solids should be removed and the sump cleaned with a conventional sump vacuum cleaner. Filter media should be replaced and sediments, oils and grease should be removed where required.

Green Roofs: Green roofs should be maintained as per the details of the proprietary product brochure/manual. This varies from product to product but generally involves the application of fertilisers in the spring months, removal of flowers at the end of summer and the application of slow-release fertilisers in autumn.

Catchpit Manhole: Catchpit manholes collect silt and debris from upstream SuDS features and gullies in the surface water system. Due to large volumes of silt and debris building up in catchpit manhole sumps, it is essential for them to be cleaned regularly. Inadequate maintenance of the catchpit manholes can lead to reduced performance of storage and treatment systems and can cause blockages leading to flooding of the surface water system. It is recommended that suction equipment is used by skilled personnel when cleaning to ensure effective and safe removal of silt and debris from catchpit manholes.

Bioretention Areas: Bioretention areas should be regularly maintained to ensure optimum operation. Planting should be trimmed as necessary, and the surface regularly cleared of organic matter. Underdrains should be inspected regularly and cleared if necessary.

'Stormtech' attenuation: The Stormtech attenuation system should be maintained as per the Details of the proprietary product brochure/manual. This generally involves the removal of sediment build-up within the system.

Figure 2.22 Proposed SuDS Strategy (Source: DBFL Consulting Engineering)

2.3.10 Water Supply

The site is well served by the adjacent watermain network. Úisce Eireann records show the presence of both a 400mm and a 100mm ductile iron watermain located along Centre Park Road and the Marina. Additionally, two 200mm connections from the adjacent development are proposed to serve the site. It is proposed to serve the site via a connection to the 200mm watermain connection from the adjacent development.

It is proposed to supply the site via a 150mm connection to a spur provided as part of the adjacent development ABP-309059-20. Irish Water have previously confirmed the feasibility of a connection to the 400mm diameter ductile iron watermain along Centre Park to the south-east of the site, however upgrade works will be required to make the connection. Although the proposed connection is no longer proposed to be directly to the existing 400mm watermain and to the watermain from the adjacent development, the feed to the new watermain in the adjacent development will still be to the 400mm watermain.

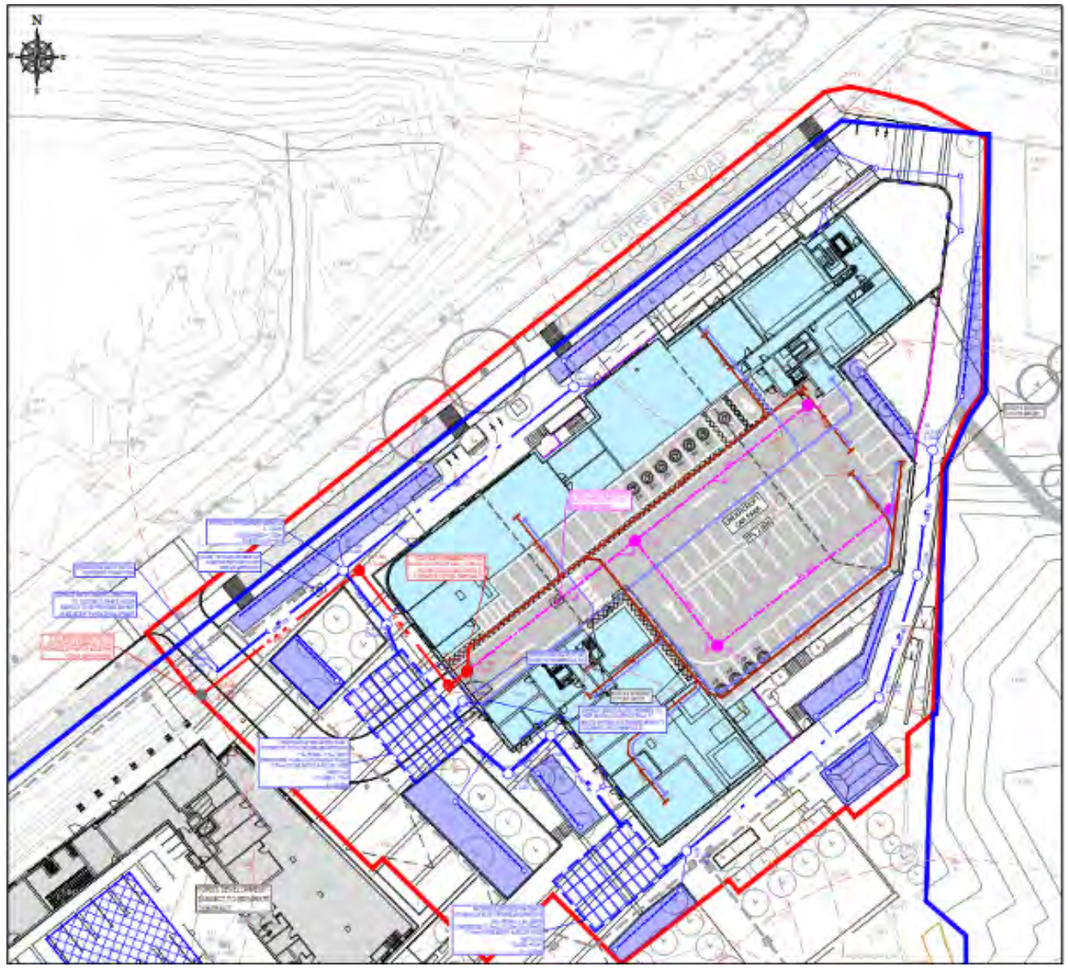


Figure 2.23 Proposed Services Layout (Source: DBFL Consulting Engineering)

2.3.11 Parking

The quantum of carparking proposed is below the maximum standards (0.25 spaces/1bed and 0.5 spaces/2/2+bed) prescribed in the CCDP. Reducing carparking has a positive impact on greenhouse gas emissions and reduces congestion particularly for a site that is located in close proximity to public transport.

The proposed development incorporates a total of 56 car parking spaces including 3 disabled parking spaces and 11 EV parking spaces. This level of provision is considered to be appropriate to accommodate the demand for both residents and visitors in accordance with both local (CCDP) and national development management standards considering the characteristics of the subject site.

11 motorcycle spaces are proposed to service the proposed development. 427 bicycle parking spaces will be provided including 384 long term parking spaces (secured and weather protected),13 cargo bike spaces and 30 short term bike parking spaces at surface level.

2.3.12 Services

2.3.12.1 Electrical Supply and Telecommunications

The proposed electrical and telecommunications installations will be finalised and installed once planning permission has been granted.

2.3.12.2 Waste Management

An Operational Waste Management Plan (OWMP) prepared by Enviroguide accompanies this application and should be referred to in conjunction with this section. As detailed on the floor plans, waste storage rooms are provided in each of the two blocks to service all apartments.

During the operational stage, 4-bin systems to encourage waste segregation at source will be provided. This will assist with meeting the EUs municipal waste recycling target and achieve a circular economy.

The OWMP has been prepared with regard to British Standard BS 5906:2005 Waste Management in Buildings – Code of Practice in respect of waste generation for domestic and commercial premises to calculate the storage, containment, and equipment requirements for effective waste management.

The Waste Storage Areas will be provided with receptacles and signage to promote a rate of 30% of the overall waste collected to be Mixed Municipal Waste (MMW) / General Waste and 70% of waste collected recyclable waste streams which will include Dry Mixed Recyclables (DMR) (packaging, papers, cardboards, plastics, aluminium, metals, and tin) and Organic (food) Waste. This waste collection proposal also provides a waste management solution that has sufficient flexibility to support future targets and legislative requirements.

All of the Mixed Municipal Waste (MMW) collected will be transported for further recovery. All MMW will be consigned to a recovery facility where it will undergo mechanical waste recovery, or it will be consigned to a facility for energy recovery. No MMW will be transported directly to landfill.

The Management Company will be responsible for the provision of a leaflet to all new tenants encouraging good waste segregation and pictorial information detailing the waste streams that can be placed in each bin. In addition to this, clauses that support waste segregation targets will be included in relevant legal documentation e.g., tenancy agreements where possible.

For the commercial units including the gym, the retail/café and the Creche, waste arising at these facilities will be dealt with at each of the units. The current layout drawings are indicative only and have not included waste storage areas within these units. Once put in place, the Commercial Waste Storage Areas will only be accessible to the commercial unit staff members and will not be accessible to residents or members of the public. The commercial units are expected to generate similar waste types to the domestic dwellings as well as volumes of packaging waste. It will be incumbent on the occupier to arrange collection of materials such as ink cartridges.

2.3.13 Building Energy Strategy/Energy Statement

A Climate Action Energy Statement prepared by ENX and an Energy & Sustainability Report undertaken by EDC forms a part of the planning application documentation. The design intent is to achieve at least an A2 Building Energy Rating.

The Energy Statement confirms that the proposed apartments will comply with Part L of the Building Regulations (NZEB). The strategies proposed are:

- Decreasing the thermal conductivity (heat losses) of the building fabric;
- Take advantage of passive solar gain to reduce the heating demand in the space;
- Mechanical ventilation and heat recovery techniques will be employed to recover energy in the exhausted air;
- Hogh performance U-Values;
- High degree of air tightness to a possible value of 3m3/m2/hr or 0.15 Air Changes;
- Air source heat pumps utilize low grade heat from external ambient air and transfer heat to heating system pipework; and
- Exhaust air heat pumps utilise an exhaust air heat pump type system for heating, hot water and ventilation of the apartment units.

2.3.14 Site Lighting

A Site Lighting Report prepared by EDC accompanies this planning application under separate cover.

The site lighting has been designed to minimise light spillage to the adjoining properties particularly the adjoining wetlands. The report contains the design layout and accompanying calculations for the proposed site lighting scheme for the proposed development. The external lighting has been prepared in accordance with Bats and Lighting – Guidance Notes for Planners, Engineers, Architects and Developers (Bat Conservation Ireland, 2010) & Bats and Lighting in the UK – Bats and the Built Environment Series (Institute of Lighting Professionals, September 2018).

2.4 Construction Phase

This application is accompanied by a Construction Environmental Management Plan (CEMP) prepared by DBFL Consulting Engineering. This report should be read in conjunction with this chapter for a comprehensive description of the construction phase.

All of the mitigation measures proposed within the EIAR, and other supporting documents are deemed adopted for the purposes of the CEMP.

The appointed contractor will be provided with the CEMP and the EIAR and will be required to comply with the provisions contained in it.

2.4.1 Programme

The development will be constructed as one project, but with basic sub-phases such as bulk dig and super-structure erection. Based on other developments of a similar scale and complexity, the construction works will take approximately 18-24 months to complete.

The proposed staffing levels during the construction phase are anticipated to be as follows:

- Average of 50 people.

An outline of the sequence of construction works, as extracted from the CEMP prepared by DBFL Consulting Engineers is provided below:

> *The proposed order of construction of key elements is as follows, however this is subject to detailed review by the Contractors at construction stage and specifics may require adjustment once the contractor has been appointed:*
>
> - *Site Setup including welfare facilities and hoarding;*
> - *Set up of construction cranes;*
> - *Earthworks, including cut and fill and disposal of excess material off site;*
> - *Construction of substructure including concrete basement and access ramp;*
> - *Construction Super Structure Frame to buildings in sequence to roof level;*
> - *Construction of site services including surface water and foul drainage and water;*
> - *supply network;*
> - *Roof and Façade finishes;*
> - *Instillation of major plant items;*
> - *M&E services & utilities;*
> - *Internal fit out;*
> - *External fit out, planters etc.;*
> - *External site works and tie into Centre Park Road.*

2.4.2 Access & Site Compound

The proposed development site has a single entry-point for vehicles at the south west corner of the site, from Centre Park Road. This existing site access is to be maintained and utilised as the development entrance. It is envisaged that the contractor may use this access as the primary access point for construction traffic and deliveries etc.

Immediately after access to the site is made and it is secure, the site compound will be established. Existing site services will be isolated including the decommissioning of any existing services and the provision of a temporary builders power supply.

The site will be secured with hoarding on all open sides and accessible approaches. The site boundary will be established as indicated by the red-line boundary.

Waste removal will be by trucks to Centre Park Road as construction activities require. Specific control measures will be implemented to fully segregate construction traffic from external pedestrian traffic.

The Contractor shall provide arrangements to provide for vehicular traffic to the site with control measures where crossing the public footpath. The proposed location of the Contractor compound will be internally within the site.

Hoardings will be painted metal panel hoarding circa 2.4m including supports and appropriate anchoring (Designed by Temporary Works Engineer), external lighting and safety signage will be set up. Site hoarding will include Health and Safety warnings at appropriate intervals.

Site security will be provided by way of a monitored infrastructure systems such as site lighting and CCTV cameras, when deemed necessary.

2.4.3 Construction Hours

It is anticipated that normal working hours may be 7am to 7pm Monday to Friday and 8am to 5pm o Saturday. Working outside these hours will be subject to agreement with the Local Authority.

Working hours will be strictly in accordance with the granted planning conditions with no works on Sundays or Bank Holidays. If work is required outside of these hours, written approval will be sought by the contractor from the Cork City Council.

2.4.4 Construction Personnel & Parking

All construction activities will be governed by a Construction Traffic Management Plan (CTMP), the final details of which will be agreed with Cork City Council prior to the commencement of construction activities on site. The principal objective of the CTMP is to ensure that the impacts of all building activities generated during the construction phase upon the public (off-site), visitors to the subject site (on-site) and internal (on-site) workers environments, are fully considered and proactively managed/programmed thereby ensuring that safety is maintained at all times, disruption is minimised and undertaken within a controlled hazard free/minimised environment. The construction of external works e.g. surface water outfall, footpaths and boundaries on Centre Park Road will be undertaken from the site or as per the conditions of the road opening license.

The construction of external works e.g. surface water outfall, footpaths and boundaries on Centre Park Road will be undertaken from the site or as per the conditions of the road opening license.

The site is readily accessible by public transport with Bus Eiren services all within nearby walking distance. On-site employees will generally arrive before 07:00, thus avoiding the morning peak hour traffic. Construction employees will generally depart after 17:00. It should be noted that a large proportion of construction workers may arrive in shared transport.

Construction traffic will not be permitted to park on the public roads or within the general area outside the main site.

2.4.5 Construction Traffic & Site Deliveries

As part of the Construction Stage Safety Plan for the works a Traffic Management Plan (TMP) will be prepared in accordance with the principles outlined below and held on site. It shall comply at all times with the requirements of;

- Chapter 8 of the Department of the Environment Traffic Signs Manual, current edition, published by The Stationery Office, and available from the Government Publications Office, Sun Alliance House, Molesworth Street, Dublin 2;
- Guidance for the Control and Management of Traffic at Road Works (June 2010) prepared by the Local Government Management Services Board;
- Any additional requirements detailed in the Design Manual for Roads and Bridges & Design Manual for Urban Roads & Streets (DMURS)

Vehicular access to the proposed development will be via or adjacent to the existing vehicular access off Centre Park Road. Traffic volumes are not anticipated to be significant and turning movements into the site shall be accommodated without delay. Warning signage will be provided for pedestrians and other road users on all approaches in accordance with Chapter 8 of the Traffic Signs Manual and the Contractor's Traffic Management Plan.

During the general excavation of the foundations there will be additional HGV movements to and from the site. All suitable material will be used for construction and fill activities where possible and appropriate. All spoil material will be removed to a registered landfill site.

In addition to the traffic generated by the movement of subsoil to and from the site, there will be traffic generated from deliveries of construction materials and equipment. It should be pointed out that construction traffic generated during the development works tends to be during off-peak hours. Such trips would generally be spread out over the full working day and are unlikely to be higher than the peak hour predicted for the operational stage.

Construction traffic will consist of the following categories:

- Private vehicles owned and driven by site construction and supervisory staff;
- Excavation plant and dumper trucks removing excavations / waste material from site;
- Materials delivery vehicles involved in site development works.

Deliveries would arrive at a steady rate during the course of the day. It is estimated that peak delivery rates would be in the region of 1 - 2 deliveries per hour throughout the day.

In the absence of a final construction programme, it is difficult to assess the exact impact during the construction period. Nevertheless, the following estimates have been made in respect of the construction period impacts:

- Appropriate on-site and compounding will be provided to prevent overflow onto the local network. Parking in nearby residential estates shall be strictly prohibited.
- It is likely that some numbers of the construction team will be brought to/from the site in vans/minibuses, which will serve to reduce the trip generation potential.
- During the period of excavation and disposal off site, it is likely that up to 2-3 no. truck trips per hour (on average) will be generated by vehicles removing unsuitable spoil from the site to allow for the construction of the development and for the removal of demolition waste.
- The site offices and compound will be located within the site boundary.

2.4.6 Vehicle Movement During Construction

At the time of writing this Chapter of the EIAR, it was noted that remediated contaminated material from both the Site and the adjoining proposed Strategic Housing Development (ABP Reference: ABP-309059-20) was stockpiled at

the Site pending removal offsite. It is estimated that there is a total of 12,006m3 of material temporarily stockpiled at the site. All stockpiles are stored on high-grade polythene sheeting to prevent cross-contamination of the soil below and are also covered with high-grade polythene sheeting to prevent rainwater run-off and leaching of potential contaminants from the stockpiled material, as well as the generation of dust. It is anticipated that the temporarily stockpiled material will be removed off site in the immediate future as part of ongoing development works at the adjoining proposed Strategic Housing Development. Therefore, the temporarily stockpiled material will have been removed well in advance of construction works commencing at the site of the Proposed Development. Further details are provided in Chapter 8 of this EIAR.

There will be unavoidable loss of in-situ soils and subsoils from the site for the construction of the Proposed Development. Excavation of soil and subsoil will be required for the construction of piling caps, drainage and other infrastructure to depths of between 1.6 meters below ground level (mbGL) and 2.2mbGL with the excavation of 2,700m3 of material. It is anticipated that all excavated materials will require permanent removal offsite for recovery / disposal in accordance with all statutory legislation.

The most onerous construction period with regards to traffic generation is expected to be HGVs during the following work elements;

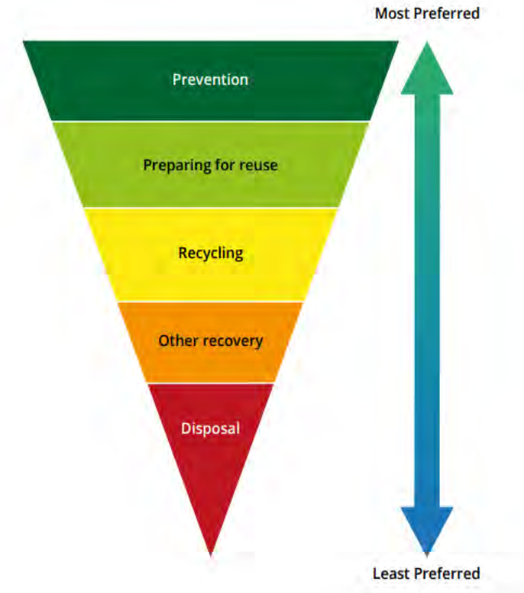
- Excavation stage where waste and soil are removed from site;
- Bringing construction materials to site;
- Bringing concrete to site for Substructure and Superstructure;
- Bringing pre-cast and steel elements to the site;
- Bringing the glazing.

Construction vehicle movements and their impact will be minimised through;

- During the pre-construction phase, the site will be securely fenced off from adjacent properties, public footpaths and roads;
- The surrounding road network will be signed to define the access and egress routes for the development;
- All road works will be adequately signposted and enclosed to ensure the safety of all road users and construction personnel;
- Consolidation of delivery loads to / from the site and management of large deliveries on site to occur outside of peak periods;
- Use of precast / prefabricated materials where possible;
- "Cut" materials generated by the construction works to be re-used onsite where possible, through various works;
- Adequate storage space on site to be provided;
- The design of the works has involved an element of minimising the quantity of material to be removed from site by way of cut and fill balance;
- A programme of street cleaning on Glenamuck Road will be implemented;
- Scheduling of movements to outside peak traffic times and school pick-up / dropoff times

2.4.7 Construction Waste

A **Resource & Waste Management Plan** (RWMP) and **Materials Management and Remedial Strategy Plan** (MMRP) have been prepared by WSP and can be found at Appendix 7.1 & 7.2 (Volume III). This will be adhered to and will ensure a high level of recycling, reuse and recovery at the Proposed Development. All recyclable materials will be segregated at source to reduce waste contractor costs and ensure maximum diversion of materials from landfill, thus achieving the targets set out in The National Waste Management Plan for a Circular Economy 2024-2030.



The construction phase will give rise to the requirement to remove and bring quantities of various materials to and from the site. Construction and excavation related wastes will be created during the construction phase. This has the potential to impact on the local waste management network. Waste will also be generated from construction workers e.g., organic/ food waste, dry mixed recyclables (wastepaper, newspaper, plastic bottles, packaging, aluminium cans, tins and cartons), mixed non-recyclables and potentially sewage sludge from temporary welfare facilities provided onsite during the construction phase. Waste printer/toner cartridges, waste electrical and electronic equipment (WEEE) and waste batteries may also be generated infrequently from site offices. Office and canteen waste, including food waste, will be stored in wheelie bins on site and it will be collected by an appropriately authorised waste collector. All wastes generated on site will be sent for recycling, recovery, or disposal to a suitably licensed or permitted waste facility (WSP, 2024).

The soil and groundwater beneath the site are impacted due to historic infilling and industrial activities that occurred previously. The MMRP will provide the construction team with a management plan for the excavation of soil materials to

ensure that the material is managed appropriately for specific end reuse onsite and/or disposal offsite as required. Contaminated hotspots have been identified which will be excavated and disposed off-site by the contractor (WSP, 2024). Removal and recovery/recycling/disposal of all waste materials, including soil, will be carried out in accordance with the Waste Management Act 1996 and as amended. The removal of all soil from the site will be undertaken in accordance with all applicable statutory legislation and will be the responsibility of the main contractor. As best-practice, all construction-related rubbish on-site e.g., plastic sheeting, netting etc. should be kept in a designated area on-site and kept off ground level so as to protect small fauna (such as small mammals) from entrapment and death.

2.4.8 Earthworks

Earthworks will consist of excavation for undercroft/podium level of the apartment blocks and reducing existing level area for foundations. Excess material will be disposed offsite to a suitably licensed facility in accordance with the project's Construction Waste Management Plan.

2.4.9 Lightings

No overnight lighting will be directed to the natural habitats along the boundaries of the Site where possible, if this cannot be avoided due to health and safety reasons, the lighting will be designed to minimise impact on local wildlife and in accordance with the Bat Conservation Trust Guidelines on artificial lighting and bats.

2.4.10 Control and Management of contaminated soil

Contaminated soil will be encountered during groundworks at the site. Remedial works undertaken to date have removed a large portion of the contaminated soil at the site. However, the soil validation results demonstrate that petroleum hydrocarbon and solvent impacted areas remain at validation sample locations across the site.

The Human Health Risk Assessment will be used to inform the remediation plan to ensure that residual sources of contamination in soil are removed offsite. The removal of the residual soil source will be validated in accordance with relevant guidelines including EPA 'Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites' (EPA, 2013a) and guidance and standards current at the time of construction works.

2.4.10.1 By-product Suitability

A significant level of made ground has been noted from the preliminary site investigation. It can be assumed most of this will be removed to reach the foundation level, however, were any similar material to be found at deeper levels it would be removed as it is not a suitable foundation stratum.

A ground works operation will be carried out in order to ensure that any material removed from the ground is taken away at regular intervals in order to reduce the amount of material that will be stored on site. Excavated material will be reused on site, where possible, subject to Waste Acceptance Criteria (WAC) analysis.

Contract and procurement procedures will ensure that all imported aggregate fill and soil materials required for the construction of the Proposed Development will be sourced from reputable suppliers operating in a sustainable manner and in accordance with industry conformity/compliance standards and statutory obligations. This may include where suitable, import as by-products that meet the legislative requirements of Article 27 of the European Communities (Waste Directive) Regulations, 2011. The importation of aggregate fill and soil materials will be subject to management and control procedures which will include testing for contaminants, invasive species and other anthropogenic inclusions and assessment of the suitability for use in accordance with engineering and environmental specifications for the Proposed Development. Therefore, any unsuitable material will be identified prior to unloading / placement onsite.

2.5 Health and Safety

2.5.1 Construction Phase

Project supervisors for the construction phase will be appointed in accordance with the Health, Safety and Welfare at Work (Construction Regulations) 2013, and a Preliminary Health and Safety Plan will be formulated during the detailed design stage which will address health and safety issues from the design stages, through to the completion of the construction phases. This Health and Safety Plan will be developed further for the construction stage of the project.

2.6 Monitoring

A CEMP is included as part of this planning application. The CEMP will be updated to address any changes required by planning conditions and will be agreed with the planning authority prior to the commencement of development.

The CEMP demonstrates the applicant's commitment to implement the proposed development so as to avoid or minimise the potential environmental effects resulting from construction activities.

These include procedures for monitoring and tracking construction activities and ensuring construction personnel are trained and educated as necessary. The Construction & Environmental Management Plan should be reviewed as the construction phase progresses to accommodate any changes in activities on site.

Aspects addressed within the CEMP include but are not limited to; noise and vibration; dust and air quality; traffic and vehicle management; pollution incident control; and protection of vegetation and fauna.

The appointed contractor will be required to implement this CEMP throughout the course of the construction phase. All personnel will be required to understand and implement the requirements of the plan.

2.6.1 Construction Noise and Dust

The construction of the project will involve the use of noise generating construction plant. There will also be an increase in noise relating to delivery of materials to site. A site representative responsible for matters relating to noise and vibration will be appointed prior to construction on site. The noise liaison officer should be appointed and charged with the responsibility of keeping people informed of progress and by setting down procedures for dealing with complaints. Additionally, a noise and vibration monitoring specialist will be appointed to periodically carry out independent monitoring of noise and vibration during random intervals and at sensitive locations for comparison with limits and baseline background levels. It is proposed that noise and vibration levels be maintained below those outlined above as part of these infrastructure works.

Daily on-site and off-site inspection should be undertaken, where receptors are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces within 100 m of site boundary, integrity of the silt control measures, with cleaning and / or repair to be provided if necessary.

2.6.2 Construction Material and Contamination

The excavation of made ground and underlying natural soils impacted with anthropogenic contamination and permanent removal off-site is a design requirement of the Proposed Development.

During the Construction Phase of the Proposed Development the following monitoring measures will be considered:

- Routine monitoring and inspections during refuelling, concrete works to ensure no impacts and compliance with avoidance, remedial and mitigation measures.
- Inspections and monitoring will be undertaken during excavations and other groundworks to ensure that measure that are protective of water quality are fully implemented and effective.
- Stockpiles will be inspected daily by the appointed contractor to ensure materials are segregated onsite for the appropriate waste stream and disposal destination and to ensure there is no leaching / runoff of potential contaminants from the stockpiled material and/or the generation of dust.
- Materials management and waste audits will be carried out at regular intervals to monitor the following:
    - Management of soils onsite and for removal offsite.
    - Record keeping.
    - Traceability of all materials, surplus soil and other waste removed from the Site.
    - Ensure records are maintained of material acceptance at the end destination
- The removal of the residual soil source will be validated in accordance with relevant guidelines including EPA 'Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites' (EPA, 2013a) and guidance and standards current at the time of construction works.
- Soil and subsoil materials to be reused within the Proposed Development (i.e., for engineering fill and landscaping) will be subject to an assessment of the suitability for use, in accordance with engineering and environmental specification for the Proposed Development.
- As part of the Odour Monitoring Plan monitoring may be required along site boundary downwind of the works area to ensure permitted odour levels are not exceeded. If a vapour or odour issue arises during the works, the appointed Contractor will cease works immediately and investigate the incident and implement appropriate mitigation measures as required.

2.6.3 Integrated Pest Management

The Main Contractor will take all necessary steps to ensure that pests, rodents, birds, insects and plants are controlled at all times.

Control measures will be undertaken prior to commencement of any works on the site. Poison where used, will comply with any relevant Health and Safety requirements and which eliminate any danger to children, household pets and other wildlife. Old and discussed service pipes and voids will be removed or filled to avoid the potential pest to infest the site.

2.6.4 Environmental

The monitoring proposed in Chapters 4 to 17 of this EIAR will be carried out during the demolition and construction phases. This monitoring is integrated to ensure that there will be no likely significant impact during development of the site.

A bespoke site Construction Environmental Management Plan (CEMP) will be prepared by the appointed contractor prior to work commencing on site. Aspects that will be addressed within the CEMP will include but are not limited to, waste and materials management; noise and vibration; dust and air quality; traffic and vehicle management; pollution incident control; and protection of vegetation, biodiversity. A summary of the mitigation measures to be incorporated into the CEMP is provided in Chapter 17 of the EIAR.

2.7 Commissioning

The testing and commissioning of services (drainage, watermain, gas, electricity) will be completed in accordance with relevant codes of practice as set out in **Chapter 7** of the EIAR.

2.8 Property Management

A property management company would be appointed to manage the scheme and common areas to ensure that the scheme is well managed, and the development is maintained to an extremely high level. They will be responsible for inter alia cleaning, landscaping, refuse management, insurance, maintenance of mechanical/electrical lifts/ life safety systems, security etc.

2.9 Decommissioning

The design life of the scheme is greater than 60 years. Thus, for the EIA process, the development is considered permanent, and a decommissioning phase is not considered in this report.

2.10 Conclusion

This chapter sets out the development parameters for the proposed development including an overview of the Architectural, Landscape and Engineering strategy. An overview of construction has also been provided, and further information can be found in this EIAR and all other supporting information that accompanies this planning application.

VOLUME II

CHAPTER 3

Alternatives Considered

McCutcheon Halley
CHARTERED PLANNING CONSULTANTS

CHAPTER THREE
Table of Contents

CHAPTER THREE
Table of Figures

CHAPTER THREE
Table of Tables

Chapter Three | Alternatives Considered

3.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) was prepared to consider alternatives as required by Annex IV (2) of the Environmental Impact Assessment (EIA) Directive 201/92/EU on the assessment of the effects of certain public and private projects on the environment as amended by EIA Directive 2014/52/EU (the "**EIA Directive**") and in Schedule 6 of the Planning and Development Regulations 2001, as amended, (PDRs) which states;

> *"A description of the **reasonable** alternatives studied by the person or persons who prepared the EIAR, which are **relevant to the proposed development and its specific characteristics**, and an indication of the main reasons for the option chosen, taking into account the effects of the proposed development on the environment".* (emp. added)

The PDRs identify that reasonable alternatives may include project design proposals, location, size and scale, which are relevant to the proposed development and its specific characteristics. The PDRs require that an indication of the main reasons for selecting the preferred option, including a comparison of the environmental effects be presented in the EIAR.

The Environmental Protection Agency Guidelines on the Information to be Contained in Environmental Impact Assessment Reports, 2022 states:

> *''The objective is for the developer to present a representative range of the practicable alternatives considered. The alternatives should be described with 'an indication of the main reasons for selecting the chosen option'. It is generally sufficient to provide a broad description of each main alternative and the key issues associated with each, showing how environmental considerations were taken into account in deciding on the selected option. A detailed assessment (or 'mini-EIA') of each alternative is not required."*

The Guidelines also state that the range of alternatives considered may include the 'do-nothing' alternative.

Notwithstanding the above, pursuant to Section 3.4.1 of the 2022 EPA Guidelines, the consideration of alternatives also needs to be cognisant of the fact that:

> "in ***some instances some of the alternatives described below will not be applicable*** – e.g. there may be no relevant 'alternative location'..." (emp. added)

The Guidelines are also instructive in stating:

> *"Analysis of high-level or sectoral strategic alternatives cannot reasonably be expected within a project level EIAR... It should be borne in mind that the amended Directive refers to 'reasonable alternatives... which are relevant to the proposed project and its specific characteristics'".*

This chapter of the EIAR provides an outline of the main alternatives examined for the proposed development and sets out the main reasons for choosing the development as proposed.

The assessment of alternatives is considered under the following headings:

i. 'Do-nothing' Alternative
ii. Alternative Locations
iii. Alternative Uses
iv. Alternative Project Design

3.2 Expertise and Qualifications

This chapter was prepared by Rachel Condon of McCutcheon Halley Chartered Planning Consultants.

Rachel graduated from University College Cork with a BA Hons in Geography and Irish, obtained in 2010 and a master's degree in Planning and Sustainable Development, obtained in 2013. Rachel is currently an Associate Director in the Practice and is experienced in the field of planning and development consultancy which includes providing consultancy services in respect of major projects. Rachel has directed the preparation of EIAR's for a range of development types including residential, mixed use, and industrial developments.

Rachel has practised as a planning consultant for over 10 years and has directed the preparation of EIARs for a range of development types including residential, commercial and industrial. Directly relevant experience to this proposed development is that Rachel has been involved in the direction of EIARs to accompany residential led applications that received permission for development including:

- Connolly Quarter Reg. Ref: 3054/22 - The construction of 187 build to rent apartments and 4 office blocks with heights ranging from 5 to 16 storeys. The proposed development included works to a Protected Structure (RPS Ref. No. 130).
- Bailey Gibson (PL29S.307221) - Demolition of all structures, construction of 416 residential units (incl. 4 houses, 412 apartments) and associated site works.
- Southwest Gate (Reg. Ref. 3228/20) – Demolition of 4 existing buildings and surface car parking, and construction of a mixed use scheme across 13 blocks comprising 1,123 residential units with supporting amenities, retail units, office accommodation, a primary healthcare centre, gym, cultural centre, childcare facility, hotel and a series of public open spaces.

3.3 Consideration of Alternatives

3.3.1 'Do-Nothing'

The 'do-nothing' alternative is a general description of the evolution of the key environmental factors of the site and environs if the proposed project did not proceed. Each chapter of this EIAR includes a description of the 'Do Nothing' alternative and should be referenced in conjunction with this Chapter.

The proposed development site would remain in its current condition, impermeable, predominately brownfield and it would not fulfil its residential zoning objective nor assist in the rejuvenation of the southern city docklands. Accordingly, there would be an adverse effect on population, as this approach would fail to address the shortage of homes in Cork City. This is critical in the context of the low volume of land available for development in Cork

City owing to the high amount of land being developed. Maximising the efficiency of zoned land particularly when nationally, there is a housing crisis and as a result, the delivery of housing on zoned land in a timely manner is of critical importance.

The site would remain derelict without any action and would be inconsistent with the opportunity for major development in the Docklands and in revitalising the City.

The proposed development site would fail to achieve the National Planning Framework, National Strategic Outcomes for compact growth and sustainable mobility, both of which have positive climate and human health benefits.

When compared with the proposed development, the key difference between the Do-Nothing and the proposed development is the delivery of new homes, and its consequential negative effect for population when compared with the alternative, the delivery of 176 new homes.

Under the Do-Nothing alternative, there will be no built environment within the proposed development site. However, this is likely to be short term having regard to the fact that the site is zoned for development. The proposed development will change the character of the landscape and harmonise with the surrounding development. Any resulting effect of this can be managed by well-considered, high quality design, that respects the setting and responds to the changing character that will shortly occur along Centre Park Road.

Under the Do-Nothing alternative, there would be no additional traffic generated from this portion of the site. However, the permitted Marina Quarter Development, also known as the South Docks Strategic Housing Development (ABP Reg. Ref: 309059), immediately adjoining the site would proceed, contributing to an increase in traffic in the area.

The proposed development itself includes a minimal provision of 56 car parking spaces, aligning with objectives to promote active travel and encourage a shift to sustainable transportation modes. When comparing the two scenarios, the proposed development is assessed as a slight positive impact, with minor overall effect due to the adjoining SHD.

To conclude, the Do-nothing alternative is an inappropriate and unsustainable approach that would result in the inefficient use of a strategically located and easily serviced landbank of zoned residential lands located in proximity to existing and planned high-frequency transport. With the mitigation measures proposed in this EIAR and having regard to the findings that no significant effects on the environment are expected with such measures in place, the comparative environmental effects are not considered sufficient to rule out the proposed development.

3.3.2 Alternative Locations

The suitability of the proposed development site for residential development is confirmed by the 'ZO 02' – New Residential Neighbourhood zoning designation in the extant Cork City Development Plan 2022-2028 (CCDP),where the following objective applies:

> *"To provide for new residential development in tandem with the provision of the necessary social and physical infrastructure."*

In addition, the Cork Docklands are earmarked as a major mixed-use centre with a substantial component dedicated to the provision of employment land-uses. The proposed development would therefore provide the accommodation for prospective employees taking up employment within the Cork Docklands. The CCDP also recognises the need to increase residential density within Cork City to cater for population projections, with Project Ireland 2040 aiming to increase the population of Cork City by 50% by 2040. The Plan sets out density standards for new developments in Cork City. This includes the South Docks, which have been allocated with specific height and density targets for the area.

The Core Strategy of the CCDP identifies a zoning tier for development, with the proposed site falling within the Tier 1 zoning for new residential development. This area is also designated as part of a strategic regeneration project. The site's location in Cork City—adjacent to public transport options, social infrastructure, and existing amenities—alongside other permitted and ongoing regeneration developments and infrastructure, highlights its potential for residential growth.

Regarding the South Docks area, it appears that, aside from the planned public open spaces designated by the Council, much of this dockland's area has already undergone significant development, i.e the Marina Park and the under construction pedestrianisation of the Marina Promenade riverside amenity. There are limited suitable undeveloped land or sites without existing planning permission or awaiting a determination. Given that many nearby sites are not readily available for development, the subject site stands out as one of the most suitable remaining locations. The site is also close to public transport and committed public transport infrastructure, social infrastructure and amenities.

Additionally, the site is an existing brownfield land, which is under the ownership of the Applicant who also owns the adjoining Strategic Housing Development (SHD) which is currently under construction. Considering the sites alignment with the city's broader regeneration objectives and national objectives, in this context, there is no reasonable alternative location.

3.3.3 Alternative Uses

At the City level, South Dock is identified as an existing built-up footprint within the Metropolitan Area given its location in proximity to the City Centre and key transport links. The planning policy aimed to regenerate Cork Docklands as a project of international importance with potential to be exemplars for sustainable urban living. The phased regeneration of the City Docks and Tivoli Docks as high quality, higher density, mixed use sustainable waterfront areas with new urban quarters and transformational projects acting as catalyst for further investment and regeneration of the City. In this way, the National Planning Framework (NPF) objective of compact growth can be achieved.

The compact development strategy within South Docklands effectively shortens travel distances, resulting in reduced vehicle miles travelled and subsequently, a significant decrease in air pollutants such as carbon dioxide (CO_2), nitrogen oxides (NO_x), and particulate matter (PM).

Moreover, the Cork Docklands' compact urban layout promotes active modes of transportation, including public transit, cycling, and walking. This sustainable approach curtails overall transportation-related energy consumption, mitigating vehicle emissions and reducing reliance on fossil fuels. Ultimately, this development model advances a more sustainable and resilient urban environment, aligning with modern principles of eco-conscious urban planning.

By concentrating development, urban consolidation helps protect green spaces within and around cities. Parks, forests, and other natural areas provide important ecosystem services, including carbon sequestration, temperature regulation, and habitat for wildlife.

In summary, urban consolidation and compact growth offer multiple environmental benefits by promoting more efficient land use, reducing energy consumption and emissions, improving air and water quality, preserving open space, promoting

sustainable infrastructure, and enhancing resilience to climate change. These strategies are essential for creating healthier, more sustainable, and resilient cities in the face of ongoing urbanisation and environmental challenges.

The alternative to compact growth would be urban sprawl, which has consequent environmental impacts. For example, increased private vehicle traffic would contribute to air pollution through emissions of pollutants that impact the climate and health. Sprawl reduces the permeability of the land, leading to increased stormwater runoff and flooding. This overwhelms drainage systems, causes erosion, and carries pollutants into water bodies, further degrading water quality.

The CCDP establishes the overall guiding principles for development of the proposed development site which has been zoned as 'ZO 02' New Residential Neighbourhood. This site is within Tier 1 zoned land which is currently serviced by physical infrastructure.

This ZO 02 zoning objective is to:

To provide for new residential development in tandem with the provision of the necessary social and physical infrastructure.

This objective is supported by a vision to:

This zone covers primarily greenfield, undeveloped lands for new sustainable residential areas. Development in this zone, while primarily residential, must provide an appropriate mix of housing types and tenures along with the amenity, social, community and physical infrastructure required to promote compact growth, balanced communities and sustainable, liveable communities.

Uses under this zoning would be appropriate as set out under 'ZO 01' Sustainable Residential Neighbourhoods:

Primary uses in this zone ZO 01 include residential uses, crèches, schools, home-based economic activity, open space and places of public worship.

The CCDP also states the following regarding uses within ZO 01 zoning *'that contribute to sustainable residential neighbourhoods are also acceptable in principle in this zone provided they do not detract from the primary objective of protecting residential amenity and do not conflict with other objectives of this Development Plan. Such uses include but are not limited to: small-scale local services including local convenience shops; community facilities;' cultural facilities; hotels and hostels; live-work units; service stations (petrol filling stations); local medical services; third level education institutes; community based enterprise or social enterprises, health facilities including hospitals.*

In principle, an application for any one or a combination of the uses listed above could be progressed on the site subject to compliance with other policies and objectives in the CCDP. Having regard to the site's zoning designation as 'New Residential Neighbourhood' the reasonable alternative scenario for the development of the proposed site is:

i. A residential development; or

ii. A residential led mixed use scheme incorporating some permitted in principle uses.

3.3.3.1 Residential Scheme

The population of the study area, defined as a 2km extent from the site boundary within the Census 2022 Small Area, was 10,148, representing a 13.8% increase compared to the 2016 population. While this growth is notable, it is relatively modest when compared to the nearly 78% population increase recorded for Cork City Council over the same period.

As outlined in Chapter 4, "Population and Human Health," the average age of residents in Cork City was 39.1 years in 2022. Furthermore, the pre-school, primary, and post-primary school age group (0–19 years) constituted approximately 20% of the population in the study area. Consequently, the proposed scheme is likely to appeal to younger households, making it a suitable development for this suburban area of the city.

3.3.3.2 Residential Led Mixed Use Scheme

Consideration was given to developing a residential-led mixed use scheme on the proposed development site. This approach would integrate a quantum of amenities to support daily living needs such as a community facility and childcare etc.

A **Social Infrastructure Audit** (included under separate cover) was undertaken at the early stage of the project to ascertain the amenities and services available locally. It is concluded that the subject site is well served by existing high quality public transport, social and community facilities together with services and amenities which are deemed sufficient to accommodate an increase in population.

The proposed development includes the construction of one childcare facility with a capacity of 35 childcare spaces. The **Childcare Demand Report** (included with the planning application under separate cover) confirmed that the proposed childcare facility with a capacity of 35 childcare spaces exceeds the projected childcare needs and would generate additional childcare spaces for the area.

Although community facility, childcare services, education uses, office and business uses are permitted in principle on this site, a childcare facility, a gym and café/retail unit are deemed to be appropriate to develop along with the residential scheme particularly given the average age of residents in the study area and their relevant needs. Further amenities are provided within the permitted mixed use SHD development which adjoins the site. Ensuring that competing uses are excluded from the proposal will protect the viability of the existing permitted uses on the adjoining site, while also complementing the proposed new uses.

Having regard to the above, a reasonable alternative is a residential-led mixed use scheme which would provide childcare facilities, a gym and a retail/café use. Given this is the preferred option, **Table 3.1** below outlines the anticipated environmental effects of progressing a residential led mixed use scheme on the proposed development site.

Table 3.1 Anticipated Environmental Effects of a Residential-led mixed use scheme

CHAPTER	QUALITY & SIGNIFICANCE	COMMENTS
Population & Human Health	Positive and Very Significant	The proposed development delivers a substantial quantum of homes in a highly accessible location, within a designated residential zoning area. to the proposed creche, gym and retail/café amenities further supports the creation of a well-connected and sustainable residential community.
Biodiversity	Positive & Significant	The development would necessitate the inclusion of open space and having regard to policies in the Development Plan biodiversity enhancement measures would be included. Over 60 additional trees will be planted on the site as a result of the development.
	Neutral & Slight	Removal of 4 existing trees will be required to facilitate the development.
Climate	Positive and Very Significant	Introducing homes at this location would support a modal shift owing to the site's excellent accessibility to the city centre and public transport.
Air Quality	Positive and Very Significant	Reduction in car usage brought by adhering to maximum car parking rates and by proximity to public transport would have a positive effect on local air quality.
Water	Neutral & Not Significant	Úisce Eireann has confirmed the water connection is feasible.
Noise & Vibration	Neutral & Not Significant	The proposed development will not result in adverse noise impacts on the local population or human health, with the presence of existing recreational parks and a nearby stadium.
Land & Soils	Positive & Moderate	A residential led mixed use development would be the most appropriate land use under this land use zoning rather than remaining as a brownfield site. To facilitate the development, removal of soils would be required. Having regard to the previous land use, the removal of contaminated soils would provide positive impact on the quality of soils and groundwater.
Traffic & Transport	Positive and Very Significant	The development at this location would promote a modal shift and the general impact on traffic would be positive.
Cultural Heritage: Archaeology & Built Heritage	Neutral and Not Significant	The proposed development site is not located within an archaeological site or within 2 km of any zone of archaeological potential. Furthermore, there are no architectural heritage features or designated structures in close proximity.
Landscape & Visual	Positive and Very Significant	High quality designed residential development of the site would introduce a change to the existing landscape. However, together with the permitted SHD, which is currently under construction, this proposal will result as the landmark of the water front of South Dock and harmonised with the permitted apartment blocks.

3.3.3.3 Preferred Use of a Residential Led Mixed Use Scheme

The suitability of the proposed development site for residential-led mixed use development is confirmed by the zoning designation in the extant Cork City Development Plan 2022-2028.

The primary difference between the 2 scenarios is that a residential-led mixed use scheme would deliver much-needed homes together with community facilities and amenities. When this is compared with a solely residential development greater traffic movements may result as the population may need to use alternatives locations for childcare facilities, gym facilities and retail offerings. The effect on population would be slight adverse.

Accordingly, it is concluded that use of the site for residential-led mixed use development is the optimum use of the proposed development site having regard to the outcome for population i.e. delivery of housing, sustainable residential development, mixed social and community development, resulting in a sustainable neighbourhood.

3.3.4 Alternative Design – Atlantic Quarter

It is acknowledged that there was a previous major planning application (Ref: 08/32919) granted for the redevelopment of the 4.984ha site and all site development works to incorporate the construction of a mixed use development of 12 no. buildings arranged in 11 no. parcels ranging from 1 to 27 no. floors plus mezzanine. This application included over 500 residential units, retail units, offices, hotel, a leisure centre, an events arena, art spaces, restaurants and cafés, a crèche, a civic building and a medical unit.

This design, ass depicted in **Figure 3.1** below, was deemed too tall and dense for the site and surrounding area and conditions were applied recommending a reduction in heights. Concerns were raised regarding its potential impact on the local skyline, the adequacy of infrastructure to support such a large development, and the strain it might place on existing community services. Although an extension of duration was permitted, this planning permission has now lapsed as of October 2024.

Figure 3.1: Atlantic Quarter 3D visualisations (Sources: JFA)

3.3.5 Alternative Designs - Layout

The proposed development consists of two buildings designed in a cornered echo form, with each building divided into front and rear volumes. The layout has been updated in response to the council's request, with the Block A layout mirrored to shift its northern section closer to Street C (see **Figure 3.2**).

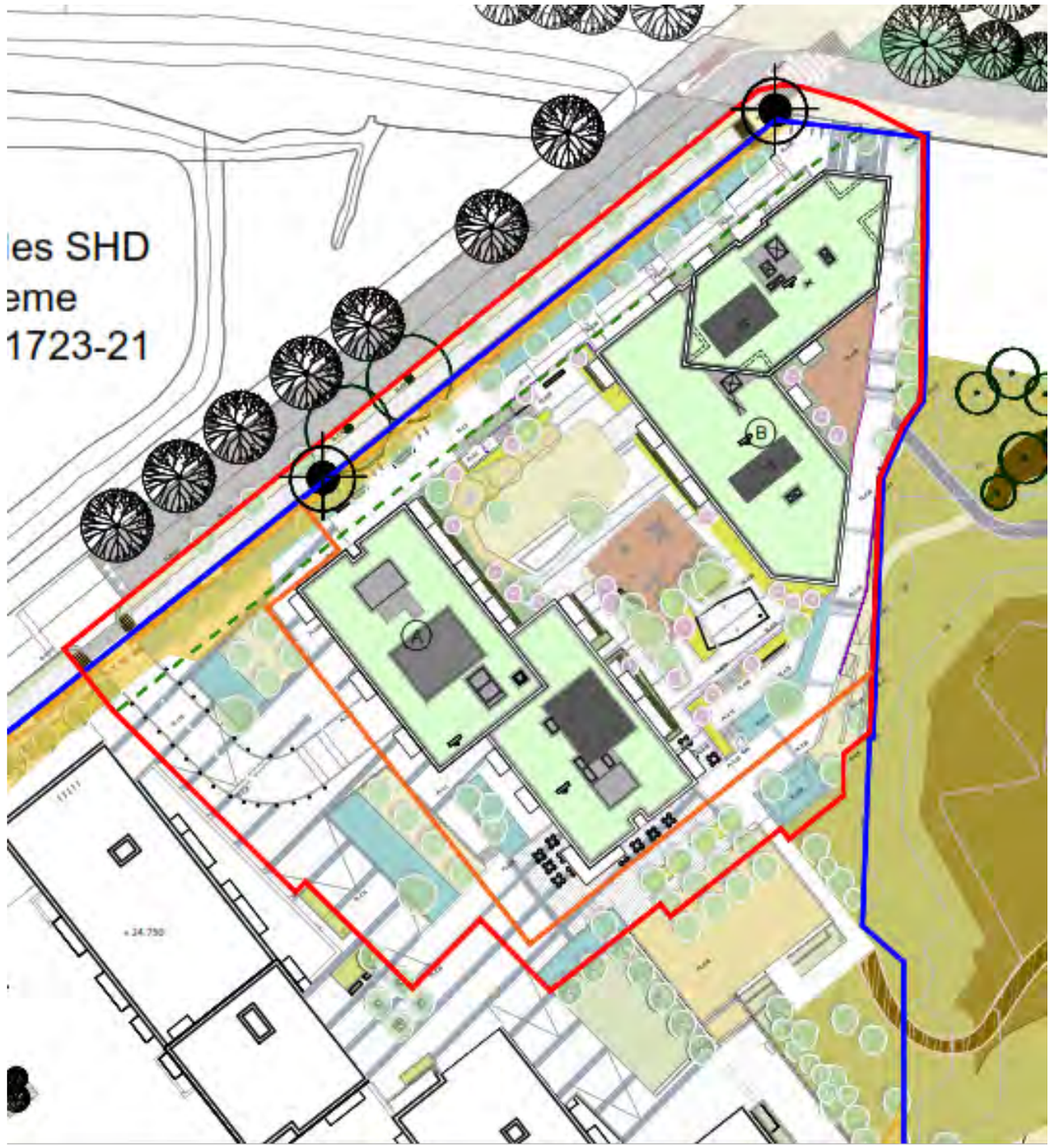


Figure 3.2: Final Site Layout (Source: JFA)

This adjustment enhances the urban edge along Street C, strengthens the sense of enclosure, and increases the podium's width, resulting in a brighter external space and improved internal lighting. Additionally, the revised block layout aligns more closely with the established block pattern of the approved adjacent SHD scheme.

The café/retail unit has been relocated from the northern corner of Block B to the southeast corner of Block A, now facing the public plaza. This strategic positioning activates and engages the open space while complementing the adjacent development. The café's design includes a double-height space on the south corner, enhancing the openness and visual appeal of the area, fostering a welcoming atmosphere, and encouraging greater interaction with the public realm.

A gym is also proposed at the northwest corner of Block A, fronting Centre Park Road and Street C, further activating the streetscape and contributing to the development's dynamic and mixed-use character.

A proposed Créche will be located at the northern corner of Block B to provide 3 classrooms with 35 places. The facility also includes toilets, staff areas, and a kitchen. According to childcare guidelines, the required number of childcare spaces for this scheme is 30, while our proposed crèche exceeds this requirement. Additionally, there is an adjacent external play area of circa 102 square meters to the south, enhancing the facility's functionality.

3.3.6 Alternative Design - Height & Scale

3.3.6.1 Blocks Height

Key environmental and amenity consideration with respect to considering the height and scale for both Blocks relates to its location at the water front adjacent to the extant SHD development adjacent to the proposed development site.

During the design development, 2 alternative approaches were considered:

1. An 8-15 storey building at the corner and a 8-9 story building at the rear;
2. A 7-10 storey building at the corner and a 7-8 story building at the rear.

The initial 8-15 storey development proposed across the site is depicted in **Figure 3.3**.This initial design resulted in a higher yield of 210 units across the site, without having an adverse impact in terms of daylight and sunlight received to the neighbouring windows and gardens and internally to the proposed development site. In terms of the visual impact, development of the site under either alternative would have a significant effect i.e. locally there will be a noticeable visual change.

Figure 3.3 Initial Design A - 8-15 storey massing (Source: JFA)

As part of discussions with the planning authority, comments were received with regards the height of the blocks and it was recommended that the design should be reflective of the transitional nature of the site and reduction in density of the proposal. As a result, a reduction of height in both blocks together with a further setback for Block A towards Street C is proposed, as illustrated at **Figure 3.4** above and **Figure 3.5** below.

The final design provides heights ranging from 7-10 storeys.

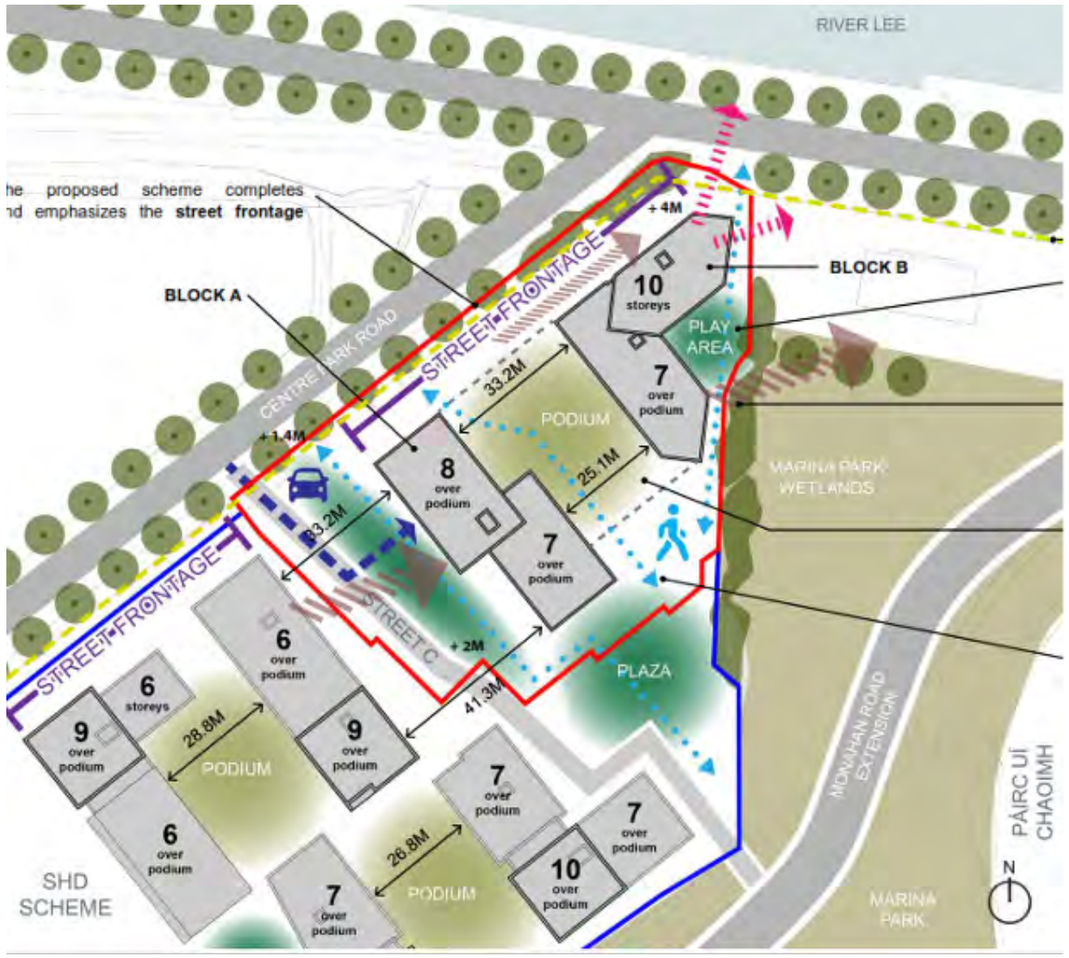


Figure 3.4: Site Strategy Diagram (Source: JFA)

Figure 3.5 Centre Park Road Contiguous Elevation (Source: JFA)

Having regard to the positive visual and urban design effect that would emerge through creating a landmark frontage, with this stepped approach in the building height across both blocks, the proposed height strategy as detailed in the accompanying planning documentation is deemed appropriate and reasonable.

3.3.6.2 Block B

Following the initial concept design, a 15 storey tall building with a stepped down 8 storey was developed. Commentary regarding the building height was provided during the Section 247 pre-planning meeting, noting that the permissible height range should be between 6 and 10 storeys.

The height of the proposed Block B tower has been reduced by 5 floors to 10 storeys, and the lowest part of the block by 1 floor to provide 7 storeys. The block serves as a focal point for both the design and architectural language of the scheme as they front the waterfront, as depicted in Figure 3.4 above and Figure 3.5 below.

Figure 3.6: Block B Elevation (Source: JFA)

3.3.7 Alternative Access Route

The proposed development site is located adjacent to the Centre Park Road. The alternatives available to facilitate access to the site are:

1. Create Entrance parallel to Street C
2. Utilise Street C as the entrance

There is no existing entrance off the Centre Park Road to the site. A new entrance is required to facilitate the development. The permitted SHD design Provides access via Street C, which is adjacent to the subject site.

A standalone entrance, as depicted in Figure 3.7 below was proposed as part of the S32B meeting request.

Figure 3.7: Initial Basement Plan (Source: JFA)

However, the Planning Authority expressed that given the land was in the ownership of the client, access via Street C was the preferred access option.

As a result, the proposed vehicle entrance has been relocated to Street C. This adjustment includes moving the access point for the undercroft car park to Street C and eliminating the associated roadspace, thereby creating an enhanced public realm within the development. Despite these changes, the proposed disabled parking bay external to the undercroft car park entrance has been retained to ensure a minimum clear vertical clearance of 2600 mm (on level ground) is provided, as stipulated by TGD Part M. Its placement has been carefully considered to avoid interfering with pedestrian connections while providing convenient access, addressing the needs of the residential scheme, see Figure 3.11 below.

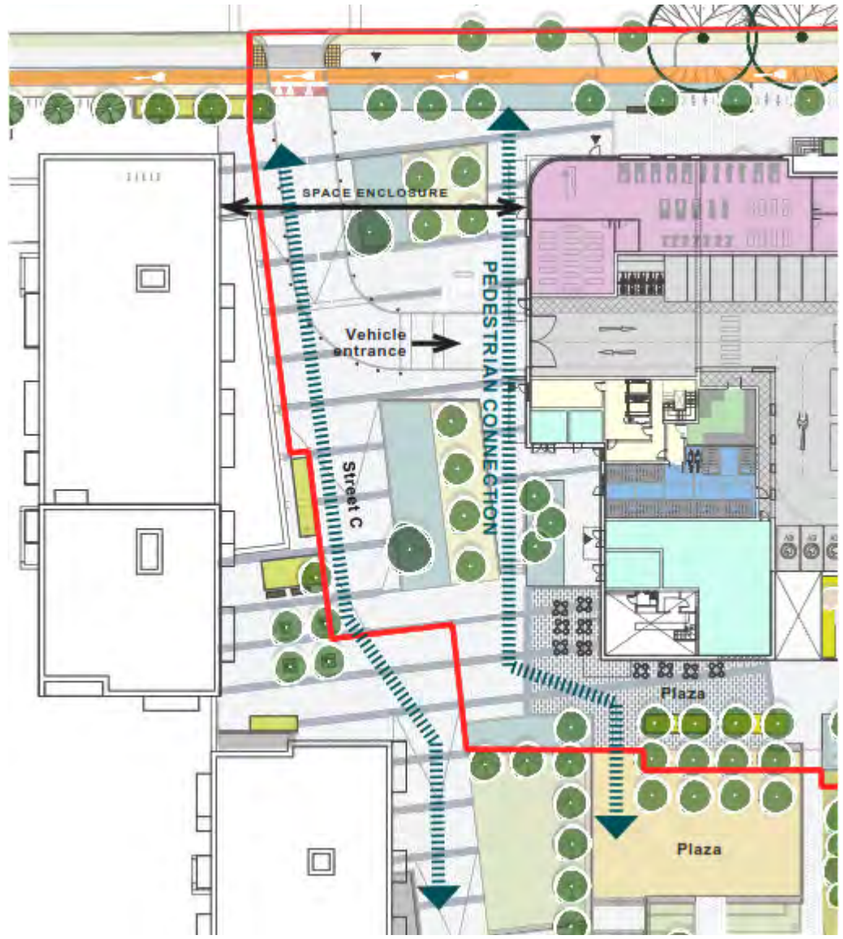


Figure 3.11: Final Basement Plan (Source: JFA)

3.4 Alternative Processes

This is an urban residential development and therefore the consideration of alternative processes to be considered relates to the methods of construction to be used in the development. The Alternatives have been considered and the Construction Environmental Management Plan (CEMP) prepared by DBFL Engineering Consultants) details the construction processes likely to be employed and which have been assumed for the purposes of this EIAR.

3.5 Difficulties Encountered

There were no difficulties encountered in the preparation of this assessment for the proposed development.

3.6 Conclusion

On the basis of the foregoing, it is considered that all reasonable alternatives to the project are considered, and no alternatives have been overlooked which would significantly reduce or further minimise environmental effects. Having considered all alternatives, the final design chosen by the developer i.e. the project as presented is deemed to be the most suitable project for the site.

VOLUME II

CHAPTER 4

Population & Human Health

McCutcheon Halley
CHARTERED PLANNING CONSULTANTS

CHAPTER FOUR
Table of Contents

CHAPTER FOUR
Table of Figures

CHAPTER FOUR
Table of Tables

Chapter Four | Population & Human Health

4.1 Introduction

According to the European Commission's Environmental Impact Assessment of Projects: Guidance on the Preparation of the Environmental Impact Assessment Report (EIAR) (2017), human health is; *"a comprehensive factor that would be highly project dependent. The notion of human health should be considered in the context of the other factors in Article 3(1) of the EIA Directive and thus environmentally related health issues (such as health effects caused by the release of toxic substances to the environment, health risks arising from major hazards associated with the Project, effects caused by changes in disease vectors caused by the Project, changes in living conditions, effects on vulnerable groups, exposure to traffic noise or air pollutants) are obvious aspects to study. In addition, these would concern the commissioning, operation, and decommissioning of a Project in relation to workers on the Project and surrounding population."*

The Environmental Protection Agency (EPA) Guidelines on the Information to be contained in Environmental Impact Assessment Reports (2022) advise that *"in an EIAR, the assessment of impacts on population and human health should refer to the assessments of those factors under which human health effects might occur, as addressed elsewhere in this EIAR, e.g. under the environmental factors of air, water, soil etc."*

This chapter addresses the likely significant environmental impacts of the proposed development on population and human health. It is noted that other chapters of the EIAR also deal with likely significant environmental effects on population and human health arising from traffic and transportation, air quality and climate, noise and vibration, landscape and visual, material assets: utilities and the risk of major accidents and/or disasters and those chapters should be referenced in conjunction with this chapter of the EIAR.

4.1.1 Expertise and Qualifications

This chapter was prepared by Rachel Condon of McCutcheon Halley Chartered Planning Consultants.

Rachel graduated from University College Cork with a BA Hons in Geography and Irish, obtained in 2010 and a master's degree in Planning and Sustainable Development, obtained in 2013. Rachel is currently an Associate Director in the Practice and is experienced in the field of planning and development consultancy which includes providing consultancy services in respect of major projects. Rachel has directed the preparation of EIAR's for a range of development types including residential, mixed use, and industrial developments.

Rachel has practised as a planning consultant for over 10 years and has directed the preparation of EIARs for a range of development types including residential, commercial and industrial. Directly relevant experience to this proposed development is that Rachel has been involved in the direction of EIARs to accompany residential led applications that received permission for development including:

- Connolly Quarter Reg. Ref: 3054/22 - The construction of 187 build to rent apartments and 4 office blocks with heights ranging from 5 to 16 storeys. The proposed development included works to a Protected Structure (RPS Ref. No. 130).
- Bailey Gibson (PL29S.307221) - Demolition of all structures, construction of 416 residential units (incl. 4 houses, 412 apartments) and associated site works.
- Southwest Gate (Reg. Ref. 3228/20) – Demolition of 4 existing buildings and surface car parking, and construction of a mixed use scheme across 13 blocks comprising 1,123 residential units with supporting amenities, retail units, office accommodation, a primary healthcare centre, gym, cultural centre, childcare facility, hotel and a series of public open spaces.

4.2 Project Description

A detailed description of the proposed development is provided in Chapter 2 of this EIAR.

The proposed development will include the construction of 176 no. 1, 2 and 3 bed apartment units in 2 no. blocks, 1 no. creche, 1 no. gym, a retail/café space and all associated ancillary development works.

4.3 Methodology

Publications and other data sources consulted include:

- National Planning Framework, Ireland 2040 – Our Plan (Government of Ireland, 2018);
- Draft Revised National Planning Framework;
- Southern Regional Spatial and Economic Strategy 2019-2031;
- Cork City Development Plan 2022-2028;
- Central Statistics Office (CSO) website www.cso.ie;
- Department of Education (DE) website https://www.gov.ie/en/organisation/department-of-education/;
- GeoDirectory-GeoFindIT App;
- Pobal website https://maps.pobal.ie/; and
- Health and Safety Authority website https://hsa.ie.

Additionally, reports prepared by McCutcheon Halley Planning Consultants included with this application under separate cover were consulted, as follows:

- Social Infrastructure Audit;
- Childcare Demand Report;
- School Demand Assessment Report; and
- Planning Statement.

This chapter has been prepared having regard to the following guidelines:

- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning & Local Government, 2018);

- Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017); and
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2022).

The impact assessment section of this chapter follows the terminology (where applicable) used in the EPA Guidelines as set out in Chapter 1 of this EIAR.

4.4 Baseline Environment

4.4.1 Application Area

The proposed development site comprises a 0.84ha site, located at Former Ford Distribution Site, fronting onto Centre Park Road, Ballintemple, Cork.

The proposed site, known as the Former Ford Distribution Site, is situated approximately 2km from Cork City Centre. It is situated on the south bank of the River Lee in the South Docks of Cork City. The proposed development falls within the Polder Quarter character area of the City Docks as defined in the Cork City Development Plan 2022-2028 (CCDP). To the north, is the River Lee which provides a serene backdrop to this post-industrial setting. To the east, the site is bordered by an area of wetlands, Pairc Ui Chaoimh GAA Stadium and the adjoining amenities of Marina Park. To the south/south-west, is the remainder of the Former Ford Distribution site which received planning permission and is referred to as the Marina Quarter Development (also known as the South Docks Strategic Housing Development (SHD) (ABP Reg. Ref: 309059)), which is currently under construction (see **Figure 4.1** below). This development includes 1,002 residential units, 5 retail units, 2 childcare facilities, a medical centre, a bar, a café, a venue and performance area and 2 community resource spaces. To the west, the site is bordered by Centre Park Road which links to the city centre and Marina Promenade.

Figure 4.1 Application Area and Surrounding Context (Source: MHP GIS Team)

4.4.2 Land Use Zoning

According to the CCDP, the subject site lies within the development boundary of the South Docks and is zoned ZO 02 'New Residential Neighbourhood' see **Figure 4.2** overleaf. The objective for ZO 02 is *"To provide for new residential development in tandem with the provision of the necessary social and physical infrastructure."* The area of the subject site is described as 'The Cork Docklands' and is identified as one of the four 'Strategic Consolidation and Regeneration Areas'. The Role of the Strategic Consolidation and Regeneration Areas in the Core Strategy is *"Phased regeneration of the City Docks and Tivoli Docks as high quality, higher density, mixed use sustainable waterfront areas with new urban quarters and transformational projects acting as catalyst for further investment and regeneration of the City."*

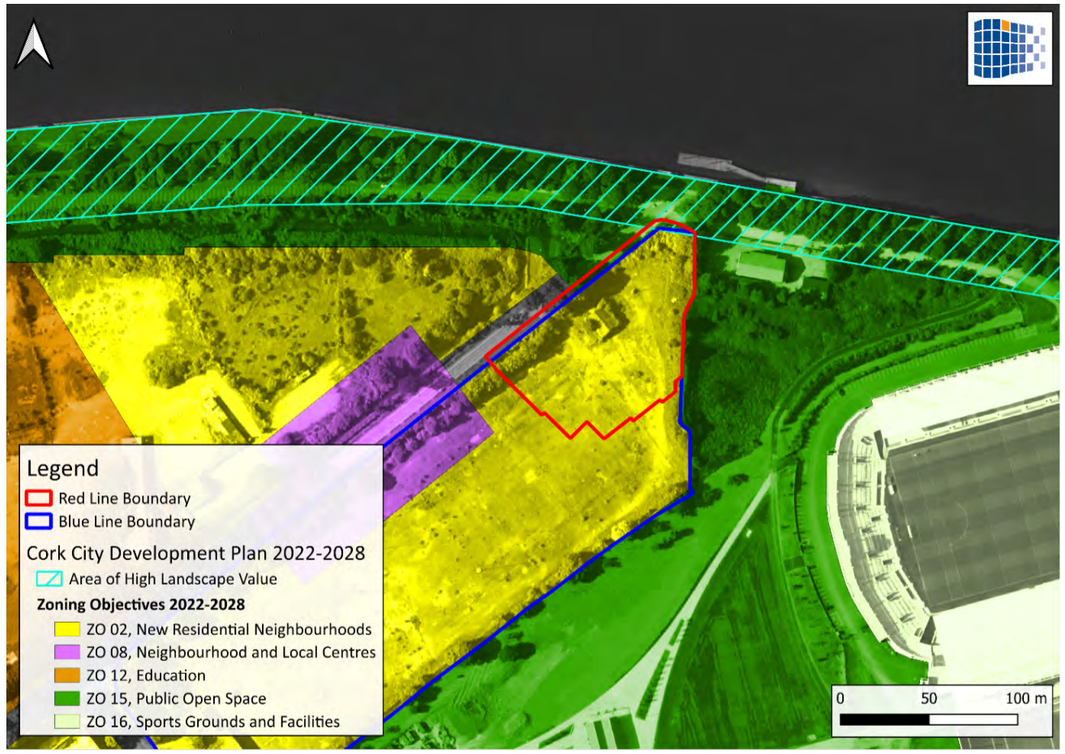


Figure 4.2 Land Use Zoning and Specific Objectives (Source: MHP GIS Team)

ZO 02 zoning is grouped under the general use category of *"Residential Uses"*, which *"facilitate residential uses in principle, either as a primary objective or as uses open for consideration."* Development on ZO 02 zoned lands, while primarily residential, *"must provide an appropriate mix of housing types and tenures along with the amenity, social, community and physical infrastructure required to promote compact growth, balanced communities and sustainable, liveable communities."*

A small portion (118 sq.m) of the proposed development located in the north-western corner of the site falls into an Area of High Landscape Value (AHLV), as illustrated in **Figure 4.2** above. Under the CCDP, any new development in an AHLV must *"respect the character and the primacy and dominance of the landscape"*, with *"a presumption against development where it causes significant harm or injury to the intrinsic character"* of the AHLV. However, this small portion of land would be proposed as the public realm area which connects the Centre Park Road and The Marina Road. Further detail in this regard is detailed in the landscape and visual assessment provided within Chapter 5 of this EIAR.

Below are the relevant policies and specific objectives for the South Docks in the CCDP:

> **Objective 10.18 – City Docks Exemplar:** *It is an objective of Cork City Council to promote the development of the City Docks as an exemplar new urban neighbourhood, regeneration project, waterfront development, climate resilient development, green mode split community, lifetime design and design quality. During the lifetime of the Plan, Cork City Council will investigate the potential for a design review process to ensure excellence in design and will develop a City Docks Architectural Policy.*
>
> **Objective 10.19 – City Docks A Place for People:** *It is an objective of Cork City Council to ensure that the City Docks is developed as a place for people by ensuring that placemaking is at the heart of all development proposals and that the needs of people of all ages, abilities and backgrounds are considered in development proposals.*
>
> **Objective 10.210 – City Docks Character Areas:** *It is an objective of Cork City Council to ensure that the City Docks is developed in a way that reinforces the identity and urban design, placemaking and architectural qualities of the eight character areas as distinct urban quarters.*
>
> *Objective 10.26 – Specific Land Use Objectives: It is an objective of Cork City Council to ensure that: a. The western neighbourhood / local centre is centred upon the western City Docks LRT stop; b. Live ground floor uses are provided in appropriate locations and restricted in all other areas to ensure a good quality of residential amenity in the new residential neighbourhood; c. Ancillary residential communal facilities will be acceptable at ground floor level as a residential use. These will also offer passive surveillance to streets within the neighbourhood.*
>
> **Objective 10.27 – Dwelling Size Mix:** *a. To ensure that the City Docks is developed to accommodate a variety of dwelling sizes to support the development of a balanced neighbourhood; b. Purpose-Built Student Accommodation should support the creation of a balanced community and sustainable neighbourhood and the student population should not exceed 10% of the overall target population for City Docks.*
>
> **Objective 10.28 – Balanced Community and Social and Affordable Housing:** *Cork City Council will seek to ensure that the Joint Housing Strategy targets for below-market priced housing for Cork City in the form of Social and Affordable housing targets are met in the City Docks. Cork City Council will utilise Part V of the Planning and Development Act 2000 (as amended) and will work with its partners to utilise available measures and opportunities to provide below-market priced housing products.*
>
> **Objective 10.36 – Development Phasing:** *a. Cork City Council will work with its partners to seek to ensure that the enabling infrastructure to unlock the potential of the City Docks in each development tranche is delivered in a timely fashion. b. Cork City Council will work with the Port of Cork to agree a decommissioning strategy for the City Quays to enable the development of the quays and waterfront sites to proceed on a phased basis.*
>
> **Objective 6.13 – Areas of High Landscape Value:** *To conserve and enhance the character and visual amenity of Areas of High Landscape Value (AHLV) through the appropriate management of development, in order to retain the existing characteristics of the landscape, and its primary landscape assets. Development will be considered only where it safeguards to the value and sensitivity of the particular landscape. There will be a presumption against development where it causes significant harm or injury to the intrinsic character of the Area of High Landscape Value and its primary landscape assets, the visual amenity of the landscape; protected views; breaks the existing ridge silhouette; the character and setting of buildings, structures and landmarks; and the ecological and habitat value of the landscape.*

The South Docks are identified as being within Cork City and Suburbs in the Development Plan, with respect to the Regional Spatial and Economic Strategy 2019-2031 (RSES) for the Southern Region, see **Figure 4.3** below.

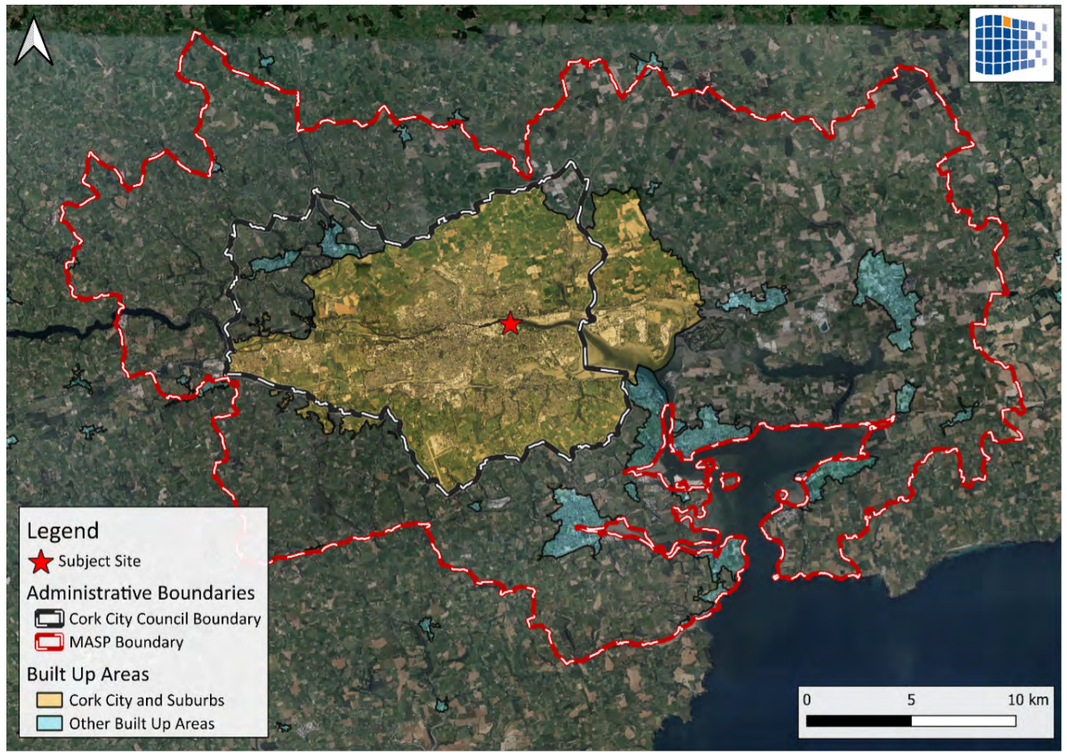


Figure 4.3 Cork City & Suburbs & MASP boundary (Source: MHP GIS Team)

4.4.3 Surrounding Land Uses

The Site is located in the former industrial area of South Docks, with current land uses reflecting the ongoing regeneration of this area. Immediately east of the Site are lands in use by the Lee Rowing Club and Marina Park. Beyond this is the newly constructed Páirc Uí Chaoimh stadium. The River Lee lies north of the Site, with the established suburban areas of Montenotte and Tivoli north of this.

Immediately south/south-west of the Site is the permitted mixed-use Marina Quarter Development SHD and further north is the newly developed Marina Park is located south of the Marina Quarter Development; the established suburban residential area of Ballintemple lies beyond this.

The lands to the west of the Site are currently undeveloped but are the proposed location of a mixed-use development of City Park SHD (ABP Reg. Ref: 313277), which remains an active case with an Bord Pleanála (as of November 27th, 2024). City Park SHD is proposed to include 823 apartments, 3 café/restaurants, 2 public houses, 7 retail units, a convenience retail store, a library, a medical centre, a pharmacy, a post office, a dentist, 2 no. childcare facilities, resident car parking (at sub-podium level), and associated open spaces. Adjacent to the City Park SHD site is a site earmarked for the development of a primary and secondary school on a shared campus.

Further to the west are the Marina Power Station and the Marina 110Kv Substation. The area between these sites and Cork City Centre is currently largely under industrial use but is zoned for future residential and mixed-use development.

Figure 4.4 Surrounding Land Uses (Source: MHP GIS Team)

The proposed development site is c.400m east of Shandon Boat Club (RPS ID: PS1242), and c.400m north of Lindville House (RPS ID: PS821) and Chiplee House (RPS ID: PS513), all identified on the Record of Protected Structures (RPS) of the CCDP, see **Figure 4.5** overleaf.

Additionally, north of the River Lee, the subject lands are located c.200m south-east of Bellevue Villas (RPS ID: PS625) and its associated pedestrian bridge (RPS ID: PS743) c.300m south-east of Carrig House (RPS ID: PS627) and its associated pedestrian bridge (RPS ID: PS741), and c.300m south-west of Woodhill Villas (RPS ID: PS734, PS735, PS736, PS737, PS738, PS739) and their associated Pedestrian Bridge at Woodhill Villas (RPS ID: PS742).

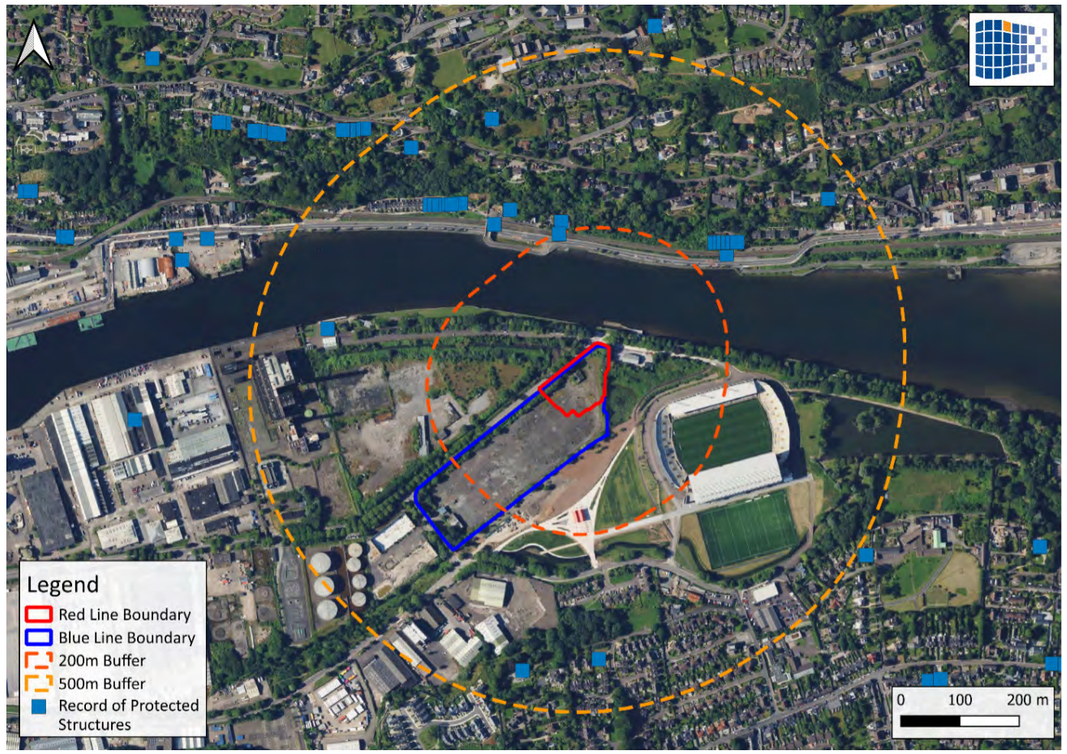


Figure 4.5 Surrounding Land use with Protected Structures (Source: MHP GIS Team).

4.4.4 Public Transport and Accessibility

The primary access point to the site will be via Centre Park Road (L1002) which bounds the site to the northwest. The Marina Promenade connects to the north of the site and provides a non-motorised/greenway link to the Mahon peninsula. Whilst the stops on the 202-, 202A-, and 212-bus routes, the cycle lanes, and sidewalks close to the proposed development provide ample alternatives to private car travel.

The area is served by the 202-,202A-, and 212-bus routes which have numerous stops located within 300m and 650m of the site. The 212-bus route runs every 60 minutes Monday to Sunday. Whilst the 202- and 202A-bus routes runs every 20 minutes during peak hours and every 30 minutes during off-peak hours. The site will benefit from several pending improvements to transport services and infrastructure. This is due to the redevelopment of the South Docks area and the implementation of the Cork Metropolitan Area-Based Transport Strategy (CMATS).

Within the CMATS, the local road network surrounding the site was identified as strategic transport corridors to incorporate high-frequency bus services along Monahan's Road to the southwest and Marquee Road to the west, and the implementation of a mass transit system along Centre Park Road to the north. A Bus Rapid Transit system is proposed in the medium term and to be eventually upgraded to a Light Rail Transit (LRT) in the long term. Moreover, the proposed Eastern Gateway Bridge which will improve pedestrian and cyclist connection across the River Lee. It is thus evident that the site will have good access to existing bus services and will gain access to future mass transit system investments. The area is well serviced with several large amenity sites located within walking distance of the site with the closest being Pairc Ui Chaoimh, Kennedy Park and the Marina Park all within 1.5km of the site. These routes and schedules are shown in **Figure 4.6** and **Table 4.1** overleaf:

Figure 4.6 Public Transport Map (Source: Chapter 6 of this EIAR, DBFL)

Table 4.1 Public Transport Options

NO.	ROUTE	TYPE	DESTINATIONS	PEAK HOURS	SERVICES SCHEDULE	DISTANCE
1	212	Bus	Kent Station to Mahon Point via Blackrock Rd	Every 20 mins	Every 60 mins	Every 30 mins
2	202	Bus	Mahon Point to Hollyhill via Merchants Quay	Every 20 mins	Every 30 mins	A bus stop c1km, <15 mins walk
3	202A	Bus	Mahon Point to Hollyhill via Eglinton St	Every 20 mins	Every 30 mins	A bus stop c1km, <15 mins walk

4.4.4.1 Heavy Rail Services

The subject site is located approximately 2.7 km east of Kent Train Station with rail services operating between Dublin, Mallow, Cobh/Midleton, and connection to Tralee, Waterford, Clonmel and Limerick via Limerick Junction Station. The commuter typically run every service Mallow-Cobh and Middleton calls at Kent Station approximately every 15 minutes and Intercity services from Cork to Dublin typically run every hour during the day. Waterford-Clonmel-Limerick Junction service operates a few services during morning and evening hours. **Figure 4.7** below summarises the frequency of services and shows the location of train station from the subject site.

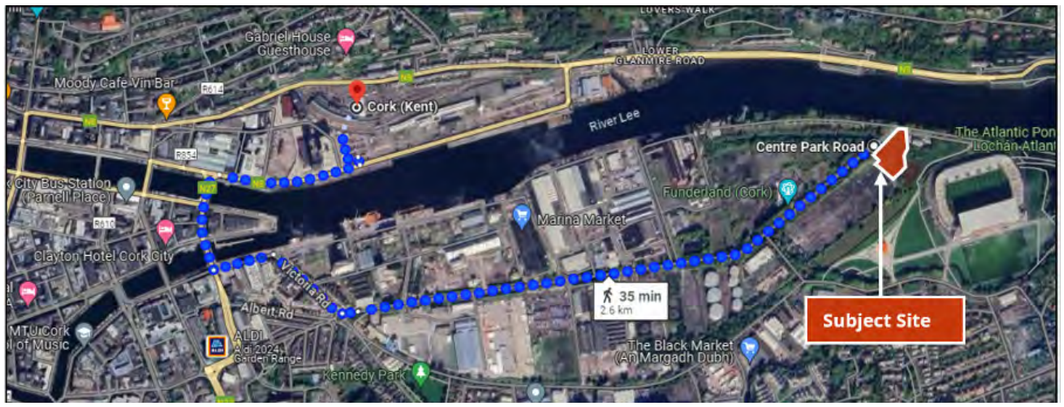


Figure 4.7 Train Station Near vicinity of Subject site (Source: Chapter 6 of this EIAR, DBFL)

Table 4.2: Rail Service Frequency (No. of service per day)

TRAIN SERVICE	WEEKDAYS	SATURDAYS	SUNDAYS & BANK HOLIDAYS
Dublin - Cork Route - Direct Services	17		12
Cork - Dublin - Direct Services	16		12
Mallow - Cork - Midleton - Cobh -	63	49	31
Cobh - Midleton - Cork – Mallow	63	49	31
Limerick Junction - Clonmel - Waterford	2		-
Waterford - Clonmel - Limerick Junction	2		-

4.4.4.2 Accessibility

The proposed development site also benefits from an existing high level of accessibility to the national, regional and road networks, as shown in **Figure 4.8** below.

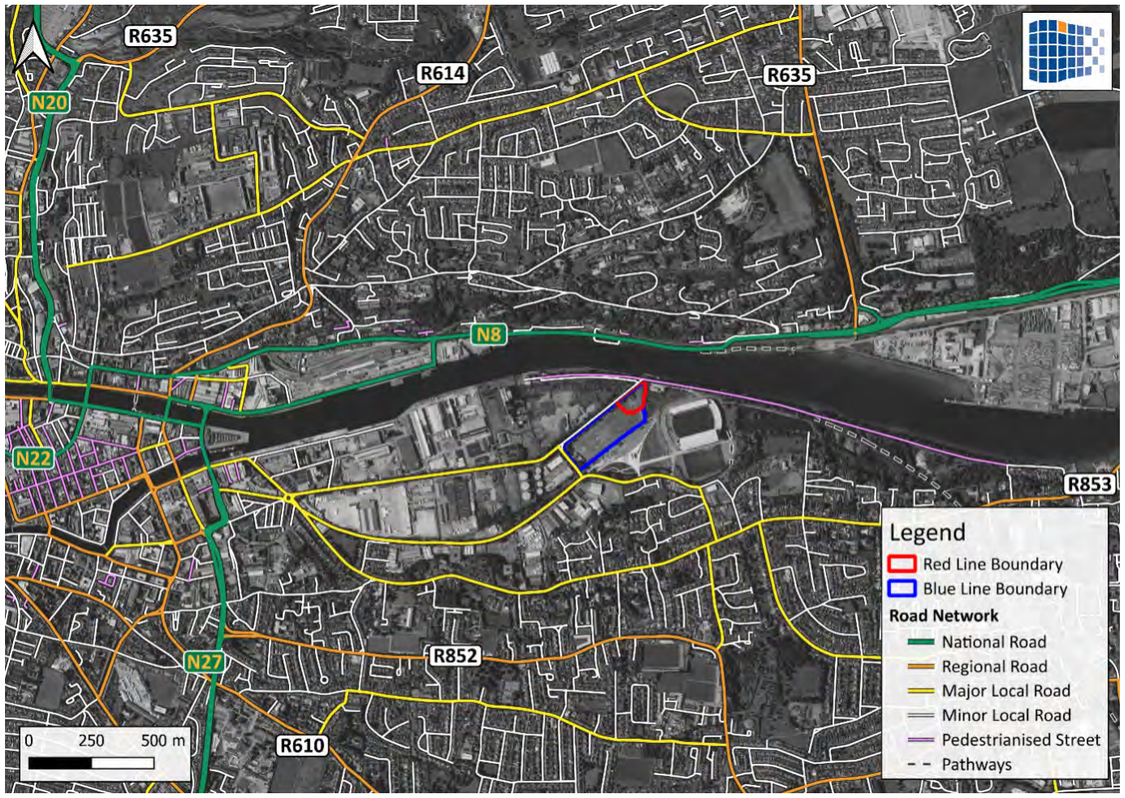


Figure 4.8 Existing Road Networks (Source: MHP GIS Team)

4.4.4.2.1 Walking Distance

The Proposed Development benefits from footpaths along the Centre Park Road and Marquee Road. Future residents / visitors walking to / from the site will be within a 10-minute walk of bus stops, the Marina Walkway, and Páirc Uí Chaoimh (see **Figure 4.9**). Within the 15-minute walking time catchment, pedestrians can access a variety of bus stops, the Marina Market, and the Passage Railway Greenway. Within the 20-minute walking catchment, pedestrians can access Kennedy Park, Blackrock Road, and various bars and restaurants.

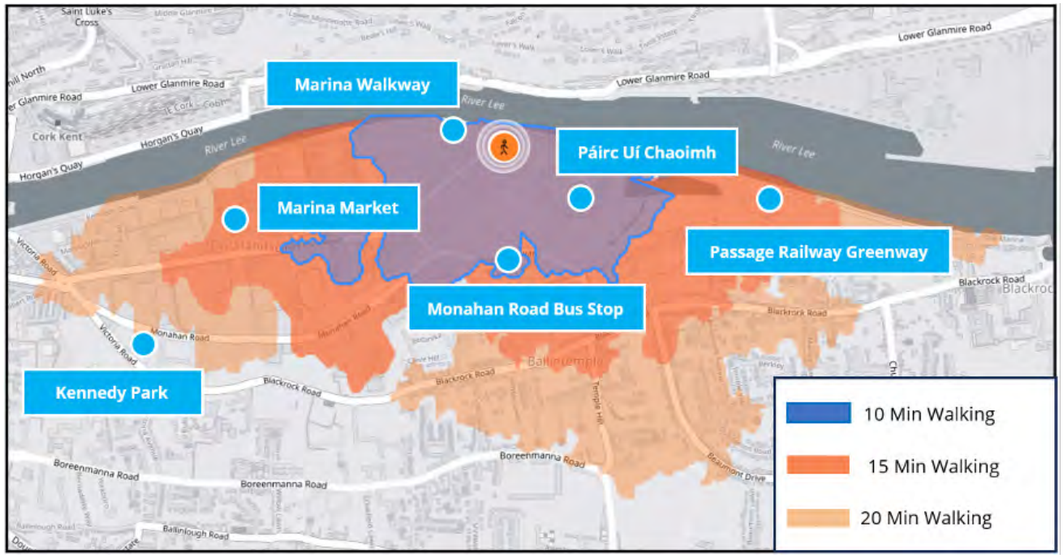


Figure 4.9 Walking Catchment (Source: Chapter 6 of this EIAR, DBFL)

4.4.4.2.2 Cycling Distance

The site is very accessible by bicycle, being located within a network of cyclable streets, some of which currently benefit from dedicated cycle infrastructure. Cyclists from the subject site can travel to Mahon Point Shopping Centre, Blackrock, Douglas, and Cork City Centre within a 15-minute cycle (see **Figure 4.10**). Within this range is a variety of schools including St. Michaels Primary School, Ursula Primary School, Urseline secondary school and Ashton School. The South Infirmary Victoria University Hospital and Kent Train Station are also located in this catchment. There are a variety of key destinations within a 30-minute cycle such as Wilton, Rochestown, and Blackpool. Wilton Shopping Centre, University College Cork, Cork University Hospital, several primary and secondary schools, and a variety of key employers such as Dell, Deloitte, and Cadence are also within this catchment. Within a 45-minute cycle of the site are key employment hubs such as Little Island, Ballincollig, and Glanmire. MTU Cork, the Apple campus, and Cork Airport are also within this catchment.

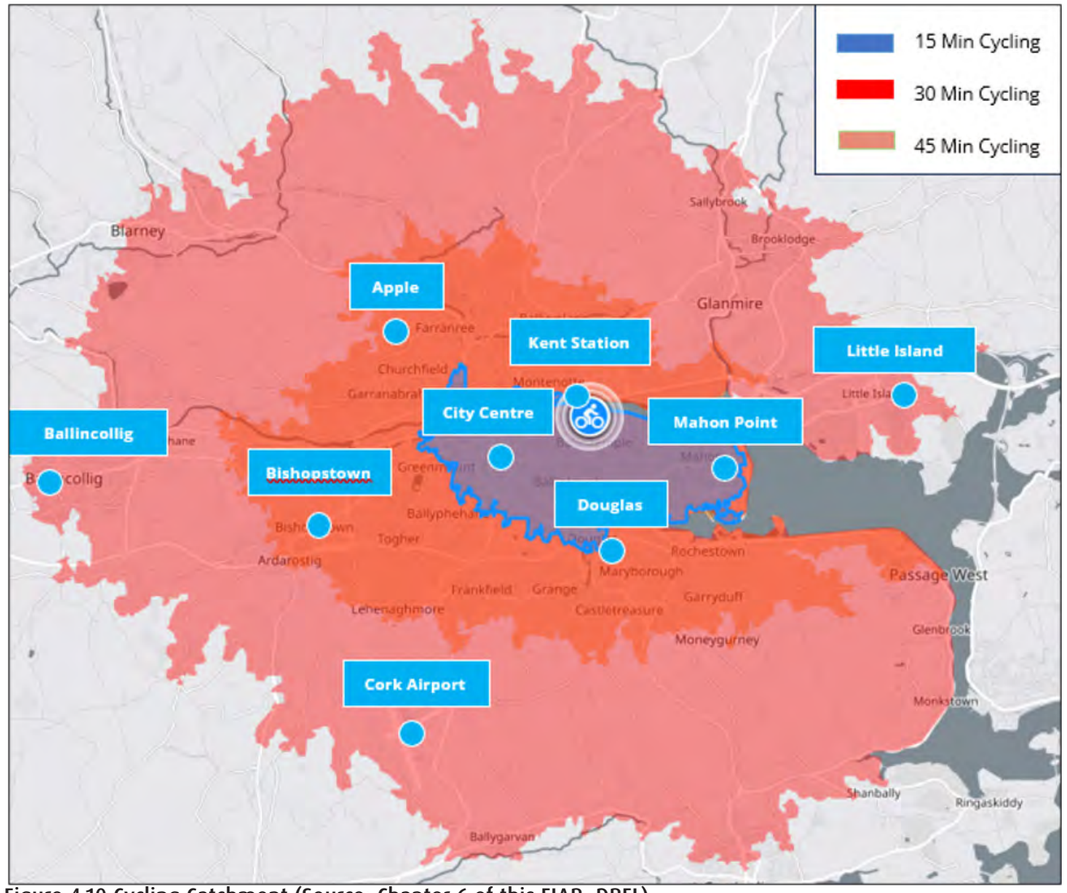


Figure 4.10 Cycling Catchment (Source: Chapter 6 of this EIAR, DBFL)

4.4.4.2.3 Public Transport Distance

Within a 30-minute public transport journey are areas such as Cork City Centre, Mahon Point Shopping Centre, and Kent Station as illustrated in **Figure 4.11.** Within a 45-minute public transport journey are areas such as University College Cork, Little Island, Wilton, Cork Airport, and Blackpool. Within a 60-minute public transport journey are key locations such as Midleton, Carrigtwohill, and Carrigaline. Along with these locations are destinations such as Cobh, Middletown, Watergrasshill, Mallow and Ballincollig.

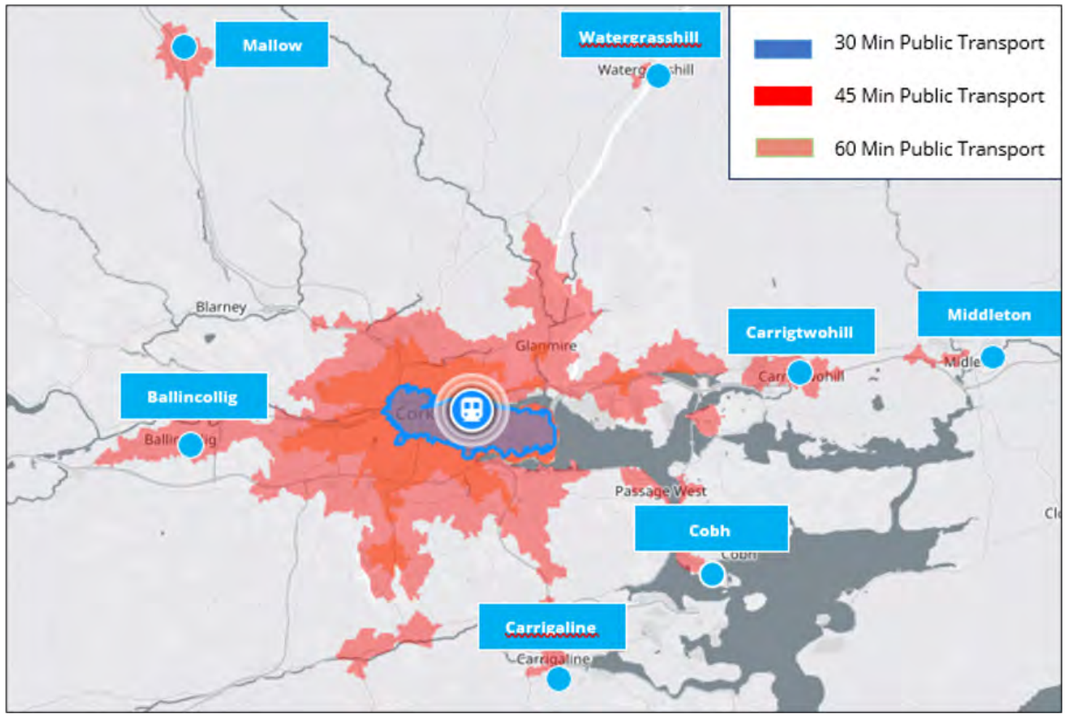


Figure 4.11 Public Transport Catchment (Source: Chapter 6 of this EIAR, DBFL)

4.4.5 Air Quality

The proposed site falls into 'Zone B' of Ireland which is described by the EPA as 'Cork Conurbation'. It is expected that existing ambient air quality in the vicinity of the site is characteristic of a suburban location with the primary source of air emissions such as particulate matter, NO2, and hydrocarbons likely to be of traffic, combustion and agriculture, and domestic fuel burning.

4.4.6 Sensitive Receptors

For the purpose of this chapter, the primary sensitive receptors are:

I. Existing residential dwellings in the vicinity of the proposed development site, in particular, the existing residential area of Ballintemple located to the south, the existing residential properties along the main vehicular routes, the future population of the adjoining permitted SHD development and the existing residential properties north of the river Lee which overlook the Site;

II. Users of the public road network, specifically The Marina and Centre Park Road, and the users of the Lee River Greenway, Marina Park and Páirc Uí Chaoimh;

III. Future occupants of the Marina Quarter mixed-use SHD, for which permission has been granted (Reg. Ref. ABP-309059-20).

4.4.7 Population & Demographic Profile

This section reviews the demographic characteristics, population, and age structure of the Cork City area. For this assessment, the extent of the Small Area (SA) was defined as the study area and a second catchment area was defined based on the Electoral Division (ED) of Cork City have been analysed, see **Figure 4.12** following. There are no guidelines that stipulate the zone of influence (ZoI) of the study area. Professional judgement is used and the rationale for the selection of this radius is based on the need to understand the capacity of the existing housing and employment profile in the local area and the existing social infrastructure available within a c.30-minute walk time, which represents a reasonable 2km distance for people to access services.

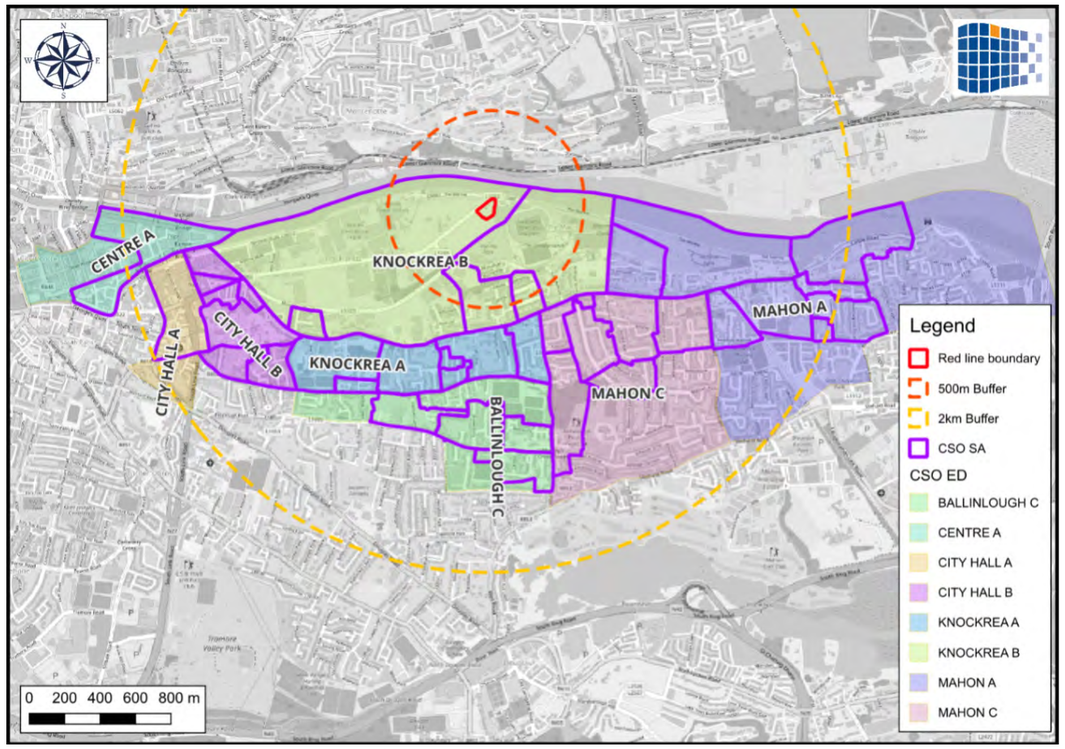


Figure 4.12 Study Area (CSO Small Areas) and Catchment Area (CSO ED) (Source: MHP GIS Team)

The CSO data shows that the study area's population was 10,148 in 2022. This represents an increase of 1,232 (approx. 13.8%) from the 2016 Census. Comparisons to the population of Cork City are not as informative as anticipated, as the data is distorted by the recent significant revision to the Local Authority administrative boundary. As such, Cork City and County figures have been included where relevant. The population growth within Cork City and County was higher than the growth in the ED catchment area and study area with c. 7.6%, see **Table 4.3 below**.

Population growth within Cork City has varied over time and decreased by 7,769 persons (approximately 6%) between 1996 and 2006. A decrease in population was experienced over the period since 1996, while the ED Catchment Area experiencing an increase in population, see **Table 4.4** below.

This review demonstrates that the ED catchment area is capable of accommodating a significant increase in population.

Table 4.3 Cork City & Wider Area Population, Census 2022 (CSO)

CENSUS	2011	2016	2022	6-YEAR INCREASE
Ireland	4,588,252	4,761,865	5,149,139	8.1%
Cork City and County	519,032	542,868	584,156	7.6%
Cork City	119,230	125,657	224,004	78.3%[1]
ED Catchment Area	15,184	15,227	16,888	10.9%
Study Area	9,094	8,916	10,148	13.8%

Table 4.4 ED Catchment and Local Authority Population, Census 2022 (CSO)

CENSUS	1996	2002	2006	2011	2016	2022
Cork City	127,187	123,062	119,418	119,230	125,657	224,004
Percentage % change	-	-3%	-3%	0.2%	5%	78%
ED Catchment Area	-	13,700	14,248	15,184	15,227	16,888
Percentage % change	-	-	4%	7%	0.3%	11%

Regarding the Census 2022, the population trend within the study areas' existing urban footprint is vital for considering future development.

In relation to the age profile of the area, the Census 2022 data shows that Cork City has a stable ageing profile. The average age of those residing in Cork City was 39.1 in 2022, which remains the same as the Census 2016.

The Census 2022 shows that the pre-school, primary and post-primary school age category (0-19 years old) accounted for c. 20% of the population in the study area, and c.23% of the population in the ED catchment area, see **Table 4.5** below.

[1] The significant change in population for Cork City Council between Census 2016 and Census 2022 is largely a result to the modification of the Local Authority's administrative boundary on the 31st of May 2019.

Table 4.5 Breakdown of the Population by Age Cohort (Source: CSO)

AGE COHORTS	STUDY AREA		CORK CITY		IRELAND	
	Population	Percentage	Population	Percentage	Population	Percentage
0-4 years	534	5%	11,410	5%	295,415	6%
5-9 years	526	5%	12,555	6%	342,670	7%
10-14 years	510	5%	13,100	6%	374,202	7%
15-19 years	493	5%	13,472	6%	337,628	7%
20-24 years	606	6%	17,653	8%	307,143	6%
25-29 years	884	9%	17,291	8%	295,808	6%
30-34 years	914	9%	17,330	8%	332,223	6%
35-39 years	869	9%	17,603	8%	382,869	7%
40-44 years	815	8%	17,015	8%	411,524	8%
45-49 years	642	6%	14,735	7%	373,504	7%
50-54 years	616	6%	13,517	6%	340,003	7%
55-59 years	637	6%	13,142	6%	307,165	6%
60-64 years	601	6%	11,909	5%	272,670	5%
65-69 years	411	4%	9,714	4%	238,144	5%
70-74 years	316	3%	8,404	4%	202,884	4%
75-79 years	310	3%	6,698	3%	154,260	3%
80-84 years	243	2%	4,603	2%	96,586	2%
85+ years	221	2%	3,853	2%	84,441	2%
Total	**10,148**	**100%**	**224,004**	**100%**	**5,149,139**	**100%**

4.4.8 Deprivation Index

The Pobal Deprivation Index is Ireland's most widely used social gradient metric, which scores areas in terms of affluence or disadvantage. The index uses information from Ireland's census, such as employment, age profile and educational attainment, to calculate this score. **Figure 4.13** below shows the level of affluence and deprivation at the Small Area level, according to the Pobal HP Deprivation Index. Scores range from -35 (Extremely Disadvantaged) to +35 (Extremely Affluent). The overall score for Cork County following the 2022 Census was 2.69 ('Marginally above average'), the small areas consist of a high number of 'affluent' areas and a small number of 'marginally above average' as seen in **Figure 4.13**. The ED Catchment Area consists of both 'affluent' and 'marginally above average' with further detail outlined in **Table 4.6** below.

Table 4.6 Breakdown of Pobal HP Index by Ed Catchment Area (Source: Pobal)

ED CATCHMENT AREA	POBAL HP INDEX	POBAL HP DESCRIPTION
Centre A	8.19	Marginally above average
City Hall A	13.27	Affluent
City Hall B	9.00	Marginally above average
Knockrea A	9.02	Marginally above average
Knockrea B	11.27	Affluent
Ballinlough C	7.97	Marginally above average
Mahon A	0.58	Marginally above average
Mahon C	6.57	Marginally above average

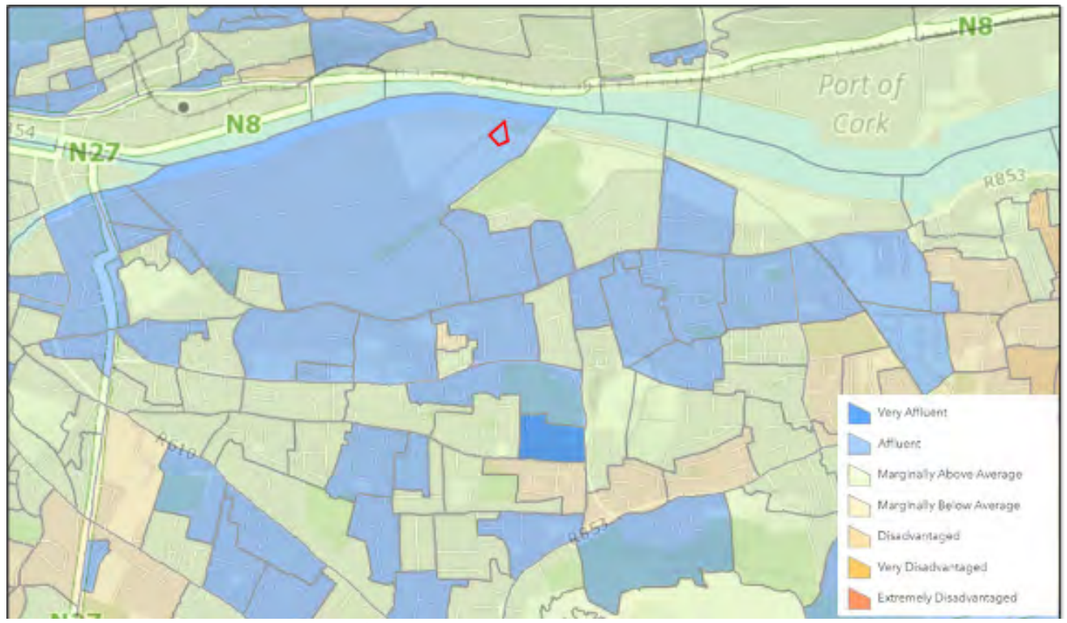


Figure 4.13 Small Area – Deprivation (Source: MHP GIS Team)

4.4.9 Households

The total population and total households for the study area and Cork City administrative area for 2022 are provided in **Table 4.7** overleaf. There were 3,894 households in the study area in 2022. Census 2022 identified that 1-2 person households (2,336 persons) made up a substantial number of households, 60% of the total of the households in the study area. The average number of children per family by Local Electoral Area of Cork City South Central, Cork City is 1.06 (below the national average of 1.34 and Cork City of 1.23). Further, the number of families with no children increased by 11% nationally and the ED Catchment Area has identified 1530 families without children.

Table 4.7 1-2 Person Households (Source: CSO)

STUDY AREA	TOTAL POPULATION	1-2 PERSON HOUSEHOLDS	TOTAL HOUSEHOLDS	% 1-2 PERSON HOUSEHOLD
Study Area	10,148	2,336	3,894	60%
Cork City	224,004	45,906	83,391	55%
Cork City & County	584,156	110,529	211,362	52%
State	5,149,139	95,9456	1,841,152	52%

4.4.10 Housing Delivery

The National Planning Framework – Project Ireland 2040 (NPF) was prepared and published by the Department of Housing and Local Government on behalf of the Government. The National Planning Framework, most commonly known as the NPF was established in tandem with Project Ireland 2040 in order to establish a policy and planning framework for the development of Ireland socially, economically and culturally.

One of the ultimate objectives of the NPF is to guide the future development of Ireland, considering a projected 1 million increase in the Country's population, the need to create 660,000 additional jobs to achieve full employment and a need for approx. 500,000 more homes by 2040.

The NPF requires delivery of a baseline of 25,000 homes annually to 2020, followed by a likely level of an average of 33,000 homes annually up to 2027. Within this output, 112,000 households are expected to have their housing needs met by social housing over the next decade. To achieve the objective of compact growth, 40% of future housing delivery is to be delivered within and close to the existing footprint of built-up areas.

Notwithstanding the above, it is acknowledged that the Census 2022 population data has indicated that there is more significant growth than the projections of the NPF anticipated and the first revision of the NPF is currently being undertaken to reflect the actual growth and upcoming needs.

The revised NPF has set out new draft national objectives in relation to housing targets with Draft National Policy Objective 43 stating its plan to target the supply of housing to accommodate approximately 50,000 additional households per annum to 2040.

The Housing for All[2] - a New Housing Plan for Ireland (2021) is the government's housing plan to deliver an average of 33,000 new homes annually by 2030. According to the CSO, New Dwelling Completions Reports[3], 6,884 new dwellings have been completed over Quarter 2 (Q2) 2024, a fall of 5.4% in the same three months of 2023. Overall, 32,695 new dwellings were constructed in 2023 which is just below the annual target of 33,000. In addition, there were 29,851 new dwelling completions in 2022, which is approx. 9.54% below the Housing for All's annual target.

There are 4,354 residential units in the study area, which includes occupied and unoccupied dwellings. This represents an increase (+308) compared to Census 2016 housing stock data (see Table 4.8) below.

Table 4.8 Population and Housing in Study Area. (Source: CSO 2022)

STUDY AREA	2016	2022	6-YEAR CHANGE
Total Population	8,916	10,148	13.8%
Housing Stock	4,046	4,354	7.6%

Of this figure, 77.6% of the stock are listed as houses/bungalows and 22.4% are apartments/flats. An examination of the household types identified that apart from dwellings/bungalows, flats and apartments are the most common type of accommodation among those areas in which renting from a private landlord dominates.

[2] Housing for All - a New Housing Plan for Ireland (Department of Housing, Local Government and Heritage,2021)
[3] Accessible via https://www.cso.ie/en/statistics/buildingandconstruction/newdwellingcompletions/

4.4.11 Owner Occupancy

Across the study area, 57% of the housing stock is owner occupied and 37% is rented either through private landlord or from a public body, as shown in Table 4.9 below. The study areas occupancy rate is consistent with Cork City at 56% owner-occupied and 38% rented either through private landlord or from a public body. The percentage of rented occupancy in the small area (SAP2022 ID: A048041005) within which the proposal development site is located is 17%.

Table 4.9 Private Households by Type of Occupancy (Study Area) (Source: CSO)

TYPE OF OCCUPANCY	HOUSEHOLD	%	PERSONS	%
Owner Occupied with Mortgage	867	22%	2,808	29%
Owner Occupied without Mortgage	1,366	35%	3,048	31%
Rented from Private Landlord	1,199	31%	2,801	29%
Rented from Local Authority	139	4%	381	4%
Rented from Voluntary Body	68	2%	111	1%
Occupied free of rent	58	1%	104	1%
Not Stated	197	5%	448	5%
Total	**3,894**	**100%**	**9,701**	**100%**

4.4.12 Employment

The seasonally adjusted unemployment rate for October 2024 was 4.2%, raised from 4.1% in September 2024 and down from 4.5% in October 2023.

At present, the CSO produces a supplementary measure of unemployment in parallel with the routine Monthly Unemployment Estimate. The methodology for the Monthly Unemployment Estimates involves forecasting the number of unemployed persons using the trend in the recipient Live Register series. The Department of Social Protection provides Working Age Income support to people arriving in Ireland from Ukraine under the Temporary Protection Directive. The Live Register series includes recipients of these supports who have met the relevant criteria. This has impacted the numbers of unemployed, primarily females, in these monthly estimates. The CSO statistical release on monthly figures issued in November 2024 in respect of October 2024 stated the following:

"The seasonally adjusted number of people unemployed was 121,200 in October 2024, compared with 120,000 in September 2024. There was a fall of 5,900 in the seasonally adjusted number of people unemployed in October 2024 when compared with a year earlier. The seasonally adjusted number of unemployed males rose to 62,500 in October 2024, compared with 61,000 in September 2024. The seasonally adjusted number of unemployed females in October 2024 fell to 58,700 from 58,900 in September 2024."

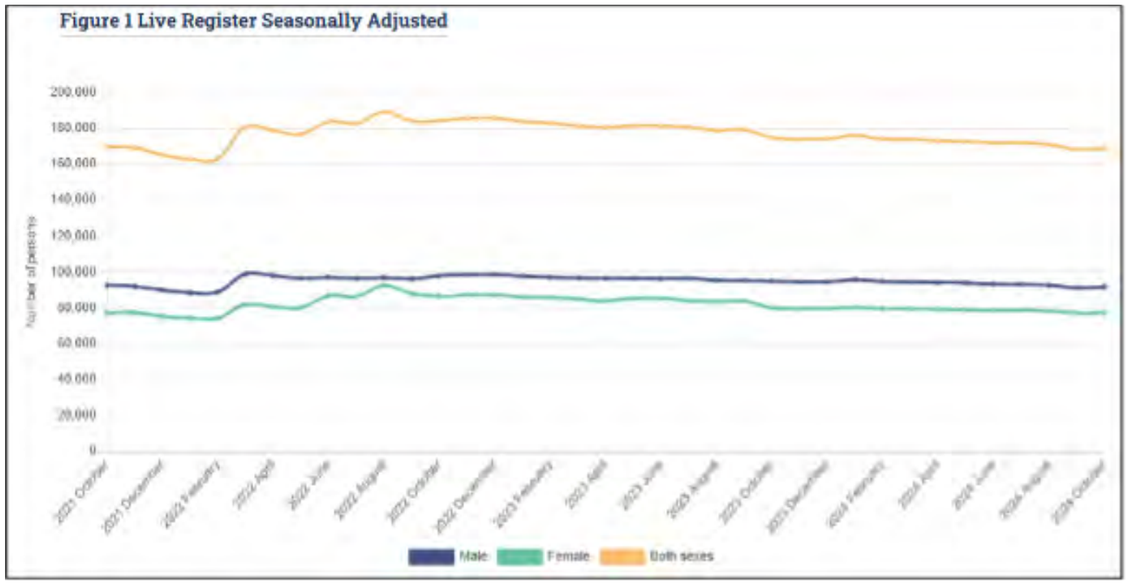


Figure 4.14 Live Register Seasonally Adjusted Figures. (Source: CSO)

The latest CSO'S Live Register statistical release[4] (October 2024) shows that 13,078 persons were benefitting from the EU's Temporary Protection Directive included in the Live Register figures of October 2024, a decrease of 726 persons from the previous month. Overall, the total number of persons on the Seasonally Adjusted Live Register increased by 700, or 0.4%, over the month from September 2024 to October 2024, see **Figure 4.14** above.

The CSO's live register data sets are available only at a county level, not at a Local Authority level. The latest Live Register data for County Cork[5] (October 2024) shows that the total number of persons on the Live Register was 13,458, an increase of 201, or 1.5%, over the month from September 2024 to October 2024; this represents a decrease of 430, or 3.1%, over the year from October 2023 to October 2024.

The CSO's monthly unemployment data sets are available only at a national level, which precludes detailed analysis of the unemployment rate in the study area.

The industries in which people are engaged in work within the study area are illustrated in **Table 4.10**. Professional Services (25.4%) is the largest sector, followed by commerce and trade (24.4%), manufacturing industries (16.9%), other (14.5%), transport and communications (10.0%), and public administration (5%).

[4] https://www.cso.ie/en/releasesandpublications/ep/p-lr/liveregisteroctober2024/

[5] LRM15 - Persons on Live Register - Dataset - data.gov.ie

Table 4.10 Persons at work by industry within Study Area - Census 2022

INDUSTRY	TOTAL (PEOPLE)	TOTAL (%)
Agriculture forestry and fishing	13	0.2%
Building and construction	181	3.4%
Public administration	264	5.0%
Transport and communications	526	10.0%
Other	762	14.5%
Manufacturing industries	889	16.9%
Commerce and trade	1282	24.4%
Professional services	1336	25.4%
Total	**5253**	**100.0%**

4.4.13 Social Infrastructure

Social infrastructure includes a wide range of services and facilities, including education, health, community, cultural, play, faith, recreation and sports facilities that contribute to the quality of life. This planning application is accompanied by a **Social Infrastructure Audit (SIA)**, a **Childcare Demand Report (CDR)** and a **School Demand Assessment (SDA)**, which should all be read in conjunction with this chapter. In summary, these reports confirm that sufficient facilities are available in the area and that these facilities can adequately provide for the new population anticipated as part of this development.

The Social Infrastructure Audit (SIA) found a total of 129 facilities located within the catchment area of the proposed development, as shown in **Figure 4.15** below. The catchment area for this SIA is set as the maximum area covered within a 15 min walk from the site access point. A 15 min walk area was chosen as it aligns with the national and local authority policy objectives of creating urban environments that provide ample services within a 15 min of a dwelling. This catchment area used a maximum walk area as the subject site is located within a post-industrial landscape adjacent to the centre of Cork City which is zoned for residential development. The full list of the facilities is provided in the SIA which forms part of the planning application.

The following sub-sections will outline the number and composition of sub-categories of SIA facilities per category. There are nine sub-sections in total listing childcare, community, cultural, educational, faith-based, healthcare; public transport, recreational, and retail facilities.

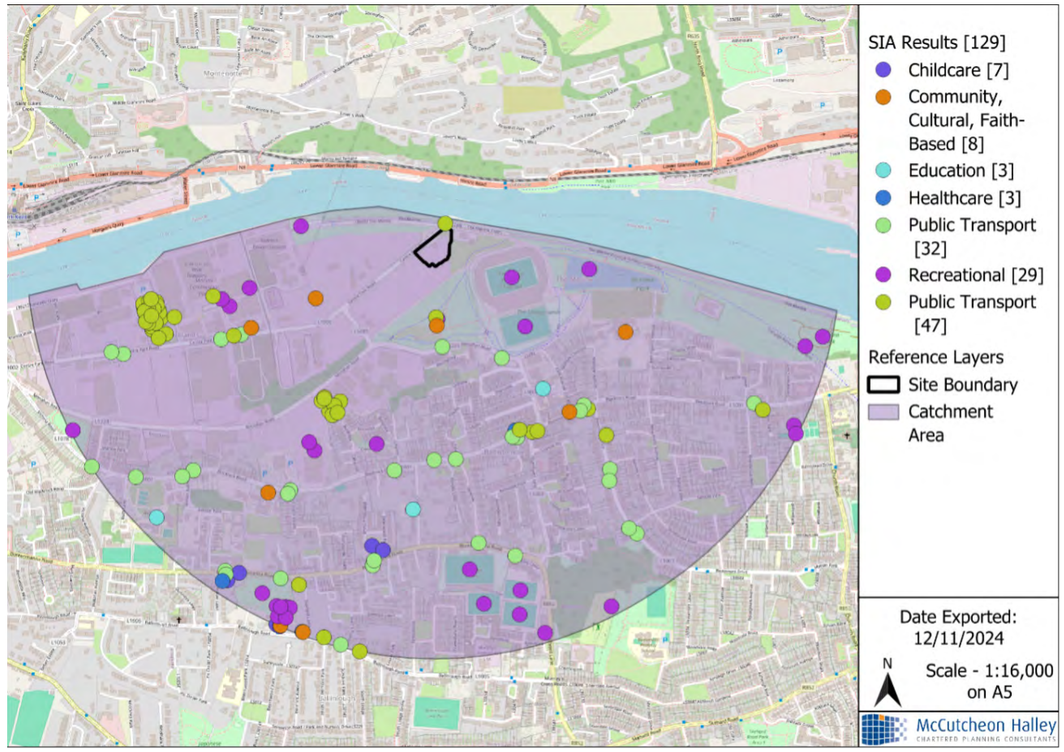


Figure 4.15 Social Infrastructure Facilities (Sources: SIA, MHP)

4.4.13.1 Education and Childcare

4.4.13.1.1 Childcare Facility

The **Childcare Demand Report (CDR)**, which accompanies this application under separate cover identified 10 no. childcare facilities within the 2km from the site boundary, see **Figure 4.16** overleaf. The capacity figures for this report are sourced from a survey which was conducted by the Cork Child Care Committee. The survey found that there are no additional childcare spaces available, see **Table 4.11** overleaf. This shows that the supply of childcare services within the catchment area is strained. Thus, an analysis of the type of childcare facility and the age range that facilities cater for is needed.

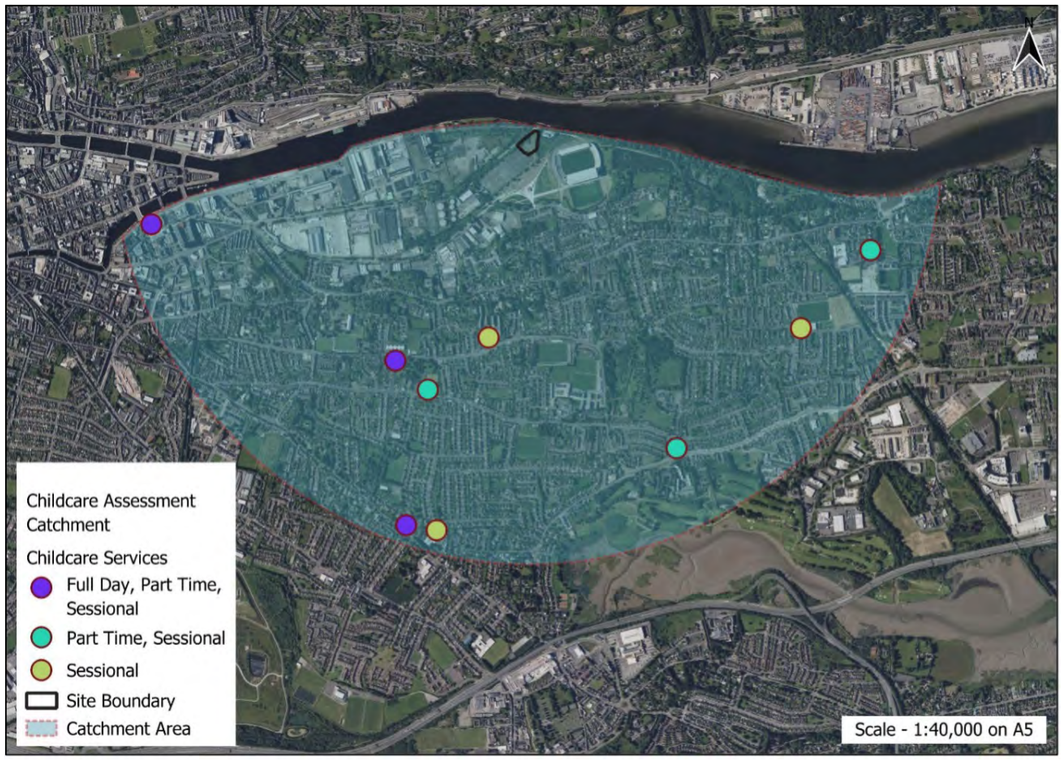


Figure 4.16 Existing Childcare Facilities within the Catchment Area (Source: CDR, MHP)

Table 4.11 TUSLA registered childcare providers within catchment area and approx. distance to site (Source: CDR, MHP)

NO.	SERVICE NAME	ADDRESS	SERVICE TYPE	AGE RANGE	AVAILABILITY
1	Classes Childcare	Hillside, Boreenmanna Road cork	Full Day, Part time, Sessional	0 - 6 Years	0
2	Lilliput Montessori School	Ardfallen, Douglas, Cork	Sessional	2 - 6 Years	0
3	Nurture Childcare Douglas	Unit 4, Ardfallen Mall, Douglas Road, Cork	Full Day, Part time, Sessional	0 - 6 Years	0
4	Oakwew Village Cork City	Cork City Hali, City Hall, Eglinton St, Cork (only available to council workers)	Full Day, Part time, Sessional	0 - 6 Years	0
5	Scoil Ursula pre-School	Scoil Ursula N.S. Blackrock, Cork, Co. Cork	Part Time, Sessional	2 - 6 Years	0
6	Scoil Ursula Creche	Scoil Ursula Primary School Blackrock Road. Cork,	Part Time, Sessional	2 - 6 Years	0
7	Step One preschool	Blackrock National Hurling Club, Church Road, Blackrock, Cork	Sessional	2 - 6 Years	0
8	Stepping Stones Pre-School	éiderwood, Boreenmanna Road, Cork	Sessional	2 - 6 Years	0
9	The Shalom Montessori Pre-School	Ballinlough Community Centre, Ballinlough Road, Cork	Part Time, Sessional	2 - 6 Years	0
10	The Village Montessori School	Skehard Road, Blackrock, Co. Cork	Part Time, Sessional	2 - 6 Years	0
				Total	**0**

4.4.13.1.2 Primary and Post-Primary Schools

The School Demand Assessment (SDA) that accompanies the planning application has establishes separate the catchment area for this school assessment was set at 2km from the site boundary which presented in **Figure 4.17.** This ensures that schools can be accessed via several travel alternatives including walking, cycling and driving. The SDA demonstrates that, based on the current enrolment figures (2023-2024) versus previous year enrolment figures, a decline in enrolment has occurred. The result shows that there are 8 no. primary schools, 2 no. special schools, and 3 no. post-primary schools located with the 2 km catchment area, with an estimated capacity of 2,626 enrolments (see **Table 4.12**).

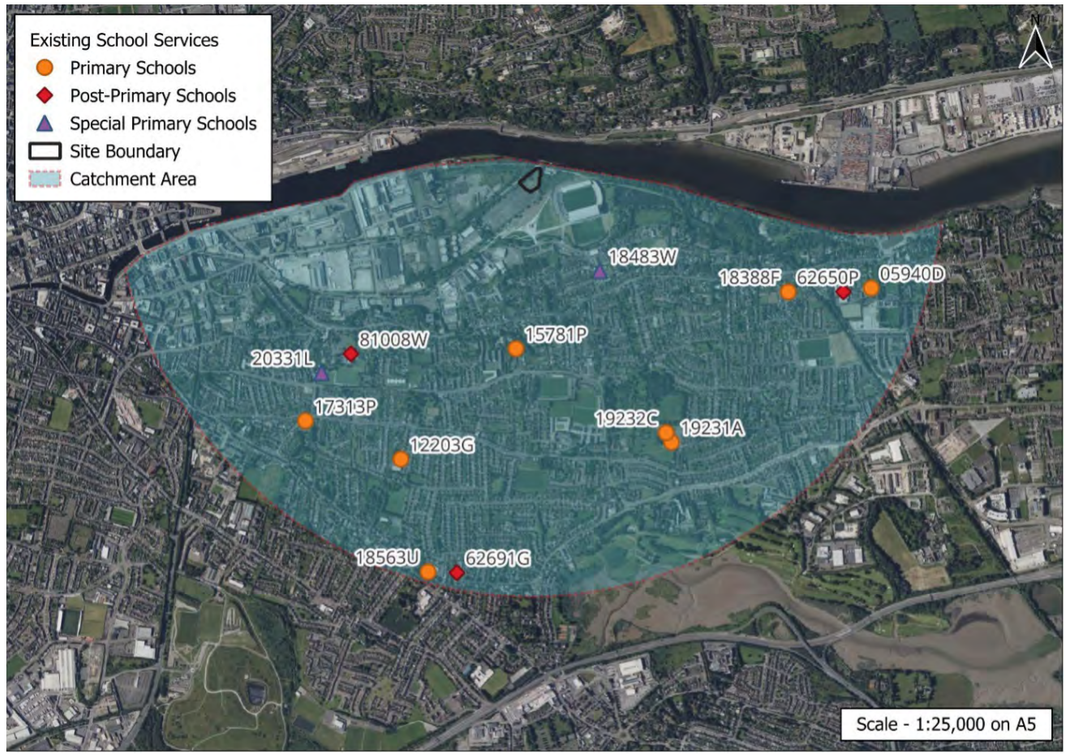


Figure 4.17 Identified Primary Schools within the Catchment Area (Source: CDA, MHP)

Table 4.12 Primary Schools in the Study Area

OFFICIAL NAME.	ENROLMENTS	NUMBER OF CLASSES	ESTIMATED CAPACITY	AVAILABLE CAPACITY
Scoil Ursula	162	10	260	98
S N Naomh Antaine	609	27	702	3
Ballintemple N S	252	9	234	0
Our Lady of Lourdes	224	9	234	10
Scoil Naomh Micheal	89	4	104	15
Scoil Naomh Brid C	400	18	468	68
S N Barra Naofa Bhuach	275	12	312	37
S N Barra Naofa Cailini	292	12	312	20
Total	**2,303**	**101**	**2,626**	**341**

In regard to Post-Primary education, SDR has identified 3 no. post-primary schools with a total capacity of 1,435, where 136 available spaces were identified (see **Table 4.13**).

Table 4.13 Post-Primary Schools in the Study Area

ROLL NUMBER	OFFICIAL NAME	ENROLMENTS	CAPACITY	AVAILABLE SPACES
62650P	Ursuline College Blackrock	364	500	136
62691G	Regina Mundi College	563	563	0
81008W	Ashton School	543	543	0*
	Total	**1,427**	**1,606**	**136**

*Schools contacted but no information provided.

4.4.13.2 Community, Cultural, and Faith-based Facilities

There are 8 no. community, cultural, and faith-based facilities located within the catchment area, composed of 3 places of worship, 2 post offices, 1 community centre, 1 community facility, and 1 performing arts centre, as shown in **Figure 4.18** and **Table 4.14** below.

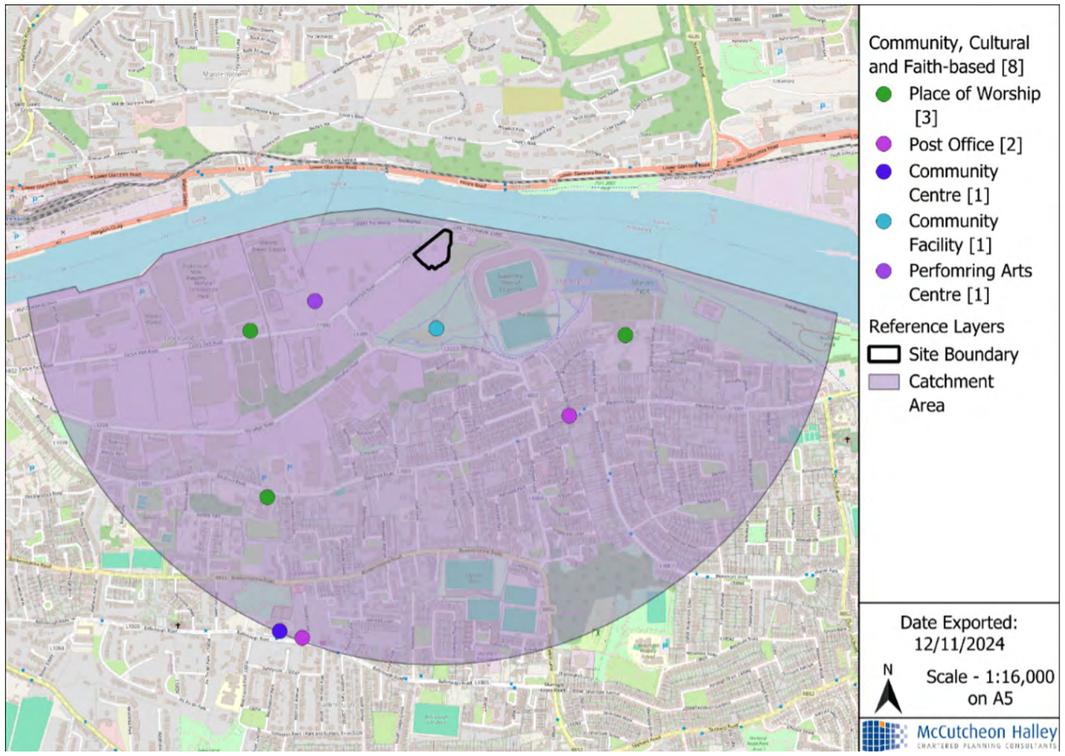


Figure 4.18: Community, Cultural, and Faith-based Facilities (Source: SIA, MHP)

Table 4.14: Community, Cultural, and Faith-based Facilities in Catchment Area (Source: SIA, MHP)

NAME	CATEGORY	SUB-CATEGORY	METERS TO SITE
Central Hall	Community, Cultural, and Faith-based	Community Facility	188
Ballinlough Community Centre	Community, Cultural, and Faith-based	Community Centre	1,239
Ballintemple Post Office	Community, Cultural, and Faith-based	Post Office	625
Ballinlough Post Office	Community, Cultural, and Faith-based	Post Office	1,233
Live at the Marquee	Community, Cultural, and Faith-based	Performing Arts Centre	348
Christ Embassy Cork	Community, Cultural, and Faith-based	Place of Worship	574
SMA Church	Community, Cultural, and Faith-based	Place of Worship	886
Ardfoyle Convent	Community, Cultural, and Faith-based	Place of Worship	614

4.4.13.3 Healthcare Facilities

There are 3 no. healthcare facilities located within the catchment area comprising of 2 pharmacies, and 1 general practitioner, as shown in **Figure 4.19** and **Table 4.15** below.

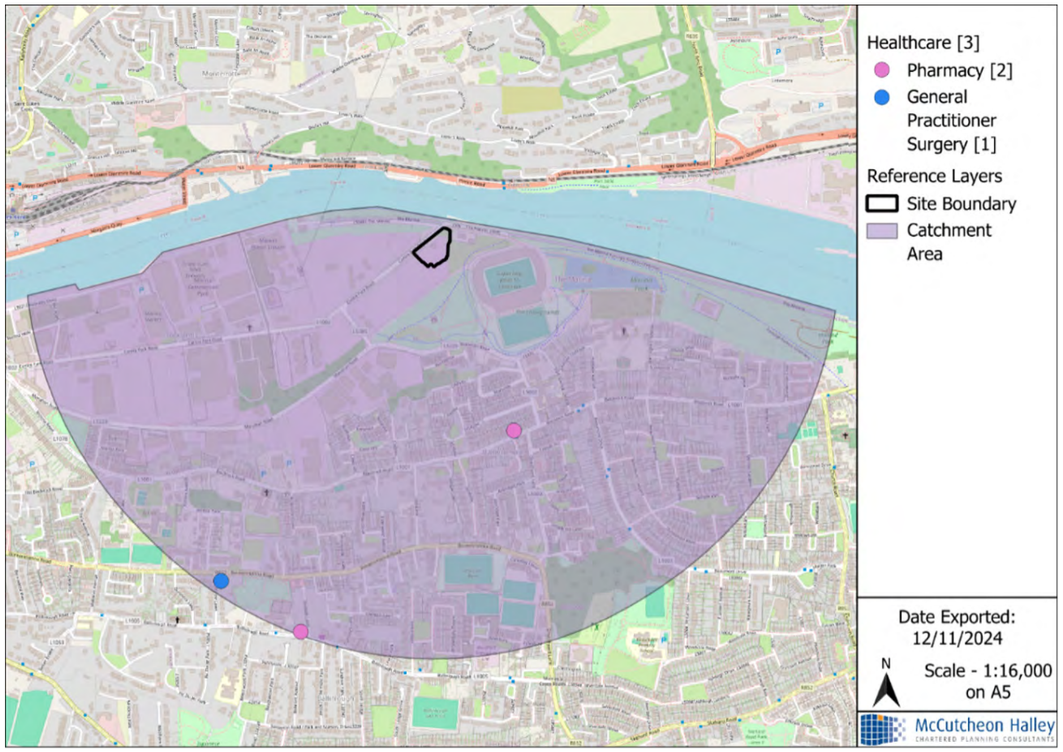


Figure 4.19 Healthcare Facilities (Source: SIA, MHP)

Table 4.15: Healthcare Facilities within the Catchment Area (Source: SIA, MHP)

NAME	CATEGORY	SUB-CATEGORY	METERS TO SITE
Ballintemple Allcare Pharmacy	Healthcare	Pharmacy	581
O'Sullivan's Pharmacy	Healthcare	Pharmacy	1,232
Avonlea Medical Centre	Healthcare	General Practitioner Surgery	1,200

4.4.13.4 Public Transport

There are 32 no. public transport facilities, comprising of 32 bus stops on four bus routes, connecting to various local and regional destinations and the train station of Cork Kent Station as shown in **Figure 4.20** below and **Table 4.16** below.

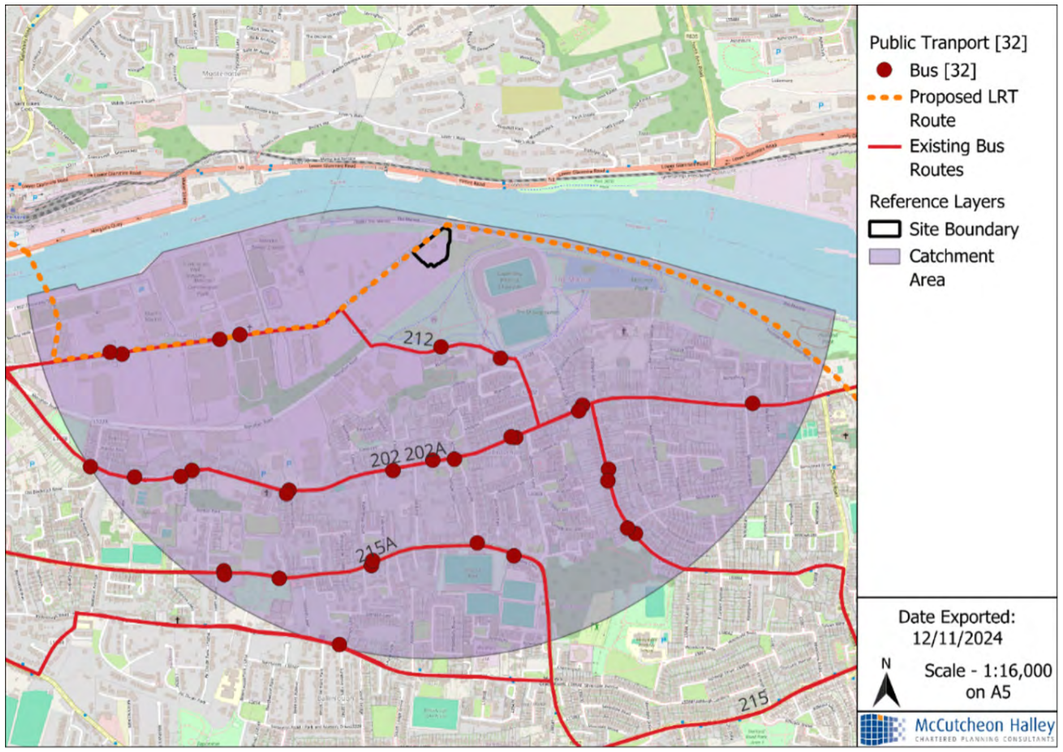


Figure 4.20 Public Transport Facilities (Source: SIA, MHP)

Table 4.16: Public Transport Facilities within the Catchment Area (Source: SIA, MHP)

NAME	CATEGORY	SUB-CATEGORY	METERS TO SITE
Glanmire Rd 2	Public Transport	Bus	677
Ardfoyle Place	Public Transport	Bus	644
Menloe Gardens	Public Transport	Bus	1,081
Elderwood Avenue 1	Public Transport	Bus	953
Glanmire Rd 1	Public Transport	Bus	612
Pairc Ui Rinn 1 (Bus Stop)	Public Transport	Bus	891
Pairc Ui Rinn 2 (Bus Stop)	Public Transport	Bus	956
Centre Park Rd 1	Public Transport	Bus	1,018
Willow Lawn 1	Public Transport	Bus	1,168
Willow Lawn 2	Public Transport	Bus	1,177
Elderwood Avenue 2	Public Transport	Bus	970
Sundrive Park 1	Public Transport	Bus	1,237
Maryville	Public Transport	Bus	359
Birch Grove	Public Transport	Bus	256
Centre Park Rd 2	Public Transport	Bus	984
Ballintemple 1	Public Transport	Bus	596
Beaumont Crescent 2	Public Transport	Bus	1,064
Beaumont Drive 1	Public Transport	Bus	848
The Temple Inn	Public Transport	Bus	638
Richmond Estate 1	Public Transport	Bus	840
Ballintemple 2	Public Transport	Bus	604
Chiplee Villas	Public Transport	Bus	616
Janeville	Public Transport	Bus	617
Ashton School 1 (Bus Stop)	Public Transport	Bus	1,142
Ashton Park 1	Public Transport	Bus	990
Marina Park (Bus Stop)	Public Transport	Bus	1,236
Crab Lane	Public Transport	Bus	659
Belfield	Public Transport	Bus	1,101
Richmond Estate 2	Public Transport	Bus	853
Beaumont Crescent 1	Public Transport	Bus	1,035
Beaumont Drive 2	Public Transport	Bus	876
Ashton Park 2	Public Transport	Bus	1,029

4.4.13.5 Recreation Facilities

There are 29 no. recreational facilities in total within the catchment area comprised of 11 pitches, 7 parks, 5 gyms, 2 stadiums, 1 children's play area, 1 rowing facility, 1 rugby facility, and 1 tennis facility, as shown in **Figure 4.21** below and **Table 4.17** below.

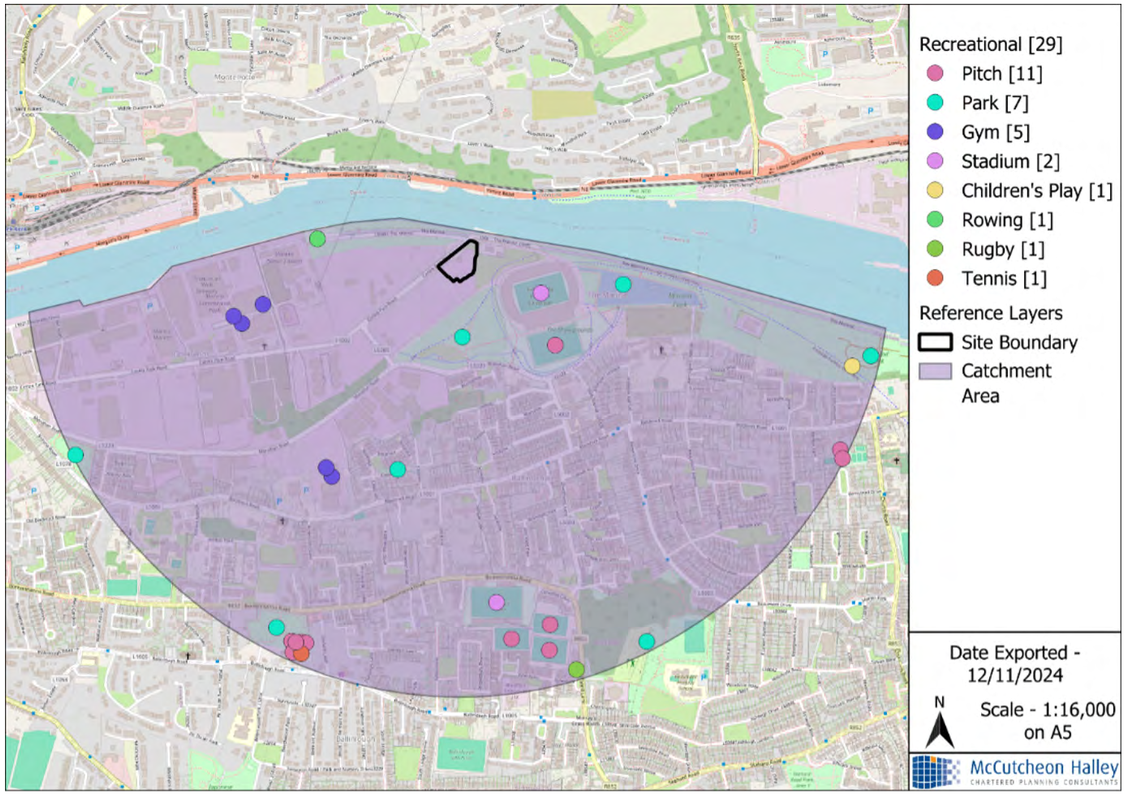


Figure 4.21 Recreation Facilities (Source: SIA, MHP)

Table 17: Recreational Facilities within the Catchment Area

NAME	CATEGORY	SUB-CATEGORY	METERS TO SITE
Tractus CrossFit	Recreational	Gym	614
Studio Fitness	Recreational	Gym	538
Cork Constitution RFC	Recreational	Rugby	1,218
Holland Park Playground	Recreational	Children's Play	1,173
Pitch 1 at SuperValu Páirc Uí Chaoimh	Recreational	Pitch	329
Tennis Court 5 at Ballinlough Tennis Club	Recreational	Pitch	1,184
Echo Athletics	Recreational	Gym	691
Pitch 2 at Cork Constitution RFC	Recreational	Pitch	1,086
Tennis Court 1 at Ballinlough Tennis Club	Recreational	Pitch	1,216
Ballinlough Park	Recreational	Park	1,170
Ballinlough Tennis Club	Recreational	Tennis	1,209
Pitch 1 at Cork Constitution RFC	Recreational	Pitch	1,067
Tennis Court 3 at Ballinlough Tennis Club	Recreational	Pitch	1,177
Tennis Court 2 at Ballinlough Tennis Club	Recreational	Pitch	1,175
Tennis Court 4 at Ballinlough Tennis Club	Recreational	Pitch	1,187
SuperValu Páirc Uí Chaoimh	Recreational	Stadium	212
Park at Cleve Hill	Recreational	Park	590
Tennis Court 5 at St. Michael's Tennis Club	Recreational	Pitch	1,226
Pitch 1 at St. Michael's Bowls Club	Recreational	Pitch	1,243
Páirc Uí Rinn	Recreational	Stadium	971
Holland Park	Recreational	Park	1,220
Beaumont Park	Recreational	Park	1,220
Marina Park	Recreational	Park	167
Kennedy Park	Recreational	Park	1,229
Phenom Gym	Recreational	Gym	679
Temple Hill	Recreational	Pitch	1,141
Shandon Boat Club & Naomhóga Chorcaí	Recreational	Rowing	371
Elite Fitness	Recreational	Gym	633
Tractus CrossFit	Recreational	Gym	614

4.4.13.6 Retail and Convenience Facilities

Retail facilities are the largest category of SIA facilities within the catchment area with 47 facilities in total. These composed of 27 fast food outlets, 6 cafes, 3 Bars/Pubs, 2 convenience stores, 2 grocery stores, 1 restaurant, 1 hairdresser, 1 supermarket, 1 bookshop, and 1 bakery, as shown in **Figure 4.22** below and **Table 4.18** below.

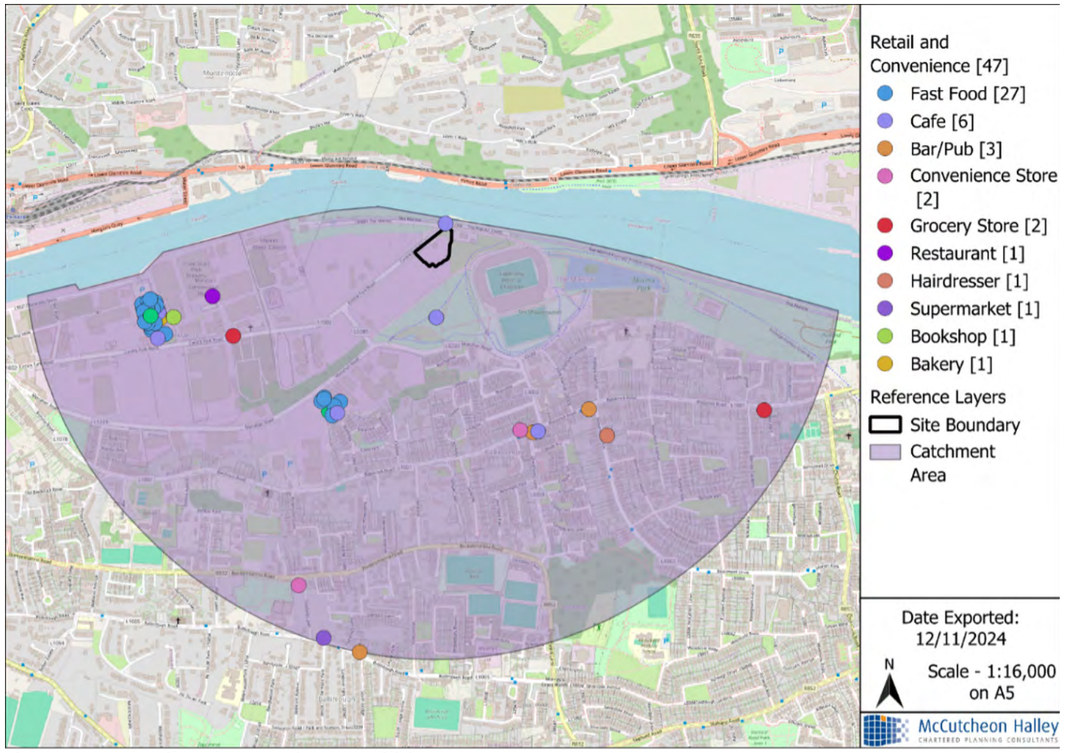


Figure 4.22: Retail and Convenience Facilities (Source: SIA, MHP)

Table 18: Retail and Convenience Facilities within the Catchment Area (Source: SIA, MHP)

NAME	CATEGORY	SUB-CATEORY	METERS TO SITE
La Cantina Company	Retail and Convenience	Fast Food	875
Kura Sushi Cuisine	Retail and Convenience	Fast Food	881
Hana	Retail and Convenience	Fast Food	873
5 Points Kiosk	Retail and Convenience	Cafe	162
Maxol Service Station Boreenmanna	Retail and Convenience	Express Convenience	1,096
DIP	Retail and Convenience	Fast Food	515
Taste of Home	Retail and Convenience	Fast Food	537
Puccio's	Retail and Convenience	Fast Food	538
Tirab Smash Burger	Retail and Convenience	Fast Food	566
Blackrock Market	Retail and Convenience	Market Place	561
Burnt Pizza	Retail and Convenience	Fast Food	549
Pie Guys	Retail and Convenience	Fast Food	534
Cortado Coffee	Retail and Convenience	Cafe	14
Young Planet SuperFoods	Retail and Convenience	Fast Food	839
Prátaí	Retail and Convenience	Fast Food	839
Macarons	Retail and Convenience	Bakery	836
Get Baked	Retail and Convenience	Fast Food	837
Alchemy	Retail and Convenience	Cafe	836
MKT Burger	Retail and Convenience	Fast Food	882
Burritos & Blues at The Marina Market	Retail and Convenience	Fast Food	882
Eco	Retail and Convenience	Fast Food	880
No Sin	Retail and Convenience	Fast Food	843
The Venue Bar	Retail and Convenience	Pub	611
Longboats	Retail and Convenience	Pub	656
GUJI Coffee Bar at The Marina Market	Retail and Convenience	Cafe	861
Menloe Stores	Retail and Convenience	Grocery Store	1,115
Hansum	Retail and Convenience	Fast Food	886
Oak Fire Pizza at The Marina Market	Retail and Convenience	Fast Food	854
Marina Market	Retail and Convenience	Market Place	864
Rebel Reads	Retail and Convenience	Bookshop	794
Dinky Donuts	Retail and Convenience	Fast Food	878
The Gourmet Sausage Hut	Retail and Convenience	Fast Food	882
The Orchard Bar	Retail and Convenience	Pub	1,246
J.J. O'Driscoll Superstore	Retail and Convenience	Supermarket	1,229
Ruth's Diner	Retail and Convenience	Restaurant	658
Simone Best Hair Styling	Retail and Convenience	Hairdresses	757
Ballintemple Food Store	Retail and Convenience	Convenience	585
Basil	Retail and Convenience	Cafe	617
Farmshop	Retail and Convenience	Grocery Store	635
Soma 2 at The Backrock Market	Retail and Convenience	Cafe	550
Tung sing	Retail and Convenience	Fast Food	835
Sultan 2	Retail and Convenience	Fast Food	869
White Rabbit BBQ	Retail and Convenience	Fast Food	851
Griolladh Marina Market	Retail and Convenience	Fast Food	862
Sweet Spot	Retail and Convenience	Fast Food	869
Poulet Vous	Retail and Convenience	Fast Food	872
Messy Buns	Retail and Convenience	Fast Food	856

4.5 Do Nothing Scenario

4.5.1 Actual Do Nothing

If the proposed development was not proceed, there would be no immediate impact on the existing population, or economic activity for residents living in the area. It is anticipated that the existing site will remain in its current condition as a brownfield site in the short to medium term and will become overgrown by grass and scrub.

In the absence of this proposal, having regard to the location of the proposed development site within the existing built-up area of Cork City, it is likely that another residential/mixed use proposal would be progressed on the site. This is in accordance with national strategic outcomes - NSO 1 – (NPF) to deliver a greater proportion of residential development within the existing footprint of built-up areas and to make better use of under-utilised land serviced by existing facilities and public transport.

The effect of the construction of another residential scheme at this location would likely be similar to the effects of the proposed development, as outlined in this chapter. The key variable during the operational phase would relate to the form of any future development proposal. Should a lower-scale scheme be progressed, then the likely visual impact may theoretically be reduced; however, in the absence of scheme specifics, it is not possible to rate the effect with any degree of confidence.

In the absence of any development of the site, the impact is determined to be negative, with a significant effect on the delivery of homes within the existing built-up footprint of the Cork City and Suburbs. If the development of residentially zoned brownfield lands close to public transport and the City Centre does not occur, the existing unsustainable pattern of urban sprawl is likely to continue. This would result in the expansion of the physical footprint of Cork City and Suburbs and other urban areas, as well as continued housing affordability issues.

In terms of Population and Human Health, a 'do nothing' scenario (i.e., not developing the proposed development site) would represent a lost opportunity to remove existing contaminated land and develop lands for residential use in close proximity to Cork City Centre. As such, the proposed development site would remain underutilised, and it would not contribute to increasing the provision of housing in this area.

4.6 Difficulties Encountered

There were no difficulties encountered in preparing this chapter.

4.7 Consultation

Two meetings were held with the Planning Authority ahead of the formal lodgement of this LRD planning application. A Section 247 consultation and a Section 32B LRD meeting were held with representatives of Cork City Council in advance of making this planning application. The Section 247 consultation took place in April 2024. An LRD Opinion was issued by Cork City Council in response to the Section 32B LRD meeting, which took place in August 2024. Further detail in this regard is provided within the Planning Statement and Response to The Cork City Council LRD Opinion that accompanies this application under separate cover.

4.8 Impact Assessment

This section describes the environmental effects that are likely to arise during the construction and operation of the proposed development. Section 4.9 sets out the mitigation measures required to alleviate identified effects. Section 4.10 presents the residual impact, which is an assessment of impacts post-mitigation.

Potential impacts are considered under the following headings in line with the Guidelines set out in Section 4.4 of this chapter:

- Population
- Employment and Economic Activity
- Health
- Residential Amenity
- Local Amenity Impacts

Specific effects with respect to matters such as air quality, noise, traffic, visual impact etc., are dealt with in the respective assessments in separate chapters of this EIAR.

4.8.1 Construction Phase

The potential impacts of the proposal during the construction phase of the development are outlined below.

4.8.1.1 Population

It is estimated that during peak construction, there will be an average of 50 people employed on site. It is not anticipated that this will generate a temporary increase in population locally as employees will travel to the proposed development site from their existing place of residence. The likely effect on the population is **neutral** and **not significant**.

4.8.1.2 Employment & Economic Activity

A vital characteristic of the proposed development in terms of its potential economic impact relates to its capital value, of which a significant portion will be for the purchase of Irish sourced goods and services. The construction phase (approx. 18-24 months) will provide a boost for the local construction sector in terms of employment generation (average of 50 people employed on-site), capital spend on materials and construction labour costs, and it will generate additional spending on the local economy (retail and local shops). It will complement the new retail, commercial and community uses that are currently under construction on the adjoining Marina Quarter Development site.

The staff will comprise of managerial, technical, skilled and unskilled workers and, as far as practicable, local labour will be employed. It is unlikely that the proposed development will increase the population of the area as a result of the construction phase.

In addition to direct employment, there will be substantial off-site employment and economic activity associated with the supply of construction materials and provision of services, such as professional firms supplying financial, architectural, engineering, legal and a range of other professional services to the project, and additional spending in local shops and other local retail services and as a consequence of the presence of construction staff during the construction phase.

The overall likely effects associated with the construction phase on the working population and local economy are **positive, temporary to short-term,** and **not significant.**

4.8.1.3 Health

Human health may be impacted on in a variety of ways and by several environmental receptors including water, biodiversity, climate, flooding, air, and major accidents, etc. Exposure to contaminants or pollutants can have serious implications for human health. Potential impacts on population and human health include inadequate water and wastewater infrastructure, contamination of soils and exposure to hydrocarbons, excessive noise, flooding due to non-control of surface water, poor air quality in areas where there are large volumes of traffic and the health impacts associated with the storage of hazardous materials during the construction stage.

Construction sites pose potential risks to the health and safety of the public. However, access by the public would be considered trespassing on private property. In the absence of mitigation, the effect would likely be **negative** and **temporary to short-term**, with a significance which may range from **slight** to **profound**, depending on the magnitude of the incident.

In the absence of standard construction mitigation measures, likely significant impacts would arise from construction traffic, noise, dust, contaminated soil/exposure to hydrocarbons and visual effects. It is noted that the potential for effects on population and human health during the construction phase are also dealt with in this EIAR under the more specific topics of the environmental media by which they might be caused, such as Landscape & Visual, Air Quality, Built Services & Waste, Traffic & Transportation, Land & Soils, Water & Hydrology, Noise & Vibration and Risk Management chapters.

4.8.1.4 Residential Amenity

The anticipated likely significant effects in the absence of mitigation on residential amenities relate to disruption due to increased construction traffic movements on the local road network, noise, dust and visual impact arising from plants (e.g. cranes) necessary to deliver the development.

In the absence of mitigation, the likely effects on local residential amenity would be **negative**, t**emporary to short-term** in duration, and would have **moderate** significance.

Specific potential for effects on residential amenities during the construction phase is dealt with in this EIAR under the more specific topics of the environmental media by which they might be caused, such as Landscape & Visual, Air Quality, Built Services & Waste, Traffic & Transportation, Noise & Vibration and Risk Management chapters.

4.8.2 Operational Phase

4.8.2.1 Population

During the operational phase, the proposed scheme will result in a generally positive alteration to the existing brownfield site which will serve the growing population of the area. It is anticipated that the proposed development will accommodate 176 units with a projected full-time population of approximately 375 persons[6]. Overall, the operational phase of the proposed development is determined to be likely to have a **positive, long-term**, and **moderate to significant** effect on population in terms of housing supply.

To support sustainable travel, it is necessary for future population growth to predominantly take place in sustainable compact urban areas, which discourage dispersed development and long commuting. Development of the brownfield site within the South Docks area of Cork City and Suburbs would deliver a critical mass of growth in population that contribute to the City's growth in a compact manner and would ensure the long-term viability of existing and proposed public transport infrastructure in the area. The operational phase of the proposed development is determined to be likely to have a **positive**, **permanent**, and **moderate** effect on population in terms of compact and sustainable development.

4.8.2.2 Employment & Economic Activity

During the operational phase, the proposed scheme will result in limited employment opportunities given that the scheme is predominantly residential in nature. Notwithstanding this, employment will be generated from the proposed restaurant/café unit and childcare facility. Additionally, some employment created in the servicing, maintenance and upkeep of the proposed apartment buildings and landscaped areas. The economic impact of the operational phase on the immediate area is therefore likely to be **positive**, **slight to non-significant**, and **permanent**.

The new residential population will generate additional spending within the South Docks area which will likely have a **positive, slight,** and **permanent** impact on local economic activity generated through the multiplier effect.

4.8.2.3 Health

During the operational phase, the proposed scheme will result in improvements to human health through increased physical activity. Insufficient physical activity has been identified by the World Health Organisation (WHO) as the fourth leading risk factor for global mortality. Urban air pollution and traffic injuries are also responsible for a further 2.6 million deaths annually. The health benefits of active transport (walking and cycling combined with public transport) can prevent many of these deaths from physical inactivity.

The proposed scheme minimises car parking, prioritising both pedestrians and cyclists. 427 bicycle spaces (379 no. secure bicycle parking and 52 visitor bike spaces), which equates to approx. 2.43 bicycle parking spaces per unit. The layout provides for the segregation of pedestrians and traffic and incorporates the principles of universal access and the requirements of Part M of the Building Regulations so that the development will be readily accessible to all, regardless of age, ability or disability. The likely predicted effect of these combined measures on the health and well-being of future occupants is **significantly positive**.

During the operational phase, the integration of energy efficient measures into the design will provide for healthier living standards for future occupants and less dependence on fossil fuels for energy generation. This is coupled with the reduced car parking provision (56 undercroft car parking spaces, or 0.32 spaces per unit, compared to a maximum provision of 75 spaces under the Cork City Development Plan 2022-2028). This lower rate will result in significant CO2 savings, promote a modal shift, will contribute to improved air quality and the effects are likely to be locally **significant**, **positive** and **permanent**.

4.8.2.4 Residential Amenity

During the operational phase, the high-quality living environment of the proposed scheme will result in positive impacts on amenity for future residents. Achieving a high-quality living environment through an integrated and balanced design approach will have a **locally significant**, **positive** and **permanent** effect on residential amenity.

The layout of the proposed development as two blocks which are 7 and 8-storeys (Block A) and 7 and 10-storeys (Block B) over the podium level is in line with the scale of nearby waterfront developments, while the 10-storey section of Block B functions as a landmark building for the site. This configuration allows dual aspect units, a site coverage ratio of 44%, with an 1,846 sqm. high-quality public open spaces and 1,400 sqm communal open spaces. A sufficient quantum of open space is critical to the health and well-being of future residents. This will have a **positive** effect on residential amenity.

The design of the proposed apartments includes a combined Living, Kitchen, Dining (LKD) format. This results in a layout with generously proportioned deep floor plans that exceed minimum requirements, see Housing Quality Assessment (HQA) as part of the planning application documentation. This will have a **positive** effect on residential amenity.

To provide private amenity space for future residents, each apartment benefits from access to ground-floor terraces or balconies. The positions of these terraces and balconies have been carefully considered to avoid overlooking, thereby providing quality private amenity space. The effect of these measures is **positive**.

[6] Estimated future population based on the proposed mix of unit sizes (i.e., number of bedrooms), and the national average number of persons per housing unit size.

The development has been designed with due consideration for sunlight and daylight and meets the recommendations as set out in the *"Building Research Establishment - BRE Site Layout Planning for Daylight and Sunlight: A guide to good practice, 3rd edition 2022"* (BRE Guide). This application is accompanied by a **Daylight & Sunlight Report** prepared by Model Works and this report should be referenced in conjunction with this chapter.

In terms of amenity areas, the report demonstrates that both communal amenity areas and public open spaces will have excellent levels of daylight and will receive a level of sunlight in excess of the recommended levels. This is determined to have a **positive** effect on residential amenity.

All rooms tested in the proposed development within the Daylight & Sunlight Report meet the minimum recommendations for internal daylight provision as set out in the BRE Guide and BS EN 17037 (National Annex). This is determined to have a **positive** effect on residential amenity.

The report also shows that the proposed development will have a negligible impact on surrounding buildings with respect to access to skylight, access to sunlight, and levels of sunlight to gardens/open spaces. This is determined to have a **Minor** and **imperceptible** effect on residential amenity.

4.8.2.5 Local Amenity Impacts

The proposed development provides high quality communal and public open space. The communal amenity space is laid out with a hierarchy of uses including passive recreational areas and play space for children. The public open space is conveniently located to the north of the proposed development site where it will be most accessible. The proposed development also completes links with the existing network of public walkways/cycle routes in the area, specifically the Marina Park and Lee River Greenway, which will provide a direct cyclist/pedestrian connection with the City Centre to the west and Blackrock/Mahon to the east. This will result in a **significant positive permanent** effect on local amenity, especially for those who currently use the network of existing greenway routes in the surrounding area.

The **Social Infrastructure Audit**, submitted with the application, demonstrates that there is a good variety of infrastructure within the catchment area. The proposed development site incorporates dedicated play areas and an outdoor gym within the communal and public open space, as detailed in the Landscape Plan provided under separate cover. The proposed development also includes a gym a childcare facility and a retail/café unit. The impact is deemed to have a **locally positive, slight**, and **permanent** effect.

As outlined previously, there is not a significant quantum of healthcare facilities in the vicinity however a medical centre has been permitted within the immediately adjoining site owned by the applicant. An existing planning application on a nearby site (City Park SHD), which is yet to be determined, also proposes a medical centre, pharmacy and dentist. Therefore, it is anticipated that a significant increase in healthcare facilities will be provided in the immediate future.

As discussed in further detail below, the **Childcare Demand Report** and **School Demand Assessment**, submitted with the application, demonstrate that there is a latent capacity within the surrounding area to cater for the proposed development with regard to the likely childcare, primary and post-primary school demand generated by the scheme. Nonetheless, a childcare facility is included in the proposed development. Accordingly, the impact is deemed **locally neutral** with a significance that, at worst, would have a **moderate effect**.

The **Childcare Demand Report** that accompanies this application notes that the scheme would generate a demand for 6 childcare spaces across the 114 residential units proposed which are considered to be capable of accommodating families on the development site.

The Childcare Guidelines of 2001 advise that 20 childcare spaces need to be provided for every 75 dwelling units. As such, the proposed development incorporates 1 creche with a combined floor space of c.181 sqm. and capacity for 35 children, this will provide an additional 29 childcare spaces to the existing childcare capacity in the catchment area. The proposed development will therefore have a **slight, positive,** and **long-term** effect on the demand for pre-school places.

As outlined in the **School Demand Assessment** which accompanies the application under separate cover, it is estimated that the proposed development will generate a maximum 38 primary school children and a requirement for maximum 22 post-primary school places. It is noted that there are 8 primary schools, 2 special schools and 3 post-primary schools within the study area (2km). The assessment concluded that the proposed development does not necessitate the provision of a primary or a post-primary school in the short term. However, the parcels of land zoned for education close to the proposed development must be safeguarded to ensure that there are available locations for the addition of primary schools and primary schools to accommodate the long-term growth of the South City Docks. Overall, the impact of the proposed development on primary and post primary schools is determined to be **locally neutral** with a **not significant** effect.

4.8.3 Risk of Major Accidents and Disaster

The potential of major risks and disasters as a result of the proposed development has been assessed and the findings are presented in Chapter 15 of this EIAR.

No risk of major accidents and disasters has been identified. Ther project comprises a mixed use development on a brownfield site. All possible risks relating to existing soil contamination, potential flooding and construction activities have been considered and mitigation measures proposed where appropriate. The proposed development is located approx. 1 km away from Gouldings Chemicals Ltd, which is a Tier 2 SEVESO site where Seveso Sites are defined as industrial sites that due to the presence of dangerous substances in sufficient quantities, are regulated under Council Directives 96/82/EC and 2003/105/EC, commonly referred to as the Seveso II Directive.

The Central Competent Authority, which is the Health and Safety Authority (HSA), set and review a protective consultation distance around each establishment within which there are potentially significant consequences from major accidents to people (or to the environment). Within the consultation distance around each COMAH establishment / Seveso site, as notified to the planning authority, three zones of risk are plotted. These are based on the location, quantity and hazards of the dangerous substances present.

Based on Appendix 2 of the HSA's *"Guidance on technical land-use planning advice"* the proposed development is classed as having Level 3 sensitivity level (Any developments (for more than two dwelling units) at a density of more than 40 dwelling units per hectare – (DT 2.1.3)). Within the appendix 3 of the of the HSA's "Guidance on technical land-use planning advice" provides detail on the developments not advised against for in each zone. Based on its sensitivity level (Level 3), the proposed development would not be advised against if located in Outer Zone 3.

It is therefore considered that the proposed development will have an **imperceptible, long term, neutral** effect on the risk of major accidents.

4.8.4 Cumulative Effects

The approved mixed-use Marina Quarter Development (Reg. Ref: ABP 309059), together with this proposed development, will provide 1,178 new homes in the South Docks. Having regard to the goals of regenerating this formerly industrial area, and of addressing the ongoing housing crisis across Ireland and within Cork City and Suburbs, this is a **Very Significant Positive** effect.

The Marina Quarter Development includes multiple small play areas, communal gardens, and public open spaces. Together with the proposed development site, the realisation of new amenities, particularly play areas is deemed **Very Significant** and **Positive**.

The Marina Quarter Development also include variety types of social infrastructure, such as child care facility, retails, community spaces, café, bar and a medical centre. Together with the proposed development site, the realisation of new residential core area is deemed **Very Significant** and **Positive**.

The proposed development, together with the Marina Quarter Development, will increase demand on local infrastructure and services. This will include increased demand on potable water supply, foul water treatment capacity, gas supply, electricity supply, and telecommunication (fibre/broadband) capacity. There will be an increased demand on creche, primary and secondary schools in the locality. The supporting reports included with this application demonstrate together with Confirmation of Feasibility from Uisce Éireann, that the cumulative effect will be **neutral** with a significance ranging from **slight** to **moderate**.

Allowing people to live in close proximity to the Cork City Centre and to existing and proposed public transport infrastructure (current bus services and the proposed light rail transit system) will contribute toward reducing dependence on car-based travel and this will be positive in the context of greenhouse gas emission reductions. Furthermore, together these developments will increase the local population, achieving a critical mass and increasing the demand and efficiency of public transportation services. The effect is **locally moderate** with a **permanent** effect.

4.9 Mitigation Measures

4.9.1 Incorporated Design

The proposed development complies with the Building Regulations which provide for the safety and welfare of people in and about buildings. The Building Regulations cover matters such as structure, fire safety, sound, ventilation, conservation of fuel and energy, and access, all of which safeguard users of the buildings and the health of occupants.

The proposed design provides for the segregation of pedestrians and bicycle traffic from motorised traffic. The design also incorporates the principles of universal design and the requirements of Part M of the Building Regulations so that the development will be readily accessible to all, regardless of age, ability or disability.

An assessment of the potential effects of the construction and operation of the proposed scheme in relation to climate forms part of Chapter 12 Air Quality and Chapter 13 Climate of this EIAR. The assessment found that any impacts would be **imperceptible,** and would be less than the targets set out under EU Legislation.

The integration of energy efficient measures into the design will provide for healthier living standards for future occupants, less dependence on fossil fuels and associated improved air quality. The availability of on the doorstep public open space, amenity spaces, and a highly accessible layout across the scheme including segregated pedestrian entrances which is strategically located in the South Docks and Marina Park will encourage sustainable modes of outdoor access for a wide age group.

4.9.2 Construction Phase

A **Construction and Environmental Management Plan (CEMP), Resource Waste Management Plan (RWMP) and Materials Management & Remedial Strategy Plan (MMRSP)** for the proposed development are included in the planning application documentation. The CEMP, RWMP & MMRSP will be further updated by the contractor, agreed with Cork City Council prior to commencement, and implemented by the selected contractor after any consent is received.

All construction personnel will be required to understand and implement the requirements of the CEMP and RWMP and shall be required to comply with all legal requirements and best practice guidance for construction sites.

The CEMP provides for a construction phase management structure to ensure that environmental protection and mitigation measures are put in place. The CEMP requires that these measures will be checked, maintained to ensure adequate environmental protection. The CEMP also requires that records will be kept and reviewed as required to by the project team and that the records will be available on site for review by the planning authority.

All construction personnel will attend induction and training classes as required to ensure that the CEMP is effectively implemented. The CEMP will comply with all appropriate legal and best practice guidance for construction sites.

Project supervisors for the construction phase (PSCP) will be appointed in accordance with the Health, Safety and Welfare at Work (Construction) Regulations 2021 (as amended), and a Preliminary Health and Safety Plan will be formulated during the detailed design stage which will address health and safety issues from the design stages including the removal of contaminated soil, through to the completion of the construction phases.

Adherence to the construction phase mitigation measures presented in this EIAR will ensure that the construction of the proposed development will have an **imperceptible** and **neutral** impact in terms of health and safety during the short-term duration of the works.

4.9.3 Operational Phase

The proposed development is of a high quality design that incorporates generously sized units with integrated energy efficiency measures and an abundance of open space. The impact assessment section did not identify likely significant negative environmental impacts on population and human health arising from the operational phase of the proposed development. Accordingly, mitigation measures are not proposed.

4.10 Residual Impact Assessment

The land will have an urban character for residential and mixed-use at this strategic land rather than brownfield site adjacent to the consented residential development. The residual effect of the proposed development for population and human health is determined to be **significantly positive** having regard to the delivery of much needed new homes in a location that has the carrying capacity in terms of both services and amenities to support the population generated by the scheme.

Allowing people to live in close proximity to the Cork City Centre and to their daily living needs together with access to public transport, employment locations and recreational areas are considered a **significantly positive** effect for population and human health

The proposed mitigation measures will avoid, prevent, reduce impacts on the human environment during the construction and operational phases of the proposed development, where no significant adverse residual effect have been identified.

4.11 Interactions

During the construction phase:

- Land and Soils: Exposure to contaminated soils and potential gases during the construction phase may give rise to health impacts.
- **Landscape & Visual:** Construction processes and plant such as cranes used during the construction phase may give rise to visual impacts.
- **Material Assets: Traffic & Transport:** Increased construction traffic movements on the local road network during the construction phase may give rise to noise, dust, and road safety impacts.
- **Material Assets: Built Services & Waste:** Excavation during the construction phase may give rise to risks to human health from the improper removal, handling and storage of waste. Extended power or telecommunications outages, or disruption to water supply or sewerage systems for existing properties in the area could negatively impact on the surrounding human population and their overall health.
- **Noise & Vibration:** There is potential for effects on human health associated with noise during the construction phase which may impact upon amenity.
- **Air Quality:** There is potential for impact on human health from dust associated with construction activities and thus impacting air quality.

During the operational phase:

- **Landscape & Visual:** The landscape plan will impact the quality of the private, communal and public open spaces, which could impact people's health and well-being.
- **Material Assets: Traffic & Transport:** The proposed development's proximity to services, amenities, and public transport would interact with patterns of traffic and transport locally during the operational phase. Traffic flows within the site have the potential to create safety risks for pedestrians and cyclists.
- **Air Quality:** Energy efficient design within the proposed development may give rise to reduced electricity consumption by future residents, potentially decreasing dependence on fossil fuels for energy generation, resulting in improved air quality. There is potential for impact on human health from a deterioration in air quality associated with emissions from vehicles.
- **Climate:** Energy efficient design within the proposed development may give rise to reduced electricity consumption by future residents, potentially decreasing dependence on fossil fuels for energy generation, resulting in significant CO2 savings.

The potential significant effects on population and human health arising from these interactions have been considered within the relevant discipline and mitigation measures outlined where required. With mitigation measures in place, no significant permanent residual negative effects will occur.

4.12 Monitoring

Measures to avoid negative impacts on Population and Human Health are largely integrated into the design and layout of the proposed development. Compliance with the design and layout will be a condition of any permitted development.

No specific monitoring is proposed in relation to this section. Monitoring of standard construction mitigation measures as outlined in this EIAR will be undertaken by the appointed contractor.

4.13 Worst Case Scenario

The worst-case scenario on population and human health is considered to be the risk of an accident during the construction phase. According to the Health and Safety Authority , in 2023 there were 11 fatal accidents recorded equivalent to 26% of the total fatal work-related incidents. In 2022, 7 fatal accidents occurred in construction equivalent to approx. 25% of the total fatal work-related incidents. This represents an increase from the number recorded the year previous.

The HSA has undertaken a range of activities in regulation, education, accreditation and enforcement to reduce incidents on construction sites. The appointed contractor is required to comply with all relevant Health and Safety legislation and the risk of a fatality is deemed unlikely.

This worst-case scenario is considered **unlikely,** and the significance of the effect is **indeterminable**.

4.14 Conclusion

There are no significant adverse effects with respect to socio-economic factors, land use, or the amenity value potential of the area. Issues which may cause risks and hazards during the construction and operational phase of the development are given due consideration. All necessary mitigation measures will be put in place to ensure the health and safety of all site personnel and neighbouring properties. All other environmental aspects relating to the human environment which could have an adverse effect on the local population such as soils, geology & hydrogeology, water and ecology have been addressed in the relevant chapters of this EIAR.

4.15 References

- National Planning Framework, Ireland 2040 – Our Plan (Government of Ireland, 2018);
- Draft Revised National Planning Framework;
- Southern Regional Spatial and Economic Strategy 2019-2031;
- Cork City Development Plan 2022-2028;
- Sustainable Urban Housing: Design Standards for New Apartments (Guidelines for Planning Authorities) (Department of Housing, Local Government and Heritage, 2020);
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning & Local Government, 2018);
- Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017);
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2022);
- Social Infrastructure Audit, MHP 2024;
- School Demand Assessment Report, MHP 2024;
- Childcare Demand Report, MHP 2024;
- Daylight and Sunlight Report, Model Works 2024;
- Construction Environmental Management Plan (DBFL 2024)
- Central Statistics Office (CSO) website www.cso.ie;
- Department of Education and Sciences (DES) website www.education.ie; and
- Health & Safety Authority https://hsa.ie/eng/

VOLUME II

CHAPTER 5

Landscape and Visual

McCutcheon Halley
CHARTERED PLANNING CONSULTANTS

CHAPTER FIVE
Table of Contents

CHAPTER FIVE
Table of Figures

CHAPTER FIVE
Table of Tables

Chapter Five | Landscape and Visual

5.1 Introduction

This chapter of the EIAR was prepared to assess the potential significant effects of the proposed development on the landscape and visual resource of the study area.

The landscape of the area is described in terms of its existing character, which includes a description of landscape values and the landscape's sensitivity to change. The landscape and visual impact assessment of the proposed development uses representative viewpoints and photomontages. The potential impacts in both landscape and visual terms are then assessed, including cumulative impacts.

It should be read in conjunction with the verified view photomontages document prepared by Penderson Focus Ltd. which forms an appendix to this EIAR (See Appendix 5.1).

5.2 Expertise & Qualifications

This chapter of the EIAR has been prepared by Dara Hilliard. Dara has a BSc Agric. Landscape Horticulture and is a Member of the Irish Landscape Institute (MILI) and Senior Landscape Architect with Enviroguide. Dara has over 15 years' experience in producing Landscaping and Visual Impact Assessments for developments and over 25 years' experience in the landscape design, management and specification.

Dara Hilliard has carried out landscape and visual impact assessments and been involved in the preparation of EIARs for the following projects:

- Kilternan Large Scale residential Development
- Blanchardstown Site B and C, mixed use development consists of the construction of 352 no apartments ranging from 5 no. to 13 no. storeys in height.
- Blanchardstown Site A, Large-scale Residential Development, consisting of 971 no. apartments, in 7 no. buildings, ranging from 1 no. to 16 no. storeys in height.

