Chapter 8 – Air Quality

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8. AIR QUALITY

8.1 Introduction

This chapter assesses the likely air quality impacts associated with the Proposed Development located at North Wall Quay, Co. Dublin. The assessment of impacts has been undertaken in the context of current relevant standards and guidance, and identifies any requirements or possibilities for mitigation. A full description of the development is available in Chapter 2.

8.2 Methodology

8.2.1 Relevant Legislation & Guidance

The principal guidance and best practice documents used to inform the assessment of potential impacts on air quality are summarised below.

- Guidance on the Assessment of Dust from Demolition and Construction v2.2 (Institute of Air Quality Management [IAQM] (hereafter referred to as the IAQM Guidelines) (IAQM, 2024);
- A Guide To The Assessment Of Air Quality Impacts On Designated Nature Conservation Sites (Version 1.1) (IAQM, 2020); and
- PE-ENV-01106: Air Quality Assessment of Specified Infrastructure Projects (Transport Infrastructure Ireland [TII], 2025).

In addition to specific air quality guidance documents, the following guidelines were considered and consulted in the preparation of this chapter:

- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (hereafter referred to as the Environmental Protection Agency (EPA) Guidelines) (EPA, 2022);
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning & Local Government, 2018); and
- Environmental Impact Assessment (EIA) Directive Guidance on the Preparation of the Environmental Impact Assessment Report (European Commission, 2017).

8.2.2 Ambient Air Quality Standards

In order to reduce the risk to health from poor air quality, national and European statutory bodies have set limit values in ambient air for a range of air pollutants. These limit values or "Air Quality Standards" are health or environmental-based levels for which additional factors may be considered. For example, natural background levels, environmental conditions and socio-economic factors may all play a part in the limit value which is set.

8.2.2.1 Air Quality Directive

Air quality significance criteria are assessed on the basis of compliance with the appropriate standards or limit values. The applicable standards in Ireland are set out in Directive (EU) 2024/2881 *of the European Parliament and of the Council of 23 October 2024 on ambient air quality and cleaner air for Europe (recast).* This directive supersedes EU Directive 2008/50/EC *of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe* (CAFE Directive). Directive (EU) 2024/2881 sets out air quality standards for pollutants to be reached by 2026 and by 2030 which are more closely aligned with the World Health Organisation (WHO) air quality guidelines.

The ambient air quality limit values for pollutants are set out in Annex I of Directive (EU) 2024/2881. Table 1 of Annex I in Directive (EU) 2024/2881 sets out the updated air quality limit values for pollutants to be achieved by 1 January 2030, which are more closely aligned with the WHO air quality guidelines. Table 2

of Annex I in Directive (EU) 2024/2881 sets out the limit values for air pollutants which are to be achieved by 11 December 2026 and are also applicable up to 2030. The limit values in Table 2 of Annex I are the same as the limits set under Directive 2008/50/EC and the Air Quality Standards Regulations 2022.

The Ambient Air Quality Standards Regulations 2022 (S.I. 739 of 2022) (the Air Quality Standards Regulations 2022) further transposed the CAFE Directive and revoked the Air Quality Standards Regulations 2011, as amended. With the adoption of Directive (EU) 2024/2881, Ireland must transpose this directive into national law, i.e. update the Air Quality Standards Regulations, before December 2026.

In relation to the Proposed Development, the applicable limit values are for nitrogen dioxide (NO_2) and particulate matter (PM_{10} and $PM_{2.5}$). The limit values for these pollutants pre- and post-2030 are outlined in Table 8.1.

Table 8.1: CAFE Directive Ambient Air Quality Limit Values

Pollutant	Directive 2008/50/EC		Directive (EU) 2024/2881	
	Limit Type	Limit Value (to be attained by 2026 and applicable until 2030)[a]	Limit Type	Limit Value (to be attained by 2030)[a]
Nitrogen Dioxide (NO_2)	Hourly limit for protection of human health - not to be exceeded more than 18 times/year	200 µg/m^3	Hourly limit for protection of human health - not to be exceeded more than 3 times/year	200 µg/m^3
	n/a	n/a	24-hour limit for protection of human health - not to be exceeded more than 18 times/year	50 µg/m^3
	Annual limit for protection of human health	40 µg/m^3	Annual limit for protection of human health	20 µg/m^3
Particulate Matter (as PM_{10})	24-hour limit for protection of human health - not to be exceeded more than 35 times/year	50 µg/m^3	24-hour limit for protection of human health - not to be exceeded more than 18 times/year	45 µg/m^3
	Annual limit for protection of human health	40 µg/m^3	Annual limit for protection of human health	20 µg/m^3
Particulate Matter (as $PM_{2.5}$)	n/a	n/a	24-hour limit for protection of human health - not to be exceeded more than 18 times/year	25 µg/m^3
	Annual limit for protection of human health	25 µg/m^3	Annual limit for protection of human health	10 µg/m^3

a. Note µg/m^3 (micrograms per cubic metre).

8.2.2.2 WHO Air Quality Guidelines & Clean Air Strategy

In April 2023, the Government of Ireland published the *Clean Air Strategy for Ireland* (Government of Ireland, 2023), which provides a high-level strategic policy framework needed to reduce air pollution. The strategy commits Ireland to achieving the 2021 WHO Air Quality Guidelines Interim Target 3 (IT3) by 2026 (Table 8.2), the IT4 targets by 2030 and the final targets by 2040 (Table 13.2). The strategy notes that a significant number of EPA monitoring stations observed air pollution levels in 2021 above the WHO targets; 80% of these stations would fail to meet the final $PM_{2.5}$ target of 5 µg/m^3. The strategy also acknowledges that "*meeting the WHO targets will be challenging and will require legislative and societal change, especially with regard to both $PM_{2.5}$ and NO_2*".

Annex II of Directive (EU) 2024/2881 gives assessment thresholds which align with the clean air strategy final 2040 WHO targets. Directive (EU) 2024/2881 states that *"Member States shall endeavour to achieve and preserve the best ambient air quality and a high level of protection of human health and the environment, with the aim of achieving a zero-pollution objective as referred to in Article 1(1), in line with WHO recommendations, and below the assessment thresholds laid down in Annex II."*

These assessment thresholds relate to monitoring of ambient air quality by Member States, where *"exceedances of the assessment thresholds specified in Annex II shall be determined on the basis of concentrations during the previous 5 years where sufficient data are available. An assessment threshold shall be deemed to have been exceeded if it has been exceeded during at least 3 separate years out of those previous 5 years."*

Table 8.2: WHO Air Quality Guidelines

Pollutant	Limit Type	IT3 (2026)	IT4 (2030)	Final Target (2040)
NO_2	24-hour limit for protection of human health	-	-	25 µg/m^3
	Annual limit for protection of human health	20 µg/m^3	-	10 µg/m^3
PM (as PM_{10})	24-hour limit for protection of human health	75 µg/m^3	50 µg/m^3	45 µg/m^3
	Annual limit for protection of human health	30 µg/m^3	20 µg/m^3	15 µg/m^3
PM (as $PM_{2.5}$)	24-hour limit for protection of human health	37.5 µg/m^3	25 µg/m^3	15 µg/m^3
	Annual limit for protection of human health	15 µg/m^3	10 µg/m^3	5 µg/m^3

The applicable air quality limit values for the purposes of this assessment are those set out in Table 8.1. The limit values stipulated under Table 2 of Annex I in Directive (EU) 2024/2881 and the Air Quality Standards Regulations 2022 are applicable for the Proposed Development as it will be constructed and operational prior to 2030.

8.2.2.3 Guidelines

The concern from a health perspective is focused on particles of dust that are less than 10 microns (PM_{10}) and less than 2.5 microns ($PM_{2.5}$). The EU ambient air quality standards outlined in Table 8.1 have set ambient air quality limit values for PM_{10} and $PM_{2.5}$.

With regards to larger dust particles that can give rise to nuisance dust, there are no statutory guidelines regarding the maximum dust deposition levels that may be generated during the construction phase of a development in Ireland. Furthermore, no criteria have been stipulated for nuisance dust for this specific type of Proposed Development.

With regard to dust deposition, the German TA-Luft standard for dust deposition (non-hazardous dust) (German VDI, 2002) sets a maximum permissible emission level for dust deposition of 350 mg/m^2/day averaged over a one-year period at any receptors outside the site boundary. The TA-Luft standard has been applied for the purpose of this assessment based on recommendations from the EPA in Ireland in the document titled *Environmental Management Guidelines - Environmental Management in the Extractive Industry (Non-Scheduled Minerals)* (EPA, 2006). The document recommends that the TA-Luft limit of 350 mg/m^2/day be applied to the site boundary of quarries. This limit value can be implemented with regard to dust impacts from construction of the Proposed Development, in terms of both sensitive human and ecological receptors.

8.2.2.4 Air Quality Significance Criteria

8.2.2.4.1 Human Receptors

The TII document *Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106* (TII, 2025) details a methodology for determining air quality impact significance criteria for road schemes which can be applied to any project that causes a change in traffic. The degree of impact is determined based on the percentage change in pollutant concentrations relative to the Do-Nothing scenario. The TII significance criteria are outlined in Table 4.9 of *Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106* (TII, 2025) and reproduced in Table 8.3 below. These criteria have been adopted for the proposed development to predict the impact of NO_2, PM_{10} and $PM_{2.5}$ emissions as a result of the proposed development.

Table 8.3: Air Quality and Traffic Significance Criteria

Long Term Average Concentration at Receptor in Assessment Year	% Change in Concentration Relative to Air Quality Standard Value (AQLV)			
	1%	2-5%	6-10%	>10%
75% or less of AQLV	Neutral	Neutral	Slight	Moderate
76 – 94% of AQLV	Neutral	Slight	Moderate	Moderate
95 – 102% of AQLV	Slight	Moderate	Moderate	Substantial
103 – 109% of AQLV	Moderate	Moderate	Substantial	Substantial
110% or more of AQLV	Moderate	Substantial	Substantial	Substantial

Source TII (2022a) Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106

As per Table 8.3 a neutral effect is one where a change in concentration at a receptor is:

- 5% or less where the Opening Year, without the proposed development, annual mean concentration is 75% or less of the standard; or
- 1% or less where the Opening Year, without the proposed development, annual mean concentration is 94% or less of the standard.

Where an effect does not meet the criteria for neutral, as described above, the effect can either be positive or negative. The TII guidance (TII, 2025) states that "*the evaluation of significance of effects for the operational phase should be undertaken for the Opening Year only as the Design Year is likely to show lower total pollutant concentrations and changes in concentration*" (TII, 2025).

Non-significant effects (i.e. of local importance only) are 'neutral' or 'slight' changes in concentrations while significant effects can be changes in pollutant concentrations that are either 'moderate' or 'substantial'. However, the TII guidance (TII, 2025) states that these must be considered in the context of the project and 'moderate' or 'substantial' increases are not necessarily always significant effects.

The impact descriptors in Table 8.3 are used to describe the impact at each modelled receptor location, and the significance of the impacts is then determined, aligning with the terminology in the EPA guidelines (EPA, 2022). Whilst it may be determined that there are 'slight', 'moderate' or 'substantial' impacts at one or more receptors, an overall judgement should be made of whether the proposed development is 'significant' or 'not significant' in terms of air quality. Factors to consider when determining the overall significance of a proposed development are provided in Table 4.10 of the TII guidance (TII, 2025).

8.2.2.4.2 Ecology Receptors

The Air Quality Standards Regulations 2022 outline an annual critical level of 30 µg/m^3 for NO_X for the protection of vegetation and natural ecosystems in general. Ammonia (NH_3) has an annual mean limit value of 1 µg/m^3 to 3 µg/m^3. Exceeding critical levels may cause direct adverse effects on some receptors, such as trees, other plants or natural ecosystems.

The TII PE-ENV-01106 guidance (TII, 2025) outlines the assessment of significance of effects at sensitive designated habitats (Section 4.10.2 and Table 4.11 of the guidance), stating that if the total N deposition and acid deposition (due to the proposed development plus background concentrations) are more than 1% of the critical loads then the modelled results should be discussed further with the project ecologist.

A 'Critical Load' is defined by the United Nations Economic Commission for Europe (UNECE) as a quantitative estimate of an exposure to one or more pollutants below which significant harmful effects on specified sensitive elements of the environment do not occur according to present knowledge (UNECE 2010).

The Royal Canal Proposed Natural Heritage Area (pNHA) is within 200 m of affected roads. To determine if there are any sensitive Annex I habitats (the basis for which a pNHA may become designated) within the Royal Canal pNHA which are located within 200 m of the affected road links, spatial data provided by National Parks and Wildlife Service (NPWS) was reviewed (https://www.npws.ie/publications/article-17-reports/article-17-reports-2025). This data shows the national distribution of sensitive Annex I habitats and is produced on a 6 yearly basis by the NPWS as part of their reporting obligations under Article 17 of the EU Directive on the Conservation of Habitats, Flora and Fauna (92/43/EEC), commonly known as "the Habitats Directive". The Article 17 Report 2019 and accompanying data on the conservation status of the Annex I habitats was reviewed (Article 17 Report 2025 has been published however the spatial data is not yet available as of the time of this assessment). According to this dataset, there are no Annex I habitats within the Royal Canal pNHA which are within 200 m of an affected road link. There are also no other designated sites or Annex I habitats within 200 m of affected road links. There is therefore no potential for sensitive ecology to be significantly affected by road traffic emissions associated with the proposed development, and a detailed assessment is therefore not required.

8.2.3 Construction Phase

8.2.3.1 Dust Assessment

The Institute of Air Quality Management in the UK (IAQM) guidance document '*Guidance on the Assessment of Dust from Demolition and Construction*' (IAQM, 2024) outlines an assessment method for predicting the impact of dust emissions from construction activities based on the scale and nature of the works and the sensitivity of the area to dust impacts. The IAQM methodology has been applied to the construction phase of this development to predict the likely risk of dust impacts in the absence of mitigation measures and to determine the level of site-specific mitigation required. The use of UK guidance is

recommended by Transport Infrastructure Ireland in their guidance document *Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106* (TII, 2025).

The major dust generating activities are divided into four types within the IAQM guidance (IAQM, 2024) to reflect their different potential impacts. These are:

- Demolition;
- Earthworks;
- Construction; and
- Trackout (transport of dust and dirt from the construction site onto the public road network).

The magnitude of each of the four categories is divided into large, medium or small scale depending on the nature of the activities involved. The criteria for determining the category for the works involved are outlined in Table 8.4, these are based on the IAQM guidance (IAQM, 2024). The magnitude of each activity is combined with the overall sensitivity of the area to determine the risk of dust impacts from site activities. This allows the level of site-specific mitigation to be determined.

Table 8.4: IAQM Criteria to Determine Dust Emissions Magnitude

Dust Emission Magnitude		
Small	**Medium**	**Large**
Demolition		
► Total building volume <12,000 m^3 ► Construction material with low potential for dust release (e.g. metal cladding or timber) ► Demolition activities <6 m above ground ► Demolition during wetter months	► Total building volume 12,000 - 75,000 m^3 ► Potentially dusty construction material ► Demolition activities 6 – 12 m above ground level	► Total building volume >75,000 m^3 ► Potentially dusty construction material (e.g. concrete) ► On-site crushing and screening ► Demolition activities >12 m above ground level
Earthworks		
► Total site area <18,000 m^2 ► Soil type with large grain size (e.g. sand) ► <5 heavy earth moving vehicles active at any one time ► Formation of bunds <3 m in height ► Earthworks during wetter months	► Total site area 18,000 m^2 - 110,000 m^2 ► Moderately dusty soil type (e.g. silt) ► 5 – 10 heavy earth moving vehicles active at any one time ► Formation of bunds 3 – 6 m in height	► Total site area >110,000 m^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 >6 m in height
Construction		
► Total building volume <12,000 m^3 ► Construction material with low potential for dust release (e.g. metal cladding or timber)	► Total building volume 12,000 - 75,000 m^3 ► Potentially dusty construction material (e.g. concrete) ► On-site concrete batching	► Total building volume >75,000 m^3 ► On-site concrete batching ► Sandblasting
Trackout (Truck Movements)		

Dust Emission Magnitude		
Small	**Medium**	**Large**
► <20 HDV (>3.5 t) outward movements in any one day ► Surface material with low potential for dust release ► Unpaved road length <50 m	► 20 – 50 HDV (>3.5 t) outward movements in any one day ► Moderately dusty surface material (e.g. high clay content) ► Unpaved road length 50 – 100 m	► >50 HDV (>3.5 t) outward movements in any one day ► Potentially dusty surface material (e.g. high clay content) ► Unpaved road length >100 m

The sensitivity of the area must then be assessed as outlined below. Both receptor sensitivity and proximity to proposed works areas are taken into consideration. For the purposes of this assessment, high sensitivity receptors are regarded as residential properties where people are likely to spend the majority of their time. Commercial properties and places of work are regarded as medium sensitivity while low sensitivity receptors are places where people are present for short periods or do not expect a high level of amenity. Table 8.5 outlines the criteria for determining the sensitivity of the area to dust soiling, dust-related human health effects and ecological impacts as per the IAQM guidance (IAQM, 2024).

Table 8.5: Criteria for Determining the Sensitivity of the Area

Sensitivity of the Area to Dust Soiling Effects on People and Property					
Receptor Sensitivity	**Number of Receptors**	**Distance From Source (m)**			
		<20	**<50**	**<100**	**<250**
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

Sensitivity of the Area to Human Health Impacts						
Receptor Sensitivity	**Annual Mean PM_{10} Concentration**	**Number of Receptors**	**Distance from Source (m)**			
			<20	**<50**	**<100**	**<250**
High	< 24 µg/m^3	>100	Medium	Low	Low	Low
		10 - 100	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low
Medium	< 24 µg/m^3	>10	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low
Low	< 24 µg/m^3	>1	Low	Low	Low	Low

Sensitivity of the Area to Ecological Impacts		
Receptor Sensitivity	**Distance from Source (m)**	
	<20	**<50**
High	High	Medium
Medium	Medium	Low
Low	Low	Low

Once the dust emission magnitude and sensitivity of the area have been determined the next step, according to the IAQM guidance (IAQM, 2024), is to establish the level of risk by combining the magnitude with the overall sensitivity of the area to dust soiling, human health and ecological effects. The level of risk associated with each activity is determined using the criteria in Table 8.6.

Table 8.6: IAQM Criteria to Determine Risk of Dust Impacts

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
Demolition			
High	High risk	Medium risk	Medium risk
Medium	High risk	Medium risk	Low risk
Low	Medium risk	Low risk	Negligible
Earthworks			
High	High risk	Medium risk	Low risk
Medium	Medium risk	Medium risk	Low risk
Low	Low risk	Low risk	Negligible
Construction			
High	High risk	Medium risk	Low risk
Medium	Medium risk	Medium risk	Low risk
Low	Low risk	Low risk	Negligible
Trackout			
High	High risk	Medium risk	Low risk
Medium	Medium risk	Medium risk	Low risk
Low	Low risk	Low risk	Negligible

8.2.3.2 Traffic Assessment

Construction phase traffic also has the potential to impact air quality. The TII guidance *Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106* (TII, 2025), states that road links meeting one or more of the following criteria can be defined as being '*affected*' by a Proposed Development and should be included in the local air quality assessment. While the guidance is specific to infrastructure projects, the approach can be applied to any development that causes a change in traffic.

- Annual average daily traffic (AADT) changes by 1,000 or more;
- Heavy duty vehicle (HDV) AADT changes by 200 or more;
- Daily average speed change by 10 kph or more;
- Peak hour speed change by 20 kph or more;
- A change in road alignment by 5m or greater.

CS Consulting have prepared a Traffic and Transport Impact Assessment for the proposed development enclosed separately and have prepared Chapter 12 Material Assets (Traffic and Transportation) of this EIAR. As per Chapter 12, it has been determined by CS Consulting that the construction stage traffic will not increase by 1,000 AADT, or 200 HDV AADT, or that the development will not result in speed changes or changes in road alignment. Therefore, the traffic does not meet the above scoping criteria. A detailed air quality assessment of construction stage traffic emissions has been scoped out from any further assessment as there is no potential for significant impacts to air quality with respect with human or ecological receptors.

8.2.4 Operational Phase

8.2.4.1 Operational Phase Traffic Assessment

Operational phase traffic has the potential to impact local air quality as a result of increased vehicle movements associated with the Proposed Development. The TII scoping criteria detailed in Section 8.2.3.2

were used to determine if any road links are affected by the Proposed Development and require inclusion in a detailed air dispersion modelling assessment. CS Consulting has prepared a Traffic and Transport Impact Assessment for the Proposed Development enclosed separately and have prepared Chapter 12 Material Assets (Traffic and Transportation). The Proposed Development will result in a greater than 1000 AADT increase on a single road link in the vicinity of the Proposed Development site. As a result, an assessment of traffic related emissions was conducted. Additionally, traffic associated with other cumulative developments in the vicinity of the Proposed Development was included in the figures supplied to ensure a full cumulative assessment was conducted. See Traffic and Transport Assessment and Chapter 12 Material Assets (Traffic and Transportation) for further details.

The impact of traffic emissions on air quality is assessed for human sensitive receptors within 200 m of impacted roads as per the TII PE-ENV-01106 guidance (TII, 2025). These are discussed in further detail within Section 8.3.3 and shown graphically in Figure 8.3.

The TII guidance (2022) states that modelling should be conducted for NO_2, PM_{10} and $PM_{2.5}$ for the Base, Opening and Design Years for both the Do Nothing, i.e. assuming the Proposed Development is not in place, and Do Something (with the Proposed Development in place) scenarios. Modelling of operational NO_2, PM_{10} and $PM_{2.5}$ concentrations has been conducted for the Do Nothing and Do Something scenarios using the TII Road Emissions Model (REM) online calculator tool (TII, 2025).

The following inputs are required for the REM tool: receptor locations, light duty vehicle (LDV) annual average daily traffic movements (AADT), heavy duty vehicles (HDV) AADT (HDV AADT), annual average traffic speeds, road link lengths, road type, project county location and pollutant background concentrations. The Default fleet mix option was selected along with the Intermediate Case fleet data for cars, ICE Sales Ban for LGVs and EU target projections for HGVs, as per TII Guidance (TII 2025). The Intermediate Case assumes a linear interpolation between the Business-as-Usual case – where current trends in vehicle ownership continue and the Climate Action Plan (CAP) case – where adoption of low emission light duty vehicles occurs. The ICE Sales Ban 2035 option for LGVs presents a sales ban on new combustion engine vehicles to be implemented by 2035. The EU Targets projections for HGVs represents interim targets for emissions from sales of new HGVs. The TII REM uses county-based Irish fleet composition for different road types, for different European emission standards from pre-Euro to Euro 6/VI with scaling factors to reflect improvements in fuel quality, retrofitting, and technology conversions. The TII REM also includes emission factors for PM_{10} emissions associated with brake and tyre wear (TII, 2025).

Using this input data the model predicts the road traffic contribution to ambient ground level concentrations at the identified sensitive receptors using generic meteorological data. The predicted road contributions are then added to the existing background concentrations to give the predicted ambient concentrations. The ambient concentrations are then compared with the relevant ambient air quality standards to assess the compliance of the Proposed Development with these ambient air quality standards.

Proposed receptors, representative of worst-case sensitive receptors introduced with the development, were also included in the assessment. However, for these receptors no impacts can be described, as the receptors do not exist in a DN scenario. For the proposed receptors, only predicted concentrations for the DS scenario are reported and compared with the relevant limit values.

8.2.4.2 Traffic Data used in Modelling Assessment

Traffic flow information is detailed in Table 8.7 as obtained from CS Consulting for the purposes of this assessment. Data for the Do Nothing and Do Something scenarios for the Opening Year 2032 and Design Year 2047 were provided. The traffic data included traffic associated with the development site and other cumulative sites as relevant (see Chapter 12 Material Assets (Traffic and Transportation) for further details).

The modelling assessment has been undertaken for road links that were within 200 m of receptors. Background concentrations have been included as per Section 8.3.2 of this chapter based on available EPA background monitoring data (EPA, 2025).

Table 8.7: Traffic Data used in Operational Phase Air Quality Assessment

Road Name	Speed (kph)	Base Year	Opening Year		Design Year	
			Do Nothing	Do Something	Do Nothing	Do Something
		LDV AADT (HDV AADT)	LDV AADT (HDV AADT)	LDV AADT (HDV AADT)	LDV AADT (HDV AADT)	LDV AADT (HDV AADT)
Clarion Quay	30	1128 (42)	1281 (53)	1300 (59)	1384 (66)	1403 (72)
Mayor Street Lower	30	1606 (60)	1823 (76)	1823 (76)	1972 (95)	1972 (95)
Mayor Street Lower	30	2011 (84)	2285 (106)	2304 (112)	2473 (133)	2492 (139)
Mayor Street Lower	30	2133 (82)	2424 (104)	2443 (110)	2618 (129)	2637 (135)
Commons Street	30	4418 (307)	5033 (386)	5043 (389)	5474 (482)	5484 (485)
Commons Street	30	4747 (313)	5407 (394)	5417 (397)	5876 (492)	5886 (495)
Guild Street	50	9602 (259)	10888 (326)	10900 (330)	11752 (408)	11764 (412)
Commons Street	30	4275 (289)	4871 (364)	4882 (367)	5293 (454)	5304 (457)
George's Dock	30	2020 (71)	2292 (89)	2292 (89)	2478 (113)	2478 (113)
North Wall Quay	30	13879 (2052)	15955 (2584)	15961 (2585)	17581 (3221)	17587 (3222)

8.2.5 Forecasting Methods and Difficulties Encountered

There were no forecasting difficulties encountered.

8.3 Receiving Environment

8.3.1 Meteorological Data

A key factor in assessing temporal and spatial variations in air quality are the prevailing meteorological conditions. Depending on wind speed and direction, individual receptors may experience very significant variations in pollutant levels under the same source strength (i.e. traffic levels) (WHO, 2006). Wind is of key importance in dispersing air pollutants and for ground level sources, such as traffic emissions, pollutant concentrations are generally inversely related to wind speed. Thus, concentrations of pollutants derived from traffic sources will generally be greatest under very calm conditions and low wind speeds when the movement of air is restricted. In relation to PM_{10}, the situation is more complex due to the range of sources of this pollutant. Smaller particles (less than $PM_{2.5}$) from traffic sources will be dispersed more rapidly at higher wind speeds. However, fugitive emissions of coarse particles ($PM_{2.5}$ - PM_{10}) will actually increase at higher wind speeds. Thus, measured levels of PM_{10} will be a non-linear function of wind speed.

The nearest representative weather station collating detailed weather records is Dublin Airport meteorological station, which is located approximately 8.8 km north of the Proposed Development at the closest point. For data collated during five representative years (2020 – 2024), the predominant wind direction is westerly to south-westerly (Met Éireann, 2025).

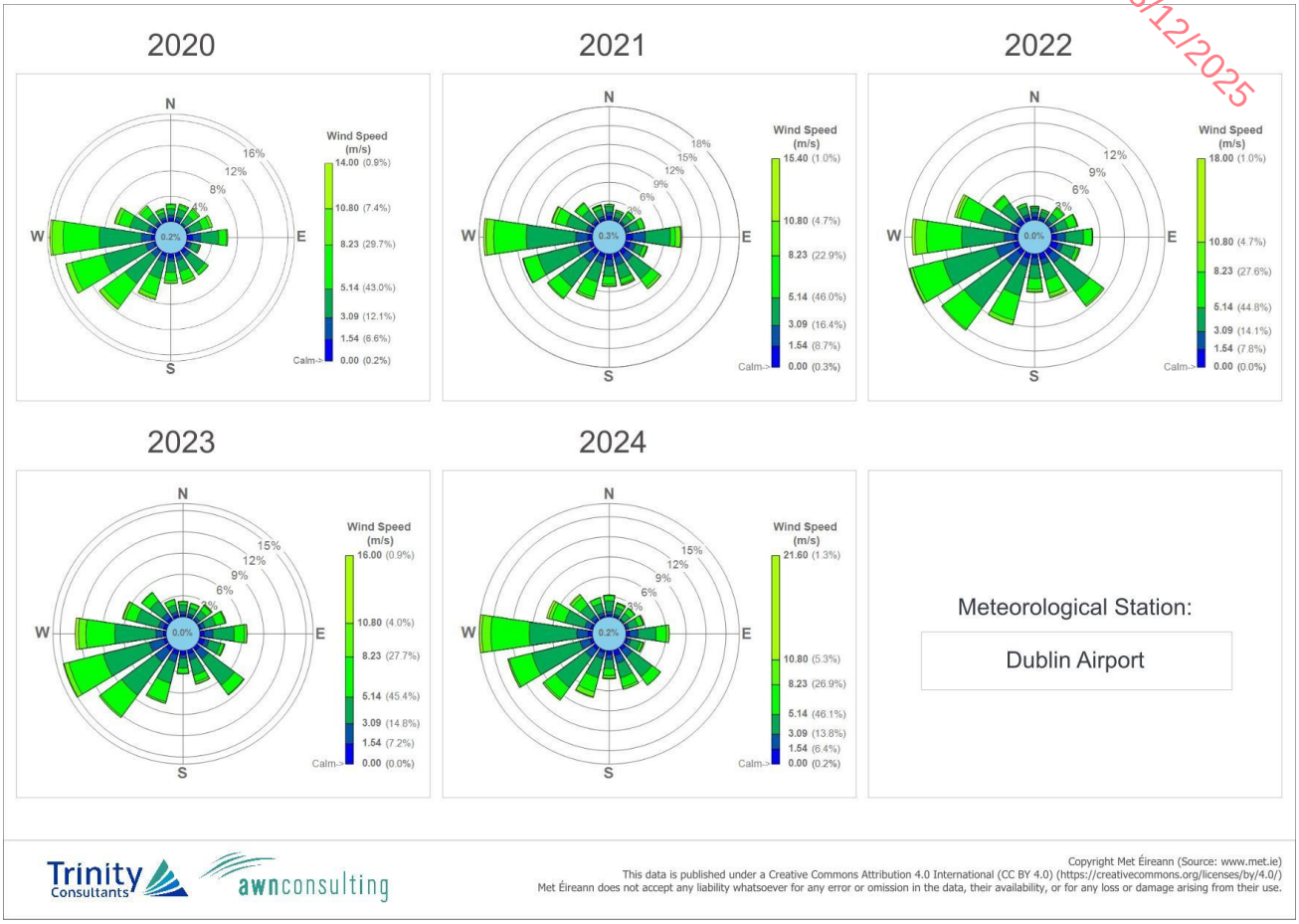

Figure 8.1: Wind Roses for Dublin Airport Meteorological Station

8.3.2 Baseline Air Quality

Air quality monitoring programs have been undertaken in recent years by the EPA. The most recent annual report on air quality in Ireland is *"Air Quality In Ireland 2024"* (EPA, 2025). The EPA website details the range and scope of monitoring undertaken throughout Ireland and provides both monitoring data and the results of previous air quality assessments (EPA, 2025).

As part of the implementation of the Air Quality Standards Regulations 2022 (S.I. No. 739 of 2022) four air quality zones have been defined in Ireland for air quality management and assessment purposes (EPA, 2025). Dublin is defined as Zone A and Cork as Zone B. Zone C is composed of 23 towns with a population of greater than 15,000. The remainder of the country, which represents rural Ireland but also includes all towns with a population of less than 15,000, is defined as Zone D.

In terms of air monitoring and assessment, the Proposed Development site is within Zone A (EPA, 2025). The long-term monitoring data has been used to determine background concentrations for the key pollutants in the region of the Proposed Development. The background concentration accounts for all non-traffic derived emissions (e.g. natural sources, industry, home heating etc.).

Long-term NO_2 monitoring was carried out at the Zone A urban background locations of Rathmines and Winetavern St. for the period 2020 – 2024 (EPA, 2025). Long term average concentrations are significantly below the annual average limit of 40 µg/m^3. Average results range from 13 – 19 µg/m^3 for the relevant background locations (Table 8.8). The 5-year average NO_2 concentration for all representative sites suggests an average concentration of 16 µg/m^3 as a background concentration. Based on the above information, a conservative estimate of the current background NO_2 concentration for the region of the Proposed Development is 16 µg/m^3.

Table 8.8: Trends In Zone A Air Quality - Nitrogen Dioxide (NO_2)

Station	Averaging Period	Year				
		2020	2021	2022	2023	2024
Rathmines	Annual Mean NO_2 (µg/m^3)	13	14	14	15	13
	1-hr Mean NO_2 Values >200 µg/m^3	0	0	0	0	0
Winetavern St.	Annual Mean NO_2 (µg/m^3)	15	18	19	19	19
	1-hr Mean NO_2 Values >200 µg/m^3	0	0	0	0	1

Continuous PM_{10} monitoring was carried out at the representative Zone A locations from 2020 - 2024: Rathmines and Winetavern St. (Table 8.9). Levels range from 11 - 15 µg/m^3 over the five-year period with at most 4 exceedances (in Rathmines) of the 24-hour limit value of 50 µg/m^3 (35 exceedances are permitted per year) (EPA, 2025). The 5-year average PM_{10} concentration at the sites suggests an average concentration of no more than 14 µg/m^3 (Table 8.9). Based on the EPA data, a conservative estimate of the current background PM_{10} concentration in the region of the Proposed Development is 14 µg/m^3.

Table 8.9: Trends in Zone A Quality - PM_{10}

Station	Averaging Period	Year				
		2020	2021	2022	2023	2024
Rathmines	Annual Mean PM_{10} (µg/m^3)	11	12	15	15	13
	24-hr Mean > 50 µg/m^3 (days)	2	0	4	2	2
Winetavern St.	Annual Mean PM_{10} (µg/m^3)	13	12	14	13	12
	24-hr Mean > 50 µg/m^3 (days)	0	0	1	0	0

Continuous $PM_{2.5}$ monitoring was carried out at the representative Zone A urban background location from 2020 - 2024: Rathmines (Table 8.10) Levels range from 7 - 9 µg/m^3 over the five-year period (EPA, 2025). Based on the EPA data, a conservative estimate of the current background $PM_{2.5}$ concentration in the region of the Proposed Development is 8 µg/m^3.