5.3 Proposed Development

The full description of the proposed development is outlined in Chapter 2 'Development Description' of this EIAR. In summary, the development consists of the permission for the construction of 176 no. 1 and 2 bed apartment units in 2 no. block, 1 no. creche, 1 no. gym, a retail/café space and all associated ancillary development works.

5.3.1 Aspects Relevant to this Assessment

The development at this site will involve the introduction of new buildings and high quality residential architecture to a currently degraded part of the South Docks. The proposed transformation of the character of the site from brownfield to high density urban will result in landscape and visual effects. The type and duration of landscape and visual effects will fall within the following two main stages:

Construction (temporary and of a short duration)

- Potential physical effects arising from construction of the development on the landscape resource within the development application boundary area;
- Potential effects to landscape character or visual amenity within the wider study area as a result of visibility of construction activities or the development during construction;
- Effects of temporary site infrastructure such as – site traffic; construction compounds; and
- Potential effects of partially built development in various stages of construction.

Operational

- Potential effects of the Proposed Development on landscape resources and landscape character, including the perceptual qualities of the landscape;
- Potential effects of the Proposed Development on views and visual amenity; and
- Potential cumulative effects of the development in combination with other planned and Proposed Developments of a similar type and scale upon the landscape and visual resource of the study area.

5.4 Methodology

This section sets out the methodology for the Landscape and Visual Impact Assessment (LVIA) as a result of the Proposed Development.

5.4.1 Legislation, policy and Guidance

The following sources were used to inform and structure this chapter:

- Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment (EIA Directive);
- The National Landscape Strategy (NLS) for Ireland 2015-2025.;
- Guidelines on the information to be contained in Environmental Impact Assessment Reports, Environmental Protection Agency (2022 (EPA Guidelines 2022));
- Draft Advice Notes For Preparing Environmental Impact Statements (EPA, 2015)
- Guidelines for Landscape and Visual Impact Assessment, 3rd edition, 2013 (GLVIA), published by the Landscape Institute;
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment, 2018, published by the Department of Housing, Planning and Local Government;
- Technical Information Note on Townscape Character Assessment, 2016, published by the Landscape Institute;
- Residential Visual Amenity Assessment (RVAA) Technical Guidance Note 2/19, published by the Landscape Institute.
- Transport Infrastructure Ireland Publication no. PE-ENV-01101, published December 2020: Landscape Character Assessment (LCA) and Landscape and Visual Impact Assessment (LVIA) of Specified Infrastructure Projects - Overarching Technical Document

5.4.2 Terminology

Landscape impacts are defined as changes in the fabric, character and quality of the landscape as a result of the development. This includes direct effects on landscape receptors and indirect effects that can alter the wider distinctiveness of the landscape. Landscape receptors are the physical or natural resource, that will experience an impact. The sensitivity of a landscape receptor is its vulnerability to change.

The extents of landscape effects are assessed by first establishing the baseline conditions by classifying baseline data according to its importance and sensitivity. Secondly, evaluation of the landscape impact on the baseline environment using the terminology defined in Tables 1, 3 and 4.

For the purposes of this study, the term 'landscape' as applied throughout should be read as being inclusive of the urban fabric of the city and the built environment, or 'townscape'.

Table 5 1 - The extent of landscape Impact (based on ratings from the EPA Guidelines, 2022)

EXTENT.	DESCRIPTION
Level 1 Imperceptible Effects	An effect capable of measurement but without noticeable consequences. There are no noticeable changes to landscape context, character or features.
Level 2 Not significant	An effect which causes noticeable changes in the character of the landscape but without noticeable consequences. There are no appreciable changes to landscape context, character or features.
Level 3 Slight Effects	An effect which causes noticeable changes in the character of the landscape without affecting its sensitivities. There are minor changes over a small proportion of the area or moderate changes in a localised area or changes that are reparable over time.
Level 4 Moderate Effects	An effect that alters the character of the landscape in a manner that is consistent with existing and emerging trends. There are minor changes over some of the area (up to 30%) or moderate changes in a localised area.
Level 5 Significant Effects	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the landscape. There are notable changes in landscape characteristics over a substantial area (30-50%) or an intensive change over a more limited area
Level 6 Very Significant Effects	An effect which, by its character, magnitude, duration or intensity significantly alters the majority of a sensitive aspect of the environment. There are notable changes in landscape characteristics over a substantial area (50-70%) or a very intensive change over a more limited area
Level 7 Profound Effects	An effect which obliterates sensitive characteristics. There are notable changes in landscape characteristics over an extensive area (70-100%) or a very intensive change over a more limited area

Visual impacts relate solely to changes in available views of the landscape and the effects of those changes on people, viewer group or special interest groups. They include the direct impact of the development on views, the potential reaction of viewers, their location and number and the impact on visual amenity. The intensity of the visual impacts on the baseline visual environment is assessed by using the terminology defined in Tables 2, 3 and 4.

Table 5 2 - The extent of Visual Impact (based on ratings from the EPA Guidelines, 2022)

EXTENT.	DESCRIPTION
Level 1 Imperceptible Effects	There are no noticeable changes to views in the visual landscape.
Level 2 Not significant	An effect which causes noticeable changes in the character of the visual environment but without noticeable consequences. The proposal is adequately screened due to the existing landform, vegetation or constructed features.
Level 3 Slight Effects	An effect which causes noticeable changes in the character of the visual environment without affecting its sensitivities. The affected view forms only a small element in the overall visual composition, or changes the view in a marginal manner.
Level 4 Moderate Effects	An effect that alters the character of the visual environment in a manner that is consistent with existing and emerging trends. The proposal affects an appreciable segment of the overall visual composition, or there is an intrusion in the foreground of a view.
Level 5 Significant Effects	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the visual environment. The proposal affects a large proportion of the overall visual composition, or views are so affected that they form a new element in the physical landscape.
Level 6 Very Significant Effects	An effect which, by its character, magnitude, duration or intensity significantly alters the majority of a sensitive aspect of the visual environment. The proposal affects the majority of the overall visual composition, or views are so affected that they form a new element in the physical landscape.
Level 7 Profound Effects	An effect which obliterates sensitive characteristics. The view is entirely altered, obscured or affected.

Table 5 3 - Quality of the Landscape and Visual Impact (EPA Guidelines 2022)

EXTENT.	DESCRIPTION
Neutral Effect	Neither detracts from nor enhances the landscape of the receiving environment or view
Positive Effect	Improves or enhances the landscape of the receiving environment or a particular view
Negative Effect	Detracts from the quality of the landscape or view

Table 5 4 - The Duration of Landscape and Visual Impact (EPA Guidelines 2022)

EXTENT.	DESCRIPTION
Momentary	Effects lasting from seconds to minutes
Brief	Effects lasting less than a day
Temporary	Effects lasting one year or less
Short-term	Effects lasting one to seven years
Medium-term	Effects lasting seven to fifteen years
Long-term	Effects lasting fifteen to sixty years
Permanent Effects	Effects lasting over sixty years.
Reversible Effects	Effects that can be undone, for example through remediation or restoration.

Please note: "Momentary" and "Brief" Effects as defined in the EPA Guidelines (2022) are not considered relevant to landscape & visual assessment as effects of such short duration are extremely unlikely to generate appreciable effects.

The landscape and visual assessment methodology will be utilised in conjunction with a professional evaluation of the proposed development to determine the degree of impact.

The term 'study area' as used in this report refers to the site itself (i.e. the extent of the planning application) and its wider landscape context in the study of the context, physical landscape and landscape character. This may extend for approximately 4km in all directions from the site in order to achieve an understanding of the overall landscape. In terms of the visual assessment, the study of visual amenity may extend outside the study area, from areas where views of the site are available, but the majority of visual impacts for a development of this nature would be most likely within the local context. Please see Figure 5-3 for a map indicating the study area with reference to identified receptors.

The methodology employed in the landscape and visual impact assessment is as follows:

a) Desktop survey of detailed maps, aerial photography and other information relevant to the study area.

b) Mapping the extent of the area from which a development is likely to be visible is commonly referred to as a Zone of Theoretical Visibility (ZTV). ZTV prediction does not consider the effects of seasons, lighting, weather conditions or visibility over distance. A ZTV can consider the screening effects of existing vegetation or built structures and can omit topographical variations of up to 10m. Therefore, in reality, the principal use of a ZTV is to identify viewing points for further analysis.

c) Site survey and photographic survey to determine landscape character of the general study area and specific landscape.

d) In determining visibility, the views to and from the proposed development areas are considered based on the heights, finishes, design and other visual characteristics of the proposed structures and setting. Verified Photomontages have been prepared by a specialist 3-D Visualisations company to represent selected views which are typical of the views within the area and are intended to demonstrate the scale of the buildings in the wider landscape. The extent of visual effects of the proposed development on the built environment is demonstrated through a selection of representative view locations around the proposed development. The photomontages on which the following assessments is based are provided in the Verified Views issued by Pedersen Focus, provided at Appendix 5.1.

e) Assessment of the potential impacts of the proposed scheme utilising the plan and elevation drawings of the scheme to determine the main impacting features and the degree to which these elements would be visible in relation to observations made during the field survey, and how they compare with the permitted development. In determining visibility, the views to and from the proposed development site are considered and the heights of the proposed structures.

f) A scheme of mitigation measures is proposed, where relevant. These will be defined as measures which will be generally implemented and specific landscape measures which would be site-specific and address particular landscape or visual issues identified.

g) An evaluation of the impacts of the scheme with and without amelioration. For the purposes of assessment the residual visual effects of the scheme are assumed at 10 years following the completion of the proposed development.

5.4.3 Relevant Legislation & Guidance

The following sources were used to inform and structure this chapter:

- Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment (EIA Directive);
- The National Landscape Strategy (NLS) for Ireland 2015-2025.;
- Guidelines on the information to be contained in Environmental Impact Assessment Reports, Environmental Protection Agency (2022 (EPA Guidelines 2022));

- Draft Advice Notes For Preparing Environmental Impact Statements (EPA, 2015)
- Guidelines for Landscape and Visual Impact Assessment, 3rd edition, 2013 (GLVIA), published by the Landscape Institute;
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment, 2018, published by the Department of Housing, Planning and Local Government;
- Technical Information Note on Townscape Character Assessment, 2016, published by the Landscape Institute;
- Residential Visual Amenity Assessment (RVAA) Technical Guidance Note 2/19, published by the Landscape Institute;
- Transport Infrastructure Ireland Publication no. PE-ENV-01101, published December 2020: Landscape Character Assessment (LCA) and Landscape and Visual Impact Assessment (LVIA) of Specified Infrastructure Projects - Overarching Technical Document; and
- Cork City Development Plan 2022-2028.

5.4.4 Site Surveys/Investigations

5.4.5 Consultation

The assessment forms part of an iterative process where, as potentially significant effects are identified, these inform the design of the Proposed Development. Mitigation of the development has been considered throughout the process, including site selection, consultation and design development. This process and the considerations, which informed it, are described within the Design Statement included in the planning submission package.

5.5 Difficulties Encountered

No significant difficulties were encountered during the landscape and visual impact assessment.

5.6 Baseline Environment

5.6.1 Landscape Character

The Proposed Development is located within the City Harbour and Estuary Landscape Character Type of the Cork City Development Plan 2022-2028. This Landscape Character Type is described as having a very high Landscape Value, a very high Landscape Sensitivity and of National Landscape Importance. The key characteristics of the City Harbour and Estuary Character Type are:

- Mouth of the River Lee
- Extensive natural harbour
- Urban, industrial and commercial developments
- Large islands
- Estuarine River

The overall landscape is described as a balance of intensive urban form, rural character and seascape.

From the Cork City Development Plan 2022-2028 the vast majority of the site lies within New Residential Neighbourhoods zoning with a very small portion of the red line boundary extending into the Area of High Landscape Value (see overlap at northern boundary). The area of site within the Area of High Landscape Value is possibly down to a mapping anomaly/ level of accuracy error, as there is no obvious reason on the ground for that distinction. Similar slight misalignments can be noticed elsewhere on the mapping where thin strips of Public Open Space are outside the Area of High Landscape Value.

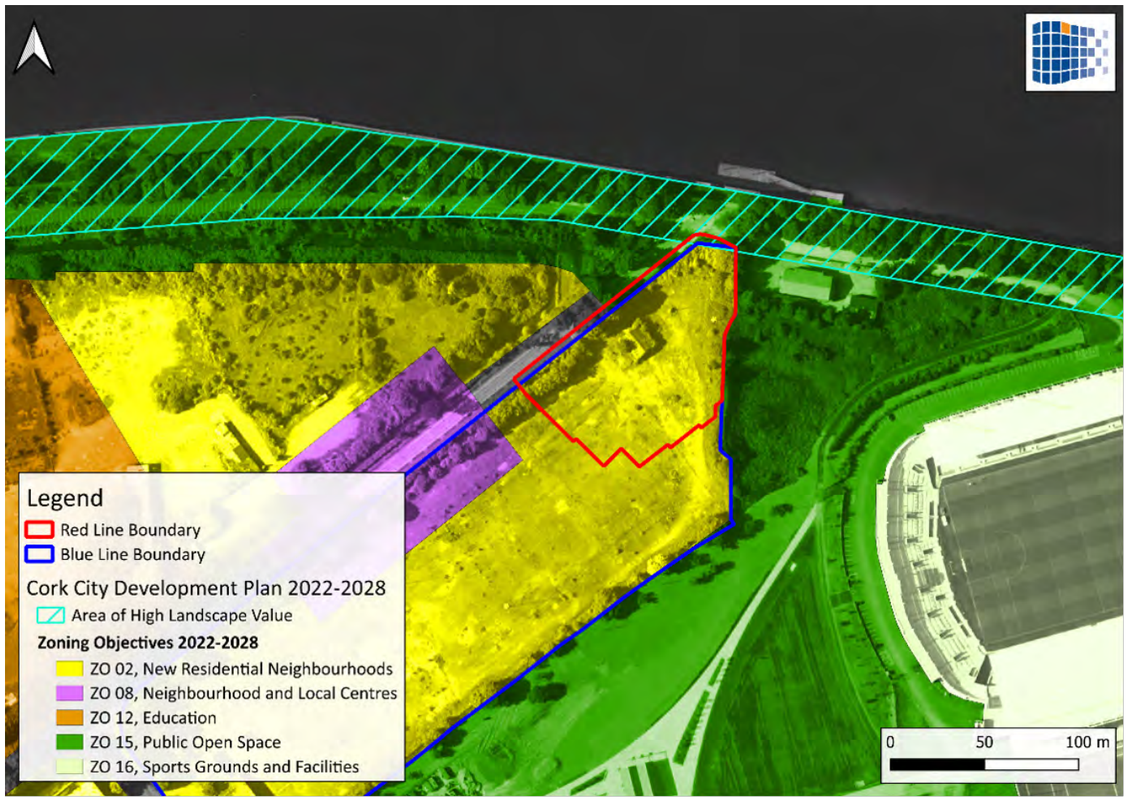


Figure 5 1 Cork City Development Plan 2022-2028 Zoning and Proposed Development Red line Boundary

A Cork City Landscape Study 2008 further identifies and describes the Landscape Character and Key Landscape Assets of Cork City which are contained within the City Harbour and Estuary Landscape Character Type of the Cork County Development Plan 2022-2028. The core study area, of the 2008 study, is comprised of several Landscape Character Areas. The Proposed Development is located within the 'Urban Sylvan Character' area. This may be a mapping error as from a review of historical satellite imagery, the site was a large hardstanding at the time. The 'Urban Industrial / Commercial / Institutional Character' area appears to be a more suitable description.

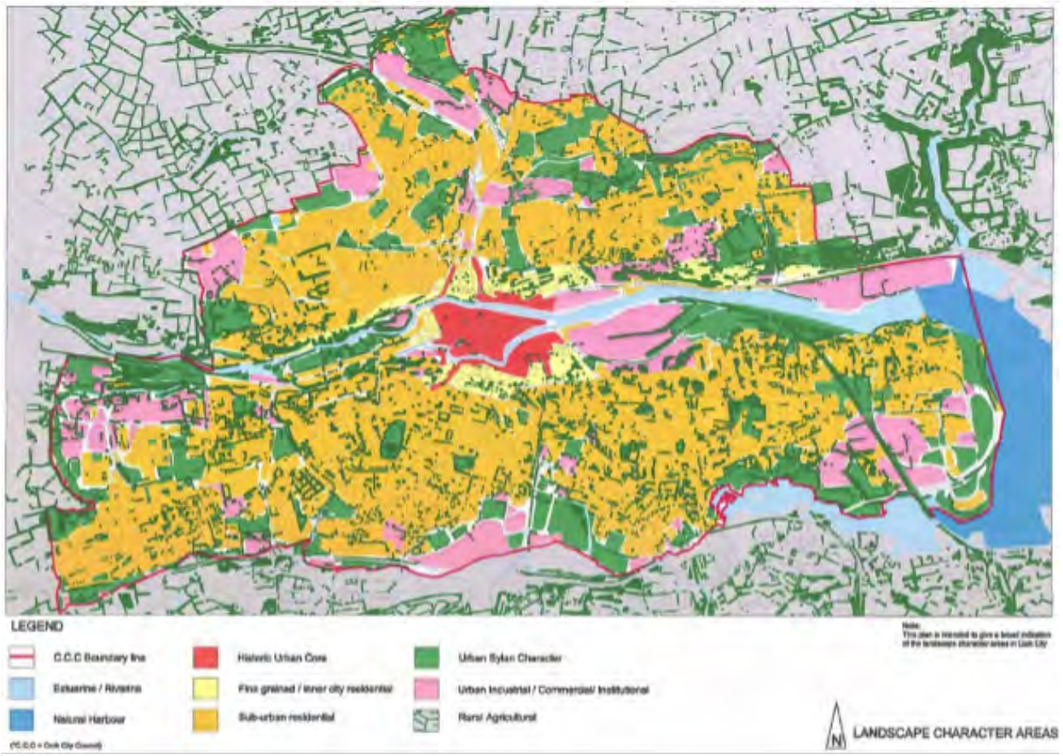


Figure 5 2 - 2008 Landscape Character Assessment of Cork City (site location red diamond)

The 'Urban Sylvan Character' area is described as:

> *The urban/sylvan character of the city is based on a number of factors. Many of the large open spaces are associated with former historic landscapes, natural habitats of river and rail corridors, the grounds of institutional open spaces, public parks and private gardens. The presence of this tree canopy has an immediate visual impact on entering the city from the east or western gateways, and enhances the green rural character of this city landscape.*

The 'Urban Industrial / Commercial / Institutional Character' area is described as:

> *The dominant industrial character areas are located on the north and south docklands to the east of the city center. There are several industrial estates scattered throughout the city's landscape, particularly to the south of the city on the South Ring Road, in Clogheen and the Blackpool Valley and in the north-west of the city. The main commercial areas to the south of the Lee are located in and around Mahon to the south-east of the city. The dominant institutional character areas are the grounds of UCC and the Cork Institute of Technology to the west of the city.*

In the current Cork City Development Plan Opportunity 12 of the Green and Blue infrastructure, Open Space and Biodiversity chapter states: *Update the Cork City Landscape Strategy (2008) to provide a clear evidence base on the character and valued features of the City's landscapes and provide information and guidance to inform the appropriate location, scale and design of new development*

From a site visit the Landscape Character of the site is best described as a part excavated/pre construction state. The landform and landcover shows signs of removal of a previous hard standing with subsoils exposed. The boundaries of the site are defined by construction site fencing and concrete post and wire chainlink fencing. The boundary is open to the lands to the south west where the Marina Quarter SHD is being built.

5.6.2 Landscape Context

The site of the Proposed Development is immediately bounded to the north west by a partial avenue of mature lime trees along Centre Park Road and footpath. Beyond this lies an industrial area and the outskirts of Cork City center.

Directly to the north, mature lime trees form an avenue along The Marina Road, footpath and carparking which are adjacent to the River Lee. The topography rises steeply on the opposite side of the Lee and is covered with mature tree and shrub growth with developments partly visible through the vegetative growth.

To the east, the Lee Rowing Club building and property forms part of the boundary along with an area approximately 500m^{2}of wetlands completing the immediate eastern boundary. Páirc Uí Chaoimh dominates the landscape further to the east.

The Marina Quarter SHD (under construction) bounds the site immediately to the south and south west with The Marina Park located further to the south. The land rises again further south with large areas of residential developments prevalent.

5.6.3 Views & Prospects

Within the current Cork City Development Plan a number of Scenic Rotes – Views and Prospects are identified. Within the Cork City Development Plan a View Management Framework has been developed which identifies Strategic Viewing locations. This information has been overlaid on a Zone of Theroretical Visibility for the development to identify where possible conflicts may occur (See Figure 5-2 below).

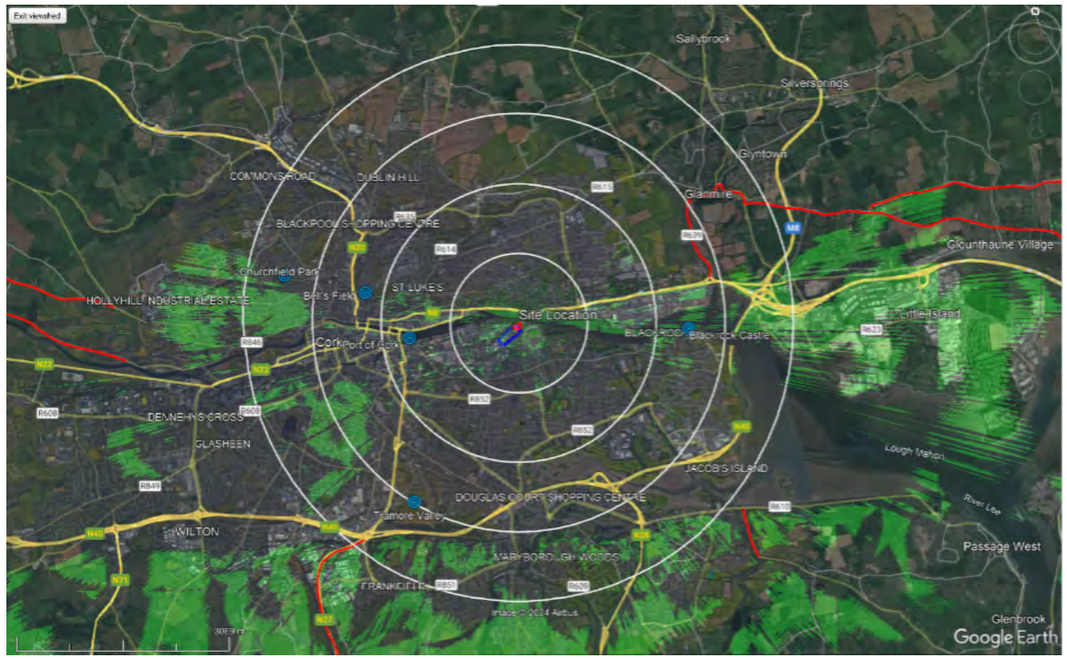


Figure 5 3 – Site Location red closed line, Scenic Routes (red lines), Strategic Viewing Locations blue circles, 1 to 4km radius from site, Bright green theoretical zone of visibility of development.

5.7 The 'Do Nothing' Scenario

If the development were not to proceed the site would be likely to remain as is. In the short term a depression would be left in the ground whilst the granted development would continue to be built to the south.

As the site is zoned for development, in the absence of the proposed development, it is likely that a development of a similar nature is likely to be constructed in the future in line with national policy and the development plan objectives. Therefore, the construction and operational phase impacts outlined in this assessment are likely to occur in the future, even in the absence of the proposed development.

5.8 Potential Significant Effects

Considering the nature of the Proposed Development, potential landscape and visual effects identified will also be considered residual as the proposed landscape mitigation will not be visible in the majority of views within the study area apart from views from the road network surrounding the proposed development site. Primary mitigation measures have been included in the architectural design during the planning and design stage. The proposed public realm cannot mitigate landscape and visual effects further due to the nature and scale of this Proposed Development. Photomontages 1 - illustrates the Proposed Development from representative viewpoint locations within the study area. A description of each photomontage is included in Section 5.10.3.2 herein.

Thirteen photomontages from representative viewpoint locations have been prepared illustrating the nature of visibility of the proposal at various distances and contexts.

The highest visual effects relating to the Proposed Development tend to occur at a local level, where there are no or few intervening building structures or existing vegetation between the viewer and the Proposed Development. The majority of significant effects will be experienced from viewpoint locations located within up to approximately 300m from the site boundary in flat areas, and up to 400-600m radius from elevated areas (particularly along the Montenotte / Tivoli ridges north of the River Lee opposite the Proposed Development and south of the development site), where open or partial views of the development will be possible. This also includes Centre Park Road, Monaghan Road and the western extent of The Marina Road adjacent buildings facing the Proposed Development, which are predominately commercial. The Proposed Development will be in- keeping with the planned regeneration works within the South Docklands Polder Quarter. The proposed architectural design has been sensitive in maintaining unobstructed and open views along the River Lee from Blackrock and similar views to insure the existing characteristic components of the river corridor remain intact.

Middle- or long-distance views beyond 600m become quickly limited. The majority of views will be partially or fully screened by intervening existing buildings, vegetation or topography. Long distance views from within the wider landscape are possible from elevated locations such as St. Luke's and Montenotte and other elevated areas from the North with open view towards the South Docks. However, the change in available views will be barely discernible as the development will not add significant new elements to views across the city viewshed.

Views of the Proposed Development beyond 600m and up to approximately 2.5km radius will become increasingly less visible as the development will be partially screened by intervening landscape and will be seen in the context of other city features. Long distance views from within the wider landscape (or cityscape) are possible from elevated locations such as Shandon Bell Tower, Elizabeth Fort and other publicly accessible locations with an open view across the historic Cork city centre. However, the change in available views will be barely discernible or imperceptible as the development will not add significant new elements to views across the city and therefore integrate into the existing visual landscape.

5.8.1 Demolition Phase

No demolition works are proposed as no structures are existing on the site.

5.8.2 Construction Phase

5.8.2.1 Landscape

Landscape effects and their significance during construction works will be temporary. They will be highest within the immediate vicinity of the site, primarily along the adjacent streets. Principal views of construction works will likely be experienced within a radius of approximately up to 300m from the site boundary.

Principal middle distance views of the construction site can also be experienced in open or partial views of the site from elevated areas located within approximately 400-600m north of the River Lee (particularly along Montenotte and Tivoli ridges). This also includes locations from Lower Glanmire Road, Blackrock Road and on higher ground at Middle Glanmire Road and Lovers Walk as well as locations from rising ground south of the development site, where cranes and scaffolding can still be seen. The magnitude of visual effects is considered medium in these views. Their significance is considered

moderate-significant adverse. Intervening buildings within the Marina Commercial Park, adjacent to the Proposed Development site will obscure direct views of the construction site apart from the upper most sections.

The visibility of construction works within the wider study area beyond 600m will become limited to middle and longer distance open and partial views. Visual effects from these areas are considered low, their significance minor adverse. Long distance views are often fully screened by intervening existing buildings or vegetation

Additional views of the construction works will not be significant due to the effects of distance and intervening built structures.

5.8.2.2 Visual Impact

Similar visual impacts will be experienced as outlined in Section 5.8.2.1.

5.8.3 Operational Phase

5.8.3.1 Landscape

Sections of the landscape adjacent to the development site requires regeneration to transform this part of the city docklands and to continue the planned redevelopment of both the north and south docks.

The operational effects will result in effects of the development on landscape and landscape character, including the perceptual qualities of the landscape, and upon designated landscapes where the primary focus of designations or sensitive landscapes is altered. Potential effects of the development on views and visual amenity such as the potential for the development to alter (beneficial or adverse) the composition of the view from a viewpoint.

5.8.3.2 Visual Impact

Similar visual impacts will be experienced as outlined in Section 5.8.3.1.

5.8.4 Cumulative Effects

Cumulative landscape and visual effects may result from additional changes to the baseline landscape character or visual amenity as a result of the Proposed Development being seen in conjunction with other developments similar in scale, type and nature. In order to ensure a reasonable and proportionate cumulative assessment, only developments that are considered to be in the neighbourhood of the Proposed Development site or are similar in scale, type and nature to the Proposed Development were included within the assessment of cumulative effects within this LVIA.

5.8.4.1 Marina Park

The proposed Marina Park is located to the immediate south east of the proposed development site. This new contemporary City Park is situated within the South Docklands and extends from Shandon Boat Club to Blackrock Harbour over an area of approximately 32ha. The redeveloped Páirc Uí Chaoimh stadium is incorporated into the park.

Given the contrasting nature and scale of both developments, it is unlikely that there will be significant adverse landscape and visual cumulative effects. The redevelopment of Páirc Uí Chaoimh is already contained within the landscape baseline character, and other proposed elements are largely related to small scale interventions such as the creation of paths and the introduction of planting. While these two developments are not similar in scale, it is useful to consider the eastern area outside the city centre in terms of the future vision of city expansion as prescribed and set out in the Cork City Development Plan.

5.8.4.2 Monaghan Road

The proposed upgrade of Monaghan Road to the south of the Proposed Development site will involve upgrading and extending Monaghan Road to provide access to adjacent development sites and a future bridge over the River Lee corridor. Combined views of both developments will be possible. Both developments are not similar in nature and scale, however, the road upgrade will further urbanise this part of the South Docklands and help the integration of the Proposed Development.

5.8.4.3 Strategic Housing Development (SHD) at the Former Ford Distribution Site (Planning Ref. ABP 309059-20)

This permitted SHD is located immediately to the south west of the Proposed Development. This development consists of 12 blocks, of 1,100 apartments, childcare facilities and associated site works. While these two developments are similar in type but not in scale, and it is important and useful to consider the eastern area outside the city centre in terms of the future vision of city expansion as prescribed and set out in the Cork City Development Plan.

The significance of landscape and visual effects is considered to range between Slight to Moderate depending on the proximity to the Proposed Development. The effect of intervening buildings and topography become greater with distance from the site. In locations where the development is visible, it will be seen in the context with other buildings and the city centre skyline.

5.8.5 Summary

The following Table summarises the identified likely significant effects during the construction phase of the proposed development before mitigation measures are applied.

Table 5 5 Summary of Construction Phase Likely Significant Effects in the absence of mitigation

VIEWPOINT	LOCATION	SENSITIVITY	MAGNITUDE OF CHANGE	CONSTRUCTION STAGE SIGNIFICANCE & QUALITY	CUMULATIVE EFFECTS
1	Tivoli Terminal/ Industrial Estate	Medium	Medium - Low	Moderate-Neutral	Moderate
2	Port of Cork 2000 Garden	Medium-High	Medium - Low	Moderate-Neutral	Moderate
3	Port of Cork 2000 Garden	Medium-High	Medium - Low	Moderate-Neutral	Moderate
4	Falcon Hill	High	High	Significant - Neutral	Moderate
5	Lower Glenmire Road	Medium	Medium - Low	Moderate-Neutral	Moderate
6	Michael Collins Bridge	Medium	None	Imperceptible - Neutral	Imperceptible
7	Centre Park Road	Medium	None	Imperceptible - Neutral	Imperceptible

VIEWPOINT	LOCATION	SENSITIVITY	MAGNITUDE OF CHANGE	CONSTRUCTION STAGE SIGNIFICANCE & QUALITY	CUMULATIVE EFFECTS
8	Franciscan Convent	Medium	None	Imperceptible - Neutral	Imperceptible
9	Marina Park	Medium - High	Medium - Low	Moderate-Neutral	Moderate
10	Monahan Road	Medium - High	Medium - Low	Moderate-Neutral	Moderate
11	Ardfoyle Convent	Medium - High	Medium - Low	Moderate-Neutral	Moderate
12	Beaumount Park/ Quarry	Medium - High	Medium - Low	Moderate-Neutral	Moderate
13	Blackrock Castle	Medium - High	Low	Imperceptible - Neutral	Imperceptible

Table 5 6 Summary of Operational Phase Likely Significant Effects in the absence of mitigation

VIEWPOINT	LOCATION	SENSITIVITY	MAGNITUDE OF CHANGE	CONSTRUCTION STAGE SIGNIFICANCE & QUALITY	CUMULATIVE EFFECTS
1	Tivoli Terminal/ Industrial Estate	Medium	Medium - Low	Slight-Neutral	Slight
2	Port of Cork 2000 Garden	Medium-High	Medium - Low	Slight-Neutral	Slight
3	Port of Cork 2000 Garden	Medium-High	Medium - Low	Slight-Neutral	Slight
4	Falcon Hill	High	High	Significant - Beneficial	Slight
5	Lower Glenmire Road	Medium	Medium - Low	Slight-Neutral	Slight
6	Michael Collins Bridge	Medium	None	Imperceptible - Neutral	Imperceptible
7	Centre Park Road	Medium	None	Imperceptible - Neutral	Imperceptible
8	Franciscan Convent	Medium	None	Imperceptible - Neutral	Imperceptible
9	Marina Park	Medium - High	Medium - Low	Slight-Neutral	Slight
10	Monahan Road	Medium - High	Medium - Low	Slight-Neutral	Slight
11	Ardfoyle Convent	Medium - High	Medium - Low	Slight-Neutral	Slight
12	Beaumount Park/ Quarry	Medium - High	Medium - Low	Slight-Neutral	Slight
13	Blackrock Castle	Medium - High	Low	Imperceptible - Neutral	Imperceptible

5.9 Mitigation Measures

Mitigation is a term used to describe the measures or actions that may be taken to minimise environmental effects. The purpose of mitigation is to avoid, reduce and where possible remedy or offset, any significant adverse direct and indirect effects on the environment arising from the Proposed Development.

5.9.1 Incorporated Design Mitigation

The landscape mitigation / public realm design has been developed through an iterative process which has helped to ensure that, wherever possible, adverse effects on the landscape and visual amenity are designed out or minimised, and the opportunity for beneficial effects is maximised. A synopsis and overview of the public realm proposals is described and illustrated below. Further details are included in the Architectural design Statement prepared by JFA Architects and a 'Landscape Report' and accompanying drawings prepared by Áit Urbanism and Landscape Ltd (see figure 5-4 below).

Figure 5 4 Overall Siteplan - Landscape

The Landscape Strategy for the site highlights the large central open space with links adjacent to The Marina and rowing club.

JFA Architects carried out a number of different massing studies as outlined in their Design Statement (see figure 5-5 below). The proposed Blocks A and B were carefully positioned on site to not only complete Centre Park Road in terms of scale and massing, but also to provide connections to the plaza proposed in the neighbouring approved SHD application (see Figure 5-6 below). The proposed scheme follows the rhythm of the neighbouring scheme, providing high quality private and public open spaces.

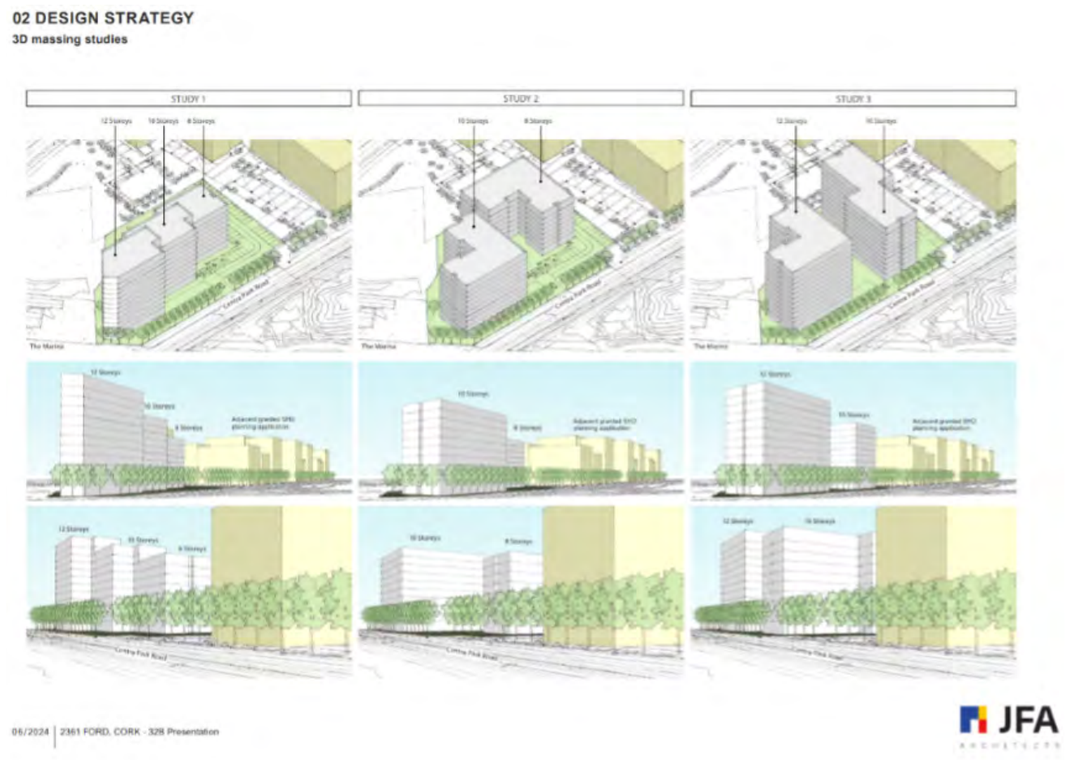


Figure 5 5 JFA 3D massing studies

Figure 5 6 JFA Architects Design Strategy

5.9.2 Demolition Phase Mitigation

As the Proposed Development Site is largely cleared the proposed site hoarding will largely mitigate for any landscape or visual impacts.

5.9.3 Construction Phase Mitigation

Construction effects will result in:

- Potential effects to landscape character or visual amenity within the locality or the wider study area as a result of the visibility of construction activities such as demolition works, the construction / restoration of buildings, associated scaffolding.
- Effects of temporary site infrastructure such as site traffic and construction compounds especially those located in areas adjacent to sensitive landscape and visual receptors.
- Potential physical effects arising from construction of the development and in particular on the landscape resource within the site area.

Landscape and visual effects and their significance during construction works will be temporary. They will be highest within the immediate vicinity of the site, primarily along the adjacent streets. Principal views of construction works will likely be experienced within a radius of approximately up to 300m from the site boundary along Centre Park Road, Monaghan Road and the western extent of The Marina Road as well as from adjacent buildings facing the development site. Principal middle distance views of the construction site can also be experienced in open or partial views of the site from elevated areas located within approximately 400-600m north of the River Lee (particularly along Montenotte and Tivoli ridges). This also includes locations from Lower Glanmire Road, Blackrock Road and on higher ground at Middle Glanmire Road and Lovers Walk as well as locations from rising ground south of the development site, where cranes and scaffolding can still be seen. The magnitude of visual effects is considered medium to high in these views. Their significance is considered moderate-significant adverse. Intervening buildings within the Marina Commercial Park, adjacent to the Proposed Development site will obscure direct views of the construction site apart from the upper most sections.

The visibility of construction works within the wider study area beyond 600m will become limited to middle and longer distance open and partial views. Visual effects from these areas are considered low, their significance minor adverse. Long distance views are often fully screened by intervening existing buildings or vegetation. The following mitigation measures will be included:

- During the construction phase mitigation will be in place with the provision of tree protection fencing to all woodland areas and to treelines proposed for retention. The Parkland and Heritage assets in the southern area of the site are similarly to be excluded from any construction activity using secure protection fencing.
- Where possible proposed tree planting should be undertaken as early as possible in the construction phase to allow for the vegetation to develop in advance of the construction and occupation of dwellings.
- Site hoarding, where natural screening is not available, will be appropriately scaled, finished and maintained for the period of construction of each section of the works as appropriate. To reduce the potential negative impacts during the construction phase, good site management and housekeeping practices will be adhered to.

5.9.4 Operational Phase Mitigation

The operational phase mitigation includes the design, orientation, massing and layout of the Proposed Development, including proposed landscaping and quality public realm creation at ground level, addition of green roofs, choice of colour and material selection, pathways and connectivity. These measures aim to mitigate the visual and landscape impact of the high-rise development during its operational phase, ensuring it integrates well with its surroundings and enhances the local area.

5.10 Residual Impact Assessment

As there are no substantive mitigation measures over and above those incorporated into the design of the proposed development, the impacts will be as per the predicted impacts. The proposed development aligns with and adheres to the policies outlined in the Cork City Development Plan. It creates a high-quality, appealing, and cohesive residential development.

5.10.1 Demolition Phase

Residual landscape impacts during the construction phase will be as per the predicted impacts as the Proposed Development Site is largely cleared the proposed site hoarding will largely mitigate for any landscape or visual impacts.

5.10.2 Construction Phase

5.10.2.1 Landscape

Residual landscape impacts during the construction phase will be as per the predicted impacts as there are no substantive mitigation measures over and above those incorporated into the design of the proposed development.

5.10.2.2 Visual Impact

Residual visual impacts during the construction phase will be as per the predicted impacts as there are no substantive mitigation measures over and above those incorporated into the design of the proposed development.

5.10.3 Operational Phase

5.10.3.1 Landscape

Residual landscape impacts during the operational phase will be as per the predicted impacts as there are no substantive mitigation measures over and above those incorporated into the design of the proposed development.

5.10.3.2 Visual Impact

Residual visual impacts during the operational phase will be as per the predicted impacts as there are no substantive mitigation measures over and above those incorporated into the design of the proposed development.

5.10.3.2.1 Viewpoint 1 Banks of River Lee - Tivoli Terminal/Industrial Estate. (c. 950m from site.)

This viewpoint is located within the Tivoli Terminal along a section of the northern River Lee corridor. This open viewpoint across the river affords views towards the city centre up along the River Lee corridor. Trees along the southern riverbank form a green edge. Stadium lighting at Páirc Uí Chaoimh can just be seen above the tree line. Two chimney stacks at ESB Marina Power Station and a ESB pylon carrying wires across the river dominate the middle ground and are well above the tree line. The city of Cork is in the background.

The value of the view is Medium. Receptors and are considered to have a Medium susceptibility to change. The sensitivity is considered Medium.

The Proposed Development will be partially seen in this view, with the upper sections of several buildings visible above the riverside tree planting. Given the proximity to the city centre further west along the river channel, the development reduces the industrial feel of the location created by pylon and power station towers and add a residential feel to the view. The magnitude of visual change is considered Medium-Low and the resulting significance is Slight- Neutral.

5.10.3.2.2 Viewpoint 2 Banks of River Lee – Port of Cork 2000 Garden. (c.590m from site)
This viewpoint is located within the Port of Cork Garden, a small linear park which runs along a section of the northern River Lee corridor. This open viewpoint across the river affords views towards the city centre up along the River Lee corridor. Trees along the southern riverbank form a green edge. Stadium lighting at Páirc Uí Chaoimh can just be seen above the tree line. Two chimney stacks at ESB Marina power station and a ESB pylon carrying wires across the river dominate the middle ground and are well above the tree line. The city of Cork is in the background.

The value of the view is Medium. Receptors and are considered to have a High susceptibility to change. The sensitivity is considered Medium-High.

The Proposed Development will be partially seen in this view, with the upper sections of several buildings visible above the riverside tree planting. Given the proximity to the city centre further west along the river channel, the development reduces the industrial feel of the location created by pylon and power station towers and add a residential feel to the view. The magnitude of visual change is considered Medium-Low and the resulting significance is Slight Neutral.

5.10.3.2.3 Viewpoint 3 Banks of River Lee – Port of Cork 2000 Garden. (c. 325m from site)
Similar to Viewpoint 2 but closer to the site. More of the Stadium lighting at Páirc Uí Chaoimh can just be seen above the tree line. The Proposed Development reads as smaller/ similar in scale as the surrounding industrial elements as does not dominate the view.

The value of the view is Medium. Receptors and are considered to have a High susceptibility to change. The sensitivity is considered Medium-High.

The magnitude of visual change is considered Medium-Low and the resulting significance is Slight Neutral.

5.10.3.2.4 Viewpoint 4 Falcon Hill (c.440m from site)
This viewpoint can be seen as representative of views south / south east from within Falcon Hill residential area. From this high point views are possible southwards across the city with views of industrial areas, warehousing and residential areas.

The value of this view is considered Medium. Receptors are mainly residents and pedestrians and are considered to have a High susceptibility to change. The overall sensitivity is High.

Mid to upper floors of several buildings will be visible behind the immediate residential setting of Falcon Hill. The significance of visual effects is Significant Beneficial as The Proposed Development will provide a new urban quarter in a currently brownfield area and a starting point of the urban transformation in the eastern South Docklands.

The magnitude of visual change is High and the resulting significance is Moderate.

5.10.3.2.5 Viewpoint 5 Lower Glenmire Road (c.690m from site)
This viewpoint looks east along the River Lee. The ESB pylon and one of the chimney stacks at ESB Marina Power Station dominate the view with The Shandon Boat Club building and infrastructure prominent along the river bank along with the river side tree line.

The value of the view is Medium. Receptors are considered to have a Medium susceptibility to change. The sensitivity is considered Medium.

The upper floors of the Proposed Development will be seen through the undulating capony of the river side trees but the proposed Development will not dominate the scene. The value of the view is Medium. Receptors and are considered to have a Medium susceptibility to change. The sensitivity is considered Medium.

The magnitude of visual change is considered Medium-Low and the resulting significance is Slight Neutral.

5.10.3.2.6 Viewpoint 6 Michael Collins Bridge (c.1600m from site)
The Proposed Development is screened from view by the intervening industrial buildings along the southern side of the river. The Proposed development won't be seen from this viewpoint.

The value of the view is Medium. Receptors and are considered to have a Medium susceptibility to change. The sensitivity is considered Medium.

The magnitude of visual change is None and the resulting significance is Imperceptible Neutral.

5.10.3.2.7 Viewpoint 7 Centre Park Road (c. 1100m from site)
A view looking east down Center Park Road with wide concrete paths bounded by industrial style railing with tall hedges and trees behind forming a soft edge. Industrial silos and wooden lamp standards dominate the view to the left, with an increased density of trees terminating the vista.

The value of the view is Medium. Receptors and are considered to have a Medium susceptibility to change. The sensitivity is considered Medium.

The magnitude of visual change is None and the resulting significance is Imperceptible Neutral.

5.10.3.2.8 Viewpoint 8 Franciscan Convent, Off Blackrock Road (c.850m from site)
Viewpoint looking towards the proposed development from the Franciscan Convent grounds. Foreground is dominated by adjacent industrial roofs and intervening tree growth with the view opening up towards the Montenotte hillside in the distance.

The Proposed Development will be hidden behind the adjacent permitted development.

The value of the view is Medium. Receptors and are considered to have a Medium susceptibility to change. The sensitivity is considered Medium.

The magnitude of visual change is None and the resulting significance is Imperceptible Neutral.

5.10.3.2.9 Viewpoint 9 Marina Park (c.270m from site)
The Marina Park is located to the south east of the Proposed Development. The view is across a bridge and public open space and park infrastructure. The terraces and lighting of Páirc Uí Chaoimh can be seen to the right of the

view and the Marina Park's Central Hall industrial style pavilion dominates the left hand side of the view. The view extends up to the Montenotte hillside in the background. The ESB pylons crossing the River Lee break the skyline.

The Proposed Development will be hidden behind the adjacent permitted development. The Proposed Development will not break the ridgeline/skyline of Montenotte hillside. The adjacent permitted development will be closer in the future view and will dominate the view.

The value of the view is Medium. Receptors and are considered to have a High susceptibility to change. The sensitivity is considered Medium-High.

The magnitude of visual change is considered Medium-Low and the resulting significance is Slight Neutral.

5.10.3.2.10 Viewpoint 10 Monahan Road (c.320m from site)
A view looking north west across The Marina Park with the terraces and lighting of Páirc Uí Chaoimh can be seen to the right of the view and the Marina Park's Central Hall industrial style pavilion just entering the left hand side of the view. The view extends up to the Montenotte hillside in the background. The ESB pylons crossing the River Lee break the skyline, with the Care Choice nursing home in Montenotte being the dominant building sitting just off the ridge line.

The Proposed Development will bookend the permitted adjacent development. The Proposed Development will not break the ridgeline/skyline of Montenotte hillside. Parts of the adjacent permitted development will break the skyline but the existing ESB pylons will be the highest points in the distance.

The value of the view is Medium. Receptors and are considered to have a High susceptibility to change. The sensitivity is considered Medium-High.

The magnitude of visual change is considered Medium-Low and the resulting significance is Slight Neutral.

5.10.3.2.11 Viewpoint 11 Ardfoyle Convent (c.610m from site)
The viewpoint is located within the grounds of Ardfoyle Convent. The upper sections of the Páirc Uí Chaoimh stadium are visible in the centre of the view. Distant hillsides, including Montenotte to the right of this view, are characterised by dense mature tree vegetation with scattered, largely residential development. The ESB pylons crossing the River Lee break the skyline, with the Care Choice nursing home in Montenotte being the dominant building sitting just off the ridge line.

A partial view of the Proposed Development will be visible through gaps in the trees. The upper sections of the Páirc Uí Chaoimh stadium will still dominate the view of the built environment and will appear much more dominant in the view than the Proposed Development.

The value of the view is Medium. Receptors and are considered to have a High susceptibility to change. The sensitivity is considered Medium-High.

The magnitude of visual change is considered Medium-Low and the resulting significance is Slight Neutral.

5.10.3.2.12 Viewpoint 12 Beaumont Park/ Quarry (c.1130m from site)
A view across residential roof tops down towards the River Lee and back up towards Montenotte in the distance. Páirc Uí Chaoimh is clearly visible on the right. The two chimney stacks at ESB Marina Power Station and a ESB pylons carrying wires across the river dominate the middle ground and break the skyline in the distance. The Care Choice nursing home in Montenotte being the dominant building sitting just off the ridge line.

The Proposed Development, while smaller in scale but similar in height to the adjacent Páirc Uí Chaoimh. The adjacent permitted development will visually extent a similar residential density towards the ESB Marina Power Station towers and will reduce in visibility behind the existing trees in the foreground. The Proposed Development will sit comfortably at the valley bottom in the view and highlight a new higher residential density within the landscape. The surrounding skylines will be unaffected.

The value of the view is Medium. Receptors are considered to have a High susceptibility to change. The sensitivity is considered Medium-High.

The magnitude of visual change is considered Medium-Low and the resulting significance is Slight Neutral.

5.10.3.2.13 Viewpoint 13 Blackrock Castle (c.2450m from site)
This view is looking west along the River Lee towards the Proposed Development. It aligns with Strategic Viewing Locations within the current county development plan. The left-hand banks of the Lee are richly covered in tree growth with part of the roof of Páirc Uí Chaoimh and The Elysian visible above the tree line. The right-hand side is dominated by the industrial buildings, cranes and ships operating at the Tivoli Industrial Estate. In the far distance, the City of Cork can be seen.

The upper floor of the Proposed Development will be partially seen behind some of the Tivoli Port cranes and will be back dropped by the rest of the built environment of Cork City. The Proposed Development will not break the skyline.

The value of the view is Medium. Receptors and are considered to have a High susceptibility to change. The sensitivity is considered Medium-High.

The magnitude of visual change is considered Low and the resulting significance is Imperceptible Neutral.

5.10.4 Summary of Post-mitigation Effects

The following Table summarises the identified likely significant residual effects during the construction phase of the proposed development following the application of mitigation measures.

Table 5 7 Summary of Construction Phase Effects Post Mitigation

VIEWPOINT	LOCATION	SENSITIVITY	MAGNITUDE OF CHANGE	CONSTRUCTION STAGE SIGNIFICANCE & QUALITY	CUMULATIVE EFFECTS
1	Tivoli Terminal/ Industrial Estate	Medium	Medium - Low	Moderate-Neutral	Moderate
2	Port of Cork 2000 Garden	Medium-High	Medium - Low	Moderate-Neutral	Moderate
3	Port of Cork 2000 Garden	Medium-High	Medium - Low	Moderate-Neutral	Moderate
4	Falcon Hill	High	High	Imperceptible - Neutral	Moderate
5	Lower Glenmire Road	Medium	Medium - Low	Moderate-Neutral	Moderate
6	Michael Collins Bridge	Medium	None	Imperceptible - Neutral	Imperceptible
7	Centre Park Road	Medium	None	Imperceptible - Neutral	Imperceptible
8	Franciscan Convent	Medium	None	Imperceptible - Neutral	Imperceptible
9	Marina Park	Medium - High	Medium - Low	Moderate-Neutral	Moderate
10	Monahan Road	Medium - High	Medium - Low	Moderate-Neutral	Moderate
11	Ardfoyle Convent	Medium - High	Medium - Low	Moderate-Neutral	Moderate
12	Beaumount Park/ Quarry	Medium - High	Medium - Low	Moderate-Neutral	Moderate
13	Blackrock Castle	Medium - High	Low	Imperceptible - Neutral	Imperceptible

The following Table summarises the identified likely residual significant effects during the operational phase of the proposed development post mitigation.

Table 5 8 Summary of Operational Phase Effects Post Mitigation

VIEWPOINT	LOCATION	SENSITIVITY	MAGNITUDE OF CHANGE	CONSTRUCTION STAGE SIGNIFICANCE & QUALITY	CUMULATIVE EFFECTS
1	1	Tivoli Terminal/ Industrial Estate	Medium	Medium - Low	Slight-Neutral
2	2	Port of Cork 2000 Garden	Medium-High	Medium - Low	Slight-Neutral
3	3	Port of Cork 2000 Garden	Medium-High	Medium - Low	Slight-Neutral
4	4	Falcon Hill	High	High	Significant - Beneficial
5	5	Lower Glenmire Road	Medium	Medium - Low	Slight-Neutral
6	6	Michael Collins Bridge	Medium	None	Imperceptible - Neutral
7	7	Centre Park Road	Medium	None	Imperceptible - Neutral
8	8	Franciscan Convent	Medium	None	Imperceptible - Neutral
9	9	Marina Park	Medium - High	Medium - Low	Slight-Neutral
10	10	Monahan Road	Medium - High	Medium - Low	Slight-Neutral
11	11	Ardfoyle Convent	Medium - High	Medium - Low	Slight-Neutral
12	12	Beaumount Park/ Quarry	Medium - High	Medium - Low	Slight-Neutral
13	13	Blackrock Castle	Medium - High	Low	Imperceptible - Neutral

5.10.5 Cumulative Residual Effects

5.11 Risk of Major Accidents or Disasters

There are no expected significant adverse effects of the project on the environment deriving from the vulnerability of the project to risks of major accidents and/or disasters which are relevant to the project concerned.

5.12 Worst Case Scenario

The views selected for analysis are those from where the proposed development is most likely to be visible and so the analysis of impacts, above, represents a worst-case scenario.

5.13 Interactions

In terms of interactions, the impact on the landscape relates to many of the impact areas considered. In the current context, the most significant interactions are considered in the following Chapters:

- Population and Human Health
- Biodiversity
- Land and Soils

The impact on landscape is significant but consistent with the prevailing planning policy context and sustainable development objectives enunciated in international, national, regional and local policy.

5.14 Monitoring

5.15 Summary of Mitigation and Monitoring

The following Table summarises the Construction Phase mitigation and monitoring measures.

Table 5 9 Summary of Construction Phase Mitigation and Monitoring

LIKELY SIGNIFICANT EFFECT	MITIGATION	MONITORING
Profound effects on the visual and landscape character	Adherence to best building practice.	National and planning conditions/enforcement.

Table 5 10 Summary of Operational Phase Mitigation and Monitoring

LIKELY SIGNIFICANT EFFECT	MITIGATION	MONITORING
Poor design and layout	Sympathetic height, massing and public realm detailing. Design revision following consultation.	Enforcement of planning conditions. Appointment of landscape Architect to supervise public realm planting and construction.

5.16 Conclusion

The Proposed Development will be a recognisable new element in the existing landscape character when experienced from the surrounding street quarters due to its height. The existing site will transform from a vacant brown-field site within the South Docks into a residential hub, which will improve the urban character of the area considerably. The highest direct landscape and visual effects will arise from the change in height of the Proposed Development, raising the skyline in this predominately low-rise part of the city resulting in a high magnitude of landscape change. It will be sympathetic to the existing open character of the river corridor and will not result in a change or modification of the wider landscape character. The proposed architectural design has been sensitive in maintaining unobstructed and open views along the River Lee from Blackrock and similar views to ensure the existing characteristic components of the river corridor remain intact.

Views of the Proposed Development beyond 600m and up to approximately 2.5km radius will become increasingly less visible as the development will be partially screened by intervening landscape and will be seen in the context of other city features. Long distance views from within the wider landscape (or cityscape) are possible from elevated locations such as Shandon Bell Tower, Elizabeth Fort and other publicly accessible locations with an open view across the historic Cork city centre. However, the change in available views will be barely discernible or imperceptible as the development will not add significant new elements to views across the city and, therefore, integrate into the existing visual landscape.

The Proposed Development will not result in any significant landscape or visual impacts but will alter the character of the environment in a manner that is consistent with existing and emerging trends and national policy.

5.17 References and Sources

- Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment (EIA Directive);
- The National Landscape Strategy (NLS) for Ireland 2015-2025.;
- Guidelines on the information to be contained in Environmental Impact Assessment Reports, Environmental Protection Agency (2022 (EPA Guidelines 2022));
- Draft Advice Notes For Preparing Environmental Impact Statements (EPA, 2015)
- Guidelines for Landscape and Visual Impact Assessment, 3rd edition, 2013 (GLVIA), published by the Landscape Institute;

- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment, 2018, published by the Department of Housing, Planning and Local Government;
- Technical Information Note on Townscape Character Assessment, 2016, published by the Landscape Institute;
- Residential Visual Amenity Assessment (RVAA) Technical Guidance Note 2/19, published by the Landscape Institute.
- Transport Infrastructure Ireland Publication no. PE-ENV-01101, published December 2020: Landscape Character Assessment (LCA) and Landscape and Visual Impact Assessment (LVIA) of Specified Infrastructure Projects - Overarching Technical Document
- Cork City Development Plan 2022-2028

VOLUME II

CHAPTER 6

Material Assets: Traffic & Transport

McCutcheon Halley
CHARTERED PLANNING CONSULTANTS

CHAPTER SIX
Table of Contents

CHAPTER SIX
Table of Figures

CHAPTER SIX
Table of Figures

CHAPTER SIX
Table of Tables

CHAPTER SIX
Table of Tables

Chapter Six | Material Assets: Traffic & Transport

6.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) quantifies the existing transport environment and detail the results of assessment work undertaken to identify the potential level of transport impact on the surrounding local road network generated as a result of the subject development. This chapter includes identifying proposed mitigation measures to minimise any identified impacts during both the construction stage and operational stage. Traffic surveys were commissioned for this assessment with the objective of providing up to date background information relating to the existing traffic movement patterns across the local road network.

6.1.1 Expertise

This chapter of the EIAR has been prepared jointly by Vivek Joy and Thomas Jennings. Vivek Joy is Transportation Engineer at DBFL Consulting Engineers, who holds a BTech in Civil Engineering (2016) and MSc in Civil, Structural & Environmental Engineering from Trinity College Dublin 2021. Vivek benefits from having 7 years post graduate experience the last 3 of which have all focused upon the assessment of development generated transport impacts as part of the planning process for a comprehensive range of different development proposals across the country. Thomas Jennings is Director at DBFL Consulting Engineers with 25 years of experience as a traffic engineer and transport planner with particular expertise in network management and design. Thomas has produced EIAR's for a range of developments including Large-Scale Residential Development such as Station Road, Dunboyne, Residential Development at Hackettstown, Skerries and St. Josephs, Hansfield, Clonsilla Dublin. Thomas holds a BEng (Hons) in Civil Engineering and a MSc in International Transportation from Cardiff University (1998).

6.1.2 Proposed Development

The proposed development will include the construction of 176 no. 1, 2 and 3 bed apartment units in 2 no. blocks, 1 no. creche, 1 no. gym, a retail/café space and all associated ancillary development works.

6.2 Methodology

The methodology used to conduct the assessment includes:

- **Review of policies and development standards:** This includes review of relevant regional and local policies, and development standards.
- **Establishing baseline conditions:** An overview of existing conditions will be recorded including existing site location and use, surrounding road network, public transport services as well as other committed developments in the area.
- **Traffic Counts:** Junction turning counts were undertaken and analysed with the objective of establishing local traffic characteristics across the local road network.
- **Trip Generation:** Determine the expected trip distribution and assignment based on existing traffic conditions.
- **Review of Committed Developments:** Identification of third party committed developments that could have a material impact upon the operational performance of the local road transport system. Trip generation and assignment exercise to distribute additional trips across the local road network.
- **Traffic Impact Assessment:** Assess the potential impact of the development on the existing local transport network and its ability to carry the development traffic;
- **Network Analysis:** Further to quantifying the predicted impact of vehicle movements across the local road network for the adopted site access strategy, more detailed computer simulations have been undertaken to assess the operational performance of key junctions in the post development 2026, 2031 and 2041 development scenarios.
- **Proposal of mitigation measures:** Mitigation measures will then be proposed to offset any impacts that may result from the development.

6.2.1 Relevant Legislation & Guidance

In the context of transportation, the subject site policy framework is influenced by the following key documentation. A common theme through each of these key documents is the emphasis placed upon the importance of travel demand management, with many identifying the need to implement mobility management plans with the objective of promoting sustainable travel patterns. These documents include;

- EPA. (2022). Guidelines on Information to be contained in Environmental Impact Assessment Reports. EPA;
- European Commission Guidance on the preparation of the Environmental Impact Assessment Report(2017);
- Traffic and Transport Assessment Guidelines, TII (2014);
- National Sustainable Mobility Policy (2023);
- Design Manual for Urban Roads and Streets;
- Project Appraisal Guidelines for National Roads Unit 5.3 - Travel Demand Projections;
- Sustainable Residential Development and Compact Settlements Guidelines;
- Sustainable Urban Housing: Design Standards for New Apartments (July 2023);
- Cork Metropolitan Area Transport Strategy (CMATS);
- Cork Metropolitan Area Cycle Network Plan (CMATS); and
- Cork City Development Plan (2022-2028).

6.2.1.1 EPA. (2022). Guidelines on Information to be contained in Environmental Impact Assessment Reports. EPA

The Environmental Protection Agency (EPA) in Ireland has established guidelines for Environmental Impact Assessment Reports (EIARs). These guidelines emphasize the importance of identifying and mitigating significant environmental effects early in the project planning process. They outline the structure of EIARs, including sections on project description, baseline environment, assessment of effects, and mitigation measures. The guidelines also stress the need for objectivity, clarity, and consultation with stakeholders, and highlight the importance of involving competent experts in the preparation of EIARs. This framework aims to support informed decision-making and effective environmental protection.

6.2.1.2 European Commission Guidance on the preparation of the Environmental Impact Assessment Report;

The European Commission Guidance on the preparation of the Environmental Impact Assessment (EIA) Report provides a comprehensive framework to ensure that EIAs are effective. This guidance emphasizes the need for detailed descriptions of the project and its potential environmental impacts, including assessments of significant effects and consideration of alternatives. It also outlines the importance of proposing mitigation measures to address adverse impacts. Public participation and transparency are key components, ensuring that stakeholders are well-informed and can contribute to the decision-making process. This approach aims to enhance the quality and reliability of EIAs, supporting sustainable development and environmental protection.

6.2.1.3 Project Appraisal Guidelines for National Roads Unit 5.3 - Travel Demand Projections;

The Project Appraisal Guidelines for National Roads Unit 5.3 - Travel Demand Projections, published by Transport Infrastructure Ireland (TII), provides a framework for forecasting future travel demand on national road networks. They emphasize the use of robust data and modelling techniques to account for factors such as population growth, economic activity, land use changes, and policy interventions. The document ensures consistency and accuracy in projections, enabling efficient resource allocation and alignment with national transportation and sustainability objectives.

6.2.1.4 Traffic and Transport Assessment Guidelines,TII (2014)

The Traffic and Transport Assessment Guidelines, published by Transport Infrastructure Ireland (TII) in 2014, provide a comprehensive framework for evaluating the impact of new developments on transport network. These guidelines outline the principles and methodologies necessary for conducting Traffic and Transport Assessments (TTAs), ensuring that developments are planned with consideration for their effects on the existing transport network. The guidelines emphasize the importance of assessing factors such as traffic flow, road safety, and public transport accessibility. This guideline is intended to provide guidance for developers and their agents, planning authorities and the National Roads Authority (NRA).

6.2.1.5 National Sustainable Mobility Policy

The National Sustainable Mobility Policy was published in April 2022 by the Department of Transport and replaces Smarter Travel 2009. The overall aim of the Policy is to "set out a strategic framework for 2030 for active travel and public transport to support Ireland's overall requirement to achieve a 51% reduction in carbon emissions by the end of this decade".

The Policy is a direct response to the fact that continued growth in demand for road transport is not sustainable due to the resulting adverse impacts of increasing congestion levels, localised air pollution, contribution to global warming and the additional negative impacts to health through promoting increasingly sedentary lifestyles.

The policy is accompanied by an Action Plan with a total 91 actions organised by goal to be completed by 2025. Each action has been assigned to a specific government department or body with the hope of creating accountability for their implementation. The success of the policy will be measured using an annual National Household Travel Survey administered by the National Transport Authority.

6.2.1.6 Design Manual for Urban Roads and Streets (2019)

DMURS guidance document was produced by the Department of Transport, Tourism and Sports and the Department of Environment, Community and Local Government in March 2013 and updated in May 2019. It provides guidance relating to the design of urban roads and streets. It presents a series of principles, approaches and standards that are necessary to achieve balanced, best practice design outcomes regarding street networks and individual streets.

The manual places a significant emphasis on car dominance in Ireland and the implications this has had regarding the pedestrian and cycle environment. The document encourages more sustainable travel patterns and safer streets by proposing a hierarchy for user priorities. This hierarchy places pedestrians at the top, indicating that walking is the most sustainable form of transport and that by prioritizing pedestrians first, the number of short car journeys can be reduced, and public transport made more accessible.

Second in the hierarchy are cyclists with public transport third in the hierarchy and private motor vehicles at the bottom. By placing private vehicles at the bottom of the hierarchy, the document indicates that there should be a balance on street networks and cars should no longer take priority over the needs of other users.

The manual emphasizes that narrow carriageways are one of the most effective design measures that calm traffic. The standard width of an arterial and link street is between 5.5m and 6m. Desirable footpath widths are between 2m - 4m. The 2m width should be implemented to allow for low to moderate pedestrian activity. A 3m - 4m footpath should be implemented to allow for moderate to high pedestrian activity.

The focus of the manual is to create a place - based sustainable street network that balances the pedestrian and vehicle movements. The manual references the different types of street networks, including arterial streets, link streets, local streets, and highlights the importance of movement.

6.2.1.7 Sustainable Residential Development and Compact Settlements Guidelines

The 'Sustainable Residential Development and Compact Settlements - Guidelines for Planning Authorities' (January 2024) sets out policy and guidance in relation to the planning and development of urban and rural settlements, with a focus on sustainable residential development and the creation of compact settlements.

These Guidelines replace the Sustainable Residential Development in Urban Areas Guidelines for Planning Authorities issued as Ministerial guidelines under Section 28 of the Act in 2009, which in turn replaced the Residential Density Guidelines issued in 1999. They build on and update previous guidance to take account of current Government policy and economic, social and environmental considerations. There is a renewed focus in the Guidelines on the renewal of existing settlements and on the interaction between residential density, reduced private car travel, housing standards and quality urban design and placemaking to support sustainable and compact growth.

6.2.1.8 Sustainable Urban Housing: Design Standards for New Apartments (July 2023);

This guideline document was initially produced by the Department of Housing, Planning and Local Government (DHPLG) in 2018 with an update released in July 2023. The purpose of this document is to set out standards for apartment focused developments, mainly in response to circumstances that had arisen whereby some local authority standards were at odds with national guidance. These Guidelines apply to all residential developments that include apartments that may be made available for sale, whether for owner occupation or for individual lease. The DHPLG advocates that cycling provides a flexible, efficient, and attractive transport option for urban living and these guidelines require that this transport mode be fully integrated into the design and operation of all new apartment development schemes. The quantum of car parking or the requirement for any such provision for apart-

ment developments will vary, having regard to the types of location in cities and towns that may be suitable for apartment development, broadly based on proximity and accessibility criteria.

6.2.1.9 Cork Metropolitan Area Strategic Plan (2020)

The Cork Metropolitan Area Strategic Plan (MASP) was developed by the National Planning Framework as an essential element of the Regional Spatial and Economic Strategy for the Southern Region which was published in 2020. In the context of the subject development site and the proposed residential development, the most relevant transport policies are summarised as follows:

- **Policy Objective 7-Integrated Landuse and Transport Planning:** "Seek investment and delivery of sustainable transport infrastructure as identified through the Cork Metropolitan Area Transport Strategy and delivery of e-mobility infrastructures."
- **Policy Objective 8-Key Transport Objectives:** "Integration of All Sustainable Travel Modes: Infrastructure to provide for integration between all modes of transport to support the use of sustainable travel choices."
- **Policy Objective 8-Key Transport Objectives:** "East-West Light Rail Public Transport Corridor: A east-west public transport corridor from Mahon to Ballincollig via the City Centre, serving CIT, CUH, UCC, Kent Station, Docklands, Mahon Point. The corridor requires development consolidation along it at appropriate nodal points for a high-capacity service.
- **Policy Objective 8- Key Transport Objective:** "Core Bus Network: A comprehensive network of high frequency bus services operating on a core radial and orbital bus network as provided for in CMATS."
- **Policy Objective 7- Integrated Land use and Transport Planning:** "The Core Strategies of City and County Development Plans in the Cork Metropolitan Area shall allocate the distribution of future population and employment growth with the integration of land use and transportation planning principles, public transport nodal points and targets identified through the Cork Metropolitan Area Transport Strategy."
- **Policy Objective 7-Integrated Land use and Transport Planning:** "Identify and deliver strategic locations for increased residential and employment use at public transport interchange locations relating to the proposed Light Rail Transit Route, Suburban Rail, and the strategic bus network, where high levels of accessibility by public transport can be achieved. Seek sustainable higher densities where practicable at public transport nodal points."

6.2.1.10 Cork Metropolitan Area Transport Strategy 2040 (2020)

The Cork Metropolitan Area Transport Strategy (CMATS) was developed by the National Transport Authority, in collaboration with Transport for Ireland and published in 2020. The goal of this document is to deliver an accessible, integrated transport network that enables the sustainable growth of the Cork Metropolitan Area as a dynamic, connected, and internationally competitive European city region as envisaged by the National Planning Framework 2040. Given that the NPF 2040 envisages Cork to become the fastest -growing city region in Ireland, with a projected 50% to 60% increase of its population by 2040, the significant increase in the demand for travel is managed and planned carefully within this document. CMATS represents a coordinated land use and transport strategy for the Cork Metropolitan area, setting out a framework for the planning and delivery of transport infrastructure and service to support the CMA's development in the period up to 2040. In the context of the subject development site and the proposed residential development the most relevant areas include:

- *"In terms of employment and education, CMATS prioritises development along its identified high capacity public transport corridors. Increased employment growth along the proposed Ballincollig-City CentreDock-lands-Mahon high capacity public transport corridor is envisaged while also serving the significant education, health and research cluster at University College Cork, Cork Institute of Technology and Cork University Hospital."*
- *"Ensure effective integration between transport and land-use through the delivery of Public Transport Orientated Development (PTOD). "*
- *"Key future growth enablers for Cork include: The development of a much enhanced Citywide public transport system to incorporate subject to further analysis, proposals for an east-west corridor from Mahon, through the City Centre to Ballincollig."*
- *"Some key primary cycle routes to be improved within the CMA include: ƒ Segregated routes along the City Docks waterfront areas including the EuroVelo Route 1 from Cork City Centre to Tivoli and Little Island."*
- *The key roads within the South Docklands area are Centre Park Road and Monahan Road. Both roads will need to be upgraded to accommodate increased demand by public transport, walking and cycling.*
- *"Improved road and bridge connectivity to Cork's North, South and Tivoli Docks is required to support the development of these areas."*
- *"Promote a higher standard of urban design and permeability in new and existing developments, and in highway design, in a fashion that consistently prioritises pedestrian movement and safety over that of the private car."*

6.2.1.11 Cork City Development Plan 2022-2028

The Cork City Development Plan 2022-2028 sets out how the city will grow and develop over the next six years, while complementing a longer 2040 vision. With a population of over 210,000, Cork is an emerging international city of scale and a national driver of economic and urban growth. Project Ireland 2040 designates the city for significant additional growth over the next 20 years, supported by large scale investment. The Cork City Development Plan 2022-2028 sets out how the city can best enable this growth and investment over the next six years, while continuing to be an innovative, vibrant, healthy, and resilient city. In the context of the subject development site the most relevant transport policies are summarised as follows:

- **Strategic Vision-Compact Growth:** "Integrate land-use and transport planning to achieve a compact city with 50% of all new homes delivered within the existing built-up footprint of the City on regenerated brownfield, infill and greenfield sites identified in the Core Strategy, and to achieve higher population densities aligned with strategic infrastructure delivery."
- **Strategic Vision-A city of neighbourhoods and communities:** "Develop a sustainable, liveable city of neighbourhoods and communities based on the 15-minute city concept, ensuring that placemaking, accessibility and safety is at the heart of all development."
- **Objective 2.10-The 15-Minute City:** "To support the delivery of a 15-Minute City that supports Compact Liveable Growth by creating vibrant local communities that can access all necessary amenities within a 10-minute walk/cycle and access workplaces and other neighbourhoods with a 15-minute public transport journey. Implementation will include walkable neighbourhoods, towns and communities with mix of uses, house types and tenure that foster a diverse, resilient, socially inclusive and responsive city. This includes support for public and active travel infrastructure projects and services and enhanced neighbourhood permeability. Strategic infrastructure and large-scale developments shall demonstrate how they contribute to a 15-minute city and enhance Cork City's liveability and accessibility.

- **Objective 2.23 -Strategic Regeneration:** "Support and enable the development and renewal of strategic regeneration sites in Cork Docklands, Cork City Centre and areas throughout the city as key deliverables to achieve NPF growth targets."
- **Objective 10.23- Integration into its Surroundings:** "It is an objective of Cork City Council to ensure that the City Docks is integrated into its surroundings by… Provision of connections across the river to integrate the North Docks (including Kent Station) and South Docks, and the City Docks with Tivoli Docks and the wider Metropolitan Are. Provisions of adequate capacity for pedestrian/cycle movement between the city docks and the city centre"
- **Objective 4.3-Strategic Location of New Development:** "To ensure that all new residential, employment and commercial development are focused in areas with good access to the planned high frequency public transport network."
- **Objective 4.4-Active Travel:** "To actively promote neighbourhoods with adequate walking and cycling infrastructure connected to high-quality public realm elements… To support the expansion of the Cork Bikes Scheme. To accommodate other innovations such as electric bike hire, and other solutions that will encourage active travel. "walking and cycling as efficient, healthy, and environmentally friendly modes of transport… To support the 15-minute city concept and walkable."
- **Objective 4.5-Permeability:** "All new development, particularly alongside the possible routes identified for public transport improvements, shall include permeability for pedestrians, cyclists, and public transport so as to maximise its accessibility".

6.2.2 Study Area

The study area (approx. 1.4 km2) is defined by the Zone of influence generated of the proposed development in terms of the scale of potential traffic and transport impacts across the receiving environment. Responding to the scale of the development the associated car parking provision and the most likely travel paths across the local road network, the preliminary zone of Influence across the road network was identified. A desktop study was undertaken to source publicly available information on projects within the Zone of influence. Traffic surveys has been undertaken at key Junctions near the subject site which has the potential to experience a material cumulative impact as a result of the proposed scheme. The analysis of these traffic surveys established the specific extent of the road network ZoI. Accordingly, the ZoI of traffic impact on the local road network is confined to junctions shown in Figure 6-1 below. The ZoI for the public transport network has focused upon the closest bus interchanges to the site (on Centre Park Road and Monahan Road) as there are the interchanges that residents (and visitors) of the proposed development will most likely use.

Figure 6 1: Study Area (Source: Google Maps)

6.2.3 Consultation

A S32B meeting was held with the council which was followed by LRD opinion (Ref No: LRD 002-24). The LRD opinion suggested the relocation of the vehicle entrance serving undercroft car park to Street C. The opinion also recommended to consider impact of construction traffic of permitted developments on local network near subject site with similar construction phase to that of the subject development. Furthermore, the LRD opinion noted the requirement of additional Transport related information requirements such Mobility Management Plan (MMP), Construction Traffic Management Plan (CTMP) that forms part of the planning application documentation.

6.3 Difficulties Encountered

The process of estimating construction traffic for specific periods proved difficult for the adjoining 3rd party sites primarily due to the limited availability of detailed information provided in the planning documentation.

6.4 Baseline Environment

6.4.1 Site Location

The proposed development is located to the eastern suburb of Cork City, approximately 2km from the city centre, within the South Docklands Area. The general location of the subject site in relation to the surrounding road network is illustrated in Figure 6 2 below.

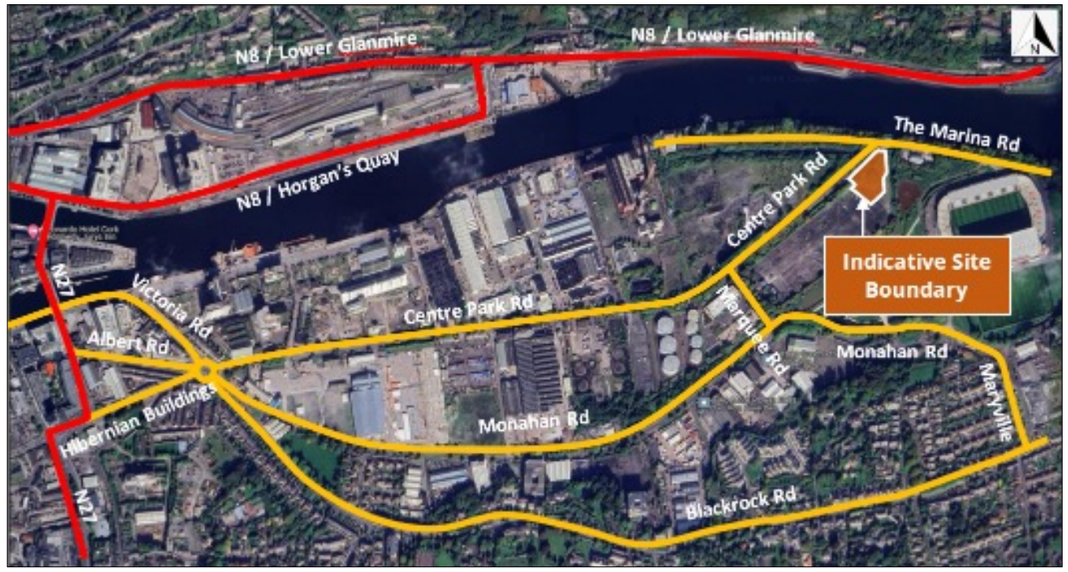


Figure 6 2: Site Location (Source: Google Maps)

6.4.2 Adjacent SHD Planning Permission (ABP-309059-20)

The proposed development is located adjacent to the permitted Marina Quarter SHD scheme as located on the grounds of the former Ford Distribution site. This includes demolition of existing structures, 10-year permission for the construction of 1,002 no. apartments, Commercial and community facilities, including 5 no. retail units, 1 no. Montessori school, 1 no. creche, a medical centre, bar, café, venue / performance area, 2 no. community resource spaces and ancillary signage.

Figure 6 3:Adjacent SHD Scheme Layout

6.4.3 Road Infrastructure

6.4.3.1 Existing Road Network

The subject site is located immediately to the south of the Centre Park Road which is a two-lane road stretching 1.5km in length providing access with Victoria Road roundabout to the west and to Marina Road to the northeast. To the south of the subject site, Marquee Road runs north south, giving access between Centre Park and Monahan Road. Monahan Road, a two-lane road, extends from the Victoria Road roundabout in the west to Blackrock Road in the east, passing through Maryville. Located to the northeast of the proposed development, The Marina is a two-lane road that runs along the southern bank of the River Lee, connecting Blackrock Village with Centre Park Road.

6.4.3.2 Pedestrian And Cycle Facilities

To the northwest of the subject site, pedestrians can benefit from footpaths provided on both sides of Centre Park Road whilst streetlights are provided on one side of the road corridor. Cyclists can avail of a protected cycle lane segregated by flexible bollards on the northern side of the road carriageway (Refer to Figure 6 4). Further south of the subject site, the Marquee Road corridor has footpaths provided on both sides of the road and cyclists benefit from the provision of protected cycle lane on one side of the road (Refer to Figure 6 5).

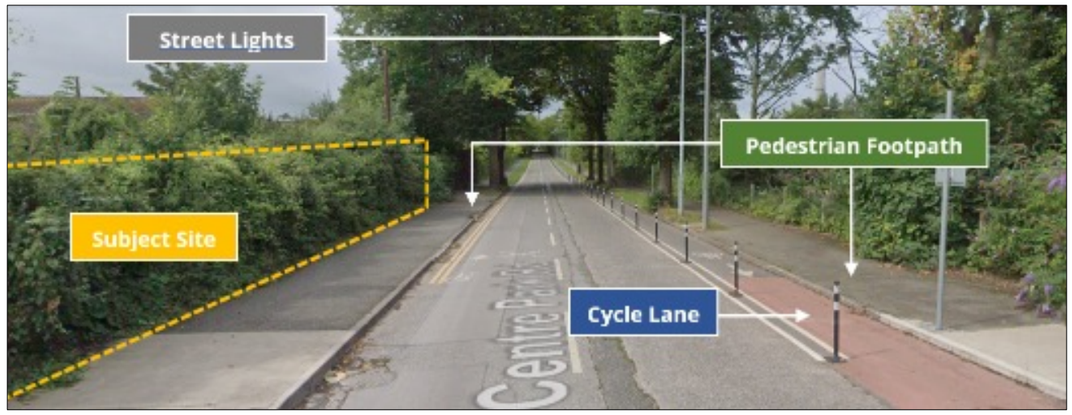


Figure 6 4: Cycle Facilities on Central Park Road

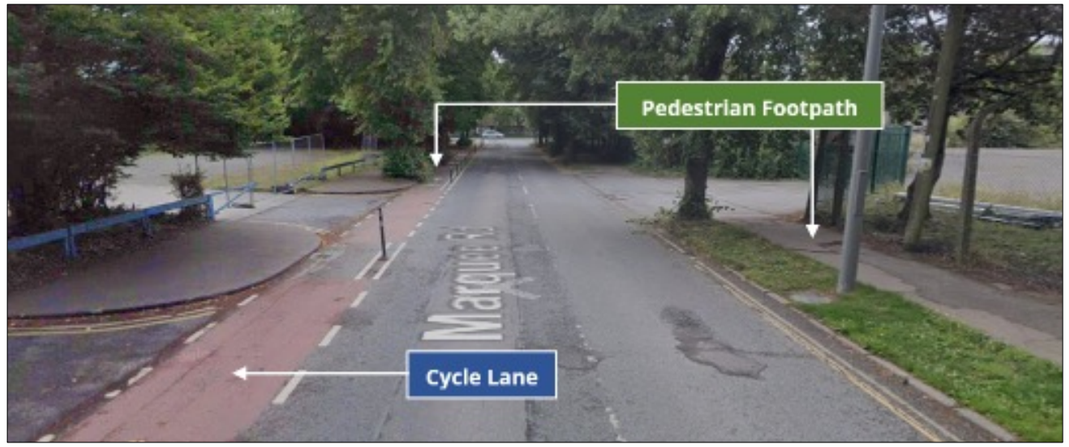


Figure 6 5: Cycle Facilities on Marquee Road

To the northeast of the subject site, The Marina Road corridor provides dedicated pedestrian/ cyclist facilities on one side of the road. In the west direction along The Marina Road, pedestrians and cyclists can benefit from the provision of the Cork Harbour Greenway, which runs from Páirc Uí Chaoimh stadium to Passage West, along the route of the former Cork Electric Tramways and Lighting Company Blackpool — Cork tram line, and Cork, Blackrock and Passage Railway as illustrated in Figure 6-6 below.

Figure 6 6: Pedestrian & Cycle Facilities on The Marina Road

6.4.4 Public Transport

6.4.4.1 Bus Services

The subject site benefits from Bus Éireann operated bus Route 212 which connects Kent Station to Mahon Point via Blackrock Road, including the Centre Park Road area. The Bus Éireann Route 212 can be accessed from two nearby bus stops; one located on Centre Park Road and the other on Monahan Road. Both stops are approximately 700 meters away (equivalent to a 10-minute walk) from the development site. Approximately 1.1 kilometres from the subject site, Bus Éireann Routes 202 and 202A can be accessed at bus stops on Blackrock Road. The route 202 operates daily, connecting Mahon Point to Hollyhill via Skehard road, Cork City, and Kilmore Rd. The 202A route offers daily services connecting Mahon Point to Hollyhill via Ringmahon, Cork City and Harbour View Road. The local Bus stops are all within walking distance of the subject site as illustrated in Figure 6 7.

Figure 6 7: Bus Stop Locations

Table 6 1: Bus Service Frequency (No. of Services per day)

ROUTE NO.	OPERATOR	ROUTE	MON-FRI	SATURDAYS	SUNDAY
212	Bus Eireann		17	17	15
			17	17	15
202	Bus Eireann		47	42	33
			48	43	32
202A	Bus Eireann		46	42	35
			49	43	33

6.4.4.2 Heavy Rail Services

The subject site is located approximately 2.7 km east of Kent Train Station with rail services operating between Dublin, Mallow, Cobh/Midleton, and connection to Tralee, Waterford, Clonmel and Limerick via Limerick Junction Station. The commuter typically run every service Mallow-Cobh and Middleton calls at Kent Station approximately every 15 minutes and Intercity services from Cork to Dublin typically run every hour during the day. Waterford-Clonmel-Limerick Junction service operates a few services during morning and evening hours. Figure 6 8 below summarises the frequency of services and shows the location of train station from the subject site.

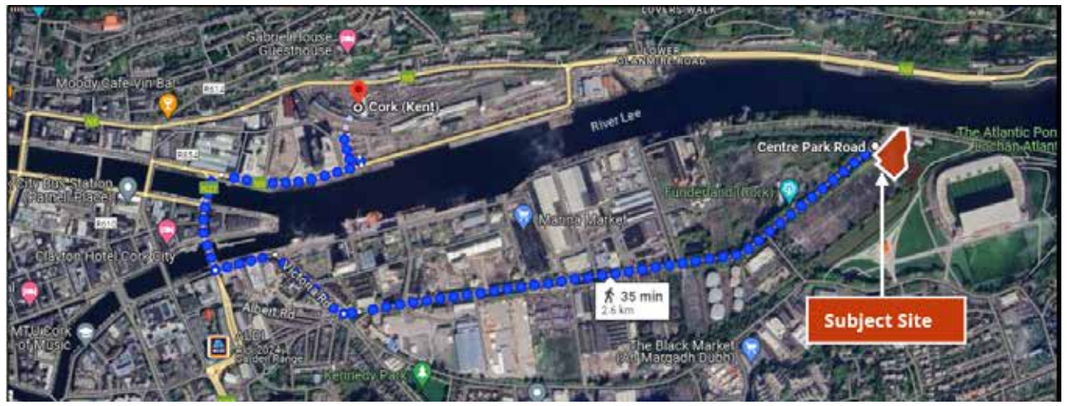


Figure 6 8: Train Station near vicinity of Subject site.

Table 6 2: Rail Service Frequency (No. of service per day)

TRAIN SERVICE	WEEKDAYS	SATURDAYS	SUNDAYS & BANK HOLIDAYS
Dublin - Cork Route - Direct Services	17		12
Cork - Dublin - Direct Services	16		12
Mallow - Cork - Midleton - Cobh -	63	49	31
Cobh - Midleton - Cork – Mallow	63	49	31
Limerick Junction - Clonmel - Waterford	2		-
Waterford - Clonmel - Limerick Junction	2		-

6.4.5 Accessibility

6.4.5.1 Accessibility- Pedestrian Catchment

As illustrated in Figure 6 9 pedestrians from the site benefit from footpaths along the Centre Park Road and Marquee Road. Future residents / visitors walking to / from the site will be within a 10-minute walk of bus stops, the Marina Walkway, and Páirc Uí Chaoimh. Future residents will also be within a 10-minute walk of the Monahan Road Bus stop. Within the 15-minute walking time catchment, pedestrians can access a variety of bus stops, the Marina Market, and the Passage Railway Greenway. Within the 20-minute walking catchment, pedestrians can access Kennedy Park, Blackrock Road, and various bars and restaurants.

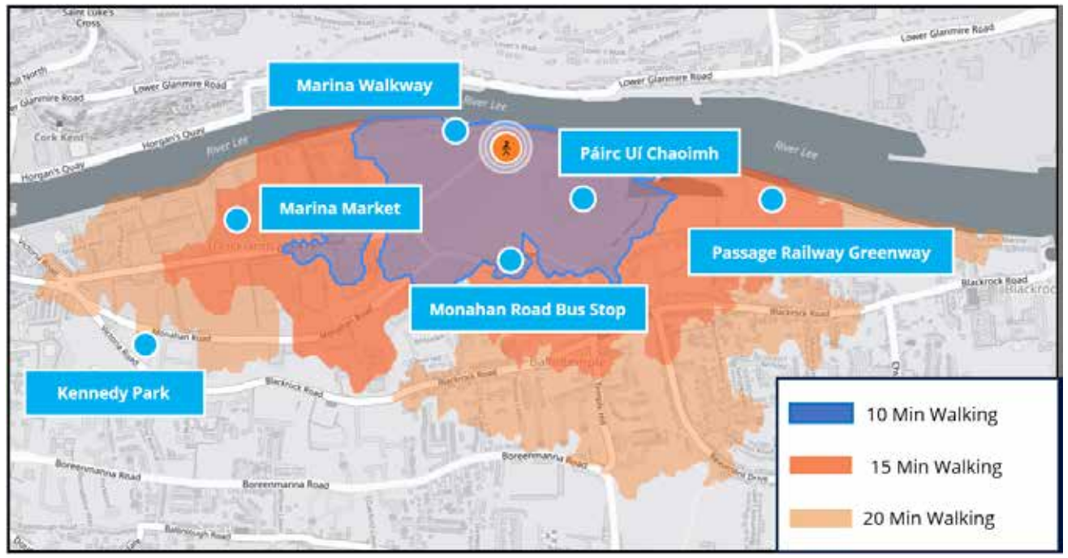


Figure 6 9: Subject Site's Pedestrian Catchment (Source: Traveltime.com)

6.4.5.2 Accessibility- Cycling Catchment

The site is very accessible by bicycle being located within a network of cyclable streets some of which currently benefits from dedicated cycle infrastructure. Figure 6 10 illustrates cycle travel time catchment areas reachable from the subject site. Cyclist's from the subject site can travel to Mahon Point Shopping Centre, Blackrock, Douglas, and Cork City Centre within a 15-minute cycle. Within this range is a variety of schools including St. Michaels Primary School, Ursula Primary School, Urseline secondary school and Ashton School. The South Infirmary Victoria University Hospital and Kent Train Station are also located in this catchment. There are a variety of key destinations within a 30-minute cycle such as Wilton, Rochestown, and Blackpool. Wilton Shopping Centre, University College Cork, Cork University Hospital, several primary and secondary schools, and a variety of key employers such as Dell, Deloitte, and Cadence are also within this catchment. Within a 45-minute cycle of the site are key employment hubs such as Little Island, Ballincollig, and Glanmire. MTU Cork, the Apple campus, and Cork Airport are within this catchment also.

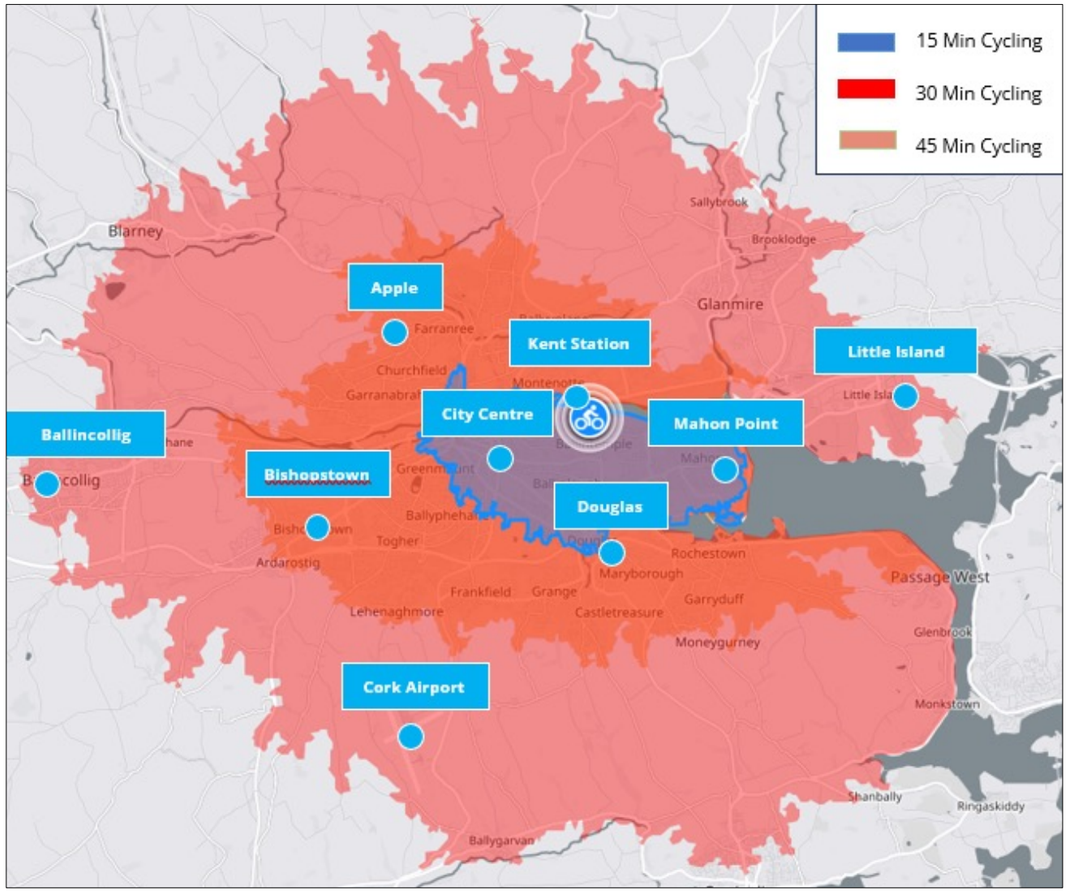


Figure 6 10: Subject Site's Cycling Catchment Area (Source: Traveltime.com)

6.4.5.3 Accessibility - Public Transport Catchment

Figure 6 11 illustrates the analysis of public transport catchment areas accessible from the subject development site. Within a 30-minute public transport journey are areas such as Cork City Centre, Mahon Point Shopping Centre, and Kent Station. Within a 45-minute public transport journey are areas such as University College Cork, Little Island, Wilton, Cork Airport, and Blackpool. Within a 60-minute public transport journey are key locations such as Midleton, Carrigtwohill, and Carrigaline. Along with these locations are destinations such as Cobh, Middletown, Watergrasshill, Mallow and Ballincollig.

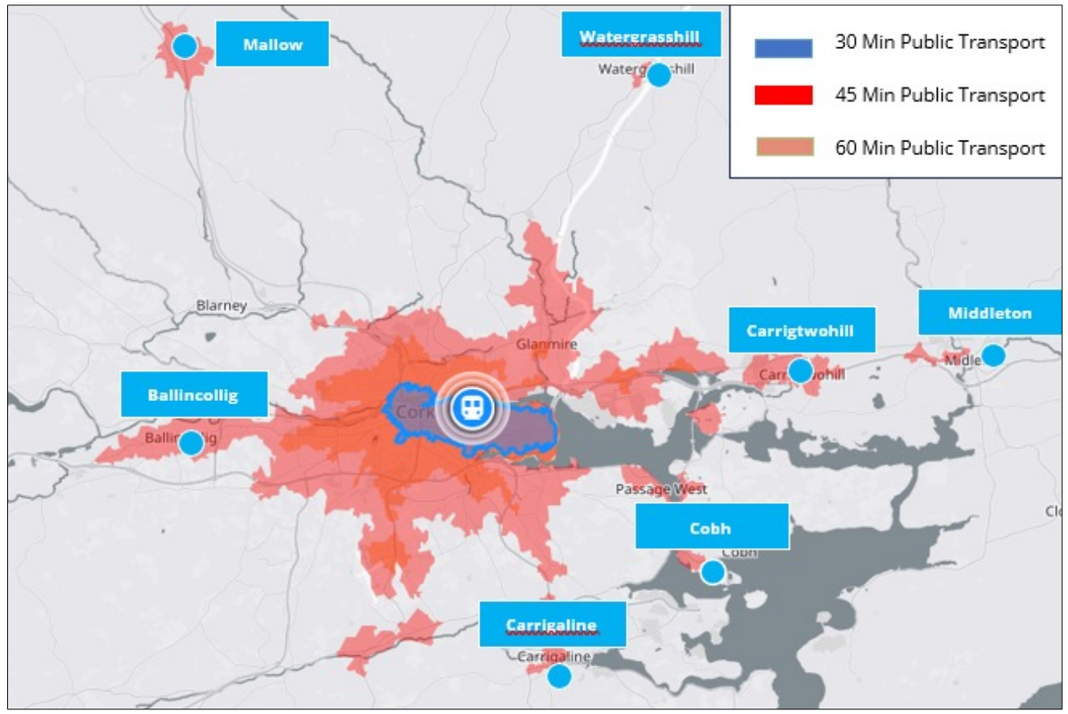


Figure 6 11: Shows the Subjects Site Public Transport Catchment (Source: Traveltime.com)

6.4.6 Future Infrastructural Improvement

6.4.6.1 Cycle Proposals-Cork City Development Plan 2022-2028

The Cork City Development Plan 2022-2028 outlines how the city can enable growth through planned investment over the six-year period, while continuing to be an innovative, vibrant, healthy and resilient city.

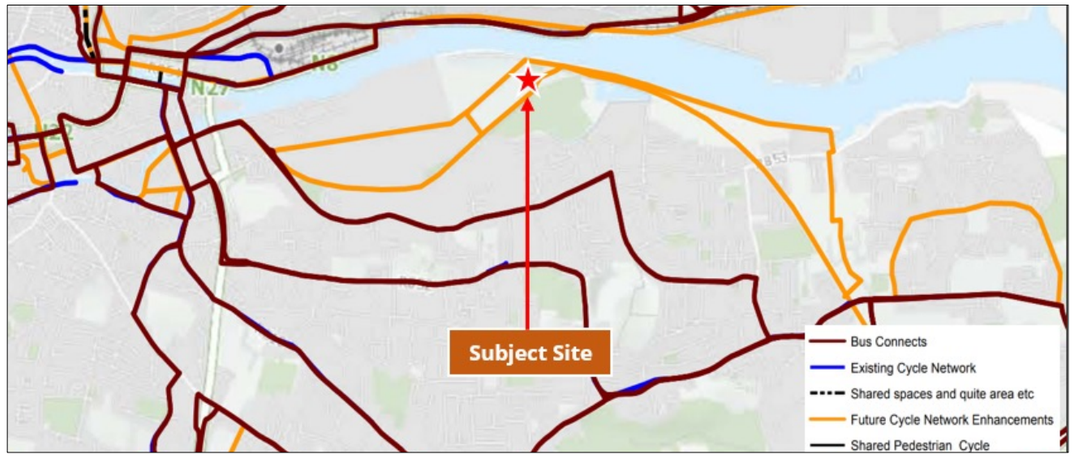


Figure 6 12: Indicative 5 Year Cork Cycle Network Map (Source: Cork City Development Plan 2022-2028)

Chapter 4 of the Cork City Development Plan discusses Transport and Mobility policies and objectives for the city. In this regard, the Cork City Development Plan details a five-year strategy for cycling from 2021 to 2025, and this plan includes the delivery of over 100km of new and improved cycling infrastructure during its term. The specifics of this plan can be seen in Figure 6 12 above.

6.4.6.2 Cycle Proposals-Cork Metropolitan Area Transport Strategy 2040 (CMATS)

The Cork Metropolitan Area Transport Strategy (CMATS), established by the National Transport Authority (NTA), outlines the plans for Cork's transport system by 2040. The proposed Cycle Network in the vicinity of the subject site is shown in Figure 6 13 below.

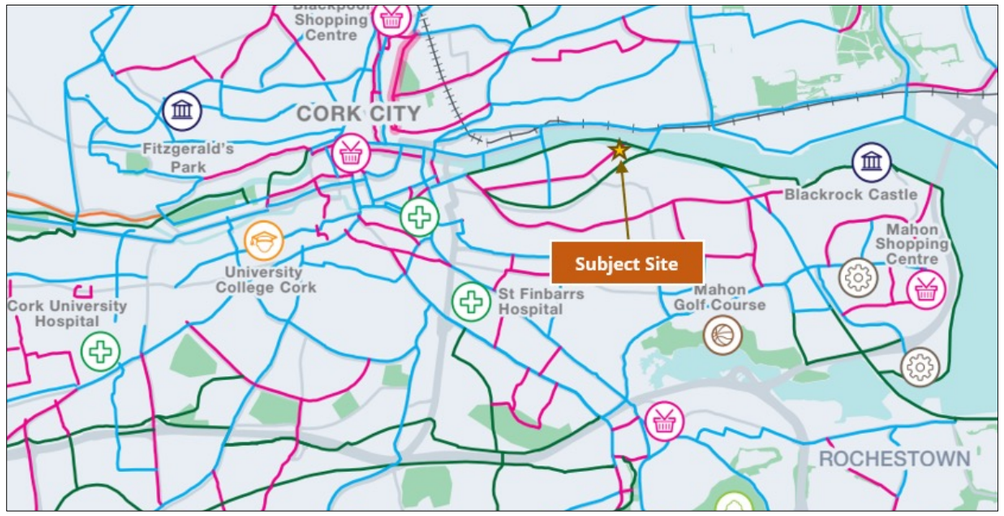


Figure 6 13: Proposed Cycle Routes (Source: CMATS 2040)

6.4.6.3 Cycle Proposals-CycleConnects

CycleConnects is an initiative by the NTA that aims to improve sustainable travel by providing the potential for more trips on a safe, accessible, and convenient cycling network, connecting more people to more places. Proposals for cycling links in key cities, towns and villages in each county are included in the plan, in addition to connections between the larger towns, villages and settlements.

The subject site will benefit from a Greenway Route type that runs directly outside of the site. This Greenway Route Type connects directly on to an Urban Secondary Route Type.

The proposed CycleConnects Network in the vicinity of the subject site is shown in Figure 6 14 below.

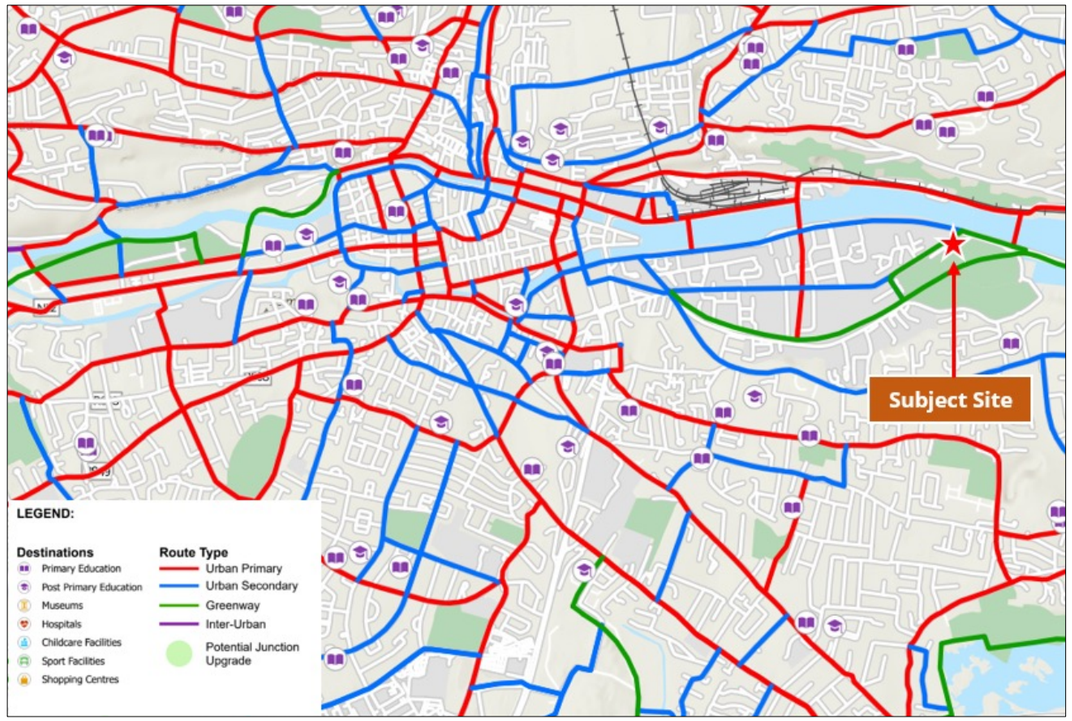


Figure 6 14: Proposed CycleConnects Network (Source: CycleConnects 2022)

6.4.6.4 Proposed Public Transport Bus Services - Cork Metropolitan Area Transport Strategy 2040

The Cork City Metropolitan Area Transport Strategy (CMATS) has identified that prioritising bus services above general traffic is critical to the delivery of an efficient, frequent, and reliable bus system and is a major part of the overall BusConnects programme. The strategy reveals that the proposed increase in bus services and vehicle numbers will benefit a significant proportion of Cork's population but will not succeed if bus priority is not implemented in full, as buses will be held up in general traffic. The existing bus priority measures through Cork City are particularly limited with 14km of bus lanes currently being provided. The proposed bus priority measures include approximately 100km of new bus lanes, representing an increase in bus lanes by a factor of 700%. The extent of the proposed bus lanes aligns with the proposed Core Bus Network, ensuring efficient, reliable, and frequent services can be accommodated. For identified key bus routes, the objective, in principle, is to provide end-to-end bus priority in each direction, where practicable. The implementation of these measures will lead to a significant improvement in punctuality and bus journey time reliability. The subject site will benefit from the identified priority measures, with Centre Park Road benefitting from being a key public transport corridor. The proposed BusConnects Priority Measures in the vicinity of the subject site is shown in Figure 6 15 below.

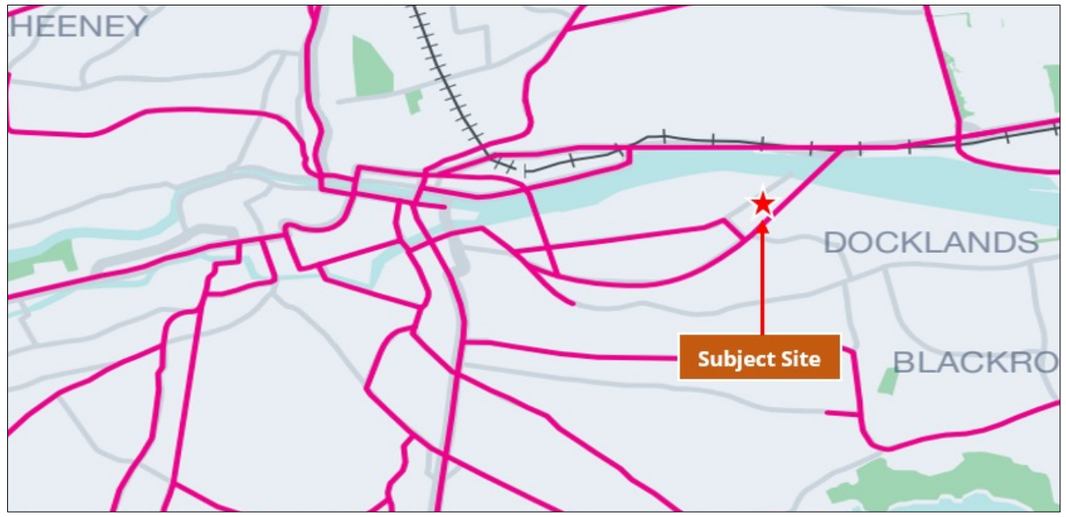


Figure 6 15: Proposed BusConnects Priority Measures (Source: Cork Metropolitan Area Transport Strategy 2040)

6.4.6.5 Proposed Public Transport Bus Services - BusConnects

BusConnects is an initiative launched by the National Transport Authority with the aim of overhauling the bus system in Ireland's key urban centres. This initiative includes a review of Cork's bus services, the definition of a core bus network comprised of radial, orbital and regional core bus corridors. It also includes enhancements to ticketing and fare systems as well as transition to a new low emission vehicle fleet.

In relation to the subject site, following this redesign of the bus network, the proposed development will be located in close proximity to the new BusConnects 'Route 4' (Lehenaghmore- Kent) and new BusConnects 'Route 11' (Mahon Point – Farranree), as outlined in Table 6-3 below.. A summary of the aforementioned new routes are summarised in Error! Reference source not found. below. Figure 6 16 illustrates potential future bus service opportunities in the area as outlined within the BusConnects redesign.

Table 6 3: Cork BusConnects Proposal (Source: BusConnects)

ROUTE	FROM	VIA	TO	FREQUENCY
4	Lehenaghmore	Pouladuff Road - Green Street - Gregg Road - St. Patrick Street - Merchant's Quay - Centre Park Road - Beaumont Drive - Skehard Road - Mahon Point Shopping Centre	Jacobs Island	Every 15 mins
11	Mahon Point Shopping Centre	Ringmahon Road - Saint Luke's Home - Blackrock - Blackrock Road - Kent Station - MacCurtain Street - Blackpool Shopping Centre - Fairfield Avenue - Upper Fairhill - Parklands Drive	Farranree	Every 30 mins

*Weekday frequency shown in table. Services may be less frequent at weekends/evenings.

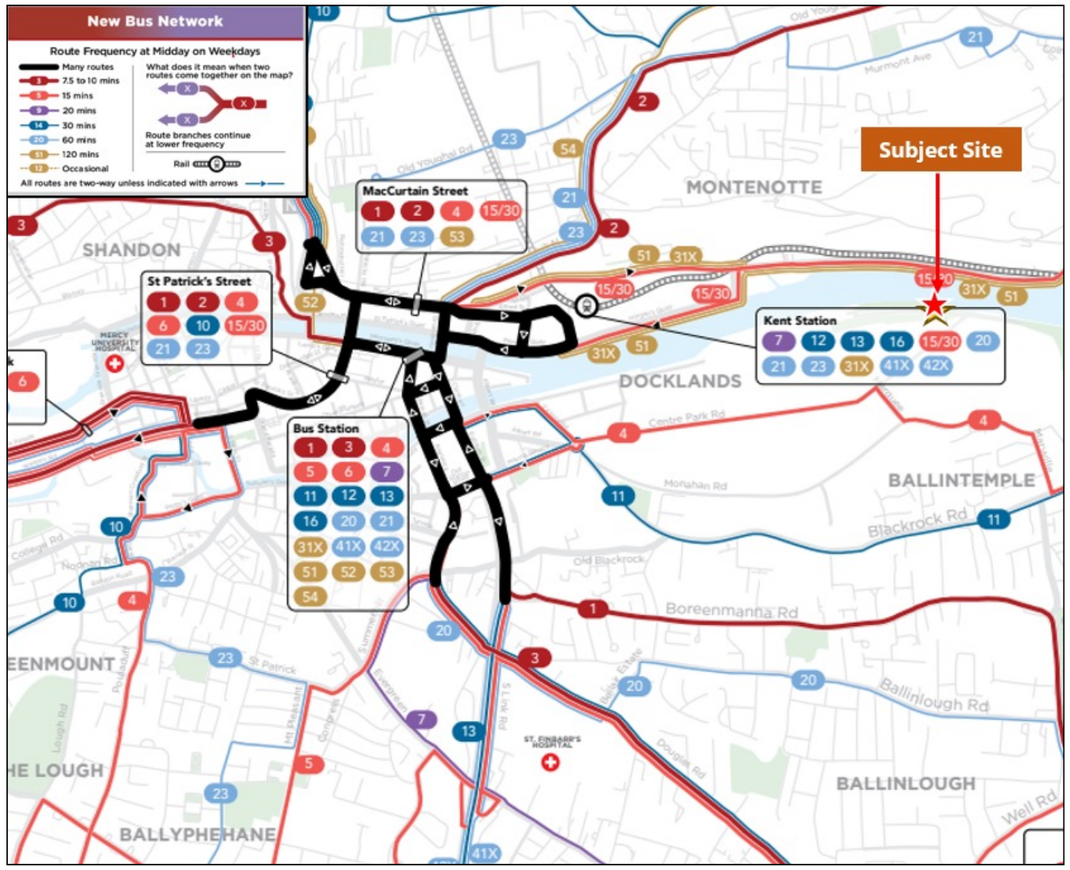


Figure 6 16: Proposed Bus Network (Source: BusConnects 2022)

6.4.6.6 Light Rail

The Cork Metropolitan Area has long aimed to establish a rapid transit corridor running from east to west via the City Centre. The National Planning Framework (NPF) 2040 and the National Development Plan 2018-2027 have both affirmed the commitment to explore the viability of this route. Recent increases in planning activities and interest in key locations along the corridor have further accelerated efforts to assess the feasibility of this project.

Following the detailed analysis of projected travel demand within the Cork Metropolitan Area, CMATS has determined that the East-West Transit Corridor is best served through the provision of a new Light Rail Transit (LRT) tram system.

The LRT system is a key enabler for development of Cork City as it will:

- Unlock strategic development areas in its catchment area including: the Cork City Docks, Curraheen, Ballincollig and Mahon.
- Maximise the development potential of windfall sites.
- Provide greater certainty for future planning and development, to pursue higher densities required to meet NPF population and employment targets for Cork City.
- Underpin the planned expansion of University College Cork (UCC), Munster Technological University (MTU) and Cork University Hospital (CUH).
- Enable car-free and low car development within its catchment in line with recent changes to government policy outlined in the NPF and Sustainable Apartment guidelines.
- Reduce reliance on the N40, for short trips within the Metropolitan Area.

6.4.6.6.1 Proposed LRT Route

Determination of the final LRT route alignment and depot location has not yet been identified. A definitive route alignment is needed to maximise the ability to provide appropriate densities for development sites at locations along the route and to avoid conflict with emerging development proposals. The indicative alignment of the Light Rail Route is shown in Figure 6 17 below. The proposed residential development is located in close proximity to two interchanges of the indicative LRT route.

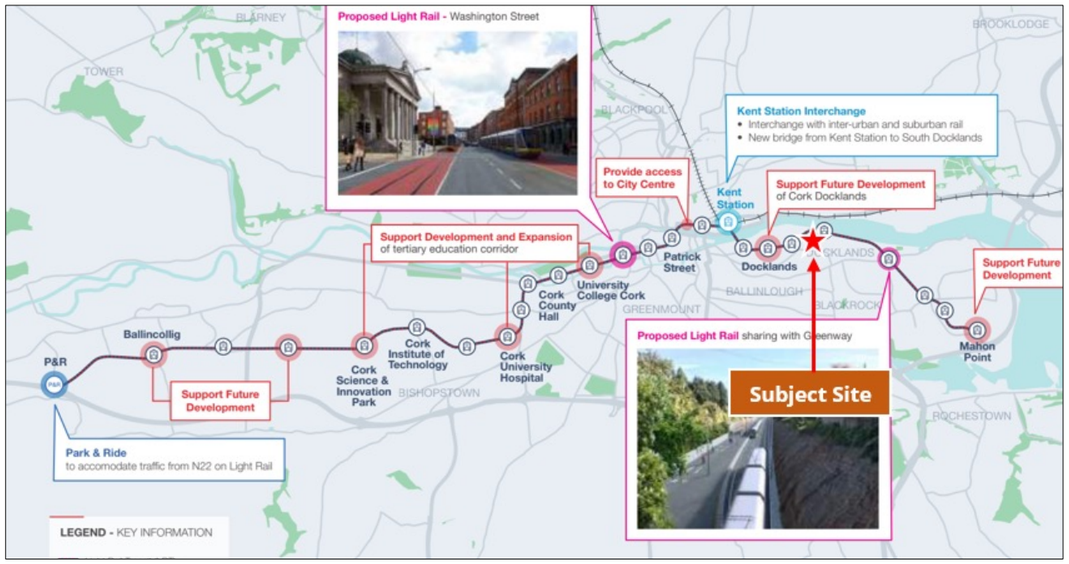


Figure 6 17: Proposed LRT East-West Corridor (Source: Cork Metropolitan Area Transport Strategy 2040)

6.4.6.7 Suburban Rail

CMATS includes proposals for enhancing the throughput at Kent Station to facilitate direct train services from Mallow to Midleton/Cobh, eliminating the need for passengers to switch services at Kent Station.

To support sustainable growth along an improved railway corridor, new railway stations are being proposed at specific locations. These locations have been chosen to align with the strategic land use planning objectives of both the Cork City Council and Cork County Council:

Midleton / Cobh- Cork Line: Tivoli Docks, Dunkettle, Water Rock, Ballynoe and Carrigtwohill West. Mallow-Cork Line: Blackpool / Kilbarry, Monard and Blarney / Stoneview. The proposed Suburban Rail Network in the vicinity of the subject site is shown in Figure 6 18 below:

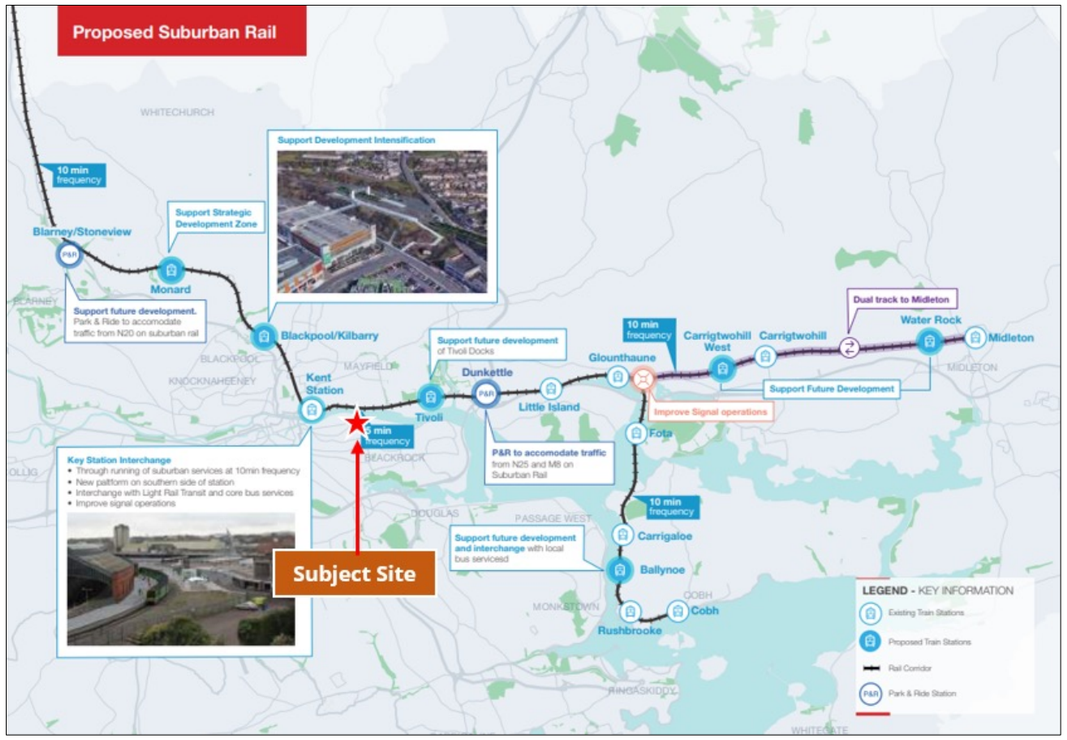


Figure 6 18: Proposed Suburban Rail Route (Source: Cork Metropolitan Area Transport Strategy 2040)

6.4.6.8 Road Infrastructure Proposals - South Docklands Road Infrastructure

The Cork Metropolitan Area Transport Strategy (CMATS) suggests a number of new road-based projects that are considered necessary to facilitate the sustainable movement of people, goods, and services. These road-based projects are designed to complement objectives related to public transport, walking, cycling, and traffic management. The Docklands to City Centre Road Network Improvement scheme is recognized by Cork City Council as a crucial project to initiate development in the South Docks of Cork City. Centre Park Road and Monahan Road are the main roads within the South Docklands area. Both roads will require upgrades to accommodate increased demand from public transport, walking, and cycling in the long term.

Bus lanes are proposed by CMATS along Monahan Road and segregated light rail transit is suggested for Centre Park Road. Discrete access points will be needed from Monahan Road, with the number and form of these arrangements determined as part of the Local Area Plan (LAP) process.

Chapter 10 of the Cork City Development Plan 2022-2028 includes objective 10.32g, which states: *"To ensure that the Centre Park Road Street corridor is a minimum of 32m in width and other streets are provided considering the transport-related functional requirements outlined in the Transport Strategy and the corresponding DMURS guidance, combined with best practice in urban and landscape design."* Centre Park Road will have a corridor width of approximately 32m, which may be exceeded depending on infrastructure requirements. The building lines will need to be set back to frame this key street. The nature of the corridor will vary along its length, responding to the Light Rail Transit (LRT) stops and incidental public open space and plaza provision. The proposed Road Network 2040 in the vicinity of the subject site is shown in Figure 6 19 below:

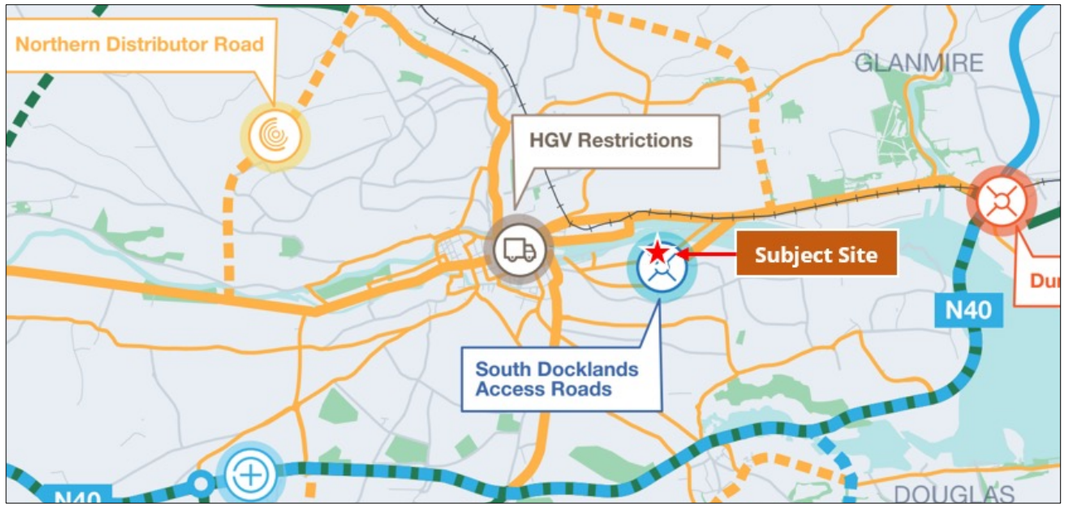


Figure 6 19: Proposed Road Network (Source: Cork Metropolitan Area Transport Strategy 2040)

6.4.7 Baseline Traffic Conditions

In order to establish the existing local road network traffic characteristics and subsequently enable the identification of the potential impact of the proposed development, traffic survey data recorded on the 21st of May 2024 was undertaken for the purpose of this assessment.

The aforementioned traffic survey (weekday classified junction turning counts) was conducted by Nationwide Data Collection between 07:00 to 10:00 and 16:00 to 19:00. The surveys undertaken included Junction Turning Counts (JTC). JTCs were carried out at four junctions within close proximity to the proposed development site. The following four locations were included in the survey (Figure 6 20).

- Junction 1- Victoria Road/ Centre Park Road/ Albert Road.
- Junction 2- Monahan Road/ Marquee Road.
- Junction 3- Marque Road/ Centre Park Road.
- Junction 4- Centre Park Road/ The Marina.

The local weekday AM and PM peak hour flows have been identified by the commissioned traffic survey as occurring between 08:00-09:00 and 18:00-19:00 respectively. These peak hour periods form the basis of the network assessments

Figure 6 20: Location of Traffic Survey Junctions.

6.4.8 Site Access Arrangements

6.4.8.1 Vehicle Access

The proposed development's small basement car park will be accessed by vehicles via 1 no. access point on Street C of the adjacent permitted development (planning reference: ABP-309059-20) scheme located to the west of Block A. This access via Street C (shared surface arrangement) will connect the basement car park onto Centre Park Road. This access point is proposed to be priority-controlled as illustrated in Figure 6 21 below.

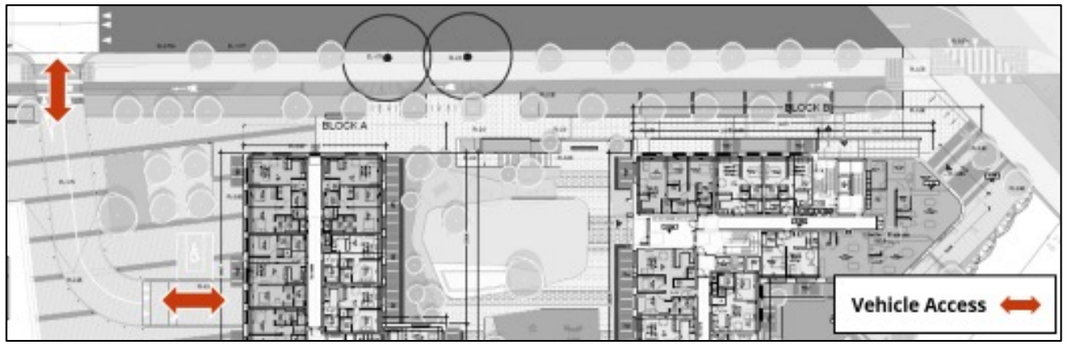


Figure 6 21: Vehicle Access Location in Basement

In reference to drawing 240002-X-04-Z00-XXX-DR-DBFL-CE-1201 clear unobstructed visibility splays of 2.4 m X-Distance an 45m Y-Distance (as per DMURS requirements) are provided for as part of the junction-design proposal as illustrated in Figure 6 22.

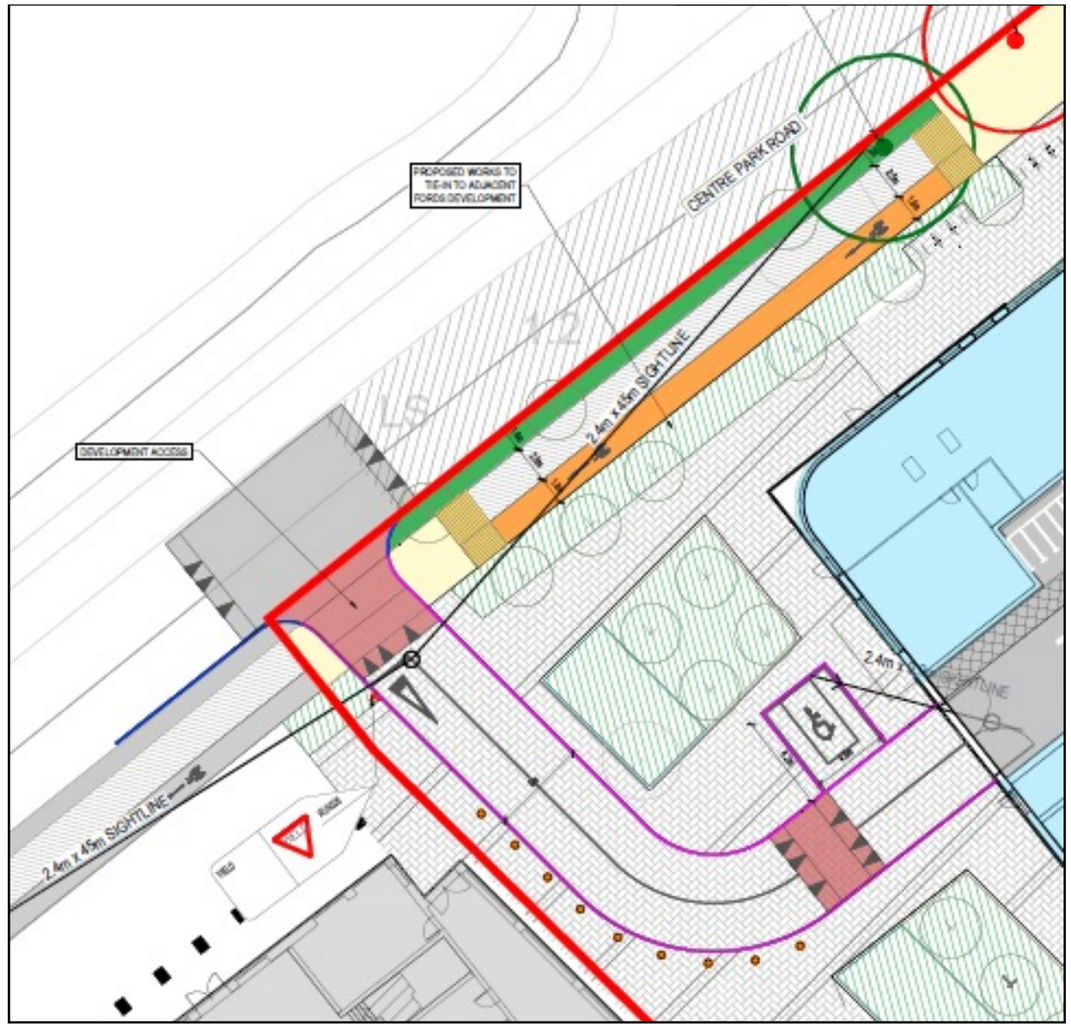


Figure 6 22: Proposed Vehicular access to the subject site and Visibility Splays

6.4.8.2 Pedestrians & Cyclists

Dedicated one-way cycle lane is proposed along the northwest site frontage of the subject development site. Cyclists will be able to access the cycle parking in the basement via a dedicated cycle access provided to the north elevation linking street level and the proposed cycle lane as illustrated in Figure 6 23 below. Cyclist can also access the creche via cycle access provided to the northeast of subject site.

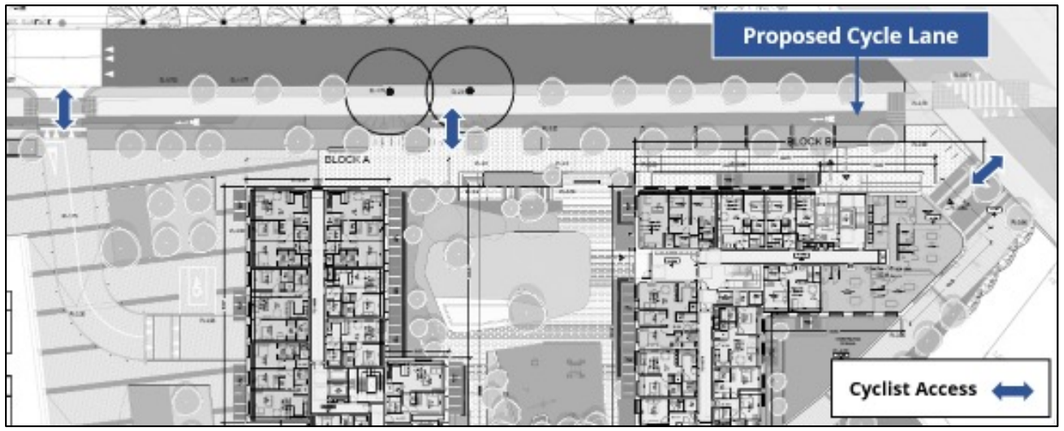


Figure 6 23:Cyclist Access

Furthermore, pedestrians can access Block A, Block B and Retail area through various access points as illustrated in Figure 6 24 below.

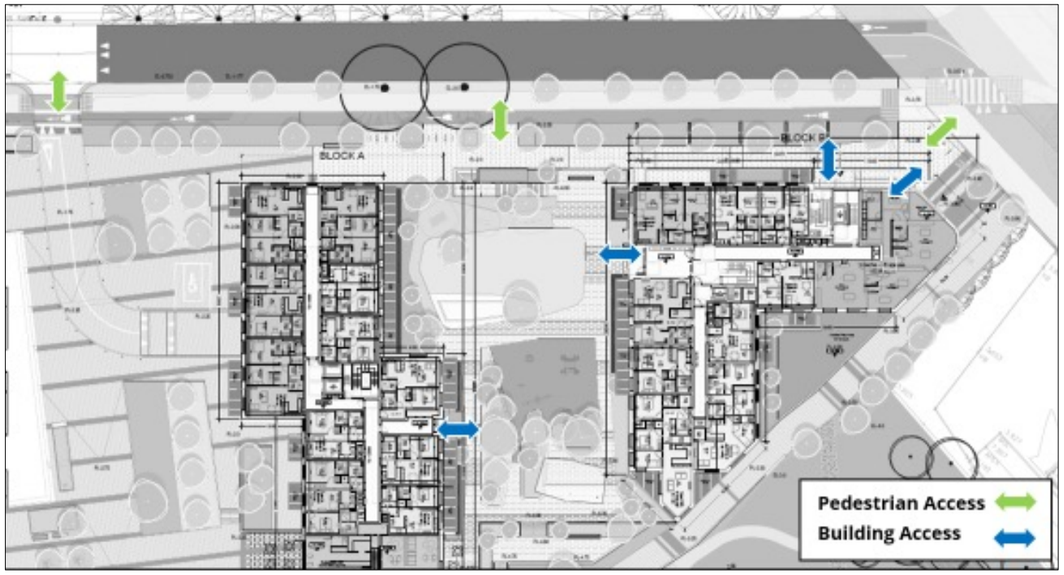


Figure 6 24: Pedestrian Access in Ground Floor.

6.4.9 Parking Provision

6.4.9.1 Car Parking

The proposed development incorporates a total of 56 no. on site car parking spaces including 3 Disabled spaces and 11 EV Spaces as illustrated in Table 6 4 below provides a summary of the proposed vehicle parking provision. This level of provision is considered to be appropriate to accommodate the demand for both residents and visitors in accordance with both local (Cork City Council Development Plan 2022-2028) and national development management standards considering the characteristics of the subject site.

Table 6 4: Car parking requirement and Proposed Provision

Unit Type	No. of Units	CCC Standard (South Docks East)	CCC Req. (Maximum)	Compact Settlement Standard (Maximum)	Compact Settlement Req.	Proposed
Apartment (1-Bed)	62	0.25 spaces per 1 Bed	15	1space per dwelling	62	56
Apartment (2-Bed)	82	0.5 spaces per 2/2+ Bed	41		82	
Apartment (3-Bed)	32	0.5 spaces per 2/2+ Bed	16		32	
Sub-Total		-	72	-	176	-
Total Car Parking		-	72	-	176	56

6.4.9.2 Disabled Car Parking

A total of 3no. disabled car parking spaces are proposed as illustrated in Figure 6 25.This equates to 5% of car parking spaces as required within the Cork City Council Development Plan 2022-2028 development management standards.

6.4.9.3 Electric Vehicles

The Cork City Development Plan 2022-2028 states that *"Multi-unit Residential developments shall provide a minimum of one EV equipped parking space per five car parking. All other parking spaces shall be developed with appropriate infrastructure (ducting) that enables future installation of a charging point for EVs."* It is proposed to provide a total of 11 EV car parking spaces (with charge point).

Figure 6 25: Proposed Car Parking

6.4.9.4 Motorcycle

The Cork City Development Plan 2022-2028 states that *"Motorcycle Parking spaces should be provided on the basis of one motorcycle parking bay per 10 car parking spaces provided for non-residential developments and apartment developments".* A total of 11 no. motorcycle parking bays are provided for the subject development within the secure basement area as illustrated in Figure 6 26.

Figure 6 26: Proposed Motorcycle Parking

6.4.9.5 Bicycle Parking Provisions

A total of 427 no. bicycle parking spaces are proposed as part of the subject development scheme. This includes 384 no. long term parking (Secured and Weather protected) in the basement,13 cargo bikes and 30 no. short term bike parking at surface level.

Table 6 5: Proposed Cycle Parking

Unit Type	No. of Units/ GFA	CCC Dev Plan Requirement (Minimum- Long term & Short term)	Compact Settlement Standard		Proposed	
			Long Stay	Short Stay	Long Stay	Short Stay
Apartment (1-Bed)	62	62	62	-	384+13 cargo	30
Apartment (2-Bed)	82	82	164			
Apartment (3-Bed)	32	32	96			
Total Cycle Parking		176	322		427	

6.5 Do Nothing Scenario

6.5.1 Do-Nothing Scenario Definition

In order to identify the impact of the development proposals on the local road network, it is first necessary to establish background traffic conditions under the assumption of no changes to the underlying land use arrangements. For this purpose, a Do-Nothing scenario has been defined, assuming the proposed development does not go ahead. Traffic levels in the do-nothing scenario comprise forecast background traffic flows, which are assumed to grow organically over the assessment period. The background traffic growth has been forecast for the

proposed development's assumed year of opening (YoO, 2026), year of opening + 5 years (YoO+5, 2031) and the year of opening + 15 years (YoO+15, 2041).

It should be noted that the Do-Nothing scenario has formed the starting point for further analysis, in particular for development of the Do-Minimum scenario, as defined in section 6.6. As the site is zoned for development, in the absence of the proposed development, it is likely that a development of a similar nature is likely to be constructed in the future in line with national policy and the development plan objectives. Therefore, the construction and operational phase impacts outlined in this assessment are likely to occur in the future at some time, in the absence of the subject proposed development.

6.5.2 Background Traffic Forecasting

6.5.2.1 Traffic Growth

For this assessment, it is assumed that the development will be fully constructed and occupied by the subject development's Opening Year of 2026. A Future Design Year of 2031,2041 has also been adopted. The TII Project Appraisal Guidelines (PAG) have been utilised to determine the traffic growth forecast rates. The traffic growth forecast rates within the PAG ensures local and regional variations and demographic patterns are accounted for. Table 6.1 within the TII Project Appraisal Guidelines Unit 5.3 provides Link-Based Annual Traffic Growth Factors for the different counties and metropolitan areas within Ireland. The subject site lies within the 'Cork' defined area.

Table 6 6: National Traffic Growth Forecasts: Annual Growth

Metropolitan Area	Central Growth Rate					
	Central Growth Rate		Central Growth Rate		Central Growth Rate	
	LV	HV	LV	HV	LV	HV
Cork	1.0169	1.0294	1.0090	1.0149	1.0083	1.0182

6.6 Do-Minimum Scenario

6.6.1 Do-Minimum Scenario Definition

The Do-Minimum scenario has been developed to reflect relevant third-party developments identified in the Study Area that have been deemed likely to cause growth in background traffic volumes on the road network in the Study Area, beyond that assumed in the Do-Nothing scenario. Accordingly, the traffic volumes forecast for the Do-Minimum scenario account for both the organic growth in background traffic and the trip generation by permitted development. An equivalent increase in public transport demand has also been considered.

6.6.2 Relevant Committed Developments and Trip Generation

The review of ABP and CCC online planning portal, revealed that the subject development's receiving environment benefits from having a number of permitted developments which are not yet occupied/completed. As per good practice this assessment has imported these local permitted schemes as 'Committed' developments with the objective of providing a robust appraisal of the local road network. As detailed in following section, a total of 4 separate 'Committed' development schemes have been included within this assessment.

6.6.2.1 Former Tedcastles Yard (ABP- 313277)

This includes the demolition of existing structures and the construction of a strategic housing development of 823 no. apartments in 6 no. buildings ranging in height from part-1 to part-35 no. storeys over lower ground floor level. The development will contain 282 no. 1 bedroom apartments, 414 no. 2 bedroom apartments and 127 no. 3 bedroom apartments. The traffic and transport assessment report indicates the associated vehicle traffic generation for the committed development as shown in Table 6 7.

Table 6 7: Committed development trips for Former Tedcastles Yard (ABP- 313277)

LAND USE	AM Peak Hour			PM Peak Hour		
	Arrival	Departure	Two-Way	Arrival	Departure	Two-Way
Phase 1 (Opening year-2025)	16	57	73	67	39	106
Phase 2 (Opening year- 2030)	31	112	143	131	76	207

6.6.2.2 LRD at Goulding's Site (2342106)

This includes a 10-year planning permission for a Large-Scale Residential Development (LRD) at the Goulding's Site, Centre Park Road and Monahan Road, Cork. The proposed development consists of the demolition of the existing on-site buildings and structures and site clearance to facilitate the construction of 1325 no. residential units including apartments and duplexes in 10 no. buildings. A standalone 2 storey creche of 665 sq.m with associated outdoor amenity space is also proposed. The development ranges in height from 2 to 14 storeys over a single basement. Table 6 8 below indicates the associated vehicle traffic generation for the committed development.

Table 6 8: Committed development trips for LRD at Goulding's Site (2342106)

LAND USE	AM Peak Hour			PM Peak Hour		
	Arrival	Departure	Two-Way	Arrival	Departure	Two-Way
LRD at Goulding's Site	105	269	374	148	90	238

6.6.2.3 Former Ford Distribution site (ABP-309059)

This includes demolition of existing structures, 10-year permission for the construction of 1,002 no. apartments, Commercial and community facilities, including 5 no. retail units, 1 no. Montessori school, 1 no. creche, a medical centre, bar, café, venue / performance area, 2 no. community resource spaces and ancillary signage. Table 6 9 below indicates the associated vehicle traffic generation for the committed development. The proposed vehicle trip generation shows that for the proposed design year of 2029 there will be 174 new two-way movements in the AM peak traffic hour (08:00-09:00) and 253 new two-way movements in the PM peak traffic hour (17:00-18:00) to and from the proposed development.

Table 6 9: Committed development trips for Former Ford Distribution site

LAND USE	AM Peak Hour			PM Peak Hour		
	Arrival	Departure	Two-Way	Arrival	Departure	Two-Way
Phase 1 (Opening Year -2024)	16	56	72	66	38	104
Phase 2 (Opening year 2029)	38	136	174	160	93	253

6.6.2.4 Former Cork Warehouse SHD (ABP-313142)

This includes demolition of existing structures on site and construction of 190 no. apartments, Crèche (358 sqm), Retail (233 sqm), Café/restaurants (231 sqm) and associated site works. The committed development includes a total of 58 No. car parking which equates to a parking ratio of 0.30. The trip rate assumed for calculating the trips generated by the committed development is as illustrated in Table 6 10.The total number of car generated by the proposed development will also be limited by the number of car parking proposed on site. For robust analysis, the trips are discounted to reflect the car parking of the committed development.

Table 6 10: Committed development trips for Former Cork Warehouse SHD

LAND USE	AM Peak Hour			PM Peak Hour		
	Arrival	Departure	Two-Way	Arrival	Departure	Two-Way
190 Apartment*	4	11	14	7	5	12
Creche (358m^2)	1	1	2	0	0	0
Retail (233 m^2)	1	1	2	1	1	2
Café (231 m^2)	1	0	1	1	1	2
Total	**6**	**13**	**19**	**9**	**8**	**17**

*Discounted by 70%

6.6.3 Do-Minimum Traffic Forecasting

The do minimum assessment will include traffic generated from the permitted development adjoining the subject site. It is assumed that the background traffic will grow based on forecast rates within Table 6.1 within the TII Project Appraisal Guidelines Unit 5.3.

6.6.4 Do-Minimum Public Transport Travel Demand

The existing Public Transport (Bus) capacity near subject site is evaluated using the frequency and seat capacity of existing bus serving the site. The subject site benefits from Bus Éireann operated bus Route 212 connecting Kent Station to Mahon Point via Blackrock Road and Bus Éireann Routes 202,202A at bus stops on Blackrock Road.

Table 6 11: Estimated Existing Public Transport Bus Capacity

Route No.	Operator	Route	No. of Daily service on Weekdays	Average Capacity per Service	Total Daily Capacity (Inbound)	Total Daily Capacity (Outbound)
212	Bus Eireann	Kent Station to Mahon Point via Blackrock Rd	17	83	1411	-
		Mahon Point to Kent Station via Blackrock Rd	17	83	-	1411
202	Bus Eireann	Mahon Point to Hollyhill via Merchants Quay	47	83	-	3901
		Hollyhill to Mahon Point via Merchants Quay	48	83	3984	-
202A	Bus Eireann	Mahon Point to Hollyhill via Eglinton St	46	83	-	3818
		Hollyhill to Mahon Point via Merchants Quay	49	83	4067	-
					9462	9130
Total Estimated Capacity					**18592**	

As illustrated in Table 6 11 there is a total estimated capacity of 18592 bus based trips utilising existing bus transport in the immediate near vicinity of subject site.

Following are the estimated Public Transport (Bus) commuters demand from the permitted neighbouring 3rd party development on a typical weekday.

- Former Tedcastles Yard (ABP- 313277) - 522 person
- LRD at Goulding's Site (2342106) - 893 person
- Former Ford Distribution site (ABP-309059) - 625 person
- Former Cork Warehouse SHD (ABP-313142) - 119 person

The total estimated Public Transport (bus) commuters from the permitted 3rd party development is approximately 2159 persons per day. The demand generated by the permitted 3rd party development equates to approximately only 11.6% of the existing local bus capacity services.

6.7 Potential Significant Effects

6.7.1 Assessment of Effects

The analysis of the predicted effect of the proposed development on the local traffic and transportation network during and after the construction phase is presented in the following section.

The impact assessment was undertaken using the following considerations, as described in the EPA's 'Guidelines on the Information to be Contained in Environmental Impact Assessment Reports' (May 2022):

Quality of Effects: Described as being Positive, Neutral or Adverse.

Significance of Effects: The significance of each effect was considered as being either an Imperceptible, Not Significant, Slight, Moderate, significant, Very Significant or Profound .

Duration of Effects: The duration of each effect was considered to be either momentary, brief, temporary, short-term, medium-term, long-term, permanent or reversible. Momentary impacts can last from seconds to minutes, Brief construction impacts are considered to last a day or so, temporary impacts last less than one year. Short-term impacts are seen as impacts lasting one to seven years. Medium-term impacts are impacts lasting seven to fifteen years. Long-term impacts are impacts lasting 15 to 60 years while Permanent impacts are impacts lasting over 60 years. Reversible impacts are considered those that can be undone through remediation or restoration.

6.7.2 Demolition Phase

No demolition is proposed as part of the development and therefore no significant effects are anticipated.

6.7.3 Construction Phase

6.7.3.1 Management of Construction Activities

All construction activities on-site will be governed by a Construction Traffic Management Plan (CTMP), the details of which will be agreed in full with Cork City Council prior to the commencement of construction activities on site.

The principal objective of the Construction Traffic Management Plan is to ensure that the impacts of all building activities generated during the construction of the proposed residential development upon public (off-site) and internal (on-site) workers environments, are fully considered and proactively managed / programmed respecting key stakeholders thereby ensuring that both the public's and construction workers safety is maintained at all times, disruptions minimised and undertaken within a controlled hazard free / minimised environment. The impact of the construction period will be temporary in nature.

6.7.3.2 Construction Traffic

Construction traffic will only be generated on weekdays (07:00-19:00), subject to conditions of the planning permission) and will consist of the following two principal categories:

- Private vehicles owned and driven by site construction staff and by full-time supervisory staff.
- Excavation plant, dumper trucks and delivery vehicles involved in site development works and material delivery vehicles for the following: granular fill materials, concrete pipes, manholes, reinforcement steel, ready-mix concrete and mortar, concrete blocks, miscellaneous building materials, etc.

The likely effect on the transport network during the construction phase will be low and temporary in nature. The number of staff on site will fluctuate over the implementation of the subject scheme. Nevertheless, based upon the experience of similar projects, it would be expected that approx. 25-30 staff will be on site at any one time, subsequently generating low levels of two-way vehicle trips during the peak AM and PM periods over the period of the construction works (construction workers will use shared transport). On-site employees will arrive before 07:00, thus avoiding the morning peak hour traffic. These employees will depart after 19:00.

Likely deliveries to the site will arrive at a steady rate during the course of the day. The majority of lorries exporting material will arise over the excavation period of the construction stage of the development. The number of specific vehicles per day is not yet known (subject to contractors site and stage specific CTMP), however, basing this assessment on previous comparable schemes, it can be assumed as a conservative assessment that there could be upto 5 loads per hour. With an 8-12 hour working day, this equates to 40 loads per day approximately.

The details of construction traffic vehicle parking demands will be outlined in the Construction Traffic Management Plan (CTMP) that forms part of the planning application documentation.

Considering the site's proximity to the strategic road network and following the implementation of an appropriately detailed CTMP, it is concluded that construction traffic will not give rise to any significant traffic concerns or impede the operational performance of the local road network and its surrounding junctions.

The scheme shall be constructed in a manner to minimise disruption to road users, local residents and businesses. All construction works are to be undertaken in a clearly delineated site area which will have specific entry and exit points for construction traffic.

6.7.3.3 Haulage Routes

It is anticipated that vehicles travelling towards the subject site will approach via the Centre Park Road in a similar manner to the adjoining sites. It is noted that exact compound location, import/export locations and detailed traffic management and construction routing will be developed by the appointed contractor for the scheme and will be detailed in a Construction Management Plan and Environmental Operating Plan. All exports/imports of material will be to be a suitably licenced facility.

An appropriate control and routing strategy for HGVs can also be implemented for the duration of site works as part of the Construction Traffic Management Plan. It is not proposed to utilise any roads with weight/height restrictions as part of the routing of HGVs during the construction phase.

6.7.3.4 Public Environment

The likely impact on the pedestrian and cycle environment during the construction phase will be short term in nature. During the construction stage, there will be an impact on the existing pedestrians and cyclists in the surrounding area, including possible diversions and impact on air quality.

Taking the above into consideration, the impacts on the surrounding transportation environments during the Construction Stage are assessed as follows:

- **Increase in Vehicular Traffic on Road Network:** There will be an increase in construction vehicular traffic on the surrounding road network, including employee vehicles and HGVs. Without the consideration of mitigation measures, this impact will be negative, slight and short term in nature and will terminate with the completion of the construction stage.
- **Pedestrian & Cycle Environment:** Without the consideration of mitigation measures, the impact on the pedestrian and cycle environment during construction works will be negative, slight and short term in nature.

6.7.3.5 Impact of proposals at Construction Phase

Table 6 12 details the percentage impact of the proposals during the construction phase. The key junctions assessed will include the following:

- Junction 1- Victoria Road/ Centre Park Road/ Albert Road.
- Junction 2- Monahan Road/ Marquee Road.
- Junction 3- Marque Road/ Centre Park Road.
- Junction 4- Centre Park Road/ The Marina.

The Table 6 12 below reveals that the predicted impacts at the key local Junctions are found to be well below the threshold 10% except for site access junction showing immaterial effects on the junctions operations.

Table 6 12: Network Impact Assessment

Junction Node	Junction Location	Design Year	AM Peak Hour (08:00 to 09:00)			PM Peak Hour (18:00 to 19:00)		
			DM	DS	% Impact	DM	DS	% Impact
1	Victoria Road/ Centre Park/ Alberta Road/ Hibernian Building	2025	1521	1535	0.95%	1450	1465	1.00%
2	Monahan Road/Marquee Road	2025	633	641	1.14%	426	433	1.70%
3	Centre Park/ Marque Road	2025	602	631	4.81%	767	796	3.78%
4	Centre Park/ The Marina	2025	113	113	0.00%	233	233	0.00%
5	Site Access	2025	112	141	25.951%	231	260	12.54%

The significance of impacts during the construction phase at each of the key local nodes is detailed within the following tables for the worst case (e.g., peak hours) during the 2025 Year scenario.

Table 6 13: Road Network Impact Significance – Construction Phase

Node Ref	Environment Character	Quality / Scale of Impact	Impact Significance	Duration
1	Medium-High	Low-Medium	Slight/Moderate	Short Term
2	Low	Low-Medium	Slight	Short Term
3	Low-Medium	Medium	Slight	Short Term
4	Low -Medium	Negligible	Imperceptible	Short Term
5	Medium	Medium-High	Moderate	Short Term

6.7.4 Operational Phase

A detailed assessment has been undertaken with regard to the generation of development traffic and the impact that this will have on the surrounding road network during the operational phase of the subject development.

6.7.4.1 rip Generation

Table 6 14 below outlines the TRICS generated trip rates for the proposed developments apartment and creche land uses during the weekday morning and evening peak hour periods. This trip rate has been discounted to reflect the 'low car allocation' characteristics of the proposed development as outlined in Table 6 14. It is assumed that the development's retail unit and creche will serve predominantly the proposed development, the local walk-in catchment and passing traffic. As such this retail use is not predicted to give rise to material levels of the additional vehicular traffic. The creche land use serving the development will generate nominal trips as illustrated in Table 6 16. The TRICS data is included in Appendix 6.1

Table 6 14: Trip Rates for Proposed Development (source TRICS)

Land Use	AM Peak Hour 08:00-09:00			PM Peak Hour 18:00-19:00		
	Arrival	Departure	Two-Way	Arrival	Departure	Two-Way
Apartments (Block A,B)	0.064	0.190	0.254	0.121	0.090	0.211
Creche (181 sqm)	3.189	2.775	5.964	0.093	0.674	0.767

Table 6 15: Discounted Trip Rates for Proposed Development (source TRICS)

Land Use	AM Peak Hour 08:00-09:00			PM Peak Hour 18:00-19:00		
	Arrival	Departure	Two-Way	Arrival	Departure	Two-Way
Apartments (Block A, B) *	0.026	0.076	0.102	0.048	0.036	0.084
Creche (181 sqm) *	1.28	1.11	2.39	0.04	0.27	0.31

***Discounted by 60%**

Based on the above trip rates as illustrated in Table 6 14 the potential vehicle trips generated travelling in and out of the proposed development during the morning and evening peak hour periods are outlined in Table 6-8 below.6.7.4 Operational Phase

Table 6 16: Predicted Vehicle Trip Generation

Land Use	AM Peak Hour 08:00-09:00			PM Peak Hour 18:00-19:00		
	Arrival	Departure	Two-Way	Arrival	Departure	Two-Way
Apartments (Block A,B)	5	14	18	9	7	15
Creche	2	2	4	0	0	1
Total	**7**	**15**	**22**	**9**	**7**	**15**

The trip generation exercise reveals that the proposed development including the residential and creche facility has the potential to generate a total of 22 two-way vehicle trips during AM peak hour and 15 two-way vehicle trips during PM peak hour period.

6.7.4.2 Do-Something Public Transport Travel Demand

The primary trip generator will be the residential development followed by staff trips of creche and retail unit. The estimation of development population is illustrated in Table 6 17.

Table 6 17: Estimation of Development Population

Unit Type		Description	Quantity	Average Occupancy	Total Occupants
Apartments	Block A	1 bedroom	32	1.5 per unit	48
		2 Bedrooms	57	3 per unit	171
	Block B	1 bedroom	30	1.5 per unit	45
		Block B	25	3 per unit	75
		3 Bedrooms	32	4 residents per unit	128
Retail			131.1 sqm	3 staffs	3
Creche			181	8 staff	8
					478

The total development population estimated for commuting to work/school/college is 478 which includes residents and staffs working in development. The Central Statistics Office's SAPMAP (Small Areas Population Map) data has also been investigated to determine the travel trends within residential and non-residential areas in the vicinity of the proposed Fords Site Development. SAPMAP is an interactive mapping tool that allows users to pinpoint a location on the map and access 2022 census data related to that area. This analysis will form the basis of the initial travel characteristics that could be generated by the proposed development. Based on this, the estimated modal share targets of the development is as follows.

Table 6 18: Mode Share Targets for proposed development

Mode of Travel	1st Year Target modal split (2026) - Residential	1st Year Target modal split (2026) - Non-Residential
On Foot	20%	21%
Bicycle	15%	18%
Bus/Minibus/Coach	18%	23%
Train/DART/LUAS	0%	0%
Motorcycle/Scooter	2%	3%
Car Driver	32%	26%
Car Passenger	12 %	8%
Van	1%	1%
Other (incl. lorry)	0%	0%

Applying these modals share the estimated population gives a total of 172 (86 amount in the AM and 86 in the PM) bus users. The demand generated by the development equates to approximately 0.93% of the existing bus capacity which is considered to be negligible. This assessment has assumed a worst-case scenario where all the residents are either working or attending school/college or undertaking a trip for another purpose.

6.7.4.3 Assessment Scenarios

A total of six different traffic scenarios have been investigated including three base 'Do-Minimum'(DM) and three potential 'Do-Something' (DS) scenarios as follows:

- A1 Do Minimum 2026 – 2026 Base Flows + Committed Developments
- A2 Do Minimum 2031 – 2031 Base Flows + Committed Developments
- A3 Do Minimum 2041 – 2041 Base Flows + Committed Developments
- B1 Do Something – 2026 Do-Minimum (A1) + Proposed Development Flows;
- B2 Do Something – 2031 Do-Minimum (A2) + Proposed Development Flows;
- B3 Do Something – 2041 Do-Minimum (A3) + Proposed Development Flows;

6.7.4.4 Traffic Distribution

It is assumed that 100% of vehicle trips will be to / from Centre Park Road (Southwest). The traffic distribution at key off intersections on the external road network has been calculated based upon existing network flow turning movements that were observed from the Traffic Surveys carried out in 21st May 2024.

6.7.4.5 Impact of proposals

The Institution of Highways and Transportation document 'Guidelines for Traffic Impact Assessments' states that the impact of a proposed development upon the local road network is considered material when the level of traffic it generates surpasses 10% and 5% on normal and congested networks respectively. When such levels of impact are generated, a more detailed assessment should be undertaken to ascertain the specific impact upon the network's operational performance. These same thresholds are reproduced in the NRA/TII document entitled Traffic and Transport Assessment Guidelines (2014).

Table 6 19 details the percentage impact of the relevant key junctions for the 2026, 2031 and 2041 design years are the following:

- Junction 1- Victoria Road/ Centre Park Road/ Albert Road.
- Junction 2- Monahan Road/ Marquee Road.
- Junction 3- Marque Road/ Centre Park Road.
- Junction 4- Centre Park Road/ The Marina.

The Table 6 19 below reveals that the predicted impacts at the key local Junctions are found to be well below the threshold 10% except for Centre park/ Marque Road junction and site access junction showing immaterial effects on the junctions operations.

Table 6 19: Network Impact Assessment

Junction Node	Junction Location	Design Year	AM Peak Hour (08:00 to 09:00)			PM Peak Hour (18:00 to 19:00)		
			DM	DS	% Impact	DM	DS	% Impact
1	Victoria Road/Centre Park/Alberta Road/ Hibernian Building	2026	1521	1524	0.22%	1450	1455	0.30%
		2031	1510	1513	0.23%	1543	1548	0.28%
		2041	1635	1639	0.21%	1658	1662	0.26%
2	Monahan Road/Marquee Road	2026	633	637	0.54%	426	430	1.01%
		2031	567	570	0.60%	515	520	0.83%
		2041	611	614	0.56%	549	553	0.78%
3	Centre Park/Marque Road	2026	602	625	3.69%	767	782	2.01%
		2031	686	708	3.24%	935	951	1.65%
		2041	719	741	3.09%	978	994	1.57%
4	Centre Park/The Marina	2026	113	113	0.00%	233	233	0.00%
		2031	121	121	0.00%	249	249	0.00%
		2041	132	132	0.00%	272	272	0.00%
5	Site Access	2026	112	134	19.87%	231	247	6.66%
		2031	120	142	18.56%	248	263	6.22%
		2041	131	153	16.99%	271	286	5.70%

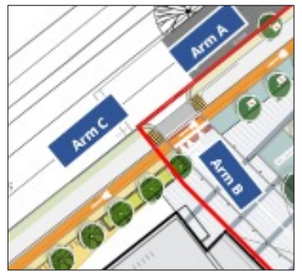
The operational assessment of the local road network has been undertaken using the Transport Research Laboratory (TRL) computer package Junctions 9 and the PICADY suite for priority-controlled junctions. When considering priority-controlled junctions/roundabouts a Ratio of Flow to Capacity (RFC) greater than 85% (0.85) would indicate a junction to be approaching capacity, as operation above this RFC value is poor and deteriorates quickly.

For the PICADY analysis, a 90-minute AM and PM period has been simulated, from 07:45 to 09:15 and 17:45 to 18:15. For the PICADY analysis traffic flows were entered using an Origin-Destination table format for the peak hours.

6.7.4.6 Site Access Junction

The proposed priority-controlled site access junction is analysed for the 'Do-Something' scenario using the TRL software PICADY. Within the PICADY model, the arms of the junction were labelled as followed:

- Arm A – Central Park Road (North East)
- Arm B – Site Access
- Arm C – Central Park Road (South West)



The AM peak hour Do Something site access PICADY results (Table 6 20) indicate that this junction will operate with significant reserve capacity with a maximum Ratio of Flow to Capacity (RFC) value of 0.03 and a maximum queue of 0.00 pcu's being recorded in 2041 Do Something Scenario. Similarly, the PM peak hour PICADY results indicate that this existing junction will again operate well within capacity with a maximum Ratio of Flow to Capacity (RFC) value of 0.02 and a maximum queue of 0.00 pcu's being recorded 2041 Do Something Scenario.

Table 6 20: Site Access Do Something Modelling Results

Scenario	Scenario	AM PEAK (08:00-09:00)		PM PEAK (18:00-19:00)	
		Queue (PCU)	RFC	Queue (PCU)	RFC
2026 Do Something Scenario	B-C	0.0	0.02	0.0	0.01
	B-A	0.0	0.01	0.0	0.02
2031 Do Something Scenario	B-C	0.0	0.02	0.0	0.01
	B-A	0.0	0.01	0.0	0.02
2041 Do Something Scenario	B-C	0.0	0.03	0.0	0.01
	B-A	0.0	0.01	0.0	0.02

6.7.4.7 Centre Park Road/Marguee Road Junction

Centre Park Road/Marguee Road Junction priority-controlled junction is analysed for the 'Do-minimum' scenario using the TRL software PICADY. Within the PICADY model, the arms of the junction were labelled as followed:

- Arm A – Central Park Road (North East)
- Arm B – Marquee Road (South East)
- Arm C – Central Park Road (South West)

The AM peak hour PICADY results for the Do Minimum PICADY results (Table 6 21) indicate that this junction operates with reserve capacity with a maximum Ratio of Flow to Capacity (RFC) value of 0.41 and a maximum queue of 0.8 pcu's being recorded in 2041 Do Something Scenario. Similarly, the PM peak hour PICADY results indicate that this existing junction will again operate within capacity with a maximum Ratio of Flow to Capacity (RFC) value of 0.77 and a maximum queue of 3.3 pcu's being recorded in 2041 Do Something Scenario.

Table 6 21: Centre Park Road / Marguee Road Junction Do Minimum Modelling Results

Junction Location	Design Year	AM PEAK (08:00-09:00)		PM PEAK (18:00-19:00)	
		Queue (PCU)	RFC	Queue (PCU)	RFC
2026 Do Minimum Scenario	B-C	0.6	0.34	0.2	0.14
	B-A	0.4	0.27	0.9	0.45
	C-AB	0.2	0.14	0.4	0.20
2031 Do Minimum Scenario	B-C	0.7	0.38	0.2	0.13
	B-A	0.3	0.21	2.8	0.73
	C-AB	0.2	0.13	0.5	0.23
2041 Do Minimum Scenario	B-C	0.8	0.41	0.2	0.14
	B-A	0.3	0.22	3.3	0.77
	C-AB	0.2	0.14	0.6	0.25

The AM peak hour Do Something site access PICADY results (Table 6 22) indicate that this junction will operate with significant reserve capacity with a maximum Ratio of Flow to Capacity (RFC) value of 0.42 and a maximum queue of 0.8 pcu's being recorded in 2041 Do Something Scenario. Similarly, the PM peak hour PICADY results indicate that this existing junction will again operate well within capacity with a maximum Ratio of Flow to Capacity (RFC) value of 0.79 and a maximum queue of 3.6 pcu's being recorded in 2041 Do Something Scenario.

Table 6 22: Centre Park Road/Marguee Road Junction Do Something Modelling Results

Scenario	Stream	AM PEAK (08:00-09:00)		PM PEAK (18:00-19:00)	
		Queue (PCU)	RFC	Queue (PCU)	RFC
2026 Do Minimum Scenario	B-C	0.6	0.35	0.2	0.14
	B-A	0.4	0.29	0.9	0.46
	C-AB	0.2	0.14	0.4	0.20
2031 Do Minimum Scenario	B-C	0.7	0.38	0.2	0.13
	B-A	0.3	0.22	3.0	0.75
	C-AB	0.2	0.13	0.5	0.23
2041 Do Minimum Scenario	B-C	0.8	0.42	0.2	0.14
	B-A	0.3	0.23	3.6	0.79
	C-AB	0.2	0.14	0.6	0.26

The significance of each of the projected impacts at each of the key local nodes is detailed within the following tables for the worst case (e.g., peak hours) during the 2041 Future Design Year scenario.

Table 6 23: Road Network Impact Significance – Operation Phase

Node Ref	Environment Character	Quality / Scale of Impact	Impact Significance	Duration
1	Medium-High	Low	Slight	Long Term
2	Low	Low-Medium	Slight	Long Term
3	Low-Medium	Medium	Slight	Long Term
4	Low -Medium	Negligible	Imperceptible	Long Term
5	Medium	Medium-High	Moderate	Long Term

6.7.5 Cumulative Effects

This assessment has considered the cumulative impacts that are likely, considered significant and which is reasonably foreseeable together with the impacts from the subject development proposals. The analysis detailed herein subsequently represents a worst case appraisal in terms of potential cumulative impacts for a typical weekday as it considers (1) four number off-site committed developments across the local area, (2) has utilised / applied TII regional traffic growth rates, which considering the cul-de-sac arrangements of Centre Park Road / The Marina Promenade; provides a robust estimation of baseline vehicle traffic in the adopted future design years in parallel with the aforementioned committed developments), and (3) investigates the operational efficiency of the local networks key nodes during the networks peak hour periods

6.7.5.1 Construction Phase

The assessment detailed in section 6.7.3 not only considers the construction traffic associated with the subject development but has also incorporated the additional construction traffic associated with the neighbouring 4 number committed developments as introduced in section 6.6.2.

6.7.5.2 Operational Phase

For the basis of this assessment, it is assumed that the 4 no. committed developments will be completed and occupied by the subject developments adopted Opening Year (2026) and two subsequent future design years (2031 and 2041). As such the operational traffic associated with each of these 4 no. committed developments are included in the subject developments operational phase assessment detailed in Section 6.7.4.

6.7.6 Summary

The following Table 6 24 summarises the identified likely significant effects during the construction phase of the proposed development before mitigation measures are applied.

Table 6 24 Summary of Construction Phase Likely Significant Effects in the absence of mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Additional HGV movement for material transfer	Negative	Slight	Road Network	Likely	Construction Period	Cumulative

The following Table 6 25 summarises the identified likely significant effects during the operational phase of the proposed development before mitigation measures are applied.

Table 6 25 Summary of Operational Phase Likely Significant Effects in the absence of mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Additional vehicle movements	Negative	Imperceptible	Road Network	Likely	Operation Period	Cumilative

6.8 Mitigation Measures

6.8.1 Construction Phase

All construction activities will be governed by a Construction Traffic Management Plan (CTMP), the details of which will be agreed with the local roads authority prior to the commencement of construction activities on site. The principal objective of the CTMP is to ensure that the impacts of all building activities generated during the construction of the proposed development upon both the public (off-site) and internal (on-site) workers environments, are fully considered and proactively managed / programmed, respecting key stakeholders requirements thereby ensuring that both the public's and construction workers safety is maintained at all times, disruptions minimised and undertaken within a controlled hazard free / minimised environment.

The Construction Traffic Management Plan (CTMP) will incorporate a range of integrated control measures and associated management initiatives with the objective of mitigating the impact of the proposed developments on-site construction activities.

The details of construction related parking will be detailed in the CTMP that forms part of the planning application documentation. Construction traffic will consist of the following categories:

- Private vehicles owned and driven by site staff and management;
- Construction vehicles e.g. excavation plant, dump trucks;
- Materials delivery vehicles involved in site development works.

It is anticipated that the generation of HGVs during the construction period will be evenly spread throughout the day and as such will not impact significantly during the peak traffic periods. Truck wheel washes will be installed at construction entrances and any specific recommendations with regard to construction traffic management made

by Cork City County Council will be adhered to. Surface of the car park will be prepared and finished to a standard sufficient to avoid mud spillage onto adjoining roads. The construction traffic during construction works will be monitored and controlled. Material deliveries and collections from site will be planned, scheduled and staggered to avoid unnecessary build-up of construction works related traffic. HGV trips are anticipated to arrive and depart the site at a uniform rate throughout the day, to avoid pressure on the morning and evening peak hour periods.

6.8.2 Operational Stage

A package of integrated mitigation measures has been identified and will be implemented to off-set the additional local demand that the proposed development could potentially generate as a result of the forecast increase in vehicle movements by residents of the scheme.

A Mobility Management Plan (MMP) will be prepared by management company prior occupation of the building. The MMP ultimately seeks to encourage sustainable travel practices for all journeys by residents and visitors travelling to and from the proposed development. It involves the incorporation of a wide range of possible 'hard' and 'soft' tools from which to choose with the objective of influencing travel choices. The measures in the MMP comprise a number of different categories including:

- Management & Monitoring Strategy
- Walking Strategy
- Cycling Strategy
- Public Transport Strategy
- Private Car Strategy
- Marketing & Promotion Strategy

In order to reduce the number of private vehicles to and from the development, walking and cycling connection points are proposed to encourage more active travel. These points connect to the high-quality pedestrian and cyclist network proposed along the Centre Park Road. High level of permeability through sites making walking and cycling a modal choice of local journey and connections with Public transport interchanges

Road markings and signage are provided according to Traffic Signs Manual. Suitable Lightings are positioned at junction, streets and pedestrian cycle routes.

A total of 427 no. cycle parking spaces (397 long stay and 30 short stay) will be provided as part of the proposed development and exceed CCC's Development Plan's requirements. 13 No. cargo spaces are also included in the proposed bicycle provision.

Charging points for electric vehicles are being provided as detailed in the Traffic and Transport assessment.

6.9 Residual Impact Assessment

6.9.1 Construction Phase

Construction works will include site levelling works at the site and these will largely be contained within the site. There will be materials required for the building works and deliveries will spread throughout the working day. Construction operatives will travel to and from the site, but the timing of trips will be offset by the worst peak times on the local road network. Additionally, construction shift times will be staggered from the peak house of the local road network. Based on the assessment of the network junctions there will be negligible impacts on the receiving traffic and transportation environments. The impacts of construction works will be short-term in duration of slight negative effects.

6.9.2 Operational Phase

The proposed development will have an imperceptible impact on the road network. Overall, the impact of the development will be long term in duration and will result in no significant negative effect.

6.10 Monitoring or Reinstatement

6.10.1 Construction Phase

During the construction phase of the proposed development, the following activities will be monitored.

- Compliance with construction vehicle routing practices;
- Compliance with construction vehicle parking practices;
- Internal and external road conditions; and
- Timing of construction activities.

6.10.2 Operational Phase

As part of the MMP process, bi-annual post occupancy surveys are to be carried out in order to determine the success of the measures and initiatives as set out in the proposed MMP (Mobility Management Plan) document. The information obtained from the monitoring surveys will be used to identify ways in which the MMP measures and initiatives should be taken forward in order to maintain and further encourage sustainable travel characteristics.

6.10.3 Reinstatement- Construction Phase

The construction work areas will be reinstated following completion of development with landscaped areas provided where proposed. The works will be restricted to the footprint of the site for the proposed scheme. Excavated topsoil and subsoil will be refused in reinstatement and landscaping where appropriate or dealt with in the appropriate manner i.e. sent for soil recovery as appropriate.

6.10.4 Reinstatement- Operational Phase

No reinstatement requirement identified during the operational phase of the proposed development.

6.11 Risk of Major Accidents or Disasters

Due to the scale and nature of the proposed development it is not expected that any risk of major accidents or disasters in transport and mobility terms shall arise due to its construction or operation phases.

6.12 Worst Case Scenario

The worst-case scenario in terms of traffic and transportation, is the scenario which operations at the proposed development site have the capacity to generate the greatest amount of traffic on the surrounding road network. To provide a robust basis for this assessment, the Do-Something scenario analysed above represents the worst-case scenario.

6.13 Interactions

The analysis contained within this chapter interacts with the climate, local air quality, and noise impact assessments contained within this EIAR, in addition to the population and human health chapter. This is primarily due to the potential for an increase in traffic movements on the surrounding road network due to development.

6.13.1 Construction Phase

During the construction phase, the following aspects have potential to interact with traffic & transport:

- **Population & Human Health:** Construction traffic movements during the construction phase may give rise to localised population & human health effects related to increased vehicular traffic on the road network, and impacts on the pedestrian and cycle environment.
- **Noise & Vibration:** Construction traffic movements during the construction phase may give rise to localised noise and vibration effects.
- **Air Quality:** Construction traffic movements during the construction phase may give rise to increased vehicular emissions.
- **Climate:** Construction traffic movements during the construction phase may give rise to increased greenhouse gas emissions.

6.13.2 Operational Phase

During the operational phase, the following aspects have potential to interact with traffic & transport:

- **Population & Human Health:** Additional traffic movements during the operational phase may give rise to localised population & human health effects. There are no potentially significant interactions identified between population & human health and traffic & transport during the operational phase.
- **Noise & Vibration:** Additional traffic movements during the operational phase may give rise to localised noise and vibration effects. There are no potentially significant interactions identified between noise & vibration and traffic & transport during the operational phase.
- **Air Quality:** Additional traffic movements during the operational phase may give rise to increased vehicular emissions. There are no potentially significant interactions identified between air quality and traffic & transport during the operational phase.
- **Climate:** Additional traffic movements during the operational phase may give rise to increased greenhouse gas emissions. There are no potentially significant interactions identified between climate and traffic & transport during the operational phase.

6.14 Summary of Mitigation and Monitoring

6.14.1 Construction Phase

The following Table 6 26 summarises the summary of the Mitigation and Monitoring measures identified for the construction phase of the proposed development.

Table 6 26: Summary of Mitigation and Monitoring during construction phase

Mitigation Measures	Monitoring
All construction activities will be governed by a Construction Traffic Management Plan (CTMP) to ensure that the impacts of all building activities generated during the construction of the proposed development upon both the public (off-site) and internal (on-site) workers environments, are fully considered and proactively managed / programme	Compliance with construction vehicle routing practices will be monitored.
The generation of HGVs during the construction period will be evenly spread throughout the day and as such will not impact significantly during the peak traffic periods	Compliance with construction vehicle parking practice will be monitored.
HGV trips are anticipated to arrive and depart the site at a uniform rate throughout the day, to avoid pressure on the morning and evening peak hour periods.	Internal and external road conditions will be monitored
Material deliveries and collections from site will be planned, scheduled and staggered to avoid unnecessary build-up of construction works related traffic.	Timing of construction activities will be monitored.

6.14.2 Operation Phase

The following Table 6 27 summarises the summary of the Mitigation and Monitoring measures identified for the operation phase of the proposed development.

Table 6 27: Summary of Mitigation and Monitoring during operation phase

Mitigation Measures	Monitoring
A Mobility Management Plan (MMP)will be prepared by management company prior occupation of the building.	As part of the MMP process, bi-annual post occupancy surveys are to be carried out in order to determine the success of the measures and initiatives as set out in the proposed MMP (Mobility Management Plan) document.
In order to reduce the number of private vehicles to and from the development, walking and cycling connection points are proposed to encourage more active travel.	
High level of permeability through sites making walking and cycling a modal choice of local journey and connections with Public transport interchanges.	
Road markings and signage are provided according to Traffic Signs Manual.	
Suitable Lightings are positioned at junction, streets and pedestrian cycle routes	
Charging points for electric vehicles are being provided as detatiled in the Traffic and Transport assessment.	

6.15 Conclusion

The purpose of this EIAR chapter is to quantify the existing transport environment of the subject site and to detail the results of assessment work undertaken to identify the potential level of transport impact generated as a result of the construction and operational phases of the proposed residential development.

VOLUME II

CHAPTER 7

Material Assets: Built Services & Waste

McCutcheon Halley
CHARTERED PLANNING CONSULTANTS

CHAPTER SEVEN
Table of Contents

CHAPTER SEVEN
Table of Figures

CHAPTER SEVEN
Table of Tables

Chapter Seven | Material Assets: Built Services and Waste

7.1 Introduction

This chapter of the EIAR was prepared to assess the potential significant effects of the proposed development on material assets including built services and waste.

It should be read in conjunction with the Infrastructure Design Report submitted with the planning application (DBFL Consulting Engineers, 2024).

7.2 Expertise & Qualifications

This chapter of the EIAR has been prepared by Louise Hewitt of Enviroguide Consulting.

Louise holds a Master of Science (Hons) in Environmental Resource Management from University College Dublin and a Bachelor of Science (Hons) in Biology from Maynooth University. Louise has worked as an Environmental Consultant with Enviroguide since 2021 and has 3 years of professional experience. Louise has carried out risk, population and human health and material asset assessments and has been involved in the preparation of EIARs for the following projects:

- Kilternan Village Large Scale Residential Development
- Athlone Large Scale Residential Development
- St. Teresa's Garden Large Scale Residential Development

7.3 Proposed Development

A comprehensive description of the proposed development is presented in Chapter 2 of this EIAR. The proposed development will consist of the construction of 176 no. 1, 2 and 3 bed apartment units in 2 no. blocks, 1 no. creche, 1 no. gym, a retail/café space and all associated ancillary development works.

7.3.1 Aspects Relevant to this Chapter

7.3.1.1 Surface Water Drainage

The proposed surface water drainage network has been designed to comply with the four main criteria outlined in the Cork City Development Plan 2022-2028 in relation to the management of surface water.

The surface water generated on site will be discharged to the proposed surface water network within the adjacent Fords SHD site (Ref. ABP-309059-20). Storm water will also be attenuated and discharged into the adjacent Fords SHD site which has accounted for the inclusion of runoff from the proposed development.[1] The SHD surface water drainage strategy has been designed to accommodate the surface water discharge generated by the proposed development.

[1] The adjacent Ford SHD development (Ref. ABP-309059-20) is under the same landowner/developer as the proposed development. Therefore, design and coordination between the two proposed surface water networks is possible.

In accordance with the Cork City Development Plan 2022-2028, the surface water strategy will incorporate SuDS features. These have been detailed in the Infrastructure Design Report and summarised below.

1. *Extensive green roofs, bioretention areas, green podiums and filter drains have been included in the scheme to provide attenuation, treatment and where possible, infiltration. The interception and treatment benefits of bioretention systems are a major benefit within the treatment train and a vital part of the surface water management of the site. The location of bioretention has been selected in more level areas of the site to ensure these are as effective as possible.*
2. *Attenuation storage will be an online infiltration / filtration type (Stormtech or similar approved) system with an isolator row to encourage infiltration and treatment of run-off.*
3. *A planted roof area with low growing, low maintenance plants consisting of self- sustaining mosses, sedums, succulents, herbs or grasses over a drainage layer and waterproofing membrane will be provided. Extensive green roofs provide ecological, aesthetic and amenity benefits and intercept, treat and retain rainfall, reducing the volume of runoff and attenuation of peak flows. The extensive roof will only be accessed for maintenance. (DBFL Consulting Engineers, 2024)*

Figure 7 1 Surface Water Strategy Plan (Drawing no. 240002-X-91-Z00-DTM-DR-DBFL-CE-1310) (DBFL, 2024)

7.3.1.2 Wastewater Drainage

Wastewater from the proposed development will be discharged to the Uisce Eireann 225 mm diameter foul sewer on Marquee Road via the proposed foul water network within the adjacent Fords SHD development.

A Confirmation of Feasibility (CoF) (Reference: CDS24001285 Pre-Connection Enquiry) was received from Uisce Éireann which confirms that a wastewater connection is feasible without upgrades (The CoF is included in the Infrastructure Design Report which forms part of the planning application documentation).

The proposed watermain layout has been detailed by DBFL Consulting Engineers on drawing no. 240002-X-93-Z00-XXX-DR-DBFL-CE-1601 that accompanies this application and is shown in Figure 7-2 below.

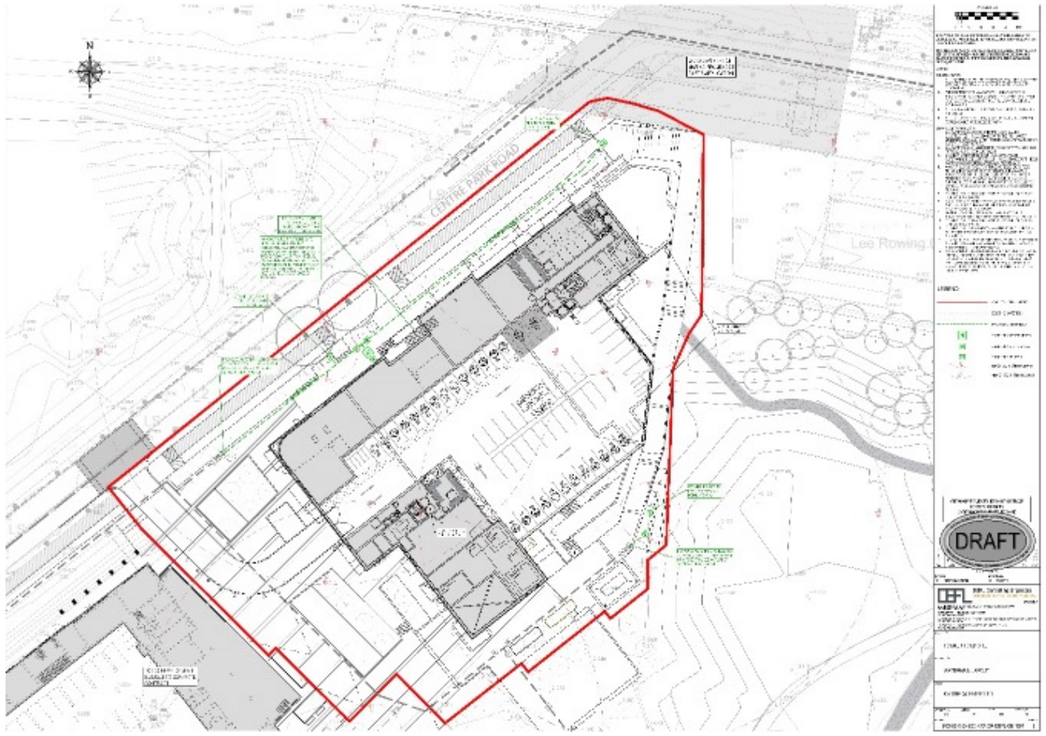


Figure 7 2 Watermain Layout (240002-X-93-Z00-XXX-DR-DBFL-CE-1601) (DBFL, 2024)

7.3.1.3 Water Supply

It is proposed to supply the site via a 150mm connection to a spur provided as part of the adjacent development ABP-309059-20. The proposed watermain layout has been detailed by DBFL Consulting Engineers on drawing no. 240002-X-93-Z00-XXX-DR-DBFL-CE-1601 that accompanies this application and is included as in Figure 7-2 above. The water main layout and details including valves, hydrants, metering etc. will be in accordance with Irish Water's Code of Practice and Standard Details for water infrastructure. Hydrants will comply with the requirements of BS 750:2012 and will be installed in accordance with Irish Water's Code of Practice and Standard Details.

A Confirmation of Feasibility (CoF) was received from Uisce Éireann which confirms that a water connection is feasible "subject to approximately 150m of water network upgrades upgrade" (The CoF is included in the Infrastructure Design Report which forms part of the planning application documentation).

Water demand has also been calculated in the Infrastructure Design Report and the per capita consumption will be 150 litres per person per day.