Table 8.10: Trends in Zone A Quality - $PM_{2.5}$

Station	Averaging Period	Year				
		2020	2021	2022	2023	2024
Rathmines	Annual Mean $PM_{2.5}$ (µg/m^3)	8	9	8	7	8

Based on the above information the air quality in the area is generally good, with concentrations of the key pollutants generally well below the relevant limit values.

8.3.3 Sensitivity of the Receiving Environment to Dust

8.3.3.1 Construction Phase

The impact to air quality from construction phase activities is assessed at sensitive receptors within 250 m of the development boundary. As mitigation will be applied across the whole site, all of the chainages have been assessed together.

In terms of receptor sensitivity to dust soiling, there are between 10 and 100 sensitive receptors within 20 m of the proposed works area and a further >100 sensitive receptors within 250 m of the Proposed Development (Figure 8.2). Based on the IAQM criteria outlined in Table 8.5, the sensitivity of the area to dust soiling is considered high.

In addition to sensitivity to dust soiling, the IAQM guidelines also outline the assessment criteria for determining the sensitivity of the area to human health impacts. The criteria take into consideration the current annual mean PM_{10} concentration, receptor sensitivity based on type (residential receptors are classified as high sensitivity) and the number of receptors affected within various distance bands from the construction works. A conservative estimate of the current annual mean PM_{10} concentration in the vicinity of the Proposed Development is 14 µg/m^3 and as discussed above, there are between 10 and 100 sensitive receptors within 20 m of the site boundary. Based on the IAQM criteria outlined in Table 8.5, the worst-case sensitivity of the area to human health is considered low.

The IAQM guidelines also outline the assessment criteria for determining the sensitivity of the area to dust-related ecological impacts. Dust from construction sites deposited on vegetation may create ecological stress within the local plant community. The guidance states that dust impacts to vegetation can occur up to 50 m from the site and 50 m from site access roads, up to 250 m for the site entrance. There is no ecological site located within this distance. Therefore, ecological impacts will not be considered further in the dust assessment.

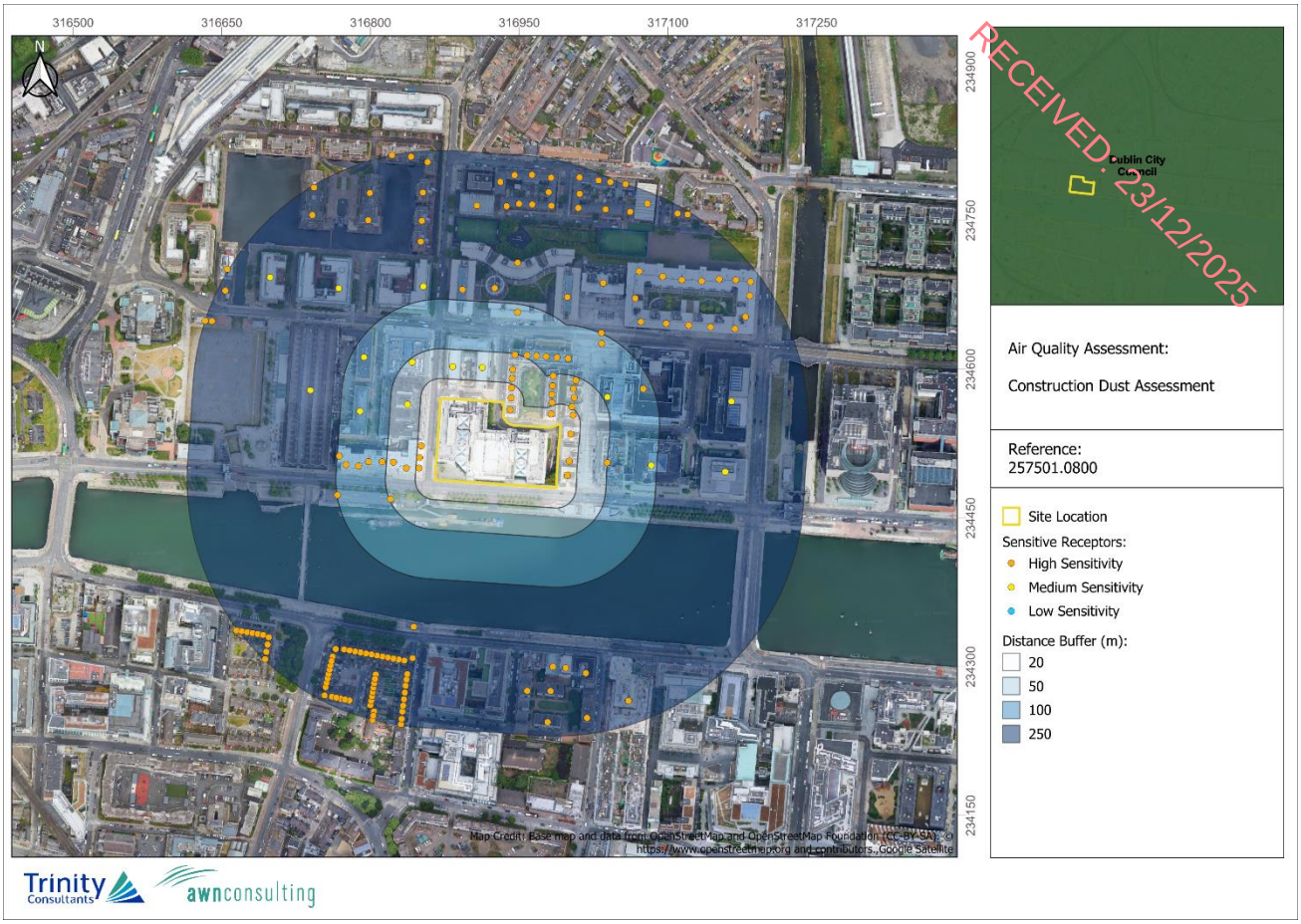

Figure 8.2: Construction Dust Sensitive Receptors within 250 m of Site

8.3.3.2 Operational Phase

The impact to air quality due to changes in traffic is assessed at sensitive receptors in the vicinity of affected roads. The TII guidance (2025) states that a proportionate number of representative receptors, which are located in areas which will experience the highest concentrations or greatest improvements because of the proposed development, are to be included in the modelling. The TII criteria state that receptors within 200 m of impacted road links should be assessed; roads which are greater than 200 m from receptors will not impact pollutant concentrations at that receptor (TII, 2025). The TII guidance defines sensitive receptor locations for the purposes of modelling annual mean pollutant concentrations as: residential housing, schools, hospitals, care homes and short term-accommodation such as hotels, i.e. locations where members of the public are likely to be regularly present for 24 hours. A total of 12 no. high sensitivity residential receptors (R1 to R12) within 200 m of affected road links were included in the modelling assessment associated with the impacted road links (Link 1 to Link 10) (see Figure 8.3).

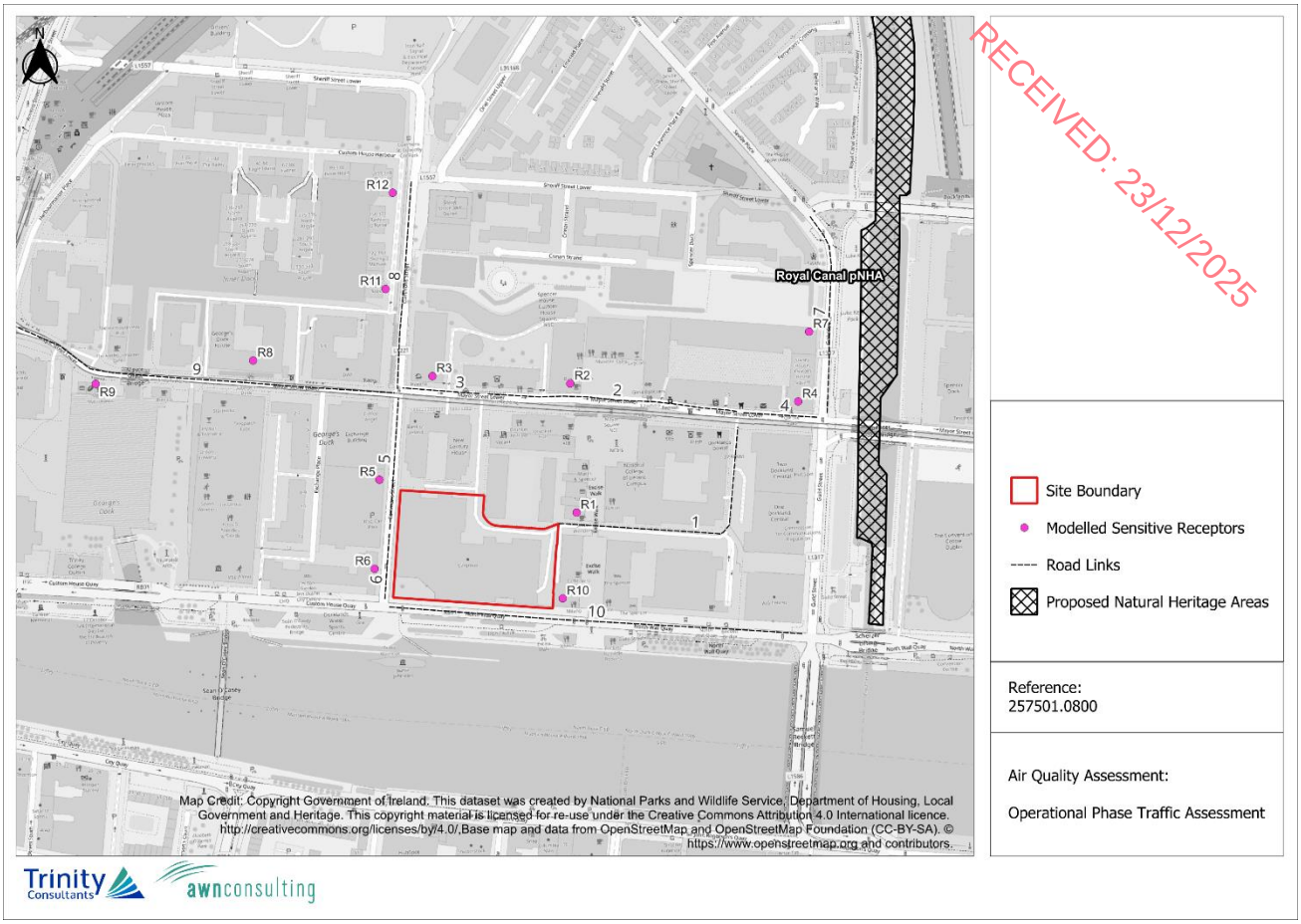

Figure 8.3: Location of Sensitive Receptors used in Operational Phase Air Quality Assessment

8.4 Characteristics of the Proposed Development

The development consists of the demolition of part of the existing office building and the construction of a new office development comprising between 7 and 12 no. levels. For a more comprehensive understanding of the Proposed Development, please refer to Chapter 2 (Description of the Proposed Development) of the EIA Report. Chapter 2 provides a detailed overview of the lifecycle of the project, including reference to the architectural and civil engineering, drawings, plans, reports, and other relevant document in order to define the Proposed Development.

8.5 Potential Impacts of the Proposed Development

8.5.1 Construction Phase

8.5.1.1 Construction Dust Assessment

The greatest potential impact on air quality during the construction phase of the Proposed Development is from construction dust emissions and the potential for nuisance dust. While construction dust tends to be deposited within 250 m of a construction site, the majority of the deposition occurs within the first 50 m (IAQM, 2024). The extent of any dust generation depends on the nature of the dust (soils, peat, sands, gravels, silts etc.) and the nature of the construction activity. In addition, the potential for dust dispersion and deposition depends on local meteorological factors such as rainfall, wind speed and wind direction. A review of Dublin Airport meteorological data indicates that the prevailing wind direction is westerly to south-westerly and wind speeds are generally moderate in nature (Section 8.3.1). A review of historical

30-year average data for Dublin Airport indicates that on average 200 days per year have rainfall over 0.2 mm (Met Éireann, 2025). Therefore, it can be determined that over 54% of the time dust generation will be negligible due to natural meteorological conditions.

To determine the level of dust mitigation required during the proposed works, the potential dust emission magnitude for each dust generating activity needs to be taken into account, in conjunction with the sensitivity of the area (Section 8.3.3). The major dust generating activities are divided into four types within the IAQM (IAQM, 2024) guidance to reflect their different potential impacts. These are: demolition, earthworks, construction and trackout (movement of heavy vehicles).

8.5.1.2 Determining the Potential Dust Emission Magnitude

The magnitude of the works under each category can be classified as either small, medium or large depending on the scale of the works involved. The magnitude of each activity (Table 8.11) has been determined below for the Proposed Development using the criteria in Table 8.4.

Table 8.11: Potential Dust Emission Magnitude

Activity	Dust Emission Magnitude	Justification
Demolition	Medium	Total building volume to be demolished will be between 12,000 m^3 and 75,000 m^3
Earthworks	Small	Total site area is less than 18,000 m^2
Construction	Large	Total building volume will be greater than 75,000 m^3
Trackout	Medium	Between 20 and 50 outward HDV movements per day

8.5.1.3 Determining the Sensitivity of the Area

As determined in Section 8.3.3, there are between 10 and 100 high sensitivity receptors within 20 m of the proposed works area and >100 high sensitivity receptors within 250 m. There are no ecological receptors present within 50 m of the Site boundary. The sensitivity of the area to dust soiling and human health impacts from dust are shown in Table 8.12.

Table 8.12: Sensitivity of the Area

Potential Impact	Sensitivity of the Surrounding Area			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	High	High	High	Low
Human Health	Low	Low	Low	Low
Ecology	N/A	N/A	N/A	N/A

8.5.1.4 Determining the Risk of Dust Impacts

As detailed in Table 8.6, The predicted dust emission magnitude has been combined with the defined sensitivity of the area to determine the risk of impacts during the construction phase, prior to mitigation.

Table 8.13 below provides a summary of the risk of dust impacts for the Proposed Development.

There is at most a high risk of dust soiling impacts and a low risk of dust-related human health impacts associated with the proposed works. Without mitigation in place, construction dust will have a ***temporary, negative*** and ***slight*** impact on air quality, which may potentially be significant. As a result, best practice

dust mitigation measures will be implemented to ensure there are no significant impacts at nearby sensitive receptors (see Section 8.3.3).

Table 8.13: Risk of Dust Impacts used to Define Site-Specific Mitigation

Potential Impact	Risk of Dust Impacts			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Medium Risk	Low Risk	High Risk	Low Risk
Human Health	Low Risk	Negligible Risk	Low Risk	Low Risk

8.5.1.5 Traffic

There is also the potential for traffic emissions to impact air quality in the short term over the construction phase. Particularly due to the increase in HGVs accessing the site. The construction stage traffic has been reviewed and a detailed air quality assessment has been scoped out as none of the road links impacted by the Proposed Development satisfy the TII assessment criteria in Section 8.2.3.2.

Following the completion of the initial site clearance works, the generation of HGV movements during the build period will be evenly spread throughout the day and, as such, will not impact significantly during the peak traffic periods.

It can therefore be determined that the construction stage traffic will have a ***short-term, direct, localised, negative*** and ***not significant*** impact on air quality.

8.5.2 Operational Phase

The potential impact of the proposed development has been assessed by modelling emissions from the traffic generated due to the development. The traffic data has included specific cumulative developments within the area to provide for a worst-case assessment and to assess potential cumulative impacts (see Chapter 12 Material Assets (Traffic and Transportation), prepared by CS Consulting, for further details).

The traffic data includes the Do Nothing (DN) scenario and Do Something (DS) scenario. The impact of NO_2, PM_{10} and $PM_{2.5}$ emissions for the Opening and Design Years was predicted at the nearest sensitive receptors to the impacted road links. This assessment allows the significance of the development, with respect to both relative and absolute impacts, to be determined.

The TII guidance PE-ENV-01106 (TII, 2025) details a methodology for determining air quality impact significance criteria for TII road schemes and infrastructure projects. However, this significance criteria can be applied to any development that causes a change in traffic. The degree of impact is determined based on both the absolute and relative impact of the proposed development. Results are compared against the 'Do Nothing' scenario, which assumes that the proposed development is not in place in future years, to determine the degree of impact.

Traffic related air emissions have the potential to impact air quality which can affect human health. The following details the results of the air dispersion modelling assessment of traffic emissions to determine the impact to human health. The predicted pollutant concentrations have been compared against the ambient air quality limit values set out in Table 8.1. The limit values set out in Table 2 of Annex I in Directive (EU) 2008/50/EC are applicable to the Opening Year 2032 and limit values set out in Table 1 of Annex I in Directive (EU) 2024/2881 are applicable to the Design Year 2047 as the assessment year is post-2030.

8.5.2.1 NO_2

The results of the NO_2 modelling are shown in Table 8.4. In the Opening Year 2032, predicted annual mean NO_2 concentrations at the modelled receptors are in compliance with the annual mean limit value of 20 µg/m^3, reaching at most 86% of the limit. In addition, the TII guidance (2025) states that the hourly limit value for NO_2 of 200 µg/m^3 is unlikely to be exceeded at roadside locations unless the annual mean is above 60 µg/m^3. As predicted NO_2 concentrations are significantly below 60 µg/m^3, it can be concluded that the short-term NO_2 limit value will be complied with at all receptor locations. Some increases in NO_2 concentrations are predicted at the worst-case receptors assessed in the Opening Year when compared with the Do-Nothing scenario (see Table 8.14). The receptors in the area will experience increases <2% of the AQLV, which are all considered 'neutral' as per the TII criteria in Table 8.3.

In the Design Year 2042, predicted annual mean NO_2 concentrations are in compliance of the limit value of 20 µg/m^3 at all modelled receptors, reaching at most 81% of the limit. The proposed development will result in a 'neutral' increase in NO_2 concentrations according to the TII significance criteria in Table 8.4, with concentrations increasing by 0.01 µg/m^3 at receptor R7 as a result of the proposed development, which is an increase of 0.05% when compared with the applicable annual mean limit value for NO_2. Therefore, the impact of the proposed development on NO_2 concentrations is neutral.

Table 8.14 Predicted Annual Mean NO_2 Concentrations (µg/m^3)

Impact Opening Year							
Receptor	**DN**	**% of AQLV**	**DS**	**% of AQLV**	**DS-DN**	**% Change of AQLV**	**Description**
R1	16.1	80%	16.1	80%	0.01	0.05%	Neutral
R2	16.1	81%	16.1	81%	0.00	0.00%	Neutral
R3	16.2	81%	16.2	81%	0.00	0.00%	Neutral
R4	16.2	81%	16.2	81%	0.00	0.00%	Neutral
R5	16.4	82%	16.4	82%	0.00	0.00%	Neutral
R6	16.4	82%	16.4	82%	0.00	0.00%	Neutral
R7	16.5	83%	16.5	83%	0.00	0.00%	Neutral
R8	16.1	81%	16.1	81%	0.00	0.00%	Neutral
R9	16.1	81%	16.1	81%	0.00	0.00%	Neutral
R10	17.2	86%	17.2	86%	0.00	0.00%	Neutral
R11	16.3	81%	16.3	81%	0.00	0.00%	Neutral
R12	16.3	82%	16.3	82%	0.00	0.00%	Neutral
Impact Design Year							
Receptor	**DN**	**% of AQLV**	**DS**	**% of AQLV**	**DS-DN**	**% Change of AQLV**	**Description**
R1	16.0	80%	16.0	80%	0.00	0.00%	Neutral
R2	16.0	80%	16.0	80%	0.00	0.00%	Neutral
R3	16.0	80%	16.0	80%	0.00	0.00%	Neutral
R4	16.0	80%	16.0	80%	0.00	0.00%	Neutral
R5	16.1	80%	16.1	80%	0.00	0.00%	Neutral
R6	16.1	80%	16.1	80%	0.00	0.00%	Neutral
R7	16.1	80%	16.1	81%	0.01	0.05%	Neutral
R8	16.0	80%	16.0	80%	0.00	0.00%	Neutral
R9	16.0	80%	16.0	80%	0.00	0.00%	Neutral

Impact Opening Year							
Receptor	**DN**	**% of AQLV**	**DS**	**% of AQLV**	**DS-DN**	**% Change of AQLV**	**Description**
R10	16.2	81%	16.2	81%	0.00	0.00%	Neutral
R11	16.1	80%	16.1	80%	0.00	0.00%	Neutral
R12	16.1	80%	16.1	80%	0.00	0.00%	Neutral

8.5.2.2 PM_{10}

The results of the PM_{10} modelling can be seen in Table 8.15 for the Opening Year 2032 and Design Year 2047.

In the Opening Year 2027, annual mean PM_{10} concentrations at the modelled receptors are in compliance with the annual mean limit value of 20 µg/m^3 reaching at most 92% of the limit. In the Design Year 2047 annual mean PM_{10} concentrations are also in compliance with the annual mean limit value of 20 µg/m^3 reaching at most 93% of the limit. In addition, the proposed development will not result in any days of exceedance of the daily PM_{10} limit value (Table 8.1) in both the opening and design years.

The changes in PM_{10} concentrations as a result of the proposed development can be assessed relative to the DN levels. In the Opening Year 2032 annual PM_{10} concentrations will increase by at most 0.01 µg/m^3 at receptors R1, R3, R4 and R7this is a 0.05% increase when compared with the annual mean limit value of 20 µg/m^3. This is considered a 'neutral' impact as per the TII criteria in Table 8.3. All predicted increases at the modelled receptors are considered 'neutral' as per the TII criteria in Table 8.3.

In the Design Year 2047 the proposed development will result in a maximum increase of 0.01 µg/m^3 at receptor R1, R3, R4, R5 & R7 which is a 0.05% increase when compared with the annual mean limit of 20 µg/m^3. The changes in concentrations in the Design Year are considered 'neutral' based on the TII criteria in Table 8.3.

Table 8.15: Predicted Annual Mean PM_{10} Concentrations (µg/m^3)

Impact Opening Year							
Receptor	**DN**	**% of AQLV**	**DS**	**% of AQLV**	**DS-DN**	**% Change of AQLV**	**Description**
R1	14.3	72%	14.3	72%	0.01	0.05%	Neutral
R2	14.5	72%	14.5	72%	0.00	0.00%	Neutral
R3	14.6	73%	14.6	73%	0.01	0.05%	Neutral
R4	14.6	73%	14.6	73%	0.01	0.05%	Neutral
R5	15.4	77%	15.4	77%	0.00	0.00%	Neutral
R6	15.6	78%	15.6	78%	0.00	0.00%	Neutral
R7	16.4	82%	16.4	82%	0.01	0.05%	Neutral
R8	14.5	72%	14.5	72%	0.00	0.00%	Neutral
R9	14.6	73%	14.6	73%	0.00	0.00%	Neutral
R10	18.3	92%	18.3	92%	0.00	0.00%	Neutral
R11	15.1	75%	15.1	75%	0.00	0.00%	Neutral
R12	15.2	76%	15.2	76%	0.00	0.00%	Neutral
Impact Design Year							

Receptor	DN	% of AQLV	DS	% of AQLV	DS-DN	% Change of AQLV	Description
R1	14.4	72%	14.4	72%	0.01	0.05%	Neutral
R2	14.5	73%	14.5	73%	0.00	0.00%	Neutral
R3	14.6	73%	14.6	73%	0.01	0.05%	Neutral
R4	14.7	73%	14.7	73%	0.01	0.05%	Neutral
R5	15.5	78%	15.5	78%	0.01	0.05%	Neutral
R6	15.7	79%	15.7	79%	0.00	0.00%	Neutral
R7	16.5	83%	16.5	83%	0.01	0.05%	Neutral
R8	14.5	72%	14.5	72%	0.00	0.00%	Neutral
R9	14.6	73%	14.6	73%	0.00	0.00%	Neutral
R10	18.5	93%	18.5	93%	0.00	0.00%	Neutral
R11	15.2	76%	15.2	76%	0.00	0.00%	Neutral
R12	15.3	77%	15.3	77%	0.00	0.00%	Neutral

8.5.2.3 $PM_{2.5}$

In relation to changes in $PM_{2.5}$ concentrations as a result of the proposed development, the results of the assessment can be seen Table 8.16 for the modelled Opening Year 2032 and Design Year 2047.

In the Opening Year 2027, predicted annual mean concentrations of $PM_{2.5}$ at the modelled receptors are mostly in compliance with the annual mean limit value of 10 µg/m^3. R10 exceeds the limit in both the opening and design year, reaching 103% of the limit. However, at this receptor there is no increase to $PM_{2.5}$ concentrations as a result of the proposed development in either year. There is predicted to be an increase in $PM_{2.5}$ concentrations at the worst-case receptor assessed in the Opening Year when compared with the Do-Nothing scenario. Concentrations are predicted to increase by 0.01 µg/m^3 at receptor R1 & R3. When comparing the change in concentration with the air quality limit value, it results in a maximum change of 0.01% at receptor R1 & R3. This is considered a 'neutral' impact as per the TII criteria in Table 8.3. The other receptor in the area will experience similar or lesser impacts and all increases at other modelled receptors are considered 'neutral' as per the TII criteria in Table 8.3.

In the Design Year 2047, predicted annual mean $PM_{2.5}$ concentrations only one of the modelled receptors are not in compliance with the limit value of 10 µg/m^3. However, concentrations at receptor R10 reach at most 104% of the annual mean limit value. The proposed development will result in 'neutral' increase in $PM_{2.5}$ concentrations according to the TII significance criteria in Table 8.3, with concentrations increasing by 0.01 µg/m^3 at receptor R3 & R4 as a result of the proposed development, which is an increase of 0.01% when compared with the annual mean limit value of 10 µg/m^3 for $PM_{2.5}$.

Table 8.16 Predicted Annual Mean $PM_{2.5}$ Concentrations (µg/m^3)

Impact Opening Year							
Receptor	DN	% of AQLV	DS	% of AQLV	DS-DN	% Change of AQLV	Description
R1	8.2	82%	8.2	82%	0.01	0.10%	Neutral
R2	8.3	83%	8.3	83%	0.00	0.00%	Neutral
R3	8.3	83%	8.3	83%	0.01	0.10%	Neutral
R4	8.3	83%	8.3	83%	0.00	0.00%	Neutral

Impact Opening Year							
Receptor	**DN**	**% of AQLV**	**DS**	**% of AQLV**	**DS-DN**	**% Change of AQLV**	**Description**
R5	8.7	87%	8.7	87%	0.00	0.00%	Neutral
R6	8.8	88%	8.8	88%	0.00	0.00%	Neutral
R7	9.3	93%	9.3	93%	0.00	0.00%	Neutral
R8	8.2	82%	8.2	82%	0.00	0.00%	Neutral
R9	8.3	83%	8.3	83%	0.00	0.00%	Neutral
R10	10.3	103%	10.3	103%	0.00	0.00%	Neutral
R11	8.6	86%	8.6	86%	0.00	0.00%	Neutral
R12	8.7	87%	8.7	87%	0.00	0.00%	Neutral
Impact Design Year							
Receptor	**DN**	**% of AQLV**	**DS**	**% of AQLV**	**DS-DN**	**% Change of AQLV**	**Description**
R1	8.2	82%	8.2	82%	0.00	0.00%	Neutral
R2	8.3	83%	8.3	83%	0.00	0.00%	Neutral
R3	8.3	83%	8.3	83%	0.01	0.10%	Neutral
R4	8.4	84%	8.4	84%	0.01	0.10%	Neutral
R5	8.8	88%	8.8	88%	0.00	0.00%	Neutral
R6	8.9	89%	8.9	89%	0.00	0.00%	Neutral
R7	9.4	94%	9.4	94%	0.00	0.00%	Neutral
R8	8.3	83%	8.3	83%	0.00	0.00%	Neutral
R9	8.3	83%	8.3	83%	0.00	0.00%	Neutral
R10	10.4	104%	10.4	104%	0.00	0.00%	Neutral
R11	8.6	86%	8.6	86%	0.00	0.00%	Neutral
R12	8.7	87%	8.7	87%	0.00	0.00%	Neutral

8.5.2.4 Significance of Predicted Changes in NO_2, PM_{10} and $PM_{2.5}$ Concentrations

As outlined in 8.2.2.4, the TII guidance (2025) states that the significance of effects should be assessed based on the opening year only. Non-significant effects are '*neutral*' or '*slight*' changes in concentrations while significant effects can be changes in pollutant concentrations that are either 'moderate' or 'substantial'. However, the TII guidance (2022) states that these must be considered in the context of the project and 'moderate' or 'substantial' increases are not necessarily always significant effects.

In relation to NO_2, PM_{10} and $PM_{2.5}$ the predicted changes in concentrations are 'neutral' at the worst-case receptors assessed in the Opening Year. Therefore, according to the TII criteria as outlined in 8.2.2.4, the impact is not significant.

For the purposes of this assessment, it has been assumed that the current estimated background pollutant concentrations are applicable for both the opening and design years, with no decreases in future background concentrations allowed for. There will be some decreases in background concentrations in future years. However, at present there is no guidance-based methodology available for estimating future year background concentrations and therefore, as a conservative approach, the current estimated background concentrations have been applied to future years.

Due to the large uncertainty in future improvements in fleet composition and emissions, such as projected changes to vehicle registration and electric vehicle uptake, the future year emission rates utilised by the TII REM tool do not account for the full implementation of these measures. Predicted design year concentrations are therefore currently overly conservative as future emissions improvements are not fully taken into account, as well as no improvement in background concentrations being assumed.

As a result, the opening year predicted concentrations are the most appropriate for determining the significance of effects as per 8.2.2.4.

It can be concluded that the impact of traffic emissions on air quality and human health during the operational phase is ***long-term, direct, localised, negative*** and ***not significant*** in EIA terms.

The measures set out in the Clean Air Strategy for Ireland (Government of Ireland 2023) aim to work towards solutions to ensure that air pollution concentrations are reduced in order to comply with the future changes in limit values. Ireland will need to continue to implement and develop measures to ensure continuing improvements in air quality in future years in order to meet the objectives of the Clean Air Strategy for Ireland (Government of Ireland, 2023) and to ensure the ambient air quality limit values set out in Directive (EU) 2024/2881 are achieved. The estimated background concentrations used in the assessment are the largest contribution to predicted pollutant concentrations, rather than pollutant contributions associated with the proposed development. Strategies to improve air quality at a national level in future years will contribute to reducing background concentrations and therefore it is envisioned that air quality will improve in the future.

8.6 Mitigation Measures

8.6.1 Construction Phase

Based on the assessment results in Section 8.5.1, mitigation associated with a medium risk of construction dust impacts is required. Mitigation measures for medium risk sites as recommended by IAQM construction dust guidance are detailed in Table 8.17.

Table 8.17: Construction Phase Dust Mitigation Measures

Mitigation Measure
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
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 offsite, and the action taken to resolve the situation in the log book.
Hold regular liaison meetings with other high risk construction sites within 500 m 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 will 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 local authority 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.
Agree dust deposition, dust flux, or real-time PM_{10} continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if it a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction.
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.
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.
Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate)
Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.
Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing)
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.
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
Bonfires and burning of waste materials are legally prohibited.

Measures Specific to Demolition
Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible to provide a screen against dust
Ensure effective water suppression is used during demolition operations. Handheld sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition, high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground.
Avoid explosive blasting, using appropriate manual or mechanical alternatives.
Bag and remove any biological debris or damp down such material before demolition.
Measures Specific to Construction
Avoid scabbling (roughening of concrete surfaces) if possible.
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.
Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.
For smaller supplies of fine powder materials, ensure bags are sealed after use and stored appropriately to prevent dust.
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.
Record all inspections of haul routes and any subsequent action in a site log book.
Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).

8.6.2 Operational Phase

There is no mitigation required for the operational phase of the development as impacts to air quality are predicted to be ***not significant*** (see Section 8.5.2).

8.7 Monitoring or Reinstatement Measures

8.7.1 Construction Phase

Monitoring of construction dust deposition along the site boundary to nearby sensitive receptors during the construction phase of the Proposed Development is recommended to ensure mitigation measures are working satisfactorily. This can be carried out using the Bergerhoff method in accordance with the requirements of the German Standard VDI 2119. The Bergerhoff Gauge consists of a collecting vessel and a stand with a protecting gauge. The collecting vessel is secured to the stand with the opening of the collecting vessel located approximately 2 m above ground level. The TA Luft limit value is 350 mg/m^2/day during the monitoring period of 30 days (+/- 2 days).

8.7.2 Operational Phase

No operational phase monitoring is required.

8.8 Residual Effects of the Proposed Development

8.8.1 Construction Phase

8.8.1.1 Air Quality

Once the dust mitigation measures outlined in Section 8.6.1 are implemented, the impact of the Proposed Development in terms of dust soiling will be **direct, short-term, negative, localised** and **not significant** at nearby receptors.

8.8.1.2 Human Health

Best practice mitigation measures are proposed for the construction phase of the Proposed Development which will focus on the pro-active control of dust and other air pollutants to minimise generation of emissions at source. The mitigation measures that will be put in place during construction of the Proposed Development will ensure that the impact of the development complies with all EU ambient air quality legislative limit values which are based on the protection of human health. Therefore, the impact of construction of the Proposed Development will be **direct, short-term, negative, localised** and **not significant** with respect to human health.

8.8.2 Operational Phase

No significant residual effects are predicted for the operational phase of the Proposed Development.

8.9 Cumulative Impacts of the Proposed Development

8.9.1 Construction Phase

According to the IAQM guidance (2024) should the construction phase of the Proposed Development coincide with the construction phase of any other developments within 500 m then there is the potential for cumulative construction dust related impacts to nearby sensitive receptors. The following developments were identified of sufficient scale to potentially generative cumulative dust impacts with the Proposed Development.