PREDICTED DEVELOPMENT WATER DEMAND						
RESIDENTIAL - WATER DEMAND						
Unit Type	**No.**	**Occupancy Rate (person/unit)**	**Occupancy**	**Per Capita Consumption (l/person/day)**	**Average daily domestic demand (l/day)**	**Average daily domestic demand (l/s)**
Residential	176	150	2.7	489	71280	0.83
NON-RESIDENTIAL - WATER DEMAND						
Unit Type	**Area (m^2)**	**Occupancy Rate (m^2/p)**	**Occupancy**	**Per Capita Consumption (l/person/day)**	**Average daily domestic demand (l/day)**	**Average daily domestic demand (l/s)**
Retail/Café/Amenity	531	90	20	27	2390	0.03
Creche	181	50	10	18	905	0.03
				Total Average Daily Demand l/s		**0.86**
				Average Day/Week Domestic Demand		1.25
				Average Day/Peak Week Demand l/s		**1.08**
				Peak Demand Factor		5.0
				Peak Hour Water Demand l/s		**5.39**
*Flow rates calculated using IW CoP for Water Infrastructure						

Figure 7 3 Estimated Water Demand for Development (DBFL, 2024)

7.3.1.4 Electrical Supply

The proposed development will require connection to the national grid for electricity supply. 1 no. ESB substation (4m x 3.5m) is proposed to facilitate this.

7.3.1.5 Gas Supply

There is no gas supply proposed.

7.3.1.7 Waste

The construction phase will give rise to the requirement to remove and bring quantities of various materials to and from the site. Construction and excavation related wastes will be created during the construction phase. The main construction phase largely comprises elements of construction, assembly and development of the apartment complexes, commercial buildings, amenity spaces, roads and associated ancillary works. This has the potential to impact on the local waste management network. Designing out waste will be facilitated through the reuse of the materials onsite itself and offsite construction. Many components and elements of the construction are to be manufactured offsite reducing the potential to generate waste at the site (WSP, 2024).

The operational phase of the Proposed Development will result in an increase in the generation of municipal waste by future occupants of both the residential and commercial units and will increase demand on waste collectors and treatment facilities. An Operational Waste Management Plan, which forms part of the planning application documentation has been prepared by Enviroguide Consulting which predicts the anticipated wastes arising from the day-to-day operations at the Proposed Development and how they will be managed (Enviroguide Consulting, 2024).

7.3.1.8 Soil

There will be a requirement for the excavation and removal of soil and subsoil for the construction of building foundations, drainage and other infrastructure (approximately 2,700m3). This also includes the removal of remediated contaminated material from the site which is temporarily stored in stockpiles on the site (approximately 12,006m3). In advance of construction works commencing, the stockpiled material will be removed off site. The excavation of made ground and underlying natural soils impacted with anthropogenic contamination (i.e., petroleum hydrocarbons and solvents) will be carried out as the Materials Management & Remedial Strategy Plan and Resource Waste Management Plan (WSP, 2024).

A further description of the land and spoils environment is presented in Chapter 8 of this EIAR.

7.4 Methodology

The methodology adopted for the assessment takes cognisance of the relevant guidelines, in particular the following:

- Environmental Protection Agency (EPA) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EIAR) (2022)
- EPA (2021) Best Practice Guidelines for the Preparation of Resource & Waste Management Plans for Construction & Demolition Projects
- Waste Framework Directive (Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste) as amended by Directive (EU) 2018/851;
- European Union (Waste Directive) Regulations 2020, S.I. No. 323 of 2020;
- Waste Management Acts 1996 (as amended);
- The National Waste Management Plan for a Circular Economy 2024-2030; and
- Cork City Development Plan 2022-2028.

The scope of work undertaken for the impact assessment included a desk-based study of built services, utilities and waste management infrastructure within the area surrounding the site. The desk study involved collecting all the relevant data for the proposed development site and surrounding area, including published information and details pertaining to the proposed development provided by the Applicant and the design team.

Information on built assets in the vicinity of the site of the proposed development was assembled by the following means:

- ESB Networks Utility Maps
- Irish Water Utility Plans
- Gas Networks Ireland Service plans
- EIR E-Maps
- Site Specific Flood Risk Assessment (DBFL Consulting Engineers, 2024)
- Resource and Waste Management Plan (WSP, 2024)
- Operational Waste Management Plan (Enviroguide, 2024)
- Construction Environmental Management Plan (DBFL, 2024)

All phases of the Proposed Development were considered in the assessment of potential impacts on Material Assets and Waste within the study area. Assessment of the likely impact of features of the Proposed Development, was carried out in accordance with the following codes of practice, guidelines, legislation, and plans:

- ESB Networks National Code of Practice for the Customer Interface Version 5 (2021)
- ESB Networks Construction Standards for MV Substation Buildings (2019)
- Irish Water Code of Practice for Water Infrastructure Connections and Developer Services Design and Construction Requirements for Self-Lay Developments July 2020 (Revision 2)
- IS EN752, Drain and Sewer Systems Outside Buildings
- Water Services Acts 2007 to 2017
- CIRIA Report c753 "The SuDS Manual" (2015)
- Section 3.2 of the Urban Development and Building Heights: Guidelines for Planning Authorities (2018)
- Waste Framework Directive (Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste) as amended by Directive (EU) 2018/851.
- European Union (Waste Directive) Regulations 2011 - 2020, S.I. No. 323 of 2020
- Waste Management Acts 1996 to 2011
- National Waste Management Plan for a Circular Economy 2024 – 2030

7.5 Difficulties Encountered

No difficulties were encountered in the preparation of this chapter.

7.6 Baseline Environment

7.6.1.1 Surface Water Drainage

Within the site, there is currently no surface water network. Externally, Centre Park Road is drained via road gulleys into the existing open channel network which drains the South Docklands area, ultimately discharging to the Atlantic Pond and then into the River Lee (DBFL Consulting Engineers, 2024).

7.6.1.2 Wastewater Drainage

A review of the Uisce Eireann records shows that there is no existing foul network adjacent to the site boundary. The nearest connection point would be a foul sewer running along Marquee Road to the southwest (DBFL Consulting Engineers, 2024).

7.6.1.3 Water Supply

The site is well served by the adjacent watermain network. Uisce Éireann records show the presence of both a 400mm and a 100mm ductile iron watermain located along Centre Park Road and the Marina (DBFL Consulting Engineers, 2024).

7.6.1.4 Electrical Supply

EirGrid develop and operate the national electricity grid and are responsible for taking electricity from the power generators and delivering it to the distribution network, which is operated by ESB Networks. The high-voltage Irish electricity transmission grid comprises 6,800 km of power lines and operates at 400 kV, 220 kV and 110 kV. Substations provide entry points to, and exits from, the transmission grid.

The Marina Generating Station is located approximately 500m west of the site which operates on thermal transmission. An underground, medium voltage (MV) network is present on Marquee Road approximately 350m south of the site. A number of 110kV stations are located in the area surrounding the site with the closest being the Marina station which is serviced by 110kV underground cables (EirGrid Group, Transmission System Map, 2023).

7.6.1.5 Gas Supply

Gas Networks Ireland builds, develops and operates Ireland's gas infrastructure, maintaining over 14,500 km of gas pipelines and two sub-sea interconnectors. Gas Networks Ireland is responsible for connecting all new gas customers to the network, and for work on service pipes and meters at customer's premises, on behalf of all gas suppliers in Ireland.

The development is located adjacent to good network utilities, with a natural gas main located on Marina Road. The Gas Networks Ireland map indicates that connections to the natural gas network are available in the Cork City area. The site is currently brownfield and there is currently no onsite consumption of natural gas.

7.6.1.6 Telecommunications

In terms of mobile telecommunication for transmission and reception, the closest mobile communications mast is located on centre park road south of the site. This mast services Eircom, Vodafone and Three mobile networks.

The Department of the Environment, Climate and Communications (DoECC) has published a High-Speed Broadband Map which identifies locations and premises based on the availability of high-speed broadband services. The site is in a blue area where *"where commercial operators are delivering or have indicated plans to deliver high speed broadband services. Operators are continuing to enhance their services in these areas to improve access to high-speed broadband."* (DoECC, 2024).

7.6.1.7 Waste

The proposed development site is located on the edge of Cork City and lies wholly within Cork City Council's jurisdiction. Cork City Council (CCC) is the local authority responsible for setting and administering waste management activities in the area of the Proposed Development. CCC's waste management activities are governed by the requirements set out in the Southern Region Waste Management Plan 2015-2021 which has since been replaced by the National Waste Management Plan for a Circular Economy 2024-2030. The site is currently brownfield in nature and has no waste management requirements.

7.6.1.8 Soil

The soils beneath the site have been mapped by the GSI (GSI, 2024) as 'Made Ground'. Based on previous site investigations, several areas of historical contamination were identified, and remedial excavations were undertaken. In addition, remedial excavations were also undertaken within isolated areas where historic deposition of waste oils/solvents were observed during site investigations. Soil samples were also collected across the site and detectable concentrations of heavy metals, mineral oil, Total Petroleum Hydrocarbons (TPH), Polycyclic Aromatic Hydrocarbons (PAHs), and volatile organic compounds (VOCs) were reported in soil samples collected. A further description of the baseline land and spoils environment is presented in Chapter 8 of this EIAR.

7.7 The 'Do Nothing' Scenario

In the 'Do Nothing' scenario, the proposed development does not proceed and there would be no excavation, construction or operational waste generated at the site. There would, therefore, be no additional demand or loading on waste management infrastructure locally or nationally and thus there would be a neutral effect on the environment in terms of waste.

There would also be no increase in the demand on the existing surface water and wastewater drainage, water, electrical and gas supply or telecommunications. Therefore, the effect on surrounding utilities infrastructure would be neutral.

As the site is zoned for development, in the absence of the proposed development, it is likely that a development of a similar nature is likely to be constructed in the future in line with national policy and the development plan objectives. Therefore, the construction and operational phase impacts outlined in this assessment are likely to occur in the future, even in the absence of the proposed development.

7.8 Potential Significant Effects

7.8.1 Demolition Phase

There is no demolition proposed as such no associated effects have been assessed.

7.8.2 Construction Phase

7.8.2.1 Surface Water Drainage

Construction activities have the potential to cause contamination of surface water runoff with entrained sediment or other contaminants from groundworks areas and stockpiled soils. There will be no unauthorised discharge of water (groundwater or surface water runoff) to ground, drains or water courses during the construction phase. Surface runoff will be managed during construction and there will be no unauthorised discharges of water from the site. However, in the event of a rainfall event, surface runoff entering the open excavations could result in mobilisation of identified hydrocarbon contamination in soil and leaching and migration to groundwater beneath the site. The potential effects will be negative, slight and short term. Chapter 9 Water and Hydrology has assessed the potential effects on surface water in further detail.

7.8.2.2 Wastewater Drainage

Commencement of construction will result in a net increase in the foul water / wastewater produced at the site. Confirmation of feasibility was issued by Uisce Éireann and the wastewater connection is *"Feasible without*

infrastructure upgrade by Uisce Éireann". Due to the temporary and phased nature of the construction phase, the likely effect of the proposed development on the existing foul water network will be negative, slight and short term. Chapter 9 Water and Hydrology has assessed the potential effects on wastewater in further detail.

7.8.2.3 Water Supply

Site offices and construction activities will create a demand for water supply to the site. A temporary connection is required to facilitate on-site works for all housing developments. Commencement of construction will therefore result in a net increase in the water demand for the site. The Proposed Development will be connected to the existing mains water supply subject to agreement from Irish Water who issued a Confirmation of Feasibility (CoF) for the connection. New connection works may cause water supply disruptions during the Construction Phase. These disruptions will be controlled by Irish Water and Cork City Council in accordance with standard protocols. Due to the nature of the works during the Construction Phase, the likely effect will be negative, imperceptible and short term.

7.8.2.4 Electricity

Construction related activities will require temporary connection to the local electrical supply network. The Main Contractor will apply for a power supply from ESB Networks to power both the compound and the construction site. The size of supply will be calculated to ensure it is sufficient to power both the site compounds and construction site activities. A temporary suspension of the network locally to facilitate the connection works may be required during the Construction Phase, and an additional temporary suspension will also occur when power is provided to the Site of the Proposed Development. These temporary suspensions will be controlled by ESB Networks as the statutory undertaker and in accordance with standard protocols. The potential impact from the construction phase of the proposed development on the local electrical supply network is likely to be negative to neutral, slight and temporary, depending on the length of temporary network suspensions.

7.8.2.5 Gas

It is not anticipated there will be a requirement for gas connection during the construction phase.

7.8.2.6 Telecommunications

Connections may be required to the existing ICT network during the construction phase. New connections will be controlled by the network provider in accordance with standard protocols. Due to the temporary nature of the construction phase, the likely effect of the construction phase on the local telecoms network will be neutral, imperceptible, and temporary.

7.8.2.7 Waste

The construction phase will give rise to the requirement to remove and bring quantities of various materials to and from the site. Construction and excavation related wastes will be created during the construction phase. This has the potential to impact on the local waste management network. Waste will also be generated from construction workers e.g., organic/food waste, dry mixed recyclables (wastepaper, newspaper, plastic bottles, packaging, aluminium cans, tins and cartons), mixed non-recyclables and potentially sewage sludge from temporary welfare facilities provided onsite during the construction phase. Waste printer/toner cartridges, waste electrical and electronic equipment (WEEE) and waste batteries may also be generated infrequently from site offices. Office and canteen waste, including food waste, will be stored in wheelie bins on site and it will be collected by an appropriately authorised waste collector. All wastes generated on site will be sent for recycling, recovery, or disposal to a suitably licensed or permitted waste facility (WSP, 2024).

The potential impact from the construction phase on waste recovery and disposal will be negative, slight and short term.

7.8.2.8 Soil

The soil and groundwater beneath the site are impacted due to historic infilling and industrial activities that occurred previously. A Materials Management and Remedial Strategy Plan (MMRP) (Appendix 7.2) has been prepared by WSP to provide the construction team with a management plan for the excavation of soil materials to ensure that the material is managed appropriately for specific end reuse onsite and/or disposal offsite as required. Contaminated hotspots have been identified which will be excavated and disposed off-site by the contractor (WSP, 2024). Removal and recovery/recycling/disposal of all waste materials, including soil, will be carried out in accordance with the Waste Management Act 1996 and as amended. The removal of all soil from the site will be undertaken in accordance with all applicable statutory legislation and will be the responsibility of the main contractor.

Based on the implementation of the above reports, the likely effect of the Proposed Development on waste soils will be neutral, imperceptible and short term.

Figure 7 4 Stockpile Quantities and Locations (SV770-STOCKPILE-07.2024)

7.8.3 Operational Phase

7.8.3.1 Surface Water Drainage

During operation, the site will have increased impermeable surfaces due to the access roads and houses. Surface water runoff from roads and the impermeable areas of the proposed development may contain potentially contaminating compounds (petroleum hydrocarbons, metals, and suspended sediments). Surface water from the proposed development will be managed in accordance with the principles and objectives of Sustainable Drainage Systems (SuDS), with a particular focus on Nature-Based Solutions to treat and attenuate surface water prior to discharging offsite at runoff rates informed by the Docklands Drainage Strategy. Overall, the likely effect of the surface water drainage strategy for the Proposed Development will be negative, slight and long-term. Chapter 9 Water and Hydrology has assessed the potential effects on surface water in further detail.

7.8.3.2 Wastewater Drainage

The operational phase will result in an increased population to the area and an increase in the production of wastewater entering the Cork City Waste Water Treatment Plant (WWTP). The wastewater connection is deemed "Feasible without infrastructure upgrade by Uisce Éireann". Chapter 9 Water and Hydrology has assessed the potential effects on surface water and foul water in further detail. The operational phase will have an increase in demand which will have a negative, slight, long-term effect.

7.8.3.3 Water Supply

Water demand has been calculated and the per-capita consumption will be 150 litres per person per day. Water supply will be provided by the existing Uisce Éireann infrastructure subject to approximately 150m of water network upgrades. The operational phase will have an increase in demand which will have a neutral, imperceptible, long-term effect.

7.8.3.4 Electricity

Electricity will be required to provide public lighting, domestic lighting, power supply and heating for each individual unit for the Proposed Development along with electric vehicle parking. The proposed development is likely to increase demand on the existing electricity supply network. The potential effect from the operational phase on the electricity supply network is likely to be neutral, imperceptible, and long term.

7.8.3.5 Gas

There is no gas supply proposed.

7.8.3.6 Telecommunications

The operational phase will have a marginal increase in demand on the local telecommunications network. The site is located within an area where high speed broadband is available and the closest mobile communications mast on centre park road south of the site services Eircom, Vodafone and Three mobile networks. The likely effect of the operational phase on the local telecommunications network will be neutral, and imperceptible in the long term.

7.8.3.7 Waste

The operational phase will result in an increase in the production of municipal waste and will increase demand on waste collectors and treatment facilities, however, as the surrounding area is urban in nature, waste collection is commonplace.

Anticipated wastes arising from the day-to-day operations at the Proposed Development are summarised in Table 7-1

Table 7 1 Expected Waste Types and List of Waste Codes

WASTE DESCRIPTION	LIST OF WASTE CODE
Mixed Municipal Waste	20 03 01
Dry Mixed Recyclables	20 03 01
Biodegradable Kitchen Waste	20 01 08
Glass	20 01 02
Bulky wastes	20 03 07
Waste electrical and electronic equipment*	20 01 35*
21 01 36	
Batteries and accumulators*	20 01 33*
20 01 34	
Textiles	20 01 11
Fluorescent tubes and other mercury containing waste*	20 01 21
Chemicals (solvents, pesticides, paints & adhesives, detergents, etc.)*	20 01 13/19/27-28/29-30
Plastic	20 01 39
Metals	20 01 40
Paper and Cardboard	20 01 01

Municipal waste is made up of household waste and commercial waste that is compositionally comparable to household waste. It includes residual, recyclables, organic, bulky, and waste electrical and electronic equipment. An Operational Waste Management Plan (OWMP) has been prepared by Enviroguide Consulting (2024) and forms part of the planning application documentation.

The OWMP details the waste segregation and storage capacity requirements, as well as the plan which will be adopted to manage the residential and commercial waste (from the creche facility) arising from the Proposed Development, once operational. The OWMP has reviewed policy alongside best practice guidance and recommendations for sustainable waste and recycling management arrangements for the Proposed Development.

The potential impact from the operational phase on waste recovery and disposal will be neutral, slight and long term.

7.8.4 Cumulative Effects

Cumulative Impacts can be defined as *"impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project"*. Effects which are caused by the interaction of effects, or by associated or off-site projects, are classed as indirect effects. Cumulative effects are often indirect, arising from the accumulation of different effects that are individually minor.

As part of this assessment, cumulative projects in Appendix 1.1 of this EIAR were reviewed and considered for possible cumulative effects with the Proposed Development.

It is considered that there is no potential for the Proposed Development to act in-combination with other permitted developments in the vicinity that could cause likely significant effects on;

- Surface water drainage
- Wastewater drainage
- Water supply
- Electrical supply
- Gas supply
- Telecommunications
- Waste / Soil

7.8.5 Summary

The following Table summarises the identified likely effects during the construction phase of the proposed development before mitigation measures are applied.

Table 7 2 Summary of Construction Phase Likely Significant Effects in the absence of mitigation

LIKELY SIGNIFICANT EFFECT	QUALITY	SIGNIFICANCE	EXTENT	PROBABILITY	DURATION	TYPE
Surface water - mobilisation of sediments, accidental spills, silts wash etc.	Negative	Slight	Cork City Area	Likely	Short term	Direct
Waste water	Negative	Slight	Cork City Area	Likely	Short term	Direct
Water supply - loss of water supply	Negative	Slight	Cork City Area	Likely	Short term	Direct
Electrical Supply - loss of electricity supply	Negative to Neutral	Slight	Cork City Area	Likely	Temporary	Direct
Telecommunications – loss of telecommunications	Neutral	Imperceptible	Cork City Area	Likely	Temporary	Direct
Waste – generation of construction waste and additional demand on surrounding waste collection facilities	Negative	Slight	Cork City Area	Likely	Short term	Direct
Soil	Neutral	Imperceptible	The Site	Likely	Short term	Direct

The following table summarises the identified likely significant effects during the operational phase of the proposed development before mitigation measures are applied.

Table 7 3 Summary of Operational Phase Likely Significant Effects in the absence of mitigation

LIKELY SIGNIFICANT EFFECT	QUALITY	SIGNIFICANCE	EXTENT	PROBABILITY	DURATION	TYPE
Surface water	Negative	Slight	Cork City Area	Likely	Long term	Direct
Waste water– additional demand on surrounding network	Negative	Slight	Cork City Area	Likely	Long term	Direct
Water supply– additional demand on surrounding network	Neutral	Imperceptible	Cork City Area	Likely	Long term	Direct
Electrical Supply– additional demand on surrounding network	Neutral	Imperceptible	Cork City Area	Likely	Long term	Direct
Gas supply	Neutral	Imperceptible	Cork City Area	Unlikely	Short term	Direct
Telecommunications – additional demand on surrounding network	Neutral	Imperceptible	Cork City Area	Likely	Long term	Direct
Waste – generation of operational waste and additional demand on surrounding waste collection facilities	Neutral	Slight	Cork City Area	Likely	Long term	Direct

7.9 Mitigation Measures

7.9.1 Incorporated Design Mitigation

The design has been prepared based on relevant codes of practice, design guidance and in consultation with relevant local and statutory authorities to ensure best practice design, considering the effect on local and wider network for water supply, foul and surface water drainage, electrical network and the telecommunication network.

7.9.2 Demolition Phase Mitigation

There is no demolition phase proposed.

7.9.3 Construction Phase Mitigation

7.9.3.1 Surface water

Specific avoidance, remedial and mitigation measures to be taken during the construction phase with respect to surface water drainage are detailed within Chapter 9 Water and Hydrology of this EIAR. All works will be carried out in accordance with the Construction and Environmental Management Plan prepared for the Proposed Development and the Irish Water Code of Practice for Water Infrastructure (July 2020) and the Irish Water Code of Practice for Wastewater Infrastructure (July 2020). The construction of any watermains infrastructure will be in accordance with Uisce Éireann standards.

7.9.3.2 Wastewater Drainage

Specific avoidance, remedial and mitigation measures to be taken during the construction phase with respect to foul water are detailed within Chapter 9 Water and Hydrology of this EIAR. All works will be carried out in accordance with the Construction and Environmental Management Plan prepared for the Proposed Development and the Irish Water Code of Practice for Water Infrastructure (July 2020) and the Irish Water Code of Practice for Wastewater Infrastructure (July 2020). The construction of any wastewater infrastructure will be in accordance with Uisce Éireann standards.

7.9.3.3 Water supply

Confirmation of feasibility has been received by Uisce Eireann. Utilities providers will be responsible for the management and any required upgrades of water supply and as such no mitigation measures are required.

7.9.3.4 Electricity

New connections for electricity supply will be coordinated with the relevant utility provider and Cork City Council and will be carried out and tested by approved contractors, as per standard protocols and as such no mitigation measures are required.

7.9.3.5 Gas

There is no gas supply proposed and as such no mitigation measures are required.

7.9.3.6 Telecommunications

Any new connections required for telecommunications will be coordinated with the relevant utility provider and Cork City Council and will be carried out and tested by approved contractors, as per standard protocols and as such no mitigation measures are required.

7.9.3.7 Waste

The measures outlined in the Resource Waste Management Plan (RWMP) (Appendix 7.1) and Materials Management and Remedial Strategy Plan (MMRP) (Appendix 7.2) will be implemented in full and form part of the mitigation strategy for the site. Implementation of the RWMP and MMRP will ensure a high level of recycling, reuse and recovery at the Proposed Development. All recyclable materials will be segregated at source to reduce waste contractor costs and ensure maximum diversion of materials from landfill, thus achieving the targets set out in The National Waste Management Plan for a Circular Economy 2024-2030.

7.9.4 Operational Phase Mitigation

7.9.4.1 Surface water

Due to the incorporated design measures relating to surface water, no additional mitigation measures are required. Following planning application stage, connection agreements will be made with Uisce Éireann to ensure water supply to the site and foul water discharge off site and no additional mitigation measures will be required.

7.9.4.2 Wastewater Drainage
Due to the incorporated design measures relating to foul / wastewater, no additional mitigation measures are required. Following planning application stage, connection agreements will be made with Uisce Éireann to ensure water supply to the site and foul water discharge off site and no additional mitigation measures will be required.

7.9.4.3 Water supply
Confirmation of feasibility has been received by Uisce Eireann. Utilities providers will be responsible for the management and any required upgrades of water supply and as such no mitigation measures are required.

7.9.4.4 Electricity
Utilities providers will be responsible for the management and any required upgrades of electricity supply and as such no mitigation measures are required.

7.9.4.5 Gas
There is no gas supply proposed and as such no mitigation measures are required.

7.9.4.6 Telecommunications
Utilities providers will be responsible for the management and any required upgrades of telecommunications and as such no mitigation measures are required.

7.9.4.7 Waste
The measures outlined in the Operational Waste Management Plan, prepared by Enviroguide which accompanies this application under separate cover, will be implemented in full and form part of the mitigation strategy for the site. Implementation of the OWMP will ensure a high level of recycling, reuse and recovery at the Proposed Development. All recyclable materials will be segregated at source to reduce waste contractor costs and ensure maximum diversion of materials from landfill, thus achieving the targets set out in The National Waste Management Plan for a Circular Economy 2024-2030.

7.10 Residual Impact Assessment

This section assesses potential significant environmental impacts which remain after mitigation measures are implemented.

7.10.1 Demolition Phase
There is no demolition proposed.

7.10.2 Construction Phase
7.10.2.1 Surface Water Drainage
Having regard to the prevention and mitigation measures proposed within this and other chapters of the EIAR, the residual impacts on surface water drainage will be neutral, imperceptible and short term.

7.10.2.2 Wastewater Drainage
Having regard to the prevention and mitigation measures proposed within this and other chapters of the EIAR, the residual impacts on wastewater will be as neutral, imperceptible and short term.

7.10.2.3 Water supply
Having regard to the prevention and mitigation measures proposed within this and other chapters of the EIAR, the residual impacts on water supply will be negative, imperceptible and short term.

7.10.2.4 Electricity
Having regard to the prevention and mitigation measures proposed within this and other chapters of the EIAR, the residual impacts on electrical supply will be negative to neutral, slight and temporary, depending on the length of temporary network suspensions.

7.10.2.5 Waste
Having regard to the prevention and mitigation measures proposed within this and other chapters of the EIAR, the RWMP and the MMRP (Appendix 7.1 and 7.2 respectively), the residual impacts on waste will be neutral, and imperceptible in the long term.

7.10.3 Operational Phase
7.10.3.1 Surface water
Having regard to the prevention and mitigation measures proposed within this and other chapters of the EIAR, the residual impacts on surface water drainage will be neutral, imperceptible and long term.

7.10.3.2 Wastewater Drainage
Having regard to the prevention and mitigation measures proposed within this and other chapters of the EIAR, the residual impacts on wastewater will be neutral, imperceptible and short term.

7.10.3.3 Water supply
No mitigation measures are proposed in relation to water supply therefore the residual effects will have a neutral, imperceptible, long-term effect.

7.10.3.4 Electricity
No mitigation measures are proposed in relation to electrical supply therefore the residual effects will have a neutral, imperceptible, long-term effect.

7.10.3.5 Telecommunications
Having regard to the prevention and mitigation measures proposed within this and other chapters of the EIAR, the residual impacts on telecommunications will remain as neutral, and imperceptible in the long term.

7.10.3.6 Waste
Based on the implementation of the OWMP, the residual effects on waste recovery and disposal will be neutral, slight and long term.

7.10.4 Summary of Post-mitigation Effects

The following Table summarises the identified likely significant residual effects during the construction phase of the proposed development following the application of mitigation measures.

Table 7 4 Summary of Construction Phase Effects Post Mitigation

LIKELY SIGNIFICANT EFFECT	QUALITY	SIGNIFICANCE	EXTENT	PROBABILITY	DURATION	TYPE
Surface water - mobilisation of sediments, accidental spills, silts wash etc.	Neutral	Imperceptible	Cork City Area	Likely	Short term	Direct
Waste water	Neutral	Imperceptible	Cork City Area	Likely	Short term	Direct
Water supply - loss of water supply	Negative	Imperceptible	Cork City Area	Likely	Short term	Direct
Electrical Supply - loss of electricity supply	Negative to Neutral	Slight	Cork City Area	Likely	Temporary	Direct
Telecommunications – loss of telecommunications	Neutral	Imperceptible	Cork City Area	Likely	Temporary	Direct
Waste – generation of construction waste and additional demand on surrounding waste collection facilities	Neutral	Slight	Cork City Area	Likely	Temporary	Direct
Waste – generation of operational waste and additional demand on surrounding waste collection facilities	Neutral	Slight	Cork City Area	Likely	Long term	Direct

The following Table summarises the identified likely residual significant effects during the operational phase of the proposed development post mitigation.

Table 7 5 Summary of Operational Phase Effects Post Mitigation

LIKELY SIGNIFICANT EFFECT	QUALITY	SIGNIFICANCE	EXTENT	PROBABILITY	DURATION	TYPE
Surface water	Neutral	Imperceptible	Cork City Area	Likely	Long term	Direct
Waste water– additional demand on surrounding network	Neutral	Imperceptible	Cork City Area	Likely	Long term	Direct
Water supply– additional demand on surrounding network	Neutral	Imperceptible	Cork City Area	Likely	Long term	Direct
Electrical Supply– additional demand on surrounding network	Neutral	Imperceptible	Cork City Area	Likely	Long term	Direct
Telecommunications – additional demand on surrounding network	Neutral	Imperceptible	Cork City Area	Likely	Long term	Direct
Waste – generation of operational waste and additional demand on surrounding waste collection facilities	Neutral	Slight	Cork City Area	Likely	Long term	Direct
Waste – generation of operational waste and additional demand on surrounding waste collection facilities	Neutral	Slight	Cork City Area	Likely	Long term	Direct

7.10.5 Cumulative Residual Effects

No cumulative residual effects have been identified.

7.11 Risk of Major Accidents or Disasters

The proposed development has been designed and will be constructed in line with best practice and, as such, major accidents and / or natural disasters will be low. The risk of major accidents or disasters in relation to built services and waste are:

- Construction activities such as excavation or movement of machinery coming into contact with live electricity lines
- Excavation works encountering water supply services causing damage and leaks
- Excavation works encountering wastewater supply services causing damage and leaks
- Accidents involving vehicles or machinery

Due to careful planning and the implementation of the aforementioned mitigation measures, the likelihood of such events occurring would be local and not significant.

7.12 Worst Case Scenario

7.12.1 Surface water

A worst-case scenario in relation to surface water would be a failure or blockage of drainage infrastructure resulting in surface flooding. However, taking account of the avoidance and mitigation measures, the worst-case scenario is deemed to be an unlikely scenario.

7.12.2 Wastewater Drainage

A worst-case scenario in relation to wastewater drainage would be where construction works resulted in an extended disruption to sewerage systems for existing properties in the area due to unforeseen delays on site. However, taking account of the avoidance and mitigation measures, the worst-case scenario is deemed to be an unlikely scenario.

7.12.3 Water supply

A worst-case scenario in relation to water supply would be where construction works resulted in an extended disruption for existing properties in the area due to unforeseen delays on site. However, taking account of the avoidance and mitigation measures, the worst-case scenario is deemed to be an unlikely scenario.

7.12.4 Electricity

A worst-case scenario in relation to electricity supply would be where construction works resulted in an extended disruption for existing properties in the area due to unforeseen delays on site. However, taking account of the avoidance and mitigation measures, the worst-case scenario is deemed to be an unlikely scenario.

7.12.5 Gas

There is no gas proposed as part of the proposed development and therefore a worst-case scenario has not been assessed.

7.12.6 Telecommunications

A worst-case scenario in relation to telecommunications would be where construction works resulted in an extended disruption for existing properties in the area due to unforeseen delays on site. Utilities providers will be responsible for the management and any required upgrades of telecommunications and as such no mitigation measures are required.

7.12.7 Waste

A worst-case scenario in relation to waste would be where a previously unclassified hazardous waste stream arose on the site during excavations, which was not identified and segregated appropriately and resulted in the contamination of a non-hazardous waste stream, such as soil and stones, resulting in a large volume of hazardous waste that would require specialist removal and treatment. Additionally, the contaminated soil and stones would no longer be fit for use for fill and landscaping and would need to be replaced with imported materials.

7.13 Interactions

7.13.1 Population and Human Health

In the absence of mitigation, the improper removal, handling and storage of waste could negatively impact on the health of construction workers. Extended power or telecommunications outages, or disruption to water supply or sewerage systems for existing properties in the area could negatively impact on the surrounding human population and their overall health. Chapter 4 Population and Human Health of this EIAR has concluded that no long term, adverse effects are likely to impact on Population and Human Health as a result of the Proposed Development.

7.13.2 Land, Soils & Geology

Improper handling and segregation of hazardous or contaminated wastes could lead to the contamination of soil and stones excavated from the site. It is also anticipated that some excavated soil and subsoil, including soil contaminated with petroleum hydrocarbons and solvents, will require removal offsite. Additionally, there is a requirement to import aggregates during the Construction Phase of the Proposed Development. Potential impacts on land and soils are addressed in Chapter 8 of this EIAR.

7.13.3 Water & Hydrology

All connections to the public water network (water supply or foul sewer), abstractions from water supply and discharges to the foul sewer during the Construction and Operational Phases will be under consent from Uisce Éireann. Potential impacts on water and hydrology are addressed in Chapter 9 of this EIAR.

7.13.4 Climate

The proposed development has been designed in accordance with all relevant building design standards. Sustainable power and heat sources have been included as part of the building design to reduce reliance on imported fossil fuels and reduce greenhouse gases (GHG) emissions.

7.13.5 Traffic

The proposed development will require the removal of excavated soil and transportation to appropriate waste facilities during the construction phase. It is anticipated that all excavated materials will require removal offsite in accordance with all statutory legislation. This has the potential to negatively affect the surrounding road network. The removal of all soil from the site will be undertaken in accordance with all applicable statutory legislation and will be the responsibility of the main contractor. Potential impacts on traffic are addressed in Chapter 6 of this EIAR.

7.14 Monitoring

During the construction phase, a procedure for waste auditing will be in place as the RWMP (Appendix 7.1). The purpose of the waste auditing is to identify any problems with the site's waste procedures and also the benefits of prevention and minimisation that is in place. The audit will be a 'self-audit' process carried out by the Resource Manager and/or appointed team member/contractor. The RM will create an Audit Plan and identify the appropriate frequency at which the audits are to be conducted over the course of the construction phase. The waste audit will document details of the quantity, type and composition of all waste removed from the site. The audit findings will highlight any corrective actions that may need to be taken in relation to waste management procedures or site practices. These corrective actions will be tracked in order to identify root- causes as appropriate (WSP,2024).

During the operational phase, building services will be subject to required maintenance as detailed in the Building Lifecycle Report (Aramark, 2024). The Building Lifecycle Report will be updated as the building design develops and at operational commencement of the development, a Planned Preventative Maintenance Schedule (PPM) will be available to the property management company. This document will form the basis of any monitoring and maintenance required in relation to building services.

Table 7 6 Summary of Operational Phase Monitoring (extracted from Building Lifecycle Report, Aramark, 2024)

BUILDING SERVICES	REQUIRED MAINTENANCE / MONITORING
Mechanical Plant	Annual Service Inspections to be included as part of Development Planned Preventative Maintenance (PPM) Programme
Soils and Wastes	
Water Services	
Ventilation Services	
Electrical / Protective Services	Annual / Every three years to be included as part of Development Planned Preventative Maintenance (PPM) Programme
Lighting Services internal	Annual / Quarterly Inspections certification as required
Lighting Services External	Annual / Quarterly Inspections certification as required as per the Planned Preventative Maintenance (PPM) schedule.
Protective Services – Fire Alarm	
Protective Services – Fire Extinguishers	Annual with Replacement of all extinguishers at year 10
Protective Services – Apartment Sprinkler System (Where Applicable by Fire Cert)	Weekly Check of Sprinkler Pumps and plant and annual testing and certification of plant by specialist.
Protective Services – Dry Risers (Where Applicable by Fire Cert)	Visual Weekly Checks of Pipework and Landing Valves with Annual testing and certification by specialist.
Fire Fighting Lobby Ventilation (To Fire Consultants Design and Specification	Annual Service Inspections to be included as part of Development Planned Preventative Maintenance (PPM) Programme.
Sustainable Services (Heat Pump Hot Water Cylinders, Electric Car Charging infrastructure, Photovoltaic (PV) Solar Panel Thermal Array on roof)	

The building management company and future residents will be required to maintain the bins and storage areas in good condition as required by the Cork County Council Waste Bye-Laws. The waste strategy presented in the OWMP will provide sufficient storage capacity for the estimated quantity of segregated waste. The designated areas for waste storage will provide sufficient room for the required receptacles in accordance with the details of this strategy.

7.15 Conclusion

The assessment of likely effects resulting from the Proposed Development on built services and waste in this chapter has identified the existing infrastructure in the surrounding area in relation to surface water, wastewater, water supply, electrical supply, gas supply, telecommunications and waste (including soil). Where relevant, appropriate mitigation and monitoring measures have been detailed.

It is reasonably considered that following all mitigation measures including design embedded and prescribed, adequate implementation of the CEMP, RWMP (Appendix 7.1), OWMP and MMRP (Appendix 8.3), that are provided as appendices and form part of the planning application documentation, and adherence to construction best practice, that no significant effects to built services and waste will arise from the Proposed Development during the construction or operational phases.

7.16 References and Sources

Eastern-Midlands Region (EMR) Waste Management Plan 2015-2021

Environmental Protection Agency (EPA) (2022) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports

EPA (2021) Best Practice Guidelines for the Preparation of Resource & Waste Management Plans for Construction & Demolition Projects

EPA (2002) Guidelines on the information to be contained in Environmental Impact Statements.

ESB Networks (2021) National Code of Practice for the Customer Interface Version 5

ESB Networks (2019) Construction Standards for MV Substation Buildings

European Union (Waste Directive) Regulations 2011-2021

Health and Safety Authority (2010) Code of Practice for Avoiding Danger from Underground Services

https://siteviewer.comreg.ie/#site/1318/53.3334867275/-6.2920326981/1/Site%201318 viewed online 26.07.2022

https://www.gov.ie/en/publication/5634d-national-broadband-plan-map/#interactive-map viewed online 26.07.2022

http://mywaste.ie viewed online 26.07.2022

https://epawebapp.epa.ie/terminalfour/waste/index.jsp viewed online 26.07.2022

http://www.nwcpo.ie/permitsearch.aspx viewed online 26.07.2022

Irish Water Code of Practice for Water Infrastructure Connections and Developer Services Design and Construction Requirements for Self-Lay Developments July 2020 (Revision 2)

Waste Framework Directive (Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste) as amended by Directive (EU) 2018/851.

Waste Management Acts 1996 to 2011

Water Services Acts 2007 to 2017

VOLUME II

CHAPTER 8

Land & Soils

McCutcheon Halley
CHARTERED PLANNING CONSULTANTS

CHAPTER EIGHT
Table of Contents

CHAPTER EIGHT
Table of Figures

CHAPTER EIGHT
Table of Tables

Chapter Eight | Land & Soils

8.1 Introduction

This chapter of the EIAR was prepared to assess the potential significant effects of the Proposed Development on the receiving land, soils, and geology on lands at the Former Ford Distribution Site, fronting onto Centre Park Road, Ballintemple, Co. Cork (hereafter referred to as the site and Proposed Development) and sets out any required mitigation measures where appropriate.

The principal objectives of this chapter are to identify:

- Land, soils, and geological characteristics of the site.
- Potential effects the Proposed Development may have on land, soils and geology including geological heritage assessments including "worst case" scenario assessment.
- Potential constraints that these features may place on the Proposed Development.
- Required mitigation measures which may be necessary to prevent or minimise any adverse effects related to the Proposed Development.
- Evaluate the significance of any residual effects.

It should be read in conjunction with Chapter 4 Population & Human Health, Chapter 9 Water & Hydrology, Chapter 12 Air Quality, Chapter 5 Landscape & Visual Impact, Chapter 7 Material Assets: Waste and Chapter 10 Biodiversity of the EIAR and other information provided by the Applicant pertaining to the design proposals for the Proposed Development and submitted with the planning application.

8.2 Expertise & Qualifications

Gareth Carroll holds a BA in Mathematics and a BEng in Civil, Structural and Environmental Engineering from Trinity College Dublin. Gareth Carroll, a Chartered Environmentalist with the Institute of Environmental Sciences (CEnv) and over 11 years' experience as an Environmental Consultant, has carried out environmental assessments for a range of project types and geological and hydrogeological site settings and been involved in the preparation of EIARs for the following projects:

- Large-Scale Residential Development at Wayside, Enniskerry Road and Glenamuck Road, Kilternan, Dublin 18.
- Large-Scale Residential Development at White Car Park Site (Site A) at Blanchardstown Town Centre, Coolmine, Dublin 15.
- Large-Scale Residential Development at lands located at Haggardstown, Dundalk, Co. Louth.

8.3 Proposed Development

The Proposed Development will include the construction of 176 no. 1, 2 and 3 bed apartment units in 2 no. blocks, 1 no. creche, 1 no. gym, a retail/café space and all associated ancillary development works.

A detailed description of the Proposed Development is provided in Chapter 2 of this EIAR.

8.3.1 Aspects Relevant to this Chapter

The Proposed Development will include the following components which are of particular relevance with respect to land, soils and geology.

8.3.1.1 Construction Phase

The construction phase of the Proposed Development will include:

- Removal of existing temporary stockpiled material at the site.
- Piling works are proposed as part of future foundation design.
- Excavation of soil and subsoil for the construction of piling caps, drainage and other infrastructure to depths of between 1.6 meters below ground level (mbGL) and 2.2mbGL with the excavation of 2,700m3 of soils. It is anticipated that there will be no requirement for the excavation of bedrock during the construction phase of the Proposed Development.
- Temporary stockpiling of excavated material.
- It is anticipated that all excavated soil will require removal offsite in accordance with all statutory legislation.
- It is estimated that 12,006m3 of remediated contaminated material stockpiled at the site from both the site and the adjoining proposed Strategic Housing Development (ABP Reference: ABP-309059-20) will also require removal offsite in accordance with all statutory legislation.
- The importation of 2,300m3 of aggregate fill materials will be required for the construction of the proposed development (e.g., granular material beneath road pavement, under floor slabs and for drainage and utility bedding / surrounds etc.).
- Landscaping within public / communal open space areas will include a minimum cover of 0.8m of imported clean, suitable for use soil. All imported soil will be sourced from a reputable suppliers in compliance with appropriate statutory consents and verified as being suitable for use within a residential development and for landscaping.

8.3.1.2 Operational Phase

The operational phase of the Proposed Development consists of the typical activities in a residential development and with the exception localised gardening works by the appointed management company, there will be no bulk excavation of soils or bedrock or infilling of waste.

The land use at the site will change from generally undeveloped brownfield land to residential land with associated vehicular and pedestrian access, car parking and landscaping.

The Proposed Development will comprise the development of residential apartment blocks, a crèche and a retail/café unit and will be covered with hardstanding, with areas of landscaping and public/communal open space. The landscaped areas will include a minimum cover of 0.8m of clean fill and topsoil.

There will be no requirement for bulk storage of petroleum hydrocarbon-based fuels during the Operational Phase of the Proposed Development as the main operating system for heating will be an air source heat pump. Further details are provided in Chapter 7 of this EIAR.

8.4 Methodology

8.4.1 Relevant Legislation & Guidance

The methodology adopted for this assessment takes cognisance of the relevant guidelines in particular, the following:

- Department of Housing, Local Government and Heritage, 2018. Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment.
- S.I. No. 92 of 2011- European Parliament and of the Council on the assessment of the effects of certain public and private projects on the environment including amendments S.I. No. 52 of 2014.
- S.I. No. 98 of 2008- European Parliament and of the Council on waste and repealing certain Directives.
- Environmental Protection Agency, May 2022. Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA, 2022)
- Institute of Geologists of Ireland Guidelines, 2002. Geology in Environmental Impact Statements, A Guide (IGI, 2002).
- Institute of Geologists of Ireland Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements (IGI, 2013).
- National Roads Authority, 2009. Guidelines on Procedures for the Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (NRA, 2009).
- Cork City Council, 2022. Cork City Development Plan 2022-2028 and as amended.
- IMEA, 2022. A New Perspective on Land and Soil in Environmental Impact Assessment.

8.4.2 Phased Approach

A phased approach was adopted for this EIAR in accordance with the Environmental Protection Agency (EPA) and Institute of Geologists of Ireland (IGI) guidelines as set out above and described in the following sections.

Element 1: An assessment and impact determination stage was carried out by Enviroguide to establish the project location, type and scale of the development, the baseline conditions, and the type of land, soils and geological environment, to establish the activities associated with the Proposed Development and to undertake an assessment and impact determination. This element of the assessment also included developing the Conceptual Site Model (CSM) for the Site and receiving environment.

The study area, for the purposes of assessing the baseline conditions for the Land & Soils Chapter of the EIAR, extends beyond the site boundaries and includes potential receptors with which there may be a pathway to/from the Proposed Development and receptors that may be indirectly impacted by the Proposed Development. The extent of the wider study area was based on the IGI, 2013 Guidelines which recommend a minimum distance of 2.0km from the Site.

The desk study involved collecting all the relevant data for the Proposed Development site and surrounding area including published information and details pertaining to the Proposed Development provided by the applicant and design team.

Site walkover surveys to establish the environmental Site setting and baseline conditions at the Proposed Development Site relevant to the land, soil and geology environment was undertaken by Enviroguide Consulting on the 9th of May 2024, the 30th of May 2024, the 26th of June 2024 and the 31st of July 2024.

The Element 1 stage of the assessment was completed by Enviroguide and included the review of the following sources of information:

- Environmental Protection Agency (EPA) webmapping 2024 (EPA, 2024).
- Geological Survey of Ireland (GSI) Datasets Public Viewer and Groundwater webmapping, 2024 (GSI, 2024).
- Google Earth Mapping and Imagery, 2024 (Google Earth, 2024).
- Ordnance Survey Ireland (OSI) webmapping, 2024 (OSI, 2024).
- National Parks and Wildlife Services (NPWS) webmapping, 2024 (NPWS, 2024).
- Teagasc webmapping, 2024 (Teagasc, 2024).
- Information provided by the Applicant pertaining to the design proposals for the Proposed Development.

The findings of site investigation work undertaken at the site were also reviewed by Enviroguide as part of the Element 1 stage of the assessment as summarised below. Copies of the relevant reports are presented in Volume 3: Appendix 7.2, 8.1, 8.2 and 8.3 of this EIAR.

Site investigations were undertaken by Ground Investigation Ireland (GII, 2024; refer to Appendix 8.1) under the supervision of WSP Ireland Consulting Ltd. (WSP) between October 2023 and January 2024. The results of the site investigation were used to inform the quantitative human health risk assessment (HHRA) (WSP, 2024a; refer to Volume 3: Appendix 8.2), the controlled waters risk assessment (CWRA) (WSP, 2024d; further discussed in Chapter 9 of this EIAR) and the Materials Management and Remedial Strategy Plan (MMRSP) (WSP, 2024b; refer to Volume 3: Appendix 7.2) for the adjoining proposed Strategic Housing Development which was granted planning by An Bord Pleanala (ABP Reference: ABP-309059-20) on the 4th of April 2021. The extent of the assessments included the site of the Proposed Development which is under the same ownership as the site of the Proposed Development (i.e., the Applicant). It is noted that the HHRA (WSP, 2024a) included a review of the following historical site investigation reports:

- RSK, 2018. Generic Quantitative Risk Assessment: Marquee Entertainment Venue, Marquee Road, Ballintemple, Cork City, Co. Cork. Dated 29 November 2018 (RSK Reference: 602303 – R01 (00).
- RSK, 2019. Waste Classification Assessment: Marquee Entertainment Venue, Marquee Road, Ballintemple, Cork City, Co. Cork. Dated 24 June 2019 (RSK Reference: 602303 – R02 (00).
- Priority Geotechnical (PGL), 2020. Marina Quarter Geoenvironmental Ground Investigation – Ground Investigation, Factual report. Dated 26 August 2020 (PGL Reference: JMS/Rp/P19189 + attachments).
- Arup, 2020. Technical Note: The Former Ford Distribution Site – Geo-Environmental Summary Note V2. Dated 3 September 2020 (Arup Job Number: 268196-00.

Based on the findings of the HHRA (WSP, 2024a) and the recommendations of the MMRSP (WSP, 2024b) WSP attended the Site between February 2024 and July 2024 to undertake remedial excavations and collect soil validation samples across the base of the excavations of material remaining in-situ post remedial excavation. The Soil Validation Report (WSP, 2024c; refer to Volume 3: Appendix 8.3) was reviewed as part of the Element 1 to inform remedial works conducted at the Site.

Element 2: Involves direct and indirect site investigation and studies stage where necessary to refine the CSM developed as part of Element 1 and evaluate the potential impacts associated with the Proposed Development. Based on a review of the information compiled and reviewed in Element 1, it was determined based on professional judgement that in accordance with industry best practice guidance and standards there was adequate site-specific scientific data was available for the assessment. The previous studies reviewed as part of Element 1 provided sufficient information including site investigation data and site-specific information on the geological conditions at the site to inform the impact assessment of the Proposed Development Site on the receiving land, soil and geology.

Element 3: Evaluation of Mitigation Measures, Residual Impacts and Final Impact Assessment were based on the outcome of the information gathered in Element 1 of the assessment. Mitigation measures to address all identified adverse impacts that were identified in Element 1 of the assessment were considered in relation to the construction phase and operational phase of the Proposed Development. These mitigation measures were then considered in the impact assessment to identify any residual impacts.

Element 4: Completion of the Land and Soil sections of the EIAR in this Chapter which includes all the associated figures and documents

8.4.3 Consultation

A Section 32B of the Planning and Development Act 2000 (as amended) meeting was held with Cork City Council on the 7th of August 2024. The relevant findings of the LRD Opinion Report (Cork City Council, 2024) in respect to this chapter of the EIAR are summarised as follows:

'With regard to potential contaminated land it is not clear if works have been carried out and/or if any remediation plan has been approved by the EPA. Due to the former industrial use of the area, there's a possibility that the site is contaminated. The applicant should further consider prior to the commencement of the development, engaging the services of a recognised environmental consultant with experience in the field of contaminated land contamination to:

- *Carry out a site investigation from a land contamination view point.*
- *Carry out a risk assessment.*
- *Recommend remedial measures.*
- *Prepare a report containing all of the above in the standard format.*

The report shall be submitted to the local authority for its written approval before commencement of the development.'

The previous site investigation repots, quantitative risk assessments and remediation validation reports have been reviewed by the author of this report who is an experienced environmental consultant specialising in the field of contaminated land. As discussed in Section 8.4.2, it was determined based on professional judgement that in accordance with industry best practice guidance and standards there was adequate site-specific scientific data to inform the impact assessment of the Proposed Development Site on the receiving geological environment. It is noted that the requirement for additional site investigations and assessment prior to commencement of the construction phase of the Proposed Development may be required and will be determined based on the findings of the impact assessment completed in this chapter of the EIAR.

8.4.4 Description of Importance of the Receiving Environment

The Transport Infrastructure Ireland (TII) criteria for rating of the importance of geological features at the Site as documented in the National Roads Authority Guidelines (NRA, 2009), are summarised in Table 8 1 below.

Impacts will vary in quality from negative, to neutral or positive. The effects of impacts will vary in significance on the receiving environment. Effects will also vary in duration. The terminology and methodology used for assessing the 'impact' significance and the corresponding 'effect' throughout this Chapter of the EIAR is described in Table 8 1.

Table 8 1. Criteria for Rating Site Importance of Geological Features (Source: IGI, 2013)

IMPORTANCE	CRITERIA	TYPICAL EXAMPLE
Very High	Attribute has a high quality, significance, or value on a regional or national scale. Degree or extent of soil contamination is significant on a national or regional scale. Volume of peat and/or soft organic soil underlying route is significant on a national or regional scale.	Geological feature rare on a regional or national scale (NHA). Large existing quarry or pit. Proven economically extractable mineral resource.
High	Attribute has a high quality, significance, or value on a local scale. Degree or extent of soil contamination is significant on a local scale. Volume of peat and/or soft organic soil underlying route is significant on a local scale.	Contaminated soil onsite with previous heavy industrial usage. Large recent landfill Site for mixed wastes. Geological feature of high value on a local scale (County Geological Site). Well drained and/or high fertility soils. Moderately sized existing quarry or pit. Marginally economic extractable mineral resource.
Medium	Attribute has a medium quality, significance, or value on a local scale. Degree or extent of soil contamination is moderate on a local scale. Volume of peat and/or soft organic soil underlying route is moderate on a local scale.	Contaminated soil onsite with previous light industrial usage. Small recent landfill Site for mixed wastes. Moderately drained and/or moderate fertility soils. Small existing quarry or pit. Sub-economic extractable mineral resource.

IMPORTANCE	CRITERIA	TYPICAL EXAMPLE
Low	Attribute has a low quality, significance, or value on a local scale. Degree or extent of soil contamination is minor on a local scale. Volume of peat and/or soft organic soil underlying route is small on a local scale.	Large historical and/or recent Site for construction and demolition wastes. Small historical and/or recent landfill Site for construction and demolition wastes. Poorly drained and/or low fertility soils. Uneconomically extractable mineral resource.

8.4.5 Description and Assessment of Potential Effects

Effects will vary in quality from negative, to neutral or positive. The effects of impacts will vary in significance on the receiving environment. Effects will also vary in duration. The terminology and methodology used for assessing the 'impact' significance and the corresponding 'effect' throughout this Chapter is described in Table 8 2 as per EPA,2022 Guidelines on the information to be contained in Environmental Impact Assessment Reports.

Table 8 2. Assessment of Potential Terminology and Methodology (Source: EPA, 2023)

QUALITY OF EFFECTS	DEFINITION
Negative/Adverse	A change which reduces the quality of the environment
Neutral	No effects or effects that are imperceptible, within the normal bounds of variation or within the margin of forecasting error.
Positive	A change that improves the quality of the environment
SIGNIFICANCE OF EFFECTS / IMPACTS	**DEFINITION**
Imperceptible	An effect capable of measurement but without significant consequences.
Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
Significant	An effect which, by its character, magnitude, duration, or intensity alters a sensitive aspect of the environment.
Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters a sensitive aspect of the environment.
Profound	An effect which obliterates sensitive characteristics.

DURATION OF EFFECTS / IMPACTS	DEFINITION
Momentary	Effects lasting from seconds to minutes
Brief	Effects lasting less than a day
Temporary	Effects lasting one year or less
Short-term	Effects lasting one to seven years
Medium-term	Effects lasting seven to fifteen years
Long-term	Effects lasting fifteen to sixty years
Permanent	Effects lasting over sixty years
Reversible	Effects that can be undone, for example through remediation or restoration

8.5 Difficulties Encountered

There were no difficulties were encountered in the preparation of this Chapter of the EIAR.

8.6 Baseline Environment

8.6.1 Site Location and Surrounding Land Use

The site of the Proposed Development is located at the Former Ford Distribution Site, fronting onto Centre Park Road, Ballintemple, Co. Cork on the south bank of the River Lee in the South Docks of Cork City. The proposed development falls within the Polder Quarter character area of the City Docks as defined in the Cork City Development Plan 2022-2028. The site is accessed via the existing entrance gate off Central Park Road.

The site is bound to the northwest by Centre Park Road with undeveloped brownfield lands beyond, to the east by marshlands located south of the Lee Rowing Club, to the southeast by Marina Park and SuperValu Pairc Ui Chaoimh (the Cork County GAA ground) and to the southwest the proposed Strategic Housing Development which was granted planning by An Bord Pleanala (ABP Reference: ABP-309059-20) on the 4th of April 2021. Until recently, this land had been used for public events as a circus or an ice skating rink with a temporary car parking facilities. The Marina Promenade connects to the northeast corner of the site and provides a non-motorised/greenway link to the Mahon peninsula.

The Lee (Cork) Estuary Lower transitional waterbody is located approximately 0.035km north of the site.

The location of the Site is presented in Figure 8 1 below.

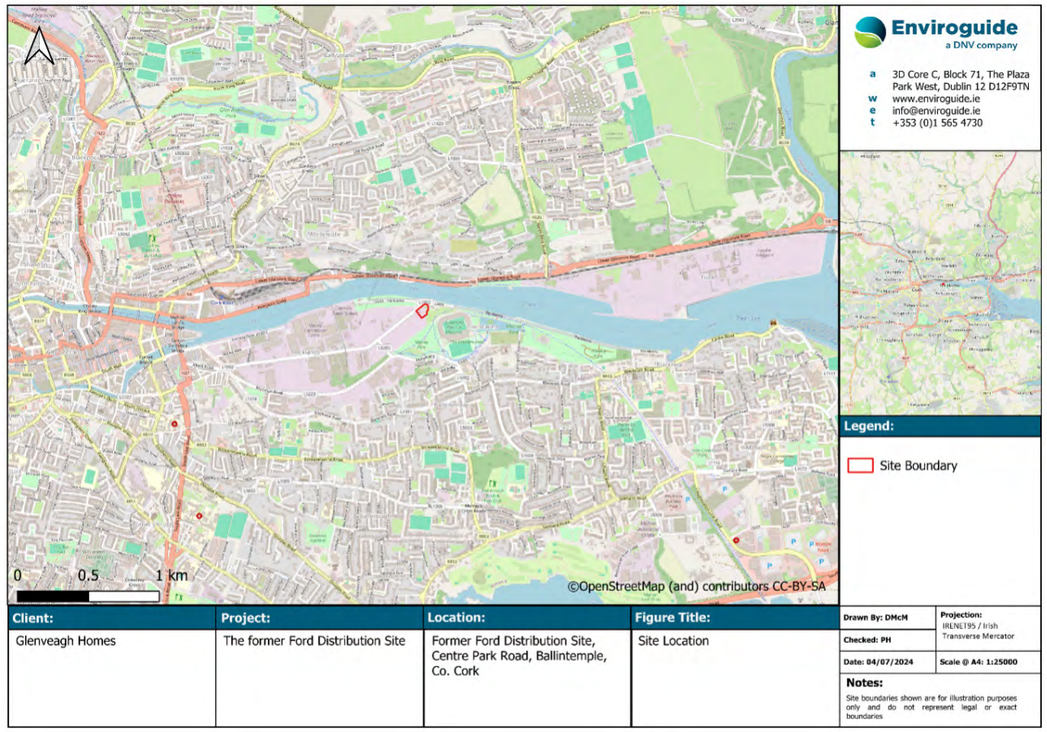


Figure 8 1. Site Location

8.6.2 Current and Historic Land Use

The Site is approximately 0.84 hectares (ha) and comprises undeveloped brownfield lands which were recently stripped under the previous grant of planning from Cork City Council (CCC) (CCC Ref. 08/32919) which expired on the 12th of October 2024. The existing industrial shed was also demolished and removed offsite as part of these works.

Based on the findings of the HHRA (WSP, 2024a) and the recommendations of the MMRSP (WSP, 2024b), remedial excavations were undertaken at the Site between February 2024 and July 2024 to remove identified hotspots of contaminated material. The extent of the remedial works spans the Site of the Proposed Development and the adjoining proposed Strategic Housing Development (ABP Reference: ABP-309059-20). During the remedial works (WSP, 2024c), soil (including made ground) to be retained onsite was excavated and combined with a cement-based grout to improve the strength characteristics of the material for use as a stabilised platform ('piling mat'). The piling mat comprised 0.15m of imported aggregates overlying 0.9m of stabilised material.

At the time of writing this Chapter of the EIAR, it was noted that excavated contaminated material, piling material and surplus material not suitable for reuse from both the Site and the adjoining proposed Strategic Housing Development (ABP Reference: ABP-309059-20) was stockpiled at the Site pending removal offsite (refer to Figure 8 3). It is estimated that there is a total of 12,006m3 of material temporarily stockpiled at the site. All stockpiles are stored on high-grade polythene sheeting to prevent cross-contamination of the soil below and are also covered with high-grade polythene sheeting to prevent rainwater run-off and leaching of potential contaminants from the stockpiled material, as well as the generation of dust.

The site boundaries are generally formed by fencing and scrub vegetation. Along the northwestern boundary and within the curtilage of the site there is an open drainage channel (referred to as the northern channel) which flows to the northeast. A second open drainage channel that flows to northeast (referred to as the southern channel) is located along and inside of the southeastern edge of the site. The northern and southern channels are potentially connected via a culvert.

The existing Site layout is presented in Figure 8 2.

The site is located within an area zoned 'ZO 02 New Residential Neighbourhoods' with the objective to 'provide for new residential development in tandem with the provision of the necessary social and physical infrastructure'. Therefore, the Proposed Development is considered to meet the zoning objectives of the Cork City Development Plan 2022-2028.

The site was part of the intertidal marshland of the Lee Estuary Lower Estuary until the late 1700s, prior to the construction of The Marina. Subsequent maps show land reclamation across the South Docks including the site.

Historical mapping and aerial photography available from the Ordnance Survey of Ireland website (OSI, 2024) and Google Earth (Google Earth, 2024) were reviewed and key observations onsite and offsite are summarised in Table 8 3.

Table 8 3. Historical Land Use

DATE	INFORMATION SOURCE	SITE DESCRIPTION
1837-1842	OSI Map 6 inch	**Onsite:** The site is comprised of marshlands labelled as 'Mud'. **Offsite:** There is a meandering waterbody located immediately north and south of the site which ultimately discharges to the Lee (Cork) Estuary Lower located approximately 0.035km north of the site. A track labelled 'Navigation Wall' is located approximately 0.025km north of the site. It is understood that during the late 18th and 19th centuries dredged riverine deposits were systematically dumped onto the slob lands behind the Navigation Wall to create a promenade along the new riverbank which later became known as the Marina. The lands to the west of the site are labelled as 'City Park'. An embankment, with a flanking channel on the north side, is depicted approximately 0.18km of the site and this was likely associated with the ongoing drainage of the reclaimed lands and appears to delimit the east end of the City Park area.
1888-1913	OSI 25 Inch	**Onsite:** The lands across the South Docklands area, including the site of the Proposed Development, have been reclaimed. **Offsite:** Land to the west of the site has been developed into a racecourse labelled City Park. Open drainage channels are identified immediately west and southwest of the site. A boat hose is identified to the east of the site. Approximately 0.06km southeast of the site, the Cork, Blackrock and Passage Railway is shown adjacent to the boundary with the former Munster Agricultural Society Showgrounds.

DATE	INFORMATION SOURCE	SITE DESCRIPTION
1830-1840	Cassini 6inch	**Onsite:** No significant changes. **Offsite**: The Cork, Blackrock and Passage Railway is still identified; however, its disuse is attested to by the presence of new developments that impinge on its footprint, including an existing roadway which connects Centre Park and Monaghan Roads and the Grand Stand Athletic Grounds. There is some additional drainage channels identified in the lands immediately surrounding the site. There is increased industrial / commercial development observed in the surrounding area including the Ford Works and Dunlop Works located approximately 0.5km west of the site.
1995	OSI Aerial Photograph	**Onsite:** The site is identified as being used for vehicle storage. **Offsite:** There is an increase in residential, industrial and commercial development in the lands surrounding the site. The former racecourse labelled City Park is no longer identified and there are two building structures remaining onsite. The remaining lands comprise open hardstanding. The SuperValu Pairc Ui Chaoimh (the Cork County GAA ground), which replaced the Grand Stand Athletic Grounds, is located approximately 0.01km east of the site. The Cork, Blackrock and Passage Railway which adjoins the southeast boundary of the site is no longer identified and there is a public walkway identified in its place.
2013-2018	OSI Aerial Photograph	**Onsite:** There is an existing shed onsite. The remaining site area is identified as being used for vehicle and container storage. **Offsite:** There is an increase in residential, industrial and commercial development in the lands surrounding the site. The land immediately southwest of the site is being used as a carnival with temporary car parking facilities. The SuperValu Pairc Ui Chaoimh (the Cork County GAA ground) stadium has been redeveloped.
2023	Google Earth	**On Site:** There is evidence of ground disturbance works on site. The existing shed structure has been demolished and the hardstand surface has been stripped. **Off Site:** There is evidence of ground disturbance works at the lands immediately southwest of the site. The former Munster Agricultural Society Showgrounds has been demolished and replaced with the Marina Park public open space.

Figure 8 2. Site Layout

Figure 8 3. Stockpiled Material Pending Removal Offsite (WSP, 2024)

8.6.3 Topography

The site is situated within the South Docklands, a low-lying area with a surface elevation of approximately 3 meters above Ordnance Datum (mOD). This region lies south of the lower Lee (Cork) Estuary Lower, a predominantly east-west oriented valley that gently slopes towards the east. While tidal influences are present in the vicinity of the site, the overall drainage of the lower Lee Estuary is eastward.

The Lee valley is characterised by significant topographic changes. To the north, a steep gradient rises to 100mOD within a distance of 0.5km from the Lee (Cork) Estuary Lower. Similarly, a pronounced rise in elevation occurs to the south, where the ground rises from less than 10mOD to 60mOD over a distance of 2.5km.

As documented in the Infrastructure Design Report (DBFL Consulting Engineers, 2024. Infrastructure Design Report) accompanying the planning application documentation, the topography surrounding the site of the Proposed Development is generally sloping from the southwest to the northeast with elevations ranging from 1.8mOD in the southwest and rising to 3.9mOD in the northeast.

8.6.4 Soils and Subsoils

The soils beneath the site have been mapped by the GSI (GSI, 2024) as 'Made Ground'. The GSI (GSI, 2023) mapped soils at the Site are presented in Figure 8 4.

The quaternary sediments beneath the site are mapped by the GSI (GSI, 2024) as 'Urban'. The GSI (GSI, 2023) mapped quaternary geology at the Site is presented in Figure 8 5.

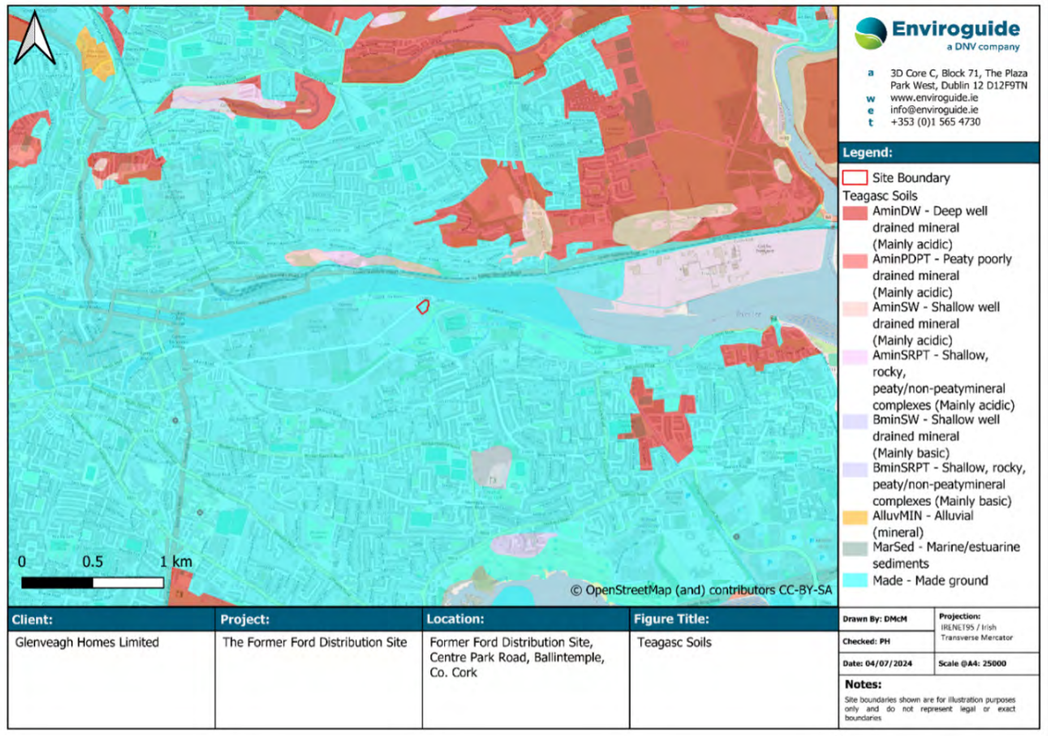


Figure 8 4. Teagasc Soils

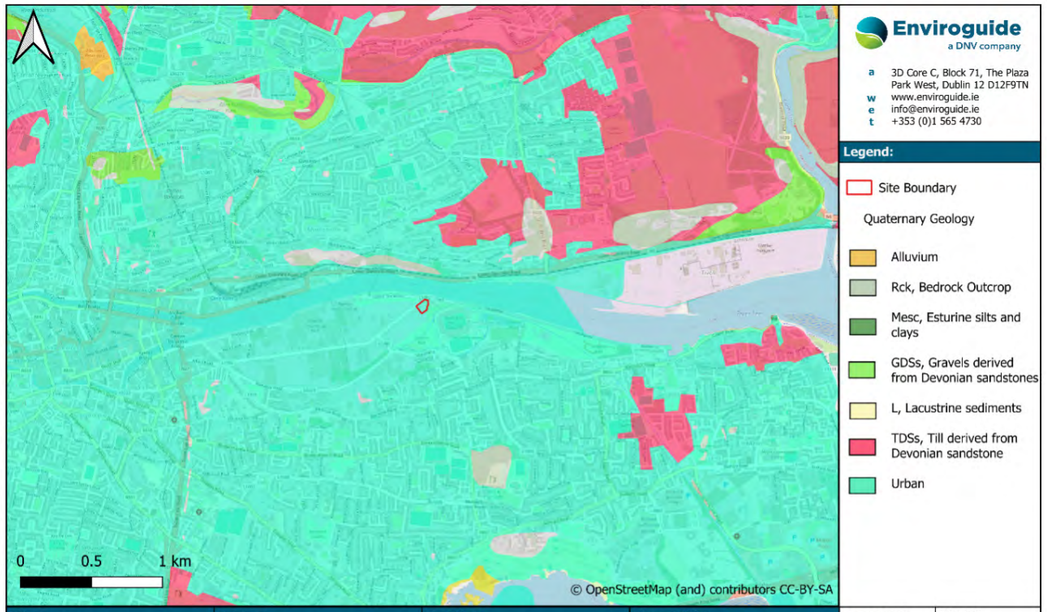


Figure 8 5. Quaternary Geology

8.6.5 Site Investigations

Previous site investigations have been completed at the site of the Proposed Development and the adjoining proposed Strategic Housing Development (ABP Reference: ABP-309059-20) as summarised below.

RSK were engaged to undertake a desk study, site investigation, laboratory analyses of soil, groundwater and surface water samples, gas monitoring and compile the results in a Generic Quantitative Risk Assessment (GQRA) report (RSK, 2018) for the Site. In addition, they completed a Waste Classification Assessment (RSK, 2019) on composite soil samples collected during the site investigation. The site investigation comprised ten (10No.) boreholes, all completed as groundwater monitoring wells, and twenty-five (25No.) trial pits. Boreholes were advanced to a maximum depth of 6.0 mbGL and trial pits to 3.0 mbGL. Sixty-nine (69No.) soil samples and nine (9no.) groundwater samples were scheduled for laboratory analyses, including TPH, PAH, BTEX, MTBE and VOCs.

Arup engaged Priority Geotechnical Ltd. (PGL) to undertake a ground investigation on the Site and write a factual report (PGL, 2020) on the works. Arup then composed an interpretive technical note on the works (Arup, 2020). The works comprised eleven (11No.) trial pits, fourteen (14No.) window sample holes, six (6No.) boreholes, thirteen (13no.) groundwater monitoring installations, surface water sampling, groundwater monitoring, soil sampling and laboratory analyses. Trial pits were excavated to depths between 2.0 and 4.5 mbGL, window sample holes between 0.8 and 8.0 mbGL, and boreholes between 8.0 and 11.5mbGL.

GII (GII, 2024) under the supervision of WSP completed a Site Investigation (SI) at the Marina Quarter Site, in several phases, between October 2023 and January 2024 to address the data gaps identified in the previous site investigations. Eighty-four (84No.) trial pits were undertaken during the works. In addition, fifteen (15No.) boreholes were advanced and installed as groundwater monitoring or gas monitoring wells. Trial pits and boreholes were advanced to between 1.6 and 8.0 mbGL. The site investigation identified several areas of soils impacted with hydrocarbons, Volatile Organic Compounds (VOCs), Asbestos Containing Materials (ACM) and areas of historic disposal of oil cans and drums on the site of the Proposed Development and the adjoining proposed Strategic Housing Development (ABP Reference: ABP-309059-20). The results of the site investigation were used to inform the quantitative human health risk assessment (HHRA) (WSP, 2024a), the controlled waters risk assessment (CWRA) (WSP, 2024d) and the Materials Management and Remedial Strategy Plan (MMRSP) (WSP, 2024b).

Based on the findings of the site investigation (GII, 2024) and HHRA (WSP, 2024a), remedial excavations were undertaken to remove the source of this impact and break the pollutant linkage. In addition, remedial excavations were also undertaken within isolated areas where historic deposition of waste oils/solvents were observed during site investigations. The results for soil validation samples collected across the base of the excavations of material remaining in-situ post remedial excavation are presented in the Soil Validation Report (WSP, 2024c).

The site investigation locations are presented in Figure 8 6, Figure 8 7, Figure 8 8, Figure 8 9 and Figure 8 10. It is noted that the site boundary has been superimposed onto the figures below for context.

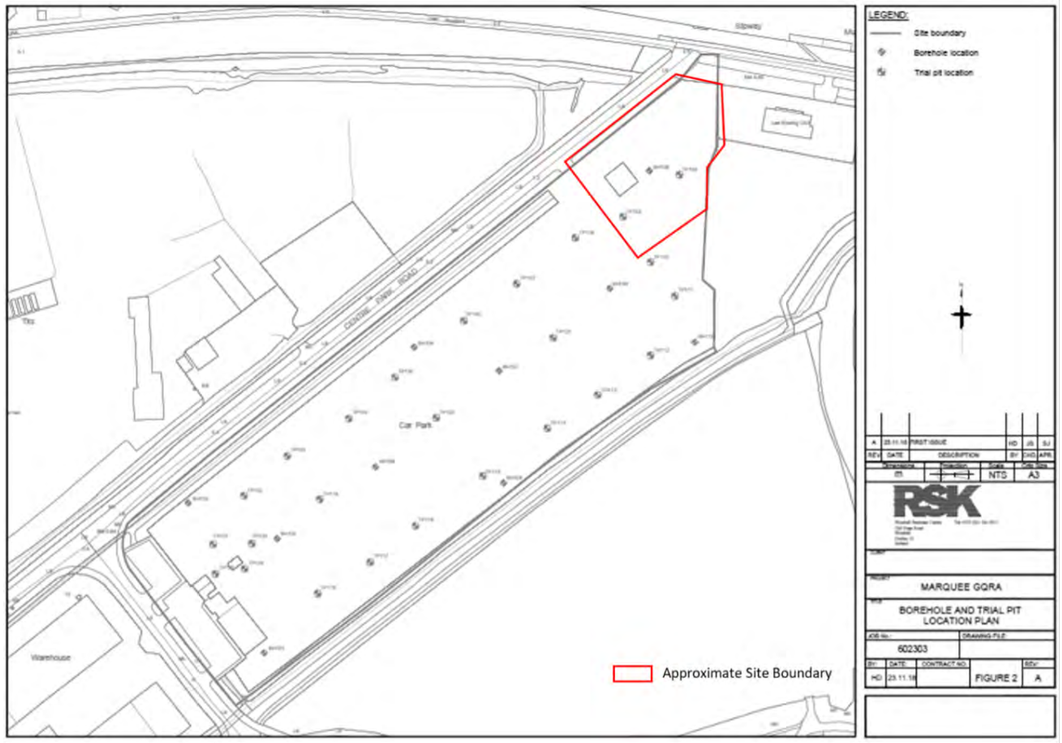


Figure 8 6. Ground Investigation Locations (RSK, 2018)

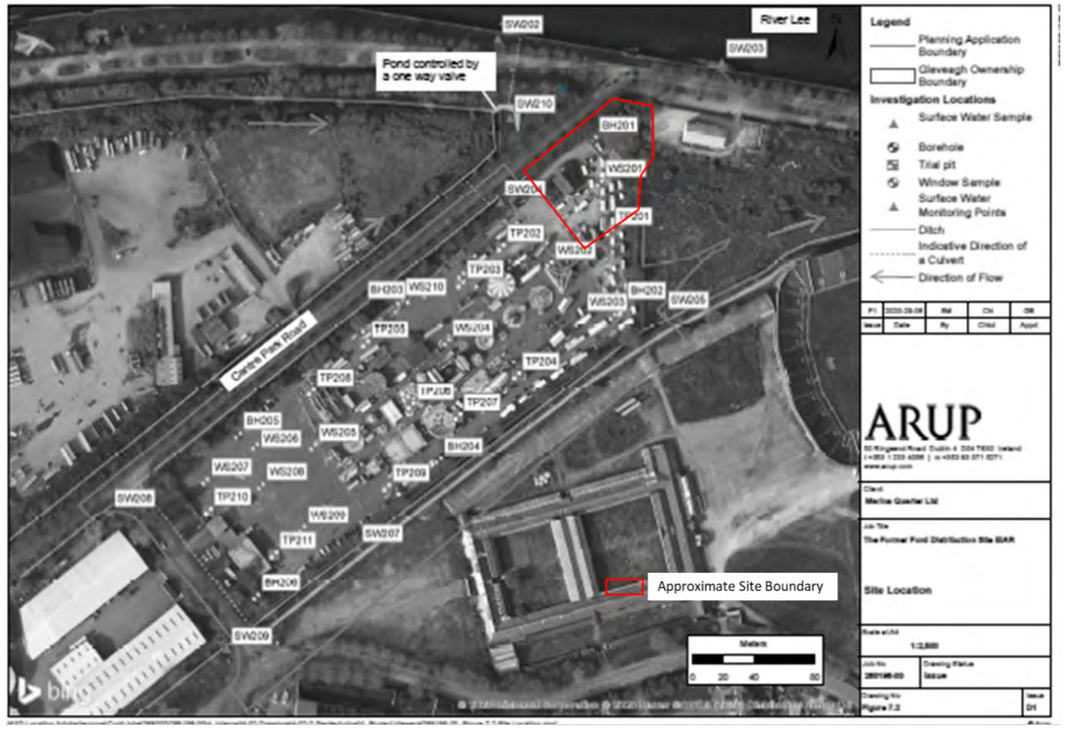


Figure 8 7. Ground Investigation Locations (PGL, 2020)

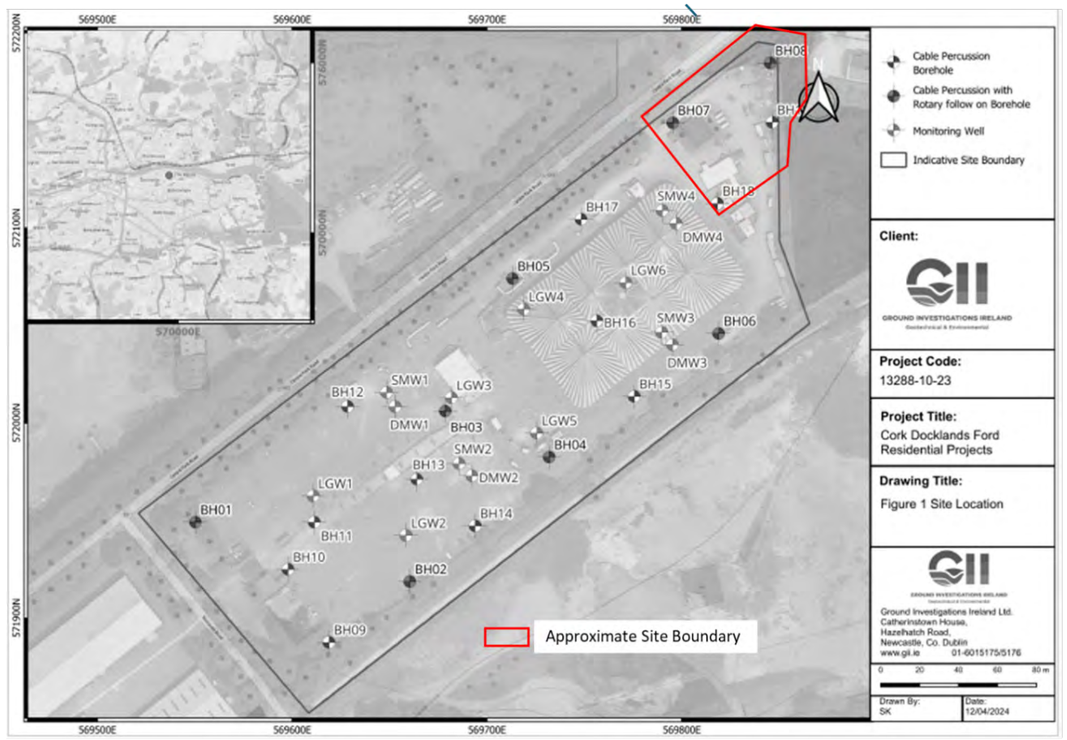


Figure 8 8. Ground Investigation Locations (GII, 2024)

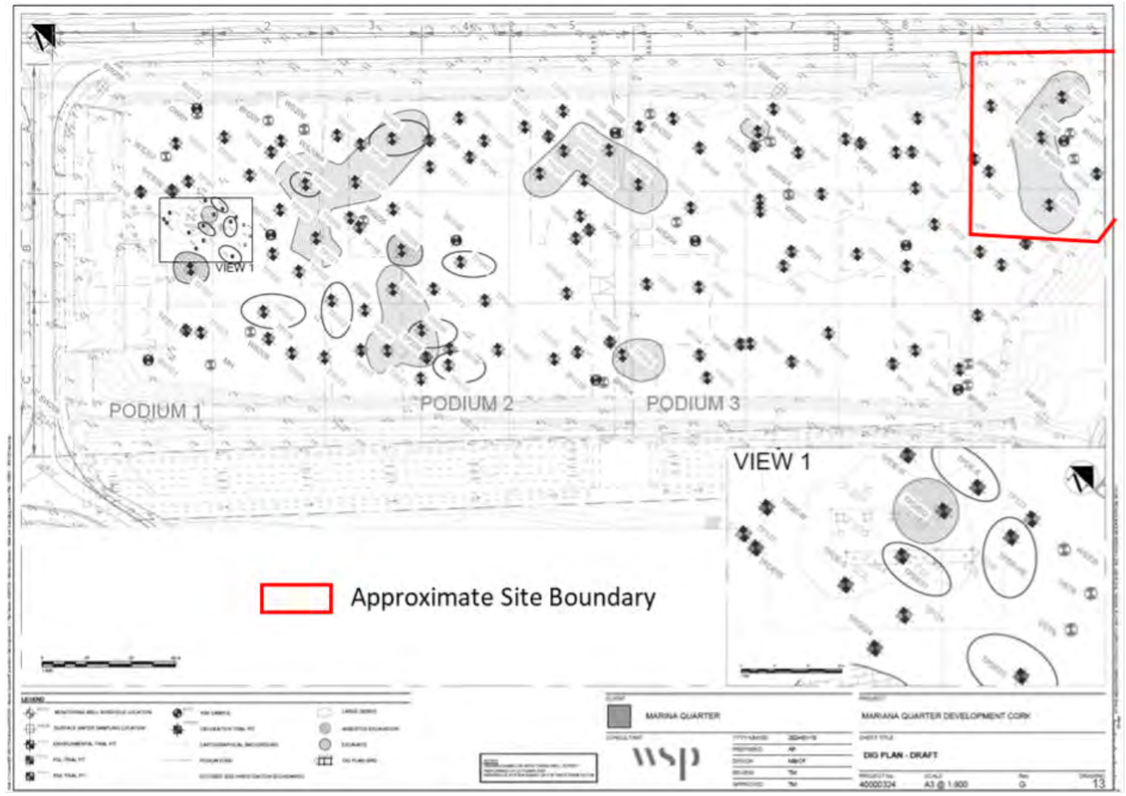


Figure 8 9. Ground Investigation Locations (WSP, 2024a)

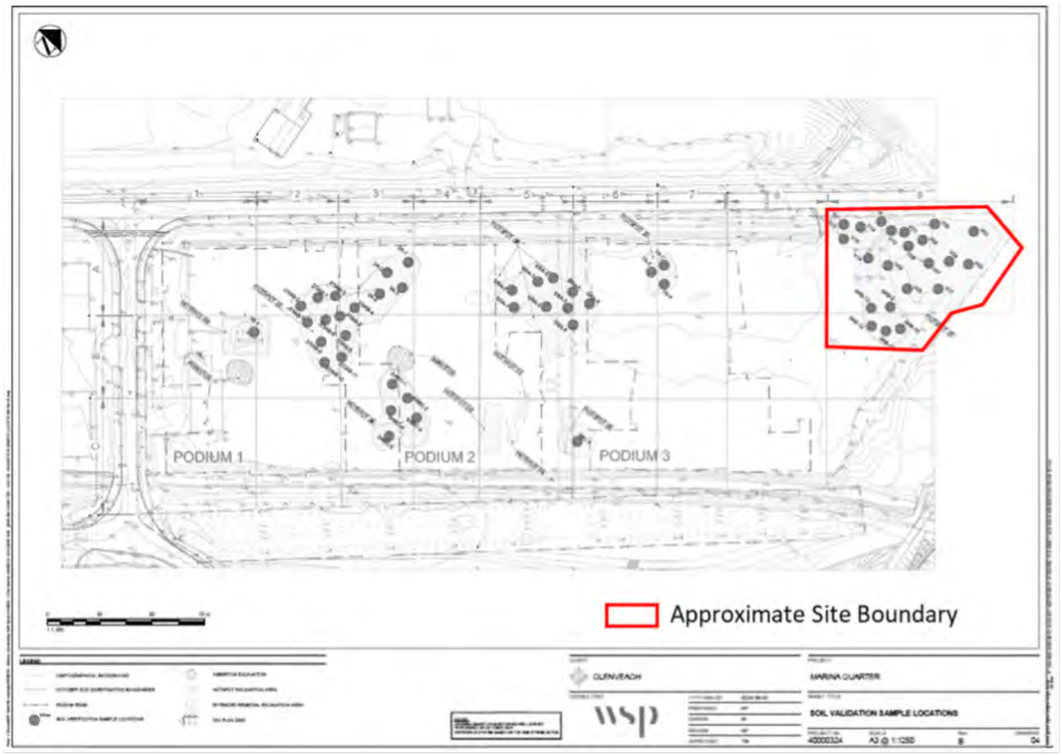


Figure 8 10. Soil Validation Sample Locations (WSP, 2024c)

8.6.5.1 Ground Conditions

The ground conditions encountered during the recent site investigations (GII, 2024 and WSP, 2024a) at the site of the Proposed Development are summarised as follows:

- Made Ground: Grey sandy GRAVEL was encountered from ground level to depths ranging from 0.2mbGL (TP069, TP070, TP072; WSP, 2024a) to 1.5mbGL (BH18, GII, 2024).
- Made Ground: Tarmac was encountered below the grey sandy GRAVEL or from ground level (TP073) to depths ranging from 0.25mbGL (TP069; WSP, 2024a) to 0.6mbGL (TP071; WSP, 2024a).
- Made Ground: Brown to dark grey / black sandy gravelly CLAY /SILT with frequent cobbles and varying inclusions of antipathogenic material (i.e., brick, concrete, plastic, steel) was encountered below the grey sandy GRAVEL and/or tarmac units to depths ranging from 1.0mbGL (BH08; GII, 2024) 4.0mbGL (BH19; GII, 2024).
- Made Ground: Purplish grey slightly clayey sandy Gravel was encountered below the grey sandy GRAVEL and/or tarmac units at BH18 (GII, 2024) to a maximum depth of 3.5mbGL.
- Purplish grey to dark grey slightly sandy slightly gravelly SILT was encountered beneath the Made Ground to depths ranging from 5.0mbGL (BH19; GII, 2024) to 5.9mbGL (BH18; GII,2024).
- Purplish grey to dark reddish purple silty sandy GRAVEL / silty gravelly SAND with varying cobble content and inclusions of clay was encountered below the SILT unit to depths ranging from 18.0mbGL (BH18; GII,2024) to 40.1mbGL (BH08; GII, 2024).

During the remedial works (WSP, 2024c), soil (including made ground) to be retained onsite was excavated and combined with a cement-based grout to improve the strength characteristics of the material for use as a stabilised platform ('piling mat'). The piling mat comprised 0.15m of imported aggregates overlying 0.9m of stabilised material.

Groundwater was encountered during site investigations at depths ranging from 1.8mbGL (TP069 and TP073; WSP, 2024a) to 5.7mbGL (BH08; GII, 2024).

Strong hydrocarbon odours were noted on shallow soil at 1.8mbGL at trial pit location TP069 (WSP, 2024a). Furthermore, strong hydrocarbon odours and oil slick were noted on shallow groundwater within the made groundwater at 2.2mbGL at TP070 (WSP, 2024a).

During previous site investigations (PGL, 2020), hydrocarbon odours and staining caused by a non-aqueous liquid were also reported within the Made Ground and underlying SILT at depths ranging from 1.5mbGL to the final extent of investigation at 4.9mbGL (i.e., the base of the contamination was not proven) at borehole location WS201.

During previous site investigations (PGL, 2020), groundwater was monitored by hand and using loggers at WS201 and BH201. The groundwater levels at WS201, installed within the Made Ground, were relatively stable at approximately 0.3mOD. In contrast, the groundwater levels at BH201, installed within the underlying gravel aquifer, ranged from approximately -1.1mOD to 0.75mOD over a two-day monitoring period between the 26th and 28th of November 2019. A similar trend was observed over the longer monitoring period from November to December 2019, indicating continuity with the Lee Estuary. Water flow in the made ground was inferred to be toward the southwest or the open drainage channels along the southeast and northwest site boundaries. Meanwhile, water flow in the underlying gravel aquifer varied due to tidal influence, flowing north during low tide and reversing during high tide. However, the net flow is expected to be toward the Lee Estuary, located 0.1km east of the site. The silt stratum was considered to act as a partial aquiclude, limiting the movement of water between the made ground and the gravel aquifer (Arup, 2020). Groundwater is assessed in Chapter 9 of this EIAR.

8.6.5.2 Soil Quality

During the site investigations (RSK, 2018; PGL, 2020; WSP, 2024a), soil samples were collected across both the site of the Proposed Development and the adjoining proposed Strategic Housing Development (ABP Reference: ABP-309059-20) for a wide variety of laboratory analyses. At the site of the Proposed Development, detectable concentrations of heavy metals, mineral oil, Total Petroleum Hydrocarbons (TPH), Polycyclic Aromatic Hydrocarbons (PAHs), and volatile organic compounds (VOCs) were reported in soil samples collected. No clear source areas for Contaminants of Potential Concern (COPC) in groundwater were identified at the site of the Proposed Development, except for localized areas with uncovered oil cans and drums (WSP, 2024a).

Based on a proposed end use of Residential (without homegrown produce) for the adjoining proposed Strategic Housing Development (ABP Reference: ABP-309059-20), WSP (2024a) identified two key pollutant linkages that required quantitative risk assessment:

- Volatile vapours in soils. Soils at the adjoining proposed Strategic Housing Development (ABP Reference: ABP-309059-20) will be stabilised and capped, making this the only viable pathway
- Volatile vapours in groundwater. Groundwater is further assessed in Chapter 9 of this EIAR.

A set of Site-Specific Assessment Criteria (SSAC) for the inhalation of soil vapours (indoor air) pathway was developed using the CLEA model as part of the HHRA (WSP, 2024a). Soil concentrations were screened against these SSAC. It is noted that the proposed end use for the Proposed Development will also be residential (without homegrown produce) (apartments)

Upon review of the results for samples collected at the site of the Proposed Development, concentrations of Chloromethane at TP069 (0.8mbGL), Vinyl Chloride (VC) at TP069 (2.20mbGL) and TP070 (0.9mbGL), Trichloroethene (TCE) at TP069 (0.8mbGL), TP070 (0.90mbGL), TP071 (1.40mbGL) and TP072 (1.10mbGL), and trans-1,2-Dichloroethene at TP070 (0.90mbGL) were reported in excess of the applicable SSAC.

Remedial excavations at the site of the Proposed Development and the adjoining proposed Strategic Housing Development (ABP Reference: ABP-309059-20) were carried out by WSP between February and July 2024. The remedial excavation locations are presented in Figure 8 10. It is noted that the remedial excavation area 7 was undertaken at the site of the Proposed Development.

A shallow tidal influence was observed within the underling gravel aquifer during the remedial excavations at the site, and therefore a stepwise approach was taken whereby the excavation was advanced and backfilled in manageable blocks. Contaminated material was excavated and validated via the collection of soil samples and PID measurements. Remedial excavations were advanced further to the south and east than the original proposed dig area (WSP, 2024a) as buried oil/solvent cans were observed during the remedial excavation in the shallow made ground. These items were removed during the excavation; however, it was reported that some material from these containers may have been lost to the ground during the exercise. Strong solvent odours were noted during the excavation works in this area of the Site when the historically deposited waste drums were disturbed.

Twenty-two (22 No.) soil validation samples were collected post excavation and screened against the SSACs developed in the HHRA (WSP, 2024a). The soil validation results demonstrate that petroleum hydrocarbon and solvent impacted areas remain at validation sample locations V03, V10, V11, V12 and 9AB-10. WSP (WSP, 2024c) reported that the detection and removal of waste oil cans and solvent drums in this area is significant, as there was no previously identified source for the TPH and solvent detections. WSP (WSP, 2024c) also concluded that removing the contaminated material will significantly improve the long-term quality of groundwater beneath the site.

8.6.6 Bedrock Geology

The bedrock beneath the site is mapped by the GSI (GSI, 2024) as the Cuskinny Member (New Code: CDKINS2) described as flaser-bedded sandstone & mudstone. Bedrock was not encountered during ground investigations undertaken across the site.

Bedrock was not encountered during previous site investigation works undertaken at the site (RSK, 2018; PGL, 2020; WSP, 2024a).

While there are no bedrock outcrops mapped by the GSI (GSI, 2024) within the site boundary, there are a number of bedrock outcrops mapped within a 2km radius of the site, the closest of which is located approximately 0.7km southwest and upgradient of the site.

The GSI (GSI, 2024) bedrock geology map is presented in Figure 8 11.

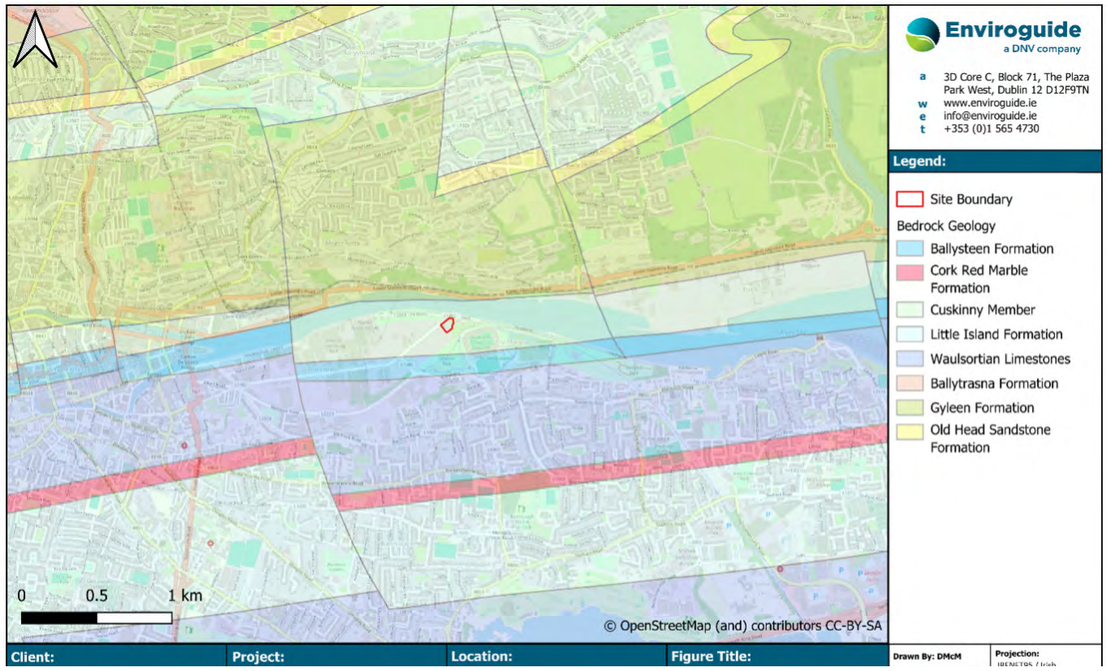


Figure 8 11. Bedrock Geology

8.6.7 Geochemical Domain

The GSI along with the EPA have developed geochemically appropriate levels (GALs) for soil recovery facilities across Ireland specifically in relation to metals and metalloids in uncontaminated soil and stone (GSI, 2023). There are a total of seven defined domains across the country. The GSI (GSI, 2023) defined Geochemical Domains map indicates that the site is located within Domain 3 which is characterised as 'Devonian-Carboniferous sandstone and shale'.

A summary of the metal's values for Domain 3 are presented below in Table 8 4.

Table 8 4. Geochemically Appropriate Levels for Domain 1 and Domain 2

ELEMENT	UNITS	VALUE DOMAIN 3
Arsenic	mg/kg	38.10
Cadmium	mg/kg	1.60
Chromium	mg/kg	47.50
Copper	mg/kg	56.90
Mercury	mg/kg	0.46
Nickel	mg/kg	54.40
Lead	mg/kg	81.30
Zinc	mg/kg	237.00

8.6.8 Radon

The Radon Risk Map of Ireland (EPA, 2024) shows a prediction of the number of the houses in any one area that are likely to have high radon levels. The map is based on an analysis of indoor radon measurements plus geological information including, bedrock type, quaternary geology, soil permeability and aquifer type.

The site of the Proposed Development is mapped by the EPA (EPA, 2024) as being in an area where 'about 1 in 5 homes in this area is likely to have high radon levels'.

The EPA cite the reference level for radon as 200 Bq/m3 and a High Radon Area where more than 10% of homes may have more than the reference level of radioactivity. As more than 10% of the houses in the area are mapped by the EPA as being over this reference level it indicates that the site is considered a High Radon Area (EPA,2024).

It is noted that north and mid Cork have one of the highest incidences of radon gas in the country.

8.6.9 Geohazards

Earthquakes are not likely to occur in the vicinity of the site at a sufficient intensity to pose a risk for the Proposed Development.

The GSI database (GSI, 2024) indicated that the site is not located within an area susceptible to landslides. Furthermore, there were no mapped landslides events recorded within a 2km radius of the site (GSI, 2024).

While there are no karst features mapped by the GSI (GSI, 2024) at the site itself, there is a cave (Karst Feature Unique I.D.: IE_GSI_Karst_40K_1855) recorded approximately 1.09km south / southeast of the site. It is noted that the cave is not located within the Cuskinny Member bedrock formation beneath the site.

8.6.10 Geological Heritage Sites

There are no geological heritage sites mapped by the GSI (GSI, 2024) at the Site. However, there are two (2No.) audited geological heritage sites, namely the Blackrock Diamond Quarry and the Beaumont Quarry mapped by the GSI (GSI, 2024) approximately 0.54km southwest and upgradient and 0.94km southeast and upgradient of the site respectively.

The Blackrock Diamond Quarry, where amethyst was found, has largely been built over, though some portions of quarry walls are still visible. It is also reported that karst features such as pipes were infilled with quaternary diamict at this geological heritage site.

The Beaumont Quarry currently comprises a partially revegetated quarry of historical importance in Corl City, with an accessible karst cave system as referenced in Section 8.6.9.

8.6.11 Economic Geology

The lands beneath the site are mapped by the GSI (GSI, 2024) as having a 'high' potential granular aggregate. While the bedrock beneath the site has been identified by the GSI (GSI, 2024) as having a 'moderate' potential for crushed rock aggregate.

There are no historical pits and quarries mapped by the GSI (GSI, 2024) within the site of the Proposed Development. As discussed in Section 8.6.10, Blackrock Diamond Quarry and the Beaumont Quarry are located approximately 0.54km southwest and upgradient and 0.94km southeast and upgradient of the site respectively. There are no other historic pits or quarries mapped by the GSI (GSI, 2024) within a 2km radius of the site.

8.6.12 Conceptual Site Model

In accordance with the EPA's document 'Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites' (EPA, 2013a) a Conceptual Site Model (CSM) was developed for the site of the Proposed Development. A conceptual site model (CSM) represents the characteristics of the Site and identifies the possible relationships and potential risks between contaminant sources, pathways and receptors. These three essential elements of the CSM are described as:

- **A source –** a substance that is in, on or under the land and has the potential to cause harm or pollution.
- **A pathway –** a transport route or means by which a receptor can be exposed to, or affected by, a contaminant source.
- **A receptor –** in general terms, something that could be adversely affected by a contaminant, such as people, an ecological system, property, or a water body.

The term contaminant linkage is used to describe a particular combination of source pathway receptor (S-P-R). Each of these elements can exist independently, but they create a risk only where they are linked together so that a particular contaminant affects a particular receptor through a particular pathway (i.e., a contaminant linkage).

The key Sources of contamination at the site of the Proposed Development include:

- Residual soil impacted with petroleum hydrocarbons and solvents within localised areas of the site remain following removal of buried waste oil cans and solvent drums (WSP, 2024c) and are considered the baseline conditions of the site.
- Dissolved phase groundwater impacted with petroleum hydrocarbons and solvents in shallow and deeper groundwater beneath the site. The removal of identified sources of contamination (i.e., waste oil cans and solvent drums) is expected to significantly improve the long-term quality of groundwater beneath the site (WSP, 2024c).
- LNAPL sheens were observed on shallow water in Made Ground during site investigations (WSP, 2024a).
- While site investigations to date have not identified the presence of DNAPL, there is a possibility that DNAPL will be present potentially pooling on the silt aquiclude layer.
- Remediated contaminated material from both the site and the adjoining proposed Strategic Housing Development (ABP Reference: ABP-309059-20) is temporarily stockpiled at the site pending removal and are considered to represent the baseline conditions at the site.

The Proposed Development will comprise the development of residential apartment blocks, a creche, a gym and a retail/café space and will be covered by hardstanding, areas of landscaping and public/communal open space. The landscaped areas will include a minimum cover of 0.8m of clean fill and topsoil. Therefore, the proposed end use for the Proposed Development has been considered as a Residential land use(excluding the consumption of the homegrown produce exposure pathway) in accordance with the UK Environment Agency's Land Contamination Risk Management (LCRM) guidance.

The approach for the site of the Proposed Development is similar to the adjoining proposed Strategic Housing Development (ABP Reference: ABP-309059-20) as described in the HHRA (WSP, 2024a). Since the site will be covered with hardstanding or clean imported fill material, direct exposure to contaminants and dust from residual contaminated soils (where present) will be prevented. Additionally, there will be no designated areas for growing vegetables or fruit, eliminating the risk of ingesting homegrown produce or soil adhering to it. The possibility of tracking contaminated soils from external areas into residences (indirect exposure via inhalation of fugitive dust) is also ruled out. Consequently, consistent with the adjoining proposed Strategic Housing Development (ABP Reference: ABP-309059-20), the only viable exposure pathway applicable to human health receptors for the Proposed Development is via the inhalation of vapours from residual soil and groundwater contamination.

The exposure Pathways and Receptors are summarised as follows:

- Leaching of contaminants from soil and vertical migration to shallow groundwater. It is noted that the majority of the Proposed Development will be covered with impermeable construction materials (i.e., buildings and pavement), which will divert rainwater to surface water discharge, thereby preventing direct contact with contaminated soils. While SuDS elements, to allow infiltration and reduction of run-off volumes and rates, have been incorporated into the design of the proposed surface water drainage network, the existing capacity for infiltration and recharge at the site of the Proposed Development is limited due to the presence of made ground and moderately permeable subsoil. Furthermore, variable head permeability testing undertaken within groundwater monitoring wells during recent site investigations (GII, 2024) at the adjoining Strategic Housing Development failed due to tidal influence, further indicating limited infiltration potential at the site. Consequently, the leaching of contaminants from unsaturated soils will be limited due to the restricted infiltration potential and diversion of groundwater and surface water away from these areas.
- Vertical migration between the shallow and deep groundwater zones. Groundwater monitoring indicates that the made ground is not in direct continuity with the Lee Estuary Lower, and the silt layer forms a relatively low permeability barrier between the made ground and the underlying gravel aquifer. However, some limited connection may occur between the water in the made ground and the underlying gravel aquifer (WSP, 2024a).
- Potential for the presence of a preferential flow path through the silt aquiclude via existing monitoring wells at the site (WSP, 2024a).
- Creation of preferential flow paths through the silt aquiclude during piling, which allows contaminated groundwater and leachates to migrate downwards through aquitard layers into the underlying groundwater.
- Lateral migration of shallow and deep groundwater toward the open drainage channels along the southeast and northwest site boundaries and the Lee (Cork) Estuary Lower.
- Volatile vapours resulting from residual soil contamination accumulating in subsurface ducts, services, cellars, basements, or other enclosed spaces. Soils at the adjoining proposed Strategic Housing Development (ABP Reference: ABP-309059-20) will be stabilised and capped, making this the only viable pathway.
- Volatile vapours in groundwater potentially presenting a risk to future development/site users, via migration to future development.

It is noted that the exposure pathways and receptors for groundwater is further described and assessed in Chapter 9 of this EIAR.

8.6.13 Importance of the Baseline Environment

It is noted that, in accordance with the TII Guidance as documented by the NRA (NRA, 2009) and as outlined in Table 8 1, the soil underlying the Site of the Proposed Development would be rated as an attribute of 'moderate' geological importance given the presence of contaminated soil onsite from imported made ground and previous industrial usage.

8.7 The 'Do Nothing' Scenario

The 'Do Nothing' scenario assesses the potential impact on the receiving land, soils, and geological environment if the Proposed Development did not proceed. It is considered that there would be no change or resulting impact on the nature of the Site with respect to land, soil and geology as the Site of the Proposed Development would remain as undeveloped land with localised areas impacted with hydrocarbon contamination. Furthermore, remedial works, including the excavation of made ground and underlying natural soils impacted by anthropogenic contamination (i.e., petroleum hydrocarbons and solvents – refer to Section 8.6.5), would not be undertaken. Residual sources of contamination in soil, if not removed offsite, could result in ongoing detriment to the underlying groundwater and receiving surface water receptors.

As the site is zoned for development, in the absence of the Proposed Development, it is likely that a development of a similar nature is likely to be constructed in the future in line with national policy and the development plan objectives. Therefore, the construction and operational phase impacts outlined in this assessment are likely to occur in the future, even in the absence of the proposed development.

8.8 Potential Significant Effects

The procedure for determination of potential effects on the receiving land, soils and geology is to identify potential receptors within the Site boundary and surrounding environment and use the information gathered during the desk study, the Site walkover and the results of site investigations to assess the degree to which these receptors will be impacted upon in the absence of mitigation.

The potential effects associated with the construction phase and operational phase of the Proposed Development are summarised below.

8.8.1 Construction Phase

8.8.1.1 Land Take and Land Use

The Proposed Development will require land take of approximately 0.84Ha and will change from undeveloped brownfield lands to predominantly residential with some commercial uses. The site is located within an area zoned 'ZO 02 New Residential Neighbourhoods' with the objective to 'provide for new residential development in tandem with the provision of the necessary social and physical infrastructure'. Therefore, the Proposed Development is considered to meet the zoning objectives of the Cork City Development Plan 2022-2028. It is considered that there will be an unavoidable land take with loss of undeveloped land and soil with a 'negative', 'moderate to significant' and 'permanent' impact taking account of the surrounding land and zoning objectives.

8.8.1.2 Excavation and Removal of Contaminated Soil and Subsoil

At the time of writing this Chapter of the EIAR, it was noted that remediated contaminated material from both the Site and the adjoining proposed Strategic Housing Development (ABP Reference: ABP-309059-20) was stockpiled at the Site pending removal offsite (refer to Figure 8 3). It is estimated that there is a total of 12,006m3 of material temporarily stockpiled at the site. All stockpiles are stored on high-grade polythene sheeting to prevent cross-contamination of the soil below and are also covered with high-grade polythene sheeting to prevent rainwater run-off and leaching of potential contaminants from the stockpiled material, as well as the generation of dust. It is anticipated that the temporarily stockpiled material will be removed off site in the immediate future as part of ongoing development works at the adjoining proposed Strategic Housing Development. Therefore, the temporarily stockpiled material will have been removed well in advance of construction works commencing at the site of the Proposed Development. Accordingly, it is considered that there will be a 'positive', 'moderate to significant' and 'permanent' impact on the quality of soils at the site.

There will be unavoidable loss of in-situ soils and subsoils from the site for the construction of the Proposed Development. Excavation of soil and subsoil will be required for the construction of piling caps, drainage and other infrastructure to depths of between 1.6 meters below ground level (mbGL) and 2.2mbGL with the excavation of 2,700m3 of material. It is anticipated that all excavated materials will require permanent removal offsite for recovery / disposal in accordance with all statutory legislation.

The excavation of made ground and underlying natural soils impacted with anthropogenic contamination (i.e., petroleum hydrocarbons and solvents – refer to Section 8.6.5) and permanent removal off-site is a design requirement of the Proposed Development. In advance of construction works commencing, the existing HHRA (WSP, 2024a) will be refined based on the results of the in-situ soil validation samples collected at the site (WSP, 2024c). The refined HHRA will be used to inform the remediation plan to ensure that residual sources of contamination are removed offsite. Accordingly, it is considered that there will be a 'positive', 'moderate to significant' and 'permanent' impact on the quality of shallow soils underlying the site. There is no significant, adverse, long-term impact associated with the excavation of soil from the site.

During excavations at the Proposed Development, there is a potential risk of contaminants leaching from the soil into the shallow groundwater. Excavation activities may disturb contaminated soils, increasing the likelihood of contaminant mobilisation. Additionally, the exposure of contaminated soils to rainfall and surface water runoff can further enhance the leaching of contaminants from unsaturated soils. Construction best practices, including the implementation of the Construction Environmental Management Plan (CEMP) (prepared by DBFL (DBFL, 2024) and submitted with the planning application) detailing the management and disposal procedures of excavated materials, will reduce the risk of contaminant leaching. However, in a worst-case scenario, the mobilisation of soil contamination beneath the site could adversely impact the receiving hydrogeological and hydrological environment, depending on the nature of the incident and in the absence of standard avoidance and design measures. The potential impacts of soil contamination on the receiving water environment are assessed in Chapter 9 of this EIAR.

There is a potential risk of adverse effects on site workers from exposure to soil contamination. As the exposure will be temporary or short-term during construction, the effect is likely to be negligible, and the overall significance is anticipated to be insignificant. The potential risks to construction workers will be further considered as part of the construction and management plans prepared by the appointed contractor in advance of construction work commencing.

During the Construction Phase of the Proposed Development in particular groundworks, there is a potential that volatile contaminants would volatilise to the ambient air with potential human health and nuisance issues (e.g., odour). The potential risks to workers at the site and at adjoining properties are assessed in Chapter 12 of this EIAR.

The existing temporarily stockpiled contaminated material, soil not suitable for re-use onsite and other waste materials arising during the construction phase will be removed off-site by an authorised contractor and sent to the appropriately authorised (licensed/permitted) receiving waste facilities. As only authorised facilities will be used, the potential impacts at any authorised receiving facility sites will have been adequately assessed and mitigated as part of the statutory consent procedures. Accordingly, it is considered that off-site removal of surplus soil will have an 'indirect', 'neutral', 'imperceptible' 'permanent' impact on the receiving destination sites and facilities.

8.8.1.3 Soil Quality and Contamination

The soils beneath the site are locally impacted with petroleum hydrocarbons and solvents (refer to Section 8.6.5). The re-use of soil onsite will be subject to control procedures which will include soil quality testing to ensure suitability for use onsite and in accordance with engineering and environmental specification for the Proposed Development. Therefore, the reuse of any excavated soil for the Proposed Development will have an 'neutral', 'imperceptible' and 'permanent' impact given that it will have undergone testing for contaminants, invasive species and other anthropogenic inclusions and assessment of the suitability for use in accordance with engineering and environmental specifications for the Proposed Development.

Piling during the construction phase of the Proposed Development, may potentially create preferential flow paths through the silt aquiclude for sources of contamination in shallow soils (leachate), groundwater and leachates to migrate downwards through aquitard layers into the underlying groundwater. An assessment of the potential impacts of piling during the construction phase of the Proposed Development is addressed in Chater 10 Water & Hydrology of this EIAR.

There is a potential risk associated with the use of cementitious materials during construction of subsurface structures on the underlying soil and geology at the Proposed Development. It is considered that this may result in a 'negative', 'moderate' and 'long-term' impact on existing quality of soil within a localised area underlying the site of the Proposed Development.

The potential accidental release of deleterious materials including fuels and other materials being used onsite, through the failure of secondary containment or a materials' handling accident on the Proposed Development could potentially result in a 'negative', 'moderate to significant', 'long-term' impact on the receiving soil and geology depending on the nature of the incident.

8.8.1.4 Dust Generation

There is a potential for creation of windblown dust generation from the temporary stockpiling of materials onsite. There will be some exhaust emissions generated from use of excavators, HGVs (heavy goods vehicles) and vibrating rollers during the construction phase of the Proposed Development. An assessment of the potential impact of the Proposed Development with regard to the generation of dust is addressed in Chapter 12 of this EIAR.

8.8.1.5 Soil Structure

The excavation and re-use of soil at the site will result in the exposure of the materials to various elements including weather and construction traffic. The temporary stockpiling of soils and subsoils pending reuse onsite will have a potential 'negative,' slight' and 'long term' impact' on the natural strength of the materials.

8.8.1.6 Importation of Materials

The Proposed Development will include the importation of aggregate fill materials (e.g., granular material beneath road pavement, under floor slabs and for drainage and utility bedding / surrounds etc.) and soil for landscaped areas during the Construction Phase of the Proposed Development. In the unlikely event that aggregate fill and soil materials are sourced from unlicensed or unauthorised sources, it may result in the importation of uncertified or material not suitable for use at the Proposed Development. In the unlikely event of the importation of contaminated materials onsite, there would be a 'negative', 'moderate to significant' and 'long term' impact on the receiving lands, soil and geology at the site.

The potential impacts may also include loss of attribute and changes in the geological regime at the source site. It is anticipated that the required aggregates fill and soil materials identified for importation onsite will be 'indirect' and have a 'neutral,' 'imperceptible' and 'permanent' impact on the source site taking account of the fact that the statutory consent process would have required the necessary environmental impacts to be assessed and mitigated as appropriate at the source site.

8.8.2 Operational Phase

During the Operational Phase of the Proposed Development there is a limited potential for any direct adverse impact on the receiving land, soil and geological environment taking account of the proposed design measures.

The design and construction of the Proposed Development in accordance with current Building regulations will ensure that the Site will be suitable for use for operational phase as a residential development taking account of the geological Site setting.

The entire footprint of the proposed buildings, the landscaped courtyards and open spaces between the buildings will be covered by an impervious liner and podium structures comprising of reinforced concrete slab, thus preventing any future contact or exposure of the existing contaminated soil. In addition, any areas which shall be developed as public open space shall be completed as necessary with imported clean soil to prevent site users from interacting with contaminated soil.

The soils beneath the site are locally impacted with hydrocarbons and solvents. Without suitable remedial measures, the presence of volatile petroleum hydrocarbons and solvents in the soil beneath the site poses a 'negative,' 'moderate to significant' and 'long-term' risk to structures and future occupants of the site from exposure to volatile vapours from residual soil contamination and from groundwater. As part of incorporated design measures for the Proposed Development, in advance of construction works commencing, the existing HHRA (WSP, 2024a) will be refined based on the results of the in-situ soil validation samples collected at the site (WSP, 2024c). The refined HHRA will be used to inform the remediation plan to ensure that residual sources of contamination in soil are removed offsite. Accordingly, it is considered that there will be a 'neutral', 'imperceptible' and 'permanent' impact to structures and future occupants of the site.

It is noted that while WSP (WSP, 2024c) has reported that the detection and removal of waste oil cans and solvent drums at the site of the Proposed Development will significantly improve the long-term quality of the underlying groundwater impacted by petroleum hydrocarbons and solvents, the potential remains for contaminated groundwater to act as a source of vapours in the subsurface. An assessment of the potential impacts of volatile vapours in groundwater is addressed in Chapter 9 of this EIAR.

8.8.3 Cumulative Effects

Cumulative effects can be defined as "impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project". Effects which are caused by the interaction of effects, or by associated or off-site projects, are classed as indirect effects. Cumulative effects are often indirect, arising from the accumulation of different effects that are individually minor. Such effects are not caused or controlled by the project developer.

As part of this assessment, other offsite developments and proposed offsite developments as detailed in Appendix 1.1 of this EIAR were reviewed and considered for possible cumulative effects with the Proposed Development.

8.8.3.1 Excavation and Removal of Soil and Subsoil

Excavated soil and subsoil during the construction phase of the Proposed Development could potentially be directed to the same receiving waste facilities for recovery / disposal as excavated materials from other developments detailed in Appendix 1.1 of this EIAR and within the Greater Cork Area. It is anticipated that 2,700m3 of excavated soil and subsoil will be removed offsite in accordance with all statutory legislation. Accordingly, it is considered that any cumulative impact on lands, soils and geology associated with the Proposed Development will be 'neutral', 'imperceptible' and 'permanent'.

8.8.3.2 Importation of Aggregates and Materials

The importation of aggregates to the Proposed Development may be sourced from the same borrow site as other permitted developments detailed in Appendix 1.1 of this EIAR and within the Greater Cork Area. However, contract and procurement

procedures will ensure that all aggregates and fill material originating from quarry sources that will be required for construction are sourced from reputable authorised suppliers operating in a sustainable manner and in accordance with the necessary statutory consents. Therefore, regardless of the number of other projects and developments using aggregates from the same source sites, there will be an 'indirect', 'neutral', 'imperceptible' and 'permanent' impact on the geological environmental at the source site.

There are no other cumulative impacts associated with land, soil and geology associated with the construction phase and operational phase of the Proposed Development.

8.8.4 Summary

Table 8 5 summarises the identified likely significant effects during the construction phase of the proposed development before mitigation measures are applied.

Table 8 5 Summary of Construction Phase Likely Significant Effects in the absence of mitigation

LIKELY SIGNIFICANT EFFECT	QUALITY	SIGNIFICANCE	EXTENT	PROBABILITY	DURATION	TYPE
Land Take and Land Use	Negative	Moderate to Significant	Local	Likely	Permanent	Direct
Removal of Existing Temporarily Stockpiled Contaminated Material and In-situ Material impacted with anthropogenic contamination (i.e., petroleum hydrocarbons and solvents).	Positive	Moderate to Significant	Local	Likely	Permanent	Direct
Excavation and Removal of Contaminated Soil and Subsoil	Positive	Moderate to Significant	Local	Likely	Permanent	Direct
Removal Of Stockpiled Contaminated Material, Soil Not Suitable for Re-Use Onsite and Other Waste Materials to Receiving Waste Facility	Neutral	Imperceptible	Regional	Likely	Permanent	Indirect
Re-Use of Soil and Subsoil Onsite	Neutral	Imperceptible	Local	Likely	Permanent	Direct
Use of Cementitious Materials	Negative	Moderate	Local	Possible	Long-term	Direct
Accidental Release of Deleterious Materials	Negative	Moderate to Significant	Local	Worst-case	Long-term	Direct
Stockpiling of Excavated Soil and Subsoils	Negative	Slight	Local	Possible	Long-term	Direct
Import of Required Soil, Subsoil and Aggregates	Negative	Moderate to Significant	Local	Possible	Long-term	Direct
Import of Required Soil, Subsoil and Aggregates	Neutral	Imperceptible	Regional	Likely	Permanent	Indirect

Table 8 6 summarises the identified likely significant effects during the operational phase of the proposed development before mitigation measures are applied.

Table 8 6 Summary of Operational Phase Likely Significant Effects in the absence of mitigation

LIKELY SIGNIFICANT EFFECT	QUALITY	SIGNIFICANCE	EXTENT	PROBABILITY	DURATION	TYPE
Exposure to Volatile Hydrocarbons and Solvents in Contaminated Soil	Negative	Moderate to Significant	Local	Likely	Long-term	Direct

8.9 Mitigation Measures

The mitigation measures as outlined below, will ensure that there will be no significant impact on the receiving land, soil and geology.

8.9.1 Incorporated Design Mitigation

In advance of construction works commencing, the existing HHRA (WSP, 2024a) will be refined based on the results of the in-situ soil validation samples collected at the site (WSP, 2024c). The refined HHRA will be used to inform the remediation plan to ensure that residual sources of contamination in soil are removed offsite.

Landscaping within public / communal open space areas will include a minimum cover of 0.8m of imported clean, suitable for use soil thereby removing any potential risks associated with direct contact and inhalation of soils in the public / communal open space areas.

8.9.2 Construction Phase Mitigation

A preliminary Construction Environmental Management Plan (CEMP) (DBFL, 2024) has been prepared for the Proposed Development and included as part of the planning application. In advance of construction works commencing, the appointed Contractor will be required further develop the CEMP to ensure, site-specific procedures and mitigation measures to monitor and control environmental impacts throughout the Construction Phase of the project and prevent any potential emissions to ground having regard to relevant industry standards (e.g., Guidance for Consultants and Contractors, CIRIA - C532', CIRIA, 2001).

The CEMP will be implemented for the duration of the construction phase, covering construction and waste management activities that will take place during the construction phase of the Proposed Development.

8.9.2.1 Control and Management of Contaminated Soil

Contaminated soil will be encountered during groundworks at the site. Remedial works undertaken to date have removed a large portion of the contaminated soil at the site. However, the soil validation results demonstrate that petroleum hydrocarbon and solvent impacted areas remain at validation sample locations V03, V10, V11, V12 and 9AB-10 (WSP, 2024c). As mentioned, in Section 8.9.1, the refined HHRA will be used to inform the remediation plan to ensure that residual sources of contamination in soil are removed offsite. The removal of the residual soil source will be validated in accordance with relevant guidelines including EPA 'Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites' (EPA, 2013a) and guidance and standards current at the

time of construction works. Therefore, there will be no residual sources of contamination that will remain onsite.

The management and removal of soils offsite will be undertaken in accordance with the recommendations of the remediation plan which will be informed by the refined HHRA, the CEMP, and the Waste Management Act 1996 -2011 as amended and associated regulations and guidance. Where required, additional sampling and waste classification assessment of potentially contaminated soil to be excavated will be undertaken in advance of construction works commencing.

Only suitably experienced contractors shall be used to carry out the remediation work. All works will be undertaken by the appointed contractor in accordance with industry best practice to manage risk from contaminated soils, groundwater and volatile vapours. These will be designed by the appointed contractor dependent on his construction practices and are likely to include the use of gloves, dust masks and potentially disposable overalls. These and other appropriate measures will minimise the exposure of the site workers.

8.9.2.2 Reuse of Soil

While it is anticipated that all excavated materials will be removed offsite in accordance with all relevant statutory legislation, where required, soil and subsoil materials to be reused within the Proposed Development (i.e., for engineering fill and landscaping) will be subject to assessment of the suitability for use in accordance with engineering and environmental specification for the Proposed Development. The refined HHRA will provide detailed Reuse Target Criteria (RTC) specific to the site of the Proposed Development. These criteria will be designed to ensure that any soils retained and reused onsite are suitable and protective of both human health and the receiving environment.

8.9.2.3 Stockpile Management

Segregation and storage of soils for re-use onsite or removal offsite and waste for disposal offsite will be segregated and temporary stored onsite pending removal or for reuse onsite in accordance with the measures outlined in the CEMP (DBFL, 2024).

Stockpiling of soils and subsoils pending removal offsite or, if required, reuse onsite will be managed in accordance with Inland Fisheries Ireland guidelines and located away from the location of any sensitive receptors (watercourses and drains).

Surplus material, pending removal offsite or if required, reuse onsite, will be segregated, and stockpiled appropriately. For any excavated material identified for removal offsite, while assessment and approval of acceptance at a destination re-use, recovery Site or waste facility is pending, excavated soil for recovery/disposal shall be stockpiled as follows:

- A suitable temporary storage area will be identified and designated.
- All stockpiles will be assigned a stockpile number.
- Stockpiled soil and stone materials will be protected from exposure to wind by storing the material in sheltered regions of the Proposed Development Site.
- Soil waste categories will be individually segregated; and all segregation, storage and stockpiling locations will be clearly delineated on the Site drawing.
- Any waste to be temporarily stockpiled will be stockpiled only on hard standing on heavy gauge polythene sheeting and soil stockpiles will be sealed to prevent run-off of rainwater and leaching of potential contaminants from the stockpiled material generation and/or the generation of dust.
- There will be no storage of materials within 10m of any boundary, drains and watercourses.

Any waste generated from construction activities, including concrete, asphalt and soil stockpiles, will be managed in accordance with the procedures outlined in the CEMP (DBFL, 2024) and will be stored onsite in such a manner as to:

- Prevent environmental pollution (bunded and/or covered storage, minimise noise generation and implement dust/ odour control measures, as may be required).
- Maximise waste segregation to minimise potential cross contamination of waste streams and facilitate subsequent re-use, recycling and recovery.
- Prevent hazards to Site workers and the general public during Construction Phase (largely noise, vibration and dust.

8.9.2.4 Control and Management of Dust

Excavated soils will be carefully managed and maintained in order to minimise potential impact on soil quality and soil structure. Handling of soils will be undertaken in accordance with documented procedures outlined in the CEMP (DBFL, 2024) that will be set out in order to protect ground and minimise airborne dust. The normal measures required to prevent airborne dust emissions and associated nuisance arising from Site work will be in place including measures to prevent uncovered soil drying out leading to wind pick up of dust and mud being spread onto the local road network and adjoining properties. This may require additional wetting at the point of dust release, dampening down during dry weather and wheel cleaning for any vehicles leaving the Site. Potential impacts and avoidance and mitigation measures associated with generation of dust are addressed in Chapter 12 of this EIAR.

8.9.2.5 Export of Soil, Subsoil and Waste

All surplus materials and any waste will be removed offsite in accordance with the recommendations of the remediation plan which will be informed by the refined HHRA, the CEMP, and the Waste Management Act 1996 -2011 as amended and associated regulations and guidance.

Materials will be brought to an authorised facility which currently holds an appropriate waste facility permit or licence for the specified waste types. Prior to any removal of materials from the site, written confirmation should be obtained from the proposed receiving authorised waste facility, that acceptance of the material will be in accordance with all waste management legislation and the conditions of the receiving facility licence or permit.

It will be the contractor's responsibility to engage a specialist waste service contractor (s) who will possess the requisite authorisations, for the collection and movement of waste materials offsite. Only hauliers with a valid National Waste Collection Permit Office (NWCPO) issued Waste Collection Permit which authorises the transport of waste materials and delivery to the proposed receiving facility should be appointed to transport the material from the site to the nominated appropriately permitted or licenced facility.

Materials and waste will be documented prior to leaving the site. All information will be entered into a waste management register kept on the site.

Vehicles transporting material with potential for dust emissions to an offsite location shall be enclosed or covered with a tarpaulin at all times to restrict the escape of dust.

Public roads outside the Site will be regularly inspected for cleanliness and cleaned as necessary. The main contractor will carry out road sweeping operations, employing a suction sweeper or similar appropriate method, to remove any project related dirt and/or material deposited on the road by construction/ delivery vehicles. All vehicles exiting the Site will make use of a wheel wash facility where appropriate, prior to exiting onto public roads.

8.9.2.6 Odour Management

It is recommended that an Odour Management Plan is prepared by the appointed contractor in advance of construction works to identify appropriate health and safety and environmental mitigation and management measures to be undertaken to ensure that the activities will be carried out in a manner such that vapours and odours do not pose any human health risk or result in significant impairment of, or significant interference with amenities or the environment beyond the site boundary. Such measures include:

- Where required, limiting the work area to minimise the release of vapours and odours from exposed contaminated soils.
- Avoiding stockpiling of soils onsite and where unavoidable, soils must be covered.
- Where required, chemical sprays/mists will be used to lower the temperature of exposed waste, inhibit evaporation and for odour control.
- Where required, odour monitoring will be undertaken along site boundary downwind of the works area to ensure permitted odour levels are not exceeded.
- If a vapour or odour issue arises during the works, the appointed Contractor will cease works immediately and investigate the incident and implement appropriate mitigation measures as required.

Potential impacts and avoidance and mitigation measures in relation to the management of vapours and odours during the construction phase of the Proposed Development are further discussed in Chapter 12 of this EIAR.

8.9.2.7 Import of Materials

Contract and procurement procedures will ensure that all imported aggregate fill and soil materials required for the construction of the Proposed Development will be sourced from reputable suppliers operating in a sustainable manner and in accordance with industry conformity/compliance standards and statutory obligations. This may include where suitable, import as by-products that meet the legislative requirements of Article 27 of the European Communities (Waste Directive) Regulations, 2011. The importation of aggregate fill and soil materials will be subject to management and control procedures which will include testing for contaminants, invasive species and other anthropogenic inclusions and assessment of the suitability for use in accordance with engineering and environmental specifications for the Proposed Development. Therefore, any unsuitable material will be identified prior to unloading / placement onsite.

8.9.2.8 Concrete Works

The cementitious grout and other concrete works during the construction phase, will avoid any contamination of ground through the use of appropriate design and methods implemented by the Contractor and in accordance with the CEMP (DBFL, 2024) and relevant industry standards.

Pre-cast concrete will be used where technically feasible to meet the design requirements for the Proposed Development. Where cast-in-place concrete is required (i.e., building foundations), all work must be carried out in dry conditions and be effectively isolated from any groundwater.

All ready-mixed concrete will be delivered to the Site by truck. Concrete batching will take place offsite, wash down and wash out of concrete trucks will take place into a container located within a controlled bunded area which will then be emptied into a skip for appropriate compliant removal offsite in accordance with all relevant waste management legislation. Any excess concrete is not to be disposed of onsite.

A suitable risk assessment for wet concreting shall be completed prior to works being carried out. Pumped concrete will be monitored to ensure there is no accidental discharge.

8.9.2.9 Handling of Fuels, Chemicals and Materials

Fuelling and lubrication of equipment will be carried out in accordance with the procedures outlined in the CEMP (DBFL, 2024), in a designated area of the site away from any watercourses and drains where not possible to carry out such activities offsite.

Any diesel, fuel or hydraulic oils stored onsite will be stored in designated areas of the site. These areas will be bunded and located away from surface water drainage and features. Bunds will have regard to Environmental Protection Agency guidelines 'Amendment to IPC Guidance Note on Storage and Transfer of Materials for Scheduled Activities' (EPA, 2013). All tank and drum storage areas will, as a minimum, be bunded to a volume not less than the greater of the following:

- 110% of the capacity of the largest tank or drum within the bunded area; or
- 25% of the total volume of substance that could be stored within the bunded area.

The appointed contractor will maintain an emergency response action plan and emergency procedures will be developed by the appointed contractor in advance of any works commencing. Construction staff will be familiar with the emergency response plan.

Spill kits will be made available onsite and identified with signage for use in the event of an environmental spill or leak. A spill kit will be kept in close proximity to the fuel storage area for use in the event of any incident during refuelling or maintenance works. Heavy machinery used on the Site will also be equipped with its own spill kit.

8.9.2.10 Emergency Procedures

Emergency procedures will be developed by the appointed Contractor in advance of works commencing and spillage kits will be available onsite including in vehicles operating onsite. Construction staff will be familiar with emergency procedures in the event of accidental fuel spillages. Remedial action will be immediately implemented to address any potential impacts in accordance with industry standards and legislative requirements.

Any required emergency vehicle or equipment maintenance work will take place in a designated impermeable area within the Site.

- Emergency response procedures will be put in place, in the unlikely event of spillages of fuels or lubricants.
- Spill kits including oil absorbent material will be provided so that any spillage of fuels, lubricants or hydraulic oils will be immediately contained.

- In the event of a leak or spill from equipment in the instance of a mechanical breakdown during operation, any contaminated soil will be removed from the Site and compliantly disposed offsite. Residual soil will be tested to validate that all potentially contaminated material has been removed. This procedure will be undertaken in accordance with industry best practice procedures and standards.
- All construction works staff will be familiar with emergency procedures for in the event of accidental fuel spillages.
- All construction works staff onsite will be fully trained on the use of equipment.

This procedure will be undertaken in accordance with industry best practice procedures and standards. These measures will ensure that there is minimal risk to the receiving land, soil and geological environment associated with the construction phase of the Proposed Development.

8.9.2.11 Welfare Facilities

Welfare facilities have the potential, if not managed appropriately, to release organic and other contaminants to ground or surface water courses. Foul drainage from temporary welfare facilities during the Construction Phase of the Proposed Development will be discharged to temporary holding tank(s) the contents of which will periodically be tankered off Site to a licensed facility. All waste from welfare facilities will be managed in accordance with the relevant statutory obligations by tankering of waste offsite by an appropriately authorised contractor.

Any connection to the public foul drainage network during the construction phase of the Proposed Development will be undertaken in accordance with the necessary temporary discharge licences issued by Úisce Eireann (UE).

8.9.3 Operational Phase Mitigation

There is no requirement for mitigation measures for the Operational Phase taking account of the incorporated design measures for the Proposed Development (refer to Section 8.9.1).

8.10 Residual Impact Assessment

Residual Impacts are defined as 'effects that are predicted to remain after all assessments and mitigation measures. They are the remaining 'environmental costs' of a project and are the final or intended effects of a development after mitigation measures have been applied to avoid or reduce adverse impacts.

8.10.1 Construction Phase

The predicted impacts of the Construction Phase of the Proposed Development are described in Table 8 7 in terms of quality, significance, extent, likelihood, and duration. The relevant mitigation measures are detailed, and the residual impacts are determined which take account of the avoidance, remedial and mitigation measures.

The excavation and removal of soil and subsoil impacted with hydrocarbons and solvents will have a positive impact on the quality of soils underlying the site.

Overall, there is no significant residual impacts on land, soils and geology anticipated regarding the Construction Phase of the Proposed Development.

Table 8 7. Residual Impacts (Construction Phase)

ACTIVITY	ATTRIBUTE	PREDICTED IMPACT	QUALITY	SIGNIFICANCE	DURATION	TYPE	MITIGATION	RESIDUAL IMPACT
Construction Phase								
Construction of the Proposed Development	Land Take and Land Use	The Proposed Development will require land take of approximately 0.84Ha and will change from undeveloped lands to predominantly residential with some commercial uses.	Negative	Moderate to Significant	Permanent	Direct	Unavoidable and no mitigation. The Proposed Development is considered to meet the zoning objectives of the Cork City Development Plan 2022-2028.	Moderate to Significant
Removal of Existing Stockpiled Contaminated Material	Soils	In advance of construction works commencing, all existing stockpiled material will be removed off site	Positive	Moderate to Significant	Permanent	Direct	The removal of all stockpiled materials will be undertaken in accordance with applicable statutory requirements.	Positive
Excavation and Removal of Soil and Subsoil Impacted with Hydrocarbons and Solvents	Soils	The excavation of made ground and underlying natural soils impacted with anthropogenic contamination (i.e., petroleum hydrocarbons and solvents – refer to Section 8.6.5) and permanent removal off-site is a design requirement of the Proposed Development.	Positive	Moderate to Significant	Permanent	Direct	In advance of construction works commencing, the refined HHRA will be used to inform the remediation plan to ensure that residual sources of contamination are removed offsite. The removal of all surplus soil will be undertaken in accordance with applicable statutory requirements.	Positive
Removal Of Stockpiled Contaminated Material, Soil Not Suitable for Re-Use Onsite and Other Waste Materials	Land, Soil and Geology at Receiving Facility	The removal of materials and waste during the Construction Phase of the Proposed Development could potentially be directed to the same receiving waste facilities for recovery / disposal as excavated materials from other developments.	Neutral	Imperceptible	Permanent	Indirect / Cumulative	None required. The removal of all material and waste from the site will be removed offsite in accordance with all statutory legislation.	Imperceptible
Re-Use of Soil and Subsoil Onsite	Soils and Subsoils	The soils beneath the site are locally impacted with petroleum hydrocarbons and solvents. The re-use of soil onsite will be subject to control procedures which will include soil quality testing to ensure suitability for use onsite and in accordance with engineering and environmental specification for the Proposed Development.	Neutral	Imperceptible	Permanent	Direct	The refined HHRA will provide detailed Reuse Target Criteria (RTC) specific to the site of the Proposed Development. These criteria will be designed to ensure that any soils retained and reused onsite are suitable and protective of both human health and the receiving environment.	Imperceptible
Use of Cementitious Materials	Soils and Subsoils	Potential release of cementitious material during construction works for foundations, pavements and infrastructure to the land, soil, and geological environment.	Negative	Moderate	Long Term	Direct	The cementitious materials used during construction will avoid any contamination of soil and geology through the use of appropriate design and methods implemented by the appointed contractor and in accordance with the CEMP and relevant industry standards.	Imperceptible
Accidental Release of Deleterious Materials (e.g., Fuels or Other Hazardous Materials Being Used Onsite).	Soils, Subsoils and Bedrock	Potential (albeit low) for uncontrolled release of deleterious materials including fuels and other materials being used onsite, through the failure of secondary and tertiary containment or a materials handling accident, to the land, soil, and geological environment.	Negative	Moderate to Significant	Long Term	Direct / Worst Case	Refuelling of plant and storage of any deleterious materials including fuels will be undertaken in accordance with the requirements and procedures outlined in the CEMP.	Imperceptible

ACTIVITY	ATTRIBUTE	PREDICTED IMPACT	QUALITY	SIGNIFICANCE	DURATION	TYPE	MITIGATION	RESIDUAL IMPACT
Stockpiling of Excavated Soil and Subsoils	Soil Structure	The temporary stockpiling of excavated soils will result in exposure of the materials to various elements including weather.	Negative	Slight	Long-term	Direct	The segregation and stockpiling of soil and stone at the Site pending reuse or removal offsite will be carefully managed and maintained in order to minimise potential impact on soil quality.	Slight
Import of Required Soil, Subsoil and Aggregates	Soils and Subsoils	In the unlikely event that aggregate materials are sourced from unlicensed or unauthorised sources, it may result in the importation of uncertified or material not suitable for use at the Proposed Development.	Negative	Slight	Permanent	Indirect	Only certified materials from authorised sources will be used.	Imperceptible
Import of Required Soil, Subsoil and Aggregates	Land, Soil and Geology at the Source Site	The importation of aggregates for the construction of roads and utility infrastructure may include the loss of attribute and changes in the geological regime at the source site.	Neutral	Imperceptible	Permanent	Indirect	None required. The statutory consent process will require the necessary environmental impacts to be assessed and mitigated as appropriate at the source site.	Imperceptible

8.10.2 Operational Phase

The predicted impacts of the Operational Phase of the Proposed Development are described in Table 8 8 in terms of quality, significance, extent, likelihood, and duration. The relevant mitigation measures are detailed, and the residual impacts are determined which take account of the avoidance, remedial and mitigation measures.

Overall, there is no significant residual impacts on land, soils and geology anticipated regarding the Operational Phase of the Proposed Development.

Table 8 8. Residual Impacts (Operational Phase)

ACTIVITY	ATTRIBUTE	PREDICTED IMPACT	QUALITY	SIGNIFICANCE	DURATION	TYPE	MITIGATION	RESIDUAL IMPACT
Construction Phase								
Exposure to Volatile Petroleum Hydrocarbons and Solvents in the Soil Beneath the Site	Structures and Future Occupants of the Site	The soils beneath the site are locally impacted with hydrocarbons and solvents. As part of incorporated design measures for the Proposed Development, in advance of construction works commencing, the existing HHRA (WSP, 2024a) will be refined based on the results of the in-situ soil validation samples collected at the site (WSP, 2024c). The refined HHRA will be used to inform the remediation plan to ensure that residual sources of contamination in soil are removed offsite.	Neutral	Imperceptible	Permanent	Direct	The removal of the residual soil source will be validated in accordance with relevant guidelines including EPA 'Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites' (EPA, 2013a) and guidance and standards current at the time of construction works.	Imperceptible

8.10.3 Summary of Post-mitigation Effects

The following Table summarises the identified likely significant residual effects during the construction phase of the proposed development following the application of mitigation measures.

Table 8 9 Summary of Construction Phase Effects Post Mitigation

LIKELY SIGNIFICANT EFFECT	QUALITY	SIGNIFICANCE	EXTENT	PROBABILITY	DURATION	TYPE
Construction of the Proposed Development	Negative	Moderate to Significant	Localised	Likely	Permanent	Direct
Removal of Existing Stockpiled Contaminated Material	Positive	Moderate to Significant	Localised	Likely	Permanent	Direct
Excavation and Removal of Contaminated Soil and Subsoil	Positive	Moderate to Significant	Localised	Likely	Permanent	Direct
Removal Of Stockpiled Contaminated Material, Soil Not Suitable for Re-Use Onsite and Other Waste Materials	Neutral	Imperceptible		Likely	Permanent	Indirect
Re-Use of Soil and Subsoil Onsite	Neutral	Imperceptible	Localised	Likely	Permanent	Direct
Use of Cementitious Materials	Negative	Imperceptible	Localised	Likely	Long-term	Direct
Accidental Release of Deleterious Materials	Negative	Imperceptible	Localised	Likely	Long-term	Direct
Stockpiling of Excavated Soil and Subsoils	Negative	Imperceptible	Localised	Likely	Long-term	Direct
Import of Required Soil, Subsoil and Aggregates	Negative	Imperceptible	Localised	Likely	Long-term	Direct
Import of Required Soil, Subsoil and Aggregates	Neutral	Imperceptible	Offsite	Likely	Permanent	Indirect

The following Table summarises the identified likely residual significant effects during the operational phase of the proposed development post mitigation.

Table 8 10 Summary of Operational Phase Effects Post Mitigation

LIKELY SIGNIFICANT EFFECT	QUALITY	SIGNIFICANCE	EXTENT	PROBABILITY	DURATION	TYPE
Exposure to Volatile Hydrocarbons and Solvents in Contaminated Soil	Neutral	Imperceptible	Localised	Likely	Permanent	Direct

8.10.4 Cumulative Residual Effects

it is considered that any cumulative residual impact on lands, soils and geology associated with excavated soil and subsoil and the importation of aggregates during the construction phase of the Proposed Development will be 'neutral', 'imperceptible' and 'permanent'.

8.11 Risk of Major Accidents or Disasters

Earthquakes are not likely to occur in the vicinity of the Proposed Development site at a sufficient intensity to pose a risk for the Proposed Development. The GSI database (GSI, 2024) indicates that the site is not located within an area susceptible to landslides. Furthermore, there are no potential ground stability hazards identified for the site. Thus, the impacts of landslides to the Proposed Development are considered 'neutral' 'imperceptible' and 'permanent'.

There are no karst features mapped by the GSI (GSI, 2024) at the site and based on the results of previous site investigations (refer to Section 8.6.4.1) there are no identified risks associated with karst features.

The EPA maps the majority of the Proposed Development Site within an area where 'about 1 in 5 homes' are likely to have high radon levels. Therefore, the Site is considered to be located within a High Radon Area. It is noted that standard design measures including appropriate radon membranes will be incorporated into the design of building in accordance with relevant Building Regulations. Therefore, the impacts of radon on the Proposed Development are considered 'neutral' 'imperceptible' and 'permanent'.

All aggregates imported to the Site for use in the Proposed Development will be subject to strict quality control procedures in accordance with design specification and relevant Building Regulations. Therefore, the impacts of imported aggregates for use in the Proposed Development is considered 'neutral' 'imperceptible' and 'permanent'.

8.12 Worst Case Scenario

The potential accidental release of hazardous material including fuels, or other hazardous materials being used on-site during the construction phase could potentially impact on the receiving land, soil and geology environment. This scenario would only occur through the failure of secondary containment or a major incident on the site.

In a worst-case scenario the mobilisation of residual contamination in soil beneath the site during the construction phase could result in an adverse impact on the receiving hydrogeological and hydrological environment. Piling during the construction phase of the Proposed Development may also potentially create pathways for sources of contamination in shallow soils to enter underlying groundwater. The potential for or inadvertent import of

contaminated materials during the construction phase could also result in an impact in the absence of the quality control measures.

Taking account of the mitigation measures any environmental harm would be avoided and it is considered that there would be a 'neutral', 'imperceptible' and 'short-term' impact on the receiving environment.

8.13 Interactions

8.13.1 Population and Human Health

An assessment of the potential impact of the Proposed Development on human health is included in Chapter 4 of this EIAR. The soils beneath the site are locally impacted with hydrocarbons. Without suitable remedial measures the contamination in the soils under the proposed development poses a risk to site workers and future occupants of the site. Furthermore, the presence of volatile hydrocarbons in the made ground poses a risk to structures and future occupants of the site from exposure to volatile vapours from residual contamination in soils and from groundwater.

Appropriate industry standard and health and safety legislative requirements will be implemented during the construction phase of the Proposed Development that will be protective of Site workers.

All works will be undertaken by the appointed contractor in accordance with industry best practice to manage risk form contaminated soils and volatile vapours from residual soil contamination and from groundwater. These will be designed by the appointed contractor dependent on his construction practices and are likely to include the use of gloves, dust masks and potentially disposable overalls. These and other appropriate measures will minimise the exposure of the site worker.

8.13.2 Biodiversity

An assessment of the potential impacts of the Proposed Development on the Biodiversity of the Site, with emphasis on habitats, flora and fauna which may be impacted a result of the excavation and importation of materials to the Site are included in Chapter 10 of this EIAR. It also provides an assessment of the impacts of the Proposed Development on habitats and species, particularly those protected by national and international legislation or considered to be of particular conservation importance and proposes measures for the mitigation of these impacts.

8.13.3 Hydrology and Hydrogeology

An assessment of the potential impact of the Proposed Development on the hydrological and hydrogeological environment is included in Chapter 9 of this EIAR. Dissolved phase groundwater impacted with petroleum hydrocarbons and solvents is present in both shallow and deeper groundwater beneath the site. The recent removal of identified sources of contamination (i.e., impacted soil, waste oil cans, and solvent drums) is expected to significantly improve the long-term quality of groundwater beneath the site (WSP, 2024c).

In advance of construction works commencing, the existing HHRA (WSP, 2024a) will be refined based on the results of the in-situ soil validation samples collected at the site (WSP, 2024c). The refined HHRA will inform the remediation plan to ensure that residual sources of contamination in soils are removed offsite, further improving the quality of groundwater beneath the site.

However, impacted groundwater will continue to act as an ongoing source of vapours in the subsurface. The mobilisation of residual contamination in soil beneath the site during the construction phase could result in an adverse impact on the receiving hydrogeological and hydrological environment. Piling during the construction phase of the Proposed Development may also potentially create pathways for sources of contamination in shallow soils, groundwater and leachates to enter underlying groundwater.

An assessment of the potential impacts of volatile vapours in groundwater and procedures for the protection of the receiving water environment are addressed in Chapter 9 of this EIAR.

8.13.4 Air Quality and Climate

The excavation of soils across the Site and the temporary stockpiling of soils pending reuse or removal offsite has the potential to generate nuisance impacts (i.e., dust) during the Construction Phase of the Proposed Development.

An Odour Management Plan will be prepared by the appointed contractor in advance of construction works to identify appropriate health and safety and environmental mitigation and management measures to be undertaken to ensure that the activities will be carried out in a manner such that vapours and odours do not pose any human health risk or result in significant impairment of, or significant interference with amenities or the environment beyond the site boundary.

An assessment of the potential impact of the Proposed Development on air quality is included in Chapter 12 of this EIAR.

8.13.5 Landscape and Visual

During the construction phase and into the operational phase of the Proposed Development, the site landscape will undergo a change from undeveloped brownfield lands to predominantly residential with some commercial uses with associated landscaping. An assessment of the potential impact of the Proposed Development on the receiving landscape is included in Chapter 5 of this EIAR.

8.13.6 Material Assets: Waste

Where possible, it is intended to retain and re-use the excavated soil and subsoil on the Site for engineering fill and landscaping. However, it is anticipated that some excavated soil and subsoil, including soil contaminated with petroleum hydrocarbons and solvents, will require removal offsite. Additionally, there is a requirement to import aggregates during the Construction Phase of the Proposed Development. The assessment of the potential impact of the Proposed Development is included in Chapter 7 of this EIAR.

8.14 Monitoring

8.14.1 Construction Phase

During the Construction Phase of the Proposed Development the following monitoring measures will be considered:

- Routine monitoring and inspections during refuelling, concrete works to ensure no impacts and compliance with avoidance, remedial and mitigation measures.
- Inspections and monitoring will be undertaken during excavations and other groundworks to ensure that measure that are protective of water quality are fully implemented and effective.

- Stockpiles will be inspected daily by the appointed contractor to ensure materials are segregated onsite for the appropriate waste stream and disposal destination and to ensure there is no leaching / runoff of potential contaminants from the stockpiled material and/or the generation of dust.
- Materials management and waste audits will be carried out at regular intervals to monitor the following:
    - Management of soils onsite and for removal offsite.
    - Record keeping.
    - Traceability of all materials, surplus soil and other waste removed from the Site.
    - Ensure records are maintained of material acceptance at the end destination
- The removal of the residual soil source will be validated in accordance with relevant guidelines including EPA 'Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites' (EPA, 2013a) and guidance and standards current at the time of construction works.
- Soil and subsoil materials to be reused within the Proposed Development (i.e., for engineering fill and landscaping) will be subject to an assessment of the suitability for use, in accordance with engineering and environmental specification for the Proposed Development.
- As part of the Odour Monitoring Plan monitoring may be required along site boundary downwind of the works area to ensure permitted odour levels are not exceeded. If a vapour or odour issue arises during the works, the appointed Contractor will cease works immediately and investigate the incident and implement appropriate mitigation measures as required.

8.14.2 Operational Phase

There are no monitoring requirements specifically in relation to land, soil and geology during the Operational Phase of the Proposed Development.

8.15 Conclusion

The excavation and removal of soil and subsoil impacted with hydrocarbons and solvents will have a positive impact on the quality of soils underlying the site.

Overall, there is no significant residual impacts on land, soils and geology anticipated regarding the Construction Phase and Operational Phase of the Proposed Development.

8.16 References and Sources

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VOLUME II

CHAPTER 9

Water & Hydrology

McCutcheon Halley
CHARTERED PLANNING CONSULTANTS

CHAPTER NINE
Table of Contents

CHAPTER NINE
Table of Figures

CHAPTER NINE
Table of Tables

Chapter Nine | Water & Hydrology

9.1 Introduction

This chapter of the EIAR was prepared to assess the potential significant effects of the Proposed Development on the receiving hydrological and hydrogeological (water) environment on lands at the Former Ford Distribution Site, fronting onto Centre Park Road, Ballintemple, Co. Cork (hereafter referred to as the site and Proposed Development) and sets out any required mitigation measures where appropriate.

The principal objectives of this chapter are to identify:

- Hydrological and hydrogeological characteristics of the receiving environment at the Site.
- Potential effects that the Proposed Development may have on the receiving water environment including "worst case" scenario assessment.
- Potential constraints that the environmental attributes may place on the Proposed Development.
- Required mitigation measures which may be necessary to minimise any adverse effects related to the Proposed Development.
- Evaluate the significance of any residual effects.

This chapter of the EIAR should be read in conjunction with Chapter 4 Population & Human Health, Chapter 8 Land & Soils, Chapter 7 Material Assets: Built Services and Chapter 10 Biodiversity of the EIAR and other information provided by the Applicant pertaining to the design proposals for the Proposed Development.

9.2 Expertise & Qualifications

Gareth Carroll holds a BA in Mathematics and a BEng in Civil, Structural and Environmental Engineering from Trinity College Dublin. Gareth Carroll, a Chartered Environmentalist with the Institute of Environmental Sciences (CEnv) and over 11 years' experience as an Environmental Consultant, has carried out environmental assessments for a range of project types and geological and hydrogeological site settings and been involved in the preparation of EIARs for the following projects:

- Large-Scale Residential Development at Wayside, Enniskerry Road and Glenamuck Road, Kilternan, Dublin 18.
- Large-Scale Residential Development at White Car Park Site (Site A) at Blanchardstown Town Centre, Coolmine, Dublin 15.
- Large-Scale Residential Development at lands located at Haggardstown, Dundalk, Co. Louth.

9.3 Proposed Development

The Proposed Development will include the construction of 176 no. 1, 2 and 3 bed apartment units in 2 no. blocks, 1 no. creche, 1 no. gym, a retail/café space and all associated ancillary development works.

A detailed description of the Proposed Development is provided in Chapter 2 of this EIAR.

9.3.1 Aspects Relevant to this Chapter

The Proposed Development will include the following components which are of particular relevance with respect to hydrology and hydrogeology.

9.3.1.1 Construction Phase

The construction phase of the Proposed Development will include:

- Removal of existing temporary stockpiled material at the site.
- Piling works are proposed as part of future foundation design.
- Excavation of soil and subsoil for the construction of piling caps, drainage and other infrastructure to depths of between 1.6 meters below ground level (mbGL) and 2.2mbGL with the excavation of 2,700m3 of soils. It is anticipated that there will be no requirement for the excavation of bedrock during the construction phase of the Proposed Development.
- Temporary stockpiling of excavated material.
- It is anticipated that all excavated soil will require removal offsite in accordance with all statutory legislation.
- It is estimated that 12,006m3 of remediated contaminated material stockpiled at the site from both the site and the adjoining proposed Strategic Housing Development (ABP Reference: ABP-309059-20) will also require removal offsite in accordance with all statutory legislation.
- The importation of 2,300m3 of aggregate fill materials will be required for the construction of the proposed development (e.g., granular material beneath road pavement, under floor slabs and for drainage and utility bedding / surrounds etc.).
- Landscaping within public / communal open space areas will include a minimum cover of 0.8m of imported clean, suitable for use soil. All imported soil will be sourced from a reputable suppliers in compliance with appropriate statutory consents and verified as being suitable for use within a residential development and for landscaping.
- Localised groundwater dewatering during the construction of utility services may be required to enable 'dry excavation' during excavation.
- Construction of new surface water drainage designed in accordance with the principles and objectives of Sustainable Drainage Systems (SuDS) and the requirements of Cork County Council.
- Construction of new foul drainage and mains water connections in accordance with UE Code of Practice for Wastewater Infrastructure (IW-CDS-5030-03), UE's Code of Practice for Water Infrastructure (IW-CDS-5020-03).

9.3.1.2 Operational Phase

9.3.1.2.1 Proposed Development

The operational phase of the Proposed Development consists of the typical activities in a residential development.

The Proposed Development will comprise the development of residential apartment blocks, a crèche and a retail/café unit and will be covered with hardstanding, with areas of landscaping and public / communal open space. The landscaped areas will include a minimum cover of 0.8m of clean fill and topsoil.

There will be no requirement for bulk storage of petroleum hydrocarbon-based fuels during the Operational Phase of the Proposed Development as the main operating system for heating will be an air source heat pump. Further details are provided in Chapter 7 of this EIAR.

9.3.1.2.2 Proposed Surface Water Drainage

As documented in the Infrastructure Design Report (DBFL Consulting Engineers, 2024. Infrastructure Design Report), the surface water strategy for the Proposed Development area will incorporate SuDS features to reduce run-off and provide biodiversity benefits. Storm water from the contributing catchment will be attenuated and discharged into the adjacent development ((i.e., the Proposed Strategic Housing Development which was granted planning by An Bord Pleanala (ABP Reference: ABP-309059-20) on the 4th of April 2021) which has accounted for the inclusion of runoff from the Proposed Development. Discharge rates from the adjacent development accounting for the overall surface water strategy are in accordance with the Docklands Drainage Strategy in the Cork City Development Plan Objectives 2022-2028, with storm-water storage facilities and SuDS elements incorporated to allow infiltration and reduction of run-off volumes and rates where possible. It is noted that the existing capacity for infiltration and recharge to the aquifer is moderate due to the presence of made ground and the thickness of moderately permeable subsoil at the site of the Proposed Development. Furthermore, variable head permeability testing undertaken within groundwater monitoring wells during recent site investigations (GII, 2024) at the adjoining Strategic Housing Development failed due to tidal influence, indicating limited infiltration potential at the site.

The surface water network will be attenuated at one attenuation location using 'Stormtech' type systems to provide the attenuation storage volume required for a 100-year plus 20% climate change storm event. All surface water discharges will be controlled using a vortex flow control (Hydrobrake or equivalent).

The following attenuation and SuDS measures will be incorporated into the Proposed Development as detailed in the Infrastructure Design Report (DBFL Consulting Engineers, 2024).

- Permeable Paving
- Bypass Separator
- Green Roofs
- Catchpit Manholes
- Bioretention Areas
- Attenuation System

The adjacent SHD scheme (Ref. ABP-309059) is under the same land owner/developer as the site of the Proposed Development and this planning application is part of the wider site in regard to infrastructure. Therefore, design and coordination between the two proposed surface water networks is possible. The SHD surface water drainage strategy has been designed to accommodate the surface water discharge generated by the Proposed Development. Discharge from the subject site into the adjacent SHD drainage network will be restricted to 5l/s via a flow control.

9.3.1.3 Proposed Foul Drainage

As documented in the Infrastructure Design Report (DBFL Consulting Engineers, 2024. Infrastructure Design Report), foul water from the Proposed Development wastewater will be discharged to the existing Uisce Eireann (UE) 225 mm diameter foul sewer on Marquee Road via the proposed foul water network within the adjacent Fords SHD development.

The estimated peak wastewater loading generated by the Proposed Development's Dry Weather Flow is estimated at 20.95l/s with a Design Flow of 4.29l/s.

Construction of new foul drainage connection will be in accordance with UE's Code of Practice for Wastewater Infrastructure (IW-CDS-5030-03), IS EN 752 (2008), IS EN12056: Part 2 and Building Regulations Part H.

The UE Confirmation of Feasibility (CoF) letter dated the 24th of April 2024 (UE Reference: CDS24001285) states that the proposed foul water connection is feasible without infrastructure upgrade by UE.

Foul water from the Proposed Development will be treated in the Carrigrennan (Cork City) WWTP (Licence No. D0033-01) before ultimately discharging to the Lough Mahon transitional waterbody.

9.3.1.4 Proposed Watermain and Supply

It is proposed to supply the site via a 150mm connection to a spur provided as part of the adjacent development ((i.e., the Proposed Strategic Housing Development which was granted planning by An Bord Pleanala (ABP Reference: ABP-309059-20) on the 4th of April 2021).

The UE Confirmation of Feasibility (CoF) letter dated the 24th of April 2024 (UE Reference: CDS24001285) states that the proposed foul water connection to the 400mm diameter ductile iron watermain along Centre Park to the south-east of the site is feasible subject to 150m of water network upgrades will be required to provide additional network capacity. Although the proposed connection is no longer proposed to be directly to the existing 400mm watermain, the proposed connections to the new 200mm watermain from the adjacent development, will ultimately connect to the existing 400mm watermain along Centre Park. The Applicant will ensure that all UE requirements, as outlined in the UE CoF letter (UE Reference: CDS24001285), will be completed prior to any connection from the Proposed Development.

The water main layout and details including valves, hydrants, metering etc. will be in accordance with UE's Code of Practice for Water Infrastructure (IW-CDS-5020-03) and Standard Details for water infrastructure.

9.3.1.5 Flood Risk Management

Proposed mitigation measures to address residual flood risks as presented in the schemes Site Specific Flood Risk Assessment (SSFRA) (DBFL, 2024) (included with the planning application) are summarised below:

- Pluvial flooding from the drainage system related to a pipe blockage or from flood exceedance:
    - The proposed drainage system is to be maintained on a regular basis to reduce the risk of a blockage. Maintenance of SUDS features should also be carried out in accordance with the recommendations of "The SUDS Manual" (CIRIA).
- Pluvial flooding from the Proposed Development's drainage system for storms exceeding the design capacity:
    - The drainage network is designed in accordance with the recommendations of the Cork City Council Development Plan 2022-2028 and provides attenuated outlets and associated storage up to the 1% AEP (1 in 100-year return period event) plus 20% climate change. The drainage network for the site has been designed to ensure that

there is no out of pipe flooding for a 1% AEP or 1 in 100-year return period storm plus 20% climate change.

- At detailed design stage, the location of all dropped kerbs to be fully reviewed to ensure all overland flow paths are not impeded.
    - Defence failure (overtopping or breach of the flood defences by a flood that exceeds the design level of the defence).
    - Advanced warning systems such as alarms or notifications will be implemented where possible for users and workers to be alerted of any imminent flood warnings.
    - All 'highly vulnerable' development will be located above the maximum flood levels.

9.4 Methodology

9.4.1 Relevant Legislation & Guidance

The methodology adopted for the assessment has regard to the relevant guidelines and legislation including:

- Council Directive 2006/118/EEC, 2006. On the protection of groundwater against pollution and deterioration. European Parliament and the Council of European Communities.
- Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy with amendments 2455/2001/EC, 2008/32/EC and 2008/105/EC (Water Framework Directive (WFD)).
- European Commission, 2022. WFD Reporting Guidance 2022. Final Draft V4.
- Local Government, October 2021. No. 1.1977. Local Government (Water Pollution (Amendment) Act.
- Local Government, October 2007. No. 30.2007. Water Services Act 2007.
- Local Government, July 1990. No. 21.1990. Local Government (Water Pollution) (Amendment) Act, 1990.
- Local Government, March 1977. No. 01/1977. Local Government (Water Pollution) Act, 1977 with amendments.
- S.I. No. 722/2003 – European Communities (Water Policy) with amendment S.I. No. 413/2005.
- S.I. No. 489/2011 – European communities (Technical Specifications for the Chemical Analysis and Monitoring of Water Status) Regulations, 2011.
- S.I. No. 122/2010 – European Communities (Assessment and Management of flood Risks) Regulations 2010 including amendment S.I. No. 495/2015.
- S.I. No. 272/2009 - European Communities Environmental Objectives (Surface Waters) Regulations 2009 including amendments S.I. No. 327/2012, S.I. No. 386/2015 and S.I. No. 77/2019.
- S.I. No. 9 of 2010 - European Communities Environmental Objectives (Groundwater) Regulations 2010 including amendments S.I. No. 149 of 2012 and S.I. No. 366 of 201.
- Transport for Ireland (TII), 2009. Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes
- WFD Working Group, 2005. Guidance on the Assessment of the Impact of Groundwater Abstractions (WFD, 2005).
- Cork City Council, 2022. Cork City Development Plan 2022-2028.

Other guidance used in the assessment of potential impacts on the receiving water environment include:

- Construction Industry Research and Information Association, 2001. Control of Water Pollution from Construction Sites (CIRIA – C532).
- Construction Industry Research and Information Association, 2015. Environmental Good Practice on Site Guide (CIRIA – C741).
- Construction Industry Research and Information Association, 2016. Groundwater Control: Design and Practice (CIRIA – C750).
- Department of the Environment, Heritage and Local Government, Environmental Protection Agency and Geological Survey of Ireland, 1999. Groundwater Protection Schemes (DEHLG/EPA/GSI, 1999).
- Department of the Environment, Heritage and Local Government, 2009. Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities (DEHLG, 2009).
- Department of Housing, Planning and Local Government, 2018. Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (DHPLG, 2018).
- Environmental Protection Agency, 2014. Guidance on the Authorisation of Direct Discharges to Groundwater.
- Environmental Protection Agency, 2013. Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites.
- Environmental Protection Agency, 2013. Storage and Transfer of Materials for Scheduled Activities.
- Environmental Protection Agency, May 2022. Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA, 2022).
- IMEA, 2022. A New Perspective on Land and Soil in Environmental Impact Assessment.

9.4.2 Phased Approach

A phased approach was adopted for this EIAR in accordance with Environmental Protection Agency (EPA) and Institute of Geologists of Ireland (IGI) guidelines as set out above and is described in the following sections.

Element 1: An initial assessment and impact determination stage was carried out by Enviroguide to establish the project location, type and scale of the Proposed Development, the baseline conditions, and the type of hydrological and hydrogeological environment, to establish the activities associated with the Proposed Development and to undertake an initial assessment and impact determination. This element of the assessment also included developing the Conceptual Site Model (CSM) for the Site and receiving environment.

This stage of the assessment included a desk top study that comprised a review of published environmental information for the Site. The study area, for the purposes of assessing the baseline conditions for the Water & Hydrology Chapter of this EIAR, extends beyond the Site boundaries and includes a 2.0km radius of the Proposed Development Site and potential receptors outside of this radius that are potentially hydraulically connected with the Site were also considered. The extent of the wider study area was based on the Institute of Geologists of Ireland (IGI) Guidelines (IGI, 2013) that recommends a minimum distance of 2.0km radius from the Site. The purpose of this increased search radius was to ensure that any potential hydrogeological / hydrological connections to sensitive receptors including habitats were identified.

The desk study involved collecting all the relevant data for the Site and surrounding area including published information and details pertaining to the Proposed Development provided by the Applicant and design team.

A site walkover survey to establish the environmental Site setting and baseline conditions at the Proposed Development Site relevant to the hydrological and hydrogeological environment was undertaken by Enviroguide on the 9th of May 2024, the 30th of May 2024, the 26th of June 2024 and the 31st of July 2024.

The Element 1 stage of the assessment was completed by Enviroguide and included the review of the following sources of information:

- Environmental Protection Agency (EPA) webmapping (EPA, 2024).
- Geological Survey Ireland (GSI) Datasets Public Viewer and Groundwater webmapping (GSI, 2024).
- National Parks and Wildlife Services (NPWS) webmapping (NPWS, 2024).
- Ordnance Survey Ireland (OSI) webmapping (OSI, 2024).
- Water Framework Directive Ireland (WFD) webmapping (WFD, 2024).
- Teagasc webmapping (Teagasc, 2024).
- Office of Public Works (OPW) database on historic flooding and the Catchment Flood Risk Assessment and Management (CFRAM) maps (OPW, 2024).
- Information provided by the Applicant pertaining to the design proposals for the Proposed Development.

The findings of site investigation work undertaken at the site were also reviewed by Enviroguide as part of the Element 1 stage of the assessment as summarised below. Copies of the relevant reports are presented in Volume 3: Appendix 8.2, 9.1 and 9.2 of this EIAR.

Site investigations were undertaken by Ground Investigation Ireland (GII, 2024) under the supervision of WSP Ireland Consulting Ltd. (WSP) between October 2023 and January 2024. The results of the site investigation were used to inform the quantitative human health risk assessment (HHRA) (WSP, 2024a; ; refer to Volume 3: Appendix 8.2), the controlled waters risk assessment (CWRA) (WSP, 2024d); refer to Volume 3: Appendix 9.2) and the Materials Management and Remedial Strategy Plan (MMRSP) (WSP, 2024b) for the adjoining proposed Strategic Housing Development which was granted planning permission by An Bord Pleanála (ABP Reference: ABP-309059-20) on the 4th of April 2021. The extent of the assessments included the site of the Proposed Development which is under the same ownership as the proposed development site (i.e., the Applicant). It is noted that the HHRA (WSP, 2024a) included a review of the following historical site investigation reports:

- RSK, 2018. Generic Quantitative Risk Assessment: Marquee Entertainment Venue, Marquee Road, Ballintemple, Cork City, Co. Cork. Dated 29 November 2018 (RSK Reference: 602303 – R01 (00).
- RSK, 2019. Waste Classification Assessment: Marquee Entertainment Venue, Marquee Road, Ballintemple, Cork City, Co. Cork. Dated 24 June 2019 (RSK Reference: 602303 – R02 (00).
- Priority Geotechnical (PGL), 2020. Marina Quarter Geoenvironmental Ground Investigation – Ground Investigation, Factual report. Dated 26 August 2020 (PGL Reference: JMS/Rp/P19189 + attachments).
- Arup, 2020. Technical Note: The Former Ford Distribution Site – Geo-Environmental Summary Note V2. Dated 3 September 2020 (Arup Job Number: 268196-00.

Based on the findings of the HHRA (WSP, 2024a) and the recommendations of the MMRSP (WSP, 2024b) WSP attended the Site between February 2024 and July 2024 to undertake remedial excavations and collect soil validation samples across the base of the excavations of material remaining in-situ post remedial excavation. The Soil Validation Report (WSP, 2024c; further discussed in Chapter 8 of this EIAR) was reviewed as part of the Element 1 to inform remedial works conducted at the site.

During the enabling (earth works) programme for the for the adjoining proposed Strategic Housing Development (ABP Reference: ABP-309059-20), WSP also completed surface water monitoring within open drainage channels along the northern and southern boundaries of the site and at down gradient surface water receptors (i.e., the Atlantic Pond and Lee (Cork) Estuary Lower) over the period August 2023 to September 2024 (i.e., prior to, during and after the enabling works) to monitor for potential impacts during these works. The results of the surface water assessment (WSP, 2024e; refer to Volume 3: Appendix 9.1) were reviewed as part of the Element 1 to inform the baseline hydrological conditions and identify any potential impacts to receiving waters associated with the current site condition.

Element 2: Involves direct and indirect site investigation and studies stage where necessary to refine the CSM developed as part of Element 1 and evaluate the potential impacts associated with the Proposed Development. Based on a review of the information compiled and reviewed in Element 1, it was determined based on professional judgement that in accordance with industry best practice guidance and standards there was adequate site-specific scientific data was available for the assessment. The previous studies reviewed as part of Element 1 provided sufficient information including site investigation data and site-specific information on the hydrological and hydrogeological conditions at the Site to inform the impact assessment of the Proposed Development Site on the receiving hydrological and hydrogeological environment.

Element 3: Evaluation of Mitigation Measures, Residual Impacts and Final Impact Assessment were based on the outcome of the information gathered in Element 1 of the assessment. Mitigation measures to address all identified adverse impacts that were identified in Element 1 of the assessment were considered in relation to the construction phase and operational phase of the Proposed Development. These mitigation measures were then considered in the impact assessment to identify any residual impacts.

Element 4: Completion of the Water and Hydrology Chapter of the EIAR which includes all the associated figures and documents.

9.4.3 Consultation

As per Section 32B of the Planning and Development Act 2000 (as amended), a request for a meeting was sought and subsequently held with Cork City Council on the 7th of August 2024. The relevant findings of the LRD Opinion Report (Cork City Council, 2024) in respect to this chapter of the EIAR are summarised as follows:

'With regard to potential contaminated land it is not clear if works have been carried out and/or if any remediation plan has been approved by the EPA. Due to the former industrial use of the area, there is a possibility that the site is contaminated. The applicant should further consider prior to the commencement of the development, engaging the services of a recognised environmental consultant with experience in the field of contaminated land contamination to:

- *Carry out a site investigation from a land contamination view point.*
- *Carry out a risk assessment.*
- *Recommend remedial measures.*
- *Prepare a report containing all of the above in the standard format.*

The report shall be submitted to the local authority for its written approval before commencement of the development.'

The previous site investigation reports, quantitative risk assessments and remediation validation reports have been reviewed by the author of this report who is an experienced environmental consultant specialising in the field of contaminated land. As discussed in Section 9.4.2, it was determined based on professional judgement that in accordance with industry best practice guidance and standards there was adequate site-specific scientific data to inform the impact assessment of the Proposed Development Site on the receiving hydrological and hydrogeological environment. It is noted that the requirement for additional site investigations and assessment prior to commencement of the construction phase of the Proposed Development may be required and will be determined based on the findings of the impact assessment completed in this chapter of the EIAR.

9.4.4 Description of Importance of the Receiving Environment

The National Roads Authority (NRA) criteria for estimation of the importance of hydrological and hydrogeological features at the site of the Proposed Development during the Environmental Impact Assessment (EIA) stage, as documented by IGI (IGI, 2013) are summarised in Table 9 1 below.

Impacts will vary in quality from negative, to neutral or positive. The effects of impacts will vary in significance on the receiving environment. Effects will also vary in duration. The terminology and methodology used for assessing the 'impact' significance and the corresponding 'effect' throughout this Chapter of the EIAR is described in Table 9 1.

Table 9 1. Criteria for Rating Site Importance of Hydrogeological Features

IMPORTANCE	CRITERIA	TYPICAL EXAMPLE
Extremely High	Attribute has a high quality or value on an international scale.	Groundwater supports river, wetland or surface water body ecosystem protected by European Union (EU) legislation e.g., SAC or SPA status.
Very High	Attribute has a high quality or value on a regional or national scale.	Regionally Important Aquifer with multiple wellfields. Groundwater supports river, wetland, or surface water body. ecosystem protected by national legislation – e.g., NHA status. Regionally important potable water source supplying >2500 homes Inner source protection area for regionally important water source.
High	Attribute has a high quality or value on a local scale.	Regionally Important Aquifer. Groundwater provides large proportion of baseflow to local rivers. Locally important potable water source supplying >1000 homes. Outer source protection area for regionally important water source. Inner source protection area for locally important water source.
Medium	Attribute has a medium quality or value on a local scale.	Locally Important Aquifer Potable water source supplying >50 homes. Outer source protection area for locally important water source.
Low	Attribute has a low quality or value on a local scale.	Poor Bedrock Aquifer. Potable water source supplying <50 homes.

9.4.5 Description and Assessment of Potential Effects

Effects will vary in quality from negative, to neutral or positive. The effects of impacts will vary in significance on the receiving environment. Effects will also vary in duration. The terminology and methodology used for assessing the 'impact' significance and the corresponding 'effect' throughout this Chapter are described in Table 9 2.

Table 9 2. Criteria for Assessment of Potential Impacts Terminology and Methodology

QUALITY OF EFFECTS	DEFINITION
Negative / Adverse	A change which reduces the quality of the environment
Neutral	No effects or effects that are imperceptible, within the normal bounds of variation or within the margin of forecasting error.
Positive	A change that improves the quality of the environment
SIGNIFICANCE OF EFFECTS / IMPACTS	**DEFINITION**
Imperceptible	An effect capable of measurement but without significant consequences.
Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Slight Effects	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate Effects	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
Significant Effects	An effect which, by its character, magnitude, duration, or intensity alters a sensitive aspect of the environment.
Very Significant	An effect which, by its character, magnitude, duration, or intensity significantly alters a sensitive aspect of the environment.
Profound Effects	An effect which obliterates sensitive characteristics.
EXTEND AND CONTEXT OF EFFECTS	**DEFINITION**
Extend	Describe the size of the area, the number of sites and the proportion of a population affected by an effect.
Context	Describe weather the extent, duration or frequency will conform or contrast with established (baseline) conditions

PROBABILITY OF EFFECTS	DEFINITION
Likely Effects	The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.
Unlikely	The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.
DURATION OF EFFECTS / IMPACTS	**DEFINITION**
Momentary	Effects lasting from seconds to minutes
Brief	Effects lasting less than a day
Temporary	Effects lasting one year or less
Short-term	Effects lasting one to seven years
Medium-term	Effects lasting seven to fifteen years
Long-term	Effects lasting fifteen to sixty years
Permanent	Effects lasting over sixty years
Reversible	Effects that can be undone, for example through remediation or restoration
TYPES OF EFFECTS	**DEFINITION**
Indirect Effects	Effects on the environment, which are not a direct result of the project, often produced away from the project site or because of a complex pathway
Cumulative Effects	he addition of many minor or insignificant effects, including effects of other projects, to create larger, more significant effects.
“Do-nothing” Effects	The environment as it would be in the future should the subject project not be carried out
“Worst-case” Effects	The effects arising from a project in the case where mitigation measures substantially fail.
Indeterminable Effects	When the full consequences of a change in the environment cannot be described.
Irreversible Effects	When the character, distinctiveness, diversity or reproductive capacity of an environment is permanently lost
Residual Effects	The degree of environmental change that will occur after the proposed mitigation measures have taken effect.

9.4.6 Difficulties Encountered

There were no difficulties were encountered in the preparation of this Chapter of the EIAR.

9.5 Baseline Environment

9.5.1 Site Setting and Surrounding Land Use

The site of the Proposed Development is located at the Former Ford Distribution Site, fronting onto Centre Park Road, Ballintemple, Co. Cork on the south bank of the River Lee in the South Docks of Cork City. The proposed development falls within the Polder Quarter character area of the City Docks as defined in the Cork City Development Plan 2022-2028. The site is accessed via the existing entrance gate off Central Park Road.

The site is bound to the northwest by Centre Park Road with undeveloped brownfield lands beyond, to the east by marshlands located south of the Lee Rowing Club, to the southeast by Marina Park and SuperValu Pairc Ui Chaoimh (the Cork County GAA ground) and to the southwest the proposed Strategic Housing Development which was granted planning by An Bord Pleanala (ABP Reference: ABP-309059-20) on the 4th of April 2021. Until recently, this land had been used for public events as a circus or an ice skating rink with a temporary car parking facilities. The Marina Promenade connects to the northeast corner of the site and provides a non-motorised/greenway link to the Mahon peninsula.

The Lee (Cork) Estuary Lower transitional waterbody is located approximately 0.035km north of the site.

The location of the Site is presented in Figure 9 1 below below.

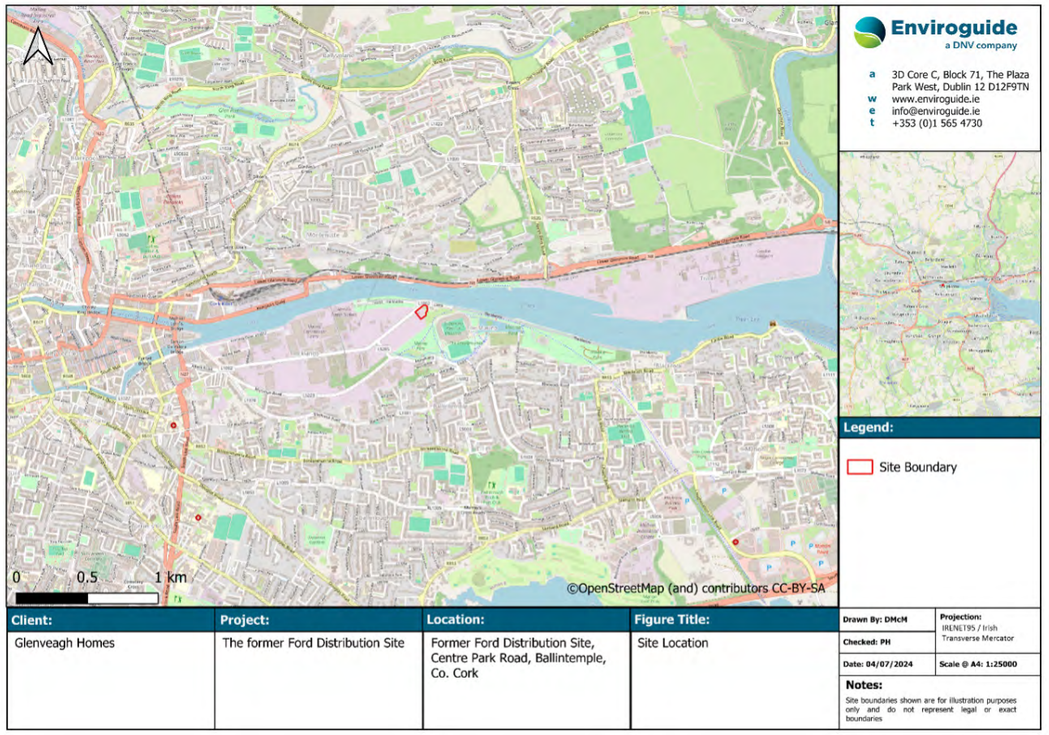

Figure 9 1. Site Location

9.5.2 Current Land Use

The site is approximately 0.84 hectares (ha) and comprises undeveloped brownfield lands which were recently stripped under the previous grant of planning from Cork City Council (CCC) (CCC Ref. 08/32919) which expired on the 12th of October 2024. The existing industrial shed was also demolished as part of these works.

The site was part of the intertidal marshland of the Lee Estuary Lower Estuary until the late 1700s, prior to the construction of The Marina. Subsequent maps show land reclamation across the South Docks including the site.

Based on the findings of the HHRA (WSP, 2024a) and the recommendations of the MMRSP (WSP, 2024b), remedial excavations were undertaken at the Site between February 2024 and July 2024 to remove identified hotspots of contaminated material. The extent of the remedial works spans the Site of the Proposed Development and the adjoining proposed Strategic Housing Development (ABP Reference: ABP-309059-20). During the remedial works (WSP, 2024c), soil (including made ground) to be retained onsite was excavated and combined with a cement-based grout to improve the strength characteristics of the material for use as a stabilised platform ('piling mat'). The piling mat comprised 0.15m of imported aggregates overlying 0.9m of stabilised material.

At the time of writing this Chapter of the EIAR, it was noted that excavated contaminated material, piling material and surplus material not suitable for reuse from both the Site and the adjoining proposed Strategic Housing Development (ABP Reference: ABP-309059-20) was stockpiled at the Site pending removal offsite. It is estimated that there is a total of 12,006m3 of material temporarily stockpiled at the site. All stockpiles are stored on high-grade polythene sheeting to prevent cross-contamination of the soil below and are also covered with high-grade polythene sheeting to prevent rainwater run-off and leaching of potential contaminants from the stockpiled material, as well as the generation of dust.

The site boundaries are generally formed by fencing and scrub vegetation. Along the northwestern boundary and within the curtilage of the site there is an open drainage channel (referred to as the northern channel) which flows to the northeast. A second open drainage channel that flows to northeast (referred to as the southern channel) is located along and inside of the southeastern edge of the site. The northern and southern channels are potentially connected via a culvert.

The existing Site layout is presented in Figure 9 2.

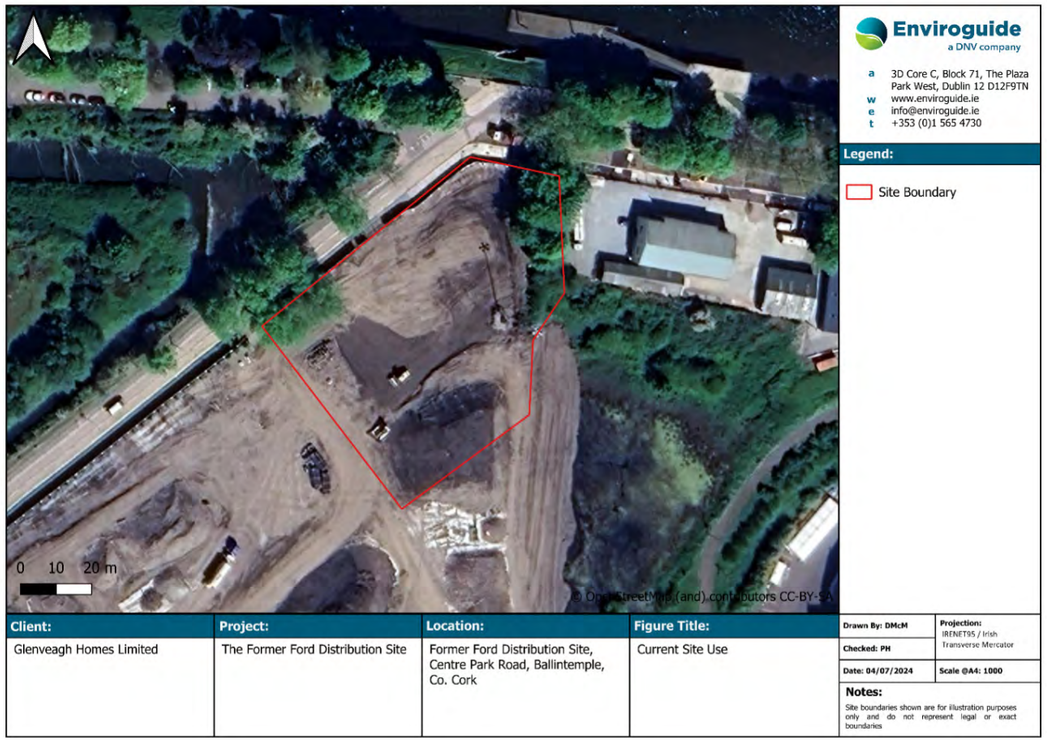

Figure 9 2. Current Site Layout

9.5.3 Topography

The site is situated within the South Docklands, a low-lying area with a surface elevation of approximately 3 meters above Ordnance Datum (mOD). This region lies south of the Lee (Cork) Estuary Lower, a predominantly east-west oriented valley that gently slopes towards the east. While tidal influences are present in the vicinity of the site, the overall drainage of the lower Lee Estuary is eastward.