Table 8.18: Summary of Committed Developments with Potential for Cumulative Construction Dust Effects

Planning Reference No.	Description
2749/20	The proposed development comprises of refurbishment of the existing 6 no. storey building to provide for a new façade treatment to all elevations, Reduction of the existing bank branch from 216sqm to 187sqm, Change of use of former bank branch to office use at ground floor level (147 sqm), etc.
4579/22	The development will consist of alterations to the front (east), rear (west) elevations at fourth floor level, fifth floor level and roof level and all ancillary and associated site development works.
4678/23	Additional floor area (8.6sq.m) to existing hotel restaurant and bar area, (b) Alterations to the existing south façade to include new double doors, new canopies and alterations to existing windows, (c) Alterations to existing east façade to include new canopy, etc.

The dust mitigation measures outlined in Section 8.6.1 will be applied during the construction phase which will avoid significant cumulative impacts on air quality. Similar dust mitigation measures are required for other permitted developments as per their respective impact assessments and planning conditions.

With appropriate mitigation measures in place, the predicted cumulative impacts on air quality associated with the construction and decommissioning phases of the proposed project is ***direct, short-term, negative, localised*** and ***not significant***.

No significant cumulative effects on air quality are predicted for the construction or operational phases.

8.9.1.1 Operational Phase

There is the potential for cumulative and also indirect impacts to air quality during the operational phase as a result of traffic associated with other existing and permitted developments within the area. The traffic data provided for the Operational Phase air quality assessment included specific cumulative developments within the area (see Chapter 12 Material Assets (Traffic and Transportation) for further details) as well as the Climate Chapter.

The cumulative operational phase impact is assessed within Section 8.5.2 and was found to have a neutral impact on air quality as per the TII significance criteria (Table 8.3). The cumulative Operational Phase impact is ***long-term, localised, direct, negative*** and ***not significant.***

8.10 Interactions and Interrelationships

8.10.1 Air Quality and Population & Human Health

8.10.1.1 Construction Phase

An adverse air quality impact during the construction phase can cause health and dust nuisance issues. There is a low risk of dust-related human health impacts during the construction phase of the Proposed Development. Best practice mitigation measures will be implemented during the construction phase to ensure that the impact of the Proposed Development complies with all ambient air quality legislative limits. Therefore, the predicted impact is ***direct, short-term, negative, localised*** and ***not significant*** with respect to Population and Human Health during the construction phase.

8.10.1.2 Operational Phase

Vehicles accessing the site will emit pollutants which may impact Air Quality and Human Health. However, the increased number of vehicles associated with the Proposed Development will not cause a significant change in air pollutant emissions in the locality. It has been assessed that emissions will be in compliance with the ambient air quality standards which are set for the protection of human health. Impacts will be ***long-term, localised, direct, negative*** and ***not significant***.

8.10.2 Air Quality and Climate

Air Quality and Climate have interactions as the emissions from the burning of fossil fuels during the construction and operational phases generate 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.

8.10.3 Air Quality and Land & Soils

8.10.3.1 Construction Phase

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.

8.10.3.2 Operational Phase

There are no potentially significant interactions identified between Air Quality, and Land & Soils during the operational phase.

8.10.4 Air Quality and Biodiversity

8.10.4.1 Construction Phase

Dust generation can occur during extended dry weather periods due to construction traffic along haul routes and construction activities such as excavations and infilling works. Dust emissions can coat vegetation leading to a reduction in the photosynthesising ability as well as other effects. There are no designated ecological sites within 250 m of the Proposed Development site area. Significant dust impacts are not predicted beyond this distance. Dust mitigation measures will be implemented on site as set out in Section 8.6.1. With the implementation of these mitigation measures dust emissions will be ***direct, short-term, negative, localised*** and ***not significant*** with respect to biodiversity.

8.10.4.2 Operational Phase

There are no potentially significant interactions identified between Air Quality, and Biodiversity during the operational phase.

8.10.5 Air Quality and Material Assets – Traffic & Transport

8.10.5.1 Construction Phase

Interactions between Air Quality and Traffic can be significant. With increased traffic movements and reduced engine efficiency, i.e. due to congestion, the emissions of vehicles increase. The impacts of the Proposed Development on air quality are assessed by reviewing the change in annual average daily traffic on roads close to the site. In this assessment, the impact of the interactions between Traffic and Air Quality are linked but there is no potential for significant impacts from traffic on air quality. The effects are considered to be ***direct***, ***short-term***, ***neutral***, ***localised*** and ***not significant*** during the construction phase.

8.10.5.2 Operational Phase

As there are very few traffic movements associated with the operational development, the impact of the interactions between Traffic and Air Quality are considered to be ***long-term, direct, negative*** and ***not significant*** during the operational phase.

8.11 References

- BRE (2003) Controlling Particles, Vapours & Noise Pollution from Construction Sites
- Department of Housing, Planning & Local Government (DHPLG) (2018) Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment
- Department of the Environment Heritage and Local Government (DEHLG) (2004) Quarries and Ancillary Activities, Guidelines for Planning Authorities
- Dublin City Council (DCC) (2018) Air Quality Monitoring and Noise Control Unit's Good Practice Guide for Construction and Demolition
- Environmental Protection Agency (2006) Environmental Management Guidelines - Environmental Management in the Extractive Industry (Non-Scheduled Minerals)
- Environmental Protection Agency (2022) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports
- Environmental Protection Agency (2024) Air Quality in Ireland 2022 (& previous annual reports)
- European Commission (2017) Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report
- German VDI (2002) Technical Guidelines on Air Quality Control – TA Luft
- Government of Ireland (2023) Clean Air Strategy for Ireland
- Institute of Air Quality Management (IAQM) (2020) A Guide To The Assessment Of Air Quality Impacts On Designated Nature Conservation Sites (Version 1.1)
- Institute of Air Quality Management (IAQM) (2024) Guidance on the Assessment of Dust from Demolition and Construction (Version 2.2)
- Met Éireann (2024) Met Éireann website: https://www.met.ie/
- National Parks and Wildlife Service (NPWS) (2020) Article 17 GIS and Metadata Downloads - Spatial data for 2019. Available online at: https://www.npws.ie/maps-and-data/habitat-and-species-data/article-17 [Accessed December 2025]
- Transport Infrastructure Ireland (2024) TII Road Emissions Model (REM): Model Development Report – GE-ENV-01107
- Transport Infrastructure Ireland (2025) Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106
- UK Office of Deputy Prime Minister (ODPM) (2002) Controlling the Environmental Effects of Recycled and Secondary Aggregates Production Good Practice Guidance
- USEPA (1997) Fugitive Dust Technical Information Document for the Best Available Control Measures
- World Health Organisation (2006) Air Quality Guidelines - Global Update 2005 (and previous Air Quality Guideline Reports 1999 & 2000)
- World Health Organisation (2021) Air Quality Guidelines 2021

Chapter 9 – Climate

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9. CLIMATE

9.1 Introduction

This chapter assesses the likely climate impacts and the impact of climate change risks on the Proposed Development located in Co. Dublin. The Proposed Development provides for the part- demolition of an existing office building and extension and refurbishment, ranging in height from 7 no. to 12 no. storeys over existing basement comprising of office accommodation and a community space. Office accommodation is provided from ground floor to 11th floor level and 2 no. community spaces are provided at the ground floor level. Outdoor terraces are located at, 4th, 5th, 6th, 9th and 11th, floor levels and a shared atrium between Block B and Block C. The basement comprises 32 no. car parking spaces, 718 no. bicycle parking spaces and 4 no. motorbike spaces as well as a gym, shower/changing facilities and plantroom.

A full description of the Proposed Development is outlined in Chapter 2 'Description of the Proposed Development' of this EIAR.

This assessment considers the whole life-cycle of the Proposed Development. It assesses the climatic impacts associated with the operation of the Proposed Development across its 60-year lifespan and the impacts on the development itself from climate change hazards.

The climate assessment is divided into two distinct sections – a greenhouse gas assessment (GHGA) and a climate change risk assessment (CCRA).

- Greenhouse Gas Emissions Assessment (GHGA) – Quantifies the GHG emissions from a project over its lifetime. The assessment compares these emissions to relevant carbon budgets, targets and policy to contextualise magnitude.
- Climate Change Risk Assessment (CCRA) – Identifies the impact of a changing climate on a project and receiving environment. The assessment considers a projects vulnerability to climate change and identifies adaptation measures to increase project resilience.

9.2 Methodology

9.2.1 Relevant Guidance, Legislation & Policy

9.2.1.1 Guidance

The principal guidance and best practice documents used to inform the assessment of potential impacts on climate are summarised below. In addition to specific climate guidance documents, the following guidelines were considered and consulted in the preparation of this assessment:

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

The assessment has referred to national guidelines where available, in addition to international standards and guidelines relating to the assessment of climate impacts. These are summarised below:

- Carbon Management in Infrastructure and Built Environment - PAS 2080 (BSI, 2023);
- Environmental Protection Agency (2024a) National Climate Change Risk Assessment (NCCRA), Technical Guidance on Sectoral Assessment

- International Organization for Standardization (ISO) (2021) ISO 14091:2021. Adaptation to climate change — Guidelines on vulnerability, impacts and risk assessment
- Institute of Sustainability & Environmental Professionals (ISEP) (formerly known as IEMA) Environmental Impact Assessment Guide to: Assessing GHG Emissions and Evaluating their Significance (hereafter referred to as the ISEP GHG guidance) (ISEP, 2022)
- ISEP Environmental Impact Assessment Guide to: Climate Change Resilience and Adaptation (hereafter referred to as the ISEP Climate Change guidance) (ISEP, 2020a)
- ISEP GHG Management Hierarchy (hereafter referred to as the ISEP GHG Management Hierarchy) (ISEP, 2020b)
- ISEP Principles Series: Climate Change Mitigation & EIA (ISEP, 2010)
- Technical Guidance on the Climate Proofing of Infrastructure in the Period 2021-2027 (European Commission, 2021a)
- Transport Infrastructure Ireland (TII) PE-ENV-01104: Climate Guidance for National Roads, Light Rail and Rural Cycleways (Offline & Greenways) – Overarching Technical Document (TII, 2022a)
- Transport Infrastructure Ireland (TII) GE-ENV-01106: TII Carbon Assessment Tool for Road and Light Rail Projects and User Guidance Document (TII, 2025)
- Transport Infrastructure Ireland (TII) PE-ENV-01106: Air Quality Assessment of Specified Infrastructure Projects (TII, 2022b)

In addition, data of relevance to the climate impact assessment is outlined below:

- Ireland's Greenhouse Gas Emissions Projections – 2024 - 2055 (EPA, 2025a)
- Ireland's Provisional Greenhouse Gas Emissions 1990-2024 (EPA, 2025b).
- Met Éireann (2025) Historical Climatology for Dublin Airport.
- Environmental Protection Agency (2025c) *Climate Ireland Data Explorer*. O'Brien, E. and Nolan, P., 2023. TRANSLATE: standardized climate projections for Ireland.
- European Centre for Medium-Range Weather Forecasts (ECMWF) (2023) ERA5 Fifth Generation Atmospheric Reanalysis: Copernicus Climate Change Service - Complete ERA5 global atmospheric reanalysis.

9.2.1.2 Legislation

In 2015, the Climate Action and Low Carbon Development Act 2015 (No. 46 of 2015) (Government of Ireland, 2015) was enacted (the 2015 Climate Act). The purpose of the Act was to enable Ireland "to pursue, and achieve, the transition to a low carbon, climate resilient and environmentally sustainable economy by the end of the year 2050" (3.(1) of No. 46 of 2015). This is referred to in the 2015 Climate Act as the *"National Transition Objective"*. The 2015 Climate Act made provision for a national low carbon transition and mitigation plan (now known as a Climate Action Plan), and a national adaptation framework. In addition, the 2015 Climate Act provided for the establishment of the Climate Change Advisory Council with the function to advise and make recommendations on the preparation of the national mitigation and adaptation plans and compliance with existing climate obligations.

The first Climate Action Plan (CAP) was published by the Irish Government in June 2019 (Government of Ireland, 2019). The Climate Action Plan 2019 (CAP19) outlined the current status across key sectors including Electricity, Transport, Built Environment, Industry and Agriculture and outlined the various broadscale measures required for each sector to achieve ambitious decarbonisation targets. The 2019 CAP also detailed the required governance arrangements for implementation including carbon-proofing of policies, establishment of carbon budgets, a strengthened Climate Change Advisory Council and greater accountability to the Oireachtas. The fifth and most recent climate action plan, CAP25, was published in April 2025 (Government of Ireland, 2025).

Following on from Ireland declaring a climate and biodiversity emergency in May 2019, and the European Parliament approving a resolution declaring a climate and environment emergency in Europe in November 2019, the Government approved the publication of the General Scheme in December 2019, followed by

the publication of the Climate Action and Low Carbon Development (Amendment) Act 2021 (hereafter referred to as the 2021 Climate Act) in March 2021. The Climate Act was signed into Law on the 23rd of July 2021, giving statutory effect to the core objectives stated within the CAP.

The purpose of the 2021 Climate Act (Government of Ireland, 2021) is to provide for the approval of plans "*for the purpose of pursuing the transition to a climate resilient, biodiversity rich and climate neutral economy by no later than the end of the year 2050*". The 2021 Climate Act will also *"provide for carbon budgets and a decarbonisation target range for certain sectors of the economy".* The 2021 Climate Act defines the carbon budget as *"the total amount of greenhouse gas emissions that are permitted during the budget period".*

In relation to carbon budgets, the 2015 Act (as amended) states "*a carbon budget, consistent with furthering the achievement of the national climate objective, shall be proposed by the Climate Change Advisory Council, finalised by the Minister and approved by the Government for the period of 5 years commencing on the 1 January 2021 and ending on 31 December 2025 and for each subsequent period of 5 years (in this Act referred to as a 'Budget Period')*". The carbon budget is defined as the total amount of greenhouse gas emissions that are permitted during the budget period. The carbon budget is to be produced for 3 sequential budget periods (Table 9-1). The carbon budget can be revised where new obligations are imposed under the law of the European Union or international agreements or where there are significant developments in scientific knowledge in relation to climate change. In relation to the sectoral emissions ceiling, the Minister for the Environment, Climate and Communications (the Minister for the Environment) shall prepare and submit to government the maximum amount of GHG emissions that are permitted in different sectors of the economy during a budget period, and different ceilings may apply to different sectors. The sectorial emission ceilings for 2030 were published in the Climate Action Plan 2025 (CAP25) (Government of Ireland, 2025) (Table 9-2).

Table 9-1 5-Year Carbon Budgets 2021- 2035

Budget Period	Carbon Budget	Reduction Required
2021-2025	295 Mt CO_2e	Reduction in emissions of 4.8% per annum for the first budget period.
2026-2030	200 Mt CO_2e	Reduction in emissions of 8.3% per annum for the second budget period.
2031-2035	151 Mt CO_2e	Reduction in emissions of 3.5% per annum for the third provisional budget.

Table 9-2 Sectoral Emission Ceilings 2030

Sector	Baseline ($MtCO_2e$)	Carbon Budgets ($MtCO_2e$)		2030 Emissions ($MtCO_2e$)	Indicative Emissions % Reduction in Final Year of 2025-2030 Period (Compared to 2018)
	2018	2021-2025	2026-2030		
Electricity	10	40	20	3	75
Transport	12	54	37	6	50
Built Environment - Residential	7	29	23	4	40
Built Environment - Commercial	2	7	5	1	45
Industry	7	30	24	4	35
Agriculture	23	106	96	17.25	25

Sector	Baseline ($MtCO_2e$)	Carbon Budgets ($MtCO_2e$)		2030 Emissions ($MtCO_2e$)	Indicative Emissions % Reduction in Final Year of 2025-2030 Period (Compared to 2018)
	2018	2021-2025	2026-2030		
Other (F-gases, waste, petroleum refining)	2	9	8	1	50
Land Use, Land-use Change and Forestry (LULUCF)	5	Reflecting the continued volatility for LULUCF baseline emissions to 2030 and beyond, CAP24 puts in place ambitious activity targets for the sector reflecting an EU-type approach			
Total	68				
Unallocated Savings	-	-	26	-5.25	-
Legally Binding Carbon Budgets and 2030 Emission Reduction Targets	-	295	200	-	51

9.2.1.3 Policy

9.2.1.3.1 Climate Action Plans

In December 2023, CAP24 was published, establishing key actions to deliver a 51% reduction in GHG emissions by 2030 (compared to 2018 levels) and achieve climate neutrality by 2050 (Government of Ireland, 2023). The updated and current CAP25 (Government of Ireland, 2025), published in April 2025, builds on the progress of the previous four iterations of the CAP, with CAP23 first publishing carbon budgets and sectoral emission ceilings, and reaffirms Ireland's climate ambition, with a focus on delivery, implementation and measurable outcomes, particularly ahead of the second carbon budget period (2026–2030). 2025 is the last year in the first 5-year carbon budget period. During the initial 5-year budget period the average annual reduction required was 4.8%, this increases to 8.3% in the second budget period (2026-2030). CAP25 retains the high-impact sectors where the biggest savings can be achieved, while emphasising public sector leadership and green procurement. These sectors include renewable energy, energy efficiency of buildings, transport, sustainable farming, sustainable business and land-use change.

CAP25 also reinforces targets first outlined in CAP24 to reduce the embodied carbon of construction materials, with a 10% reduction by 2025 and 30% reduction by 2030 for materials produced and used in Ireland. Cement and high embodied carbon construction materials can be reduced through product substitution, reduced clinker content in cement and uptake of low-carbon construction methods, including those outlined in the Construction Industry Federation 2021 report Modern Methods of Construction (Construction Industry Federation, 2021). There also remains scope for the construction industry to use more timber in construction. In 2022, 24% of new construction in Ireland was built using timber frames to satisfy the demand for housing. Public bodies are now required under the Public Sector Mandate to use best practice project design to reduce embodied carbon; procure concretes with clinker replacements (lower carbon); and require that large construction projects produce a whole life-cycle GHG emissions assessment.

Furthermore, CAP25 advances sector-specific measures in green procurement, electrification of transport and heat, and just transition (with the introduction of a Just Transition Commission) to support vulnerable communities. Transport emissions increased by 0.3%. Electric vehicles and the use of biofuels are stated as the best means of transport emission reductions in the medium term.

9.2.1.3.2 Local Policy

The Dublin City Council Climate Action Plan 2024–2029 (DCC, 2024) sets out the council's objectives to reduce greenhouse gas (GHG) emissions and enhance resilience to climate change impacts. The key

actions provided in the report reflects a new change for Diblin and include a resilient, low emissions, social city which supports climate resilience to hazards, biodiversity and works to achieve a 51% reduction by 2030 from this plan. Key areas which the proposed development align include emissions reduction, biodiversity support and climate resilience. Additionally, the climate action plan outlines relevant actions across Built Environment and Energy Action B1, which commits to implementing the DCC Development Plan 2022–2028 (DCC, 2022).

Section 11.7.1 Built Environment of the DCC Development Plan 2022–2028 includes the following measures aimed at reducing climate impacts associated with proposed developments:

To achieve a more sustainable built environment, the Planning Authority will promote the following:

- Retention, restoration, and reuse of existing buildings rather than demolition and reconstruction where feasible.
- Use of structural materials with low or zero embodied energy and CO_2 emissions.
- Design adaptability for residential buildings.

9.2.1.3.3 Climate Change Vulnerability Policy

The Second *National Adaptation Framework* (NAF) (Government of Ireland, 2024c), published in June 2024 under the Climate Action and Low Carbon Development Act 2015, outlines a comprehensive, whole-of-government and whole-of-society approach to climate adaptation. Its core objective is to enhance Ireland's resilience to a wide range of climate risks, including extreme weather events, flooding, drought, biodiversity loss, sea level rise, and rising temperatures.

Building on the principles of a "Just Transition", the NAF introduces the concept of "Just Resilience", envisioning a climate-resilient Ireland that ensures fairness, equity, and inclusivity in adaptation planning and implementation. It promotes reduced reliance on fossil fuels, the expansion of electrified and accessible public transport, and the integration of sustainability and climate resilience across all sectors. These include energy, water, wastewater, agriculture, transport, health, built environment, and biodiversity, with a strong emphasis on mainstreaming adaptation practices into policy, planning, and operations.

With respect to building and office development sectors, the second NAF highlights several potential climate impacts and risks and adaptation measures:

- Increased frequency and intensity of rainfall may damage buildings, assets, and surrounding infrastructure, requiring integration of flood risk management into spatial planning, use and expansion of sustainable drainage systems, and elevation or relocation of infrastructure in highly vulnerable areas.
- Temperature increases projected for the future will call improved and energy efficient design integrating passive cooling, improved ventilation, and retrofitting measures to maintain thermal comfort and protect health during heatwaves.
- Power outages during extreme weather events can disrupt operations for buildings, heating and cooling systems, highlighting the need for backup power solutions and emergency response protocols.

The *National Climate Change Risk Assessment Technical Guidance* (NCCRA) was published in 2024 (EPA, 2024a). The NCCRA was required to be developed under Action 457 from the 2021 CAP (Government of Ireland, 2021). Action 457 seeks to "*Further develop Ireland's national climate change risk assessment capacity to identify the priority physical risks of climate change to Ireland'*. The NCCRA uses definitions of the risk determinants from the Intergovernmental Panel on Climate Change (IPCC) Risk Framework (IPCC, 2023):

- **Hazard** - the potential occurrence of a natural or human-induced physical event or trend or physical impact that may cause loss of life, injury, or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision, ecosystems, and environmental resources.
- **Exposure** - the presence of people, livelihoods, species or ecosystems, environmental functions, services, and resources, infrastructure, or economic, social, or cultural assets in places and settings that could be adversely affected.
- **Sensitivity** - refers to the degree to which a system or asset is affected by climate hazards. It reflects how vulnerable something is to changes such as temperature extremes, flooding, or drought, based on its physical, functional, or ecological characteristics.
- **Vulnerability** - the propensity or predisposition to be adversely affected. Vulnerability encompasses a variety of concepts including sensitivity
- **Risk** - the potential for adverse consequences for human or ecological systems.

When considering risk, the NCCRA assess exposure and vulnerability for two future climate change scenarios or Representative Concentration Pathways (RCPs):

- RCP4.5 was selected as it represents a scenario aligned with the global temperature trajectory
- RCP8.5 was selected as it represents a high-emissions scenario and achieves the highest level of modelled temperature increases by the end of the century. Consequently, this scenario will result in the highest level of physical risk for Ireland, and therefore the greatest requirement for adaptation.

These scenarios align with a conservative approach to assess risks to Ireland and assumes global emission reduction targets are not met. This aligns with the principle of precaution as stated in the NAF (Government of Ireland, 2024c). In addition to the future climate scenarios, the NCCRA assesses the risk from the future climate during the following timeframes:

- Present (~2030)
- Medium term (2040-2070) (~ 2050)
- Long term (2070-2100) (~2100)

It is recommended that the Environmental Impact Assessment (EIA) for climate risk and vulnerability evaluates risks across the lifecycle of the Proposed Development—construction and operational phases. For this project, future climate risk has been assessed using the 2050s timeframe (2040-2070) which matches with design life of the Proposed Development.

9.2.1.4 Forecasting Methods and Difficulties Encountered

The Proposed Development is still in the design stage and therefore materials used, construction and operational activities are subject to change. For the purposes of the Embodied Carbon assessment, BPC assumed:

- 30% GGBS (Ground Granulated Blast-furnace Slag) in concrete mixtures.
- 90% recycled content to be used in rebar.
- 20% recycled content to be used in structural steel.

9.2.2 Greenhouse Gas Assessment

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 9.3.19.3.1).

9.2.2.1 Lifecycle Carbon Assessment

A Whole Lifecycle Carbon Assessment was prepared by BPC Engineers (2025a), (hereafter referred to as "Embodied Carbon Report") which will be submitted as part of the Planning Application. The analysis

assessed the whole life-cycle carbon for the Proposed Development versus a 'Baseline' option. The 'Baseline' option assumes that the entirety of the existing structure is demolished and re-built. The Proposed Development takes an 'extend and refurbish' approach instead and includes a partial (c. 33%) demolishment. The majority of the existing structure (foundations, floor slabs, beams, columns) will be retained and the building will be extended so that the floor area is increased from 34,507m^2 to 61,882m^2.

The embodied carbon emissions were calculated in line with EN 15978 for the carbon life-cycle stages A1-A5, B1-B5 and C1-C4 using Life-Cycle Analysis (LCA) software (OneClick LCA). The software is aligned with the calculation requirements for EN 15978, ISO 21931 – 1 & ISO 21929, and data requirements of ISO 14040 & EN 15804, and is LEED, BREEAM and PAS 2080 aligned. It provides a comprehensive Environmental Product Declaration (EPD) database to choose from and allows users to assess the carbon impact of buildings at various stages of design.

The tool includes a detailed product and material list based on Irish materials as well as materials from the UK and Europe. The Embodied Carbon Report acknowledges that due to the early stage in the planning process, the inputs are based on estimations as a full bill of quantities has not yet been finalised. Where an exact material type or quantity was unknown, as it will not be chosen until detailed design, an estimated value or alternative material was used within the tool to complete the assessment. The tool allows for optioneering and optimization of the carbon impact, it highlights the key areas within the building with the highest carbon impact and provides options for lower carbon intensive materials.

Embodied carbon emissions are attributed to four main categories, taken from BS EN 15978. The categories are:

- **Product Stages (Category A1 to A3)** The carbon emissions generated at this stage arise from extracting the raw materials from the ground, their transport to a point of manufacture and then the primary energy used (and the associated carbon impacts that arise) from transforming the raw materials into construction products.
- **Construction (Category A4 to A5)** These carbon impacts arise from transporting the construction products to site, and their subsequent processing and assembly into the building.
- **Use Stage (Category B1 to B7)** This covers a wide range of sources from the GHG emissions associated with the operation of the building (B1), maintenance (B2), repair (B3), refurbishment (B4) and replacement (B5) of materials, and operational energy use (B6) and water use (B7).
- **End of Life Stages (Category C1 to C4)** The eventual deconstruction and disposal of the existing building at the end of its life takes account of the on-site activities of the demolition contractors. No 'credit' is taken for any future carbon benefit associated with the reuse or recycling of a material into new products.

B1, B2, B3 and B6 were not included in the scope of the Embodied Carbon Report.

The purpose of the assessment is to engage the design team in the consideration of embodied carbon at an early stage in the development and enable mitigation strategies to be imbedded. This engagement aims to ensure carbon savings are made and to assist in aligning the project to Ireland's CAP goal of Net Carbon Zero by 2050.

9.2.2.2 Traffic Emissions

Emissions from road traffic associated with the operational phase of the Proposed Development have the potential to emit carbon dioxide (CO_2) which will impact climate.

The TII guidance *Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106* (TII, 2022b), states that road links meeting one or more of the following criteria can be defined as being 'affected' by a proposed development and should be included in the local air quality assessment, and

also the climate assessment. While the guidance is specific to infrastructure projects the approach can be applied to any development that causes a change in traffic.

- Annual average daily traffic (AADT) changes by 1,000 or more;
- Heavy duty vehicle (HDV) AADT changes by 200 or more;
- Daily average speed change by 10 kph or more;
- Peak hour speed change by 20 kph or more;
- A change in road alignment by 5 m or greater.

The Proposed Development promotes the use of public transport and active transport through its proximity to Dublin city centre which provides many public transport options and by reducing car parking spaces on site by no. 162 compared to the existing structure. As a result, the Proposed Development is not predicted to cause a significant change in traffic. The change in traffic was reviewed against the above TII screening criteria and it was determined that a detailed assessment could be screened out as none of the criteria are met. There is no potential for significant impacts to climate from operational phase traffic emissions associated with the Proposed Development. Construction phase traffic is included within the Embodied Carbon Report.

9.2.2.3 Significance Criteria for GHGA

The Transport Infrastructure Ireland (TII) guidance document entitled *PE-ENV-01104 Climate Guidance for National Roads, Light Rail and Rural Cycleways (Offline & Greenways) – Overarching Technical Document* (TII, 2022a) outlines a recommended approach for determining the significance of both the construction and operational phases of a development.

The significance of GHG effects set out in PE-ENV-01104 (TII, 2022a) is based on ISEP GHG Guidance (ISEP, 2022) which is consistent with the terminology contained within Figure 3.4 of the EPA's (2022) '*Guidelines on the Information to be Contained in Environmental Impact Assessment Reports*'.

The ISEP GHG Guidance (ISEP, 2022) sets out the following principles for significance:

- When evaluating significance, all new GHG emissions contribute to a negative environmental impact; however, some projects will replace existing development or baseline activity that has a higher GHG profile. The significance of a project's emissions should therefore be based on its net impact over its lifetime, which may be positive, negative or negligible;
- Where GHG emissions cannot be avoided, the goal of the EIA process should be to reduce the project's residual emissions at all stages; and
- Where GHG emissions remain significant, but cannot be further reduced, approaches to compensate the project's remaining emissions should be considered.

The criteria for determining the significance of effects are a two-stage process that involves defining the magnitude of the impacts and the sensitivity of the receptors (i.e. Ireland's National GHG targets). In relation to climate, there is no project specific assessment criteria, but the project will be assessed against the recommended TII significance determination. This takes account of any embedded or committed mitigation measures that form part of the design which should be considered.

TII (TII, 2022a) states that professional judgement must be taken into account when contextualising and assessing the significance of a project's GHG impact. In line with ISEP GHG Guidance (ISEP, 2022), TII 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".*

Significance is determined using the criteria outlined in Table 9-3 (derived from Table 6.7 of PE-ENV-01104 (TII 2022a)) along with consideration of 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 9-3 GHGA Significance Criteria

Effects	Significance level Description	Description
Significant adverse	Major adverse	► The project's GHG impacts are not mitigated. ► The project has not complied with do-minimum standards set through regulation, nor provided reductions required by local or national policies; and ► No meaningful absolute contribution to Ireland's trajectory towards net zero[1].
	Moderate adverse	► The project's GHG impacts are partially mitigated. ► The project has partially complied with do-minimum standards set through regulation, and have not fully complied with local or national policies; and ► Falls short of full contribution to Ireland's trajectory towards net zero.
Not significant	Minor adverse	► The project's GHG impacts are mitigated through 'good practice' measures. ► The project has complied with existing and emerging policy requirements; and ► Fully in line to achieve Ireland's trajectory towards net zero.
	Negligible	► The project's GHG impacts are mitigated beyond design standards. ► The project has gone well beyond existing and emerging policy requirements; and ► Well 'ahead of the curve' for Ireland's trajectory towards net zero.
Beneficial	Beneficial	► The project's net GHG impacts are below zero and it causes a reduction in atmosphere GHG concentration. ► The project has gone well beyond existing and emerging policy requirements; and ► Well 'ahead of the curve' for Ireland's trajectory towards net zero, provides a positive climate impact.

Ireland's carbon budgets can also be used to contextualise the magnitude of GHG emissions from the Proposed Development (TII, 2022a). The approach is based on comparing the net Proposed Development GHG emissions to the relevant carbon budgets (Government of Ireland, 2025a). With the publication of the Climate Action Act in 2021 and CAP25, sectoral carbon budgets have been published for comparison with the net GHG emissions from the Proposed Development over its lifespan.

[1] Net Zero: "When anthropogenic emissions of greenhouse gases to the atmosphere are balanced by anthropogenic removals over a specified period." Net zero is achieved where emissions are first educed in line with a 'science-based' trajectory with any residual emissions neutralised through offsets.

9.2.3 Climate Change Risk Assessment

As per the TII PE-ENV-01104 guidance (2022), an initial screening of risk during the operational phase is conducted. This is carried out by determining the sensitivity of Proposed Development assets (i.e. receptors) and their exposure to climate change hazards.

The Proposed Development asset categories must be assigned a level of sensitivity to climate hazards. PE-ENV-01104 (TII, 2022a) provides the list of asset categories and climate hazards to be considered. The asset categories will vary for development type and need to be determined on a development-by-development 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.

First an initial screening of physical hazards is carried out based on the proposed site location. This is a qualitative screening which intends to only proceed with relevant hazards (e.g., sea level rise is not an applicable hazard to inland areas or wildfire is not considered a hazard in an urban location). Following this, all-relevant hazards are assessed on their exposure under future climate change.

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 is undertaken. 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.

9.2.3.1 Significance Criteria for CCRA

The CCRA involves an initial screening assessment to determine 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.

Vulnerability = Sensitivity x Exposure

The vulnerability assessment takes any proposed mitigation into account. Table 9-4 details the vulnerability matrix; vulnerabilities are scored on a high, medium and low scale.

TII guidance (TII, 2022a) and the EU technical guidance (European Commission, 2021a) note that if all vulnerabilities are ranked as low in a justified manner, no detailed climate risk assessment may be needed. Therefore, the impact from climate change on the Proposed Development can be considered as not significant.

However, 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. An assessment of construction phase CCRA impacts is only required according to the TII guidance (TII, 2022a) if a detailed CCRA is required.

Table 9-4 Vulnerability Matrix

		Exposure		
		High (3)	**Medium (2)**	**Low (1)**
Sensitivity	**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 screening and Climate Change Vulnerability Assessment detailed in Section 9.4.2.3 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 as outlined in Section 9.5.1.

9.3 Receiving Environment

Climate impacts are assessed at a national level and in relation to national targets and sectoral emission ceilings. The study area for climate is the Republic of Ireland, and the baseline is determined in relation to this study area.

9.3.1 Current GHG Baseline

PE-ENV-01104 (TII, 2022a) states that a baseline climate scenario should identify, consistent with the study area for the project, GHG emissions without the project for both the current and future baseline.

Ireland declared a climate and biodiversity emergency in May 2019 and in November 2019 there was European Parliament approval of a resolution declaring a climate and environment emergency in Europe. This, in addition to Ireland's current failure to meet its EU binding targets under Regulation 2018/842 (European Union, 2018) results in changes in GHG emissions either beneficial or adverse being of more significance than previously considered prior to these declarations.

Data published in July 2025 (EPA, 2025a), indicates that Ireland exceeded, without the use of flexibilities, its 2024 annual limit set under EU's Effort Sharing Decision (ESD) (406/2009/EC) by 1.03 Mt CO_2e. However, the 2024 emissions represent the second consecutive year in which Ireland's emission were below (-4.2%) 1990 levels. ETS (Emissions Trading Scheme) emissions decreased (-1.1%) and ESR (Effort Sharing Regulation) emissions decreased (-2.2%). Ireland's target is an emission reduction of 626 kt of CO_2e by 2030 on an average baseline of 2016 to 2018.

The EPA estimate that 2024 total national GHG emissions, excluding LULUCF, have decreased by 2.0% on 2023 levels to 53.82 Mt CO_2e, with a 0.7 Mt CO_2e (-8.9%) reduction in electricity industries alone. This was driven by a 39.7% share of energy from renewables in 2024 and the complete phase-out of peat for electricity generation. Manufacturing combustion and industrial processes decreased by 4.6% to 6.0 Mt CO_2e in 2024 due to declines in fossil fuel usage. The sector with the highest emissions in 2024 was agriculture at 37.9% of the total, followed by transport at 20.8%. For 2024, total national emissions (including LULUCF) were 57.64 Mt CO_2e (EPA, 2025a) (see Table 9-5).

The current estimates of National greenhouse gas emissions (including LULUCF) in 2024 are 12.0% below 2018, well off the National Climate ambition of a 51% reduction by 2030. The data indicate that from 2021- 2024 Ireland has used 82.8% (243.3 Mt CO_2e) of the 295 Mt CO_2e Carbon Budget for the five-year period 2021-2025. This leaves 17.5% of the budget available for 2025, requiring a substantial 10.3% annual emissions reduction for 2025 to stay within budget.

Table 9-5 Trends in National GHG Emissions in 2021 – 2024

Sector [Note 1]	2021 Emissions (Mt CO_2e)	2022 Emissions (Mt CO_2e)	2023 Emissions (Mt CO_2e)	2024 Emissions (Mt CO_2e)	Total Budget (Mt CO_2e) (2021-2025)	% Budget 2021-2025 used	Annual change 2023 to 2024
Electricity	9.89	9.69	7.57	6.95	40	85.25%	-8.19%
Transport	11.09	11.76	11.8	11.65	54	85.74%	-1.27%
Buildings (Residential)	6.87	5.75	5.35	5.61	29	81.31%	4.86%
Buildings (Commercial and Public)	1.44	1.45	1.39	1.49	7	82.43%	7.19%
Industry	7.09	6.62	6.31	6.01	30	86.77%	-4.75%
Agriculture	21.94	21.78	20.72	20.41	106	80.05%	-1.50%
Other [Note 2]	1.86	1.93	1.81	1.63	9	80.33%	-9.94%
LULUCF	4.63	3.98	3.89	3.89	–	–	0
Total including LULUCF	**64.82**	**62.99**	**58.83**	**57.64**	**295**	**82.81%**	**-2.04%**

Note 1 Reproduced from latest emissions data from the EPA (EPA, 2025a).

Note 2 Other includes Petroleum refining, F-Gases and Waste (emissions from solid waste disposal on land (landfilling), solid waste treatment (composting and anaerobic digestion), wastewater treatment, waste incineration and open burning of waste).

9.3.2 Future GHG Baseline

The future baseline with respect to the GHGA can be considered in relation to the future climate targets which the assessment results will be compared against. In line with TII (TII, 2022a) and ISEP GHG guidance (ISEP, 2022) 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"*.

The future baseline will be determined by Ireland meeting its targets set out in the CAP25, and future CAPs, alongside binding 2030 and net zero by 2050 EU targets. 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) (European Union, 2018). 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.

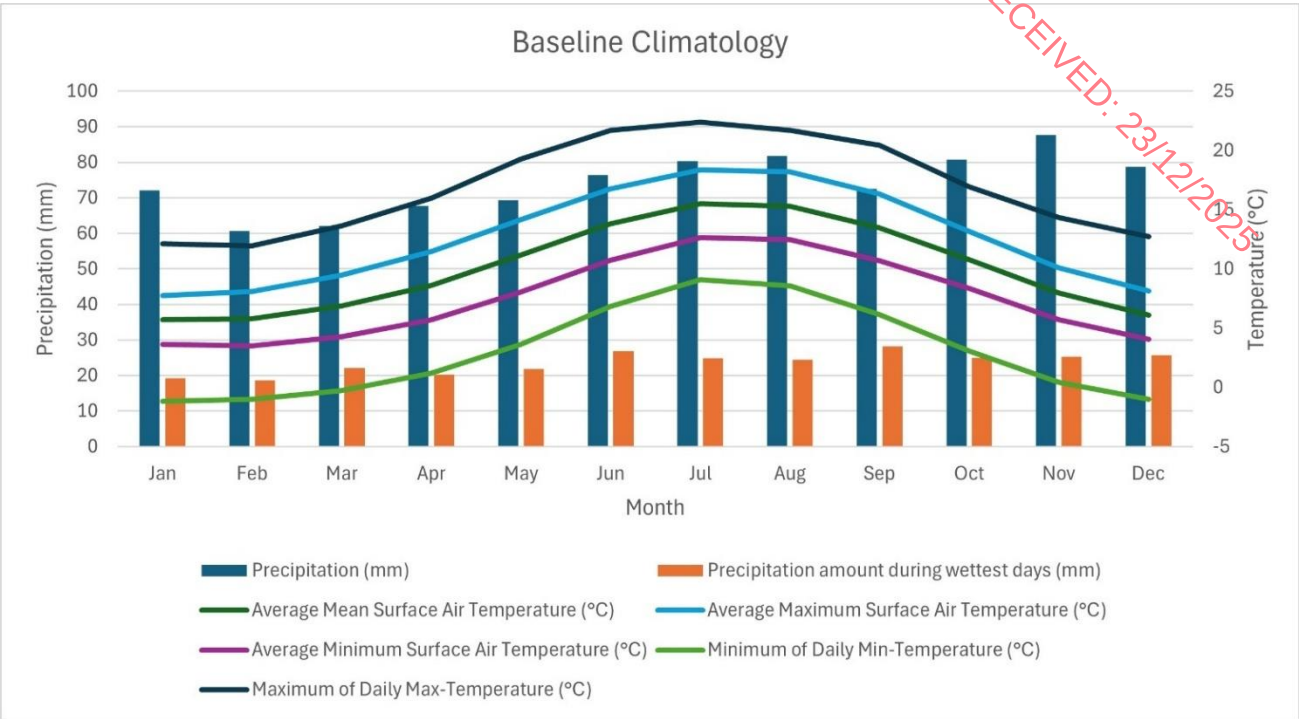
In May 2025, the EPA released the report *Ireland's Greenhouse Gas Emissions Projections 2024-2055* (EPA, 2025b), which includes total projected emissions and a breakdown of projected emissions per sector under the 'With Existing Measures' and 'With Additional Measures' scenarios. The EPA projections indicate that currently implemented measures (With Existing Measures) will achieve a reduction of 10% 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 22% by 2030, still short of the 42% reduction target.

9.3.3 Current CCRA Baseline

The region of the Proposed Development has a temperate, oceanic climate, resulting in mild winters and relatively cooler summers when compared with continental Europe. This baseline data is derived from the European Centre for Medium-Range Weather Forecasts (ECMWF) ERA5 data reanalysis (ECMWF, 2023) which includes observed data from individual meteorological weather stations across Ireland from 1950-2023 such as that at Dublin Airport. This data is reanalysed to model a complete picture of Ireland's historical climate. This method has been chosen to ensure data can be analysed at the daily level and harmoniously compared with future scenarios. The baseline time-period referred to in this assessment was from 1991-2020 and is specific to county Dublin and the location of the development in question.

Figure **9**-1 below shows the climatology for the 30-year baseline period from 1991 to 2020 indicating the wettest months are from October through to January with November (87mm) being the wettest on average. July and August are also markedly wetter than other months both <80mm on average. Spring and Summer (Feb-Jun) are markedly drier compared to the wettest months with average monthly precipitation 60mm-76mm respectively. The driest month on average was February (60mm), with March through to May also experiencing lower than average rainfall (~64mm). Ireland and Dublin's precipitation patterns are strongly influenced by its oceanic climate, with the wettest months typically coinciding with periods of frequent low-pressure Atlantic storm systems. In the cases of July and August however, this may be a factor of convection and frontal rainfall, whereby warm continental summer air is pressed against colder air moving across the Atlantic.

Figure 9-1 Baseline Climatology (Dublin County) 1991-2020



July was the warmest month with a mean temperature of 15.5°C with average mean surface temperatures across the summer months (July – August) >13°C. July is also the warmest month for maximum daily temperatures (22°C) which showcases the higher value ranges recorded during a particular month. Across May – September average maximum daily temperatures exceed 19°C.

January and February are the coldest months with average mean surface air temperatures of 5.7°C and average minimum temperatures of 3.3-3.6°C. For daily minimum temperatures which reference the lowest range values (10th percentile range) of the data, January (-1.9°C) and February (-1.0°C) also remain the coldest with marginal difference. Several other winter and early spring months (December - March) also experience daily minimums of below 0°C.

Historical records show Dublin and the site of the proposed development has experienced and been exposed to several severe storms, with wind speeds exceeding 100 km/h, and national record braking wind speeds set during Storm Éowyn in January 2025. Storm activity is concentrated in winter (December–February), with an average of eight named storms annually (Met Éireann, 2025). Historical data was taken from Dublin Airport between 1962–2020, approximately 10km from the proposed development site and indicates a mean 10m wind speed of 10 knots (18 km/hr) and maximum gusts ranging across the 90th percentile range from ≥60 knots (111 km/h) (Met Éireann, 2025).

Overall, the baseline climatology for the proposed development site and region shows evidence of high rainfall across the year high. Mild winters with average minimums >3°C and relatively mild summers with average maximums of 18°C. Notable high temperature events have occurred in recent history such as 32°C in 2018 and >30°C in 2022 (Met Eireann, 2025). However, these anomalies do not represent the average maximums (~25°C) which is not significant for extreme heat or prolonged drought impacts.

9.3.4 Future CCRA Baseline

9.3.4.1 Climate Change Impacts and Projections for Ireland

Ireland is already experiencing increased annual rainfall in the north and west, with more variable patterns in the south and east including the area of the Proposed Development (EPA, 2021a). Key risks identified by the EPA relevant to the proposed project include:

- Increased likelihood of more frequent and intense North Atlantic low-pressure systems bringing high rainfall and high winds.
- More intense rainfall periods which may lead to pluvial flooding and elevated fluvial levels.
- Longer dry spells and increased temperatures, increasing the risk of wildfire and drought while reducing the likelihood of cold and ice.

9.3.4.2 Climate Modelling and Planning

International best practice and national policy such as the IPCC (2023), NCCRA (2024a), and Transport Infrastructure Ireland (TII, 2022a) recommends using two emission scenarios to project future climate change. This includes a moderate and high emission scenarios (RCP4.5 and RCP8.5) for future planning. These Representative Concentration Pathways (RCPs) reflect varying levels of global climate mitigation and are explained below.

- RCP 4.5 (a 'moderate' scenario) represents an approximate 2.4°C increase in global average temperatures (1.7-3.2°C). It assumes moderate mitigation efforts leading to stabilisation of emissions by mid-century and is generally aligned with current policies for emission reduction.
- RCP 8.5 (a 'worst case' / high emissions scenario) represents an approximate 4.3°C increase in global average temperatures (3.2-5.4°C) and assumes continued high emissions with minimal mitigation. This high-end scenario is useful for understanding potential impacts of current emission trends continue. Consequently, this scenario will result in the highest level of physical risk for Ireland, and therefore the greatest requirement for adaptation.

This climate change assessment uses the latest climate change projections standardised and bias corrected for Ireland available through the EPA and the TRANSLATE project (EPA, 2025c).

9.3.4.3 Key Findings from Future Climate Change Projections

Table 9-6 presents the key findings from the analysis of future climate projections under two scenarios: a medium-emissions pathway (RCP4.5) and a high-emissions 'worst-case' pathway (RCP8.5). Both scenarios are compared against the site-specific baseline (1976–2005) derived from the Ireland TRANSLATE projections (EPA, 2025b) dataset and historical data taken from Shannon Airport (Met Eireann, 2025). The table details the principal climate hazards and their projected changes under each scenario.

Projected changes include:

- Summer temperatures rising by over 2°C and overall mean temperatures increasing 1.0°C and 1.5°C by mid-century under RCP4.5 and RCP8.5 respectively.
- Summer rainfall is decreasing while winter rainfall increases sharply, attributing to an overall increase in rainfall annually for the Proposed Development location.
- Fewer cold winter nights, significant reduction in the number of frost days annually (minimum daily temperature <0°C).
- Increased likelihood of short heatwaves (≥5 consecutive days >25°C).
- Increased likelihood of extended dry spells and possible drought which may elevate the risk of wildfire.

- Increased likelihood of more storms which may increase the risk of flooding due to deluge of rainfall which may be a factor in increased Max 1-day precipitation projections.

Impacts resulting from climate change hazards will evolve and have the potential to include increases in global temperatures and increases in the intensity and frequency of rainfall days per year combined with increases in the intensity and frequency of low-pressure systems in the north Atlantic during the winter storm period. Therefore, it is expected that the climate over the Proposed Development site will evolve over time and consideration is needed with respect to this within the design of the Proposed Development.

Table 9-6 Site Specific - Future Climate Change Summary of Projections under both RCP scenarios for 2050 period (2040-2070) taken from the EPA Climate Ireland Translate Projections

Climate Hazard	Indicator	Baseline (1976-2005)	RCP4.5 (2040-2070)	RCP8.5 (2040-2070)
Temperature	*Mean temp (°C)*	10.5	11.5	12
	Mean Max temp (°C)	13.7	14.6	15.2
	Mean Min temp (°C)	7.2	8.3	8.8
	Average of Daily Max temp (°C)	25	27	27.7
	Frost Days annually (no. of days)	18.9	8.8	6.5
Precipitation and Flooding	*Annual precipitation (mm)*	691	726 (+35)	744 (+53)
	Max 1-day (mm)	34	42	34
Storms and high winds	*Number of Storms Qualitative (Description)*	On Average 8 named storms annually with speeds exceeding 100km/hr (N.1)	Winter storm frequency is projected to increase, with a possible extension of the storm season. While the intensity of individual storms cannot be accurately projected, storm wind speeds are likely to remain above 100 km/hr.	
	Max Gust Speed 90th percentile (Knots)	60 (N.2)		
Drought	*Absolute Drought (≥15 days with less than 1mm)*	Rare	Marginal increase	Increased Likelihood
Lightning	*Qualitative (Descriptive)*	Occurring during summer periods	This hazard may modestly increase in the future due to more favourable conditions, such as rising temperatures and extended warm periods beyond the traditional summer season	
Note-1: Data from combined Met Éireann, UK Met Office and Dutch Meteorological services.				
Note-2: Data Dublin Airport approximately 10km from the site. Met Éireann Historical Dataset (2025)				

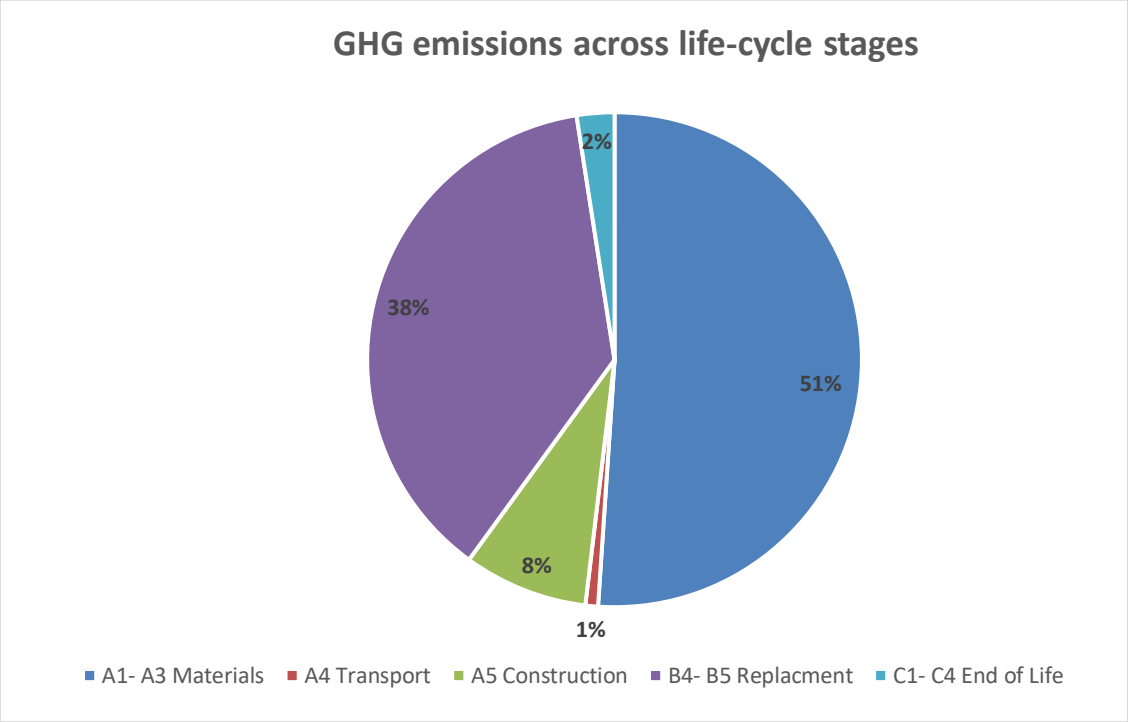
9.4 Potential Impacts of the Proposed Development

9.4.1 Greenhouse Gas Assessment

9.4.1.1 Construction Phase

As set out in the Embodied Carbon Report, the construction stage results in the highest GHG emissions across the life-cycle of the Proposed Development (60%) (See Table 9-7) with an estimated 30,286 tCO_2e. Of this, 85% is attributed to the Product Stage (A1-A3) Table 9-7. Product Stage emissions come from construction materials such as concrete (23.5%) and steel (27%).

Figure 9-2 Construction Phase GHG emissions



9.4.1.2 Operational and End of Life Phases

The operational phase of the Proposed Development is predicted to result in 18,935 tCO_2e (see Table 9-7) which is 38% of the total life-cycle GHG emissions and are due to the replacement of building parts. The Embodied Carbon Report draws on an example of ceiling and floor systems, which have relatively low initial upfront embodied carbon but due to short service life-cycles they will be upgraded multiple times across the 60-year lifespan, emitting GHGs in the process.

End of Life embodied carbon has been calculated through default scenarios within OneClick LCA which represent the typical end of life processing for material types in compliance with the requirements of the EN 15804+A1.

9.4.1.3 Total GHG Emissions Over Life-cycle

Table 9-7 shows the GHG emissions for the Proposed Development per life-cycle stage taken from the Embodied Carbon Report.

Table 9-7 GHG Assessment Results

Stage	Emissions (tCO_2e)	Relevant Sector for Comparison with Sectoral Budgets
A1- A3 Materials	25,769	Industry
A4 Transport	415	Transport
A5 Construction	4,102	Industry
B4- B5 Replacement	18,935	Industry
C1- C4 End of Life	1,242	Industry
Total	**50,463**	

The GHG emissions from the development as a total cannot be compared against one specific sector 2030 carbon budget. The emissions are broken down into different assessment categories and these must be compared separately to the relevant sectoral emissions budget. The predicted GHG emissions (as shown in Table 9-8) have been averaged over the full lifespan of the Proposed Development to give the predicted annual emissions to allow for direct comparison with national annual emissions and targets.

In Table 9-8, GHG emissions have been compared against the carbon budget for the industry, and transport sectors in 2030 (Government of Ireland, 2025), against Ireland's total GHG emissions in 2024, and against Ireland's EU 2030 target of a 42% reduction in non-ETS sector emissions based on 2005 levels (27.7 Mt CO_2e) (set out in Regulation EU 2018/842 of the European Parliament and of the Council).

The estimated total GHG emissions, when annualised over the 60-year Proposed Development lifespan, are equivalent to 0.001% of Ireland's total GHG emissions in 2024 and 0.003% of Ireland's Non-ETS 2030 target. The total annualised industry-related emissions are 0.02% of Ireland's 2030 Industry budget. The estimated annualised GHG emissions associated with transport-related activities are 0.0001% of the 2030 Transport budget

Table 9-8 Estimated GHG Emissions Relative to Sectoral Budgets and GHG Baseline

Target/Sectoral Budget	(tCO_2e)	Annualised Development GHG Emissions	% of Relevant Target/Budget
Ireland's 2024 Total GHG Emissions (existing baseline)	57,640,000	Total GHG Emissions	0.001%
Non-ETS 2030 Target	27,722,000	Total GHG Emissions	0.003%
2030 Sectoral Budget (Industry Sector)	4,000,000	Total Industry Emissions	0.02%
2030 Sectoral Budget (Transport Sector)	6,000,000	Total Transport Emissions	0.0001%

9.4.1.4 GHGA Significance of Effects

The TII guidance 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 significant emissions saving set out in the Embodied Carbon Report between the Baseline scenario

(full demolition) and the Proposed Development avoids approximately 10,000 tCO_2e. Further, the significant contribution of the construction emissions compared to operational or end of life stages highlights the importance of retaining part of the structure to avoid additional emissions associated with the use of new materials. The Embodied Carbon Report states "By retaining the majority of the existing horizontal structures (basement, floor slabs, etc.), approximately 10,000 tCO_2e (155 $kgCO_2e/m^2$) will be avoided over the building lifecycle (assumed to be 60 years.)"

The commitment to refurbishment and extension, in addition to the level of mitigation described in Section 9.5 has been considered when determining the significance of the Proposed Development's GHG emissions. The Proposed Development has mitigated GHG impacts and is fully in line with Ireland's national climate policy and its trajectory towards net zero. According to the TII significance criteria described in Section 9.2.2.3 and Table 9-3, the significance of the GHG emissions during the life-cycle of the Proposed Development phase is ***minor adverse***.

The ISEP GHG guidance (ISEP, 2022) (which has been embraced by the updated TII Guidance (TII 2022) in Section 6.7.2) states as follows:

"A minor adverse not significant impact is described with: 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 that has a minor adverse effect that 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."

In accordance with the EPA guidelines (EPA, 2022), which sets different criteria, the significance of effect of GHG emissions during the construction and operational phase is ***direct, long-term, negative*** and ***slight***, which is overall ***not significant***.

9.4.2 Climate Change Risk Assessment

9.4.2.1 Construction Phase

A detailed CCRA of the construction phase has been scoped out. 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 9.5.

- Flood risk due to increased precipitation, and intense periods of rainfall. This includes fluvial and pluvial flooding.
- Increased temperatures potentially causing water scarcity and prolonged periods of hot weather
- Reduced temperatures resulting in ice or snow and [possible hazard to working conditions].
- Major Storm Damage, including wind damage and flooding intense rainfall.
- Longer and more frequent dry spells with elevated temperatures.

9.4.2.2 Operational Phase

9.4.2.2.1 Climate Hazard Screening

To determine the vulnerability of the Proposed Development to climate change the sensitivity and exposure of the development to various climate hazards must first be determined. Table 9-9 presents the initial qualitative climate hazards screening relevant to the Proposed Development. A number of climate hazards have been screened out of the assessment due to the Proposed Development location.

Table 9-9 Climate Hazard Screening

Climate-related Hazard	Hazard Screening Rationale	Screening
Extreme Heat temperatures	High temperatures are a key consideration for both construction and long-term operation of the Proposed Development. Historical data combined with future projections shows rising temperatures in Ireland. Heat and thermal expansion can damage buildings, materials, and road surfaces, and affect the lifecycle of assets.	Screen in
Extreme Cold Temperature	Snow and ice events pose significant risks to health, safety, and site operations. Road access may be disrupted, and low temperatures can affect assets such as fuel tankers, workers, and infrastructure. Freeze-thaw cycles may cause cracking in concrete and road surfaces, requiring snow clearance and ice management.	Screen in
High precipitation and pluvial flooding	Surface water remains a key vulnerability for any Proposed Development during both construction, and operational phases due to the sensitivity of construction materials, site access, and site assets to water exposure.	Screen in
Fluvial flooding	The development site located adjacent to a fluvial watercourse.	Screen in
Drought	Droughts have occurred across Ireland, previously impacting water supply. Future reductions in water availability would not directly impact operation.	Screen out
Wildfire	The area surrounding the site is largely urban and is screened out.	Screen out
High winds and storms	While the site itself isn't significantly elevated, nor are the proposed design changes, existing and proposed assets and design components may be exposed to high winds. Historically, Ireland has experienced several notable storm events including Storm Éowyn (2025) and Storm Darragh (2024), which caused widespread damage across Ireland. These storms often bring heavy rainfall and flood warnings, increasing overall risk.	Screen in
Fog	Fog is not considered a significant hazard for this development, as it does not involve transport, aviation, or activities requiring high visibility.	Screen out
Lightning	The proposed design is not elevated, and no extra risk is considered above what already exists under the existing design codes of the site and buildings	Screen out
Landslides and Subsidence	The Geological Society of Ireland (GSI) landslide susceptibility mapping database (GSI, 2025) was reviewed. No data was available for the site of the proposed development.	Screen in
Sea level rise and coastal flooding	The Flood Risk Assessment did not identify coastal flood as a risk to the development due to sufficient mitigation provided by authorities outside of the proposed development.	Screen out

9.4.2.3 Climate Change Vulnerability Assessment

The sensitivity and exposure of the development to the screened in climate hazards must first be determined to then determine the vulnerability of the Proposed Development to climate change. The screened in hazards have been considered as relevant climate hazards in the context of the Proposed Development.

The sensitivity of the Proposed Development to the climate hazards is assessed irrespective of the project location. Table 9-10 details the sensitivity of the Proposed Development on a scale of high (3), medium (2) and low (1). Once the sensitivity has been determined, the exposure of the Proposed Development to

each of the climate hazards is determined, this reflects on the possible likelihood of the climate hazard occurring at the project location and is also scored on a scale of high (3), medium (2) and low (1). The product of the sensitivity and exposure is then used to determine the overall vulnerability of the Proposed Development to each of the climate hazards. The results of the vulnerability assessment are detailed in Table 9-10.

Table 9-10 Climate Change Vulnerability Assessment

Climate Hazard	Sensitivity	Exposure	Vulnerability
Flooding (Pluvial & Fluvial)	1 (Low)	2 (Medium)	2 (Low)
Extreme Heat	1 (Low)	2 (Medium)	2 (Low)
Extreme Cold	1 (Low)	1 (Low)	1 (Low)
Extreme Wind	1 (Low)	2 (Medium)	2 (Low)
Landslide	1 (Low)	1 (Low)	1 (Low)

The sensitivity and exposure of the area was determined with reference to several online tools and with input from the various discipline specialists on the project team. It was concluded that the Proposed Development does not have any significant vulnerabilities to the identified climate hazards as described in the below sections. All vulnerabilities are classified as low.

9.4.2.3.1 Flooding

Future increases in rainfall due to climate change may elevate the risk of surface water (pluvial) flooding and fluvial flooding from the river Liffey. A Site-Specific Flood Risk Assessment (SSFRA) was completed by CS consulting (2025) and concluded the site was appropriate for development with the majority located with Flood Zone C (highlighting low probability of flooding). There is a very small portion of the site located with Flood Zone B but this area does not house any water vulnerable assets.

The proposed design incorporates robust flood mitigation and drainage resilience measures. Site drainage has been engineered to accommodate a 1-in-100-year extreme rainfall event, with an additional 30% capacity uplift to account for climate change, significantly reducing stormwater discharge to the public network and minimising flood risk to adjacent properties. Sustainable Drainage Systems (SuDS), including attenuation features and green/blue roof designs, further reduce peak flows while enhancing biodiversity.

A Site-Specific Flood Risk Assessment (SSFRA) confirms that the majority of the site lies at a suitable elevation, with negligible fluvial flood risk. The design flood level is set at 3.650m AOD, and while a minor portion of the site intersects Flood Zone B, it is not highly vulnerable. Where necessary, flood defences will be implemented to address predictable tidal flooding during extreme events. Collectively, these measures ensure compliance with planning standards and deliver a resilient, climate-adaptive development.

9.4.2.3.2 Extreme Temperatures (Heat & Cold)

In relation to extreme temperatures, both extreme heat and extreme cold, these have the potential to impact the building materials and some related infrastructure. However, building materials will be selected which meet the relevant design standards and accommodate high and low extreme temperatures. The design complies with EN 1991-1-5 for thermal actions and relevant material Eurocodes (EN 1992, EN 1993, etc.) to ensure performance under elevated and low temperature conditions. All materials are specified in accordance with the appropriate Eurocodes and CE-marked product standards to ensure long-term performance under Ireland's temperature extremes, including freeze–thaw resistance, thermal expansion properties, and durability requirements.

The likelihood of extreme cold events in the future is projected to decrease reducing their overall exposure and risk. Dangerous heat levels (+30°C) are equally unlikely and building design has incorporated these considerations with thresholds for materials accommodating these extremes. Therefore, both extreme temperatures (cold and heat) are not considered a significant risk given the mitigation integrated across the design.

Additionally, the proposed development aims to minimise adverse impacts on the urban heat island through design, layout, materials and the incorporation of green infrastructure. The design also aims to reduce the potential for internal overheating and reliance on air conditioning systems through sustainable heating and cooling technology as well as enhanced ventilation to accommodate temperature variation and extremes (BPC engineers, 2025b)

9.4.2.3.3 High Winds and Storms

The Proposed Development will be designed in accordance with the appropriate standards to address existing and projected wind loading events. All assets will be secured with reinforced mounting systems meeting Eurocode standards. Routine inspections will be carried out to reduce long-term exposure risks and deterioration.

The design does not introduce any significant changes in elevation compared to the existing layout; therefore, wind load effects are expected to be within standard design parameters for the site location.

9.4.2.3.4 Landslide and Subsidence

The Proposed Development passes through areas that may be susceptible to ground instability. During the construction phase, engineering will take all precautions not to disrupt ground stability in line with best practice. Robust retaining wall and basement construction shall facilitate below ground levels in the development. All shall be structurally designed to withstand sliding and overturning.

9.4.2.3.5 Summary

Overall, the Proposed Development has at most low vulnerabilities to the identified climate hazards. Therefore, no detailed risk assessment is required.

9.4.2.4 CCRA Significance of Effects

With design mitigation in place, there are no significant risks to the Proposed Development due to climate change. In accordance with the EPA Guidelines (EPA, 2022), the significance of effect of the impacts to the Proposed Development due to climate change during the operational phase are ***direct***, ***long-term***, ***negative*** and ***not significant***.

9.5 Mitigation Measures

9.5.1 Construction Phase

Embodied carbon of materials and construction activities will be the primary source of climate impacts during the lifecycle of the Proposed Development. The Embodied Carbon Report demonstrates that opting to part-demolish and extend the site, as opposed to demolishing the whole site and re-building, avoids ~10,000tCO_2e over the 60-year lifespan.

The Royal Institute of the Architects of Ireland (RIAI) set benchmarks relating to embodied carbon and operational energy in new-build offices in Ireland. The Embodied Carbon Report states "*The upfront carbon in the proposed building is 1.25% below the RIAI Climate Challenge 2030 target. The total embodied carbon is 4.2% higher than the RIAI Climate Challenge 2030 target. However, with some minor improvements to the design with respect to embodied carbon, including careful product selection, the building should be capable of meeting the RIAI 2030 climate challenge target for total EC.*" Where upfront

carbon is life-cycle stages A1-A5.

According to LETI (Low Energy Transformation Initiative), for buildings that are currently in the design stage: a good design should achieve a LETI band C, meaning that the embodied carbon stages A1-A5 should be between 475 and 600 $kgCO_2e/m^2$. The upfront embodied carbon calculated for the Proposed Development is in line with the benchmarks presented (469 $kgCO_2e/m^2$). The Embodied Carbon Report demonstrates the upfront embodied carbon for the Proposed Development achieves all benchmark targets whereas for the Baseline design, the benchmarks cannot be met.

The most significant mitigation strategy is therefore retaining a proportion of the existing structure and extending it. In addition, material selection will also help to reduce associated GHG emissions.

As part of the overall embodied carbon reduction strategy, the design targets 30% of the cement will be replaced by Ground Granulated Blast Furnace Slag (GGBS) (See Section 9.2.1.4). GGBS is a by-product of iron and steel making processes. It is dried and ground in to a white powder which can be used to replace anywhere between 30% and 80% of the cement in concrete. During detailed design, if technically viable this percentage will be increased. The project will also target 90% recycled steel in rebar and 20% recycled content in structural steel.

The Embodied Carbon Report identified further opportunities to reduce GHG emissions associated with carbon intensive materials such as:

- Suspended ceiling systems (17.06% EC [A-C]):
  - Alternative to steel system types, e.g. low EC mineral fibre panels, exposed ceilings.
- Raised flooring systems (13.80% EC [A-C]):
  - Alternatives to steel/aluminium system types, e.g. calcium sulphate raised floors.
- Ready-mix concrete for external walls and floors (13.54% EC [A-C]): Increasing GGBS %. 30% currently assumed.
  - Some of the new or infill floor slab elements may be able to be increased to 50% GGBS.
- HVAC components and equipment (10.50% EC [A-C]):
  - Reducing amount of equipment/material.
  - Particular attention to be paid to AHUs where units may be custom and may offer more flexibility with regard to specifications compared to other equipment.
  - Considering equipment EC when specifying equipment and selecting lower EC options where possible. (Whole lifecycle needs to be considered including operational energy.)
- Reinforcement bars (8.09%)
  - Increase recycled content to 100% (90% currently assumed).
  - Prioritize green steel and lower carbon manufacturing where possible.
- Floor coverings (8.07% EC [A-C]):
  - Explore different flooring solutions that have lower upfront EC and require less maintenance and replacement, e.g. linoleum, wood, natural stones.
- Structural steel and steel profiles (6.89% EC [A-C]):
  - Increasing recycled content (20% currently assumed.)
  - Prioritize green steel and lower carbon manufacturing where possible.
- Glass façade including frames and aluminium shading (3.61% EC [A-C], 7.5% for stages A1-A3):
  - Reducing amount of material, e.g. size/amount of shading fins, framing %. (Must be balanced with operational energy, accounting for solar requirements, etc.)
  - Product selection. Increase recycled content %. Recycled aluminium consumes roughly 10% of the energy of virgin sourced material so choosing products that use recycled aluminium can reduce EC significantly.