The Lee valley is characterised by significant topographic changes. To the north, a steep gradient rises to 100mOD within a distance of 0.5km from the Lee (Cork) Estuary Lower. Similarly, a pronounced rise in elevation occurs to the south, where the ground rises from less than 10mOD to 60mOD over a distance of 2.5km.

As documented in the Infrastructure Design Report (DBFL Consulting Engineers, 2024. Infrastructure Design Report) accompanying the planning application documentation, the topography surrounding the site of the Proposed Development is generally sloping from the southwest to the northeast with elevations ranging from 1.8mOD in the southwest and rising to 3.9mOD in the northeast.

9.5.4 Site Investigations

Previous site investigations have been completed at the site of the Proposed Development and the adjoining proposed Strategic Housing Development (ABP Reference: ABP-309059-20) as summarised below.

RSK were engaged to undertake a desk study, site investigation, laboratory analyses of soil, groundwater and surface water samples, gas monitoring and compile the results in a Generic Quantitative Risk Assessment (GQRA) report (RSK, 2018) for the Site. In addition, they completed a Waste Classification Assessment (RSK, 2019) on composite soil samples collected during the site investigation. The site investigation comprised ten (10No.) boreholes, all completed as groundwater monitoring wells, and twenty-five (25No.) trial pits. Boreholes were advanced to a maximum depth of 6.0 mbGL and trial pits to 3.0 mbGL. Sixty-nine (69No.) soil samples and nine (9no.) groundwater samples were scheduled for laboratory analyses, including TPH, PAH, BTEX, MTBE and VOCs.

Arup engaged Priority Geotechnical Ltd. (PGL) to undertake a ground investigation on the Site and write a factual report (PGL, 2020) on the works. Arup then composed an interpretive technical note on the works (Arup, 2020). The works comprised eleven (11No.) trial pits, fourteen (14No.) window sample holes, six (6No.) boreholes, thirteen (13no.) groundwater monitoring installations, surface water sampling, groundwater monitoring, soil sampling and laboratory analyses. Trial pits were excavated to depths between 2.0 and 4.5 mbGL, window sample holes between 0.8 and 8.0 mbGL, and boreholes between 8.0 and 11.5mbGL.

GII (GII, 2024) under the supervision of WSP completed a Site Investigation (SI) at the Marina Quarter Site, in several phases, between October 2023 and January 2024 to address the data gaps identified in the previous site investigations. Eighty-four (84No.) trial pits were undertaken during the works. In addition, fifteen (15No.) boreholes were advanced and installed as groundwater monitoring or gas monitoring wells. Trial pits and boreholes were advanced to between 1.6 and 8.0 mbGL. The site investigation identified several areas of soils impacted with hydrocarbons, Volatile Organic Compounds (VOCs), Asbestos Containing Materials (ACM) and areas of historic disposal of oil cans and drums site of the Proposed Development and the adjoining proposed Strategic Housing Development (ABP Reference: ABP-309059-20). The results of the site investigation were used to inform the quantitative human health risk assessment (HHRA) (WSP, 2024a), the controlled waters risk assessment (CWRA) (WSP, 2024d) and the Materials Management and Remedial Strategy Plan (MMRSP) (WSP, 2024b).

Based on the findings of the site investigation and HHRA (WSP, 2024a), remedial excavations were undertaken to remove the source of this impact and break the pollutant linkage. In addition, remedial excavations were also undertaken within isolated areas where historic deposition of waste oils/solvents were observed during site investigations. The results for soil validation samples collected across the base of the excavations of material remaining in-situ post remedial excavation are presented in the Soil Validation Report (WSP, 2024c).

The site investigation locations are presented in Figure 9 3, Figure 9 4, Figure 9 5, Figure 9 6 and Figure 9 7. It is noted that the site boundary has been superimposed onto the figures below for context.

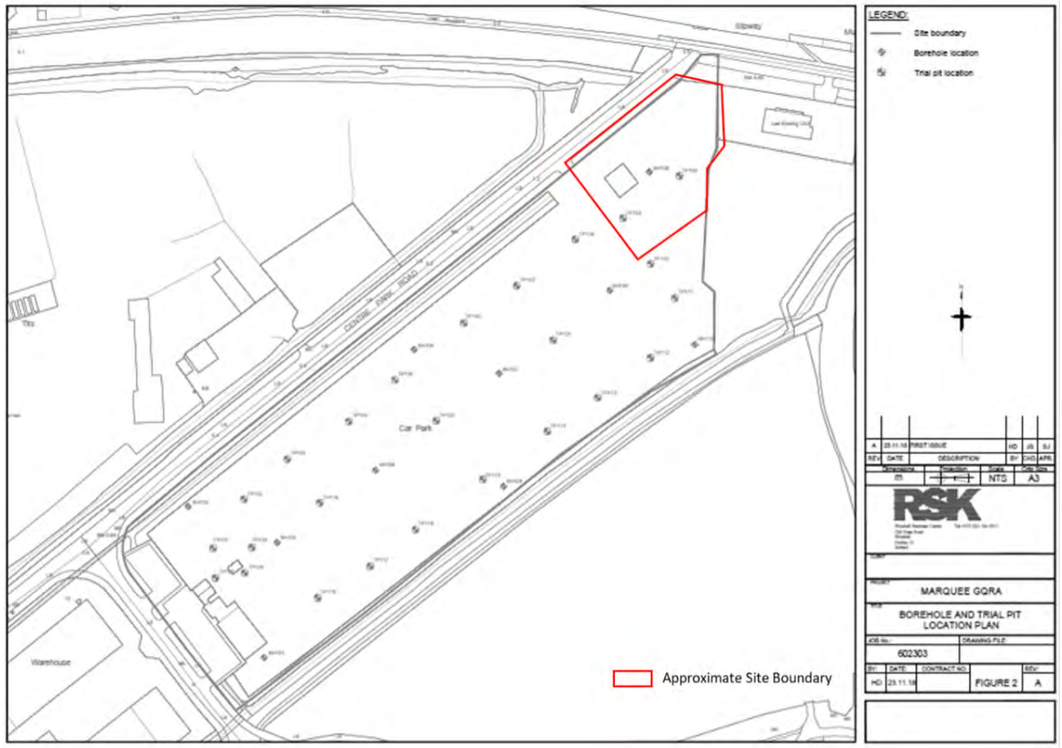

Figure 9 3. Ground Investigation Locations (RSK, 2018)

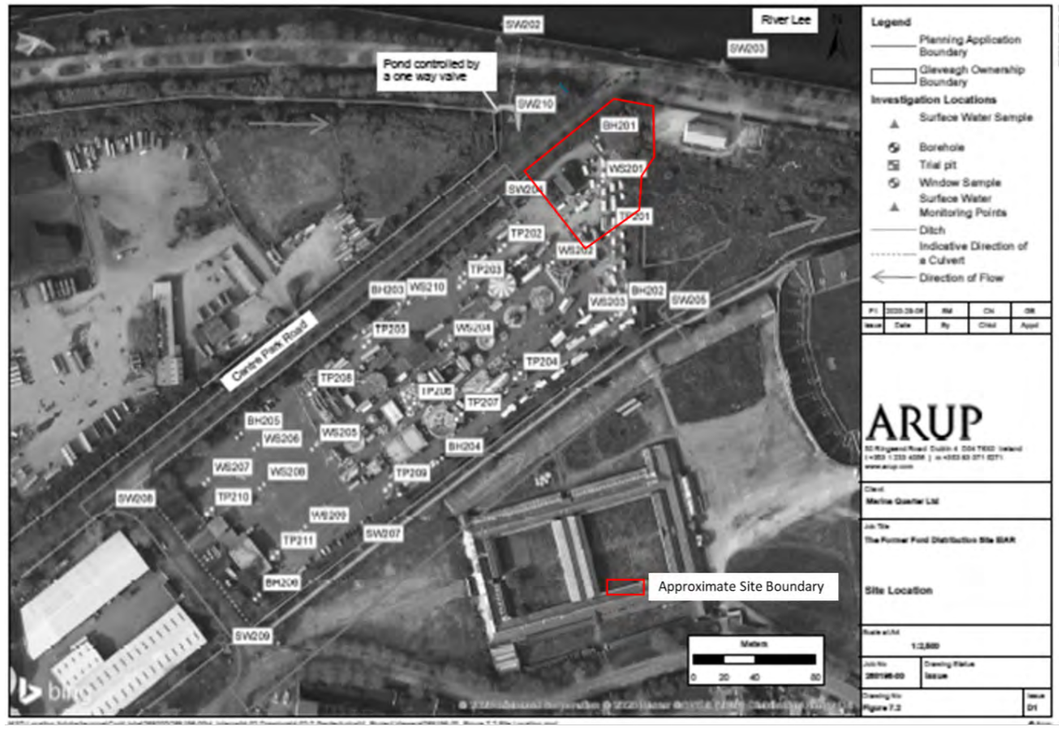

Figure 9 4. Ground Investigation Locations (PGL, 2020)

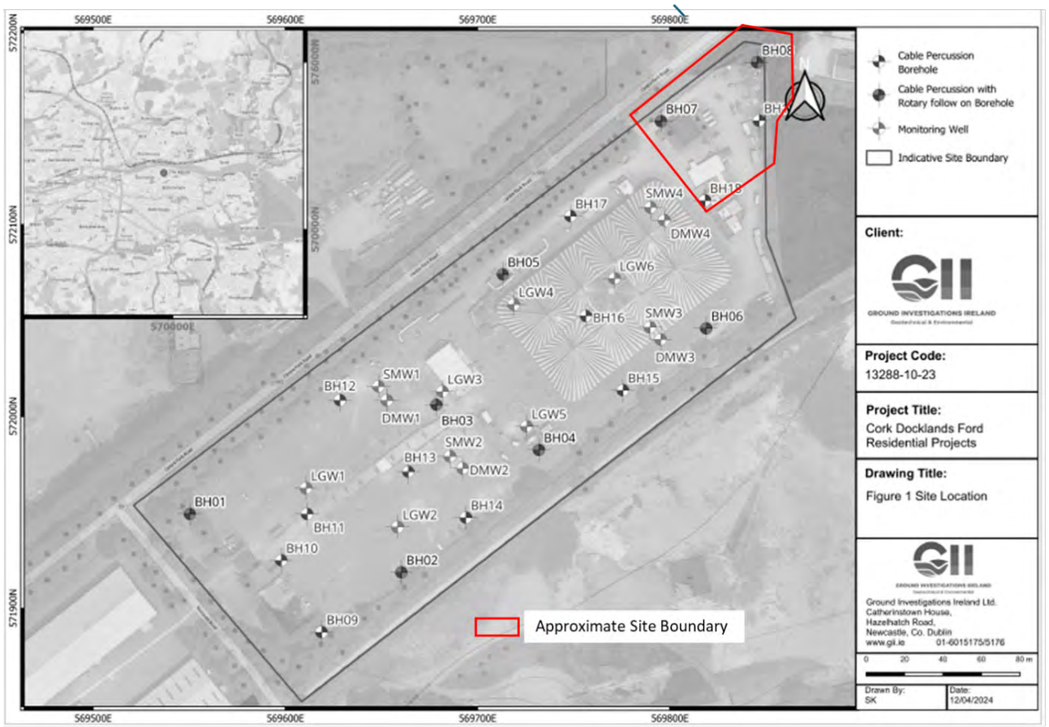

Figure 9 5. Ground Investigation Locations (GII, 2024)

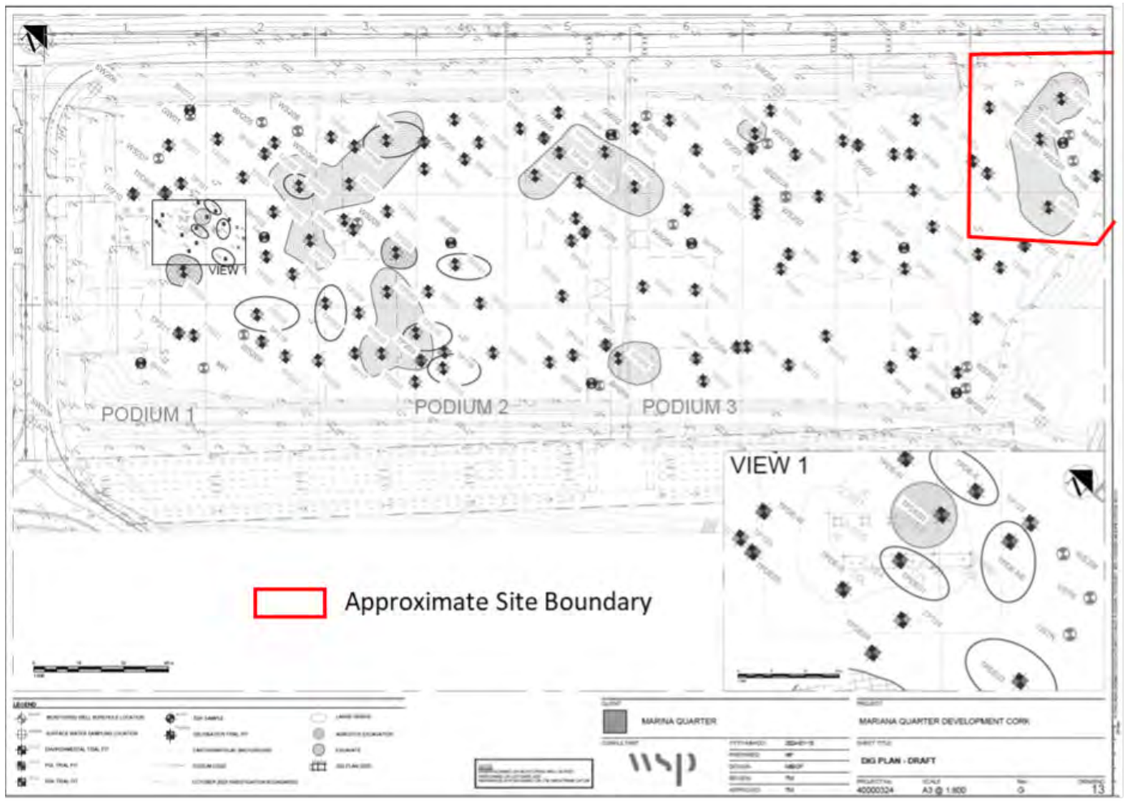

Figure 9 6. Ground Investigation Locations (WSP, 2024a)

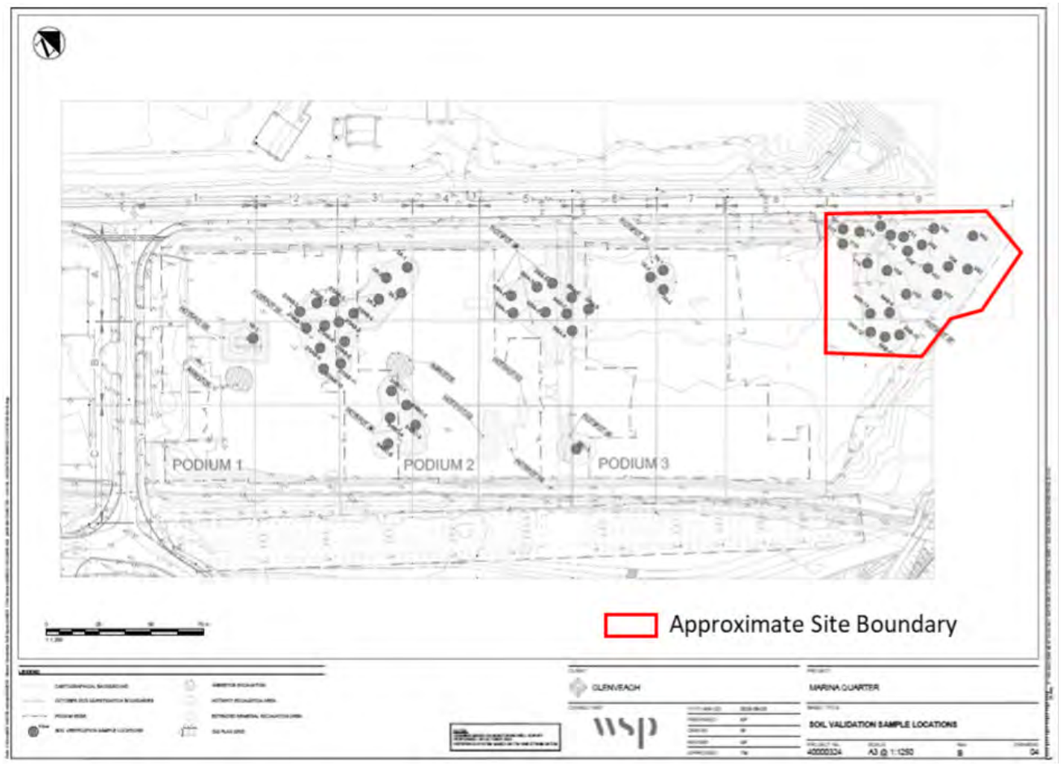

Figure 9 7. Soil Validation Sample Locations (WSP, 2024c)

9.5.4.1 Ground Conditions

The ground conditions encountered during the recent site investigations (GII, 2024 and WSP, 2024a) at the site of the Proposed Development are summarised as follows:

- Made Ground: Grey sandy GRAVEL was encountered from ground level to depths ranging from 0.2mbGL (TP069, TP070, TP072; WSP, 2024a) to 1.5mbGL (BH18, GII, 2024).
- Made Ground: Tarmac was encountered below the grey sandy GRAVEL or from ground level (TP073) to depths ranging from 0.25mbGL (TP069; WSP, 2024a) to 0.6mbGL (TP071; WSP, 2024a).
- Made Ground: Brown to dark grey / black sandy gravelly CLAY /SILT with frequent cobbles and varying inclusions of antipathogenic material (i.e., brick, concrete, plastic, steel) was encountered below the grey sandy GRAVEL and/or tarmac units to depths ranging from 1.0mbGL (BH08; GII, 2024) 4.0mbGL (BH19; GII, 2024).
- Made Ground: Purplish grey slightly clayey sandy Gravel was encountered below the grey sandy GRAVEL and/or tarmac units at BH18 (GII, 2024) to a maximum depth of 3.5mbGL.
- Purplish grey to dark grey slightly sandy slightly gravelly SILT was encountered beneath the Made Ground to depths ranging from 5.0mbGL (BH19; GII, 2024) to 5.9mbGL (BH18; GII,2024).
- Purplish grey to dark reddish purple silty sandy GRAVEL / silty gravelly SAND with varying cobble content and inclusions of clay was encountered below the SILT unit to depths ranging from 18.0mbGL (BH18; GII,2024) to 40.1mbGL (BH08; GII, 2024).

During the remedial works (WSP, 2024c), soil (including made ground) to be retained onsite was excavated and combined with a cement-based grout to improve the strength characteristics of the material for use as a stabilised platform ('piling mat'). The piling mat comprised 0.15m of imported aggregates overlying 0.9m of stabilised material.

Strong hydrocarbon odours were noted on shallow soil at 1.8mbGL at trial pit location TP069 (WSP, 2024a). Furthermore, strong hydrocarbon odours and oil slick were noted on shallow groundwater within the made groundwater at 2.2mbGL at TP070 (WSP, 2024a).

During previous site investigations (PGL, 2020), hydrocarbon odours and staining caused by a non-aqueous liquid were also reported within the Made Ground and underlying SILT at depths ranging from 1.5mbGL to the final extent of investigation at 4.9mbGL (i.e., the base of the contamination was not proven) at borehole location WS201.

9.5.5 Hydrogeology

9.5.5.1 Groundwater Levels

Groundwater was encountered during site investigations (GII, 2024 and WSP, 2024a) at the stie of the Proposed Development at depths ranging from 1.8mbGL (TP069 and TP073; WSP, 2024a) to 5.7mbGL (BH08; GII, 2024).

During previous site investigations (PGL, 2020), groundwater was monitored by hand and using loggers at WS201 and BH201. The groundwater levels at WS201, installed within the Made Ground, were relatively stable at approximately 0.3mOD. In contrast, the groundwater levels at BH201, installed within the underlying gravel aquifer, ranged from approximately -1.1mOD to 0.75mOD over a two-day monitoring period between the 26th and 28th of November 2019. A similar trend was observed over the longer monitoring period from November to December 2019, indicating continuity with the Lee Estuary. Water flow in the made ground was inferred to be toward the southwest or the open drainage channels along the southeast and northwest site boundaries. However, the volumes of discharge into the open drainage channels are not likely to be significant (ARUP, 2020). Meanwhile, water flow in the underlying gravel aquifer varied due to tidal influence, flowing north during low tide and reversing during high tide. Overall, the net flow is expected to be toward the Lee Estuary, located 0.035km north of the site. The silt stratum was considered to act as a partial aquiclude, limiting the movement of water between the made ground and the gravel aquifer (Arup, 2020).

9.5.5.2 Groundwater Body and Flow Regimes

The bedrock aquifer beneath the site is within the Lee Valley Gravels Groundwater Body (GWB) (EU Code: IE_EA_G_094) that covers some 25.5km2 and occupies the Lee River Valley from Crookstown to Ballincollig Co. Cork (GSI, 2024).

Regionally, the gravel aquifer is predominantly recharged from areas upgradient and west of Cork City. It is also likely that recharge occurs locally from the Lee River during tidal fluctuations.

The limestone aquifer is unlikely to receive any direct recharge from the site due to its depth (40m to 60m below ground level). Furthermore, given the site's proximity to the discharge point of the Lee Estuary Lower into the sea, it is more likely to be an area of groundwater discharge rather than recharge.

Locally, groundwater flow within the vicinity of the site is likely to be to the north and northeast towards the Lee Estuary.

9.5.5.3 Aquifer Classification

The gravel aquifer beneath the site and surrounding areas is mapped by the GSI (GSI, 2024) as a Locally Important Gravel Aquifer. Locally important (L) aquifers are capable of 'good' well yields 100-400 m3/d Groundwater flows through the pore spaces between sand/gravel grains. The aquifer exhibits relatively homogeneous hydraulic properties, enabling effective groundwater storage and transmission. Groundwater flow velocities within the aquifer are generally low due to gentle hydraulic gradients. A pronounced interaction exists between the aquifer and overlying surface water bodies, with groundwater discharge or recharge contingent upon the relative water levels.

The underlying bedrock aquifer within the Cuskinny Member beneath the site is classified by the GSI (GSI, 2024) as a Locally Important Aquifer which is moderately productive only in local zones (LI).

The gravel and bedrock aquifers mapped by the GSI (GSI, 2024) beneath the site are presented in Figure 9 8 below.

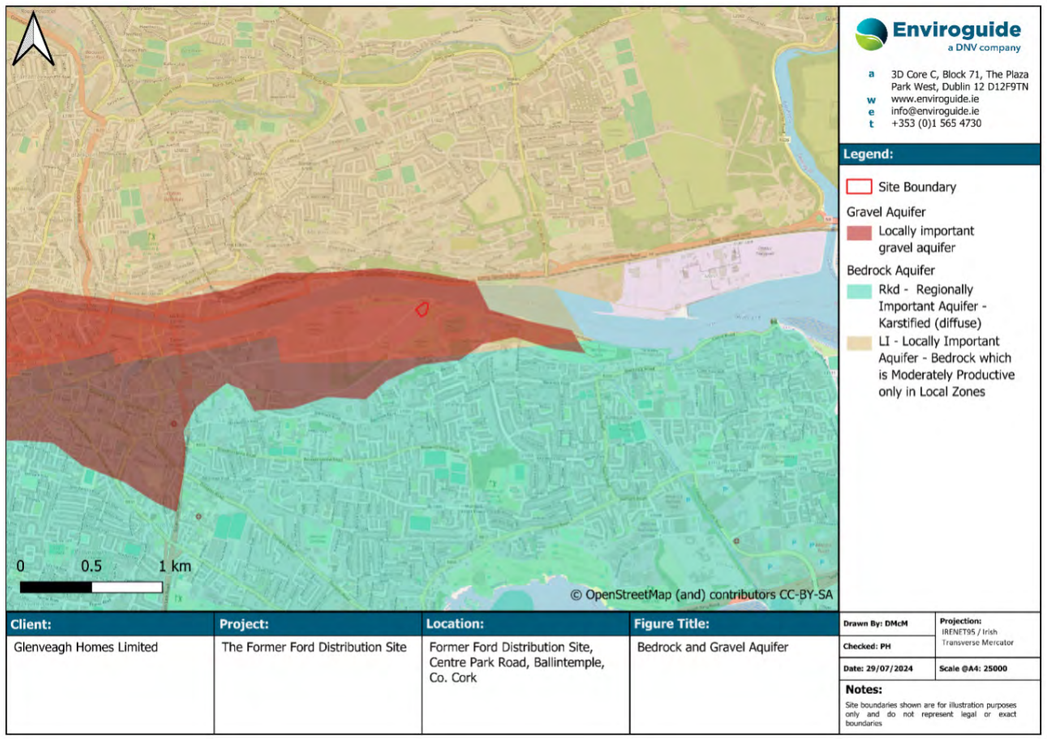

Figure 9 8. Aquifer Classification

9.5.5.4 Groundwater Vulnerability

The vulnerability categories, and methods for determination, are presented in the Groundwater Protection Schemes publication (DEHLG/EPA/GSI, 1999), and summarised in Table 9 3. The publications state that 'as all groundwater is hydrologically connected to the land surface, it is the effectiveness of this connection that determines the relative vulnerability to contamination'. Groundwater that readily and quickly receives water (and contaminants) from the land surface is considered to be more vulnerable than groundwater that receives water (and contaminants) more slowly and in lower quantities. The travel time, attenuation capacity and quantity of contaminants are a function of the following natural geological and hydrogeological attributes of any area.

Table 9 3. Vulnerability Mapping Criteria (DEHLG/EPA/GSO, 1999)

LIKELY SIGNIFICANT EFFECT	HYDROGEOLOGICAL REQUIREMENTS				
	DIFFUSE RECHARGE			POINT RECHARGE	UNSATURATED ZONE
	SUBSOIL PERMEABILITY AND TYPE				
	HIGH PERMEABILITY (SAND AND GRAVEL)	MODERATE PERMEABILITY (SANDY SUBSOIL)	LOW PERMEABILITY (CLAYEY SUBSOIL, CLAY, PEAT)	(SWALLOW HOLES, LOSING STREAMS)	(SAND AND GRAVEL AQUIFERS ONLY)
0-3m	Extreme	Extreme	Extreme	Extreme (30m radius)	Extreme
3-5m	High	High	High	N/A	High
5-10m	High	High	Moderate	N/A	High
>10m	High	Moderate	Low	N/A	High

Notes: (i) N/A = not applicable (ii) Permeability classifications relate to the material characteristics as described by the subsoil description and classification method.

The GSI has assigned a groundwater vulnerability rating of 'Moderate' (M) for the groundwater beneath the site (GSI, 2024). The subsoil permeability classification beneath the site is 'Moderate' (GSI, 2024). Based on the 'Moderate' permeability and 'Moderate' vulnerability rating, the depth to bedrock beneath the site is anticipated to be greater than 10.0 meters below ground level (mbGL).

Bedrock was not encountered during previous site investigations onsite, which extended to maximum depth of 59.6mbGL (BH02; GII, 2024). Therefore, the groundwater vulnerability can be considered to be 'Moderate' locally beneath the site.

The groundwater vulnerability mapping is presented in Figure 9 9 below.

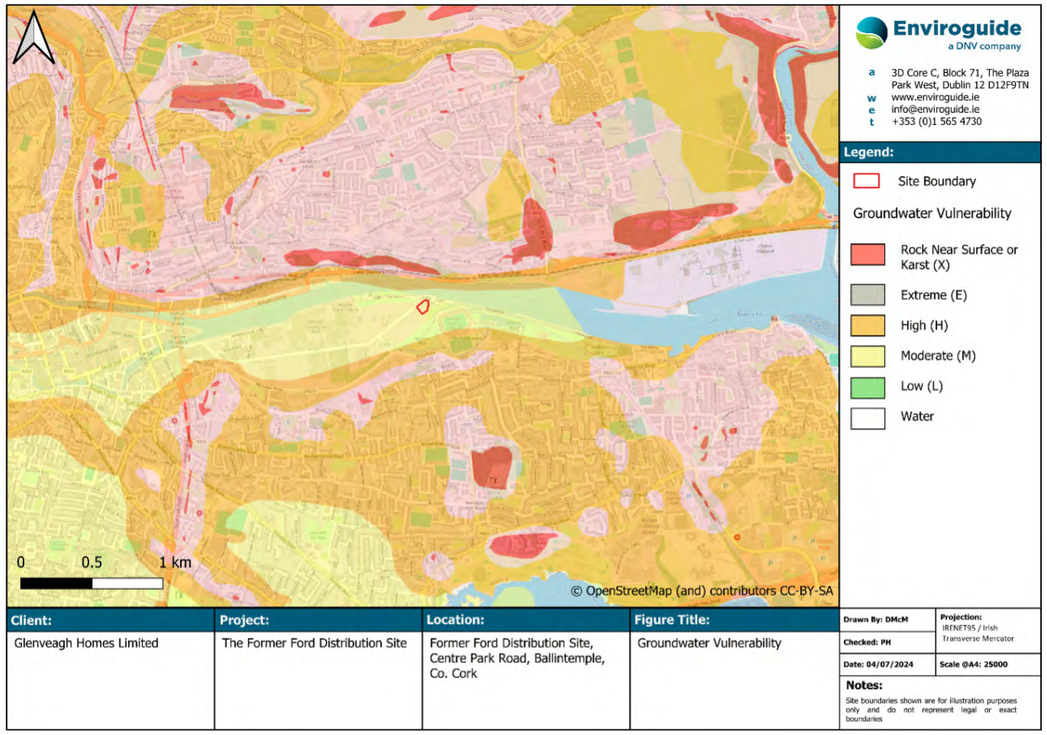

Figure 9 9. Groundwater Vulnerability

9.5.6 Hydrology

9.5.6.1 Catchment and Surface Water Features

The site has been mapped by the EPA (EPA, 2024) to be within the Lee, Cork Harbour and Youghal Bay WFD Catchment (I.D.: 19), the Glasheen [Cork City]_SC_010 Sub-Catchment, (Sub-Catchment ID: 19_17) and the Glasheen (Cork City)_010 WFD River Sub Basin (EU Code: IE_SW_19G040700).

The Lee, Cork Harbour and Youghal Bay catchment encompasses a 2,153km2 area drained by the River Lee and its tributaries. This region extends from the headwaters of the River Lee to the tidal waters of Cork Harbour and Youghal Bay, bounded by Knockaverry and Templebreedy Battery in County Cork. Cork City is the largest urban centre within this catchment. The Lee is subject to a series of significant modifications due to impoundment for hydroelectric schemes to the west of the Proposed Development (upstream).

The closest surface water feature is recorded on the EPA database (EPA, 2024) as the Lee (Cork) Estuary Lower transitional waterbody (EU Code: IE_SW_060_0900) located approximately 0.035km north of the site. The Lee (Cork) Estuary Lower transitional waterbody discharges to the Lough Mahon transitional waterbody (EU Code: IE_SW_060_0750), approximately 2.7km east of the site. The Lough Mahon transitional waterbody ultimately discharges to Cork Harbour (EU Code: IE_SW_060_0000), Outer Cork Harbour (EU Code: IE_SW_050_0000) and the Western Celtic Sea (EU Code: IE_SW_010_0000).

Other waterbodies mapped by the EPA (EPA, 2024) within a 2km radius of the site include:

- The Lee (Cork) Estuary Upper (Transitional Waterbody Code: IE_SW_060_0950) is located approximately 1.7km west of the site. It discharges to the Lee (Cork) Estuary Lower upstream of the site.
- The Bride (CorkCity)_020 (River Waterbody Code: IE_SW_19B140300) is located approximately 1.48km north of the site at its closest point. The Bride Stream discharges to the Lee (Cork) Estuary Upper upstream of the site.

The Atlantic Pond, though not characterised by the EPA (EPA, 2024) as a discrete waterbody, is a notable manmade lake located approximately 0.4km east of the site and receives surface water drainage from a portion of the South Docks prior to discharging to the Lee Estuary.

The surface water features mapped by the EPA (EPA, 2024) within a 2km radius of the site are presented in Figure 9 10.

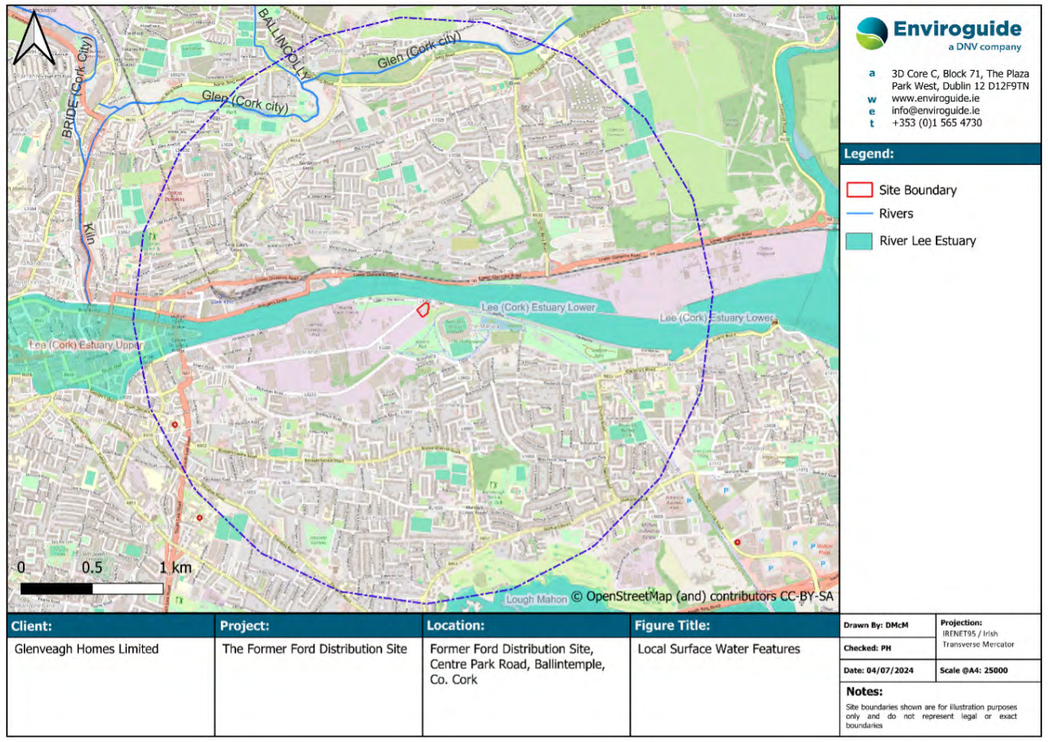

Figure 9 10: Surface Water Features within a 2km Radius of the Site

9.5.6.2 Existing Surface / Storm Drainage

The existing storm sewer network in the South Docks has developed over time since the area was reclaimed from the River Lee. It consists of a series of pipes, culverts, open channels and the Atlantic Pond. The site of the Proposed Development and surrounding lands have historically drained to the adjacent open channels. Centre Park Road is drained via road gulleys into the existing open channel network. The Atlantic Pond receives surface water drainage from a portion of the South Docks prior to discharging to the Lee Estuary. Along the northwest boundary and within the curtilage of the site there is an open drainage channel (referred to as the northern channel) which flows to the northeast. A second open drainage channel that flows to northeast (referred to as the southern channel) is located along and inside of the southeastern edge of the site. Both channels collect water from elsewhere in the South Docklands to the southwest of the site. The southern channel flows directly to the Atlantic Pond (around 0.4km east of the site), which in turn outfalls to the Lee Estuary Lower. The northern channel flows northeast and is connected to another open channel ("The Tedcastles Channel") located on the northern side of Centre Park Road via a culvert and non-return valve under Centre Park Road "The Centre Park Road Culvert". The Tedcastles channel discharges to the Lee Estuary Lower via a pond in the Tedcastles site. It is noted that in lower flow the northern channel flows south to Marquee Road and follows the southern channel that leads to the Atlantic Pond.

9.5.6.3 Existing Foul Drainage

A review of the UE records shows that there is no existing foul network adjacent to the site boundary. The nearest connection point would be a foul sewer running along Marquee Road to the southwest. Foul water from lands in the vicinity of the development discharge to the Carrigrennan (Cork City) WWTP (Discharge License No. D0033-01).

9.5.7 Flood Risk

An SSFRA was developed for the site and Proposed Development (DBFL, 2024) and accompanies the planning application. It assessed the potential flood risk associated with fluvial, groundwater, coastal and pluvial flooding. The SSFRA (DBFL, 2024) concludes the following:

- The site is located within Flood Zone 'A' for tidal flood risk, assuming no defence in place. However, it is protected to a high standard by the existing polder defences along the quayside. Cork City Council intend to raise this polder defence in the future to ensure the existing standard of protection is maintained or increased. Accordingly, it will be the primary flood protection measure for the Docklands.
- There is a possible coastal flood risk, however, this risk is mitigated by utilising the ground floor areas for less vulnerable development such as under-croft car parking, landscaping, and recreational areas. All highly vulnerable development (i.e. residential apartments and crèche) will be located at a podium level higher than the predicted future coastal flood level of 3.8m (comprising of 2.99m 1:200 CFRAMS coastal flood level + 500mm mean sea level rise + 300mm freeboard allowance).
- The Proposed Development will not increase run-off rate when compared with the existing site and satisfies the requirement of the CCC Development Plan 2022-2028 SFRA to reduce flooding and improve water quality.
- SUDS features are incorporated into the drainage design for the scheme where feasible to manage surface water runoff from the development in accordance with the recommendations of the Cork City Development Plan 2022-2028.
- This SSFRA has demonstrated that the risks relating to flooding to the Proposed Development can be managed and mitigated to acceptable levels and therefore comply with DoEHLG / OPW and Cork City Council planning guidance.

9.5.8 Water Supply and Drinking Water Source Protection

A review of the GSI wells and springs database (GSI, 2023) has identified forty-two (42No.) sources within a 2km radius of the Site (refer to Table 9 4 and Figure 9 11).

Table 9 4. GSI Springs and Wells within 2km of Site (GSI, 2024)

GSI NAME	TYPE	DRILL DATE	DEPTH (MBGL)	TOWNLAND	SOURCE USE	YIELD CLASS
1707SWW085	Borehole	30/12/1899	Unknown	BALLYPHILIP	Public supply (Co Co)	Poor
1707SWW110	Borehole	01/11/1998	82.5	MAYFIELD	Agri & domestic use	Unknown
1707SWW115	Dug well	01/12/1995	11.2	LOTA BEG	Unknown	Unknown
1707SWW186	Borehole	22/09/1999	8.8	LOTA BEG	Unknown	Unknown
1707SWW187	Borehole	22/09/1999	9	LOTA BEG	Unknown	Unknown
1407SEW074	Borehole	01/09/1998	11	BALLINTEMPLE	Unknown	Unknown
1407SEW075	Borehole	01/09/1998	7.9	BALLINTEMPLE	Unknown	Unknown
1407SEW093	Borehole	01/03/1998	14.8	CORK CITY	Industrial use	Moderate
1407SEW095	Borehole	01/09/1998	13	BALLINTEMPLE	Unknown	Unknown
1407SEW096	Borehole	01/09/1998	10	BALLINTEMPLE	Unknown	Unknown
1407SEW097	Borehole	01/09/1998	11.2	BALLINTEMPLE	Unknown	Unknown
1407SEW098	Borehole	01/04/1998	10.5	BALLINTEMPLE	Unknown	Unknown
1407SEW185	Borehole	14/02/2002	3	MONAHANS ROAD	Unknown	Unknown
1407SEW186	Borehole	14/02/2002	5	MONAHANS ROAD	Unknown	v
1407SEW187	Borehole	14/02/2002	3	MONAHANS ROAD	Unknown	Unknown
1407SEW188	Borehole	14/02/2002	3	MONAHANS ROAD	Unknown	Unknown
1407SEW189	Borehole	14/02/2002	3	MONAHANS ROAD	Unknown	Unknown

There is no existing water supply at the Site. As documented in the Infrastructure Design report (DBFL, 2024), the site is well served by the existing adjacent watermain network. UE records show the presence of both a 400mm and a 100mm ductile iron watermain located along Centre Park Road and the Marina. Additionally, two 200mm connections from the adjacent development are proposed to serve the site. It is proposed to serve the site via a connection to the 200mm watermain connection from the adjacent Strategic Housing Development which was granted planning by An Bord Pleanala (ABP Reference: ABP-309059-20) on the 4th of April 2021.

There are no groundwater source protection areas (SPAs) identified by the GSI (GSI, 2024) at the site or within a 2km radius of the site.

There are no surface water drinking water sources, under Article 7 of the Water Framework Directive, identified by the EPA (EPA, 2023) at the Site or within a 2km radius of the Site.

The location of the groundwater wells springs and SPAs are presented in Figure 9 11.

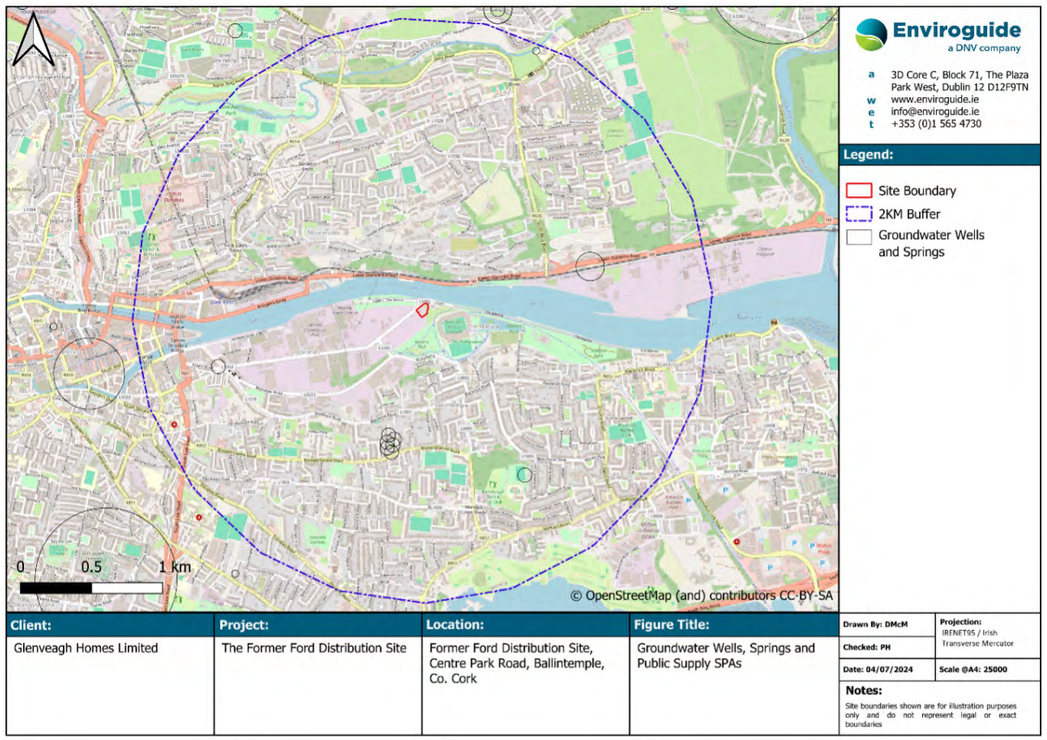

Figure 9 11. Groundwater Wells, Springs and Public Supply SPA's

There are no Groundwater Source Protection Areas (SPAs) mapped by the GSI (GSI, 2024) within a 2km radius of the site. The closest Groundwater SPAs is the Carraignabhfear public water scheme located 10.2km northwest of the site.

The Lee River upstream of the Thomas Davis bridge (Lee_090), the Glashaboy ((Lough Mahon)_030) and the Tibbotstown_010) are the closest watercourses mapped by the EPA (EPA, 2024) as a surface water drinking water source under Article 7 of the Water Framework Directive (WFD). These watercourses are seen as upstream of the Proposed Development and therefore are not hydraulicly linked. There are no surface water drinking sources identified by the EPA (EPA, 2024) within a 2km radius of the site.

9.5.9 Water Quality Data

9.5.9.1 Published Regional Surface Water Quality

The EPA surface water quality monitoring database (EPA, 2024) was consulted. A summary of the most recent published EPA water quality monitoring data (EPA, 2024) for waterbodies which have a potential hydraulic connection to the site is presented in Table 9 5 below.

Table 9 5. Surface Water Quality

WATERBODY	EPA WFD Parameter Quality & Trend Analysis				
	PARAMETER	PERIOD	INDICATIVE QUALITY	TREND	BASELINE CONC. (2017)
Lee (Cork) Estuary Lower (IE_SW_060_0900)	Chlorophyll	Summer	High	Downwards	4.4mg/m3
		Winter	High	Downwards	1.1mg/m3
	Dissolved Inorganic Nitrogen (as N)	Summer	Good	Downwards	0.0490mg/l
		Winter	Good	Downwards	1.033mg/l
	ortho-Phosphate (as P)- unspecified	Summer	High	Downwards	20.5ug/l
		Winter	Good	Downwards	35.0ug/l
Lough Mahon (IE_SW_060_0750)	Chlorophyll	Summer	High	Upwards	7.05mg/m3
		Winter	High	Downwards	1.20mg/m3
	Dissolved Inorganic Nitrogen (as N)	Summer	Good	Downwards	0.324mg/l
		Winter	Moderate	Downwards	1.060mg/l
	ortho-Phosphate (as P)- unspecified	Summer	High	Downwards	12.00ug/l
		Winter	Good	Downwards	31.50ug/l

WATERBODY	EPA WFD Parameter Quality & Trend Analysis				
	PARAMETER	PERIOD	INDICATIVE QUALITY	TREND	BASELINE CONC. (2017)
Cork Harbour (IE_SW_060_0000)	Chlorophyll	Summer	High	Downwards	3.25mg/m3
		Winter	High	Downwards	0.50mg/m3
	Dissolved Inorganic Nitrogen (as N)	Summer	High	Downwards	0.073mg/l
		Winter	Good	Downwards	0.394mg/l
	ortho-Phosphate (as P)- unspecified	Summer	High	Downwards	2.50ug/l
		Winter	High	Downwards	24.00ug/l
Outer Cork Harbour (IE_SW_050_0000)	Chlorophyll	Summer	High	Downwards	1.8mg/m3
		Winter	High	Downwards	0.5mg/m3
	Dissolved Inorganic Nitrogen (as N)	Summer	High	Downwards	0.034mg/l
		Winter	Good	Downwards	0.204mg/l
	ortho-Phosphate (as P)- unspecified	Summer	High	Downwards	2.50ug/l
		Winter	High	Downwards	16.00ug/l
Western Celtic Sea (IE_SW_010_0000)	(No Chemical Monitoring data available)				

The status of individual estuarine and coastal water bodies is assessed using the EPA's Trophic Status Assessment Scheme (TSAS). This assessment is required for the Urban Waste Water Treatment Directive and Nitrates Directive. The scheme compares the compliance of individual parameters against a set of criteria indicative of trophic state (Table 9 6). These criteria fall into three different categories which broadly capture the cause-effect relationship of the eutrophication process, namely nutrient enrichment, accelerated plant growth, and disturbance to the level of dissolved oxygen normally present.

Table 9 6. Trophic Status Assessment Scheme (EPA, 2022)

WATERBODY	TROPHIC STATUS	POLLUTION STATUS	CONDITION
Lee (Cork) Estuary Lower	**Intermediate**	Unpolluted	Intermediate status water bodies are those which breach one or two of the criteria.
Lough Mahon	Eutrophic	Polluted	Eutrophic water bodies are those in which criteria in each of the categories are breached, i.e., where elevated nutrient concentrations, accelerated growth of plants and undesirable water quality disturbance occur simultaneously.

9.5.9.2 Site Investigation Results – Surface Water Quality

Surface water sampling and analysis has been undertaken at eight (8No.) samples locations (SW202, SW203, SW204, SW205, SW207, SW208, SW209 and SW2010) as part of previous ground investigation on waterbodies upstream and downstream of the site by Priority Geotechnical Limited (PGL) between November 2019 to January 2020. The surface water sample locations were in the northern and southern open drainage channels (refer to Section 9.5.6.2), the Tedcastles pond, the Lee Lower Estuary upstream of the Tedcastles pond discharge and in the Lee Lower Estuary adjacent to the site. The surface water sample locations are presented in Figure 9 12.

The water quality data collected during the 2019 Ground Investigation has been compared to the relevant environmental quality standards (EQS) including the surface water limits from 2009 Surface Water Regulations (as amended).

Monitoring values that exceeded the regulations are described below, however it should be noted that all exceedances, bar four occurrences of arsenic, also occur in sampling locations upstream of the development, therefore, the source of pollution maybe upstream, in the South Dockland area.

Specific Pollutants:

- Elevated levels of chlorinated hydrocarbons were found in both upstream (sample SW209) and downstream (samples SW210 and SW205) surface water samples, indicating a likely pollution source outside the proposed development site.
- Hydrocarbon concentrations exceeded limits in one upstream surface water sample (SW209) but not in downstream samples or the Lee Estuary Lower.
- Ammonia, nitrate, zinc, and chromium trivalent levels exceeded limits in the open drain surface water samples, both upstream and downstream of the site.

It is noted that detectable levels of chlorinated hydrocarbons were reported in shallow soils at site investigation location WS201 (further discussed in Chapter 8 of this EIAR). Therefore, the elevated levels of chlorinated hydrocarbons in the open drainage channel downstream of the site may be attributable to the impacted made ground soils beneath the site via migration of contaminants in shallow groundwater.

Surface water sampling and analysis were undertaken by WSP before, during, and after the enabling (earthworks) programme for the adjoining proposed Strategic Housing Development (ABP Reference: ABP-309059-20) (WSP, 2024e). Samples were collected from open drainage channels along the northern and southern site boundaries and at downgradient

surface water receptors (i.e., the Atlantic Pond and Lee (Cork) Estuary Lower) from August 2023 to September 2024. The surface water sample locations are presented in Figure 9 12. The results of the surface water assessment are summarised below.

- Upgradient Open Drainage Channel Locations:
    - SW206: Slight exceedance of EQS for Zinc and annual average EQS for PAHs (Fluoranthene and Benzo(a) pyrene). Detectable concentrations of VOCs were also reported. The concentrations of cis-1,2-Dichloroethene (cDCE) (91.9 ug/l) and Vinyl Chloride (VC) (23.7 ug/l) increased in April 2024 but were not detected in the July or September 2024 monitoring rounds. These detections may be related to groundworks disturbance during enabling works. A 'slight sheen' was observed at SW206 on 15 December 2024.
    - SW209: Slight exceedance of annual average EQS for Fluoranthene. Detectable concentrations of VOCs were also reported
    - It is noted that SW206 and SW209 receive shallow groundwater from the site and surface water from the South Docklands to the southwest of the site.
- • Open Drainage Channel Locations within the Site Boundary:
    - SW204 & SW205: No exceedances of applicable EQS, but detectable concentrations of VOCs were reported.
- Downgradient Open Drainage Channel Locations and the Atlantic Pond:
    - SW301 & SW302: Exceedance of annual average EQS for PAHs (Fluoranthene). Detectable concentrations of chloroform were below the applicable EQS. Trace concentrations of cDCE and chlorobenzene were noted. Generally, COPC concentrations in SW301 were slightly higher than in SW302. No detections of cDCE and chlorobenzene were found in the July and September 2024 monitoring rounds, indicating possible water quality improvement due to remedial excavations (WSP, 2024e).
    - SW303: No exceedances of applicable EQS. Occasional trace detections of chloroform, slightly above the laboratory detection limit. Chloroform was not detected in soil samples, except for a single trace detection. Higher chloroform concentrations in SW301 (upgradient) compared to SW302 and SW303 suggest it is not sourced from the proposed development sites (WSP, 2024e).
- Lee (Cork) Estuary Lower Locations:
    - SW201, SW202, SW203, SW304: No reported exceedances of applicable EQS.
    - SW202: Detected total TPH at 1,180 ug/l on 17 July 2024, considered spurious as TPH was not detected at other locations on the same date. A 'sheen' was observed at SW202 on 10 September 2024.

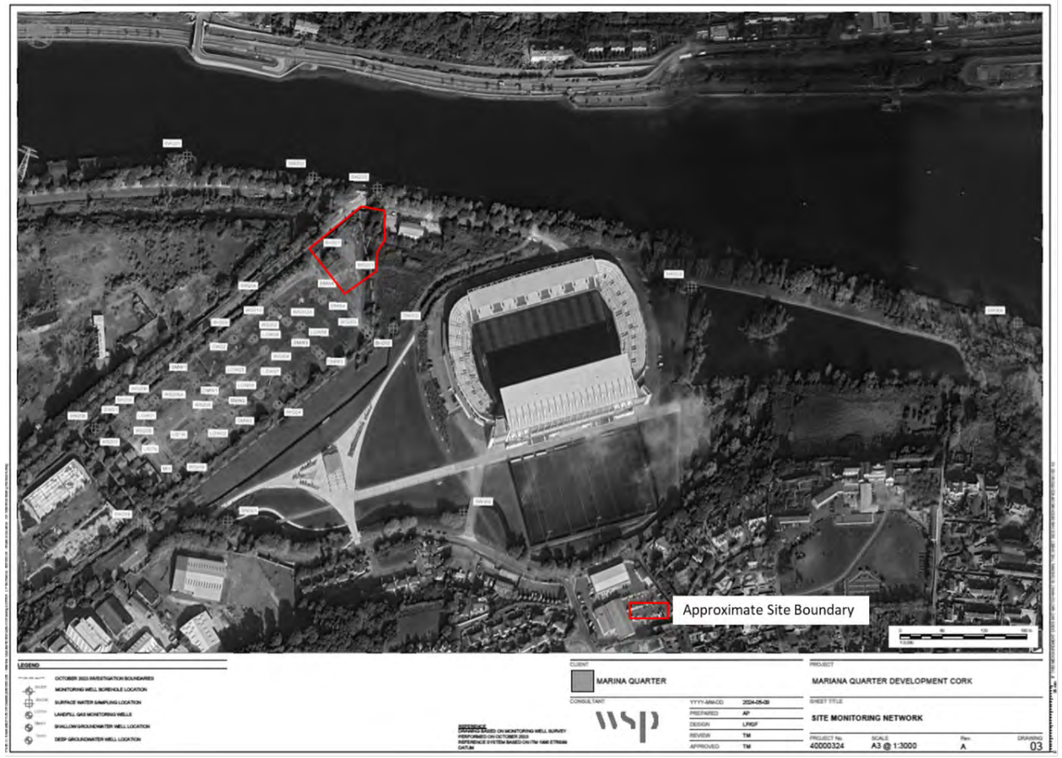

Figure 9 12. Surface Water Sample Locations (WSP, 2024e)

9.5.9.3 Published Regional Groundwater Quality

The EPA (EPA, 2024) groundwater monitoring data was reviewed and there are no groundwater quality monitoring stations within a 2km radius of the site or that are hydraulically connected to the site.

It is likely that the groundwater quality beneath the site is significantly influenced by the water quality in the Lee Estuary Lower, which is expected to be saline or brackish near the site.

9.5.9.4 Site Investigation Results – Groundwater Quality

The results of the RSK site investigation (RSK, 2018) discussed in Section 9.5.4 are summarised as follows:

- Vinyl chloride concentrations exceeding human health screening criteria in three (3No.) monitoring wells across the site of the Proposed Development and adjoining proposed Strategic Housing Development (ABP Reference: ABP-309059-20) (WSP, 2024a).
- Several analytes in groundwater were also found to exceed the applicable Groundwater Threshold Values (GTVs) (as per the Groundwater Regulations 2016) including vinyl chloride, TPH, BTEX compounds, naphthalene, lead and arsenic.

The results of the Arup interpretive technical note for the PGL site investigation (Arup, 2020) discussed in Section 9.5.4 are summarised as follows:

- Chlorinated hydrocarbons and naturally occurring inorganic compounds were recorded in water in Made Ground, a drainage channel downstream of the site, and in deeper groundwater beneath the site, exceeding the applicable GTVs. Arup noted that concentrations of chlorinated hydrocarbons in the west of the site were 'new' (as of 2020) and suggested they could be attributable to new pathways created by historical monitoring wells with response zones that bisect the Silt stratum.
- Six (6No.) of the groundwater samples were collected at the site of the Proposed Development at ground investigation locations WS201, BH201 and BH202 during two (2No.) monitoring events.
    - Detectable levels of Chromium VI were reported at sample locations BH201 and BH202. The concentration at WS201 was below the laboratory limits of detection (LOD).
    - The concentration of mineral and total petroleum hydrocarbons was below the laboratory LOD at BH201 and BH202. These hydrocarbons were not reported for WS201.
    - Detectable concentrations of volatile organic compounds (VOCs) were reported at WS201, BH201, and BH202.
    - The concentration of semi-volatile organic compounds (SVOCs) at all three sample locations was below the laboratory LOD.
    - Elevated concentrations of ammoniacal nitrogen were reported at all three sample locations.

The results for groundwater monitoring conducted by WSP during four (4No.) rounds between August 2023 and February 2024 (refer to WSP, 2024a and WSP, 2024d) are summarised as follows:

- Significant concentrations of TPH, TCE, cDCE, and VC were noted in several wells the site of the Proposed Development and adjoining proposed Strategic Housing Development (ABP Reference: ABP-309059-20), particularly in BH201, BH203, BH205, WS201, WS202, and WS206A (refer to Figure 9 6).
- VOC concentrations were higher in deeper wells beneath the Silt.
- Dissolved metals concentrations in the deeper aquifer were not significant and localised detections of dissolved metals were considered likely related to historical waste disposal activities in the Made Ground (WSP, 2024a).
- It is noted that LNAPL sheens were observed on shallow water in Made Ground during the site investigation.
- Groundwater samples were collected at the site of the Proposed Development at groundwater monitoring locations WS201m BH201 and WS202 during four monitoring events showed significant concentrations of VOCs, particularly cDCE and VC, indicating potential contamination hotspots (WSP, 2024a).
    - Detectable concentrations of VC were reported at sample location WS201 (maximum concentration of 1,290ug/l) and WS202 (maximum concentration of 5,070ug/l), BH201 (maximum concentration of 12.6ug/l).
    - Detectable concentrations of 1,1-dichloroethene were reported at sample location BH201 (maximum concentration of 1.41ug/l) and WS202 (maximum concentration of 2.43ug/l)
    - Detectable concentrations of trans-DCE were reported at sample location BH201 (maximum concentration of 5.28ug/l) and WS202 (maximum concentration of 19.6ug/l)
    - Detectable concentrations of cDCE were reported at sample location BH201 (maximum concentration of 2,010ug/l) and WS202 (maximum concentration of 6,360ug/l).
    - Detectable concentrations of trichloroethene were reported at sample location BH201 (maximum concentration of 81.1ug/l).
    - Detectable concentrations of total PAHs were reported at sample location WS201 (ranging from 0.728ug/l to 7.91ug/l). Naphthalene, the predominant PAH compound in petrol, was present in WS201 at a maximum concentration of 0.464ug/l.
    - Detectable concentrations of lead were reported at sample location BH201 (0.337ug/l).
    - Significant concentrations of TPH were also noted in wells BH201 and WS201. Possible hydrocarbon fuel was detected in WS201 where the concentrations of total aliphatic (>C12-C35) and total aromatics (>EC12-EC35) of 2,250µg/l and 490ug/l were reported.
    - BTEX were limited mainly to WS201 where suspect fuel was encountered. The
    - concentrations were low with a maximum sum of BTEX of 7.79ug/l.
    - It is noted that no readily identifiable source areas were identified during site investigations, except for the localised areas with uncovered oil cans and drums.
    - Evidence indicating the presence of dense non-aqueous phase liquid (DNAPL) was not reported. However, it is noted that given the high concentrations of chlorinated hydrocarbons (CHC) recorded in groundwater, its presence in the aquifer cannot be discounted.

The results of the site investigation informed the quantitative human health risk assessment (HHRA) (WSP, 2024a) based on WSP-derived Generic Assessment Criteria (GAC). The HHRA identified unacceptable risks to residential receptors from the inhalation of vapours from impacted groundwater beneath the site of the Proposed Development.

- Vinyl Chloride detections with concentrations exceeding the GAC of 3ug/l were recorded at groundwater monitoring wells WS201, BH201 and WS202. Concentrations of GAC exceedances varied from 10.7 to 5,070ug/l (GAC 3ug/l). Exceedances of the applicable GAC were also recorded at groundwater monitoring wells BH203, BH205, WS206 and DMW3 located within the adjoining Strategic Housing Development.
- Trichloroethene detections with concentrations exceeding the GAC of 29ug/l were recorded at BH201. Exceedances of the applicable GAC were also recorded at groundwater monitoring wells BH203, BH205, WS206 and WS206A located within the adjoining Strategic Housing Development.

The results of the site investigation also informed the Controlled Waters Risk Assessment (CWRA) (WSP, 2024d), which used a simple dilution/mass balance model to identify potential risks to the receiving surface water receptors, specifically the Lee (Cork) Estuary Lower. The mass balance was conducted by estimating the discharge in the River Lee adjacent to the site and the groundwater discharge into the river passing through the site. The results of the CWRA summarised as follows:

- The hydraulic model included the following assumptions:
    - Estimated hydraulic gradient of groundwater beneath the site: 0.0024
    - Saturated aquifer thickness: 10m
    - Estimated hydraulic conductivity of the aquifer: 10m/d
    - Seepage velocity in the gravel aquifer: approximately 0.08m/d
    - Dilution factor: 37,000 (based on available flow data from the nearest river flow monitoring station in the River Lee at Inniscarra, located approximately 11 km upstream to the west of the site).
- A conservative mass balance approach was used to estimate the concentration of Contaminants of Potential Concern (COPCs) in groundwater, primarily in the gravel aquifer below the site, and their concentration in the Lee (Cork) Estuary Lower after mixing due to the discharge of impacted groundwater.
- A qualitative sensitivity analysis was undertaken to ensure the model's conservativeness. It is reported by WSP that the qualitative sensitivity analysis demonstrated that further investigations or analysis will likely lower the potential risk / predicted impact t the River Lee.
- The mass balance was applied to the highest reported concentration of cDCE, and it was found that expected concentrations in the Lee (Cork) Estuary Lower after dilution were likely to be below detection levels.
- The report concludes that any impact on the Lee (Cork) Estuary Lower is likely to be negligible.
- The CWRA notes that while there is evidence of probable biodegradation of chlorinated hydrocarbons (CHC) at the site, a full analysis was outside the scope of the report and was not carried out. The long-term impact of possible dense non-aqueous phase liquid (DNAPL) in the gravel aquifer is uncertain.
- The CWRA also notes that the remedial excavations (WSP, 2024c) have significantly reduced the mass of COPCs in the made ground and shallow soils beneath the site, which will likely provide a long-term improvement in groundwater quality beneath the site.

As noted in Section 9.5.8.2 above, the results of the surface water assessment (WSP, 2024d) did not identify any impact to the Lee (Cork) Estuary Lower associated with the current site condition.

9.5.9.5 Receiving Water Quality – Carrigrennan (Cork City) Wastewater Treatment Plant

Foul water from the Proposed Development will discharge via the Carrigrennan (Cork City) Wastewater Treatment Plant (WWTP) to the Lough Mahon. The WWTP is operated under relevant statuary approvals. The most recent available Annual Environmental Report (AER) for the Carrigrennan (Cork City) WWTP is 2022 (Uisce Éireann, 2023). The AER identified that the final effluent was non-compliant with the Emission Limit Values (ELV) specified in the discharge license (D0033-01). The parameters falling to meet there ELV's included biochemical oxygen demand (BOD), "with Inhibition (Carbonaceo mg/l Total Nitrogen mg/l)" (Uisce Éireann, 2023).

While exceedances in the ELV's is noted, the following is also relevant under the significance of results section of the AER:

- "The discharge from the wastewater treatment plant does not have an observable impact on the water quality."
- "The discharge from the wastewater treatment plant does not have an observable negative impact on the Water Framework Directive status."

9.6 Water Framework Directive

The WFD status for river, lake, groundwater, transitional and/or coastal water bodies that have a potential hydraulic connection to the subject site as recorded by the EPA (EPA, 2024) in accordance with European Communities (Water Policy) Regulations 2003 (SI no. 722/2003) are provided in Table 9 7 .

Table 9 7. Water Framework Directive Status

WFD WATERBODY I.D.	WATER BODY EU CODE	LOCATION FROM SITE	DISTANCE FROM SITE (KM)*	WFD STATUS (2016-2021)	WFD RISK (2016-2021)	HYDRAULIC CONNECTION TO THE SITE
Transitional Waterbodies						
Lee (Cork) Estuary Lower	IE_SW_060_0900	North	0.035	Moderate	At risk	Yes, downstream of the site
Lough Mahon	IE_SW_060_0750	East	2.7	Moderate	At risk	Yes, downstream of the site and the Carrigrennan WwTP
Coastal Waterbodies						
Cork Harbour	IE_SW_060_0000	Southeast	12.131	Moderate	At risk	Yes, downstream of the site and the Carrigrennan WwTP
Outer Cork Harbour	IE_SW_050_0000	Southeast	18.2	Moderate	Not At Risk	Yes, downstream of the site and the Carrigrennan WwTP
Western Celtic Sea	IE_SW_010_0000	Southeast	23.9	High	Not At Risk	Yes, downstream of the site and the Carrigrennan WwTP
Groundwater Bodies						
Lee Valley Gravels	IE_SW_G_094	Underlying	0.0	Good	At risk	Yes, underlying the site
Ballinhassig East	IE_SW_G_004	Underlying	0.0	Good	Good	Yes, underlying the site and Lee Valley Gravels GWB

'*' = Distance is measured distance downstream along potential hydraulic linkages

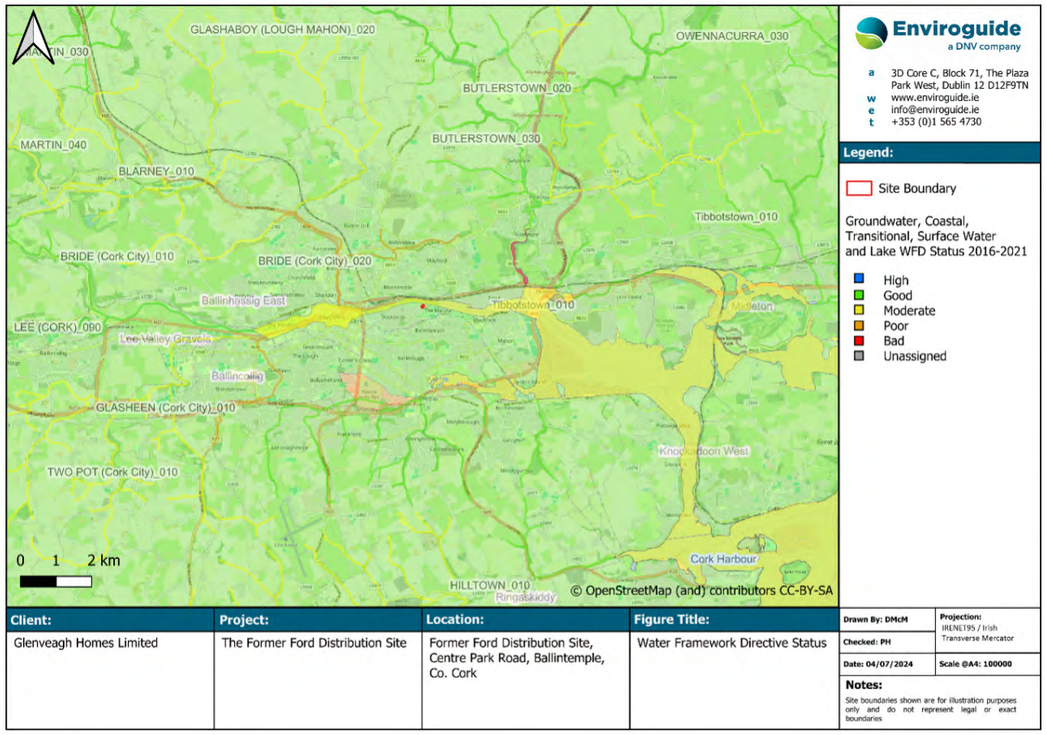

Figure 9 13. Water Framework Directive Status (2016-2021)

9.6.1 Nature Conservation

The Habitats Directive (92/43/EEC) seeks to conserve natural habitats and wild fauna and flora by the designation of Special Areas of Conservation (SACs) and the Birds Directive (2009/147/EC) seeks to protect birds of special importance by the designation of Special Protection Areas (SPAs). SACs and SPAs are collectively known as Natura 2000 or European sites (referred to hereafter as Natura 2000 site).

National Heritage Areas (NHAs) are designations under the Wildlife Acts to protect habitats, species, or geology of national importance. The boundaries of many of the NHAs in Ireland overlap with SAC and/or SPA Sites. Although many NHA designations are not yet fully in force under this legislation (referred to as 'proposed NHAs' or pNHAs), they are offered protection in the meantime under planning policy which normally requires that planning authorities give recognition to their ecological value.

There are two (2No.) Natura 2000 sites that are identified with a potential hydraulic connection to the site and Proposed Development. There are also five (5No.) pNHA identified with a potential hydraulic connection to the site and Proposed Development. The Natura 2000 sites and other protected and designated sites or areas with a potential hydraulic connection to the site are summarised in Table 9 8.

Table 9 8. Designated and Protected Sites

DESIGNATED SITE	SITE CODE	DISTANCE FROM SITE (KM)*	DIRECTION	POTENTIAL RISK
Special Area of Conservation (SAC)				
Great Island Channel SAC	00105	6.45	East / Southeast	Yes, hydrological connection via the Lee estuary, Lough Mahon and Cork Harbour.
Special Protection Area (SPA)				
Cork Harbour SPA	004030	1.6	East / Southeast	Yes, hydrological connection via the Lee estuary, Lough Mahon and Cork Harbour.
Proposed Natural Heritage Area (pNHA)				
Fountainstown Swamp	371	18	East / Southeast	
Douglas River Estuary	1046	2.7	East / Southeast	
Great Island Channel	1058	8	East / Southeast	
Lough Beg (Cork)	1066	14	East / Southeast	
Rockfarm Quarry, Little Island	1074	5	East / Southeast	
Rostellan Lough, Aghada Shore and Poulnabibe Inlet	1076	16	East / Southeast	Yes, hydrological connection via the Lee Estuary, Lough Mahon and Cork Harbour
Dunkettle Shore	1082	2.7	East / Southeast	
Whitegate Bay	1084	14	East / Southeast	
Monkstown Creek	1979	12	East / Southeast	
Cuskinny Marsh	1987	13	East / Southeast	
Owenboy River	1990	16	East / Southeast	

Note:
'*' = Distance is measured distance downstream along potential hydraulic linkages

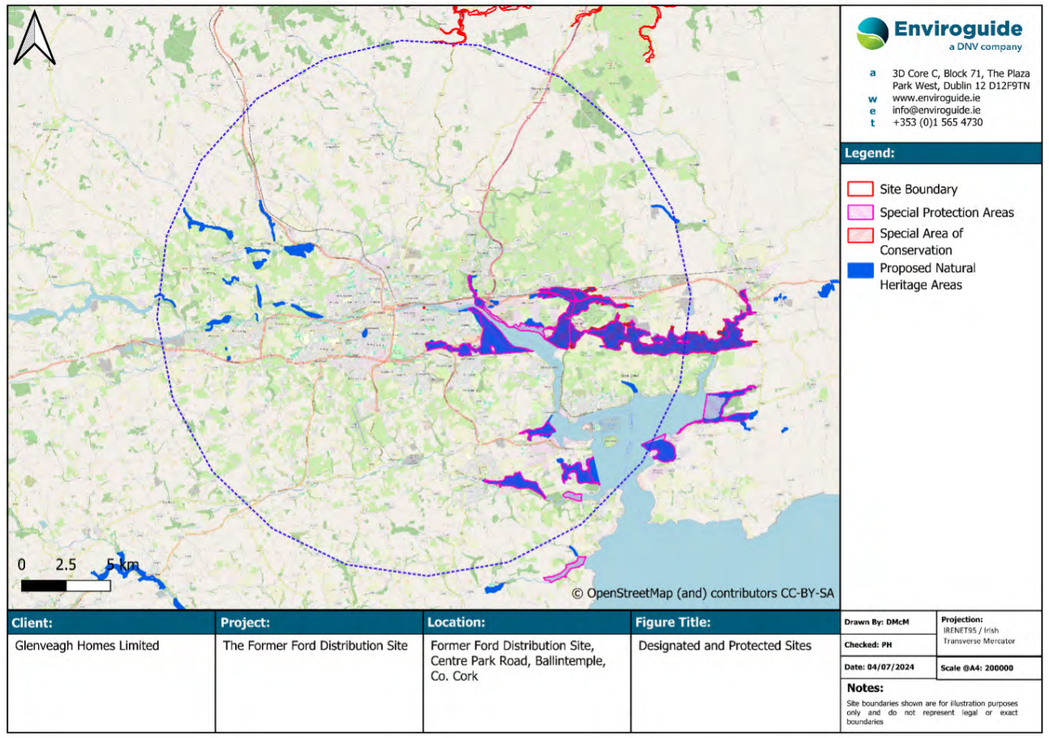

Figure 9 14. Designated and Protected Nature Conservation Sites

9.6.2 Drinking Water

The river drinking water protected areas (DWPA) are represented by the full extent of the WFD river waterbodies from which there is a known qualifying abstraction of water for human consumption as defined under Article 7 of the WFD.

There are no surface water drinking water sources, under Article 7 of the WFD, identified by the EPA (EPA, 2024) within a 2km radius or hydraulically downstream of the site.

9.6.3 Shellfish Areas

Although the Shellfish Waters Directive (SWD) has been repealed, areas used for the production of shellfish that were designated under the SWD, are protected under the WFD as 'areas designated for the protection of economically significant aquatic species'.

The requirement from a WFD perspective is to ensure that water quality does not impact on the quality of shellfish produced for human consumption. In Ireland, 64 areas have been designated as shellfish waters (S.I. No. 268 of 2006, S.I. No. 55 of 2009, S.I. 464 of 2009).

The closest designated Shellfish Area location is Cork Great Island North Channel approximately 11.9km downstream of the Site. There are also three SWD along the eastern shore of Cork Harbour, namely the Rostellan West, Rostellan South and Rostellan North located approximately 19.9km, 21.1km and 21.3km downstream and east of the site respectively.

9.6.4 Nutrient Sensitive Areas

EU member states are required under the Urban Wastewater Treatment Directive (91/271/EEC) to identify nutrient-sensitive areas. These have been defined as "natural freshwater lakes, other freshwater bodies, estuaries and coastal waters which are found to be eutrophic or which in the near future may become eutrophic if protective action is not taken".

The Lee Estuary, Lough Mahon and the Owennacurra Estuary / North Channel are all designated as nutrient sensitive. The designated sections surface water includes several water treatment agglomerations including Cork City, Passage West, Cobh, Carrigtwohill and Midleton.

9.6.5 Bathing Waters

Bathing waters are designated under Regulation 5 of Directive 2006/7/EC. Designated Bathing Waters exist under S.I. No. 79/2008 and S.I. No. 351/2011 Bathing Water Quality (Amendment) Regulations 2011. EC Bathing Water Profiles - Best Practice and Guidance 2009.

The closest designated bathing water location is Fountainstown located approximately 20km downstream of the site.

9.7 Conceptual Site Model

In accordance with the EPA's document 'Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites' (EPA, 2013a) a Conceptual Site Model (CSM) was developed for the site of the Proposed Development. A conceptual site model (CSM) represents the characteristics of the Site and identifies the possible relationships and potential risks between contaminant sources, pathways and receptors. These three essential elements of the CSM are described as:

- **A source –** a substance that is in, on or under the land and has the potential to cause harm or pollution.
- **A pathway –** a transport route or means by which a receptor can be exposed to, or affected by, a contaminant source.
- **A receptor –** in general terms, something that could be adversely affected by a contaminant, such as people, an ecological system, property, or a water body.

The term contaminant linkage is used to describe a particular combination of source pathway receptor (S-P-R). Each of these elements can exist independently, but they create a risk only where they are linked together so that a particular contaminant affects a particular receptor through a particular pathway (i.e., a contaminant linkage).

The key Sources of contamination at the site of the Proposed Development include:

- Residual soil impacted with petroleum hydrocarbons and solvents within localised areas of the site remain following removal of buried waste oil cans and solvent drums (WSP, 2024c) and are considered the baseline conditions of the site.
- Dissolved phase groundwater impacted with petroleum hydrocarbons and solvents in shallow and deeper groundwater beneath the site. The removal of identified sources of contamination (i.e., waste oil cans and solvent drums) is expected to significantly improve the long-term quality of groundwater beneath the site (WSP, 2024c).
- LNAPL sheens were observed on shallow water in Made Ground during site investigations (WSP, 2024a).
- While site investigations to date have not identified the presence of DNAPL, there is a possibility that DNAPL to be present potentially pooling on the silt aquiclude layer.
- Remediated contaminated material from both the site and the adjoining proposed Strategic Housing Development (ABP Reference: ABP-309059-20) is stockpiled temporarily at the site pending removal and are considered to represent the baseline conditions at the site.

The Proposed Development will comprise the development of residential apartment blocks, a creche, a gym and a retail/café space and will be covered by hardstanding, areas of landscaping and public / communal open space. The landscaped areas will include a minimum cover of 0.8m of clean fill and topsoil. Therefore, the proposed end use for the Proposed Development has been considered as a Residential land use (excluding the consumption of the homegrown produce exposure pathway) in accordance with the UK Environment Agency's Land Contamination Risk Management (LCRM) guidance.

The approach for the site of the Proposed Development is similar to the adjoining proposed Strategic Housing Development (ABP Reference: ABP-309059-20) as described in the HHRA (WSP, 2024a). Since the site will be covered with hardstanding or clean imported fill material, direct exposure to contaminants and dust from residual contaminated soils (where present) will be prevented. Additionally, there will be no designated areas for growing vegetables or fruit, eliminating the risk of ingesting homegrown produce or soil adhering to it. The possibility of tracking contaminated soils from external areas into residences (indirect exposure via inhalation of fugitive dust) is also ruled out. Consequently, consistent with the adjoining proposed Strategic Housing Development (ABP Reference: ABP-309059-20), the only viable exposure pathway applicable to human health receptors for the Proposed Development is via the inhalation of vapours from residual soil and groundwater contamination. .

The exposure Pathways and Receptors are summarised as follows:

- Leaching of contaminants from soil and vertical migration to shallow groundwater. It is noted that the majority of the Proposed Development will be covered with impermeable construction materials (i.e., buildings and pavement), which will divert rainwater to surface water discharge, thereby preventing direct contact with contaminated soils. While SuDS elements, to allow infiltration and reduction of run-off volumes and rates, have been incorporated into the design of the proposed surface water drainage network, the existing capacity for infiltration and recharge at the site of the Proposed Development is limited due to the presence of made ground and moderately permeable subsoil. Furthermore, variable head permeability testing undertaken within groundwater monitoring wells during recent site investigations (GII, 2024) at the adjoining Strategic Housing Development failed due to tidal influence, further indicating limited infiltration potential at the site. Consequently, the leaching of contaminants from unsaturated soils will be limited due to the restricted infiltration potential and diversion of groundwater and surface water away from these areas.
- Vertical migration between the shallow and deep groundwater zones. Groundwater monitoring indicates that the made ground is not in direct continuity with the Lee Estuary Lower, and the silt layer forms a relatively low permeability barrier between the made ground and the underlying gravel aquifer. However, some limited connection may occur between the water in the made ground and the underlying gravel aquifer (WSP, 2024a).
- Potential presence of preferential flow path through the silt aquiclude via existing monitoring wells at the site (WSP, 2024a).
- Creation of preferential flow paths through the silt aquiclude during piling, which allows contaminated groundwater and leachates to migrate downwards through aquitard layers into the underlying groundwater.
- Lateral migration of shallow and deep groundwater toward the open drainage channels along the southeast and northwest site boundaries and the Lee (Cork) Estuary Lower.
- Volatile vapours resulting from residual soil contamination accumulating in subsurface ducts, services, cellars, basements, or other enclosed spaces. Soils at the adjoining proposed Strategic Housing Development (ABP Reference: ABP-309059-20) will be stabilised and capped, making this the only viable pathway.
- Volatile vapours in groundwater potentially presenting a risk to future development/site users, via migration to future development.

It is noted that the exposure pathways and receptors for soil is further described and assessed in Chapter 8 of this EIAR.

9.8 The 'Do Nothing' Scenario

The 'Do Nothing' scenario assesses the potential impact on the receiving hydrological and hydrogeological environment if the Proposed Development did not proceed. It is considered that there would be no change or resulting impact on the nature of the Site with respect to hydrology and hydrogeology as the Site of the Proposed Development would remain as undeveloped land with localised areas impacted with hydrocarbon contamination.

In the 'Do Nothing' scenario potential negative impacts during the construction phase in terms of introduction and mobilisation of contaminants in surface water and groundwater would be negated. However, the removal and reduction of contaminants that would be required as part of the Proposed Development would also not take place.

In a 'Do Nothing' Scenario risk to persons and property from flooding is negligible as the site is undeveloped. Undertaking the Proposed Development increases the residual risk of flooding to the site as more people will be in an area of flood risk both during the construction and operational phases. Nonetheless, the Proposed Development as assessed in the supporting SSFRA is appropriate as per the OPW Guidelines for Flood Risk Management which includes measures for minimising residual risk.

As the site is zoned for development, in the absence of the Proposed Development, it is likely that a development of a similar nature is likely to be constructed in the future in line with national policy and the development plan objectives. Therefore, the construction and operational phase impacts outlined in this assessment are likely to occur in the future, even in the absence of the Proposed Development.

9.9 Potential Significant Effects

The procedure for determination of potential effects on the receiving hydrological and hydrogeological environment is to identify potential receptors within the site boundary and surrounding environment and use the information gathered during the desk study, the Site walkover and information obtained from direct and indirect site investigations to assess the degree to which these receptors will be impacted upon in the absence of mitigation.

The assessment will identify the likely impacts during the construction and operational phases of the site. This will involve assessing the significance of any potential effects by determining the sensitivity of the receptors and the magnitude of the potential effect.

The following potential effects have been identified and will be assessed in detail as part of the final EIAR submitted as part of the planning application to CCC for the Proposed Development.

9.9.1 Construction Phase

In the absence of appropriate mitigation measures there could be an impact on the receiving water environment including the following receptors:

- Underlying locally important gravel aquifer (Lg) which is part of the Lee Valley Gravels GWB.
- Underlying locally important bedrock aquifer (Ll) which is part of the Ballinhassig East GWB.
- Groundwater flow beneath the Site is expected to be to the north, discharging to the Lee (Cork) Estuary Lower located approximately 0.035km north of the Site.
- The Lee (Cork) Estuary Lower transitional waterbody and downstream waterbodies including the Lough Mahon transitional waterbody and the Cork Harbour coastal waterbody.
- There are two (2No.) Natura 2000 Sites and five (5No.) proposed Natural Heritage Areas (NHAs) that are identified with a potential hydraulic connection to the Site and Proposed Development.

The GSI (GSI, 2024) registered wells and groundwater sources within a 2km radius of the site which are recorded for a mix of uses including domestic, industrial, agricultural and public supply. However, there are no identified downgradient groundwater sources between the Site and the Lee (Cork) Estuary Lower. Therefore, there is no identified impact to groundwater supply users associated with the construction phase of the proposed development.

The excavation of made ground and underlying natural soils impacted with anthropogenic contamination (i.e., petroleum hydrocarbons and solvents) and permanent removal off-site is a design requirement of the Proposed Development. In advance of construction works commencing, the existing HHRA (WSP, 2024a) will be refined based on the results of the in-situ soil validation samples collected at the site (WSP, 2024c). The refined HHRA and CWRA will be used to inform the remediation plan to ensure that residual sources of contamination are removed offsite. Accordingly, it is considered that there will be a 'positive', 'moderate to significant' and 'long-term' impact on the quality of shallow soils underlying the site and subsequent improvements to quality of groundwater.

There will be no direct discharge to groundwater or surface water during the construction phase of the Proposed Development. Surface runoff will be managed during construction and there will be no unauthorised discharges of water from the site. However, in the event of a rainfall event, surface runoff entering the open excavations could result in mobilisation of identified hydrocarbon contamination in soil and leaching and migration to groundwater beneath the site. In addition, if existing monitoring wells are inadvertently damaged there could be a potential for migration of surface runoff or other sources to migrated directly to groundwater. Accordingly, this could result in a 'negative', 'significant' and 'medium-term' impact on groundwater, the Lee (Cork) Estuary Lower and associated downstream receptors. Appropriate controls will be in place to prevent this unlikely scenario, refer to section 9.10.3 below.

Shallow groundwater may be encountered during excavations required to achieve the required formation levels for the Site including building foundations, surface water and foul water drainage, roads and all other associated infrastructure. Localised dewatering or sump pumping during the excavations may result in a 'negative', 'imperceptible to slight' and 'temporary' impact within a very localised zone of the aquifer only and there will be no impact on the flow regime of receiving water bodies.

There is a potential risk for the mobilisation of contaminants in shallow soil and groundwater or introduction of contaminants (i.e., surface runoff with entrained contaminants) during groundworks where either ground or groundwater is exposed. The mobilisation of hydrocarbon contamination or other residual contamination from soil could occur during groundworks with an impact on groundwater quality. In addition, any dewatering required including the pumping of groundwater, where encountered in excavations, could alter the local groundwater flow regime and contaminant distribution within the subsurface. Taking account of the existing groundwater quality beneath the Site this could result in a 'negative', 'significant' and 'medium-term' impact on groundwater, the Lee (Cork) Estuary Lower and associated downstream receptors. Appropriate controls will be in place to prevent this unlikely scenario, refer to section 9.10.3 below.

The groundwater vulnerability will temporarily be increased during the Construction Phase. Construction activities will include the use of potentially hazardous materials including cementitious materials, fuels and oils and other materials. A potential uncontrolled release of materials could result in for example through the failure of secondary containment or a materials handling accident could also result in a 'negative', 'significant' and 'medium-term' impact on the receiving environment (i.e., underlying Lee Valley Gravels and Ballinhassig GWBs and the Lee (Cork) Estuary Lower transitional waterbody and downstream waterbodies). Appropriate controls will be in place to prevent this unlikely scenario, refer to section 9.10.3 below.

Piling could introduce a potential conduit to groundwater for any contaminants used during construction and depending on the piling method, materials used in piling such as grout and other materials. In the event of such scenarios, it is considered that this could result in 'negative', 'significant' and 'medium-term' impact on a local area of the underlying aquifer environment and the receiving Lee (Cork) Estuary Lower and associated downstream receptors. Appropriate controls, including the development of a Piling Risk Assessment will be in place to prevent this unlikely scenario, refer to section 9.10.3 below.

The release of suspended solids entrained in surface runoff from haul routes to / from the site or other contaminants from groundworks areas and stockpiled soils could potentially enter offsite road gullies before discharging to the Lee (Cork) Estuary Lower transitional waterbody. The appointed contractor will ensure that any run-off from the Site will be managed for the duration of the construction phase to ensure that surface water runoff is contained, attenuated and treated onsite prior to discharge offsite. However, in the absence of mitigation measures, there is a potential 'negative', 'moderate' and 'medium-term' impact on the receiving water quality and WFD status of the Lee (Cork) Estuary Lower and downstream receiving waterbodies.

During a flood event there is the potential for pollutants derived from construction materials to be mobilised by flood waters. Overall, flood events during the construction phase have the potential to have 'negative', 'temporary', 'moderate' – 'significant' effects on hydrological receptors.

Foul water discharge from the temporary welfare units at the site during the construction phase will be either tankered offsite in accordance with waste management legislation or discharged under temporary consent to the UE mains foul network for treatment at Carrigrennan (Cork City) WWTP subject to agreement with UE. It is considered that any effect of the Proposed Development relating to wastewater during the construction phase will be 'neutral', 'imperceptible' and 'temporary'.

9.9.2 Operational Phase

9.9.2.1 Hydrogeological Flow Regime

The Site is approximately 0.84ha and comprises undeveloped brownfield lands which were recently stripped under the previous grant of planning from Cork City Council (CCC) (CCC Ref. 08/32919) which expires on the 12th of October 2024. The construction of the Proposed Development will convert a percentage of the surface to impermeable surface due to the construction of building, roads and other infrastructure. Variable head permeability testing undertaken within groundwater monitoring wells during recent site investigations (GII, 2024) at the adjoining Strategic Housing Development failed due to tidal influence, indicating limited infiltration potential at the site. The change in cover will result in an unavoidable limited reduction in infiltration potential within a localised portion of the underlying gravel aquifer. The incorporation of the SuDS elements within the surface water drainage network will encourage continued groundwater recharge and any change in recharge potential will only impact a very localised area of the aquifer within the vicinity of the site. Therefore, it is considered that there will be an unavoidable 'negative', 'imperceptible' and 'long-term' impact on the hydrogeological regime within a very localised zone of the regionally important aquifer.

9.9.2.2 Drainage and Flood Risk

As outlined in the Infrastructure Design Report (DBFL, 2024) the surface water drainage for the Proposed Development has been designed in accordance with SuDS and satisfies the requirements of the GDSDS to meet the following design criteria:

- Criterion 1 – River Water Quality Protection.
- Criterion 2 – River Regime Protection.
- Criterion 3 – Level of Service (Flooding) / Flood Risk Assessment.
- Criterion 4 – River Flood Protection.

The SSFRA (DBFL, 2024) has demonstrated that the risks relating to flooding to the Proposed Development can be managed and mitigated to acceptable levels and therefore comply with DoEHLG / OPW and Cork City Council planning guidance.

Therefore, it is considered that the potential flooding impacts associated with the Proposed Development are 'neutral', 'imperceptible' and 'long-term'.

9.9.2.3 Water Quality

The design and construction of the Proposed Development in accordance with current Building regulations will ensure that the Site will be suitable for use for operational phase as a residential development taking account of the hydrogeological site setting.

There will be no significant sources of contamination at the site during the operational phase of the Proposed Development.

There will be no requirement for bulk storage of petroleum hydrocarbon-based fuels during the Operational Phase of the Proposed Development as the main operating system for heating will be an air source heat pump. Further details are provided in Chapter 7 Material Assets of this EIAR.

The groundwater beneath the site is impacted with hydrocarbons, VOCs and PAHs. Without suitable remedial measures, the presence of volatile petroleum hydrocarbons and solvents in the groundwater beneath the site poses a 'negative,' 'moderate to significant' and 'long-term' risk to structures and future occupants of the site from exposure to groundwater vapours. The design for the proposed development will include the installation of a vapour barrier to break the identified pollutant linkage between future site users and impacted residual soils and groundwater. As part of incorporated design measures for the Proposed Development, in advance of construction works commencing, the existing HHRA (WSP, 2024a) will be refined to inform the proposed remedial design measures (i.e., installation of vapor barrier) and the performance specification of the barrier itself. Accordingly, it is considered that there will be a 'neutral', 'imperceptible' and 'permanent' impact to structures and future occupants of the site.

It is noted that while WSP (WSP, 2024c) has reported that the detection and removal of waste oil cans and solvent drums at the site of the Proposed Development will significantly improve the long-term quality of the underlying groundwater impacted by petroleum hydrocarbons and solvents, the potential remains for contaminated groundwater to act as a source of vapours in the subsurface.

The ground conditions across the site comprise approximately 0.9m of stabilised material ('piling mat'). During the operational phase of the Proposed Development, the rate of infiltration to ground will decrease. There will be no discharges to ground other than rainfall to unpaved landscaped areas and via limited recharge from SuDS measures incorporated into the surface water drainage network for the Proposed Development. The reduction of infiltrations (i.e., rainfall and surface runoff) to ground at the site will have an overall 'positive', 'imperceptible to slight' and long-term' impact on the underlying groundwater by minimising the potential for mobilisation or leaching of residual soil contaminants to the underlying aquifer.

As documented in the Infrastructure Design Report (DBFL, 2024), prior to discharging to the existing surface water drainage within the adjacent development ((i.e., the Proposed Strategic Housing Development which was granted planning by An Bord Pleanala (ABP Reference: ABP-309059-20) on the 4th April 2021) and ultimately the Lee (Cork) Estuary Lower, all surface water runoff will be treated and attenuated in accordance with the principals and objectives of SuDS (i.e., Permeable Paving, Bypass Separator, Green Roofs, Catchpit Manholes, Bioretention Areas and Attenuation System). Therefore, it is considered that there will be a 'neutral', 'imperceptible' and 'long-term' impact on to the quality of receiving hydrological receptors including the Lee (Cork) Estuary Lower. However, In the worst-case scenario of accidental spillage from a vehicle engine and failure of SuDS there is a potential risk to water quality in the receiving environment. In the absence of mitigation measures, there is a potential 'negative', 'moderate' and 'long-term' impact on the quality of the receiving water environment depending on the nature of the incident.

As documented in the Infrastructure Design Report (DBFL, 2024), foul water from the Proposed Development will be treated in the Carrigrennan (Cork City) WWTP before ultimately discharging to the Lough Mahon transitional waterbody, in accordance with the requirements from the UE CoF (UE Reference: CDS24001285) and other applicable statutory consents verifying capacity at the Carrigrennan (Cork City) WWTP for the Proposed Development. Foul water from the Proposed Development will be treated at the Carrigrennan (Cork City) WWTP (EPA Licence No. D0033-01) before ultimately discharging to the Lough Mahon transitional waterbody. The Mallow WWTP is operated under existing statutory consents and foul water from the site will only be discharged to the mains foul network under the appropriate consents from UE. Therefore, there will be a 'neutral', 'imperceptible', 'long-term' impact on receiving water quality and WFD status.

9.9.3 Cumulative Effects

Cumulative effects can be defined as "impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project". Effects which are caused by the interaction of effects, or by associated or off-site projects, are classed as indirect effects. Cumulative effects are often indirect, arising from the accumulation of different effects that are individually minor. Such effects are not caused or controlled by the project developer.

As part of this assessment, other offsite developments and proposed offsite developments as detailed in Appendix 1.1 of this EIAR were reviewed and considered for possible cumulative effects with the Proposed Development.

9.9.3.1 Water Resources

As documented in the Infrastructure Design Report (DBFL, 2024), water supply to the Proposed Development will be from a 150mm connection to a spur provided as part of the adjacent development ((i.e., the Proposed Strategic Housing Development which was granted planning by An Bord Pleanala (ABP Reference: ABP-309059-20) on the 4th of April 2021).

The UE CoF letter (UE Reference: CDS24001285) states that the proposed water connection to the 400mm diameter ductile iron watermain along Centre Park to the south-east of the site is feasible subject to 150m of water network upgrades will be required to provide additional network capacity. Although the proposed connection is no longer proposed to be directly to the existing 400mm watermain, the proposed connections to the new 200mm watermain from the adjacent development, will ultimately connect to the existing 400mm watermain along Centre Park. The Applicant will ensure that all UE requirements, as outlined in the UE CoF letter (UE Reference: CDS24001285), will be completed prior to any connection from the Proposed Development

The mains water supply will be operated in accordance with relevant existing statutory consents. Therefore, there will be a 'neutral', 'imperceptible', 'long-term' cumulative impacts associated with the Proposed Development on the supply network and water resources.

9.9.3.2 Impacts to Water Quality

Removal and remediation of contaminated soils from the site and adjacent development will have a positive impact on the long-term groundwater and surface water quality in the South Docklands and receiving waterbodies (i.e., Lee Estuary and Lee Valley Gravels). Accordingly, it is considered that any cumulative impact on Water Quality associated with the Proposed Development will be 'positive', 'slight to moderate' and 'long-term'.

9.9.3.3 Pluvial and Surface Water Flooding

The implementation of SuDS measures on Site and adjacent developments detailed in Chapter 2 of this EIAR will likely have positive impacts on the control of peak runoff rates and volumes when compared the existing brownfield land uses. It is considered that any cumulative impact on Pluvial and Surface water Flooding associated with the Proposed Development will be 'positive', 'slight' and 'permanent'.

9.9.4 Summary

Table 9 9 summarises the identified likely significant effects during the construction phase of the Proposed Development before mitigation measures are applied.

Table 9 9 Summary of Construction Phase Likely Significant Effects in the absence of mitigation

LIKELY SIGNIFICANT EFFECT	QUALITY	SIGNIFICANCE	EXTENT	PROBABILITY	DURATION	TYPE
Excavation of Contaminated Soil	Positive	Moderate to Significant / Slight to Moderate	Local / Regional	Likely	Long-term	Direct / Cumulative
Contaminant Mobilisation - Surface Water Runoff Entering Excavations	Negative	Significant	Regional	Possible	Medium-term	Direct
Localised Dewatering or Sump Pumping	Negative	Imperceptible to Slight	Local	Likely	Temporary	Direct
Contaminant Mobilisation – Groundworks Including Dewatering	Negative	Significant	Regional	Possible	Medium-term	Direct
Potential Uncontrolled Release of Hazardous Materials Including Cementitious Materials, Fuels, Oils and Other Materials	Negative	Significant	Local	Worst-case	Medium-term	Direct
Creation of Preferential Pathways During Piling	Negative	Significant	Local	Possible	Medium-term	Direct
Release of Suspended Solids Entrained in Surface Runoff	Negative	Moderate	Regional	Possible	Medium-term	Direct
Mobilised Pollutants from Construction materials as a Result of Flooding	Negative	Moderate	Regional	Possible	Temporary	Direct
Discharge of Treated Effluent to US Mains Sewer	Neutral	Imperceptible	Regional	Likely	Temporary	In-direct

Table 9 10 summarises the identified likely significant effects during the operational phase of the Proposed Development before mitigation measures are applied.

Table 9 10 Summary of Operational Phase Likely Significant Effects in the absence of mitigation

LIKELY SIGNIFICANT EFFECT	QUALITY	SIGNIFICANCE	EXTENT	PROBABILITY	DURATION	TYPE
Limited Reduction in Infiltration Potential as a Result of Increased Impermeable Surfaces	Negative	Imperceptible	Local	Likely	Long-term	Direct
Flooding	Neutral	Imperceptible	Local	Likely	Long-term	Direct
Exposure to Volatile Hydrocarbons and Solvents in Contaminated Groundwater	Negative	Moderate to Significant	Local	Likely	Long-term	Direct
Reduced Potential for Contaminant Migration through Reduction in Infiltration	Positive	Imperceptible to Slight	Local	Likely	Long-term	Direct
Management of Surface Water Runoff in Accordance with SuDS	Neutral	Imperceptible	Local	Likely	Long-term	Direct / Cumulative
Failure of SuDS	Negative	Moderate	Regional	Likely	Long-term	Direct / Worst-case
Discharge of Treated Effluent	Neutral	Imperceptible	Regional	Likely	Long-term	In-direct / Cumulative
Mains Water Supply	Neutral	Imperceptible	Regional	Likely	Long-term	Cumulative

9.10 Mitigation Measures

9.10.1 Incorporated Design Mitigation

In advance of construction works commencing, the existing HHRA (WSP, 2024a) and CWRA (WSP, 2024d) will be refined based on the results of the in-situ soil validation samples collected at the site (WSP, 2024c) and post remedial groundwater monitoring. The refined HHRA and CWRA will be used to inform the remediation plan to ensure that residual sources of contamination in soil are removed offsite, to inform the proposed remedial design measures including the installation and performance specification of the vapour barrier and identify if any supplementary remedial works for groundwater are required.

It is noted that protective coatings or sealants on concrete structures will be required in areas where they may come into contact with groundwater impacted with petroleum hydrocarbons and chlorinated solvents. The design and specification of the concrete will be undertaken by a suitably qualified engineer during the detailed design stage.

9.10.2 Construction Phase Mitigation

A preliminary Construction Environmental Management Plan (CEMP) (DBFL, 2024) has been prepared for the Proposed Development as part of the planning application. In advance of construction works commencing, the appointed Contractor will be required further develop the CEMP to ensure, site-specific procedures and mitigation measures to monitor and control environmental impacts throughout the Construction Phase of the project and ensure that construction activities do not adversely impact on the receiving water environment having regard to relevant industry standards (e.g., Guidance for Consultants and Contractors, CIRIA - C532', CIRIA, 2001).

The CEMP will be implemented for the duration of the construction phase, covering construction and waste management activities that will take place during the construction phase of the Proposed Development.

Mitigation measures will address the main activities of potential impact which include:

- Control and management of contaminated soil.
- Control and management of surface water runoff.
- Control and management of water including potentially contaminated groundwater and management of dewatering activities.
- Piling.
- Borehole decommissioning.
- Control and handling of cementitious materials.
- Appropriate fuel and chemical handling, transport and storage.
- Management of accidental release of contaminants at the site.
- Flooding.
- Welfare facilities.

The construction works will be managed with consideration of applicable regulations and standard international best practice; good construction management practices will minimise the risk of pollution from construction activities at the site including but not limited to:

- Construction Industry Research and Information Association, 2000. Environmental Handbook for Building and Civil Engineering Projects (CIRIA – C528).
- Construction Industry Research and Information Association, 2001. Control of Water Pollution from Construction Sites: Guidance for Consultants and Contractors (CIRIA – C532).
- Construction Industry Research and Information Association, 2006. Control of water pollution from linear construction projects: Technical guidance (CIRIA - C648).
- Construction Industry Research and Information Association, 2015. Environmental Good Practice on Site Guide (CIRIA – C741).
- Construction Industry Research and Information Association, 2016. Groundwater control: design and practice (CIRIA – C750).
- EPA, 2013. Amendment to IPC Guidance Note on Storage and Transfer of Materials for Scheduled Activities' (EPA, 2013b).
- National Roads Authority, 2009. Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes.
- UK Pollution Prevention Guidelines (PPG) UK Environment Agency, 2004.

9.10.2.1 Control and Management of Contaminated Soil

Contaminated soil will be encountered during groundworks at the site. Remedial works undertaken to date have removed a large portion of the contaminated soil at the site. However, the soil validation results demonstrate that petroleum hydrocarbon and solvent impacted areas remain at validation sample locations V03, V10, V11, V12 and 9AB-10 (WSP, 2024c). As mentioned, in Section 9.9.1, the refined HHRA will be used to inform the remediation plan to ensure that residual sources of contamination in soil are removed offsite. The removal of the residual soil source will be validated in accordance with relevant guidelines including EPA 'Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites' (EPA, 2013a) and guidance and standards current at the time of construction works. Therefore, there will be no residual sources of contamination that will remain onsite.

This work should be undertaken prior to the bulk excavation works for the construction of building foundations, utility infrastructure and other works to reduce the potential risks associated with exposure of soils to rainfall or surface runoff and leaching to groundwater.

Where possible, stockpiling of soils and subsoils onsite will be avoided. However, in the event that stockpiling is required, stockpiled materials, pending reuse onsite, will be located away from the location of any sensitive receptors (watercourses and drains). In accordance with Inland Fisheries Ireland guidelines, stockpiles will not be allowed within 50m of the open water where sufficient working areas are available within the Site boundary.

Surplus material, not suitable for reuse onsite, will be segregated, and stockpiled appropriately for removal offsite. For any excavated material identified for removal offsite, while assessment and approval of acceptance at a destination re-use, recovery Site or waste facility is pending, excavated soil for recovery/disposal shall be stockpiled as follows:

- A suitable temporary storage area will be identified and designated.
- All stockpiles will be assigned a stockpile number.
- Stockpiled soil and stone materials will be protected from exposure to wind by storing the material in sheltered regions of the Proposed Development Site.
- Soil waste categories will be individually segregated; and all segregation, storage & stockpiling locations will be clearly delineated on the Site drawing.
- Any waste to be temporarily stockpiled will be stockpiled only on hard standing on heavy gauge polythene sheeting and soil stockpiles will be sealed to prevent run-off of rainwater and leaching of potential contaminants from the stockpiled material generation and/or the generation of dust.
- There will be no storage of materials within 10m of any boundary, drains and watercourses

9.10.2.2 Control and Management of Surface Water Runoff

There will be no direct discharges from construction activities to groundwater or surface water during the construction phase of the Proposed Development.

Surface water will be managed in accordance with the requirements of the CEMP (DBFL, 2024) and the measures outlined below.

Excavation works for piling caps; utility infrastructure and other works will be undertaken in a phased manner in order to minimise the exposure of soil to rainfall. Where feasible groundworks will be undertaken during dryer weather and avoided where heavy rainfall is forecast. Suitable temporary cover (e.g., tarpaulins) of potentially contaminated areas will be required to prevent ingress of rainfall.

A regular review of weather forecasts of heavy rainfall will be conducted, in particular during groundworks, and a contingency plan will be prepared for before and after such events to minimise any potential nuisances. As the risk of the break-out of silt laden run-off is higher during these weather conditions, no work will be carried out during such periods where possible.

Surface water from the surrounding areas will be prevented from draining into the open excavations onsite during construction works through the use of temporary bunds / sandbags around excavation areas to provide diversion of surface water away from excavations. A 10m buffer zone will be established around any open drainage courses and road gullies during construction works and other methods such as bunding implemented where appropriate to ensure that all watercourses or drainage gullies are appropriately isolated.

There will be no storage of materials or refuelling permitted within 10m of a water course (i.e. the Lee (Cork) Estuary Lower) any open drainage courses or road gully. Further details are provided in Section 9.10.2.7.

There will be no authorised discharge of surface water runoff during the construction phase.

The use of wheel-wash and water treatment facilities will be used as required on site. The correct use and management of these will be undertaken by the appointed contractor to ensure that there is no harm to the receiving water environment.

Public roads outside the site will be regularly inspected for cleanliness, as a minimum on a daily basis, and cleaned as necessary. If required, a road sweeper will be deployed to ensure that public roads are kept free of debris to prevent any runoff entering road gullies and the receiving water environment.

9.10.2.3 Control and Management of Groundwater

It is anticipated that localised dewatering or sump pumping on a temporary basis will be required during excavation and management of water from these excavations will include control of surface water runoff and pumping of water from excavations.

Where water must be pumped from the excavations, water will be managed through robust dewatering methodologies in accordance industry best practice standards (i.e., CIRIA – C750) that will be designed by the contractor to minimise the potential impact on the local groundwater flow regime.

- Dewatering must be carried out in cells or localised work areas and larger scale dewatering of the entire Site must be avoided to prevent an extensive groundwater drawdown across the site.
- The current groundwater flow regime must not be altered to ensure any risk of increasing the distribution of contaminants within the groundwater beneath the site.
- Monitoring of groundwater levels and contaminant concentrations around the periphery of the works area will be required as part of the groundwater management (refer to Section 9.16.1).

There will be no authorised discharge of water to ground during the construction phase. Where dewatering of shallow groundwater is required or where surface water runoff must be pumped from the excavations, water will be discharged by the contractor to sewer in accordance with the necessary discharge licences issued by UE under Section 16 of the Local Government (Water Pollution) Acts and Regulations for any water discharges to sewer or from FCC under Section 4 of the Local Government (Water Pollution) Act 1977, as amended in 1990 for discharges to surface water. To facilitate this, a temporary water treatment facility, including holding tanks and other necessary apparatus (such as activated carbon filtration and siltbusters), will be constructed on-site. This facility will ensure compliance with the conditions of the temporary discharge consent. Water will be treated and pumped to a holding area, where it will be sampled and tested by the contractor before discharge. Upon receiving analysis results and screening against required consent limits, the contractor will arrange for appropriate disposal. Groundwater will be treated and discharged to sewer in accordance with the temporary discharge consent.

Under no circumstances will any untreated wastewater generated onsite (from equipment washing, road sweeping etc.) be released offsite. Where required, all public sewers will be protected to ensure that any untreated wastewater generated onsite does not enter the public sewers.

9.10.2.4 Piling

Given the presence of petroleum hydrocarbons and solvents in soil and groundwater beneath the site, it is recommended that a piling risk assessment is completed by the appointed Contractor at detailed design stage and in advance of construction works commencing onsite. The proposed piling methodology will refer to the Environment Agency's (EA) guidance on 'Piling into Contaminated Sites' (EA, 2002) and 'Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance on Pollution Prevention' (EA, 2001), (or similar best practice) in order to minimise the potential for the introduction of any temporary conduit between any potential sources of contamination at the ground surface, made ground and underlying groundwater. The piling method will also include procedures to ensure any potential impact to water quality is prevented including preventing surface runoff or other piling/drilling fluids from entering the pile bores and surrounding formation. Where there is a requirement to use lubricants, drilling fluids or additives the contractor will use water-based, biodegradable, and non-hazardous compounds under controlled conditions.

9.10.2.5 Borehole Decommissioning

Existing groundwater monitoring wells at the site that are no longer required will be decommissioned in advance of construction works commencing. This work should be undertaken prior to the bulk excavation works for the construction of building foundations, utility infrastructure and other works to remove any direct conduit or pathway from ground surface for any contaminants to enter groundwater beneath the site.

Prior to commencing the demolition works, all wells must be inspected. The proposed schedule of wells to be decommissioned will be identified by the appointed Contractor in advance of construction works commencing onsite.

Monitoring wells within the site to be retained during the construction phase of the Proposed Development will be protected to ensure that the well head is not damaged during works. Any required wells that will unavoidably be removed during construction works will be decommissioned and replaced with a new monitoring well.

Decommissioning of wells will be undertaken in strict accordance with current best-practice at the time of decommissioning and at a minimum the specifications outlined in EPA Advice Note 14 (EPA, 2013b). This will remove any potential direct conduit for contaminants to enter the groundwater directly and potentially migrate offsite.

Any wells to be retained must be appropriately protected from damage during construction works using precast concrete rings, steel road plates or permanent metal bollards to protect them from damage throughout the works. Clear legible signage must be maintained, and daily inspection of the integrity of wells and protection measures completed.

9.10.2.6 Concrete Works

The cementitious grout and other concrete works during the construction phase, will avoid any contamination of ground through the use of appropriate design and methods implemented by the Contractor and in accordance with the CEMP (DBFL, 2024) and relevant industry standards.

Pre-cast concrete will be used where technically feasible to meet the design requirements for the Proposed Development. Where cast-in-place concrete is required (i.e., building foundations), all work must be carried out in dry conditions and be effectively isolated from any groundwater.

All ready-mixed concrete will be delivered to the Site by truck. Concrete batching will take place offsite, wash down and wash out of concrete trucks will take place into a container located within a controlled bunded area which will then be emptied into a skip for appropriate compliant removal offsite in accordance with all relevant waste management legislation. Any excess concrete is not to be disposed of onsite.

A suitable risk assessment for wet concreting shall be completed prior to works being carried out. Pumped concrete will be monitored to ensure there is no accidental discharge.

9.10.2.7 Handling of Fuels, Chemicals and Materials

Fuelling and lubrication of equipment will be carried out in accordance with the procedures outlined in the CEMP (DBFL, 2024), in a designated area of the site away from any watercourses and drains where not possible to carry out such activities offsite.

Any diesel, fuel or hydraulic oils stored onsite will be stored in designated areas of the site. These areas will be bunded and located away from surface water drainage and features. Bunds will have regard to Environmental Protection Agency guidelines 'Amendment to IPC Guidance Note on Storage and Transfer of Materials for Scheduled Activities' (EPA, 2013). All tank and drum storage areas will, as a minimum, be bunded to a volume not less than the greater of the following:

- 110% of the capacity of the largest tank or drum within the bunded area; or
- 25% of the total volume of substance that could be stored within the bunded area.

The appointed contractor will maintain an emergency response action plan and emergency procedures will be developed by the appointed contractor in advance of any works commencing. Construction staff will be familiar with the emergency response plan.

Spill kits will be made available onsite and identified with signage for use in the event of an environmental spill or leak. A spill kit will be kept in close proximity to the fuel storage area for use in the event of any incident during refuelling or maintenance works. Heavy machinery used on the Site will also be equipped with its own spill kit.

9.10.2.8 Emergency Procedures

Emergency procedures will be developed by the appointed Contractor in advance of works commencing and spillage kits will be available onsite including in vehicles operating onsite. Construction staff will be familiar with emergency procedures for in the event of accidental fuel spillages. Remedial action will be immediately implemented to address any potential impacts in accordance with industry standards and legislative requirements.

Any required emergency vehicle or equipment maintenance work will take place in a designated impermeable area within the Site.

- Emergency response procedures will be put in place, in the unlikely event of spillages of fuels or lubricants.
- Spill kits including oil absorbent material will be provided so that any spillage of fuels, lubricants or hydraulic oils will be immediately contained.
- In the event of a leak or spill from equipment in the instance of a mechanical breakdown during operation, any contaminated soil will be removed from the Site and compliantly disposed offsite. Residual soil will be tested to validate that all potentially contaminated material has been removed. This procedure will be undertaken in accordance with industry best practice procedures and standards.
- All construction works staff will be familiar with emergency procedures for in the event of accidental fuel spillages.
- All construction works staff onsite will be fully trained on the use of equipment.

This procedure will be undertaken in accordance with industry best practice procedures and standards. These measures will ensure that there is minimal risk to the receiving land, soil and geological environment associated with the construction phase of the Proposed Development.

9.10.2.9 Flooding

The appointed Contractor will provide method statements for weather and tide/storm surge forecasting and continuous monitoring of water levels in the Lee (Cork) Estuary Lower. The appointed Contractor will also provide method statements for the removal of site materials, fuels, tools, vehicles, and persons from flood zones in order to minimise the risk to persons working on the site as well as potential input of sediment or construction materials into the waterbodies during flood events.

9.10.2.10 Welfare Facilities

Welfare facilities have the potential, if not managed appropriately, to release organic and other contaminants to ground or surface water courses. Foul drainage from temporary welfare facilities during the construction phase of the Proposed Development will be discharged to temporary holding tank(s) the contents of which will periodically be tankered off Site to a licensed facility. All waste from welfare facilities will be managed in accordance with the relevant statutory obligations by tankering of waste offsite by an appropriately authorised contractor.

Any connection to the public foul drainage network during the construction phase of the Proposed Development will be undertaken in accordance with the necessary temporary discharge licences issued by Uisce Eireann (UE).

9.10.3 Operational Phase Mitigation

There will be no risk to water quality including groundwater and surface water associated with the operational phase of the Proposed Development. It is considered that the design of the Proposed Development is in line with the objectives of the Water Framework Directive (2000/60/EC), as amended (WFD) to prevent or limit any potential impact on water quality.

There will be no petroleum hydrocarbon-based fuels used during the operational phase and the main operating system for heating will be air to water heat pump, thereby removing any potential contaminant sources associated with fuels.

There will be no discharges to ground from drainage and only rainfall on public / communal open spaces will infiltrate to ground.

All drainage from paved areas along roads and impermeable roads will be collected and managed within the surface water drainage and SuDS solutions as outlined in the Infrastructure Design Report (DBFL, 2024).

The surface water management strategy includes a number of measures that will capture any potentially contaminating compounds (petroleum hydrocarbons, metals, and suspended sediments) in surface water runoff from the higher risk areas including roads and the impermeable areas that could potentially otherwise discharge to groundwater or receiving water courses in the vicinity the site. The measures incorporated in the SuDS design include, Permeable Paving, Green Roofs, Catchpit Manholes, Bioretention Areas and Attenuation System. The SuDS measures implemented will be effective in the treatment and removal of any contaminants (metals, hydrocarbons, polycyclic aromatic hydrocarbons (PAHs) and suspended solids) entrained in surface water runoff. The effectiveness of these SuDS measures is documented in TII guidance (TII, 2014). Furthermore, prior to discharging from the site will pass through a Bypass Separator that will be effective in removal of hydrocarbons that may enter the drainage system in particular in the event of worst-case scenario spill incident (e.g., collision on the roadway resulting in the loss of fuel form a vehicle).

Ongoing regular operational monitoring and maintenance of drainage and the SuDS measures will be incorporated into the overall management strategy for the Proposed Development. This will ensure that there are no impacts on water quality and quantity (flow regime) during the Operational Phase of the Proposed Development.

Accordingly, any potential impact on receiving surface water and groundwater beneath the Proposed Development site will be avoided taking account of the design proposals. Therefore, it is considered that the water quality protection criteria and objectives of the GDSDS and Water Framework Directive will be achieved.

There is no other requirement for mitigation measures for the operational phase of the Proposed Development.

9.11 Water Framework Directive

The findings of the risk-based assessment identified that in the absence of any mitigation and avoidance measures there could be a potential impact on the water quality within receiving water bodies associated with the Proposed Development, specifically within the Lee Valley Gravels GWB, the Lee (Cork) Estuary Lower and Lough Mahon transitional waterbodies and the Cork Harbour coastal waterbody. There is no identified potential impact to the Ballinhassig East GWB, and the Outer Cork Harbour and Western Celtic Sea coastal waterbodies attributed to the separation distances and anticipated assimilation capacity of the receiving water bodies taking account of the existing baseline conditions and WFD Status.

The design avoidance and mitigation measures as outline above, including the refinement of the existing HHRA (WSP, 2024a) and CWRA (WSP, 2024d) in advance of construction works commencing, remedial excavations of residual contaminated soil, the implementation of a robust CEMP during the construction phase and the incorporation of SuDS in the design of the Proposed Development, will service to mitigate impact on the receiving groundwater and surface water environment. Hence, the Proposed Development will not have any effect on compliance with the EU Water Framework Directive, European Communities (Environmental Objectives) Surface Water Regulations, 2009 (SI 272 of 2009, as amended 2012 (SI No 327 of 2012), and the European Communities Environmental Objectives (Groundwater) Regulations, 2010 (S.I. No. 9 of 2010), as amended 2012 (SI 149 of 2012) and 2016 (S.I. No. 366 of 2016).

The Proposed Development will not cause a deterioration in the status of waterbodies hydraulically connected with the Proposed Development, taking account of design avoidance and mitigation measures that will be implemented. The Proposed Development will not jeopardise the objective to achieve 'good' surface water status or good ecological potential.

Therefore, considering the embedded design avoidance and mitigation measures, there will be no adverse effect on the existing WFD status of water bodies associated with the Proposed Development including the Lee Valley Gravels and Ballinhassig East GWBs, the Lee (Cork) Estuary Lower and Lough Mahon transitional waterbodies and the Cork Harbour, Outer Cork Harbour and Western Celtic Sea coastal waterbodies and there will be a 'neutral to positive', 'slight to moderate' and 'long-term' impact on the WFD Status.

9.12 Residual Impact Assessment

Residual Impacts are defined as 'effects that are predicted to remain after all assessments and mitigation measures. They are the remaining 'environmental costs' of a project and are the final or intended effects of a development after mitigation measures have been applied to avoid or reduce adverse impacts.

9.12.1 Construction Phase

The predicted impacts of the Construction Phase of the Proposed Development are described in Table 9 11 in terms of quality, significance, extent, likelihood, and duration. The relevant mitigation measures are detailed, and the residual impacts are determined which take account of the avoidance, remedial and mitigation measures.

There are no significant residual impacts on the receiving water environment (hydrology and hydrogeology) anticipated regarding this Proposed Development.

The permanent removal of residual contaminated soil (and groundwater where applicable) will result in source removal and an overall site betterment and will have an overall 'neutral to positive', 'slight to moderate' and 'long-term' impact on receiving water quality.

Table 9 11. Residual Impacts (Construction Phase)

ACTIVITY	ATTRIBUTE	PREDICTED IMPACT	QUALITY	SIGNIFICANCE	DURATION	TYPE	MITIGATION	RESIDUAL IMPACT
Construction Phase								
Excavation of Contaminated Soil	Groudnwater Quality and WFD status	The excavation of made ground and underlying natural soils impacted with anthropogenic contamination (i.e., petroleum hydrocarbons and solvents) and permanent removal off-site is a design requirement of the Proposed Development.	Positive	Moderate to Significant / Slight to Moderate	Long-term	Direct / Cumulative	In advance of construction works commencing, the refined HHRA and CWRA will be used to inform the remediation plan to ensure that residual sources of contamination are removed offsite.	Positive
Contaminant Mobilisation - Surface Water Runoff Entering Excavations	Groundwater and Receiving Surface Water Quality and WFD status	In the event of a rainfall event, surface runoff entering the open excavations could result in mobilisation of identified hydrocarbon contamination in soil and leaching and migration to groundwater beneath the site.	Negative	Significant	Medium-term	Direct	Surface water will be managed in accordance with the requirements of the CEMP. Excavation works will be undertaken in a phased manner and surface water runoff will be prevented from draining into open excavations.	Imperceptible
Contaminant Mobilisation – Groundworks Including Dewatering	Groundwater and Receiving Surface Water Quality and WFD status	Dewatering could alter the local groundwater flow regime and contaminant distribution within the subsurface	Negative	Significant	Medium-term	Direct	Robust dewatering methodologies in accordance industry best practice standards (i.e., CIRIA – C750) will be designed by the contractor taking account of the potential for contaminant migration. Monitoring of groundwater levels and contaminant concentrations around the periphery of the works area will be required as part of the groundwater management	Imperceptible
Potential Uncontrolled Release of Hazardous Materials Including Cementitious Materials, Fuels, Oils and Other Materials	Groundwater and Receiving Surface Water Quality and WFD status	Potential (albeit low) for uncontrolled release of deleterious materials including fuels and other materials being used onsite, through the failure of secondary and tertiary containment or a materials handling accident, to the receiving groundwater environment.	Negative	Significant	Medium-term	Direct	Refuelling of plant and storage of any deleterious materials including fuels will be undertaken in accordance with the requirements and procedures outlined in the CEMP.	Imperceptible
Creation of Preferential Pathways During Piling	Groundwater and Receiving Surface Water Quality and WFD status	Piling could introduce a potential conduit to groundwater for any contaminants used during construction and depending on the piling method, materials used in piling such as grout and other materials.	Negative	Significant	Medium-term	Direct	A piling risk assessment will be completed by the appointed Contractor at detailed design stage and in advance of construction works commencing onsite.	Imperceptible
Release of Suspended Solids Entrained in Surface Runoff	Surface Water Quality and WFD status	Release of suspended solids entrained in surface runoff from haul routes to / from the site or other contaminants from groundworks areas and stockpiled soils could potentially enter open drainage channels and offsite road gullies.	Negative	Moderate	Medium-term	Direct	A 10m buffer zone will be established around any open drainage courses and road gullies during construction works and other methods such as bunding implemented where appropriate to ensure that all watercourses or drainage gullies are appropriately isolated.	Imperceptible
Mobilised Pollutants from Construction materials as a Result of Flooding	Groundwater and Receiving Surface Water Quality and WFD status	During a flood event there is the potential for pollutants derived from construction materials to be mobilised by flood waters.	Negative	Moderate	Temporary	Direct	The Contractor will continuously monitor water levels in the Lee (Cork) Estuary Lower. The Contractor will also provide method statements for the removal of site materials, fuels, tools, vehicles, and persons from flood zones.	Imperceptible

9.12.2 Operational Phase

The predicted impacts of the operational phase of the Proposed Development are described in Table 9 12 in terms of quality, significance, extent, likelihood, and duration. The relevant mitigation measures are detailed, and the residual impacts are determined which take account of the avoidance, remedial and mitigation measures.

Overall, there is no significant residual impacts on the receiving hydrology and hydrogeology anticipated regarding the operational phase of the Proposed Development.

Table 9 12. Residual Impacts (Operational Phase)

ACTIVITY	ATTRIBUTE	PREDICTED IMPACT	QUALITY	SIGNIFICANCE	DURATION	TYPE	MITIGATION	RESIDUAL IMPACT
Construction Phase								
Exposure to Volatile Hydrocarbons and Solvents in Contaminated Groundwater	Structures and Future Occupants of the Site	The groundwater beneath the site is impacted with hydrocarbons, VOCs and PAHs. Without suitable remedial measures, the presence of volatile petroleum hydrocarbons and chlorinated solvents in the groundwater beneath the site poses a 'negative,' 'moderate to significant' and 'long-term' risk to structures and future occupants of the site from exposure to groundwater vapours.	Negative	Moderate to Significant	Long-term	Direct	The refined HHRA and CWRA will inform the remediation plan, ensuring offsite removal of residual soil contamination, guiding remedial design measures (including vapor barrier specifications), and identifying any necessary supplementary groundwater remediation. A qualified engineer will specify the concrete during the detailed design stage to protect against groundwater impacted by petroleum hydrocarbons and chlorinated solvents.	Imperceptible / Positive
Reduced Potential for Contaminant Migration through Reduction in Infiltration		The reduction of infiltrations (i.e., rainfall and surface runoff) to ground at the site will impact on the underlying groundwater by minimising the potential for mobilisation or leaching of residual soil contaminants to the underlying aquifer	Positive	Imperceptible to Slight	Long-term	Direct	The refined CWRA will identify if any supplementary remedial works for groundwater are required taking account of the design proposal for the Proposed Development. Post construction groundwater and surface water monitoring will be implemented to ensure there are no impacts to receiving waterbodies.	Positive
Failure of SuDS		In the worst-case scenario of accidental spillage from a vehicle engine and failure of SuDS there is a potential risk to water quality in the receiving environment.	Negative	Moderate	Long-term	Direct / Worst-case	Ongoing regular operational monitoring and maintenance of drainage and the SuDS measures will be incorporated into the overall management strategy for the Proposed Development.	Imperceptible / Positive

9.12.3 Summary of Post-mitigation Effects

Table 9 13 summarises the identified likely significant residual effects during the construction phase of the Proposed Development following the application of mitigation measures.

Table 9 13 Summary of Construction Phase Effects Post Mitigation

LIKELY SIGNIFICANT EFFECT	QUALITY	SIGNIFICANCE	EXTENT	PROBABILITY	DURATION	TYPE
Excavation of Contaminated Soil	Positive	Moderate to Significant / Slight to Moderate	Local / Regional	Likely	Long-term	Direct / Cumulative
Contaminant Mobilisation - Surface Water Runoff Entering Excavations	Imperceptible	Significant	Regional	Possible	Medium-term	Direct
Contaminant Mobilisation – Groundworks Including Dewatering	Imperceptible	Significant	Regional	Possible	Medium-term	Direct
Potential Uncontrolled Release of Hazardous Materials Including Cementitious Materials, Fuels, Oils and Other Materials	Imperceptible	Significant	Local	Worst-case	Medium-term	Direct
Creation of Preferential Pathways During Piling	Imperceptible	Significant	Local	Possible	Medium-term	Direct
Release of Suspended Solids Entrained in Surface Runoff	Imperceptible	Moderate	Regional	Possible	Medium-term	Direct
Mobilised Pollutants from Construction materials as a Result of Flooding	Imperceptible	Moderate	Regional	Possible	Temporary	Direct

Table 9 14 summarises the identified likely residual significant effects during the operational phase of the Proposed Development post mitigation.

Table 9 14 Summary of Operational Phase Effects Post Mitigation

LIKELY SIGNIFICANT EFFECT	QUALITY	SIGNIFICANCE	EXTENT	PROBABILITY	DURATION	TYPE
Exposure to Volatile Hydrocarbons and Solvents in Contaminated Groundwater	Imperceptible / Positive	Moderate to Significant	Local	Likely	Long-term	Direct
Reduced Potential for Contaminant Migration through Reduction in Infiltration	Positive	Imperceptible to Slight	Local	Likely	Long-term	Direct
Failure of SuDS	Imperceptible / Positive	Moderate	Regional	Likely	Long-term	Direct / Worst-case

9.13 Risk of Major Accidents or Disasters

Extreme flood events (heavy rainfall events, storms, high tides and storm surges of the Lee (Cork) Estuary Lower) have the potential to flood the construction site which stores construction material and equipment which are potential sources of contaminants. The project can exacerbate the risk of flooding during construction by temporarily increasing hard standing in areas that are currently greenfield. The construction works will increase the number of people working near known sources of flooding, thus increasing the potential for flood risk related impacts on human health.

The site is currently defended by an embankment in conjunction with non-return valves that protect the South Docks from extreme flood levels in the Lee (Cork) Estuary Lower. These features are maintained by the Local Authority and OPW and it is proposed that these are enhanced to result in a higher level of protection. The Proposed Development will not affect the operation of these measures or interact with them in any way. The residual risk of failure or overtopping of these defences has been considered as part of the SSFRA for the scheme and within this assessment.

9.14 Worst Case Scenario

The potential accidental release of hazardous material including fuels, waste materials being used on-site, contaminated soil and groundwater removed during groundworks, creation of create pathways for contaminants to enter underlying groundwater during piling and any associated impact on the receiving hydrological and hydrogeological environment would only occur through the failure of secondary containment or a major incident on the site. A major failure in municipal flood defences during the construction phase of the Proposed Development, may also potentially create pathways for contaminants to enter adjacent waterbodies.

Taking account of standard management practices and mitigation measures any environmental harm can be avoided and it is considered that there would be a 'neutral', 'imperceptible' and 'short-term' impact on the receiving environment.

9.15 Interactions

9.15.1 Population and Human Health

An assessment of the potential impact of the Proposed Development on human health is included in Chapter 4 of this EIAR. The soils and groundwater beneath the site are locally impacted with hydrocarbons. Without suitable remedial measures the contamination under the Proposed Development poses a risk to site workers and future occupants of the site. Furthermore, the presence of volatile hydrocarbons in the made ground poses a risk to structures and future occupants of the site from exposure to ground gas.

The Proposed Development will increase the amount of people in close proximity to flood-prone areas such as the South Docks. This increased population density could heighten the potential for flood-related health impacts, particularly during construction. However, this area is currently defended by municipal flood defences to an appropriate standard. Residual risk will be mitigated by monitoring weather forecasts to optimize construction planning.

Appropriate industry standard and health and safety legislative requirements will be implemented during the construction phase of the Proposed Development that will be protective of Site workers.

9.15.2 Biodiversity

An assessment of the potential impacts of the Proposed Development on the Biodiversity of the Site, with emphasis on habitats, flora and fauna which may be impacted a result of the excavation and importation of materials to the Site are included in Chapter 10 of this EIAR. It also provides an assessment of the impacts of the Proposed Development on habitats and species, particularly those protected by national and international legislation or considered to be of particular conservation importance and proposes measures for the mitigation of these impacts.

9.15.3 Land and Soils

An assessment of the potential impact of the Proposed Development on the land and Soils is included in Chapter 8 of this EIAR. During the construction earthworks, heavy rainfall events have the potential to mobilise contaminated run-off and impact on the usability of materials stored onsite. This could therefore require the importation of additional material from external sources. Mitigation measures to reduce the risk of damage of construction materials from heavy rainfall and flood events is outlined in Chapter 9 above.

9.15.4 Material Assets

There is a risk of excess silts from construction runoff accumulating in the existing drainage network, potentially compromising its capacity. To mitigate this, standard pollution control measures will be employed to manage contaminated runoff and preserve the integrity of drainage channels during construction.

9.16 Monitoring

9.16.1 Construction Phase

During the Construction Phase of the Proposed Development the following monitoring measures will be considered:

- The removal of the residual soil source will be validated in accordance with relevant guidelines including EPA 'Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites' (EPA, 2013a) and guidance and standards current at the time of construction works.
- Groundwater and surface water monitoring will be implemented for the duration of the construction phase of the Proposed Development. A period of monitoring will also be undertaken post completion of the construction phase. The programme of monitoring will be informed by the refined HHRA and CWRA and will be agreed with the local authority in advance of construction works commencing onsite.
- Inspections will be undertaken during excavations and other groundworks to ensure that measures that are protective of water quality outlined in this EIAR, and the CEMP (DBFL, 2024) are fully implemented and effective.
- An Environmental Clerk of Works (ECoW) will be onsite to supervise all excavation and piling works.
- The decommission of boreholes onsite will be supervised by the ECoW to ensure it is completed in accordance with industry best practice standards including the Environmental Protection Agency's (EPA) advice note on "Borehole Construction and Wellhead Protection" (EA, 2013).
- The installation of vapour barrier will be supervised and signed off by a suitably qualified engineer.
- During dewatering works, monitoring of groundwater levels and contaminant concentrations around the periphery of the works area will be required as part of the groundwater management.
- Discharges to sewer will be monitored where required in accordance with statutory consents (i.e., discharge licence). Where required, water pumped from excavations will be treated and pumped to a holding area, where it will be sampled and tested by the contractor before discharge. Upon receiving analysis results and screening against required consent limits, the contractor will arrange for appropriate disposal. Groundwater will be treated and discharged to the foul sewer in accordance with the temporary discharge consent.
- Routine monitoring and inspections during refuelling, concrete works to ensure no impacts and compliance with avoidance, remedial and mitigation measures.

9.16.2 Operational Phase

Ongoing regular operational monitoring and maintenance of drainage and the SuDS measures will be undertaken throughout the lifetime of the operational phase of the Proposed Development.

9.17 Conclusion

The excavation and removal of soil and subsoil impacted with petroleum hydrocarbons and solvents will have a positive impact on the quality of soils and groundwater underlying the site.

Overall, taking account of the design avoidance and mitigation measures, there is no significant residual impacts on hydrology and hydrogeology anticipated regarding the construction phase and operational phase of the Proposed Development.

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VOLUME II

CHAPTER 10
Biodiversity

McCutcheon Halley
CHARTERED PLANNING CONSULTANTS

CHAPTER TEN
Table of Contents

CHAPTER TEN
Table of Figures

CHAPTER TEN
Table of Tables

Chapter Ten | Biodiversity

10.1 Introduction

10.1.1 Overview and Aims

Enviroguide Consulting was commissioned by McCutcheon Halley to prepare the Biodiversity Chapter of this EIAR, for a Proposed Large-scale Residential Development (LRD) at the Former Ford Distribution Site, fronting onto Centre Park Road, Ballintemple, Cork, hereafter referred to as 'Proposed Development' or 'Site' when referring to the site area of the Proposed Development.

This Biodiversity Chapter assesses the potential effects of the Proposed Development on habitats and species; particularly those protected by national and international legislation or considered to be of nature conservation importance on or adjacent to the Site. This report will describe the ecology of the Site, with emphasis on habitats, flora and fauna, and will assess the potential effects of the Construction and Operational Phases of the Proposed Development on these ecological receptors. The report follows Guidelines for Ecological Impact Assessment in the UK and Ireland, by the Chartered Institute of Ecology and Environmental Management (CIEEM, 2018) and supplemented by the National Roads Authority (2009) Guidelines for Assessment of Ecological Impacts of National Road Schemes. The purpose of this Report is to:

- Set out the methodologies used to inform the assessment.
- Identify Key Ecological Receptors (KERs) within the Zone of Influence (ZOI).
- Assess the impacts from the Proposed Development on the KERs and the resulting significant effects.
- Set out measures to avoid or mitigate negative effects.
- Assess the residual effects after the incorporation of agreed avoidance or mitigation measures to ensure legal compliance.
- Set out agreed measures to offset significant residual effects.
- Set out opportunities for ecological enhancement.

10.1.2 Quality Assurance and Competence

Enviroguide Consulting is wholly Irish Owned multi-disciplinary consultancy specialising in the areas of the Environment, Waste Management and Planning. All of our consultants carry scientific or engineering qualifications and have a wealth of experience working within the Environmental Consultancy sectors, having undergone extensive training and continued professional development.

Enviroguide Consulting as a company remains fully briefed in European and Irish environmental policy and legislation. Enviroguide staff members are highly qualified in their field. Professional memberships include the Chartered Institution of Wastes Management (CIWM), the Irish Environmental Law Association and Chartered Institute of Ecology and Environmental Management (CIEEM).

All surveying and reporting have been carried out by qualified and experienced ecologists and environmental consultants. TR, Senior Ecologist and Ornithologist with Enviroguide is the lead author of this chapter, and also undertook the Breeding Bird Survey, habitat, fauna and flora surveys and desktop research for this report. BMc, Ornithologist and Ecologist with Enviroguide, undertook the Breeding Bird Survey and Bat Activity Survey for this report. KM and CRK, Ecology interns at Enviroguide, assisted in carrying out the Bat Activity Surveys for this report. This chapter of the EIAR has been prepared by TR of Enviroguide Consulting.

TR holds a B.Sc. in Environmental and Natural Resource Management (Hons.) and a Post-Graduate Diploma in Environmental Management with GIS. TR is an experienced Ecologist who has specialised in ornithology and terrestrial mammals with over 8 years' experience in ecological consultancy, including input into ecological reports such as EIAR Biodiversity Chapters, Stage 1 Appropriate Assessment Screening (AA), Stage 2 Natura Impact Statements (NIS), and Ecological Impact Assessment (EcIA) for Large-Scale Residential Developments. TR also has a lifetime of personal interest and experience in wildlife management, has extensive experience in ecological surveying, desktop research, bird activity reports and detailed species-specific mapping. His ability to deal with and understand a range of species, survey methods and habitats is excellent, having an in-depth knowledge and understanding of EU and Irish legislation.

BMc is an Ecologist and experienced Ornithologist with 12 years of bird survey experience. BMc is a longstanding and active member of Bird Watch Ireland and has provided Ornithology survey work for ecological consultancies, e.g., vantage points surveys of gulls, terns, raptors, waders, and wildfowl; hinterland surveys of the above as well as riverine species; and breeding waders and country birds. BMc is highly experienced with all survey methodologies and with surveying all species groups of Irish birds and migrants.

CRK is an intern Ecologist with a M.Sc. in Biodiversity and Conservation from Trinity College Dublin. CRK's experience as an ecologist is broad both variety of ecological reports and literature, and field surveys conducted. CRK has experience in surveying habitats, birds, plants, bats, mammals and invasive species, with some experience in assessing welfare conditions of animals using behavioural repertoires as indicators. CRK's experience in ecological report writing extends from Research associated literature reviews to AA screening reports and Municipal District Summary reports.

10.1.3 Relevant Legislation and Policy Context

An EcIA is a process of identifying, quantifying, and evaluating potential effects of development-related or other actions on habitats, species and ecosystems (CIEEM, 2018). When an EcIA is undertaken as part of an EIA process (in the form of an EIAR Biodiversity Chapter) it is subject to the EIA Regulations (under the Planning and Development Regulations 2001-2023). An EcIA is not a statutory requirement, however it is a best practice evaluation process. The EcIA detailed within this Biodiversity Chapter is provided to assist the Competent Authority with its decision making in respect of the Proposed Development.

There is a number of pieces of legislation, regulations and policies specific to ecology which underpin this assessment. These may be applicable at a European, National or Local level. Legislation at the International level relevant to the Proposed Development are listed below:

- Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora; hereafter the 'Habitats Directive'.
- Directive 2009/147/EEC, hereafter the 'Birds Directive'.
- Directive 2011/92/EU, hereafter the 'EIA Directive'.

- EU Regulation 1143/2014, on Invasive Alien Species.
- Convention on the Conservation of European Wildlife and Natural Habitats 1982, hereafter the 'Bern Convention'
- The Convention on the Conservation of Migratory Species of Wild Animals 1983, hereafter the 'Bonn Convention'.
- Ramsar Convention on Wetlands 1971, hereafter referred to as 'Ramsar'.
- Water Framework Directive 2000/60/EC, hereafter the 'WFD'.

National legislation and policy relevant to the Proposed Development are listed below:

- Wildlife Act 1976, as amended in 2000.
- Flora (Protection) Order 2022.
- The Planning and Development Act 2000.
- National Biodiversity Plan 2023-2030.

Additionally, Natural Heritage Areas (NHAs) are designations under the Wildlife Acts to protect habitats, species, or geology of national importance. The boundaries of many of the NHAs in Ireland overlap with Special Areas of Conservation (SAC) and/or Special Protection Area (SPA) sites. Although many NHA designations are not yet fully in force under this legislation (referred to as 'proposed NHAs' or pNHAs), they are offered protection in the meantime under planning policy which normally requires that planning authorities give recognition to their ecological value.

Local plans and policies relevant to the Proposed Development are listed below:

- Cork City Heritage and Biodiversity Plan (2021-2026)
- Cork City Development Plan (2022-2028).

Further details on legislation and policy relevant to the Proposed Development are detailed in Appendix 10.1.

10.2 Description of the Proposed Development

10.2.1 Proposed Development Description

The proposed development will include the construction of 176 no. 1, 2 and 3 bed apartment units in 2 no. blocks, 1 no. creche, 1 no. gym, a retail/café space and all associated ancillary development works. A detailed description of the proposed development is provided in Chapter 2 of this Environmental Impact Assessment Report (EIAR).

10.2.2 Site Location

The Proposed Development is located within Corks South Docklands and is bound by an existing Strategic Housing Development (SHD) SHD) (ABP Ref: TA28.309059) to the southwest and Centre Park Road to the north. The Proposed Development site is bordered by the Marquee Road to the southwest, and by a pedestrian trail to the southeast. Lee Rowing Club is adjoining the Proposed Development Site to the northeast. The existing SHD is in the early stages of the construction phase and backs directly onto the proposed Site. The area is located within a 25-minute walk of Cork City Centre and within a 35-minute walk of Mahon Point. Both of which are significant employment centres. The total site area is 0.84 hectares.

The location of the site is presented in Figure 10-1 below.

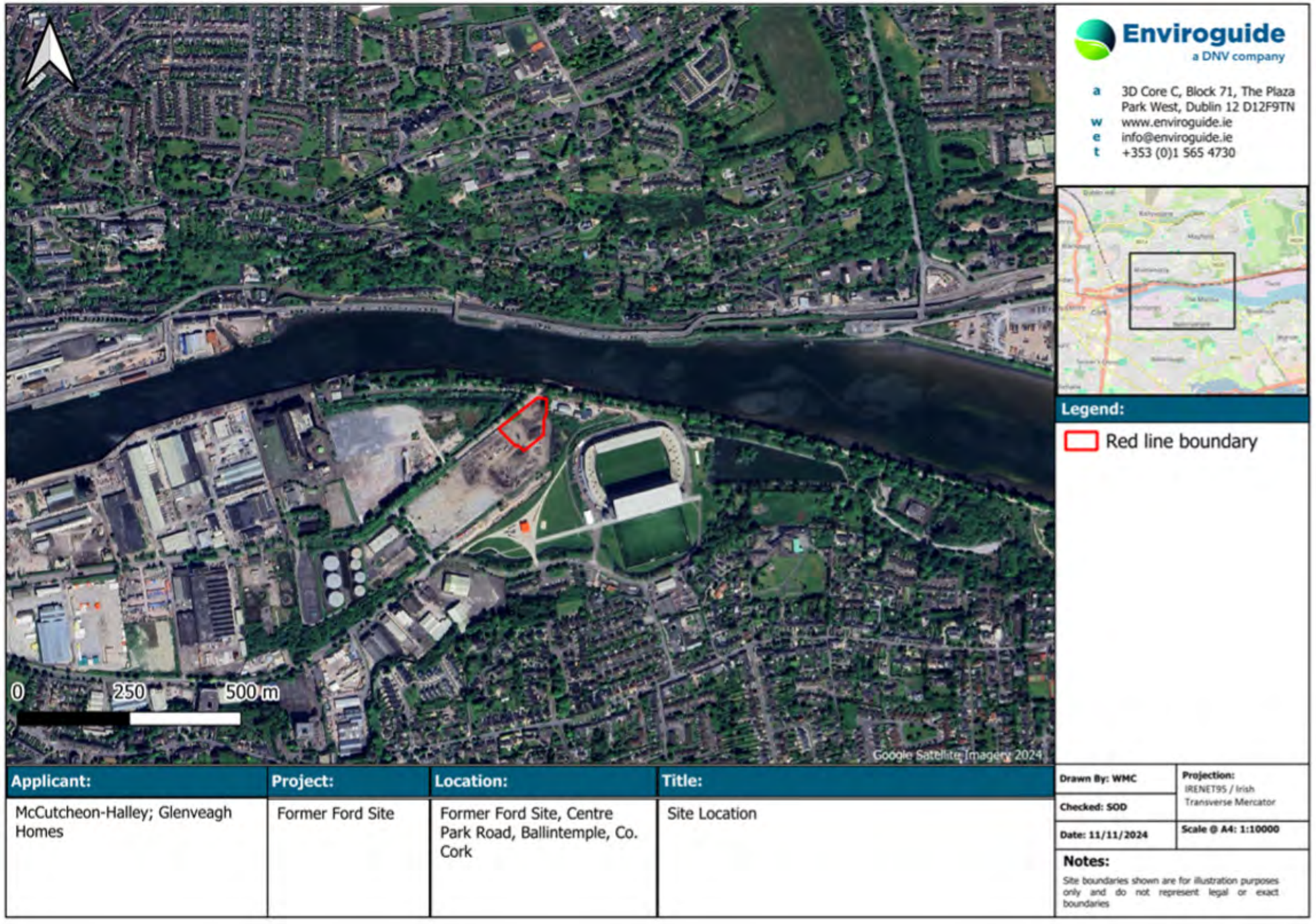


Figure 10 1 Site Location

10.2.3 Description of the Construction Phase

Marina Quarter Ltd. Intend to apply for permission for the development of 176 apartments constructed in two blocks as described in Section 10.2.1. It is estimated that the project will commence in Q4 2025/ Q1 2026 with the construction phase lasting c. 18 -24 months as outlined in the preliminary Construction Environmental Management Plan (CEMP) prepared by DBFL (2024).

10.2.3.1 Construction Phase Order of Activities
The construction phase will include the following order of activities:

- Site Setup including welfare facilities and hoarding;
- Set up of construction cranes;
- Earthworks, including cut and fill and disposal of excess material off site;
- Construction of substructure including concrete basement and access ramp;
- Construction Super Structure Frame to buildings in sequence to roof level;
- Construction of site services including surface water and foul drainage and water supply network;
- Roof and Façade finishes;
- Instillation of major plant items;
- M&E services & utilities;
- Internal fit out;
- External fit out, planters etc.;
- External site works and tie into Centre Park Road.

10.2.3.2 Earthworks
Earthworks will involve the excavation of the Site to undercroft level and reduction of the existing level area to facilitate building foundations. Excess material will be transported off-Site and disposed of by a licensed facility and this will be carried out at regular intervals to avoid large amounts of material being stored on Site. Initial site clearance works will be carried out prior to development.

10.2.3.3 Working Hours
As per the preliminary CEMP, it is anticipated that normal working hours will be 7am – 7pm Monday to Friday and 7am to 2pm on Saturdays.

10.2.3.4 Sediment and Water Pollution Control Plan
As per the preliminary CEMP, all statutory legislation in relation to water pollution will be followed in full, including full co-operation with the Environmental Section of Cork City Council with regards to pollution control.

10.2.3.5 Dust and Dirt Generation Control Measures
There is a probability that on-Site activities will produce dust emissions, the extent of which will be dependent on environmental factors such as rainfall, wind speed and wind direction. A dust management plan is described in the CEMP (DBFL, 2024) with the following dust control measures prescribed for the Site during construction.

'" Consultation will be carried with an ecologist throughout the construction phase;

- *Trucks leaving the site with excavated material will be covered so as to avoid dust emissions along the haulage routes.*
- *Apply a speed limit of at least 15km/hr for on-site vehicles*
- *Provide water bowsers during periods of dry weather to ensure unpaved areas are kept moist. Spray exposed site haul roads during dry and / or windy weather.*
- *Ford LRD, Cork City Construction and Environmental Management Plan 240002-X-20-BK01-L01-RP-DBFL-CE-0003 P1_0 August 2024 14*
- *Ensure paved roads are kept clean and free of mud and other materials. Sweep hard surface roads, inside and outside the site, to ensure roads are kept clear of debris, soil or other material.*
- *Restrict un-surfaced roads to essential site traffic.*
- *Provide water bowsers during periods of high winds and dry weather conditions to ensure moisture content is high to increase the stability of the soil.*
- *During the proposed infrastructure works the following mitigation measures shall be implemented to minimise dust emissions:*
    - *Construction techniques shall minimise dust release into the air.*
    - *Protect overburden material from exposure to wind by storing the material in sheltered regions of the site.*
    - *Regular watering of stockpiles during dry and windy periods.*
    - *Locate any stockpiles away from sensitive receptors, (i.e. receptors sensitive to dust release).*
    - *Provide tarpaulins over all unacceptable excavated materials being carted off site.*
- *The wheels of all vehicles leaving the construction site will be washed to ensure that dirt and dust is not transferred onto the public roadway.*
- *During dry spells and if deemed necessary monitoring of dust levels shall be carried out using the Bergerhoff Method i.e. analysis of dust collecting jars left on-site (German*
- *Standard VDI 2119, 1972). Results will be compared to the TA Luft guidelines (TA Luft, 1972). Should an exceedance of the TA Luft limit occur, additional mitigation measures, for example more regular spraying of water, shall be implemented."*

Adequate Site monitoring, operation and measures specific to earthworks are also outlined in the CEMP, in order to mitigate environmental pollution of the Site and surrounding areas due to dust generation during construction.

10.2.3.6 Noise and Vibration

The construction phase will involve the generation of noise through construction plant machinery and delivery of material to Site. The noise generated during the development phase will be minimised in accordance with standard *guidelines and regulations as described in the preliminary CEMP (DBFL, 2024) including;*

- *''BS 5228: Code of Practice for Noise and Vibration Control on Construction and Open Sites;*
- *Guidelines for the Treatment of Noise and Vibration in National Road Schemes (NRA, 2014);*
- *Safety, Health and Welfare at Work (General Application) Regulations 2007, Part 5 - Noise and Vibration."*

10.2.4 Description of the Operational Phase

The Operational Phase will comprise residential use that is consistent with the neighbouring land use in the area and that of the neighbouring SHD development currently under construction.

10.2.4.1 Drainage and Water Supply

10.2.4.1.1 Surface Water Management

The Proposed Development is to be served by a gravity surface water drainage network discharging into suds/ storage infrastructures and ultimately discharging to neighbouring surface water attenuation system previously accounted and designed for as part of the previously approved SHD (Ref. ABP-309059-20). The proposed Surface Water Management Strategy comprises a combined system of surface water pipe network as well as SuDS features, which will also serve to reduce and restrict the rainfall runoff discharging from the Proposed Development to the greenfield equivalent runoff rate.

Proposed SuDS features include:

- Green roofs;
- Green podiums;
- Permeable paving;
- Filter drains;
- Rain garden, swales with check dams;
- Bio-retention and geocellular storage systems and,;
- Flow control devices.

As outlined in the Infrastructure Design Report (IDR) accompanying this planning application prepared by DBFL Consulting Engineers (2024), the management of surface water for the proposed development has been designed to comply with the policies and guidelines outlined in the Cork City Development Plan Objectives 2022-2028. The guidelines require the following 4 main criteria to be provided by the design:

Criterion 1: Sustainable Urban Drainage Systems (SUDS) – for any new residential development it is required to incorporate SUDS by providing interception storage and treatment within the green roof, bio-retention/filter drains and green courtyard and garden.

Criterion 2: Discharging – to require that onsite petrol/interceptors and silt traps shall be installed to all significant road projects where surface water otherwise discharges to watercourse, to prevent hydrocarbon pollution of the water.

Criterion 3: Storm Water– satisfied by the development's surface water drainage design, planned flood routing, run-off contained within site and that flood management ensures that measures are implemented to protect property and infrastructure.

Criterion 4: Water quality– to support Irish water in its implementation of water quality for ground, surface, coastal and estuarine. To support mitigation and protection measures for all protected areas and associated source protection plan in line with the Water framework Directives.

In summary the design of the surface water network is aligned with the requirements of the Cork South Docklands Levels Strategy as set out in planning reference: ABP-3090059-20 and as stated by DBFL (2024). The surface water strategy for the proposed development incorporates SuDS features to reduce runoff and all surface water will be directed to the neighbouring SHD development where surface water will be attenuated to a volume of 1:100 years plus 20%. The previously granted SHD application has been designed to accommodate the addition of the subject Site and is under the same ownership, making the linkage of infrastructure possible in this case.

10.2.4.1.2 Foul Water Management

It is understood that wastewater resulting from the Proposed Development will be treated at Cork City (Carrigrennan) Waste Water Treatment Plant (WWTP) (Licence No. D0033-01) during the operational phase, before discharging to Lough Mahon transitional waterbody (Enviroguide, 2024). The current capacity of Cork City WWTP will be reduced as a result of the Proposed Development.

The following text from the Infrastructure Management Plan sets out the proposed foul water layout for the Proposed Development (DBFL, 2024).

''The proposed developments wastewater will be discharged to the Uisce Eireann 225 mm diameter foul sewer on Marquee Road via the proposed foul water network within the adjacent Fords SHD development.

All matters relating to wastewater will be agreed with Uisce Eireann. A confirmation of feasibility was received from Irish Water confirming feasibility without need for any upgrade works."

The proposed connection to the neighbouring SHD system is displayed in Figure 10-2 below.

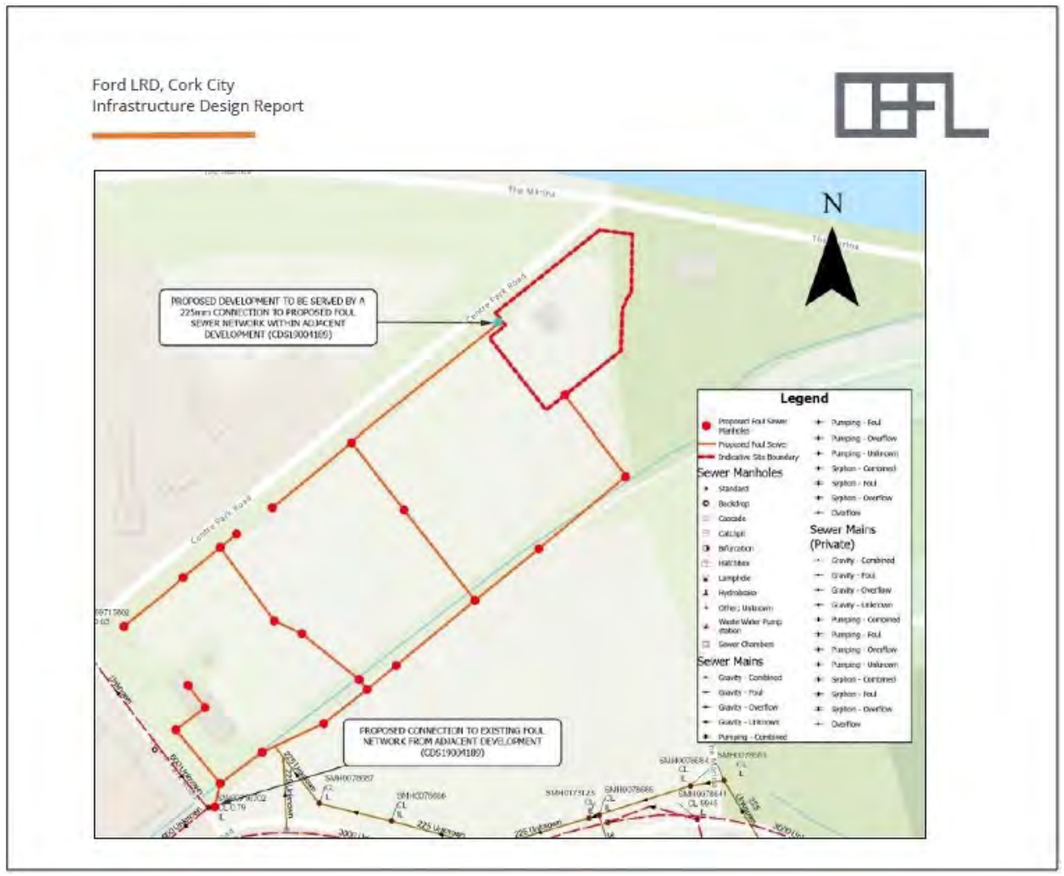


Figure 10 2. Foul Water Connection DBFL, IDR document reference 240002-X-X-X-XXX-RP-DBFL-CE-0001 IDR

10.2.4.1.3 Landscape Plan

The proposed landscape plan, as prepared by AIT (2024), is displayed in Figure 10-3 below. Biodiversity measures proposed include planting of native trees including Hazel, hawthorn, Silver Birch, Scots Pine and Oak as well as pollinator friendly shrubs within planting beds, the majority of which are listed on the All-Ireland Pollinator Plan 2015 - 2020. Formal hedging will consist of native holly.

Consultation between the landscape team and the engineers will result in a consistent approach to SuDS measures including the direction of surface water to sustainable water management infrastructure as outlined in the landscape report.

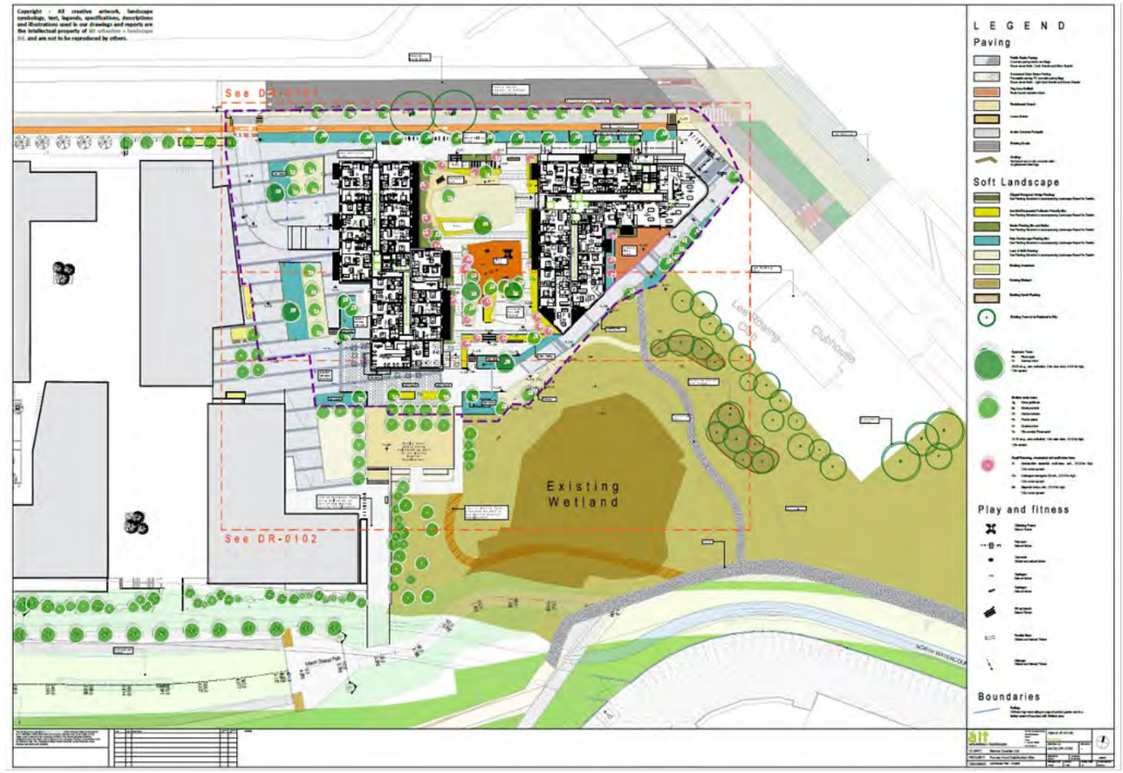


Figure 10 3. Landscape Plan (AIT, 2024)

10.2.4.1.4 Lighting Plan

The lighting report prepared by EDC (2024) shows the areas of light on the periphery of the development, including the marsh area to the east. Ligh spill will be kept to a minimum level as shown in Figure 10-4 below. Lighting design is in line with, and designed with cognisance of best practice guidelines issued by the Bat Conservation Trust and the Institute of Lighting Professionals (2023).

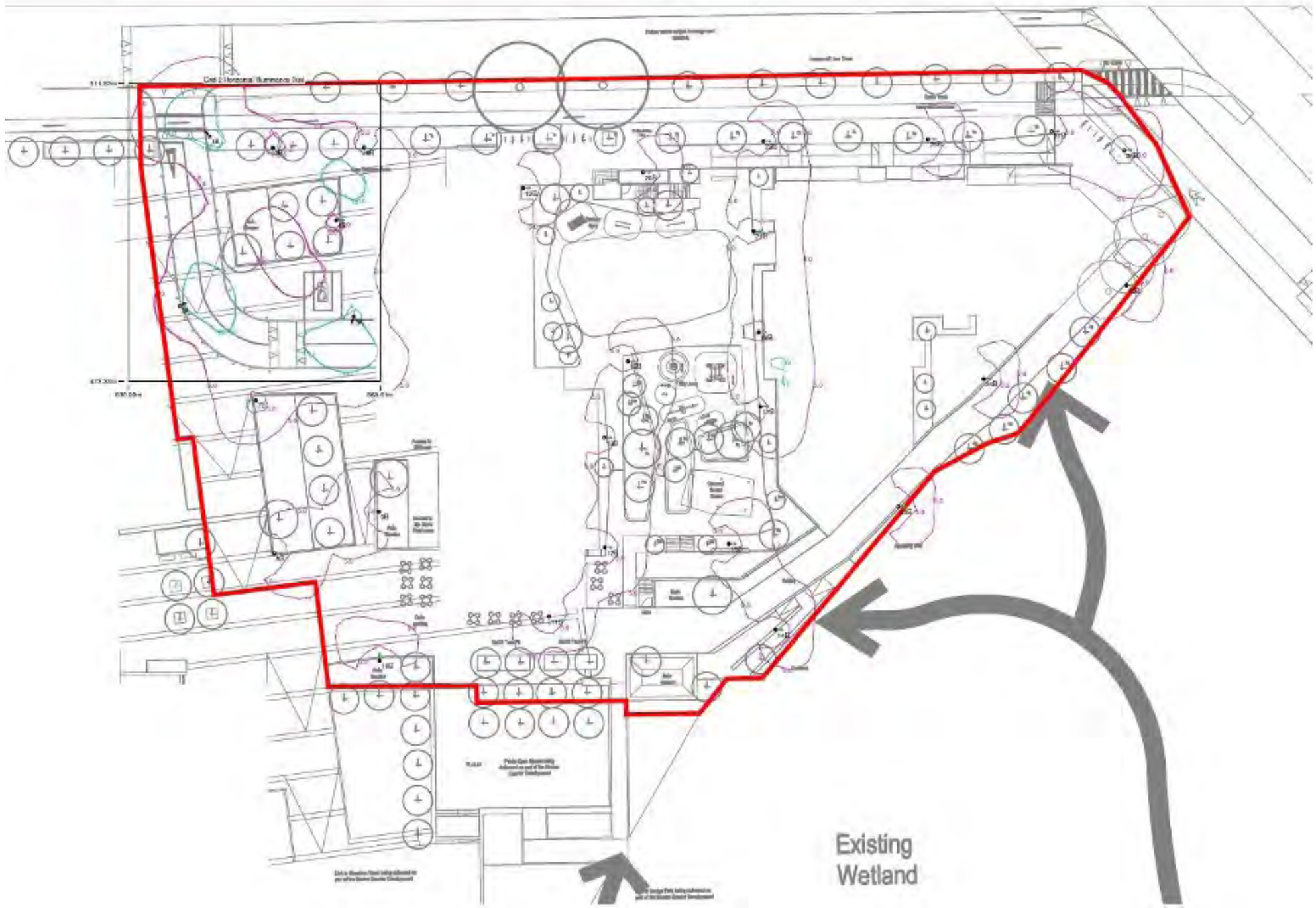


Figure 10 4. Lighting Plan (EDC, 2024).

10.3 Methodology

10.3.1 Scope of Assessment

The specific objectives of the study were to:

- Undertake baseline ecological surveys and evaluate the nature conservation importance of the Site;
- Identify and assess the direct, indirect and cumulative ecological implications or effects of the Proposed Development during its lifetime; and
- Where possible, propose mitigation measures to remove or reduce those effects at the appropriate stage of the development.

10.3.2 Desk Study

A desktop study was carried out to collate and review available information, datasets and documentation sources pertaining to the Site's natural environment. The desk study, completed in May 2024, relied on the following sources:

- Information on species records and distributions, obtained from the National Biodiversity Data Centre (NBDC) at maps.biodiversityireland.ie;
- Information on Floral Protection Order (FPO) Bryophytes database at dahg.maps.arcgis.com;
- Information on waterbodies, catchment areas and hydrological connections obtained from the Environmental Protection Agency (EPA) at gis.epa.ie;
- Information on bedrock, groundwater, aquifers and their statuses, obtained from Geological Survey Ireland (GSI) at www.gsi.ie;
- Information on the network designated conservation sites, site boundaries, qualifying interests and conservation objectives, obtained from the National Parks and Wildlife Service (NPWS) at www.npws.ie;
- Satellite imagery and mapping obtained from various sources and dates including Google, Digital Globe, Bing and Ordnance Survey Ireland;
- Information on the existence of permitted development, or developments awaiting decision, in the vicinity of the Proposed Development from the National Planning Application Database available at: https://housinggovie.maps.arcgis.com/apps/webappviewer/index.html?id=9cf2a09799d74d8e9316a3d3a4d3a8de; and
- Information on the extent, nature and location of the Proposed Development, provided by the applicant and/or their design team.

A comprehensive list of all the specific documents and information sources consulted in the completion of this report is provided in Section 10.19, References and Sources.

10.4 Zone of Influence

The ZOI for a project is the area over which ecological features may be affected by changes as a result of the Proposed Development and associated activities. This is likely to extend beyond the development site, for example where there are ecological or hydrological links beyond the site boundaries (CIEEM, 2018). The ZOI will vary with different ecological features, depending on their sensitivities to an environmental change.

Furthermore, ZOI in relation to European sites is described as follows in the 'OPR Practice Note PN01 - Appropriate Assessment Screening for Development Management' (OPR, 2021):

> *"The zone of influence of a proposed development is the geographical area over which it could affect the receiving environment in a way that could have significant effects on the Qualifying Interests of a European site. This should be established on a case-by-case basis using the Source-Pathway-Receptor framework and not by arbitrary distances (such as 15 km)."*

10.5 Identification of Relevant Designated Sites

To determine the ZOI of the Proposed Development for designated sites, reference was made to the OPR Practice Note PN01 - Appropriate Assessment Screening for Development Management' (OPR, 2021), a practice note produced by the Office of the Planning Regulator, Dublin. This note was published to provide guidance on screening for AA during the planning process, and although it focuses on the approach a planning authority should take in screening for AA, the methodology is also readily applied in the preparation of reports such as this to identify all relevant designated sites potentially linked to the Proposed Development.

As noted above, the most recent guidance advises against the use of arbitrary distances that serve as precautionary ZOI (e.g., 15km), and instead recommends the application of the Source-Pathway-Receptor (S-P-R) model in the identification of designated sites, stating that "This should avoid lengthy descriptions of European sites, regardless of whether they are relevant to the Proposed Development, and a lack of focus on the relevant European sites and issues of importance". Although this statement refers to European sites, it is also applicable to other designated sites.

Thus, the methodology used to identify relevant designated sites comprised the following:

- Identification of potential sources of effects based on the Proposed Development description and details;
- Identification of potential pathways between the Site of the Proposed Development and any designated sites within the ZOI of any of the identified sources of effects.
    - Water catchment data from the EPA (www.epa.ie) were used to establish or discount potential hydrological connectivity between the Proposed Development and any designated sites.
    - Groundwater and bedrock information used to establish or discount potential hydrogeological connectivity between the Proposed Development and any designated sites.
    - Air and land connectivity assessed based on Proposed Development details and proximity to designated sites.
    - Consideration of potential indirect pathways, e.g., impacts to flight paths, ex-situ habitats, etc.

- Review of Ireland's designated sites to identify those sites which could potentially be affected by the Proposed Development in view of the identified pathways, using the following sources;
    - European sites and nationally designated sites (e.g., NHAs and pNHAs) from the NPWS (www.npws.ie);
    - Ramsar sites from the Irish Ramsar Wetland Committee (https://irishwetlands.ie/irish-sites/);
    - Other internationally designated sites e.g., UNESCO Biosphere's; and
- Regional development plans to identify any remaining sites or areas designated for nature conservation at a local level.

10.6 Field Surveys

10.6.1.1 Preliminary Ecological Appraisal

Preliminary Ecological surveys were carried out on-Site in May 2024. The field survey for the Preliminary Ecological Assessment (PEA) included habitat mapping, an invasive species survey, and a general search for signs of protected species that may be expected to be present based on the desk study, as well as an initial assessment of habitat suitability for same.

10.6.1.2 Habitat and Flora Surveys

Ecological walkovers of the Site were conducted on the 09th of May 2024 by Enviroguide Consulting. Where possible species compositions and abundance are described using the DAFOR (Dominant, Abundant, Frequent, Occasional or Rare) scale, a simple method of assigning abundance categories to species. Habitats were categorised to level 3, according to the Heritage Council's 'A Guide to Habitats in Ireland' (Fossitt, 2000). The habitat mapping exercise had regard to the 'Best Practice Guidance for Habitat Survey and Mapping' (Smith et al., 2011) published by the Heritage Council, and the National Roads Association (now known as Transport Infrastructure Ireland (TII)) guidance on 'Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes' (TII, 2009). Habitats within the surrounding area of the Proposed Development were classified based on views from the Site and satellite imagery where necessary (Google Earth, Digital Globe and OSI). The habitat and flora surveys cover the period considered suitable for such surveys as per the abovementioned guidance (April-October). The surveys also included a search for any rare or protected plant species which may be present at the Site.

10.6.1.3 Invasive Species Surveys

Invasive species surveys were incorporated into the ecological walkovers carried out at the Site. During the ecological walkovers conducted on the 09th of May 2024, the location of invasive species, where they were encountered, was documented on the field map or through the use of GPS in the field, along with the extent of the area they cover. The invasive plant species survey primarily focused on plant species that are listed on Schedule III of the European Communities (Birds and Habitats) Regulations and considered to be 'High impact' invasive species e.g., Japanese Knotweed (Fallopia japonica). Incidental observations of other terrestrial plant species known to be potentially invasive, such as Butterfly Bush (Buddleja davidii), were also recorded, where found.

10.6.1.4 Non-volant Mammals Surveys

Mammal surveys of the Site were carried out in conjunction with the initial habitat and bird surveys. The Site was searched for tracks and signs of non-volant mammals as per Bang and Dahlstrom (2001) (i.e., mammals which are incapable of flight). The habitat types recorded throughout the survey area were used to assist in identifying the fauna considered likely to utilise the area.

All accessible watercourses within 150m of the Site were assessed for the presence of Otter (Lutra lutra) and for the suitability to support Otters. This involved searching for associated field signs, such as spraints, footprints, anal jelly, holts and couches to best practice guidelines (NRA, 2008). The possibility for the Site and surrounding areas to hold other species e.g. Badger (Meles meles) was also considered during the initial Site survey as per best practice guidelines (Harries, Cresswell & Jefferies 1989; NRA 2005)

10.6.1.5 Bat Surveys

10.6.1.5.1 Preliminary Bat Roost Assessment

A daytime inspection of the Site was undertaken on the 09th of May 2024, in adherence to best practice guidelines (Collins, 2023). The aim of the inspection was to search for indication of the presence of roosting bats, and to assess the habitat for its ability to support commuting and foraging bats. Buildings and trees on Site were visually assessed from the ground with the aid of a torch and binoculars. The roost inspection comprised a detailed inspection of structures and trees on Site. These were subject to exterior and interior inspections (where possible) to search for evidence of bat use. This includes live and dead specimens, droppings, feeding remains, oil staining and noise (Collins 2023). Trees were searched for Potential Roosting Features (PRFs) such as hollow trunks, knot holes, peeling bark, splits, cracks, and crevices (Collins 2023; Andrews 2018). Collins (2023) recommends that structures and trees are assessed for their ability to support roosting bats under separate categorisations using professional judgement and sub-categories as presented in Table 4.1 (Collins, 2023) and summarised below.

Structures are categorised as:

- Negligible – No suitable features observed, however, a small element of uncertainty remain;
- Low – A structure with one or more roost features as used by individual bats opportunistically at any time of year;
- Moderate – A structure with one or more roost features that could be used by bats on a regular basis or by a larger number of bats; and
- High – A structure with one or more roost features that are obviously suitable for use by a larger number of bats on a regular basis, and potentially for longer periods of time. These features have the potential to support high conservation status roosts.

Trees are categorized separately accordingly to Table 4.2 of Collins (2023). These classifications are:

- NONE – Either no PRFs in the tree or highly unlikely to be any;
- FAR – Further assessment required to establish if PRFs are present in the tree; and
- PRF – A tree with at least one PRF present.

Where a tree contains at least one PRF, each PRF is further assessed according to Table 6.2 (Collins 2023). PRF's are scored as either:

- PRF-I – PRF is only suitable for individual bats or very small numbers of bats either due to size or lack of suitable surrounding habitats.
- PRF-M – PRF is suitable for multiple bats and may therefore be used by a maternity colony.

For trees with PRF-I's only, no further surveys may be required, but appropriate compensation for all PRF-I's must be designed and incorporated in advance of impacts along with a Precautionary Working Method Statement (PWMS). As the Site increases in suitability for roosting bats e.g., PRF-M's present, the survey effort increases accordingly. A PRF-M will require a detailed inspection, such as aerial inspection, conducted over three survey visits, a minimum of three weeks apart, which should be carried out between May and September with at least two in the period May to August. Where features are inaccessible by ladder, climbing, or MEWP, or too extensive for a PRF inspection, the aerial inspection should be replaced with emergence surveys carried out between May and September with Night Vision Aids (NVA) where possible or otherwise surveyed using Advanced Licence Bat Survey Techniques (ALBST), such as trapping, tagging, and radio-tracking to inform of the importance of a roost.

10.6.1.5.2 Preliminary Bat Habitat Suitability Assessment

The Site was also assessed in relation to potential bat foraging habitat and potential bat commuting routes. This assessment evaluated the habitats present on Site and in the wider area for bat foraging and commuting suitability. Habitat suitability is assessed qualitatively from None to High as per Collins (2023):

- None - No habitat features on site likely to be used by any commuting or foraging bats at any time of the year (i.e. no habitats that provide continuous lines of shade/protection for flight-lines, or generate/shelter insect populations available to foraging bats)
- Negligible – No obvious habitat features on site likely to be used as flightpaths or by foraging bats; however, a small element of uncertainty remains in order to account for non-standard bat behaviour.
- Low – Habitat that could be used by small numbers of bats as flightpaths such as a gappy hedgerow or unvegetated stream, but isolated, i.e. not very well connected to the surrounding landscape by other habitat. Suitable, but isolated habitat that could be used by small numbers of foraging bats such as a lone tree (not in a parkland situation) or a patch of scrub.
- Moderate – Continuous habitat connected to the wider landscape that could be used by bats for flightpaths such as lines of trees and scrub or linked back gardens. Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland, or water.
- High – Continuous, high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by bats for flightpaths such as river valleys, streams, hedgerows, lines of trees and woodland edge. High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree-lined watercourses, and grazed parkland. Site is close to and connected to known roosts).

All survey methodologies will follow those of the Bat Conservation Trust Bat Surveys for Professional Ecologists: Good Practice Guidelines (Collins, 2023). Any further recommended bat survey work will be undertaken within the recommended survey period of May to September inclusive and as per best practice guidelines

10.6.1.5.3 Bat Landscape Suitability

The Bat Conservation Ireland Landscape Suitability Model (Lundy et al., 2011) provides a habitat suitability index for bat species across Ireland. The model divides the country into 1 km grid squares and ranks the habitat within the squares according to its suitability for various bat species. The scores are divided into five qualitative categories of suitability, namely:

- 0.0000000 - 13.000000: Low
- 13.000001 - 21.333300: Low – Medium
- 21.333301 - 28.111099: Medium
- 28.111100 - 36.444401: Medium – High
- 36.444402 - 58.555599: High

10.6.1.5.4 Bat Activity Surveys (Nighttime Bat Walkover (NBW))

Bat Activity Surveys were carried out on three occasions during the Spring/ Summer periods of 2024.

The methodology was chosen to ensure all bat commuting and/or foraging activity on/around the Site was adequately quantified. The layout of the Site, proposed survey works, and current baseline conditions meant that a targeted survey effort (NBW) was most suitable. This methodology was adapted from the most recent bat survey guidelines as described by the *Bat Conservation Trust Bat Surveys for Professional Ecologists: Good Practice Guidelines*, (Collins et al.,2023).

Two set points were surveyed for the first one-hour period after sunset, followed by a transect survey of the Site and its perimeter, targeting the most suitable habitat for commuting and foraging bat species. Point 1, (see Figure 10-5 below) was surveyed using a Batlogger M detector and was placed in a location most likely to hold foraging and roosting bats. Point 2 was manned by the second surveyor who made notes on all bat observations relevant to the northern treeline. The transect routes were then walked slowly for the remainder of the survey, focusing on the Site footprint and the perimeter, including treelines to the north along Marina Road and public walkways with scrub and marsh habitat to the north and east of the Site.

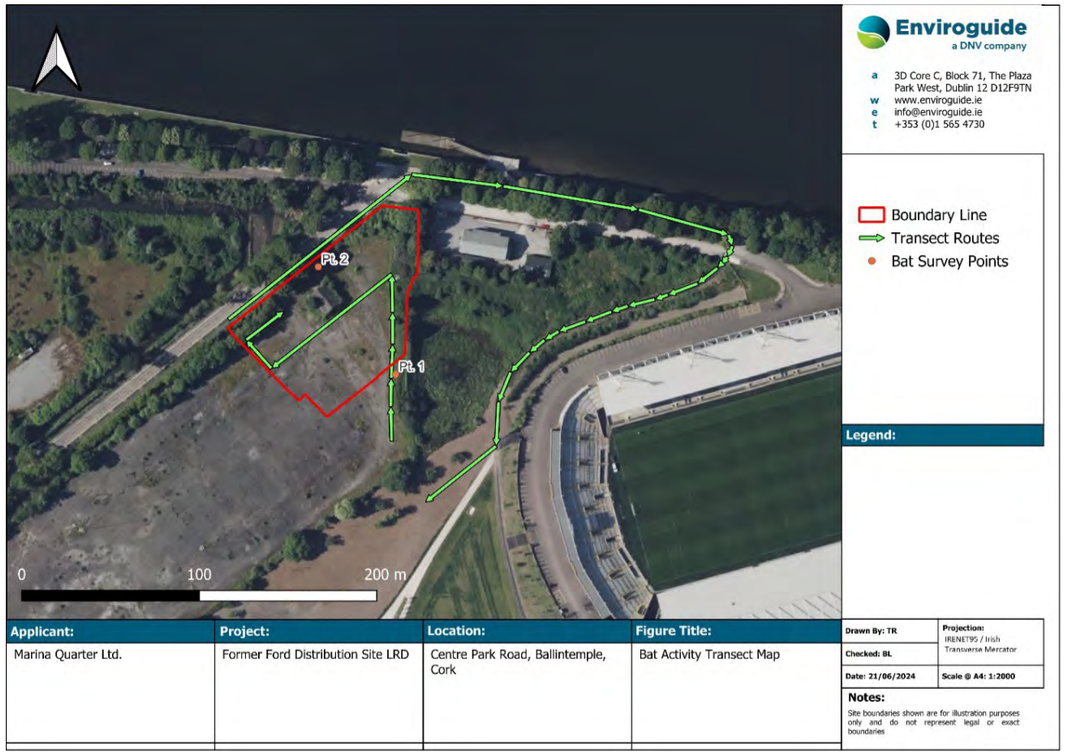


Figure 10 5. Bat Activity Survey Design

10.6.1.5.5 Bat Data Analysis

Species were recorded using a full-spectrum Elekon Bat Logger M2 in the field and datasets were identified from recordings using Batexplorer analytical version 3.5.2 software. Bat data was analysed and species assigned to each record with reference to species identification guides such as Russ (2012).

Each record i.e., a sequence of bat calls/pulses, is noted as a bat pass and indicates the level of bat activity for each species recorded. It is important to note that bat passes are representative of activity levels and do not necessarily denote individual bats. For example, some bats such as pipistrelle species may continuously circle a treeline or hedgerow and multiple calls may represent one individual circling an area. Alternatively, Leisler's bats recorded early in a survey are likely to be commuting high overhead, and each call may represent a singular bat. Therefore, a bat pass is a measure of activity and is not representative of the number of bats present.

In general, activity levels are classified from low to high by Enviroguide ecologists. Low activity comprises less than 10 bat passes per hour, medium is equal to or greater than 10 bat passes per hour, and anything above 50 bat passes per hour is considered high.

10.6.1.6 Bird Surveys

10.6.1.6.1 Bird Scoping Survey

During the preliminary Site surveys on 09th of May 2024, a list of all bird species encountered was recorded. The survey methodology employed was based on that recommended in standard literature used by for example the British Trust for Ornithology (BTO) (Gillings et al, 2007; Bibby et al, 1992 and Gilbert et al, 1998), which has subsequently been adapted into guidelines for ecological consultants by the Bird Survey & Assessment Steering Group (2022). During the survey, the Site was walked slowly, approaching all habitats within and adjacent to the Proposed Development and scanning and listening for birds. The locations of birds seen and heard were recorded using standard BTO codes and activity symbols, to provide an overview of bird species using the site.

During this bird survey the Site was thoroughly assessed to determine potential roosting and nesting sites for birds. Special attention was given to identifying areas where birds were likely to congregate or build nests, such as trees, hedgerows and scrub, and other habitable structures where they may occur.

During the inspection, any signs of bird activity were documented. This included the presence of birds themselves, their nests, feathers, droppings, and any other indicative evidence.

10.6.1.6.2 Breeding Bird Surveys

Breeding Bird Surveys were carried out in accordance with and adapted from standard literature and guidelines set out in for example Gilbert et. al. (1998), Bibby et al (2000), Gillings et al (2007) and Birdwatch Ireland & National Parks and Wildlife Service (2012), which has subsequently been adapted into guidelines for ecological consultants by the Bird Survey & Assessment Steering Group. (2022).

During the surveys, the Site was walked slowly, approaching all habitat within and adjacent to the Proposed Development and scanning and listening for birds. The presence of all birds on Site was recorded with all possible, probable, and confirmed breeding activity recorded where relevant.

To inform the evaluation of the on-Site habitats for bird species, three breeding bird survey visits were made to the Site and surrounding areas during the 2024 breeding season between May and July. The ZOI in relation to birds was set at 500m based on the Proposed Development description and the avifauna species most likely to be encountered on Site and in the surrounding hinterland. The ZOI was chosen with cognisance to guidelines set out by the Bird Survey & Assessment Steering Group (2022) and all surveys were carried out by experienced and suitably qualified ornithologists (TR & BMc) both experienced Ornithologists.

Table 10 1 Survey effort with weather conditions during Breeding Bird Surveys at the Proposed Development

DATE	START TIME	DURATION	WEATHER CONDITIONS
30/05/24	06:25	03:00	Light breeze, dry, good visibility, 10°C, 25-50% cloud cover.
26/06/24	10:30	03:00	Light breeze, dry, good visibility, 20°C, 66-100% cloud cover.
31/07/24	07:00	03:00	Light Breeze, dry, good visibility, 15°C, 66-100% cloud cover.

10.6.1.7 General Fauna Surveys

The Site was assessed for the presence of fauna other than mammals and birds in conjunction with the habitat surveys undertaken at the Site. The Site was searched for signs of aquatic fauna (incl. amphibians, fish and invertebrates), reptiles and rare/endangered invertebrates, and habitats were assessed for their potential suitability for same.

10.6.2 Consultation

Consultation was sought from Cork City Council (CCC) Environmental Department on the 11th of September 2024 regarding opinion on the exclusion of Winter Bird Surveys as a requirement for assessment of likely significant effects resulting from the Proposed Development, principally the effect on bird assemblages within 500m of the Proposed Development boundary. A response was received 17th of September 2024 where it was agreed by CCC that taking into account the suite of breeding bird surveys already carried out within 500m during the breeding season 2024, ecological appraisals of the Site, desk study and considerations of the small wetland area east of the Site, that further winter bird surveys would add little to our current knowledge of the baseline conditions and effects arising from the Proposed Development.

10.7 Ecological Assessment

This Report has been undertaken following the methodology set out in Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (CIEEM, 2018); and with reference to the National Roads Authority 'Guidelines for Assessment of Ecological Impacts of National Road Schemes' (NRA, 2009) and the Environmental Protection Agency (EPA) 'Guidelines on the information to be contained in Environmental Impact Assessment Reports' (EPA, 2022) and BS 42020:2013 Biodiversity: Code of practice for planning and development (BSI, 2013).

The evaluation of significant effects should be based on available scientific evidence. Based on the precautionary principle, if the available information is not sufficient, then a significant effect may be assumed likely to occur.

10.7.1 Evaluation of Ecological Features

The value of the ecological features, i.e., the habitats and species present or potentially present, was determined using the ecological evaluation at different geographical scales (NRA, 2009), presented in Appendix 10.2. This evaluation scheme, with values ranging from locally important to internationally important, seeks to provide value ratings for habitats and species present that are considered ecological receptors of effects that may ensue from a proposal. Based on best practice (CIEEM, 2018), any features considered to be less than of local value are not assessed within this EcIA.

10.7.2 Impact Assessment

As per NRA guidelines, impact assessment is only undertaken of Key Ecological Receptors (KERs). The assessment of the potential impact of the Proposed Development on the identified KERs was carried out with regard to the criteria outlined in the EPA Guideline (EPA, 2022), presented in Appendix 10.3. These guidelines set out a number of parameters that should be considered when determining which elements of the Proposed Development could constitute impact or sources of impacts. These include;

- Positive, neutral or negative effect;
- Significance;
- Extent;
- Probability;
- Duration;
- Timing;
- Frequency; and
- Reversibility.

The impact assessment process considers both direct and indirect effects: direct ecological effects are changes that are directly attributable to a defined action, e.g. the physical loss of habitat. Indirect ecological effects are attributable to an action, but which affect ecological resources through effects on an intermediary ecosystem, process, or feature, e.g., the creation of roads which cause hydrological changes, which, in the absence of mitigation, could lead to an adverse effect of a sensitive habitat.

10.7.3 Assessment of Cumulative Impacts and Effects

Cumulative effects can result from individually insignificant but collectively significant actions taking place over a period of time or concentrated in a location. Cumulative effects can occur where a Proposed Development results in individually insignificant effects that, when considered in combination with effects of other proposed or permitted plans and projects, can result in significant effects.

Relevant plans and policies (see Section 10.10.5) were reviewed to identify any potential for negative cumulative effects with the Proposed Development. Additionally, existing planning permissions from the past five years (from 2019 onwards) within the ZOI of the Proposed Development were reviewed, with particular focus on potential cumulative effects on the identified KERs. Long-term developments were also considered where applicable.

10.7.4 Avoidance, Mitigation, Compensation and Enhancement Measures

Where potentially significant effects have been identified, the mitigation hierarchy has been applied, as recommended in the CIEEM Guidelines. The mitigation hierarchy sets out a sequential approach beginning with the avoidance of effects where possible, the application of mitigation measures to minimise unavoidable effects and then compensation for any remaining effects. Once avoidance and mitigation measures have been applied residual effects are then identified along with any necessary compensation measures, and incorporation of opportunities for enhancement. When seeking mitigation or compensation solutions, efforts should be consistent with the geographical scale at which an effect is significant. For example, mitigation and compensation for effects on a species population significant at a county scale should ensure no net loss of the population at a county scale. The relative geographical scale at which the effect is significant will have a bearing on the required outcome which must be achieved.

It is important for the EcIA to clearly differentiate between avoidance, mitigation, compensation and enhancement and these terms are defined here as follows:

- Avoidance is used where an impact has been avoided, e.g., through changes in scheme design. In practice, avoidance measures are typically implemented during the design stage via discussions and re-design (e.g., avoiding a sensitive habitat by relocating a building). Avoidance measures are therefore rarely reported within an EcIA, which focuses on assessing the final design.
- Mitigation is used to refer to measures to reduce or remedy a specific negative impact in situ.
- Compensation describes measures taken to offset residual effects, i.e. where mitigation in situ is not possible.
- Enhancement is the provision of new benefits for biodiversity that are additional to those provided as part of mitigation or compensation measures, although they can be complementary.

10.8 Difficulties Encountered / Limitations

No significant difficulties were encountered in the preparation of this chapter and every effort has been made to provide a comprehensive description of the site; however, the following specific limitations apply to this assessment:

- An extensive search of available datasets for records of rare and protected species within proximity of the Proposed Development has been undertaken as part of this assessment. However, the records from these datasets do not constitute a complete species list. The absence of species from these datasets does not necessarily confirm an absence of species in the area.
- Inaccessible areas to the west of the Site which contain drainage, scrub and watercourses remain un-surveyed for Otter and Badger. However, these drainage ditches and watercourses both on Site and within 150m are considered highly modified, unproductive in terms of fish, and unsuitable for Otter feeding or resting Otter (<2m wide) (Reid et al. 2013a, Bailey and Rochford 2006). There is also no evidence of suitable habitat being present for Badger in the surrounding un-surveyed areas to the north, however no detailed surveys were possible in the area.

10.9 Ecological Baseline Conditions

This Section sets out the baseline conditions for the ecological features within the Site using the findings of the desk study and field surveys.

10.9.1 Hydrology, Geology and Hydrogeology

The Site is located in the Lee, Cork Harbour and Youghal Bay Catchment (Catchment I.D 19) and in the Glasheen [Cork City] _SC_010 Sub-catchment (Sub-catchment I.D.19_17) (EPA, 2024). The Lee Estuary Lower is located approximately 30m north of the Site and flows east into Lough Mahon located approximately 3.1 km north-east of the Site (EPA, 2024).

The Bride (Cork City) River IE_SW_19B140300 is located approximately 1.5km north of the Site which flows southwest and ultimately discharges to the River Lee (North Channel) IE_SW_060_0950, which flows into the Lee Estuary Lower (EPA, 2024).

The EPA water quality monitoring data for the stations on the Lee Estuary Lower located closest to the Site is summarised in Table 10-2. The reported Q-value results indicate that water quality in the Lee Estuary Lower in the vicinity of the Site is moderate, the water quality of the more distant Bride (Cork City) River is classified as poor.

Table 10 2. EPA Monitoring Stations and Assigned Q-Values

EPA MONITORING STATION NAME	STATION CODE	LOCATION FROM SITE	DISTANCE FROM SITE	ASSIGNED Q VALUE
Lee (Cork) Estuary Lower – Tivoli	TW04003159LE2006	East downstream	330m	3 - 4 "Moderate"
Bride (Cork City) River – M13 Glen Rec. Park	RS19G090400	North-west upstream	1.6km	3 "Poor"

The Site of the Proposed Development is situated on the Lee Valley Gravel (IE_EA_G_094) groundwater body. The bedrock aquifer identified beneath the Site is mapped as "Locally Important – Bedrock which is Moderately Productive only in Local Zones" (Pl) (GSI, 2024).

The Groundwater Vulnerability Rating assigned to groundwater beneath the Site is mapped as "Moderate" (M) (GSI, 2024). The quaternary sediments beneath most of the Site are mapped as Urban (GSI, 2024). The soil beneath the Site is mapped as "Made - Made Ground" (GSI, 2024). Based on groundwater levels in the Made Ground, the groundwater flows southwest away from the Lee Estuary Lower and towards the open drainage channels at the southeast of the site. These open drainage channels discharge into the Lee Estuary Lower. However, the volumes of discharge into the open drainage channels are deemed insignificant.

The Waterbody Status for river, groundwater, and transitional water bodies relevant to the Site as recorded by the EPA (2024) in accordance with European Communities (Water Policy) Regulations 2003 (SI no. 722/2003), Part IV of the European Communities Environmental Objectives (Surface Waters) Regulations 2009 and Part IV of the European Communities Environmental Objectives (Groundwater) Regulations 2010, are provided in Table 10 -3.

Table 10 3. WFD Risk and Waterbody Status

WATERBODY NAME	WATER BODY; EU CODE	LOCATION FROM SITE	DISTANCE FROM SITE (KM)	WFD WATER BODY STATUS (2016-2021)	WFD 3RD CYCLE RISK STATUS	HYDRAULIC CONNECTION TO THE SITE
Transitional Water Bodies						
Lee (Cork) Estuary Lower	IE_ SW_060_0900	North	0.03	Moderate	At risk	Downstream of the Site
Groundwater Bodies						
Lee Valley Gravels	IE_SW_G_094	N/A	N/A	Good	At risk	Underlying groundwater-body

10.9.1.1 Site Drainage

In the previously granted neighbouring SDH EIAR (McCutcheon Halley, 2020), an open drainage channel was found along the northwest boundary of the Site, and a second open drainage channel was identified along the southeastern edge of the site. Both channels flow south towards the new Marina Stream and eventually into Atlantic Pond (350m east of the site), which discharges into the Lee (Cork) Estuary Lower. Historical maps suggest the northern channel is connected to the Tedcastles Channel located on the northern side of Centre Park Road via a

culvert under Centre Park Road "The Centre Park Road Culvert". The Tedcastles channel discharges to the Lee Estuary Lower via a pond in the Tedcastles site.

During a site walkover in September 2019 (McCutcheon Halley, 2020), it was noted that the Tedcastles pond is controlled by a one-way valve which is designed to stop water flowing back into the pond during high tide, however, during the site visit the valve was not functioning, and the pond was seen to fill with water from the River Lee during high tide.

10.9.2 Designated Sites

All European sites potentially linked to the Proposed Amendments have been identified and fully assessed in the AA Screening Report (Stage 1 AA) accompanying this submission under separate cover. A summary of the AA conclusions is given below.

Other Nationally or Internationally designated sites potentially linked to the Proposed Development are identified in Section 10.9.2.3 below.

10.9.2.1 European Sites Appropriate Assessment (Stage 1 AA and Stage 2 NIS)

An AA has been completed (Stage 1; Screening) for the Proposed Development which identified any potential S-P-R links to designated European Sites. The Site of the Proposed Development is not located within or adjacent to any designated European Sites and neither direct or indirect habitat loss or disturbance is considered an issue in this case. The Proposed Development will not be dependent on any resource use of any European Sites. However, the AA screening report concluded that the possibility of significant effects arising on Cork Harbour SPA as a result of the Proposed Development could not be excluded and therefore a Natura Impact Statement has been prepared to assess likely significant effects and to propose mitigation measures where relevant.

The NIS prepared by Enviroguide (2024) accompanying this application under separate cover states that

''Where potentially significant effects were identified, a range of mitigation and avoidance measures have been suggested to avoid them. This NIS has concluded that, once the avoidance and mitigation measures are implemented as proposed, the Proposed Development will not have an adverse effect on the integrity of the above European site(s), individually or in combination with other plans and projects. Where applicable, a suite of monitoring surveys have been proposed to confirm the efficacy of said measures in relation to ensuring no adverse impacts on the habitats of the relevant European sites have occurred.

As a result of the complete, precise and definitive findings in of this NIS, it has been concluded, beyond reasonable scientific doubt, that the Proposed Development will have no significant adverse effects on the QIs, SCIs and on the integrity and extent of Cork Harbour SPA (004030). Accordingly, the Proposed Development will not adversely affect the integrity of any relevant European site."

Table 10 4. European Sites considered with the Source-Pathway-Receptor (S-P-R) method to establish notable links between the sources of effects arising from the Proposed Development, and any European Sites. Sites with notable S-P-R links are highlighted in green

SITE NAME & SITE CODE	QUALIFYING INTERESTS (*= PRIORITY HABITATS)	POTENTIAL PATHWAYS
Special Areas of Conservation (SAC)		
Great Island Channel SAC (001058) Linear Distance to Proposed Development: c. 6.45 km	**As per NPWS (2014a)** **Habitats** • Mudflats and sandflats not covered by seawater at low tide [1140] • Atlantic salt meadows (Glauco-Puccinellietalia mariti-mae) [1330]	Hydrological via the River Lee, deemed insignificant due to distance.
Special Protection Areas (SPAs)		
Cork Harbour SPA (004030) Hydrological Distance to Proposed Development c.3.5km Linear Distance to Proposed Development: c. 1.6km	**QIs as per NPWS (2014b)** • Little Grebe (Tachybaptus ruficollis) [A004] • Great Crested Grebe (Podiceps cristatus) [A005] • Cormorant (Phalacrocorax carbo) [A017] • **Grey Heron (Ardea cinerea) [A028]** • Shelduck (Tadorna tadorna) [A048] • Wigeon (Anas penelope) [A050] • Teal (Anas crecca) [A052] • Pintail (Anas acuta) [A054] • Shoveler (Anas clypeata) [A056] • Red-breasted Merganser (Mergus serrator) [A069] • Oystercatcher (Haematopus ostralegus) [A130] • Golden Plover (Pluvialis apricaria) [A140] • Grey Plover (Pluvialis squatarola) [A141] • Lapwing (Vanellus vanellus) [A142] • Dunlin (Calidris alpina) [A149] • Black-tailed Godwit (Limosa limosa) [A156] • Bar-tailed Godwit (Limosa lapponica) [A157] • Curlew (Numenius arquata) [A160] • Redshank (Tringa totanus) [A162] • Black-headed Gull (Chroicocephalus ridibundus) [A179] • Common Gull (Larus canus) [A182] • Lesser Black-backed Gull (Larus fuscus) [A183] • Common Tern (Sterna hirundo) [A193] • Wetland and Waterbirds [A999]	Direct hydrological, pathway via New Marina Stream -Atlantic Pond – Cork Harbour Estuary. Negligible indirect impact pathways to affect **one QI species (Grey Heron**), as negligible suitable breeding / foraging habitats at the Site or within the ZOI for these species.

10.9.2.2 National and International Designated Sites

The search determined that there is a single I-WeBS Site c.2.3km east of the Proposed Development: Cork Harbour subsite, Dunkettle (site code: OL403). One Ramsar site; 'Cork Harbour' (Ramsar ID: 837) and one Important Bird Area (IBA) 'Cork Harbour' overlap with Cork Harbour SPA which is located 1.6km south and 2.2km east of the Proposed Development (linear distance).

10.9.2.3 Relevant Designated Sites

A designated site will only be at risk from likely significant effects where an S-P-R link of note exists between the Proposed Development and the designated site. All designated sites considered as part of the S-P-R method are listed in Table 10-5 and Figures 10-6, 7 and 8.

Those sites with notable S-P-R links to the Proposed Development are assessed further in this report as KERs of 'National Importance' (pNHAs and NHAs) or 'International Importance' (SACs/SPAs, UNESCO sites, Ramsar sites, etc.).

In conclusion, the desk study determined that there is a total of one SAC, one SPA, no NHAs, 3 pNHAs, one I-WeBS Site, one IBA site, and one Ramsar sites located within the ZOI of the Proposed Development Site.

However, it should be noted that the identified I-WeBS, Ramsar pNHA and IBA sites share the same boundaries and QI designations as the Cork Harbour SPA. As such, the potential impact on these sites from the Proposed Development has been screened out (by proxy) in the AA Screening Report accompanying this report under separate cover.

Table 10 5. Designated Sites considered using the S.P.R. method

SITE NAME & SITE CODE	QUALIFYING INTERESTS (*= PRIORITY HABITATS)	POTENTIAL PATHWAYS
Special Areas of Conservation (SAC)		
Great Island Channel SAC (00105) Linear Distance to Proposed De-velopment: approx. 6.45 km	**As per NPWS (2014a)** **Habitats** • Mudflats and sandflats not covered by seawater at low tide [1140] • Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330]	Hydrological via the River Lee, deemed insignificant due to distance.
Special Protection Areas (SPAs)		
Cork Harbour SPA (004030) Linear Distance to Proposed De-velopment: c. 1.6km	**QIs as per NPWS (2014b)** • Little Grebe (Tachybaptus ruficollis) [A004] • Great Crested Grebe (Podiceps cristatus) [A005] • Cormorant (Phalacrocorax carbo) [A017] • Grey Heron (Ardea cinerea) [A028] • Shelduck (Tadorna tadorna) [A048] • Wigeon (Anas penelope) [A050] • Teal (Anas crecca) [A052] • Pintail (Anas acuta) [A054] • Shoveler (Anas clypeata) [A056] • Red-breasted Merganser (Mergus serrator) [A069] • Oystercatcher (Haematopus ostralegus) [A130] • Golden Plover (Pluvialis apricaria) [A140] • Grey Plover (Pluvialis squatarola) [A141] • Lapwing (Vanellus vanellus) [A142] • Dunlin (Calidris alpina) [A149] • Black-tailed Godwit (Limosa limosa) [A156] • Bar-tailed Godwit (Limosa lapponica) [A157] • Curlew (Numenius arquata) [A160] • Redshank (Tringa totanus) [A162] • Black-headed Gull (Chroicocephalus ridibundus) [A179] • Common Gull (Larus canus) [A182] • Lesser Black-backed Gull (Larus fuscus) [A183] • Common Tern (Sterna hirundo) [A193] • Wetland and Waterbirds [A999]	Direct hydrological, pathway. No indirect impact pathways to affect listed species, as no suitable breeding / foraging habitats at the Site or within the ZOI for these species.
Natural Heritage Areas (NHAs)		
Great Island Channel pNHA (001058) **Douglas River Estuary pNHA (001046)** **Dunkettle Shore pNHA (001082)**	There are no formal qualifying interests listed for proposed Natural Heritage Areas. A general site synopsis is available for most sites on the NPWS website: https://www.npws.ie/sites/default/files/general/pNHA_Site_Synopsis_Portfolio.pdf	Hydrologically linked to the Proposed Devel-opment via surface water channels. Screened out for significant effects due to distance.

SITE NAME & SITE CODE	QUALIFYING INTERESTS (*= PRIORITY HABITATS)	POTENTIAL PATHWAYS
I-WeBS Sites		
Cork Harbour subsite, Dunkettle (site code: OL403) Linear Distance to Proposed Devel-opment: c. 1.6km	Wetland and waterbirds.	Hydrologically linked to the Proposed Devel-opment via surface water channels. Screened out for sig-nificant effects due to distance.
Ramsar Sites		
Cork Harbour' (Ramsar ID: 837) Linear Distance to Proposed Devel-opment: c. 1.6km	Wetland and waterbirds	Hydrologically linked to the Proposed Devel-opment via sur-face water channels. Screened out for sig-nificant effects due to distance.
Important Bird Areas		
Cork Harbour Linear Distance to Proposed Devel-opment: c. 1.6km	Wetland and waterbirds	Hydrologically linked to the Proposed Devel-opment via sur-face water channels. Screened out for sig-nificant effects due to distance.

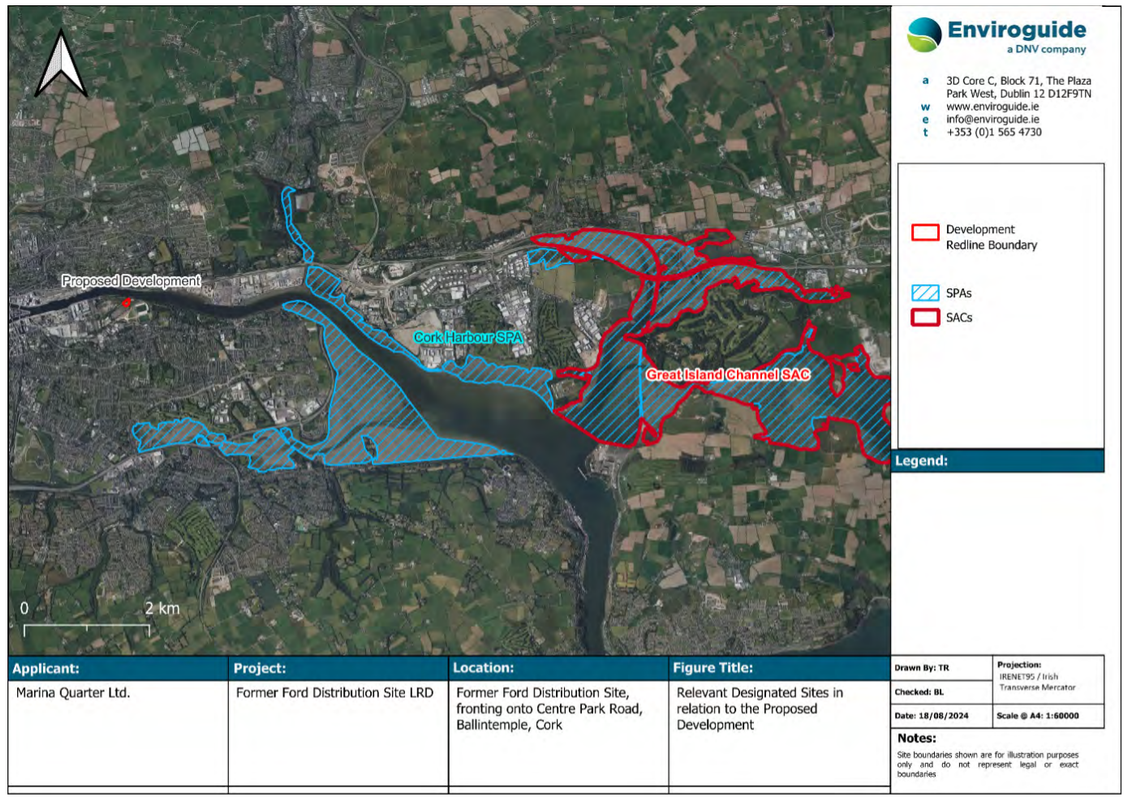


Figure 10 6. Internationally designated sites (SPA & SAC) in relation to the Proposed Development

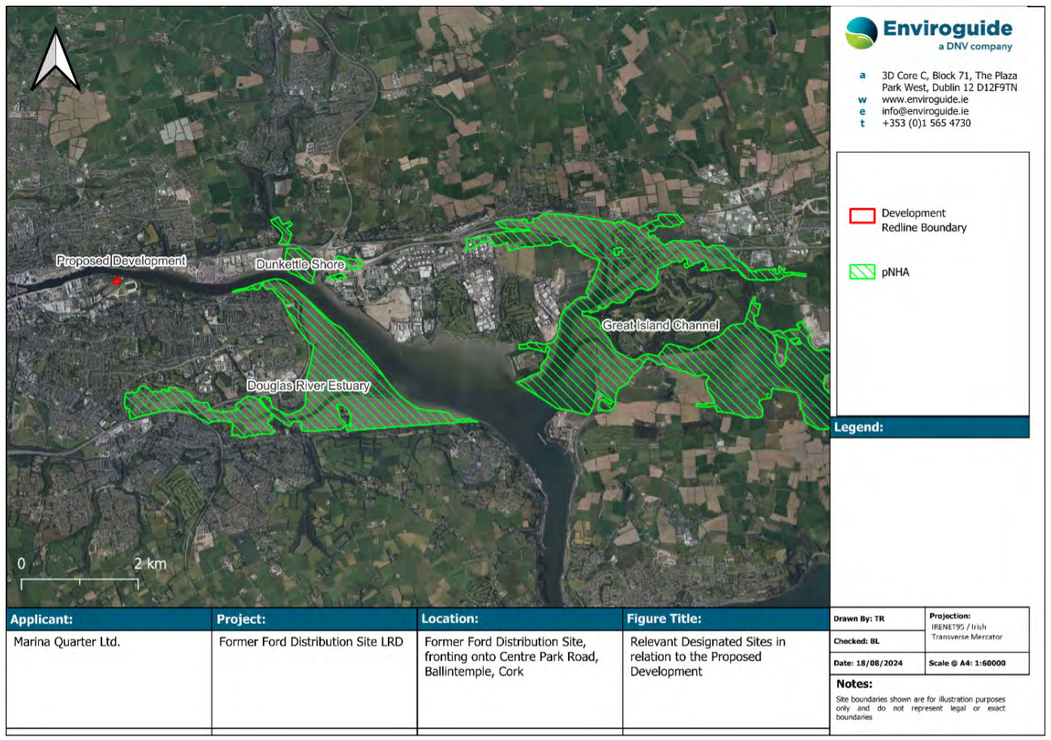


Figure 10 7. Nationally designated sites (pNHA) in relation to the Proposed Development

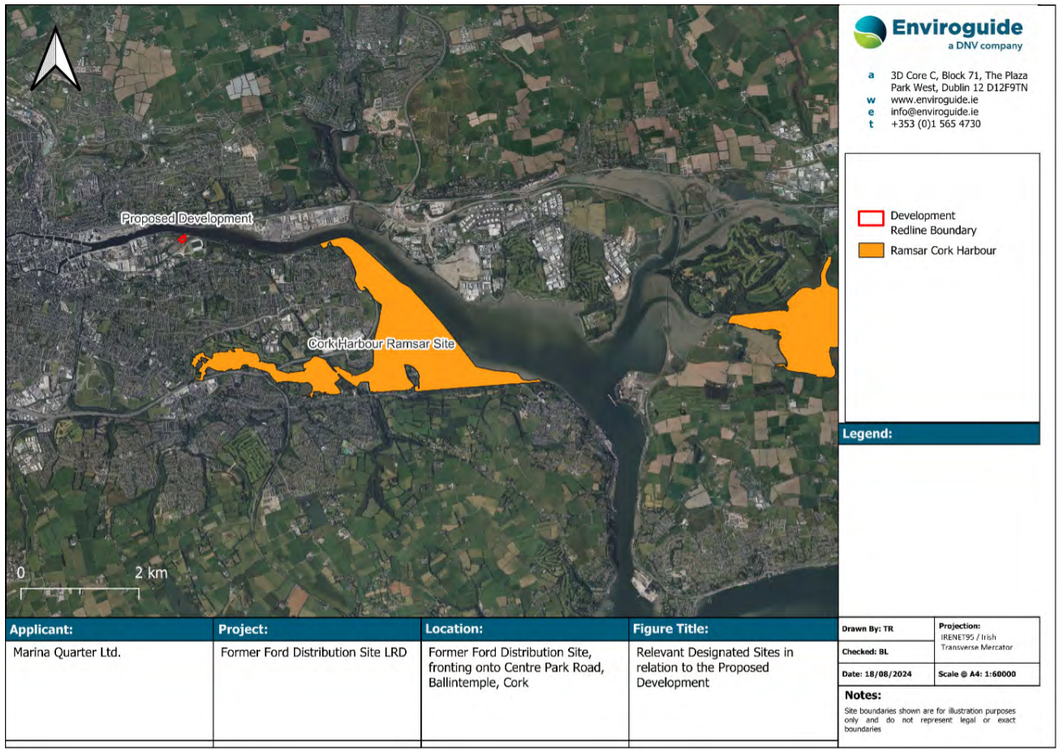


Figure 10 8. Cork Harbour Ramsar Site in relation to the Proposed Development

10.9.3 Habitats

The habitats present within the Site, as recorded in the survey area during the field surveys, are described in this Section and summarised below. Site photographs of these habitats are included after each habitat Section and a map of the habitats is presented in Figure 10-14.

The Site is comprised mainly of Spoil and Bare Ground (ED2), most of which has been cleared of vegetation and infilled with hardcore material, the underlying geology can be described as 'made ground'.

Limited areas of Scrub (WS1) comprising predominantly Bramble (Rubus fructicosus), with some scattered Elder (Sambucus nigra) and Hawthorn (Crataegus monogyna) are present at the northeast edge of the Site, bordering existing non-native, medium impact invasive and naturalised treeline (Sycamore, Acer sp.) and surrounding the off-Site Reed and Sedge Swamp (FS1). Non-native treeline is present on the northern edge, bordering Centre Park Road, consisting of Lime species (Tilia sp.)

A man-made drainage ditch is located c.65m off-Site to the south, which grades southwest towards new Marina Stream, adjacent to the neighbouring SHD project. It is of low biodiversity value overall with negligible value with respect to fish, semi-aquatic mammals or amphibians.

No rare or protected plant species were observed during the ecological walkovers.

In summary, habitats recorded on Site during the ecological walkover include:

- ED2 – Spoil and Bare Ground
- WL2 – Treeline
- WS2 – Scrub

Off-Site habitats recorded in proximity/ adjacent to the Proposed Development boundary are listed below.

- FW4 – Drainage Ditches
- FS1 - Reed and Large Sedge Swamp

10.9.3.1 Spoil & Bare Ground (ED2)
The majority of the Site is made up of artificial building material and infill with large spoil heaps from ongoing nearby construction activity present. The spoil and bare ground areas are highly modified artificial habitats and have little or no biodiversity value in their current state.

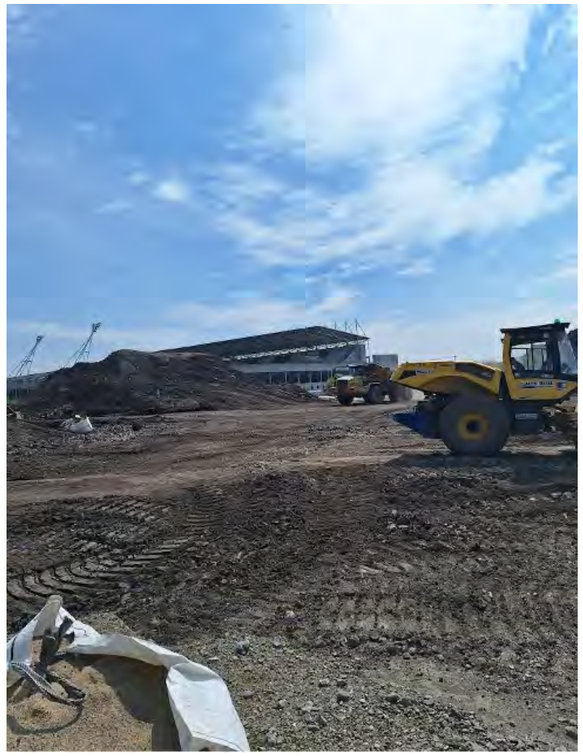


Figure 10 9. Spoil and Bare Ground (ED2) on Site (Bordering onto existing SHD Development, (Ref. ABP-309059-20)

10.9.3.2 Reed and Large Sedge Swamp (FS1)
Reed and Large Sedge Swamp is located directly adjacent to the Proposed Development boundary at the eastern edge, south of Lee Rowing Club. Dominant species include Sea Club-rush (Bolboschoenus maritimus), Club Rush (Schenoplectus tabernaemontani) and Creeping Bent (Agrostis stolonifera). Willow (Salix sp.) is present in isolated parts in the centre and edge of the swamp area.

Although considered a species- poor community (Fossit 2000; Perrin 2016), reed and large sedge swamp has valuable biodiversity value in a local context and is considered of higher local importance in this respect.

Figure 10 10.Reed and Large Sedge Swamp (FS1), off Site at eastern edge

10.9.3.3 Scrub (WS1)

Areas of scrub are present at the northeast edge of the Site bordering existing non-native treeline and surrounding the off-Site Reed and Sedge Swamp mentioned above. Scrub that has developed along the boundary of the Site and immediately off-Site comprise of common species including bramble, ivy an isolated pockets of invasive Winter Heliotrope (Petasites pyrenaicus) amongst non-native treeline. The habitat is therefore considered of local importance – lower value.

Figure 10 11. Scrub (WS1) extending off Site, eastwards (surrounding Reed and Large Sedge Swamp habitat)

Figure 10 12. Scrub (WS1) On Site, extending northwards

10.9.3.4 Treeline (WL2)

Treelines are present along the northern and northeastern corner of the Site. Species present included semi-mature non-native Lime (Tilia sp.) Non-native Sycamore in present on the northern edge of the Site and within scrub adjacent to the marsh area off-Site. The habitat is therefore considered of local importance – lower value.

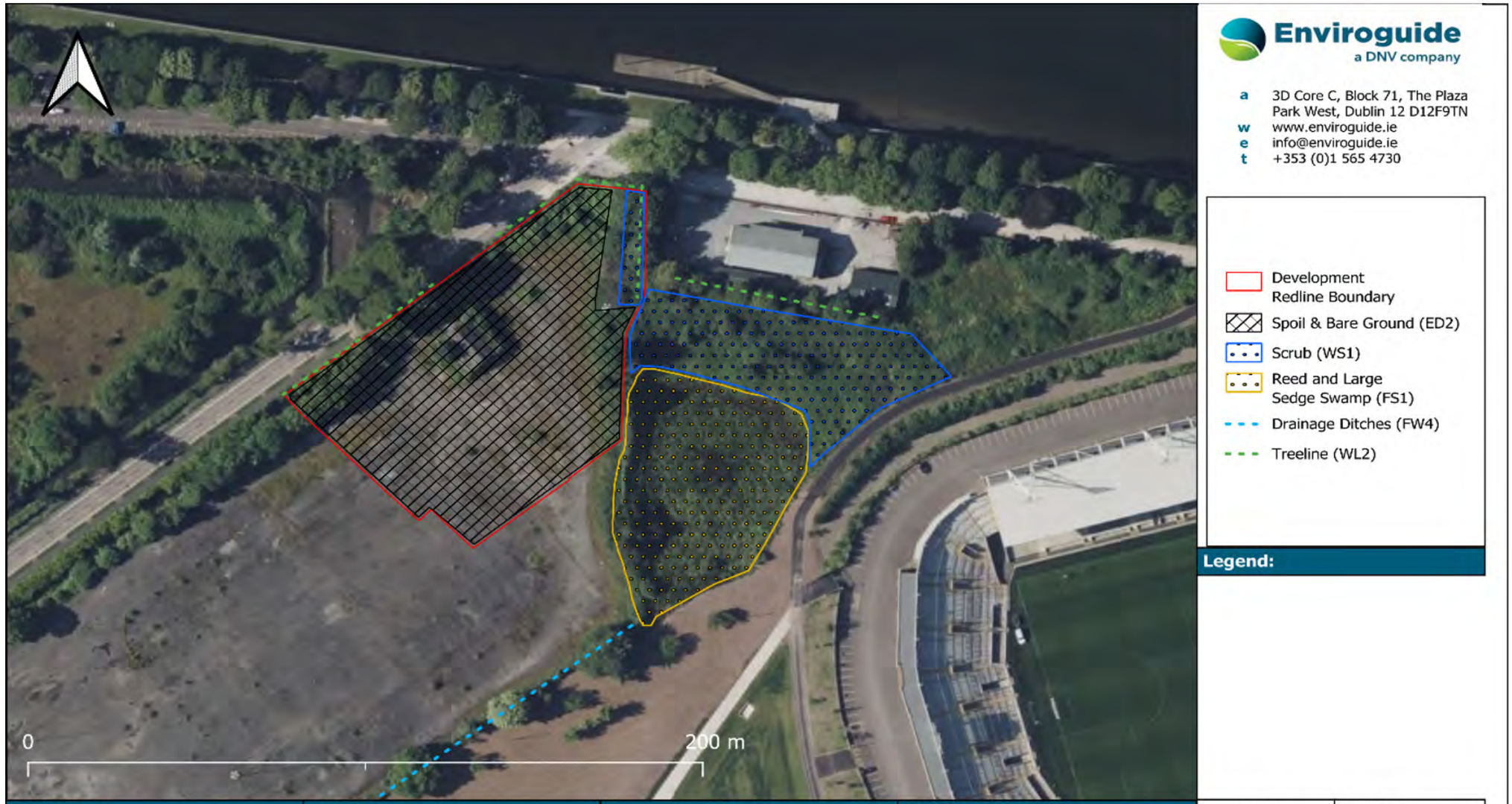
Figure 10 13. Treeline habitat at northern Site edge

10.9.3.5 Drainage Ditches (FW4)

An artificial man-made drainage ditch runs in a southwestern direction c. 65m south of the Site. This drainage ditch connects to the new Marina Stream which flows into the Atlantic Pond and eventually outflows into the River Lee and associated Lee Estuary lower transitional waterbody via a public outfall.

The drainage channel present, although connected to the adjacent Sedge Swamp, is located off-Site, is heavily modified and has limited biodiversity potential and is categorised as of local importance – lower value.

10.9.3.6 Desk Study



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Development Redline Boundary
Spoil & Bare Ground (ED2)
Scrub (WS1)
Reed and Large Sedge Swamp (FS1)
Drainage Ditches (FW4)
Treeline (WL2)

Legend:

Applicant:	Project:	Location:	Figure Title:
Marina Quarter Ltd.	Former Ford Distribution Site LRD	Former Ford Distribution Site, fronting onto Centre Park Road, Ballintemple, Cork	Habitats on-Site and adjacent to the SIte

Drawn By: TR	Projection: IRENET95 / Irish Transverse Mercator
Checked: BL	
Date: 15/08/2024	Scale @ A4: 1:1500

Notes:
Site boundaries shown are for illustration purposes only and do not represent legal or exact boundaries

Figure 10 14. Habitat Map

10.9.4 Flora

10.9.4.1 Rare and Protected Flora

The Site of the Proposed Development is located within the Ordnance Survey 10km Grid Square (W67), 2km Grid Square (W67W) and 1km Grid Square (W6972). Species records from the NBDC online database show these grid squares were studied for the presence of rare and/or protected species within the last 20 years. This database contained no records of protected flora within the last 20 years. Similarly, no rare or protected floral species were recorded during the Site visits.

10.9.4.2 Invasive Species

Table 10-6 below lists the invasive species previously recorded within 2km grid square W67W.

Table 10 6. Invasive species records (NBDC Database)

SPECIES	GRID SQUARE	DATE OF LAST RECORD	SOURCE	DESIGNATIONS
Butterfly-bush *(Buddleja davidii)*	W67W	21/05/2016	Vascular plants: Online Atlas of Vascu-lar Plants 2012 On-wards	Invasive Species: Invasive Species || Invasive Species: Invasive Spe-cies >> Medium Impact Invasive Species
Cherry Laurel *(Prunus laurocerasus)*	W67W	31/03/2021	Vascular plants: Online Atlas of Vascu-lar Plants 2012 On-wards	Invasive Species: Invasive Species || Invasive Species: Invasive Spe-cies >> High Impact Invasive Spe-cies
Himalayan Knot-weed *(Persicaria wallichii)*	W67W	19/09/2015	National Invasive Species Database	Invasive Species: Invasive Species || Invasive Species: Invasive Spe-cies >> Medium Impact Invasive Species || Invasive Species: Inva-sive Species >> Regulation S.I. 477 (Ireland)
Indian Balsam *(Im-patiens glandulif-era)*	W67W	10/10/2015	National Invasive Species Database	Invasive Species: Invasive Species || Invasive Species: Invasive Spe-cies >> High Impact Invasive Spe-cies || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)
Japanese Knot-weed *(Fallopia japonica)*	W67W	03/05/2020	Vascular plants: Online Atlas of Vascu-lar Plants 2012 On-wards	Invasive Species: Invasive Species || Invasive Species: Invasive Spe-cies >> High Impact Invasive Spe-cies || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)
Sycamore *(Acer pseudoplatanus)*	W67W	21/05/2016	Vascular plants: Online Atlas of Vascu-lar Plants 2012 On-wards	Invasive Species: Invasive Species || Invasive Species: Invasive Spe-cies >> Medium Impact Invasive Species
Three-cornered Garlic *(Allium tri-quetrum)*	W67W	31/03/2021	Vascular plants: Online Atlas of Vascu-lar Plants 2012 On-wards	nvasive Species: Invasive Species || Invasive Species: Invasive Spe-cies >> Medium Impact Invasive Species || Invasive Species: Inva-sive Species >> Regulation S.I. 477 (Ireland)
Traveller's-joy *(Clematis vitalba)*	W67W	21/05/2016	Vascular plants: Online Atlas of Vascu-lar Plants 2012 On-wards	Invasive Species: Invasive Species || Invasive Species: Invasive Spe-cies >> Medium Impact Invasive Species

Of the eight invasive plant species that were recorded, four were listed in schedule III of the European Communities (Birds and Natural Habitats) Regulations 2011 (SI 477 of 2011), namely Himalayan Knotweed (*Persicaria wallichii*), Indian Balsam (*Impatiens glandulifera*), Japanese Knotweed (*Fallopia japonica*) and Three-cornered Garlic *(Allium triquetrum*).

Japanese Knotweed was recorded c.400m southwest of the Site on Centre Park Road in 2018 and on the edges of Atlantic Pond c. 400m east of the Site in 2014. The closest record of Himalayan Knotweed was recorded at the Foxes and Hounds pub c.1.8km north of the Site boundary in 2015. Indian Balsam was recorded c.1.5km north of the Site boundary in 2015. It is also noted that no records for invasive species of flora are held for the 1km grid square that encompasses the Site.

10.9.4.3 Field Study Results

The ecological walkover completed by Enviroguide Consulting in May 2024 did not record any invasive non-native species listed on schedule III of the European Communities (Birds and Natural Habitats) Regulations 2011 (SI 477 of 2011) within the Proposed Development Site.

One Medium-impact invasive species was noted within the Site boundary during the invasive species survey in May 2024. Sycamore (*Acer pseudoplatanus*) – Medium-impact invasive species was present in the treeline at the northeast corner of the Site and off-Site bordering the wetland south of Lee Rowing Club and Winter Heliotrope was present on the northern boundary of the Site bordering Centre Park Road. Detailed results and management strategies to deal with invasive species have been prepared separately and will accompany this application under separate cover.

10.9.5 Non-volant Mammals (excl. bats)

10.9.5.1 Desk Study Results

Records for terrestrial mammals were obtained from the NBDC online database. Table 10-7 lists these species, their date of last record and summarises their protected status/designation. A total of six native terrestrial mammals were recorded within the 2km grid square associated with the Site.

Table 10 7. Records of terrestrial mammals (Native and Non-Native) for the surrounding 2km (W67W) Grid Square associated with the Site (NBDC)

SPECIES	GRID SQUARE	DATE OF LAST RECORD	SOURCE	DESIGNATIONS
NATIVE SPECIES				
Eurasian Red Squir-rel *(Sciurus vulgar-is)*	W67W	01/07/2022	Mammals of Ireland 2016-2025	Protected Species: Wildlife Acts
European Otter *(Lutra lutra)*	W67W	21/05/2018	Mammals of Ireland 2016-2025	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex II || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
West European Hedgehog *(Erina-ceus europaeus)*	W67W	09/07/2023	Hedgehogs of Ireland	Protected Species: Wildlife Acts
Invasive Non-Native Species				
Greater White-toothed Shrew *(Crocidura russula)*	W67W	29/07/2011	Atlas of Mammals in Ireland 2010-2015	Invasive Species: Invasive Species || Invasive Species: Invasive Spe-cies >> Medium Impact Invasive Species

10.9.5.2 Field Survey Results

During the ecological walkover of the Site in May 2024, the Site was checked for any evidence of fauna presence/activity on Site. There was no evidence of Otter or Badger or any other mammals on Site. The Site itself contains little or no suitable commuting, foraging or resting habitat for small mammals such as Hedgehog (Erinaceus europaeus) or Irish Stoat (Mustela erminea Hibernica). However, the off-Site scrub areas to the east can provide commuting and foraging habitat for small mammals such as hedgehog, particularly along the dense understory of the scrubby wetland margins which could provide potentially suitable shelter/commuting habitat for these species.

It is noted that there are no suitable waterbodies located within the Proposed Development Site capable of supporting Otter or other aquatic/semi-aquatic species.

Red Fox (Vulpes vulpes) was recorded on several occasions during the survey period 2024 at the eastern edge of the Site. This included the presence of juvenile cubs. Suitable foraging habitat for fox is present off-Site to the east.

10.9.6 Bats

10.9.6.1 Desk Study Results

A total of four bat species have been recorded within the 1km (W6972) grid square which encompasses the Site (Table 10-8). Records of common pipistrelle (Pipistrellus pipistrellus), soprano pipistrelle (Pipistrellus pygmaeus), brown long-eared bat (Plecotus auritus), and Leisler's bat (Nyctalus Leisleri) were found.

In addition, the 10km grid square that encompasses the Site holds records for eight bat species (NBDC, 2024) (Table 10-8).

Table 10 8. Records of bats for the surrounding 1km Grid square which encompasses the Site (NBDC)

SPECIES	DATE OF LAST RECORD	DATABASE	DESIGNATION
Common Pipistrelle (*Pipistrellus pipistrel-lus*)	26/06/2008	National Bat Database of Ireland	• EU Habitats Directive - Annex IV • Wildlife Act 1976 (as amended)
Daubenton's Bat (*Myotis daubentonii)*	26/06/2008	National Bat Database of Ireland	• EU Habitats Directive - Annex IV • Wildlife Act 1976 (as amended)
Leisler's bat (*Nyctalus leisleri)*	26/06/2008	National Bat Database of Ireland	• EU Habitats Directive - Annex IV • Wildlife Act 1976 (as amended)
Soprano Pipistrelle (*Pipistrellus pygmaeus*)	26/06/2008	National Bat Database of Ireland	• EU Habitats Directive - Annex IV • Wildlife Act 1976 (as amended)
Brown Long-eared Bat *(Plecotus auritus)*	21/05/2016	Mammals of Ireland 2016-2025	• EU Habitats Directive - Annex IV • Wildlife Act 1976 (as amended)
Common Pipistrelle *(Pipistrellus pipistrellus sensu stricto)*	29/05/2018	National Bat Database of Ireland	• EU Habitats Directive - Annex IV • Wildlife Act 1976 (as amended)
Daubenton's Bat *(Myo-tis daubentonii)*	31/08/2021	National Bat Database of Ireland	• EU Habitats Directive - Annex IV • Wildlife Act 1976 (as amended)
Leisler's bat *(Nyctalus leisleri)*	03/07/2021	National Bat Database of Ireland	• EU Habitats Directive - Annex IV • Wildlife Act 1976 (as amended)
Natterer's Bat *(Myotis nattereri)*	18/07/2022	National Bat Database of Ireland	• EU Habitats Directive - Annex IV • Wildlife Act 1976 (as amended)
Pipistrelle *(Pipistrellus pipistrellus sensu lato)*	22/05/2016	National Bat Database of Ireland	• EU Habitats Directive - Annex IV • Wildlife Act 1976 (as amended)
Soprano Pipistrelle *(Pipistrellus pygmaeus)*	29/05/2018	National Bat Database of Ireland	• EU Habitats Directive - Annex IV • Wildlife Act 1976 (as amended)
Whiskered Bat (*Myotis mystacinus)*	17/07/2022	National Bat Database of Ireland	• EU Habitats Directive - Annex IV • Wildlife Act 1976 (as amended)

10.9.6.2 Field Survey Results

10.9.6.2.1 Preliminary Bat Roost Assessment

During the Site visit on the 09th of May 2024, a preliminary bat roost assessment was conducted on all trees and buildings (where they were present) within the Site and the adjacent habitats.

No evidence of bats was detected on Site and the trees present were assessed as having Negligible value for roosting bats (Collins, 2023). No evidence of roosting bats was present, nor were any significant gaps or cracks evident on the trees capable of supporting roosting bats. Additionally, the presence of trees was only present on the Site edge at the northeast and north. The area within the Proposed Development boundary provided no potential roosting features.

10.9.6.2.2 Bat Habitat Suitability Assessment Survey

The habitats present on Site were also assessed for their potential to provide suitable features which could be used by commuting and foraging bat species which may be present in the area. The dominant habitat types on Site were Spoil and Bare Ground (ED2), with areas of Scrub (WS1) to the northeast and off-Site surrounding the wetland/ swamp (FS1), directly adjacent to the Site. While there was no potential suitability for roosting bats on Site it was noted that the Site boundaries to the east comprising scrub, treeline and wetland could afford suitable commuting and foraging habitat for bat species which may be present in the area, providing connectivity between this Site and the wider landscape.

As such, the wetland and scrub habitat that bound the Site was assessed as having **Moderate** value for commuting and foraging bats.

Figure 10 15. Bat Landscape Index (NBDC)

10.9.6.2.3 Bat Activity Transect Survey Results

10.9.6.2.4 May 2024 Survey Results

In total, three species were recorded during May surveys (all of which were observed from Point 1) namely Common Pipistrelle (*Pipistrellus pipistrellus*), Soprano Pipistrelle *(Pipistrellus pygmaeus*) and Leisler's Bat (*Nyctalus leisleri*). All activity recorded during the May survey occurred in the area off Site, east of Point 1, see Figure 10-16 below). All records were obtained during the initial VP at Point 1 which took place for 60 minutes post sunset. The transect that followed covered the Site footprint and the outer perimeter. No bats were recorded during the transect survey.

Activity was dominated by Leisler's Bat accounting for 45% of the total calls recorded, see Table 10-10 below. Pipistrellus sp. were also recorded, with a minimum of three (3.no) individuals recorded foraging over the marsh area to the east of the Site. Individuals were observed travelling from the northeast, over treeline, hedgerow and scrub to eventually forage over the marsh area adjacent to the Site. Foraging activity took place intermittently between 22.07 and 22.40 and individuals were also noted as commuting in a southwest direction over the existing treeline bordering Marina Park. Activity was not recorded on Site and was classed as **Moderate** within the marsh area **Off-Site** in May.

Table 10 10. Bat Activity Survey Results, May 2024

SPECIES COMMON NAME	SPECIES LATIN NAME	NUMBER (N) OF CALLS [#]	% OF TOTAL CALLS
Leisler's Bat	*Nyctalus leisleri*	143	45%
Common Pipistrelle	*Pipistrellus pipistrellus*	42	13%
Soprano Pipistrelle	*Pipistrellus pygmaeus*	131	41%
Total number of calls		**316**	**100%**

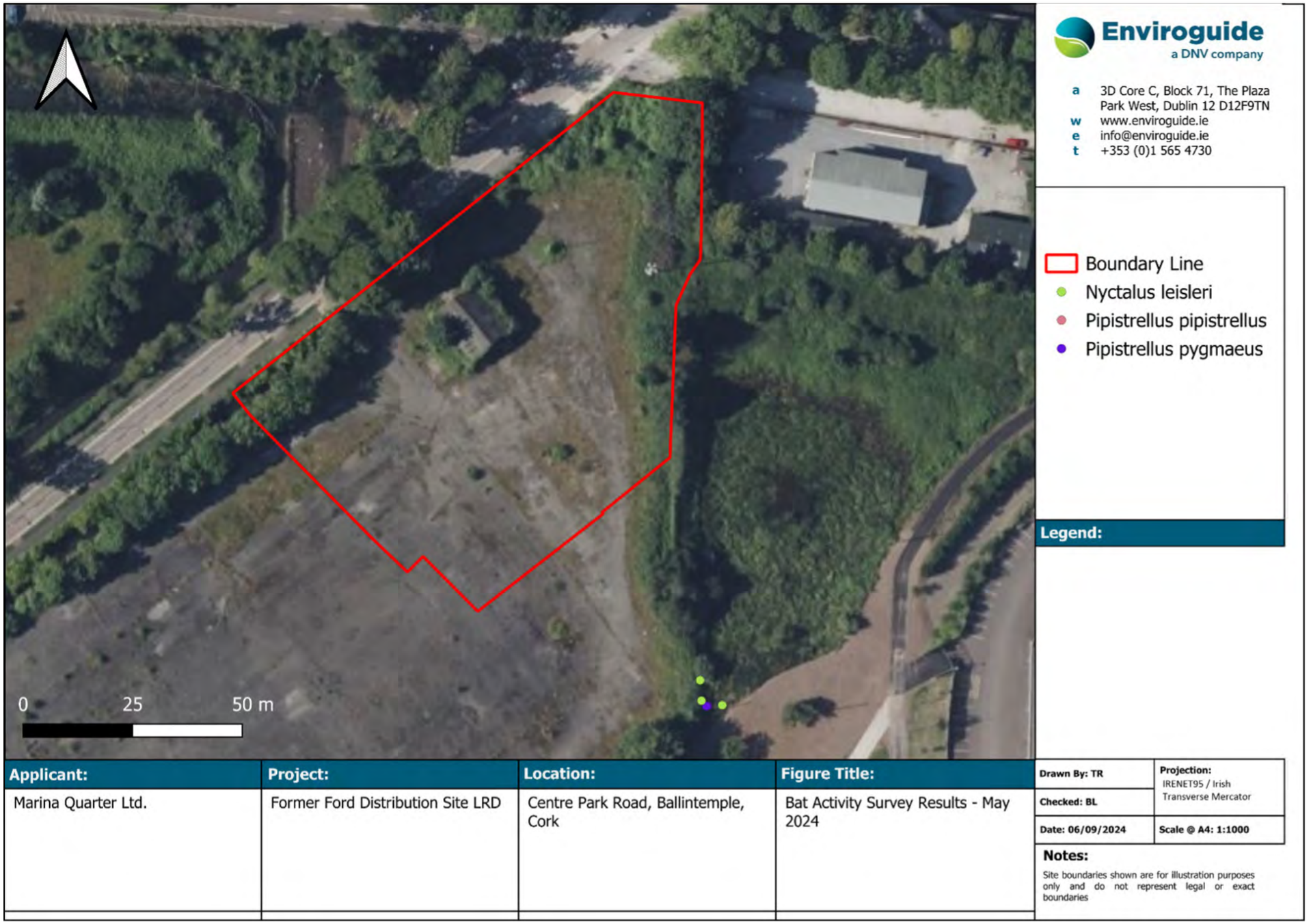

Figure 10 16. Bat Activity Survey Results - May 2024

10.9.6.2.5 June 2024 Survey Results

In total, two species were recorded during June surveys (Table 10-11) (all of which were recorded during transect surveys) namely *Pipistrellus pipistrellus* and *Nyctalus leisler*i. The initial VP survey recorded no bat activity for the first hour post sunset. Subsequent transect surveys recorded Leisler's Bat in a commuting flight within the Site area. Common Pipistrelle was recorded off-Site to the northeast from a public walkway see Figure 10-17 below. Activity levels were found to be **Low** during June surveys with low numbers of bats recorded.

Table 10 11. Bat Activity Survey Results, June 2024

SPECIES COMMON NAME	SPECIES LATIN NAME	NUMBER (N) OF CALLS [#]	% OF TOTAL CALLS
Leisler's Bat	*Nyctalus leisleri*	16	39%
Common Pipistrelle	*Pipistrellus pipistrellus*	25	61%
Total number of calls		**41**	**100%**

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Boundary Line
Nyctalus leisleri
Pipistrellus pipistrellus

Legend:

Applicant:	Project:	Location:	Figure Title:
Marina Quarter Ltd.	Former Ford Distribution Site LRD	Centre Park Road, Ballintemple, Cork	Bat Activity Survey Results - June 2024

Drawn By: TR
Checked: BL
Date: 06/09/2024
Projection: IRENET95 / Irish Transverse Mercator
Scale @ A4: 1:1000

Notes:
Site boundaries shown are for illustration purposes only and do not represent legal or exact boundaries

Figure 10 17. Bat Activity Survey Results - June 2024

10.9.6.2.6 August 2024 Survey Results

In total, three species were recorded during August surveys, including bats foraging within the Site boundary. Figure 10-18 below shows the data recorded using bat detectors and the core activity areas (which are outside the Proposed Development Boundary). Visuals of bats foraging on-Site is not included in the bat detector dataset and is purely based on direct observations by surveyors. Most of the activity was foraging behaviour off-Site over the adjacent wetland to the east, with a small number of individuals observed flying and foraging within the confines of the Site (2 no.) at the northern edge bordering Centre Park Road and (2 no.) at the southern Site boundary. Bats were observed regularly commuting over the wetland and back and forth between off-Site scrub, as well as bats commuting in a southwest direction off-Site bordering Marina Park. Activity levels on Site were found to be **low**, with off-Site activity levels (outside the ZOI) considered **High**.

Table 10 12. Bat Activity Survey Results, August 2024

SPECIES COMMON NAME	SPECIES LATIN NAME	NUMBER (N) OF CALLS [#]	% OF TOTAL CALLS
Leisler's Bat	*Nyctalus leisleri*	29	1%
Soprano Pipistrelle	*Pipistrellus pygmaeus*	1662	90%
Common Pipistrelle	*Pipistrellus pipistrellus*	159	9%
Total number of calls		**1850**	**100%**

Figure 10 18. Bat Activity Survey Results - August 2024

10.9.7 Birds

10.9.7.1 Desk Study Results

A total of 54 bird species have been recorded within the W67W 2km grid square. Of these, 31 are green-listed, 14 are Amber-listed, and nine (9 no.) are Red-listed according to Birds of Conservation Concern in Ireland 2020-2026 (Gilbert et al., 2021) (Table 10-13). One Green-listed species was also noted as being listed under Annex I of the EU Birds Directive, namely peregrine falcon (Falco peregrinus).

Common Snipe was recorded within 100m of the Site boundary in 2023 and this record is discussed in Section 10.9.7.1.1 below.

Table 10 13. Details of EU Annex I, BoCCI Amber and BoCCI Red-listed species recorded within the 2km grid square (W67W) (NBDC,2024)

SPECIES NAME	DATE OF LAST RECORD	TITLE OF DATASET	CONSERVATION STATUS BOCCI, BIRDS DIRECTIVE
Common Swift *(Apus apus)*	24/05/2023	Swifts of Ireland	Red
Common Snipe *Gallinago gallinago)*	25/04/2023	Birds of Ireland	Red
Grey Wagtail *(Motacilla cinerea)*	30/04/2020	Birds of Ireland	Red
Eurasian Curlew *(Numenius arquata)*	02/12/2017	Birds of Ireland	Red
Northern Lapwing *(Vanel-lus vanellus)*	02/12/2017	Birds of Ireland	Red
White-tailed Eagle *(Haliaeetus albicilla)*	02/12/2017	Birds of Ireland	Red
Meadow Pipit *(Anthus pratensis)*	29/10/2012	Birds of Ireland	Red
Common Kestrel *(Falco tinnunculus)*	31/12/2011	Bird Atlas 2007 - 2011	Red
Eurasian Oystercatcher *(Haematopus ostralegus)*	31/12/2011	Bird Atlas 2007 - 2011	Red
Spotted Flycatcher *(Musci-capa striata)*	25/05/2023	Birds of Ireland	Amber
Common Starling *(Sturnus vulgaris)*	30/04/2020	Birds of Ireland	Amber
Mallard *(Anas platyrhynchos)*	30/04/2020	Birds of Ireland	Amber
Barn Swallow *(Hirundo rustica)*	20/04/2020	Birds of Ireland	Amber
Eurasian Teal *(Anas crecca)*	16/04/2020	Birds of Ireland	Amber
Herring Gull *(Larus argentatus)*	16/04/2020	Birds of Ireland	Amber
Willow Warbler *(Phylloscopus trochilus)*	16/04/2020	Birds of Ireland	Amber
Black-headed Gull *(Larus ridibundus)*	02/12/2017	Birds of Ireland	Amber
Common Coot *(Fulica atra)*	02/12/2017	Birds of Ireland	Amber
Common Shelduck *(Tador-na tadorna)*	02/12/2017	Birds of Ireland	Amber
Eurasian Wigeon *(Anas penelope)*	02/12/2017	Birds of Ireland	Amber
Great Cormorant *(Phalacrocorax carbo)*	02/12/2017	Birds of Ireland	Amber
Lesser Black-backed Gull *(Larus fuscus)*	21/10/2009	Birds of Ireland	Amber
Little Bittern *(Ixobrychus minutus)*	04/05/1989	Rare birds of Ireland	Amber
Peregrine Falcon *(Falco peregrinus)*	31/12/2011	Bird Atlas 2007 - 2011	Green, Annex 1 EU Birds Directive

10.9.7.1.1 Common Snipe –

Snipe was recorded within the 100m grid square north of the Site encompassing Lee Rowing Club and bordering the northern edge of the swamp area bordering the eastern edge of the Site on 25th April 2023. This record was of a single bird which was flushed by a passerby, and was recorded off-Site, likely associating with the Lee Estuary to the north.

10.9.7.2 Preliminary Bird Survey Results

The following bird species were recorded during the initial Site visit on 09th May 2024.

10.9.7.2.1.1 House Martin (BoCCI Amber List)

Recorded in flight over the Site, foraging over the wetland area to the east, off-Site.

10.9.7.2.2 Swallow (BoCCI Amber List)

Observed in flight, travelling over the Site and in the vicinity of parkland and the stadium to the southeast of the Site.

10.9.7.2.3 Mallard (BoCCI Amber List)
An adult pair was present on the edge of the wetland area to the east, off-Site. Both birds were observed resting and preening, no breeding behaviour was observed.

10.9.7.2.4 Buzzard (BoCCI Green List)
Two birds were observed briefly interacting in a low flight over an area of scrub/ treeline, across Centre Park Road c. 70m to the northwest of the Site boundary. This is an indication of breeding behaviour and typical of the species at this time in the breeding cycle, although this species typically exhibits display behaviour over a very large area (Hardey et. al., 2011). This observation does not confirm breeding nearby, although this is possible due to the presence of possible breeding habitat in the area off -Site where the birds were observed. No detailed survey was possible on the day due to access restrictions and no Buzzards were observed within the confines of the Site boundary. It is worth noting, from satellite imagery, that large areas of potentially suitable breeding habitat for Buzzard are located at the northern side of the Lee Estuary and this observation could be of birds originating from those areas.

10.9.7.2.5 Other Species (BoCCI Green-listed)
Dunnock, Goldfinch and Wren were also recorded during the initial Site visit on the 09th of May 2024. All of which were in song, off-Site.

10.9.7.3 Breeding Bird Survey Results
A total of 24 bird species were recorded during breeding bird surveys, the majority of which were recorded outside the Proposed Development area. No breeding activity was recorded for any bird species within the confines of the Proposed Development Site. Several common species were recorded within the 500m survey radius, and those species confirmed as breeding during breeding bird surveys, as well as those recorded as present/possibly breeding during the survey period are displayed in Figure 10-19 below. Table 10-14 lists the species of most conservation concern, relative to the Site. All common and Green-listed species are included in Appendix 10.4 accompanying this chapter and the below Sections summarise the results of breeding bird surveys in relation to the most notable species recorded in and around the Site.

10.9.7.3.1 Little Egret (Egretta garzetta) (Annex 1, EU Birds Directive and BoCCI Green-list)
Little Egret is listed on Annex 1 of the EU Birds Directive 2009/149/EEC and is a Green-listed species in Ireland (Gilbert et al, 2021). The species was recorded foraging on the new Marina Stream adjacent to Monaghan Road c.300m south of the Site boundary in June 2024 and was present at Atlantic Pond c.430m east of the Site boundary in July 2024.

The species has been classed as a 'possible' breeder at Atlantic Pond due to the presence of live birds in suitable breeding habitat, alongside a confirmed Grey Heron breeding area. These two species are known to breed near each other, with Little Egret often taking up residence within existing Grey Heron colonies (BTO, 2024). The breeding status is classed as 'possible' in 2024 as no direct breeding activity was recorded during surveys, given the concentration of survey effort within the Site and on directly adjacent habitats.

In addition to the direct observations recorded during 2024 surveys, several records of Little Egret in and around the Marina/Atlantic Pond area were discovered during the initial desk study (NBDC, 2024). Bird Atlas 2007 -2011 data shows confirmed breeding at the 2km grid square W77A which overlaps the Atlantic Pond. Up to seven birds were recorded as present under 'confirmed breeding' and this suggests that up to c. 3 pairs are likely to have used this off-Site area for breeding in the past. Their continued presence in 2024 suggests that the area continues to be used for possible breeding, c. 430m east of the Site. Little Egret was not recorded within or directly adjacent to the Site during 2024 surveys and although records exist within the 2km grid squares encompassing the Site, no specific records of the species exist within or directly adjacent to the Site.

10.9.7.3.2 Moorhen (Gallinula chloropus) (BoCCI Green List)
Moorhen, confirmed as breeding at the swamp area directly adjacent to the Proposed Development in 2024, is a Green-listed species in Ireland (Gilbert et al 2021) and like most bird species in Ireland, is protected under the Wildlife Act (1976) and subsequent amendments. Four fledged chicks were observed with adults post-fledging.

10.9.7.3.3 Mallard (Anas platyrhynchos) (BoCCI Amber List)
Mallard is likewise protected during the breeding season under the Wildlife Act and is an Amber-listed species in Ireland (Gilbert et al 2021). Mallard is classed as a 'possible' breeder in 2024 on the swamp area, directly adjacent to the proposed works. No direct breeding activity was observed during surveys, and it is possible that the swamp is being used as resting/ feeding area by non-breeding individuals, although breeding is not ruled out.

10.9.7.3.4 Swallow (Hirundo rustica) (BoCCI Amber List)
Swallows (max flock size c.8 individuals) were regularly observed in flight over scrub and parkland surrounding the Site and not regularly observed over the Site area. No breeding activity was observed on Site, however the stadium located to the east is believed to be holding some breeding pairs, based on the behaviour of birds repeatedly entering, leaving and returning to the stadium area as well as the presence of juveniles in flight close by the stadium.

10.9.7.3.5 House Martin (Delichon urbicum) (BoCCI Amber List)
House Martin (max flock size c.4 individuals) were recorded regularly within and surrounding the Site. Foraging behaviour was frequently recorded over the Site, adjacent Marina parkland, and over the swamp area adjacent to the Site. No breeding activity was observed.

10.9.7.3.6 Summary of Other Bird Species Recorded
Several species were observed commuting through the general area including two BoCCI Amber-listed Gull species. Herring Gull (*Larus argentatus*) and Lesser Black-backed Gull (*Larus fuscus*) were recorded regularly during bird surveys commuting through the area c. 20m north of the Site boundary in an east-west direction. Gulls were not recorded flying directly over the Site area. Cormorant (*Phalacrocorax carbo*) (BoCCI Amber-listed) was observed flying through the Site at c. 60m height towards Atlantic Pond in June 2024.

The treeline and scrub areas on the opposite side of Centre Park Road c. 10-150m northwest of the Site boundary, hosted species including Goldcrest (*Regulus regulus*) (*BoCCI Amber-listed*), Willow Warbler (*Phylloscopus trochilus*) (BoCCI Amber-listed) and Buzzard (*Buteo buteo*) (*BoCCI Green-listed*).

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Proposed Development Area Boundary Line (RLB)

Confirmed Breeding Birds

Bird Survey Observations

Legend:

Applicant:	Project:	Location:	Figure Title:
Marina Quarter Ltd.	Former Ford Distribution Site LRD	Former Ford Distribution Site, fronting onto Centre Park Road, Ballintemple, Cork	Breeding Bird Survey Results

Drawn By: TR	Projection: IRENET95 / Irish Transverse Mercator
Checked: BL	
Date: 08/08/2024	Scale @ A4: 1:3500

Notes:
Site boundaries shown are for illustration purposes only and do not represent legal or exact boundaries

Figure 10 19. Breeding Bird Survey Overview Map

Table 10 14. Bird Species List (Annex 1 & Amber-listed) - Recorded within 500m of development Site boundary during Breeding Bird Surveys, 2024.

SPECIES	SCIENTIFIC	OBSERVED BREEDING STATUS	CONSERVATION STATUS
Little Egret	*Egretta garzetta*	Possible Breeding – Off Site	Annex 1 EU Birds Directive, BoCCI **Green** List
Cormorant	*Phalacrocorax carbo*	Present in flight – Off Site	BoCCI **Amber** List
Herring Gull	*Larus argentatus*	Present in flight – Off Site	BoCCI **Amber** List
Lesser Black-backed Gull	*Larus fuscus*	Present in flight – Off Site	BoCCI **Amber** List
Mallard	*Anas platyrhynchos*	Possible Breeding - Off Site	BoCCI **Amber** List
Moorhen	*Gallinula chloropus*	Confirmed Breeding – Off Site	BoCCI **Amber** List
Goldcrest	*Regulus regulus*	Probable Breeding – Off Site	BoCCI **Amber** List
House Martin	*Delichon urbicum*	Present - Foraging	BoCCI **Amber** List
Swallow	*Hirundo rustica*	Probable Breeding – Off Site	BoCCI **Amber** List
Willow Warbler	*Phylloscopus trochilus*	Probable Breeding – Off Site	BoCCI **Amber** List

10.9.8 Other Fauna

10.9.8.1 Amphibians

Common Frog (*Rana temporaria*) was recorded in the 1km (W6972) grid square for the Site in 2007, north of the Lee Estuary. Common Frog was also recorded historically in the broader area to the east of the Site. It is noted, however, that Smooth Newt (*Lissotriton vulgaris*) was not recorded within the 1km (02349) grid square that encompass the Site (NBDC: Amphibians and reptiles of Ireland).

There were no bodies of standing water present on Site which may support amphibians, but the drainage ditches and swamp areas located off Site to the south could potentially support Common Frog under the right conditions. There was no suitable habitat on Site capable of providing shelter for common frog, however the scrub areas surrounding the adjacent swamp could provide suitable foraging and/or hibernation habitat for this species.

10.9.8.2 Reptiles

Common Lizard (*Zootoca vivipara*) records exist for the relevant 2km grid square (W67W), however, there is no suitable habitat for this species located on Site. Common Lizard is associated with a broad range of habitats including scrub and wetland, particularly in Ireland (Herptological Society of Ireland (HSI,) 2024). It is therefore considered likely that common lizard could utilise the habitats off-Site to the east within the scrub adjoining the wetland area, and the wetland itself. The area within the confines of the Site are of negligible value for common lizard.

10.9.8.3 Fish

There are no waterbodies within the Site of the Proposed Development, and as such, there are no waterbodies present which could support notable fish species such as salmonids or lampreys.

10.9.8.4 Molluscs

There are no waterbodies within the Site of the Proposed Development, and as such, there are no waterbodies present which could support notable mollusc species.

10.9.8.5 Invertebrates

No records for rare or protected species of invertebrates are available for the 2km grid square which encompasses the Proposed Development, nor were any recorded during the Site walkovers. There is negligible habitat present on Site to support common butterfly species.

10.9.9 Evaluation of Ecological Features

The value of the ecological features, i.e., the habitats and species present or potentially present, was determined using the ecological evaluation at different geographical scales (NRA, 2009), presented in Appendix 10.2. This evaluation scheme, with values ranging from locally important to internationally important, seeks to provide value ratings for habitats and species present that are considered ecological receptors of effects that may ensue from a proposal. Based on best practice (CIEEM, 2018), any features considered to be less than of local value are not assessed within this EcIA.

The effects of the Proposed Development on the identified KERs are assessed in Section 10.10. Table 10-15 below summarises the evaluation rating assigned to each ecological feature and the rationale behind these evaluations is also provided.

Table 10 15. Evaluation of Designated Sites, Habitats, Flora and Fauna recorded within the Site and surrounding area. Those identified as Key Ecological Receptors (KERs) are highlighted in green.

SPECIES / SPECIES GROUP	EVALUATION	RATIONALE	KEY ECOLOGICAL RECEPTOR (KER)
DESIGNATED SITES			
Cork Harbour SPA (004030)	International Importance	Hydrologically linked to the Proposed Development via surface water channels. Screened out in the AA screening report accompanying this application due to linear distance (1.6km) from the Site.	No
Great Island Channel SAC & pNHA (001058)	International Importance	Hydrologically linked to the Proposed Development via surface water channels. Screened out in the AA screening report accompanying this application due to linear distance (6.4km) from the Site.	No
Douglas River Estuary pNHA (001046)	National Importance	Hydrologically linked to the Proposed Development via surface water channels. Screened out for significant effects due to distance.	No
Dunkettle Shore pNHA (001082)	National Importance	Hydrologically linked to the Proposed Development via surface water channels. Screened out for significant effects due to distance.	No

SPECIES / SPECIES GROUP	EVALUATION	RATIONALE	KEY ECOLOGICAL RECEPTOR (KER)
HABITATS			
Spoil & Bare Ground (ED2)	Little or no biodiversity value	Spoil and bare ground is of little or no biodiversity value and is highly modified.	No
Treelines (WL2)	Local Importance (Lower Value)	Present along the northern and northeastern corner of the Site. Non-native species classed as of lower importance for wildlife although potentially supporting a limit number of species.	No
Drainage Ditches (FW4)	Local Importance (Lower Value)	Relatively low floral diversity and limited evidence of fauna use across this habitat.	No
ADJACENT AND LINKED HABITATS			
Reed and Large Sedge Swamp (FS1)	Local Importance (Higher Value)	Located off-Site but directly adjacent to the Proposed Development. Important for small numbers of species in a local context.	Yes
East and Northeast Scrub (WS1)	Local Importance (Lower Value)	Bordering existing non-native Treeline and surrounding the off-Site Reed and Sedge Swamp mentioned above. Scrub that has developed along the boundary of the Site and immediately off-Site comprise of common species including bramble, ivy an isolated pockets of invasive winter heliotrope amongst non-native treeline, of local importance for a number of species including small non-volant mammals, foraging bats and common passerine birds.	Yes
FLORA			
Rare & Protected Flora	Local Importance (Lower Value)	No rare or protected flora were recorded during the field surveys. Unlikely to be present in notable numbers/densities.	No
Invasive Species	Negligible value	Limited stands that provide little ecological value.	No
FAUNA			
Bat Assemblages	Local Importance (Higher Value)	Potentially suitable habitat adjacent to Site of the Proposed Development. Surveyed as part of this planning application for bat activity (foraging and commuting).	Yes
Wintering Bird Assemblages	Local Importance (Higher Value)	Reed and Large Sedge Swamp supporting small numbers of breeding waterbirds, as confirmed during breeding bird surveys as part of this planning application. Moorhen confirmed breeding. Mallard present and possibly breeding. Little Egret and Mallard present at Atlantic Pond and grey heron confirmed breeding at Atlantic Pond c. 450m east with juvenile confirmed as utilising the swamp area adjacent to the Site post fledging. Likely to support local populations of birds during the winter period. Adjacent to busy heavily urbanized park and space, so unlikely to support larger flocks of wintering ducks, largely unsuitable for wintering wader species due to poor foraging opportunities, disturbance and small scale.	Yes
Potential Breeding Bird Assemblage	Local Importance (Higher Value)	As above, Moorhen confirmed breeding at swamp area to the east of the Site with Mallard possibly breeding. Little Egret is a possible breeding bird at Atlantic Pond, off-Site.	Yes
Fox *(Vulpes vulpes)*	Local Importance (Lower Value)	Fox observed on-Site on three occasions including an observation of an adult with three young in June. Fox is not legally protected and not of conservation concern.	No
Hedgehog *(Erinaceus europaeus)*	Local Importance (Higher Value)	Suitable habitats present for these small native mammals off-Site in adjacent swamp and perimeter scrub.	Yes
Pygmy Shrew *(Sorex minutus)*	Local Importance (Higher Value)	Suitable habitats present for these small native mammals off-Site in adjacent swamp and perimeter scrub.	Yes
Amphibians - Common Frog *(Rana temporaria)*	Local Importance (Lower Value)	Suitable habitats in areas of pooling water and in adjacent drainage ditch located off-Site.	No
Reptiles	Local Importance (Lower Value)	Suitable habitats within off-Site scrub and swamp habitats.	No

SPECIES / SPECIES GROUP	EVALUATION	RATIONALE	KEY ECOLOGICAL RECEPTOR (KER)
Fish	Imperceptible	No suitable habitat on-Site or in areas adjacent.	No
Molluscs	Imperceptible	No suitable habitat on-Site or in areas adjacent.	No
Invertebrates	Local Importance (Lower Value)	Suitable habitats within off-Site scrub and swamp habitats.	No

10.10 Potential Significant Effects

10.10.1 Avoidance and Mitigation Embedded in the Project Design

The Proposed Development includes several embedded design features that may act to avoid or mitigate negative effects that would likely occur in the absence of these features. However, as opposed to typical mitigation measures, the implementation of these features is integral to the design and completion of the Proposed Development, and as such the impact assessments are performed with consideration of these features as integrated parts of the Proposed Development. All considered embedded design features that may act to mitigate negative effects on local ecology and environment are listed in Table 10-16.

Table 10 16. Embedded Design Features and their potential to act to avoid or mitigate negative effects on the local ecology and environment.

EMBEDDED DESIGN FEATURE	AVOIDANCE / MITIGATION POTENTIAL
SUDS: • Green roofs; • Green podiums; • Permeable paving; • Filter drains; • • Rain garden, swales with check dams; • Bio-retention and geocellular storage systems and,; • Flow control devices.	The SUDS features included in the Project Design will ensure the surface water discharge from the Proposed Development is reduced to greenfield runoff rates. These features will be implemented as part of the surface water drainage design.
Landscape Design: • Inclusion of lawns and meadow grassland. • Bio-retention area; • Native tree and shrub planting • SuDS measures – rain garden, swales..	Accounting for the listed design features, the retention of the mature hedgerow on Site and the reinstatement of trees and grassland lost to facilitate the Development, the Proposed Landscape Plan is expected to have an overall positive impact on a local scale.
Biosecurity Site Best Practice: • Validation that all machinery / vehicles are free of IAPS, prior to their first introduction to site. • Certification from the suppliers that all imported soils and other fill/landscaping materials are free of IAPS • A regular schedule of site inspections across the IAPS growing seasons, for the duration of the construction works programme. • Validation that all machinery / vehicles are free of IAPS, prior to leaving the site. • Appropriate and effective site biosecurity hygiene to ensure that no IAPS are transmitted off-site for the duration of the Proposed Works.	e introduction of IAS to the Site during the construction phase of the Proposed Development could have a negative, local, long term, significant impact on local habitats. However, the Development incorporates site best practice management measures to remove this risk.

The below Sections assess the potential effects on the previously identified KERs of the Site and immediate surrounds during the Construction and Operational Phases of the Proposed Development. The KERs identified are described in Section 10.9.9 above.

10.10.2 Construction Phase

10.10.2.1 Effects on Designated Sites

There are hydrological links between the Site and a number of designated sites namely Cork Harbour SPA (004030), Great Island Channel SAC (001058)/ pNHA, Douglas River Estuary pNHA (001046) and Dunkettle Shore pNHA (001082). As discussed earlier, all are within c. 7km downstream of the Site boundary and connected via the Cork Harbour Estuary transitional waterbody flowing eastwards from the public outflow north of the Atlantic Pond. There is a low risk that effluent or polluting surface runoff and increased siltation and nutrient release, as well as surface water containing polluting chemicals such as hydrocarbons could reach these designated sites downstream of the Proposed Development in the event of overland flows or spillages during the construction phase. However, the separation of the Site from off Site drainage ditches, embedded design and construction/ environmental best practice minimises this risk.

Affects arising from changes in the composition of the habitats within the designated areas could have knock on effect on the favourable conservation status of these areas, particularly those located closest to the public outflow in particular Cork Harbour SPA, c. 1.6km downstream.

The AA Screening Report accompanying this EIAR under separate cover concluded that a degree of uncertainty exists in whether the Proposed Development could give rise to potentially significant effects on one nearby European site, namely:

- Cork Harbour SPA (004030).

Therefore, a Natura Impact Statement (NIS) has been prepared for the Proposed Development. The purpose of this NIS report is to provide information for the relevant competent authority to carry out a Stage 2 Appropriate Assessment in respect of the Proposed Development

Further to the mitigation measures outlined in the NIS, standard on-site construction controls will be implemented during the construction phase of the Proposed development, as is the case for the ongoing construction of the adjacent Ford SHD project, minimising the potential release of potentially harmful runoff from entering the drainage ditches and streams during the construction phase. All works will be undertaken following the preliminary Construction Environmental Management Plan (CEMP), following appointment, the contractor will be further required to develop the plan to manage on-Site construction waste in line with construction industry standards.

Given the size of the Proposed Development and its distance upstream from areas of conservation significance, the potential effect on the designated sites during the construction phase of the Proposed Development is neutral in this case.

10.10.2.2 Effects on Habitats and Flora

The habitats on Site and in the adjacent environs considered as KERs (NRA, 2009) will remain intact during the construction phase of the development with little or no removal of the habitats present. The habitats with the potential to be affected during construction are listed and discussed below.

10.10.2.2.1 Reed and Large Sedge Swamp (FS1)

Located adjacent to the eastern boundary, this habitat is of local importance – higher value. The proximity to the Site poses a low risk of polluting surface water runoff and increased siltation and nutrient release, as well as polluting surface water entering the swamp area, decreasing its ecological condition in the short term. However, based on the CEMP proposed for the Proposed Development, construction stage best practice procedures to be followed by the construction contractor will eliminate/minimise the occurrence of such releases to the swamp area adjoining the Site. The effect on this habitat during the construction phase of the development is assessed as **negative, slight** and **short-term.**

10.10.2.2.2 Scrub (WS1)

Most of the scrub mentioned is located Off-Site and will remain intact and largely separate from the Proposed Development. There is a low potential for significant effects to the scrub areas overall due to their location outside the Proposed Developments red line boundary. Minimal areas of scrub located to the east of the Site are likely to be lost during the construction phase. The loss of the on-Site scrub areas in deemed insignificant due to the small area involved (Site edge on perimeter of existing treeline). The effect on this habitat during the construction phase of the development is assessed as **negative, slight** and **short-term**.

10.10.2.3 Impact on Non-volant Mammals (excl. bats)

Hedgehog is a species likely to be associated with scrub which is present in limited amounts on-Site and more abundant surrounding the adjacent swamp area. No hedgehogs were observed on-Site during any of the Site visits in 2024 but it is likely that they are present off-Site in the scrub areas mentioned in Section 10.9.3.3. The poor quality and small area of scrub on-Site and the location of suitable scrub off-Site which is to remain intact as part of the Proposed Development mean the effect on hedgehog and other small mammals such as Irish Stoat during the construction phase of the development is assessed as negative, slight and short-term.

10.10.2.4 Impact on Bat Assemblages

Three species of bat have been recorded during activity surveys. On site flights were recorded but the majority of activity was confined to the swamp area adjacent to the eastern boundary. Commuting in a southwest direction was also frequently observed, with negligible activity over the core Site area, consistent with the lack of suitable foraging or commuting habitat on Site. Effects on bat assemblages during the construction phase of the development is assessed as **negative, slight** and **short-term**.

10.10.2.5 Impact on Bird Assemblages

10.10.2.5.1 Potential Breeding Bird Assemblages

The Site contains limited breeding opportunities for birds in its current state. The adjoining habitats provide breeding habitat for common species such as Moorhen and Mallard.

The swamp area directly adjacent to the east of the Site is likely to be exposed to construction related noise, affecting Green-listed species, Moorhen, Amber-listed possible breeding Mallard and noise related disturbance to the more common, Green-listed passerine species associated with the scrub surrounding the swamp area such as House Sparrow.

No species of conservation concern (EU Annex 1 or BoCCI Red /Amber listed) will be affected by the construction phase of the development. As stated above regarding the presence of Little Egret in the broader area, the species is very versatile and will utilise the broader network of foraging and roosting areas within the hinterland of the Site during the construction phase of the development and has not been recorded on or adjacent to the Site. No optimally suitable breeding habitat is present within 430m of the Site boundary and the Little Egret was not observed within the Site boundary during breeding bird surveys in 2024. Possible breeding areas are present at Atlantic Pond c. 430m east of the Site boundary. Little Egret is often associated with Grey Heron colonies (BTO, 2024) and is an extremely versatile forager having a broad diet which mainly consists of fish smaller then 10cm, but can also feed on small birds, crustaceans, small mammals and insects (BTO 2024; Birdlife International 2023 Kazantzidis & Goutner 1996). Furthermore, the disturbance effects associated with construction activities at the Site would not be expected to extend beyond c. 300m, as noise levels associated with general construction activities would attenuate to close to background levels at that distance (Cutts et al., 2009). The effect on breeding bird assemblages during the construction phase of the development is assessed as **negative, slight** and **short-term**.

10.10.2.5.2 Wintering Bird Assemblages

Noise related disturbances and potential surface runoff are relevant factors when assessing the impact on small assemblages of birds likely to be present or affected during the construction phase. Resident species including Mallard and Moorhen were present on the adjacent swamp area during the breeding season in 2024. These species are likely to be present at any time of year due to their resident status and there is a possibility into the future that small assemblages of other bird species such as Little Egret would utilise the swamp area for foraging and/ or roosting. It is possible that Little Egret will use the adjacent swamp as a foraging area in the future, particularly outside the breeding season (BTO 2024; Birdlife International 2023; Kazantzidis 1996).

The presence of the nearby Lee Estuary and its connectivity to designated areas downstream provide temporary alternatives and an offset of roosting and foraging opportunities during the temporary construction phase for such species. This, combined with the relatively small-scale footprint of the Site and adjacent swamp/ scrub areas and the increasing trend in Little Egret populations in Ireland, the UK and across Europe since c. 2000 (BTO, 2024) make species such as Little Egret less vulnerable to affects arising from temporary loss/disturbance to foraging habitat. The effect on wintering bird assemblages during the construction phase of the development is assessed as **negative, slight** and **short-term**.

10.10.3 Operational Phase

10.10.3.1 Impact on Designated Sites

A 1:100 year flood event plus 20% to allow for climate change is accounted for in the surface water drainage design, allowing for significant future flood events without the risk of breaching the capacity of the proposed drainage system minimising the risk of untreated surface water entering the drainage system and subsequently, downstream designated areas. Sustainable Urban Drainage Systems (SUDS) measures also form a large proportion of the surface area with permeable surface areas filtering surface water through to an appropriate attenuation/ treatment tank before any surface water enters the drainage network.

With regards to protected bird species, the separation distance of 1.6km between the Proposed Development and the nearest designated Site (Cork Harbour SPA) significantly reduces the likelihood of significant affects due to increases in noise, lighting and disturbance/ displacement arising during the operational phase of the Proposed Development. Cork harbour SPA is designated as an important area for 23 bird species (NPWS, 2024). One of these SCI species, Grey Heron was observed foraging in the adjacent swamp area during breeding bird survey in 2024, off-Site and is regularly occurring in the broader hinterland of the Site, including a confirmed breeding area at Atlantic Pont, c.430m east of the Site boundary. The impact on the Proposed Development on ex-situ feeding areas is therefore relevant with regards to Grey Heron as well as the potential for other SCI species associated with Cork Harbour SPA to utilise the adjacent swamp area in the future. Grey Heron is a common and Green-listed species in Ireland (Gilber et al. 2021) and as noted in previous Sections, the small-scale footprint of the Site and adjacent swamp area coupled with the connectivity of Cork Harbour SPA with the Site via Cork Harbour make the possible effects to ex-situ areas of a designated Site low – negligible in this case. The overall impact on designated areas during the operational phase of the Proposed Development is assessed as **neutral** in this case.

10.10.3.2 Habitats and Flora

10.10.3.2.1 Reed and Large Sedge Swamp (FS1)

There is a risk that the quality of the adjacent swamp area could be reduced due to increased exposure to anthropogenic pressures such as increases in littering, runoff from the development area and increased footfall. There will be an appropriate drainage design implemented as part of the Proposed Development with a connecting walkway joining the new Marina Park area to the south and east of the Site as outlined in the landscape design strategy prepared by (AIT, 2024). Appropriate design of walkways and net gain of biodiversity is expected to arise, thereby enhancing the overall area. This includes the construction of green roofs and SuDS measures. The overall impact on the adjacent reed and large sedge swamp area during the operational phase of the Proposed Development is assessed as neutral in this case.

10.10.3.2.2 Scrub (WS1)

Scrub areas located off-Site will remain largely untouched during the operational phase of the Proposed Development as they are located outside the development boundary to the east. The impact on scrub areas during the operational phase of the Proposed Development is assessed as neutral.

10.10.3.3 Impact on Non-volant Mammals (excl. bats)

Small mammals such as Hedgehog and Irish Stoat are likely to be present off-Site surrounding the adjacent swamp area. The retention of the off-Site scrub areas and the addition of native trees and hedgerows at the perimeter of the planned development will increase the connectivity for these species to move between suitable areas. Due to the relatively poor baseline conditions on-Site for small mammals, the planned biodiversity measures and the increased connectivity mean the effect on small mammals during the operational phase is assessed as **positive, slight** and **long-term**.

10.10.3.4 Impact on Bat Assemblages

Possible increases in lighting and human activity in areas of Scrub and wetland adjacent to the Site could make the area less suitable for foraging. The effect on bats during the operational phase is assessed as **negative, slight** and **long-term**.

10.10.3.5 Impact on Bird Assemblages

10.10.3.5.1 Potential Breeding Bird Assemblages

Breeding birds present in 2024 directly adjacent to the Site displayed a tolerance for moderate levels of human disturbance and those species recorded using the adjacent swamp will not be adversely affected by the operational phase of the Proposed Development. The landscape plan prepared by AIT, (2024) includes the provision of treelines, native shrubs and ecologically enhancing native species as part of the design. Possible breeding species located off Site including Buzzard are not likely to associate with the Proposed Development Site and as such will not be impacted negatively as a result of the project. The impact on breeding bird assemblages is therefore assessed as **positive, slight** and **long-term**.

10.10.3.5.2 Winter Bird Assemblages

There is a potential for increased disturbance to winter birds on a localised scale during the operational phase. The increase in footfall in areas surrounding the adjacent swamp and new Marina Stream could pose a risk of disturbance and displacement to resident birds. The presence of these species in an already heavily urbanised environment, directly beside public walkways shows the tolerance of species including Little Egret, Moorhen and Mallard to moderate levels of human disturbance. The possible future utilisation of the new Marine Stream and the adjacent swamp by other species including ex-situ usage by SCIs of designated areas is not considered an issue in this case due to the small size and relatively limited feeding or roosting opportunities available within the zone of influence of the Site. The effects on winter bird assemblages during the operational phase of the development is assessed as **negative, slight** and **long-term.**

10.10.3.5.3 Collision Risk

Tall structures such as electrical pylons, wind farms and tall buildings can lead to fatal collisions with commuting bird species. This is particularly true for those species considered to be "poor" fliers, with relatively low manoeuvrability compared to other more agile bird species (see Eirgrid, 2012).

Some of the most at-risk groups (classified as 'medium' and 'high' collision risk species) include wader species; waterfowl such as geese, swan and duck species; and some raptor species. Gulls such as Black-headed Gull (*Larus ridibundus*), Herring Gull (*Larus argentatus*), and Lesser Black-backed Gull (*Larus fuscus*) are classed as 'low' collision risk species due to their superior manoeuvrability when flying (Eirgrid, 2012).

10.10.3.5.3.1 Likelihood of Collision Impacts

The physical location of buildings and structures can influence the likelihood of bird collisions, with structures placed on or near areas regularly used by large numbers of feeding, breeding, or roosting birds, or on local flight path; such as those located between important foraging and roosting areas, can present a higher risk of collision.

The Site itself is located within industrial lands and adjacent to highly urbanised parkland to the south and is not deemed to be located in a sensitive area in terms of bird flight paths i.e., it is not located along the coast, or adjacent to any SPAs designated for wetland bird populations. While Gull species were recorded using the areas north of the Site for commuting, these species are at low risk of collision with building as described above.

The absence of suitable feeding or roosting habitat in the vicinity of the Site and the location of the Site, which is offset from optimal feeding and roosting areas for Waders or Geese, makes the likelihood of flight paths through the Site as imperceptible.

10.10.3.5.4 Loss of Ex-Situ Habitat

The Site itself is not deemed to represent suitable ex-situ feeding/roosting habitat for any SCI species. Habitats present largely comprise of spoil and bare ground. While there will be an increase in human presence within the Site of the Proposed Development, ex-situ habitats surrounding the Site are separated by public roads and are located adjacent to existing industrial estates and public amenity spaces, including Marina Park. As such, the likelihood of increased disturbance to these ex-situ habitats as a result of the Operational Phase of the Proposed Development is considered imperceptible.

10.10.4 Do Nothing Impact

If the area in question was to be left un-developed, it would remain of low biodiversity value overall due to the extensive coverage of poor value habitat such as spoil and bare ground. The landscape and engineering plan proposed for the Development incorporate sustainable drainage measures coupled with a native planting regime, water attenuation areas and pollinator friendly raised beds. These measures are expected to provide a biodiversity 'Net Gain' for the Site when compared to baseline conditions.

10.10.5 Cumulative Effects

10.10.6 Summary

Cumulative Impacts can be defined as "impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project". Effects which are caused by the interaction of effects, or by associated or off-site projects, are classed as indirect effects. Cumulative effects are often indirect, arising from the accumulation of different effects that are individually minor. Such effects are not caused or controlled by the project developer.

A review of other off-site developments and Proposed Developments was completed as part of this assessment. The following projects and plans were reviewed and considered for possible cumulative effects with the Proposed Development.

10.10.6.1 Relevant Plans and Policies

The following plans and policies were reviewed and considered for potential in-combination effects with the Proposed Development.

- Cork City Heritage and Biodiversity Plan (2021-2026).
- Cork City Development Plan (2022-2028).

No significant effects are expected to arise, either from direct or indirect sources during the construction or operational phases of the Proposed Development or in combination with the above plans and policies. Therefore, it is considered that there are no means by which the above could act in combination with the Proposed Development to cause likely significant effects on ecological features / sensitivities.

10.10.6.2 Existing Planning Permissions

A search of planning applications located within a 500m radius of the Site of the Proposed Development was conducted using online planning resources such as the National Planning Application Database (NPAD) (MyPlan.ie). Any planning applications listed as granted or decision pending from within the last five years were assessed for their potential to act in-combination with the Proposed Development and cause likely significant effects on the relevant European sites. Long-term developments granted outside of this time period were also considered where applicable.

It is noted that the majority of the developments within the vicinity of the Site of the Proposed Development are applications granted for small scale extensions and alterations to existing permitted developments as well as larger applications for residential and mixed-use residential areas. The larger developments in the vicinity of the Proposed Development are outlined in Table 10-17 below.

Table 10 17. Large Developments within the vicinity of the Proposed Development

PLANNING REFERENCE	PLANNING AUTHORITY	STATUS	LOCATION
TA28.313277	**Cork City Council**	**Live Case**	**Former Tedcastles Yard, Centre Park Road and the Marina, Cork**
Development Description Demolition of existing structures, construction of 823 no. apartments, creche and associated site works. **Potential for In-combination effects** The Natura Impact Statement provided for this Development states: 'It has been objectively concluded following an examination, analysis and evaluation of the relevant information, including in particular the nature of the predicted effects from the Proposed Development and with the implementation of the mitigation measures proposed, that the construction and operation of the Proposed Development will not adversely affect (either directly or indirectly) the integrity of any European site, either alone or in combination with other plans or projects. There is no reasonable scientific doubt in relation to this conclusion. The competent authority will make the final			
TA28.309059	**Cork City Council**	**Permission Granted**	**SHD. The Former Ford Distribution Site, Fronting on to Centre Park Road, Marquee Road and Monahan's Road, Cork.**
Development Description Demolition of existing structures, 10 year permission for the construction of 1,002 no. apartments, childcare facilities and associated site works. **Potential for In-combination effects** The Natura Impact Statement provided for this Development states: Following an Appropriate Assessment, it has been ascertained that the Proposed Development, individually or in combination with other plans or projects would not adversely affect the integrity of the Cork Harbour SPA and Great Island Channel SAC, or any other European site, in view of the sites's Conservation Objectives'.			

The Proposed Development is estimated to provide an increase in both extent and variability of available habitats for local wildlife, offsetting some of the loss accrued by nearby developments (both permitted and planned).

It is considered that there is no potential for the Proposed Development to act in-combination with other permitted developments in the vicinity that could cause likely significant effects on any nearby KERs.

10.11 Avoidance, Mitigation, Compensation and Enhancement Measures

The following mitigation measures will be implemented as part of the Proposed Development and in line with the policy objectives of the Cork City Heritage and Biodiversity Plan 2021 – 2026, in order to minimise the potential effects on the existing ecology as discussed in previous Sections.

10.11.1 Incorporated Design Mitigation

Green infrastructure is incorporated into the design of the Proposed Development. The inclusion of native species will enhance biodiversity overall with provision of native shrubs, trees and sustainable surface water drainage methods including a rain garden as outlined in the landscape strategy prepared by AIT (2024).

10.11.2 Construction Phase Mitigation

10.11.2.1 Surface Water Protection

Appropriate mitigation measures will be implemented during the construction phase to ensure there will be no significant impact on the receiving hydrological network both on and off-Site via construction best practice including new marina Stream, Cork Harbour SPA and the adjacent swamp area to the east of the Site.

10.11.2.2 Timing of works and vegetation clearance

Works likely to cause disturbance to nesting birds at the eastern edge of the Site should be timed to take place outside the breeding season i.e. during the period September – February inclusive. This includes the use of heavy machinery in areas directly beside the swamp area which are likely to cause noise disturbance and possible breeding failure to active breeding birds such as Moorhen and Mallard.

Any clearance of scrub on-Site should take place during the same period (February to March inclusive) in line with the strict timing of vegetation clearance stated in the Wildlife Act 1976 and subsequent amendments.

10.11.2.3 Construction Phase Lighting

No overnight lighting will be directed to the natural habitats along the boundaries of the Site (i.e., the eastern swamp/ wetland off-Site, and treelines. Where overnight lighting cannot be avoided in these areas due to health and safety concerns, the lighting within the Proposed Development will be designed and installed to minimise the impact on local wildlife and in accordance with the Bat Conservation Trust guidelines on artificial lighting and bats (BCT 2023):

- There will be no light spill to the boundary habitats.
- All luminaires used will lack UV/IR elements to reduce impact.
- LED luminaires will be used due to the fact that they are highly directional, lower intensity, good colour rendition and dimming capability.
- A warm white spectrum (<2700 Kelvins will be used to reduce the blue light component of the LED spectrum).
- Luminaires will feature peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats.
- Column heights should be carefully considered to minimise light spill. The shortest column height allowed should be used where possible.
- Only luminaires with an upward light ratio of 0% and with good optical control will be used.
- Luminaires will be mounted on the horizontal, i.e. no upward tilt.
- Any external security lighting will be set on motion-sensors and short (1min) timers.
- As a last resort, accessories such as baffles, hoods or louvres will be used to reduce light spill and direct it only to where it is needed.

10.11.2.4 Waste Management

As best-practice, all construction-related rubbish on-site e.g., plastic sheeting, netting etc. should be kept in a designated area on-site and kept off ground level so as to protect small fauna (such as small mammals) from entrapment and death.

10.11.3 Operational Phase Mitigation

10.11.3.1 Surface Water Protection

Regular maintenance of surface water treatment facilities in accordance with best practice and manufacturers guidelines is required to keep the drainage system in adequate working order and to allow continued filtration of the surface water.

10.11.3.2 Landscape Management

Pollinators will be promoted through the management of the soft landscaping on-Site during the lifetime of the development, see landscape strategy prepared by (AIT, 2024).

10.11.3.3 Wildlife Sensitive Operational Phase Lighting

A lighting report prepared by EDC (2024) details the lux levels on the periphery of the Proposed Development and is illustrated in Figure 10-4 above. In order to minimise disturbance to bats utilising the swamp area located to the east of the Proposed Development, the lighting and layout will be designed to minimise light-spill onto habitats used by the local bat populations identified as foraging or commuting over this off-site area. See Bat Activity results maps (Section 10.9.6.2) for detailed illustrations of bat foraging and commuting areas identified adjacent to the Site. This can be achieved by ensuring that the design of lighting accords with guidelines presented in the Bat Conservation Trust & Institute of Lighting Engineers 'Bats and Lighting in the UK - Bats and Built Environment Series', the Bat Conservation Trust 'Artificial Lighting and Wildlife Interim Guidance' and the Bat Conservation Trust 'Statement on the impact and design of artificial light on bats'.

- Lighting will only be installed where necessary for public safety in known Bat Foraging and Roosting locations (areas adjoining the eastern swamp located off-Site and adjoining the Proposed Development). These lights have been designed and selected with specific shutters and filters to minimise any potential for back spills into the sensitive locations while still providing the primary function of safely lighting the pedestrian routes.
- Reflectance – Downward lighting can be reflected from bright surfaces. To minimize bat disturbance, the design avoids the use of bright surfaces and incorporates darker colour lamp heads and poles to reduce reflectance. Only luminaires with an upward light ratio of 0% and with good optical control to be used.
- Lighting controls and dimming shall be utilised for post-curfew times.

- Shielding of Luminaires & Light - To minimize bat disturbance, the design avoids the use of up-ward lighting by shielding or by downward directional focus. i.e., no upward tilt.
- Type of Light – To minimize bat disturbance, the design avoids the use of strong UV lighting. The lighting design is based on the use of LED lighting which has minimal or no UV output of significance. Warmer 2700°K LED lighting will be utilized for amenity areas, as the warmer col-our temperatures with peak wavelengths greater than 550nm (~3000°K) cause less effects on bats.

10.11.4 Biodiversity Enhancement Measures

10.11.4.1 Enhancement 1: Swift Bricks

Although there were no observations of swift on-Site during surveys. It is proposed to include swift bricks or external swift boxes on the western facades of the buildings as an enhancement measure. A minimum of 5 bricks/ boxes will be incorporated into the envelope of both proposed apartment blocks (10 no. total) and will be installed a minimum of 5m off the ground. Care will be taken to ensure no obstacles or plate glass windows are located below the bricks/boxes.

Guidelines for the bird box scheme should follow guidelines published by Swift Conservation Ireland, and those published by Birdwatch Ireland entitled "Saving Swifts" (2019). The incorporation of swift bricks/boxes will help recover the declining swift population in the local area, which are now Red Listed in Ireland (Gilbert et al., 2021).

Swifts are a "clean" bird species which remove their own wastes from their nests periodically. As such, swift bricks/ boxes do not require any cleaning by the management company.

A project ecologist will be instructed to oversee the installation of the swift bricks or boxes during the construction phase or after the development has been completed, depending on which option is decided upon by the design team.

10.11.4.2 Enhancement 2: House Martin Nest Cups

House martins were observed on-Site during surveys and there is a lack of optimal breeding locations in the area. As an enhancement measure, at least four (4 no.) nest cups will be installed on the western façade of the Proposed Development. These nest cups will be placed under the eaves of the structure at a minimum height of 2m above ground, with a droppings board placed at least 2m below the nest cups, as outlined in guidelines issued by House Martin Conservation UK & Ireland (2021). House Martin are an Amber-listed species in Ireland (Gilbert et., al 2021).

A project ecologist will be instructed to oversee the installation of the nest cups after the development has been completed.

10.11.4.3 Enhancement 3: Bat Boxes

Common bat species (Soprano Pipistrelle, Common Pipistrelle and Leisler's Bat) were observed foraging on the off-Site wetland area adjacent to the eastern edge of the Site. Coupled with appropriate lighting (<1 lux) penetrating into the swamp area and associated scrub/ treeline, five (5 no.) bat boxes are recommended as an enhancement measure. These boxes will be placed on native trees which are to be planted at the eastern edge of the Proposed Development, bordering the wetland area (AIT, 2024). The boxes will provide roosting opportunities for local bat populations and help to increase the availability of suitable roost features in the area.

These boxes will be erected under supervision of the project ecologist and monitored for bat activity in the years post construction.

10.12 Risk of Major Accidents or Disasters

The Proposed Development has been assessed and considered in relation to its vulnerability to major accidents and disasters, in compliance with the EIA Directive on assessment of the effects of certain public and private projects on the environment (2017). It can be reasonably concluded that the pro-posed development is not vulnerable to give rise to major accidents or disasters of any kind, including those likely to pose a risk to the environment and/ or Biodiversity.

10.13 Worst Case Scenario

The worst-case scenario for the Proposed Development area (EIAR boundary) is defined as the development of all lands as detailed in the design, and coinciding with other plans and projects as detailed in Section 10.10.5. Considering the mitigation measures and the residual impacts that remain, the impact on Biodiversity is not significant.

10.14 Interactions

There are interactions between biodiversity at the Site of the Proposed Development and other disciplines which are described in separate chapters within the EIAR.

Changes in climate over time has the potential to alter species distributions and ecological balances as described in the chapter dedicated to climate within this EIAR. Conservation measure to protect flora and fauna from changes in climate have been considered when prescribing enhancement measures and mitigation measures relating to Biodiversity.

Potential noise related impacts, particularly in relation to local bird populations within the vicinity of the Proposed Development have been considered fully as part of the assessment of likely significant effects. Such effects are not likely to be significant, as described in Section 10.10.2.5 above.

Air quality, and particularly effects arising from dust emissions during the construction phase of the Proposed Development could have impacts on local biodiversity. These potential effects have been fully considered as part of this assessment. When standard dust minimisation measures as part of construction best practice are implemented, these effects are not likely to be significant and no likely significant effects are expected in this case.

Interactions can occur between biodiversity and hydrology through impacts to water quality arising from, for example an accidental pollution event during the construction and/ or operation phase. Unmitigated interactions between hydrology have the potential to impact on ecological receptors such as designated sites that are hydrologically linked to the Site. Mitigation measures relating to interactions between hydrology and biodiversity have been outlined in the NIS report accompanying this EIAR and have been prescribed to prevent this potential impact.

10.15 Monitoring

Table 10-18 below provides a summary of the required monitoring and pre-works inspections during the construction phase, as well as any surveys that should be completed during the Operational Phase. The monitoring, inspections and surveys will ensure that the identified mitigation measures are implemented and maintained efficiently and have the desired effect of protecting the local ecology from adverse effects.

The monitoring/surveys outlined below will be included in a Biodiversity Management Plan (BMP) for the Proposed Development, along with the detailed mitigation measures for the construction and operational phases (Sections 10.11.2 and 10.11.3) and Biodiversity Enhancement Measures (Section 10.11.4).

In addition to the items listed below, this document should detail the landscape management operations for the Proposed Development, including cutting/trimming regimes and maintenance of bird and bat boxes (if applicable). This document will also be updated to reflect any follow-up survey results as they are carried out. The BMP will be prepared and agreed in consultation with a suitably qualified ecologist and Cork County Council.

Table 10 18. Mitigation and enhancement measures during the construction and operational phase as well as enhancement measures to be carried out by a suitably qualified ecologist (represented in green).

MEASURE	MONITORING
CONSTRUCTION PHASE	
Mitigation 1: Timing of works and vegetation clearance	Any clearance of scrub on-Site should take place during the period (February to March inclusive) in line with the strict timing of vegetation clearance stated in the Wildlife Act 1976 and subsequent amendments. All treeline currently in place should be retained and reinforced with native species.
Mitigation 2: Construction Phase lighting	No overnight lighting will be directed to the natural habitats along the boundaries of the Site (i.e., the eastern swamp/ wetland off-Site, hedgerows and treelines.
Operational Phase	
Surface Water Protection	As per construction best practice.
Landscape Management	Pollinators will be promoted through the management of the soft landscaping on-Site during the lifetime of the development.
ENHANCEMENT	
Enhancement 1: Swift Bricks Installation	The location and placement of these structures should be carried out under the advisement and supervision of an Ecologist to ensure they are fit for purpose.
Enhancement 2: House Martin Nest Cup Installation	The location and placement of these structures should be carried out under the advisement and supervision of an Ecologist to ensure they are fit for purpose.
Enhancement 3: Bat box Installation	The location and placement of these structures should be carried out under the advisement and supervision of an Ecologist to ensure they are fit for purpose.

10.16 Residual Impact Assessment

This Section assesses potential significant environmental effects which remain after mitigation measures are implemented.

Standard construction phase control measures, and specific mitigation measures, have been outlined to ensure that the Proposed Development does not impact on any species, or habitats of conservation importance within the zone of influence of the Proposed Development. It is essential that these measures are complied with, in order to ensure that the Proposed Development complies with National conservation legislation. Provided all recommended measures are implemented in full and remain effective throughout the lifetime of the Proposed Development, no significant negative residual effects on the local ecology, or on any designated nature conservation sites, will occur as a result of the Proposed Development.

Using green roofs, sustainable surface water management and planting of native hedgerow, trees and shrubs it is reasonable to state that the residual effects arising following the implementation of mitigation will be a net gain in biodiversity value when compared to the baseline conditions of the Site. This is due to the low ecological value of the Site footprint in its current form and considering the landscape design plan and planting strategy (AIT, 2024).

The installation of artificial nest sites for Swift and House Martin will provide nesting opportunities for up to ten (10 no.) pairs of Red-listed swifts and up to a minimum of four (4 no.) pairs of House Martin (Amber-listed). Bat boxes will enhance the area for roosting bats which have been recorded foraging over the swamp and scrub adjoining the Site. This residual impact will have a positive impact on the local population of both species and contribute to their recovery in the area.

10.17 'Do Nothing Scenario'

As the site is zoned for development, in the absence of the proposed development, it is likely that a development of a similar nature is likely to be constructed in the future in line with national policy and the development plan objectives. Therefore, the construction and operational phase effects outlined in this assessment are likely to occur in the future, even in the absence of the proposed development.

10.18 Conclusion

The assessment of potential adverse effects resulting from the Proposed Development on biodiversity in this chapter has identified KERs including habitats and Fauna. It is reasonably considered that following all mitigation measures including design embedded and prescribed, adequate implementation of the CEMP, and adherence to construction best practice that no significant effects to biodiversity will arise from the Proposed Development during the construction or operational phases.

Additionally, the landscape plan for the Proposed Development and the prescribed maintenance and landscape strategy will provide enhancement to biodiversity in the local area over the long term.

Bat activity results carried out in 2024 concluded that three common bat species were regularly recorded foraging over the swamp area to the east of the development area, outside of the red line boundary of the Proposed Development site.

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VOLUME II

CHAPTER 11

Noise & Vibration

McCutcheon Halley
CHARTERED PLANNING CONSULTANTS

CHAPTER ELEVEN
Table of Contents

CHAPTER ELEVEN
Table of Figures

CHAPTER ELEVEN
Table of Figures

CHAPTER ELEVEN
Table of Tables

CHAPTER ELEVEN
Table of Tables

CHAPTER ELEVEN
Table of Photographs

Chapter Eleven | Noise & Vibration

11.1 Introduction

This chapter of the EIAR was prepared to assess the potential significant effects of the proposed development on the local soundscape. Potential inward noise impacts are also assessed. The proposed development will consist of:

- 176 apartments in two blocks ranging in height from 8 to 10 storeys over podium level.
- One ground floor retail/restaurant unit.
- A childcare facility.
- Internal and external residential amenity spaces.
- Associated ancillary development works.

A more detailed description is provided in Chapter 2 of this EIAR. Potential noise and vibration effects are typically divided into the following categories:

- Construction phase noise effects on surrounding receptors.
- Construction phase vibration effects on surrounding receptors.
- Operational phase noise effects on surrounding receptors.
- Operational phase vibration effects on surrounding receptors.
- Noise impacts within the completed development from external sources ('inward impacts').

Following a preliminary scoping exercise, it was concluded that the proposed development will not give rise to any vibration effects following construction, and therefore operational phase vibration effects have been scoped out. The remaining four categories are assessed in this chapter i.e. construction phase noise and vibration effects on surrounding receptors, operational phase noise effects on surrounding receptors, and inward effects on the proposed development from offsite noise sources.

11.2 Expertise & Qualifications

This chapter of the EIAR has been prepared by Damian Brosnan, MKO Acoustics Projects Director. Damian holds an MSc in Applied Acoustics from the University of Derby and has over 30 years of experience in both private practice and local authority.

Following graduation from UCC in 1993, Damian worked with Cork County Council's Environment Department. From 2001 to 2023, he worked as an acoustic consultant, initially with DixonBrosnan where he specialised in environmental impact assessment and acoustics, and subsequently as Damian Brosnan Acoustics, a specialist provider of acoustic services to a wide range of public and private clients. Damian joined MKO in 2023, heading up the new MKO acoustics unit.

Damian has extensive experience in assessing noise impacts associated with industry, quarrying, waste management, renewable energy and residential developments, as well as a wide variety of other projects through planning applications, SID applications and the EPA licensing system. He is a member of the Institute of Acoustics and is Secretary of the Irish Branch. He is also a founding member of the Association of Acoustic Consultants of Ireland, an industry body founded to promote acoustics best practice in Ireland. Damian has presented acoustic evidence in a number of court hearings and oral hearings. Damian undertook the noise and vibration assessment as part of the EIAR for the adjacent large residential development permitted by An Bord Pleanála order ABP-309059-20 (referenced 'SHD' development in this chapter).

11.3 Proposed Development

11.3.1 Development Description

The site, which is subject to the current application, is located at the northeast tip of the former Ford site, close to the River Lee, as delineated in the site layout shown in Figure 11.1 below. In this area, it proposed to construct two blocks of 176 apartment units over a podium level. An SHD development is permitted immediately adjoining the site to the south-west. This permission, granted in 2021, included for 1002 apartments over 12 blocks and occupies most of the former Ford Distribution Site, which borders Centre Park Road.

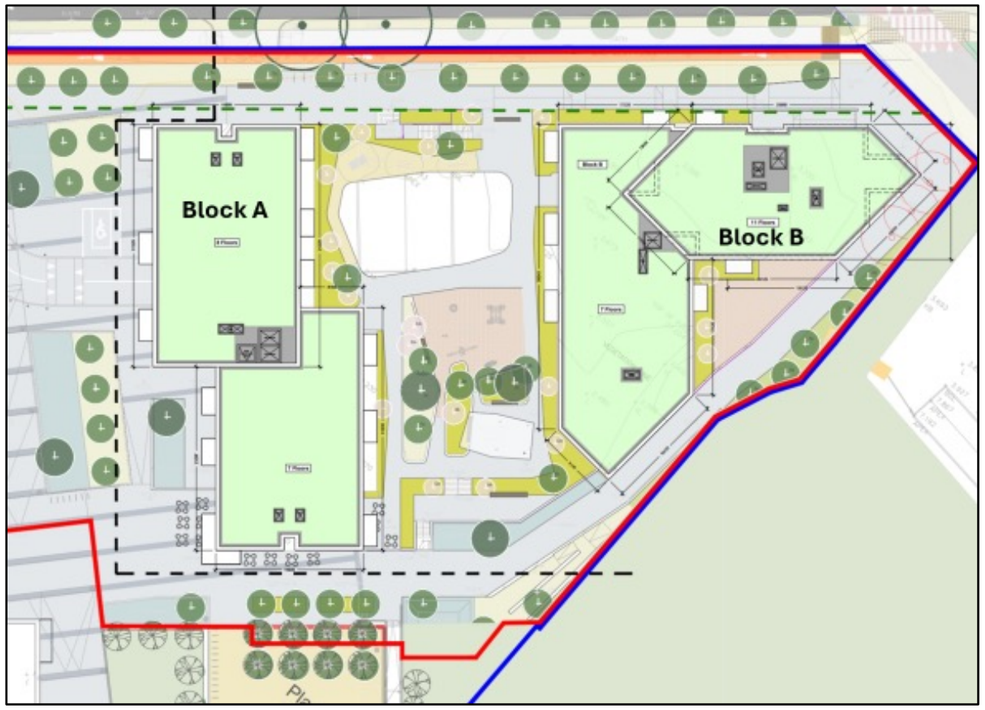

Figure 11.1 Proposed Site Layout

Block A, located on the southwest side of the site, will extend to eight floors, with a portion of the building topping out at seven floors. A portion of Block B, at the river end of the site, will also extend to seven floors, while the northern end overlooking the river will continue to ten floors. Apart from a podium level retail/restaurant space at the southern end of Block A, and a podium level creche at the river end of Block B, the entirety of both blocks will consist of a mixture of apartment types. Apartments will include balconies on certain facades. Roof areas will not be accessible to residents.

Both blocks will include an additional floor below podium level – this basement area will be used to provide space for car parking, bike storage, additional storage, plant equipment and a gym. Vehicular access to the basement will be gained from Centre Park Road. The podium area between the blocks will be landscaped to include paved areas, grassed areas and pathways. This landscaping will be extended southwest to meet the podium level at the adjacent SHD development.

11.3.2 Aspects Relevant to this Assessment

Aspects of the proposed development and the surrounding area which are relevant to this assessment are as follows:

- Noise emissions arising during construction may impacts surrounding receptors.
- Cumulative noise impacts at surrounding receptors may arise where construction works coincide with other nearby construction works.
- Groundborne vibration arising during construction may impact surrounding structures.
- The proposed development will give rise to local increases in road traffic noise which may affect surrounding receptors.
- The proposed retail/restaurant area may give rise to noise emissions affecting surrounding receptors.
- Similarly, internal noise levels at the creche will be required to meet relevant criteria.
- The proposed childcare facility may give rise to noise emissions affecting surrounding receptors.
- There is an onus on the applicant to ensure that internal living spaces at the proposed development, and noise levels at external amenity areas, meet relevant criteria.
- In assessing internal and external amenity noise levels, it is necessary to consider existing traffic noise levels, as well as future changes in road traffic noise due to changing traffic volumes and altered road layouts. It is also necessary to consider a potential light rail project, and the nearby Páirc Uí Chaoimh.

11.4 Methodology

11.4.1 Methodology Overview

The following objectives are addressed in this assessment:

- The study area is defined.
- Standards and criteria relevant to the proposed development are identified.
- The nearest receptors are identified.
- The baseline soundscape is described.
- Construction noise levels arising from the proposed works are described.
- Construction noise effects at receptors are assessed.
- Potential groundborne vibration effects associated with construction works are assessed.
- Noise emissions from activities associated with the commissioned development are described.
- Operational phase noise effects at receptors are assessed.
- Potential cumulative effects arising in conjunction with other sources are assessed.
- An assessment of potential inward noise impacts is undertaken.
- Mitigation measured are identified, where required.

A baseline noise survey was undertaken, and measured data used for four objectives:

- To identify relevant construction phase noise criteria.
- To allow an assessment of construction phase noise effects.
- To assess the proposed development site noise risk.
- To validate the traffic baseline noise model.

With respect to the construction phase, likely construction plant are identified, and their noise emissions data used to predict likely noise levels at surrounding receptors. Predicted levels are assessed in the context of identified criteria, and mitigation measures identified where required. Potential sources of vibration during the construction phase are identified, and effects assessed by reference to commonly applied criteria.

Noise sources associated with the operational phase of the proposed development are reviewed, and potential effects assessed. Such effects relate chiefly to traffic. An assessment of inward noise impacts is undertaken, and the requirement for enhanced façade treatments is assessed.

Noise effects are assessed with reference to the scheme set out in Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2022). The most relevant aspects of the scheme are summarised in Table 11.1.

Table 11.1 EPA Effect Assessment Scheme

FACTOR	EFFECT	DESCRIPTION
Quality	Positive	Improves quality of environment
	Neutral	No effects or imperceptible effects
	Adverse	Reduces quality of environment
Significance	Imperceptible	Capable of measurement, but without significant consequences
	Not significant	Causes noticeable changes to soundscape, but without significant consequences

FACTOR	EFFECT	DESCRIPTION
	Slight	Causes noticeable changes to soundscape without affecting its sensitivities
	Moderate	Alters soundscape in manner consistent with existing and emerging baseline trends
	Significant	Alters soundscape due to source character, magnitude, duration or intensity
	Very significant	Significantly alters soundscape due to source character, magnitude, duration or intensity
	Profound	Obliterates soundscape
Duration	Brief	<1 day
	Temporary	<1 year
	Short term	1-7 years
	Medium term	7-15 years
	Long term	15-60 years
	Permanent	>60 years
Extent & Context	Extent	Size of area and population affected by an effect
	Context	Degree to which project conforms or contrasts with baseline soundscape
Effect type	Indirect	Secondary effects not directly caused by project, often occurring at some distance
	Cumulative	Combined effects attributable to project in tandem with other projects
	Worst case	Effects where mitigation measures substantially fail
	Indeterminable	Where full consequences of change in soundscape cannot be described
	Irreversible	Effects to soundscape which are permanent and cannot be undone
	Residual	Degree of soundscape change which will arise after implementation of mitigation
	Synergistic	Where resultant effect exceeds sum of individual component effects

In addition to the terminology presented in Table 11.1, British Standard BS 4142:2014+A1:2019 Methods for Rating and Assessing Industrial and Commercial Sound (2019) uses the terms 'adverse impact' and 'significant adverse impact' with respect to operational noise impacts. These terms are used where relevant in the assessment below.

Construction phase noise effects due to onsite construction works and offsite construction traffic are typically assessed with reference to a scale of effects set out in Design Manual for Roads and Bridges – LA111: Noise and Vibration (UK Highway Agency, 2020). The scale does not correspond to the EPA scale set out in Table 11.1. To facilitate assessment of construction works and construction traffic in the context of the EPA scale, effect categories in both scales are aligned as closely as possible, as described below.

11.4.2 Relevant Legislation & Guidance

11.4.2.1 Construction Phase Noise

There are no national mandatory noise limits relating to construction works. In granting planning permission, a local authority may stipulate construction phase noise limits applicable to daytime, evening, night-time and weekend hours as appropriate. There are no national guidelines available regarding the selection of such limits. Many local authorities chose to apply a 65 dB $L_{Aeq\,T}$ limit.

The chief noise guidance document applied in Ireland and the UK in construction phase noise assessments is British Standard BS 5228-1:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 1: Noise (2014). Annex E of the document sets out several methods to draw up suitable noise criteria applicable to the construction phase of a project. The most appropriate method here is the 'ABC method', which provides for the selection of criteria based on existing ambient noise data. On the basis of noise data recorded across the surrounding area, as discussed below, a daytime $L_{Aeq\,1\,h}$ level of 65 dB is the most appropriate criterion for this assessment.

The $L_{Aeq\,1\,h}$ parameter describes the total noise emissions from all construction sources occurring during any 1 h period, averaged over that hour. The criterion is applicable to daytime working hours. With respect to the proposed development, evening or night-time construction works are unlikely to be required.

The 65 dB criterion is considered applicable to surrounding receptors, in their immediate curtilage. In this regard, the EPA document NG4 Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (2016) defines a noise sensitive location as:

> *"Any dwelling house, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other facility or area of high amenity which for its proper enjoyment requires absence of noise at nuisance levels."*

Construction noise criteria set out in the National Roads Authority (NRA, now TII) document Good Practice Guidance for the Treatment of Noise during the Planning of National Road Schemes (2014) are occasionally applied to non-road projects, particularly in relation to temporary louder activities. The document recommends a daytime $L_{Aeq\,1\,h}$ criterion of 70 dB at receptors, marginally higher than the 65 dB BS 5228-1:2009 criterion. In this case, the NRA limit is considered relevant to specific construction operations which may generate elevated noise levels over a short period, bearing in mind that permitting isolated periods of intense activity may eliminate the need for more drawn out and less efficient construction methods. With respect to such activities, the NRA document includes an L_{ASmax} recommendation of 80 dB with respect to impulsive events such as breaking and impact piling.

Neither BS 5228-1:2009 nor the NRA documents include a methodology for the assessment of effect significance. The UK Highways Agency document Design Manual for Roads and Bridges – LA111: Noise and Vibration (2020) (DMRB) includes a methodology based on a combination of BS 5228-1:2009 guidance and external baseline $L_{Aeq\,T}$ levels. The DMRB scale of effects with respect to daytime working hours, based on the 65 dB BS 5228-1:2009 criterion, is set out in Table 11.2. The table includes EPA effect categories drawn from Table 11.1. The seven EPA categories do not correspond exactly with the four categories listed in the DMRB scheme, and the correlation

presented in Table 11.2 is therefore an approximation. Table 11.3 presents a more detailed scale applied in this assessment, based on DMRB guidance.

Table 11.2 DMRB Construction Noise Effect Assessment Scale for Daytime Working Hours

CONSTRUCTION NOISE LEVEL	DMRB EFFECT	EPA EFFECT
Below daytime baseline $L_{Aeq\,T}$	Negligible	Imperceptible
Daytime baseline $L_{Aeq\,T}$ to 65 dB	Minor	Not significant to slight
Daytime baseline $L_{Aeq\,T}$ to 69 dB	Moderate	Moderate to significant
≥70 dB	Major	Very significant to profound

Table 11.3 Refined DMRB Scale Applied in this Assessment

CONSTRUCTION NOISE LEVEL	EFFECT
Below daytime baseline $L_{Aeq\,T}$	Imperceptible
Daytime baseline L_{Aeq} T to 59 dB	Not significant
60-65 dB	Slight
66-67 dB	Moderate
68-69 dB	Significant
≥70 dB	Very significant

The DMRB document additionally notes that construction noise:

> "...shall constitute a significant effect where it is determined that a major or moderate magnitude of impact will occur for a duration exceeding:
> 1) 10 or more days or nights in any 15 consecutive days or nights;
> 2) a total number of days exceeding 40 in any 6 consecutive months."

11.4.2.2 Construction Phase Traffic

Construction works may result in a temporary increase in road traffic volumes. The DMRB document also includes a scale of effects relating to construction phase traffic noise. Unlike the scale presented in Table 11.2, which is based on absolute noise levels, the DMRB construction traffic scale is based on the magnitude of noise level increase. Table 11.4 sets out this scale. EPA effect categories are again included – as before, different effect scales are used by the EPA and the DMRB, and the table attempts to correlate these as closely as possible.

Table 11.4 DMRB Offsite Construction Traffic Noise Effect Assessment Scale

NOISE LEVEL INCREASE	DMRB EFFECT	EPA EFFECT
<1 dB	Negligible	Imperceptible
1—2.9 dB	Minor	Not significant to slight
3—4.9 dB	Moderate	Moderate to significant
≥5 dB	Major	Very significant to profound

The DMRB document adds that construction phase traffic may give rise to a significant effect if the criteria set out in the quotation above are met.

11.4.2.3 Construction Phase Vibration

As with noise, there are no national limits relating to groundborne vibration, and reference is usually made to guidance set out in British Standard BS 5228-2:2009+A1:2014 Code Of Practice For Noise And Vibration Control On Construction And Open Sites – Part 2: Vibration (2014). Table 11.5 presents guidance included in the document with respect to human perception of peak particle velocity (PPV), the most commonly applied descriptor of groundborne vibration.

Table 11.5 Human Perception of Vibration, from BS5228-2:2009

PPV	EFFECT
0.14 mm/s	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration.
0.3 mm/s	Vibration might be just perceptible in residential environments.
1.0 mm/s	It is likely that vibration of this level in residential environments will cause complaint, but can be tolerated if prior warning and explanation has been given to residents.
10.0 mm/s	Vibration is likely to be intolerable for any more than a very brief exposure to this level.

During construction projects, reference is usually made to criteria relevant to buildings in order to avoid potential cosmetic or structural damage. The NRA document identified above has seen increasing application to non-road projects due to the absence of any other Irish guidance. NRA criteria, listed in Table 11.6, are informed by documents such as British Standard BS 7385-2:1993 Evaluation and Measurement for Vibration in Buildings – Part 2: Guide to Damage Levels from Ground Borne Vibration (1993). The criteria apply to the closest part of any relevant building or structure.

Table 11.6 NRA Building Vibration Criteria, from BS5228-2:2009

FREQUENCY	<10 HZ	10-50 HZ	>50 HZ
PPV	8 mm/s	12.5 mm/s	20 mm/s

Limits set out above are considerably lower than criteria presented in Table 11.7, which lists PPV levels below which cosmetic damage to buildings such as hairline cracking is unlikely to occur. Limits relating to structural damage are significantly higher.

Table 11.7 Recommended Vibration Limits

STRUCTURE	LOWER FREQUENCIES	HIGHER FREQUENCIES	SOURCE
Modern dwellings	<40 Hz: 19 mm/s	>40 Hz: 51 mm/s	1
Older dwellings	<40 Hz: 12.7 mm/s	>40 Hz: 51 mm/s	1
Industrial & heavy commercial	4-15 Hz: 50 mm/s	>15 Hz: 50 mm/s	2 & 3
Residential & light commercial	4-15 Hz: 15-20 mm/s	>15 Hz: 20-50 mm/s	2 & 3

Sources:

1: US Bureau of Mines Report RI 8507: Structural Response and Damage Produced by Ground Vibration from Surface Mines Blasting (1980).
2: BS 5228-2:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 2: Vibration (2014).
3: BS 7385-02: 1993 Evaluation and Measurement for Vibration in Buildings – Part 2: Guide to Damage Levels from Ground Borne Vibration (1993).

11.4.2.4 Operational Phase Noise

There are no national mandatory noise limits applicable to commercial or residential developments. Noise emissions from such sites may be assessed using World Health Organisation (WHO) guidance. Most environmental noise guidance documents issued across Europe ultimately derive limits from WHO guidance documents. The WHO document Guidelines on Community Noise (1999) sets out guideline values considered necessary to protect communities from environmental noise. With respect to residential settings, the document notes that an outdoor $L_{Aeq\ 16\ h}$ level of 55 dB is an indicator of serious annoyance during daytime and evening hours, with 50 dB being an indicator of moderate annoyance. The 55 dB criterion was first suggested by the WHO in their 1980 document Environmental Health Criteria 12.

Since 1980, the 55 dB criterion has become the de facto daytime limit applied by most Irish regulatory authorities to commercial and industrial operators. Although the WHO criterion applies to daytime periods of 16 hours, authorities typically specify shorter periods, and thus limits such as $L_{Aeq\ 15\ min}$, $L_{Aeq\ 30\ min}$ and $L_{Aeq\ 1\ h}$ are variously applied. In issuing licences to industrial facilities, the EPA typically specifies a daytime $L_{Aeq\ T}$ limit of 55 dB at receptors. The EPA defines daytime as 0700-1900 h. A similar daytime limit is usually included in noise conditions attached to planning permission issued by local authorities.

The WHO's 1999 guidance document recommends an external night-time criterion of 45 dB to prevent sleep disturbance. Although the WHO document Night Noise Guidelines for Europe (2009) makes reference to a 40 dB night-time criterion, this relates to the L_{night},outside parameter, which is the long term average measured throughout a whole year. The 45 dB criterion is considered more appropriate to short term measurement intervals. As before, $L_{Aeq\ 15\ min}$, $L_{Aeq\ 30\ min}$ and $L_{Aeq\ 1\ h}$ intervals are variously applied by regulatory authorities, rather than the 8-hour period to which the WHO's 45 dB criterion applies. The EPA defines night-time as 2300-0700 h.

Neither of the WHO documents identified above makes reference to an evening period, and indeed their 1999 document assumes that daytime extends to 2300 h. However, a trend towards the separate assessment of evening effects is currently evident, partly driven by the EPA's NG4 document. The original 2012 version of the document introduced the evening period 1900-2300 h. The NG4 document recommends an evening criterion of 50 dB, applicable externally at receptors.

Many authorities require that a penalty be added to measured noise levels where emissions are tonal and/or impulsive. NG4 specifies the addition of a 5 dB penalty to site-specific $L_{Aeq\ T}$ levels measured during daytime or evening hours. During night-time hours, the EPA prohibits tones and impulses entirely, stating that such characteristics should not be 'clearly audible or measurable'. With respect to short term impulsive sources, the WHO recommends a night-time L_{AFmax} limit of 60 dB outside bedroom windows during night-time hours. No L_{AFmax} limit is recommended for daytime periods.

The above criteria, summarised in Table 11.8, are considered relevant to commercial noise emissions. At the proposed development, such emissions may arise only from the proposed retail/restaurant space in Block A. Rather than allowing daytime and evening levels to be rated for tonal or impulsive features, the table assumes that such features are avoided at all times. Criteria apply externally at receptors. The EPA definition of a noise sensitive receptor is presented above.

Table 11.8 Noise Criteria Appropriate to Commercial Emissions

PERIOD	PARAMETER	LIMIT
0700-1900 h	$L_{Aeq\ 15\ min}$	55 dB
1900-2300 h	$L_{Aeq\ 15\ min}$	50 dB
2300-0700 h	$L_{Aeq\ 15\ min}$	45 dB
2300-0700 h	L_{AFmax}	60 dB

In addition to the absolute criteria above, the impact of noise emissions from commercial sources may be assessed by reference to relative criteria. The most commonly applied standard here is British Standard BS 4142:2014+A1:2019 Methods for Rating and Assessing Industrial And Commercial Sound (2019) which provides for the comparison of specific $L_{Aeq\ T}$ levels (i.e. noise levels attributable to the source in question) with background levels, and provides an indication of impact depending on the difference. Specific levels may be rated to take tonal, impulsive and other characteristics into account. The standard notes that the background noise environment may include existing industrial emissions unrelated to the specific source.

BS 4142:2014 states that a difference between specific and background levels of 10 dB or more is indicative of a significant adverse impact. A difference of 5 dB suggests an adverse impact, with lower differences suggesting reduced impacts. The standard adds that the perception of impact will be increased or reduced depending on local context.

Noise effects associated with commercial emissions may also be assessed by reference to Guidelines for Environmental Noise Impact Assessment (Institute of Environmental Management and Assessment, 2014) which sets out guidance on impacts by comparison with ambient levels. Table 11.9 sets out a scale adapted from IEMA and EPA guidance. The table is considered relevant to total external ambient $L_{Aeq\,T}$ levels i.e. $L_{Aeq\,T}$ levels attributable to the proposed development may be compared to existing $L_{Aeq\,T}$ levels.

Table 11.9 Assessment of Impacts by Reference to Existing Noise Levels

CHANGE	IMPACT	EFFECT
<2 dB	Imperceptible	Capable of measurement, but without significant consequences
2-4 dB	Not significant	Causes noticeable changes to soundscape, but without significant consequences
4-6 dB	Slight	Causes noticeable changes to soundscape without affecting its sensitivities
6-10 dB	Moderate	Alters soundscape in manner consistent with existing and emerging baseline trends
10-15 dB	Significant	Alters soundscape due to source character, magnitude, duration or intensity
15-20 dB	Very significant	Significantly alters soundscape due to source character, magnitude, duration or intensity
>20 dB	Profound	Obliterates soundscape

11.4.2.5 Operational Phase Traffic

Local offsite receptors are currently subject to existing traffic noise levels on the surrounding road network. The proposed development may result in an increase in local traffic volumes, with a consequent increase in traffic noise levels. Associated effects may be assessed using the DMRB scheme set out in Table 11.10. The scheme applies to long term traffic noise increases, rather than short term increases associated with construction traffic as addressed in Table 11.4. As before, the EPA scale is included and correlated as closely as possible. Although the DMRB scale applies to the $L_{AF10\,18\,h}$ parameter, it is also of some pertinence to the $L_{Aeq\,T}$ levels assessed below.

Table 11.10 DMRB Scale for Offsite Operational Traffic Noise Effect

NOISE LEVEL INCREASE	DMRB EFFECT	EPA EFFECT
<3 dB	Negligible	Imperceptible
3—4.9 dB	Minor	Not significant to slight
5—9.9 dB	Moderate	Moderate to significant
≥10 dB	Major	Very significant to profound

11.4.2.6 Inward Noise

The assessment of inward noise impacts on proposed residential developments is a relatively new feature in the Irish planning system, and no formal national guidance has been issued to date. Assessments are typically undertaken in accordance with ProPg Planning & Noise: Professional Practice Guidance on Planning and Noise – New Residential Development (2017), jointly issued by the Association of Noise Consultants, the Institute of Acoustics and the Chartered Institute of Environmental Health. ProPG provides for good acoustic design through a five-step process:

- Stage 1: Initial noise risk assessment of the proposed development site.
- Stage 2 element 1: Demonstrating a good acoustic design process.
- Stage 2 element 2: Observing internal noise level guidelines.
- Stage 2 element 3: Undertaking an external amenity area noise assessment.
- Stage 2 element 4: Consideration of other relevant issues.

Internal noise guidelines recommended by ProPG, drawn from British Standard BS 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings (2014), are presented in Table 11.11.

Table 11.11 Recommended internal criteria from BS 8233:2014 and ProPG

ACTIVITY	LOCATION	0700-2300 H	2300-0700 H
Resting	Living room	$L_{Aeq\,16\,h\ 35}$ dB	-
Dining	Dining area	$L_{Aeq\,16\,h\ 40}$ dB	-
Sleeping or daytime resting	Bedroom	$L_{Aeq\,16\,h\ 35}$ dB	$L_{Aeq\,8\,h\ 30}$ dB

BS 8233:2014 adds that:

> *"Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$, depending on the character and number of events per night. Sporadic noise events could require separate values."*

ProPG adds further advice here:

> *"In most circumstances in noise-sensitive rooms at night (e.g. bedrooms) good acoustic design can be used to that individual noise events to not normally exceed 45 dB L_{AmaxF} more than 10 times a night. However, where it is not reasonably practicable to achieve this guideline then the judgement of acceptability will depend not only on the maximum noise levels but also on factors such as the source, number, distribution, predictability and regularity of noise events."*

With respect to external amenity areas such as gardens in the curtilage of dwellings, BS 8233:2014 states:

> *"For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB $L_{Aeq\ T}$, with an upper guideline value of 55 dB $L_{Aeq\ T}$ which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such a city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable noise levels in these external amenity spaces, but should not be prohibited."*

With respect to the proposed creche, there are no specific creche criteria in force. Reference may be made to Technical Guidance Document TGD-021-5: Acoustic Performance in New Primary and Post Primary School Buildings (Department of Education and Skills, 2015). The document recommends an indoor ambient $L_{Aeq\ 30\ min}$ level of 35 dB. This criterion is applied in this assessment.

Achieving compliance with the above recommendations in internal spaces at the proposed development will require consideration at detailed design stage, particularly in relation to internal transmission between rooms. The chief consideration with respect to the planning application stage is to identify if external noise levels due to road traffic are elevated, thus indicating that enhanced building fabric treatments including glazing will be required.

11.4.2.7 World Health Organisation

World Health Organisation (WHO) recommendations issued in 1999 have been discussed in Section 11.4.2.4 above. The 1999 guidelines recommend external daytime ($L_{Aeq\ 16\ h}$) and night-time ($L_{Aeq\ 8\ h}$) limits of 55/50 and 45 dB. The WHO recommendations subsequently informed internal criteria given in BS 8233:2014 and Pro-PG as discussed above. Corrections from external to internal levels are typically based on a 15 dB attenuation factor through an open window. This factor is consistent with the 12-18 dB range reported in NANR116: Open/Closed Window Research – Sound Insulation Through Ventilated Domestic Windows (prepared by the Napier University Building Performance Centre for DEFRA, 2007) with respect to road traffic noise.

The WHO document Environmental Noise Guidelines for The European Region (2018) updated their guidance with respect to certain sources. Of relevance here are updated guidelines in relation to road traffic. In this regard, the document states:

> *"For average noise exposure, the GDG (Guideline Development Group) strongly recommends reducing noise levels produced by road traffic below 53 decibels (dB) L_{den}, as road traffic noise above this level is associated with adverse health effects.*
>
> *For night noise exposure, the GDG strongly recommends reducing noise levels produced by road traffic during night time below 45 dB L_{night}, as night-time road traffic noise above this level is associated with adverse effects on sleep."*

It is noted that the 53 L_{den} and 45 dB L_{night} criteria recommended in the 2018 document are lower than criteria set out in other documents. In this regard, the 2018 guidelines are considered aspirational, and are likely to form the basis of national and local guidance over the next two decades.

The 2018 WHO document also includes recommendations with respect to rail noise, as follows:

> *"For average noise exposure, the GDG strongly recommends reducing noise levels produced by railway traffic below 54 decibels (dB) L_{den}, as railway noise above this level is associated with adverse health effects.*
>
> *For night noise exposure, the GDG strongly recommends reducing noise levels produced by railway traffic during night time below 44 dB L_{night}, as night-time railway noise above this level is associated with adverse effects on sleep."*

The WHO railway criteria are of potential relevance here due to the local authority's long-term proposal to provide a light railway line along Centre Park Road. Again, the rail criteria are considered aspirational and are likely to inform future national and local authority noise guidance documents.

11.4.2.8 Noise Action Plan

The Cork Agglomeration Draft Noise Action Plan 2024-2028 was issued by Cork City Council and Cork County Council in 2024. Preparation of the plan is a requirement of Directive 2002/49/EC of the European Parliament and of the Council relating to the Assessment and Management of Environmental Noise (2002), transposed into Irish law by the European Communities (Environmental Noise) Regulations 2018 (SI No. 549/2018). The Directive requires preparation of noise plans for all roads with annual traffic volumes over 3 million vehicles. The nearest major roads subject to mapping are Centre Park Road, to its junction with Marquee Road, and the Lower Glanmire Road across the river. The Directive also refers to railway noise and aircraft noise, although traffic thresholds in relation to both are insufficient in Cork to warrant mapping.

Unlike previous Noise Action Plans, the 2024-2028 plan includes mapping of industrial noise for the first time. The nearest mapped industrial area is at Tivoli port, approximately 1200 m northeast of the proposed development site.

The Noise Action Plan lists the following threshold values for the assessment of harmful effects of road traffic noise:

- L_{den}: 53 dB.
- L_{night}: 45 dB.

These levels are drawn directly from the 2018 WHO document referenced above. The Noise Action Plan identifies areas where these criteria are exceeded, and where further action is required. The proposed development site and nearby receptors do not lie in one of these areas.

The Noise Action Plan also identifies potential candidate quiet areas, where environmental noise levels are deemed to be 'good', and where protection should be considered in the context of new development. The riverbank area to the immediate north of the proposed development site, and the recently developed park area to its immediate south, are both included in the plan as candidate quiet areas. This area, termed the Atlantic Pond and Marina Park potential candidate quiet area, is included in the Noise Action Plan as a candidate area due, not to low noise levels, but rather to its community value. During the lifetime of the Noise Action Plan, the candidate area will be further evaluated, and a decision will be taken regarding official designation as a quiet area.

Given that noise levels across the potential candidate quiet area are dominated by road traffic, particularly Lower Glanmire Road traffic across the river, and given that noise levels are not the determinant for selection as a candidate, the proposed development is unlikely to have any implication for candidate area status. The proposed development is also unlikely to have implications for the wider Noise Action Plan. The site is not located in a high priority noise action area.

11.4.3 Site Surveys/Investigations

This assessment is informed by a baseline noise survey undertaken in August 2024 at the proposed development site. Reference is also made to baseline surveys undertaken in the vicinity in 2019 and 2020.

11.4.4 Consultation

A pre-application meeting was held with Cork City Council on 23.04.24. Following the meeting, the local authority issued meeting minutes dated 07.05.24. The minutes include the following comment from the local authority Environment Directorate in relation to noise:

> "An inward noise assessment is required taking account the Monahan Road extension and future bridge and concerts/matches at Pairc Ui Chaoimh. Is there are any issue and required mitigation."

The subsequent LRD opinion issued by the local authority included the following item:

> "13(a) Given the location close to Pairc Ui Chaoimh and the future Eastern Gateway bridge, as part of the EIAR, further consideration should be given to a noise and lighting assessment being undertaken to identify any issues and proposed remediation measures."

This chapter includes an assessment of potential effects associated with the mooted Monahan Road extension and associated bridge, as well as Páirc Uí Chaoimh use.

11.5 Difficulties Encountered

No difficulties were encountered in undertaking this assessment.

As with all noise impact assessments, measurements and predictive modelling incorporate a degree of uncertainty. Three potential sources of uncertainty are relevant to this assessment:

- Baseline noise levels are used to inform the assessment process. Levels were measured through a survey undertaken in accordance with International Standard ISO 1996-2:2017 Acoustics – Description, Measurement and Assessment of Environmental Moise, Part 2: Determination of Environmental Noise Levels (2017). Potential for uncertainty was minimised throughout the survey process, and survey equipment was calibrated in accordance with the requirements of the standard. Nonetheless, environmental noise measurement will include a margin of uncertainty. The standard uncertainty value attributable to the equipment is 0.5 dB (IEC 61672-1 class 1 value). While measured baseline noise levels apply chiefly to conditions prevailing only during the survey period, levels are likely to be reasonably representative of a wider range of conditions.
- Predictive modelling is undertaken using the algorithm set out in International Standard ISO 9613-2:1996 Acoustics – Attenuation of Sound during Propagation Outdoors, Part 2: General Method of Calculation (1996). The standard estimates prediction accuracy at ±3 dB at receptors out to a distance of 1000 m where the mean propagation route lies within 5 m of ground level. Receptors beyond this distance are likely to be well outside audible range of the site.
- In relation to potential future scenarios assessed in the predictive model, it is necessary to apply certain assumptions in the absence of more detailed information. Assumptions include details of future road traffic volumes and light rail activity. It is not possible to quantify the uncertainty margin associated with such assumptions.

11.6 Baseline Environment

11.6.1 Location

The proposed development site is located in the Cork City Docklands area, adjacent to the northeast end of Centre Park Road where it turns onto The Marina. The irregular shaped boundary of the site is shown in Figure 11.1 above. The northwest boundary adjoins Centre Park Road. The southwest and southeast boundaries adjoin the adjacent SHD residential site. The eastern boundary adjoins an overgrown scrub area to the rear of the Lee Rowing Club premises. A small segment of the boundary at the northern corner adjoins The Marina. The site topography is level.

The local area is urban in character, with a mixture of active industrial sites, disused industrial sites, the Páirc Uí Chaoimh complex, and residential areas. The nearest housing zones are to the south. The site is also overlooked by dwellings across the river to the north at Lover's Walk and Montenotte. In recent years, the local authority has developed an open park adjacent to Páirc Uí Chaoimh, named Marina Park. The park connects to The Marina via a narrow corridor between the stadium and the scrub area adjacent to the eastern boundary of the proposed development site.

A corridor between Marina Park and the SHD site is currently used as a temporary works depot by the local authority. The authority proposes to extend Monahan Road through this corridor in future years. It is additionally proposed to continue the extension through the area between the stadium and the scrub area, where the proposed road will turn north to cross the river via a new bridge.

Another long-term proposal will see the Cork Light Rail project, currently at route selection stage, constructed in this part of the city. The current proposal includes a tram line along Centre Park Road, in close proximity to the proposed development site.

The local soundscape is typical of an urban area, being dominated by road traffic on surrounding roads. These consist of relatively quieter roads where traffic speeds are low (Centre Park Road and Monahan Road), and busier commuter roads such as Lower Glanmire Road across the river. Traffic noise on the latter generally dominates the soundscape continuously throughout the daytime, evening and night-time. There are no point sources of significance apart from the Páirc Uí Chaoimh facility where noise emissions arise from time to time due to sporting, training and sporadic music events. The local area is not subject to any industrial or commercial noise of note, although historically the area was subject to noise from several industrial sources, many associated with the former Ford works.

In recent years, the local area has been subject to intermittent construction noise from various sites, including works at the Marina Park development, the Atlantic Pond, and upgrade works along The Marina. In addition, site clearance works have commenced at the adjacent SHD site. At this site, construction of the proposed residential blocks is expected to run for approximately 10 years, and will thus form part of the local soundscape in the medium term. Long term proposals to develop the docklands area and to construct associated infrastructure are likely to maintain a degree of construction noise across the wider area over coming decades.

11.6.2 Receptors

For the purposes of this assessment, a study area radius of 300 m was identified. Given the urban character of the soundscape, noise effects due to the proposed development are not expected at receptors beyond 300 m.

There are no residential receptors on the site or adjacent to the boundary. The nearest receptors to the south are located at Birchgrove residential estate, where the closest dwellings lie 270 m from the site boundary. An extensive network of residential estates lies further south, southeast and southwest, all of which are accessed from Blackrock Road or Maryville Road. There are no residential receptors in audible range to the east or west.

To the north, across the river at Lover's Walk and Montenotte, a large number of detached dwellings are scattered along the hillside overlooking the site. Upper floors of dwellings along Lower Glanmire Road are also afforded views towards the site. The nearest dwellings across the river lie 200 m from the site boundary.

The nearest receptors are shown in Figure 11.2 below. No particularly vulnerable receptors such as hospitals, nursing homes or care centres have been identified within 400 m. The nearest such facility is the Enable Ireland Lavanagh Centre at Maryville, 480 m southeast of the site.

With respect to structures potentially vulnerable to vibration, the nearest structure of note is the Páirc Uí Chaoimh stadium. A number of other industrial structures lie to the west of the site, including fuel storage tanks 420 m southwest. The ESB's Marina power generating facility lies 400 m west of the site. While the Lee Rowing Club premises outside the eastern boundary of the site is not considered noise sensitive in the context of the EPA definition presented above, the buildings may be considered vibration sensitive.

In addition to existing receptors shown in Figure 11.2, the SHD scheme permitted by order ABP-309059-20 provides for a large residential development to the immediate southwest of the proposed development site. When completed, the scheme will include two apartment blocks immediately overlooking the site. The blocks will extend to ten floors, although not across their entire footprint. On each floor, ten apartments across the two blocks will have views of the proposed development site. While these blocks may or may not be in place prior to commencement of construction works at the proposed development site, it is considered prudent to include them as noise sensitive receptors. The blocks themselves may also be considered vibration sensitive. Although the SHD development will include a number of non-residential receptors, including a medical centre and a creche, these will be entirely screened from the proposed development site by intervening blocks.

Figure 11.2 Nearest Receptors, with Indicative Site Boundary Shown in Yellow

Figure 11.3 below shows receptors applied in this assessment for modelling purposes. The receptors selected represent other receptors in the vicinity. Receptors marked yellow represent existing receptors, while four receptors marked green represent future apartments at the adjacent SHD site.

Figure 11.3 Receptors Identified for Modelling Purposes

11.6.3 Noise Levels

11.6.3.1 2019-2020 Surveys

Noise levels were measured through an unattended survey undertaken 01.07.19—03.07.19 by Damian Brosnan Acoustics (now part of MKO). The station, designated N1 for the purposes of this assessment, was located at the southwest corner of the adjacent SHD site. The station is shown in Figure 11.4 below. A repeat survey was carried out 04.02.20—06.02.20.

Measured data are summarised in Table 11.12 below. The soundscape over both surveys was dominated by intermittent local road traffic, with Lower Glanmire Road traffic continuously dominating the background. Distant traffic dominated through night-time hours

Table 11.12 2019 Noise Data Summary at Station N1 (dB)

STATION	JULY 2019		FEBRUARY 2020	
	$L_{Aeq\ 15\ min}$	$L_{AF90\ 15\ min}$	$L_{Aeq\ 15\ min}$	$L_{AF90\ 15\ min}$
Daytime range	53-67 dB	41-49 dB	57-65 dB	45-56 dB
Daytime arithmetic average	57 dB	45 dB	60 dB	50 dB
Evening range	50-58 dB	38-47 dB	51-63 dB	41-51 dB
Evening arithmetic average	54 dB	41 dB	58 dB	46 dB
Night-time range	35-56 dB	32-44 dB	36-49 dB	34-55 dB
Night-time arithmetic average	45 dB	36 dB	47 dB	40 dB
$L_{Aeq\ 16\ h}$	58 dB	-	60 dB	-
L_{night}	48 dB	-	50 dB	-
L_{den}	59 dB	-	61 dB	-
Typical night-time L_{AFmax}	65-71 dB	-	70-75 dB	-

A comparison between data measured July 2019 and February 2020 indicates that the more recent data were several decibels higher, with aggregate parameters ($L_{Aeq\ 16\ h}$, L_{night} and L_{den}) all 2 dB higher than measured originally. This may be due to lower traffic noise levels during the July 2019 survey, which coincided with the summer holiday period. The difference may also be partially due to the higher microphone height during the February 2020 survey (4 m, in contrast to the 1.5 m height used originally).

On 03.07.19, an attended daytime survey was also undertaken at the nearest residential area, at Birchgrove (station N4 in Figure 11.4), in order to inform selection of an appropriate construction phase noise criterion. Here, $L_{Aeq\ 1\ h}$ levels were 44-52 dB (omitting one outlier), with an arithmetic average of 47 dB.

11.6.3.2 2024 survey

In order to obtain up to date noise data at the site, a part-attended survey was undertaken 07.08.24-08.08.24 at two onsite positions, designated N2 and N3. Daytime attended monitoring was also carried out at two positions on 08.08.24 (station N4, as used during the 2019 survey, and a new station N5) to inform the construction phase criterion applied in this assessment. Station N1 was not resurveyed, as there are no noise sensitive receptors at this position – although there will be receptors here in the future, they will be screened from the proposed development site. The stations are shown in Figure 11.4. Station N1, surveyed in 2019, is also shown for context.

The surveyed stations (N2 to N5) are shown in Photographs 11.1 to 11.4 and described in Table 11.13. Equipment specifications and weather conditions are listed in Table 11.14. Recorded time history profiles are shown in Figures 11.5 to 11.8. Noise data measured at the onsite stations are presented in Table 11.15 and summarised in Table 11.16. Noise data measured at the offsite stations are presented in Table 11.17.

Figure 11.4 Noise Stations N2 to N5 used during the 2024 Baseline Survey. Station N1, used during the 2019 Survey for the Adjacent SHD Project, is also shown.

Photograph 11.1 Station N2, looking W

Photograph 11.2 Station N3, looking SE

Photograph 11.3 Station N4, looking N

Photograph 11.4 Station N5, looking NW

Table 11.13 2024 Noise Station Details

REF.	ITM NGR	LOCATION	REASON FOR SELECTION
N2	569760 572128	W corner of site	To quantify soundscape in vicinity of proposed facades overlooking Centre Park Road
N3	569850 572157	Midway along E boundary of site	To quantify soundscape in vicinity of proposed facades further back from Centre Park Road
N4	569836 571767	Grassed area at Birchgrove residential estate	To quantify soundscape at Birchgrove
N5	569649 572422	E end of Myrtle Hill Terrace, across river	To quantify soundscape at Myrtle Hill Terrace

Table 11.14 2024 Survey Details

FACTOR	DETAILS
Cloud cover	Varying 80-100 %
Temperature	17 oC on 07.07.24, falling to 14 oC overnight, rising to 22 oC 08.07.24
Precipitation	0 mm
Wind direction	W on 07.07.24, veering SW through evening, S overnight, SW 08.08.24
Wind speed	1-4 m/s on 07.07.24, falling 0-1 m/s overnight, returning to 1-4 m/s on 08.08.24
Wind speed meas.	Handheld anemometer at 2 m height
Survey operator	Sinead Fagan
N2 SLM details	Type: NTi XL2; Serial: A2A-13658-E0; Microphone: A14735; Verification: 11.05.23
N2 SLM calibration	Date: 07.07.24; Time: 0900; Sensitivity: 38.5 mV/Pa; Post survey drift check: <0.2 dB
N3 SLM details	Type: NTi XL2; Serial: A2A-14337-E0; Microphone: A14972; Verification: 10.05.23
N3 SLM calibration	Date: 07.07.24; Time: 0859; Sensitivity: 41.4 mV/Pa; Post survey drift check: <0.2 dB
N4 & N5 SLM details	Type: NTi XL2; Serial: A2A-15392-E0; Microphone: A16340; Verification: 11.05.23
N4 & N5 SLM calibration	Date: 08.07.24; Time: 0904; Sensitivity: 41.5 mV/Pa; Post survey drift check: <0.2 dB
Calibrator	Type: Bruel & Kjaer Type 4231; Serial: 3017723; Verification: 06.03.24

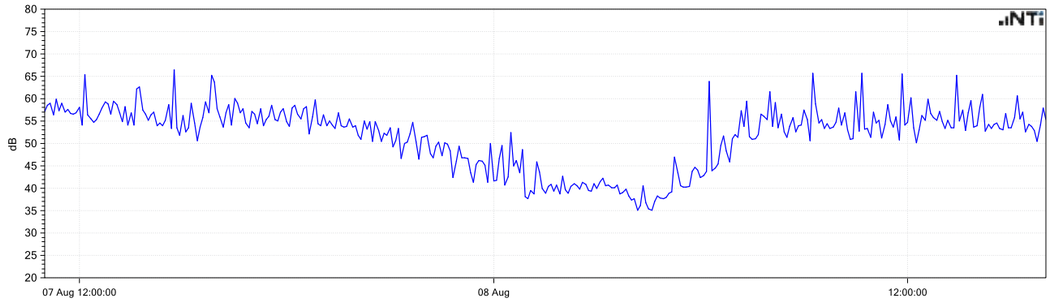

Figure 11.5 $L_{Aeq\,1s}$ Profile at N2

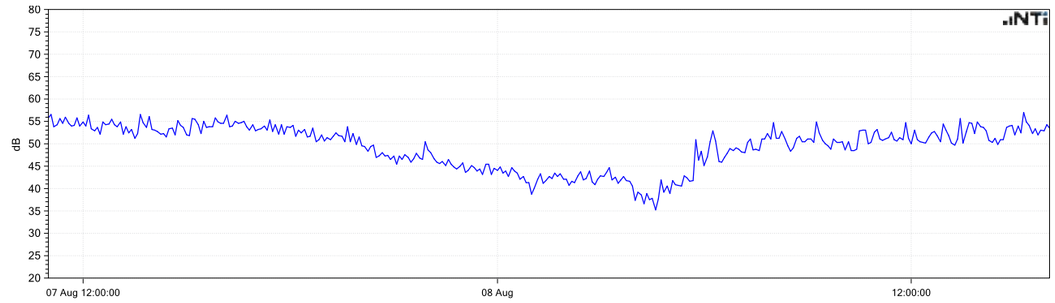

Figure 11.6 $L_{Aeq\,1s}$ Profile at N3

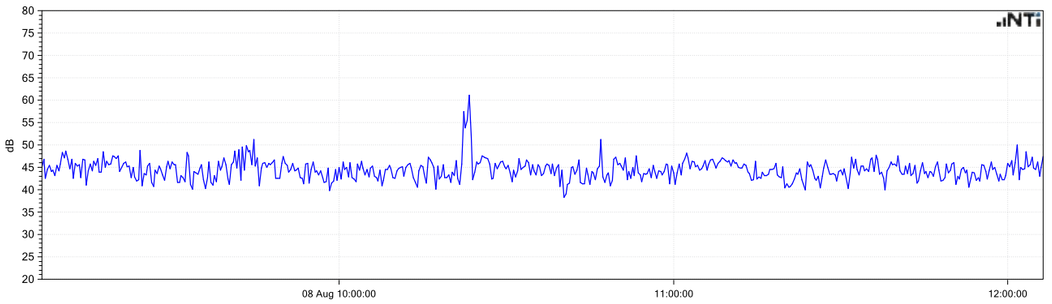

Figure 11.7 $L_{Aeq\,1s}$ Profile at N4

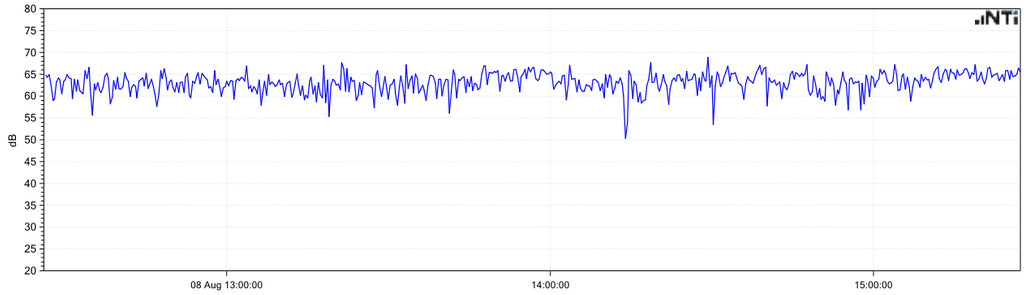

Figure 11.8 $L_{Aeq\,1\,s}$ Profile at N5

Table 11.15 Noise Data Meased at the Onsite Stations (dB)

INTERVAL	N2			N3		
	$L_{Aeq\ 15\ min}$	$L_{AF10\ 15\ min}$	$L_{AF90\ 15\ min}$	$L_{Aeq\ 15\ min}$	$L_{AF10\ 15\ min}$	$L_{AF90\ 15\ min}$
1000-1015	55	59	49	54	56	51
1015-1030	54	58	48	53	56	50
1030-1045	56	59	48	53	55	50
1045-1100	58	60	50	54	57	50
1100-1115	58	60	49	55	57	51
1115-1130	59	61	50	55	58	52
1130-1145	57	60	50	54	56	52
1145-1200	57	59	49	55	58	51
1200-125	61	60	48	55	56	51
1215-1230	55	59	49	53	55	50
1230-1245	58	61	48	55	58	50
1245-1300	59	61	49	55	57	51
1300-1315	57	61	49	54	56	50
1315-1330	57	60	48	52	55	50
1330-1345	61	60	49	55	57	51
1345-1400	57	59	49	55	57	51
1400-1415	56	59	48	53	55	50
1415-1430	55	58	49	53	55	50
1430-1445	63	61	49	54	57	50
1445-1500	54	57	48	53	56	50
1500-1515	56	58	48	55	57	49
1515-1530	53	57	48	54	56	51
1530-1545	58	60	49	54	56	50
1545-1600	63	60	49	55	58	51
1600-1615	56	59	49	55	58	51
1615-1630	58	60	50	55	57	51
1630-1645	58	60	49	55	57	51
1645-1700	55	58	49	54	56	51
1700-1715	56	59	49	54	56	51
1715-1730	55	59	49	54	56	51
1730-1745	57	60	49	54	56	51
1745-1800	57	59	48	53	55	50
1800-1815	57	60	47	53	55	49
1815-1830	57	61	47	53	55	49
1830-1845	56	60	46	52	54	48
1845-1900	57	60	47	51	53	48
1900-1915	55	60	46	51	53	48

INTERVAL	N2			N3		
	$L_{Aeq\ 15\ min}$	$L_{AF10\ 15\ min}$	$L_{AF90\ 15\ min}$	$L_{Aeq\ 15\ min}$	$L_{AF10\ 15\ min}$	$L_{AF90\ 15\ min}$
1915-1930	55	59	47	52	54	49
1930-1945	54	59	46	52	55	48
1945-2-00	55	59	46	51	54	48
2000-2015	53	57	45	49	51	46
2015-2030	53	57	45	49	51	46
2030-2045	53	58	44	48	49	45
2045-2100	53	57	44	47	49	45
2100-2115	51	56	43	46	48	44
2115-2130	49	51	43	47	49	45
2130-2145	53	58	43	47	49	46
2145-2200	50	53	43	49	50	45
2200-2215	49	53	43	47	49	45
2215-2230	49	52	42	46	47	44
2230-2245	50	53	41	46	47	43
2245-2300	47	47	40	45	47	42
2300-2315	47	46	40	44	46	42
2315-2330	44	44	39	44	46	41
2330-2345	46	45	39	45	47	42
2345-0000	46	44	39	44	46	41
0000-0015	47	46	39	44	46	41
0015-0030	48	46	39	44	46	40
0030-0045	45	44	38	43	45	39

INTERVAL	N2			N3		
	$L_{Aeq\ 15\ min}$	$L_{AF10\ 15\ min}$	$L_{AF90\ 15\ min}$	$L_{Aeq\ 15\ min}$	$L_{AF10\ 15\ min}$	$L_{AF90\ 15\ min}$
0045-0100	45	40	36	41	43	36
0100-1015	43	42	36	42	45	36
0115-0130	41	42	37	42	45	38
0130-0145	40	42	37	43	46	38
0145-0200	41	43	36	43	45	37
0730-0745	54	56	46	50	52	48
0745-0800	59	59	46	53	53	47
0800-0815	56	60	46	52	55	48
0815-0830	54	56	45	50	51	47
0830-0845	54	58	45	51	53	47
0845-0900	56	60	46	51	53	48
0900-0915	61	58	46	53	53	48
0915-0930	57	59	47	51	52	48
0930-0945	54	58	46	50	52	47
0945-1000	56	59	47	50	52	48
1000-1015	55	59	45	49	51	46
1015-1030	58	57	45	51	52	47
1030-1045	61	58	45	52	56	46
1045-1100	55	58	47	52	56	48
1100-1115	54	58	47	51	53	48
1115-1130	56	59	47	52	54	48
1130-1145	54	57	46	51	53	48

INTERVAL	N2			N3		
	$L_{Aeq\ 15\ min}$	$L_{AF10\ 15\ min}$	$L_{AF90\ 15\ min}$	$L_{Aeq\ 15\ min}$	$L_{AF10\ 15\ min}$	$L_{AF90\ 15\ min}$
1145-1200	61	59	46	53	54	48
1200-1215	57	58	47	52	54	48
1215-1230	55	59	47	51	53	48
1230-1245	58	59	47	52	55	49
1245-1300	56	59	47	53	55	49
1300-1315	54	58	47	51	52	48
1315-1330	61	58	46	53	55	48
1330-1345	56	59	47	54	57	50
1345-1400	57	59	49	54	57	49
1400-1415	58	59	48	53	54	49
1415-1430	54	58	48	51	52	49
1430-1445	54	57	48	52	54	49
1445-1500	55	58	47	53	57	49
1500-1515	58	59	48	55	58	50
1515-1530	55	58	48	54	56	51
1530-1545	53	56	48	53	55	50
1545-1600	56	59	48	54	56	50

Table 11.16 Noise Data Summary at the Onsite Stations (dB)

PERIOD	PARAMETER	TYPE	N2	N3
Daytime	$L_{Aeq\ 15\ min}$	Range	53-63	49-55
		Mean	57	53
	$L_{AF90\ 15\ min}$	Range	44-50	46-52
		Mean	48	49
Evening	$L_{Aeq\ 15\ min}$	Range	47-55	45-52
		Mean	52	48
	$L_{AF90\ 15\ min}$	Range	40-47	42-49
		Mean	44	45
Night-time	$L_{Aeq\ 15\ min}$	Range	36-59	38-51
		Mean	43	43
	$L_{AF90\ 15\ min}$	Range	33-44	33-45
		Mean	38	38
Daytime + Evening	$L_{Aeq\ 16\ h}$	-	57	53
	$L_{AF10\ 18\ h}$	-	58	55
Night-time	$L_{Aeq\ 8\ h}$	-	47	44
24 h	L_{den}	-	57	54

Table 11.17 Noise Data Meased at the Offsite Stations (dB)

N2				N3			
Interval	$L_{Aeq\ 15\ min}$	$L_{AF10\ 15\ min}$	$L_{AF90\ 15\ min}$	Interval	$L_{Aeq\ 15\ min}$	$L_{AF10\ 15\ min}$	$L_{AF90\ 15\ min}$
0907-0922	46	48	42	1226-1241	63	66	56
0922-0927	45	48	41	1241-1256	63	65	58
0937-0952	46	48	40	1256-1311	63	65	57
0952-1007	45	47	41	1311-1326	63	66	55
1007-1022	44	47	40	1326-1341	63	65	56
1022-1037	49	50	41	1341-1356	65	67	60
1037-1052	44	47	40	1356-1411	63	65	57
1052-1107	45	46	41	1411-1426	64	66	58
1107-1122	46	47	43	1426-1441	64	66	58
1122-1137	44	46	40	1441-1456	63	66	56
1137-1152	45	48	41	1456-1511	64	66	60
1152-1207	44	46	41	1511-1526	65	67	62
Mean	45	47	41	Mean	64	66	58

The soundscape at all four stations was dominated by traffic, both local and distant. Lower Glanmire Road traffic dominated during night-time hours. Other sources audible included lightly rustling trees, bird calls, aircraft, distant barking, grass mowing, and daytime construction activity in nearby areas. There were no noise generating activities at the proposed development site, or at the adjacent SHD site.

11.6.3.3 Noise Risk Assessment

Measured L_{den} levels at the proposed development site range from 57 dB adjacent to the Centre Park Road boundary, to 54 dB further back into the site. $L_{Aeq\ 16\ h}$ levels are 53-57 dB, with L_{night} levels of 44-47 dB. These levels are likely to be reasonably representative of typical long-term values. It is noted that levels in the vicinity of Centre Park Road were slightly lower during the 2024 survey than measured previously, most likely due to the closure of The Marina to through-traffic in the interim, and indeed Centre Park Road traffic volumes were noted to be considerably lower than during the earlier survey. Some of this reduction may have also been a result of lower traffic volumes during the 2024 survey, which coincided with the August holiday period.

The ProPG document includes guidance on undertaking a risk assessment with respect to inward noise affecting a proposed development site. The ProPG risk assessment scheme is displayed in Figure 11.9. $L_{Aeq\ 8\ h}$ is synonymous with Lnight.

Based on measured $L_{Aeq\ 16\ h}$ levels of up to 57 dB, and L_{night} levels reaching 47 dB, it is concluded that the proposed development site is low risk. In this regard, ProPG states that:

> "At low noise levels, the site is likely to be acceptable from a noise perspective provided that a good acoustic design process is followed and is demonstrated in an Acoustic Design Statement which confirms how the adverse impacts of noise will be mitigated and minimised in the finished development."

The required elements of the acoustic design statement are incorporated into this chapter where relevant. ProPG adds that:

> "An indication that there may be more than 10 noise events at night (2300-0700) with $L_{Amax,F}$ > 60 dB means the site should not be regarded as negligible risk."

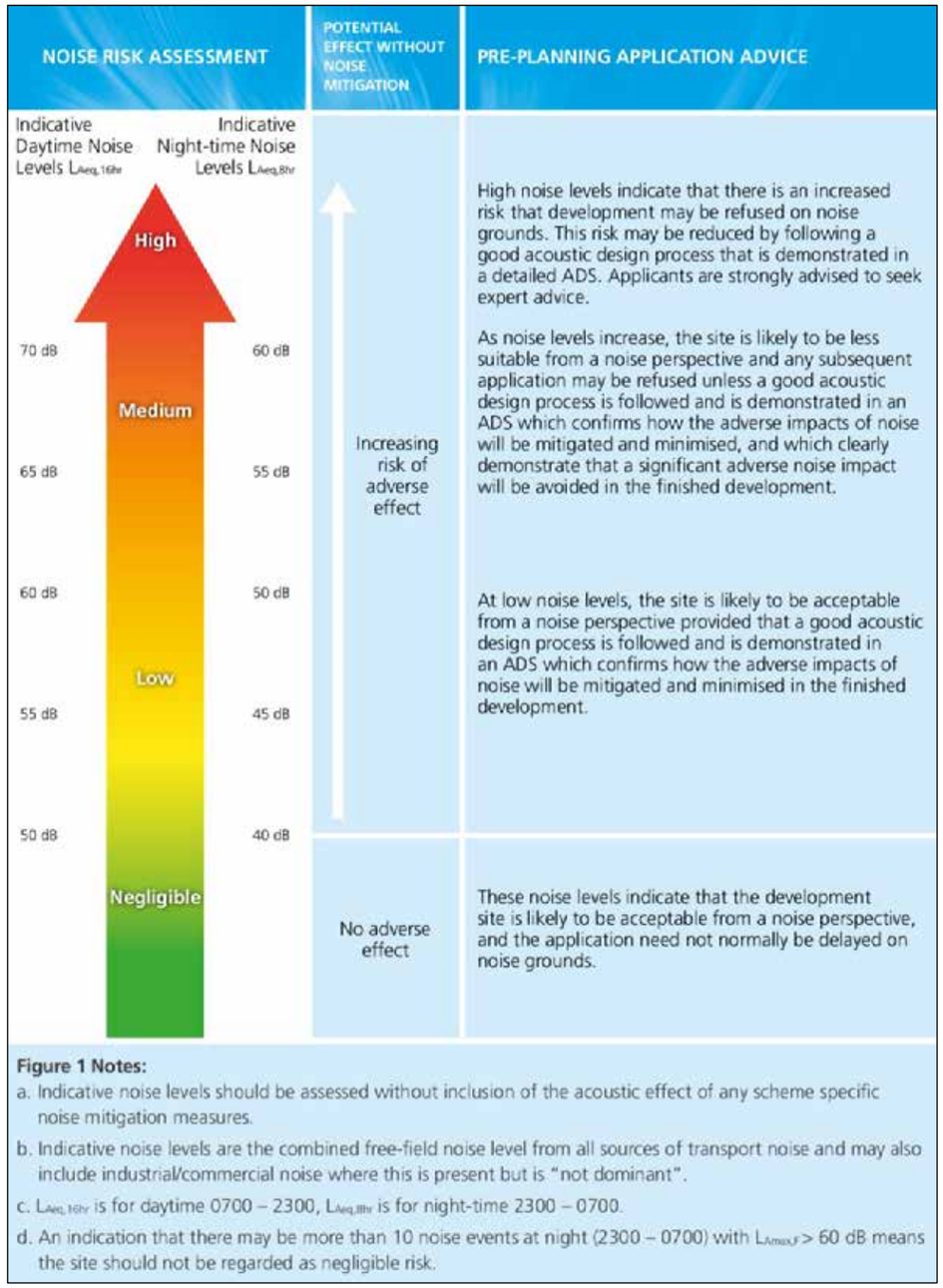

Figure 11.9 ProPG Noise Risk Assessment Scheme

Night-time L_{AFmax} levels at the site exceed 60 dB along the Centre Park Road boundary during vehicle passes, although not each vehicle results in L_{AFmax} levels which exceed the 60 dB criterion. During the survey of 07.08.24-08.08.24, 24 vehicle passes during the period 2300-0700 h resulted in L_{AFmax} levels above 60 dB at noise station N2, with levels from louder vehicles typically reaching 65-70 dB. A considerably smaller number of passes resulted in L_{AFmax} levels above 60 dB at station N3, which was located at a greater setback distance from Centre Park Road.

Although these L_{AFmax} levels do not alter the site's low noise risk status, it is evident that particular attention to internal night-time noise levels is required when determining glazing and ventilation specifications at facades overlooking Centre Park Road, either directly or obliquely.

11.6.3.4 Noise Mapping

Local authorities are required by Directive 2002/49/EC to prepare strategic noise maps. Mapping was most recently undertaken in 2022 ('round 4'). The round 4 road traffic noise maps are shown in Figures 11.10 and 11.11. Mapping shows road traffic L_{den} levels of approximately 55 dB at the northern corner of the site due to Lower Glanmire Road traffic. L_{night} levels are approximately 45-48 dB. These levels are markedly similar to those measured during the 2024 baseline survey, with discrepancies of approximately 1-2 dB.

The Cork Agglomeration Draft Noise Action Plan 2024-2028 refers to a 53 dB L_{den} and a 45 dB L_{night} threshold for the assessment of harmful effects of road traffic noise. The WHO also lists these values as aspirational criteria. Measured and mapped levels suggest that these criteria are marginally exceeded at positions close to the Centre Park Road boundary, due to a combination of Centre Park Road and Lower Glanmire Road traffic.

On this basis, it is concluded that the site is low noise risk and suitable for development, although levels near the northern corner and Centre Park Road exceed long term health goals by several decibels. Glazing on facades overlooking Centre Park Road and Lower Glanmire Road across the river will require appropriate consideration. A proposal by the local authority to continue Monahan Road towards the river will also precipitate a requirement to consider glazing at units overlooking this road and associated bridge, due to possible night-time L_{AFmax} levels above 60 dB.

Round 4 mapping includes industrial noise contours for the first time. The nearest mapped industrial areas are the commercial port at Tivoli, and the ESB power station to the west. L_{den} and L_{night} contours from these do not extend as far as the proposed development site, indicating that noise emissions from these facilities are below thresholds at the site. Industrial mapping is shown in Figures 11.12 and 11.13.

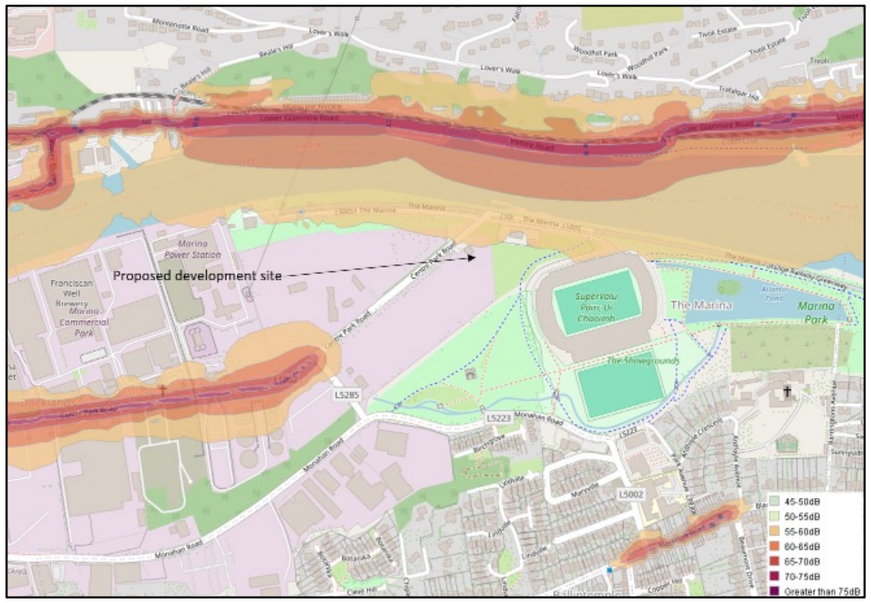

Figure 11.10 Round 4 L_{den} Road Traffic Contours

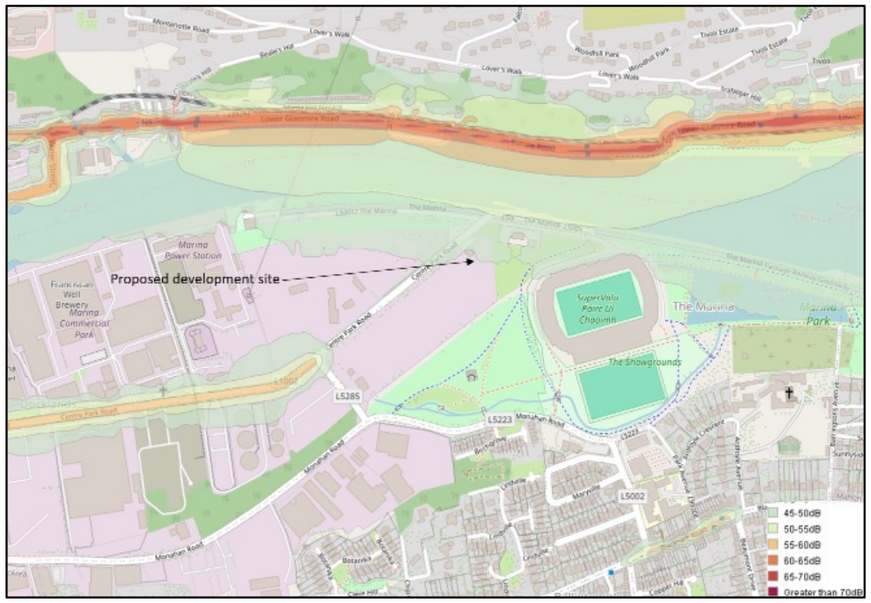

Figure 11.11 Round 4 L_{night} Road Traffic Contours

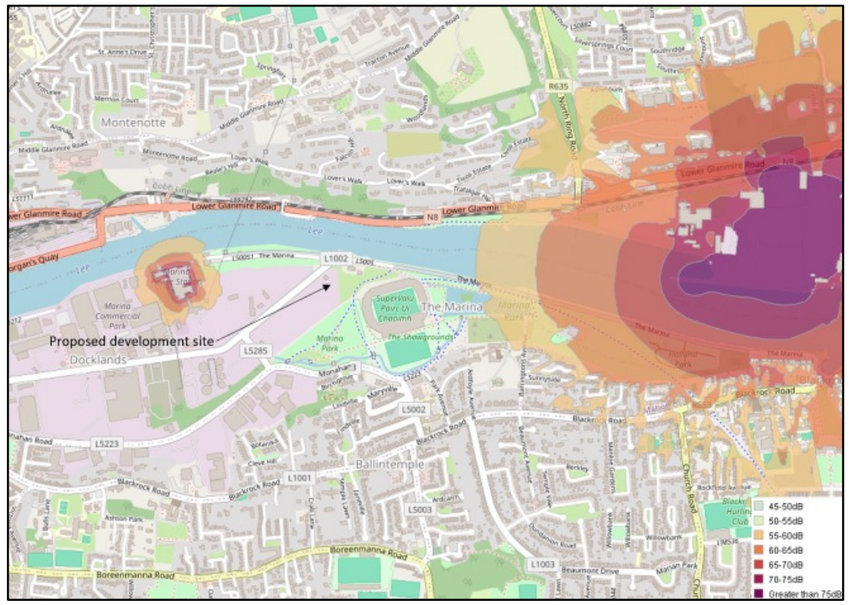

Figure 11.12 Round 4 L_{den} Industry Contours

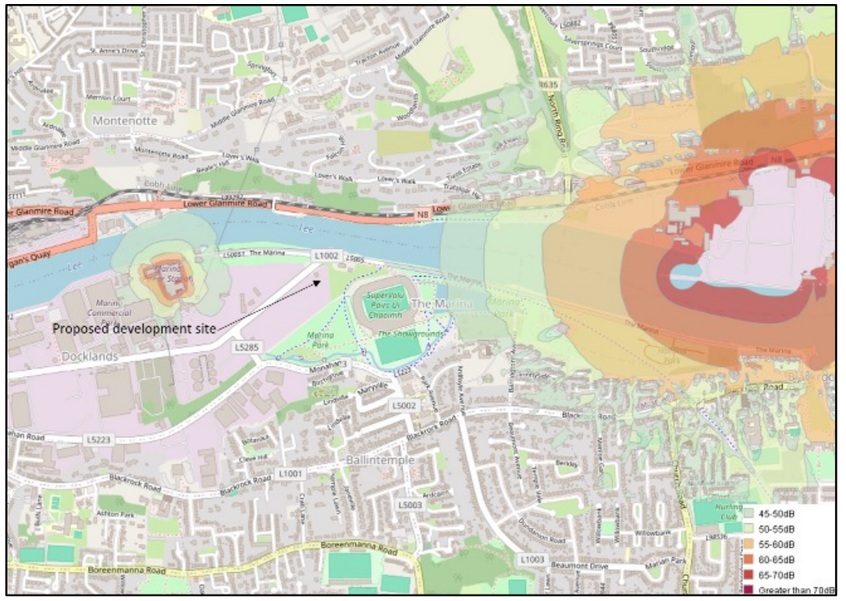

Figure 11.13 Round 4 L_{night} Industry Contours

11.6.3.5 Future Trends

EPA EIAR guidance recommends that a noise impact assessment should include a description of the likely evolution of the future receiving acoustic environment in the absence of the proposed development. The local noise environment is urban in character, with the dominant noise source being local and distant road traffic. Likely changes are as follows:

- Traffic flows on Centre Park Road and Monahan Road are relatively low at present, as these roads serve a limited hinterland, and many industrial sites in the surrounding area are no longer in use. As the wider docklands area is developed into the future, it is likely that these roads will see a substantial increase in road traffic, with a consequent increase in noise levels.
- Traffic noise on Lower Glanmire Road, the chief contributor to the background soundscape, is not expected to alter significantly. Relocation of the Tivoli container terminal to Ringaskiddy may result in a reduction in HGV content on Lower Glanmire Road.
- Traffic noise locally is likely to increase considerably if a proposed local bridge across the Lee is constructed.
- A proposed extension to Monahan Road will increase noise levels on the southern and eastern sides of the site. However, through-traffic on the extension will be limited until the proposed bridge is constructed.

Introduction of a mooted light rail system on Centre Park Road is likely to result in intermittent L_{AFmax} increases above levels currently due to road traffic.

- While engine noise emissions will reduce over time due to increasing take-up of electric vehicles, it is noted that traffic noise above 40 km/h arises chiefly from tyre noise, and such tyre noise is not less in electric vehicles. Thus the introduction of electric vehicles is unlikely to reduce the dominance of road traffic noise from Lower Glanmire Road.
- The expected increase in the proportion of electric vehicles in the national car fleet will gradually reduce engine and transmission noise at speeds below 40 km/h. This is likely to result in lower road traffic noise levels on Centre Park Road and Monahan Road.
- The increasing trend in lowering urban speed restrictions, if applied locally, will further reduce traffic noise.
- Increased use of public transport resulting from government and local authority policies is likely to reduce car volumes on the surrounding road network.

11.7 The 'Do Nothing' Scenario

Should the proposed development not proceed (the 'do nothing' scenario), noise emissions will continue to arise from land management practices, depending on how the site is used into the future. Planning policies which promote residential development on infill sites may result in development at the site at some point in the future.