Additionally, during the construction phase the following best practice measures shall be implemented on site to prevent significant GHG emissions and reduce impacts to climate:

- Prevention of on-site or delivery vehicles from leaving engines idling, even over short periods.
- Ensure all plant and machinery are well maintained and inspected regularly.
- Minimising waste of materials due to poor timing or over ordering on site will aid to minimise the embodied carbon footprint of the site.
- Sourcing materials locally will be prioritised. This will help to reduce transport related CO_2 emissions and helps support local suppliers, further promoting economic sustainability.

In terms of impact on the Proposed Development due to climate change, during construction the Contractor will be required to mitigate against the effects of climate hazards such as extreme rainfall, pluvial flooding, extreme wind/storms, temperature extremes through site risk assessments and method statements. All materials used during construction will be accompanied by certified datasheets which will set out the limiting operating temperatures. Temperatures can affect the performance of some materials, and this will require consideration during construction. During construction, the Contractor will be required to mitigate against the effects of other hazards through site risk assessments and method statements that may influence construction materials such as accommodating workers health and safety during high heatwaves or weather warnings aligned to appropriate regulations and practices.

9.5.2 Operational Phase

A number of measures have been incorporated into the design of the development 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 pluvial flooding 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 9.4.2.3).

The Proposed Development has been designed to reduce the impact on climate as a result of energy usage during operation. The Climate Action Energy Statement, prepared by BPC Engineers details a number of incorporated design mitigation measures to reduce the impact on climate wherever possible. Such measures include:

- District Heat Enabled
- Low air permeability
- High performance U-values
- Limiting thermal bridging
- Optimisation of solar gain
- Maximising daylight
- Air-source heat pumps (ASHPs) (Multi-functional [4-pipe] heat pumps.)
- Solar Photovoltaics (PV).

These identified measures will aid in reducing the impact to climate during the operational phase of the Proposed Development in line with the goals, relevant policies and objectives of the *Dublin City Council Action Plan 2024-2029*, including climate mitigation measures. Further details on some of the incorporated design measures can be found in the Climate Action Energy Statement, prepared by BPC Engineers (2025b).

9.6 Monitoring

No monitoring is required for the development during the construction or operational phase

9.7 Residual Effects of the Proposed Development

The impact to climate as a result of a Proposed Development must be assessed as a whole for all phases. The Proposed Development will result in some impacts to climate through the release of GHGs. TII reference the ISEP GHG Guidance which states 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 Proposed Development with mitigation measures is estimated to result in total GHG emissions of 50,463 tonnes over the 60-year lifetime of the Proposed Development, or 841 tCO_2e when annualised. This is equivalent to 0.02% of the 2030 Industrial sector budget when annualised over the lifespan.

The commitment to refurbish and extend, in addition to the level of mitigation described in Section 9.5 has been considered when determining the significance of the residual impact of the Proposed Development in relation to GHG emissions. The Proposed Development has mitigated GHG impacts and is fully in line with Ireland's national climate policy and its trajectory towards net zero. According to the TII significance criteria described in Section 9.2.2.3 and Table 9-3, the significance is ***minor adverse***.

The ISEP GHG guidance (ISEP, 2022) (which has been embraced by the updated TII Guidance (TII 2022) in Section 6.7.2) states as follows:

"A minor adverse not significant impact is described with: 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 that has a minor adverse effect that 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."

As per the assessment criteria in Table 9-3 the residual impact of the Proposed Development in relation to GHG emissions is considered ***direct, long-term, negative*** and ***slight***, which is overall ***not significant*** in EIA terms.

In relation to climate change vulnerability and residual risks to the proposed development due to climate change. The most impactful hazard is that of pluvial flooding. The mitigation measure presented in Sections 9.4.2.3 and 9.5 have reduced the residual risk to very low. The residual effect of climate change on the proposed development is therefore considered ***direct, long-term, negative*** and ***imperceptible***, which is overall ***not significant*** in EIA terms.

9.8 Cumulative Impacts of the Proposed Development

With respect to the requirement for a cumulative assessment the ISEP (ISEP, 2022) and TII (TII, 2022a) guidance on which the assessment is based states that:

"*the identified receptor for the GHG Assessment is the global climate and impacts on the receptor from a project are not geographically constrained, the normal approach for cumulative assessment in EIA is not considered applicable. By presenting the GHG impact of a project in the context of its alignment to Ireland's trajectory of net zero and any sectoral carbon budgets, this assessment will demonstrate the potential for the project to affect Ireland's ability to meet its national carbon reduction target. This assessment approach is considered to be inherently cumulative*".

As per the above, the cumulative impact of the Proposed Development in relation to GHG emissions is considered ***direct, long-term, negative*** and ***slight***, which is overall ***not significant*** in EIA terms.

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Chapter 10 – Noise and Vibration

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10. NOISE AND VIBRATION

10.1 Introduction

This chapter of the Environmental Impact Assessment Report assess the potential noise and vibration impacts associated with the proposed development at 1 North Wall Quay, Dublin 1.

The Proposed Development comprises the partial demolition (c. 33% of the existing floor area) of the existing CitiGroup Building and the construction of a new office development with heights from 7 to 12 no. storeys over 1 level of basement with an overall gross floor area of c. 0.88 ha.

A full description of the development can be found in Chapter 2.

This chapter considers both the noise and vibration impacts associated with the short-term construction phase and the long-term operational phase impacts on the surrounding environment. Mitigation measures are included, where relevant, to ensure the proposed development is constructed and operated with minimal impact on the receiving noise environment.

10.2 Methodology

10.2.1 Assessment Overview

This impact assessment has been undertaken using the following methodology:

- A review of the most applicable standards and guidelines has been conducted in order to set a range of acceptable noise and vibration criteria for the construction and operational phases of the proposed development;
- A baseline noise survey has been undertaken surrounding the development site to establish the prevailing noise environment across the site and at the nearest noise sensitive locations (NSLs). Review of published noise maps in the vicinity of the proposed development site have been reviewed to provide further baseline noise data to describe the prevailing noise environment.
- Predictive calculations have been performed to estimate the likely noise emissions during the construction phase of the proposed development at the nearest NSLs to the site;
- Predictive calculations have been performed to assess the potential effects associated with the operation of the proposed development at NSLs surrounding the site; and
- An assessment has been completed of potential cumulative effects that may arise as a result of the proposed development and other existing or proposed plans and projects;

10.2.2 Relevant Guidelines and Standards

There are no statutory standards in Ireland relating to noise and vibration limit values for construction works or for environmental noise relating to the operational phase. In the absence of specific statutory Irish guidelines, the assessment has made reference to non-statutory national guidelines, where available, in addition to international standards and guidelines relating to noise and / or vibration impact for environmental sources which are set out in the following sections.

In addition to specific noise and vibration guidance documents, the Environmental Protection Agency (EPA) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA 2022) were considered and consulted in the preparation of this Chapter.

10.2.3 Assessment Criteria – Construction Phase

Dublin City Council typically control construction activities by imposing limits on the hours of construction and recommended construction noise limits based on a risk based approach which considers the nature and extent of the works and the surrounding environment. Construction noise sources include construction plant and machinery and construction related traffic on surrounding roads. Reference is made to the following guidelines and standards to inform the most appropriate construction noise and vibration significance thresholds and assessment methodologies:

- Dublin City Council's (DCC) "Air Quality Monitoring and Noise Control Unit's Good Practice Guide for Construction and Demolition" (hereinafter referred to as DCC GPG)
- British Standard Institute (BSI) British Standard (BS) 5228-1:2009 +A1 2014 Code of Practice for noise and vibration control of construction and open sites - Part 1: Noise (hereafter referred to as BS 5228–1) (BSI 2014a);
- BS 5228-2:2009+A1:2014 Code of Practice for noise and vibration control of construction and open sites - Part 2: Vibration (hereafter referred to as BS 5228 – 2) (BSI 2014b);
- BS 7385: 1993 Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration (hereafter referred to as BS 7385–2). (BSI 1993);
- BS 6472-1: 2008 Guide to evaluation of human exposure to vibration in buildings, Part 1 Vibration sources other than blasting (hereafter referred to as BS 6472–1) (BSI 2008);
- UK Highways Agency (UKHA) Design Manual for Roads and Bridges (DMRB) LA 111 Sustainability and Environmental Appraisal LA 111 Noise and Vibration Revision 2 (hereafter referred to as DMRB Noise and Vibration) (UKHA 2020); and
- International Organization for Standardization (ISO) 9613-2:2024 Acoustics – Attenuation of sound during propagation outdoors - Part 2: Engineering method for the prediction of sound pressure levels outdoors (hereafter referred to as ISO 9613 – 2) (ISO 2024).

10.2.3.1 Construction Noise Criteria

The proposed Project has been classed as a high-risk category site based on the DCC GPG risk assessment factors as detailed below:

- Duration of the works;
- Distance to NSLs;
- Ambient noise levels;
- Site operating hours;
- Location of works;
- Duration of demolition, and
- Intrusive noise activities, including vibration generating activities.

The duration, nature and extent of construction activities associated with the Construction Phase of the proposed Project would categorise it within the high-risk category. The monitoring section (S.6) of the DCC GPG document notes the following for high-risk category sites: -

> *'The ABC Method detailed in Paragraph E.3.2 of BS 5228-1:2009 shall be used to determine acceptable noise levels for day, evening and night time work.'*

10.2.3.2 British Standard BS 5228 – 1: 2009+A1:2014 – ABC Method

The ABC method detailed in Paragraph E.3.2 of BS 5228 – 1 (BSI 2009 +A1 2014a) designates a noise-sensitive location into a specific category (A, B or C) based on exiting ambient noise levels in the absence of construction noise. This then sets a threshold noise value that, if exceeded at this location, indicates a potential significant noise impact is associated with the construction activities, depending on context.

This document sets out guidance on Construction Noise Thresholds (CNTs) relative to the existing noise environment. Table 10-1 sets out the threshold values which, when exceeded, signify a potential significant effect at the facades of residential receptors as recommended by BS5228-1:2009+A1:2014.

10.2.3.3 Residential and Other Noise Sensitive Receptors

Table 10-1. Example CNT of Potentially Significant Effect at Dwellings

Assessment category and threshold value period (L_{Aeq})	Construction Noise Threshold (CNT) value in decibels (dB)		
	Category A [A]	Category B [B]	Category C [C]
Daytime (07:00 – 19:00) and Saturdays (07:00 – 13:00)	65	70	75
Evenings and weekends	55	60	65
Night-time (23:00 to 07:00hrs)	45	50	55

Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are less than these values.
Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are the same as category A values.
Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are higher than category A values.

It should be noted that this assessment method is only valid for residential properties and if applied to commercial premises without consideration of other factors may result in an excessively onerous thresholds being set.

10.2.3.4 Commercial Receptors

BS 5228--1:2009+A1:2014 gives several examples of acceptable limits for construction noise, the most simplistic being based upon the exceedance of fixed noise limits. Section E.2 notes

> "*Noise levels, between say 07.00 and 19.00 hours, outside the nearest window of the occupied room closest to the site boundary should not exceed:*
>
> *70 decibels (dBA) in rural, suburban areas away from main road traffic and industrial noise;*
>
> *75 decibels (dBA) in urban areas near main roads in heavy industrial areas*".

10.2.3.5 Summary

Given the environment in which the site is located and the nature and proximity of the surrounding building uses, the following construction noise thresholds (CNT) are proposed for the development:

- Residential Unit North and east of site: 65 dB $L_{Aeq,T}$
- All other locations (offices and commercial buildings): 75 dB $L_{Aeq,T}$

Exceedance of the above CNTs is deemed to result in a potentially significant effect, depending on the duration or the impact and margin above the threshold level is calculated.

10.2.3.6 Significance of Construction Noise Levels

In order to assist with interpretation of significance, Table 10-2 includes guidance as to the likely magnitude of noise impact associated with construction activities, relative to the CNT. This guidance is derived from Table 3.16 of DMRB Noise and Vibration document (DMRB 2020) and adapted to include the relevant significance effects from the EPA *Guidelines* on the Information to be Contained in Environmental Impact Assessment Reports (EPA 2022) using professional expertise and judgment.

In accordance with the DMRB Noise and Vibration document (UKHA 2020), construction noise and construction traffic noise impacts shall constitute a significant effect where it is determined that a major or moderate magnitude of impact will occur for a duration exceeding:

- Ten or more days or night in any 15 consecutive day or nights; and
- A total number of days exceeding 40 in any six consecutive months.

Table 10-2 *Construction Noise Significante Ratings*

Construction Noise Level	DMRB Magnitude of Impact	EPA Mapped Impacts	Determination
Below or equal to baseline noise level	Negligible	Not Significant	Depending on CNT, duration & baseline noise level
Above baseline noise level and below or equal to CNT	Minor	Slight to Moderate Note 1	
Above CNT and below or equal to CNT +5dB	Moderate	Moderate	
Above CNT +5 and below or equal to CNT +15dB Note 2	Major	Significant, to Very Significant	
Above +15dB		Very Significant to Profound Note 2	

Note 1: CNLs at the upper end of this range will result in higher potential impacts, therefore this range is categorised as slight to moderate, acknowledging that values approaching the CNT are greater than slight. In accordance with DMRB, noise levels below the CNT are deemed 'Not Significant'.

Note 2: The DMRB does not distinguish beyond a 'Major' impact. For the purposes of distinguishing a Very Significant and Profound Impact, CNLs exceeding the CNT by +20dB are categorised as Profound.

The adapted DMRB Noise and Vibration (UKHA 2020) guidance is used to assess the overall significance of construction noise at NSLs across the proposed Project.

10.2.3.7 Construction Vibration Criteria

Vibration standards are generally split into two categories, those dealing with human comfort and those dealing with cosmetic or structural damage to buildings. In both instances, it is appropriate to consider the magnitude of vibration in terms of Peak Particle Velocity (PPV) based on the reviewed documents in the following sections.

10.2.3.8 Building Response

Guidance relevant to acceptable vibration within buildings is contained in the following documents:

- British Standard BS 7385-2:1993 Evaluation and Measurement for Vibration In Buildings - Guide to Damage Levels from Ground Borne Vibration, and;
- British Standard BS 5228-1:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites - Vibration.

BS 7385:1993 states that there should typically be no cosmetic damage if transient vibration does not exceed 15 mm/s at low frequencies rising to 20 mm/s at 15 Hz and 50 mm/s at 40 Hz and above. These guidelines relate to relatively modern buildings and should be reduced to 50 % or less for more critical buildings.

BS 7385-2 and BS 5228-2 advise that, for soundly constructed residential properties and similar light-framed structures that are generally in good repair, a threshold for minor or cosmetic (i.e. non-structural) damage should be taken as a peak component particle velocity (in frequency range of predominant pulse) of 15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz and 50 mm/s at 40 Hz and above for transient vibration. Where the dynamic loading caused by continuous vibration is such as to give rise to dynamic magnification due to resonance, especially at the lower frequencies where lower guide values apply, then the guide values in Table B.2 of BS 5228-2 might need to be reduced by up to 50%. On a cautious basis, therefore, continuous vibration limits are set as 50% of those for transient vibration across all frequency ranges. For buildings or structures that are structurally unsound, lower vibration magnitudes will apply, typically 50% of those for structurally sound buildings. Protected or historic buildings are not automatically assumed to be more vulnerable to vibration unless they have existing structural defects. The values are summarised in Table 10-3.

Table 10-3 Transient Vibration Threshold values for Buildings

Type of Building	Peak component particle velocity in frequency range of predominant pulse	
	4 Hz to 15 Hz	15 Hz and above
Unreinforced or light framed structures. Residential or light commercial buildings.	15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz	20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above
Reinforced or framed structures. Industrial and heavy commercial buildings	50mm/s	

Note 1: Values referred to are at the base of the building.
Note 2: At frequencies below 4 Hz, a maximum displacement of 0.6 mm (zero to peak) is not to be exceeded.

BS 5228-2 and BS 7485-2 state that minor structural damage can occur at vibration magnitudes greater than twice those in Table 10-3 and major structural damage can occur at vibration magnitudes greater than four times those in Table 10-3.

10.2.3.9 Human Response

Humans are sensitive to vibration stimuli, and perception of vibration at magnitudes significantly lower than those related to building response may cause concern to building occupants. BS 5228-2 (BSI 2014b) notes that vibration typically becomes perceptible at around 0.15 to 0.3 mm/s and may become disturbing or annoying at higher magnitudes. Higher levels of vibration are typically tolerated for single events or events of short-term duration, particularly during construction projects and when the origin of vibration is known.

Table 10-4 presents the significance table relating to potential effects to building occupants during construction based on guidance from BS 5228-2 the DMRB Noise and Vibration (UKHA 2020) document and the associated EPA EIAR significant ratings.

Table 10-4 Guidance on effects of human response to PPV magnitudes

PPV range	BS 5228-2 (Note A, B, C)	DMRB Impact Magnitude	EPA Significance Ratings
≥10 mm/s PPV	Vibration is likely to be intolerable for any more than a very brief exposure to this level in most building environments.	Very High	Very Significant
≥1 mm/s PPV	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	High	Moderate to Significant
≥0.3 mm/s PPV	Vibration might be just perceptible in residential environments.	Medium	Slight to Moderate
≥0.14 mm/s PPV	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.	Low	Not significant to Slight
<0.14 mm/s PPV	Not perceptible	Very Low	Imperceptible to Not significant

Notes from BS5228-2

A) The magnitudes of the values presented apply to a measurement position that is representative of the point of entry into the recipient.

B) A transfer function (which relates an external level to an internal level) needs to be applied if only external measurements are available.

C) Single or infrequent occurrences of these levels do not necessarily correspond to the stated effect in every case. The values are provided to give an initial indication of potential effects, and where these values are routinely measured or expected then an assessment in accordance with BS 6472 (BS1 2008), and/or other available guidance, might be appropriate to determine whether the time varying exposure is likely to give rise to any degree of adverse comment.

10.2.4 Construction Traffic Noise Criteria

Vehicular movement to and from the construction site for the proposed development will make use of the existing road network. In order to assess the potential impact of additional traffic on the human perception of noise, the following two guidelines are referenced DMRB Noise and Vibration (UKHA 2020) and the EPA EIAR Guidelines (EPA, 2022). For construction traffic, due to the short-term period over which this impact occurs, the magnitude of impacts is assessed against the 'short term' period in accordance with the DMRB Noise and Vibration (UKHA 2020) document.

Table 10-5 sets out the classification of changes in noise level to impact on human perception based on the guidance contained in these documents.

Table 10-5 Classification of Magnitude of traffic noise changes for Construction Traffic

Change in Sound Level (dB)	Subjective Reaction	DMRB Magnitude of Impact (Short-term)	EPA Significance of Effect
Less than 1 dB	Inaudible	Negligible	Imperceptible
1 – 2.9	Barely Perceptible	Minor	Not Significant
3 – 4.9	Perceptible	Moderate	Slight, Moderate
≥ 5	Up to a doubling of loudness	Major	Significant

10.3 Operational Phase Assessment Criteria

The main potential source of outward noise from the proposed development will be limited to traffic flows to and from the development site onto the public roads and mechanical and electrical plant required to service the new office buildings. The relevant guidance documents used to assess potential operational noise and vibration impacts on the surrounding environment are summarised below.

- BS 8233:2014 Guidance on sound insulation and noise reduction for buildings (hereafter referred to as BS 8233) (BSI 2014c);
- BS 4142: 2014 +A1 2019 Methods for Rating and Assessing Industrial and Commercial Sound (hereafter referred to as BS 4142) (BSI 2019);
- ISO 1996-1:2016 Acoustics - Description, measurement and assessment of environmental noise. Part 1: Basic quantities and assessment procedures (hereafter referred to as ISO 1996 – 1) (ISO 2016);
- The UK Department of Transport Calculation of Road Traffic Noise (hereafter referred to as the CRTN) (UK Department of Transport 1988).
- UK Highways Agency (UKHA) Design Manual for Roads and Bridges (DMRB) LA 111 Sustainability and Environmental Appraisal LA 111 Noise and Vibration Revision 2 (hereafter referred to as DMRB Noise and Vibration) (UKHA 2020);
- International Organization for Standardization (ISO) 9613-2:1996 Acoustics – Attenuation of sound during propagation outdoors - Part 2: Engineering method for the prediction of sound pressure levels outdoors (hereafter referred to as ISO 9613 – 2) (ISO 2024);

10.3.1 Building Services Plant Noise

Building services required for ventilation, heating or other active process have the potential to emit noise to the surrounding environment. For the proposed development these items of plant have the potential to operate on a 24/7 basis depending on the end users in different areas of the building. To assess any noise impacts from these sources, reference is made here to the British Standard BS 4142 (BSI 2019).

10.3.1.1 Existing Noise Sensitive Locations - External

Dublin City Council (DCC) refer to the BS 4142 document as a means of controlling noise emissions from new developments. Typical planning conditions relating to the control of noise from new commercial development state the following:

> *Noise levels from the proposed development shall not be so loud, so continuous, so repeated, of such duration or pitch or occurring at such times as to give reasonable cause for annoyance to a person in any premises in the neighbourhood or to a person lawfully using any public place. In particular, the rated noise levels from the proposed development shall not constitute reasonable grounds for complaint as provided for in B.S. 4142. Method for rating industrial noise affecting mixed residential and industrial areas.*
>
> The method of assessing plant noise set out in BS 4142 (BSI 2019) is based on the following definitions:
>
> *"Specific noise level, $L_{Aeq,T}$" is the equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, T;*
>
> *"Rating level, $L_{Ar,T}$" is the specific noise level plus adjustments for the character features of the sound (if any);*
>
> *"Residual noise level, $L_{Aeq,T}$" is the noise level produced by all sources excluding the sources of concern, in terms of the equivalent continuous A-weighted sound pressure level over the reference time interval, T;*

"Background noise level, $L_{A90,\,T}$" is the A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T. This level is expressed using the L_{A90} parameter. These levels were measured as part of the baseline survey.

Adjustments to the rating level are appropriate where noise emissions are found to be tonal, impulsive in nature or irregular enough to attract attention. In these cases, penalties are applied of either an additional 2 dB, 4 dB or 6 dB depending on how perceptible the tone is at the noise receptors.

The background level should then be subtracted from the rating level. The greater this difference, the greater the magnitude of the impact will be, in general. A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, while a difference of around +5 dB is likely to be an indication of an adverse impact (as referred to in BS 4142 (BSI 2019)), depending on the context.

10.3.1.2 Noise Sensitive Locations – Within Proposed Development

For offices within to the proposed development, acceptable noise levels both internally and externally, can be determined by referring to the British Standard BS 8233 (BSI 2014c). The following guidance, summarised in Table 10-6, is provided in this standard for internal ambient noise levels in the spaces noted.

Table 10-6 Guidance on Indoor Ambient Noise Levels for Development Building

Activity	Location	Internal Noise Design Range	Derived External Levels
Office	Executive office	35 – 40 dB $L_{Aeq,\,T}$	50 – 55 dB $L_{Aeq,\,T}$
	Open Pan	45 – 50 dB $L_{Aeq,\,T}$	60 – 65 dB $L_{Aeq,\,T}$
	Staff areas/ meeting rooms	35 – 45 $L_{Aeq,\,T}$	50 – 65 dB $L_{Aeq,\,T}$
Commercial Spaces	Shops, cafes, etc	50 – 55 $L_{Aeq,\,T}$	65 – 70 L_{Aeq}

The derived external levels are based on the approximate attenuation provided by a partially open window of 15 dB, as advised in BS 8233 (BSI 2014c), and represent the appropriate noise level at the external façade of the building. For mechanically ventilated buildings, higher external noise levels will achieve the same internal noise levels with closed windows.

10.3.2 Additional Traffic on Surrounding Roads

Vehicular movement to and from the proposed development will make use of the existing road network. In order to assess the potential impact of additional traffic on the human perception of noise, the following two guidelines are referenced DMRB Noise and Vibration (UKHA 2020) and the EPA Guidelines (EPA, 2022).

Table 10-7 relates to changes in noise to impact on human perception based on the guidance contained in these documents.

Table 10-7 Classification of magnitude of changes in traffic noise in the long term

Change in Sound Level (dB)	Subjective Reaction	DMRB Magnitude of Impact (Long-term)	EPA Significance of Effect
0	Inaudible	--	Imperceptible

0.1 – 2.9	Barely Perceptible	Negligible	Not significant
3 – 4.9	Perceptible	Minor	Not Significant to Slight
5 – 9.9	Up to a doubling of loudness	Moderate	Slight to Moderate
10+	Doubling of loudness and above	Major	Significant to Very significant

10.3.3 Operational Phase – Vibration

The development is commercial and mixed use in nature. There are no vibration sources associated with the proposed development, therefore there are no outward impact associated with vibration for the operational phase, and accordingly such impacts have been scoped out.

10.4 Forecasting Methods and Difficulties Encountered

Construction noise calculations have been conducted generally in accordance with BS 5228: 2009+A1:2014: *Code of practice for noise control on construction and open sites - Noise.*

Prediction calculations for building services noise, car park activity and vehicle movements on site have been conducted generally in accordance with ISO 9613 (2024): *Acoustics – Attenuation of sound outdoors – Part 2:* Engineering method for the prediction of sound pressure levels outdoors.

No difficulties were encountered in the preparation of this chapter

10.5 Receiving Environment

The site is bound by North Wall Quay to the south and Commons Street to the west. Existing commercial and residential buildings adjoin the site to the north and east. Clarion Quay runs immediately adjacent to the northern boundary of the site.

The nearest noise sensitive locations (NSLs) have been identified as residential units to the north of the proposed development along Alderman Way and Clarion Quay, residential units to the east of the development along Clarion Quay and Excise Walk and commercial units to the north and west of the proposed development along Common Street.

An environmental noise survey has been conducted to quantify noise emissions across the existing site. The external survey was conducted in general accordance with ISO1996-2:2017 *Acoustics - Description, Measurement and Assessment of Environmental Noise*. The following section reviews the existing noise environment surrounding the site.

10.5.1 Baseline Noise Survey

10.5.1.1 Monitoring Locations

Four attended noise measurements were conducted at Locations AT1, AT2, AT3 and AT4. Figure 10-1 indicates the noise monitoring locations surveyed. The survey locations are described below.

Figure 10-1 Noise Monitoring Locations (Background Imagery Google earth, Red Line Indicative)

AT1 Located along the west site boundary outside a commercial office building. This location was chosen to represent noise levels to the west of the building.

AT2 Located along the northern site boundary, an attended noise survey was undertaken at this location outside a residential apartment building.

AT3 Located along the northeastern site boundary, an attended noise survey was undertaken at this location to measure noise levels of the eastern side of the building representing the rear facades of the adjacent apartment buildings to the east.

AT4 Located along the southern site boundary, an attended noise survey was undertaken at this location to measure noise levels along the quay side boundary.

10.5.1.2 Monitoring Equipment

AWN personnel conducted all noise measurements. Attended noise measurements were undertaken using a Larson Davis LxTI sound level meter (S/N 6260). The measurement apparatus was check calibrated both before and after each survey using a Brüel & Kjær (4231) Sound Level Meter Calibrator.

10.5.1.3 Survey Periods

Attended noise measurements were conducted at Locations AT1, AT2, AT3 and AT4 between 11:00 hrs and 15:00 hrs 29 August 2023.

Survey periods for all measurements were 15 minutes. The measurements represent typical periods that were selected in order to provide a snapshot of the existing noise climate.

10.5.1.4 Noise Measurement Parameters

The survey results are presented in terms of the following parameters:

L_{Aeq} is the equivalent continuous sound level. It is a type of average and is used to describe a fluctuating noise in terms of a single noise level over the sample period. It is typically used as a descriptor for ambient noise.

L_{AFMax} is the maximum sound level that is exceeded during the survey period measured using fast weighting of 1 second.

L_{A10} is the sound level that is exceeded for 10% of the sample period. It is typically used as a descriptor for background noise.

L_{A90} is the sound level that is exceeded for 90% of the sample period. It is typically used as a descriptor for background noise.

The "A" suffix denotes the fact that the sound levels have been "A-weighted" in order to account for the non-linear nature of human hearing. All sound levels in this report are expressed in terms of decibels (dB) relative to $2x10^{-5}$ Pa.

10.5.1.5 Noise Survey Results

10.5.1.5.1 Location AT1

The survey results for Location AT1 are presented in Table 10-8.

Table 10-8 Summary of Survey Results for Location AT1

Date / Time (hrs)		Measured Noise Levels (dB re. 2x10-5 Pa)			
		$L_{Aeq,15min}$	L_{Amax}	$L_{A10,15min}$	$L_{A90,15min}$
29/08/2023	11:00	67	88	70	55
	12:12	66	83	70	55
	13:30	66	85	69	56

Road traffic passing along the adjacent road was the main source observed during the survey. Construction noise was audible in the background during the first and second measurement period. Ambient noise levels were in the range of 66 to 67 dB $L_{Aeq,15min}$ with background noise levels (i.e. L_{A90} values) in the range of 55 to 56 dB $L_{A90,15min}$.

10.5.1.5.2 Location AT2

The survey results for Location AT2 are presented in Table 10-9.

Table 10-9 Summary of Survey Results for Location AT2

Date / Time (hrs)	Measured Noise Levels (dB re. 2x10-5 Pa)

		$L_{Aeq,15min}$	L_{Amax}	$L_{A10,15min}$	$L_{A90,15min}$
29/08/2023	11:17	58	74	60	55
	12:30	58	73	59	56
	13:47	59	80	60	56

Local road traffic along the adjacent road was the main sources observed during the survey. Construction activity was audible at low level during the first and second measurement period. During the third measurement period delivery vehicles passing along the adjacent road were source of the maximum noise level. Ambient noise levels were in the range of 58 to 59 dB $L_{Aeq,15min}$ with background noise levels (i.e. L_{A90} values) in the range of 55 to 56 dB $L_{A90,15min}$.

10.5.1.5.3 Location AT3

The survey results for Location AT3 are presented in Table 10-10.

Table 10-10 Summary of Survey Results for Location AT3

Date / Time (hrs)		Measured Noise Levels (dB re. $2x10^{-5}$ Pa)			
		$L_{Aeq,15min}$	L_{Amax}	$L_{A10,15min}$	$L_{A90,15min}$
29/08/2023	11:36	61	81	63	55
	12:47	61	76	63	55
	14:04	60	82	62	55

Local road traffic along the adjacent road was the main sources observed during the survey. Construction activity was audible at low level during the first and second measurement period. Ambient noise levels were in the range of 60 to 61 dB $L_{Aeq,15min}$ with background noise levels (i.e. L_{A90} values) in the range of 55 to 55 dB $L_{A90,15min}$.

10.5.1.5.4 Location AT4

The survey results for Location AT4 are presented in Table 10-11.

Table 10-11 Summary of Survey Results for Location AT4

Date / Time (hrs)		Measured Noise Levels (dB re. $2x10^{-5}$ Pa)			
		$L_{Aeq,15min}$	L_{Amax}	$L_{A10,15min}$	$L_{A90,15min}$
29/08/2023	11:55	69	89	72	58
	13:06	68	74	71	58
	14:24	68	85	71	57

Road traffic and Pedestrian noise were the main sources observed during the survey. During the first measurement period buses passed nearby to the monitoring location. Ambient noise levels were in the range of 68 to 69 dB $L_{Aeq,15min}$ with background noise levels (i.e. L_{A90} values) in the range of 57 to 58 dB $L_{A90,15min}$.

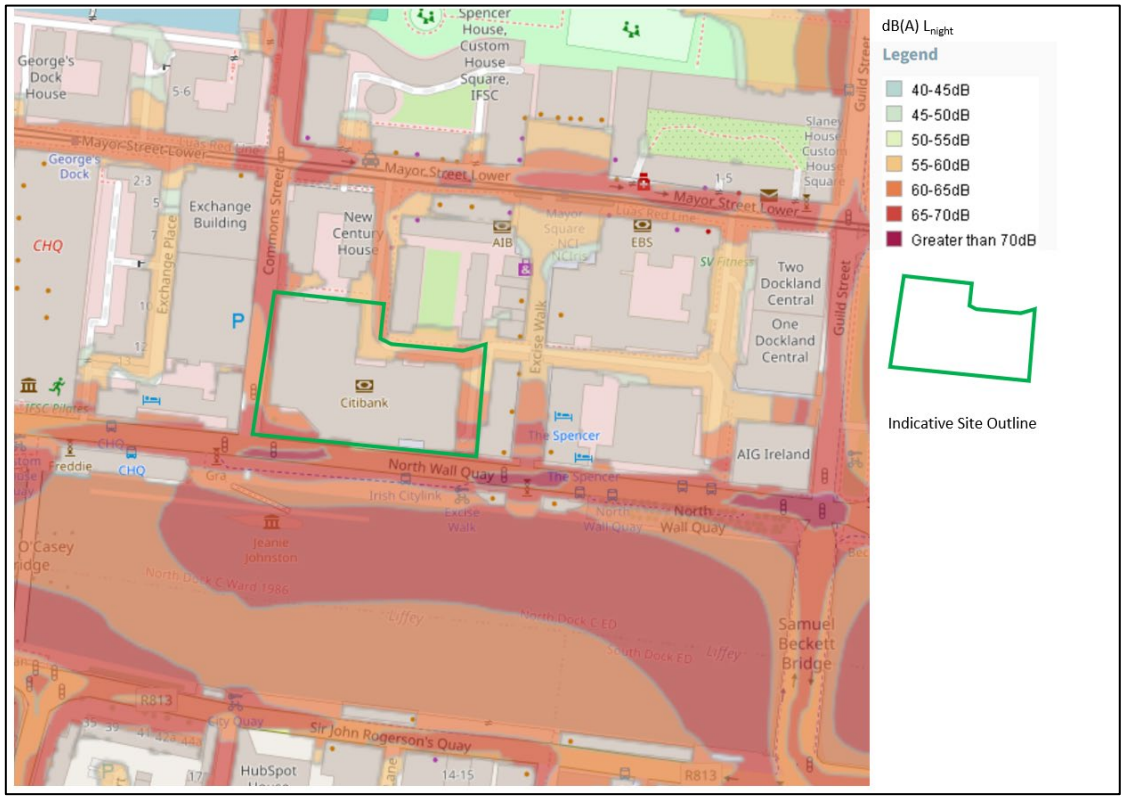
10.5.2 Review of Noise Maps

A desktop review of publicly available data has been undertaken to further characterise the baseline noise environment in the study area. Reference has been made to the most recent Round 4 noise maps published by the Environmental Protection Agency (EPA) (http://gis.epa.ie) for road traffic and rail noise within the Dublin Agglomeration. The published noise maps are provided for the overall day-evening-night period in terms of L_{den} and the L_{night} parameters. For the purposes of this report, the mapped night-time noise levels are presented here. The L_{night} parameter is defined below:

L_{night} is the A-weighted long-term average sound level as defined in ISO 1996-2, determined over all the night periods of a year. The eight-hour night-time period is between 23:00hrs and 07:00hrs.

Figure 10-2 presents the mapped agglomeration noise levels in the vicinity of the development site. For this site, the mapped noise levels relate to road traffic noise.

Figure 10-2 Mapped L_{night} Traffic Noise Level (Source: *http://gis.epa.ie*)



Night-time noise levels surrounding the site are dominated by traffic along the local road networks including North Wall Quay, Commons Street and Mayor Street Lower. Noise levels are mapped in the range of 55 to 60 dB L_{night} along Clarion Quay on the northern and eastern site boundaries. Noise levels to the south and west of the site along Common Street and North Wall Quay are mapped within the 60 to 65 dB L_{night} contour.

10.6 Characteristics of the Proposed Development

The information presented in this section is informed by the project design, but it is not a complete description of the Proposed Development. Therefore, it should be read in conjunction with the full development package. For a more comprehensive understanding of the Proposed Development, please refer to Chapter 2 (Description of the Proposed Development) of the EIA Report. Chapter 2 provides a detailed overview of the lifecycle of the project, including reference to the architectural and civil

engineering, drawings, plans, reports, and other relevant document in order to define the proposed development.

When considering a development of this nature, the potential noise and vibration impact on the surroundings are considered for each of two distinct stages:

- Construction Phase; and
- Operational Phase

10.6.1 Construction Phase

During the short-term construction phase, construction works will involve the partial demolition of the existing building, piling works through the existing basement floor, steel works and construction of the superstructure and fit out works. In addition to the construction activities on site there will be construction traffic including movement of machinery and materials within and to and from the construction site.

A variety of items of plant will be in use during these construction work all of which have the potential to generate high levels of noise potential levels of perceptible vibration. These will include excavators, loaders, cranes, piling rigs and static plant such as generators, compressors and pumps.

10.6.2 Operational Phase

Once operational the potential noise sources associated with the development relate to any external operational mechanical and electrical plant items required to serve the building uses. These are likely to include water pumps, air handling systems, condensers, etc. Depending on the operational hours and occupancy of the various spaces within the building, some of these will operate on a 24/7 basis depending on the specific use. The location of external plant items with potential to emit noise to the surrounding environment are located on various roof levels of the proposed development and enclosed at basement level.

Traffic flows to and from the development via public roads have the potential to increase the surrounding noise environment. The vehicular site access to the proposed development is located along Clarion Quay. The development will include 33 no. carparking spaces internally at basement level -1.

10.7 Potential Impacts of the Proposed Development

10.7.1 Construction Phase

10.7.1.1 Construction Plant and Equipment Noise

The highest potential noise and vibration impact of the proposed development will occur during the construction phase due to the different phases of work requiring a range of construction plant and equipment with high noise levels. The Proposed Development is anticipated to be completed over a 3.5-year period. The construction phase including piling works, structural works and fit out duration is approximately 30 months. The overall construction phase is less than 7 years and hence is categorised as a short-term impact in accordance with EPA EIAR guidelines. Specific phases of work will occur over a number of months and less than 1 year and hence are described as temporary impacts, where relevant.

The nearest NSLs to the site are residential units along the northern and eastern boundaries and commercial units to the northern and western boundaries. The relevant NSLs are outlined below and highlighted within Figure 10.2:

- NSL 1: Residential Units to the North and North- East of the site (15m)
- NSL 2: Residential Units to the East of the site (15m)
- NSL 3: Commercial Units to the North of the site (15m)

- NSL 4: Commercial Units to the East of the site (15m)

Figure 10-3 Noise Sensitive Locations (Background Imagery Google earth, Red Line Indicative)

The construction phase is highly transient in nature and involves a number of various stages which will encompass a range of different activities on a day to day and week to week basis. Given the transient nature of the works it is not possible to calculate with a high degree of accuracy the specific levels of noise associated with each stage. The construction stage will be undertaken over a number of stages from demolition, ground excavation through to building construction and internal fit out. In terms of the potential noise and vibration impacts, the key stages and activities are expected to involve:

- Piling Works;
- Site Services Installations (drainage, power, water)
- Construction of building frame and envelope; and
- Fit out of interior and exterior landscaping

The impact at nearby NSLs will depend upon a number of variables, the most notable of which are:

- the amount of noise generated by plant and equipment being used at any one time, expressed in terms of sound pressure or sound power;
- the periods of operation of the plant at the development site, known as the "on-time";
- the distance between the noise source and the receptor; and
- the attenuation due to ground absorption or barrier screening effects from walls, buildings, site hoarding etc.

Indicative ranges of noise levels associated with construction may be calculated in accordance with the methodology set out in BS 5228-1. This standard sets out sound power / sound pressure levels for plant items normally encountered on construction sites, which in turn enables the prediction of noise levels. These have been used to derive typical construction noise levels associated with different phases of work.

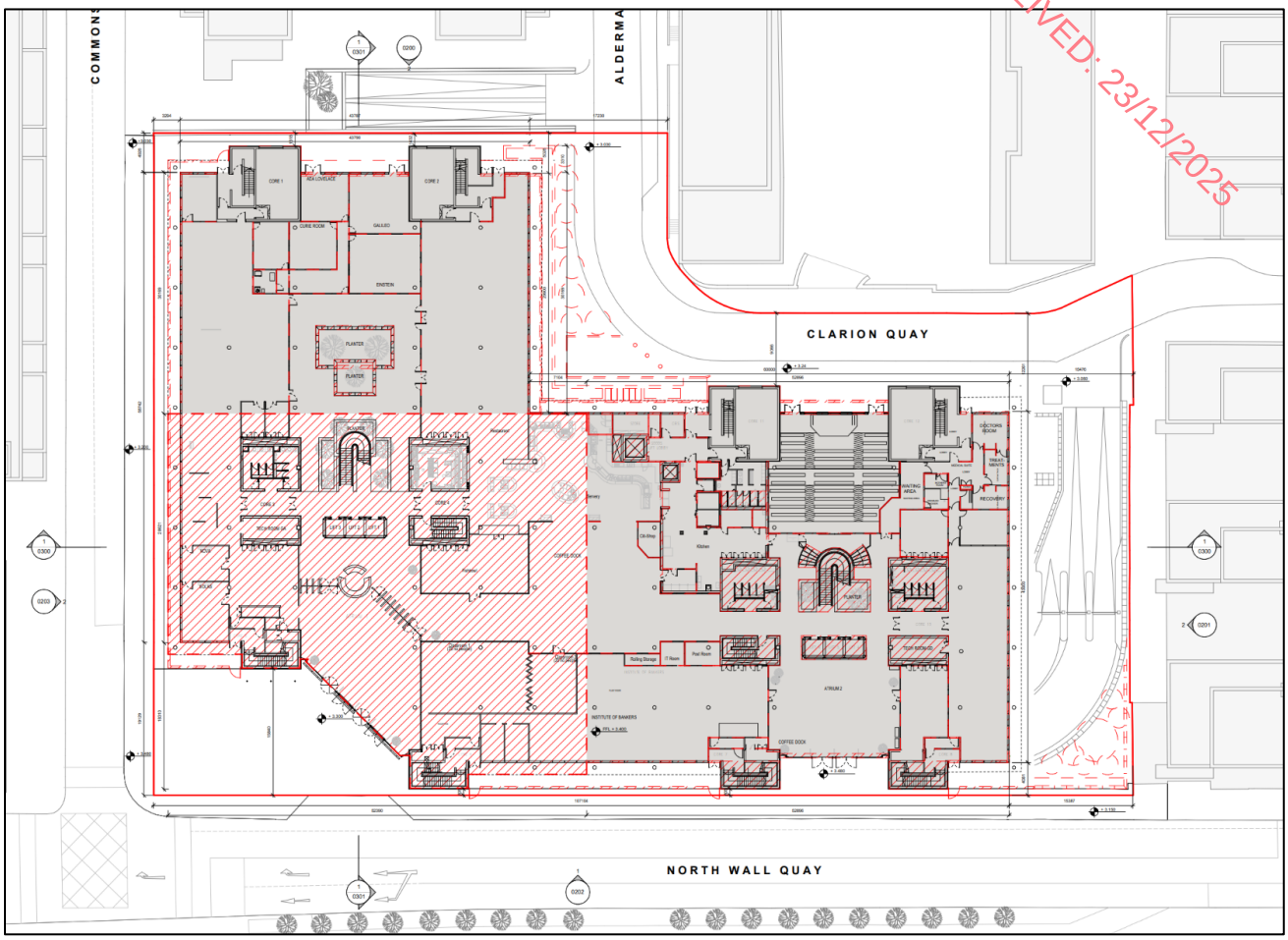
10.7.1.2 Demolition and Piling

It is proposed that the existing 6-storey building will be partially demolished utilising a system of cutting and carving through existing RC Structures, back-propping and mini-pulverisers (Brokk or similar). The existing building would be back-propped to allow the saw, RC "muncher" pulveriser to locally demolish the structure carefully.

The basement level will need localized reinforcement to support the new structure. This will involve cutting and coring to install mini piles and an additional reinforced concrete (RC) slab, which will be tied into the existing foundation slab. To construct the mini piles, the existing basement is expected to be backfilled with demolition material to create a piling mat. The existing concrete structure will then be drilled through using rotary cored piles and subsequently backfilled with stone or lean-mix concrete.

For construction works associated with such activities as rotary piling and demolition works including pulverisers and concreting works etc. noise levels are typically in the range of 80 to 85 dB L_{Aeq} at 10m. Self-screening of the retained walls will reduce the noise levels at the receivers to the North and East as indicated in Figure 10-4. Therefore, a total construction noise level of 85 dB L_{Aeq} at 10m has been used for the purposes of indicative calculations for these activities representing a variety of plant items and activities over this stage. This would include, for example three items of plant at 80 dB L_{Aeq} and two items of plant at 82 dB L_{Aeq} operating simultaneously within one work area resulting in a total noise level of 85 dB L_{Aeq}.

Figure 10-4. Typical floor layout with demolition areas in red (Ground Floor Demolition Plans - Source: HJL drawing 1NWQ-HJL-AX-00-DR-A-0050)



10.7.1.3 Sub-structure

For construction works associated with activities such as mechanical excavation, basement construction and structural works including excavators, loaders, dozers, cranes, generators, and concreting works etc. noise levels are typically in the range of 70 to 80 dB L_{Aeq} at 10m.

For ongoing construction activity associated with the above activities, a total construction noise level of 80 dB L_{Aeq} at 10m has been used for the purposes of indicative calculations for these activities representing a variety of plant items and activities over this stage. This would include, for example two items of plant at 77 dB L_{Aeq} and three items of plant at 75 dB L_{Aeq} operating simultaneously within one work area resulting in a total noise level of 80 dB L_{Aeq}.

10.7.1.4 Superstructure and Lower Noise Activities

For construction work areas with lower noise levels such as those associated with superstructure works including site compounds (for storage, offices and material handling, generators etc.), smaller items of mobile plant (excavators, cranes, dozers), landscaping and concreting works with lower noise emissions, a total construction noise level of 78 dB L_{Aeq} at 10m has been used for the purposes of indicative calculations. This would include, for example one item of plant at 75 dB L_{Aeq} and three items of plant at 70 dB L_{Aeq} operating simultaneously within a work area.

10.7.1.5 Indicative Construction Noise Calculations at Varying Distances

The closest NSLs to the proposed development are directly adjacent to the site boundaries to the north, east and west within 15 to 20m, with other buildings at distances beyond 25m and screened by the immediately adjacent buildings.

The calculations assume that plant items are operating for 66% of the time. For the purpose of the assessment, due to the height of the existing receptors at upper floor levels, calculations do not include any screening attenuation from basic site hoarding.

Table 10-12 presents the calculated noise levels at the closest NSLs along the boundary of the site. To represent the various working distances and ground level of activities that will take place from all boundaries, noise levels are calculated at various distances from the site. The works are likely to be transient in nature and noise levels will vary as they increase or decrease in distance from NSLs.

Table 10-12 Indicative Construction Noise Calculations at Distances

Construction Activity	Cumulative Predicted Construction Noise Level at a Specific Distance (dB $L_{Aeq,T}$)					
	15m	25m	40m	80m	100m	Daytime CNT $L_{Aeq,T}$ (dB)
Demolition and Piling	80	75	71	65	63	65
Structural Works: (basement excavation, foundation and concrete works)	80	75	71	65	63	65
General Construction: (superstructure works, fit out)	73	68	64	58	56	65

Reference to 10.12 indicates that during the most intrusive early stage activities relating to demolition and piling works the CNT has the potential to be exceeded when works are occurring up to 80m from NSLs without mitigation. The calculated noise level in this table will not occur during all periods of these construction phases as there will be periods where the assumed plant items (i.e. pulverisers, piling rigs etc) will not be in operation or will be in use for intermittent periods of time. In this regard, the noise levels presented here are considered a reasonable worst-case scenario.

During structural works including those associated with basement excavation and foundation works the CNT has the potential to be exceeded when works are typically occurring within 80m of NSLs without mitigation.

Once the most intrusive ground works have been completed on site, noise levels associated with the general construction of the superstructure will be significantly reduced. During this phase the CNT has the potential to be exceed up to 40m at the closest NSLs without mitigation.

Overall, a ***negative, very significant and temporary*** potential impact is forecast as a worst case for the closest residential NSLs to the construction boundary during the most noise intrusive activities relating to demolition and piling. However, the highest noise levels predicted relating to the demolition phase are only likely to occur for a maximum of 12 months within the working hours outlined within the construction management plan.

For the structural construction works the predicted noise levels will result in a ***negative***, ***moderate to significant*** and ***short term*** potential impact. The impact will reduce to within the CNT whilst works are taking place further into the site at distances beyond 80m during these works the predicted impact is likely to be ***negative, slight to moderate*** and ***short term.***

During the general construction phases relating to the superstructure the predicted impact will be ***negative, moderate*** *and* ***short term***, reducing to ***negative***, ***slight to moderate*** and ***short term*** beyond 25m from the construction works.

Noise mitigation measures will be required to reduce construction noise levels along all boundaries.

10.7.1.6 Construction Phase Traffic Noise

During the construction phase, traffic associated with the proposed development would consist of a mix of Light Goods Vehicles (LGVs) and Heavy Goods Vehicles (HGVs) travelling to and from the site. Chapter 12 (Traffic and Transportation) includes information relating to traffic generated and traffic management during this phase.

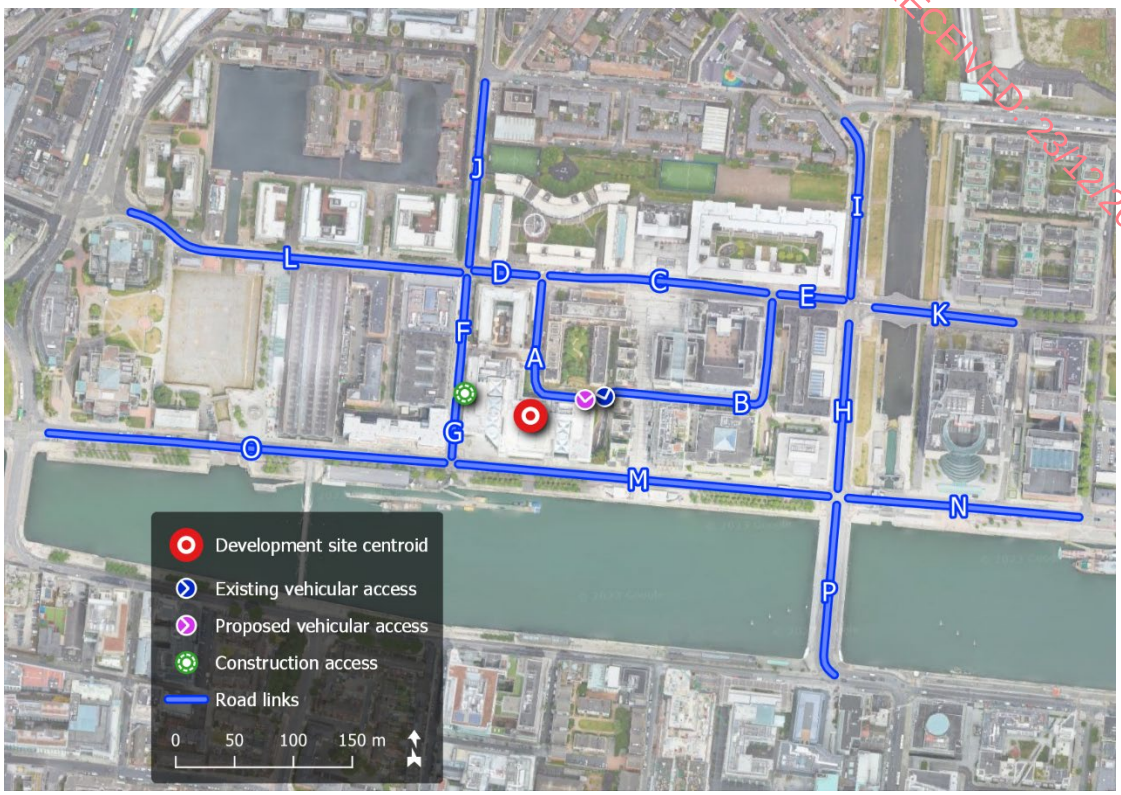
HGV traffic to and from the site will follow a designated route, ensuring that heavy construction vehicles avoid sensitive streets to the greatest extent possible and travel as little as possible within the city centre.

The major construction items include demolition, excavation, construction, and fit out. HGV construction traffic to and from the site shall reach a peak during reduced level excavation, which will require the removal of spoil from the site. Under a 'worst-case' scenario, however, it is possible that up to 4 no. such HGV trips may be made to the site each hour (one HGV arrival and one HGV departure every 15 minutes).

In addition to HGV traffic, periodic deliveries of materials to site shall be made by LGVs. To the extent possible, these shall be scheduled to take place outside of the background peak traffic hours.

For the purposes of assessing the potential noise impact, it is appropriate to consider the relative increase in noise level associated with traffic movements on existing roads and junctions with and without the proposed development, given that traffic from the development will make use of the existing road network. Figure 10.3 illustrates the road links assessed and highlights the proposed vehicular access during the construction phase.

Figure 10-5 Construction Traffic Roads Assessed



Peak hour traffic flows have been factored over an Annual Average Daily Traffic (AADT) period by the traffic engineers to allow comparison against a typical daytime period. Traffic data along the adjacent roads and junctions where traffic will travel from the site for the assumed construction year of 2030 have been reviewed to calculate the change in traffic noise. Traffic flows during both the Do Nothing Scenario and the Do Something Construction Worst Case scenario for 2030 have been reviewed to calculate the change in traffic noise. Table 10-13 presents the results of this assessment. The calculations take account of the LGV and HGV traffic associated with each scenario.

Table 10-13 Construction Traffic Noise Impacts

Road Link	AADT (Do Nothing)	AADT (Do Something)	Change in Noise Level, dB
Link A - Clarion Quay (west of proposed development access)	909	687	-1.22
Link B Clarion Quay (east of existing development access)	1,268	1,046	-0.84
Link C - Mayor Street Lower (between Clarion Quay Junctions)	1,795	1,800	0.01
Link D - Mayor Street Lower (between Commons Street and Clarion Quay)	2,250	2,033	-0.44
Link E - Mayor Street Lower (between Guild Street and Clarion Quay)	2,396	2,179	-0.41
Link F - Commons Street (between North Wall Quay and construction access)	4,977	4,889	-0.08

Road Link	AADT (Do Nothing)	AADT (Do Something)	Change in Noise Level, dB
Link G - Commons Street (between North Wall Quay and construction access)	5,312	5,262	-0.04
Link H - Guild Street (between Mayor Street and North Wall Quay)	14,075	13,994	-0.03
Link I - Guild Street (between Mayor Street and Sherriff Street Upper)	10,746	10,623	-0.05
Link J - Commons Street (between Mayor Street and Sherriff Street Lower)	4,814	4,723	-0.08
Link K - Mayor Street Upper (east of Guild Street)	2,219	2,201	-0.04
Link L - George's Dock (west of Commons Street)	2,267	2,267	0.00
Link M - North Wall Quay (between Commons Street and Guild Street)	15,531	15,515	0.00
Link N - North Wall Quay (between Guild Street and Park Lane)	12,877	12,880	0.00
Link O - Custom House Quay (west of commons street)	14,473	14,433	-0.01
Link P - Beckett Bridge (south of North Wall Quay)	18,849	18,765	-0.02

The calculated change in traffic noise associated with the addition of construction related traffic is less than 1 dB (A) along all site access roads. Reference to Table 10-5 confirms the potential related impact is ***negative, imperceptible*** and ***short-term.***

10.7.1.7 Construction Phase Vibration

10.7.1.7.1 Ground Breaking / Rock Breaking Activities

The main potential source of vibration during the construction programme is associated with excavation activities. During excavation below ground level in soil, there are no significant vibration sources expected due to the ground conditions. The depth of rock is below the depth of the basement excavation hence, rock breaking or rock extraction will not be required for this site.

10.7.1.7.2 Piling

There is potential for vibration impacts during piling of the building perimeter and foundations.

For the purposes of this assessment, the expected vibration levels during piling, assuming augured or bored piles, have been determined through reference to published empirical data. The British Standard BS 5228 – Part 2: Vibration, publishes the measured magnitude of vibration of rotary bored piling using a 600 mm pile diameter for bored piling into soft ground over rock in line with the site conditions experienced at the proposed development site:

- 0.54 mm/s at a distance of 5 m, for auguring;
- 0.22 mm/s at a distance of 5 m, for twisting in casing;
- 0.42 mm/s at a distance of 5 m, for spinning off; and
- 0.43 mm/s at a distance of 5 m, for boring with rock auger.

Considering the low vibration levels at very close distances to the piling rigs, vibration levels at the nearest off-site buildings (>15m from apartment buildings) will be orders of magnitude below those associated with building response or human response to vibration referred to in Section 10.2.3.7, and Table 10-4.

The predicted vibration effect during this phase of works is **Neutral**, **Not Significant** and **Short Term**.

10.7.2 Operational Phase

The main potential sources of outward noise from the development during the operational phase will be traffic flows to and from the development via public roads, and mechanical and electrical plant used to service the buildings. The review of standards and guidelines in Section 10.3 will be used here to assess the potential impact of the proposed development during the operational phase.

10.7.2.1 Building Services Plant Noise

There will be a variety of mechanical and electrical (M&E) items required to serve the proposed development once it becomes operational. These are likely to include heat pumps, air handling systems, condensers, etc. Depending on the operational hours and occupancy of the various spaces within the building, some of these will operate on a 24/7 basis depending on the specific use.

The M&E plant requirements for the building have not yet been progressed to detailed design stage, however the M&E consultants note they key items of external plant with potential to emit noise to the surrounding environment are located within the proposed plant areas located at roof level and will be surrounded by a plant screen. All other plant items will be enclosed within basement plant areas.

The key design criteria for the proposed development for operational plant noise relates to the achievement of acceptable noise levels at NSLs adjacent to the site and to ensure an acceptable internal noise environment is achieved within the office areas of the proposed development. As the final specifics in terms of plant selection and operational noise levels has not yet been established, the choice, location and number of items during detailed design will be reviewed to control noise from the development.

A noise barrier will form part of the development, with acoustic performance requirements defined at the design stage. Provision has been made within the roof layout for a barrier with a maximum height of 3.5 m.

BS 4142 (BSI 2019) sets out a method for assessing the impact of a new continuous noise source to a residential environment such as the plant items used to service the office and commercial elements from the proposed development. During the detailed design, the location and operation of plant items serving the building with potential to emit noise to the surrounding environment will be reviewed and operational noise levels determined at the closest sensitive façades, including the façade of the proposed development.

Based on a review of the baseline noise environment and the BS 4142 assessment methodology, cumulative plant noise associated with the development shall be designed to not exceed 45 dB $L_{Aeq,15min}$ at the façade of the closest residential buildings at night and do not contain audible tones at NSLs outside of the site. This is set to ensure no significant increase in the prevailing background noise level occurs at existing residential NSLs. At commercial facades, an operational noise limit of 50 dB $L_{Aeq,15min}$ is proposed.

The above limits are set to ensure the operational impact associated with plant items serving the proposed development are ***neutral, not significant*** and ***long-term***.

10.7.2.2 Traffic and Vehicle Noise

The vehicular site access to the proposed development is located along Clarion Quay. The development will include 32 no. carparking spaces, with 30 spaces located internally at basement level -1. Hence, most office staff will utilise alternative means of travel to the proposed development during the operational phase.

For the purposes of assessing the potential noise impact, it is appropriate to consider the relative increase in noise level associated with traffic movements on existing roads and junctions with and without the proposed development, given that traffic from the development will make use of the existing road network.

Traffic data along the adjacent roads/ junctions highlighted in Figure 10.3 where traffic will travel from the site for the Do Nothing and Do Something scenarios in terms of the AADT have been reviewed to calculate the change in traffic noise The calculated change in noise levels during the Opening Year (2032) and Design Year (2047) are summarised in Table 10-14 and Table 10-15.

Table 10-14 Operational Phase Traffic Noise Changes on Adjacent Roads Opening Year 2032

Road Link	AADT (Do Nothing 2032)	AADT (Do Something 2032)	Change in Noise Level, dB
Link A - Clarion Quay (west of proposed development access)	924	943	0.09
Link B Clarion Quay (east of existing development access)	1,281	1,300	0.06
Link C - Mayor Street Lower (between Clarion Quay Junctions)	1,823	1,823	0.00
Link D - Mayor Street Lower (between Commons Street and Clarion Quay)	2,285	2,304	0.04
Link E - Mayor Street Lower (between Guild Street and Clarion Quay)	2,424	2,443	0.03
Link F - Commons Street (between North Wall Quay and construction access)	5,033	5,043	0.01
Link G - Commons Street (between North Wall Quay and construction access)	5,407	5,417	0.01
Link H - Guild Street (between Mayor Street and North Wall Quay)	14,229	14,238	0.00
Link I - Guild Street (between Mayor Street and Sherriff Street Upper)	10,888	10,900	0.00
Link J - Commons Street (between Mayor Street and Sherriff Street Lower)	4,871	4,882	0.01
Link K - Mayor Street Upper (east of Guild Street)	2,248	2,250	0.00
Link L - George's Dock (west of Commons Street)	2,292	2,292	0.00
Link M - North Wall Quay (between Commons Street and Guild Street)	15,955	15,961	0.00
Link N - North Wall Quay (between Guild Street and Park Lane)	13,050	13,055	0.00
Link O - Custom House Quay (west of commons street)	14,898	14,902	0.00
Link P - Beckett Bridge (south of North Wall Quay)	19,052	19,061	0.00

Table 10-15 Operational Phase Traffic Noise Changes on Adjacent Roads Design Year 2047

Road Link	AADT (Do Nothing 2047)	AADT (Do Something 2047)	Change in Noise Level, dB
Link A - Clarion Quay (west of proposed development access)	1,005	1,024	0.08
Link B Clarion Quay (east of existing development access)	1,384	1,403	0.06
Link C - Mayor Street Lower (between Clarion Quay Junctions)	1,972	1,972	0.00
Link D - Mayor Street Lower (between Commons Street and Clarion Quay)	2,473	2,492	0.03
Link E - Mayor Street Lower (between Guild Street and Clarion Quay)	2,618	2,637	0.03
Link F - Commons Street (between North Wall Quay and construction access)	5,474	5,484	0.01
Link G - Commons Street (between North Wall Quay and construction access)	5,876	5,886	0.01
Link H - Guild Street (between Mayor Street and North Wall Quay)	15,354	15,363	0.00
Link I - Guild Street (between Mayor Street and Sherriff Street Upper)	11,752	11,764	0.00
Link J - Commons Street (between Mayor Street and Sherriff Street Lower)	5,293	5,304	0.01
Link K - Mayor Street Upper (east of Guild Street)	2,433	2,435	0.00
Link L - George's Dock (west of Commons Street)	2,478	2,478	0.00
Link M - North Wall Quay (between Commons Street and Guild Street)	17,581	17,587	0.00
Link N - North Wall Quay (between Guild Street and Park Lane)	14,438	14,443	0.00
Link O - Custom House Quay (west of commons street)	16,469	16,473	0.00
Link P - Beckett Bridge (south of North Wall Quay)	20,558	20,567	0.00

The calculated change in traffic noise associated with the addition of operational phase traffic is less than 1 dB (A) along the site access roads for both assessment years. Reference to Table 10-7 confirms the potential related impact is ***neutral, imperceptible*** and ***long-term***.

10.8 Mitigation Measures

10.8.1 Construction Phase

Best practice noise and vibration control measures will be employed by the contractor during the construction phase in order to avoid significant impacts at the nearest sensitive buildings.

The following construction noise thresholds (CNT) are proposed for the development to avoid significant impacts:

- Residential Units North and East of site: 65 dB $L_{Aeq,T}$
- All other locations (offices and commercial buildings): 75 dB $L_{Aeq,T}$

The best practice measures set out in *BS 5228-1:2009+A1:2014* and *BS 5228-2:2009+A1:2014*, will be complied with. In addition, the specific noise and vibration mitigation called up in the DCC GPG for construction and demolition sites will be required at this site. The above documents include guidance on several aspects of construction site mitigation measures, which include:

- Selection of quiet plant;
- Noise control at source;
- Screening;
- Liaison with the public, and;
- Monitoring.

Noise control measures that will be considered include the selection of quiet plant, use of enclosures and screens around noise sources and site boundaries, limiting the hours of work and noise and vibration monitoring.

10.8.1.1 Selection of Quiet Plant

The potential for any item of plant to result in exceedance of construction noise thresholds will be assessed prior to the item being brought onto the site. The least noisy item of plant will be selected wherever practicable (e.g. plant items with sound attenuation incorporated). Should a particular item of plant already on the site be found to exceed the construction noise thresholds, the first action will be to identify whether the item can be replaced with a quieter alternative.

The appointed contractor will evaluate the choice of excavation, breaking, piling or other working method taking into account various ground conditions and site constraints. Where alternative lower noise generating equipment are available that will provide equivalent structural / excavation / breaking results, these will be selected to control noise within the relevant thresholds, where it is practicable to do so.

The decision regarding the type of excavation technique or other construction activity to be used on a site will normally be governed by a range of engineering and environmental constraints. In these instances, it may not be possible for technical reasons to replace an item of plant with a quieter alternative. In some instances, the adoption of a quieter method may prolong the overall process, with the net result being that the overall disturbance to the community will not necessarily be reduced.

10.8.1.2 Noise Control at Source

The following measures will be implemented, if required, by the appointed contractor to control noise at source. These measures relate to specific site considerations:

- For mobile plant items such as dump trucks, cranes, excavators and loaders, the installation of an acoustic exhaust, utilising an acoustic canopy to replace the normal engine cover and / or maintaining enclosure panels closed during operation can reduce noise levels by up to 10 dB;
- For percussive tools such as pneumatic breakers and tools a number of noise control measures include fitting a muffler or sound reducing equipment to the breaker 'tool' and ensuring any leaks in the air lines are sealed;
- Use of rotary drills and 'bursters' activated by hydraulic or electrical power to facilitate quieter methods for excavation of hard material.
- Removal of larger sections of demolished buildings by lifting out and breaking at areas away from noise sensitive boundaries;

- For piling plant, noise reduction can be achieved by enclosing the driving system in an acoustic shroud. For steady continuous noise, such as that generated by diesel engines, it is possible to reduce the noise emitted by fitting a more effective exhaust silencer system or utilising an acoustic canopy to replace the normal engine cover;
- Mobile and stationary plant will be switched off or throttled back to a minimum when not in use (engines, motors and generators). Lorries, trucks and concrete vehicles will not be permitted to queue outside site compounds with engines left idling;
- Where compressors, generators and pumps are located in proximity to NSLs and have the potential to exceed the construction noise thresholds, these will be surrounded by acoustic lagging or enclosed within acoustic enclosures providing air ventilation;
- Resonance effects in panel work or cover plates can be reduced through stiffening or the application of damping compounds, while other noise nuisance can be controlled by fixing resilient materials in between the surfaces in contact;
- For all materials handling, ensure that materials are not dropped from excessive heights, lining drops chutes and dump trucks with resilient materials;
- All items of plant will be subject to regular maintenance. Such maintenance can prevent unnecessary increases in plant noise and can serve to prolong the effectiveness of noise control measures;
- Where practicable, equipment powered by mains electricity or battery shall be used in preference to equipment powered by internal combustion engines or locally generated electricity; and
- Plan the site layout to ensure that reversing is kept to a minimum.