11.8 Potential Significant Effects

11.8.1 Construction Phase

11.8.1.1 Construction Noise Sources

Construction works are expected to last approximately three years. Works will be confined to daytime hours Monday-Friday, with some additional works on Saturday. Works will entail the following stages:

- Initial groundworks to prepare the site.
- Piling and substructure construction.
- Above ground construction.
- Façade and fit out works.
- Final landscaping works.

Noise sources required during the above will vary. Initial construction works will require excavators and piling plant. This will be replaced by up to two tower cranes as development rises. Smaller plant sources such as portable generators and compressors will be required throughout, in addition to one or more telescopic loaders. Trucks will access the site regularly throughout the construction period, required for delivery of fill, concrete, fittings and other materials, and export of spoil.

For several weeks at the start of the project, piling will be required. It is proposed to use bored cast-in-situ piles or continuous flight auger (CFA) piles, depending on ground conditions. It is not proposed to use driven piles.

Noise emissions from expected onsite plant are listed in Table 11.18, taken from BS 5228-1:2009.

Table 11.18 Expected Construction Plant ($L_{Aeq\ T\ at\ 10\ m}$) (dB)

PLANT	63 HZ	125 HZ	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	Total $L_{Aeq\ T}$
Rotary boring piling rig	84	92	81	80	78	76	68	61	83
CFA crawler rig	79	79	78	78	75	71	66	56	80
Concrete pump & mixer discharging	83	81	78	79	77	74	71	66	82
Tracked excavator (16 t)	78	70	72	68	67	66	73	65	76
Mobile generator	78	71	66	62	59	55	56	49	65
Telescopic handler	85	79	69	67	64	62	56	47	71
8x4 tipper	85	87	77	75	76	73	69	62	81
Tower crane (22 t)	82	77	80	76	66	66	56	50	76

Noise emissions arising during the construction phase of the proposed development will vary due to several reasons:

- Emissions will arise from plant operating across the site, and thus the site will not constitute a single point source.
- The varied construction area will result in differing propagation conditions with respect to receptors at different locations.
- The construction phase will last several years. During this time, plant associated with different activities will relocate around the site as required.
- Different plant will be required at different times, and construction operations will vary on a daily basis. There may be extended periods during the construction phase with minimal noise emissions.
- Each machine item may operate under different loading conditions or be in varying states of repair.
- Construction works may be concentrated for certain periods, followed by periods of inactivity. Localised works may require several hours of intense activity.
- During later stages of the construction phase, emissions from some operations will be screened by previously completed blocks.
- As buildings near completion, activity will gradually relocate indoors.
- A number of different construction firms are likely to be contracted, each using different plant.
- With respect to particular plant, the models selected will change depending on requirements.
- The method of construction may be modified shortly before commencement, resulting in the need to import different equipment. Construction projects tend to be fluid in nature, with plant requirements changing as the site is progressed and circumstances change on the ground. The need for specific plant may often be established only following the start of a project.

From the foregoing, it is clear that construction phase noise emissions will vary in time and location, and it is not possible to determine a single overall noise output figure for the construction phase. The most appropriate approach here is to assess a number of worst case scenarios. Table 11.19 lists scenarios applied in this assessment. For the assessment of piling, rotary bored piling is assumed due to the higher noise levels produced, in order to adopt a worst case scenario.

Table 11.19 Assessed Construction Scenarios

SCENARIO	WORKS	WORKS AREA	PLANT
1	Ground preparation	Simultaneous works at NE and SW corners	2 no. tracked excavators and recurring 8x4 tipper HGV movements in each zone
2	Piling	NW corner of block A	Rotary piling rig and telescopic handler
3	Block A construction	Block A area	Tracked excavator, discharging concrete mixer HGV and pump, telescopic handler, tower crane, mobile generator
4	Block B construction	Block B area	Tracked excavator, discharging concrete mixer HGV and pump, telescopic handler, tower crane, mobile generator
5	Podium level landscaping	SW side and site centre	Tracked excavator and telescopic handler in each zone

11.8.1.2 Construction Noise Levels

Noise emissions from the five construction scenarios above were modelled using DGMR iNoise Pro v2024 software. Input parameters were as follows:

- Model algorithm: International Standard ISO 9613-2:1996 Acoustics: Attenuation Of Sound During Propagation Outdoors – Part 2 General Method Of Calculation (1996).
- Ground conditions: Hard ground assumed throughout. River included.
- Conditions: 10 °C and 70 % relative humidity.
- Receiver height: 2 m, to assess compliance with external BS 5228-1:2009 criteria. 5, 10 and 15 m heights additionally assessed at R8-R11 (adjacent SHD apartments).
- Plant output data taken from Table 11.19. 31.5 Hz levels (not provided in BS 5228:2009) assumed to be same as 63 Hz levels.
- Screening: None, apart from that provided by previously completed buildings. It is assumed that blocks at the adjacent SHD site will be complete.
- Plant on-times per hour: piling rig (80 %), excavator (80 %), concrete pump and mixer HGV (90 %), tower crane (20 %), mobile generator (100 %).

The model output at 2 m height is shown in Figures 11.14 to 11.18. Levels are presented in Table 11.20.

Table 11.20 Construction Phase $L_{Aeq\,1\,h}$ levels (dB)

Receiver	Height	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
R1	2 m	48	53	52	51	44
R2	2 m	48	52	51	51	44
R3	2 m	52	55	51	54	47
R4	2 m	51	53	49	51	29
R5	2 m	46	48	44	38	43
R6	2 m	45	37	44	52	44
R7	2 m	33	31	33	38	31
R8	2 m	65	69	70	43	67
R8	5 m	65	69	70	43	67
R8	10 m	65	69	70	43	67
R8	15 m	64	69	69	43	66
R9	2 m	68	67	69	41	63
R9	5 m	68	67	69	41	63
R9	10 m	67	67	69	40	63
R9	15 m	67	67	69	40	62
R10	2 m	70	66	68	58	62
R10	5 m	70	66	68	57	62
R10	10 m	69	66	68	57	62
R10	15 m	69	66	68	57	62
R11	2 m	67	65	66	56	60
R11	5 m	67	65	66	56	60
R11	10 m	67	65	67	56	60
R11	15 m	67	65	66	56	60

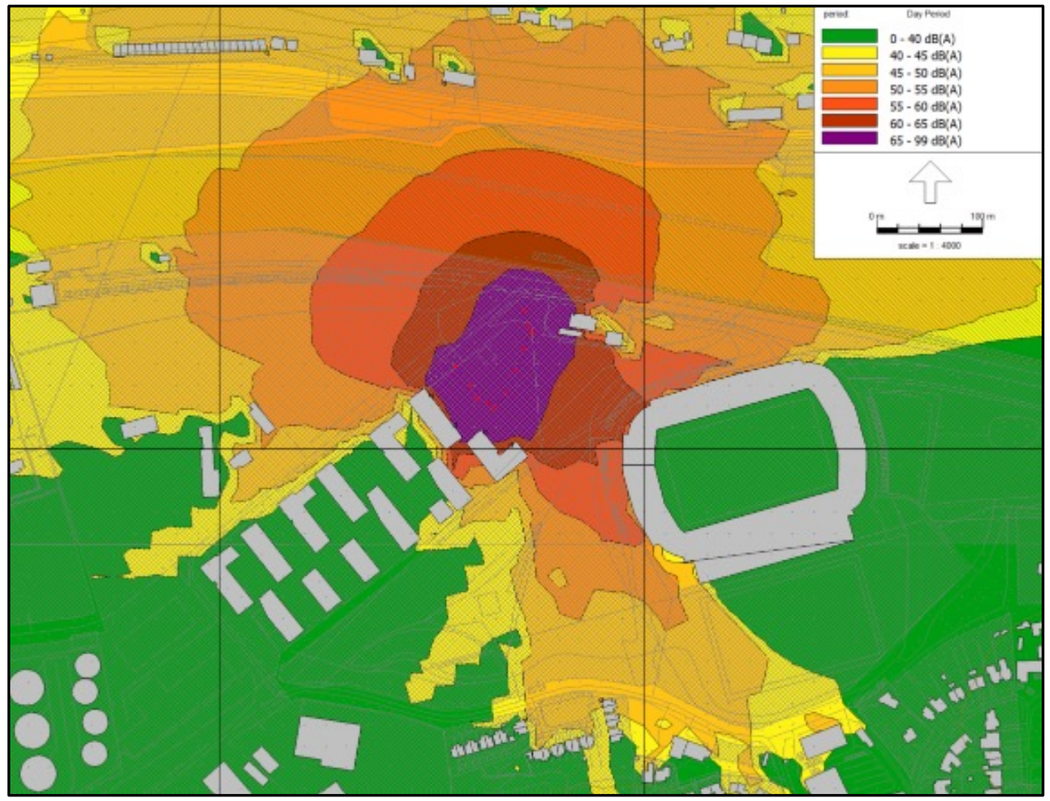

Figure 11.14 Predicted $L_{Aeq\,1\,h}$ Contours at 2 m – Construction Scenario 1

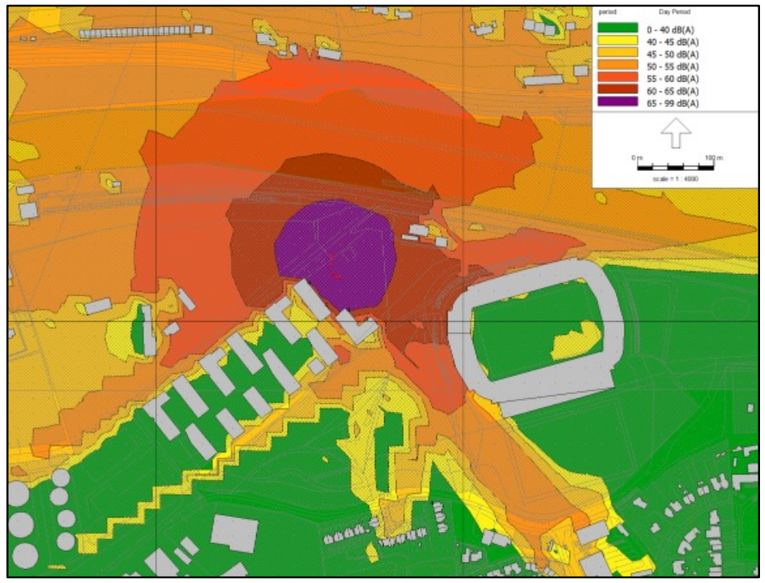

Figure 11.15 Predicted $L_{Aeq\,1h}$ Contours at 2 m – Construction Scenario 2

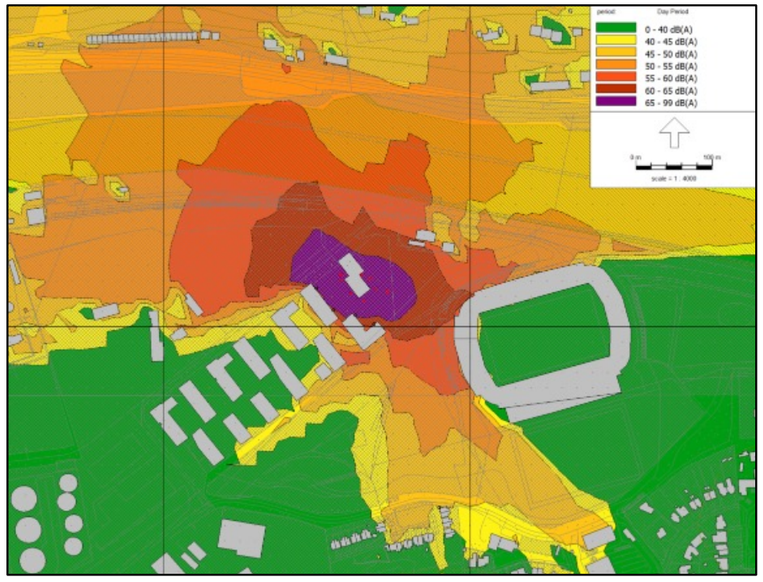

Figure 11.16 Predicted $L_{Aeq\,1h}$ Contours at 2 m – Construction Scenario 3

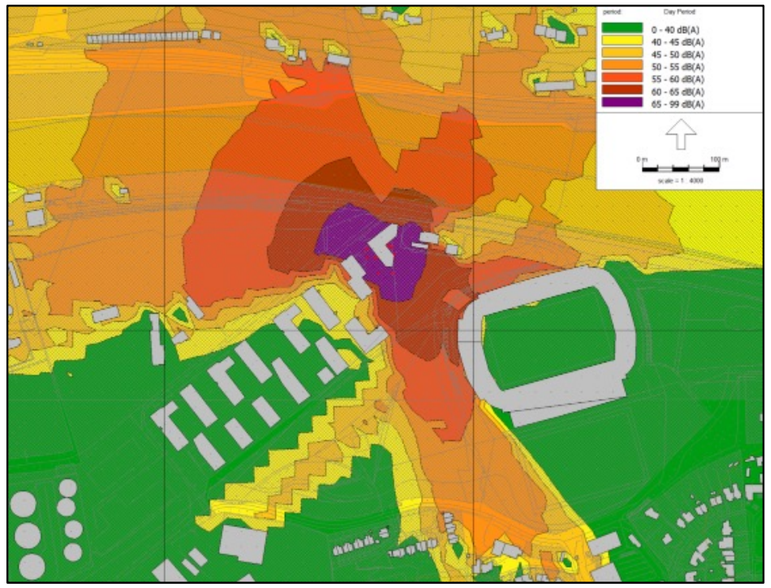

Figure 11.17 Predicted $L_{Aeq\,1h}$ Contours at 2 m – Construction Scenario 4

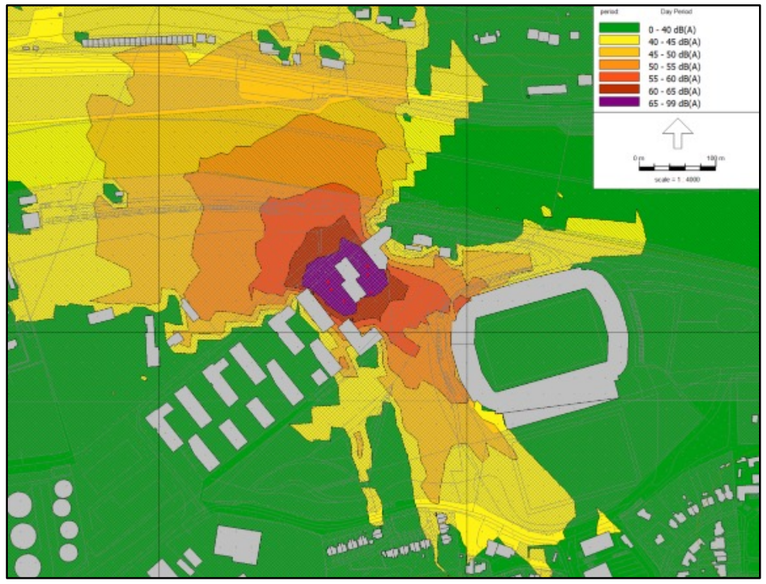

Figure 11.18 Predicted $L_{Aeq\,1h}$ Contours at 2 m – Construction Scenario 5

At the dwellings to the north across the river, the highest $L_{Aeq\,1h}$ levels received during the construction phase will be 55 dB, arising at the nearest dwelling during piling works. These works will last several weeks at the project outset. The highest level arising at receptors to the south will be 52 dB, received during scenario 4. Noise levels at receptors to the north and south will be considerably lower than the 65 dB BS 5228:2009 criterion throughout the construction phase.

External $L_{Aeq\,1h}$ levels received at apartment balconies on the adjacent SHB buildings, treated here as completed and occupied noise receptors, will reach a maximum of 70 dB during initial site preparation works. Levels will quickly reduce through the remaining construction stages. While $L_{Aeq\,1h}$ levels will exceed the 65 dB BS 5228:2009 criterion at most apartments which directly overlook the proposed development site during certain construction stages, levels will not exceed the 70 dB NRA criterion. It should be noted that these apartments may not be completed or occupied by the time construction works commence at the proposed development site, and they are included as receptors here only as a precaution.

11.8.1.3 Construction Noise Effects

At existing receptors across the river and to the south, $L_{Aeq\,1h}$ levels throughout the construction phase will be considerably lower than the 65 dB criterion recommended by BS 5228-1:2009, as well as the 70 dB NRA criterion.

Receptors R8-R11 represent apartments at the adjacent SDH site. If these apartments are occupied at the time of construction of the proposed development, they will constitute noise sensitive receptors. $L_{Aeq\,1h}$ levels received at the façade of apartments overlooking the site will reach a maximum of 70 dB due to proximity of plant at the proposed development site. Although levels will exceed the 65 dB BS 5228-1:2009 criterion, levels are not expected to exceed the 70 dB NRA criterion.

Tables 11.2 and 11.3 above set out the DMRB scale used to assess noise effects associated with construction noise. Tables 11.21 to 12.25 present an assessment based on this scale, applying the equivalent EPA effect category. Baseline $L_{Aeq\,T}$ levels are taken from Tables 11.16 and 11.17, with baseline levels at each receptor taken from the nearest baseline noise station. The assessment relates to daytime $L_{Aeq\,1h}$ levels, as these are most relevant to the construction phase.

At all existing offsite receptors, construction phase noise effects will range from imperceptible to not significant. Effects at receptors at the adjacent SDH site are also likely to be imperceptible to not significant, apart from apartments which directly overlook the site, represented here by receptors R8-R11. Noise effects at these will range from imperceptible to very significant at various stages of the construction project, and mitigation will be required to minimise effects.

In all cases, construction phase effects will be temporary. Effects will be consistent with the local urban context, where construction works may be expected to arise from time to time across the surrounding area.

Table 11.21 Construction Noise Effects ($L_{Aeq\,1h}$ levels, dB) – Scenario 1

Receiver	Height	Baseline	Predicted	Effect
R1	2 m	64	48	Imperceptible
R2	2 m	64	48	Imperceptible
R3	2 m	64	52	Imperceptible
R4	2 m	64	51	Imperceptible
R5	2 m	45	46	Not significant
R6	2 m	45	45	Not significant
R7	2 m	45	33	Imperceptible
R8	2 m	57	65	Slight
R8	5 m	57	65	Slight
R8	10 m	57	65	Slight
R8	15 m	57	64	Slight
R9	2 m	53	68	Significant
R9	5 m	53	68	Significant
R9	10 m	53	67	Moderate
R9	15 m	53	67	Moderate
R10	2 m	53	70	Very significant
R10	5 m	53	70	Very significant
R10	10 m	53	69	Significant
R10	15 m	53	69	Significant
R11	2 m	53	67	Moderate
R11	5 m	53	67	Moderate
R11	10 m	53	67	Moderate
R11	15 m	53	67	Moderate

Table 11.22 Construction Noise Effects ($L_{Aeq\,1\,h}$ levels, dB) – Scenario 2

Receiver	Height	Baseline	Predicted	Effect
R1	2 m	64	53	Imperceptible
R2	2 m	64	52	Imperceptible
R3	2 m	64	55	Imperceptible
R4	2 m	64	53	Imperceptible
R5	2 m	45	48	Not significant
R6	2 m	45	37	Imperceptible
R7	2 m	45	31	Imperceptible
R8	2 m	57	69	Significant
R8	5 m	57	69	Significant
R8	10 m	57	69	Significant
R8	15 m	57	69	Significant
R9	2 m	53	67	Moderate
R9	5 m	53	67	Moderate
R9	10 m	53	67	Moderate
R9	15 m	53	67	Moderate
R10	2 m	53	66	Moderate
R10	5 m	53	66	Moderate
R10	10 m	53	66	Moderate
R10	15 m	53	66	Moderate
R11	2 m	53	65	Slight
R11	5 m	53	65	Slight
R11	10 m	53	65	Slight
R11	15 m	53	65	Slight

Table 11.23 Construction Noise Effects ($L_{Aeq\,1\,h}$ levels, dB) – Scenario 3

Receiver	Height	Baseline	Predicted	Effect
R1	2 m	64	52	Imperceptible
R2	2 m	64	51	Imperceptible
R3	2 m	64	51	Imperceptible
R4	2 m	64	49	Imperceptible
R5	2 m	45	44	Imperceptible
R6	2 m	45	44	Imperceptible
R7	2 m	45	33	Imperceptible
R8	2 m	57	70	Very significant
R8	5 m	57	70	Very significant
R8	10 m	57	70	Very significant
R8	15 m	57	69	Significant
R9	2 m	53	69	Significant
R9	5 m	53	69	Significant
R9	10 m	53	69	Significant
R9	15 m	53	69	Significant
R10	2 m	53	68	Significant
R10	5 m	53	68	Significant
R10	10 m	53	68	Significant
R10	15 m	53	68	Significant
R11	2 m	53	66	Moderate
R11	5 m	53	66	Moderate
R11	10 m	53	67	Moderate
R11	15 m	53	66	Moderate

Table 11.24 Construction Noise Effects ($L_{Aeq\,1\,h}$ levels, dB) – Scenario 4

Receiver	Height	Baseline	Predicted	Effect
R1	2 m	64	51	Imperceptible
R2	2 m	64	51	Imperceptible
R3	2 m	64	54	Imperceptible
R4	2 m	64	51	Imperceptible
R5	2 m	45	38	Imperceptible
R6	2 m	45	52	Not significant
R7	2 m	45	38	Imperceptible
R8	2 m	57	43	Imperceptible
R8	5 m	57	43	Imperceptible
R8	10 m	57	43	Imperceptible
R8	15 m	57	43	Imperceptible
R9	2 m	53	41	Imperceptible
R9	5 m	53	41	Imperceptible
R9	10 m	53	40	Imperceptible
R9	15 m	53	40	Imperceptible
R10	2 m	53	58	Not significant
R10	5 m	53	57	Not significant
R10	10 m	53	57	Not significant
R10	15 m	53	57	Not significant
R11	2 m	53	56	Not significant
R11	5 m	53	56	Not significant
R11	10 m	53	56	Not significant
R11	15 m	53	56	Not significant

Table 11.25 Construction Noise Effects ($L_{Aeq\,1\,h}$ levels, dB) – Scenario 5

Receiver	Height	Baseline	Predicted	Effect
R1	2 m	64	44	Imperceptible
R2	2 m	64	44	Imperceptible
R3	2 m	64	47	Imperceptible
R4	2 m	64	29	Imperceptible
R5	2 m	45	43	Imperceptible
R6	2 m	45	44	Imperceptible
R7	2 m	45	31	Imperceptible
R8	2 m	57	67	Moderate
R8	5 m	57	67	Moderate
R8	10 m	57	67	Moderate
R8	15 m	57	66	Moderate
R9	2 m	53	63	Slight
R9	5 m	53	63	Slight
R9	10 m	53	63	Slight
R9	15 m	53	62	Slight
R10	2 m	53	62	Slight
R10	5 m	53	62	Slight
R10	10 m	53	62	Slight
R10	15 m	53	62	Slight
R11	2 m	53	60	Slight
R11	5 m	53	60	Slight
R11	10 m	53	60	Slight
R11	15 m	53	60	Slight

11.8.1.4 Construction Traffic Noise

Construction traffic throughout all construction stages will access the site via Centre Park Road. The expected maximum number of HGV movements during the construction phase peak is 80 per day (40 loads), with a likely hourly maximum of ten movements. The traffic assessment included in this EIAR indicates that this volume of traffic will be negligible in the context of existing traffic volumes on Centre Park Road and on the surrounding road network. Construction traffic noise effects will therefore be imperceptible.

11.8.1.5 Construction Vibration Effects

Potential sources of groundborne vibration during the construction phase are as follows:

- HGV movements: HGVs may give rise to vibration at positions adjacent to the roadway. However, such emissions are typically imperceptible beyond 5 m, and are highly unlikely to be perceptible at offsite locations.
- Plant movements: The movement of plant onsite is not considered to constitute a source of groundborne vibration, and is not listed in typical vibration documents such as BS 5228-2:2009. In addition, plant machinery used onsite is likely to be small to mid-sized, and similar to those used on other urban construction projects.
- Ground works: Excavation of trenches and pits for foundations and services will be required. These activities are not typically associated with offsite groundborne vibration effects.
- Piling: Piling will give rise to groundborne vibration. However, piling methods such as boring and CFA piling, to which preference will be given, give rise to minimal vibration.

On the basis of the foregoing, construction operations are not expected to give rise to offsite groundborne vibration. Levels onsite or offsite are highly unlikely to approach criteria set out in Tables 11.5 to 11.7.

11.8.1.6 Cumulative Construction Noise Effects

Construction works at the proposed development site may coincide with a number of works in the surrounding area. Potential scenarios are assessed below.

Construction of the proposed development may coincide with later stages of the adjacent SHD project, potentially affecting existing offsite receptors. Potential effects may be summarily assessed by estimating noise levels likely to be received at receptors if SHD construction works coincide with scenario 2 works, which will give rise to the highest onsite noise levels. For the purposes of this assessment, it is assumed that similarly loud works will be undertaken at the SHD site at the same time. Table 11.26 presents an assessment of noise levels at receptors in this scenario. Previously completed receptors at the SHD project are not included here, as noise levels received at these positions will be entirely dominated by SHD works, with minimal contribution from the proposed development. Effects will in all cases be imperceptible to not significant.

Table 11.26 Cumulative construction noise effects ($L_{Aeq\,1h}$ levels, dB) due to combined scenario 2 LRD and SHD works

Receiver	Height	Baseline	Predicted LRD scenario 2	Estimated SHD scenario 2	Combined level	Effect
R1	2 m	64	53	53	56	Imperceptible
R2	2 m	64	52	52	55	Imperceptible
R3	2 m	64	55	55	58	Imperceptible
R4	2 m	64	53	53	56	Imperceptible
R5	2 m	45	48	48	51	Not significant
R6	2 m	45	37	37	40	Imperceptible
R7	2 m	45	31	31	34	Imperceptible

Construction of the proposed development may also overlap with the Marina Park construction project. While construction work on the nearest part of Marina Park is complete, some works are currently ongoing in the vicinity of the Atlantic Pond. These ongoing works are expected to be largely complete prior to commencement of construction at the applicant's site, and cumulative construction noise effects are unlikely to arise here.

Construction of the proposed development may coincide with the mooted Monahan Road extension project. To assess potential cumulative effects associated with same, the five construction scenarios described above were remodelled, with inclusion of a tracked excavator, roller and asphalt paver on the Monahan Road extension, all operating simultaneously in proximity to the proposed development site. Combined noise levels are listed in Tables 11.27 to 11.31. Effects at existing offsite receptors to the north and south will remain unchanged, at imperceptible to not significant. Effects at the permitted SHD receptors will be similar to before, ranging from imperceptible to very significant. At all receptors, received $L_{Aeq\,1h}$ levels will not exceed the 70 dB NRA construction works criterion.

Table 11.27 Construction Noise effects ($L_{Aeq\,1h}$ Levels, dB) – LRD Scenario 1 Combined with Monahan Road Extension Project

Receiver	Height	Baseline	Predicted	Effect
R1	2 m	64	50	Imperceptible
R2	2 m	64	50	Imperceptible
R3	2 m	64	53	Imperceptible
R4	2 m	64	52	Imperceptible
R5	2 m	45	51	Not significant
R6	2 m	45	51	Not significant
R7	2 m	45	39	Imperceptible
R8	2 m	57	65	Slight

Receiver	Height	Baseline	Predicted	Effect
R8	5 m	57	65	Slight
R8	10 m	57	65	Slight
R8	15 m	57	65	Slight
R9	2 m	53	68	Significant
R9	5 m	53	68	Significant
R9	10 m	53	68	Significant
R9	15 m	53	67	Moderate
R10	2 m	53	70	Very significant
R10	5 m	53	70	Very significant
R10	10 m	53	70	Very significant
R10	15 m	53	69	Significant
R11	2 m	53	68	Very significant
R11	5 m	53	68	Very significant
R11	10 m	53	68	Very significant
R11	15 m	53	68	Very significant

Table 11.28 Construction Noise effects ($L_{Aeq\,1h}$ Levels, dB) – LRD Scenario 2 Combined with Monahan Road Extension Project

Receiver	Height	Baseline	Predicted	Effect
R1	2 m	64	53	Imperceptible
R2	2 m	64	53	Imperceptible
R3	2 m	64	55	Imperceptible
R4	2 m	64	54	Imperceptible
R5	2 m	45	52	Not significant
R6	2 m	45	51	Not significant
R7	2 m	45	39	Imperceptible
R8	2 m	57	69	Significant
R8	5 m	57	69	Significant
R8	10 m	57	69	Significant
R8	15 m	57	69	Significant
R9	2 m	53	68	Significant
R9	5 m	53	68	Significant
R9	10 m	53	68	Significant
R9	15 m	53	68	Significant
R10	2 m	53	67	Moderate
R10	5 m	53	67	Moderate
R10	10 m	53	67	Moderate
R10	15 m	53	67	Moderate
R11	2 m	53	66	Slight
R11	5 m	53	66	Slight
R11	10 m	53	66	Slight
R11	15 m	53	66	Slight

Table 11.29 Construction Noise effects ($L_{Aeq\,1h}$ Levels, dB) – LRD Scenario 3 Combined with Monahan Road Extension Project

Receiver	Height	Baseline	Predicted	Effect
R1	2 m	64	53	Imperceptible
R2	2 m	64	52	Imperceptible
R3	2 m	64	52	Imperceptible
R4	2 m	64	50	Imperceptible
R5	2 m	45	51	Not significant
R6	2 m	45	51	Imperceptible
R7	2 m	45	39	Imperceptible
R8	2 m	57	70	Very significant
R8	5 m	57	70	Very significant
R8	10 m	57	70	Very significant
R8	15 m	57	69	Significant
R9	2 m	53	69	Significant
R9	5 m	53	69	Significant
R9	10 m	53	69	Significant
R9	15 m	53	69	Significant
R10	2 m	53	68	Significant
R10	5 m	53	68	Significant
R10	10 m	53	68	Significant
R10	15 m	53	68	Significant
R11	2 m	53	67	Moderate
R11	5 m	53	67	Moderate
R11	10 m	53	67	Moderate
R11	15 m	53	67	Moderate

Table 11.30 Construction Noise effects ($L_{Aeq\,1h}$ Levels, dB) – LRD Scenario 4 Combined with Monahan Road Extension Project

Receiver	Height	Baseline	Predicted	Effect
R1	2 m	64	52	Imperceptible
R2	2 m	64	53	Imperceptible
R3	2 m	64	55	Imperceptible
R4	2 m	64	52	Imperceptible
R5	2 m	45	50	Not significant
R6	2 m	45	54	Not significant
R7	2 m	45	41	Imperceptible
R8	2 m	57	45	Imperceptible
R8	5 m	57	44	Imperceptible
R8	10 m	57	44	Imperceptible
R8	15 m	57	44	Imperceptible
R9	2 m	53	58	Not significant
R9	5 m	53	57	Not significant
R9	10 m	53	57	Not significant
R9	15 m	53	57	Not significant
R10	2 m	53	63	Slight
R10	5 m	53	62	Slight
R10	10 m	53	62	Slight
R10	15 m	53	62	Slight
R11	2 m	53	62	Slight
R11	5 m	53	62	Slight
R11	10 m	53	62	Slight
R11	15 m	53	61	Slight

Table 11.31 Construction Noise effects ($L_{Aeq\,1h}$ Levels, dB) – LRD Scenario 5 Combined with Monahan Road Extension Project

Receiver	Height	Baseline	Predicted	Effect
R1	2 m	64	45	Imperceptible
R2	2 m	64	46	Imperceptible
R3	2 m	64	50	Imperceptible
R4	2 m	64	48	Imperceptible
R5	2 m	45	51	Not significant
R6	2 m	45	51	Not significant
R7	2 m	45	39	Imperceptible
R8	2 m	57	67	Moderate
R8	5 m	57	67	Moderate
R8	10 m	57	67	Moderate
R8	15 m	57	66	Moderate
R9	2 m	53	64	Slight
R9	5 m	53	64	Slight
R9	10 m	53	64	Slight
R9	15 m	53	63	Slight
R10	2 m	53	65	Slight
R10	5 m	53	64	Slight
R10	10 m	53	64	Slight
R10	15 m	53	64	Slight
R11	2 m	53	63	Slight
R11	5 m	53	63	Slight
R11	10 m	53	63	Slight
R11	15 m	53	63	Slight

A long term proposal will see the Monahan Road extension discussed above continue northwards across the river, connecting to the Lower Glanmire Road. Cumulative noise effects may potentially arise where construction works at the proposed development site coincide with bridge construction works. The predictive model was again revised to include bridge construction noise. For the purposes of modelling, it is assumed that bridge construction will involve use of a hydraulic jacking piling rig installing sheet steel piles simultaneously on each bank, as well as two tracked excavators and a telescopic handler at each bank. This stage of the bridge project is likely to give rise to the highest noise levels. Combined noise levels are listed in Tables 11.32 to 11.36. Effects at existing offsite receptors to the north and south will again be imperceptible to not significant. Effects at the permitted SHD receptors will range from imperceptible to very significant as before. At all receptors, received $L_{Aeq\,1h}$ levels will not exceed the 70 dB NRA construction works criterion.

Table 11.32 Construction Noise Effects ($L_{Aeq\,1h}$ levels, dB) – LRD Scenario 1 Combined with Bridge Project

Receiver	Height	Baseline	Predicted	Effect
R1	2 m	64	50	Imperceptible
R2	2 m	64	51	Imperceptible
R3	2 m	64	54	Imperceptible
R4	2 m	64	62	Imperceptible
R5	2 m	45	46	Not significant
R6	2 m	45	45	Not significant
R7	2 m	45	34	Imperceptible
R8	2 m	57	65	Slight
R8	5 m	57	65	Slight
R8	10 m	57	65	Slight
R8	15 m	57	64	Slight
R9	2 m	53	68	Significant
R9	5 m	53	68	Significant
R9	10 m	53	67	Moderate
R9	15 m	53	67	Moderate
R10	2 m	53	70	Very significant
R10	5 m	53	70	Very significant
R10	10 m	53	69	Significant
R10	15 m	53	69	Significant
R11	2 m	53	67	Moderate
R11	5 m	53	67	Moderate
R11	10 m	53	67	Moderate
R11	15 m	53	67	Moderate

Table 11.33 Construction Noise Effects ($L_{Aeq\,1\,h}$ levels, dB) – LRD Scenario 2 Combined with Bridge Project

Receiver	Height	Baseline	Predicted	Effect
R1	2 m	64	53	Imperceptible
R2	2 m	64	53	Imperceptible
R3	2 m	64	56	Imperceptible
R4	2 m	64	62	Imperceptible
R5	2 m	45	48	Not significant
R6	2 m	45	38	Imperceptible
R7	2 m	45	32	Imperceptible
R8	2 m	57	69	Significant
R8	5 m	57	69	Significant
R8	10 m	57	69	Significant
R8	15 m	57	69	Significant
R9	2 m	53	68	Significant
R9	5 m	53	67	Moderate
R9	10 m	53	67	Moderate
R9	15 m	53	67	Moderate
R10	2 m	53	66	Moderate
R10	5 m	53	66	Moderate
R10	10 m	53	66	Moderate
R10	15 m	53	66	Moderate
R11	2 m	53	65	Slight
R11	5 m	53	65	Slight
R11	10 m	53	65	Slight
R11	15 m	53	65	Slight

Table 11.34 Construction Noise Effects ($L_{Aeq\,1\,h}$ levels, dB) – LRD Scenario 3 Combined with Bridge Project

Receiver	Height	Baseline	Predicted	Effect
R1	2 m	64	52	Imperceptible
R2	2 m	64	52	Imperceptible
R3	2 m	64	53	Imperceptible
R4	2 m	64	61	Imperceptible
R5	2 m	45	46	Not significant
R6	2 m	45	44	Imperceptible
R7	2 m	45	34	Imperceptible
R8	2 m	57	70	Very significant
R8	5 m	57	70	Very significant
R8	10 m	57	70	Very significant
R8	15 m	57	69	Significant
R9	2 m	53	69	Significant
R9	5 m	53	69	Significant
R9	10 m	53	69	Significant
R9	15 m	53	69	Significant
R10	2 m	53	68	Significant
R10	5 m	53	68	Significant
R10	10 m	53	68	Significant
R10	15 m	53	68	Significant
R11	2 m	53	66	Moderate
R11	5 m	53	66	Moderate
R11	10 m	53	67	Moderate
R11	15 m	53	67	Moderate

Table 11.35 Construction Noise Effects ($L_{Aeq\,1\,h}$ levels, dB) – LRD Scenario 4 Combined with Bridge Project

Receiver	Height	Baseline	Predicted	Effect
R1	2 m	64	52	Imperceptible
R2	2 m	64	53	Imperceptible
R3	2 m	64	55	Imperceptible
R4	2 m	64	62	Imperceptible
R5	2 m	45	39	Imperceptible
R6	2 m	45	52	Not significant
R7	2 m	45	39	Imperceptible
R8	2 m	57	43	Imperceptible
R8	5 m	57	43	Imperceptible
R8	10 m	57	43	Imperceptible
R8	15 m	57	43	Imperceptible
R9	2 m	53	49	Imperceptible
R9	5 m	53	48	Imperceptible
R9	10 m	53	47	Imperceptible
R9	15 m	53	47	Imperceptible
R10	2 m	53	59	Not significant
R10	5 m	53	58	Not significant
R10	10 m	53	58	Not significant
R10	15 m	53	58	Not significant
R11	2 m	53	56	Not significant
R11	5 m	53	56	Not significant
R11	10 m	53	56	Not significant
R11	15 m	53	56	Not significant

Table 11.36 Construction Noise Effects ($L_{Aeq\,1\,h}$ levels, dB) – LRD Scenario 5 Combined with Bridge Project

Receiver	Height	Baseline	Predicted	Effect
R1	2 m	64	48	Imperceptible
R2	2 m	64	49	Imperceptible
R3	2 m	64	51	Imperceptible
R4	2 m	64	61	Imperceptible
R5	2 m	45	43	Imperceptible
R6	2 m	45	44	Imperceptible
R7	2 m	45	32	Imperceptible
R8	2 m	57	67	Moderate
R8	5 m	57	67	Moderate
R8	10 m	57	67	Moderate
R8	15 m	57	66	Moderate
R9	2 m	53	63	Slight
R9	5 m	53	63	Slight
R9	10 m	53	63	Slight
R9	15 m	53	63	Slight
R10	2 m	53	62	Slight
R10	5 m	53	62	Slight
R10	10 m	53	62	Slight
R10	15 m	53	62	Slight
R11	2 m	53	60	Slight
R11	5 m	53	60	Slight
R11	10 m	53	60	Slight
R11	15 m	53	60	Slight

Plans for a proposed light rail project across Cork City are currently nearing completion. Current plans involve a light rail line along Centre Park Road, continuing onto The Marina. It is possible that construction of the proposed rail project will overlap with construction works at the proposed development. The predictive model was revised to include tramline construction works along Centre Park Road and The Marine. For the purposes of modelling, it is assumed that tramline construction will involve use of a breaker mounted on an excavator operating at two positions along the route, in proximity to the proposed development site, this likely to constitute the noisiest element of the rail project. The model assumes that each breaker will be joined by a wheeled excavator, telescopic handler and dumper. Combined noise levels are listed in Tables 11.37 to 11.41. Effects at existing receptors to the north and south will be imperceptible to not significant. Effects at the permitted SHD receptors will range from slight to very significant. In several cases, received $L_{Aeq\,1\,h}$ levels at the nearest SHD receptors will exceed the 70 dB NRA construction works criterion, and mitigation will be required.

Table 11.37 Construction Noise Effects ($L_{Aeq\,1\,h}$ levels, dB) – LRD Scenario 1 Combined with Light Rail Project

Receiver	Height	Baseline	Predicted	Effect
R1	2 m	64	54	Imperceptible
R2	2 m	64	54	Imperceptible
R3	2 m	64	58	Imperceptible
R4	2 m	64	56	Imperceptible
R5	2 m	45	51	Not significant
R6	2 m	45	48	Not significant
R7	2 m	45	35	Imperceptible
R8	2 m	57	70	Very significant
R8	5 m	57	70	Very significant
R8	10 m	57	70	Very significant
R8	15 m	57	69	Significant
R9	2 m	53	69	Significant
R9	5 m	53	69	Significant
R9	10 m	53	69	Significant
R9	15 m	53	69	Significant
R10	2 m	53	71	Very significant
R10	5 m	53	70	Very significant
R10	10 m	53	70	Very significant
R10	15 m	53	70	Very significant
R11	2 m	53	68	Significant
R11	5 m	53	68	Significant
R11	10 m	53	68	Significant
R11	15 m	53	67	Moderate

Table 11.38 Construction Noise Effects ($L_{Aeq\,1\,h}$ levels, dB) – LRD Scenario 2 Combined with Light Rail Project

Receiver	Height	Baseline	Predicted	Effect
R1	2 m	64	56	Imperceptible
R2	2 m	64	56	Imperceptible
R3	2 m	64	59	Imperceptible
R4	2 m	64	57	Imperceptible
R5	2 m	45	52	Not significant
R6	2 m	45	45	Not significant
R7	2 m	45	34	Imperceptible
R8	2 m	57	72	Very significant
R8	5 m	57	72	Very significant
R8	10 m	57	72	Very significant
R8	15 m	57	71	Very significant
R9	2 m	53	69	Significant
R9	5 m	53	69	Significant
R9	10 m	53	69	Significant
R9	15 m	53	69	Significant
R10	2 m	53	68	Significant
R10	5 m	53	68	Significant
R10	10 m	53	68	Significant
R10	15 m	53	68	Significant
R11	2 m	53	67	Moderate
R11	5 m	53	67	Moderate
R11	10 m	53	67	Moderate
R11	15 m	53	67	Moderate

Table 11.39 Construction Noise Effects ($L_{Aeq\,1h}$ levels, dB) – LRD Scenario 3 Combined with Light Rail Project

Receiver	Height	Baseline	Predicted	Effect
R1	2 m	64	55	Imperceptible
R2	2 m	64	55	Imperceptible
R3	2 m	64	57	Imperceptible
R4	2 m	64	56	Imperceptible
R5	2 m	45	51	Not significant
R6	2 m	45	48	Not significant
R7	2 m	45	35	Imperceptible
R8	2 m	57	72	Very significant
R8	5 m	57	72	Very significant
R8	10 m	57	72	Very significant
R8	15 m	57	72	Very significant
R9	2 m	53	70	Very significant
R9	5 m	53	70	Very significant
R9	10 m	53	70	Very significant
R9	15 m	53	70	Very significant
R10	2 m	53	69	Significant
R10	5 m	53	69	Significant
R10	10 m	53	69	Significant
R10	15 m	53	69	Significant
R11	2 m	53	68	Significant
R11	5 m	53	68	Significant
R11	10 m	53	68	Significant
R11	15 m	53	67	Moderate

Table 11.40 Construction Noise Effects ($L_{Aeq\,1h}$ levels, dB) – LRD Scenario 4 Combined with Light Rail Project

Receiver	Height	Baseline	Predicted	Effect
R1	2 m	64	56	Imperceptible
R2	2 m	64	55	Imperceptible
R3	2 m	64	59	Imperceptible
R4	2 m	64	57	Imperceptible
R5	2 m	45	49	Not significant
R6	2 m	45	52	Not significant
R7	2 m	45	39	Imperceptible
R8	2 m	57	68	Significant
R8	5 m	57	68	Significant
R8	10 m	57	68	Significant
R8	15 m	57	68	Significant
R9	2 m	53	63	Slight
R9	5 m	53	63	Slight
R9	10 m	53	63	Slight
R9	15 m	53	63	Slight
R10	2 m	53	64	Slight
R10	5 m	53	64	Slight
R10	10 m	53	63	Slight
R10	15 m	53	63	Slight
R11	2 m	53	63	Slight
R11	5 m	53	63	Slight
R11	10 m	53	63	Slight
R11	15 m	53	63	Slight

Table 11.41 Construction Noise Effects ($L_{Aeq\,1\,h}$ levels, dB) – LRD Scenario 5 Combined with Light Rail Project

Receiver	Height	Baseline	Predicted	Effect
R1	2 m	64	55	Imperceptible
R2	2 m	64	54	Imperceptible
R3	2 m	64	58	Imperceptible
R4	2 m	64	55	Imperceptible
R5	2 m	45	49	Not significant
R6	2 m	45	47	Not significant
R7	2 m	45	34	Imperceptible
R8	2 m	57	71	Very significant
R8	5 m	57	71	Very significant
R8	10 m	57	71	Very significant
R8	15 m	57	70	Very significant
R9	2 m	53	66	Moderate
R9	5 m	53	66	Moderate
R9	10 m	53	66	Moderate
R9	15 m	53	66	Moderate
R10	2 m	53	65	Slight
R10	5 m	53	65	Slight
R10	10 m	53	65	Slight
R10	15 m	53	65	Slight
R11	2 m	53	64	Slight
R11	5 m	53	64	Slight
R11	10 m	53	64	Slight
R11	15 m	53	64	Slight

A review of planning files indicates that one offsite development of potential significance is currently proposed: a proposed apartment scheme at the former Tedcastles site on the opposite side of Centre Park Road (An Bord Pleanála reference ABP-311723-21). Construction works at this site, if ultimately granted permission, may coincide with construction works at the proposed development site. A worst case scenario will involve simultaneous piling works at both sites i.e. scenario 2 construction works at the proposed development site coinciding with similar works at the Tedcastles site. The predictive model was revised to include such works at both sites. Combined noise levels are listed in Table 11.42. Effects at existing receptors to the north and south will be imperceptible to not significant. Effects at the permitted SHD receptors will range from moderate to very significant. At SHD apartments close to Centre Park Road, and which overlook the proposed development site, received $L_{Aeq\,1\,h}$ levels will exceed the 70 dB NRA construction works criterion, and mitigation will be required.

Table 11.42 Cumulative Construction Noise Effects ($L_{Aeq\,1\,h}$ levels, dB) due to Combined Scenario 2 LRD works, and Similar Works at the Tedcastles SHD site

Receiver	Height	Baseline	Predicted	Effect
R1	2 m	64	56	Imperceptible
R2	2 m	64	56	Imperceptible
R3	2 m	64	58	Imperceptible
R4	2 m	64	56	Imperceptible
R5	2 m	45	50	Not significant
R6	2 m	45	43	Imperceptible
R7	2 m	45	35	Imperceptible
R8	2 m	57	71	Very significant
R8	5 m	57	71	Very significant
R8	10 m	57	71	Very significant
R8	15 m	57	71	Very significant
R9	2 m	53	69	Significant
R9	5 m	53	69	Significant
R9	10 m	53	69	Significant
R9	15 m	53	69	Significant
R10	2 m	53	68	Significant
R10	5 m	53	68	Significant
R10	10 m	53	68	Significant
R10	15 m	53	68	Significant

Receiver	Height	Baseline	Predicted	Effect
R11	2 m	53	67	Moderate
R11	5 m	53	67	Moderate
R11	10 m	53	67	Moderate
R11	15 m	53	67	Moderate

11.8.2 Operational Phase

11.8.2.1 Onsite Noise Sources

At the completed development, noise emissions will arise from the following sources:

- Air management and other plant installed in basement plant rooms. Emissions from these will cut in and out as required. Vents on the basement plant room walls will open to onsite external areas. Given the need to provide a satisfactory noise environment for residents living in apartments directly overhead, with windows and balconies overlooking these areas, appropriate measures will be installed at design stage so as to ensure that emissions are not audible more than 5 m from plant room facades. It follows that emissions will not be audible offsite.
- The proposed Block A ground floor retail/restaurant area may require additional air extraction, venting to the facade. Again, this will be designed so as to eliminate any effect on surrounding onsite residents, and will thus be inaudible offsite.
- The proposed retail/restaurant unit will require deliveries at intervals. Most deliveries are likely to require vans. Small HGVs may be required on occasion, and will also visit the site at intervals to remove waste and recycling materials. The volume of such traffic is expected to be negligible in the context of existing Centre Park Road and traffic.
- Amplified music may be played at the proposed basement gym. The gym room has been designed to ensure zero noise breakout with respect to apartments overhead. Gym emissions will not be audible offsite.
- Noise emissions will arise from typical residential activities such as talking, music through open windows, etc. Such emissions form part of the urban soundscape.
- Emissions may arise from landscaping plant such as mowers and strimmers at intervals. Again, these emissions form part of the urban noise environment.

From the foregoing, the commissioned development is highly unlikely to give rise to offsite noise effects. The applicant's obligation to provide a satisfactory environment for onsite residents will ensure that suitable measures are incorporated at final design and construction stage, thus also benefitting offsite receptors. It follows that operational phase noise emissions will be satisfactory in the context of criteria set out in Tables 11.8 and 11.9 above. Noise effects will be imperceptible.

The proposed development, once operational, is not expected to give rise to an increase in noise levels at offsite receptors, including apartments at the adjacent SHD development. $L_{Aeq\,T}$ levels resulting from onsite noise sources are highly unlikely to be higher than baseline $L_{AF90\,T}$ levels at receptors. An assessment in the context of BS 4142:2014 concludes that the proposed development is highly unlikely to give rise to adverse impacts at receptors.

11.8.2.2 Operational phase traffic

Opening year +10 is 2041. Data presented in the traffic assessment chapter indicate that the proposed development is likely to give rise to a maximum hourly traffic flow of up to 19 movements during peak hour periods. This volume will be negligible in the context of existing and future traffic volumes on the surrounding road network. The increase will be less than 5 %, corresponding to a noise increase of considerably less than 1 dB. On the basis of the scale presented in Table 11.10 above, it is concluded that road traffic noise effects attributable to the proposed development will be imperceptible.

11.8.2.3 Inward Noise Impacts

11.8.2.3.1 Overview

Inward impacts relate to noise immissions (see Glossary) received at a receptor due to emissions emitted by one or more offsite sources. Emerging best practice provides for the design of new developments such that occupants are not subject to high immissions from existing and potential future offsite noise sources. Such sources usually consist of transport (road, rail and aircraft), and industry. Internal and external criteria considered appropriate to new residential developments are identified above.

At the proposed development site, inward immissions arise chiefly from local traffic, and traffic across the river on Lower Glanmire Road. Immissions from aircraft and rail activity are minimal. Noise data presented above indicate that L_{den} levels at the site are 57 dB along the Centre Park Road boundary, and fall to below 54 dB at the southeast corner. $L_{Aeq\,16\,h}$ and L_{night} levels reach 57 and 47 dB respectively.

Night-time L_{AFmax} levels at the site exceed the 60 dB criterion at intervals, with the number of exceedances being higher than the threshold (ten) described in the ProPG document.

Noise surveys and inspections indicate that the site does not receive any industrial noise immissions of significance from premises on Centre Park Road, Monahan Road, or the docklands area.

The assessment of inward impacts requires consideration not just of current noise sources in the soundscape, but potential future sources which may influence the soundscape in the vicinity of the proposed development. Bearing this in mind, four inward noise scenarios are assessed as follows:

- Scenario 1: Proposed development constructed. No other infrastructural changes.
- Scenario 2: Proposed development constructed, with the proposed Monahan Road extension outside the southeast corner of the site.
- Scenario 3: As scenario 2, with the proposed bridge over the River Lee to the north of Páirc Uí Chaoimh.
- Scenario 4: As scenario 3, with the mooted light rail line introduced on Centre Park Road.

11.8.2.3.2 Modelled Baseline

To allow subsequent modelling of the four scenarios identified above, a baseline model was built and validated using noise levels measured onsite. The program used was DGMR iNoise Pro v2024. The following input parameters were applied:

- Model algorithm: International Standard ISO 9613-2:1996 Acoustics: Attenuation Of Sound During Propagation Outdoors – Part 2 General Method Of Calculation (1996). Although less widely applied for road traffic modelling than the CRTN model, ISO 9613 is suitable here as validation through onsite noise data is possible, and to allow subsequent inclusion of rail noise.
- Modelled height: 4 m.
- Local traffic volumes taken from the traffic chapter, with a traffic speed of 50 km/h, a daytime-evening-night-time split of 75-15-10 %, and % HGV content taken from the traffic report.
- Lower Glanmire Road traffic volumes directly across the river are not available, and were thus estimated from the TII traffic counter 500 m east of the Silversprings interchange. Based on TII data, and considering the diversion of some traffic to the North Ring Road and the port at Tivoli, the AADT across the river is estimated at 25,000, with a daytime-evening-night-time distribution of 80-12-08 %, a 3 % HGV content, and a traffic speed of 60 km/h.
- Light vehicle and HGV noise emissions are taken from the CNOSSUS-EU database.
- A temporary onsite barrier installed on the Marquee Road and Centre Park Road boundaries is included in the model to represent a construction screen installed at the time of the baseline survey.

The model output is shown in Figures 11.19 and 11.20. Table 11.43 presents a comparison between modelled, measured and mapped L_{den} and L_{night} levels. Levels predicted using the iNoise model are within 1-3 dB of measured levels at N2 and N3. The model is considered reasonably valid for the purposes of this assessment.

Table 11.43 Comparison of Modelled, Measured and Mapped Baseline Noise Levels (dB)

Source	N2		N3	
	L_{den}	L_{night}	L_{den}	L_{night}
Round 4*	55	45	55	45
Measured	57	47	54	44
iNoise	57	48	55	47
*Estimated from contours				

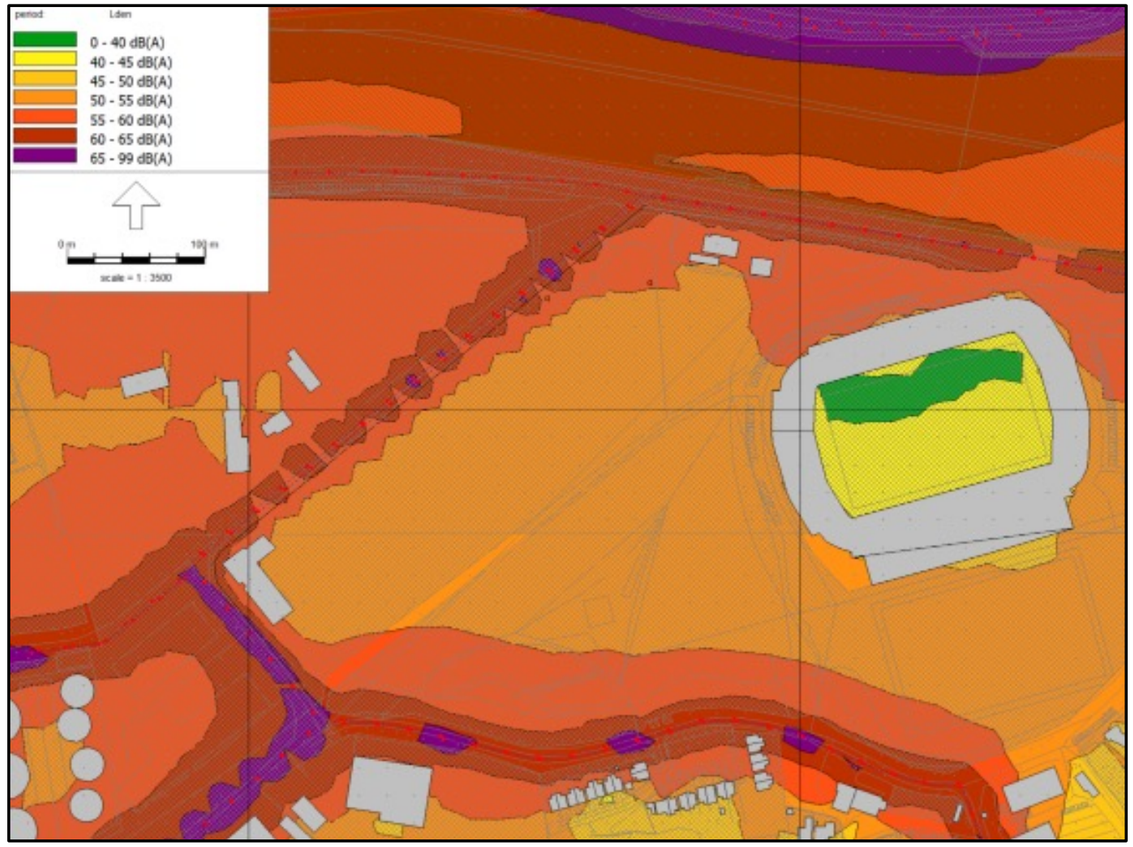

Figure 11.19 Modelled Baseline L_{den} Contours

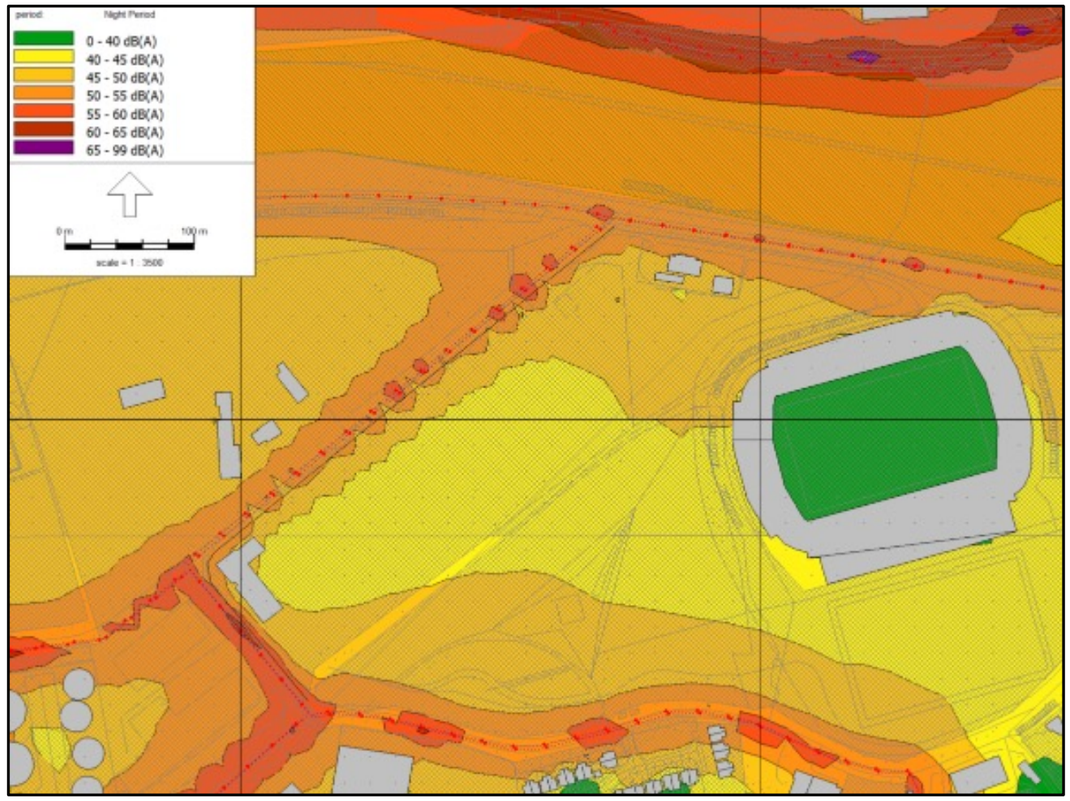

Figure 11.20 Modelled Baseline L_{night} Contours

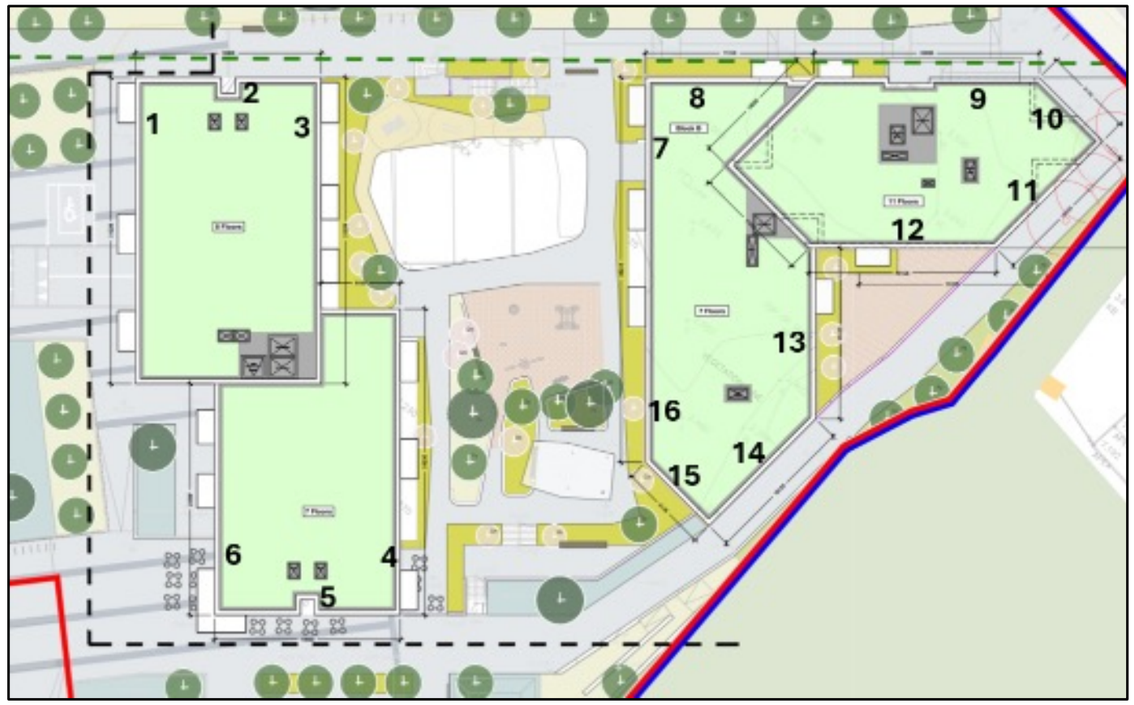

Figure 11.21 Façade Receptor Points Assessed

11.8.2.3.3 Predicted Levels – 2041 Scenario 1

The baseline model was modified to include the proposed development. Traffic volumes on surrounding roads were also modified to reflect the design year 2041, inclusive of the proposed development. Traffic volumes on surrounding roads are taken from the traffic assessment, which includes future traffic volumes on the road network. A 10 % increase in Lower Glanmire Road traffic is assumed. The boundary construction barrier applied to the baseline model was removed. Sixteen receptors points at various facades of the proposed blocks were added, as shown in Figure 11.21.

Predicted $L_{Aeq\ 16\ h}$, L_{den} and L_{night} contours are shown in Figures 11.22 to 11.24. Predicted noise levels are listed in Table 11.44. $L_{Aeq\ 16\ h}$ levels will range from 47 to 59 dB, being highest at facades directly overlooking Centre Park Road. L_{den} and L_{night} levels will also be highest on these facades, respectively reaching 61 and 52 dB.

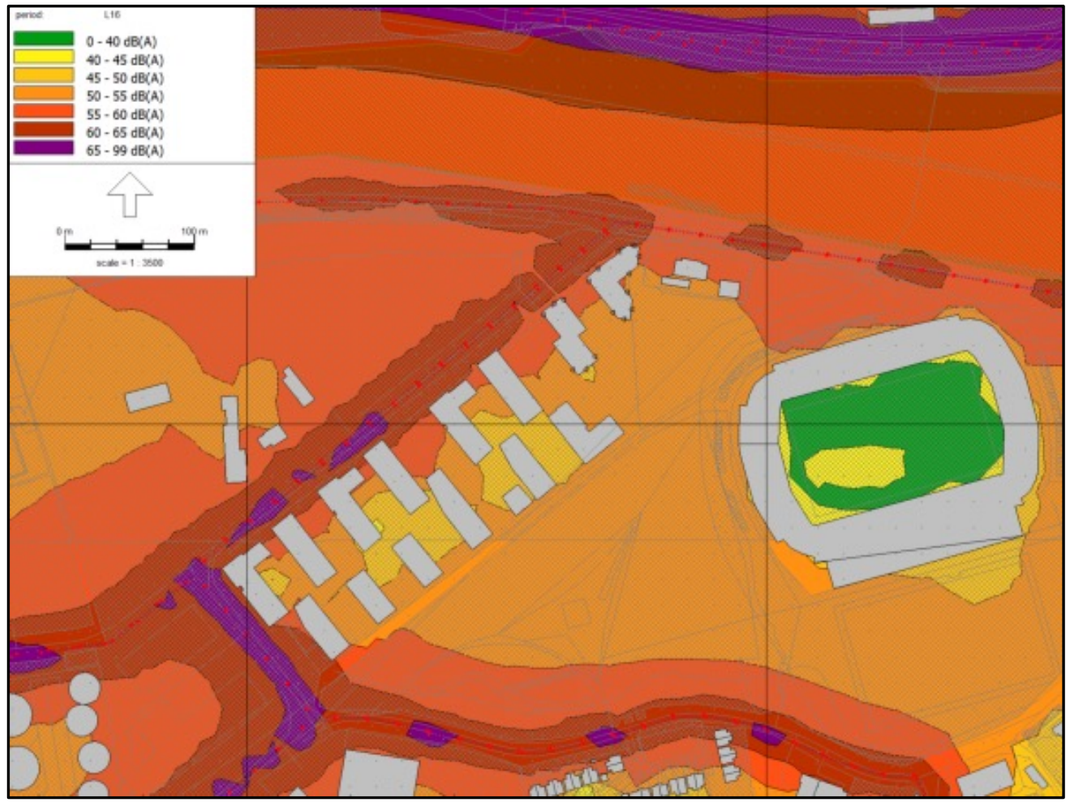

Figure 11.22 Modelled L_{Aeq}16 h Contours – 2041 Scenario 1

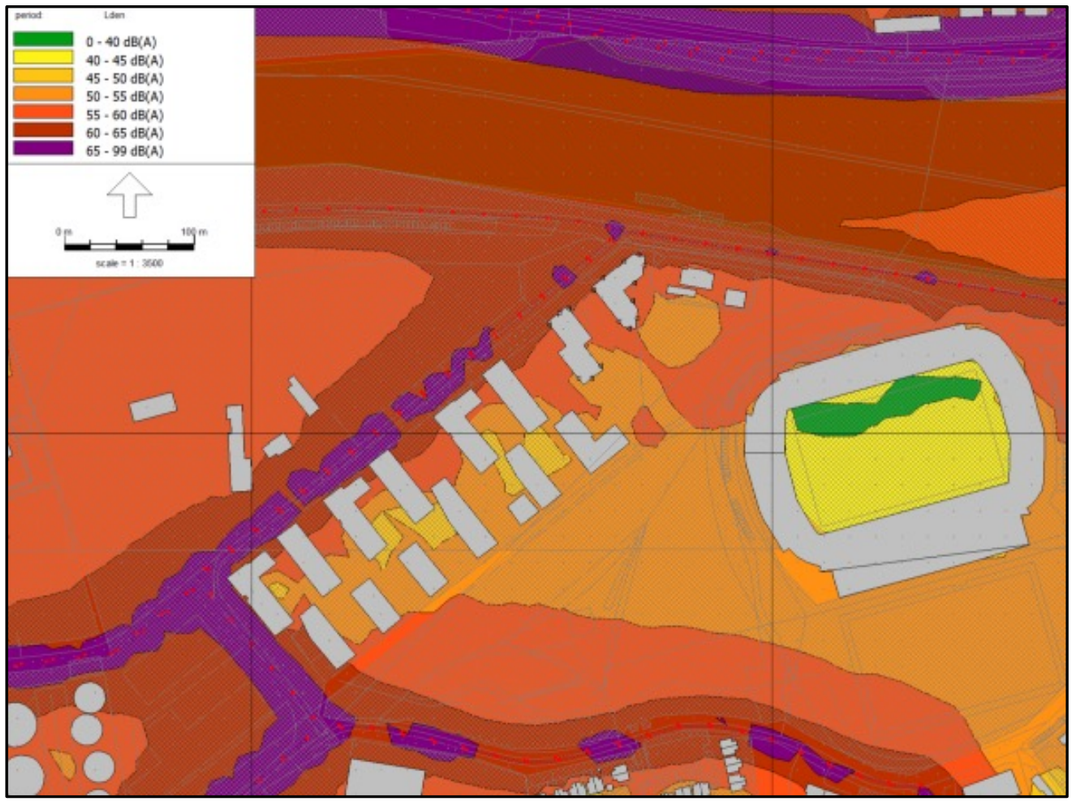

Figure 11.23 Modelled L_{den} Contours – 2041 Scenario 1

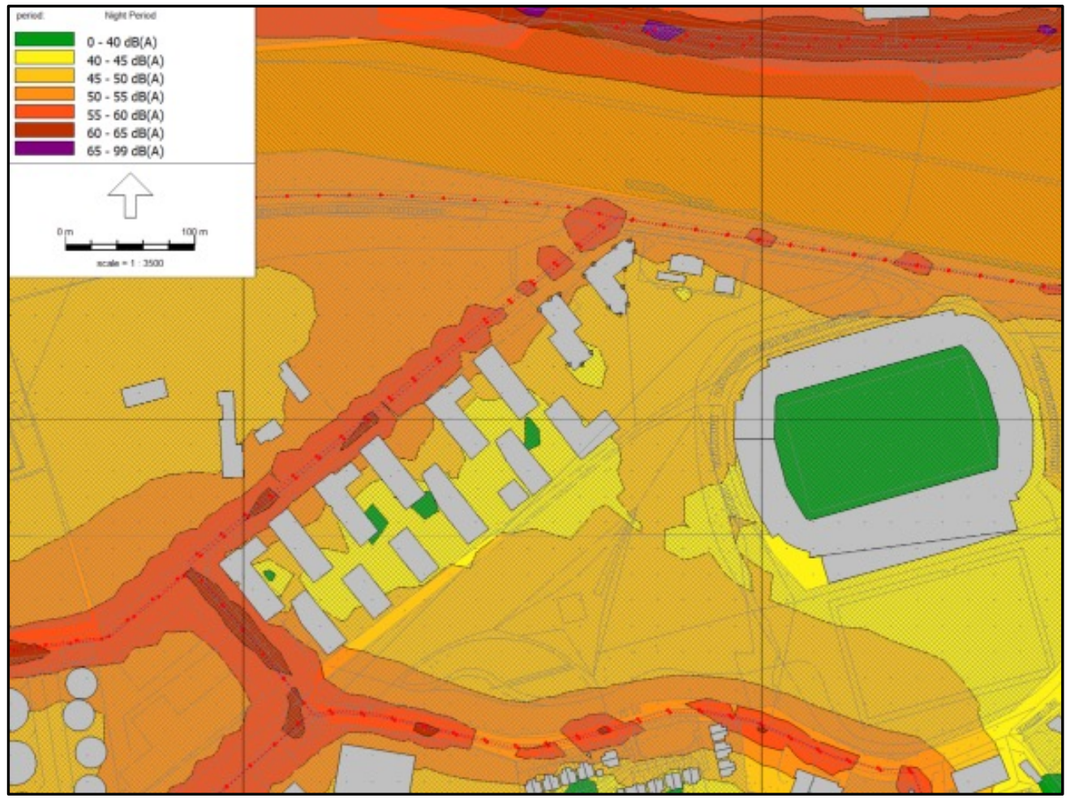

Figure 11.24 Modelled Lnight Contours – 2041 Scenario 1

Table 11.44 Predicted Noise Levels – 2041 Scenario 1 (dB)

Facade point	$L_{Aeq\ 16\ h}$				L_{den}				L_{night}			
	2 m	5 m	10 m	15 m	2 m	5 m	10 m	15 m	2 m	5 m	10 m	15 m
1	56	56	55	55	58	58	57	57	49	49	49	48
2	59	58	58	58	61	60	60	59	52	52	51	51
3	56	55	55	54	58	57	57	57	49	49	48	48
4	49	49	48	49	52	51	51	51	43	42	42	42
5	48	47	47	47	50	49	49	49	41	41	40	40
6	51	51	50	50	54	53	53	52	45	44	44	44
7	55	55	54	54	57	57	56	56	48	48	48	47
8	59	58	58	57	61	60	60	59	52	52	51	51
9	59	58	58	57	61	61	60	60	52	52	51	51
10	59	58	57	57	61	60	60	59	52	51	51	50
11	54	53	53	53	56	56	55	55	48	47	47	46
12	52	51	51	52	54	53	53	53	45	45	44	44
13	51	51	50	50	53	53	53	53	45	44	44	44
14	51	51	51	51	53	53	53	53	45	44	44	44
15	48	47	47	47	50	50	49	49	41	41	40	40
16	52	52	51	51	54	54	53	53	46	45	44	44

11.8.2.3.4 Predicted Levels – 2041 Scenario 2

Traffic on the proposed Monahan Road extension was added to the scenario 1 model. The extended road will in due course continue over the River Lee at the proposed Eastern Gateway Bridge. Prior to construction of the bridge, the Monahan Road extension will terminate outside the southeast corner of the proposed development site. The extension will thus be a cul de sac, and will not provide throughway access to any zones. The number of vehicles using the road will be low. For the purposes of this assessment, 20 vehicles per hour is assumed during the daytime and evening, with 5 movements per hour during the night-time, all travelling at 30 km/h. HGV content is assumed to be zero.

$L_{Aeq\ 16\ h}$, L_{den} and L_{night} contours are shown in Figures 11.25 to 11.27. Predicted noise levels are listed in Table 11.45. Received levels at facades overlooking Monahan Road will increase by 0-1 dB, indicating that construction of the road, without the onwards bridge connection, will give rise to a negligible increase in noise levels.

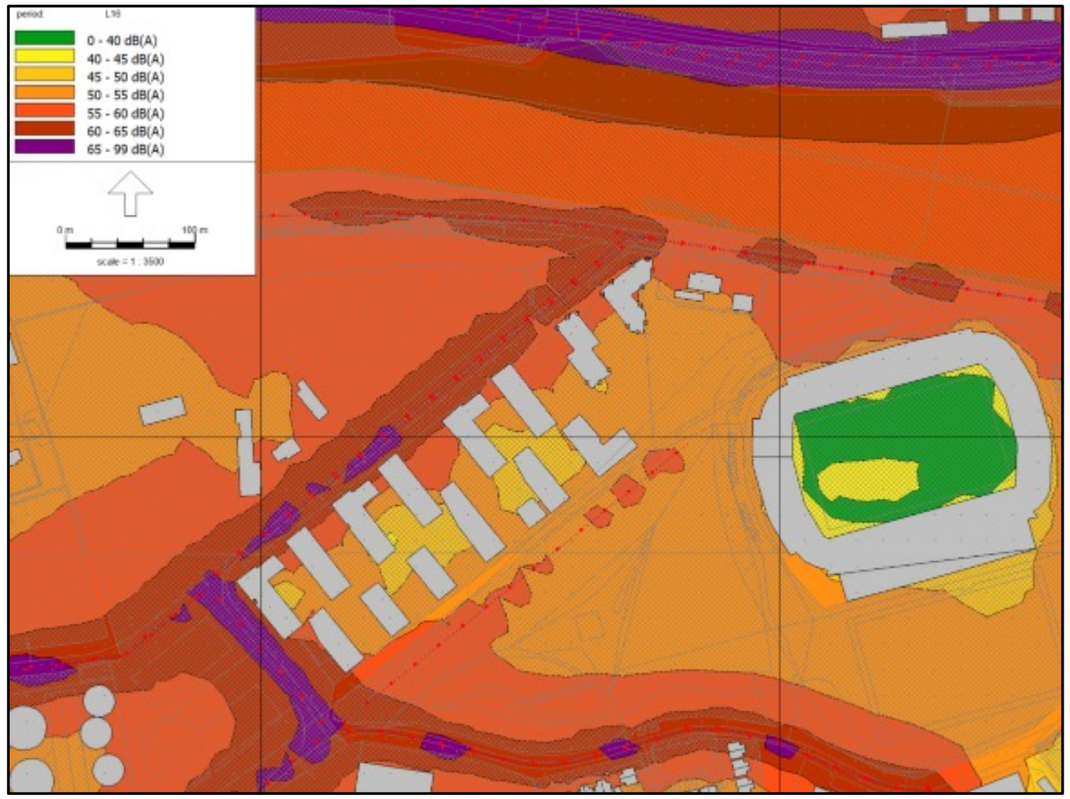

Figure 11.25 Modelled $L_{Aeq\ 16\ h}$ Contours – 2041 Scenario 2

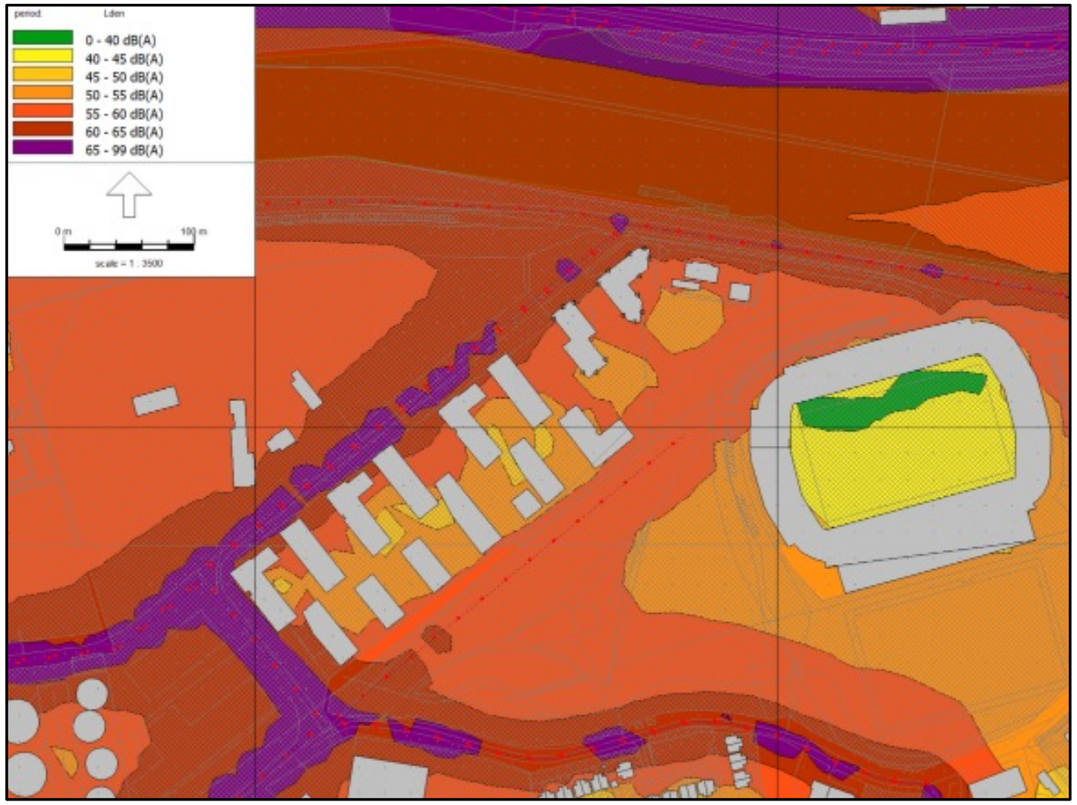

Figure 11.26 Modelled L_{den} Contours – 2041 Scenario 2

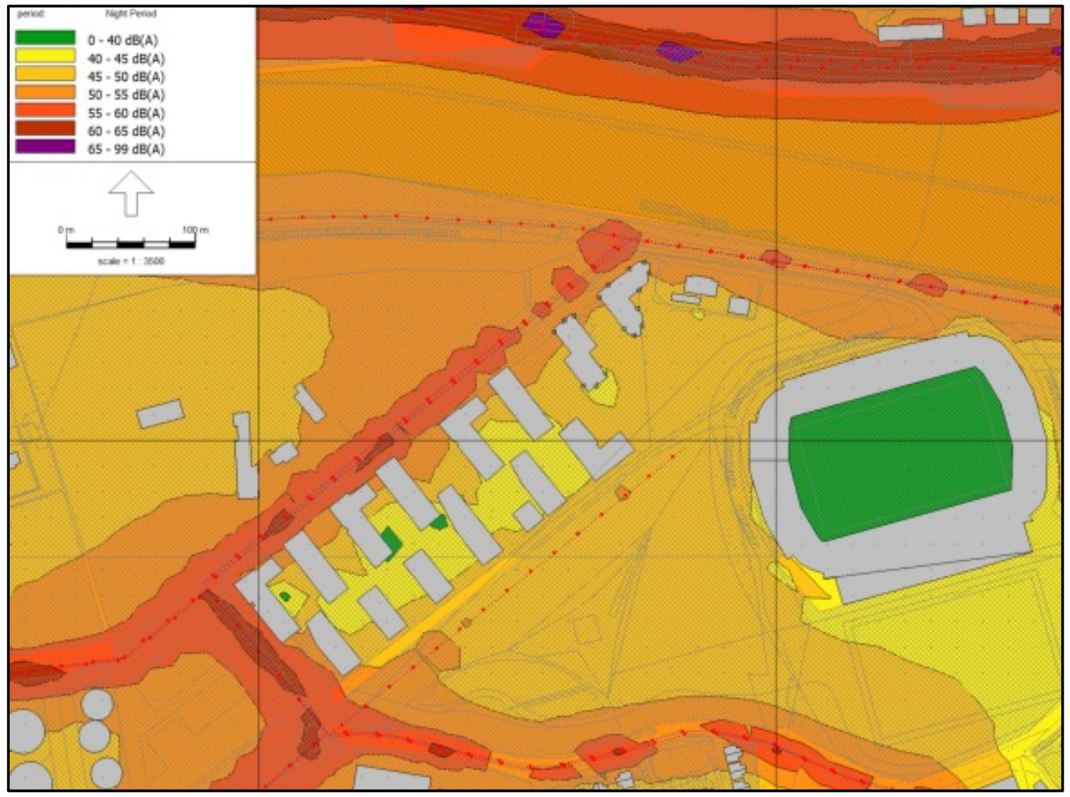

Figure 11.27 Modelled L_{night} Contours – 2041 Scenario 2

Table 11.45 Predicted Noise Levels – 2041 Scenario 2 (dB).

Facade point	$L_{Aeq\ 16\ h}$				L_{den}				L_{night}			
	2 m	5 m	10 m	15 m	2 m	5 m	10 m	15 m	2 m	5 m	10 m	15 m
1	56	56	55	55	58	58	57	57	50	49	49	48
2	59	58	58	57	61	61	60	59	52	52	51	51
3	56	55	55	54	58	57	57	57	49	49	48	48
4	50	49	49	49	52	51	51	51	43	43	42	43
5	48	48	47	47	51	50	50	50	42	41	41	41
6	52	51	51	50	54	53	53	53	45	45	44	44
7	55	55	54	54	57	57	56	56	49	48	48	47
8	59	58	58	57	61	61	60	59	52	52	51	51
9	59	58	58	57	61	61	60	60	52	52	51	51
10	59	58	58	57	61	60	60	59	52	51	51	51
11	54	54	53	53	57	56	55	55	48	47	47	47
12	52	52	51	51	54	54	53	53	46	45	44	44
13	51	51	51	51	53	53	53	53	45	44	44	44
14	51	51	51	51	53	53	53	53	45	44	45	44
15	49	48	48	48	51	50	50	50	42	41	41	41
16	52	52	51	51	55	54	54	53	46	45	45	45

11.8.2.3.5 Predicted Levels – 2041 Scenario 3

The model was again modified to include a possible bridge over the River Lee, provisionally titled the Eastern Gateway Bridge. No information is available regarding the bridge at this point. The following assumptions were made:

- The bridge will run due north-south across the river to the north of Páirc Uí Chaoimh.
- The proposed Monahan Road extension will continue northeast to meet the bridge, and traffic will flow freely between the two.
- The bridge will reach a height of 10 m above the river, and 4 m above The Marina roadway.
- For the purposes of the model, a bridge AADT of 10,000 is assumed, with a 75-15-10 % daytime-evening-night-time distribution, and a 3 % HGV content.
- A traffic speed of 50 km/h is assumed.
- Noise data are taken from the CNOSSOS-EU database.
- Monahan Road traffic volumes assumed in the model are increased to match the assumed bridge traffic volume.
- Traffic volumes on the Lower Glanmire Road to the west of the bridge landing will not alter.

Figures 11.28 to 11.30 show predicted $L_{Aeq\ 16\ h}$, L_{den} and L_{night} contours. Predicted levels are listed in Table 11.46. The proposed bridge, and corresponding increase in traffic volumes using the Monahan Road extension, will result in a considerable increase in noise levels received at facades facing southeast and east. $L_{Aeq\ 16\ h}$ levels at these facades will increase to 57 dB, with L_{night} levels rising to 50 dB. Despite this increase, noise levels will continue to remain below levels experienced at facades overlooking Centre Park Road.

Table 11.46 Predicted noise levels – 2041 scenario 3 (dB).

Facade point	$L_{Aeq\ 16\ h}$				L_{den}				L_{night}			
	2 m	5 m	10 m	15 m	2 m	5 m	10 m	15 m	2 m	5 m	10 m	15 m
1	56	56	55	55	58	58	58	57	50	49	49	49
2	59	58	58	57	61	61	60	59	52	52	51	51
3	57	56	55	55	59	58	58	57	50	49	49	49
4	56	55	55	55	58	58	57	57	49	49	49	49
5	55	55	55	55	57	57	57	57	49	48	48	48
6	53	52	52	52	55	55	54	54	46	46	45	45
7	56	55	55	55	58	58	57	57	49	49	48	48
8	59	58	58	57	61	61	60	60	52	52	51	51
9	59	58	58	57	61	61	60	60	53	52	51	51
10	59	58	58	57	61	60	60	60	52	52	51	51
11	56	55	56	56	58	58	58	58	49	49	49	49
12	56	55	55	56	58	58	58	58	49	49	49	49
13	55	55	55	55	58	57	57	58	49	49	49	49
14	57	56	56	56	59	58	58	58	50	50	50	50
15	55	55	55	55	57	57	57	57	49	48	48	48
16	55	54	54	54	57	56	56	56	48	48	47	47

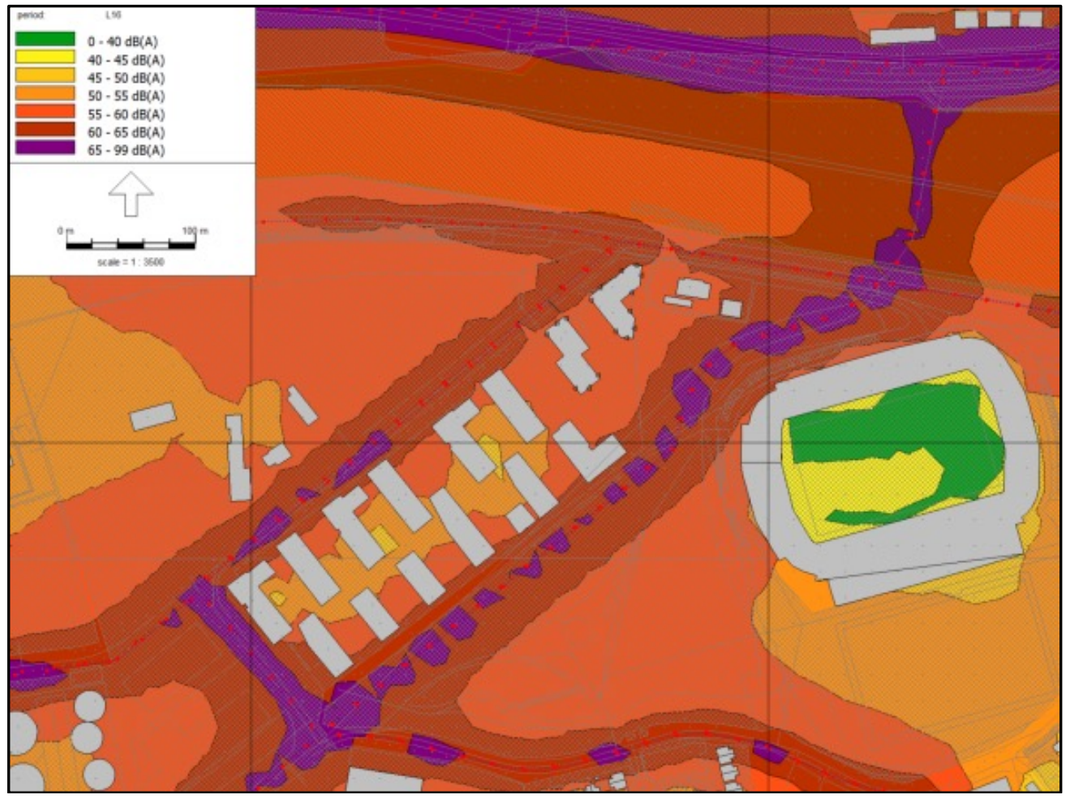

Figure 11.28 Modelled $L_{Aeq\ 16\ h}$ Contours – 2041 Scenario 3

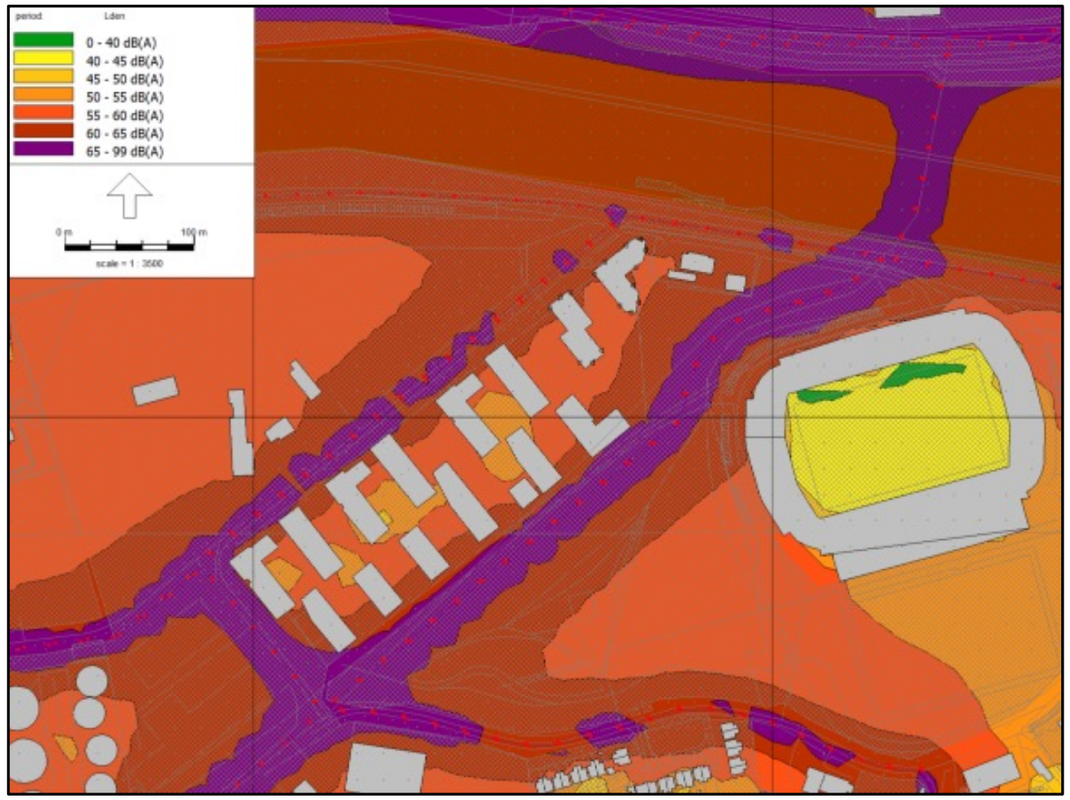

Figure 11.29 Modelled L_{den} Contours – 2041 Scenario 3

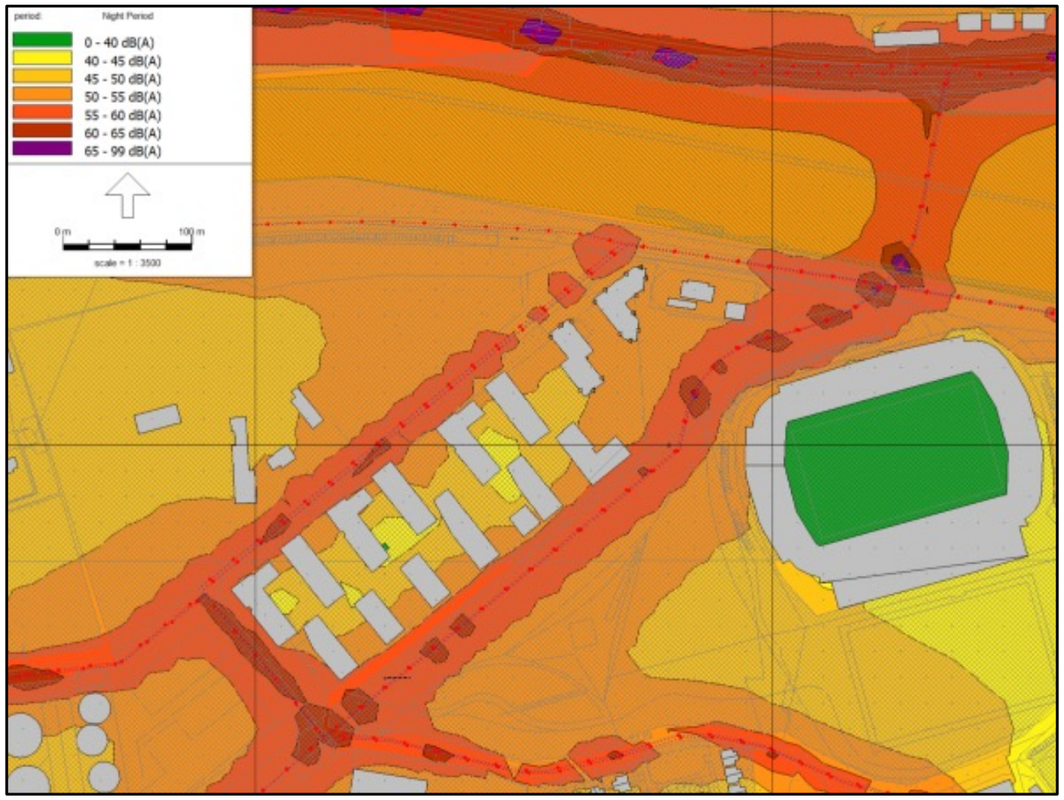

Figure 11.30 Modelled L_{night} Contours – 2041 Scenario 3

11.8.2.3.6 Predicted Levels – 2041 Scenario 4

The scenario 3 model was modified to include the proposed Centre Park Road light rail line. While rail modelling is typically undertaken using Calculation of Railway Noise (UK Department of Transport, 1995), this document is more relevant to heavy rail. ISO 9613-2:1996, which forms the basis of most models, was therefore used here.

Little or no information is available at present in relation to the proposed line. It was therefore necessary to apply a number of assumptions, as follows:

- The light rail will be similar to Dublin's Luas, running on embedded track in the road surface.
- The rail will run from 0600 h to midnight.
- Four passages will occur each way per hour, totalling eight movements, with four movements per hour during the periods 2300-0000 h and 0600-0700 h.
- Tram speed will be 30 km/h locally.
- Local road traffic volumes will remain unchanged (worst case scenario).

It is assumed that noise emissions will be similar to those from the Luas. Luas noise emission levels were taken from Reductions in Environmental Noise Emissions from Dublin's Light Rail System Following a Rail Grinding Campaign (Byrne, S. in Proceedings of Euronoise 2018). Third octave band data measured at 2 m from an embedded track were used, measured approximately 18 months after a rail grinding campaign. The sound exposure level measured at 2 m was 89 dB, which correlates well with levels reported in literature. This equates to a sound pressure level of 81 dB at 2 m over a typical 7 s pass. Noise emissions from tram bells have not been included.

$L_{Aeq\ 16\ h}$, L_{den} and L_{night} contours are shown in Figures 11.31 to 11.33. Predicted levels are given in Table 11.47. Centre Park Road rail movements will result in an increase of 0-1 dB over scenario 3 at facades overlooking the road. The negligible increase is due to the relatively low number of rail movements assumed.

Table 11.47 Predicted Noise levels – 2041 Scenario 4 (dB).

Facade point	$L_{Aeq\ 16\ h}$				L_{den}				L_{night}			
	2 m	5 m	10 m	15 m	2 m	5 m	10 m	15 m	2 m	5 m	10 m	15 m
1	56	56	56	55	58	58	58	57	50	49	49	49
2	59	58	58	57	61	61	60	60	52	52	51	51
3	57	56	56	55	59	58	58	57	50	49	49	49
4	56	55	55	55	58	58	57	57	49	49	49	49
5	55	55	55	55	58	57	57	57	49	48	48	48
6	53	52	52	52	55	55	54	54	46	46	45	45
7	56	56	55	55	58	58	57	57	49	49	49	48
8	59	58	58	57	61	61	60	60	52	52	51	51
9	59	59	58	58	61	61	60	60	53	52	51	51
10	59	58	58	57	61	61	60	60	52	52	51	51
11	56	56	56	56	58	58	58	58	50	49	49	49
12	56	55	56	56	58	58	58	58	49	49	49	49
13	56	55	55	55	58	57	58	58	49	49	49	49
14	57	56	56	56	59	58	58	58	50	50	50	50
15	55	55	55	55	57	57	57	57	49	48	48	48
16	55	54	54	54	57	56	56	56	48	48	47	47

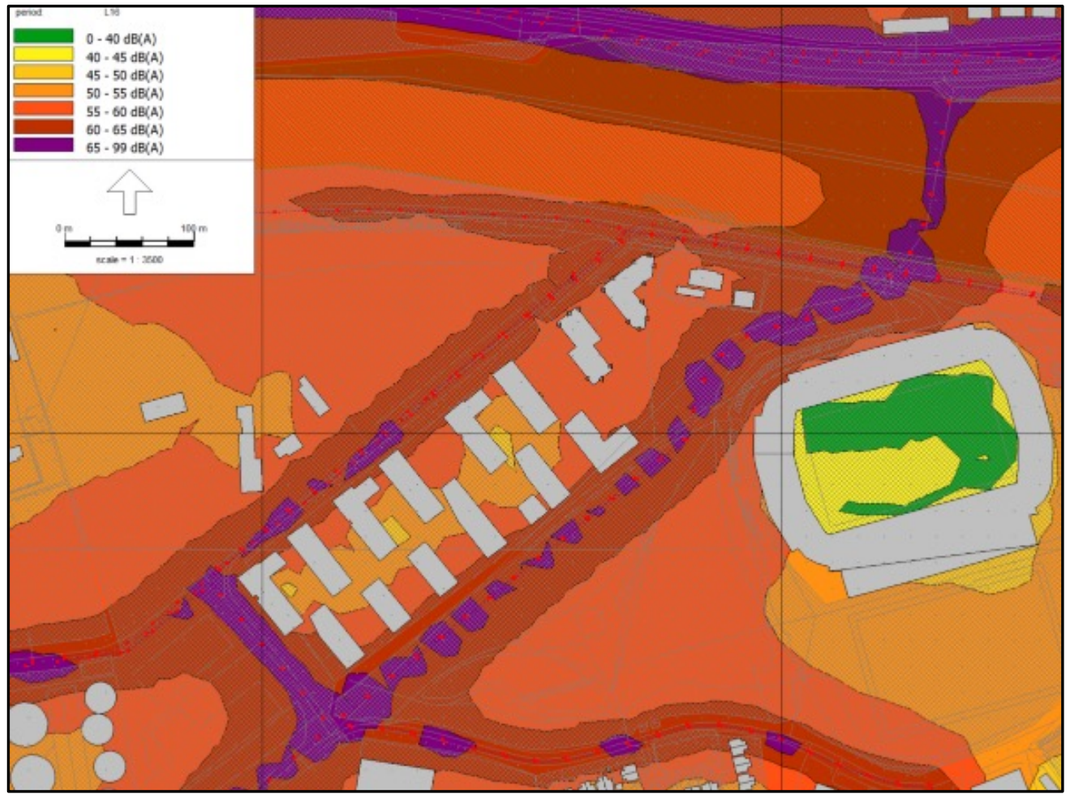

Figure 11.31 Modelled $L_{Aeq\ 16\ h}$ Contours – 2041 Scenario 4

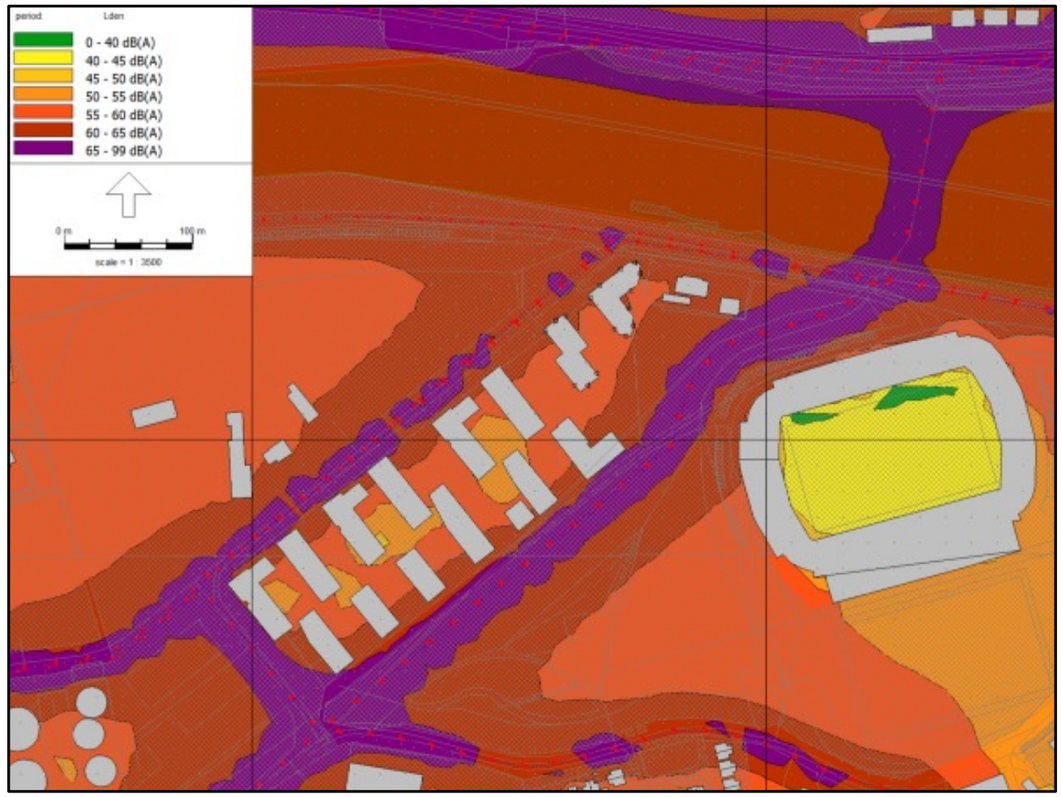

Figure 11.32 Modelled L_{den} Contours – 2041 Scenario 4

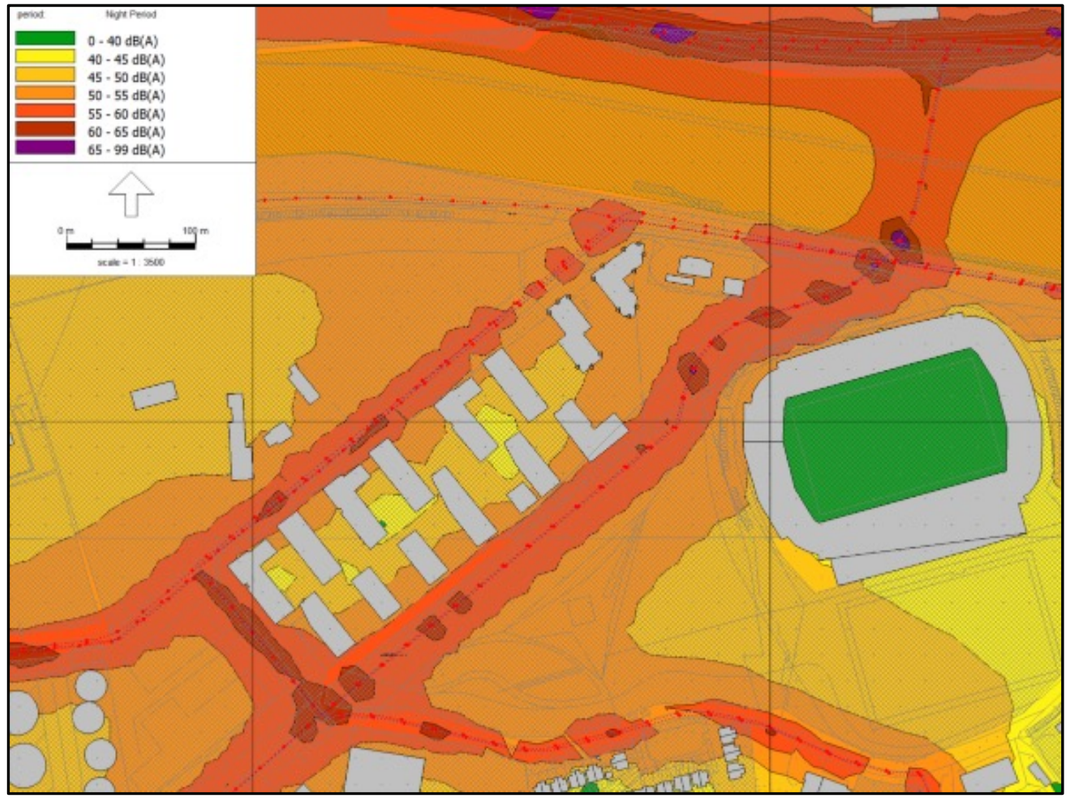

Figure 11.33 Modelled Lnight Contours – 2041 Scenario 4

11.8.2.3.7 L_{AFmax} Levels

Onsite measurements indicate that night-time L_{AFmax} levels exceed 60 dB at the northern end of the site during passage of vehicles on Centre Park Road, with L_{AFmax} levels due to louder vehicles approaching 70 dB near the Centre Park Road boundary. On this basis, the following may be expected once the proposed development is complete:

- Night-time L_{AFmax} levels due to Centre Park Road traffic will exceed the 60 dB ProPG recommendation at facades facing the road.
- L_{AFmax} levels at east- and south-facing facades are likely to exceed the criterion if the Monahan Road extension and proposed bridge are built, although the road extension alone without bridge is unlikely to generate L_{AFmax} levels above 60 dB, depending on where the extension terminates.
- Byrne (2018) reported L_{AFmax} levels of 85 dB at 2 m from the Luas line 18 months following track grinding. On this basis, it can be concluded that night-time L_{AFmax} levels due to light rail movements on Centre Park Road will exceed the 60 dB criterion at facades overlooking the road, and may approach 80 dB. It is possible that the total number of rail movements during the early night and early morning may be higher than the threshold of 10 recommended by ProPG.

Regardless of $L_{Aeq\ 16\ h}$, L_{den} and L_{night} levels, it can be concluded that facades facing Centre Park Road, both directly and obliquely, will be exposed to more than 10 events per night which exceed 60 dB L_{AFmax}. If the proposed bridge is constructed, this conclusion will also extend to the southern and eastern facades.

Night-time L_{AFmax} levels at facades will vary, depending on location within the development, apartment height, and whether the rail and bridge proposals proceed. Data suggest that currently the highest L_{AFmax} levels received will approach 70 dB at facades directly overlooking Centre Park Road. Levels may rise towards 80 dB during light rail passes.

L_{AFmax} levels may be similarly high at facades overlooking the Monahan Road connection to the proposed bridge. It is not possible to accurately predict L_{AFmax} noise levels at façades overlooking the road, as this will be entirely dependent on vehicle characteristics, vehicle speed, road surface treatment, and final road alignment. Based on experience at other sites, it is likely that L_{AFmax} levels received at facades overlooking the road as it skirts the southeast corner of the site will exceed 70 dB, and possibly 75 dB.

The recommended L_{AFmax} noise level internally in bedrooms is 45 dB, based on WHO guidance. On this basis, it will be necessary to provide for a transmission loss of up to 25 dB when specifying glazing with respect to facades overlooking Centre Park Road directly and obliquely. A transmission loss of up to 35 dB will be required to cater for light rail movements. A transmission loss of 30-35 dB will be required at facades overlooking, again directly and obliquely, the proposed Monahan Road extension if the proposed bridge is built.

11.8.2.3.8 Páirc Uí Chaoimh Emissions

Facades at the southeast corner of the proposed development will lie 110 m from the Páirc Uí Chaoimh stadium. Noise emissions arise at the stadium at intervals, with the highest emissions occurring during competitive games, typically Sunday afternoons, and from infrequent music concerts. Given that concerts occur rarely, they may be omitted here.

Information provided in Páirc Uí Chaoimh Stadium Redevelopment and Centre of Excellence Environmental Impact Statement (Malachy Walsh and Partners, 2014), available on the public planning file, indicates that the stadium typically hosts 20-40 games each year, with an average of two games per year with more than 15,000 in attendance. Predictive modelling included in the EIS shows that noise emissions from use of all-weather pitches at the complex are insignificant at offsite locations, including the proposed development site.

No information is available with respect to noise levels from large attendance games at Páirc Uí Chaoimh. Information presented in literature suggests that the typical sound pressure level over a two-hour game is approximately 90 dB L_{Aeq} T in the stadium. This figure may be used to estimate sound pressure levels at the nearest residential facades of the proposed development during such games. The predictive model was modified to include a planar source (in the horizontal plane) 10 m above pitch level. No information is available regarding the likely sound power level required to give rise to a stadium sound pressure level of 90 dB. For modelling purposes, an estimated sound power level of 120 dB is applied. As octave band data are unavailable, a broadband spectrum with greatest energy in the 500-2000 Hz range was assumed, corresponding to the human vocal range.

$L_{Aeq\ 1\ h}$ contours during a large game are shown in Figure 11.34. $L_{Aeq\ 1\ h}$ levels at the nearest façade of the proposed development will be 51-52 dB, varying with height. $L_{Aeq\ 16\ h}$ levels will increase by 0-1 dB (over scenario 1 levels) at the nearest facades on such days. These levels will not be excessive at the proposed development and will not alter the noise risk status of the site.

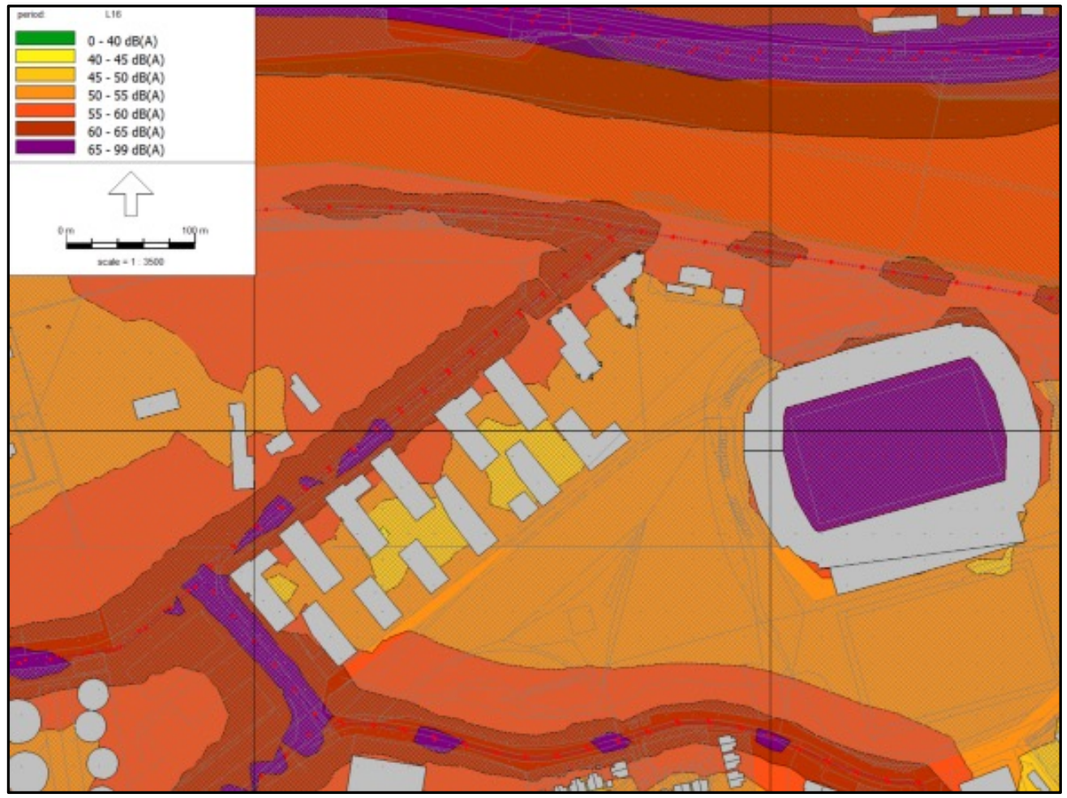

Figure 11.34 $L_{Aeq\ 1\ h}$ Contours During High Attendance Páirc Uí Chaoimh Fixture, with Scenario 1 Traffic Included

11.8.2.3.9 ProPG Assessment

Stage 1: Risk Assessment

It has been concluded above that current noise levels across the proposed development site render the site a low noise risk with respect to inward noise levels. Increases in road traffic in the design year 2041 will result in a minimal change in noise levels, and thus the site will continue to achieve low risk status in the future. Scenario 2 (Monahan Road extension) and Scenario 4 (light rail project) will also see minimal change. Further extension of Monahan Road to incorporate the proposed Eastern Gateway Bridge (scenario 3) will increase façade noise levels at east- and south-facing facades, although the noise risk will remain low.

The number of night-time L_{AFmax} events above 60 dB is likely to exceed 10 at facades overlooking Centre Park Road. Construction of the proposed bridge will see a similar scenario apply at east- and south-facing facades.

Stage 2: Element 1 – Good Acoustic Design Process

Given the site's low noise risk, acoustic design is not a critical feature of the proposed development. However, several acoustic features have been incorporated in the design as follows:

- A number of facades will face internally into the site, or southwest towards the adjacent SHD site, and will not directly overlook roads.
- Block A will not include any bedrooms which directly overlook Centre Park Road or the Monahan Road extension.
- The southern point of Block B, which will represent the closest point to the proposed Monahan Road extension, will also not include any bedrooms.
- The internal site area will incorporate a number of landscaped features, including trees, to soften the soundscape, both acoustically and psychologically.
- The development includes considerable bicycle storage facilities, thus reducing onsite and local car movements.

Stage 2: Element 2 – Internal Noise Level Guidelines

Internal noise levels recommended by ProPG and BS 8233:2014 are presented in Table 11.48, in addition to conclusions resulting from predictive modelling. The lower 35 dB L_{Aeq} 16 h criterion is applied.

Table 11.48 ProPG assessment – Internal noise levels.

PARAMETER	CRITERION	ASSESSMENT	TRANSMISSION LOSS REQUIRED
$L_{Aeq\ 16\ h}$	35 dB	External levels will be reach 59 dB at facades overlooking Centre Park Road. Levels will be up to 11 dB lower on S facades in scenario 1. The proposed bridge will increase S façade levels to 57 dB.	Up to 24 dB on N facades. Similar loss required on S facades if proposed bridge is built.
L_{night}	30 dB	External levels will be 52 dB at NW facades during scenario 1, increasing to 53 dB if the light rail project is constructed. Levels at other facades will be lower, unless the proposed bridge is constructed, in which case levels at S and E facades will increase to 50 dB.	Up to 23 dB on NW façade, and up to 20 dB on S facades if bridge is constructed.
L_{AFmax}	45 dB	Facades overlooking Centre Park Road will receive levels approaching 70 dB, and possibly approaching 80 dB if the light rail is built. Levels at other facades will be lower, unless the bridge is constructed, which may see levels possibly exceed 75 dB.	25 dB currently required at facades overlooking Centre Park Road, increasing to 35 dB if the light rail project is built. At least 30 dB required on S facades to provide for the bridge project, with 35 dB recommended.

On the basis of the table, attenuation requirements will be dictated by L_{AFmax} levels rather than $L_{Aeq\ 16\ h}$ or L_{night} levels. Achievement of compliance with internal L_{AFmax} levels during night-time hours will guarantee compliance with $L_{Aeq\ 16\ h}$ and L_{night} criteria. The transmission loss required will be as follows:

- 25 dB at bedrooms at all facades if none of the identified infrastructure projects is constructed.
- 35 dB at bedrooms on facades directly overlooking Centre Park Road if the proposed light rail project is constructed. This will also apply to facades obliquely overlooking the road, extending at least 50 m into the site.
- 30-35 dB (35 dB recommended) at bedrooms on facades overlooking the proposed Monahan Road extension if the bridge is constructed. This will apply to facades facing south, southeast, east and northeast (numbered 4, 5, 11, 12, 13, 14, and 15 in Figure 11.21 above). If the bridge is not constructed, the Monahan Road extension alone is unlikely to warrant high transmission loss, unless the road will see free-flowing through traffic to The Marina.
- If the proposed light rail and bridge extension are constructed, it is advisable that a 35 dB transmission loss be applied to bedrooms on all facades across the site.
- With respect to living/dining spaces, a transmission loss of 25 dB will be sufficient.

Transmission of noise from the exterior to the interior is greatest through windows, doors and ventilation openings. Where a reduction of 35 dB is required, glazing with a minimum RW value of 35 dB will be required, to be selected at the time of construction. If the light rail and bridge projects do not proceed, glazing with a RW value of 25 dB will suffice. The 35 dB requirement may be considerably relaxed if a decision is taken to apply L_{Aeq} 16 h and L_{night} criteria rather than L_{AFmax} criteria.

Stage 2: Element 3 – External Amenity Area Noise Assessment

ProPG recommends that $L_{Aeq\ 16\ h}$ levels should ideally not exceed 50-55 dB in external amenity areas. In this case, external areas include balconies and terraces. At balconies overlooking Centre Park Road, $L_{Aeq\ 16\ h}$ levels will reach 59 dB, regardless of whether the light rail project proceeds or not. Levels at other balconies deeper in the site will in general not exceed the 55 dB criterion, although will in most cases exceed 50 dB. Completion of the Monahan Road extension and bridge projects will chiefly affect balconies at the southeast corner of Block A, where received $L_{Aeq\ 16\ h}$ levels will increase from 49 to 55 dB.

ProPG notes that, where $L_{Aeq\ 16\ h}$ levels exceed 50-55 dB, residents may benefit from access to nearby external areas where levels are less than this range. Such areas will be provided on the development site itself. In addition, residents will have access to Marina Park, which will constitute the largest park in the city. On this basis, external noise levels will be satisfactory.

Stage 2: Element 4 – Assessment of Other Relevant Issues

Other issues assessed, as recommended by ProPG, include the following:

- Compliance with relevant national and local policy: The most relevant policies are those set out in the Cork Agglomeration Draft Noise Action Plan 2024-2028 which refers to the following threshold values for the assessment of harmful effects of road traffic noise: 53 dB L_{den} and 45 dB L_{night}. L_{den} and L_{night} levels along the Centre Park Road boundary currently exceed these criteria by 2-4 dB. Levels across the site are however considerably lower than mitigation action values indicated in the previous Noise Action Plan. In future years, it is expected that the local authority will implement measures to reduce road traffic noise levels across the city, including in the vicinity of the proposed development site. Such measures ae likely to include reduced traffic speeds and quieter road surfaces. This will benefit the proposed development. The proposed development, in itself, will not affect local L_{den} or L_{night} levels, or future ability to achieve compliance with the targets set out in the current Noise Action Plan.
- Magnitude and extend of compliance with ProPG: $L_{Aeq\ 16\ h}$ and L_{night} levels across the site will meet identified criteria without specific acoustic mitigation measures, and standard thermal glazing will be sufficient to achieve compliance with these criteria. The requirement for enhanced glazing and ventilation relates to night-time L_{AFmax} levels due to passing road traffic, and future road and rail traffic.
- Likely occupants of the development: The proposed development is expected to be occupied by a typical sample of the population, and is unlikely to see a predominance of one particularly sensitive group.
- Acoustic design versus unintended adverse consequences: No adverse consequences have been identified.
- Acoustic design versus wider planning objectives: No issues have been identified

One additional item requires consideration here: noise levels at the proposed creche at podium level of Block B. At the proposed creche, incident $L_{Aeq\ 16\ h}$ levels at the north-facing and northwest-facing façades are currently 57 dB,

reducing to 54 dB in the vicinity of the northeast point of Block B. $L_{Aeq\ 30\ min}$ levels are currently 57-59 at the northern façade, reducing to 50-55 dB away from the road. Based on current noise levels, standard construction materials and design, including thermal glazing, will reduce internal $L_{Aeq\ 30\ min}$ levels in all creche rooms below the 35 dB criterion recommended by TGD-021-5. If ventilation other than mechanical ventilation is proposed, consideration will need to be given to acoustic vents at all facades of the proposed creche.

The output from modelled scenarios 2, 3 and 4 described above was used to determine if enhanced glazing will be required at the proposed creche in the event that the Monahan Road extension, bridge and light rail projects proceed in the future. The results indicate that the road extension and light rail projects will not alter incident noise levels at the creche facades. In contrast, the proposed bridge will result in an increase of 2 dB in $L_{Aeq\ T}$ levels received at the east-facing and southeast-facing facades. The increase will, however, not introduce a requirement for enhanced glazing on these facades, and standard thermal glazing will comfortably achieve compliance with the internal 35 dB criterion.

11.8.3 Cumulative Effects

The proposed development will not give rise to operational noise emissions audible at any receptor, and thus cumulative operational noise effects will not arise. Potential cumulative noise effects relate solely to construction works, which may overlap with other construction projects. Construction projects of potential cumulative significance are as follows:

- Adjacent SHD site.
- Monahan Road extension.
- Eastern Gateway Bridge.
- Light rail project.
- Tedcastles residential development.

Potential cumulative impacts associated with these are assessed in Section 11.8.1.6 above. While a number of other projects are included in the cumulative project list, none of these will give rise to cumulative impacts at receptors in the vicinity of the Proposed Development due to (a) their small scale or (b) large separation distance.

11.8.4 Summary

11.8.4.1 Construction Phase

The following table summarises the identified likely significant effects during the construction phase of the proposed development before mitigation measures are applied.

Table 11.49 Summary of Construction Phase Likely Effects in the Absence of Mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Noise effects at existing offsite receptors	Neutral to adverse	Imperceptible to not significant	Low	Effects unlikely	Short term	Direct and cumulative
Noise effects at SHD apartments overlooking site	Adverse	Imperceptible to very significant	Low	Effects likely	Short term	Direct and cumulative
Traffic effects at offsite receptors	Neutral	Imperceptible	Low	Effects unlikely	Short term	Direct and cumulative
Vibration effects at offsite receptors	Neutral	Imperceptible	Low	Effects unlikely	Short term	Direct only

11.8.4.2 Operational Phase

The following table summarises the identified likely significant effects during the operational phase of the proposed development before mitigation measures are applied.

Table 11.50 Summary of Operational Phase Likely Effects in the Absence of Mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Noise effects at offsite receptors	Neutral	Imperceptible	Low	Effects unlikely	Permanent	Direct only
Traffic effects at offsite receptors	Neutral	Imperceptible	Low	Effects unlikely	Permanent	Direct only
Vibration effects at offsite receptors	Neutral	Imperceptible	Low	Effects unlikely	Permanent	Direct only

11.9 Mitigation Measures

11.9.1 Construction Phase Mitigation

The applicant proposes to apply the following mitigation measures throughout the construction phase:

- Construction operations will in general be confined to the period Monday-Friday 0700-1900 h, and Saturday 0700-1400 h.
- Where it is proposed to operate plant during the period 0700-0800 h, standard 'beeper' reversing alarms will be replaced with flat spectrum alarms.
- Hooting will be prohibited onsite. Drivers of plant and vehicles will be instructed to avoid hooting at all times while onsite.
- Plant used onsite during the construction phase will be maintained in a satisfactory condition and in accordance with manufacturer recommendations. In particular, exhaust silencers will be fitted and operating correctly at all times. Defective silencers will be immediately replaced.
- Machinery not in active use will be shut down.
- A site representative will be appointed as a liaison officer with the local community.
- Where evening or night-time operations are required, local residents will be notified through the liaison officer.
- All complaints of noise received during the construction phase will be logged in a register, and investigated immediately. Details of follow-up action will be included in the register.
- Where it is proposed to import potentially noisy plant to the site, the potential effect of noise emissions will be assessed in advance.
- Guidance set out in British Standard BS 5228:2009 with respect to noise control will be applied throughout the construction phase.

The only situation where the 70 dB NRA construction phase noise criterion will be exceeded at any receptor is where construction works at the proposed development coincide with road surface breaking works in relation to the proposed light rail project. The criterion will be exceeded at SHD receptors directly overlooking the proposed development site. If these receptors are occupied by the time construction works commence, it will be necessary to ensure that construction scenarios 1, 2, 3 and 5 at the proposed development site do not coincide with ground breaking works outside the boundary.

Similarly, it will be necessary to avoid overlap of piling works at the proposed development site with similar works at the Tedcastles site in order to ensure that combined noise levels at occupied SHD apartments overlooking the proposed development site do not exceed the 70 dB NRA criterion. This requirement only applies if these apartments will be complete and occupied, and only where there is a risk of piling works coinciding at both sites.

11.9.2 Operational Phase Mitigation

The completed development will not give rise to noise or vibration emissions at offsite receptors, and no mitigation requirements have been identified in this regard. Operational phase mitigation required onsite relates solely to inward impacts associated with local road traffic and potential light rail noise.

Wall and roof structures will be sufficiently robust. Such structures will not require any additional treatment with respect to noise. It follows that the chief onsite elements of concern here are windows and ventilation openings, which represent the weakest link in building facades. A requirement to install acoustic grade windows at certain facades has been identified, as follows:

- If none of the identified infrastructure projects is constructed, standard thermal glazing will be sufficient at all facades, including facades overlooking Centre Park Road.
- If the proposed light rail project is constructed, it will be necessary to install enhanced glazing at bedrooms on facades directly and obliquely overlooking Centre Park Road. The required transmission loss is 35 dB.
- Similarly, a transmission loss of 30-35 dB is required at bedrooms on facades overlooking the proposed Monahan Road extension if the bridge is constructed.
- If the proposed light rail and bridge extension are constructed, it is advisable that a 35 dB transmission loss be applied to bedrooms on all facades across the site.
- With respect to living/dining spaces, a transmission loss of 25 dB will be sufficient.
- Standard thermal glazing will be sufficient at the proposed creche, including where all of the identified offsite infrastructure projects proceed.

Where a reduction of 35 dB is required, bedroom glazing with a minimum RW value of 35 dB will be required, to be selected at the time of construction. Standard thermal glazing will be sufficient in bedrooms where a reduction of 25 dB is required. Standard glazing will in any case suffice for living/dining spaces, bathrooms and common areas.

In selecting glazing, R values in each octave band are of greater importance than overall or average RW, and glazing should be optimised for road traffic (road and rail on Centre Park Road facades if the light rail project proceeds).

Where non-mechanical ventilation is proposed, it is recommended that all facades affected by Centre Park Road noise, as well as all creche facades, be fitted with acoustic grade vents. Bedroom vents will be required to achieve a transmission loss of 35 dB where the proposed light rail is constructed. These should also be installed on other facades in the event that the proposed bridge is constructed.

Plant installed in the basement, as well as vents associated with retail/restaurant and childcare facility extraction systems, will be designed, selected and installed so as to ensure that external emissions are not audible beyond 5 m.

11.10 Residual Effect Assessment

This section assesses potential significant environmental effects which remain after mitigation measures are implemented.

11.10.1 Construction Phase

11.10.1.1 Noise

At existing receptors to the north and south, $L_{Aeq\ 1\ h}$ levels throughout the construction phase will be considerably lower than the 65 dB criterion recommended by BS 5228:2009, as well as the 70 dB NRA criterion. Effects at these receptors will be imperceptible to not significant.

If apartments at the nearest blocks of the adjacent SHD site are occupied at the time of construction, they will constitute noise sensitive receptors. $L_{Aeq\ 1\ h}$ levels received at SHD apartments overlooking the site will reach a maximum of 70 dB due to proximity of plant at the proposed development site. Although levels will exceed the 65 dB BS 5228:2009 criterion, levels are not expected to exceed the 70 dB NRA criterion. Effects at these apartments will range from imperceptible to very significant, depending on construction stage. It should be noted that moderate, significant and very significant effects will arise only at apartments directly overlooking the proposed development site, and only during certain temporary construction works stages.

Construction traffic noise effects will be imperceptible. Effects are summarised in Table 11.51.

Table 11.51 Summary of Construction Phase Likely Noise Effects

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Noise effects at existing receptors	Neutral to adverse	Imperceptible to not significant	Low	Effects unlikely	Short term	Direct and cumulative
Noise effects at SHD apartments overlooking site	Adverse	Imperceptible to very significant	Low	Effects likely	Short term	Direct and cumulative
Traffic effects at all receptors	Neutral	Imperceptible	Low	Effects unlikely	Short term	Direct and cumulative
Vibration effects at offsite receptors	Neutral	Imperceptible	Low	Effects unlikely	Short term	Direct only

11.10.1.2 Vibration

Construction operations are not expected to give rise to offsite groundborne vibration, and PPV levels are highly unlikely to approach identified criteria. Effects are summarised in Table 11.52.

Table 11.52 Summary of Construction Phase Likely Vibration Effects

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Vibration effects at all receptors	Neutral	Imperceptible	Low	Effects unlikely	Short term	Direct and cumulative

11.10.2 Operational Phase

11.10.2.1 Noise

No effects are expected with respect to noise emissions associated with commercial elements of the proposed development, such as air management systems and deliveries. The applicant's obligation to provide a satisfactory environment for onsite residents will ensure that suitable measures are incorporated at final design and construction stage, thus also benefitting offsite receptors.

An assessment of traffic indicates that traffic volumes will increase locally as a result of the proposed development. The traffic increase will generate noise increases of less than 1 dB. Traffic noise effects attributable to the proposed development will be imperceptible.

With respect to ProPG, the proposed development site is a low noise risk, and this is expected to continue into the future. The proposed Monahan Road extension and light rail project will result in minimal change, apart from a potential increase in night-time L_{AFmax} levels due to tram movements. In contrast, further extension of Monahan Road to incorporate the proposed Eastern Gateway Bridge will increase noise levels at facades facing the road and bridge, although the noise risk will remain low.

The number of night-time L_{AFmax} events above 60 dB is likely to exceed 10 on facades overlooking Centre Park Road. This will also apply to east- and south-facing facades if the proposed bridge is completed.

While external L_{Aeq} 16 h levels on some balconies will exceed the 50-55 dB recommendation given in ProPG, residents will benefit from close proximity of tranquil external areas in the surrounding area, particularly the adjacent Marina Park.

Although sports fixtures at Páirc Uí Chaoimh will give rise to elevated noise levels locally over short periods, $L_{Aeq\ 16\ h}$ and L_{den} levels will remain below relevant criteria. Music concert events are not sufficiently frequent to be an issue, although levels at the southeast corner of the proposed development are likely to be elevated during any concerts.

Operational phase environmental effects are assessed in Table 11.53. The assessment scheme is not applicable to inward impacts, which are assessed separately through the ProPG procedure set out above.

Table 11.53 Summary of Operational Phase Likely Noise Effects

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Noise effects at all offsite receptors	Neutral	Imperceptible	Low	Effects unlikely	Permanent	Direct only

11.10.2.2 Vibration

Operational phase vibration effects are assessed in Table 11.54. No effects are expected.

Table 11.54 Summary of Operational Phase Likely Vibration Effects

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Vibration effects at all offsite receptors	Neutral	Imperceptible	Low	Effects unlikely	Permanent	Direct only

11.10.3 Cumulative Residual Effects

No cumulative residual effects have been identified in relation to the operational phase of the development. Potential cumulative effects have been identified only in relation to the construction phase, and only in relation to SHD receptors where construction works overlap with construction of the proposed light rail project and Tedcastles projects. Depending on the construction stage of these projects, noise effects may range from imperceptible to very significant.

11.11 Risk of Major Accidents or Disasters

The existing and future soundscape at the proposed development site is not vulnerable to any potential accidents or disasters, apart from short term incidents such as road traffic collisions, or incidents across the surrounding docklands. None of the mitigation measures identified above is likely to fail or to be vulnerable to accidents or disasters.

11.12 Worst Case Scenario

Construction and operational phase effects assessed above relate to identified worst case scenarios. No other potential worst case scenarios have been identified.

11.13 Interactions

No interactive effects have been identified. While the proposed development will give rise to an increase in road traffic on surrounding roads, the resulting noise level increase will be less than 1 dB, and therefore imperceptible. On this basis, noise effects at receptors will also be imperceptible.

With increased traffic movements, the noise levels in the surrounding area increase. The impacts of the proposed development on the noise environment are assessed by reviewing the change in traffic flows on roads close to the site. In this assessment, the impact of the interactions between traffic and noise are considered to be not significant, long term and imperceptible due to the low-level changes in traffic flows associated with the proposed development.

11.14 Monitoring

It is not considered necessary to undertake environmental noise monitoring during the construction phase or post-completion. The nearest receptors are sufficiently distant that construction phase noise monitoring is not warranted.

Given the proximity of Páirc Uí Chaoimh to proposed onsite piling zones, it is recommended that vibration monitoring is undertaken at the stadium throughout periods of piling, subject to agreement with the Gaelic Athletic Association. This also applies to the Lee Rowing Club premises outside the northeast corner of the site, and to adjacent blocks at the SHD scheme outside the southwest boundary, if constructed ahead of the proposed development.

The purpose of the monitoring will be to ensure that PPV levels do not exceed Table 11.6 or 11.7 criteria at the stadium, rowing club or SHD structures. Monitoring should be carried out by reference to British Standard BS 5228-2:2009 and the Association of Noise Consultants document Measurement and Assessment of Groundborne Noise and Vibration (2012).

11.15 Conclusion

The assessment of effects on human health is typically undertaken by reference to WHO guidance, which has been revised over the last four decades according as noise and health studies have been published. The WHO currently recommends the following:

- In residential settings, a daytime/evening $L_{Aeq\ 16\ h}$ level of 50 dB is an indicator of moderate annoyance.
- A night-time $L_{Aeq\ 8\ h}$ level of 45 dB is recommended to prevent sleep disturbance.
- With respect to short term impulsive sources, the WHO recommends a night-time L_{AFmax} limit of 60 dB outside bedroom windows during night-time hours.

Effects assessed above may be reviewed in light of the WHO recommendations. It is highly unlikely that construction activities will result in $L_{Aeq\ 16\ h}$ levels above 50 dB at any offsite receptor, although this level may be exceeded at apartments at the adjacent SHD site if completed and occupied by the time construction commences at the proposed development site. The night-time WHO $L_{Aeq\ 8\ h}$ and L_{AFmax} criteria are unlikely to be exceeded at any receptor during the construction phase, as night-time construction works are not envisaged. No operational phase effects will arise at receptors.

With respect to inward impacts, external noise levels may exceed WHO criteria at certain facades. However, residents will have access to tranquil positions within the site and at the adjacent Marina Park. While night-time L_{AFmax} levels are likely to exceed 60 dB at units overlooking surrounding roads, specified glazing and vents will reduce internal L_{AFmax} levels below 45 dB, and thus internal noise levels will meet WHO criteria.

On this basis, it is considered that there will be no adverse noise effects on the local population or on human health, subject to the mitigation measures discussed above.

11.16 References and Sources

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British Standard BS 7385-2:1993 Evaluation and Measurement for Vibration in Buildings – Part 2: Guide to Damage Levels from Ground Borne Vibration (BSI, 1993).

International Standard ISO 9613-2:1996 Acoustics – Attenuation of Sound during Propagation Outdoors, Part 2: General Method of Calculation (ISO, 1996).

Guidelines on Community Noise (WHO, 1999).

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Night Noise Guidelines for Europe (WHO, 2009).

Measurement and Assessment of Groundborne Noise and Vibration (Association of Noise Consultants, 2012).

British Standard BS 5228-1:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 1: Noise (BSI, 2014).

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Guidelines for Environmental Noise Impact Assessment (Institute of Environmental Management and Assessment, 2014).

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Páirc Uí Chaoimh Stadium Redevelopment and Centre of Excellence Environmental Impact Statement (Malachy Walsh and Partners, 2014).

NG4 Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (EPA, 2016).

International Standard ISO 1996-2:2017 Acoustics – Description, Measurement and Assessment of Environmental Noise, Part 2: Determination of Environmental Noise Levels (ISO, 2017).

ProPg Planning & Noise: Professional Practice Guidance on Planning and Noise – New Residential Development (Association of Noise Consultants, Institute of Acoustics and Chartered Institute of Environmental Health, 2017).

Environmental Noise Guidelines For The European Region (WHO, 2018).

Reductions In Environmental Noise Emissions From Dublin's Light Rail System Following A Rail Grinding Campaign (Byrne, S., in Proceedings of Euronoise 2018).

British Standard BS 4142:2014+A1:2019 Methods for Rating and Assessing Industrial and Commercial Sound (BSI, 2019).

Design Manual for Roads and Bridges – LA111: Noise and Vibration (UK Highway Agency, 2020).

Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2022).

Cork Agglomeration Draft Noise Action Plan 2024-2028 (Cork City Council and Cork County Council, 2024).

11.17 Glossary

Ambient Total noise environment at a location, including all sounds present.

A-weighting Weighting or adjustment applied to sound level to approximate non-linear frequency response of human ear. Denoted by suffix A in parameters such as $L_{Aeq\,T}$, $L_{AF10\,T}$, etc.

Background level A-weighted sound pressure level of residual noise exceeded for 90 % of time interval T. Denoted $L_{AF90\,T}$.

Decibel (dB) Unit of noise measurement scale. Based on logarithmic scale so cannot be simply added or subtracted. 3 dB difference is smallest change perceptible to human ear. 10 dB difference is perceived as doubling or halving of sound level. Examples of decibel levels are as follows: 20 dB: very quiet room; 30-35 dB: night-time rural environment; 55-65 dB: conversation; 80 dB: busy pub; 100 dB: nightclub. Throughout this report noise levels are presented as decibels relative to 20 µPa.

Effect Consequence of an impact.

Emissions Noise originating from source under consideration, spreading spherically, hemispherically or otherwise into surrounding environment.

Fast response 0.125 seconds response time of sound level meter to changing noise levels. Denoted by suffix F in parameters such as $L_{AF10\,T,\ LAF90\,T}$, etc.

Frequency Number of cycles per second of a sound or vibration wave. Low frequency noise may be perceived as hum, while whine represents higher frequency. Range of human hearing approaches 20-20,000 Hertz.

Hertz (Hz) Unit of frequency measurement.

Immissions Noise received at a receptor, as a result of emissions arising from elsewhere.

Effect Change resulting from an action, such as implementation of a project.

Impulse Noise which is of short duration, typically less than one second, sound pressure level of which is significantly higher than background.

Interval Time period T over which noise parameters are measured at position. Denoted by T in $L_{Aeq\,T,}$ $L_{AF90\,T}$, etc.

L_{AE} A-weighted sound exposure level. Measure of noise level of an event, standardised to interval of one second, and containing same acoustic energy as actual event.

$L_{Aeq\,T}$ Equivalent continuous sound pressure level during interval T, effectively representing average A-weighted noise level of ambient noise environment.

$L_{AF10\,T}$ A-weighted sound pressure level exceeded for 10% of interval T, usually used to quantify traffic noise.

$L_{AF90\,T}$ A-weighted sound pressure level exceeded for 90% of interval T, usually used to quantify background noise. May also be used to describe noise level from continuous steady or almost-steady source, particularly where local noise environment fluctuates.

L_{AFmax}	Maximum A-weighted sound pressure level occurring during measurement interval.
L_{day}	A-weighted long term average incident sound pressure level determined over all daytime periods of a year, where daytime is typically 0700-1900 h.
L_{den}	Day-evening-night noise level. Calculated from separate L_{day}, $L_{evening}$ and L_{night} levels using formula specified in EU Directive 2002/49/EC.
$L_{evening}$	A-weighted long term average incident sound pressure level determined over all evening periods of a year, where evening is typically 1900-2300 h.
L_{night}	A-weighted long term average incident sound pressure level determined over all night-time periods of a year, where night-time is typically 2300-0700 h.
L_{WA}	A-weighted sound power level generated by source due to conversion of work energy into noise energy.
Noise sensitive location	Any dwelling house, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other facility or area of high amenity which for its proper enjoyment requires absence of noise at nuisance levels.
1/3 octave band	Frequency spectrum may be divided into octave bands. Upper limit of each octave is twice lower limit. Each octave may be subdivided into thirds, allowing greater analysis of tones.
Peak particle velocity (PPV)	Rate of change of displacement of particles in solid medium due to vibration, measured as mm/s. Usually used to assess vibration in relation to activities such as blasting as correlates well with human perception of vibration and property damage.
Residual level	Noise level remaining when specific source is absent or does not contribute to ambient.
RW	Overall sound reduction index provided across a range of frequencies, determined from laboratory measured sound insulating properties of material or building element in each frequency band.
Sound pressure	Deviation over ambient atmospheric pressure due to passing sound wave. Human ear is sound pressure detector, and thus acoustic parameters ultimately relate to sound pressure. Sound pressure level is ratio of measured sound pressure to reference value.
Soundscape	Acoustic environment as perceived, experienced or understood by listeners, taking context into account.
Specific level	$L_{Aeq\ T}$ level produced by specific noise source under consideration during interval T, measured directly or by estimation or calculation.
Tone	Character of noise caused by dominance of one or more frequencies which may result in increased noise nuisance.
Z-weighting	Standard weighting applied by sound level meters to represent linear scale. Denoted by suffix Z in parameters such as LZeq T, LZF90 T, etc. Typically used to describe spectral band levels.

VOLUME II

CHAPTER 12

Air Quality

McCutcheon Halley
CHARTERED PLANNING CONSULTANTS

CHAPTER TWELVE
Table of Contents

CHAPTER TWELVE
Table of Figures

CHAPTER TWELVE
Table of Tables

Chapter Twelve | Air Quality

12.1 Introduction

This chapter of the EIAR was prepared to assess the potential significant effects of the proposed development on air quality.

Taking into account Ambient Air Quality Standards , the baseline air quality was examined along with the potential for release of emissions to the atmosphere and associated effects prior to and following mitigation measures.

It should be read in conjunction with the Population and Human Health, Land and Soils, Biodiversity and Traffic Chapters of this EIAR.

12.1.1 Ambient Air Quality Standards

For the protection of health and ecosystems, EU directives apply air quality standards in Ireland and other EU member states for a range of pollutants. These rules include requirements for monitoring, assessment and management of ambient air quality. The first major instrument in tackling air pollution was the Air Quality Framework Directive 96/62/EC and its four daughter Directives. Each of these instruments was repealed with the introduction of Directive 2008/50/EC on ambient air quality and cleaner air for Europe in 2008 (as amended by Decision 2011/850/EU and Directive 2015/1480/EC) (the "CAFE Directive"), save for the "Fourth Daughter Directive" (Directive 2004/107/EC relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air).

The CAFE Directive lays down measures aimed at:

1. Defining and establishing objectives for ambient air quality designed to avoid, prevent or reduce harmful effects on human health and the environment as a whole;
2. Assessing the ambient air quality in Member States on the basis of common methods and criteria and, in particular, assessing concentrations in ambient air of certain pollutants;
3. Providing information on ambient air quality in order to help combat pollution and nuisance and to monitor long-term trends and improvements resulting from national and Community measures;
4. Ensuring that such information on ambient air quality is made available to the public;
5. Promoting increased cooperation between Member States in reducing air pollution.

Ambient air quality monitoring and assessment in Ireland is carried out in accordance with the requirements of the CAFE Directive. The CAFE Directive has been transposed into Irish legislation by the Air Quality Standards Regulations (S.I. No. 180 of 2011). The CAFE Directive requires EU member states to designate 'Zones' reflective of population density for the purpose of managing air quality. Four zones were defined in the Air Quality Standards Regulations (2011) and subsequently amended in 2013 to account for 2011 census population counts and to align with coal restricted areas in the Air Pollution Act (Marketing, Sale, Distribution and Burning of Specified Fuels) Regulations 2012. (S.I. No. 326 of 2012) (the 2012 Regulations).

The main areas defined in each zone are:

- **Zone A:** Dublin Conurbation
- **Zone B:** Cork Conurbation
- **Zone C:** Other cities and large towns comprising Limerick, Galway, Waterford, Drogheda, Dundalk, Bray, Navan, Ennis, Tralee, Kilkenny, Carlow, Naas, Sligo, Newbridge, Mullingar, Wexford, Letterkenny, Athlone, Celbridge, Clonmel, Balbriggan, Greystones, Leixlip and Portlaoise.
- **Zone D:** Rural Ireland, i.e., the remainder of the State excluding Zones A, B and C.

The site is located at the Former Ford Distribution Site, Centre Park Road, Ballintemple, Co. Cork and falls under the 'Zone B' category based on the Air Quality Standards Regulations.

The CAFE Directive outlines certain limit or target values specified by the five published directives that apply limits to specific air pollutants. These limits, outlined in Table 12-1, will be referred to as part of the proposed development assessment with respect to air quality.

Table 12 1 Limit Values of Cleaner Air for Europe (CAFE) Directive 2008/50/EC (Source: EPA 2020)

POLLUTANT	LIMIT VALUE OBJECTIVE	AVERAGING PERIOD	LIMIT VALUE MG/M^3	LIMIT VALUE PPB	BASIS OF APPLICATION OF THE LIMIT VALUE	LIMIT VALUE ATTAINMENT DATE
SO_2	Protection of Human Health	1 hour	350	132	Not to be exceeded more than 3 times in a calendar year	1 Jan 2005
SO_2		24 hours	125	47	Not to be exceeded more than 3 times in a calendar year	1 Jan 2005
SO_2	Protection of vegetation	Calendar year	20	7.5	Annual mean	19 July 2001
SO_2		1 Oct - 31 Mar	20	7.5	Winter mean	19 July 2001
NO_2	Protection of human health	1 hour	200	105	Not to be exceeded more than 18 times in a calendar year	1 Jan 2010
NO_2		Calendar year	40	21	Annual mean	1 Jan 2010
$NO_2 + NO_2$	Protection of ecosystems	Calendar year	30	16	Annual mean	19 July 2001
PM_{10}	Protection of human health	24 hours	50	-	Not to be exceeded more than 35 times in a calendar year	1 Jan 2005
PM_{10}		Calendar year	40	-	Annual mean	1 Jan 2005
$PM_{2.5}$ – Stage 1		Calendar year	25	-	Annual mean	1 Jan 2015
$PM_{2.5}$ – Stage 2		Calendar year	20	-	Annual mean	1 Jan 2020
Lead		Calendar year	0.5	-	Annual mean	1 Jan 2005
Carbon Monoxide		8 hours	10,000	8,620	Not to be exceeded	1 Jan 2005
Benzene		Calendar year	5	1.5	Annual mean	1 Jan 2010

The EPA is the competent authority for the purpose of the CAFE Directive and is required to send an annual report to the Minister for Environment and the European Commission. The regulations further provide for the distribution of public information. This includes information on any exceedances of target values, the reasons for exceedances, the area(s) in which they occurred, and the relevant information regarding effects on human health and environmental impacts.

On the 14th of October 2024, the European Parliament and the Council adopted a directive setting updated air quality standards across the EU. The directive aims to improve air quality across the EU by aligning standards with the latest World Health Organisation (WHO) guidelines and reducing air pollution's health impacts by more than 55% by 2030. The directive updates and consolidates previous directives (2004/107/EC and 2008/50/EC) to enhance clarity and effectiveness. This plan is part of the boarder European Green Deal, targeting significant reductions in air, water, and soil pollution by 2050. The revised directive will also ensure early action, with air quality roadmaps that need to be prepared ahead of 2030 if there is a risk that the new standards will not be attained by that date. The air quality standards will be reviewed regularly in line with latest scientific evidence to assess whether they continue to be appropriate.

The text will be published in the EU's Official Journal and enter into force on the twentieth day following publication. Member states will have two years after the entry into force to transpose the directive into national law.

By 2030, the European Commission will review the air quality standards and every five years thereafter, in line with latest scientific evidence.

At present, the applicable standards for assessing compliance in relation to air quality are those outlined in Table 12-1.

12.2 Expertise & Qualifications

This chapter of the EIAR has been prepared by Laura Griffin of Enviroguide Consulting.

Laura holds a Master of Science (Hons) degree in Climate Change from Maynooth University and a Bachelor of Arts (Hons) degree in English and Geography from Maynooth University. Laura has been working as an Environmental Consultant with Enviroguide since 2021 and has 5 years of professional experience. Laura has built up experience in EIAs for a range of residential and commercial developments, particularly for LRD (previously SHD) projects in Dublin and across Ireland. Laura's experience includes EIA Screening, EIAR report writing and coordination, Air Quality Assessment Reports, Resource Waste Management Plans and Construction Environmental Management Plans. Laura has been involved in the preparation of EIARs for the following projects:

- Donore Project (St. Teresa's Gardens):
  - Project Description: Residential scheme on a 3.26-hectare site with a net developable area of 2.05 hectares on the former St. Teresa's Gardens, Donore Avenue, Dublin 8.
  - Scale: Residential scheme of 543 no. apartments and crèche.
- Blessington Phase 2 and 3:
  - Project Description: Large Scale-Residential Development and residential led master plan at a c. 25.14-hectare site within the townlands of Blessington Demesne, Newpaddocks and Santryhill, Blessington, Co. Wicklow.
  - Scale: 329 no. residential units and the extension of the Blessington Inner Relief Road (approx. 700m long) from the existing 4-arm roundabout at Blessington Demesne Lands, running northwest of Blessington Business Park, and north of the Woodleigh residential area to a new four-arm roundabout junction on the N81 Dublin Road.
- Athlone LRD:
  - Project Description: 10-year permission for the provision of residential development on lands located within the townlands of Ballkeeran and Cornamaddy, Athlone, Co. Westmeath.
  - Scale: 332 no. residential unit masterplan with a 2-storey crèche.

12.3 Guidance

This chapter has been prepared having regard to the following guidelines:

- Department for Environment, Food and Rural Affairs (DEFRA) (2022) Air Quality Management Technical Guidance LAQM.TG (22);
- EPA Guidelines on the information to be contained in Environmental Impact Assessment Reports 2022;
- European Commission Guidance on the preparation of the Environmental Impact Assessment Report;
- IAQM Guidance on the Assessment of Dust from Demolition and Construction (2024);
- Transport Infrastructure Ireland (2011) Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes; and
- Transport Infrastructure Ireland (2023) GE-GEN-01101: Guide to the Implementation of Sustainability for TII Projects.

12.4 Proposed Development

The proposed development will include the construction of 176 no. 1, 2 and 3 bed apartment units in 2 no. blocks, 1 no. creche, 1 no. gym, a retail/café space and all associated ancillary development works.

12.4.1 Aspects Relevant to this Assessment

12.4.2 Construction Phase

The aspects of the Construction Phase relevant to this chapter are as follows:

- Dust deposition, resulting in the soiling of surfaces;
- Visible dust plumes, which are evidence of dust emissions;
- Elevated PM^{10}, $PM^{2.5}$ concentrations from demolition and construction activities (including earthworks and trackout); and
- An increase in concentrations of PM^{10}, $PM^{2.5}$ and nitrogen dioxide due to exhaust emissions from vehicles and equipment used on site (non-road mobile machinery) and vehicles accessing the site.

12.4.3 Operational Phase

The aspects of the Construction Phase relevant to this chapter are as follows:

- An increase in concentrations of PM^{10}, $PM^{2.5}$ and nitrogen dioxide due to exhaust emissions from vehicles and equipment used on site (non-road mobile machinery) and vehicles accessing the site.

12.5 Methodology

This study methodology is in line with accepted practices. Taking into account Ambient Air Quality Standards, the baseline air quality of the site is examined using EPA monitoring data. Air quality impacts from the proposed development are then determined by a qualitative assessment of the nature and scale of dust and emission generating activities associated with the Construction Phase of the proposed development in accordance with relevant guidance (Institute of Air Quality Management (IAQM) 2024).

Operational phase traffic has the potential to impact local air quality as a result of increased vehicle movements associated with the proposed development. The scoping criteria detailed in 12.5.2 has been used to determine if any road links are affected by the proposed development and require an air quality assessment.

12.5.1 Construction Phase

12.5.1.1 Construction Phase Dust Impact Assessment

The main air quality impacts that may arise during demolition and construction activities are:

- Dust deposition, resulting in the soiling of surfaces;
- Visible dust plumes, which are evidence of dust emissions;
- Elevated PM^{10}, $PM^{2.5}$ concentrations from demolition and construction activities (including earthworks and trackout); and
- An increase in concentrations of $PM^{10,}$ $PM^{2.}5$ and nitrogen dioxide due to exhaust emissions from vehicles and equipment used on site (non-road mobile machinery) and vehicles accessing the site.

As with any impact, the risk will be determined by the magnitude of the source, the effectiveness of the pathway and the sensitivity of the receptor.

The IAQM Guidance on the Assessment of Dust from Demolition and Construction (2024) provides a framework for the assessment of risk.

Activities on construction sites have been divided into four types:

- Demolition;
- Earthworks;
- Construction; and
- Trackout.

The potential for dust emissions is assessed for each activity that is likely to take place.

The assessment methodology considers three separate dust impacts:

- Annoyance due to dust soiling;
- The risk of health impacts due to an increase in exposure to PM^{10}; and
- Harm to ecological receptors with account being taken of the sensitivity of the area that may experience these effects.

The assessment is used to define appropriate mitigation measures to ensure that there will be no significant impact.

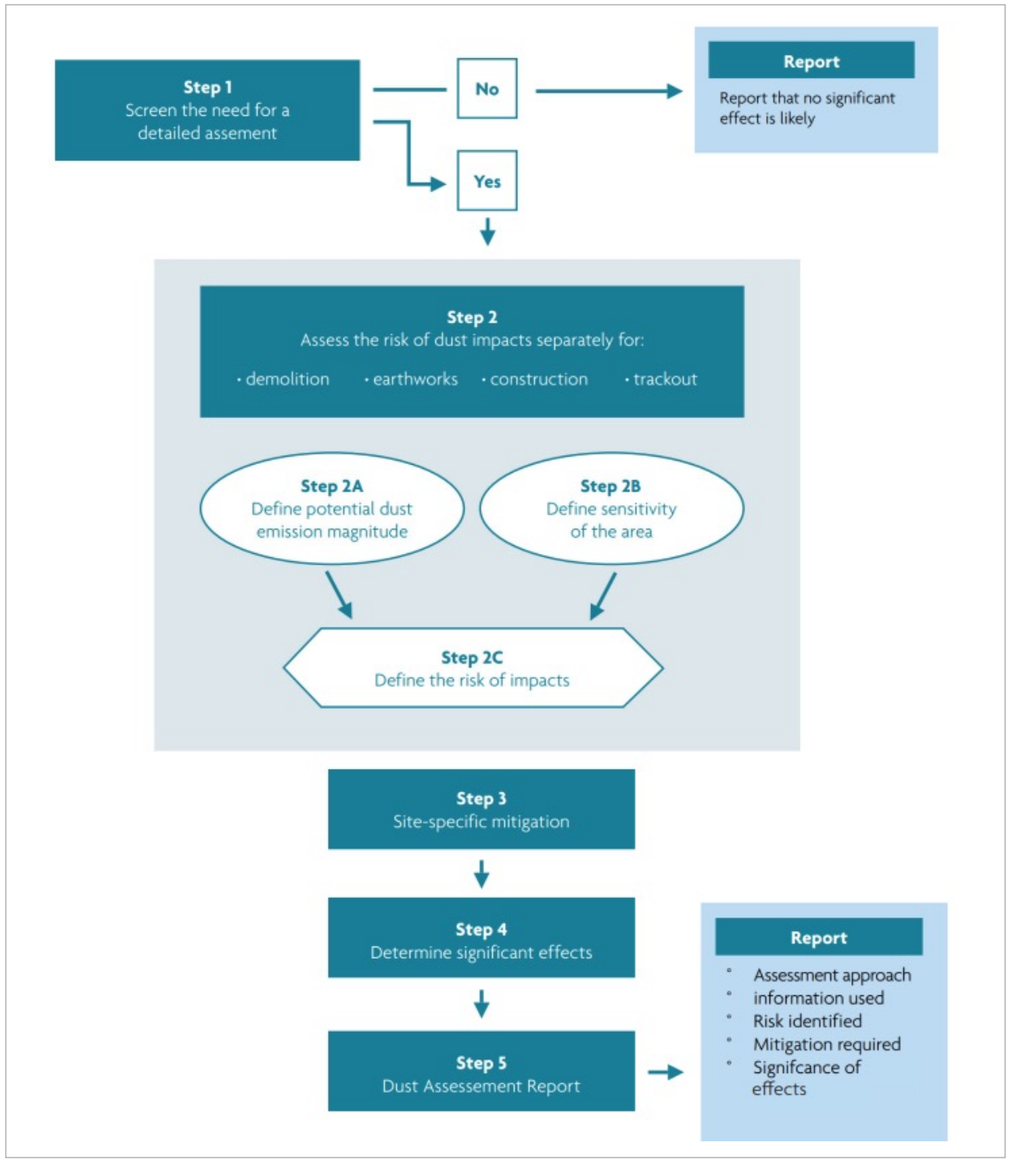

Figure 12 1 Steps to Perform a Dust Assessment (IAQM, 2024)

Step 1 – Screening the Need for a Detailed Assessment

Step 1 is to screen the requirement for a more detailed assessment. An assessment will normally be required where there is:

- A human receptor within:
  - 250m of the boundary of the site; and/or
  - 50m of the route(s) used by the construction vehicles on the public highway, up to 250m from the site entrance(s).
- An 'ecological receptor' within:
  - 50m of the boundary of the site; and/or
  - 50m of the route(s) used by construction vehicles on the public highway, up to 250m from the site entrance(s).

A review of publicly available information indicates that there are no statutory (international or national) ecological receptors within 50m of the site or applicable construction routes. However, there are some green-listed birds possibly breeding in the swamp area adjacent to the site, treelines and therefore, assessment of potential impacts to ecological receptors has been scoped in.

Figure 12 2 Map Showing 20m Buffer from the Site Boundary

Figure 12 3 Map Showing 50m Buffer from the Site Boundary

Figure 12 4 Map Showing 100m Buffer from the Site Boundary

Figure 12 5 Map Showing 250m Buffer from the Site Boundary

Step 2 – Assess the Risk of Dust Impacts

Step 2 is to assess the risk of dust impacts. This is carried out separately for each of the activities; as there is no demolition works proposed as part of the proposed development, the dust impacts are assessed for the remaining three activities (earthworks; construction; and trackout). According to the IAQM (2024), the risk of dust arising in sufficient quantities to cause annoyance and/or ecological impacts should be determined using four risk categories: negligible, low, medium and high. A site is allocated to a risk category based on two factors:

- The scale and nature of the works, which determines the potential dust emission magnitude as small, medium and large (Step 2A); and
- The sensitivity of the area to dust impacts (Step 2B), which is defined as low, medium or high sensitivity.

These two factors are combined in Step 2C to determine the risk of dust impacts with no mitigation applied. The risk category assigned to the site can be different for each of the three potential activities (earthworks, construction and trackout). More than one of these activities may occur on a site at any one time. Risks are described in terms of there being a low, medium and high risk of dust impacts for each of the four separate potential activities. Where there are low, medium and high risks of an impact, then site-specific mitigation will be required, proportionate to the level of risk

Step 2A – Define the Potential Dust Emission Magnitude

The dust emission magnitude is based on the scale of the anticipated works and should be classified as Small, Medium or Large.

Earthworks: Earthworks will primarily involve excavating material, haulage, topping and stockpiling. Activities such as levelling the site and landscaping works are also considered under this category. The dust emission magnitude from earthworks can be classified as small, medium and large based on the definitions from the IAQM guidance:

- Large: Total site area >110,000m^2, potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size), >10 heavy earth moving vehicles active at any one time, formation of bunds >6m in height;
- Medium: Total site area 18,000m^2 – 110,000m^2, moderately dusty soil type (e.g. silt), 5-10 heavy earth moving vehicles active at any one time, formation of bunds 3m – 6m in height; and
- Small: Total site area <18,000m^2, soil type with large grain size (e.g. sand), <5 heavy earth moving vehicles active at any one time, formation of bunds >3m in height.

The site area is 0.845 hectares, however, as a worst-case scenario the dust emission magnitude for the proposed earthwork activities can be classified as medium.

Construction: The key issues when determining the potential dust emission magnitude during the construction phase include the size of the building(s)/infrastructure, method of construction, construction materials, and duration of build. The IAQM example definitions for construction are:

- Large: Total building volume >75,000 m^3, on site concrete batching, sandblasting;
- Medium: Total building volume 12,000 m^3 – 75,000 m^3, potentially dusty construction material (e.g. concrete), on site concrete batching; and
- Small: Total building volume <12,000 m^3, construction material with low potential for dust release (e.g. metal cladding or timber).

As a worst case scenario the proposed development can be classified as large.

Trackout: Factors which determine the dust emission magnitude are vehicle size, vehicle speed, vehicle numbers, geology and duration. As with all other potential sources, professional judgement must be applied when classifying trackout into one of the dust emission magnitude categories. IAQM definitions for trackout are:

- Large: >50 HDV (>3.5t) outward movements[2] in any one day[3], potentially dusty surface material (e.g. high clay content), unpaved road length >100m;

[2] A vehicle movement is a one-way journey, i.e., from A to B, and excludes the return journey.

[3] HDV movements during the construction project vary over its lifetime, and the number of movements is the maximum, not the average.

- Medium: 20-50 HDV (>3.5t) outward movements in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50m – 100m; and
- Small: <20 HDV (3.5t) outward movements in any one day, surface material with low potential for dust release, unpaved road length <50m.

These numbers are for vehicles that leave the site after moving over unpaved ground, where they will accumulate mud and dirt that can be tracked out onto the public highway.

As part of DBFL Consulting Engineers's worst-case assessment during the busiest construction period, the maximum predicted volumes including both 'materials out/collections' and 'materials in/deliveries' is 40 one-way trips over a 12-hour working day. This equates to 80 two-way trips. Therefore, the dust emission magnitude for the proposed trackout activities can be classified as large as a worst-case scenario.

Table 12 2 Dust Emission Magnitude for the Site

ACTIVITY	DUST EMISSION MAGNITUDE
Earthworks	Medium
Construction	Large
Trackout	Large

Step 2B – Define the Sensitivity of the Area

The sensitivity of the area takes account of a number of factors:

- The specific sensitivities of receptors in the area;
- The proximity and number of those receptors;
- In the case of PM10, the local background concentration; and
- Site-specific factors, such as whether there are natural shelters, such as trees, to reduce the risk of wind-blown dust.

Sensitivities of People to Dust Soiling Effects

For the sensitivity of people and their property to soiling, the IAQM (2024) recommends that the air quality practitioner uses professional judgment to identify where on the spectrum between high and low the sensitivity of a receptor lies, taking into account the following general principles set out in Table 12-3.

Table 12 3 Sensitivity of People to Dust Soiling Effects (Source: IAQM, 2024)

SENSITIVITY	FEATURES	DUST EMISSION MAGNITUDE
High	• Users can reasonably expect enjoyment of a high level of amenity; or • The appearance, aesthetics or value of their property would be diminished by soiling; and • The people or property would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of the use of the land.	• Dwellings; • Museums and other culturally important collections; and • Medium and long-term carparks and showrooms
Medium	• Users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home; or • Their appearance, aesthetics or value of their property could be diminished by soiling; or • The people or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land.	• Parks; and • Places of work.
Low	• The enjoyment of amenity would not reasonably be expected; or • Property would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling; or • There is a transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use for the land.	• Playing fields; • Farmland (unless commercially sensitive horticultural); • Footpaths; • Short-term carparks[4]; and • Places of work.

[4] Carparks have a range of sensitivities depending on the duration and frequency that people would be expected to park their cars there, and the level of amenity they could reasonably expect whilst doing so. Car parks associated with workplace or residential parking might have a high level of sensitivity compared to car parks used less frequently and for shorter durations, such as those associated with shopping. Cases should be examined on their own merits.

Sensitivities of People to Health Effects of PM10

For the sensitivity of people to the health effects of PM10, the IAQM (2024) recommends that the air quality practitioner assumes that there are three sensitivities based on whether or not the receptor is likely to be exposed to elevated concentrations over a 24-hour period, consistent with the Defra's advice for local air quality management, Defra LAQM Technical Guidance LAWM.TG (2022).

Table 12 4 Sensitivities of People to the Health Effects of PM10 (Source: IAQM, 2024)

SENSITIVITY	FEATURES	INDICATIVE EXAMPLES
High	• Locations where members of the public are exposed over a time period relevant to the air quality objective for PM10 (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day)[5] .	• Residential properties; • Hospitals; • Schools; and • Residential care homes.
Medium	• Locations where the people exposed are workers[6], and exposure is over a time period relevant to the air quality objective for PM10 (in the case of 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day).	• Office and shop owners. (Workers occupationally exposed to PM10 are generally not included as protection is covered by Health and Safety at Work Legislation)
Low	• Locations where human exposure is transient[7] .	• Public footpaths; • Playing fields; and • Shopping streets.

Sensitivities of Receptors to Ecological Effects

Dust deposition due to earthworks, construction and trackout has the potential to affect sensitive habitats and plant communities.

Dust can have two types of effect on vegetation: physical and chemical. Direct physical effects include reduced photosynthesis, respiration and transpiration through smothering. Chemical changes to soils or watercourses may lead to a loss of plants or animals for example via changes in acidity. Indirect effects can include increased susceptibility to stresses such as pathogens and air pollution. These changes are likely to occur only as a result of long-term demolition and construction works adjacent to a sensitive habitat. Often impacts will be reversible once the works are completed, and dust emissions cease.

Table 12-5 provides an example of possible sensitivities:

[5] This follows Defra Guidance as set out in LAQM.TG (2022)

[6] Notwithstanding the fact that the air quality objectives and limit values do not apply to people in the workplace, such people can be affected by the exposure of PM10. However, they are considered to be less sensitive than the general public as a whole because those most sensitive to the effects of air pollution, such as young children are not normally workers. For this reason, workers have been included in the medium sensitivity category.

[7] There are no standards that apply to short-term exposure, e.g., one or two hours, but there is still a risk of health impacts, albeit less certain.

Table 12 5 Sensitivities of Receptors to Ecological Effects

SENSITIVITY	FEATURES	INDICATIVE EXAMPLES
High	• Locations with an international designation and the designated features may be affected by dust soiling; or • Locations where there is a community of a particularly dust sensitive species such as vascular species included in the Red Data for Ireland[8].	• A Special Area of Conservation (SAC) designated for acid heathlands, or a local site designated for lichens adjacent to the demolition of a large site containing (alkali) buildings.
Medium	• Locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown; or • Locations with a national designation where the features may be affected by dust deposition.	• A Site of Special Scientific Interest (SSSI) with dust sensitive features.
Low	• Locations with a local designation where the features may be affected by dust deposition.	• A local Nature Reserve with dust sensitive features.

Table 12-6 - 12-8 illustrate how the sensitivity of the area may be determined for dust soiling, human health impacts and ecological impacts, respectively. It should be noted that the highest level of sensitivity from each table should be considered, as recommended by the IAQM.

The criteria detailed in Table 12-6 - 12-8 were used to determine the sensitivity of the area to dust soiling effects, human health impacts and ecological impacts.

Table 12 6 Sensitivity to Dust Soiling Effects on People and Property

RECEIVER SENSITIVITY	NUMBER OF RECEIVERS	DISTANCE FROM THE SOURCE (M)			
		<20M	<50M	<100M	<250M
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

[8] A Habitat Regulation Assessment of the site may be required as part of the planning process, if the site lies close to an internationally designated site i.e., Special Conservation Areas (SACs), Special Protection Areas (SPAs) designated under the Habitats Directive (92/43/EEC) and RAMSAR sites.

Table 12 7 Sensitivity of the Area to Human Health Impacts

RECEPTOR SENSITIVITY	Annual Mean PM10 Concentration	NUMBER OF RECEPTORS	DISTANCE FROM THE SOURCE (M)			
			<20	<50	<100	<250
High		>100	High	High	High	Medium
	>32 µg/m³	10-100	High	High	Medium	Low
		10-100	High	Medium	Low	Low
	28-32 µg/m³	>100	High	High	Low	Low
		10-100	High	Medium	Low	Low
		1-10	High	Medium	Low	Low
	24-28 µg/m³	>100	High	Medium	Low	Low
		10-100	High	Medium	Low	Low
		1-10	Medium	Low	Low	Low
	<24 µg/m³	>100	Medium	Low	Low	Low
		10-100	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Medium	>32 µg/m³	>100	High	Medium	Low	Low
		10-100	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low
	28-32 µg/m³	>100	Low	Low	Low	Low
		10-100	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
	24-28 µg/m³	>100	Low	Low	Low	Low
		10-100	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
	<24 µg/m³	>100	Low	Low	Low	Low
		10-100	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Low	-	≥1	Low	Low	Low	Low

Table 12 8 Sensitivity of the Area to Ecological Impacts

RECEIVER SENSITIVITY	DISTANCE FROM THE SOURCE (M)	
	<20	<50
High	Hight	Medium
Medium	Medium	Low
Low	Low	Low

Step 2C – Define the Risk of Impacts

In accordance with the IAQM Guidance, the dust emission magnitude (Step 2A) and sensitivity of the area (Step 2B) have been combined and the risk of impacts from construction, earthworks and trackout have determined (before mitigation is applied).

Table 12-9 to 12-11 illustrate how the dust emission magnitude should be combined with the sensitivity of the area to determine the risk with no mitigation measures applied.

Table 12 9 Risk of Dust – Earthworks

POTENTIAL IMPACT	DUST EMISSION MAGNITUDE		
	LARGE	Medium	SMALL
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Table 12 10 Risk of Dust – Construction

POTENTIAL IMPACT	DUST EMISSION MAGNITUDE		
	LARGE	Medium	SMALL
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Table 12 11 Risk of Dust – Trackout

POTENTIAL IMPACT	DUST EMISSION MAGNITUDE		
	LARGE	Medium	SMALL
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Low Risk	Negligible
Low	Low Risk	Low Risk	Negligible

The risk of dust impacts is based on the potential dust emissions magnitude and the sensitivity of the area. These two factors are then combined to determine the risk of dust impacts with no mitigation applied. In the absence of any site-specific information, a higher risk category has been applied to represent a worst-case scenario.

The risk of dust soiling and the impact on human health before mitigation, is summarised in Section 12.8.

12.5.1.2 Construction Phase Traffic Emissions

Construction vehicles and machinery during this phase will temporarily and intermittently generate exhaust fumes and consequently potential emissions of volatile organic compounds, nitrogen oxides, sulphur oxides, and particulate matter (dust). Dust emissions associated with vehicular movements are largely due to the resuspension of particulate materials from ground disturbance. According to the IAQM (2024), experience from the assessment of exhaust emissions from on-site machinery and site traffic suggests that they are unlikely to make a significant impact on local air quality, and in the vast majority of cases they will not need to be quantitatively assessed. Air pollutants may increase marginally due to construction-related traffic and machinery from the proposed development. However, any such increase is not considered significant and will be well within relevant ambient air quality standards. According to TII (2011), the significance of impacts due to vehicle emissions during the Construction Phase will be dependent on the number of additional vehicle movements, the proportion of HGVs and the proximity of sensitive receptors to site access routes. If construction traffic would lead to a significant change (> 10%) in Annual Average Daily Traffic (AADT) flows near to sensitive receptors, then concentrations of nitrogen dioxide, PM^{10} and $PM^{2.5}$ should be predicted in line with the methodology as outlined within TII guidance.

Construction traffic is not expected to result in a significant change (> 10%) in AADT flows near to sensitive receptors (see Volume 3 – Appendices for Construction Phase Traffic AADTs). Therefore, a detailed air quality assessment is not required.

12.5.2 Operational Phase

In terms of associated impacts on air quality, Table 12-12 outlines the typical criteria that are pre-requisite for an air quality assessment:

Table 12 12 Indicative Criteria for Requiring an Air Quality Assessment (Source: IAQM, 2017)

Potential Change Resulting from Proposed Development	Indicative Criteria to Prtoceed to an Air Quality Assessment
Cause a significant change in Light Duty Vehicle (LDV) traffic flows on local roads with relevant receptors	A change of LDV flows of more than 1000 Annual Average Daily Traffic (AADT)
Cause a significant change in Heavy Duty Vehicle (HGV) flows on local roads with relevant receptors	A change of HGV flows of more than 100 Annual Average Daily Traffic (AADT)
Cause a change in Daily Average Speed (DAS)	Where the change is 5m or more
Cause a change in peak hour speed	Where the peak hour speed will change by 20km/h or more

The criteria presented in Table 12-12 have not been met by the Proposed Development; it is therefore unlikely for significant air quality impacts to occur as a result of increased traffic flow, and an associated air quality assessment is not required. A full copy of the annual average daily traffic (AADT) generated during the operational phase of the proposed development can be found in Volume 3 – Appendices (12.1 and 12.2). No link roads meet the above criteria and therefore further assessment is not required

12.6 Difficulties Encountered

No difficulties have been encountered while compiling this chapter.

12.7 Baseline Environment

12.7.1 Air Quality

According to the 2012 Regulations (S.I. No. 326 of 2012) the proposed site falls into 'Zone B' of Ireland which is described by the EPA as 'Cork Conurbation'. It is expected that existing ambient air quality in the vicinity of the site is characteristic of a suburban location with the primary source of air emissions such as particulate matter, NO^2, and hydrocarbons likely to be of traffic, combustion and agriculture, and domestic fuel burning.

The EPA launched a national air quality forecast in November 2023, to provide greater information to the public regarding expected air quality in Ireland for up to three days - "Today", "Tomorrow" and the "Day after Tomorrow".

Forecasts include daily Air Quality Index for Health (AQIH), Particulate Matter (PM), nitrogen dioxide (NO^2) and ozone (O3). PM, NO^2 and O^3 are the three main air pollutants impacting human health in Ireland. All pollutants mapped are presented on the Air Quality Index for Health (AQIH) scale (1 – 10). The forecast maps are uploaded twice daily, once in the morning and once in the evening.

In conjunction with individual local authorities, the EPA undertakes ambient air quality monitoring at specific locations throughout the country in the urban and rural environment; an Air Quality Report based on data from monitoring stations and a number of mobile air quality units is developed on an annual basis. The EPA's most recent publication 'Air Quality in Ireland, 2022' reports the quality of the air in Ireland based on the data from the National Ambient Air Quality Monitoring Network throughout the year 2022.

Table 12 13 Concentrations of NO^2 at Zone B Monitoring Stations

Station	Objective	Concentration ($\mu g/m^3$)		Limit or Threshold Value
		2021	2022	
South Link Road	Annual Mean NO^2	16	17.9	40 $\mu g/m^3$
	Days >200$\mu g/m^3$	0	0	35 days
UCC Distillery Fields	Annual Mean NO^2	8.5	9.0	40 $\mu g/m^3$
	Days >200$\mu g/m^3$	0	0	35 days
Cork Mallow	Annual Mean NO^2	16.2	15.8	40 $\mu g/m^3$
	Days >200$\mu g/m^3$	0	0	35 days
Cork Glanmire Rd	Annual Mean NO^2	-	32.1	40 $\mu g/m^3$
	Days >200$\mu g/m^3$	-	0	35 days

Based on the data summarised in Table 12-13, existing baseline air quality for the area in which the site is located be characterised as being of good quality with no exceedances of the Air Quality Regulations limit values of specific pollutants. The results show that current levels of NO^2 are well below the annual mean and 1-hour maximum limit values. In the year 2021, annual mean concentrations of NO^2 ranged from 8.5 – 16.2 ug/m^3 across all Zone B stations, with no exceedance of the maximum hourly limit (EPA, 2022). In the year 2022, annual mean concentrations of NO^2 ranged from 17.9 – 32.1 ug/m^3 across all Zone B stations, with no exceedance of the maximum hourly limit (EPA, 2023).

The closest representative suburban background monitoring to the site which continuously monitors for concentrations of nitrogen oxides (NO^2) and particulate matter ($PM^{2.5}$ and PM^{10}) is located on the South Link Road on the south side of Cork City (ca. 2.6km southeast of the site). Air quality monitoring carried out at this location is likely to be broadly representative of conditions that may be experienced at the site. Concentrations of NO^2 are also well below the threshold limits contained within the regulations at South Link Road monitoring station, with an annual mean of 16 ug/m^3 and 17.9 ug/m^3 measured in 2021 and 2022, respectively (EPA, 2022; EPA, 2023).

EPA 2022 background concentrations for South Link Road have been used in combination with correction factors to estimate current annual average NO^2 concentrations in the region of the proposed development. These factors have been adapted from both TII (2011) and DEFRA roadside NO^2 projection factors. Based on these correction factors, the estimated baseline year background NO^2 concentration in the region of the proposed development is 17 µg/m^3.

Table 12 14 Concentrations of PM10 at Zone B Monitoring Stations

Station	Objective	Concentration (µg/m^3)		Limit or Threshold Value
		2021	2022	
South Link Road	Annual Mean PM10	18	15.8	40 µg/m^3
	Days >50µg/m^3	2	2	35 days
UCC Distillery Fields	Annual Mean PM^{10}	11.4	11.9	40 µg/m^3
	Days >50µg/m^3	1	0	35 days
Cork Mallow	Annual Mean PM^{10}	13.4	14.4	40 µg/m^3
	Days >50µg/m^3	0	1	35 days
Cork Glanmire Rd	Annual Mean PM^{10}	-	14.1	40 µg/m^3
	Days >50µg/m^3	-	0	35 days

Measured concentrations of PM10 for the years 2021 and 2022 are presented in Table 12-14 for Zone B monitoring stations. As is evident from these results, current levels of PM^{10} are well below the annual mean limit value. In the year 2021, annual mean concentrations of PM^{10} ranged from 11.4 – 18 ug/m^3 across all Zone B stations, with no exceedance of short-term limit values (EPA, 2022). In the year 2022, annual mean concentrations of PM^{10} ranged from 11.9 – 15.8. ug/m^3 across all Zone B stations

Concentrations of PM^{10} at South Link Road monitoring station are also well below their respective limit values with an annual mean of 18 ug/m^3 and 15.8 ug/m^3 measured in 2021 and 2022 (EPA, 2022; EPA, 2023).

EPA 2022 background concentrations for South Link Road have been used in combination with correction factors to estimate current annual average PM^{10} concentrations in the region of the proposed development. These factors have been adapted from both TII (2011) and DEFRA roadside NO^2 projection factors. Based on these correction factors, the estimated baseline year background PM10 concentration in the region of the proposed development is 15.7 µg/m^3.

12.7.2 Macroclimate

Ireland has a typical maritime climate, largely due to its proximity to the Atlantic Ocean and the presence of the Gulf Stream. Due to the moderating effects of the Gulf Stream, Ireland does not suffer the temperature extremes that are experienced by many other countries at a similar latitude. Mean annual temperatures generally range between 9oC and 10oC. Winters tend to be cool and windy while summers are mostly mild and less windy. The prevailing wind direction is between the south and west with average annual wind speeds ranging between 6 knots in parts of south Leinster to over 15 knots in the extreme north. Rainfall in Ireland occurs throughout the year with reasonable frequency. The highest rainfall occurs in the western half of the country and on high ground; and generally, decreases towards the northeast. As the prevailing winds are from the west-southwest, the west of Ireland experiences the largest number of wet days. The area of least precipitation is along the eastern seaboard of the country.

12.7.3 Microclimate

The synoptic meteorological station at Cork Airport is located approximately 6km southwest of the proposed development; and for the purposes of this chapter, weather data collected here may be considered similar to that which is experienced in the area of the site.

The weather in the area of the site is generally dominated by cool oceanic air masses, with cool winters, mild humid summers, and a lack of temperature extremes. Based on meteorological data at Cork Airport over the last 3 years, the mean January temperature is 5.8oC, while the mean July temperature is 15.8oC. The prevailing wind direction is from a quadrant centred on the southwest. These are moderately warm winds from the Atlantic and they habitually bring rain. The average annual rainfall in Cork is 1228.0mm. Easterly winds are less frequent, weaker, and tend to bring cooler weather from the northeast in spring and warmer weather from the southeast in summer.

12.7.3.1 Rainfall

Table 12-15 illustrates the monthly and annual rainfall data collected over a 3-year period (2021-2024) at Cork Airport Weather Station. The annual rates of precipitation ranged from 1150.7mm in 2022 to 1527.3mm in 2023, with distribution of the highest monthly rainfall values falling mainly in the autumn and winter months. This is broadly within the expected range of the southern half of the country.

Table 12 15 Monthly Rainfall Values (mm) for Cork Airport Weather Station from January 2021 to December 2023 (Source: Met Eireann)

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Annual
2023	134.6	15.2	211.4	52.0	44.9	50.3	145.2	117.8	171.4	307.2	108.2	169.1	**1527.3**
2022	38.3	112.3	61.9	64.9	35.7	84.1	28.1	14.2	162.7	232.5	203.4	112.6	**1150.7**
2021	121.8	235.9	67.5	18.2	172.7	37.4	60.7	65.0	85.4	197.6	34.2	148.0	**1244.4**
Mean	**131.4**	**97.8**	**97.6**	**76.5**	**82.3**	**80.9**	**78.8**	**96.8**	**94.6**	**138.2**	**120.0**	**133.1**	**1228.0**

12.7.3.2 Wind

Wind at a particular location can be influenced by a number of factors, such as obstructions by trees or buildings, the nature of the terrain, and deflection by nearby mountains or hills. Wind blows most frequently from the south and west for open sites while winds from the northeast and north occur less often. The analysis of hourly weather data from Cork Airport synoptic weather station over a period of 30 years suggests that the predominant wind direction blows from the southwest, with windspeeds of between 7 and 10 knots occurring most frequently.

Figure 12-7 provides a wind speed frequency distribution which represents wind speed classes and the frequency at which they occur (% of time) at Cork Airport weather station over a period of 5 years. Wind speeds of 7 knots have the highest frequency, occurring approximately 8.5% of the time.

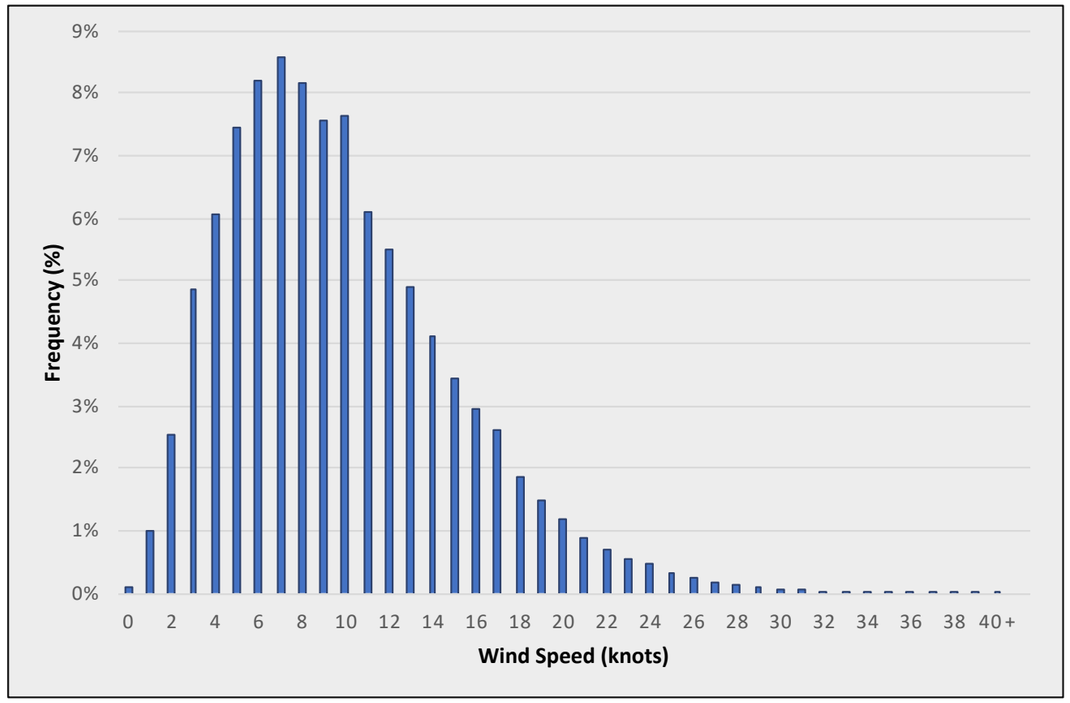

Figure 12 6 Wind Speed Frequency Distribution at Cork Airport Synoptic Weather Station over 5 years (1992-2021)

Figure 12-8 provides a wind rose of the predominant wind directions and associated wind speeds at Cork Airport. As is visible from Figure 12-8, the prevailing wind is from a south-westerly direction with an annual incidence of 29.40% for winds between 200 and 250 degrees. The most frequent wind speed associated with this wind direction is between 7 and 10 knots which is considered a 'gentle breeze' in terms of the Beaufort scale, this wind direction and wind speed occurs in combination approximately 9.76% of the time. The overall most common windspeed is also between 7 and 10 knots, occurring in 31.95% of incidences, and wind speeds of between 11 and 16 knots occurring in 26.99% of incidences.