10.8.1.3 Screening

Screening is an effective method of reducing construction noise levels at a receiver location and can be used successfully as an additional measure to other forms of noise control. The effectiveness of a noise screen will depend on the height and length of the screen, its mass, and its position relative to both the source and receiver. BS 5228–1 state that on level sites the screen should be placed as close as possible to either the source or the receiver. The construction of the barrier will be such that there are no gaps or openings at joints in the screen material.

The site will incorporate a solid site hoarding line of minimum 2.4m in height around its perimeter which will be maintained in situ for the duration of the construction phase. Where necessary, this hoarding height will be increased in height to assist in reducing noise levels at adjacent noise sensitive buildings.

Erection of localised demountable enclosures or screens will be used around breakers or drill bits when in operation in proximity to NSLs with the potential to exceed the construction noise thresholds. Annex B of BS 5228–1 (Figures B1, B2 and B3) provide typical details for temporary and mobile acoustic screens, sheds and enclosures that can be constructed on-site from standard materials. A well placed and designed mobile temporary screen around a breaker or excavation can effectively reduce noise emissions by 10 dB(A).

In addition, careful planning of the construction site layout will also be considered. The placement of site buildings such as offices and stores between the site and sensitive locations can provide a good level of noise screening.

10.8.1.4 Hours of Work

Standard working hours for construction will be 7.00am to 7.00pm Monday to Friday and 7.00am to 14.00pm on Saturday (if required), with no works on Sundays or Bank Holidays except in exceptional circumstances or in the event of an emergency.

10.8.1.5 Liaison with the Public

For the proposed development, the duration of demolition, piling and excavation and any required ground breaking will be short in relation to the length of construction work as a whole, and the amount of time spent working near to sensitive areas can represent only a part of the overall period.

The contractor will establish clear forms of communication between the contractor and adjacent NSLs to the works, so that residents or building occupants are aware of the likely duration of activities likely to generate noise or vibration that are potentially significant.

A community Liaison Plan will be developed by the developer in liaison with the local residents and businesses and a single point of contact nominated to engage with DCC.

10.8.1.6 Monitoring

During the construction phase, the contractor will carry out noise and vibration monitoring at representative sensitive locations to evaluate and inform the requirement and / or implementation of noise and vibration management measures.

Noise and vibration monitoring systems will be installed at the site prior to any works taking place and will be maintained in continuous operation throughout the construction period. The system will be configured to trigger alerts in the event that the set limit values relating to the control of significant noise effects are approaching, as per Section 9.2.1.3 and for the avoidance of any cosmetic damage to buildings as per Table 10-3.

10.8.1.7 Vibration Control

On review of the likely vibration levels associated with construction activities, construction activities associated with the proposed development will not give rise to vibration that is either significantly intrusive or capable of giving rise to structural or cosmetic damage to buildings.

Vibration from construction activities will be limited to the values set out in Table 10-3 to avoid any form of potential cosmetic damage to buildings and structures.

In the case of vibration levels giving rise to human response, impacts are significantly reduced once the source of vibration is known and good communications are in place. As such, in order to minimise any potential impacts to adjacent building occupants, the following measures shall be implemented during the Construction Phase.

- A clear communication programme will be established by contractor to inform adjacent building occupants in advance of any potential intrusive works which may give rise to vibration levels likely to result in significant effects as per Table 10-4. The nature and duration of the works will be clearly set out in all communication circulars as necessary; and
- Appropriate vibration isolation shall be applied to plant (such as resilient mounts to pumps and generators), where required and where feasible.

10.8.2 Operational Phase

10.8.2.1 Building Noise Services

At the detailed design stage, best practice measures relating to building services plant will be taken to ensure there is no significant noise impact on NSLs adjacent to the development. Best practice measures in this context include the following:

- The selection and design of operational plant items with potential to emit noise to atmosphere will be designed to comply with the noise control guidance from BS 4142 (BSI 2014) for residential dwellings, as discussed in Section 10.3.1.
- Where ventilation is required for plant rooms, consideration will be given to acoustic louvers or attenuated acoustic vents, where required, to reduce noise breakout to within relevant design criteria at NSLs;
- Ventilation plant serving plant rooms and car parks will be fitted with effective acoustic attenuators to reduce noise emissions to the external environment to within relevant design criteria at NSLs;
- The use of attenuators or silencers will be installed on external air-handling plant, pumps and heating and cooling systems, where required, to reduce noise breakout to within relevant design criteria at NSLs;
- The use of acoustic louvres or solid plant screens will be sited around roof top plant area perimeters to control noise to the surrounding environment;
- All mechanical plant items, e.g. fans, pumps etc., shall be regularly maintained to ensure that excessive noise generated by worn or rattling components is minimised;
- Any new or replacement mechanical plant items, shall be designed so that all noise emissions from site do not exceed the noise limits outlined in this document; and
- Installed plant will have no tonal or impulsive characteristics when in operation.

10.8.2.2 Traffic Around Surrounding Road Network

Changes to traffic flows will not result in a perceptible increase in noise level in the surrounding environment. Therefore, no mitigation measures are necessary in this case.

10.9 Monitoring or Reinstatement Measures

10.9.1 Construction Phase

During the construction phase the contractor will carry out noise monitoring at representative NSLs to evaluate and inform the requirement and / or implementation of noise and or vibration management measures. Monitoring will be undertaken in line with Section 10.6.1.6.

10.9.2 Operational Phase

No monitoring is proposed during the operational phase of the development.

10.10 Residual Effects of the Proposed Development

The Residual Effects are the final or intended effects which occur after the proposed mitigation measures have been implemented.

10.10.1 Construction Phase

10.10.1.1 Construction Plant and Equipment Noise

The use of best practice noise control measures, hours of operation, scheduling of works within appropriate time periods, and noise monitoring during this phase will be implemented. With the inclusion of the various noise and vibration control measures on site discussed in Section 6.1 it is expected that calculated noise levels in Table 10-12 can be reduced by 5 to 10 dB.

With the inclusion of the various available noise and vibration control measures, noise levels can be controlled to within the CNTs at the closest NSLs for the majority of the Construction Phases, thus resulting in a ***negative, moderate to significant*** and ***short term impact***.

For early stage demolition and piling phases, there is potential for construction noise levels to remain above the CNT. Whilst the adopted CNT has the potential to be exceeded, the residual noise levels can be controlled to below the upper construction noise limit of 75 dB $L_{Aeq,T}$ typically applied for urban sites. Given the potential for elevated periods of construction noise will be experienced over temporary periods, this can be tolerated with good public liaison and monitoring programmes.

10.10.1.2 Construction Phase Traffic Noise

The calculated change in traffic noise associated with the addition of construction related traffic is less than 1 dB (A) along the site access roads. Reference to Table 10-5 confirms the potential related impact is ***negative, imperceptible*** and ***short-term.***

10.10.1.3 Construction Phase Vibration

Vibration magnitudes associated with this activity are well below those associated with any form of cosmetic damage to buildings as per the guidance values in Table 10-3 and hence vibration impacts to buildings are ***neutral, not significant*** and ***short-term***.

In terms of human response, with clear communication protocols in place, vibration impacts during the construction phase are limited to ***negative, not significant to slight, and brief to temporary impact*** for closest building occupants.

10.10.2 Operational Phase

10.10.2.1 Building Services Plant Noise

Once operational, residual noise levels associated with building services plant from the proposed development will be designed to not exceed 45 dB $L_{A,rT}$ at the closest residential NSLs and 50 dB $L_{A,rT}$ at the closest façade of office buildings. The residual effect is ***neutral, not significant,*** and ***long-term***.

10.10.2.2 Traffic and Vehicle Noise

Traffic along the surrounding road network will not lead to a change in noise level that would pose any significant effect. The resultant impact is ***neutral, imperceptible,*** and ***long-term.***

10.11 Cumulative Impacts of the Proposed Development

The cumulative impact of the proposed development with any relevant other planned or permitted developments are discussed below. For details on the developments considered refer to Chapter 2 of this EIA Report.

10.11.1 Construction Phase

In the event that demolition/construction activities at nearby sites are taking place concurrently with the demolition/construction of the proposed development, there is potential for cumulative noise impacts to occur. Due to the nature of demolition/construction works associated with the proposed development, noise levels from this site will dominate the noise environment when occurring in proximity to the noise sensitive locations along its immediate boundary. The noise contribution from other construction sites would need be equal to those associated with the proposed development in order to result in any cumulative effect.

In the event of the two construction phases of the proposed development overlapping predicted construction noise levels within Section 10.5.1 may rise by the order of +3 dB.

10.11.2 Operational Phase

There are no cumulative noise impacts associated with the proposed development and other developments in the areas. The noise limits set for off-site noise sensitive locations are designed to avoid any significant increase in the prevailing background noise environment. Operational noise limits included in this report refer to cumulative noise from all fixed installations on site. The design of plant and other fixed installations will be progressed during the design stage to ensure the noise limits at off-site noise sensitive locations are not exceeded.

10.12 References

- British Standard Institute (BSI) British Standard (BS) 5228-1:2009 +A1 2014 Code of Practice for noise and vibration control of construction and open sites - Part 1: Noise
- BS 5228-2:2009+A1:2014 Code of Practice for noise and vibration control of construction and open sites - Part 2: Vibration
- BS 7385: 1993 Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration
- BS 6472-1: 2008 Guide to evaluation of human exposure to vibration in buildings, Part 1 Vibration sources other than blasting
- BS 8233:2014 Guidance on sound insulation and noise reduction for buildings;
- BS 4142: 2014 +A1 2019 Methods for Rating and Assessing Industrial and Commercial Sound
- Environmental Protection Agency (EPA) Guidelines the Information to be Contained in Environmental Impact Assessment Reports (EPA 2022)
- UK Highways Agency (UKHA) Design Manual for Roads and Bridges (DMRB) LA 111 Sustainability and Environmental Appraisal LA 111 Noise and Vibration Revision 2, 2020
- Dublin Local Authorities including Dublin City Council (DCC), Fingal County Council (FCC), South Dublin County Council (SDCC) and Dún Laoghaire Rathdown County Council (DLRCC) Dublin Agglomeration Third Environmental Noise Action Plan December 2018 – July 2023
- Dublin City Council (DCC) Air Quality Monitoring and Noise Control Unit's Good Practice Guide for Construction and Demolition
- S.I. No. 549/2018 – European Communities (Environmental Noise) Regulations 2018 (hereafter referred to as the Noise Regulations).
- S.I. No. 241/2006 - European Communities Noise Emission by Equipment for Use Outdoors (Amendment) Regulations 2006
- International Organization for Standardization (ISO) 9613-2:2024 Acoustics – Attenuation of sound during propagation outdoors - Part 2: Engineering method for the prediction of sound pressure levels outdoors
- ISO 1996-1:2016 Acoustics - Description, measurement and assessment of environmental noise. Part 1: Basic quantities and assessment procedures;
- ISO 1996-2:2017 - Description, measurement and assessment of environmental noise - Part 2: Determination of sound pressure levels
- The UK Department of Transport Calculation of Road Traffic Noise (hereafter referred to as the CRTN) (UK Department of Transport 1988)

Chapter 11 – Archaeological and Cultural Heritage

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11. ARCHAEOLOGY AND CULTURAL HERITAGE

11.1 Introduction

The following chapter assesses the predicted impacts of the proposed development on archaeological and cultural heritage. Please note that architectural heritage is being dealt with by Savills incorporating CityDesigner in Volume 3 (Heritage, Townscape, Landscape and Visual Impact Assessment (HTLVIA)) of the EIAR. The proposed development is located at the junction of North Wall Quay and Commons Street, Dublin City (ITM E. 716841m, 734548m; see Figure 11-1).

11.2 Methodology

11.2.1 Forecasting Methods and Difficulties Encountered

11.2.2 Forecasting Methods

Archaeological and cultural heritage have been assessed in line with best practice at a National and EU level, in line with the following:

11.2.2.1 Guidelines and Legislation

Archaeological and cultural heritage have been assessed in line with best practice at a National and EU level, in line with the following:

- Historic and Archaeological Heritage and Miscellaneous Provisions Act 2023 (formerly the National Monuments Act, 1930 (as amended));
- Planning and Development Act 2000 (as amended);
- Code of Practice for Archaeology agreed between the Minister for Arts, Heritage, Regional, Rural and Gaeltacht Affairs and Transport Infrastructure Ireland, 2017;
- Council of Europe (1992). European Convention on the Protection of the Archaeological Heritage (ratified by Ireland 1992), 'Valetta Convention';
- Council of Europe (2005). Framework Convention on the Value of Cultural Heritage for Society, 'Faro Convention';
- Department of Arts, Heritage, Gaeltacht and the Islands (DAHG) (1999). Framework and Principles for the Protection of the Archaeological Heritage;
- Environmental Protection Agency (EPA) (2022). Guidelines on the information to be contained in Environmental Impact Assessment Reports, May 2022;
- Heritage Act, 1995 (as amended);
- ICOMOS (2011). Guidance on Heritage Impact Assessments for Cultural World Heritage
- National Roads Authority (NRA) (2005). Guidelines for the Assessment of Archaeological Heritage;
- The Heritage Council (2013). Historic Landscape Characterisation in Ireland: Best Practice;
- The UNESCO World Heritage Convention, 1972.

11.2.2.2 The Valletta Convention

Archaeological monuments are protected through national and international policy designed to secure the protection of the cultural heritage resource. This is facilitated in accordance with the provisions of the European Convention on the Protection of the Archaeological Heritage (Valletta Convention), which was ratified by Ireland in 1997.

The Valletta Convention was adopted on 16 January 1992 in Valletta (Malta) and came into force on 25 May 1995 (Council of Europe Treaty Series no. 143). It is open for signature by member states of the Council of Europe and other states party to the European Cultural Convention and for accession by non-member states and the European Community.

The Valletta Convention (The European Convention for the Protection of the Archaeological Heritage (revised)) replaced and updated the original London Convention of 1969. It reflected the change in the nature of threats to the archaeological heritage, which now came less from unauthorised excavations, as in the 1960s, and more from the major construction projects carried out all over Europe from 1980 onwards. The revised Convention drew on twenty-two years of experience in implementing the original Convention. It established a body of new basic legal standards for Europe, to be met by national policies for the protection of archaeological assets as sources of scientific and documentary evidence, in line with the principles of integrated conservation.

11.2.2.3 Difficulties Encountered During the Study

No difficulties were encountered during the study.

11.2.2.4 Assessment Methodology

To set the Proposed Development within its wider archaeological and cultural heritage landscape, and to assess the potential of encountering such features on the site, a paper survey of archaeological, historical and cartographic sources was undertaken. A study area of approximately 300m from the Proposed Development was assessed, with reference to important relevant findings farther afield.

11.2.2.5 Record of Monuments and Places

The Record of Monuments and Places (RMP), comprising the results of the Archaeological Survey of Ireland, is a statutory list of all recorded archaeological monuments known to the National Monuments Service[1]. The relevant files for these sites contain details of documentary sources and aerial photographs, early maps, OS memoirs, the field notes of the Archaeological Survey of Ireland and other relevant publications. Sites recorded on the Record of Monuments and Places all receive statutory protection under the National Monuments Act 1994. The information contained within the RMP is derived from the earlier non-statutory Sites and Monuments Record (SMR); some entries, however, were not transferred to the statutory record as they refer to features that on inspection by the Archaeological Survey were found not to merit inclusion in that record or could not be located with sufficient accuracy to be included. Such sites however remain part of the SMR. The record is a dynamic one and is updated so as to take account of on-going research. The Record of Monuments and Places was consulted in the Archives of the Department of Arts, Heritage and the Gaeltacht. The recorded archaeological monuments in the study area are shown Figure 11-1, detailed in Appendix 11.1).

11.2.2.6 Recorded Archaeological Objects

The National Museum of Ireland's topographical files are a national archive of all known archaeological finds from Ireland. They relate primarily to artefacts but also include references to monuments and contain a unique archive of records of previous excavations. The topographical files were consulted to determine if any archaeological artefacts had been recorded from the area. Other published catalogues of prehistoric material were also studied: Iron Age antiquities[2]; bronze swords, Bronze Age hoards and goldwork[3];bronze axes, halberds and daggers[4]. No stray finds were recorded.

[1] https://www.archaeology.ie

2 Raftery, B., 1983. A catalogue of Irish iron age antiquities. Marburg.

3 Eogan, G. 1965. A catalogue of Irish Bronze swords. Dublin: Stationery Office.; Eogan, G. 1983. Hoards of the Irish Later Bronze Age. Dublin: University College Dublin.; Eogan, G. 1994. The Accomplished Art, Gold and Gold working in Britain and Ireland during the Bronze Age. Oxford: Oxbrow Books.

4 Harbison, P. 1968. Catalogue of Irish Early Bronze Age associated finds containing copper or bronze. Proceedings of the Royal Irish Academy 67C, 35-91.; Harbison, P. 1969a. The daggers and the halberds of the Early Bronze Age in Ireland. Prähitorische Bronzefunde, Abteilung VI, Band 1. C.H. Munich: Beck.; Harbison, P. 1969b. The axes of the Early Bronze Age in Ireland. Prähitorische Bronzefunde, Abteilung IX, Band 1. Munich.

11.2.2.7 Recorded Archaeological Excavations

The excavation bulletin website[5] was consulted to identify previous excavations that have been carried out within the study area. This database contains summary accounts of excavations carried out in Ireland from 1970 to 2024. The study area has been subject to twelve development led licenced excavations, or which seven uncovered archaeological remains. Summaries of excavations within the study area are detailed in Appendix 11.2 (see also Table 11-1 and Figure 11-1).

11.2.2.8 Cartographic Sources

Down Survey - Taken in the years 1656-1658, the Down Survey of Ireland is the first ever detailed land survey on a national scale anywhere in the world. The survey, led by William Petty, sought to measure all the land to be forfeited by the Catholic Irish in order to facilitate its redistribution to Merchant Adventurers and English soldiers[6]. The Down Survey map of the county of Dublin is shown in Figure 11-2.

De Gomme - Sir Bernard de Gomme (1620 –1685) was a Dutch military engineer. By some he is considered the most important figure in 17th-century English military engineering. He produced a series of maps and drawings of the city and suburbs of Dublin, from Kilmainham to Rings-End wherein the rivers, streets, lanes, alleys, churches, gates etc are exactly described at a scale of Scale 1760 yards to 1 English mile[7]. The 1673 map of the proposed development lands is shown as Figure 11-3.

Rocque - John Rocque (c.1705–62) was a cartographer and engraver of European repute, who could count among his achievement's maps of London, Paris, Berlin and Rome. Rocque's Irish work between 1754 and 1760, included a remarkable series of c.170 manuscript estate maps for the earl of Kildare, and a range of commercially driven projects that resulted in finely-engraved and printed surveys of the cities of Dublin[8]. An extract from Rocque's 1760 map of south county Dublin is shown in Figure 11-4.

Ordnance Survey Early Editions - Reference to cartographic sources provides information on the development of the area. Manuscript maps consulted included the Ordnance Survey first edition 6" (1829-41) and second edition 25" (1897-1913) maps were also assessed[9] (see Figure 11-5 and Figure 11-7).

Insurance Plan of the City of Dublin - This detailed 1893 plan (at a scale of 1 inch to 50 feet).of Dublin is one of a series of twenty sheets in an atlas originally produced to aid insurance companies in assessing fire risks. The building footprints, their use (commercial, residential, educational, etc.), the number of floors and the height of the building, as well as construction materials (and thus risk of burning) and special fire hazards (chemicals, kilns, ovens) were documented in order to estimate premiums. Names of individual businesses, property lines, and addresses were also often recorded. These maps, undertaken in between the first and second edition Ordnance Survey maps, provide a rich historical snapshot of the commercial activity and urban landscape of towns and cities at the time[10] (see Figure 11-6).

11.2.2.9 Aerial Photography

Available online sources for aerial photography were consulted, including the Ordnance Survey and National Monuments Service collections, and images provided by the design team (see Figure 11-8 and Figure 11-9).

5 https://excavations.ie
6 https://downsurvey.tchpc.tcd.ie/
7 https://www.rmg.co.uk/collections/objects/rmgc-object-541695
8 http://www.dublinhistoricmaps.ie/maps/1600-1799/index.html
9 https://www.heritagemaps.ie/
10 https://www.oldmapsonline.org/en

11.2.2.10 Historical Research

The baseline historical research utilised sources including Lewis' Topographical Dictionary of Ireland (1837) and the Ordnance Survey Letters for County Dublin and local journals.

11.2.2.11 County Development Plan

The Dubin City Development Plan 2022 – 2028[11] was consulted. The plan includes policy objectives for the protection of the county's archaeological and cultural heritage. The plan also contains a plan of the city showing the evolution of the city from its medieval core, with the site of proposed development reclaimed in the 19th century[12] (see Figure 11-10).

11.2.2.12 Difficulties Encountered During the Study

No difficulties were encountered during the study.

Table 11-1. Recorded archaeological excavations within the study area[13]

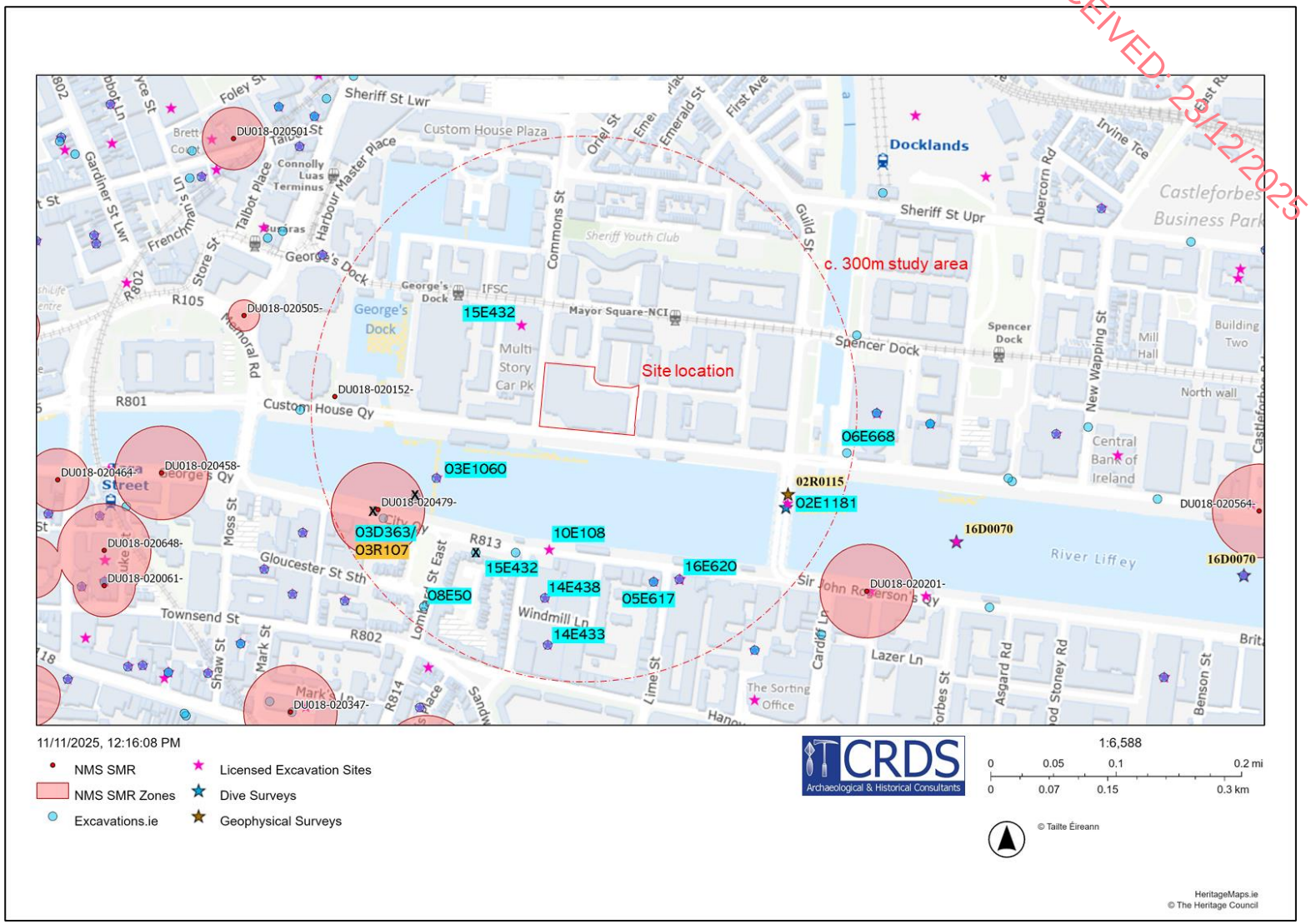
Licence No.	Site location	Site type
02E1181/02D074/02R115	Macken Street – Guild Street Bridge	No archaeological significance
03E1060	River Liffey, City Quay/Custom House Quay	No archaeological significance
03E363/03R107	River Liffey, Custom House Quay/City Quay	No archaeological significance
05E0617	17–19 Sir John Rogerson's Quay	Urban post-medieval
06E668	Spencer Dock, North Wall Quay	Weir - fish: Mesolithic (8000 BC-4001 BC)
08E50	Mahaffy's Public House, 1–2 Lombard Street	No archaeological significance
10E108	George's Quay to Sir John Rogerson's Quay	Post-medieval reclamation deposits
14E0433	1-4 Windmill Lane	Urban post-medieval: 19th/20th C windmill
14E0438	1-6 Sir John Rogerson's Quay / 16-25 Creighton Street	Urban post-medieval: masonry
15E0432	Exchange Facility, Mayor Street, IFSC	Urban medieval; pottery
16E0620	Lime Street	Land reclamation, early 18th C houses

[11] https://www.dublincity.ie/planning-and-land-use/learn-about-councils-plans-city/dublin-city-development-plans

[12] https://www.consult.dublincity.ie/en/consultation/draft-dublin-city-development-plan-2022-2028/chapter/chapter-11-built-heritage-and-archaeology

[13] www.heritagemaps.ie; www.excavations.ie

Figure 11-1. Site location map showing recorded archaeological heritage sites in the area of the Proposed Development[14]

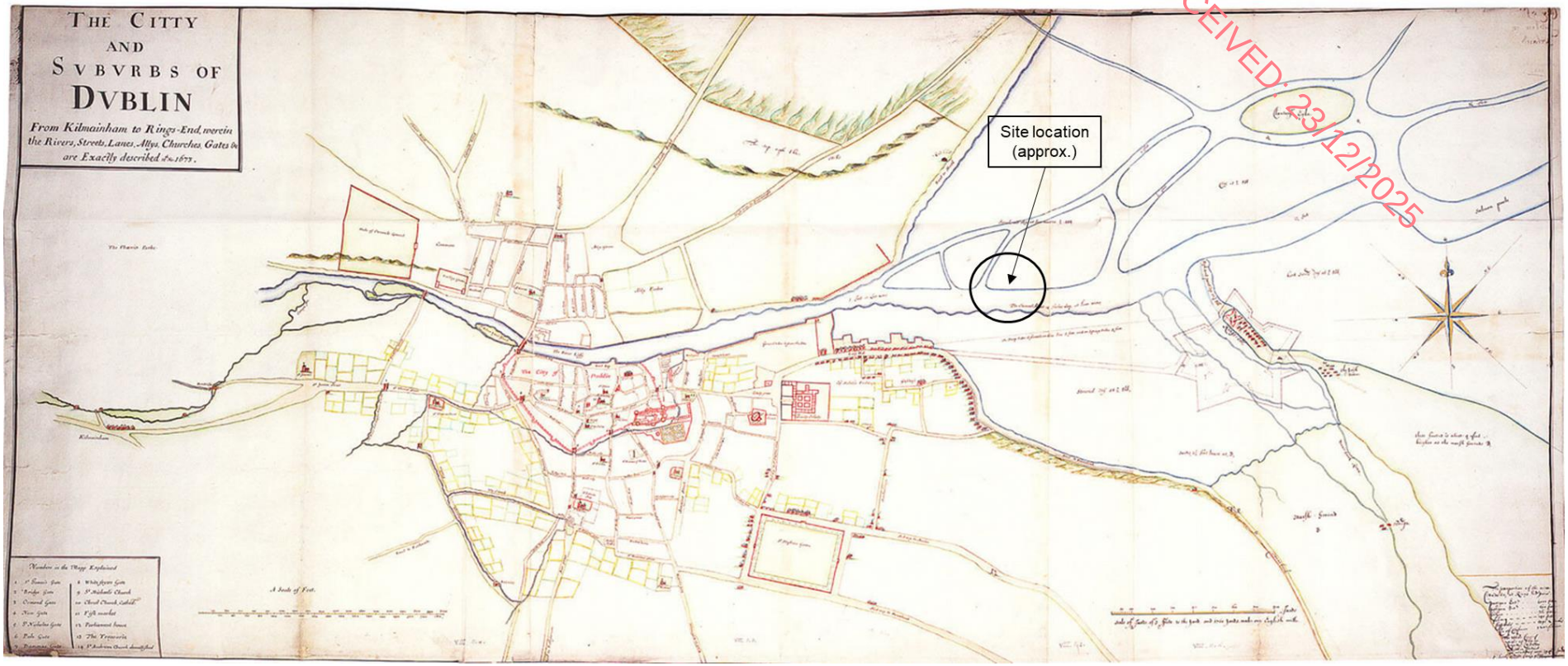


[14] www.heritagemaps.ie

Figure 11-2. Extract of Down Survey map of the County of Dublin[15]

[15] http://www.downsurvey.tcd.ie

Figure 11-3. Extract from De Gomme's 1673 map of Dublin[16]

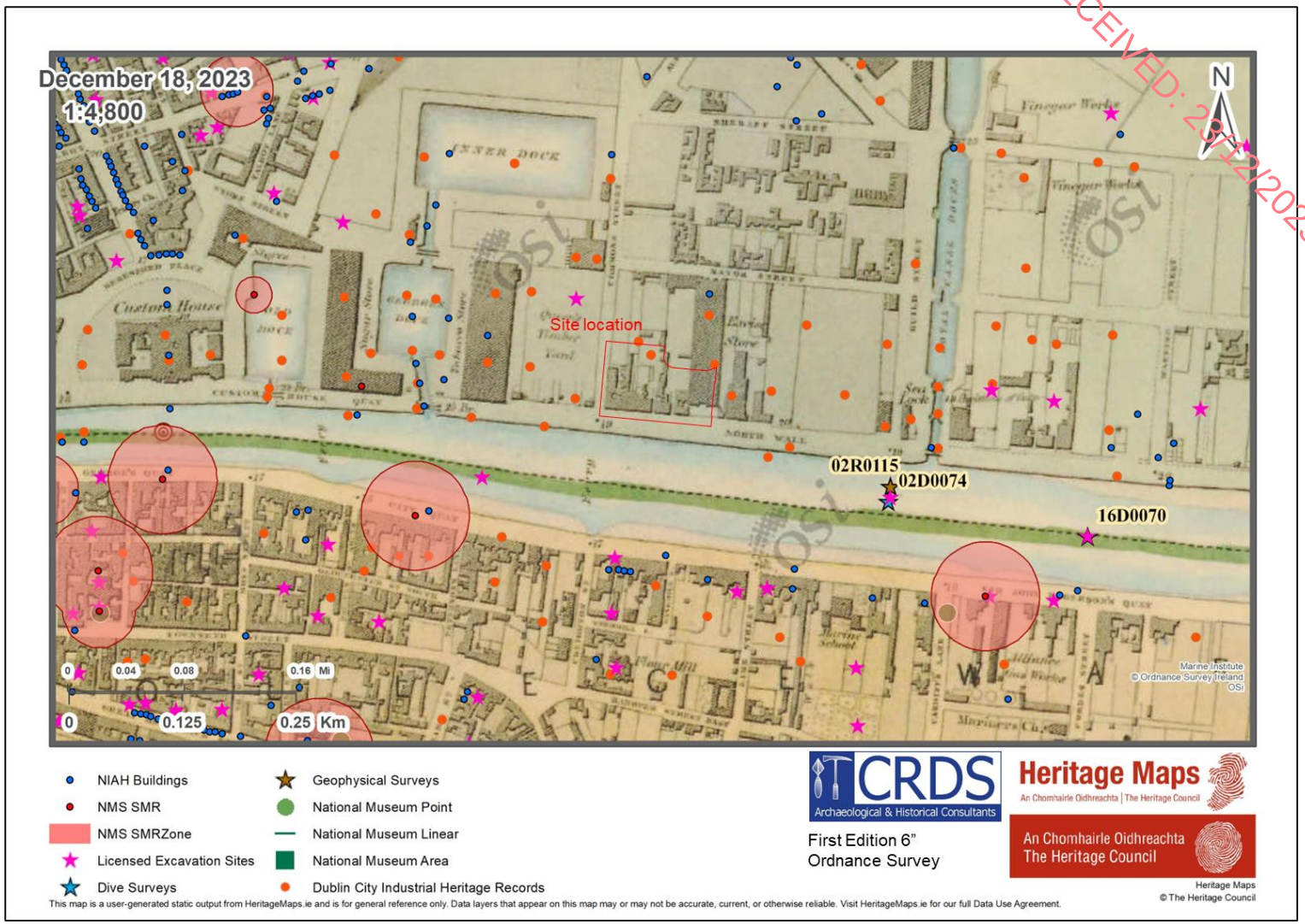


[16] http://www.rmg.co.uk/collections/objects/rmgc-object-541695

Figure 11-4. Extract from John Rocque's 1760 map of Dublin County South East[17]