The lowest frequency is for winds blowing from the northern quadrant at approximately 4.58% of the time. The incidence of wind between 1 and 6 knots is about 30.11% of the year with wind speeds of above 17 knots (8.7 m/s) occurring in just 10.86% of incidences. This windrose is broadly representative of the prevailing conditions experienced at the site.

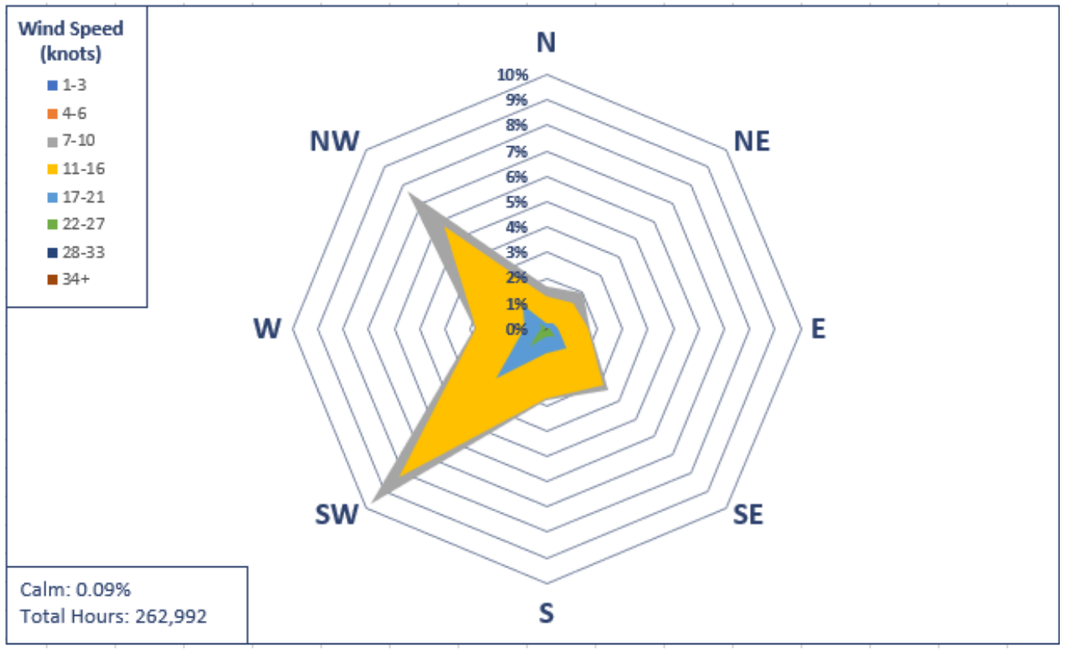

Figure 12 7 30-year Windrose at Cork Airport Synoptic Weather Station 1992-2021 (Developed using Met Eireann Hourly Data)

12.8 The 'Do Nothing' Scenario

If the proposed development were not to proceed, ambient air quality at the site will remain as per the baseline and will change in accordance with trends within the wider area (including influences from potential new developments in the surrounding area, changes in road traffic etc). Under the Do-Nothing Scenario construction works associated with the proposed development will not take place. Impacts from increased traffic volumes and associated emissions from the proposed development will also not occur. As the site is zoned for development, in the absence of the proposed development it is likely that a development of a similar nature would be constructed in the future in line

with national policy and the development plan objectives. Therefore, the construction and operational phase impacts outlined in this assessment are likely to occur in the future even in the absence of the proposed development.

12.9 Potential Significant Effects

12.9.1 Potential Impact on Air Quality

12.9.1.1 Dust

There is potential for construction related air emissions to impact on local air quality due to the proposed development. The IAQM *Guidance on the Assessment of Dust from Demolition and Construction* (2024) provides a framework for the assessment of risk, details of which are provided in Section 12.4 of this chapter.

Potential Dust Emission Magnitude (Step 2A)

The potential magnitude of dust emissions from construction, earthworks and trackout has been assessed, as identified in Table 12-16.

Table 12 16 Dust Emission Magnitude for the Site

Activity	Dust Emission Magnitude
Earthworks	Medium
Construction	Large
Trackout	Large

Sensitivity of the Area (Step 2B)

Table 12 17 Sensitivity of the Area

Sensitivity Type	Factors	Sensitivity of the Area	
		On-site	Trackout
Dust Soiling	Residential areas are considered to be highly sensitive to dust soiling. There are between no highly sensitive residential receptors within 50m of the site boundary. Therefore, the sensitivity of the area surrounding the site can be classified as low to dust soiling for on-site activity (earthworks and construction). However, to account for a worst-case scenario, the site has been classified as medium to dust soiling for on-site activity. The sensitivity to dust soiling for trackout has been classified as medium.	Medium	Medium
Human Health	EPA 2022 background concentrations for South Link Road have been used in combination with correction factors to estimate current annual average PM10 concentrations in the region of the Proposed Development. These factors have been adapted from both TII (2011) projection factors. Based on these correction factors, the estimated baseline year (2024) background PM^{10} concentration in the region of the proposed development is 15.7 µg/m^3. As the PM10 concentration is less than 24 µg/m3, the sensitivity of the area to human health impacts is considered to be low.	Low	Low
Ecology	There are no priority habitats within 50m of the site. However, there are a number of ecological receptors within 50m of the site. For example, green-listed birds. In order to account for a worst-case scenario, the ecological receptors can be classified as a low sensitivity receptor as per Table 12-5.	Low	Low

Risk of Dust Impacts (Step 2C)

The outcomes of the assessments of potential magnitude of dust emissions and the sensitivity of the area are combined to determine the risk of impact. This risk is then used to inform the selection of appropriate mitigation. Table 12-18 details the risk of dust impacts for earthworks, construction and trackout activities.

Table 12 18 Summary of Unmitigated Risks

POTENTIAL IMPACT	SENSITIVITY	MAGNITUDE		
		EARTHWORKS	Construction	TRACKOUT
		MEDIUM	Large	LARGE
High	Medium	Medium Risk	Medium Risk	Medium Risk
Medium	Low	Low Risk	Low Risk	Low Risk
Low	Low	Low Risk	Low Risk	Low Risk

The dust risk categories for each of the four activities determined in STEP 2C have been used to define the appropriate, site-specific, mitigation measures to be adopted in Section 12.10 of this chapter (Step 3 as per the IAQM Guidance on the Assessment of Dust from Demolition and Construction (2024) (see Section 12.4 of this chapter).

For those cases where the risk is assigned as 'negligible', no mitigation measures beyond those required by legislation are required. However, additional mitigation measures as defined in Section 12.4 may be applied as part of good practice.

12.9.2 Cumulative Effects

Cumulative Impacts can be defined as "impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project". Effects which are caused by the interaction of effects, or by associated or off-site projects, are classed as indirect effects. Cumulative effects are often indirect, arising from the accumulation of different effects that are individually minor.

Cumulative air quality impacts have the potential to arise locally when construction activities associated with the proposed development take place at the same time as other developments in a specific location.

A review of other off-site developments was completed as part of this assessment. Chapter 2 of this EIAR details the existing, proposed and granted planning permissions on record in the area, a review of these planning permissions has been completed as part of this assessment.

The cumulative effects on the air quality of the current proposed development and other permitted or existing developments have been considered, through the generation of air pollutants. The potential impacts on air quality are assessed in Section 12.9 and it is considered that there are no other potential significant cumulative impacts associated with the Proposed Development and considered offsite permitted developments.

In terms of dust, no significant impacts are predicted; good construction practice, which incorporates the implementation of the identified mitigation measures, will be employed at the P site. Due to the implementation of good construction practices at the site and these offsite permitted developments, it is not anticipated that significant cumulative impacts will occur.

Assessment of road traffic emission impacts on air quality involved traffic data which is inclusive of traffic associated with other existing and permitted developments on the road networks surrounding the site. Therefore, cumulative impacts have been assessed in this regard and the impact on ambient air quality has been determined as not being significant.

It is considered that there are no other potential significant cumulative impacts associated with the proposed development and considered offsite permitted developments.

12.9.3 Summary

The following Table summarises the identified likely significant effects during the Construction Phase of the proposed development before mitigation measures are applied.

Table 12 19 Summary of Construction Phase Likely Significant Effects in the absence of mitigation

LIKELY SIGNIFICANT EFFECT	QUALITY	SIGNIFICANCE	EXTENT	PROBABILITY	DURATION	TYPE
Dust Nuisance	Negative	Slight	Cork City Area	Likely	Short-term	Direct
Traffic Emissions	Negative to neutral	Imperceptible	Cork City Area	Unlikely	Short-term	Direct

The following Table summarises the identified likely significant effects during the Operational Phase of the proposed development before mitigation measures are applied.

Table 12 20 Summary of Operational Phase Likely Significant Effects in the absence of mitigation

LIKELY SIGNIFICANT EFFECT	QUALITY	SIGNIFICANCE	EXTENT	PROBABILITY	DURATION	TYPE
Traffic Emissions	Negative to neutral	Imperceptible	Cork City Area	Unlikely	Short-term	Direct

12.10 Mitigation Measures

12.10.1 Construction Phase Mitigation

Communications

- Develop and implement a stakeholder communications plan that includes community engagement before work commences on site;
- Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager;
- Display the head or regional office contact information; and
- Develop and implement a Dust Management Plan (DMP), the final dust management plan will form part of the overall construction management plan which will formally be prepared and submitted to Cork City Council post grant of planning permission.

Site Management

- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken;
- Make the complaints log available to the local authority when asked;
- Record any exceptional incidents that cause dust and/or air emissions, either on- or off-site, and the action taken to resolve the situation in the log book; and
- Hold regular liaison meetings with other high risk construction sites within 250m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/deliveries which might be using the same strategic road network routes.

Monitoring

- Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100 m of site boundary, with cleaning to be provided if necessary;
- Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the Cork City Council when asked; and
- Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions

Preparing and Maintaining the site

- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible;
- Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site;
- Fully enclose site or specific operations where there is a high potential for dust production and the site is actives for an extensive period;
- Avoid site runoff of water or mud;
- Keep site fencing, barriers and scaffolding clean using wet methods;
- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below; and
- Cover, seed or fence stockpiles to prevent wind whipping.

Operating Vehicle/Machinery and Sustainable Travel

- Ensure all vehicles switch off engines when stationary - no idling vehicles;
- Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable; and
- A speed restriction of 20 km/hr will be applied as an effective control measure for dust for on-site vehicles using unpaved haul roads.

Operations

- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems;
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/ mitigation, using non-potable water where possible and appropriate;
- Use enclosed chutes and conveyors and covered skips;
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate; and
- Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.

Waste Management

- Avoid bonfires and burning of waste materials.

Measures Specific to Earthworks

- Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable;
- Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable; and
- Only remove the cover in small areas during work and not all at once.

Measures Specific to Construction

- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.

Measures Specific to Trackout

- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use;
- Avoid dry sweeping of large areas;
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport;
- Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable;
- Record all inspections of haul routes and any subsequent action in a site log book;
- Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned;
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable);
- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits; and
- Access gates to be located at least 10 m from receptors, where possible.

12.10.2 Operational Phase Mitigation

It has been determined that the Operational Phase air quality impact is negligible and therefore no site-specific mitigation measures are proposed.

12.11 Residual Impact Assessment

The IAQM recommends that significance is only assigned to effect after considering the construction activity mitigation. The risk of dust impacts has been determined in Step 2C and the appropriate dust mitigation measures identified in Step 3 (Section 12.8.1 of this chapter) and the final step is to determine whether there are significant effects arising from the Construction Phase of the proposed development. The proposed mitigation measures will ensure that a potential significant adverse effect will not occur, therefore, the residual effect will not be significant.

The traffic generated by the proposed development has been assessed for its impact on air quality and it has been determined to have an overall not significant impact in terms of local air quality with the implementation of the proposed mitigation measures.

12.11.1 Summary of Post-mitigation Effects

The following Table summarises the identified likely significant residual effects during the construction phase of the proposed development following the application of mitigation measures.

Table 12 21 Summary of Construction Phase Effects Post Mitigation

LIKELY SIGNIFICANT EFFECT	QUALITY	SIGNIFICANCE	EXTENT	PROBABILITY	DURATION	TYPE
Dust Nuisance	Negative	Imperceptible	Cork City Area	Unlikely	Long-term	Direct
Traffic Emissions	Negative to neutral	Imperceptible	Cork City Area	Unlikely	Long-term	Direct

The following Table summarises the identified likely residual significant effects during the Operational Phase of the proposed development post mitigation.

Table 12 22 Summary of Operational Phase Effects Post Mitigation

LIKELY SIGNIFICANT EFFECT	QUALITY	SIGNIFICANCE	EXTENT	PROBABILITY	DURATION	TYPE
Traffic Emissions	Negative to neutral	Imperceptible	Cork City Area	Unlikely	Long-term	Direct

12.11.2 Cumulative Residual Effects

It is considered that there are no other potential significant cumulative impacts associated with the proposed development and considered offsite permitted developments.

12.12 Risk of Major Accidents or Disasters

The Site-Specific Flood Risk Assessment (DBFL Consulting Engineers, 2024) has demonstrated that the risks relating to flooding to the proposed development can be managed and mitigated to acceptable levels and therefore comply with Department of Housing, Local Government and Heritage (DoEHLG) / OPW and Cork City Council planning guidance.

12.13 Worst Case Scenario

A worst-case scenario has been applied - Step 2A (defining the potential dust emission magnitude) of the construction dust impact assessment and the highest risk category has been applied when selecting the mitigation measures that are general for the proposed development.

It is expected that adequate mitigation measures, as outlined in Section 12.8, will assist in preventing nuisance dust from resulting in any significant effects. However, even with the most rigorous DMP in place, it is not possible to guarantee that the dust mitigation measures will be effective all the time, and if, for example, dust emissions occur under adverse weather conditions, or there is an interruption to the water supply used for dust suppression, the local community may experience occasional, short-term dust annoyance. The likely scale of this would not be considered sufficient to change the conclusion that with mitigation the effects will be 'not significant'.

12.14 Interactions

12.14.1 Population and Human Health

Interactions between air quality and population and human health have been considered as the proposed development has the potential to cause health issues as a result of impacts on air quality from dust nuisances and potential traffic derived pollutants. However, the mitigation measures employed at the proposed development will ensure that all impacts are compliant with ambient air quality standards and human health will not be affected. Furthermore, traffic-related pollutants have been assessed and determined as having an overall insignificant impact, therefore air quality impacts from the Proposed Development are not expected to have a significant impact on population and human health.

12.14.2 Land and Soils

Construction phase activities such as land clearing, excavations, stockpiling of materials etc. have the potential for interactions between air quality and land and soils in the form of dust emissions. With the appropriate mitigation measures to prevent fugitive dust emissions, it is predicted that there will be no significant interactions between air quality and land and soils during the construction phase. There are no potentially significant interactions identified between air quality, and land, soils and hydrogeology during the operational phase.

12.14.3 Biodiversity

Interactions between air quality and biodiversity have been considered as the construction phase has the potential to interact with flora and fauna in adjacent habitats and designated sites due to dust emissions arising from the construction works. However, the mitigation measures employed at the Proposed Development will ensure that the impacts to flora and fauna are not significant.

12.14.4 Traffic

There can be a significant interaction between air quality and traffic. This is due to traffic-related pollutants that may arise. In the current assessment, traffic derived pollutants which may affect Air Quality have been deemed not significant. Therefore, the impact of the interaction between air quality and traffic is not significant.

Section 12.14.5 Climate
Air quality and climate have interactions due to the emissions from the burning of fossil fuels during the construction and operational phases generating both air quality and climate impacts. Air quality modelling outputs are utilised within the Climate Change Chapter (Ch. 13). There is no impact on climate due to air quality however the sources of impacts on air quality and climate are strongly linked.

12.15 Monitoring
The monitoring of construction dust during the Construction Phase of the proposed development is recommended to ensure that impacts are not experienced beyond the Site boundary. Monitoring of dust can be carried out by using the Bergerhoff Method. This involves placing Bergerhoff Dust Deposit Gauges at a strategic locations along the Site boundaries for a period of 30 +/- 2 days. The selection of sampling point locations should be carried out in consideration of the requirements of VDI 2119 with respect to the location of the samplers relative to buildings and other obstructions, height above ground, and sample collection and analysis procedures. After the exposure period is complete, the Gauges should be removed from the Site; the dust deposits in each Gauge will then be determined gravimetrically and expressed as a dust deposition rate in mg/m2/day in accordance with the relevant standard.

Due to the negligible impact on air quality from the Operational Phase of the proposed development, no specific monitoring is recommended.

12.16 Summary of Mitigation and Monitoring
The following Table summarises the Construction Phase mitigation and monitoring measures.

Table 12 23 Summary of Construction Phase Mitigation and Monitoring

LIKELY SIGNIFICANT EFFECT	QUALITY	SIGNIFICANCE
Dust nuisance	Negative	Imperceptible
Traffic Emissions	Negative to neutral	Imperceptible

The following Table summarises the Operational Phase mitigation and monitoring measures.

Table 12 24 Summary of Operational Phase Mitigation and Monitoring

LIKELY SIGNIFICANT EFFECT	QUALITY	SIGNIFICANCE
Traffic Emissions	Negative to neutral	Imperceptible

12.17 Conclusion
The implementation of the mitigation measures outlined in Section 12.10 will ensure that the proposed development has an overall not significant impact in terms of local air quality

12.18 References and Sources
Air Pollution Act 2012 (S.I. No. 326 of 2012) Irish Statute Book.

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VOLUME II

CHAPTER 13

Climate

McCutcheon Halley
CHARTERED PLANNING CONSULTANTS

CHAPTER THIRTEEN
Table of Contents

CHAPTER THIRTEEN
Table of Figures

CHAPTER THIRTEEN
Table of Tables

Chapter Thirteen | Climate

13.1 Introduction

This chapter of the EIAR was prepared to assess the potential significant effects of the proposed development on climate

It should be read in conjunction with Ch. 13 Air Quality, Ch. 7 Material Assets, Ch 6 Traffic and Transport and the Traffic and Transport Assessment, as well as the Energy Analysis Report, Building Life Cycle Assessment Report and Site-Specific Flood Risk Assessment submitted with the planning application.

Enviroguide Consulting was commissioned by McCutcheon Halley Planning Consultants, acting on behalf of Marina Quarter Ltd. to prepare a climate chapter for the proposed Large-scale Residential Development (LRD) at the Former Ford Distribution Site, fronting on to Centre Park Road, Ballintemple, Co. Cork.

A full description of the development description can be found in Chapter 2.

Climate change is recognised as one of the most serious global environmental problems and arguably the greatest challenge facing humanity today. While natural variations in climate over time are normal, anthropogenic activities have interfered greatly with the global atmospheric system by emitting substantial amounts of greenhouse gases (GHGs). This has caused a discernible effect on our global climate system, with continued change expected due to current and predicted trends of GHG emissions. In Ireland this is demonstrated by rising sea levels, changes in the ecosystem, extreme weather events and biodiversity loss.

The GHG assessment evaluates the project's climate impact across different life stages, considering a 50-year building life expectancy. It categorises greenhouse gas emissions into four main stages based on BS EN 15978: Production (embodied carbon from raw material extraction to product manufacturing), Pre-construction/Construction (impacts from product delivery and assembly), Operational (emissions from building operations, maintenance, and replacement), and End of Life (deconstruction and disposal activities). The assessment includes the first three stages, while the End-of-Life stage is excluded due to uncertainties in deconstruction methods.

Attention will be focused on Ireland's obligations under the Paris Agreement (Climate Action Plan & Corresponding carbon budgets) in the context of the overall climatic impact of the presence and absence of the Proposed Development.

13.2 Expertise & Qualifications

This chapter of the EIAR has been prepared by Aoife Gillen of Enviroguide Consulting a DNV Company. Aoife holds a Master of Science (Hons) degree, is a Chartered Environmental Health Practitioner, and Certified Energy Manager. Aoife has worked as a Principal Sustainability Consultant with Enviroguide since March 2024, and has built up experience preparing Climate Change Impact Assessments, Environmental Impact Assessment (EIA) Screening Reports, Climate Chapters, Climate Impact Statements and Carbon assessments. Aoife has been involved in the preparation of EIARs for the following projects:

- N&C Kilmeague Quarry GHG Assessment
- Dyke Road Galway LRD Climate Change Impact Assessment
- DRES Properties Railpark Maynooth LRD Climate Chapter
- DRES Properties Kilcock Maynooth LRD Climate Chapter.

13.3 Proposed Development

A comprehensive description of the proposed development is presented in Chapter 2 of this EIAR. The construction of 176 no. apartments in 2 no. blocks ranging in height from 7 to 10 storeys over podium level, 1 retail/cafe unit, 1 childcare facility, internal and external residential amenity spaces, and all associated ancillary development.

13.3.1 Greenhouse Gas Emissions in Ireland

Ireland's latest greenhouse gas (GHG) emissions 1990-2023 are based on the Sustainable Energy Authority Ireland's (SEAI's) provisional energy balance released in July 2024 (EPA, 2024). In 2023, Ireland's GHG emissions are estimated to be 55.01 million tonnes carbon dioxide equivalent (Mt CO2 eq), which is 6.8% lower (or 4.00 Mt CO2 eq) than emissions in 2022 (59.00 Mt CO2 eq) and follows a 2.0% decrease in emissions reported in 2022.

Arresting growth in emissions is a challenge in the context of a growing economy but one which must continue to be addressed by households, business, farmers, and communities if Ireland is to reap the benefits of a low-carbon economy.

The provisional greenhouse gas emission inventory for 2023 is the third of ten years over which compliance with targets set in the European Union's Effort Sharing Regulation (EU 2018/842) will be assessed. This Regulation sets 2030 targets for emissions outside of the Emissions Trading Scheme (known as ESR emissions) and annual binding national limits for the period 2021-2030. Ireland's target is to reduce its greenhouse gas emissions by at least 42% by 2030 compared with 2005 levels, with a number of flexibilities available to assist in achieving this. The ESR includes the sectors outside the scope of the EU Emissions Trading System (ETS) (such as Agriculture, Transport, Residential, Public Services and Commercial Services and Waste).

Ireland's ESR emissions annual limit for 2023 is 40.52 Mt CO2eq. Ireland's provisional 2023 greenhouse gas ESR emissions are 42.79 Mt CO2eq, this is 2.27 Mt CO2eq more than the annual limit for 2023. This value is the national total emissions less emissions generated by stationary combustion i.e. power plants, cement plants, and domestic aviation operations that are within the EU's emissions trading scheme. Cumulatively from 2021-2023 and after using the ETS flexibility, Ireland is in compliance with the ESR by a net distance to target of 0.15 Mt CO2eq, although in 2023 there is an exceedance of 0.36 Mt CO2eq above its Annual Emissions Allocation with the ETS flexibility. Agriculture and Transport accounted for 76.0% of total ESR emissions in 2023. The revised Land Use, Land-use Change and Forestry (LULUCF) Regulation (2023) incorporates new rules around LULUCF flexibilities for the period 2021-2025 and 2026-2030. There is a high degree of uncertainty relating to the availability of the LULUCF flexibility and, if available, the quantity of flexibility in each budgetary period (EPA, 2024).

The latest projections (May 2024) indicate that currently implemented measures (With Existing Measures) will achieve a reduction of 9% on 2005 levels by 2030, significantly short of the 42% reduction target. If measures in the higher ambition (With Additional Measures) scenario are implemented, EPA projections show that Ireland can achieve a reduction of 25% by 2030, still short of the 42% reduction target (EPA, 2024).

In terms of the 2030 targets, the ESR provides two flexibilities (use of ETS allowances and credit from action undertaken in the land use, land use change and forestry (LULUCF) sector) to allow for a fair and cost-efficient

achievement of the targets. New Regulations in 2023 mean there are new rules around LULUCF flexibility that incorporates split budgets 2021-2025 to 2026-2030. Additional analyses are needed to estimate the impact of the new rules on flexibilities. In the interim, based on latest LULUCF inventory and projections data, the maximum amount of LULUCF flexibility now projected to be available is 13.4 Mt CO2eq in the first 5-year period (or 2.68 Mt CO2 eq per annum), with no flexibility available in the second 5-year period (EPA, 2024).

Ireland's greenhouse gas (GHG) emissions increased in the period from 1990 to 2001 where it peaked at 70.82 Mt CO2 equivalent, before displaying a downward trend to 2014. Emissions increased by 4.0% and 3.8%, respectively in the years, 2015 and 2016 and remained relatively stable in 2017 and 2018, followed by a 3.0% decrease in 2019. In 2020 total national GHG emissions were 3.6% lower than 2019 emissions largely driven by the covid restrictions. The gradual lifting of covid restrictions in 2021 along with an increase in the use of coal and less renewables within electricity generation resulted in a 4.5% increase in emissions in 2021 compared to 2020. A 2.0% decrease in emissions was seen in 2022 compared to 2021, mainly due to a substantial decrease in residential sector emissions combined with decreases from industry, agriculture, and electricity generation. This was followed by a 6.8% reduction in emissions in 2023. Ireland's GHG emissions have decreased by 1.2% from 1990-2023 (EPA, 2024).

In relation to the greenhouse gases, carbon dioxide (CO2) accounted for 61.0% of the total, with methane (CH4) and nitrous oxide (N2O) contributing 28.9% and 8.8% as CO2 equivalent, respectively and F-gases contributing 1.3% of the total as CO2 equivalent (EPA, 2024).

In 2023, the energy industries, transport and agriculture sectors accounted for 73.5% of total GHG emissions. Agriculture is the single largest contributor to the overall emissions, at 37.8%. Transport, energy industries and the residential sector are the next largest contributors (aspects relevant to this assessment), at 21.4%, 14.3% and 9.7%, respectively (EPA, 2024).

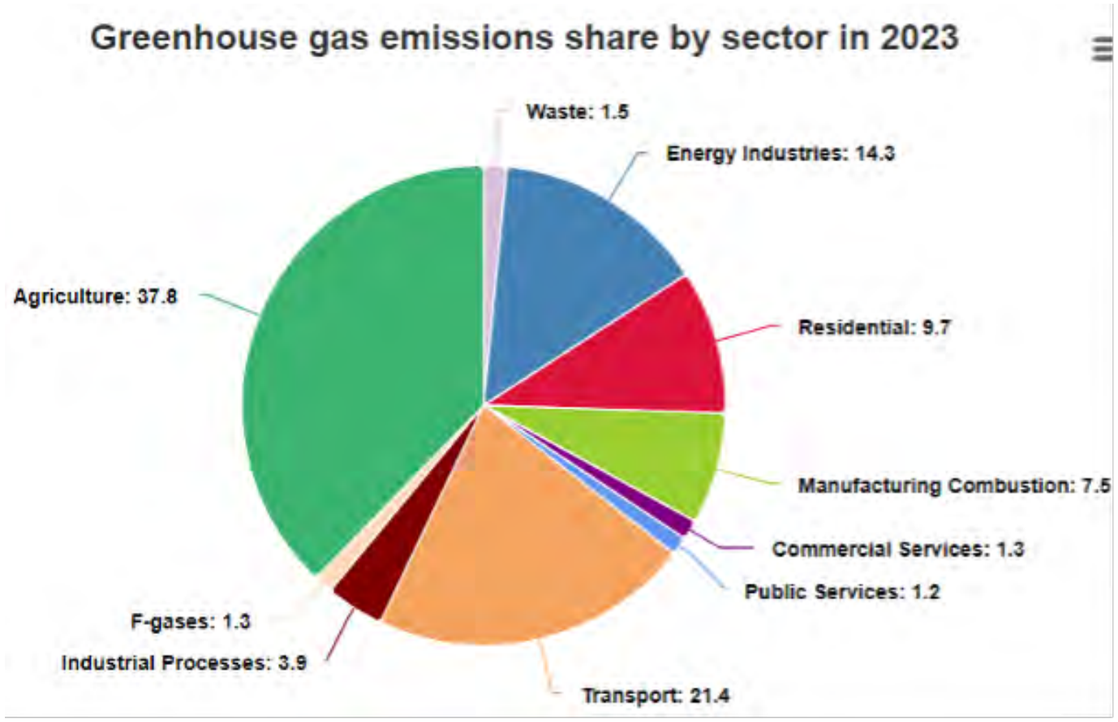

Figure 1: Ireland's Greenhouse Gas Emissions Share by Sector 2023 (Source: EPA, 2024)

The Climate Change Advisory Council submitted their Annual Review 2023 to the Minister of the Environment, Climate and Communications on 24th of June 2024. Detailed key messages, including observations and recommendations for each sector (electricity; transport; built environment; enterprise and waste; agriculture, forestry, and other land use; and biodiversity), can be found at the beginning of each chapter in the annual review (CCAC, 2024).

The overall recommendations are as follows:

- The Council strongly recommends that the Government urgently conducts a full review of taxation in the Transport sector (including vehicle registration tax, motor tax, excise duty, carbon tax, fuel pricing and distance-based charges) to ensure that taxation policy for households and businesses supports emission targets, is aligned with climate objectives, promotes energy efficiency and minimises negative impacts on society.
- Government and local authorities should reallocate road space to provide better access for more sustainable modes of transport, such as walking, cycling or taking a bus. Public transport services need to improve, and more public engagement is needed to understand the barriers people face in making sustainable transport choices.
    - The Government must urgently complete the planning reform necessary to:

- ensure that new developments reduce transport demand by placing homes, workplaces, public services and leisure spaces closer to each other and nearer to public and active transport (e.g. walking and cycling) infrastructure,
- speed up the delivery of major public and active transport infrastructure projects and minimise the costs and delays associated with the planning process.
- Local authorities must have the support and guidance from Government that they need to reduce transport demand and emissions, with locally implemented measures such as low-emission zones and provision of shuttle bus services or incentives to promote carpooling.
- The number of car journeys to and from schools needs to be reduced by significantly expanding the School Transport Scheme and continuing work to increase the number of pupils walking and cycling to school.
- The Government needs to prioritise measures and investments to strengthen the resilience of ports and critical roads and railways to the future impacts of climate change such as more intense rainfall events and sea level rise

13.3.2 Aspects Relevant to this Assessment

At project construction phase, site vehicles and machinery will generate emissions, primarily CO2, with some contribution from other greenhouse gases (GHGs). Additionally, the carbon embodied in the construction materials and on-site activities will have an environmental impact. These climate-related effects are evaluated in light of Ireland's commitments under the EU 2030 GHG targets and sector-specific emission limits.

In the operational phase, vehicle emissions from site access will continue to contribute to climate change through CO2 release, with these impacts expected to be ongoing. Moreover, the development's exposure to potential future climate risks must be considered. The project has been designed with measures to mitigate its environmental impact wherever feasible, following the latest regulatory standards, including Part L of the Building Regulations 2022, and the guidelines outlined in the Climate Action Plan 2024 (DECC, 2023).

13.4 Methodology Overview

Carbon dioxide (CO2) emissions have a global climate warming effect. This is regardless of rate of release, location or the weather when released into the atmosphere. This is unlike pollutants that affect local air quality where the rate of release, location and prevailing weather, as well as the amount of pollutant, determines the local concentrations and the impact. Local ambient concentrations of CO2 are not relevant for climate change and there are no limits or thresholds that can be applied to particular sources of carbon emissions. Any amount of CO2 released into the atmosphere will contribute to climate warming, the extent of which is determined by the magnitude of the release. Although CO2 emissions are typically expressed as kilogrammes or tonnes per year, there is a cumulative effect of these emissions because CO2 emissions have a warming effect which lasts for 100 years or more.

In this regard, the methodology adopted in this chapter covers two separate assessments – a greenhouse gas assessment (GHGA) and a climate change risk assessment (CCRA).

- Greenhouse Gas Emissions Assessment (GHGA) – This evaluation estimates the greenhouse gas emissions generated by a project throughout its entire lifespan. It then compares these emissions against pertinent Irish carbon budgets, targets, and policies to help gauge their significance.; The Transport Infrastructure Ireland (TII) Carbon assessment tool and the Irish Green Building Councils (IGBC) Lifecycle Assessment Tool have been used for this assessment and
- Climate Change Risk Assessment (CCRA) – This analysis examines how a changing climate could affect a project and its surrounding environment. The assessment considers a projects vulnerability to climate change and identifies adaptation measures to increase project resilience.

Further details on the methodologies undertaken are presented later in this report.

13.5 Relevant Legislation & Guidance

13.5.1.1 International Legislation/Commitments/Agreements

In March 1994, the United Nations Framework Convention on Climate Change (UNFCCC) was established as an intergovernmental effort to tackle the challenges posed by climate change. The Convention membership is almost universal, with 197 countries having ratified. Under the Convention, governments gather and share information on GHG emissions, national policies, and best practices. This information is then utilised to launch national strategies and international agreements to address GHG emissions. Following the formation of the UNFCCC, two major international climate change agreements were adopted: The Kyoto Protocol, and the Paris Agreement.

In April 1994, Ireland ratified the United Nations Framework Convention on Climate Change (UNFCCC) and subsequently signed the Kyoto Protocol in 1997. The Kyoto Protocol is an international agreement linked to the UNFCCC which commits its parties to legally binding emission reduction targets. In order to ensure compliance with the protocol, the Intergovernmental Panel on Climate Change (IPCC) has outlined detailed guidelines on compiling National Greenhouse Gas Inventories. These are designed to estimate and report on national inventories of anthropogenic GHG emissions and removals. Under Article 4 of the Kyoto Protocol, Ireland agreed to limit the net anthropogenic growth of the six named GHGs to 13% above the 1990 level, spanning the period 2008 to 2012 (IPPC, 2006).

The second commitment period of the Kyoto Protocol was established by the Doha amendment which was adopted in extremis on the 8th of December 2012, to impose quantified emission limitation and reduction commitments (QELRCs) to Annex I (developed country) Parties during a commitment period from 2013 to 2020. 38 developed countries, inclusive of the EU and its 28 member states, are participating. Under the Doha amendment, participating countries have committed to an 18% reduction in emissions from 1990 levels. The EU has committed to reducing emissions in this period to 20% below 1990 levels. Ireland's QELRCs for the period 2013 to 2020 is 80% of its base year emissions. Ireland's compliance with the Doha amendment will be assessed based on the GHG inventory submission in 2022 for 1990-2020 data. As of October 2020, the Doha Amendment has received the required number of ratifications to enter into force. Once in force, the emission reduction commitments of participating developed countries and economies in transition (EITs) become legally binding.

The Sustainable Development Goals (SDGs), also known as the Global Goals, were adopted by all United Nations Member States in 2015 as a universal call to action to end poverty, protect the planet, and ensure that all people enjoy peace and prosperity by 2030. The 17 SDGs are integrated—that is, they recognise that action in one area will affect outcomes in others, and that development must balance social, economic, and environmental sustainability.

The creativity, knowhow, technology and financial resources from all of society is necessary to achieve the SDGs in every context. At its heart, the SDGs are about global partnership for this call to action. No matter how large or small, and regardless of their industry, all companies can contribute to the SDGs through their sustainability and corporate social responsibility strategies, policies, and processes.

Figure 2: UN Sustainable Development Goals (https://sdgs.un.org/goals)

Ireland has published a Sustainable Development Goals National Implementation Plan 2022-2024 to provide a whole-of-government approach to implementing these goals. Sustainable development, climate change and equity are intrinsically intertwined. Climate change impacts can be linked in one way or another to all 17 of the UN Sustainable Development Goals (SDGs). Climate action that considers co-impacts across other SDGs can increase efficiency, reduce costs and support early and ambitious climate action (DECC, 2022).

13.5.1.2 European Legislation

GHG Legislation

In December 2015, the Paris Climate Change Conference (COP21) took place and was an important milestone in terms of international climate change agreements. The Paris Agreement sets out a global action plan to put the world on track to mitigate dangerous climate change by setting a global warming limit not to exceed 2°C above pre-industrial levels, with efforts to limit this to 1.5°C. As a contribution to the objectives of the agreement, countries have submitted national climate action plans (nationally determined contributions, (NDCs)). Under this agreement, governments agreed to come together every 5 years to assess the collective progress towards the long-term goals and inform Parties in updating and enhancing their nationally determined contributions. Ireland will contribute to the Paris Agreement through the NDC tabled by the EU on behalf of Member States in 2020, which commits to a 55% reduction in EU-wide emissions by 2030 compared to 1990. This is considered to be the current NDC maintained by the EU and its Member States under Article 4 of the Paris Agreement.

The EU has set itself targets for reducing its GHG emissions progressively up to 2050, these are outlined in the 2020 climate and energy package and the 2030 climate and energy policy framework. These targets are defined to assist the EU in transitioning to a low-carbon economy, as detailed in the 2050 low carbon roadmap. The 2020 package is a set of binding legislation to ensure that the EU meets its climate and energy targets for the year 2020 (EEA; 2020). There are three key targets outlined in the package which were set by the EU in 2007 and enacted in legislation in 2009:

- 20% reduction in GHG emissions from 1990 levels;
- 20% of EU energy to be from renewable sources; and
- 20% improvement in energy efficiency.

The 2030 climate and energy framework builds on the 2020 climate energy package and was adopted by EU leaders in October 2014. The framework sets three key targets for the year 2030:

- At least 40% cuts in GHG emissions from 1990 levels;
- At least 32% share for renewable energy; and
- At least 32.5% improvement in energy efficiency.

The EU has acted in several areas in order to meet these targets, including the introduction of the Emissions Trading System (ETS). The ETS is the key tool used by the EU in cutting GHG emissions from large-scale facilities in the power, industrial, and aviation sectors. Around 45% of the EU's GHG emissions are covered by the ETS.

As part of the European Green Deal, the EU Commission proposed in September 2020 to raise the 2030 greenhouse gas emission reduction target, including emissions and removals, to at least 55% compared to 1990. The European Climate Law came into force in July 2021 and writes into law the goal set out in the European Green Deal for Europe's economy and society to become climate-neutral by 2050. The law also sets the intermediate target of reducing net greenhouse gas emissions by at least 55% by 2030, compared to 1990 levels.

Corporate Sustainability Reporting Directive (CSRD)

On 5 January 2023, the Corporate Sustainability Reporting Directive (CSRD) entered into force. It modernises and strengthens the rules concerning the social and environmental information that companies must report. The CSRD is effective from 01 January 2024 for those entities already subject to the NFRD (reporting in 2025) and from 01 January 2025 for all other large companies (reporting in 2026).

Companies subject to the CSRD will have to report according to European Sustainability Reporting Standards (ESRS). The standards are developed in a draft form by the EFRAG, previously known as the European Financial Reporting Advisory Group (EFRAG, 2024).

If the client falls in scope for CSRD, the results from this current Climate Chapter should be reviewed in line with the materiality assessment and annual CSRD disclosure requirements. Specifically, the findings may serve as an evidence base for EFRAG Standard ESRS E1 CLIMATE CHANGE.

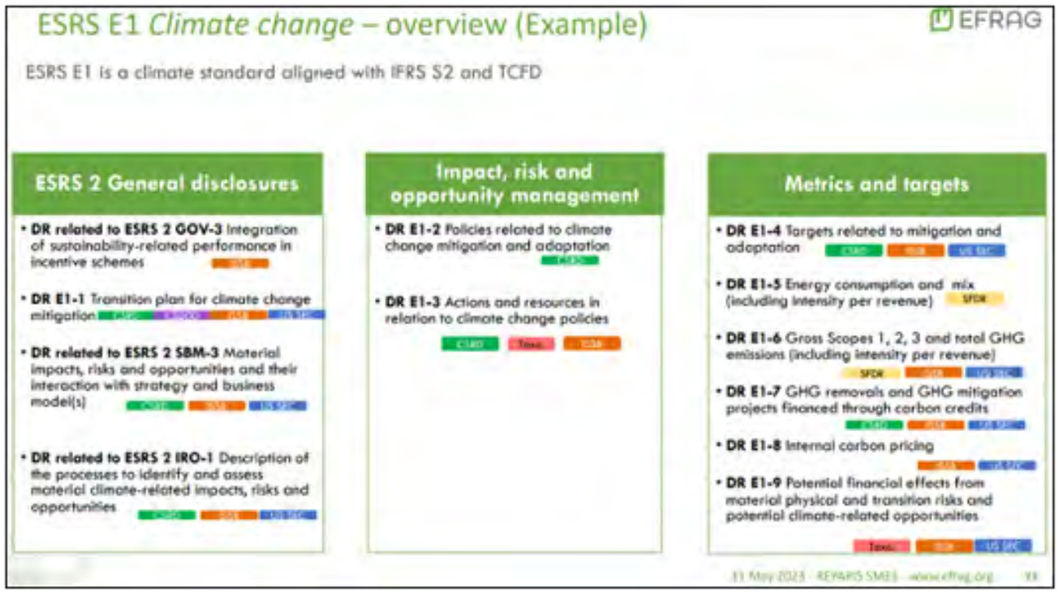

Figure 3: ESRS E1 Climate Change: presented by Eric Duvaud, EFRAG SR TEG member (Source: The first set of ESRS – the journey from PTF to delegated act (adopted on 31 July 2023) – EFRAG)

The data/information from this Climate Chapter should be considered for Impact, Risk and Opportunity Management Disclosure Requirements 20 and 21 below within ESRS E1 CLIMATE CHANGE (EFRAG; 2023):

20. The undertaking shall describe the process to identify and assess climate-related impacts, risks and opportunities. This description shall include its process in relation to:

(a) impacts on climate change, in particular, the undertaking's GHG emissions (as required by Disclosure Requirement ESRS E1-6);

(b) climate-related physical risks in own operations and along the upstream and downstream value chain, in particular:

I. the identification of climate-related hazards, considering at least high emission climate scenarios; and

II. the assessment of how its assets and business activities may be exposed and are sensitive to these climate-related hazards, creating gross physical risks for the undertaking.

(c) climate-related transition risks and opportunities in own operations and along the upstream and downstream value chain, in particular:

I. the identification of climate-related transition events, considering at least a climate scenario in line with limiting global warming to 1.5°C with no or limited overshoot; and

II. the assessment of how its assets and business activities may be exposed to these climate-related transition events, creating gross transition risks or opportunities for the undertaking.

21. When disclosing the information required under paragraphs 20 (b) and 20 (c) the undertaking shall explain how it has used climate-related scenario analysis, including a range of climate scenarios, to inform the identification and assessment of physical risks and transition risks and opportunities over the short-, medium- and long-term.

Corporate Sustainability Due Diligence Directive (CSDDD)

This proposed Directive establishes a corporate due diligence duty. The core elements of this duty are identifying, bringing to an end, preventing, mitigating and accounting for negative human rights and environmental impacts in the company's own operations, their subsidiaries and their value chains. In addition, certain large companies must have a plan to ensure that their business strategy is compatible with limiting global warming to 1.5 °C in line with the Paris Agreement.

The CSDDD is expected to complement the CSRD as it will require companies to implement comprehensive identification, prevention and mitigation processes to eliminate adverse human rights and environmental impacts in the company's own operations, its subsidiaries and value chains. It will also complement the Taxonomy Regulation that requires specific details of what constitute "environmentally sustainable" investments.

It is expected that the CSDDD will require companies in scope to ensure the identification, prevention, mitigation and ability to account for any adverse environmental impacts, with adequate governance, management systems and measures in place to this end.

For instance, regarding adverse climate change impacts, a company would have to obtain quantitative and qualitative information about baseline conditions at higher risk sites or facilities. Identification of adverse impacts would include assessing the environmental context in a dynamic way and at regular intervals, prior to a new activity or relationship; prior to major decisions or changes in the operation; in response to or anticipation of changes in the operating environment; and periodically (at least every 12 months) throughout the life of an activity or relationship. The following Climate Change Impact Assessment can serve as due diligence demonstrating partial compliance with the CSDDD.

13.5.1.3 National Legislation

Climate Action and Low Carbon Development Act

The Climate Action and Low Carbon Development Act 2015 (the principal act) set national climate policy on a statutory footing for the first time in Ireland, with the target of pursuing the transition to a low-carbon, climate-resilient, and environmentally sustainable economy by 2050. The principal act was subsequently amended by the Climate Action and Low Carbon Development (Amendment) Act 2021 (the '2021 Act') which sets Ireland on a legally binding path to net-Zero emissions no later than 2050, and to a 51% reduction in emissions by the end of this decade (Government of Ireland; 2015).

The 2021 Act provides a legally binding framework with clear targets and commitments set in law, and ensures the necessary structures and processes are embedded on a statutory basis to ensure Ireland achieves its national, EU and international climate goals and obligations in the near and long term. Policy amendments will involve the rapid electrification of transport system: electric bikes, electric vehicles, and electric public transport. This will be enacted in tandem with a ban on new registrations of petrol and diesel cars from 2030. Furthermore, there will be a policy to incentivise behavioural changes by increased effective modal shift to walking, cycling and public transport infrastructure.

The 2021 Climate Act incorporates carbon budgets and sectoral emissions limits, defining the carbon budget as the total allowable greenhouse gas emissions during the budget period. Consequently, the Act has removed any mention of a national mitigation plan, replacing it with references to both former and latest versions of the Climate Action Plan, as well as a series of National Long Term Climate Action Strategies. Additionally, it has updated the national transition objective to a national climate objective, committing "to pursue and achieve, by no later than the end of the year 2050, the transition to a climate resilient, biodiversity rich, environmentally sustainable and climate neutral economy" (Government of Ireland; 2022).

Section 6B(12) of the 2021 Climate Act requires the Minister for the Environment, Climate and Communications to publish the approved carbon budget programme. In May 2022, the budgets were published and the total emissions allowed under each budget is set out below, as well as the average annual reduction for each 5-year period (DECC, 2022):

- 2021-2025: 295 Mt CO2eq - this represents an average reduction in emissions of 4.8% per annum for the first budget period.
- 2026-2030: 200 Mt CO2eq - this represents an average reduction in emissions of 8.3% per annum for the second budget period.
- 2031-2035: 151 Mt CO2eq - this represents an average reduction in emissions of 3.5% per annum for the third provisional budget.

To meet these targets, the government published a set of Sectoral Emissions Ceilings in July 2022 and each sector has been assigned a % reduction target on the 2018 baseline to achieve a ceiling of 295 Mt CO2eq by 2025 and 200 Mt CO2eq by 2030 (DECC, 2022).

The assessment in this chapter has been prepared in accordance with, among other things, the 2021 Act and the EIA Directive.

The 2021 Act also introduces a requirement for each local authority to prepare a Climate Action Plan, which will include both mitigation and adaptation measures and be updated every five years. Local authority Development Plans will also align with their Climate Action Plan (DECC, 2021).

The proposed project is consistent with the following plans, strategies and objectives specified in section 15 of the Climate Action and Low Carbon Development Act 2015, as amended:

- The National Climate Objective;
- The most recent Climate Action Plan;
- The most recent National Long-Term Climate Action Strategy;
- The most recent National Adaptation Framework; and
- The objective of mitigating greenhouse gas emissions and adapting to the effects of climate change in the State.

The Act mandates the relevant Minister to develop the Climate Action Plan, the National Long-Term Climate Action Strategy, and the National Adaptation Framework to achieve the National Climate Objective (DECC, 2021). This objective of becoming 'climate neutral' by 2050 aligns with the EU's climate goal as established in Regulation (EU) No 2021/1119 (the 'European Climate Law'). The European Climate Law enshrines into EU legislation the target set by the European Green Deal for the EU to attain climate neutrality, or 'net zero' greenhouse gas emissions, by 2050.

The Climate Action Plan 2024 (CAP24) is the third annual update to Ireland's Climate Action 2019 (the plans are to be updated annually to ensure alignment with Ireland's legally binding economy-wide carbon budgets and sectoral ceilings) (DECC; 2023). This plan is the second to be prepared under the Climate Action and Low Carbon Development (Amendment) Act 2021, and following the introduction, in 2022, of economy-wide carbon budgets and sectoral emissions ceilings. The plan was launched on 20 December 2023.

The plan implements the carbon budgets and sectoral emissions ceilings and sets out a roadmap for taking decisive action to halve our emissions by 2030 and reach net zero no later than 2050, as committed to in the Programme for Government. Climate Action Plan 2024 sets out how Ireland can accelerate the actions that are required to respond to the climate crisis, putting climate solutions at the centre of Ireland's social and economic development (DECC; 2023.

The supplementary Annex of Actions, approved by the Irish Government, provides the specific actions required to implement the targets set out in the Plan, and includes information regarding outputs, lead departments, timelines and stakeholders. For 2024 a new approach to the Annex has been implemented that will see only new, high-impact actions included in the Annex, while the full roadmap of actions to support the delivery of our climate targets remains within the Climate Action Plan itself (DECC; 2023).

13.5.1.4 National Policy

National Adaptation Framework (NAF)

Ireland's first statutory National Adaptation Framework (NAF) was published on 19 January 2018 and was developed under the Climate Action and Low Carbon Development Act 2015. The NAF sets out the national strategy to reduce the vulnerability of the country to the negative effects of climate change and to avail of positive impacts (DECC; 2018).

The NAF builds on the work already carried out under the National Climate Change Adaptation Framework (NCCAF, 2012). The NAF outlines a whole of government and society approach to climate adaptation in Ireland. It also aims to improve the enabling environment for adaptation through ongoing engagement with civil society, the private sector, and the research community.

Under the NAF, several government departments are required to prepare sectoral adaptation plans in relation to the priority areas that they are responsible for, which is to be reviewed once every five years. Local authorities are required to prepare local adaptation strategies. The NAF also aims to ensure ongoing engagement with civil society, the private sector, and the research community.

Just Transition

The 2021 Climate Action Plan sets out a just transition framework consisting of four principles to underpin both processes and implementation of all climate action policies and measures. The present report primarily examines the impact of climate change (Government; 2021). However, we recommend that due consideration be given to the concept of a "just transition," aligning with the Irish Government's framework, to ensure a comprehensive approach to addressing the climate crisis that extends beyond mere climate action.

The just transition framework is made up of four principles (DECC; 2021):

- An integrated, structured, and evidence-based approach to identify and plan our response to just transition requirements.
- People are equipped with the right skills to be able to participate in and benefit from the future net zero economy.
- The costs are shared so that the impact is equitable and existing inequalities are not exacerbated.
- Social dialogue to ensure impacted citizens and communities are empowered and are core to the transition process.

Regional Policy

Action 8 of the National Adaptation Framework (DCCAE 2018) indicates that four regional climate offices must be established, and the REGION Climate Action Regional Office (CARO) is one of these offices. One of the responsibilities of the CARO is to assist local authorities within their region in preparing a Climate Change Action Plan.

There are four local governments in the Dublin region; Dublin City Council (DCC), Fingal County Council (FCC), South Dublin County Council (SDCC) and Dún Laoghaire Rathdown County Council (DLRCC) and each have individual climate change action plans. The individual plans were prepared having regard to 'A Strategy Towards Climate Change Action Plans for the Dublin Local Authorities' (Codema 2017a and 2017b). This combined plan sought to aid the Councils in tackling climate change and setting a path to tackling the challenges related to the consequences of climate change.

13.5.1.5 Cork City Council Climate Action Plan 2024-2029

In February 2024, Cork City County Council (CCCO) adopted the Cork City Council Climate Action Plan 2024-2029 (Cork CCAP). The Action Plan is the climate adaptation and mitigation strategy for the City, and sets out to achieve, by no later than the end of 2050, the transition to a climate resilient, biodiversity rich, environmentally sustainable and climate neutral City. Aligned to the Government's National Climate Objective (as set out in the national Climate Action Plan 2024), the new Plan outlines mitigation and adaptation climate action measures across the following six thematic areas:

- community,
- biodiversity / natural environment / heritage / land use,
- economy,
- transportation,
- built environment and waste

The actions in these themes collectively address the main goals and targets of this plan:

1. 50% improvement in Cork CC's energy efficiency by 2030
2. 51% reduction in Cork CC's greenhouse gas emissions by 2030
3. Make Climate Change Central to the Operation of the Council
4. Mobilise climate action in local communities and ensure a just transition.
5. Protect, restore, and enhance Biodiversity
6. Manage and protect our heritage from the impacts of climate change, promote appreciation of natural heritage, and support practices, knowledge and skills that foster sustainable development, inclusion, and social cohesion
7. To understand land use in Cork City and how to most effectively capture and store carbon and produce better, greener food and energy
8. Promote climate action in enterprise, industry, tourism and agriculture and support the transition to an inclusive, low carbon economy
9. Transition Cork City's transportation to a low carbon system
10. Reduce solid waste disposal and resulting emissions

The Plan sets out how Cork CC will be responsible for enhancing climate resilience, increasing energy efficiency and reducing greenhouse gas emissions across its own assets, services and infrastructure to which it is fully accountable for.

In the development of the CAP, Cork CC has reviewed the risks posed by climate change for the County and the implications of these risks for the delivery of services by Cork CC. This has been achieved through a Climate Change Risk Assessment (CCRA) which identifies the likelihood of future climate hazards and their potential impacts. The CCRA has been undertaken, in accordance with 'Technical Annex B: Climate Change Risk Assessment' of the 'Local Authorities Climate Action Planning Guidelines'. The Cork City Council Climate Action Plan (2024) aims to create a cleaner, greener, and more resilient county. The Climate Action Plan has 51 specific actions that have either been delivered, are in development stage or drafted for the future implementation.

A qualitative CCRA supports the identification and prioritisation of potential future climate risks for more detailed analysis and provides a broad understanding of where adaptation actions could be required. The approach comprises of two phases, where both current and future risks and impacts are assessed.

13.5.1.6 Cork City Development Plan (CCDP) 2022-2028

The Cork CDP sets out the policy objectives and the overall strategy for the proper planning and sustainable development of the County over the plan period from 2022 to 2028.

The Climate Change and Environment,, Green and Blue Infrastructure, Open Space and Biodiversity, Environmental Infrastructure, E chapters of the plan (Chapters 5, 6, & 9 respectively) sets out detailed policy objectives in relation to climate action and the role of planning in climate change mitigation, climate change adaptation, and the transition towards a more climate resilient City.

The creation of a climate resilient city is an overarching strategic outcome of the CCDP, and as such, the theme permeates the entire plan with a selection of policy objectives in multiple Chapters all contributing to aid in the transition of the City to a climate resilient low carbon society. Relevant policy objectives and their incorporation into the Proposed Development design have been considered in this report.

13.5.1.7 Cork City 'Climate Action Plan' Climate Neutral Cork City (2024-2029)

The Cork County Council 'Climate Change Action Plan' (2024) outlines a number of goals and plans to prepare for and adapt to climate change:

1. Mitigation: This involves reducing greenhouse gas emissions to mitigate the effects of climate change. The plan includes measures to decrease emissions from various sectors, including transportation, energy, and waste management.

2. Adaptation: Enhancing resilience to the impacts of climate change is crucial. The plan includes actions to improve infrastructure, protect natural habitats, and ensure that communities are better prepared for climate-related events.

3. Biodiversity: Protecting, restoring, and enhancing biodiversity across the county is a significant focus. This includes initiatives to preserve natural habitats and promote sustainable land use practices.

4. Public Engagement: The plan emphasizes the importance of engaging with the public and raising awareness about climate change. This includes educational campaigns, community involvement, and encouraging sustainable practices among residents.

5. Sustainable Transport: Promoting active travel and developing greenway infrastructure are key components. The plan aims to transition to a low-carbon transport system, which includes improving public transport and pedestrian pathways.

13.5.1.8 Cork City Council Climate Adaptation Strategy

The Cork City Council Climate Adaptation Strategy (Cork City Council 2019) includes 55 adaptation measures to deliver across seven significant goals to mitigate climate change. The delivery of these goals varies between 1-5 years contingent on the aim. Glenveagh Properties plc also aims to support national, regional, and local climate policy. Glenveagh Properties plc collaborates with other agencies to establish robust infrastructure for these events which enables Glenveagh Properties plc to adapt to climate change.

The most recent Glenveagh Properties plc Net Zero Transition Plan 2023, published in March 2023, identifies the sources of Glenveagh Properties plc emissions and proposes measures to reduce these.

The key components of the Glenveagh Properties plc climate change and sustainability policies include:

- Reducing emissions in operations and ensuring they are environmentally considerate
- Building sustainable homes and creating sustainable communities
- Building for the future
- Sustainable and responsible sourcing

Glenveagh's sustainability strategy aligns well with the Cork City Council Climate Change Adaptation Strategy 2019-2024. Both strategies emphasise the importance of addressing climate change and enhancing resilience to its impacts.

The Cork City Council Climate Change Adaptation Strategy focuses on increasing the city's resilience to climate change by identifying key risks and vulnerabilities, implementing climate-resilient actions, and mainstreaming climate adaptation considerations into all operations and functions. This aligns with Glenveagh's commitment to integrating sustainable practices into all aspects of their operations and making rapid and deep cuts to emissions as part of their Net Zero Transition Plan 2023.

Key areas of alignment include:

- Climate Resilience: Both strategies prioritise enhancing resilience to climate change. Glenveagh's focus on sustainable homebuilding and reducing environmental impact supports Cork City Council's goal of making the city as climate resilient as possible.
- Collaboration and Stakeholder Engagement: Glenveagh emphasises collaboration with various stakeholders, which aligns with Cork City Council's strategy to engage with citizens and external stakeholders on climate action.
- Sustainable Development: Glenveagh's commitment to providing high-quality, affordable housing and integrating sustainable practices aligns with Cork City Council's focus on integrating climate considerations into the design, planning, and construction of infrastructure.

13.5.1.9 Guidance

The assessment has referred to national guidelines, where available, in addition to international standards and guidelines relating to the assessment of GHG emissions and associated climatic impact. These are summarised below:

- 2030 Climate and Energy Policy Framework (European Commission, 2014)
- 2030 EU Climate Target Plan (European Commission, 2021b)
- Assessing GHG Emissions and Evaluating their Significance (Institute of Environmental Management & Assessment (IEMA), 2022)
- Carbon Management in Infrastructure (European Commission, 2013)
- Climate Action and Low Carbon Development (Amendment) Act 2021 (No. 32 of 2021) (Government of Ireland, 2021)
- Climate Action Plan 2024 (Government of Ireland, 2023)
- Design Manual for Roads and Bridges (DMRB) Volume 11 Environmental Assessment, Section 3 Environmental Assessment Techniques, Part 14 LA 114 Climate (UK Highways Agency, 2019)
- Environmental Protection Agency (EPA). Guidelines on the information to be contained in Environmental Impact Assessment Reports (2022)
- Department of Housing, Planning, and Local Government. Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (2018)
- European Commission. Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment (2013)
- European Commission. Technical Guidance on the Climate Proofing of Infrastructure in the Period 2021-2027 (2021a)
- IEMA. EIA Guide to: Climate Change Resilience and Adaptation (2020a)

- IEMA. GHG Management Hierarchy (2020b)
- IEMA. Environmental Impact Assessment Guide to: Assessing GHG Emissions and Evaluating their Significance (2022)
- Irish Green Building Council, Land Development Agency (LDA), and Environmental Protection Agency (EPA). The Carbon Designer for Ireland Tool
- Publicly Available Specification (PAS) 2080: 2016
- Transport Infrastructure Ireland (TII). GE-ENV-01106: TII Carbon Assessment Tool for Road and Light Rail Projects and User Guidance Document (2022c)
- Transport Infrastructure Ireland (TII). GE-GEN-01101: Guide to the Implementation of Sustainability for TII Projects (2023)
- Transport Infrastructure Ireland (TII). PE-ENV-01104: Climate Guidance for National Roads, Light Rail and Rural Cycleways (Offline & Greenways) – Overarching Technical Document (2022a)
- Transport Infrastructure Ireland (TII). PE-ENV-01105: Climate Assessment Standard for Proposed National Roads (2022b)
- Integrating Climate Change into Strategic Environmental Assessment in Ireland – A Guidance Note (EPA, 2015)

13.5.2 Study Methodology

Carbon dioxide (CO2) emissions have a global climate warming effect. This is regardless of rate of release, location or the weather when released into the atmosphere. This is unlike pollutants that affect local air quality where the rate of release, location and prevailing weather, as well as the amount of pollutant, determines the local concentrations and the impact. Local ambient concentrations of CO2 are not relevant for climate change and there are no limits or thresholds that can be applied to particular sources of carbon emissions. Any amount of CO2 released into the atmosphere will contribute to climate warming, the extent of which is determined by the magnitude of the release. Although CO2 emissions are typically expressed as kilogrammes or tonnes per year, there is a cumulative effect of these emissions because CO2 emissions have a warming effect which lasts for 100 years or more.

In this regard, the methodology adopted in this chapter covers two separate assessments – a greenhouse gas assessment (GHGA) and a climate change risk assessment (CCRA).

- Greenhouse Gas Emissions Assessment (GHGA) – This evaluation estimates the greenhouse gas emissions generated by a project throughout its entire lifespan. It then compares these emissions against pertinent Irish carbon budgets, targets, and policies to help gauge their significance.; The Transport Infrastructure Ireland (TII) Carbon assessment tool and the Irish Green Building Councils (IGBC) Lifecycle Assessment Tool have been used for this assessment and
- Climate Change Risk Assessment (CCRA) – This analysis examines how a changing climate could affect a project and its surrounding environment. The assessment considers a projects vulnerability to climate change and identifies adaptation measures to increase project resilience.

13.5.2.1 Desk Surveys

A desktop study involving various national and international documents on climate change and analysis of synoptic meteorological data from the nearest Met Eireann station (Cork Airport) was also carried out in order to compile this report. Attention has been focused on Ireland's obligations under the Paris Agreement in the context of the overall climatic impact of the presence and absence of the Proposed Development.

This analysis was undertaken by means of a desktop assessment based on available relevant guidance and information sources, and with reference to other chapters of this EIAR.

The following information sources have been consulted in relation to the assessment of climate aspects for the proposed Project which accompany the planning application documentation:

- Key material, resource and cut/fill balance inputs from the description of the proposed Project presented in Project Description and Construction Strategy of this EIAR;
- Traffic figures from Traffic and Transportation;
- Building Lifecycle and Energy Report findings;
- Site Specific Flood Risk Assessment
- Estimates of likely waste volumes from the description of the proposed Project presented in Project Description, Construction Strategy, Land and Soils and Resource and Waste Management of this EIAR; and
- Environmental Protection Agency (EPA) Greenhouse Gas Emissions Inventories and Projections.

13.5.2.2 Field Surveys

No site-specific baseline surveys were undertaken as part of the assessment for climate. The baseline data presented in this section is derived from the EPA Projections and Met Éireann monitoring network and may be taken as representative of the background climate within the Study Area.

13.5.3 Consultation

Two meetings were held with the Planning Authority ahead of the formal lodgement of this LRD planning application. A Section 247 consultation and a Section 32B LRD meeting were held with representatives of Cork City Council in advance of making this planning application. The Section 247 consultation took place in April 2024. An LRD Opinion was issued by Cork City Council in response to the Section 32B LRD meeting, which took place in August 2024. Further detail in this regard is provided within the Planning Statement and Response to Council Opinion that accompanies this application under separate cover.

13.5.4 Assessment Methodology

13.5.4.1 Key Parameters for Assessment

This assessment has been undertaken in line with the Institute of Environmental Management and Assessment (IEMA) guide 'Assessing Greenhouse Gas Emissions and Evaluating their Significance', 2nd Edition, 2022. The following aspects of the proposed Project are assessed in this chapter:

- Potential direct greenhouse gas (GHG) emissions associated with the construction of the proposed Project – this includes site clearance, embodied carbon, material transport, construction activities and waste management;

- Potential changes in GHG emissions associated with emissions during the operational phase of the proposed Project; and
- Vulnerability of both the construction and operational phases of the proposed Project to climate change.

13.5.5 Greenhouse Gas Assessment (GHG)

As per the EU guidance document Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment (European Commission, 2013) the climate baseline is first established with reference to EPA data on annual GHG emissions (see Section 13.7).

13.5.5.1 Assessment Criteria for GHG Emissions

After the publication of the 2021 Climate Amendment Act in July 2021 and the 2021 CAP, the carbon budgets were approved and a series of sectoral emissions ceiling were published, including sectoral emissions ceilings for the residential sector (DECC, 2021). These ceilings will allow a comparison with the net CO2 projected GHG emissions from the Project.

The IEMA Climate Change principles (IEMA, 2020) document provides a section on how to assess GHG emissions in EIA and states:

- "When evaluating significance, all new GHG emissions contribute to a significant negative environmental effect; however, some projects will replace existing development that have higher GHG profiles. The significance of a project's emissions should therefore be based on its net impact, which may be positive or negative.
- "Where GHG emissions cannot be avoided, the EIA should aim to reduce the residual significance of a project's emissions at all stages."
- "Where GHG emissions remain significant but cannot be farther reduced… approaches to compensate the project's remaining emissions should be considered."

The process for determining the significance of effects involves two key steps: first, defining the magnitude of the impacts, and second, evaluating the sensitivity of the receptors (e.g., Ireland's National GHG targets). Although there are no specific project criteria for climate assessment, the project will be evaluated using the recommended IEMA significance determination approach. This evaluation will account for any embedded or planned mitigation measures included in the project design (IEMA, 2020).

According to LA 114, professional judgment is essential when contextualizing and assessing the significance of a project's GHG impact. In alignment with IEMA Guidance, LA 114 emphasises that the core of assessing significance is not just whether a project emits GHGs or the magnitude of these emissions alone, but rather whether the project helps reduce GHG emissions compared to a baseline that aligns with a net zero trajectory by 2050 (UK Highways Agency, 2019).

Significance determination for emissions generated by the project in this assessment is based on the criteria presented in Table 1 as guided by IEMA in addition to the following two factors:

- The extent to which the trajectory of GHG emissions from the project aligns with Ireland's GHG trajectory to net zero by 2050; and
- The level of mitigation taking place.

Table 1: Definition of Climate Significance

MAGNITUDE OF IMPACT	DESCRIPTION
Major or Moderate Adverse (i.e. significant)	A project that follows a 'business-as-usual' or 'do minimum' approach and is not compatible with the net zero trajectory by 2050 or sectoral based transition to next zero targets, results in a significant adverse effect. It is down to the consultant completing the assessment to differentiate between the 'level' of significant adverse effects, e.g. 'moderate' or 'major' adverse effects. A project's impact can shift from significant adverse to non-significant effects by incorporating mitigation measures that substantially improve on business-as-usual and meet or exceed the science-based emissions trajectory of ongoing but declining emissions towards net zero. Meeting the minimum standards set through existing policy or regulation cannot necessarily be taken as evidence of avoiding a significant adverse effect. This is particularly true where policy lags behind the necessary levels of GHG emission reductions for a science based 1.5°C compatible trajectory towards net zero.
Minor Adverse (i.e. not significant)	A project that is compatible with the budgeted, science based 1.5°C trajectory (in terms of rate of emissions reduction) and which complies with up-to-date policy and 'good practice' reduction measures to achieve an impact that has a minor adverse effect but is not significant. The project may have residual impacts but is doing enough to align with, and contribute to, the relevant transition scenario. A 'minor adverse' or 'negligible' non-significant effect conclusion does not necessarily refer to the magnitude of GHG emissions being carbon neutral (i.e. zero on balance) but refers to the likelihood of avoiding severe climate change and achieving net zero by 2050. A 'minor adverse' effect or better is a high bar and indicates exemplary performance where a project meets or exceeds measures to achieve net zero earlier than 2050.
Negligible	A project that achieves emissions mitigation that goes substantially beyond the reduction trajectory, or substantially beyond existing and emerging policy compatible with that trajectory, and has minimal residual emissions, is assessed as having a negligible effect that is not significant.
Beneficial	A project that achieves emissions mitigation that goes substantially beyond the reduction trajectory, or substantially beyond existing and emerging policy compatible with that trajectory, and has minimal residual emissions, is assessed as having a negligible effect that is not significant.

Ireland's carbon budgets provide a framework for understanding the significance of GHG emissions from the proposed development. This involves comparing the anticipated net GHG emissions of the development with the established carbon budgets. With the introduction of the Climate Action Act in 2021 and the Climate Action Plan 2024, sector-specific carbon budgets have been outlined for comparison with the development's net GHG emissions over its lifecycle. For the Transport sector, which emitted approximately 12 MtCO2e in 2018, the budget has a 2030 cap of 6 MtCO2e, reflecting a 50% reduction. Similarly, the Industry sector, with 2018 emissions of about 7 MtCO2e, has a 2030 ceiling of 4 MtCO2e, indicating a 35% reduction (see Table 3).

13.5.5.2 Construction Phase GHG Assessment

The GHG assessment accounts for various components relating to the project during different life stages to determine the total impact of the development on climate. The building life expectancy for the purposes of the assessment is 50 years, typical for this type of development. GHG emissions are attributed to four main categories, taken from BS EN 15978. These categories are:

- Production Stage (Embodied carbon); The carbon emissions at this stage originate from the extraction of raw materials, their transportation to manufacturing sites, and the primary energy consumed (along with the associated carbon impacts) during the conversion of these raw materials into construction products. These phases have been included in the scope of this assessment, and relevant information has been integrated into the TII tool (TII, 2022).
- Pre-construction/Construction Stage; These carbon impacts stem from the delivery of construction products to the site and their subsequent processing and assembly into the building. This aspect has been incorporated into the assessment's scope.
- Operational Stage: This encompasses a broad range of sources, including greenhouse gas emissions from building operations (energy), maintenance, and replacement which have been included in this assessment.
- End of Life Stage: The sustainable deconstruction and disposal of the existing building at the end of its life (Approx 50 years) consider the activities carried out by demolition contractors on-site. However, no credit is given for potential future carbon benefits from reusing or recycling materials into new products. This stage is not included in the scope of this study due to the variability and uncertainty surrounding deconstruction methods that may be employed at the end of the development's lifespan.

Information and data from the building lifecycle report, building energy ratings and energy statement have been utilised for this chapter.

Nearly Zero Energy Buildings' (NZEB) means a building that has a very high energy performance. The nearly zero or very low amount of energy required should be covered to a very significant extent by energy from renewable sources, including energy from renewable sources produced on-site or nearby.

Non-residential building information

The Non-Domestic Energy Assessment Procedure (NEAP) is Ireland's official methodology for calculating a Building Energy Rating (BER) for non-domestic buildings. BER assessors use the NEAP software tool and guidance manuals to publish non-domestic Building Energy Rating (BER) certificates and advisory reports and to demonstrate compliance with Part L of the building regulations. The NEAP software calculates the energy consumption and carbon dioxide emissions of a building. It considers space heating and cooling, water heating, ventilation and lighting information.

Simplified Building Energy Model (SBEMie) or other approved software can be utilised to publish non-domestic BERs and demonstrate compliance with Part L.

Primary energy use and the associated carbon dioxide emissions are calculated using the Non-Domestic Energy Assessment Procedure (NEAP) and these parameters must not exceed specified target values.

To achieve NZEB compliance for primary energy use, the energy performance coefficient (EPC) of a building must be no greater than the Maximum Permitted Energy Performance Coefficient (MPEPC), which is 1.0.

An acceptable carbon dioxide emissions rate for NZEB compliance is achieved if the calculated carbon performance coefficient (CPC) is no greater than the Maximum Permitted Carbon Performance Coefficient (MPCPC), which is 1.15.

In terms of reporting units, all units are in equivalent kilogrammes of carbon dioxide – hereafter kg CO2eq. Equivalent kilograms of carbon dioxide (kg CO2eq) are used as a standardised unit for numerous greenhouse gases such as methane and nitrous oxide. Summary data is presented as tonnes of CO2eq for ease of reference of this data.

Residential building information

The Dwelling Energy Assessment Procedure (DEAP) is used by BER assessors to calculate the energy performance and carbon dioxide emissions of a home's space heating, water heating, ventilation and lighting. DEAP consists of a software tool and guidance manuals. BER Assessors use DEAP to publish Building Energy Rating (BER) certificates and advisory reports for homes. DEAP is also the compliance tool specified in Part L of the Irish Building Regulations.

The DEAP software is web-based and used to calculate the annual delivered energy consumption, primary energy consumption (kWh/m2/year) and carbon dioxide emissions (kgCO2/m2/y) for standardised occupancy. For all new builds, NZEB is equivalent to a 25% improvement in energy performance on the 2011 Building Regulations. Key changes to Part L for NZEB compliance include a Maximum Energy Performance Coefficient of 0.3, a Maximum Carbon Performance of 0.35 and a renewable Energy Ratio of 20%.

The project design team have also utilised the Irish Green Building Councils (IGBC) Carbon Designer tool for Ireland. The Irish Green Building Council, in collaboration with One Click LCA Ltd., have developed the Carbon Designer for Ireland tool specifically for Irish building projects. Endorsed by the EPA and the Land Development Agency, this tool is compliant with standards such as EN 15978, ISO 21931–1, ISO 21929, and the data requirements of ISO 14040 & EN 15804. It is also aligned with LEED, BREEAM, and PAS 2080. The tool enables users to evaluate the carbon footprint of buildings in the early stages by using typical default materials and values. Users input details such as gross floor area, number of stories, and building frame type. After establishing a baseline with generic data, the tool facilitates the exploration of various options and the optimisation of carbon impacts. It identifies the most carbon-intensive elements within the building and suggests alternatives with lower carbon footprints. This provides a high-level initial assessment of the lifecycle carbon for the development based on basic information and default values with the option to edit these defaults as required to reduce impacts.

The primary factor in reducing climate impact is the extent of proposed mitigation. Thus, using construction materials with lower carbon intensity can help reduce climate effects. This assessment aims not for perfection but to identify areas with significant carbon impact. We can then explore potential mitigation measures to reduce this impact. Outputs from the IGCB tool have been reviewed and implemented where relevant to reduce the climate impact of the proposed development.

Transport Infrastructure Ireland's (TII) proprietary carbon tool has been used to quantify carbon emissions from non-building elements such as material delivery, spoil removal, roads, and infrastructure. The carbon tool is a spreadsheet-based product, developed by TII, with the goal of identifying, estimating and mitigating greenhouse gas emissions that accrue on large road and rail infrastructure projects. The carbon tool is closely aligned with guidance set out in PAS 20803 which suggests a modular structure for capturing and reporting carbon emissions according to lifecycle phase. Where the exact material needed isn't listed an estimate to a similar material type has been used. The construction waste and construction traffic information were reviewed from the traffic and waste chapters.

Design data for materials, earthworks and transport distances are based on input data from the design team. Where detailed designs are not available for various parts of the project, assumptions are made based on industry best practice and default values in the carbon tool. In particular, transport distances for materials have been estimated, as no specific suppliers have been selected at this early stage of the proposed Project. This allows for an estimate of transport emissions, using an emissions factor for kg CO2eq/km in the carbon tool.

The use of the TII Carbon Tool was not considered suitable for the building elements of the proposed development. As the TII Carbon Tool was developed for road and infrastructure projects, the material types within the tool are specific to these types of developments. These material types are not fully appropriate for assessing the embodied carbon associated with the construction of buildings. Therefore, the carbon impact of the buildings was carried out using an alternative tool; the Carbon Designer for Ireland tool. The IGBC tool in combination with BER/NEAP assessments have been used for the building and operational carbon assessment.

13.5.5.3 Operational Phase GHG Assessment

Traffic Emissions

As per the EU guidance document Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment (European Commission, 2013) the climate baseline is first established by reference to EPA data on annual GHG emissions (see Section 13.7 below). Thereafter the impact of the proposed development on climate is determined. Emissions from road traffic associated with the proposed development have the potential to emit carbon dioxide (CO2) which will impact climate.

The UK Highways Agency has published an updated DMRB guidance document in relation to climate impact assessments LA 114 Climate (UK Highways Agency, 2019). The following scoping criteria are used to determine whether a detailed climate assessment is required for a proposed project during the operational stage. During the operational phase, if any of the road links impacted by the proposed development meet the below criteria then further assessment is required.

- A change of more than 10% in AADT;
- A change of more than 10% to the number of heavy duty vehicles; and
- A change in daily average speed of more than 20 km/hr.

None of the road links impacts by the proposed development satisfy the above criteria and a quantitative assessment of the impact of traffic emissions on climate is not necessary as there is no potential for significant impacts to climate.

Operational GHG Emissions

The EU guidance (2013) also states indirect GHG emissions as a result of a development must be considered, this includes emissions associated with energy usage. In addition to the EU guidance, the Institute of Environmental Management and Assessment (IEMA) guidance note on 'Assessing Greenhouse Gas Emissions and Evaluating their Significance' (IEMA, 2022) states that "the crux of significance regarding impact on climate is not whether a project emits GHG emissions, nor even the magnitude of GHG emissions alone, but whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050". Mitigation has taken a leading role within the guidance compared to the previous edition published in 2017. Early stakeholder engagement is key and therefore mitigation should be considered from the outset of the project and continue throughout the project's lifetime in order to maximise GHG emissions savings.

The Energy Statement, building lifecycle report and IGBC outputs in relation to this assessment has been reviewed and used to inform the operational phase climate assessment. This report outlines several measures in relation to energy usage from the proposed development primarily in relation to heat and electricity. Several measures have been incorporated into the overall design of the development to reduce the impact to climate where possible, in line with the objectives of the IEMA guidance (2022).

13.5.6 Climate Change Risk Assessment-Criteria for Climate Vulnerability

Climate change risk assessment is a risk assessment-based methodology for identifying potential climate impacts and assessing their severity. Carrying out a climate change risk assessment, at the simplest level, can be summarised into the following steps:

- identifying potential climate change risks to a scheme or project.
- assessing these risks (potentially prioritising to identify the most severe); and
- formulating mitigation actions to reduce the impact of the identified risks.

Any assessment of risk includes assessing the likelihood (or probability) and magnitude (or severity) of the impacts identified. This method is widespread within the climate change resilience assessments carried out by projects and cities to date.

The risk assessment assesses the likelihood and consequence of the impact occurring to each receptor, leading to the evaluation of the significance of the impact and the vulnerability of the proposed development to various climate hazards. The vulnerability is determined by combining the sensitivity and the exposure of the proposed development to various climate hazards.

To evaluate the likelihood of climate risk, we have utilised the baseline environmental information provided in Section 13.7, future climate change models, and insights from other experts involved in the proposed development (e.g., hydrologists and traffic consultants).

Initially, a preliminary Climate Change Risk Assessment (CCRA) focusing on the operational phase is performed, following the TII guidance PE-ENV-01104 (2022). This involves assessing the sensitivity of the development assets (i.e., receptors) and their exposure to climate change hazards. Each asset category within the proposed development must be assigned a level of sensitivity to climate hazards. PE-ENV-01104 outlines the asset categories and climate hazards that should be considered.

The specific asset categories will differ depending on the type of development and need to be determined on a case-by-case basis.

- **Asset Categories** Pavements; drainage; structures; utilities; landscaping; signs, light posts, buildings, and fences.
- **Climate Hazards** Flooding (coastal, pluvial, fluvial); extreme heat; extreme cold; wildfire; drought; extreme wind; lightning and hail; landslides; fog.

The sensitivity is based on a High, Medium or Low rating with a score of 1 to 3 assigned as per the criteria below.

- **High Sensitivity** The climate hazard will or is likely to have a major impact on the asset category. This is a sensitivity score of 3.

- **Medium Sensitivity** It is possible or likely the climate hazard will have a moderate impact on the asset category. This is a sensitivity score of 2.
- **Low Sensitivity** It is possible the climate hazard will have a low or negligible impact on the asset category. This is a sensitivity score of 1.

Once the sensitivities have been identified the exposure analysis can be completed. The exposure analysis involves determining the level of exposure of each climate hazard at the project location irrespective of the project type for example: flooding could be a risk if the project location is next to a river in a floodplain. Exposure is assigned a level of High, Medium, or Low as per the below criteria.

- **High Exposure** It is almost certain or likely this climate hazard will occur at the project location i.e. might arise once to several times per year. This is an exposure score of 3.
- **Medium Exposure** It is possible this climate hazard will occur at the project location i.e. might arise a number of times in a decade. This is an exposure score of 2.
- **Low Exposure** It is unlikely or rare this climate hazard will occur at the project location i.e. might arise a number of times in a generation or in a lifetime. This is an exposure score of 1.

Once the sensitivity and exposure are categorised, a vulnerability analysis is conducted by multiplying the sensitivity and exposure to calculate the vulnerability.

Vulnerability = Sensitivity x Exposure

The vulnerability assessment takes any proposed mitigation into account. Table 13.2 details the vulnerability matrix; vulnerabilities are scored on a high, medium, and low scale. Where residual medium or high vulnerabilities exist, the assessment may need to be progressed to a detailed climate change risk assessment and further mitigation implemented to reduce risks.

According to TII guidance and EU technical guidance, if all identified vulnerabilities are reasonably ranked as low, a detailed climate risk assessment may not be necessary. In such cases, the impact of climate change on the development would be deemed insignificant.

However, if there are residual medium or high vulnerabilities, a more detailed climate change risk assessment may be required, along with the implementation of additional mitigation measures to address the risks. The TII guidance specifies that a construction phase Climate Change Risk Assessment (CCRA) is only required if a detailed CCRA is deemed necessary.

Table 2: Vulnerability Matrix

		EXPOSURE		
		HIGH (3)	MEDIUM (2)	LOW (1)
MAGNITUDE OF IMPACT	HIGH (3)	9- High	6- High	3- Medium
	MEDIUM (2)	6- High	4- Medium	2- Low
	LOW (1)	3- Medium	2- Low	1- Low

The vulnerability conclusions for each impact are based on, and incorporate, confirmed design and mitigation measures. Where the assessment concludes that the impact remains high, the project team may need to identify additional adaptation/EIA mitigation measures.

The screening CCRA, detailed in Section 13.9.2, did not identify any residual medium or high risks to the proposed development as a result of climate change. Therefore, a detailed CCRA for the construction and operational phase were scoped out.

While a CCRA for the construction phase was not required, best practice mitigation against climate hazards is still recommended in Section 13.10.

13.6 Difficulties Encountered

Difficulties were encountered during the quantification of materials at the design stage in order to assess the embodied construction carbon. The exact volumes of materials, location of waste disposal sites, sourcing of products and technical specification for materials are finalised during the detailed design phase and by the appointed contractor. Throughout the assessment, efforts have been made to provide the most likely scenario of the embodied carbon assessment. Where it is required to make assumptions as the basis of the assessment presented here, these assumptions are based on advice from competent project designers and are clearly outlined within the chapter.

13.7 Baseline Environment

Climate refers to the average weather conditions over a period, typically 30 years, while climate change denotes a substantial alteration in these average conditions. Although climate change can occur naturally, human activities in recent years have accelerated its pace through the emission of greenhouse gases (GHGs), as noted by the IPCC in 2015. These anthropogenic GHGs are changing the composition of the Earth's atmosphere, leading to an enhanced 'Greenhouse Effect.' This effect increases the atmosphere's capacity to trap heat, resulting in a rise in average global temperatures over the past four decades. The burning of fossil fuels, which releases significant amounts of carbon dioxide (CO2), has been and remains a major contributor to this enhanced greenhouse effect. The most critical GHGs include carbon dioxide (CO2), methane (CH4), and nitrous oxide (N2O).

Global climate change refers to the long-term shift in temperature and weather patterns on Earth, primarily driven by human activities such as burning fossil fuels, deforestation, and industrial processes. These activities increase the concentration of greenhouse gases in the atmosphere, enhancing the greenhouse effect and leading to a rise in average global temperatures. This warming impacts natural systems, causing more frequent and severe weather events, melting polar ice, rising sea levels, and disruptions to ecosystems and biodiversity. The effects of climate change are profound, affecting agriculture, water resources, health, and the economy, necessitating urgent and sustained efforts to mitigate and adapt to these changes.

Ireland is also experiencing the impacts of a changing climate with the rise in the annual surface air temperature by 0.8% since 1900. In addition to temperature, we are seeing increased rainfall and sea-level rise and observing changes in the frequency of extreme weather like storms, flooding, and drought (EPA, 2023). Examples of extreme weather would be Storm Ophelia in 2017 and the Beast from the East in 2018 to name two of the most impactful.

13.7.1 Current GHG Emissions Baseline

In 2023, Ireland's GHG emissions are estimated to be 55.01 million tonnes carbon dioxide equivalent (Mt CO2eq), which is 6.8% lower (or 4.00 Mt CO2eq) than emissions in 2022 (59.00 Mt CO2 eq) and follows a 2.0% decrease in emissions reported for 2022. Emissions are 1.2% below the historical 1990 baseline for the first time in 33 years (EPA, 2024).

Climate impacts are evaluated at a national level, considering national targets and sectoral emission ceilings. The study area for climate assessments is the Republic of Ireland, with the baseline established in the context of this geographic focus.

In 2023 emissions in the stationary ETS1 emissions decreased (17%) and emissions under the ESR (Effort Sharing Regulation) decreased (3.4%). When LULUCF is included, total national emissions decreased by 3.8% (EPA, 2024).

Decreased emissions in 2023 compared to 2022 were observed in the largest sectors except for transport which showed an increase of 0.3% shown highlighted red in the "Emissions change 2022-2023" Table 3 below (EPA, 2024). Climate impacts are evaluated at a national level, considering national targets and sectoral emission ceilings. The study area for climate assessments is the Republic of Ireland, with the baseline established in the context of this geographic focus. The table shows that the residential sector accounted for 5.3% of emissions in 2023.

Table 3: Emissions change 2022-2023 Ireland (EPA, 2024).

MT CO2 EQ	2022	2023	% CHANGE
Agriculture	21.795	20.782	**-4.6%**
Transport	11.760	11.791	**0.3%**
Energy Industries	10.003	7.845	**-21.6%**
Residential	5.753	5.346	**-7.1%**
Manufacturing Combustion	4.334	4.133	**-4.6%**
Industrial Processes	2.288	2.155	**-5.8%**
F-Gases	0.741	0.699	**-5.7%**
Commercial Services	0.751	0.732	**-2.5%**
Public Services	0.696	0.677	**-2.7%**
Waste	0.881	0.846	**-4.0%**
LULUCF	3.983	5.614	**40.9%**
Total excluding LULUCF	**59.003**	**55.007**	**-6.8%**
Total including LULUCF	**62.986**	**60.620**	**-3.8%**

Emissions per capita decreased from 11.4 tonnes CO2eq/person in 2022 to 10.4 tonnes CO2eq/person in 2023. Ireland's average tonnes of GHG/capita over the last ten years were 12.1 tonnes. With recent CSO preliminary 2023 census data showing a population of 5.28 million people and with population projected to increase to 5.5 million in 2030, 5.9 million in 2040 and 6.2 million by 2050, per capita emissions need to reduce significantly. At current per capita emission levels, each addition 500,000 people would contribute an additional 5 million tonnes of CO2eq annually (EPA, 2024).

The EPA also publishes GHG emission projections to 2030. Table 4 shows that in the WAM scenario the percentage reduction is not achieved for electricity, transport, industry, agriculture and other (comprises of waste, fluorinated-gases and petroleum refining). Looking at the overall percentage emissions reduction target of -51% by 2030 compared to 2018, the projections are indicating a significant shortfall with only a -29% reduction achieved thus predicting that Ireland will not achieve its legally binding climate target (EPA, 2024).

Table 4: Assessment of Achievement of Sectoral Percentage Targets under the With Additional Measures scenario (EPA, 2024)

SECTOR	PROJECTED EMISSIONS 2030 (MT CO2 EQ)	WAM PROJECTIONS PERCENTAGE REDUCTION 2030 VS 2018	TARGET REDUCTION 2030 VS 2018
Electricity	10.3	-66.0%	-75%
Transport	12.3	-29%	-50%
Buildings (Residential)	7	-40%	-40%
Buildings (Commercial & Public)	1.5	-60%	-45%
Industry	7	-24%	-35%
Agriculture	23.2	-18%	-25%
Other	2.1	-25%	-50%
LULUCF* *(no ceiling currently)*	4.2	17%	n/a
Total with LULUCF	**67.6**	**-29%**	**-51%**

13.7.2 Future GHG Baseline

In line with TII and IEMA Guidance the future baseline is a trajectory towards net zero by 2050, "whether it [the project] contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050" (IEMA, 2022). The future baseline for GHG emissions assessment will be considered in relation to the future Irish climate targets which the assessment results will be compared against.

The future baseline will be based on Ireland achieving the targets outlined in the Climate Action Plan 2024 (CAP24) and subsequent Climate Action Plans, as well as meeting binding EU targets for 2030. In order to meet the commitments under the Paris Agreement, the European Union (EU) enacted 'Regulation (EU) 2018/842 on binding annual GHG emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) No. 525/2013' (hereafter referred to as the Regulation). The Regulation aims to deliver, collectively by the EU in the most cost-effective manner possible, reductions in GHG emissions from the Emission Trading Scheme (ETS) and non-ETS sectors amounting to 43% and 30%, respectively, by 2030 compared to 2005. The

Regulation was amended in April 2023 and Ireland must now limit its greenhouse gas emissions by at least 42% by 2030. The ETS is an EU-wide scheme which regulates the GHG emissions of larger industrial emitters Including electricity generation, cement manufacturing and heavy industry. The non-ETS sector includes all domestic GHG emitters which do not fall under the ETS scheme and thus includes GHG emissions from transport, residential and commercial buildings and agriculture.

13.7.3 Current Climate Baseline

Impacts to the proposed Project as a result of climate change involve increases in temperatures and increases in the number of rainfall days per year. Ireland has observed increases in the annual rainfall in the north and west of the country, with small increases or decreases in the south and east including in the region where the proposed Project will be located. The EPA (2021) has compiled a list of potential adverse impacts as a result of climate change including the following which may be of relevance to the proposed Project:

- Increase of 1 to 4 degrees Celsius in average temperature;
- More intense storms and rainfall events;
- Increased likelihood and magnitude of river and coastal flooding;
- Water shortages in summer in the east;
- Adverse impacts on water quality; and
- Changes in distribution of plant and animal species

The proposed Project area experiences a temperate, maritime climate, resulting in mild winters and cool summers. The Met Éireann weather station at Cork Airport, County Cork, is the nearest weather and climate monitoring station to the proposed Project that has meteorological data recorded for the 29-year period from 1991 to 2020 (Met Eireann, 2023). The monitoring station is located approximately 6km south of the proposed Project at its nearest point (Ford Site). Meteorological data recorded at Cork Airport over the 29-year period from 1991 to 2021 indicates that the wettest months were January and December, and the driest month on average was May July was the warmest month with a mean temperature of 15.2°C.

Met Éireann recent weather patterns were analysed, they highlight a marked rise in both the frequency and intensity of storms. Notable examples include Storm Darwin in February 2014, Storm Emma in March 2018, and Storm Ophelia in October 2018. In 1974, Cork Airport recorded its highest wind gust, reaching 94 km/h.

Annual rainfall from 1991 to 2020 was 3.6% higher compared to the 30-year period from 1961 to 1990.

The largest rainfall event in County Cork, was recorded in October 2023 during Storm Babet. Cork Airport saw its highest amount of October rainfall on record, with 307.22mm of rainfall during the month. The wettest day in October 2023 was also recorded at Cork Airport, with 55.6mm of rain falling on October 18, the highest daily fall for October since 1995.

The latest data from Met Éireann's 'The Status of Irish Climate 2020 Report' highlights that the 10-year period from 2006-2015 was the wettest recorded decade (Met Eireann, 2021).

Met Éireann's 2023 Climate Statement states 2023's average shaded air temperature in Ireland is provisionally 11.20 °C, which is 1.65°C above the 1961-1990 long-term average. Previous to this 2022 was the warmest year on record, however 2023 was 0.38 °C warmer (Met Eireann, 2023).

In 2023, Ireland experienced above-average rainfall, including the warmest June on record and the wettest March and July. Since April 2023, record-high sea surface temperatures (SST) were observed, with a severe marine heatwave affecting the western coast of Ireland in June. This marine heatwave contributed to the unprecedented rainfall in July (Met Eireann, 2024).

Recent weather patterns and extreme weather records from Met Éireann have been examined. Given the exceptional data from 2023, Met Éireann notes that current Irish climate projections predict continued warming, including milder winters. The record temperatures increase the likelihood of extreme weather events, leading to longer dry periods and heavier rainfall. Additionally, sea level rise is expected to cause more storm surges and coastal flooding, with an increase in compound events where coastal surges and extreme rainfall occur simultaneously. While Met Éireann is confident that maximum rainfall rates will rise, there is less certainty about how the frequency or intensity of storms will change with climate change.

Surface air temperature plays a crucial role in climate analysis, influencing ecosystems, livelihoods, and human activities. Changes in temperature affect various sectors, including health, agriculture, and energy demand. In Ireland, over a century of consistent temperature measurements is available. Globally, the average surface air temperature has increased by 0.85°C over the past 100 years, with the rate of warming nearly doubling since 1975, reaching an equivalent of a 1.65°C rise per century. The five warmest years on record globally were 2015–2019, which is notable since temperature records began in the mid to late 1800s. Hotter, drier summers and milder, wetter winters are now more common in many parts of the world (Met Éireann 2020).

13.7.3.1 DNV Climatics Multi-Hazard Exposure Analysis

The assessment was based on the on-site climate exposure projections generated by the IPCC climate models as appropriate. The tool is typically used in combination with multiple Shared Socio-economic pathways (SSPs), which represent different future greenhouse gas concentration trajectories developed by the International Panel on Climate Change. The assessment was undertaken for two representative scenarios SSP1-2.6 and SSP5-8.5:

- SSP1-2.6 (transition from 2030) - this scenario leads to global warming exceeding 2 °C by 2100 but remaining below 3 °C. It is described as an intermediate scenario; and
- SSP5-8.5 (business as usual) - this scenario leads to global warming significantly exceeding 3 °C by 2100 and is generally taken as the basis for the worst-case climate change scenarios.

Climatics combines the global data from multiple IPCC models (ACCESS, GFDL-ESM4, HadGEM) to address the uncertainty inherent in complex forecast modelling. Through DNV's proprietary method, we downscale and refine the global data to a 5km grid resolution for various regions. Leveraging these refined datasets, we can assess multi-hazard exposure for assets and portfolios across different geographical areas. The overall multi-hazard climate exposure for region shows spatial disparities in MHEI.

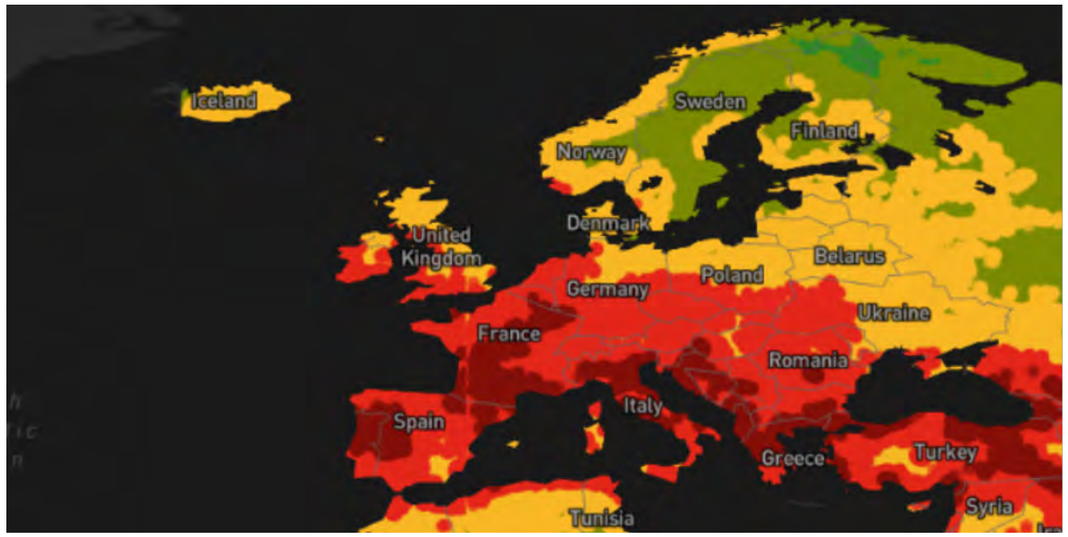

Figure 4: Multi-hazard exposure index for 2050 (SSP5-8.5)

The chart below shows the comparison of exposure levels for the given location.

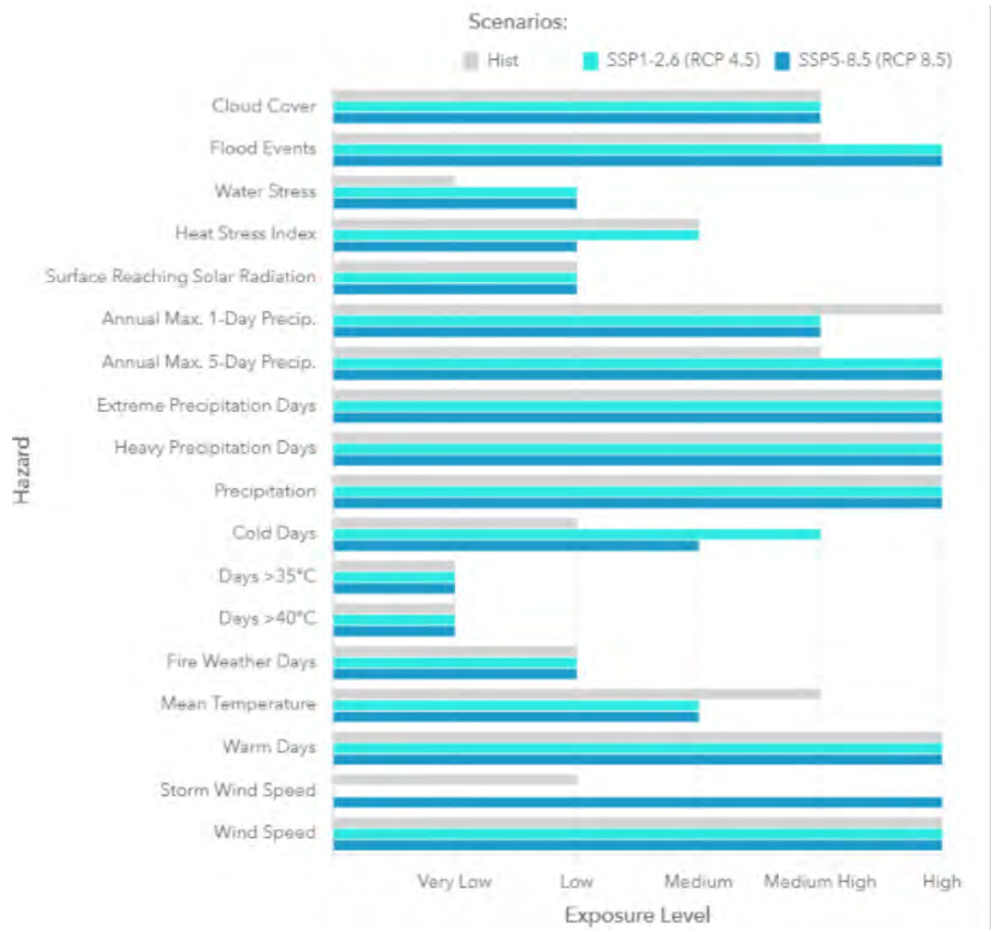

Figure 5: Comparison of extremes for the given asset location

Under each scenario, nine categories of climate exposure indices (22 hazards indices) were assessed. The findings are summarised in the following table. For key indices, the chronic exposure (average trend) and acute exposure (extremes) are considered as appropriate. Definitions for the derived hazards are summarised in the following section.

Table 5: Multi-Hazard Exposure Analysis for (51.899536, -8.440482)

CATEGORY	HAZARD SUMMARY	EXPOSURE LEVEL
Cloud Related	Cloud Cover Historic average cloud cover in the area was 77.00%. This is projected to decrease to 76.48% (-0.52%) under SSP1-2.6 and 75.69% (-1.31%) under SSP5-8.5 for 2050.	4
Drought And Floods	Flood Events The historic inundation of 100-yr flood event is 0.20 m. This is projected to increase to 0.23 m (+16.16%) under SSP1-2.6 and 0.29 m (+47.15%) under SSP5-8.5 for 2050.	5
Water Stress	Water Stress The water stress index ranges from 1 to 5, with 1 indicating low stress and 5 indicating high stress. The historic water stress is rated as 1.00. And this is projected to increase to 2.00 under SSP1-2.6 and 2.00 under SSP5-8.5 for 2050.	2
Hailstorm	Hailstorm Frequency Historical hailstorms in this location were 0.02 events/year	n/a
Heat Stress	Heat Stress Index The historic heat stress index in the area is 12.68. And this is projected to increase to 13.83 under SSP1-2.6 and 14.33 under SSP5-8.5 scenarios for 2050.	2
Irridiance At Surface	Surface Reaching Solar Radiation The surface reaching solar radiation in the area was historically 125.82 W/m^2 and this is projected to increase to 131.90 W/m^2 under SSP1-2.6 and 129.67 W/m^2 under SSP5-8.5 for 2050.	2
Lightening	Lightning Density The historic lightning density in the area was 0.00 event/km2/year	n/a
Rainfall Related	Annual Max. 1-Day Precipitation Historic annual maximum 1-day precipitation in the area was 37.92 mm. This is projected to increase to 38.56 mm under SSP1-2.6 and 38.73 mm under SSP5-8.5 for 2050.	4
	Annual Max. 5-Day Precipitation Historic annual maximum 5-day precipitation in the area was 71.38 mm. This is projected to increase to 76.62 mm under SSP1-2.6 and 77.53 mm under SSP5-8.5 for 2050.	5
	Extreme Precipitation Precipitation over 99% quantile is defined as extreme precipitation. The historic average extreme precipitation is 62.87 mm for a year and this is projected to increase to 80.85 mm (+28.61%) under SSP1-2.6 and 82.04 mm (+30.50%) under SSP5-8.5 for 2050	5
	Heavy Precipitation Days Precipitation over 20mm is defined as heavy precipitation. The historic average heavy precipitation days in the area was 30.50 days in a year. This is projected to increase to 30.87 days under SSP1-2.6 and 32.06 days under SSP5-8.5 respectively in 2050.	5
	Average Annual Precipitation Historic average precipitation in the area was 1101.92 mm/year. This is projected to decrease to 1089.29 mm/year under SSP1-2.6 and 1107.39 mm/year under SSP5-8.5 respectively in 2050.	5
Landslides	The historic landslide in the area is 0.00.	n/a
Subsidence Susceptibility Index	Subsidence susceptibility index ranges from 1-6, as very low, low, medium low, medium high, high, very high. The historic subsidence susceptibility index in the area is 3.00 and is projected to be 0.00 for 2040.	n/a
Temperature Related	Cold Days The historic cold days in the area were 7.91% per year. This is predicted to decrease to 3.50% under SSP1-2.6 and 1.83% under SSP5-8.5 for 2050.	3
	Days >35°C The historic days above 35°C in the area were 0.00 days per year. This is predicted to increase to 0.00 days under SSP1-2.6 and 0.00 days under SSP5-8.5 respectively in 2050.	1
	Days >40°C The historic days above 40°C in the area were 0.00 days per year. This is predicted to 0.00 days under SSP1-2.6 and 0.00 days under SSP5-8.5 respectively in 2050	1
	Fire Weather Days The historic fire weather days in the area were 20.60 days per year. This is predicted to increase to 27.66 (+34.31%) days under SSP1-2.6 and 31.44 (+52.63%) days under SSP5-8.5 for 2050.	2
	Mean Temperature The historic mean annual temperature in the area is 10.53°C. This is projected to increase to 11.44°C (+0.92°C) under SSP1-2.6 (optimistic) and 11.90°C (+1.38°C) under SSP5-8.5 (business as usual or pessimistic scenario) for 2050.	3
	Warm Days Warm day are defined as when the maximum temperature is beyond 90% percentile. The historic warm days in the area are 13.98% per year and this it projected to increase to 31.26% under SSP1-2.6 and 37.57% under SSP5-8.5 scenarios for 2050.	5
Wind Related	Storm Wind Speed The historic storm wind speed of the area is 13.21 m/s and this is predicted to be increase to to 19.18 m/s (+45.14%) for SSP5-8.5 scenario for 2050.	5
	Wind Speed Historic average wind speed in the area was 5.82 m/s. This is projected to be at this level 5.61 m/s under SSP1-2.6 and 5.67 m/s under SSP5-8.5 for 2050.	5

13.7.4 Future CCRA Baseline

The EPA-funded research project 'Ensemble of Regional Climate Model Projections for Ireland Report No. 159' (EPA 2015) forecasts significant reductions in mean annual, spring, and summer precipitation, with longer dry spells expected. By 2050, the most pronounced decreases are projected for summer, with reductions ranging from 0% to

13% under medium-to-low emission scenarios and 3% to 20% under high emission scenarios. In contrast, heavy precipitation during winter and autumn is expected to increase by up to 20%. Additionally, the number of extended dry periods during autumn and summer is anticipated to rise considerably by mid-century.

The report suggests that the total number of North Atlantic cyclones is expected to decrease by 10%, along with a reduction in average mean sea-level pressure of 1.5 hectopascals (hPa) across all seasons by mid-century. Wind energy is anticipated to decline in spring, summer, and autumn, with an increase expected in winter. Additionally, the predicted rise in extreme storm activity could negatively impact future wind energy supply.

The EPA's State of the Irish Environment Report (Chapter 2: Climate Change) further highlights that projections indicate that the comprehensive implementation of additional policies and measures from the 2019 Climate Action Plan could reduce Ireland's total GHG emissions by up to 25 percent by 2030 compared to 2020 levels. Climate change is already a current issue in Ireland, with a temperature increase of approximately 0.8°C since 1900. The report further highlights the importance of strong public sector climate leadership and the rapid acceleration of decarbonisation efforts if we are to halt the climate crisis (EPA, 2020).

Accurate climate projections are a key scientific input for national policymakers when planning for, and adapting to, the challenges posed by climate change. Climate projections are produced using climate models, which have been developed by scientists over recent decades and are capable of simulating Earth's past, present, and future climate. Global Climate Models (GCMs) are used to model the global impacts on Earth's climate of increasing greenhouse gas concentrations in the atmosphere at a resolution of ~50km or coarser. Regional Climate Models (RCMs) are used to capture key small-scale atmospheric features on the scale of 1-10km, such as local convection and wind gusts. Multi-model ensembles are often used in climate prediction studies to quantify associated model uncertainty.

RCMs utilise the output of GCMs and model regional climates at higher spatial resolutions; this process is known as dynamic downscaling. This approach allows key climate variables to be modelled more precisely, including precipitation; near-surface temperature; and the number and intensity of low-pressure systems. Low pressure systems are the primary driver of precipitation and wind affecting the country; therefore, the added value of RCMs in the modelling of low-pressure systems is of particular importance for Ireland.

Concentration trajectories known as Representative Concentration Pathways (RCPs) were utilised in EPA Research Report No.339 High resolution Climate Projections for Ireland – A Multi-model Ensemble Approach (EPA 2020). For the EPA study, two RCPs were chosen, RCP4.5 and RCP8.5. RCP4.5 is considered an intermediate scenario, while RCP8.5 is considered to be representative of a potential worst-case scenario.

The future climate was modelled using both the Representative Concentration Pathway 4.5 (RCP4.5) (medium-low) and RCP8.5 (high) scenarios. The study suggests that by mid-century (2041–2060), average annual temperatures are projected to rise by 1–1.2°C under RCP4.5 and 1.3–1.6°C under RCP8.5, with the most significant increases in the east. Temperature extremes are expected to become more pronounced, with summer daytime and winter night-time temperatures increasing by 1–2.4°C. The number of frost and ice days is projected to decrease by approximately 50%. Summer heatwaves are likely to become more frequent, especially in the south. Additionally, precipitation is expected to become more variable, with a significant increase in both dry periods and heavy rainfall events.

Established in June 2022, the National Framework for Climate Services (NFCS) aims to streamline the provision of climate services in Ireland and will be led by Met Éireann. The NFCS is designed to facilitate the co-production, delivery, and utilization of precise, actionable, and accessible climate information and tools to enhance climate resilience planning and decision-making. In parallel with the NFCS, ongoing research is being conducted through the TRANSLATE project. This initiative, led by climate researchers from the University of Galway's Irish Centre for High End Computing (ICHEC) and University College Cork's SFI Research Centre for Energy, Climate, and Marine (MaREI), with support from Met Éireann climatologists, is focused on advancing climate science. TRANSLATE generates outputs using internationally reviewed models from CORDEX and CMIP5, with Representative Concentration Pathways (RCPs) offering a range of possible futures based on different human activity scenarios.

TRANSLATE offers the first standardised and bias-corrected national climate projections for Ireland, designed to support climate risk decision-making across various sectors, such as transport, energy, and water. It provides insights into potential changes in Ireland's climate under global temperature increases of 1.5˚C, 2˚C, 2.5˚C, 3˚C, or 4˚Cs. These projections generally align with previous forecasts for Ireland. The country's climate is heavily influenced by the Atlantic Meridional Overturning Circulation (AMOC), a major system of ocean currents, including the Gulf Stream, which features a northward flow of warm water and a southward flow of cold water. This system prevents Ireland from experiencing the extreme temperatures seen in other countries at similar latitudes. Recent studies suggest that the AMOC may weaken by 30–40% by 2100, leading to cooler North Atlantic Sea Surface Temperatures (SSTs). Despite this, Ireland is expected to continue warming, though the cooling effect of the AMOC might moderate the warming relative to continental Europe. Additionally, a weakened AMOC is anticipated to contribute to further sea level rise around Ireland. Climate change will cause significant shifts in temperature and rainfall patterns: average summer temperatures could rise by more than 2°C, summer rainfall could decrease by 9%, and winter rainfall could increase by 24%. Future projections also include a tenfold rise in the frequency of summer nights with temperatures exceeding 15°C by the end of the century, a decrease in the frequency of cold winter nights, and an increase in heatwaves. In Ireland, a heatwave is defined as a period of five consecutive days with daily maximum temperatures above 25°C.

13.8 The 'Do Nothing' Scenario

Under the Do-Nothing Scenario no construction works will take place and the previously identified impacts of carbon emissions from equipment, machinery and development operation will not occur. Therefore, this scenario can be considered neutral in terms of climate.

As the site is zoned for development, in the absence of the proposed development, it is likely that a development of a similar nature is likely to be constructed in the future in line with national policy and the development plan objectives. Therefore, the construction and operational phase impacts outlined in this assessment are likely to occur in the future, even in the absence of the proposed development.

13.9 Potential Significant Effects

13.9.1 GHG Assessment

During both the construction and operational phases of the development, there is potential for various greenhouse gas emissions to be released into the atmosphere. According to TII guidance, the significance of these GHG emissions on the climate is evaluated based on the total emissions across all stages of the proposed development.

13.9.1.1 Construction Phase GHG Assessment

The TII Carbon toolkit was utilised to quantify the construction phase embedded carbon for the proposed development. This toolkit can quantify carbon in infrastructure projects using Ireland-specific emission factors and data. Detailed project information including tonnage of materials was obtained from the Engineering Design Team.

The project design team have also utilised the Irish Green Building Councils (IGBC) Carbon Designer tool for Ireland. This provides a high-level initial assessment of the lifecycle carbon for the development based on basic information and default values with the option to edit these defaults as required to reduce impacts.

Greenhouse gas emissions have been quantified at all aspects of the construction phase including the following stages:

- Production stage: Embodied carbon is the carbon contained within a material or product. It is the sum of all carbon emissions that have been generated during the extraction, processing, and manufacturing of a particular product. Brickwork, concrete, steel and glazing are materials which have the potential for very high embodied carbon but also have to potential for recovery or recycling. Specific items have been identified within the Construction and Environmental Management Plan and it has been detailed whether these can be salvaged and re-used on site or if they are suitable for salvage and re-use off site by providing them to a salvage merchant.
- Transportation to site: emissions associated with the carbon miles of the project materials. The impact of transporting materials from factory/source to site to facilitate construction is reported separately. A series of assumptions are made about the variables that impact transport emissions (material density, vehicle type, vehicle capacity and distance travelled) and assuming that the material may be transported from sources locally within 50km, regionally within 100km and nationally within 250km;
- Site Operations/Construction activities:
    - Site clearance emissions associated with plant and machinery required to clear the site. The carbon tool has a range of assigned land use categories for estimating site clearance. Different land use types have higher or lower carbon intensity for site clearance, which is linked to the energy required to clear the site.
    - Emissions arising from excavation activities based on the energy used in excavation activities. Energy expenditure varies depending on the type of ground to be excavated, e.g., rock excavation is much more energy intensive than topsoil excavation;
    - Construction activities covers carbon emissions generated during the construction of the proposed Project based on the scale and duration of the project; and
    - The generation of waste during the construction phase has potential for climate impact and the nature and scale of this impact depends on the type and volume of waste generated coupled with the nature of the waste treatment (reuse, recycling, recovery or disposal).
- Material replacement & refurbishment: Ongoing material refurbishment and replacement throughout the lifetime of the development is included within this stage of the GHG assessment these are default values based on the typical maintenance requirements for the chosen material types over the assumed 50-year lifetime

The results of the assessment of the above stages using the TII and IGBC tools are presented in Table 6 and Figures 4 & 5 The results indicate that the total GHG emissions generated as a result of the construction of the proposed Project are 13,120,000 kg of CO2eq (13,120 tonnes CO2eq).

The carbon assessment has identified hotspots for embodied carbon emissions, particularly those associated with building materials. These emissions have been calculated using standard default materials for different building types within the OneClick tool, as detailed material information was not available at this stage of the project. Additionally, the average material types from the TII Carbon Tool were utilised for this assessment due to the lack of more specific information.

As anticipated construction materials represent the largest portion of carbon emissions for the proposed development, constituting about 96% of the total embodied carbon emissions during the construction phase across the different buildings. The highest carbon impact is observed in the external walls, beams, floors, and roofs, based on the standard default values and assumptions used in the carbon calculations. The rest of the construction phase's embodied carbon emissions come from transportation to the site, site operations, and material replacement.

The total embodied carbon for the construction phase, including the maintenance and replacement of materials throughout the development's lifetime, has been calculated at 13,120 tonnes CO2e (see Table 7). Since the overall GHG emissions from the development cannot be directly compared to a single sector's 2030 carbon budget, the emissions are categorised into different assessment areas. These categories must be individually compared to the relevant sectoral emissions budgets, as outlined in Table 6. For the proposed development, the applicable sectoral emissions budgets include those for Industry Buildings (Residential), Transport, and Waste. The projected emissions for the development are annualised over an assumed 50-year lifespan and then compared to the relevant sector's 2030 carbon budgets. This annualization process facilitates a proper comparison with annual GHG targets.

Table 6: Construction Phase Greenhouse Gas Emissions

STAGE	GHG ASSESSMENT CATEGORY	PREDICTED GHG EMISSIONS (TCO2E)	RELEVANT SECTOR FOR CARBON BUDGET COMPARISON	ANNUALISED GHG EMISSIONS AS % OF RELEVANT CARBON BUDGET
Production Stage	Materials	10,519	Industry	0.0053%
Transportation to site	Material Transport	655	Transport	0.0002%
Site Operations/ Construction activities	Clearance and demolition	0.4	Industry	0.0000002%
Site Operations/ Construction activities	Excavation	43	Industry	0.00002%
Site Operations/ Construction activities	Construction Worker Travel to Site	33	Transport	0.00001%
Site Operations/Construction activities	Construction Fuel Use	978	Transport	0.0020%
Site Operations/ Construction activities	Construction Waste Disposal	58	Waste	0.00002%
Site Operations/ Construction activities	Construction Waste Transport	451	Transport	0.0002%
Material replacement & refurbishment	Maintenance Material	383	Industry	0.0002%
	Total		**13,120 tCO2e**	

Note 1 Project lifespan assumed 50 years for calculation purposes in line with best practice

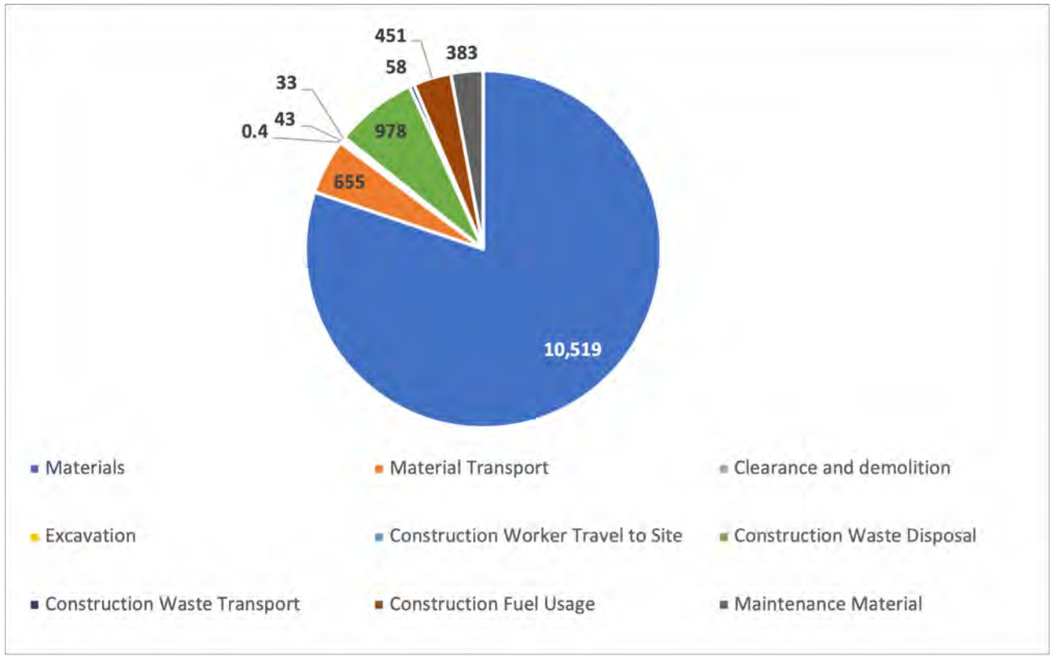

Figure 6: Construction Categories Greenhouse Gas Emissions tCO2e

The projected GHG emissions (outlined in Table 6) can be averaged across the entire lifespan of the proposed development to provide annual emissions estimates, facilitating direct comparison with national annual emissions and targets.

Table 6 compares these GHG emissions with the 2030 carbon budgets for the transport, industry, and waste sectors, Ireland's total GHG emissions for 2022, and Ireland's EU 2030 target of a 30% reduction in non-ETS sector emissions from 2005 levels (33 Mt CO2e) as specified in Regulation EU 2018/842.

When annualised over the proposed development's 50-year lifespan, the estimated total GHG emissions amount to 0.0005% of Ireland's total GHG emissions in 2023 and 0.0008% of Ireland's non-ETS 2030 emissions target. Specifically, emissions from transport-related activities account for 0.0044% of the 2030 Transport budget, construction waste emissions represent 0.0262% of the Waste budget, and industry-related emissions comprise 0.0066% of the 2030 Industry budget.

Table 7: Estimated Construction GHG Emissions relative to Sectoral Budgets and GHG Baseline

TARGET/SECTORAL BUDGET (TCO2E)		SECTOR ANNUALISED PROPOSED DEVELOPMENT GHG EMISSIONS ARE COMPARED	ANNUALISED PROPOSED DEVELOPMENT GHG EMISSIONS AS % OF RELEVANT TARGET/BUDGET
Ireland's 2023 Total GHG Emissions (existing baseline)	55,010,000	Total GHG Emissions	0.0005%
Non-ETS 2030 Target	33,381,312	Total GHG Emissions	0.0008%
(Industry Sector) 2030 Sectoral Budget	4,000,000	Total Industry Emissions	0.006%
(Transport Sector) 2030 Sectoral Budget	6,000,000	Total Industry Emissions	0.004%
(Waste Sector) 2030 Sectoral Budget	1,000,000	Total Waste Emissions	0.0262%

A potential scenario for reducing GHG emissions was explored, which involved incorporating recycled cement into the concrete mix. This approach could lower the embodied carbon from 500 kgCO2e/m^2 (Baseline Design) to 400 kgCO2e/m^2 for a typical precast scheme with strip foundations (reaching an Embodied Carbon Benchmark B according to the One Click LCA 'Carbon Heroes Benchmark Programme'), resulting in an estimated total reduction of around 900 tCO2e compared to the baseline design. The feasibility of implementing this GHG reduction scenario or similar measures will be further examined during the detailed design phase.

13.9.1.2 Operational Phase GHG Assessment

There is the potential for a number of greenhouse gas emissions to the atmosphere during the operational phase of the development. The main sources of GHG emissions from the operational stage of the development arise from heating, domestic hot water, and lighting. The proposed project will introduce sustainable and renewable energy technology to the development. Ongoing maintenance of the proposed development materials has been accounted for within Section 13.9.1 above. The following section outlines the impact of operational energy use on GHG emissions.

There is also the potential for increased traffic volumes to impact climate. The change in AADT values is not of the magnitude to require a detailed climate assessment as per the DMRB screening criteria outlined in Section 13.6.3 (UK Highways Agency, 2019b). It can therefore be determined that traffic related CO2 emissions during the operational phase are long-term, localised, neutral and imperceptible.

The proposed development has been designed to reduce the impact to climate where possible. A number of measures have been incorporated into the design to ensure the operational phase emissions are minimised. These are outlined fully within the Energy Statement and are summarised below.

The development will be a Nearly Zero Energy Building (NZEB) in accordance with the Part L 2021 requirements. Each building will have a Building Energy Rating (BER) that will comply with the Part L requirements. The following measures, or similar will be incorporated into the proposed development to achieve a more energy efficient (i.e. less carbon intensive) design. All measures will be reviewed at the detailed design stage and the most appropriate options will be implemented.

- High performance U-values;
- Improved air tightness;
- Improved thermal transmittance and thermal bridging;
- Use of renewable technologies to ensure energy consumption is in line with the Part L 2021 requirements
- Both internal and external lighting to be energy efficient LED lighting.
- Water Heating plant is proposed to consist primarily of Exhaust Air Heat Pumps with back up heater.
- Building materials will be high-quality and long-lasting to reduce the requirement for regular maintenance or replacement which will reduce the embodied carbon footprint of the development.

It is proposed to incorporate bicycle and electric vehicle parking spaces within the proposed development to promote the use of sustainable transport. Overall, these measures will aid in reducing the impact to climate during the operational phase of the proposed development. Full descriptions of the measures proposed, and their benefits are outlined within the Building Lifecycle Report submitted with this application.

In Table 8 below, operational GHG emissions have been compared against the carbon budget for the residential sector in 2030, against Ireland's total GHG emissions in 2022 and against Ireland's EU 2030 target of a 30% reduction in non-ETS sector emissions based on 2005 levels (33 Mt CO2e) (set out in Regulation EU 2018/842 of the European Parliament and of the Council).

The estimated total GHG emissions, when annualised over the 50-year proposed development lifespan, are equivalent to 0.0001% of Ireland's total GHG emissions in 2023 and 0.0002% of Ireland's non-ETS 2030 emissions target. The total GHG emissions associated with residential-related activities are 0.0011% of the 2030 residential budget.

Table 8: Estimated Operational GHG Emissions relative to Residential Budget and GHG Baseline

TARGET/SECTORAL BUDGET (TCO2E)		SECTOR ANNUALISED PROPOSED DEVELOPMENT GHG EMISSIONS ARE COMPARED	ANNUALISED PROPOSED DEVELOPMENT GHG EMISSIONS AS % OF RELEVANT TARGET/BUDGET
Ireland's 2023 Total GHG Emissions (existing baseline)	55,010,000	Total GHG Emissions	0.0001%
Non-ETS 2030 Target	33,381,312	Total GHG Emissions	0.0002%
(Residential Sector) 2030 Sectoral Budget	5,753,000	Total Industry Emissions	0.0011%

13.9.1.3 GHGA Significance of Effects

The TII guidance (2022) states that the following two factors should be considered when determining significance:

- The extent to which the trajectory of GHG emissions from the project aligns with Ireland's GHG trajectory to net zero by 2050; and
- The level of mitigation taking place.

The level of mitigation described in Section 13.10 has been taken into account when determining the significance of the proposed development's construction and operational GHG emissions. According to the IEMA significance criteria described in Section 13.5.5.1 and Table 1, the significance of the GHG emissions during the construction and operational phase is minor adverse.

In accordance with the EPA guidelines (EPA, 2022), the above significance equates to a significance of effect of GHG emissions during the construction and operational phase, which is **direct, long-term, negative and slight, which is overall not significant.** In addition, the proposed development has been designed to reduce the impact to GHG emissions where possible during operation.

13.9.2 Climate Change Risk Assessment (CCRA)

13.9.2.1 Construction Phase

According to the 'LA 114 (2019) – Climate' guidance, which has been successfully implemented in the UK and referenced by the EPA in Ireland, a qualitative assessment of disruption risk should be reported for the construction phase. The guidance suggests that changes to long-term seasonal averages due to climate change are not anticipated to be significant by the construction year, as predictions are typically cantered around mid-century. However, flooding during construction remains a possibility, and the areas at risk of flooding are detailed in Chapter 9 on Water & Hydrology (Including Hydrology & Flood Risk). Flood risk measures and extreme weather considerations have been integrated into the construction planning process.

The subject site is located within Flood Zone 'A' for tidal flood risk, assuming no defence in place. However, it is protected to a high standard by the existing polder defences along the quayside. Cork City Council intend to raise this polder defence in the future to ensure the existing standard of protection is maintained or increased. Accordingly, it will be the primary flood protection measure for the Docklands.

There is a possible coastal flood risk, however, this risk is mitigated by utilising the ground floor areas for less vulnerable development such as under-croft car parking, landscaping, and recreational areas. All highly vulnerable development (i.e. residential apartments and creche) will be located at a podium level higher than the predicted future coastal flood level of 3.8m (comprising of 2.99m 1:200 CFRAMS coastal flood level + 500mm mean sea level rise + 300mm freeboard allowance).

SUDS features are incorporated into the drainage design for the scheme where feasible to manage surface water runoff from the development in accordance with the recommendations of the Cork City Development Plan 2022-2028.

Mitigation measures are outlined in Section 13.10 of Chapter 9 Water & Hydrology (Including Hydrology & Flood Risk) to manage flood risk impacts during the construction stage, affecting the rail line, construction zones, and nearby properties. With these measures implemented, the risk of climate change impacts, particularly flooding, during the construction phase of the proposed project is not deemed significant.

A detailed CCRA of the construction phase has been scoped out, as discussed in Section 13.5.6 which states that there are no residual medium or high-risk vulnerabilities to climate change hazards and therefore a detailed CCRA is not required. However, consideration has been given to the proposed development's vulnerability to the following climate change hazards with best practice mitigation measures proposed in Section 13.10:

- Flood risk due to increased precipitation, and intense periods of rainfall. This includes fluvial and pluvial flooding;

- Increased temperatures potentially causing drought, wildfires and prolonged periods of hot weather;
- Reduced temperatures resulting in ice or snow;
- Geotechnical impacts; and
- Major Storm Damage – including wind damage.

13.9.2.2 Operational Phase

Climate change has the potential to alter weather patterns and increase the frequency of rainfall in future years. As a result of this there is the potential for flooding related impacts on site in future years. However, adequate attenuation and drainage have been provided for to account for increased rainfall in future years as part of the design of this development. Therefore, the impact will be long-term, localised, neutral and imperceptible.

To assess the vulnerability of the proposed development to climate change, it is essential to first evaluate the development's sensitivity and exposure to various climate hazards. The following climate hazards have been analysed in relation to the proposed development: flooding (coastal, pluvial, and fluvial), extreme heat, extreme cold, wildfire, drought, extreme wind, lightning, hail, landslides, and fog.

The sensitivity of the proposed development to these climate hazards is evaluated independently of its location. Table 8 provides a sensitivity assessment of the proposed development, rated on a scale from high (3) to medium (2) to low (1). After establishing sensitivity, the exposure of the proposed development to each climate hazard is determined, reflecting the likelihood of these hazards occurring at the project site, also rated on a scale of high (3), medium (2), and low (1). The overall vulnerability of the proposed development to each climate hazard is then calculated by multiplying sensitivity and exposure, as outlined in Table 8.

Table 9: Climate Change Vulnerability Assessment

CLIMATE HAZARD	SENSITIVITY	EXPOSURE	VULNERABILITY
Flooding (Coastal, Pluvial, Fluvial)	2 (Medium)	2 (Medium)	1 (Low)
Extreme Heat	1 (Low)	1 (Low)	1 (Low)
Extreme Cold	1 (Low)	1 (Low)	1 (Low)
Wildfire	1 (Low)	1 (Low)	1 (Low)
Drought	1 (Low)	1 (Low)	1 (Low)
Extreme Wind	1 (Low)	1 (Low)	1 (Low)
Lightning & Hail	1 (Low)	1 (Low)	1 (Low)
Landslides	1 (Low)	1 (Low)	1 (Low)
Fog	1 (Low)	1 (Low)	1 (Low)

The sensitivity and exposure of the area were assessed using various online tools such as Met Éireann's TRANSLATE tools, Climate Ireland – Climate Change Projection Maps, and DNV's Climatics multi-climate hazard analysis tool in addition to the project teams subject matter expertise. The analysis concluded that the proposed development has no significant vulnerabilities to the identified climate hazards, as outlined below, with a low to medium vulnerability of flood. All remaining identified vulnerabilities are classified as low. As a result, there are no residual medium or high-risk vulnerabilities related to climate change hazards, making a detailed Climate Change Risk Assessment (CCRA) unnecessary.

The Site-Specific Flood Risk Assessment (SSFRA) conducted by DBFL Consulting Engineers (2024) indicates that the site is located within Flood Zone A. The primary flood risk for the proposed development is tidal flooding due to its proximity to the Quayside. Coastal flooding occurs when high sea levels or waves cause water to overflow onto land. However, the development is unlikely to be impacted by such flooding. The Catchment Flood Risk Assessment and Management (CFRAM) flood maps for the site do not indicate any risk of fluvial flooding. The Office of Public Works (OPW) Past Flood Events reports no previous records of flooding onsite.

Due to the predicted increase in the frequency and intensity of extreme rainfall events, it is prudent that site specific drainage and management measures aimed at mitigating the effects of pluvial flooding are incorporated into the development design. The proposed development includes the construction of a surface water network which consists of Sustainable Urban Drainage Systems (SuDS) measures which will minimise the impact to the receiving environment and manage the pluvial flood risk at the site. The proposed surface water network has been designed with an allowance for climate change as per the Cork CC CDP 2022-2028. The design accommodates flows in peak rainfall events and the drainage system has sufficient capacity to accommodate a 1 in 100 Year plus 20% Climate Change event below ground without flooding any of the paved surfaces.

The correct operation and maintenance of the drainage system is necessary to reduce the risk of human or mechanical error causing pluvial flood risk from blockage. The CFRAM mapping available for the site indicates that the pluvial flood risk to the development is low

Groundwater flooding occurs when the water table rises above the land surface, this means the natural underground drainage system is incapable of sufficiently draining itself, resulting in the emergence of groundwater at the surface. It generally requires sustained rainfall over relatively longer duration than other forms of flooding, its location is discontinuous, and they can last for weeks or months. The SSFRA has determined that the Proposed Development is not at risk of groundwater flooding.

Regarding wildfires, the Think Hazard! tool developed by the Global Facility for Disaster Reduction and Recovery classifies the wildfire hazard in the Cork area as medium. This classification suggests there is a 10% and 50% chance of weather conditions that could support a problematic wildfire in the project area, potentially causing disruptions and posing a low but real risk to life and property each year. Although future climate models predict an increase in conditions favourable to wildfires—such as higher temperatures and extended dry periods—the project's suburban location significantly reduces the wildfire risk. Therefore, the proposed development is considered to have a low vulnerability to wildfires.

According to the Landslide Susceptibility Map developed by Geological Survey Ireland (GSI), the Proposed Development Site ranges from Low to Moderately Low in terms of landslide susceptibility.

Extreme temperatures, whether extreme heat or cold, have the potential to affect building materials and associated infrastructure. During the detailed design stage, high-quality, durable, and resilient materials will be selected to withstand future temperature fluctuations due to climate change. Consequently, the proposed development is assessed to have, at most, low vulnerabilities to these climate hazards, and a detailed risk assessment is not necessary.

There is no additional vulnerability with respect to all climate hazards when design mitigation has been put in place in order to alleviate this known vulnerability to future climate change risk.

13.9.2.3 CCRA Significance of Effects

With the implementation of design mitigation measures, the proposed development faces no substantial risks from climate change. As outlined in the EPA Guidelines (EPA, 2022), the impacts of climate change on the development are considered **direct, long-term, negative, and imperceptible**, and are therefore **not deemed significant** in terms of Environmental Impact Assessment (EIA).

13.9.3 Cumulative Effects

Regarding the requirement for a cumulative assessment, TII PE-ENV-01104 (2022) indicates that "since the GHG assessment pertains to global climate and the impacts on the receptor from a project are not geographically constrained, the typical approach for cumulative assessment in EIA is not deemed applicable." However, by evaluating the GHG impact of a project in relation to its alignment with Ireland's trajectory towards net zero and sectoral carbon budgets, this assessment will demonstrate the project's potential influence on Ireland's ability to meet its national carbon reduction targets. Consequently, the assessment approach is inherently cumulative.

The following potential cumulative impacts related to climate have been considered within this Environmental Impact Assessment Chapter. Cumulative impacts result from the combined effects of the proposed development alongside other existing or planned developments in the area. These impacts can intensify climate-related risks and environmental pressures, leading to more pronounced and widespread consequences. IEMA emphasises the importance of understanding these interactions to develop effective mitigation and adaptation strategies that align with broader sustainability objectives.

Greenhouse Gas (GHG) Emissions

As per IEMA's guidance on assessing climate change within EIAs (2022), the cumulative effect of GHG emissions from the proposed development, in conjunction with other developments, must be carefully evaluated. The aggregation of emissions across multiple projects can significantly contribute to global climate change, exacerbating the effects of rising temperatures, more frequent extreme weather events, and changes in precipitation patterns. To address this, we have identified robust mitigation measures aimed at reducing the development's carbon footprint, ensuring alignment with regional and national climate targets, and adhering to the principles of the EU Taxonomy and Near Zero Energy Building (NZEB) standards. Nearby emission sources to the proposed development include Monahan Road Business Park, Tivoli Industrial Estate, Residential sites, Pairc Ui Chaoimh, and road emissions.

Water Resources and Flooding

IEMA (2022) stresses the importance of considering cumulative impacts on water resources, particularly with respect to flood risks and water availability. The combined effect of increased rainfall due to climate change and additional impermeable surfaces from multiple developments can overwhelm existing drainage infrastructure, leading to a higher frequency and severity of flooding events. This underscores the need for integrated water management strategies that enhance the resilience of water systems and incorporate climate adaptation measures, such as sustainable urban drainage systems (SUDS), as recommended within the site-specific flood risk assessment.

Biodiversity and Habitat Loss

Cumulative impacts on biodiversity are another significant concern. IEMA guidance (2022) highlights that climate change, coupled with habitat loss from multiple developments, can lead to more severe impacts on ecosystems and species. The fragmentation of habitats and disruption of ecological networks can accelerate species decline and reduce ecosystem resilience. To mitigate these impacts, the EIA should incorporate strategies for habitat conservation, restoration, and connectivity, ensuring that biodiversity is protected and enhanced in the face of cumulative pressures.

Air Quality and Human Health

IEMA also advises considering the cumulative impacts on air quality and human health. Increased emissions from multiple developments can lead to higher concentrations of pollutants, exacerbating climate change-related health risks, such as respiratory conditions and heat-related illnesses. The EIA should ensure that air quality management plans are in place and that mitigation measures are designed to minimise emissions, particularly in urban areas where cumulative impacts are more likely to be significant.

Soil Degradation and Erosion

Cumulative impacts on soil degradation and erosion are another area of concern highlighted by IEMA. The combined effects of climate change-induced extreme weather events and land disturbance from construction activities can lead to accelerated soil erosion, reduced fertility, and increased sedimentation in water bodies. Sustainable land management practices, including erosion control measures and soil conservation techniques, should be integrated into the development to mitigate these cumulative impacts.

Infrastructure and Energy Demand

Finally, IEMA's guidance emphasises the importance of considering the cumulative impacts on infrastructure and energy demand. As multiple developments increase the demand for energy, there is a risk of overloading local grids and increasing reliance on fossil fuels, which could exacerbate GHG emissions and climate change. The proposed development does promote energy efficiency, the use of renewable energy sources, and the integration of smart grid technologies to ensure that infrastructure can accommodate future energy needs without compromising climate goals.

13.9.4 Summary

The following Table summarises the identified likely significant effects during the construction phase of the proposed development before mitigation measures are applied.

Table 10 Summary of Construction Phase Likely Significant Effects in the absence of mitigation

LIKELY SIGNIFICANT EFFECT	QUALITY	SIGNIFICANCE	EXTENT	PROBABILITY	DURATION	TYPE
Green House Gas Emissions	Negative to slight	Not Significant	Cork City Area	Unlikely	Short Term	Direct
Climate Change	Negative to imperceptible	Not Significant	Cork City Area	Unlikely	Short Term	Direct

The following Table summarises the identified likely significant effects during the operational phase of the proposed development before mitigation measures are applied.

Table 11 Summary of Operational Phase Likely Significant Effects in the absence of mitigation

LIKELY SIGNIFICANT EFFECT	QUALITY	SIGNIFICANCE	EXTENT	PROBABILITY	DURATION	TYPE
Green House Gas Emissions	Negative to neutral	Not Significant	Cork City Area	Unlikely	Long Term	Direct
Climate Change	Negative to imperceptible	Not Significant	Cork City Area	Unlikely	Long Term	Direct

13.10 Mitigation Measures

In accordance with IEMA guidance (2022), addressing cumulative impacts requires a comprehensive approach that includes effective mitigation strategies and ongoing monitoring. These strategies should focus on enhancing energy efficiency, reducing GHG emissions, protecting natural habitats, managing water resources sustainably, and ensuring resilient infrastructure. Continuous monitoring and adaptive management will be essential to identify cumulative impacts early and to adjust mitigation measures as necessary to minimise long-term environmental and climate-related risks.

By considering cumulative impacts within the climate chapter of the EIA, we ensure a thorough and responsible assessment that aligns with IEMA's best practices, contributing to the sustainability and resilience of both the proposed development and the broader environment.

13.10.1 Construction Phase Mitigation

Embodied carbon of materials and construction activities is the primary source of climate impacts during the construction phase. The Construction and Environmental Management Plan prepared by DBFL which accompanies this planning application details a number of measures to reduce the embodied carbon of the construction works. Further pre-construction carbon Avoidance, Remedial & Mitigation Measures include:

Design for Performance

- Request a Design for Performance approach from design teams and contractors.
- Include contractual targets for whole life carbon with a focus on Net Zero and nature-positive goals where possible.

Circularity in Design

- Require design teams to develop a circularity concept for projects, focusing on adaptability, disassembly, and reuse.
- Set a target for a percentage of reused and recycled materials in designs.

Building Lifecycle Report

- Ensure the building lifecycle report is regularly reviewed and updated in line with current policy and best practice for sustainable construction.

Carbon Literacy

- Develop carbon literacy within design and construction teams by providing training on carbon literacy, ESG reporting, and disclosure.
- Incorporate sustainability and carbon considerations into site team talks, construction targets, and reporting.
- Include training clauses for contractors and sub-contractors to upskill their teams in low-energy construction techniques.

Cement Reduction

- Specify the minimum amount of cement needed in concrete and substitute where feasible to reduce cement usage.

Sustainable Procurement

- Review sustainable procurement and material choices during detailed design to identify and implement lower embodied carbon options.
- Request Environmental Product Declarations (EPDs) and prioritise the use of products with EPDs where possible within procurement restrictions.
- Drive demand for EPDs by increasing the percentage of products used in the project with EPDs.

European Framework for Sustainable Buildings

- Commit to using key indicators from the European Framework for sustainable buildings, Level(s), with support from the IGBC.
- Focus on indicators such as Life Cycle Assessment (LCA), Life Cycle Cost (LCC), Indoor Air Quality (IAQ), and Circularity.

Energy and Carbon Performance Reporting

- Plan to disclose the operational energy and carbon performance of the project in your annual reporting.

Post-Occupancy Evaluation

- Allow for post-occupancy evaluation of completed developments to ensure feedback is passed to the design team.

Construction Waste Management

- Create a construction programme allowing sufficient time to determine reuse and recycling opportunities for demolition waste.
- Appoint a competent waste contractor to undertake a pre-construction audit detailing resource recovery best practice and identifying materials for reuse and recycling.
- Reuse materials on site possible.
- Implement effective segregation and storage practices for recyclable materials.
- Provide training for site personnel on waste management practices.
- Focus on minimizing waste generation and maximizing recycling, reuse, and recovery of waste.

EU Taxonomy Compliance

- Commit to complying with EU taxonomy requirements on the circular economy, specifically reuse, recycling, and material recovery of construction waste.

- Review and ensure compliance with the EU Taxonomy Regulation (EU) 2020/852 regarding circular economy practices for construction waste.

Local Material Sourcing

- Source materials locally where possible to reduce transport-related CO2 emissions.

Building Certifications

- Aim for building certifications such as HPI (Home Performance Index), LEED (Leadership in Energy and Environmental Design), or equivalent, to ensure sustainable and high-performance standards are met throughout the project.

Glenveagh Properties plc Net Zero Transition Plan 2023, published in March 2023, outlines Glenveagh Properties plc emissions sources and outlines its plan to be net zero by 2050.

As part of the plan, Glenveagh has set science-based targets for Scopes 1, 2 and 3, which they have approved by the Science Based Targets initiative (SBTi). The targets are as follows:

- Reduce Scope 1 and 2 emissions by 46% by 2031 to achieve net zero by 2050;
- Reduce Scope 3 emissions intensity (tCO2e/100sqm) by 55% by 2031 to achieve net zero by 2050.

Scopes 1 and 2: Much of Glenveagh's Scope 1 emissions come from fossil fuels used on sites to run generators, plant and machinery. The remainder is from own fleet of vans and cars, while a small amount of natural gas is also used. Scope 2 emissions arise from electricity used in the offices, factories and sites.

A large proportion (42%) of Glenveagh's Scope 3 emissions sit within the 'capital goods' category and represent the embodied carbon within the houses and apartments that they build i.e. the extraction and production of the materials with which they build. The transportation of these materials and the end-of-life treatment are also captured within Scope 3 although these represent a small percentage – three and two per cent, respectively. Another significant element of the Scope 3 emissions is the fuel used by subcontractors on site (22%). This makes up almost all of the emissions from the purchased goods and services category. The remaining significant element of their Scope 3 emissions is the occupant energy i.e. energy used over a 50-year period, by those that live in the houses and apartments built. This makes up 27% of the total emission (Glenveagh Properties plc, 2024).

All reduction targets have been validated by the Science Based Targets initiative (SBTi), a corporate climate action organization. The SBTi develops standards, tools, and guidelines to help companies align their greenhouse gas reduction targets with the goal of net-zero emissions by 2050. Science-based targets provide companies and financial institutions with a clear pathway for reducing emissions in order to mitigate the worst impacts of climate change. Glenveagh Properties plc is one of over 6,000 companies whose targets have been validated by the SBTi, and their specific targets are searchable in the SBTi target dashboard.

Achieving these reductions will involve engaging suppliers to make informed procurement decisions, working with subcontractors to transition to lower-carbon fuels (currently, diesel and gas oil are standard), and investing in innovations for designing and constructing homes that minimize embodied carbon. These emission categories—Scope 1, Scope 2, and Scope 3—are defined by the Greenhouse Gas (GHG) Protocol, which offers the most widely used standards for greenhouse gas accounting (GHG Protocol, 2004).

In their Full Year 2023 Results, published in March 2024, Glenveagh Properties plc reported a 7% reduction in Scope 3 emissions intensity compared to the 2021 baseline, thanks largely to the focus on energy efficiency in residential units, with the proportion of A1-rated homes increasing from 55% to 85% in 2023. Scope 1 and 2 emissions saw an 11% reduction from 2022, driven by the implementation of hydrotreated vegetable oil (HVO) as a diesel alternative across sites.

Specific measures will be introduced during the construction phase to further reduce greenhouse gas (GHG) emissions:

Regarding the development's resilience to climate change, the Contractor will be required to mitigate the effects of extreme weather, such as heavy rainfall, flooding, windstorms, and temperature fluctuations, through site risk assessments and method statements. Additionally, certified datasheets for construction materials will outline their operational temperature limits, ensuring that temperature-sensitive materials perform adequately. The Contractor will also address risks associated with fog, lightning, and hail through appropriate risk assessments and mitigation plans.

During the construction phase the following best practice measures shall be implemented on site to prevent significant GHG emissions and reduce impacts to climate:

- **Energy-Efficient Equipment:** Use energy-efficient machinery and equipment on-site. Regular maintenance and proper operation can also help reduce fuel consumption and emissions.
- **Renewable Energy**: Incorporate renewable energy sources, such as solar panels, to power construction activities. This can significantly reduce reliance on fossil fuels
- **Reduce Idling:** Prevention of on-site or delivery vehicles from leaving engines idling, even over short periods.
- **Sustainability Awareness:** Ensure that sustainability and carbon specifically is incorporated into site team talks, construction and reporting targets. Integrate training clauses for contractors and sub-contractors to upskill their onsite personnel including sub-contractors in low energy construction skills. Appoint sustainability champions to ensure that the project continues to perform in a sustainable manner.
- **Sustainable Transportation:** Encourage carpooling, use of public transportation, or electric vehicles for workers commuting to the site.
- **Monitoring and Reporting:** Regularly monitor and report GHG emissions from the construction site. This helps in identifying areas for improvement and ensuring compliance with environmental standards Sustainability spot checks should be added to ongoing site inspections and feedback shared with all onsite to ensure measures are being adopted.
- **Maintenance:** Ensure all plant and machinery are well maintained and inspected regularly.
- **Waste Management:** Implement a robust waste management plan to reduce, reuse, and recycle construction waste. Proper waste management can significantly cut down on emissions Minimising waste of materials due to poor timing or over ordering on site will aid to minimise the embodied carbon footprint of the site. Application of the waste hierarchy to all waste material generated.
- **Sustainable Procurement:** Sourcing low carbon materials locally where possible to reduce transport related CO2 emissions.

13.10.2 Operational Phase Mitigation

A number of measures have been incorporated into the design of the development in order to mitigate against the impacts of future climate change. For example, adequate attenuation and drainage have been incorporated into the design of the development to avoid potential flooding impacts as a result of increased rainfall events in future years. These measures have been considered when assessing the vulnerability of the proposed development to climate change (see Section 13.7.3).

The proposed development has been designed to reduce the impact on climate as a result of energy usage during operation. The Energy Report and building lifecycle report, submitted under separate cover with this planning application, detail a number of incorporated design mitigation measures that have been incorporated into the design of the development to reduce the impact on climate wherever possible.

Such measures included in the proposed development to reduce the impact to climate from energy usage are:

- The development will be in compliance with the requirements of the Near Zero Energy Building (NZEB) Standards.
- EU Taxonomy alignment with 10% lower than NZEB.
- A renewable energy rating (RER) of 20% will be achieved to comply with Part L (2021) of the NZEB regulations.
- A Building Energy Rating (BER) of A2 is being targeted.
- Improved building thermal transmittance (U-Values), air permeability and thermal bridging.
- Use of air source heat pumps.
- Sustainability information provided to building occupants
- Smart building technologies
- Low-Carbon Operational Practices include:
    - Green Certifications: Design the building to meet energy and environmental standards such as LEED, BREEAM, or the Passive House standard, which focus on reducing operational energy usage.
    - Post-Occupancy Evaluations: Perform regular post-occupancy energy performance assessments to track and improve energy efficiency.

In addition, electric vehicle and bicycle parking will be provided within the development which will promote the use of more sustainable modes of transport and reduce potential transport emissions. Full descriptions of the measures proposed, and their benefits are outlined within the Building Lifecycle Report submitted with this application.

13.11 Residual Impact Assessment

The proposed development will result in some impacts to climate through the release of GHGs. IEMA (2022) state that the crux of assessing significance is "not whether a project emits GHG emissions, nor even the magnitude of GHG emissions alone, but whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050". The proposed development has proposed some best practice mitigation measures and is committing to reducing climate impacts where feasible, the development will comply with the do-minimum standards set through regulation (NZEB and Part L 2021). As per the assessment criteria in Table 13.14 the impact of the proposed development in relation to GHG emissions is considered **long-term, minor adverse and not significant.**

In relation to climate change vulnerability, it has been assessed that there are no significant risks to the proposed development as a result of climate change.

13.12 Risk of Major Accidents or Disasters

As outlined in Section 13.9.2., climate change could shift weather patterns and lead to more frequent rainfall in the coming years. Nonetheless, a thorough review of the potential flood risk at the site has been conducted, and sufficient measures for attenuation and drainage have been incorporated to address increased rainfall. The proposed development has been evaluated as having a low susceptibility to climate change-related hazards, with no major risks identified. Consequently, the impact is considered **direct, long-term, negative, and imperceptible**, and is therefore not deemed significant in terms of the Environmental Impact Assessment (EIA).

13.13 Worst Case Scenario

Worst case estimates have been used as part of this assessment. As a result, Section 14.11 details the worst-case impact for the proposed development.

13.14 Interactions

Climate interactions with various environmental topics are extensive and significant, highlighting the broad impact of climate factors across different aspects of the environment. One of the most critical interactions is between climate and greenhouse gas (GHG) emissions. The proposed development's carbon footprint, which includes emissions from construction activities, energy use, and transportation, plays a role in influencing climate change. Effective management and reduction of these emissions are crucial to mitigate the project's contribution to global warming and to comply with regulatory requirements and sustainability targets.

13.14.1 Water & Hydrology

Interactions between climate and water resources are identified. Climate variability, such as increased rainfall or prolonged droughts, can affect water availability, quality, and management practices. This includes impacts on stormwater runoff, flood risk, and water supply. The development must incorporate effective water management strategies to address these potential issues and ensure resilience to changing climate conditions. The impact of flood risk has been assessed and the surface water drainage network will be designed to cater for run-off from the building and the surrounding hardscaped areas.

13.14.2 Air Quality

Air quality and climate have interactions due to the emissions from the burning of fossil fuels during the construction and operational phases generating both air quality and climate impacts. Air quality modelling outputs are utilised within the

Climate Chapter. There is no impact on climate due to air quality however the sources of impacts on air quality and climate are strongly linked.

13.14.3 Biodiversity

The relationship between climate and biodiversity is significant. Changes in temperature and precipitation patterns can alter habitat conditions, disrupt species distributions, and affect ecological balances. These shifts may impact local flora and fauna, necessitating careful consideration of conservation measures to protect biodiversity within and around the development area.

13.14.4 Waste

Interactions across many areas can be used to minimise the GHG emissions from both the construction and operational phases. For instances, waste management measures will be put in place to minimise the amount of waste entering landfill, which has higher associated embodied carbon emissions than other waste management such as recycling or incineration.

13.14.5 Land and Soils

Soil interactions with climate are critical, with changes in climate affecting soil moisture, erosion rates, and land productivity. Increased rainfall may lead to soil erosion, while extended dry periods can degrade soil quality. Addressing these interactions is essential for maintaining soil health and implementing sustainable land use practices.

13.14.6 Material Assets: Traffic

During the construction and operational phase, there is the potential for interactions between climate and traffic. Vehicles accessing the site will result in emissions of CO2, a greenhouse gas. However, the effect on climate due to change in traffic is predicted to be significant. In summary, the proposed development's interactions with climate encompass a range of factors including GHG emissions, water resources, biodiversity, soil, air quality, waste and traffic. . Effective mitigation strategies and robust monitoring will be essential to address these interactions, minimise adverse impacts, and ensure the development's resilience to climate change.

13.15 Monitoring

13.15.1 Construction Phase

We recommend the following monitoring strategies to ensure compliance with the environmental objectives outlined in this EIA. These strategies are essential for effectively managing the environmental impacts associated with the demolition and construction phases, with a particular focus on resource recovery, waste management, and the reduction of greenhouse gas (GHG) emissions.

Compliance with EU Taxonomy for Circular Economy

Given the project's commitment to meeting EU taxonomy requirements, we recommend the following:

- Comprehensive Documentation and Reporting: It is essential to maintain detailed records that document compliance with the circular economy principles outlined in the EU taxonomy. This documentation should include logs of all recycled materials, percentages of materials reused on-site, and detailed descriptions of how circular economy practices are being implemented.
- Independent Third-Party Audits: We recommend engaging an independent auditor to periodically assess the project's compliance with the EU taxonomy. The audit should verify the accuracy of reported data and ensure that the circular economy requirements are fully adhered to throughout the project.

Monitoring of GHG Emissions Reduction Measures

To mitigate the project's impact on climate change, we propose the following monitoring activities:

- Appoint sustainability champions to ensure that the project continues to perform in a sustainable manner including monitoring and reporting of performance on site.
- Idle Time Monitoring for Vehicles and Machinery: We suggest installing GPS or telematics systems on all vehicles and machinery used on-site to monitor engine idling times. Automatic alerts should be set up to notify site managers when idling exceeds a specified threshold, enabling prompt corrective action to reduce unnecessary emissions.
- Maintenance Logs for Plant and Machinery: Implementing a digital maintenance log system to track the inspection and maintenance of all on-site equipment is recommended. This system should record inspection dates, maintenance activities, and any identified issues, ensuring that all machinery operates efficiently and with minimal emissions.
- Material Waste Minimisation Tracking: A monitoring system should be developed to track material orders and usage. This system should identify trends in over-ordering or inefficient material use, enabling the project team to take corrective actions that will help minimise the embodied carbon footprint of the site.

Application of Waste Hierarchy

To optimise waste management on-site, we recommend the following monitoring protocols:

- Waste Segregation Audits: Regular audits should be conducted to ensure that waste is being properly segregated according to the waste hierarchy (reduce, reuse, recycle). These audits will help identify opportunities for improving waste management practices and reducing overall waste generation.
- Monthly Waste Management Reports: We suggest generating monthly reports detailing the volume of waste reduced, reused, and recycled. These reports should be compared against predefined targets to assess the effectiveness of the waste management strategies and to identify areas for improvement.

Local Sourcing of Materials

To reduce transport-related emissions and support local suppliers, we recommend the following:

- Supplier Distance Monitoring: A database of suppliers should be developed, documenting the distance of each supplier from the construction site. This database should be used to monitor and minimise the carbon footprint associated with material transportation, prioritising local suppliers wherever possible.
- Transport-Related Carbon Footprint Analysis: Conducting a carbon footprint analysis for the transportation of all materials to the site is recommended. This analysis should inform the selection of suppliers, with a preference for those within a closer radius to reduce CO2 emissions.

These monitoring recommendations are designed to ensure that the project adheres to its environmental commitments, particularly in the areas of resource recovery, waste management, and greenhouse gas emissions reduction. By implementing these strategies, the project will not only comply with regulatory requirements but also contribute to broader environmental sustainability goals. Regular reporting, on-site inspections, and third-party audits will be critical to maintaining compliance and achieving the desired environmental outcomes.

13.15.2 Operational Phase

Implementation of a Construction Environmental Management Plan (CEMP) and Contractor Management Plan that incorporates adaptive management principles.

Ensure climate change resilience plans are robust; continued monitoring of trends in weather events; and continued review of resilience measures related to interdependencies.

We recommend the following monitoring strategies to ensure that the proposed development meets its environmental objectives. These strategies focus on mitigating the impacts of climate change, enhancing energy efficiency, and promoting sustainable transport, all of which are aligned with best practices outlined in IEMA guidelines.

To ensure the proposed development effectively mitigates the impacts of future climate change, we recommend the following monitoring strategies:

Monitoring of Climate Change Mitigation Measures

- **Attenuation and Drainage Systems Monitoring:** Consistent with IEMA's guidance on climate resilience, regular inspections should be undertaken to verify the functionality of the attenuation and drainage systems. These inspections should be conducted during construction, after significant rainfall events, and periodically thereafter to ensure long-term effectiveness in preventing flooding.
- **Climate Vulnerability Assessment Review:** In accordance with IEMA's recommendation to periodically reassess climate risks, we suggest reviewing the climate vulnerability assessment (as detailed in Section 13.7.3) at regular intervals. This review should incorporate the latest climate projections to ensure the mitigation measures remain adequate and effective.

Monitoring of Energy Efficiency and Climate Impact Reduction

To minimise the impact of the development on climate through energy use during operation, the following monitoring activities are recommended:

- **NZEB Compliance Verification:** Continuous monitoring during the construction phase should ensure that the development complies with the Near Zero Energy Building (NZEB) Standards. This includes verifying that all building components and systems meet the NZEB criteria.
- **EU Taxonomy Alignment Monitoring:** Ensure that the development achieves energy performance that is at least 10% lower than the NZEB requirements. Regular energy performance assessments should be conducted to confirm alignment with the EU Taxonomy for sustainable development.
- **Renewable Energy Ratio (RER) Compliance:** Monitor the implementation of renewable energy systems, such as solar panels and air source heat pumps, to ensure that the development achieves a Renewable Energy Ratio (RER) of 20%, in line with Part L (2021) of the NZEB regulations. Post-installation, periodic checks should be performed to verify ongoing compliance.
- **Building Energy Rating (BER) Target Achievement:** Regular energy audits should be carried out to monitor the building's energy performance, ensuring that the targeted Building Energy Rating (BER) of A2 is achieved. This includes verifying the efficiency of insulation, windows, HVAC systems, and other energy-related components.
- **Thermal Performance Monitoring:** Continuous monitoring during construction should ensure that the building achieves the improved thermal transmittance (U-Values), air permeability, and thermal bridging standards specified in the design. Post-construction thermal imaging surveys and air tightness tests should be conducted to confirm that these standards have been met.

Monitoring of Renewable Energy Systems

To ensure the successful implementation and operation of renewable energy systems, the following monitoring measures are recommended:

- **Air Source Heat Pump Performance:** Regular inspections and maintenance checks should be conducted on the air source heat pumps to ensure they are operating efficiently and contributing effectively to the building's energy needs. Performance metrics such as Coefficient of Performance (COP) and Seasonal Performance Factor (SPF) should be tracked and compared against the expected values.
- **Occupant Sustainability Information:** Consistent with IEMA's emphasis on stakeholder engagement, it is important to ensure that all building occupants receive comprehensive sustainability information. This should include guidance on energy conservation practices and how to use renewable energy systems effectively. Feedback mechanisms, such as surveys, should be used to assess the impact of this information on occupant behaviour.

Monitoring of Sustainable Transport Initiatives

To promote sustainable transport and reduce transport-related emissions, we recommend the following monitoring strategies:

- **Electric Vehicle (EV) and Bicycle Parking Usage:** Regular monitoring should be carried out to assess the usage of electric vehicle charging stations and bicycle parking facilities within the development. This will help gauge the effectiveness of these measures in promoting sustainable transport modes. Usage data can inform whether additional facilities or adjustments are needed.
- **Transport Emissions Impact Assessment:** Periodic assessments should be conducted to evaluate the impact of the provided sustainable transport facilities on reducing overall transport emissions. This could include monitoring the uptake of electric vehicles by residents and the corresponding reduction in greenhouse gas emissions.

These monitoring recommendations are designed to ensure that the development's climate change mitigation measures, energy efficiency initiatives, and sustainable transport provisions are effectively implemented and maintained throughout the lifecycle of the project. By adhering to these strategies, the development will not only comply with relevant regulatory requirements but also contribute to broader environmental sustainability goals. Regular inspections, energy performance assessments, and occupant engagement will be crucial to achieving the desired environmental outcomes.

13.16 Conclusion

The assessment of potential adverse effects resulting from the Proposed Development on climate change in this chapter has identified the potential sources of greenhouse gas emissions and vulnerability of the site to climate change.

It is reasonably considered that following all mitigation measures including design embedded and prescribed, adequate implementation of construction phase mitigation, and adherence to operational best practice, no significant effects on climate change will arise from the Proposed Development during the construction or operational phases.

Additionally, the operational and maintenance plan for the Proposed Development and the prescribed energy strategy will provide enhancement to energy efficiency over the long term.

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VOLUME II

CHAPTER 14

Cultural Heritage

Archaeology & Buailt Heritage

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CHAPTER FOURTEEN
Table of Contents

CHAPTER FOURTEEN
Table of Figures

CHAPTER FOURTEEN
Table of Tables

Chapter Fourteen | Cultural Heritage

Archaeology & Built Heritage

14.1 Introduction

This chapter of the EIAR was prepared to assess the potential significant effects of the proposed development on the cultural heritage resource. The term 'Cultural Heritage' encompasses heritage assets relevant to both the tangible elements of this resource (archaeology, architecture/built heritage); as well as non-tangible elements (including history, folklore, tradition, language, and place names). It should be read in conjunction with Chapter 2 (Description of Proposed Development) and Chapter 5 (Landscape Visual Impact Assessment).

14.2 Expertise & Qualifications

This chapter was prepared by John Cronin and Tony Cummins of John Cronin and Associates. Mr Cronin holds qualifications in archaeology (B.A. (University College Cork (UCC), 1991), regional and urban planning (MRUP (University College Dublin (UCD) 1993) and urban and building conservation (MUBC (UCD), 1999). Mr Cummins holds primary and postgraduate degrees in archaeology (B.A. 1992 and M.A. 1994 (UCC)). Both individuals have extensive experience in the compilation of archaeological, architectural and cultural heritage impact assessments and have been involved in the preparation of EIARs for the following projects:

- Large-Scale Residential Development, Gouldings Site, Centre Park Road, Cork City; and
- Strategic Housing Development, Former Ford Distribution Site, Centre Park Road, Cork City.

14.3 Proposed Development

The proposed development will entail the construction of 176 no. apartments in 2 no. blocks ranging in height from 8 to 10 storeys over podium level, 1 retail/café unit, 1 creche, internal and external residential amenity spaces, and all associated ancillary development works. A full description of the proposed development is outlined in Chapter 2 'Development Description' of this EIAR.

14.3.1 Aspects Relevant to this Assessment

The aspects of the proposed development relevant to this assessment includes changes to the existing built character within its environs and onsite excavation works required to facilitate the development during the construction phase.

14.4 Methodology

The chapter assesses the impacts of the proposed development on the known and potential cultural heritage resource. The recorded archaeological, architectural heritage and other elements of the cultural resource within a study area encompassing the proposed development site and areas extending for 500m in all directions from its boundary were reviewed. The following sub-sections present details on the methodology and scope of studies undertaken as part of this assessment.

14.4.1 Desktop Study

The desktop study identified all recorded archaeological sites and designated architectural structures within the study area and also endeavoured to identify any hitherto unrecorded features of cultural heritage significance within the area. This information has provided an insight into the historical development of the study area over time and assisted in an evaluation of the potential presence of unrecorded cultural heritage constraints.

The Sites and Monuments Record (SMR) and the Record of Monuments and Places (RMP) for County Cork were the principal sources consulted for identifying recorded archaeological sites. The current Cork City Council's Record of Protected Structures (RPS) and Architectural Conservation Areas (ACA) as well as the National Inventory of Architectural Heritage (NIAH) were consulted to assess the designated architectural heritage resource. A summary of the legal and planning context for these designations is provided in Section 14.4.2 of this chapter.

- Development Plans: These publications are published by Local Authorities and include lists the buildings and structures included in Record of Protected Structures (RPS) and define the extent of Architectural Conservation Areas and Zones of Archaeological Potential. They also present policies and objectives designed for the protection of the archaeological and architectural heritage resources. The study area is located within the Cork City Council administrative area and the Cork City Development Plan 2022-2028 was consulted as part of the desktop study.
- Archaeological Inventory of County Cork Vol. 2: South and East Cork: This publication presents summary descriptions of the recorded archaeological sites within this area of County Cork. In addition, the current national database (online) resources pertaining to same were accessed: Historical Environment Viewer (available at www.archaeology.ie) in October 2024;
- National Monument Service Wreck Viewer: this online resource (www.archaeology.ie) provides access to the National Monuments Service's database for the Wreck Inventory of Ireland Database and was reviewed in October2024;
- UNESCO World Heritage Sites and Tentative List: UNESCO seeks to encourage the identification, protection and preservation of cultural and natural heritage around the world considered to be of outstanding value to humanity. There are currently two World Heritage Sites in Ireland while a number of other significant sites are included in a Tentative List (2022) that has been put forward by Ireland for inclusion. None of these are located within County Cork;
- National Inventory of Architectural Heritage (NIAH): The NIAH provides a comprehensive catalogue of significant architectural heritage structures within Ireland. While inclusion in the inventory does not provide statutory protection to a structure it is used to advise local authorities on compilation of their Record of Protected Structures. Relevant current national datasets were accessed via www.buildingsofireland.ie in October 2024;
- Database of Irish Excavation Reports: This database contains summary accounts of all licensed archaeological excavations carried out in Ireland (North and South) from 1970 to present. Current data was accessed via www.excavations.ie in October 2024;
- Historical publications and cartographic sources: various published and unpublished sources and historical maps were consulted. The historical maps and other figures are presented within the chapter and a list of consulted publications is provided in Section 14.17.

- Cork City Library and National Library of Ireland: The online catalogues of these libraries were consulted, including historic mapping and photographic records;
- Digital Atlas of Cork: This interactive online mapping service contains historic maps of Cork and historical information for 6,245 sites, including undesignated features of cultural heritage interest. This online resource was reviewed in October 2024;
- Aerial Imagery: available online aerial images of the study area were consulted to determine if any traces of unrecorded, sub-surface archaeological sites were evident;
- Placenames Database of Ireland: this current online database provides a comprehensive management system for data, archival records and place names research conducted by the State;
- Ireland's National Inventory of Intangible Cultural Heritage: this inventory was established to protect, promote and celebrate Irish living cultural heritage practices, customs, crafts and traditions; and
- Irish National Folklore Collection: transcribed material from the National Folklore Collection archive has been digitised and published at www.duchas.ie. This online resource was reviewed in October 2024.

14.4.2 Relevant Legislation & Guidance

The management and protection of cultural heritage in Ireland is achieved through a framework of national laws and policies which are in accordance with the provisions of the European Convention on the Protection of the Archaeological Heritage (Valletta Convention) and the European Convention on the Protection of Architectural Heritage (Grenada Convention). In addition, the UNESCO 'Convention Concerning the Protection of the World Cultural and Natural Heritage', 1972 (World Heritage Convention) was ratified by Ireland in 1991. While there is no current national legislation providing legal protection for the Irish intangible heritage resource it is noted that the UNESCO Convention for the Safeguarding of the Intangible Cultural Heritage, 2003, which seeks to safeguard and promote awareness of this element of cultural heritage, was ratified by Ireland in 2015.

The national legal statutes, guidelines and planning documents relevant to this assessment include:

- Historic and Archaeological Heritage and Miscellaneous Provisions Act 2023
- National Monuments Act 1930 (as amended);
- Heritage Act 1995 (as amended);
- National Cultural Institutions Act 1997;
- Architectural Heritage (National Inventory) and Historic Monuments (Misc) Provisions Act (1999);
- Planning and Development Act 2000 (as amended);
- Department of Arts, Heritage, and Gaeltacht (2011) Architectural Heritage Protection: Guidelines for Planning Authorities;
- Department of Arts, Heritage, Gaeltacht, and the Islands (1999) Framework and Principles for the Protection of Archaeological Heritage;
- International Council on Monuments and Sites (2011) Guidance on Heritage Impact Assessments for Cultural World Heritage Properties;
- Office of the Public Regulator (2022) A Guide to Architectural Heritage;
- Office of the Public Regulator (2021) Archaeology in the Planning Process;
- Environment Protection Agency (2015) Draft Advice Notes for Preparing an EIS;
- Environment Protection Agency (2022) Guidelines on the information to be contained in EIARs;
- Department of Housing, Planning and Local Government (2018) Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment; and
- European Union (2017) Environmental Impact Assessment of Projects: Guidance on the Preparation on the Environmental Impact Assessment Report.

14.4.2.1 Archaeological Legal and Planning Framework

The administration of national policy in relation to archaeological heritage management is the responsibility of the National Monuments Service (NMS) which is currently based in the Department of Housing, Local Government and Heritage (DHLGH).

The Historic and Archaeological Heritage and Miscellaneous Provisions Act 2023 was signed into law in October 2023. The DHLGH published an online guidance document in relation to this Act in November 2023[1] which provides an overview of its status, and this is summarised hereafter. While the Act is now law most of its provisions will not enter into force until the Minister has made one or more "Commencement Orders". This means that section 7 of the Act (which provides for the repeal of the National Monuments Acts 1930 (as amended) and related legislation) has not entered into force. Accordingly, the National Monuments Acts 1930 (as amended) remain fully in force and will continue to do so for the time being. The Act contains transitional provisions which will, if necessary, enable certain aspects of the existing National Monuments Acts 1930 to 2014 to continue in operation notwithstanding their repeal post-commencement of the Act while successor provisions are being brought fully into operation. This includes provisions enabling the Record of Monuments and Places to continue to have effect pending the establishment of a new Register of Monuments.

The National Monuments Act 1930 (as amended) therefore remains the primary means of ensuring the satisfactory protection of the archaeological resource and include provisions that are applied to secure the protection of archaeological monuments. These include the designations of nationally significant sites as National Monuments as well as the Register of Historic Monuments (RHM), the Record of Monuments and Places (RMP), the Sites and Monuments Record (SMR), and placing of Preservation Orders and Temporary Preservation Orders on endangered sites.

[1] https://www.archaeology.ie/news/enactment-of-historic-and-archaeological-heritage-and-miscellaneous-provisions-act-2023-and

Section 2 of the National Monuments Act 1930 defines a National Monument as 'a monument or the remains of a monument, the preservation of which is a matter of national importance'. The State may acquire or assume guardianship of examples through agreement with landowners or under compulsory orders. There are no National Monuments or sites with Preservation Orders located within the study area.

The National Monuments (Amendment) Act, 1994 made provision for the establishment of the RMP which comprises a record of the known archaeological sites within the State. The RMP, which is based on the earlier RHM and SMR, comprises county-based lists of all recorded archaeological sites with accompanying maps. All listed sites receive statutory protection under the National Monuments Act 1994 which requires that the NMS must be given two months' notice in advance of any work proposed at their locations.

The Cork City Development Plan 2022-2028 includes a range of objectives in relation to the protection of the archaeological resource within the city and these comprise: Objective 8.1 (Strategic Archaeology Objective), Objective 8.2 (Protection of the Archaeological Resource), Objective 8.3 (The Value of Archaeological Knowledge), Objective 8.4 (Protection of the Medieval Historic Core), Objective 8.5 (Protection of Cork's Medieval City Wall and Defences), Objective 8.6 (Objective 8.6 (Protection of Burial Grounds), Objective 8.7 (Industrial Archaeology) Objective 8.8 (Underwater Archaeology), Objective 8.9 (Preservation of Archaeology within Open Space in Developments) and Objective 8.10 (Archaeological Management Strategy for the City). The descriptions of each of these planning objectives are available at https://www.corkcity.ie/en/cork-city-development-plan/volume-1-written-statement/ (pages 272-274).

14.4.2.2 Architectural Heritage Legal and Planning Framework

The conservation principles of care and protection of architectural heritage and the facilitation of the listing of significant buildings of architectural merit are set out in Part IV of the Planning and Development Act 2000 (as amended). This Act requires Planning Authorities to keep a 'Record of Protected Structures' (RPS) of buildings and other structures that are of special architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest. All structures listed in the RPS published in current development plans have statutory protection under the Planning and Development Act 2000 (as amended) and planning permission is required for any works to such structures that would affect their character. The Act also provides for the inclusion of objectives for preserving the character of places, areas, groups of structures or townscapes of special interest designated as Architectural Conservation Areas (ACAs).

The National Inventory of Architectural Heritage (NIAH) was established under the Architectural Heritage (National Inventory) and Historic Monuments (Misc) Provisions Act (1999), to record architectural heritage structures within the State. The NIAH also compiles desk-based survey records of Historic Gardens and Designed Landscapes within the State. While inclusion in a NIAH inventory does not provide statutory protection to a structure or lands, the inventory is intended to advise local authorities on the compilation of their Records of Protected Structures (RPS).

The Cork City Development Plan 2022-2028 presents a number of objectives intended to protect the architectural heritage resource within the city and these comprise: Objective 18.17 (Conservation of the City's Built Heritage), Objective 8.18 (Reuse & Refurbishment of Historic Buildings), Objective 18.19 (Record of Protected Structures), Objective 8.20 (Historic Landscapes), Objective 8.21 (Enabling Development), Objective 8.22 (National Inventory of Architectural Heritage), Objective 8.23 (Development in Architectural Conservation Areas), Objective 8.24 (Demolition in Architectural Conservation Areas), Objective 8.25 (Recording of Structures in Architectural Conservation Areas), Objective 8.26 (Individual Buildings of Character in Suburban Areas and Villages), Objective 18.27 (Elements of Built Heritage), Objective 18.28 (Separate Access to the Upper Floors of Buildings) and Objective 8.29 (Historic Town Centre Supports). The descriptions of each of these planning objectives are available at https://www.corkcity.ie/en/cork-city-development-plan/volume-1-written-statement/ (pages 276-280).

14.4.2.3 Intangible Cultural Heritage

In December 2015 Ireland ratified the 2003 UNESCO *Convention for the Safeguarding of the Intangible Cultural Heritage*. Intangible cultural heritage 'refers to the practices, representations, expressions, knowledge, skills – as well as the instruments, objects, artefacts and cultural spaces associated therewith – that communities, groups and, in some cases, individuals recognize as part of their cultural heritage. This intangible cultural heritage, transmitted from generation to generation, is constantly recreated by communities and groups in response to their environment, their interaction with nature and their history, and provides them with a sense of identity and continuity, thus promoting respect for cultural diversity and human creativity'.

Ireland's obligations under the 2003 Convention include establishing a National Inventory for Intangible Cultural Heritage to protect, promote and celebrate Irish living cultural heritage practices, customs, crafts and traditions. The foundational collection of the Irish National Folklore Collection - the Irish Folklore Commission Collection 1935-1970 - was inscribed into the UNESCO Memory of the World Register (2017) in recognition of its 'world significance' and 'outstanding universal value to culture'. Similarly, Irish Hurling (2018) and Irish Harping (2019) has been inscribed on the UNESCO Representative List of the Intangible Cultural Heritage of Humanity. In July 2019, the Minister for Culture, Heritage and the Gaeltacht approved the inscription of thirty cultural heritage elements on Ireland's permanent National Inventory of Intangible Cultural Heritage (NIICH).

In January 2020 the Minister of Culture, Heritage and the Gaeltacht published Ireland's first national cultural framework, Culture 2025 – A National Cultural Policy Framework to 2025. Culture 2025 sets the direction for Government policy across the cultural sector, including the arts, the Irish language and the creative, heritage and audio-visual sectors.

14.4.3 Site Inspection

The study area was inspected in August 2024 and was assessed in terms of existing built environment, ground conditions and the potential for the presence of previously undetected archaeological and architectural heritage sites or features.

14.4.4 Consultation

The consultation process included issuing a scoping request to the Development Applications Unit (Department of Housing, Local Government and Heritage) in relation to the proposed development and no response was received from this body. A review of the Cork City Council's Notice of LRD Opinion in relation to the proposed development was carried out and it contains no content in relation to the archaeological, architectural and cultural heritage resources relevant to the assessment addressed in this chapter.

14.4.5 Assessment of Impacts

The methodology used for the assessment of potential impacts has been informed by the Environmental Protection Agency (EPA) Guidelines for Information to be Contained in EIAR (2022), in accordance EIA requirements of codified EU Directive 2011/92/EU as amended by EU Directive 2014/52/EU, per current Planning Legislation, concerning EIA assessment: Planning and Development Act, 2000 (as amended) (Part X) and in Part 10 of the Planning and Development Regulations, 2001 (as amended). The following summation of the criteria used to assess impacts is provided to concisely outline the methodology specifically applied to the cultural heritage resource. Assessment is achieved by a consideration of the duration, quality, type, value and magnitude of effect(s) on the cultural heritage resource:

The Duration of Effect is assessed based on the following criteria:

- Momentary (seconds to minutes);
- Brief < 1 day;
- Temporary <1 year;
- Short-term 1-7 years;
- Medium Term 7-15 years;
- Long Term 15-60 years;
- Permanent > 60 years; and
- Reversible: Effects that can be undone through remediation or restoration.

The Quality of Effect on the cultural heritage resource can be positive, neutral or negative:

- Positive: a change which improves the quality of the cultural heritage environment (e.g. increasing amenity value of a site in terms of managed access, signage, presentation etc. or high-quality conservation and re-use of an otherwise vulnerable derelict structure);
- Neutral: no change or effects that are imperceptible, within the normal bounds of variation for the cultural heritage environment; and
- Adverse: a change which reduces the quality of the cultural heritage resource (e.g. visual intrusion on the setting of a site and/or physical intrusion on features/setting of a site).

The Type of Effect on the cultural heritage resource can be described as following:

- Direct Effect: where a cultural heritage site is physically located within the footprint of a proposed development, which will result in its complete or partial removal;
- Indirect Effect: Effects on the setting of the cultural heritage environment often produced away from the footprint of a proposed development site or because of a complex pathway; and
- None predicted: where a proposed development will not adversely or positively affect a cultural heritage site.
- Cumulative: Effects The addition of many minor or insignificant effects, including effects of other projects, to create larger, more significant effects;
- 'Do-nothing Effects': The cultural heritage environment as it would be in the future should the project not be carried out;
- 'Worst-case' Effects: The effects arising from a Project in the case where mitigation measures substantially fail;
- Irreversible Effects: When the character, distinctiveness, diversity or reproductive capacity of an environment is permanently lost; and
- Residual Effects: The degree of environmental change that will occur after the proposed mitigation measures have taken effect.

The Magnitude of Effect is based on the degree of change, incorporating any mitigation measures, and is based on a consideration of the character, duration, probability and consequences (Table 14.1). The magnitude can be negative or positive and is ranked without regard to the value of the asset according to the following scale: High; Medium; Low and Negligible. The descriptions of magnitudes presented in Table 14.1 are based on guidance published *in Guidance on Heritage Impact Assessments for Cultural World Heritage Properties* (ICOMOS 2011).

Table 14- 1 Magnitude of Effect Criteria

MAGNITUDE	DESCRIPTION
High	Most or all key archaeological or architectural materials affected such that the resource is totally altered. Comprehensive changes to setting. Changes to most or all key historic landscape elements, parcels or components; extreme visual effects; fundamental changes to use or access; resulting in total change to historic landscape character. Major changes to area that affect Intangible Cultural Heritage activities or associations or visual links and cultural appreciation.
Medium	Changes to many key archaeological or historic building materials/elements such that the resource is clearly/significantly modified. Considerable changes to setting that affect the character of the archaeological asset. Changes to the setting of a historic building, such that it is significantly modified. Change to many key historic landscape elements, parcels or components, visual change to many key aspects of the historic landscape, considerable changes to use or access, resulting in moderate changes to historic landscape character. Considerable changes to area that affect the Intangible Cultural Heritage activities or associations or visual links and cultural appreciation.
Low	Changes to key archaeological materials/historic building elements, such that the resource is slightly altered/slightly different. Slight changes to setting of an archaeological monument. Change to setting of a historic building, such that it is noticeably changed. Change to few key historic landscape elements, parcels or components; slight visual changes to few key aspects of historic landscape; slight changes to use or access; resulting in limited change to historic landscape character. Changes to area that affect the Intangible Cultural Heritage activities or associations or visual links and cultural appreciation.

MAGNITUDE	DESCRIPTION
Negligible	Very minor changes to key archaeological materials or setting. Slight changes to historic building elements or setting that hardly affect it. Very minor changes to key historic landscape elements, parcels or components; virtually unchanged visual effects; very slight changes to use or access. Very minor changes to area that affect the Intangible Cultural Heritage activities or associations or visual links and cultural appreciation

The Values assigned to cultural heritage assets for the purposes of this assessment are intended as indicators which contribute to a wider judgment based on the individual circumstances of each example. Other than the level of legal designations, e.g., National Monuments and recognition as World Heritage sites, there is no formal grading or rating system for Irish archaeological monuments or architectural heritage structures. The non-statutory National Inventory of Architectural Heritage (NIAH) does apply a ranking system (Local, Regional, National and International) to structures included in that inventory and, while these rankings do not confer a graduated level of statutory protection they have been utilised as a value indicator for NIAH-listed structures for the purpose of this assessment.

The criteria for assessing the value of archaeological and other cultural heritage assets as part of this assessment has been informed by the *Guidance on Heritage Impact Assessments for Cultural World Heritage Properties* (ICOMOS 2011, 14-16). The Value of known or potential cultural heritage assets are ranked according to the following scale: Very High, High; Medium; Low and Negligible (Table 14.2). Generally, the more criteria that are evident for a given asset, the higher in scale its respective Value is deemed to be. Criteria considered in addition to legal designations include condition / preservation; documentary / historical significance; group value; rarity; visibility in the landscape; fragility / vulnerability and amenity value. The values assigned to the known cultural heritage constraints within the study area were determined following the completion of the desktop study combined with site inspections and are identified in Section 14.6 of this chapter.

Table 14- 2 Value Assessment Criteria

MAGNITUDE	DESCRIPTION
Very High	World Heritage Sites (including Tentative List properties). Sites, buildings or landscapes of acknowledged international importance. Intangible associations with individuals or innovations of global significance.
High	Nationally designated sites, buildings and landscapes of significant quality, rarity, preservation and importance. Undesignated assets of the quality and importance to be designated. Assets that can contribute significantly to acknowledged national research objectives. Archaeological Landscapes with significant group value. Intangible associations with individuals or innovations of national significance.
Medium	Designated or undesignated assets that can contribute significantly to regional research objectives, including buildings that can be shown to have exceptional qualities in their fabric or historical associations. Conservation Areas and historic townscapes containing buildings that contribute significantly to its historic character. Intangible associations with individuals or innovations of regional significance.
Low	Assets compromised by poor preservation and/or poor survival of contextual associations. Assets of limited value, but with potential to contribute to local research objectives. Historic Townscape or built-up areas of limited historic integrity in their buildings and settings. Intangible associations with individuals or innovations of local significance.
Negligible	Assets with very little or no surviving archaeological interest. Landscapes little or no significant historical interest. Buildings or urban areas of no architectural or historical note; buildings of an intrusive character.
Unknown	Assets whose importance has not been ascertained. Buildings with some hidden (i.e., inaccessible) potential for historic significance.

The significance of effects is assessed based on a consideration of the magnitude of impact combined with the value of the cultural heritage asset. The significance of effect can be described as Profound, Very Significant, Significant, Moderate, Slight, Not Significant or Imperceptible (Tables 11.3 and Table 11.4).

Table 14- 3 Significance of Effects (per 2022 EPA EIAR Guidelines)

SIGNIFICANCE	DESCRIPTION
Imperceptible	An effect capable of measurement but without significant consequences
Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences
Slight	An effect which causes noticeable changes in the character of the environment but without affecting its sensitivities
Moderate	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends
Significant	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment
Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment
Profound	An effect which obliterates sensitive characteristics

Table 14- 4 Significance of Effects Matrix (per 2022 EPA EIAR Guidelines

Magnitude of Impact					
	High	Not Significant/ Slight	Moderate/ Significant	Significant/ Very Significant	Very Significant/ Profound
	Medium	Not Significant	Slight	Moderate/ Significant	Significant/ Very significant
	Low	Not Significant/ Imperceptible	Slight/ Not Significant	Slight	Moderate
	Negligible	Imperceptible	Not Significant/ Imperceptible	Not Significant/ Slight	Slight
		Negligible	**Low**	**Medium**	**High**
			Magnitude of Impact		

14.5 Difficulties Encountered

No difficulties were encountered during the compilation of this assessment.

14.6 Baseline Environment

The following section presents summary details of the archaeological and historical context of the study area and its environs with references to the recorded archaeological sites and designated architectural structures/areas located within the study area. Datasets have been interrogated and retrieved largely from State organisations and are considered accurate and current per publicly available information. The dating framework used for each period of the archaeological record is based on the *Guidelines for Authors of Reports on Archaeological Excavations* published by the National Monuments Service (2006).

14.6.1 Archaeological and Historical Context

14.6.1.1 Recorded Archaeological Sites

The proposed development site is located approx. 2.3km to the east of the medieval core of Cork city and is not located within, or in close proximity to, the zones of archaeological potential identified in the Cork City Development Plan 2022-2028. There are no recorded archaeological sites located within the proposed development site. There are two examples located within 500m of its boundary and these comprise two late 18th/early 19th century country houses (CO074-086---- and CO074-101----) located in the Montenotte area on the north side of the river. The nearest of these houses (CO074-101----) is located 260m to the northeast of the proposed development site (see Figure 14.1). These recorded archaeological constraints are of likely medium to high value.

A review of the National Monument Service's online Wreck Viewer revealed that the location of a wreck (NMS ref. W11312) of unknown date or classification is indicated in an area of the Marina located c.370m to the west of the proposed development. The online database does not provide any descriptive information apart from the place of loss being recorded in the River Lee, Cork City and cites the UK Hydrographic Office (UKHO) as providing the co-ordinates for the location.

The Database of Irish Excavation Reports does not contain any entries for licensed archaeological investigations within the boundary of the proposed development site, but it does contain descriptions of a number of investigations undertaken within the surrounding study area. These investigations did not reveal anything of archaeological significance and the following provides a summary of the results:

- Archaeological monitoring of trench excavations associated with laying of ESB cables within the Marina area in 1996 uncovered no archaeological remains (Lane 1996);
- Archaeological monitoring of the Cork Main Drainage Scheme works on Centre Park Road in 1999 recorded stratigraphy associated with 19th and 20th century layers of reclaimed ground over a gravely silt that did not yield any archaeological material (Ni Loingsigh 1999);
- Archaeological monitoring of ground works in 2015 was undertaken during the redevelopment of Páirc Uí Chaoimh in the adjoining property to the south and did not reveal anything of archaeological significance (Purcell 2015);
- Archaeological test trenching in 2008 within the Cleve Hill House property along a section of the Blackrock Road to the south revealed nothing of archaeological significance (Hurley 2008)
- Archaeological monitoring of dredging works adjacent to the section of the north bank of the river channel opposite to the study area revealed nothing of archaeological significance within the excavated riverine deposits (Bangerter 2008).

Figure 14- 1 Location of Recorded Archaeological Sites Within Study Area

14.6.1.2 Archaeological and Historical Development of Study Area

Prior to the extensive land reclamation works undertaken in recent centuries the proposed development site and its environs were situated within a section of the River Lee channel that extends along the north side of the Mahon peninsula which is delimited on the south side by the Douglas River. While there are no recorded prehistoric monuments within the environs of the area, evidence of previously unrecorded prehistoric activity was uncovered during pre-development archaeological investigations in advance of the construction of the Mahon shopping centre near the east end of the peninsula, at a distance of c.3km to the southeast of the study area (Purcell 2003). In addition, a prehistoric object known as the Cork Horns was discovered in 1909 near the south jetties in an area of Victoria Road located approx. 1.4km to the west. The horns bear ornament in the La Tène style which is typical of the later Iron Age period, and it is thought that they were probably once attached to a leather helmet which did not survive (O' Kelly 1961).

A number of placenames in the area are indicative of early ecclesiastical activity within wider lands to the south of the river, i.e. Ballintemple (town of the church) and Borreenamanna (road of the monks) both of which are located outside the south end of the study area. This activity has been associated with an 18th-century graveyard located approx. 950m to the south of the proposed development on Temple Hill which is a recorded archaeological site (CO074-065----) with a tenuous association with a late 14th-century Knights Templar church (Power 1994).

The proposed development site is located c. 2.3km to the east of the medieval city of Cork and is not depicted on the 16th and 17th century maps of the city at a time when it formed part of the River Lee channel which was likely adjacent to agricultural lands to the east of the city. The steep slopes that delimit the back gardens of the existing houses on the north side of Blackrock Road in the area to the south formed the river's edge prior to extensive reclamation works in the late 18th and 19th centuries. A review of 19th century maps indicates that this former riverbank was located c.250m to the south of the proposed development site.

The reclamation and subsequent development of the riverine area containing the proposed development site commenced with the construction of an 18th-century masonry breakwater which was initially known as the New Wall and later as the Navigation Wall. In the 1760s work began on the construction of this wall within the river slob lands to the east of the city centre with the purpose of creating a regular shipping channel and it was gradually extended eastwards towards Blackrock village during the following decades. The wall was constructed on cut stone foundations which were built two feet below the low water level of the normal spring tides (Rynne 2006). The Navigation Wall still survives as a retaining feature along the south side of the river for a length of 2.3km and it comprises a bonded, rubble masonry structure measuring 2m in thickness which is located at c.40m outside the north end of the proposed development site. While it is not a designated architectural heritage structure or a recorded archaeological site the Navigation Wall is, nonetheless, considered to be of cultural heritage significance.

During the late 18th and 19th centuries dredged riverine deposits were systematically dumped onto the slob lands behind the Navigation Wall to create a promenade along the new riverbank which later became known as the Marina. In 1780 the City Corporation devised an ambitious plan to reclaim 230 acres of land to the south of the wall and to develop a new urban centre in the area. This proposal was influenced by Renaissance urban planning design based around a central primary street with secondary streets laid out in a grid system. While the reclamation works continued during the following decades, the development of the proposed new urban centre did not proceed, and the reclaimed area remained largely undeveloped at the start of the 19th century. The Navigation Wall required regular upkeep and in 1794 the Corporation raised funds for its repair by selling plots of the adjacent reclaimed lands for uses such as brickmaking and cattle-fattening. The state took on responsibility for the greater part of the expenses of the upkeep of the wall in 1816 and in 1838 a local historian named John Fitzgerald described the Navigation Wall and the ongoing reclamation works as follows (Henchion 2005, 155):

> *"Walking on the Navigation Wall was ticklish, with one stream of people going down and another coming up and having to pass on less than 5ft of pathway with 20ft of water on either side. It was only small boys, fishermen or the foolhardy who ventured along that wall, while the ladies stayed aloof. While the labourers toiled to fill in the slob behind the wall with the dredgings of the river, young chappies would volunteer their services as navvies only to have the barrows taken from them and told to buzz off."*

The detail on Beauford's 1801 map of 1801 shows the lands to the east of the city and indicates the extent of the 'New Wall' at the beginning of the 19th century Figure 14.2). The general location of the proposed development site is shown to the south of the terminus of the completed section of wall at that time and is depicted as a vacant, undeveloped area which was likely subject to tidal flooding as the river wall had not extended beyond its location.

Figure 14- 2 Extract from 1801 Beauford Map With Location of Proposed Development Circled

The detail on the first edition 6-inch OS map of 1845 (Figure 14.3) demonstrates that the line of the river wall, which it labels 'Walk', had been extended as far as Blackrock village during the early decades of the 19th century. The map indicates that much of the east end of the lands behind the wall, including the location of the proposed development site, continued to remain undeveloped within a vacant area annotated as 'Mud' while the area further to the west is named 'City Park'. There are no buildings, roads or field/garden plots depicted within the environs of the proposed development site, but it was likely no longer subject to daily flooding due to the extension of the river wall to Blackrock village. An embankment, with a flanking drainage channel, is depicted in the area outside the west end of the proposed development site and this was likely associated with the ongoing drainage of the reclaimed lands and appears to delimit the east end of the City Park area.

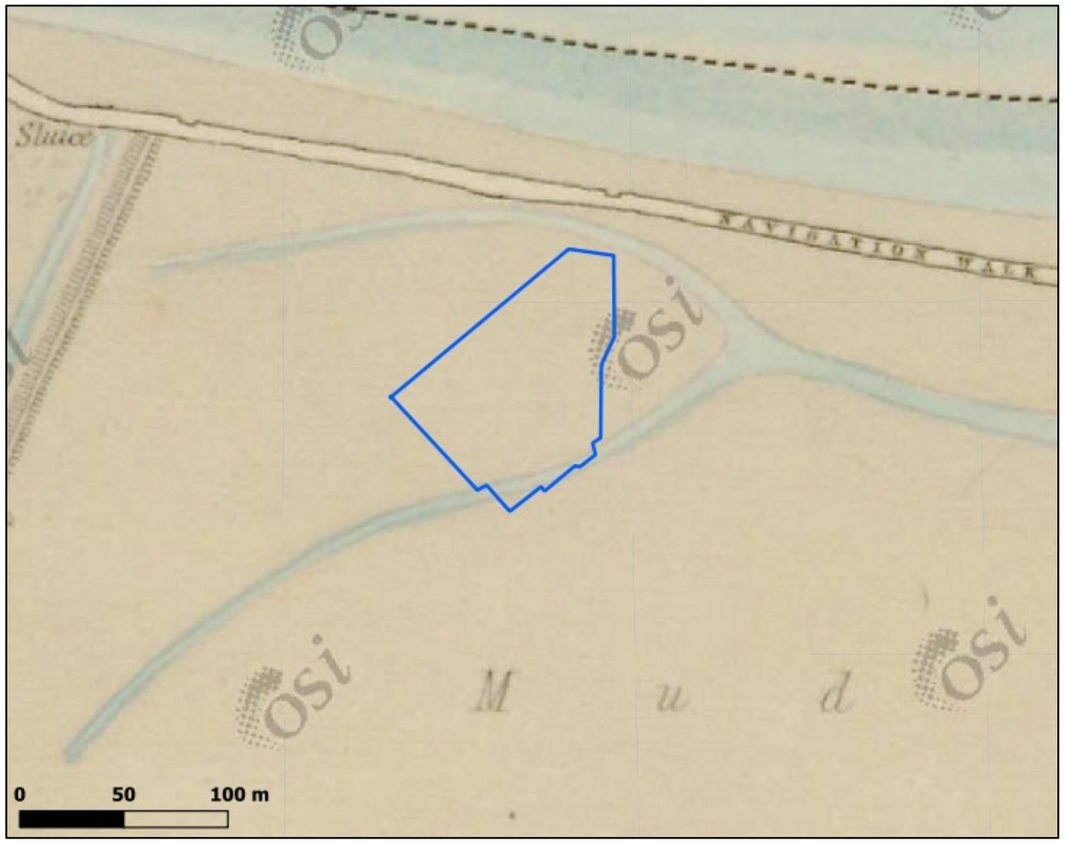

Figure 14- 3 Extract From 1st Edition 6-inch OS Map (1845) Showing Proposed Development

The first major development within the reclaimed area occurred in the 1850s when it formed part of the route of the newly opened Cork, Blackrock & Passage railway line. This line initially followed the riverbank into the city until 1873 when a section was diverted at the Atlantic Pond to extend inland. This diverted line is shown on the 25-inch edition OS map (1902) which shows its route extending outside the south end of the proposed development site (Figure 14.3). The Cork Blackrock and Passage Railway was amalgamated with the Great Southern Railway Company in 1925, but the increasing use of private cars resulted in its closure in 1932.

In 1856, Professor Edmund Murphy of Queens College Cork (now UCC) planted rows of elm trees along the riverside promenade as part of a crop and tree growing experiment and many of these were felled and replaced in the early 1970s due to Dutch elm disease. In 1872, the Council adopted the name Marina for the river promenade which was named after a similar feature near Palermo in Sicily that was also developed within an area of reclaimed slob land. The lands to the west of the proposed development site were developed as the Cork Park Racetrack in 1869 while the Cork Agricultural Society established their showgrounds in the area to the south and east during the

1890s. In the late 1890s the Cork County GAA Board were granted lands within that property by the Cork Agricultural Company, the leaseholders of the land. The county board built its own stadium in 1898 in an area now occupied by the CAB Ford garage on Monahan Road. While the first edition 6-inch OS map shows small-scale waterfront activity, such as private docking features, along the original riverside to the rear of a number of houses along Blackrock Road, the development of the Navigation Wall and associated reclamation works saw this activity begin to relocate along the new waterfront. A number of rowing clubs opened within the area from the mid-19th century onward, including the Lee Rowing Club and Glenbrook Boat Club which were founded in the 1850s and the Cork Boat Club which was founded in 1899.

The detail on the 25-inch edition OS map (1902) indicates that the proposed development site remained as an undeveloped plot at the start of the 20th century and the only internal intervention appears to have been the creation of a number of land drains (Figure 14.4). A racetrack, which opened in 1869, is shown within the City Park area to the west of the proposed development site with a small ancillary racetrack depicted in the area to the northwest. A number of other riverside features of heritage interest are located within the section of the Marina to the north of the proposed development site and include landing places, a gunpowder pier, a now removed band stand, the Captain Hanson Flag Pole which was erected here in 1864 and a cannon used in the Crimea War which was moved to this area from the Grand Parade in 1861.[2] Other elements of the built environment within the environs of the proposed development site shown on the 25-inch map includes a road along the existing line of the Centre Park Road, with the diverted railway line to the south, a boat house within the modern Lee Rowing Club grounds to the northeast and Agricultural Society buildings within the showground property to the southeast.

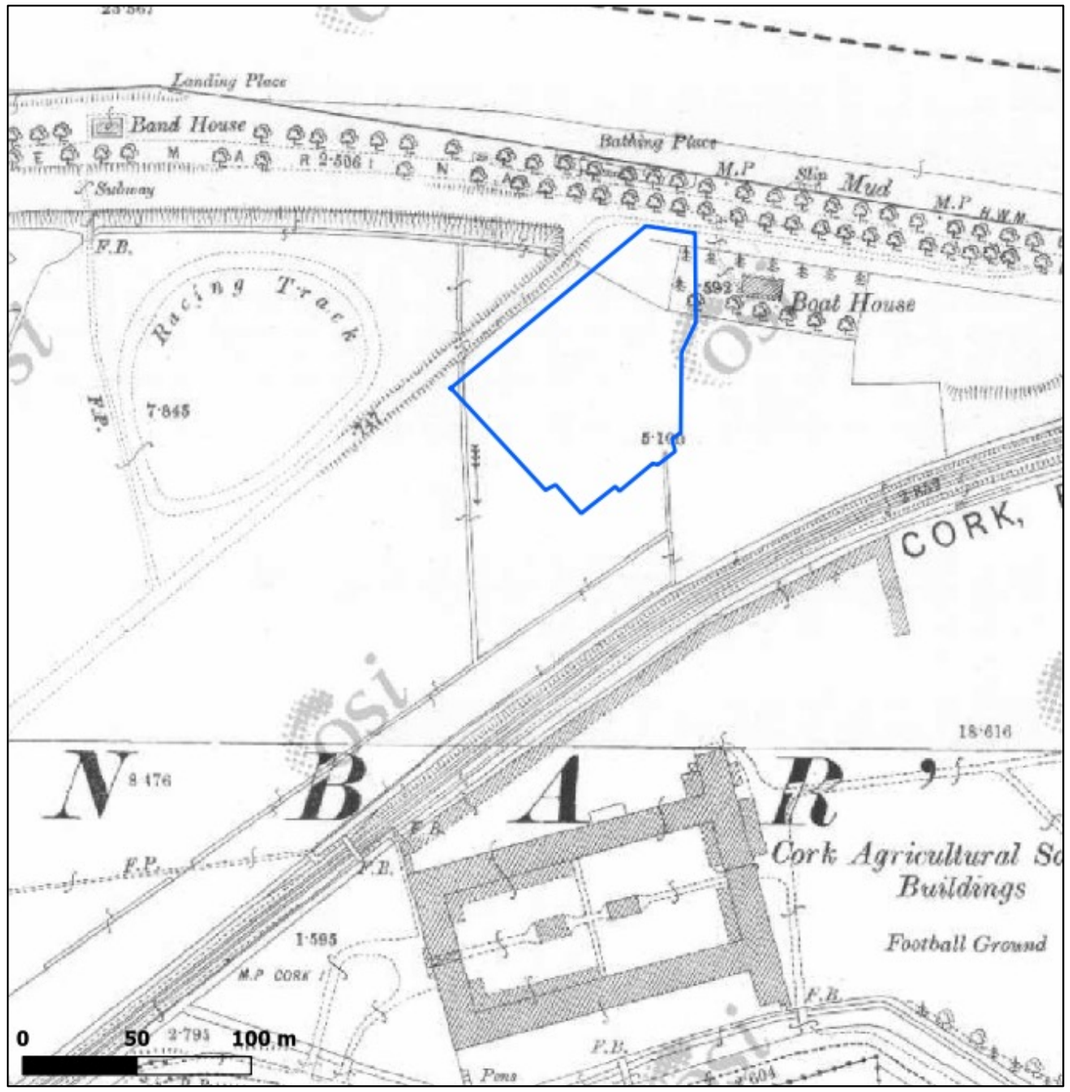

Figure 14- 4 Extract From 25-inch OS Map (1902) Showing Proposed Development

[2] http://corkheritage.ie/?page_id=5989

The racetrack in the lands to the west of the proposed development site was extensively re-developed during the early 20th century when it became the site of the Fords tractor assembly plant which commenced construction in 1917 and continued to expand during the following decades. A map included in a Cork Corporation Engineers report of 1917 indicates that while the proposed development site was not developed as part of the Fords factory it was included in the overall 136-acre landholding acquired by the firm at a cost of £10,000 (Figure 14.5). The factory was used for the manufacturing of tractors until 1923 when it began to also be used for the assembly of motor vehicles such as the Models T and A. The fortunes of the factory, and other industrial operations opened in the City Park area in later decades, fluctuated during the 20th century with periods of decline, such as during the during World War II, interspersed with periods of growth that included a significant investment in upgrading the assembly line during the 1960s. The factory had gone into further decline by the early 1980s, in part due to inflation, tariffs and competition from other Ford plants in Europe, and it closed as a manufacturing plant in 1984. The former factory site still exists in the area to the west of the proposed development site and has been sub-divided into small commercial units. While the proposed development site never formed part of the Fords manufacturing area, it did form the northeast end of an ancillary car distribution site created during the 1970s and was subsequently used a seasonal entertainment venue in recent decades

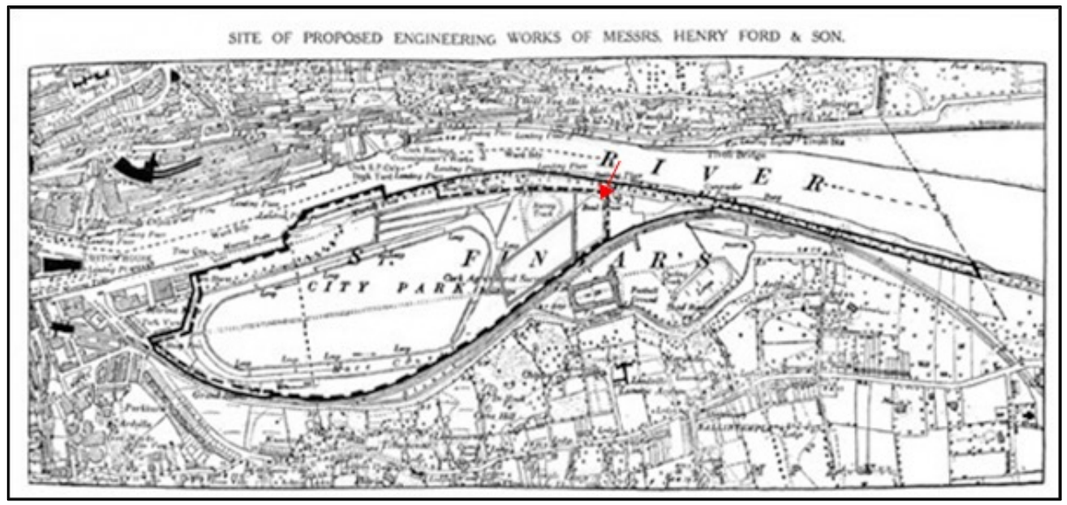

Figure 14- 5 Cork Corporation Map (1917) of Fords Landholding with Proposed Development Indicated by Arrow

The 2nd edition 6-inch OS map (1956) shows little change to the layout of the proposed development site, which continues to be depicted as an undeveloped vacant plot of land (Figure 14.6). This map also clearly depicts the extent of the development of the wider area during the first half of the 20th century with the Fords and Dunlop factories shown in lands to the west. This map also shows the route of the closed railway line within the study area and its disuse is attested to by the presence of new developments that impinge on its former line. Sections of the former railway line were developed as a public walkway in the 1970s. The map also shows Centre Park Road as a tree-lined route in the area outside the west end of the proposed development site. The detail on an oblique 1950s aerial photograph taken from the west also demonstrates the extent of the development of the general area and shows the general location of the proposed development site as a vacant undeveloped plot (Figure 14.7). The surrounding area continued to develop as a commercial and amenity centre during the late 20th century. In 1976 the GAA constructed the Páirc Uí Chaiomh stadium within the Agricultural Showground property to the east. This stadium was demolished in 2014 and was replaced by the existing stadium which opened in 2017. Recent development works in the area to the south also saw the removal of the surviving Agricultural Showground structures during the development of an amenity park to the south of the proposed development site. While the tracks of the former railway line were removed after its closure in the 1930s much of its footprint survives in the area and sections were developed as a public walkway in the 1970s, including a pathway in the area to the south of the proposed development site.

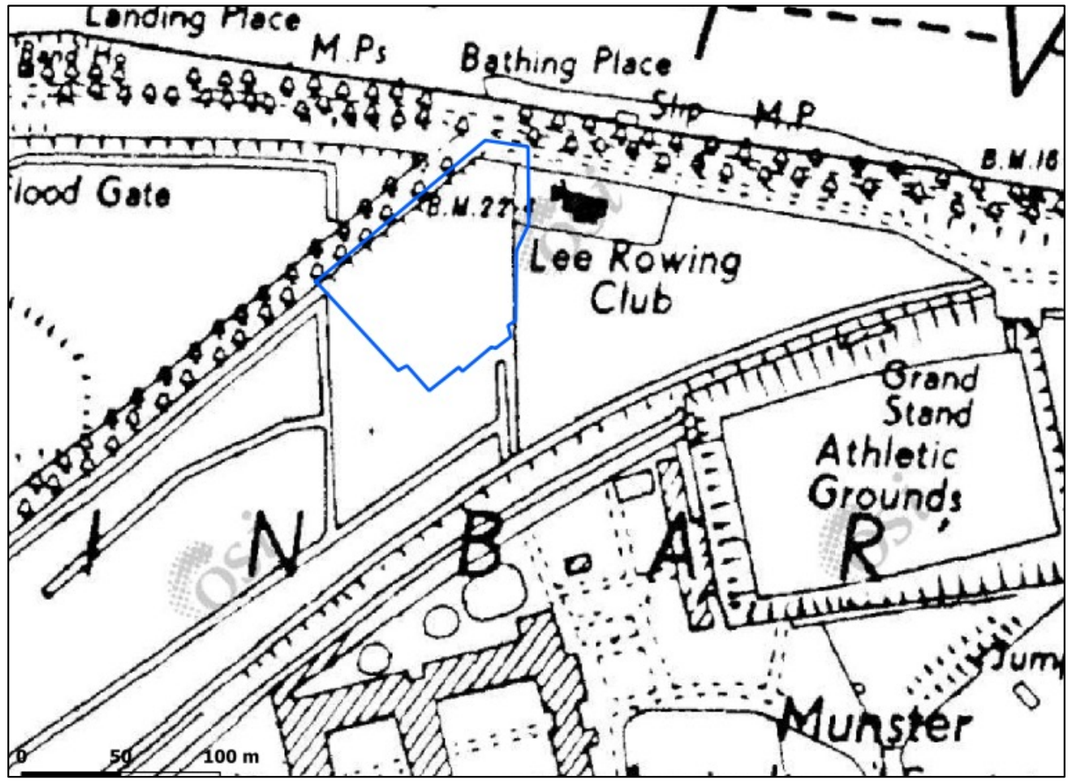

Figure 14- 6 Extract From 2nd Edition OS Map (1956) Showing Proposed Development

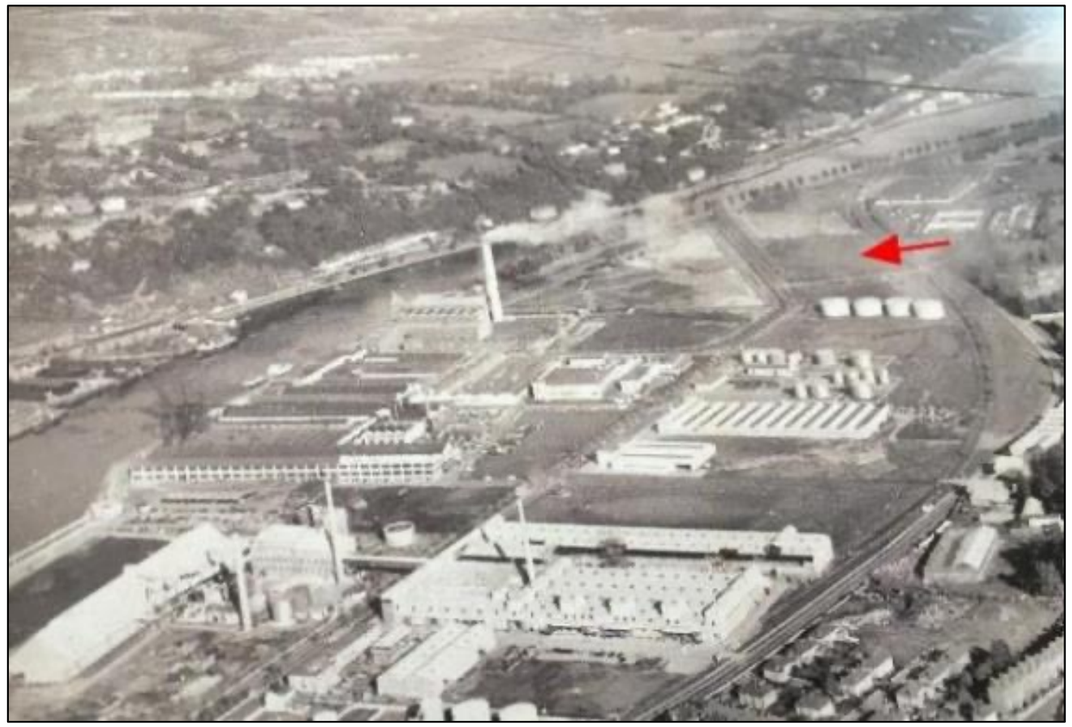

Figure 14- 7 Aerial Image (1950s) of Proposed Development (source www.nli.ie)

14.6.2 Architectural Heritage

The proposed development site is not located within a designated or proposed Architectural Conservation Area (ACA) and it does not contain any Protected Structures or NIAH-listed buildings. While there are no ACAs located within the study area, the Former Ford Factory ACA is located c.680m to the west of the proposed development and the nearest section of the Blackrock Road ACA is located c.560m to the southeast.

It is noted that while the Cork City Development Plan 2022-2028 contains a number of objectives in relation to proposed developments located inside the boundaries of ACAs (Development in Architectural Conservation Areas (Objective 8.23), Demolition in Architectural Conservation Areas (Objective 8.24) and Recording of Structures in Architectural Conservation Areas (Objective 8.25)), none of these objectives contain any content in relation to proposed developments located outside ACA boundaries.

It is nonetheless noted that the *Architectural Heritage Protection Guidelines for Planning Authorities* does refer to the potential that large scale developments may alter views to or from or an ACA and thus have an effect on their character (Department of Arts, Heritage and the Gaeltacht 2011, 202). A review of the statements of characteristics included in Volume 3 of the City Development Plan 2022-2028 for the sections of the Former Ford Factory and Blackrock ACAs within the environs of the study area revealed that neither refer to sensitivities or the protection of views extending from their locations.

The section of the 500m study area on the south side of the River Lee contains three Protected Structures, Chiplee and Lindville Houses and Shandon Boat Club, and none of these are located within 400m of the proposed development (Table 14.1 and Figure 14.8). The NIAH also lists two structures within the section of the study area on the south side of the river which are not listed as Protected Structures and neither of these are located within 400m of the proposed development (Table 14.1 and Figure 14.8).

There are also a number of Protected Structures located within the section of the study extending into lands on the north side of the river and these are located at distances of 200m-460m from the proposed development site (Table 14.2 and Figure 14.8). The NIAH has assigned a Regional Rating for all the structures within the study area that are listed in that inventory and they are of likely medium to high values.

Table 14- 5 Designated Architectural Heritage Structures on South Side of River Lee

Protected Structure ref.	NIAH ref	Structure	NIAH Rating	Approx. distance from proposed development
PS1242	20507191	Shandon Boat Club	Regional	410mm to northwest
PS513	20867017	Chiplee House	Regional	440m to southwest
PS821	-	Lindville House	n/a	400m to south
-	20867025	Ardfoyle House	Regional	460m to southeast
-	20867055	Former showgrounds stand (removed)	Regional	400m to southeast

Table 14- 6 Protected Structures on North Side of River Lee

Protected Structure ref.	Structure	Approx. distance from proposed development
PS621	Honan-Home	430m to northwest
PS624	Bellevue-Lodge	330m to northwest
PS625	Bellvue-Villas	210m to northwest
PS627	Carrig-House	270m to northwest
PS726	15 Lower Glanmire Road (house)	340m to northwest
PS727	16 Lower Glanmire Road (house)	340m to northwest
PS728	17 Lower Glanmire Road (house)	340m to northwest
PS729	18 Lower Glanmire Road (house)	340m to northwest
PS730	19 Lower Glanmire Road (house)	340m to northwest
PS731	20 Lower Glanmire Road (house)	340m to northwest
PS732	21 Lower Glanmire Road (house)	340m to northwest
PS733	Octagonal-gate-lodge-(adjacent-to-Lee-Mount)	450m to northeast
PS734	1 Lower Glanmire Road (house)	260m to northeast
PS735	2 Lower Glanmire Road (house)	260m to northeast
PS736	3 Lower Glanmire Road (house)	260m to northeast
PS737	4 Lower Glanmire Road (house)	260m to northeast
PS738	5 Lower Glanmire Road (house)	260m to northeast
PS739	6 Lower Glanmire Road (house)	260m to northeast
PS740	Myrtle-Hill-House	460m to northwest
PS741	Pedestrian-Bridge-at-Carrig-House	260m to northwest
PS742	Pedestrian-Bridge-at-Woodhill-Villas	280m to northeast
PS743	Pedestrian-Bridge-at-Bellevue-Villas	200m to northwest

Figure 14- 8 Location of Designated Architectural Heritage Constraints Within Study Area

14.6.3 Undesignated Cultural Heritage Constraints

There were no sensitivities associated with undesignated cultural heritage assets noted within the proposed development site during the desktop study. The River Lee Navigation Wall, the former line of the Blackrock-Passage railway and the former location of the Cork Agricultural Society showgrounds comprise undesignated assets of cultural heritage significance located within the surrounding area and details on these are provided in Section 14.6.1. In addition, the Páirc Uí Chaoimh stadium and rowing activities within the area are also not designated constraints but do have associations with the intangible cultural heritage resource as part of sporting activities undertaken within the area since the 19th century.

14.6.4 Site Inspection

The proposed development site was inspected in August 2024 and at that time it comprised a vacant plot in the northern end of an ongoing construction area with a raised ground surface created by the recent introduction of earth, stone and spoil material. No surface traces of any features of cultural heritage interest, or any extant structures of any date were noted within the boundary of the proposed development. Extracts from the photographic record compiled during the site inspection are provided in Appendix 14.1.

The results of the ground investigations carried within the overall Former Ford's Distribution Site landholding, including the location of the proposed development site, were also reviewed and the identified stratigraphy to the level of natural subsoils is summarised as follows:

- Tarmac surfacing was present typically to a depth of between 0.05m to 0.50m below ground level (BLG);
- Made Ground comprising of grey to dark grey slightly clayey sandy GRAVEL with varying inclusions of anthropogenic materials (i.e., concrete, brick, ash, coal, plastic, timber and metal) was encountered at all locations from ground level to a maximum depth of 3.5m BGL;
- Made Ground comprising brown to black slightly sandy gravelly CLAY was encountered below the upper Made Ground material to depths ranging from 2.0m to 4.0m BGL;
- Grey, slightly gravelly SILT / CLAY was encountered below the Made Ground to depths ranging from 3.0m to 7.0m BGL; and
- Grey, brown, purple, slightly sandy GRAVEL was encountered below the SILT / CLAY unit to a maximum depth of 15.0mbGL.

14.7 The 'Do Nothing' Scenario

A 'Do Nothing Scenario' will result in the continued preservation of the known and potential cultural heritage resource, such as any potential sub-surface archaeological remains, located within the study area. As the site is zoned for development, in the absence of the proposed development, it is likely that a development of a similar nature is likely to be constructed in the future in line with national policy and the development plan objectives. Therefore, the construction and operational phase impacts outlined in this assessment are likely to occur in the future, even in the absence of the proposed development.

14.8 Potential Significant Effects

14.8.1 Demolition Phase

The proposed development will not require any demolition works and, therefore, no demolition phase effects on the cultural heritage resource will arise.

14.8.2 Construction Phase

There are no recorded archaeological sites located within proposed development or within 260m of its boundary and it is located c.2.3km outside the medieval core of Cork city. In addition, no potential unrecorded archaeological sites were identified within the site or its environs during the desktop study and site inspection carried out as part of this assessment. The proposed development will, therefore, have no predicted effects on the known archaeological resource during the construction phase.

The proposed development site comprised a vacant, undeveloped area within riverine slob lands prior to reclamation works in recent centuries which included the introduction of extensive deposits of infill material. A review of the results of ground investigation works, Ground Investigation Report provided at Appendix 8.1, within the site revealed that the infilled made ground deposits exist to depths of up to 4m below existing ground levels and contain modern inclusions, such as concrete material. It is noted that the proposed development will require the reduction of the introduced infill deposits of made ground during excavations for the undercroft level of the apartment blocks and foundation works. Given the absence of evidence for settlement activity within the proposed development site or its environs combined with the known infilling and subsequent development of the location in the 19th and 20th centuries, the potential for the presence of sub-surface archaeological remains within the development boundary is deemed to be low. However, the potential for the presence of unrecorded, sub-surface archaeological riverine features, such as trackways or fish-traps, located beneath infilled made ground deposits or the presence of archaeological objects within these deposits cannot be entirely discounted. As the existence, nature, depth and extent of any unrecorded, sub-surface archaeological remains within the proposed development site are unknown; the magnitude and significance of effects by ground works during the construction phase is indeterminable but the potential for direct, adverse effects is noted and this will require mitigation.

There are no designated architectural heritage structures located within the proposed development site or within 400m of its boundary on the south bank of the River Lee and it is not located within, or adjoining an Architectural Conservation Area. The proposed development will, therefore, have no predicted direct or indirect effects on the designated architectural heritage resource during the construction phase. There were no intangible or undesignated cultural heritage assets identified within the proposed development site and, therefore, no direct effects on these elements of the cultural heritage resource are predicted.

14.8.3 Operational Phase

There are no recorded archaeological sites located within the proposed development site or within 260m of its boundary and it is not located within a zone of archaeological potential. Following the successful implementation of the archaeological mitigation measures identified in Section 14.9, no operational effects on the archaeological resource are predicted.

There are no designated architectural heritage structures within the proposed development site, or within 400m of its boundary on the south bank of the River Lee, and it is not located within, or adjacent to, an Architectural Conservation Area. In addition, no undesignated structures of architectural heritage significance are located within the proposed development site. The operational phase of the proposed development will, therefore, not result in any predicted direct effects on the architectural heritage resource. While the assessment of Landscape and Visual impacts of the proposed development on various views within the wider cityscape is presented in Chapter 5 of this EIAR, a review of the locations of cultural heritage constraints carried out as part of the Cultural Heritage assessment did not reveal any likely significant, indirect adverse effects on the setting of any such constraints, including any intrusions on other potential attributes such as designed sightlines between cultural heritage constraints which were intended to form an intrinsic aspect of their function or setting. While the proposed development will be visible from various cultural heritage constraints within the 500m study area, and from other constraints within the wider cityscape, given the absence of any such constraints within or in close proximity to the proposed development site in combination with the existing modern built environment within the area, the indirect, permanent adverse effect on the cultural heritage resource is considered to be negligible-low in magnitude and not significant-slight in significance.

The proposed development will have no predicted operational phase effects on extant undesignated cultural heritage constraints in the study area, such as the former railway line or the Navigation Wall. While the Páirc Uí Chaoimh sports complex in the area to the east has an association with the intangible cultural heritage resource as a centre for Gaelic games it is located within a modern urban area that has been extensively developed as an industrial and residential centre during the past century. In addition, the existing stadium and its surrounds are of recent construction and replaced an earlier stadium at that location as well as remains of the former showgrounds. Given these factors, it is concluded that the proposed development will have no predicted effect on the new sport complex's association with the Gaelic game's tradition. The proposed development will also have no predicted effects on associations with other historical sporting practices in the area such as the former racecourse to the west and rowing activities in the river channel to the north.

In conclusion, no significant direct or indirect effects on the cultural heritage resource are predicted to arise during the operational phase of the proposed development.

14.8.4 Cumulative Effects

As detailed in Section 14.6.1, a number of archaeological monitoring investigations have been undertaken during projects located within the environs of the proposed development, including the Cork Main Drainage Scheme and the redevelopment of Páirc Uí Chaoimh. Nothing of archaeological significance was identified within the study area during any of these projects. Given these factors, in combination with the absence of any predicted direct effects on the known cultural heritage resource arising from the proposed development it is concluded that it will not contribute to any potential direct cumulative effects on the archaeological resource combined with these completed developments.

A review of An Bord Pleanála (ABP) and Cork City Council (CCC) online planning portals revealed the presence of a number of proposed and permitted developments located within the environs of the proposed development. The cultural heritage impact assessments prepared for a number of these developments were reviewed in order to assess the potential for cumulative effects on the cultural heritage resource and the results are summarised below.

Former Ford Distribution site (ABP-309059)

This development includes the demolition of existing modern structures within the site and the construction of apartments, commercial and community facilities. This site contains no recorded cultural heritage constraints, and the cultural heritage impact assessment prepared for the proposed development includes archaeological monitoring of the construction phase as a mitigation measure. No moderate or significant effects on the known cultural heritage resource were predicted in the cultural heritage impact assessment.

Former Tedcastles Yard (ABP- 313277)

This development includes the demolition of existing modern structures and the construction of a strategic housing development including six apartment buildings. There are no recorded cultural heritage constraints located within the boundary of the development. Archaeological monitoring of the construction phase is included as a mitigation measure in the cultural heritage impact assessment prepared for this development and no moderate or significant effects on the known cultural heritage resource were predicted.

LRD at Goulding's Site (CCC-2342106)

This proposed development consists of the demolition of the existing on-site modern buildings and structures to facilitate the construction of a residential development with an associated creche and amenity space. A review of the cultural heritage assessment prepared for this development revealed that no recorded cultural heritage constraints are located within its boundary and that archaeological monitoring of the construction phase will be carried out. No moderate or significant effects on the known cultural heritage resource were predicted in the cultural heritage impact assessment.

Former Cork Warehouse SHD (ABP-313142)

This proposed development includes demolition of existing modern structures on-site and the construction of apartments, creche and commercial units. There are no recorded cultural heritage constraints located within the site and no predicted effects on the known archaeological resource were predicted in the archaeological impact assessment report prepared for the development which includes archaeological monitoring of the construction phase as a mitigation measure.

Lee Rowing Club (CCC-2443106)

This development will include the retention of a boat shed, extension and alterations to an existing clubhouse, a new single storey boat shed clubhouse and all associated site and ancillary works. There are no recorded cultural heritage constraints located within this site and no cultural heritage conditions were included in the grant of planning permission.

Pairc Ui Chaoimh CTR (ABP-311651-21)

This development will include internal reorganisation and redevelopment of the South Stand, external works comprising modifications to existing stadium entrances and revised access and egress arrangements. There are no extant recorded cultural heritage constraints located within this site and no cultural heritage conditions were included in the grant of planning permission.

In summary, none of the cultural heritage impact assessments of the reviewed developments detailed above predicted any moderate or significant direct/indirect effects on the known cultural heritage resource and archaeological monitoring of the construction phase is included as a mitigation measure for a number of the developments. Given the absence of impacts on known cultural heritage constraints resulting from the reviewed developments, including the proposed development assessed within this chapter, combined with the application of appropriate construction archaeological mitigation measures where relevant, no likely significant cumulative effects on the cultural heritage resource are predicted to occur.

14.8.5 Summary

The proposed development will not result in any predicted significant construction, operational or cumulative effects on the cultural heritage resource.

14.9 Mitigation Measures

14.9.1 Incorporated Design Mitigation

There are no recorded cultural heritage constraints located within or adjacent to the proposed development site and, therefore, no incorporated mitigation was required during the design of the development.

14.9.2 Demolition Phase Mitigation

The proposed development will not involve a demolition phase and, therefore, no demolition phase mitigation will be required.

14.9.3 Construction Phase Mitigation

Archaeological monitoring of ground excavation works during the construction phase will be carried out by a suitably qualified archaeologist under licence by the National Monument Service. In the event that any archaeological remains, or other sub-surface features of cultural heritage interest, are identified during monitoring they will be recorded and left to remain securely *in situ* while the National Monuments Service and the Cork City Council Archaeologist are consulted to determine further appropriate mitigation measures, which may entail preservation *in situ* by avoidance or preservation in record by archaeological excavation. The construction phase of the proposed development will not result in any predicted effects on other aspects of the cultural heritage resource that will require mitigation.

14.9.4 Operational Phase Mitigation

Following the successful implementation of the archaeological mitigation measures presented in Section 14.9.3, the operational phase of the proposed development will not result in any predicted effects on the archaeological resource that will require mitigation. The operational phase of the proposed development will not result in any predicted direct effects on other elements of the cultural heritage resource that will require mitigation. While the proposed development will have the potential to result in indirect effects of a visual nature on cultural heritage constraints within the wider cityscape, given the distances of these constraints from the boundary of the proposed development and the nature of the existing modern built environment within the area these indirect effects are predicted to be negligible-low in magnitude and not significant-slight in significance and do not require mitigation.

14.10 Residual Impact Assessment

14.10.1 Demolition Phase

The proposed development will not require a demolition phase and, therefore, no residual effects are predicted.

14.10.2 Construction Phase

The mitigation measures detailed in Section 14.9.3 will provide for either the preservation in situ of any currently unrecorded, sub-surface archaeological features that may exist within the proposed development site by avoidance or the proper and adequate recording of such features by full archaeological excavation. Preservation *in situ* shall allow for a negligible magnitude of effect resulting in a potential not significant/imperceptible significance of effect in the context of residual impacts on the unrecorded archaeological resource. Preservation by record shall allow for a high magnitude of effect, albeit ameliorated by the creation of a full and detailed archaeological record, the results of which shall be publicly disseminated. This shall result in a potential slight/moderate range of significance of effect in the context of residual adverse impacts on the unrecorded archaeological resource.

14.10.3 Operational Phase

While the operation phase of the proposed development will have the potential to result in permanent, indirect, residual adverse effects of a visual nature on cultural heritage constraints located within the wider cityscape, these effects are predicted to be negligible-low in magnitude and not significant-slight in significance.

14.10.4 Summary of Post-mitigation Effects

Given the nature of the cultural heritage baseline environment described in Section 14.6 of this chapter, no post-mitigation effects on the cultural heritage resource are predicted to arise other than Not-Significant-Slight indirect adverse effects on cultural heritage constraints located within the wider environs of the proposed development.

14.10.5 Cumulative Residual Effects

Given the nature of the cultural heritage baseline environment described in Section 14.6, no cumulative residual effects on the cultural heritage resource are predicted to arise.

14.11 Risk of Major Accidents or Disasters

No predicted risks of major accidents of disasters are predicted to arise from any potential adverse effects on the cultural heritage resource.

14.12 Worst Case Scenario

If the proposed development were to proceed without the implementation of the archaeological mitigation measures outlined in Section 14.9.3 then construction phase ground works will have the potential to result in direct negative effects on any unrecorded, sub-surface archaeological remains that may exist within the proposed development site.

14.13 Interactions

The proposed development will not interact with other aspects of the environment assessed in this EIAR to result in any predicted effects on the cultural heritage resource.

14.14 Monitoring

There are a number of obligatory processes required as part of archaeological licence applications to the National Monuments Service and these will allow for monitoring of the successful implementation of the archaeological mitigation measures presented in Section 14.9.3. A method statement detailing the proposed strategy for archaeological supervision of ground works during the construction phase will be submitted to the National Monuments Service as part of the licence application. This will clearly outline the proposed extent of ground works and outline the consultation process to be enacted in the event that any unrecorded archaeological remains are identified, which may include preservation in situ by avoidance or preservation in record by archaeological excavation. A report will be compiled on all archaeological site investigations which will clearly present the results in written, drawn and photographic formats. Copies of this report will be submitted to the National Monuments Service, Cork City Council and the National Museum of Ireland.

14.15 Summary of Mitigation and Monitoring

Archaeological monitoring of ground excavation works during the construction phase will be carried out by a suitably qualified archaeologist under licence by the National Monument Service. A method statement detailing the proposed strategy for archaeological supervision of ground works during the construction phase will be submitted to the National Monuments Service as part of the licence application. A report detailing the results of the archaeological monitoring of the construction phase will be submitted to the National Monuments Service, Cork City Council and the National Museum of Ireland.

14.16 Conclusion

There are no recorded archaeological sites located within the proposed development site or within 260m of its boundary and it is located c.2.3km outside the zone of archaeological potential around the historic core of Cork city as identified in the Cork City Development Plan 2022-2028. There are no designated architectural heritage structures within the proposed development site, or within 400m of its boundary on the south bank of the River Lee, and it is not located within, or adjacent to, an Architectural Conservation Area. In addition, no undesignated structures of architectural heritage significance are located within the proposed development site. It is concluded that the proposed development will not result in any predicted significant construction, operation or cumulative direct or indirect effects on the cultural heritage resource.

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www.duchas.ie (Folklore)

https://nationalinventoryich.chg.gov.ie/national-inventory/ (Intangible assets)

www.excavations.ie (Archaeological investigations)

www.logainm.ie (Placenames)

www.heritagemaps.ie/WebApps/HeritageMaps/index.html (Various datasets)

http://www.corkarchives.ie/media/1917%20Ford%20factory%20with%20cover.pdf (Local history)

http://www.corkpastandpresent.ie (Historic maps and photographs)

http://blackrockcorkonlineheritage.ie/index.php/en/ (Local history)

https://experience.arcgis.com/experience/b0878e633a5242e4a4de7656d70cde83/page/Map/?views=View (Digital Atlas of Cork)

VOLUME II

CHAPTER 15

Interactions of the Foregoing

McCutcheon Halley
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CHAPTER FIFTEEN
Table of Contents

CHAPTER FIFTEEN
Table of Tables

Chapter Fifteen | Interactions of the Foregoing

15.1 Introduction

The construction, operational and cumulative impacts of the proposed development have been assessed within each chapter of the EIAR. This chapter considers the significant interactions of impacts between each of the separate disciplines.

In practice many impacts have slight or subtle interactions with other disciplines. Table 15.1 provided at the end of this chapter highlights those interactions which are considered to potentially be of a significant nature. Discussions of the nature and effect of the impact is primarily undertaken within each of the relevant chapters, while this chapter identifies the most important potential interactions.

This chapter was prepared by Rachel Condon of McCutcheon Halley Chartered Planning Consultants with input from the lead author of each assessment.

15.2 Population & Human Health

During the construction phase, the following aspects have potential to interact with population & human health:

- **Land and Soils:** Exposure to contaminated soils and potential gases during the construction phase may give rise to health impacts.
- **Landscape and Visual:** Construction processes and plant such as cranes used during the construction phase may give rise to visual impacts.
- **Material Assets: Traffic:** Increased construction traffic movements on the local road network during the construction phase may give rise to noise, dust, and road safety impacts.
- **Material Assets: Built Services & Waste:** Excavation during the construction phase may give rise to risks to human health from the improper removal, handling and storage of waste. Extended power or telecommunications outages, or disruption to water supply or sewerage systems for existing properties in the area could negatively impact on the surrounding human population and their overall health.
- **Noise & Vibration:** There is potential for effects on human health associated with noise during the construction phase which may impact upon amenity.
- **Air Quality:** There is potential for impact on human health from dust associated with construction activities and thus impacting air quality.

During the operational phase, the following aspects have potential to interact with population & human health:

- **Landscape and Visual:** The landscape plan will impact the quality of the private, communal and public open spaces, which could impact people's health and well-being.
- **Material Assets: Traffic:** The proposed development's proximity to services, amenities, and public transport would interact with patterns of traffic and transport locally during the operational phase. Traffic flows within the site have the potential to create safety risks for pedestrians and cyclists.
- **Air Quality:** Energy efficient design within the proposed development may give rise to reduced electricity consumption by future residents, potentially decreasing dependence on fossil fuels for energy generation, resulting in improved air quality. There is potential for impact on human health from a deterioration in air quality associated with emissions from vehicles.
- **Climate:** Energy efficient design within the proposed development may give rise to reduced electricity consumption by future residents, potentially decreasing dependence on fossil fuels for energy generation, resulting in significant CO2 savings.

The potential significant effects on population and human health arising from these interactions have been considered within the relevant discipline and mitigation measures outlined where required. With mitigation measures in place, no significant permanent residual negative effects will occur.

15.3 Landscape & Visual

During the construction phase, the following aspects have potential to interact with landscape & visual:

- **Population & Human Health:** During the construction phase, the emergence of plant to facilitate the development have potential to have short-term, slight to not-significant, neutral visual effects for existing residents and surrounding road network.
- **Biodiversity:** Clearance and excavation works to the existing landscape could potentially impact on surrounding biodiversity particularly those recorded within the adjoining wetlands area.
- **Land and Soils:** Excavation and cutting into the soil of the existing landscape will change the current landscape.

During the operational phase, the following aspects have potential to interact with landscape & visual:

- **Population & Human Health:** The provision of new housing opportunities set within a high quality development with landscape and visual amenities and recreational opportunities, in close proximity to Cork City Centre, with access to bus, cycling and pedestrian infrastructure as well as a host of local amenities has been considered. The interaction of the future potential landscape and visuals effects of the proposed scheme with existing and future population and human health has the potential to have a significant positive effect in the long term.
- **Biodiversity:** The increase in the quantum of trees within the site is part of the overall green infrastructure strategy of the landscape site plan providing instant visual and landscape amenity value. The proposed landscape and green infrastructure strategies that are proposed, along with designed mitigation measures for the flora and fauna on the site, biodiversity have the potential to have an interaction that can be described as a significant positive effect in the long term.

The potential significant effects on landscape and visual arising from these interactions have been considered within the relevant discipline and mitigation measures outlined where required. With mitigation measures in place, no significant permanent residual negative impacts will occur.

15.4 Material Assets: Traffic

During the construction phase, the following aspects have potential to interact with traffic:

- **Population & Human Health:** Construction traffic movements during the construction phase may give rise to localised population & human health effects related to increased vehicular traffic on the road network, and impacts on the pedestrian and cycle environment.
- **Noise & Vibration:** Construction traffic movements during the construction phase may give rise to localised noise and vibration effects.
- **Air Quality:** Construction traffic movements during the construction phase may give rise to increased vehicular emissions.
- **Climate:** Construction traffic movements during the construction phase may give rise to increased greenhouse gas emissions.

During the operational phase, the following aspects have potential to interact with traffic:

- **Population & Human Health:** Additional traffic movements during the operational phase may give rise to localised population & human health effects. There are no potentially significant interactions identified between population & human health and traffic during the operational phase.
- **Noise & Vibration:** Additional traffic movements during the operational phase may give rise to localised noise and vibration effects. There are no potentially significant interactions identified between noise & vibration and traffic during the operational phase.
- **Air Quality:** Additional traffic movements during the operational phase may give rise to increased vehicular emissions. There are no potentially significant interactions identified between air quality and traffic during the operational phase.
- **Climate:** Additional traffic movements during the operational phase may give rise to increased greenhouse gas emissions. There are no potentially significant interactions identified between climate and traffic during the operational phase.

The potential significant effects on Material Assets: Traffic arising from these interactions have been considered within the relevant discipline and mitigation measures outlined where required. With mitigation measures in place, no significant permanent residual negative impacts will occur.

15.5 Material Assets: Built Services & Waste

During the construction phase, the following aspects have potential to interact with built services & waste:

- **Population & Human Health:** In the absence of mitigation, the improper removal, handling and storage of waste could negatively impact on the health of construction workers. Extended power or telecommunications outages, or disruption to water supply or sewerage systems for existing properties in the area could negatively impact on the surrounding human population and their overall health. No long term, adverse effects are likely to impact on Population and Human Health as a result of the Proposed Development.
- **Material Assets: Traffic:** The proposed development will require the removal of excavated soil and transportation to appropriate waste facilities during the construction phase. It is anticipated that all excavated materials will require removal offsite in accordance with all statutory legislation. This has the potential to negatively affect the surrounding road network. The removal of all soil from the site will be undertaken in accordance with all applicable statutory legislation and will be the responsibility of the main contractor.
- **Land & Soils:** Improper handling and segregation of hazardous or contaminated wastes could lead to the contamination of soil and stones excavated from the site. It is also anticipated that some excavated soil and subsoil, including soil contaminated with petroleum hydrocarbons and solvents, will require removal offsite.
- **Water & Hydrology:** All connections to the public water network (water supply or foul sewer), abstractions from water supply and discharges to the foul sewer during the Construction Phase.

During the operational phase, the following aspects have potential to interact with built services & waste:

- Water & Hydrology: All abstractions from water supply and discharges to the foul sewer during the Operational Phase will be under consent from Uisce Éireann. The proposed development may give rise to changes to surface water run-off, with impacts to water and hydrology.
- Climate: The proposed development has been designed in accordance with all relevant building design standards. Sustainable power and heat sources have been included as part of the building design to reduce reliance on imported fossil fuels and reduce greenhouse gases (GHG) emissions.

The potential significant impacts on built services arising from these interactions have been considered within the relevant discipline and mitigation measures outlined where required. With mitigation measures in place, no significant permanent residual negative impacts will occur.

15.6 Land & Soils

During the construction phase, the following aspects have potential to interact with land & soils:

- **Population & Human Health: T**he soils beneath the site are locally impacted with hydrocarbons. Without suitable remedial measures the contamination in the soils under the proposed development poses a risk to site workers. Appropriate industry standard and health and safety legislative requirements will be implemented during the construction phase of the Proposed Development that will be protective of site workers. All works will be undertaken by the appointed contractor in accordance with industry best practice to manage risk form contaminated soils and volatile vapours from residual soil contamination and from groundwater. These will be designed by the appointed contractor dependent on his construction practices and are likely to include the use of gloves, dust masks and potentially disposable overalls. These and other appropriate measures will minimise the exposure to site staff.
- **Landscape & Visual:** During the construction phase and into the operational phase of the site landscape will undergo a change from undeveloped brownfield lands to residential/commercial with associated landscaping.
- **Material Assets: Built Services & Waste:** Where possible, it is intended to retain and re-use the excavated soil and subsoil on the Site for engineering fill and landscaping. However, it is anticipated that some excavated soil and subsoil, including soil contaminated with petroleum hydrocarbons and solvents, will require removal offsite. Additionally, there is a requirement to import aggregates during the Construction Phase of the Proposed Development.

- **Water & Hydrology:** Dissolved phase groundwater impacted with petroleum hydrocarbons and solvents is present in both shallow and deeper groundwater beneath the site. The recent removal of identified sources of contamination (i.e., impacted soil, waste oil cans, and solvent drums) is expected to significantly improve the long-term quality of groundwater beneath the site. In advance of construction works commencing, the existing human health risk assessment (HHRA) will be refined based on the results of the in-situ soil validation samples collected at the site. The refined HHRA will inform the remediation plan to ensure that residual sources of contamination in soils are removed offsite, further improving the quality of groundwater beneath the site. However, impacted groundwater will continue to act as an ongoing source of vapours in the subsurface. The mobilisation of residual contamination in soil beneath the site during the construction phase could result in an adverse impact on the receiving hydrogeological and hydrological environment. Piling during the construction phase of the Proposed Development may also potentially create pathways for sources of contamination in shallow soils, groundwater and leachates to enter underlying groundwater.
- **Biodiversity:** As a result of the excavation and importation of materials to the Site, biodiversity with emphasis on habitats, flora and fauna may be impacted.
- **Air Quality:** The excavation of soils across the Site and the temporary stockpiling of soils pending reuse or removal offsite has the potential to generate nuisance impacts (i.e., dust) during the construction phase of the proposed development. An Odour Management Plan will be prepared by the appointed contractor in advance of construction works to identify appropriate health and safety and environmental mitigation and management measures to be undertaken to ensure that the activities will be carried out in a manner such that vapours and odours do not pose any human health risk or result in significant impairment of, or significant interference with amenities or the environment beyond the site boundary.

No potential operational interactions are identified.

The potential significant effects on land and soils arising from these interactions have been considered within the relevant discipline, and mitigation measures have been outlined where required. With mitigation measures in place, no significant permanent residual negative effects will occur.

15.7 Water & Hydrology

During the construction phase, the following aspects have potential to interact with water & hydrology:

- **Population & Human Health:** The Proposed Development will increase the amount of people in close proximity to flood-prone areas such as the South Docks. This increased population density could heighten the potential for flood-related health impacts, particularly during construction. However, this area is currently defended by municipal flood defences to an appropriate standard. Residual risk will be mitigated by monitoring weather forecasts to optimize construction planning. The soils and groundwater beneath the site are locally impacted with hydrocarbons. Without suitable remedial measures the contamination under the Proposed Development poses a risk to site workers and future occupants of the site. Furthermore, the presence of volatile hydrocarbons in the made ground poses a risk to structures and future occupants of the site from exposure to ground gas. Appropriate industry standard and health and safety legislative requirements will be implemented during the construction phase of the Proposed Development that will be protective of Site workers.
- **Material Assets: Built Services & Waste:** There is a risk of excess silts from construction runoff accumulating in the existing drainage network, potentially compromising its capacity. To mitigate this, standard pollution control measures will be employed to manage contaminated runoff and preserve the integrity of drainage channels during construction.
- **Land & Soils:** During the construction earthworks, heavy rainfall events have the potential to mobilise contaminated run-off and impact on the usability of materials stored onsite. This could therefore require the importation of additional material from external sources.
- **Biodiversity:** An assessment of the potential impacts of the proposed development on the Biodiversity, with emphasis on habitats, flora and fauna which may be impacted as a result of potential contamination entering the waterbody which provides a hydraulic connection to designated sites where habitats and species, particularly those protected by national and international legislation or considered to be of particular conservation importance. Mitigation measures relating to interactions between hydrology and biodiversity have been outlined in the NIS report accompanying the planning application.

During the operational phase, the following aspects have potential to interact with water & hydrology:

- **Population & Human Health: T**he Proposed Development will increase the amount of people in close proximity to flood-prone areas such as the South Docks. This increased population density could heighten the potential for flood-related health impacts. However, this area is currently defended by municipal flood defences to an appropriate standard which are also proposed to be upgraded to provide a higher level of protection.
- **Material Assets: Built Services & Waste:** There will be an increased demand on potable water supply and on the municipal drainage system.

The potential significant impacts on biodiversity arising from these interactions have been considered within the relevant discipline and mitigation measures outlined where required. With mitigation measures in place, no significant permanent residual negative impacts will occur.

15.8 Biodiversity

During the construction phase, the following aspects have the potential to interact with biodiversity:

- **Water & Hydrology:** Interactions can occur between biodiversity and hydrology through impacts to water quality arising from, for example an accidental pollution event during the construction phase. Unmitigated interactions between hydrology have the potential to impact on ecological receptors such as designated sites that are hydrologically linked to the Site. Mitigation measures relating to interactions between hydrology and biodiversity have been outlined in the NIS report accompanying this EIAR and have been prescribed to prevent this potential impact.
- **Noise & Vibration:** Potential noise related impacts, particularly in relation to local bird populations within the vicinity of the proposed development have been considered fully as part of the assessment of likely significant effects. Such effects are not likely to be significant, as described in Chapter 10 Biodiversity.
- **Air Quality:** Air quality, and particularly effects arising from dust emissions during the construction phase of the Proposed Development could have impacts on local biodiversity. These potential effects have been fully

considered as part of this assessment. When standard dust minimisation measures as part of construction best practice are implemented, these effects are not likely to be significant and no likely significant effects are expected in this case.

- **Climate:** Changes in climate over time has the potential to alter species distributions and ecological balances as described in the chapter dedicated to climate within this EIAR. Conservation measure to protect flora and fauna from changes in climate have been considered when prescribing enhancement measures and mitigation measures relating to Biodiversity.

During the operational phase, the following aspects have the potential to interact with biodiversity:

- **Water & Hydrology:** Interactions can occur between biodiversity and hydrology through impacts to water quality arising from, for example an accidental pollution event during the operation phase. Unmitigated interactions between hydrology have the potential to impact on ecological receptors such as designated sites that are hydrologically linked to the Site. Mitigation measures relating to interactions between hydrology and biodiversity have been outlined in the NIS report accompanying this EIAR and have been prescribed to prevent this potential impact.

- **Climate:** Changes in climate over time has the potential to alter species distributions and ecological balances as described in the chapter dedicated to climate within this EIAR. Conservation measures to protect flora and fauna from changes in climate have been considered when prescribing enhancement measures and mitigation measures relating to Biodiversity.

The potential significant effects on water and hydrology arising from these interactions have been considered within the relevant discipline and mitigation measures outlined where required. With mitigation measures in place, no significant permanent residual negative effects will occur.

15.9 Noise & Vibration

During the construction phase, the following aspects have potential to interact with noise & vibration:

- **Population & Human Health:** There is potential for interaction with population and human health for adjoining residential properties associated with noise generated during the construction phase.

- **Material Assets: Traffic:** While the proposed development will give rise to an increase in road traffic on surrounding roads, the resulting noise level increase will be imperceptible. On this basis, the impact of the interactions between traffic and noise are considered to be not significant, long term and imperceptible due to the low-level changes in traffic flows associated with the proposed development.

During the operational phase, the following aspects have potential to interact with noise & vibration:

- **Material Assets: Traffic:** While the proposed development will give rise to an increase in road traffic on surrounding roads, the resulting noise level increase will be imperceptible. On this basis, the impact of the interactions between traffic and noise are considered to be not significant, long term and imperceptible due to the low-level changes in traffic flows associated with the proposed development.

The potential significant impacts on noise and vibration arising from these interactions have been considered within the relevant discipline and mitigation measures outlined where required. With mitigation measures in place, no significant permanent residual negative effects will occur

15.10 Air Quality

During the construction phase, the following aspects have potential to interact with air quality:

- **Population & Human Health:** Interactions between air quality and population and human health have been considered as the proposed development has the potential to cause health issues as a result of impacts on air quality from dust nuisances and potential traffic derived pollutants. However, the mitigation measures employed at the proposed development will ensure that all impacts are compliant with ambient air quality standards and human health will not be affected. Furthermore, traffic-related pollutants have been assessed and determined as having an overall insignificant impact, therefore air quality impacts from the Proposed Development are not expected to have a significant impact on population and human health.

- **Material Assets: Traffic:** In the current assessment, traffic derived pollutants which may affect Air Quality have been deemed not significant. Therefore, the impact of the interaction between air quality and traffic is not significant.

- **Land & Soils:** Construction phase activities such as land clearing, excavations, stockpiling of materials etc. have the potential for interactions between air quality and land & soils in the form of dust emissions. With the appropriate mitigation measures to prevent fugitive dust emissions, it is predicted that there will be no significant interactions between air quality and land and soils during the construction phase.

- **Biodiversity:** Interactions between air quality and biodiversity have been considered as the construction phase has the potential to interact with flora and fauna in adjacent habitats and designated sites due to dust emissions arising from the construction works. However, the mitigation measures employed at the Proposed Development will ensure that the impacts to flora and fauna are not significant.

- **Climate:** Air quality and climate have interactions due to the emissions from the burning of fossil fuels during the construction and operational phases generating both air quality and climate impacts. There is no impact on climate due to air quality; however, the sources of impacts on air quality and climate are strongly linked.

During the operational phase, the following aspects have potential to interact with air quality:

- **Population & Human Health:** Interactions between air quality and population and human health have been considered as the proposed development has the potential to cause health issues as a result of impacts on air quality from dust nuisances and potential traffic derived pollutants. However, the mitigation measures employed at the proposed development will ensure that all impacts are compliant with ambient air quality standards and human health will not be affected. Furthermore, traffic-related pollutants have been assessed and determined as having an overall insignificant impact, therefore air quality impacts from the Proposed Development are not expected to have a significant impact on population and human health.

- **Material Assets: Traffic:** In the current assessment, traffic derived pollutants which may affect Air Quality have been deemed not significant. Therefore, the impact of the interaction between air quality and traffic is not significant.

- **Land & Soils:** There are no potentially significant interactions identified between air quality, and land & soils during the operational phase.
- **Climate:** Air quality and climate have interactions due to the emissions from the burning of fossil fuels during the construction and operational phases generating both air quality and climate impacts. Air quality modelling outputs are utilised within the Climate Change Chater. There is no impact on climate due to air quality; however, the sources of impacts on air quality and climate are strongly linked.

15.11 Climate

During the construction phase, the following aspects have potential to interact with climate:

- **Material Assets: Traffic:** During the construction phase, there is the potential for interactions between climate and traffic. Vehicles accessing the site will result in emissions of CO2, a greenhouse gas. However, the effect on climate due to change in traffic is not predicted to be significant.
- **Material Assets: Built Services & Waste:** Interactions across many areas can be used to minimise the GHG emissions from the construction phase. For instance, waste management measures will be put in place to minimise the amount of waste entering landfill, which has higher associated embodied carbon emissions than other waste management such as recycling or incineration.
- **Air Quality:** Air quality and climate have interactions due to the emissions from the burning of fossil fuels during the construction phase generating both air quality and climate impacts. Air quality modelling outputs are utilised within the Climate Chapter. There is no impact on climate due to air quality; however, the sources of impacts on air quality and climate are strongly linked.

During the operational phase, the following aspects have potential to interact with climate:

- **Material Assets: Traffic:** During the operational phase, there is the potential for interactions between climate and traffic. Vehicles accessing the site will result in emissions of CO2, a greenhouse gas. However, the effect on climate due to change in traffic is predicted to be significant.
- **Material Assets:** Built Services & Waste: Interactions across many areas can be used to minimise the GHG emissions from the operational phase. For instances, waste management measures will be put in place to minimise the amount of waste entering landfill, which has higher associated embodied carbon emissions than other waste management such as recycling or incineration.
- **Land & Soils:** Soil interactions with climate are critical, with changes in climate affecting soil moisture, erosion rates, and land productivity. Increased rainfall may lead to soil erosion, while extended dry periods can degrade soil quality. Addressing these interactions is essential for maintaining soil health and implementing sustainable land use practices.
- **Water & Hydrology:** Interactions between climate and water resources are identified. Climate variability, such as increased rainfall or prolonged droughts, can affect water availability, quality, and management practices. This includes impacts on stormwater runoff, flood risk, and water supply. The development must incorporate effective water management strategies to address these potential issues and ensure resilience to changing climate conditions. The impact of flood risk has been assessed and the surface water drainage network will be designed to cater for run-off from the building and the surrounding hardscaped areas.
- **Biodiversity:** The relationship between climate and biodiversity is significant. Changes in temperature and precipitation patterns can alter habitat conditions, disrupt species distributions, and affect ecological balances. These shifts may impact local flora and fauna, necessitating careful consideration of conservation measures to protect biodiversity within and around the development area.
- **Air Quality:** Air quality and climate have interactions due to the emissions from the burning of fossil fuels during the operational phase generating both air quality and climate impacts. Air quality modelling outputs are utilised within the Climate Chapter. There is no impact on climate due to air quality; however, the sources of impacts on air quality and climate are strongly linked.

The potential significant impacts on climate arising from these interactions have been considered within the relevant discipline and mitigation measures outlined where required. With mitigation measures in place, no significant permanent residual negative effects will occur.

15.12 Cultural Heritage: Archaeology & Built Heritage

No potential operational interactions with cultural heritage were identified during both the construction and operational phases.

15.13 Conclusion

As outlined above, the proposed development has the potential to impact various environmental aspects, with interactions and inter-relationships between these aspects as described above. The EIAR has considered these interactions and inter-relationships throughout the appraisal, firstly through the design and layout of the proposed developments, to avoid impacts where possible, and also in the definition of suitable mitigation measures to minimise the impacts.

Table 15 1 Interactions with Potential for Significant Impacts Before the Implementation of Mitigation Measures

INTERACTION	POPULATION & HUMAN HEALTH		LANDSCAPE & VISUAL		MA: TRAFFIC		MA: SERVICES & WASTE		LAND & SOILS		WATER & HYDROLOGY		BIO-DIVERSITY		NOISE & VIBRATION		AIR QUALITY		CLIMATE		CULTURAL HERITAGE: A&BH		RISK MNGMT	
	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O
Population & Human Health			×	×	√	√	√	×	√	√	√	√	×	×	√	×	√	√	×	×	×	×	×	√
Landscape & Visual	√	√			×	×	×	×	√	√	×	×	×	×	×	×	×	×	×	×	×	×	×	×
MA: Traffic	√	√	×	×			√	×	×	×	×	×	×	×	√	√	√	√	√	√	×	×	×	×
MA: Built Services & Waste	√	×	×	×	×	×			√	×	√	√	×	×	×	×	×	×	√	√	×	×	×	×
Land & Soils	×	×	×	×	×	×	√	×			√	×	×	×	×	×	√	√	×	√	×	×	√	×
Water & Hydrology	×	×	×	×	×	×	√	√	√	×			√	√	×	×	×	×	×	√	×	×	√	√
Biodiversity	×	×	×	×	×	×	×	×	√	√	√	×			×	×	√	×	×	√	×	×	√	×
Noise & Vibration	√	×	×	×	√	√	×	×	×	×	×	×	√	×			×	×	×	×	×	×	×	×
Air Quality	√	√	×	×	√	√	×	×	√	×	×	×	√	×	×	×			√	√	×	×	√	√
Climate	×	√	×	×	√	√	×	√	×	×	×	×	√	√	×	×	√	√			×	×	×	×
CH: Archaeology & Built Heritage	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×			√	×
Risk Management	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×		

C - Construction Phase | O - Operational Phase | √ - Potential Significant Interaction | × - No Significant Interaction

VOLUME II

CHAPTER 16

Risk of Major Accidents and Disasters

McCutcheon Halley
CHARTERED PLANNING CONSULTANTS

CHAPTER SIXTEEN
Table of Contents

CHAPTER SIXTEEN
Table of Figures

CHAPTER SIXTEEN
Table of Tables

Chapter Sixteen | Risk of Major Accidents and Disasters

16.1 Introduction

This chapter of the EIAR assesses the vulnerability of the proposed development to be affected by major accidents and disasters (MA&D). It includes an assessment of the potential of the proposed development to cause an increased risk of MA&D, and the likely significant adverse effects arising from potential MA&D.

16.2 Expertise & Qualifications

This chapter of the EIAR has been prepared by Louise Hewitt of Enviroguide Consulting.

Louise holds a Master of Science (Hons) in Environmental Resource Management from University College Dublin and a Bachelor of Science (Hons) in Biology from Maynooth University. Louise has worked as an Environmental Consultant with Enviroguide since 2021 and has 3 years of professional experience. Louise has carried out risk, population and human health and material asset assessments and has been involved in the preparation of EIARs for the following projects:

- Kilternan Village Large Scale Residential Development
- Athlone Large Scale Residential Development
- St. Teresa's Garden Large Scale Residential Development

16.2.1 Scope of Assessment

The relevant legislation that applies to this chapter is the Planning and Development Regulations 2001 as amended, and in particular Schedule 6 – Information to be contained in EIAR. The following paragraph of Schedule 6, Paragraph 2(e)(i)(IV), specifically refers to *"a description of the likely significant effects on the environment of the proposed development resulting from … the risks to human health, cultural heritage or the environment (for example due to accidents or disasters)".*

Paragraph 2(h) further expands with *"a description of the expected significant adverse effects on the environment of the proposed development deriving from its vulnerability to risks of major accidents and/or disasters which are relevant to it. Relevant information available and obtained through risk assessments pursuant to European Union legislation such as the Seveso III Directive or the Nuclear Safety Directive or relevant assessments carried out pursuant to national legislation may be used for this purpose, provided that the requirements of the Environmental Impact Assessment Directive are met. Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for, and proposed response to, emergencies arising from such events."*

Additionally, the Chemicals Act (Control of Major Accident Hazards involving Dangerous Substances) Regulations 2015 (S.I. No. 209 of 2015) (the "COMAH Regulations"), which implement the Seveso III Directive (2012/18/EU), and which revoked the 2006 Major Accident Regulations also applies to this Chapter.

Wastewater from the proposed development will be discharged to the Uisce Eireann 225 mm diameter foul sewer on Marquee Road via the proposed foul water network within the adjacent Fords SHD development.

A Confirmation of Feasibility (CoF) (Reference: CDS24001285 Pre-Connection Enquiry) was received from Uisce Éireann which confirms that a wastewater connection is feasible without upgrades (The CoF is included in the Infrastructure Design Report which forms part of the planning application documentation).

The proposed watermain layout has been detailed by DBFL Consulting Engineers on drawing no. 240002-X-93-Z00-XXX-DR-DBFL-CE-1601 that accompanies this application and is shown in Figure 7-2 below.

16.2.2 Guidelines and Reference Material

Cognisance has been taken of the Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA 2022). This document follows the requirements laid out in the Directive 2014/52/EU.

Specifically, the EPA Guidelines state that the EIAR must take 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)… The potential for a project to cause risks to human health, cultural heritage or the environment due to its vulnerability to external accidents or disasters is considered where such risks are significant, e.g., the potential effects of floods on sites with sensitive plants. Where such risks are significant then the specific assessment of those risks in the form of a Seveso Assessment (where relevant) or Flood Risk Assessment may be required. The EIAR should refer to those separate assessments while avoiding duplication of their contents."*

Reference has also been made to the Department of the Environment, Heritage & Local Government (DoEHLG) Publication 'Guide to Risk Assessment in Major Emergency Management 2010' and the Office of Emergency Planning, Department of Defence (DOD) Publication 'A National Risk Assessment for Ireland 2020'. A consolidated list of national hazards for Ireland identified in the DOD document are identified in Table 16-1.

Table 16 1 Consolidated List of National Hazards (Source: A National Risk Assessment for Ireland (2020) Department of Defence)

HAZARD: CIVIL	HAZARD: NATURAL
• Large Crowd Event • Pandemic • Water Supply Distribution & Contamination • Food Chain Contamination • Animal Disease • Terrorist Incident	• Storm • Snow and Ice (including prolonged low temperature) • Flooding (including pluvial, fluvial and coastal)
HAZARD: CIVIL	**HAZARD: NATURAL**
• Maritime Incident • Air Incident • Transport Hub (including Airports, Ports & Rail Stations)	• Structural Collapse (including Dam, Tunnel, Bridge and Building) • Nuclear Incident (Abroad) • Cyber Incident • Disruption of Energy Supply (including oil, gas, electricity and communications)

16.3 Methodology

The risk assessment methodology has been supported by general risk assessment methods. Hazard analysis and risk assessment are accepted internationally as essential steps in the process of identifying the challenges that may have to be addressed by society, particularly in the context of emergency management. Mitigation as a risk treatment process involves reducing or eliminating the likelihood and/or the impact of an identified hazard (DoEHLG, 2010).

Table 16 2 Classification of National Likelihood Criteria (Source: A National Risk Assessment for Ireland (2020) Department of Defence)

National Likelihood Criteria		
Rating	Classification	Average Recurrence Interval
1	Extremely Unlikely	500 or more years between occurrences
2	Very Unlikely	100-500 year between occurrences
3	Unlikely	10-100 years between occurrences
4	Likely	1-10 years between occurrences
5	Very Likely	Less than 1 year between occurrences

16.4 Proposed Development

A comprehensive description of the proposed development is presented in Chapter 2 of this EIAR. The proposed development will consist of the construction of 176 no. 1, 2 and 3 bed apartment units in 2 no. blocks, 1 no. creche, 1 no. gym, a retail/café space and all associated ancillary development works.

16.5 Description of Existing Environment

16.5.1 Site Description

The site, known as the Former Ford Distribution Site, is brownfield in nature and is approximately 0.845 hectares in size. The site is bounded by Centre Park Road to the northwest and SuperValu Páirc Uí Chaoimh to the east. The lands to the southwest are to be developed with residential apartments as per planning reference: ABP-309059-20. The River Lee is located directly north of the site. Marina Park is located to the southeast of the site.

Contamination is stockpiled at the site; however, it should be noted that these are temporary and are in the process of removal. Based on previous site investigations carried out by RSK in 2018 and Arup 2019 respectively petroleum hydrocarbons and Volatile Organic Compound (VOC) impacts to soil and groundwater beneath the site were identified. WSP then completed a Site Investigation (SI) at the site, in several phases, between October 2023 and January 2024. Remedial excavations at the site were carried out by WSP between February and July 2024 to address the potential pollution risk. In addition, the Site investigation had identified isolated areas of the site where historic deposition of waste oils/solvents was observed and recommended removal of this material also (Soil Validation Report, WSP, 2024 – Appendix 4).

16.5.2 Topography

The site slopes from southwest to the northeast with levels ranging from 1.8m to the southwest rising to 3.9m at the northeast. The site boundaries are generally formed by fencing and scrub vegetation. The east of the site is formed by marshlands located south of the Lee Rowing Club.

16.5.3 Flood Risk

The site is located approximately 35m south of the River Lee. A Site-Specific Flood Risk Assessment (SSFRA) was carried out by DBFL Consulting Engineers. The site is located within Flood Zone 'A' for tidal flood risk, assuming no defence in place. However, it is protected to a high standard by the existing polder defences along the quayside. Cork City Council intend to raise this polder defence in the future to ensure the existing standard of protection is maintained or increased.

There is a possible coastal flood risk, however, this risk is mitigated by utilising the ground floor areas for less vulnerable development such as under-croft car parking, landscaping, and recreational areas. All highly vulnerable developments (i.e. residential apartments and creche) will be located at a podium level higher than the predicted future coastal flood level of 3.88m. The creche is located at 4.00m Above Ordnance Datum (AOD)[1].

The SSFRA concluded "the risks relating to flooding to the proposed development can be managed and mitigated to acceptable levels and therefore comply with Department of Housing, Local Government and Heritage (DoEHLG) / Office of Public Works (OPW) and Cork City Council planning guidance." (DBFL, 2024) (The SSFRA forms part of the planning application documentation).

16.5.4 Seismic Activity

In Ireland, the Dublin Institute for Advanced Studies (DIAS) operates and maintains the Irish National Seismic Network (INSN); a network of seismometers installed across Ireland to detect earthquakes. The INSN has recorded the earthquakes detected in Ireland since 1980. Ground vibrations are measured at seismic stations around the country and sent to their data centre in Dublin for automatic and manual processing.

There are currently 12 stations around Ireland measuring seismic activity (Table 16-3).

[1] AOD refers to the height of a location relative to a specific reference point known as the Ordnance Datum (OD) and provides a standardized way to measure and compare elevations.

Table 16 3 Seismic stations around Ireland (Irish National Seismic Network, 2024)

STATION CODE	STATION NAME
DSB	Dublin Mountains, Co. Dublin
IDGL	Inch Island, Co. Donegal
DGL2	Gortnasillagh, Co. Donegal
IGLA	Glengowla Mines, Ireland
ILTH	Belurgan Park, Co Louth
IMAC	Coolroe East, Co. Kerry
IMAY	Knockananny, Co. Mayo
IMIC	Mitchelstown Cave, Co. Cork
ITIP	Cappanamuck, Co. Tipperary
IWEX	Carrickbyrne Hill, Co. Wexford
VAL	Valentia, Co. Kerry
IBMH	Coastguard Station, Co. Waterford

No seismic activity has been recorded in close proximity to the site with the majority of activity located in the south, southeastern and northwestern coastline (Figure 16-1).

The Geological Survey Ireland (GSI) has developed and maintained the national landslide database and national susceptibility map. The site is mapped as being of *"Made"* ground and is not located in an area with landslide susceptibility. The closest landslide event occurred in Ballymot which is approximately 8km southeast of the site which was classified as an area of high landslide susceptibility (GSI, 2024)

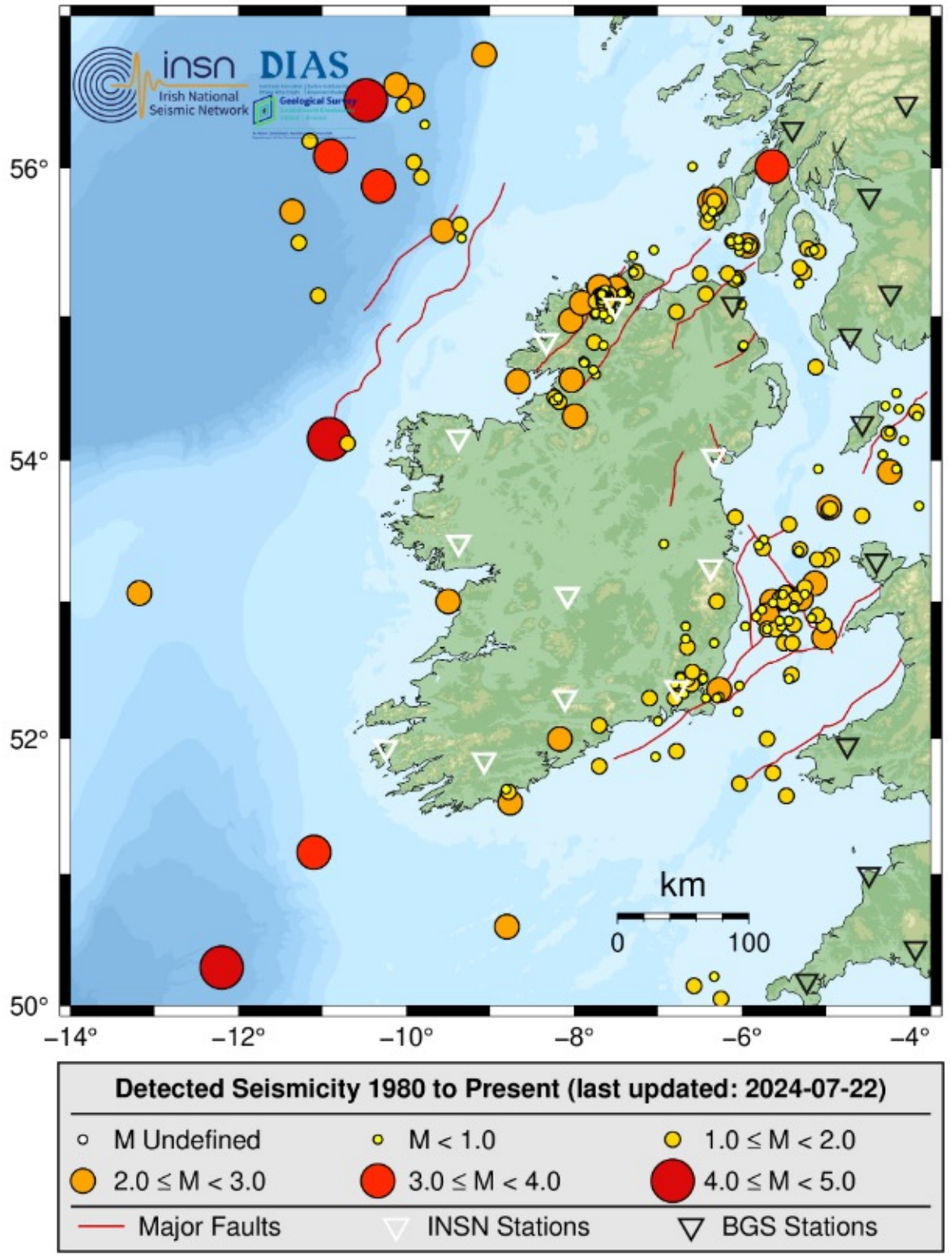

Figure 16 1 Detected Seismicity (Irish National Seismic Network, 2024)

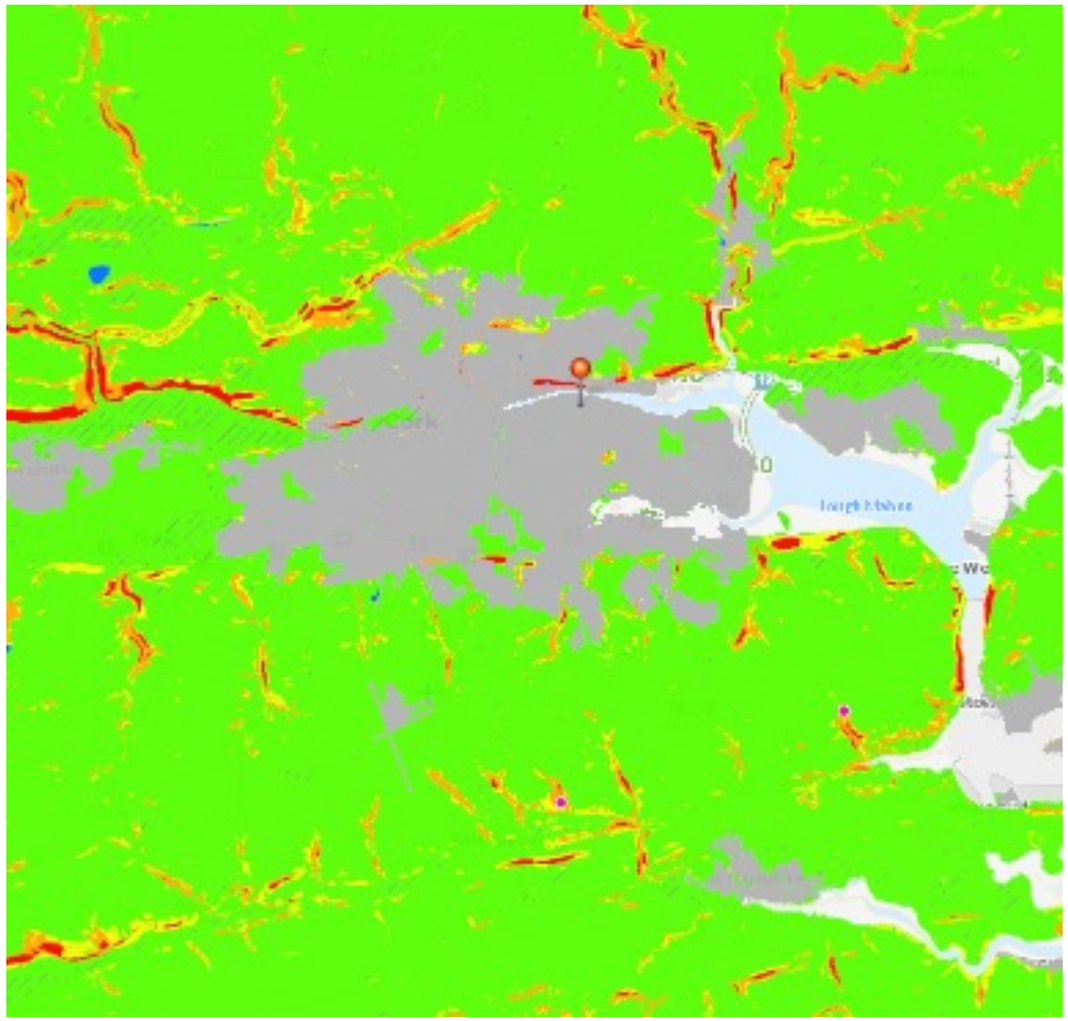

Figure 16 2 Landslide Susceptibility Map (site location indicated by red pin) (GSI, 2024)

16.6 Environmental Receptors

The EIAR chapters within this report identify that the proposed development has been designed in accordance with best practice and that it can be safely undertaken without risk to health.

In order to understand the potential consequences and predicted impacts of any major accident or disaster due to the proposed development and the vulnerability of the project a desk study was undertaken. The assessment reviewed:

- The vulnerability of the project to major accidents or disasters.
- The potential for the project to cause risks to human health, cultural heritage and the environment, as a result of that identified vulnerability.

A methodology has been used including the following phases:

Phase 1: Assessment
The DOD Consolidated List of National Hazards was used to identify a preliminary list of potential major accident and disasters. Receptors covered by legislation were not included within the assessment, for example, the quarry operatives.

Phase 2: Screening
The list was screened, and major events caused by geological faults or natural phenomena were not included given the unlikely event of one occurring. Elements already addressed as a key part of the design e.g. risks of building collapse, are not repeated.

Phase 3: Mitigation and Evaluation
In the event that mitigation measures included did not mitigate against the risk, then, the potential impacts on receptors are identified in the relevant chapter. Table 16-4 lists the major accidents and/or disasters reviewed.

Table 16 4 Review of Potential Major Accidents and/or Disasters

Major Accident or Disaster	Relevant for this Proposed Development?	Why relevant?	Potential Receptor	Covered within EIAR?
Civil				
Large Crowd Event (An event with over 5,000 people)	N	Not considered vulnerable due to the nature of the Proposed Development i.e., a residential development including 176 no. apartments,1 no. retail/restaurant unit and 1 childcare facility.	N/A	**N/A**
Water Supply Contamination	Y	Waterborne diseases can be caused by consuming contaminated drinking water. No public health issues have been identified for the Proposed Development.	Local water users	**Chapter 9 Water and Hydrology of this EIAR identifies the control measures required to avoid contamination of water supplies.**
Food Chain Contamination	N	Not considered vulnerable	N/A	**N/A**
Animal Disease	N	Not considered vulnerable	N/A	**N/A**
Terrorist Incident	N	Not considered vulnerable	N/A	**N/A**

Major Accident or Disaster	Relevant for this Proposed Development?	Why relevant?	Potential Receptor	Covered within EIAR?
Transportation				
Maritime Incident	Y	The closest port is Cork Port which is located approximately 1.5km east of the site.	N/A	**N/A**
Air Incident	N	The closest airport is Cork airport located approximately 6km southwest.	N/A	**Public Safety Zones for are assessed in Section 16.7.2 of this chapter.**
Transport Hub (Includes Airports, Ports & Rail Stations)	N	The site is located in close proximity to Cork Port and Kent Train Station (approximately 1.3km west across the River Lee) however the site itself is not considered a transport hub.	N/A	**N/A**
Natural				
Cultural, Archaeological & Architectural Heritage	N	There are no sites on the Sites and monuments Record (SMR) or the National Inventory of Architectural Heritage (NIAH). The site is not located in an Architectural Conservation Area.	Cultural Heritage	**Chapter 14 Cultural Heritage of this EIAR assesses impact of the Proposed Development on the Archaeological and Cultural Heritage and proposes mitigation measures where required.**
Landslides	N	Geological Survey Ireland (GSI) has mapped the area as being of "Made" ground and is not located in an area with landslide susceptibility. Furthermore, there were no mapped landslides events recorded within a 2km radius of the site (GSI, 2024)	Residents, service users, members of the public and nearby properties.	**Chapter 8 Land and Soils of this EIAR assessed the vulnerability of the Proposed Development to landslides.**
Earthquakes	N	Earthquakes are not likely to occur in the vicinity of the site at a sufficient intensity to pose a risk for the Proposed Development.	N/A	**N/A**

Major Accident or Disaster	Relevant for this Proposed Development?	Why relevant?	Potential Receptor	Covered within EIAR?
Natural				
Floods/ Storm surge/tidal flooding	Y	The site is located within Flood Zone A with a high probability of flooding. However, it is protected to a high standard by the existing polder defences along the quayside.	Proposed Development & surrounding developments.	**Chapter 9 Water and Hydrology of this EIAR identifies the vulnerability of the project to flooding.**
Severe weather such as storms, blizzards, droughts, tornados, heatwaves	N	Not considered vulnerable. In the event of severe weather events, the national meteorological service, Met Éireann, provides advance notice of severe weather, usually several days in advance. When appropriate, colour-coded weather warnings are issued. The Office of Emergency Planning works with the government departments and other key public authorities in order to ensure the best possible use of resources and compatibility across different emergency planning requirements.	N/A	**N/A**
Air quality events	Y	Dust emissions during the construction phase and vehicular emissions during the construction and operational phase.	Residents/ workers	**Chapter 12 Air Quality of this EIAR identifies the impact of the construction and operation of the development on ambient air quality.**
Wildfires	N	Not considered vulnerable to wildfires.	N/A	**N/A**
Fire	N	The risk of fire may lead to loss of life.	Residents, service users, members of the public and nearby properties.	**Section 16.7.1 of this chapter details fire prevention measures.**

Major Accident or Disaster	Relevant for this Proposed Development?	Why relevant?	Potential Receptor	Covered within EIAR?
Natural				
Invasive species	Y	Invasive species surveys were carried out in May 2024 as part of Preliminary Ecological surveys. The surveys did not record any invasive non-native species listed on schedule III of the European Communities (Birds and Natural Habitats) Regulations 2011 (SI 477 of 2011) within the Proposed Development Site. One medium-impact invasive species was noted within the site boundary (Sycamore (*Acer pseudoplatanus*)).	Native species / local biodiversity	**Chapter 10 Biodiversity of this EIAR identifies the impact of invasive species.**
Technological				
Structural Collapse (Building)	N	The design criteria of the buildings will be in accordance with all relevant building design standards. No further assessment is required.	N/A	**N/A**
Structural Collapse (Dam, Bridge, Tunnel)	N	Not considered vulnerable as no dams, bridges or tunnels are proposed as part of the development.	N/A	**N/A**
Nuclear incident	N	Not considered vulnerable.	N/A	**N/A**
Cyber incident	N	Not considered vulnerable.	N/A	**N/A**
Disruption of energy supply (oil, gas, electricity)	N	Not considered vulnerable. ESB Networks maintain the electricity network in Ireland. Gas Networks Ireland maintain the natural gas network in Ireland.	N/A	**Chapter 7 Material Assets Built Services & Waste contains information on energy supply**

Major Accident or Disaster	Relevant for this Proposed Development?	Why relevant?	Potential Receptor	Covered within EIAR?
Technological				
Utilities failure (communications)	N	Not considered vulnerable. In Ireland, the fixed-line communications market is dominated by Eir; while Eir, Three, and Vodafone own Ireland's mobile telecommunications infrastructure.	N/A	**Chapter 7 Material Assets Built Services & Waste contains information on communications**
Utilities failure (water supply)	N	Not considered vulnerable	N/A	**Chapter 9 Water and Hydrology and Chapter 7 Material Assets Built Services & Waste contains information on water supply**
Utilities failure (wastewater, sewage)	N	Not considered vulnerable	N/A	**Chapter 9 Water and Hydrology and Chapter 7 Material Assets Built Services & Waste contains information on wastewater management**
Utilities failure (solid waste)	N	Not considered vulnerable	N/A	**Chapter 7 Material Assets Built Services & Waste contains information on waste management**
Industrial accidents (defence, energy, oil and gas refinery, food industry, chemical industry, manufacturing, quarrying, mining)	Y	The closest Seveso site to the proposed development Goulding Chemicals Ltd., is a lower tier site (approx. 1km southwest). The closest upper tier Seveso site is Flogas Ireland Ltd. (1.8km east).	N/A	**Section 16.7.3 of this chapter details potential major emergency management**

16.7 Management Plans

16.7.1 Fire Safety and Emergency Response Plan

The design criteria of the buildings are in accordance with all relevant building and fire safety standards. Fire alarms, fire extinguishers and fire blankets will be installed in all internal areas. All fire alarms will be in accordance with the current IS3218:2013 + A1 2019 and the Fire Certificate, and all fire extinguishers will meet the requirements of I.S 291:2015 – Selection, Commissioning, Installation, Inspection and Maintenance of Portable Fire Extinguishers.

A fire evacuation strategy will be put in place in advance of occupancy. Appropriate means of escape in case of fire involving multiple escape stairs, ventilated corridors and sprinkler systems have been designed into each of the warehousing units. Fire safety checks and fire drills will be employed by the Management Company once the Proposed Development is operational. Access routes serving the Proposed Development have been designed to provide adequate space for the Fire Brigade.

16.7.2 Public Safety Zone

Public Safety Zones (PSZs) are mapped out around airport runways to protect the public on the ground from possible aircraft crashes in populated areas. PSZs are used to prevent inappropriate use of land where the risk to the public is greatest, e.g., by limiting the type and allowable height of buildings and structures within the zones.

The closest airport to the site is Cork Airport. Cork Airport has two PSZs (inner and outer). The site is not located within a PSZ. Considering the distance between the proposed development and the nearest airport and associated PSZs, an aircraft strike disaster is not considered relevant to the proposed development.

16.7.3 Potential Major Emergency Management Sites and Seveso Sites

Seveso Sites are defined as industrial sites that due to the presence of dangerous substances in sufficient quantities, are regulated under Council Directives 96/82/EC and 2003/105/EC, commonly referred to as the Seveso II Directive. Seveso Sites are categorised as Lower, or Upper, by the type and quantity of hazardous substances stored at the site. There are currently 6 Seveso sites located within the Cork City Council administrative area (Table 16-5).

Table 16 5 Seveso sites in the Cork City Council administrative area (Chapter 9, Cork City Development Plan 2022-2028)

SEVESO TIER	SITE DETAILS	DISTANCE
Upper Tier	1. Calor Teoranta, Tivoli, Cork	2.2km east
	2. Flogas Ireland Ltd., Tivoli Industrial Estate, Cork	1.8km east
	3. Grassland Agro, Carrigrohane Road, Cork	6.5km west[2]
Lower Tier	4. Chemical Bulk Storage Ltd., Tivoli Industrial Estate, Cork	2.2km east
	5. Goulding Chemicals Ltd., Centre Park Road, Cork	1km southwest
	6. Irish Oxygen Co. Ltd., Waterfall Road, Cork	7.6km southwest

[2] The Health and Safety Authority maintains a more up to date list of Seveso sites which was most recently updated on the 8th of May 2024. Grassland Agro (no. 3) has not been included in this list but will remain in this assessment in order to assess a worst-case scenario.

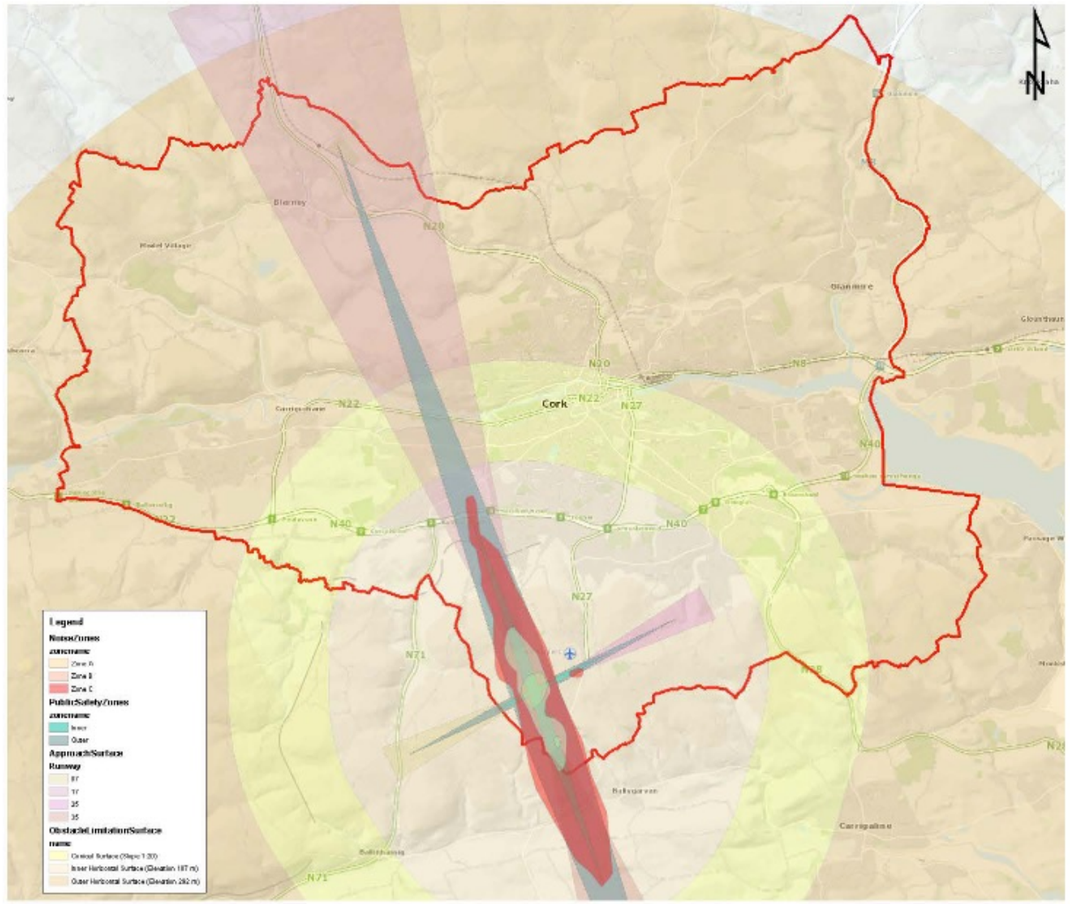

Figure 16 3 Cork International Airport Safety Zones (Chapter 10, Cork City Development Plan 2022-2028)

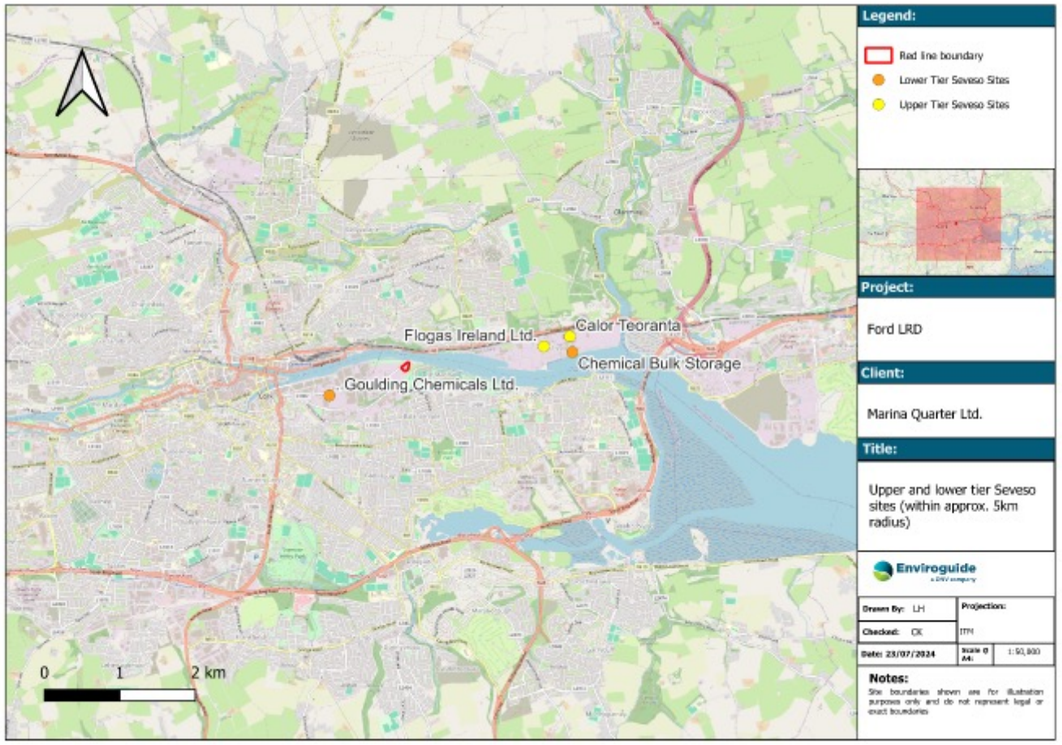

Figure 16 4 Seveso Sites in close proximity

The Central Competent Authority, which is the Health and Safety Authority (HSA), set and review a protective consultation distance around each establishment within which there are potentially significant consequences from major accidents to people (or to the environment).

Within the consultation distance around each COMAH establishment / Seveso site, as notified to the planning authority, three zones of risk are plotted. These are based on the location, quantity and hazards of the dangerous substances present.

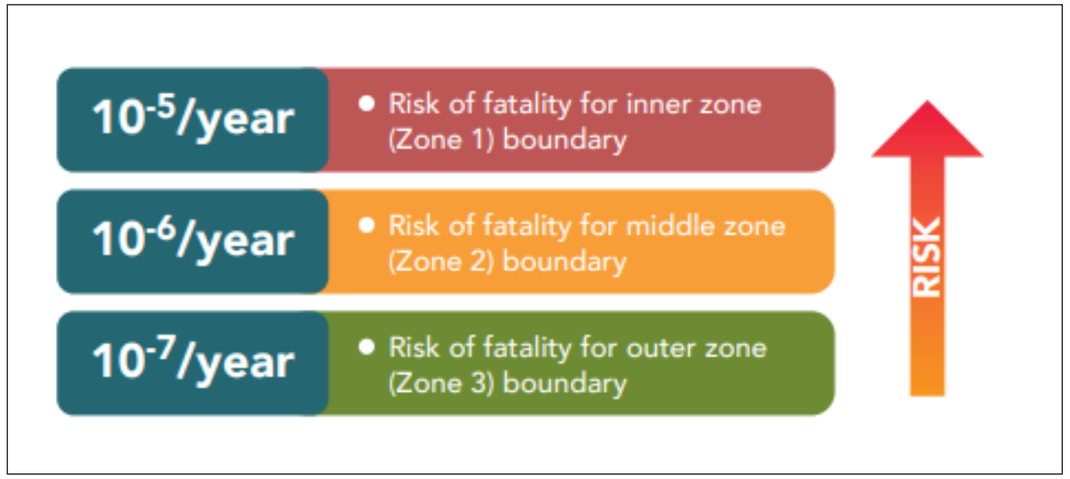

Figure 16 5 Zones of Risk (HSA, 2024)

Based on Appendix 2 of the HSA's *"Guidance on technical land-use planning advice"* the proposed development is classed as having Level 3 sensitivity level (Any developments (for more than two dwelling units) at a density of more than 40 dwelling units per hectare – (DT 2.1.3)).

Appendix 3 of the of the HSA's *"Guidance on technical land-use planning advice"* provides detail on the developments not advised against for in each zone. Based on its sensitivity level (Level 3), the proposed development would not be advised against if located in Outer Zone 3.

16.7.4 Ground Contamination

At the time of preparing this EIAR, remediated contaminated material from both the site and the adjoining proposed Strategic Housing Development (ABP Reference: ABP-309059-20) has been temporarily stockpiled on the site pending removal offsite. In advance of construction works commencing, the temporary stockpiled material will be removed off site.

During the remedial works, soil (including made ground) to be retained onsite was excavated and combined with a cement-based grout to improve the strength characteristics of the material for use as a stabilised platform ('piling mat'). All temporary stockpiles are stored on high-grade polythene sheeting to prevent cross-contamination of the soil below and are also covered with high-grade polythene sheeting to prevent rainwater run-off and leaching of potential contaminants from the stockpiled material, as well as the generation of dust.

The excavation of made ground and underlying natural soils impacted with anthropogenic contamination and permanent removal off-site is a design requirement of the Proposed Development. In advance of construction works commencing, the existing HHRA (WSP, 2024) (Appendix 9.1) will be refined based on the results of the in-situ soil validation samples collected at the site. The refined HHRA will be used to inform the remediation plan to ensure that residual sources of contamination are removed offsite. Chapter 8 Land and Soils has assessed the potential effects associated with contaminated soil on the site in further detail.

16.8 Predicted Impacts

The potential impacts of the construction and operational phases of the Proposed Development are outlined below.

16.8.1 Do Nothing Scenario

In relation to the risk of major accidents and / or disasters, the do-nothing scenario would result in no change to the existing infrastructure and the risk of the proposed development causing a major accident or disaster would be low.

As the site is zoned for development, in the absence of the proposed development, it is likely that a development of a similar nature is likely to be constructed in the future in line with national policy and the development plan objectives. Therefore, the construction and operational phase impacts outlined in this assessment are likely to occur in the future, even in the absence of the proposed development.

16.8.2 Demolition

There is no demolition as part of the proposed development.

16.8.3 Construction Phase

The Proposed Development will have an imperceptible, short term, neutral effect on the risk of major accidents.

16.8.4 Operational Phase

The Proposed Development will have an imperceptible, long term, neutral effect on the risk of major accidents.

16.8.5 Cumulative Effects

Cumulative effects are considered imperceptible and neutral in relation to risks of major accidents and disasters.

16.9 Mitigation Measures

No specific measures are proposed. All mitigation measures for the interacting chapters have been detailed in the relevant technical chapters.

16.10 Monitoring

There is no monitoring required with regards to risk management. All monitoring measures for the interacting chapters have been detailed in the relevant technical chapters.

16.11 Residual Impacts

Control measures will be put in place for health and safety and environmental management as per conditions of the planning permission, relevant code of practices and relevant legislation. The residual impacts will be negligible once all control, mitigation and monitoring measures have been implemented. The potential for dust or noise from the site operations to cause any nuisance to nearby receptors is deemed to be negligible and the adherence and full implementation of the appropriate control and mitigation measures will ensure there is no potential for cumulative effects to arise.

16.12 Interactions

There are interactions with Population and Human Health, Land, Soils, Water and Hydrogeology, Noise, Climate and Air, Material Assets, Traffic and Transport, Landscape and Visual, and Cultural Heritage. However, subject to the implementation of mitigation measures, good working practises, and codes, the interactions between these areas have been sufficiently considered in relation to risk management. It is not considered that any significant effects will be experienced in relation to the risk of major accidents and disasters.

16.13 Conclusion

The assessment of likely effects resulting from the Proposed Development on the risk of major accidents and disasters in this chapter has described the existing environment and detailed the relevant management plans.

It is reasonably considered that following all mitigation measures including design embedded and prescribed, implementation of the CEMP, RWMP (Appendix 7.1), OWMP and MMRP (Appendix 8.3), that are provided as appendices and reports that form part of the planning application documentation, and adherence to construction best practice, that no significant effects relating to risk of major accidents and disasters will arise from the Proposed Development during the construction or operational phases.

16.14 References

Environmental Protection Agency (2022) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports

Geological Survey Ireland Spatial Resources (2024) Landslide Susceptibility Map

Cork City Council (2022) Cork City Development Plan 2022-2028

Health and Safety Authority (2024) Notified Seveso Establishments

WSP Ireland Consulting Ltd. (2024) Materials Management and Remedial Strategy Plan

DBFL Consulting Engineers (2024) Site-Specific Flood Risk Assessment

VOLUME II

CHAPTER 17

Summary of Proposed Mitigation Measures

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CHARTERED PLANNING CONSULTANTS

CHAPTER SEVENTEEN
Table of Contents

CHAPTER SEVENTEEN
Table of Tables

Chapter Seventeen | Summary of Proposed Mitigation Measures

17.1 Introduction

A key objective of the Environmental Impact Assessment process is to identify likely significant environmental impacts at the pre-consent stage and where necessary to propose measures to mitigate or ameliorate such impacts. This chapter of the EIAR summarises the proposed mitigation measures set out in Chapters 4 to 14.

All the mitigation measures proposed within the individual specialists' assessments will be incorporated into the Construction and Environmental Management Plan (CEMP) prior to works commencing on-site.

17.2 Mitigation

Table 17 1 Incorporated Design Mitigation

ASPECT	MITIGATION
Population & Human Health	• The proposed development complies with the Building Regulations which provide for the safety and welfare of people in and about buildings. • The Building Regulations cover matters such as structure, fire safety, sound, ventilation, conservation of fuel and energy, and access, all of which safeguard users of the buildings and the health of occupants. • The proposed design provides for the segregation of pedestrians and bicycle traffic from motorised traffic. • The design also incorporates the principles of universal design and the requirements of Part M of the Building Regulations so that the development will be readily accessible to all, regardless of age, ability or disability. • An assessment of the potential effects of the construction and operation of the proposed scheme in relation to climate forms part of Chapter 12 Air Quality and Chapter 13 Climate of this EIAR. The assessment found that any impacts would be imperceptible. • The integration of energy efficient measures into the design will provide for healthier living standards for future occupants, less dependence on fossil fuels and associated improved air quality. • The availability of on the doorstep public open space, amenity spaces, and a highly accessible layout across the scheme including segregated pedestrian entrances which is strategically located in the South Docks and Marina Park will encourage sustainable modes of outdoor access for a wide age group.
Landscape & Visual	• The landscape mitigation / public realm design has been developed through an iterative process which has helped to ensure that, wherever possible, adverse effects on the landscape and visual amenity are designed out or minimised, and the opportunity for beneficial effects is maximised. • JFA Architects carried out a number of different massing studies as outlined in their Design Statement. The proposed Blocks A and B were carefully positioned on site to not only complete Centre Park Road in terms of scale and massing, but also to provide connections to the plaza proposed in the neighbouring approved SHD application. • The proposed scheme follows the rhythm of the neighbouring scheme, providing high quality private and public open spaces. • Further details are included in the Architectural Design Statement prepared by JFA Architects and the Landscape Report and accompanying drawings prepared by Áit Urbanism and Landscape Ltd.
Material Assets: Traffic	• In order to reduce the number of private vehicles to and from the development, walking and cycling connection points are proposed to encourage more active travel. • High level of permeability through sites making walking and cycling a modal choice of local journey and connections with Public transport interchanges. • Road markings and signage are provided according to Traffic Signs Manual. • Suitable Lightings are positioned at junction, streets and pedestrian cycle routes • Charging points for electric vehicles are being provided as detailed in the Traffic and Transport assessment. • A total of 427 no. cycle parking spaces (397 long stay and 30 short stay) will be provided as part of the proposed development which exceeds the CCC Development Plan's requirements. 13 No. cargo spaces are also included in the proposed bicycle provision.
Material Assets: Built Services & Waste	• The design has been prepared based on relevant codes of practice, design guidance and in consultation with relevant local and statutory authorities to ensure best practice design, considering the effect on local and wider network for water supply, foul and surface water drainage, electrical network and the telecommunication network.
Land & Soils	• In advance of construction works commencing, the existing quantitative human health risk assessment (HHRA) (Appendix 8.2), will be refined based on the results of the in-situ soil validation samples collected at the site. • The refined HHRA will be used to inform the remediation plan to ensure that residual sources of contamination in soil are removed offsite. • Landscaping within public / communal open space areas will include a minimum cover of 0.8m of imported clean, suitable for use soil thereby removing any potential risks associated with direct contact and inhalation of soils in the public / communal open space areas.

ASPECT	MITIGATION
Water & Hydrology	• In advance of construction works commencing, the existing quantitative human health risk assessment (HHRA) (Appendix 8.2) and controlled waters risk assessment (CWRA) (Appendix 9.2) will be refined based on the results of the in-situ soil validation samples collected at the site and post remedial groundwater monitoring. • The refined HHRA and CWRA will be used to inform the remediation plan to ensure that residual sources of contamination in soil are removed offsite, to inform the proposed remedial design measures including the installation and performance specification of the vapour barrier and identify if any supplementary remedial works for groundwater are required. • It is noted that protective coatings or sealants on concrete structures will be required in areas where they may come into contact with groundwater impacted with petroleum hydrocarbons and chlorinated solvents. • The design and specification of the concrete will be
Biodiversity	• Green infrastructure is incorporated into the design of the Proposed Development. • The inclusion of native species will enhance biodiversity overall with provision of native shrubs, trees and sustainable surface water drainage methods including a rain garden as outlined in the landscape strategy prepared by AIT which forms part of the planning application documentation. • Bat boxes, swift boxes and House Martin Nest Cups are recommended to be included in the design, as outlined by the project ecologist.
Noise & Vibration	<u>Windows</u> • A requirement to install acoustic grade windows at certain facades has been identified, as follows: • If none of the identified infrastructure projects is constructed, standard thermal glazing will be sufficient at all facades, including facades overlooking Centre Park Road. • If the proposed light rail project is constructed, it will be necessary to install enhanced glazing at bedrooms on facades directly and obliquely overlooking Centre Park Road. The required transmission loss is 35 dB. • Similarly, a transmission loss of 30-35 dB is required at bedrooms on facades overlooking the proposed Monahan Road extension if the bridge is constructed. • If the proposed light rail and bridge extension are constructed, it is advisable that a 35 dB transmission loss be applied to bedrooms on all facades across the site. • With respect to living/dining spaces, a transmission loss of 25 dB will be sufficient. • Standard thermal glazing will be sufficient at the proposed creche, including where all of the identified offsite infrastructure projects proceed. • Where a reduction of 35 dB is required, bedroom glazing with a minimum RW value of 35 dB will be required, to be selected at the time of construction. • Standard thermal glazing will be sufficient in bedrooms where a reduction of 25 dB is required. • Standard glazing will in any case suffice for living/dining spaces, bathrooms and common areas. • In selecting glazing, R values in each octave band are of greater importance than overall or average RW, and glazing should be optimised for road traffic (road and rail on Centre Park Road facades if the light rail project proceeds).

ASPECT	MITIGATION
	<u>Ventilation</u> • Where non-mechanical ventilation is proposed, it is recommended that all facades affected by Centre Park Road noise, as well as all creche facades, be fitted with acoustic grade vents. • Bedroom vents will be required to achieve a transmission loss of 35 dB where the proposed light rail is constructed. • These should also be installed on other facades in the event that the proposed bridge is constructed. <u>Plant and Extraction Vents</u> • Plant installed in the basement, as well as vents associated with retail/restaurant and childcare facility extraction systems, will be designed, selected and installed so as to ensure that external emissions are not audible beyond 5 m.
Air Quality	No incorporated design mitigation measures are proposed as part of the proposed development.
Climate	• Adequate attenuation and drainage have been incorporated into the design of the development to avoid potential flooding impacts as a result of increased rainfall events in future years. • Electric vehicle and bicycle parking will be provided within the development which will promote the use of more sustainable modes of transport and reduce potential transport emissions. • The Energy Report and Building Lifecycle Report, which form part of the planning application documentation, detail a number of mitigation measures that have been incorporated into the design of the development to reduce the impact on climate, such as: • The development will be in compliance with the requirements of the Near Zero Energy Building (NZEB) Standards. • EU Taxonomy alignment with 10% lower than NZEB. • A renewable energy rating (RER) of 20% will be achieved to comply with Part L (2021) of the NZEB regulations. • A Building Energy Rating (BER) of A2 is being targeted. • Improved building thermal transmittance (U-Values), air permeability and thermal bridging. • Use of air source heat pumps. • Smart building technologies.
Cultural Heritage: Archaeology & Built Heritage	No incorporated design mitigation measures are proposed as part of the proposed development.

Table 17 2 Construction Mitigation

ASPECT	MITIGATION
Population & Human Health	• A Construction and Environmental Management Plan (CEMP), Resource Waste Management Plan (RWMP) and Materials Management & Remedial Strategy Plan (MMRSP) for the proposed development are included in the planning application documentation. • The CEMP, RWMP & MMRSP will be further updated by the contractor, agreed with Cork City Council prior to commencement, and implemented by the selected contractor after any consent is received. • All construction personnel will be required to understand and implement the requirements of the CEMP and RWMP and shall be required to comply with all legal requirements and best practice guidance for construction sites. • The CEMP provides for a construction phase management structure to ensure that environmental protection and mitigation measures are put in place. • The CEMP requires that these measures will be checked, maintained to ensure adequate environmental protection. • The CEMP also requires that records will be kept and reviewed as required to by the project team and that the records will be available on site for review by the planning authority. • All construction personnel will attend induction and training classes as required to ensure that the CEMP is effectively implemented. • The CEMP will comply with all appropriate legal and best practice guidance for construction sites. • Project supervisors for the construction phase (PSCP) will be appointed in accordance with the Health, Safety and Welfare at Work (Construction) Regulations 2021 (as amended), and a Preliminary Health and Safety Plan will be formulated during the detailed design stage which will address health and safety issues from the design stages, through to the completion of the construction phases. • Adherence to the construction phase mitigation measures presented in this EIAR will ensure that the construction of the proposed development will have an imperceptible and neutral impact in terms of health and safety during the short-term duration of the works.
Landscape & Visual	• No substantive mitigation measures over and above those incorporated into the design are proposed. • Landscape and visual effects and their significance during construction works will be temporary. They will be highest within the immediate vicinity of the site, primarily along the adjacent streets. Principal views of construction works will likely be experienced within a radius of approximately up to 300m from the site boundary along Centre Park Road, Monaghan Road and the western extent of The Marina Road as well as from adjacent buildings facing the development site. • Principal middle distance views of the construction site can also be experienced in open or partial views of the site from elevated areas located within approximately 400-600m north of the River Lee (particularly along Montenotte and Tivoli ridges). • This also includes locations from Lower Glanmire Road, Blackrock Road and on higher ground at Middle Glanmire Road and Lovers Walk as well as locations from rising ground south of the development site, where cranes and scaffolding can still be seen. • The magnitude of visual effects is considered medium to high in these views. Their significance is considered moderate-significant adverse. Intervening buildings within the Marina Commercial Park, adjacent to the Proposed Development site will obscure direct views of the construction site apart from the upper most sections. • The visibility of construction works within the wider study area beyond 600m will become limited to middle and longer distance open and partial views. Visual effects from these areas are considered low, their significance minor adverse. Long distance views are often fully screened by intervening existing buildings or vegetation.
Material Assets: Traffic	• All construction activities will be governed by a Construction Traffic Management Plan (CTMP) to ensure that the impacts of all building activities generated during the construction of the proposed development upon both the public (off-site) and internal (on-site) workers environments, are fully considered and proactively managed / programme. • The generation of HGVs during the construction period will be evenly spread throughout the day and as such will not impact significantly during the peak traffic periods • HGV trips are anticipated to arrive and depart the site at a uniform rate throughout the day, to avoid pressure on the morning and evening peak hour periods. • Material deliveries and collections from site will be planned, scheduled and staggered to avoid unnecessary build-up of construction works related traffic.

ASPECT	MITIGATION
Material Assets: Built Services & Waste	<u>Surface Water</u> • All works will be carried out in accordance with the Construction and Environmental Management Plan that forms part of the planning application documentation, and the Irish Water Code of Practice for Water Infrastructure (July 2020) and the Irish Water Code of Practice for Wastewater Infrastructure (July 2020). • The construction of any watermains infrastructure will be in accordance with Uisce Éireann standards. <u>Wastewater Drainage</u> • All works will be carried out in accordance with the Construction and Environmental Management Plan that forms part of the planning application documentation, and the Irish Water Code of Practice for Water Infrastructure (July 2020) and the Irish Water Code of Practice for Wastewater Infrastructure (July 2020). • The construction of any wastewater infrastructure will be in accordance with Uisce Éireann standards. <u>Waste</u> • The measures outlined in the Resource Waste Management Plan (RWMP) (Appendix 7.1) and Materials Management and Remedial Strategy Plan (MMRP) (Appendix 7.2) will be implemented in full and form part of the mitigation strategy for the site. • Implementation of the RWMP and MMRP will ensure a high level of recycling, reuse and recovery at the Proposed Development. • All recyclable materials will be segregated at source to reduce waste contractor costs and ensure maximum diversion of materials from landfill, thus achieving the targets set out in The National Waste Management Plan for a Circular Economy 2024-2030.
Land & Soils	• A preliminary Construction Environmental Management Plan (CEMP) is included as part of the planning application. • In advance of construction works commencing, the appointed Contractor will be required further develop the CEMP to ensure, site-specific procedures and mitigation measures to monitor and control environmental impacts throughout the Construction Phase of the project and prevent any potential emissions to ground having regard to relevant industry standards (e.g., Guidance for Consultants and Contractors, CIRIA - C532', CIRIA, 2001). • The CEMP will be implemented for the duration of the construction phase, covering construction and waste management activities that will take place during the construction phase of the Proposed Development.

ASPECT	MITIGATION
	<u>Control and Management of Contaminated Soil</u> • Contaminated soil will be encountered during groundworks at the site. • The refined HHRA will be used to inform the remediation plan to ensure that residual sources of contamination in soil are removed offsite. • The removal of the residual soil source will be validated in accordance with relevant guidelines including EPA's 'Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites' and guidance and standards current at the time of construction works. • Therefore, there will be no residual sources of contamination that will remain onsite. • The management and removal of soils offsite will be undertaken in accordance with the recommendations of the remediation plan which will be informed by the refined quantitative human health risk assessment (HHRA), the CEMP, and the Waste Management Act 1996 -2011 as amended and associated regulations and guidance. • Where required, additional sampling and waste classification assessment of potentially contaminated soil to be excavated will be undertaken in advance of construction works commencing. • Only suitably experienced contractors shall be used to carry out the remediation work. • All works will be undertaken by the appointed contractor in accordance with industry best practice to manage risk from contaminated soils, groundwater and volatile vapours. • These will be designed by the appointed contractor dependent on his construction practices and are likely to include the use of gloves, dust masks and potentially disposable overalls. • These and other appropriate measures will minimise the exposure of the site workers. <u>Reuse of Soil</u> • While it is anticipated that all excavated materials will be removed offsite in accordance with all relevant statutory legislation, where required, soil and subsoil materials to be reused within the Proposed Development (i.e., for engineering fill and landscaping) will be subject to assessment of the suitability for use in accordance with engineering and environmental specification for the Proposed Development. • The refined HHRA will provide detailed Reuse Target Criteria (RTC) specific to the site of the Proposed Development. • These criteria will be designed to ensure that any soils retained and reused onsite are suitable and protective of both human health and the receiving environment.

ASPECT	MITIGATION

	Stockpile Management
	• Segregation and storage of soils for re-use onsite or removal offsite and waste for disposal offsite will be segregated and temporary stored onsite pending removal or for reuse onsite in accordance with the measures outlined in the CEMP.
	• Stockpiling of soils and subsoils pending removal offsite or, if required, reuse onsite will be managed in accordance with Inland Fisheries Ireland guidelines and located away from the location of any sensitive receptors (watercourses and drains).
	• Surplus material, pending removal offsite or if required, reuse onsite, will be segregated, and stockpiled appropriately.
	• For any excavated material identified for removal offsite, while assessment and approval of acceptance at a destination re-use, recovery Site or waste facility is pending, excavated soil for recovery/disposal shall be stockpiled as follows:
	  • A suitable temporary storage area will be identified and designated.
	  • All stockpiles will be assigned a stockpile number.
	  • Stockpiled soil and stone materials will be protected from exposure to wind by storing the material in sheltered regions of the Proposed Development Site.
	  • Soil waste categories will be individually segregated; and all segregation, storage and stockpiling locations will be clearly delineated on the Site drawing.
	  • Any waste to be temporarily stockpiled will be stockpiled only on hard standing on heavy gauge polythene sheeting and soil stockpiles will be sealed to prevent run-off of rainwater and leaching of potential contaminants from the stockpiled material generation and/or the generation of dust.
	  • There will be no storage of materials within 10m of any boundary, drains and watercourses.
	• Any waste generated from construction activities, including concrete, asphalt and soil stockpiles, will be managed in accordance with the procedures outlined in the CEMP and will be stored onsite in such a manner as to:
	  • Prevent environmental pollution (bunded and/or covered storage, minimise noise generation and implement dust/odour control measures, as may be required).
	  • Maximise waste segregation to minimise potential cross contamination of waste streams and facilitate subsequent re-use, recycling and recovery.
	  • Prevent hazards to Site workers and the general public during Construction Phase (largely noise, vibration and dust.
	
	Control and Management of Dust
	• Excavated soils will be carefully managed and maintained in order to minimise potential impact on soil quality and soil structure.
	• Handling of soils will be undertaken in accordance with documented procedures outlined in the CEMP (DBFL, 2024) that will be set out in order to protect ground and minimise airborne dust.
	• The normal measures required to prevent airborne dust emissions and associated nuisance arising from Site work will be in place including measures to prevent uncovered soil drying out leading to wind pick up of dust and mud being spread onto the local road network and adjoining properties.
	• This may require additional wetting at the point of dust release, dampening down during dry weather and wheel cleaning for any vehicles leaving the Site.

ASPECT	MITIGATION

	Export of Soil, Subsoil and Waste
	• All surplus materials and any waste will be removed offsite in accordance with the recommendations of the remediation plan which will be informed by the refined HHRA, the CEMP, and the Waste Management Act 1996-2011 as amended and associated regulations and guidance.
	• Materials will be brought to an authorised facility which currently holds an appropriate waste facility permit or licence for the specified waste types.
	• Prior to any removal of materials from the site, written confirmation should be obtained from the proposed receiving authorised waste facility, that acceptance of the material will be in accordance with all waste management legislation and the conditions of the receiving facility licence or permit.
	• It will be the contractor's responsibility to engage a specialist waste service contractor (s) who will possess the requisite authorisations, for the collection and movement of waste materials offsite.
	• Only hauliers with a valid National Waste Collection Permit Office (NWCPO) issued Waste Collection Permit which authorises the transport of waste materials and delivery to the proposed receiving facility should be appointed to transport the material from the site to the nominated appropriately permitted or licenced facility.
	• Materials and waste will be documented prior to leaving the site.
	• All information will be entered into a waste management register kept on the site.
	• Vehicles transporting material with potential for dust emissions to an offsite location shall be enclosed or covered with a tarpaulin at all times to restrict the escape of dust.
	• Public roads outside the Site will be regularly inspected for cleanliness and cleaned as necessary.
	• The main contractor will carry out road sweeping operations, employing a suction sweeper or similar appropriate method, to remove any project related dirt and/or material deposited on the road by construction/ delivery vehicles.
	• All vehicles exiting the Site will make use of a wheel wash facility where appropriate, prior to exiting onto public roads.
	
	Odour Management
	• It is recommended that an Odour Management Plan is prepared by the appointed contractor in advance of construction works to identify appropriate health and safety and environmental mitigation and management measures to be undertaken to ensure that the activities will be carried out in a manner such that vapours and odours do not pose any human health risk or result in significant impairment of, or significant interference with amenities or the environment beyond the site boundary.
	• Such measures include:
	  • Where required, limiting the work area to minimise the release of vapours and odours from exposed contaminated soils.
	  • Avoiding stockpiling of soils onsite and where unavoidable, soils must be covered.
	  • Where required, chemical sprays/mists will be used to lower the temperature of exposed waste, inhibit evaporation and for odour control.
	  • Where required, odour monitoring will be undertaken along site boundary downwind of the works area to ensure permitted odour levels are not exceeded.
	  • If a vapour or odour issue arises during the works, the appointed Contractor will cease works immediately and investigate the incident

ASPECT	MITIGATION
	Import of Materials • Contract and procurement procedures will ensure that all imported aggregate fill and soil materials required for the construction of the Proposed Development will be sourced from reputable suppliers operating in a sustainable manner and in accordance with industry conformity/compliance standards and statutory obligations. • This may include where suitable, import as by-products that meet the legislative requirements of Article 27 of the European Communities (Waste Directive) Regulations, 2011. • The importation of aggregate fill and soil materials will be subject to management and control procedures which will include testing for contaminants, invasive species and other anthropogenic inclusions and assessment of the suitability for use in accordance with engineering and environmental specifications for the Proposed Development. • Therefore, any unsuitable material will be identified prior to unloading / placement onsite. Concrete Works • The cementitious grout and other concrete works during the construction phase, will avoid any contamination of ground through the use of appropriate design and methods implemented by the Contractor and in accordance with the CEMP (DBFL, 2024) and relevant industry standards. • Pre-cast concrete will be used where technically feasible to meet the design requirements for the Proposed Development. • Where cast-in-place concrete is required (i.e., building foundations), all work must be carried out in dry conditions and be effectively isolated from any groundwater. • All ready-mixed concrete will be delivered to the Site by truck. • Concrete batching will take place offsite, wash down and wash out of concrete trucks will take place into a container located within a controlled bunded area which will then be emptied into a skip for appropriate compliant removal offsite in accordance with all relevant waste management legislation. • Any excess concrete is not to be disposed of onsite. • A suitable risk assessment for wet concreting shall be completed prior to works being carried out. • Pumped concrete will be monitored to ensure there is no accidental discharge.

ASPECT	MITIGATION

	Handling of Fuels, Chemicals and Materials
	• Fuelling and lubrication of equipment will be carried out in accordance with the procedures outlined in the CEMP (DBFL, 2024), in a designated area of the site away from any watercourses and drains where not possible to carry out such activities offsite.
	• Any diesel, fuel or hydraulic oils stored onsite will be stored in designated areas of the site.
	• These areas will be bunded and located away from surface water drainage and features.
	• Bunds will have regard to Environmental Protection Agency guidelines 'Amendment to IPC Guidance Note on Storage and Transfer of Materials for Scheduled Activities' (EPA, 2013).
	• All tank and drum storage areas will, as a minimum, be bunded to a volume not less than the greater of the following:
	  • 110% of the capacity of the largest tank or drum within the bunded area; or
	  • 25% of the total volume of substance that could be stored within the bunded area.
	• The appointed contractor will maintain an emergency response action plan and emergency procedures will be developed by the appointed contractor in advance of any works commencing.
	• Construction staff will be familiar with the emergency response plan.
	• Spill kits will be made available onsite and identified with signage for use in the event of an environmental spill or leak.
	• A spill kit will be kept in close proximity to the fuel storage area for use in the event of any incident during refuelling or maintenance works.
	• Heavy machinery used on the Site will also be equipped with its own spill kit.

ASPECT	MITIGATION
	Emergency Procedures • Emergency procedures will be developed by the appointed Contractor in advance of works commencing and spillage kits will be available onsite including in vehicles operating onsite. • Construction staff will be familiar with emergency procedures in the event of accidental fuel spillages. • Remedial action will be immediately implemented to address any potential impacts in accordance with industry standards and legislative requirements. • Any required emergency vehicle or equipment maintenance work will take place in a designated impermeable area within the Site. • Emergency response procedures will be put in place, in the unlikely event of spillages of fuels or lubricants. • Spill kits including oil absorbent material will be provided so that any spillage of fuels, lubricants or hydraulic oils will be immediately contained. • In the event of a leak or spill from equipment in the instance of a mechanical breakdown during operation, any contaminated soil will be removed from the Site and compliantly disposed offsite. • Residual soil will be tested to validate that all potentially contaminated material has been removed. • This procedure will be undertaken in accordance with industry best practice procedures and standards. • All construction works staff will be familiar with emergency procedures for in the event of accidental fuel spillages. • All construction works staff onsite will be fully trained on the use of equipment. • This procedure will be undertaken in accordance with industry best practice procedures and standards. • These measures will ensure that there is minimal risk to the receiving land, soil and geological environment associated with the construction phase of the Proposed Development. Welfare Facilities • Welfare facilities have the potential, if not managed appropriately, to release organic and other contaminants to ground or surface water courses. • Foul drainage from temporary welfare facilities during the Construction Phase of the Proposed Development will be discharged to temporary holding tank(s) the contents of which will periodically be tankered off Site to a licensed facility. • All waste from welfare facilities will be managed in accordance with the relevant statutory obligations by tankering of waste offsite by an appropriately authorised contractor. • Any connection to the public foul drainage network during the construction phase of the Proposed Development will be undertaken in accordance with the necessary temporary discharge licences issued by Úisce Eireann (UE).

ASPECT	MITIGATION
Water & Hydrology	• A preliminary Construction Environmental Management Plan (CEMP) (DBFL, 2024) has been prepared for the Proposed Development as part of the planning application. • In advance of construction works commencing, the appointed Contractor will be required further develop the CEMP to ensure, site-specific procedures and mitigation measures to monitor and control environmental impacts throughout the Construction Phase of the project and ensure that construction activities do not adversely impact on the receiving water environment having regard to relevant industry standards (e.g., Guidance for Consultants and Contractors, CIRIA - C532', CIRIA, 2001). • The CEMP will be implemented for the duration of the construction phase, covering construction and waste management activities that will take place during the construction phase of the Proposed Development. • The construction works will be managed with consideration of applicable regulations and standard international best practice; good construction management practices will minimise the risk of pollution from construction activities at the site.

ASPECT	MITIGATION

	Control and Management of Contaminated Soil
	• Contaminated soil will be encountered during groundworks at the site.
	• The refined HHRA will be used to inform the remediation plan to ensure that residual sources of contamination in soil are removed offsite.
	• The removal of the residual soil source will be validated in accordance with relevant guidelines including EPA 'Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites' and guidance and standards current at the time of construction works.
	• Therefore, there will be no residual sources of contamination that will remain onsite.
	• This work should be undertaken prior to the bulk excavation works for the construction of building foundations, utility infrastructure and other works to reduce the potential risks associated with exposure of soils to rainfall or surface runoff and leaching to groundwater.
	• Where possible, stockpiling of soils and subsoils onsite will be avoided.
	• However, in the event that stockpiling is required, stockpiled materials, pending reuse onsite, will be located away from the location of any sensitive receptors (watercourses and drains).
	• In accordance with Inland Fisheries Ireland guidelines, stockpiles will not be allowed within 50m of the open water where sufficient working areas are available within the Site boundary.
	• Surplus material, not suitable for reuse onsite, will be segregated, and stockpiled appropriately for removal offsite.
	• For any excavated material identified for removal offsite, while assessment and approval of acceptance at a destination re-use, recovery Site or waste facility is pending, excavated soil for recovery/disposal shall be stockpiled as follows:
	  • A suitable temporary storage area will be identified and designated.
	  • All stockpiles will be assigned a stockpile number.
	  • Stockpiled soil and stone materials will be protected from exposure to wind by storing the material in sheltered regions of the Proposed Development Site.
	  • Soil waste categories will be individually segregated; and all segregation, storage & stockpiling locations will be clearly delineated on the Site drawing.
	  • Any waste to be temporarily stockpiled will be stockpiled only on hard standing on heavy gauge polythene sheeting and soil stockpiles will be sealed to prevent run-off of rainwater and leaching of potential contaminants from the stockpiled material generation and/or the generation of dust.
	  • There will be no storage of materials within 10m of any boundary, drains and watercourses

ASPECT	MITIGATION
	Control and Management of Surface Water Runoff • There will be no direct discharges from construction activities to groundwater or surface water during the construction phase of the Proposed Development. • Surface water will be managed in accordance with the requirements of the CEMP (DBFL, 2024) and the measures outlined below. • Excavation works for piling caps; utility infrastructure and other works will be undertaken in a phased manner in order to minimise the exposure of soil to rainfall. • Where feasible groundworks will be undertaken during dryer weather and avoided where heavy rainfall is forecast. • Suitable temporary cover (e.g., tarpaulins) of potentially contaminated areas will be required to prevent ingress of rainfall. • A regular review of weather forecasts of heavy rainfall will be conducted, in particular during groundworks, and a contingency plan will be prepared for before and after such events to minimise any potential nuisances. • As the risk of the break-out of silt laden run-off is higher during these weather conditions, no work will be carried out during such periods where possible. • Surface water from the surrounding areas will be prevented from draining into the open excavations onsite during construction works through the use of temporary bunds / sandbags around excavation areas to provide diversion of surface water away from excavations. • A 10m buffer zone will be established around any open drainage courses and road gullies during construction works and other methods such as bunding implemented where appropriate to ensure that all watercourses or drainage gullies are appropriately isolated.

ASPECT	MITIGATION

	Control and Management of Groundwater
	• It is anticipated that localised dewatering or sump pumping on a temporary basis will be required during excavation and management of water from these excavations will include control of surface water runoff and pumping of water from excavations.
	• Where water must be pumped from the excavations, water will be managed through robust dewatering methodologies in accordance industry best practice standards (i.e., CIRIA – C750) that will be designed by the contractor to minimise the potential impact on the local groundwater flow regime.
	  • Dewatering must be carried out in cells or localised work areas and larger scale dewatering of the entire Site must be avoided to prevent an extensive groundwater drawdown across the site.
	  • The current groundwater flow regime must not be altered to ensure any risk of increasing the distribution of contaminants within the groundwater beneath the site.
	  • Monitoring of groundwater levels and contaminant concentrations around the periphery of the works area will be required as part of the groundwater management.
	• There will be no authorised discharge of water to ground during the construction phase.
	• Where dewatering of shallow groundwater is required or where surface water runoff must be pumped from the excavations, water will be discharged by the contractor to sewer in accordance with the necessary discharge licences issued by UE under Section 16 of the Local Government (Water Pollution) Acts and Regulations for any water discharges to sewer or from FCC under Section 4 of the Local Government (Water Pollution) Act 1977, as amended in 1990 for discharges to surface water.
	• To facilitate this, a temporary water treatment facility, including holding tanks and other necessary apparatus (such as activated carbon filtration and siltbusters), will be constructed on-site.
	• This facility will ensure compliance with the conditions of the temporary discharge consent.
	• Water will be treated and pumped to a holding area, where it will be sampled and tested by the contractor before discharge.
	• Upon receiving analysis results and screening against required consent limits, the contractor will arrange for appropriate disposal.
	• Groundwater will be treated and discharged to sewer in accordance with the temporary discharge consent.
	• Under no circumstances will any untreated wastewater generated onsite (from equipment washing, road sweeping etc.) be released offsite.
	• Where required, all public sewers will be protected to ensure that any untreated wastewater generated onsite does not enter the public sewers.

ASPECT	MITIGATION
	Piling • Given the presence of petroleum hydrocarbons and solvents in soil and groundwater beneath the site, it is recommended that a piling risk assessment is completed by the appointed Contractor at detailed design stage and in advance of construction works commencing onsite. • The proposed piling methodology will refer to the Environment Agency's (EA) guidance on 'Piling into Contaminated Sites' (EA, 2002) and 'Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance on Pollution Prevention' (EA, 2001), (or similar best practice) in order to minimise the potential for the introduction of any temporary conduit between any potential sources of contamination at the ground surface, made ground and underlying groundwater. • The piling method will also include procedures to ensure any potential impact to water quality is prevented including preventing surface runoff or other piling/drilling fluids from entering the pile bores and surrounding formation. • Where there is a requirement to use lubricants, drilling fluids or additives the contractor will use water-based, biodegradable, and non-hazardous compounds under controlled conditions. Borehole Decommissioning • Existing groundwater monitoring wells at the site that are no longer required will be decommissioned in advance of construction works commencing. • This work should be undertaken prior to the bulk excavation works for the construction of building foundations, utility infrastructure and other works to remove any direct conduit or pathway from ground surface for any contaminants to enter groundwater beneath the site. • Prior to commencing the demolition works, all wells must be inspected. • The proposed schedule of wells to be decommissioned will be identified by the appointed Contractor in advance of construction works commencing onsite. • Monitoring wells within the site to be retained during the construction phase of the Proposed Development will be protected to ensure that the well head is not damaged during works. • Any required wells that will unavoidably be removed during construction works will be decommissioned and replaced with a new monitoring well. • Decommissioning of wells will be undertaken in strict accordance with current best-practice at the time of decommissioning and at a minimum the specifications outlined in EPA Advice Note 14. • This will remove any potential direct conduit for contaminants to enter the groundwater directly and potentially migrate offsite. • Any wells to be retained must be appropriately protected from damage during construction works using precast concrete rings, steel road plates or permanent metal bollards to protect them from damage throughout the works. • Clear legible signage must be maintained, and daily inspection of the integrity of wells and protection measures completed

ASPECT	MITIGATION

	Concrete Works
	• The cementitious grout and other concrete works during the construction phase, will avoid any contamination of ground through the use of appropriate design and methods implemented by the Contractor and in accordance with the CEMP (DBFL, 2024) and relevant industry standards.
	• Pre-cast concrete will be used where technically feasible to meet the design requirements for the Proposed Development.
	• Where cast-in-place concrete is required (i.e., building foundations), all work must be carried out in dry conditions and be effectively isolated from any groundwater.
	• All ready-mixed concrete will be delivered to the Site by truck.
	• Concrete batching will take place offsite, wash down and wash out of concrete trucks will take place into a container located within a controlled bunded area which will then be emptied into a skip for appropriate compliant removal offsite in accordance with all relevant waste management legislation.
	• Any excess concrete is not to be disposed of onsite.
	• A suitable risk assessment for wet concreting shall be completed prior to works being carried out.
	• Pumped concrete will be monitored to ensure there is no accidental discharge.
	
	Handling of Fuels, Chemicals and Materials
	• Fuelling and lubrication of equipment will be carried out in accordance with the procedures outlined in the CEMP (DBFL, 2024), in a designated area of the site away from any watercourses and drains where not possible to carry out such activities offsite.
	• Any diesel, fuel or hydraulic oils stored onsite will be stored in designated areas of the site.
	• These areas will be bunded and located away from surface water drainage and features.
	• Bunds will have regard to Environmental Protection Agency guidelines 'Amendment to IPC Guidance Note on Storage and Transfer of Materials for Scheduled Activities' (EPA, 2013).
	• All tank and drum storage areas will, as a minimum, be bunded to a volume not less than the greater of the following:
	  • 110% of the capacity of the largest tank or drum within the bunded area; or
	  • 25% of the total volume of substance that could be stored within the bunded area.
	• The appointed contractor will maintain an emergency response action plan and emergency procedures will be developed by the appointed contractor in advance of any works commencing.
	• Construction staff will be familiar with the emergency response plan.
	• Spill kits will be made available onsite and identified with signage for use in the event of an environmental spill or leak.
	• A spill kit will be kept in close proximity to the fuel storage area for use in the event of any incident during refuelling or maintenance works.
	• Heavy machinery used on the Site will also be equipped with its own spill kit.

ASPECT	MITIGATION
	Emergency Procedures • Emergency procedures will be developed by the appointed Contractor in advance of works commencing and spillage kits will be available onsite including in vehicles operating onsite. • Construction staff will be familiar with emergency procedures for in the event of accidental fuel spillages. • Remedial action will be immediately implemented to address any potential impacts in accordance with industry standards and legislative requirements. • Any required emergency vehicle or equipment maintenance work will take place in a designated impermeable area within the Site. • Emergency response procedures will be put in place, in the unlikely event of spillages of fuels or lubricants. • Spill kits including oil absorbent material will be provided so that any spillage of fuels, lubricants or hydraulic oils will be immediately contained. • In the event of a leak or spill from equipment in the instance of a mechanical breakdown during operation, any contaminated soil will be removed from the Site and compliantly disposed offsite. • Residual soil will be tested to validate that all potentially contaminated material has been removed. • This procedure will be undertaken in accordance with industry best practice procedures and standards. • All construction works staff will be familiar with emergency procedures for in the event of accidental fuel spillages. • All construction works staff onsite will be fully trained on the use of equipment. • This procedure will be undertaken in accordance with industry best practice procedures and standards. • These measures will ensure that there is minimal risk to the receiving land, soil and geological environment associated with the construction phase of the Proposed Development. Flooding • The appointed Contractor will provide method statements for weather and tide/storm surge forecasting and continuous monitoring of water levels in the Lee (Cork) Estuary Lower. • The appointed Contractor will also provide method statements for the removal of site materials, fuels, tools, vehicles, and persons from flood zones in order to minimise the risk to persons working on the site as well as potential input of sediment or construction materials into the waterbodies during flood events.

ASPECT	MITIGATION
	Welfare Facilities • Welfare facilities have the potential, if not managed appropriately, to release organic and other contaminants to ground or surface water courses. • Foul drainage from temporary welfare facilities during the construction phase of the Proposed Development will be discharged to temporary holding tank(s) the contents of which will periodically be tankered off Site to a licensed facility. • All waste from welfare facilities will be managed in accordance with the relevant statutory obligations by tankering of waste offsite by an appropriately authorised contractor. • Any connection to the public foul drainage network during the construction phase of the Proposed Development will be undertaken in accordance with the necessary temporary discharge licences issued by Uisce Eireann (UE).
Biodiversity	Surface Water Protection • Appropriate mitigation measures will be implemented during the construction phase to ensure there will be no significant impact on the receiving hydrological network both on and off-Site via construction best practice including new marina Stream, Cork Harbour SPA and the adjacent swamp area to the east of the Site. Timing of works and vegetation clearance • Works likely to cause disturbance to nesting birds at the eastern edge of the Site should be timed to take place outside the breeding season i.e. during the period September – February inclusive. • This includes the use of heavy machinery in areas directly beside the swamp area which are likely to cause noise disturbance and possible breeding failure to active breeding birds such as Moorhen and Mallard. • Any clearance of scrub on-Site should take place during the same period (February to March inclusive) in line with the strict timing of vegetation clearance stated in the Wildlife Act 1976 and subsequent amendments. • All treelines currently in place should be retained and reinforced with native species.

ASPECT	MITIGATION

	Construction Phase Lighting
	• No overnight lighting will be directed to the natural habitats along the boundaries of the Site (i.e., the eastern swamp/ wetland off-Site, and treelines.
	• Where overnight lighting cannot be avoided in these areas due to health and safety concerns, the lighting within the Proposed Development will be designed and installed to minimise the impact on local wildlife and in accordance with the Bat Conservation Trust guidelines on artificial lighting and bats (BCT, 2023):
	  • There will be no light spill to the boundary habitats.
	  • All luminaires used will lack UV/IR elements to reduce impact.
	  • LED luminaires will be used due to the fact that they are highly directional, lower intensity, good colour rendition and dimming capability.
	  • A warm white spectrum (<2700 Kelvins will be used to reduce the blue light component of the LED spectrum).
	  • Luminaires will feature peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats.
	  • Column heights should be carefully considered to minimise light spill. The shortest column height allowed should be used where possible.
	  • Only luminaires with an upward light ratio of 0% and with good optical control will be used.
	  • Luminaires will be mounted on the horizontal, i.e. no upward tilt.
	  • Any external security lighting will be set on motion-sensors and short (1min) timers.
	  • As a last resort, accessories such as baffles, hoods or louvres will
	Waste Management
	• As best-practice, all construction-related rubbish on-site e.g., plastic sheeting, netting etc. should be kept in a designated area on-site and kept off ground level so as to protect small fauna (such as small mammals) from entrapment and death.

ASPECT	MITIGATION
Noise & Vibration	• Construction operations will in general be confined to the period Monday-Friday 0700-1900 h, and Saturday 0700-1400 h. • Where it is proposed to operate plant during the period 0700-0800 h, standard 'beeper' reversing alarms will be replaced with flat spectrum alarms. • Hooting will be prohibited onsite. Drivers of plant and vehicles will be instructed to avoid hooting at all times while onsite. • Plant used onsite during the construction phase will be maintained in a satisfactory condition and in accordance with manufacturer recommendations. In particular, exhaust silencers will be fitted and operating correctly at all times. Defective silencers will be immediately replaced. • Machinery not in active use will be shut down. • A site representative will be appointed as a liaison officer with the local community. • Where evening or night-time operations are required, local residents will be notified through the liaison officer. • All complaints of noise received during the construction phase will be logged in a register, and investigated immediately. Details of follow-up action will be included in the register. • Where it is proposed to import potentially noisy plant to the site, the potential effect of noise emissions will be assessed in advance. • Guidance set out in British Standard BS 5228:2009 with respect to noise control will be applied throughout the construction phase. • Where construction works at the proposed development coincide with road surface breaking works in relation to the proposed light rail project, and SHD receptors directly overlooking the proposed development site are occupied at the time construction works commence, it will be necessary to ensure that construction scenarios 1, 2, 3 and 5 at the proposed development site do not coincide with ground breaking works outside the boundary. • The overlap of piling works at the proposed development site and similar works at the Tedcastles site will be avoided if the SHD apartments overlooking the proposed development site are complete and occupied, and only where there is a risk of piling works coinciding at both sites.

ASPECT	MITIGATION
Air Quality	<u>Communications</u> • Develop and implement a stakeholder communications plan that includes community engagement before work commences on site; • Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager; • Display the head or regional office contact information; and • Develop and implement a Dust Management Plan (DMP), the final dust management plan will form part of the overall construction management plan which will formally be prepared and submitted to Cork City Council post grant of planning permission <u>Site Management</u> • Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken; • Make the complaints log available to the local authority when asked; • Record any exceptional incidents that cause dust and/or air emissions, either on- or off-site, and the action taken to resolve the situation in the log book; and • Hold regular liaison meetings with other high risk construction sites within 250m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/deliveries which might be using the same strategic road network routes. <u>Preparing and Maintaining the site</u> • Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible; • Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site; • Fully enclose site or specific operations where there is a high potential for dust production and the site is actives for an extensive period; • Avoid site runoff of water or mud; • Keep site fencing, barriers and scaffolding clean using wet methods; • Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below; and • Cover, seed or fence stockpiles to prevent wind whipping.

ASPECT	MITIGATION
	Operating Vehicle/Machinery and Sustainable Travel • Ensure all vehicles switch off engines when stationary - no idling vehicles; • Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable; and • A speed restriction of 20 km/hr will be applied as an effective control measure for dust for on-site vehicles using unpaved haul roads. Operations • Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems; • Ensure an adequate water supply on the site for effective dust/particulate matter suppression/ mitigation, using non-potable water where possible and appropriate; • Use enclosed chutes and conveyors and covered skips; • Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate; and • Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods. Waste Management • Avoid bonfires and burning of waste materials. Measures Specific to Earthworks • Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable; • Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable; and • Only remove the cover in small areas during work and not all at once. Measures Specific to Construction • Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.

ASPECT	MITIGATION
	Measures Specific to Trackout • Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use; • Avoid dry sweeping of large areas; • Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport; • Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable; • Record all inspections of haul routes and any subsequent action in a site log book; • Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned; • Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable); • Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits; and • Access gates to be located at least 10 m from receptors, where possible.

ASPECT	MITIGATION
Climate	• Materials like mixed construction and demolition waste, plastic, concrete, brick, tiles, ceramics, and bituminous mixtures will be diverted from waste processing and reused on-site, reducing CO2 emissions. • Energy-Efficient Equipment: Use energy-efficient machinery and equipment on-site. • Regular maintenance and proper operation can also help reduce fuel consumption and emissions. • Renewable Energy: Incorporate renewable energy sources, such as solar panels, to power construction activities. • This can significantly reduce reliance on fossil fuels • Reduce Idling: Prevention of on-site or delivery vehicles from leaving engines idling, even over short periods. • Sustainability Awareness: Ensure that sustainability and carbon specifically is incorporated into site team talks, construction and reporting targets. • Integrate training clauses for contractors and sub-contractors to upskill their onsite personnel including sub-contractors in low energy construction skills. • Appoint sustainability champions to ensure that the project continues to perform in a sustainable manner. • Sustainable Transportation: Encourage carpooling, use of public transportation, or electric vehicles for workers commuting to the site. • Maintenance: Ensure all plant and machinery are well maintained and inspected regularly. • Waste Management: Implement a robust waste management plan to reduce, reuse, and recycle construction waste. • Proper waste management can significantly cut down on emissions. • Minimising waste of materials due to poor timing or over ordering on site will aid to minimise the embodied carbon footprint of the site. • Application of the waste hierarchy to all waste material generated. • Sustainable Procurement: Sourcing low carbon materials locally where possible to reduce transport-related CO2 emissions. • Effects of Climate Change: The Contractor will be required to mitigate the effects of extreme weather, such as heavy rainfall, flooding, windstorms, and temperature fluctuations, through site risk assessments and method statements. • Additionally, certified datasheets for construction materials will outline their operational temperature limits, ensuring that temperature-sensitive materials perform adequately. • The Contractor will also address risks associated with fog, lightning, and hail through appropriate risk assessments and mitigation plans.

ASPECT	MITIGATION
	Further pre-construction carbon Avoidance, Remedial & Mitigation Measures: • Design for Performance: Request a Design for Performance approach from design teams and contractors. • Include contractual targets for whole life carbon with a focus on Net Zero and nature-positive goals where possible. • Circularity in Design: Require design teams to develop a circularity concept for projects, focusing on adaptability, disassembly, and reuse. • Set a target for a percentage of reused and recycled materials in designs. • Building Lifecycle Report: Ensure the building lifecycle report is regularly reviewed and updated in line with current policy and best practices for sustainable construction. • Carbon Literacy: Develop carbon literacy within design and construction teams by providing training on carbon literacy, ESG reporting, and disclosure. • Incorporate sustainability and carbon considerations into site team talks, construction targets, and reporting. • Include training clauses for contractors and sub-contractors to upskill their teams in low-energy construction techniques. • Building Renovation Passports (BRPs): Request Building Renovation Passports for this asset as part of the roadmap to decarbonise each asset. • Cement Reduction: Specify the minimum amount of cement needed in concrete and substitute where feasible to reduce cement usage. • Sustainable Procurement: Review sustainable procurement and material choices during detailed design to identify and implement lower embodied carbon options. • Request Environmental Product Declarations (EPDs) and prioritise the use of products with EPDs where possible within procurement restrictions. • Drive demand for EPDs by increasing the percentage of products used in the project with EPDs. • European Framework for Sustainable Buildings: Commit to using key indicators from the European Framework for sustainable buildings, Level(s), with support from the IGBC.

ASPECT	MITIGATION
	• Focus on indicators such as Life Cycle Assessment (LCA), Life Cycle Cost (LCC), Indoor Air Quality (IAQ), and Circularity. • Energy and Carbon Performance Reporting: Plan to disclose the operational energy and carbon performance of the project in your annual reporting. • Post-Occupancy Evaluation: Allow for post-occupancy evaluation of completed developments to ensure feedback is passed to the design team. • Construction Waste Management: Create a construction programme allowing sufficient time to determine reuse and recycling opportunities for demolition waste. Appoint a competent waste contractor to undertake a pre-construction audit detailing resource recovery best practice and identifying materials for reuse and recycling. Reuse materials on site possible. Implement effective segregation and storage practices for recyclable materials.Provide training for site personnel on waste management practices. Focus on minimising waste generation and maximizing recycling, reuse, and recovery of waste. • EU Taxonomy Compliance: Commit to complying with EU taxonomy requirements on the circular economy, specifically reuse, recycling, and material recovery of construction waste. • Review and ensure compliance with the EU Taxonomy Regulation (EU) 2020/852 regarding circular economy practices for construction waste. • Local Material Sourcing: Source materials locally where possible to reduce transport-related CO2 emissions. • Building Certifications: Aim for building certifications such as HPI (Home Performance Index), LEED (Leadership in Energy and Environmental Design), or equivalent, to ensure sustainable and high-performance standards are met throughout the project.
Cultural Heritage: Archaeology & Built Heritage	• The construction phase of the proposed development will not result in any predicted effects on other aspects of the cultural heritage resource that will require mitigation. • In the event that any archaeological remains, or other sub-surface features of cultural heritage interest, are identified during monitoring they will be recorded and left to remain securely in situ while the National Monuments Service and the Cork City Council Archaeologist are consulted to determine further appropriate mitigation measures, which may entail preservation in situ by avoidance or preservation in record by archaeological excavation.

Table 17 3 Operational Mitigation

ASPECT	MITIGATION
Population & Human Health	No mitigation measures are required during the operational phase of the proposed development.
Landscape & Visual	• The operational phase mitigation includes the design, orientation, massing and layout of the Proposed Development, including proposed landscaping and quality public realm creation at ground level, addition of green roofs, choice of colour and material selection, pathways and connectivity. • These measures aim to mitigate the visual and landscape impact of the high-rise development during its operational phase, ensuring it integrates well with its surroundings and enhances the local area.
Material Assets: Traffic	• A Mobility Management Plan (MMP) will be prepared by management company prior occupation of the building. The MMP ultimately seeks to encourage sustainable travel practices for all journeys by residents and visitors travelling to and from the proposed development.
Material Assets: Built Services & Waste	Waste • The measures outlined in the Operational Waste Management Plan, prepared by Enviroguide which accompanies this application under separate cover, will be implemented in full and form part of the mitigation strategy for the site. • Implementation of the OWMP will ensure a high level of recycling, reuse and recovery at the Proposed Development. • All recyclable materials will be segregated at source to reduce waste contractor costs and ensure maximum diversion of materials from landfill, thus achieving the targets set out in The National Waste Management Plan for a Circular Economy 2024-2030.
Land & Soils	No mitigation measures are required during the operational phase of the proposed development.

ASPECT	MITIGATION

Water & Hydrology	• There will be no petroleum hydrocarbon-based fuels used during the operational phase and the main operating system for heating will be air to water heat pump, thereby removing any potential contaminant sources associated with fuels.
	• There will be no discharges to ground from drainage and only rainfall on public / communal open spaces will infiltrate to ground.
	SuDS
	• All drainage from paved areas along roads and impermeable roads will be collected and managed within the surface water drainage and SuDS solutions as outlined in the Infrastructure Design Report (DBFL, 2024).
	• The surface water management strategy includes a number of measures that will capture any potentially contaminating compounds (petroleum hydrocarbons, metals, and suspended sediments) in surface water runoff from the higher risk areas including roads and the impermeable areas that could potentially otherwise discharge to groundwater or receiving water courses in the vicinity the site.
	• The measures incorporated in the SuDS design include:
	  • Permeable Paving,
	  • Green Roofs,
	  • Catchpit Manholes,
	  • Bioretention Areas, and
	  • Attenuation Systems.
	• The SuDS measures implemented will be effective in the treatment and removal of any contaminants (metals, hydrocarbons, polycyclic aromatic hydrocarbons (PAHs) and suspended solids) entrained in surface water runoff.
	• Furthermore, prior to discharging from the site will pass through a Bypass Separator that will be effective in removal of hydrocarbons that may enter the drainage system in particular in the event of worst-case scenario spill incident (e.g., collision on the roadway resulting in the loss of fuel form a vehicle).
	• Ongoing regular operational monitoring and maintenance of drainage and the SuDS measures will be incorporated into the overall management strategy for the Proposed Development.

Biodiversity	<u>Surface Water Protection</u> • Regular maintenance of surface water treatment facilities in accordance with best practice and manufacturers guidelines is required to keep the drainage system in adequate working order and to allow continued filtration of the surface water. <u>Landscape Management</u> • Pollinators will be promoted through the management of the soft landscaping on-Site during the lifetime of the development, see landscape strategy prepared by AIT that forms part of the planning application documentation.

ASPECT	MITIGATION

	<u>Wildlife Sensitive Operational Phase Lighting</u>
	• In order to minimise disturbance to bats utilising the swamp area east of the Proposed Development, the lighting and layout will be designed to minimise light-spill onto habitats used by the local bat populations identified as foraging or commuting over this off-Site area.
	• This can be achieved by ensuring that the design of lighting accords with guidelines presented in the Bat Conservation Trust & Institute of Lighting Engineers 'Bats and Lighting in the UK - Bats and Built Environment Series', the Bat Conservation Trust 'Artificial Lighting and Wildlife Interim Guidance' and the Bat Conservation Trust 'Statement on the impact and design of artificial light on bats'.
	• Lighting will only be installed where necessary for public safety in known Bat Foraging and Roosting locations (areas adjoining the eastern swamp located off-Site and adjoining the Proposed Development).
	• These lights have been designed and selected with specific shutters and filters to minimise any potential for back spills into the sensitive locations while still providing the primary function of safely lighting the pedestrian routes.
	• <u>Reflectance</u>
	  • Downward lighting can be reflected from bright surfaces.
	  • To minimize bat disturbance, the design avoids the use of bright surfaces and incorporates darker colour lamp heads and poles to reduce reflectance.
	  • Only luminaires with an upward light ratio of 0% and with good optical control to be used.
	• Lighting controls and dimming shall be utilised for post-curfew times.
	• <u>Shielding of Luminaires & Light</u>
	  • To minimize bat disturbance, the design avoids the use of up-ward lighting by shielding or by downward directional focus. i.e., no upward tilt.
	• <u>Type of Light</u>
	  • To minimize bat disturbance, the design avoids the use of strong UV lighting.
	  • The lighting design is based on the use of LED lighting which has minimal or no UV output of significance.
	  • Warmer 2700°K LED lighting will be utilized for amenity areas, as the warmer col-our temperatures with peak wavelengths greater than 550nm (~3000°K) cause less effects on bats.
	
	<u>Biodiversity Enhancement Measure 1: Swift Bricks</u>
	• It is proposed to include swift bricks or external swift boxes on the western facades of the buildings as an enhancement measure.
	• A minimum of 5 bricks/ boxes will be incorporated into the envelope of both proposed apartment blocks (10 no. total) and will be installed a minimum of 5m off the ground.
	• Care will be taken to ensure no obstacles or plate glass windows are located below the bricks/boxes.
	• Guidelines for the bird box scheme should follow guidelines published by Swift Conservation Ireland, and those published by Birdwatch Ireland entitled "Saving Swifts" (2019).
	• A project ecologist will be instructed to oversee the installation of the swift bricks or boxes during the construction phase or after the development has been completed, depending on which option is decided upon by the design team.

ASPECT	MITIGATION
	Biodiversity Enhancement Measure 2: House Martin Nest Cups • As an enhancement measure, at least four (4 no.) nest cups will be installed on the western façade of the Proposed Development. • These nest cups will be placed under the eaves of the structure at a minimum height of 2m above ground, with a droppings board placed at least 2m below the nest cups, as outlined in guidelines issued by House Martin Conservation UK & Ireland (2021). • A project ecologist will be instructed to oversee the installation of the nest cups after the development has been completed. Biodiversity Enhancement Measure 3: Bat Boxes • Coupled with appropriate lighting (<1 lux) penetrating into the swamp area and associated scrub/ treeline, five (5 no.) bat boxes are recommended as an enhancement measure. • These boxes will be placed on native trees which are to be planted at the eastern edge of the Proposed Development, bordering the wetland area. • The boxes will provide roosting opportunities for local bat populations and help to increase the availability of suitable roost features in the area. • These boxes will be erected under supervision of the project ecologist and monitored for bat activity in the years post construction.
Noise & Vibration	Windows • As identified under Incorporated Design mitigation measures, the installation of specific acoustic grade windows for bedrooms at certain facades may be required if certain identified infrastructure projects are constructed (light rail project, Monahan Road extension). Ventilation • As identified under Incorporated Design mitigation measures, the installation of specific acoustic grade vents for bedrooms at certain facades may be required if certain identified infrastructure projects are constructed (light rail project, Monahan Road extension).
Air Quality	No mitigation measures are required during the operational phase of the proposed development.

Climate	• The Energy Report and Building Lifecycle Report, which form part of the planning application documentation, detail a number of operational mitigation measures, such as:
	  • Sustainability information provided to building occupants .
	  • Green Certifications: Design the building to meet energy and environmental standards such as LEED, BREEAM, or the Passive House standard, which focus on reducing operational energy usage.
	  • Post-Occupancy Evaluations: Perform regular post-occupancy energy performance assessments to track and improve energy efficiency.

Cultural Heritage: Archaeology & Built Heritage	No mitigation measures are required during the operational phase of the proposed development.

17.3 Monitoring

Table 17 4 Construction Monitoring

ASPECT	MITIGATION
Population & Human Health	• Monitoring of standard construction mitigation measures as outlined in this EIAR will be undertaken by the appointed contractor.
Landscape & Visual	• National and planning conditions/enforcement.
Material Assets: Traffic	• The construction traffic during construction works will be monitored and controlled. • Compliance with construction vehicle routing practices will be monitored. • Compliance with construction vehicle parking practice will be monitored. • Internal and external road conditions will be monitored. • Timing of construction activities will be monitored.
Material Assets: Built Services & Waste	• During the construction phase, a procedure for waste auditing will be in place, as specified within the RWMP (Appendix 7.1). • The purpose of the waste auditing is to identify any problems with the site's waste procedures and also the benefits of prevention and minimisation that is in place. • The audit will be a 'self-audit' process carried out by the Resource Manager and/or appointed team member/contractor. • The RM will create an Audit Plan and identify the appropriate frequency at which the audits are to be conducted over the course of the construction phase. • The waste audit will document details of the quantity, type and composition of all waste removed from the site. • The audit findings will highlight any corrective actions that may need to be taken in relation to waste management procedures or site practices. • These corrective actions will be tracked in order to identify root-causes as appropriate.

ASPECT	MITIGATION

Land & Soils	• Routine monitoring and inspections during refuelling, concrete works to ensure no impacts and compliance with avoidance, remedial and mitigation measures.
	• Inspections and monitoring will be undertaken during excavations and other groundworks to ensure that measure that are protective of water quality are fully implemented and effective.
	• Stockpiles will be inspected daily by the appointed contractor to ensure materials are segregated onsite for the appropriate waste stream and disposal destination and to ensure there is no leaching / runoff of potential contaminants from the stockpiled material and/or the generation of dust.
	• Materials management and waste audits will be carried out at regular intervals to monitor the following:
	  • Management of soils onsite and for removal offsite.
	  • Record keeping.
	  • Traceability of all materials, surplus soil and other waste removed from the Site.
	  • Ensure records are maintained of material acceptance at the end destination.
	• The removal of the residual soil source will be validated in accordance with relevant guidelines including EPA 'Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites' (EPA, 2013a) and guidance and standards current at the time of construction works.
	• Soil and subsoil materials to be reused within the Proposed Development (i.e., for engineering fill and landscaping) will be subject to an assessment of the suitability for use, in accordance with engineering and environmental specification for the Proposed Development.
	• As part of the Odour Monitoring Plan monitoring may be required along site boundary downwind of the works area to ensure permitted odour levels are not exceeded.
	• If a vapour or odour issue arises during the works, the appointed Contractor will cease works immediately and investigate the incident and implement appropriate mitigation measures as required.

ASPECT	MITIGATION
Water & Hydrology	• The removal of the residual soil source will be validated in accordance with relevant guidelines including EPA 'Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites' and guidance and standards current at the time of construction works. • Groundwater and surface water monitoring will be implemented for the duration of the construction phase of the Proposed Development. • A period of monitoring will also be undertaken post completion of the construction phase. • The programme of monitoring will be informed by the refined quantitative human health risk assessment (HHRA) and controlled waters risk assessment (CWRA) and will be agreed with the local authority in advance of construction works commencing onsite. • Inspections will be undertaken during excavations and other groundworks to ensure that measures that are protective of water quality outlined in this EIAR, and the CEMP (DBFL, 2024) are fully implemented and effective. • An Environmental Clerk of Works (ECoW) will be onsite to supervise all excavation and piling works. • The decommission of boreholes onsite will be supervised by the ECoW to ensure it is completed in accordance with industry best practice standards including the Environmental Protection Agency's (EPA) advice note on "Borehole Construction and Wellhead Protection". • The installation of vapour barrier will be supervised and signed off by a suitably qualified engineer. • During dewatering works, monitoring of groundwater levels and contaminant concentrations around the periphery of the works area will be required as part of the groundwater management. • Discharges to sewer will be monitored where required in accordance with statutory consents (i.e., discharge licence). • Where required, water pumped from excavations will be treated and pumped to a holding area, where it will be sampled and tested by the contractor before discharge. • Upon receiving analysis results and screening against required consent limits, the contractor will arrange for appropriate disposal. • Groundwater will be treated and discharged to the foul sewer in accordance with the temporary discharge consent. • Routine monitoring and inspections during refuelling, concrete works to ensure no impacts and compliance with avoidance, remedial and mitigation measures.

ASPECT	MITIGATION
Biodiversity	• Any clearance of scrub on-Site should take place during the period (February to March inclusive) in line with the strict timing of vegetation clearance stated in the Wildlife Act 1976 and subsequent amendments. • All treeline currently in place should be retained and reinforced with native species. • No overnight lighting will be directed to the natural habitats along the boundaries of the Site (i.e., the eastern swamp/ wetland off-Site, hedgerows and treelines). <u>Biodiversity Management Plan</u> • The monitoring/surveys outlined above will be included in a Biodiversity Management Plan (BMP) for the Proposed Development, along with the detailed mitigation measures for the construction and operational phases and Biodiversity Enhancement Measures. • In addition to the items listed above, the BMP should detail the landscape management operations for the Proposed Development, including cutting/trimming regimes and maintenance of bird and bat boxes (if applicable). • The BMP will also be updated to reflect any follow-up survey results as they are carried out. • The BMP will be prepared and agreed in consultation with a suitably qualified ecologist and Cork County Council.
Noise & Vibration	• Given the proximity of Páirc Uí Chaoimh to proposed onsite piling zones, it is recommended that vibration monitoring is undertaken at the stadium throughout periods of piling, subject to agreement with the Gaelic Athletic Association. • This also applies to the Lee Rowing Club premises outside the northeast corner of the site, and to adjacent blocks at the SHD scheme outside the southwest boundary, if constructed ahead of the proposed development.
Air Quality	• The monitoring of construction dust during the Construction Phase of the proposed development is recommended to ensure that impacts are not experienced beyond the Site boundary. • Monitoring of dust can be carried out by using the Bergerhoff Method. This involves placing Bergerhoff Dust Deposit Gauges at a strategic locations along the Site boundaries for a period of 30 +/- 2 days. • The selection of sampling point locations should be carried out in consideration of the requirements of VDI 2119 with respect to the location of the samplers relative to buildings and other obstructions, height above ground, and sample collection and analysis procedures. • After the exposure period is complete, the Gauges should be removed from the Site; the dust deposits in each Gauge will then be determined gravimetrically and expressed as a dust deposition rate in mg/m2/day in accordance with the relevant standard. • Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100 m of site boundary, with cleaning to be provided if necessary. • Carry out regular site inspections to monitor compliance with the Dust Management Plan, record inspection results, and make an inspection log available to the Cork City Council when asked. • Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.

ASPECT	MITIGATION
Climate	• Monitoring and Reporting: Regularly monitor and report GHG emissions from the construction site. This helps in identifying areas for improvement and ensuring compliance with environmental standards Sustainability spot checks should be added to ongoing site inspections and feedback shared with all onsite to ensure measures are being adopted. <u>Compliance with EU Taxonomy for Circular Economy</u> • Comprehensive Documentation and Reporting: It is essential to maintain detailed records that document compliance with the circular economy principles outlined in the EU taxonomy. This documentation should include logs of all recycled materials, percentages of materials reused on-site, and detailed descriptions of how circular economy practices are being implemented. • Independent Third-Party Audits: We recommend engaging an independent auditor to periodically assess the project's compliance with the EU taxonomy. The audit should verify the accuracy of reported data and ensure that the circular economy requirements are fully adhered to throughout the project. <u>Monitoring of GHG Emissions Reduction Measures</u> • Appoint sustainability champions to ensure that the project continues to perform in a sustainable manner including monitoring and reporting of performance on site. • Idle Time Monitoring for Vehicles and Machinery: We suggest installing GPS or telematics systems on all vehicles and machinery used on-site to monitor engine idling times. Automatic alerts should be set up to notify site managers when idling exceeds a specified threshold, enabling prompt corrective action to reduce unnecessary emissions. • Maintenance Logs for Plant and Machinery: Implementing a digital maintenance log system to track the inspection and maintenance of all on-site equipment is recommended. This system should record inspection dates, maintenance activities, and any identified issues, ensuring that all machinery operates efficiently and with minimal emissions. • Material Waste Minimisation Tracking: A monitoring system should be developed to track material orders and usage. This system should identify trends in over-ordering or inefficient material use, enabling the project team to take corrective actions that will help minimise the embodied carbon footprint of the site. <u>Application of Waste Hierarchy</u> • Waste Segregation Audits: Regular audits should be conducted to ensure that waste is being properly segregated according to the waste hierarchy (reduce, reuse, recycle). These audits will help identify opportunities for improving waste management practices and reducing overall waste generation. • Monthly Waste Management Reports: We suggest generating monthly reports detailing the volume of waste reduced, reused, and recycled. These reports should be compared against predefined targets to assess the effectiveness of the waste management strategies and to identify areas for improvement.

ASPECT	MITIGATION
	Local Sourcing of Materials • Supplier Distance Monitoring: A database of suppliers should be developed, documenting the distance of each supplier from the construction site. This database should be used to monitor and minimise the carbon footprint associated with material transportation, prioritising local suppliers wherever possible. • Transport-Related Carbon Footprint Analysis: Conducting a carbon footprint analysis for the transportation of all materials to the site is recommended. This analysis should inform the selection of suppliers, with a preference for those within a closer radius to reduce CO2 emissions.
Cultural Heritage: Archaeology & Built Heritage	• Archaeological monitoring of ground excavation works during the construction phase will be carried out by a suitably qualified archaeologist under licence by the National Monument Service.

Table 17 5 Operational Monitoring

ASPECT	MITIGATION
Population & Human Health	No monitoring measures are required during the operational phase of the proposed development.
Landscape & Visual	• Enforcement of planning conditions. • Appointment of landscape Architect to supervise public realm planting and construction
Material Assets: Traffic	• As part of the Mobility Management Plan (MMP) process, bi-annual post occupancy surveys are to be carried out in order to determine the success of the measures and initiatives as set out in the proposed MMP document.
Material Assets: Built Services & Waste	• During the operational phase, building services will be subject to required maintenance as detailed in the Building Lifecycle Report that forms part of the planning application documentation. • The Building Lifecycle Report will be updated as the building design develops and at operational commencement of the development, a Planned Preventative Maintenance Schedule (PPM) will be available to the property management company. • This document will form the basis of any monitoring and maintenance required in relation to building services. • The building management company and future residents will be required to maintain the bins and storage areas in good condition as required by the Cork City Council Waste Bye-Laws. • The waste strategy presented in the Operational Waste Management Plan (submitted as part of the planning application) will provide sufficient storage capacity for the estimated quantity of segregated waste. • The designated areas for waste storage will provide sufficient room for the required receptacles in accordance with the details of this strategy.
Land & Soils	No monitoring measures are required during the operational phase of the proposed development.
Water & Hydrology	• Ongoing regular operational monitoring and maintenance of drainage and the SuDS measures will be undertaken throughout the lifetime of the operational phase of the Proposed Development.

ASPECT	MITIGATION
Biodiversity	• Surface Water Protection – As per construction best practice. • Landscape Management – Pollinators will be promoted through the management of the soft landscaping on-Site during the lifetime of the development. • Biodiversity Enhancement Measure 1: Swift Bricks Installation – The location and placement of these structures should be carried out under the advisement and supervision of an Ecologist to ensure they are fit for purpose. • Biodiversity Enhancement Measure 2: House Martin Nest Cup Installation – The location and placement of these structures should be carried out under the advisement and supervision of an Ecologist to ensure they are fit for purpose. • Biodiversity Enhancement Measure 3: Bat box Installation – The location and placement of these structures should be carried out under the advisement and supervision of an Ecologist to ensure they are fit for purpose. Biodiversity Management Plan • The monitoring/surveys outlined above will be included in a Biodiversity Management Plan (BMP) for the Proposed Development, along with the detailed mitigation measures for the construction and operational phases and Biodiversity Enhancement Measures. • In addition to the items listed above, the BMP should detail the landscape management operations for the Proposed Development, including cutting/trimming regimes and maintenance of bird and bat boxes (if applicable). • The BMP will also be updated to reflect any follow-up survey results as they are carried out. • The BMP will be prepared and agreed in consultation with a suitably qualified ecologist and Cork County Council.
Noise & Vibration	• No monitoring measures are required during the operational phase of the proposed development.
Air Quality	No monitoring measures are required during the operational phase of the proposed development.
Climate	• Implementation of an Environmental Management Plan (EMP) that incorporates adaptive management principles. • Ensure climate change resilience plans are robust; continued monitoring of trends in weather events; and continued review of resilience measures related to interdependencies. Monitoring of Climate Change Mitigation Measures • Attenuation and Drainage Systems Monitoring: Consistent with IEMA's guidance on climate resilience, regular inspections should be undertaken to verify the functionality of the attenuation and drainage systems. These inspections should be conducted during construction, after significant rainfall events, and periodically thereafter to ensure long-term effectiveness in preventing flooding. • Climate Vulnerability Assessment Review: In accordance with IEMA's recommendation to periodically reassess climate risks, we suggest reviewing the climate vulnerability assessment (as detailed in Section 13.7.3) at regular intervals. This review should incorporate the latest climate projections to ensure the mitigation measures remain adequate and effective.

ASPECT	MITIGATION
	Monitoring of Energy Efficiency and Climate Impact Reduction • To minimise the impact of the development on climate through energy use during operation, the following monitoring activities are recommended: • NZEB Compliance Verification: Continuous monitoring during the construction phase should ensure that the development complies with the Near Zero Energy Building (NZEB) Standards. This includes verifying that all building components and systems meet the NZEB criteria. • EU Taxonomy Alignment Monitoring: Ensure that the development achieves energy performance that is at least 10% lower than the NZEB requirements. Regular energy performance assessments should be conducted to confirm alignment with the EU Taxonomy for sustainable development. • Renewable Energy Ratio (RER) Compliance: Monitor the implementation of renewable energy systems, such as solar panels and air source heat pumps, to ensure that the development achieves a Renewable Energy Ratio (RER) of 20%, in line with Part L (2021) of the NZEB regulations. Post-installation, periodic checks should be performed to verify ongoing compliance. • Building Energy Rating (BER) Target Achievement: Regular energy audits should be carried out to monitor the building's energy performance, ensuring that the targeted Building Energy Rating (BER) of A2 is achieved. This includes verifying the efficiency of insulation, windows, HVAC systems, and other energy-related components. • Thermal Performance Monitoring: Continuous monitoring during construction should ensure that the building achieves the improved thermal transmittance (U-Values), air permeability, and thermal bridging standards specified in the design. Post-construction thermal imaging surveys and air tightness tests should be conducted to confirm that these standards have been met. Monitoring of Renewable Energy Systems • To ensure the successful implementation and operation of renewable energy systems, the following monitoring measures are recommended: • Air Source Heat Pump Performance: Regular inspections and maintenance checks should be conducted on the air source heat pumps to ensure they are operating efficiently and contributing effectively to the building's energy needs. Performance metrics such as Coefficient of Performance (COP) and Seasonal Performance Factor (SPF) should be tracked and compared against the expected values. • Occupant Sustainability Information: Consistent with IEMA's emphasis on stakeholder engagement, it is important to ensure that all building occupants receive comprehensive sustainability information. This should include guidance on energy conservation practices and how to use renewable energy systems effectively. Feedback mechanisms, such as surveys, should be used to assess the impact of this information on occupant behaviour.

ASPECT	MITIGATION
	Monitoring of Sustainable Transport Initiatives • To promote sustainable transport and reduce transport-related emissions, we recommend the following monitoring strategies: • Electric Vehicle (EV) and Bicycle Parking Usage: Regular monitoring should be carried out to assess the usage of electric vehicle charging stations and bicycle parking facilities within the development. This will help gauge the effectiveness of these measures in promoting sustainable transport modes. Usage data can inform whether additional facilities or adjustments are needed. • Transport Emissions Impact Assessment: Periodic assessments should be conducted to evaluate the impact of the provided sustainable transport facilities on reducing overall transport emissions. This could include monitoring the uptake of electric vehicles by residents and the corresponding reduction in greenhouse gas emissions.
Cultural Heritage: Archaeology & Built Heritage	No monitoring measures are required during the operational phase of the proposed development.

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