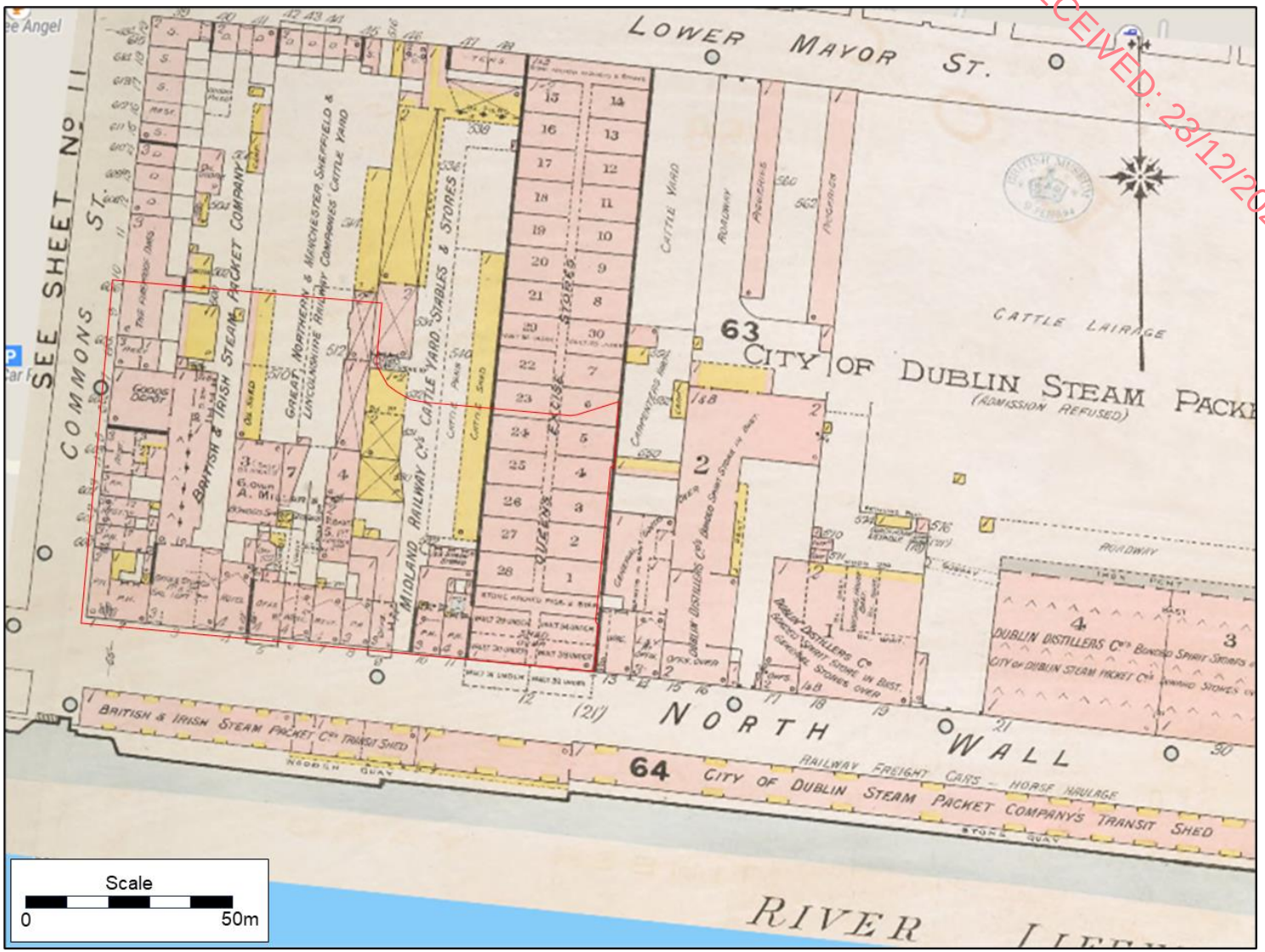
[17] http://www.dublinhistoricmaps.ie/maps/1600-1799/index.html

Figure 11-5. Extract from the Ordnance Survey c. 1830s First Edition map of Dublin[18]



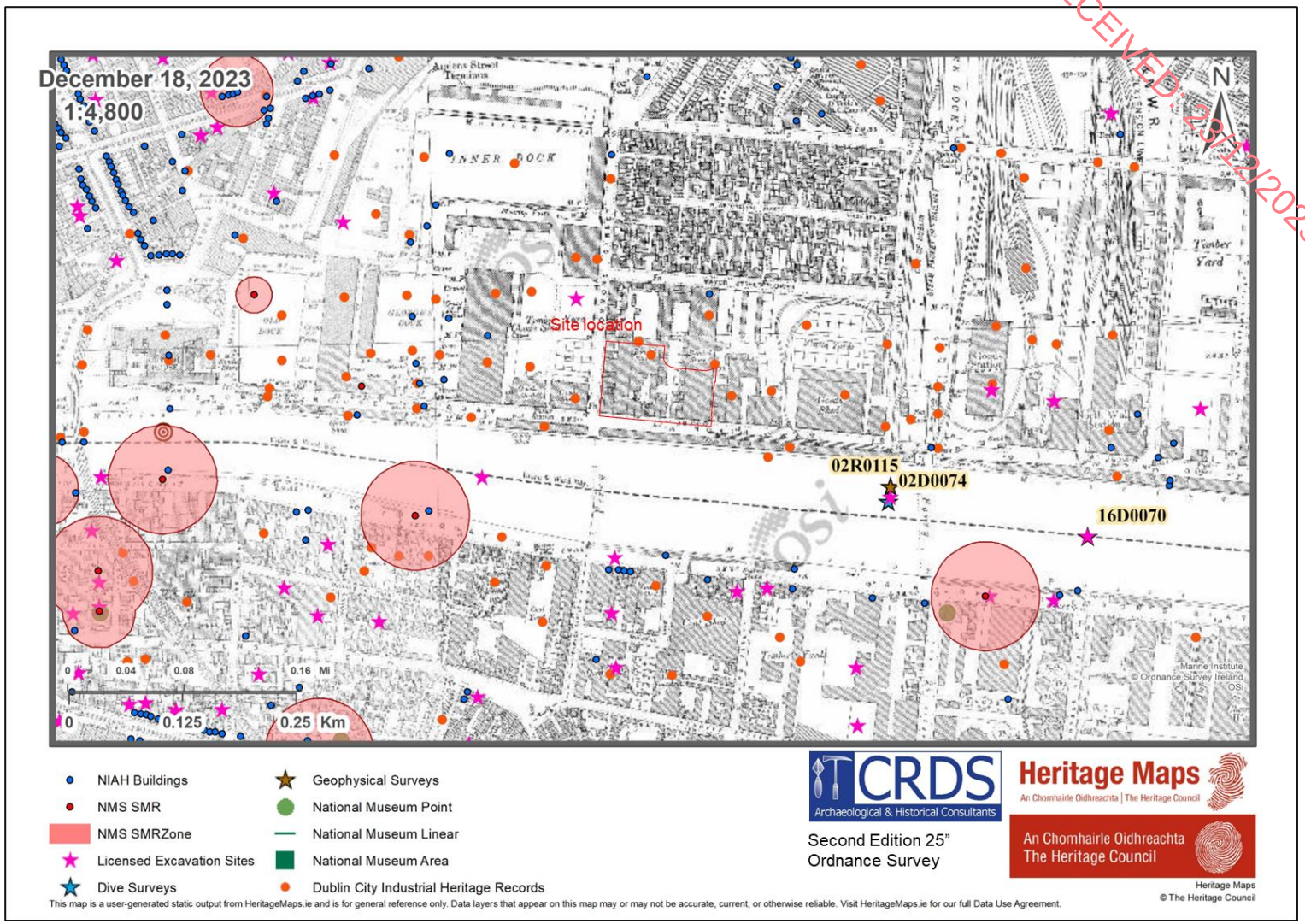
[18] http://www.heritagemaps.ie

Figure 11-6. Extract from the 1893 Goad Fire Insurance Map of Dublin[19]



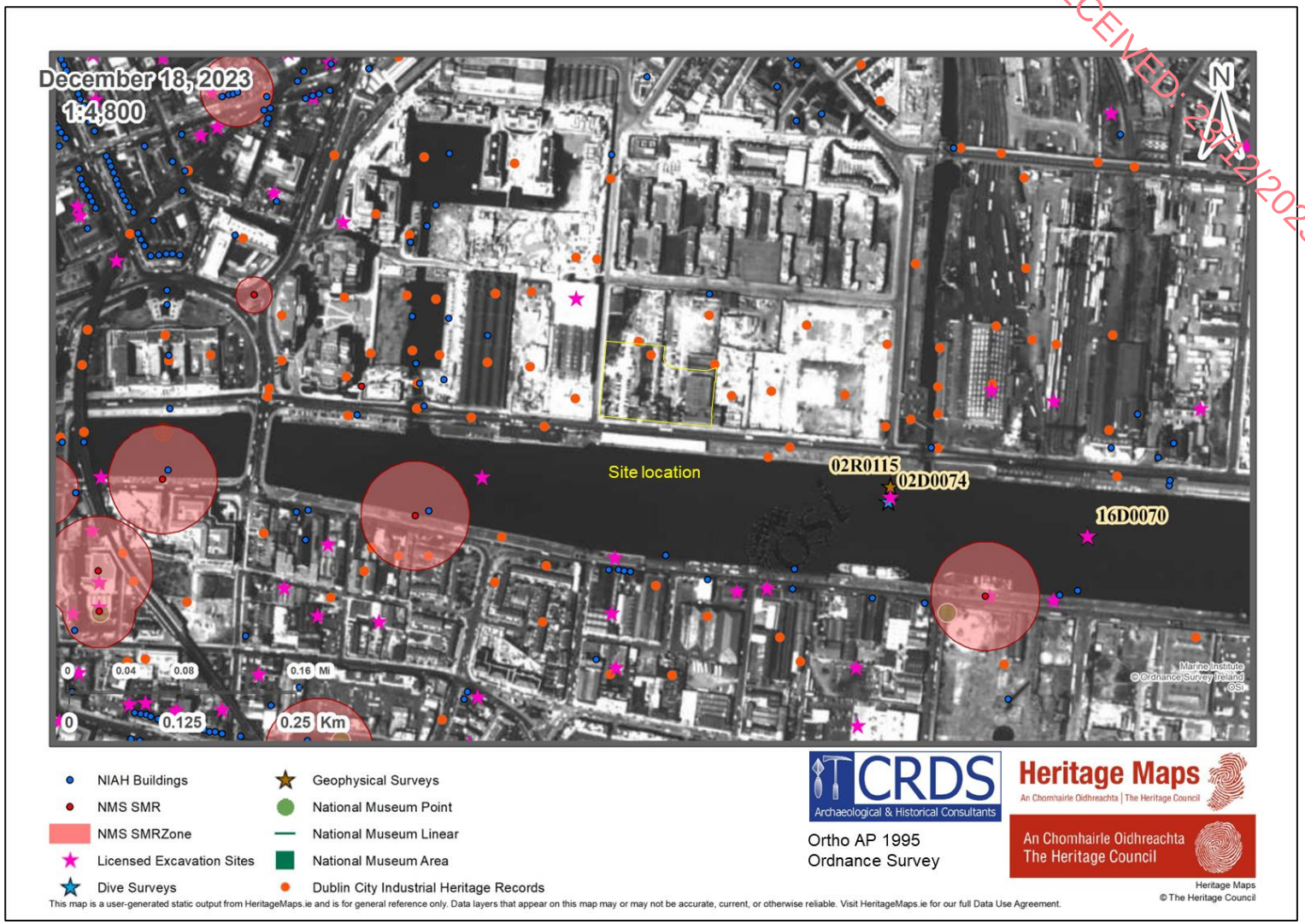
[19] http://www.oldmapsonline.org/

Figure 11-7. Extract from the Ordnance Survey c. 1910s Second Edition map of Dublin[20]



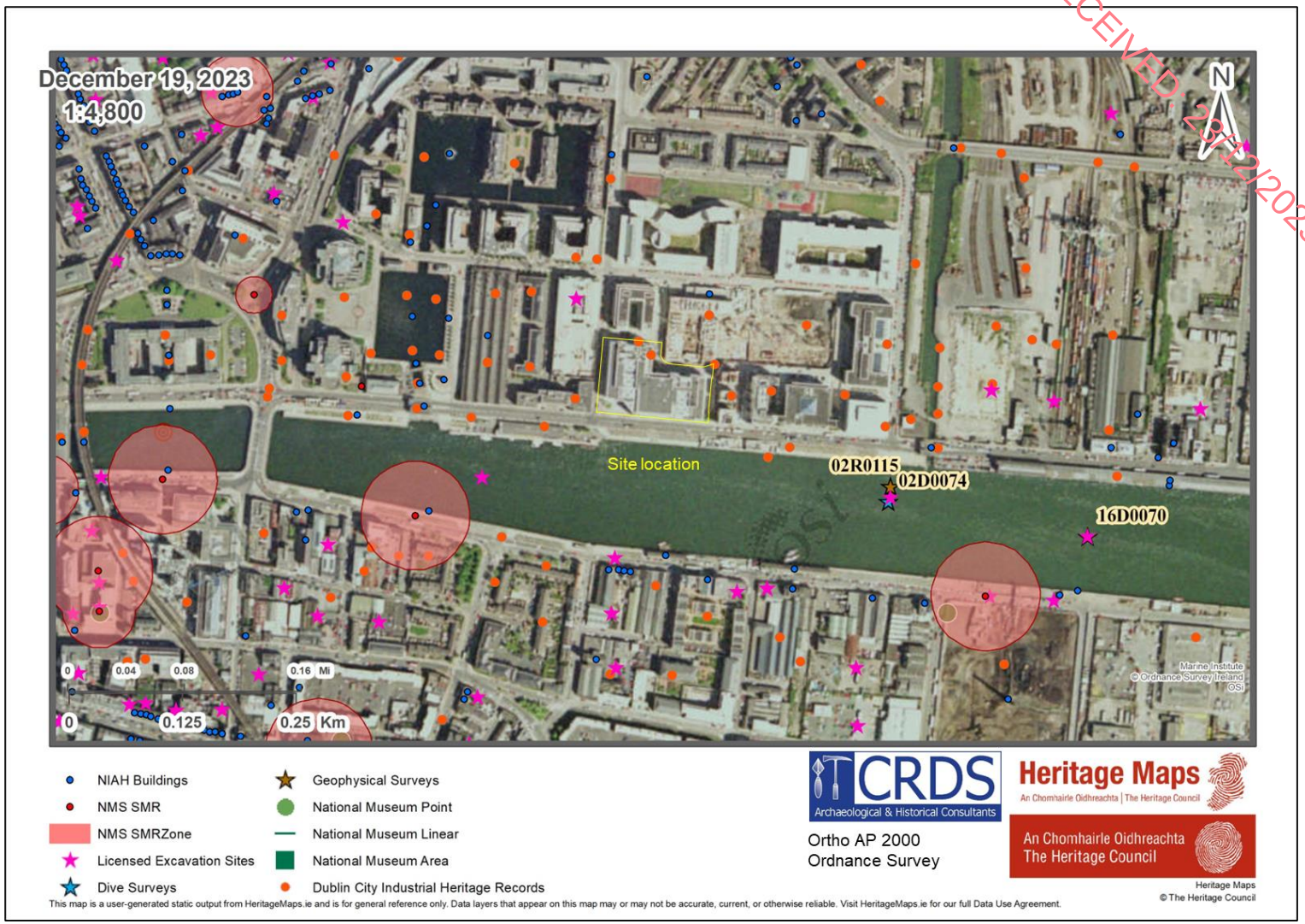
[20] http://www.heritagemaps.ie

Figure 11-8. Extract from the Ordnance Survey 1995 Aerial Photograph of Dublin[21]



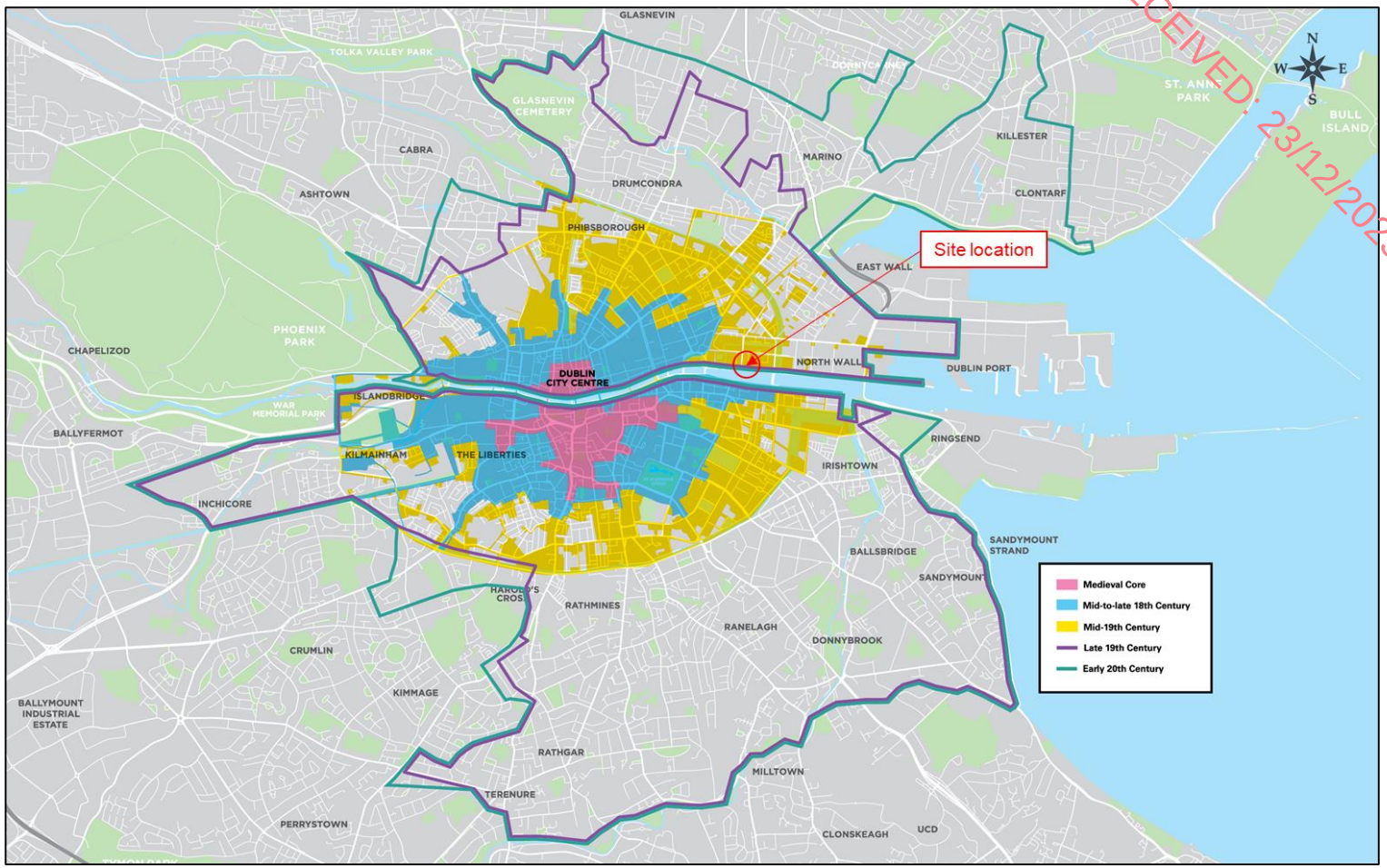
[21] http://www.heritagemaps.ie

Figure 11-9. Extract from the Ordnance Survey 2000 Aerial Photograph of Dublin[22]



[22] http://www.heritagemaps.ie

Figure 11-10. Extract from the Dublin City Development Plan showing the historic development of the city[23]



[23] http://www.consult.dublincity.ie/en/consultation/draft-dublin-city-development-plan-2022-2028/chapter/chapter-11-built-heritage-and-archaeology

11.3 Receiving Environment

The proposed development area is located within the zone of archaeological potential for the historic centre of Dublin City, which is a recorded monument (DU018-020; see Appendix 11.1). The area lay undeveloped until the early 18th century when a focused programme of land reclamation commenced. The site has been subject to continuous redevelopment in following centuries.

11.3.1 Pre-history (c. 8000 BCE – 400 AD)

There is evidence of human habitation in Ireland during the late Palaeolithic in Co. Clare[24], however, by the Mesolithic period there is widespread and unequivocal evidence of human activity throughout the island. The coastline, rivers and lakes played a vital role in the movement and settlement patterns of these hunter gatherer societies in what would have been a densely wooded environment. The River Liffey is an important waterway sourcing in the Wicklow mountains and flowing some 130km, entering the Irish Sea. Evidence of human activity associated with the river was found in 2004 with the discovery of Mesolithic fish traps during the development of the Spencer Dock area, c. 300m east of the proposed development area (Licence No. 06E0668).

Excavation uncovered the remains of two stationary fishing structures or fish traps constructed of wood and several pieces of worked wood which had been washed in by the tide. The traps may be described as ebb weirs. These structures were generally V-shaped and were constructed of large wooden fences or stone walls. They were erected in tidal zones and caught fish that drifted with the falling tide. There was often a basket at the junction of the fences. The fences served to direct the fish into the basket or trap. Fish could then be removed when the traps were exposed for two to three hours at low tide. All of the wooden remains had been covered in layers of estuarine silt, which had built up from tidal deposition. These waterlogged silt deposits facilitated the preservation of the wood. Two distinct phases of prehistoric activity were identified on the southern end of the site, within the area previously occupied by the Liffey estuary. Phase 1 was represented by the in situ remains of a fish trap, most probably an ebb weir, which was partially exposed within an area of deeper excavation (to minus 4.66m OD) on the southern end of the site. At this location the trap would have stood in the intertidal mudflats along the northern edge of the River Liffey or on the shore of an island within the estuary area. The remains of this trap were dated to the Late Mesolithic period (6000–5760 cal BC). Phase 2 was characterised by the remains of a wattle panel which was probably part of the fence of a much larger ebb weir. The wattle panel was not in situ but was found washed up against what was then the shoreline of the Liffey estuary. The weir probably would originally have stood in the intertidal mud flats somewhere to the south of the shore. It was dated to the Middle Neolithic period (3630–3370 cal BC).

11.3.2 Early Medieval Period (c. 400 AD – 1100 AD)

During the early medieval period, County Dublin straddled two ancient kingdoms, Brega to the north of the River Tolka and Laigin to the south. The early cartographic representations of Dublin city indicate the position of the estuary shoreline prior to the commencement of reclamation works. On the northern side of the river, it is possible that Amiens Street (formerly the North Strand), represents this former shoreline[25]; whilst the southern shoreline would have been dominated by a marshy delta at the mouth of the River Dodder. De Courcy also argues that this is likely to have been the position of the shoreline as far back as AD 850[26].

[24] Dowd, M. and Carden, R.F. 2016. First evidence of a Late Upper Palaeolithic human presence in Ireland. Quaternary Science Reviews 139, 158-163.
[25] De Courcy, J. W. 1996. The Liffey in Dublin, Dublin: Irish Academic Press, p. 270.
[26] De Courcy, J. W. 1996. The Liffey in Dublin, Dublin: Irish Academic Press, p. xxvii.

The name "Dublin," meaning 'black pool,' originated from a pond southeast of present-day Dublin Castle, tying to an early ecclesiastical foundation referenced in AD 790[27].

The proposed development area lay downriver from this early settlement focus near the 'ford of the hurdles.' Pre-18th century, it likely sat within the River Liffey's course, possibly as mud flats impacted by tidal flooding. While unsuitable for habitation, it was likely used for resource gathering like shellfish, seabird hunting, and seaweed harvesting due to its proximity to settlements. The estuary might have employed tidal fish traps similar to those found in the Shannon Delta[28].

Dublin underwent a significant transformation with the arrival of Vikings in the 9th century. Their settlement established itself by the Liffey and Steine confluence, marked by 'The Long Stone'[29]. Initially a raiding base, the Viking longphort evolved into a commercial hub for slave trade and luxury goods over 60 years before being driven away in 902. They returned in 917 to a new site overlooking the Liffey and Poddle confluence, developing a trading town with property plots, streets, and earth defences from Christchurch Cathedral to Dublin Castle.

Throughout the 11th century, Dublin expanded, covering around 12 hectares on the southern side of the river[30]. This growth likely led to increased resource exploitation in the proposed development area, evidenced by abundant shell remains found at Woodquay, including cockle, mussel, oyster, and scallop shells. Notably, the region east of the proposed area was renowned for its oyster beds until the 18th century[31].

11.3.3 Later Medieval Period (c. 1100 AD – 1650 AD)

Following the Anglo-Norman invasion in 1169, medieval Dublin experienced a period of growth and prosperity extending into the 14th century. The Anglo-Norman administration reinforced town walls with defensive towers and erected gates on streets outside these walls, fortifying the city. Significant reclamations of land along the Liffey at Woodquay started around the late 12th century, indicating extramural development[32].

The proposed development site, initially tidal mudflats about 1km east of the walled town, remained relatively unchanged until the 17th century. The Down Survey map of 1641 (Figure 11-2) and De Gomme's 1673 map (Figure 11-3) provide insights into the medieval period's landscape. Notably, the Augustinian Priory of All Saints (later becoming Trinity College) was established in 1166, 650m southwest of the site, eventually amassing substantial wealth through estates, farming, and rentals[33]. However, it was dissolved in 1538, its possessions granted to Dublin citizens for their loyalty during the Silken Thomas Rebellion of 1534[34].

East of the town, another religious foundation emerged in 1220, established by Archbishop Henry of London, this site catered to pilgrims and possibly operated as a place for lepers, likely lending its name to the area—initially "Lazar's Hill," later becoming "Lazy Hill" and then Townsend Street[35].

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[27] Duffy, P. 2016. 'The Church of Bearach, the Grange of Baldoyle and the Town of the Dark Stranger' in Seán Duffy (ed) Medieval Dublin XV, Dublin: Four Courts Press.
[28] O'Sullivan, A., McCormick, F., Kerr, T. R., and Harney, L. 2014. Early Medieval Ireland, The evidence from Archaeological Excavations, Dublin: Royal Irish Academy, p. 212
[29] De Courcy, J. W. 1996. The Liffey in Dublin, Dublin: Irish Academic Press., p. 235.
[30] Bradley J. 1998. The Medieval Boroughs of County Dublin. Dublin and beyond the Pale: studies in honour of Patrick Healy. Bray.
[31] De Courcy, J. W. 1996. The Liffey in Dublin, Dublin: Irish Academic Press, p. 290.
[32] Halpin, A. 2000. The Port of Medieval Dublin, Dublin: Four Courts Press, p. 34.
[33] Gwynn A. and Hadcock R. M. 1970. Mediaeval Religious Houses: Ireland: with and Appendix to Early Sites, Dublin: Irish Academic Press, p. 171.
[34] Gilbert J. T. 1861. A History of the City of Dublin Dublin: James Duffy, p. 3-4.
[35] Takeda, J. T. 2011. Between Crown and Commerce: Marseille and the Early Modern Mediterranean Baltimore: The Johns Hopkins University Press, p. 118.

During the medieval period, the proposed site likely served as a foreshore resource, with intensified exploitation as Dublin's population grew. Shellfish, seabirds, seaweed, and sand from the coast were harvested. Fishing activity increased, evidenced by discoveries of fishhooks, sinkers, eel-spears, and netting-needles in Dublin and Howth. As Dublin's population expanded and various religious and landholding establishments grew, the control and regulation of coastal resources intensified. Fishing and resource harvesting rights became valuable possessions administered by different landlords[36].

11.3.4 Post-Medieval Period (c. 1650 AD –)

Major improvements to the City of Dublin took place in the latter half of the 17th century and this included the development of lands along the Liffey that had been part of the margins of the river or low-lying land adjacent. This was facilitated by Dublin's Norman charter, which granted to the city all of the tidal area, so that any land reclaimed from the water became city property with potential rental income. From the 17th century, reclamation projects involving wooden revetments were undertaken within the vicinity of the proposed development site.

Lands reclaimed frequently carry the names of those who received leases from the city at this time, such as Usher, Ellis and Jervis. The sequence of the quays is encoded into the names that they bear, with Usher's Island and Usher's Quay, Ellis Quay, Arran Quay and Ormond Quay dating from the 17th century. George's Quay, City Quay, Sir John Rogerson's Quay, Aston Quay, North Wall Quay and Crampton Quay date to the 18th century Burgh Quay, Wolfe Tone Quay and Victoria Quay date to the 19th century. The largest programme of land reclamation from the river and its estuary began in the early 18th century. This took place to the north and south of the river, with the construction of river walls along North Wall Quay and East Wall on the northern side and George's Quay, City Quay and Sir John Rogerson's Quay on the southern side. Huge tracts of land were reclaimed and were suitable for building by the end of the century[37].

The 18th century expansion of the port of Dublin, which led to the construction of the quays, created moorage for shipping as far as Carlisle Bridge (now O'Connell Bridge). This culminated in the construction of the new Custom House in the 1780s and 90s, which shifted the focus of port activity definitively to the area surrounding Custom House Quay, City Quay, North Wall Quay and Sir John Rogerson's Quay. The newly constructed quays and reclaimed land are depicted on Rocque's 1760 map of Dublin County South East (Figure 11-4).

The Grand Canal dock was also constructed at this time (De Courcy 1996, 176). The port was further augmented in the early 19th century with the provision of docks adjacent to the Custom House, on the site now occupied by Memorial Road.

The Royal Canal reached the Liffey in the 19th century, necessitating the provision of bridges over the canal lock and resulting in the provision of Spencer Dock. The mechanisation of the port facilities gradually brought rail tracks along the northern and southern quays, particularly North Wall Quay and Sir John Rogerson's Quay. Most of these rail lines were privately owned and enabled bulk goods to be moved efficiently between the ships moored at the quays and the warehouses and industrial units nearby.

The development of the area north of the quays, including the land in which the proposed development is to be sited, is well illustrated in the first (1830s) and second (1910s) edition Ordnance Survey maps (Figure 11-5 and Figure 11-7), and in particular, the Goad Fire Insurance Map of 1893 (Figure 11-6). This detailed 1893 plan (at a scale of 1 inch to 50 feet) of Dublin is one of a series of twenty sheets in an atlas originally produced to aid insurance companies in assessing fire risks. The building footprints, their use (commercial, residential, educational, etc.), the number of floors and the height of the building, as well as construction materials (and thus risk of burning) and special fire hazards (chemicals, kilns, ovens) were documented in order to estimate premiums. Names of individual businesses, property lines, and addresses

[36] Murphy, M. and Potterton, M. 2010. The Dublin Region in the middle ages. Dublin. Four Courts Press.
[37] Lennon, C. 2008. Dublin 1610–1756: Irish Historic Town Atlas No. 19. Dublin. Royal Irish Academy, p.6 .

were also often recorded. These maps, undertaken in between the first and second edition Ordnance Survey maps, provide a rich historical snapshot of the commercial activity and urban landscape of towns and cities at the time. The area of the proposed development, at this time, comprised a series of buildings related to the Midland Railway Company's Cattle Yard and Stables (Figure 11-6).

Aerial photography images from 1995 (Figure 11-8) and 2000 (Figure 11-9) indicate the land proposed for development has been redeveloped extensively in the recent past, during the construction of the Financial District along the north side of the quays. Whilst the streetscape remains unchanged since the time of the building of the quay walls and reclamation of the land in the 18th century, the layout of buildings as depicted on the Goad Fire Insurance Map of 1893 is completely gone.

11.4 Characteristics of the Proposed Development

The purpose of this section is to provide an overview of the key relevant details of the construction phase and operational phase of the proposed development. The information presented in this section is informed by the project design, but it is not a complete description of the Proposed Development. Therefore, it should be read in conjunction with the full development package. For a more comprehensive understanding of the Proposed Development, please refer to Chapter 2 (Description of the Proposed Development) of the EIA Report. Chapter 2 provides a detailed overview of the lifecycle of the project, including reference to the architectural and civil engineering, drawings, plans, reports, and other relevant document in order to define the proposed development. Construction Phase

11.4.1 Construction Phase

In relation to archaeology and cultural heritage, the proposed development will comprise minor ground disturbance namely, piling through the existing basement with appropriate types of piles. New piles for new development shall be stitched into the existing foundations, with foundations strengthened where required.

11.4.2 Operational Phase

There will be no ground disturbance during the operational phase of the proposed development.

11.5 Potential Impacts of the Proposed Development

11.5.1 Construction Phase

There are no recorded archaeological sites within the proposed development, although it should be noted that the development lies within the zone of archaeological potential for the city of Dublin (SMR No. DU18-020). There are two recorded archaeological sites listed in the RMP within the study area. Neither of these will be impacted, directly or indirectly, by the proposed development.

There have been numerous development led licensed archaeological investigations in the area of the proposed development, including eleven within c. 300m of the site. One of these revealed medieval remains, and four revealed post-medieval remains. More significantly, one revealed the remains of Mesolithic fish traps were recovered from beneath the overlying 18th century reclaimed land.

The desktop survey did not highlight any previously unrecorded archaeological sites within the site of the proposed development.

The land on which the proposed development is sited has been subjected to substantial development in the recent past and is currently offices with a basement car park.

However, given that the Proposed Development will involve piling through the existing basement to make-way for new foundations for the proposed vertical structure, the potential impact of the proposed

development on the archaeological and cultural heritage is deemed to be ***negative***, ***moderate*** and ***permanent***.

11.5.2 Operational Phase

No impacts on archaeological and cultural heritage are expected as a result of the operational phase of the Proposed Development.

11.6 Mitigation Measures

11.6.1 Construction Phase

In order to mitigate against the potential impacts of the proposed development on archaeological heritage, the following will be required:

A suitably qualified archaeological consultant will be required to oversee the works and undertake the required archaeological mitigation strategy.

The appointed archaeological consultant should consult with the Dublin City Archaeologist and National Monuments Service of the Department of Housing, Local Government and Heritage, to discuss the construction methodology and agree an appropriate strategy to mitigate against the potential impacts of the proposed development on archaeology.

It is envisaged that archaeological monitoring of ground works will be carried out to identify features or deposits of archaeological significance. Should such features be discovered, further mitigation may be required, such as preservation by record or in-situ.

Financial, logistical and time provision should be made for archaeological excavation, if required.

Should these mitigation measures be implemented, the potential impact of the proposed development on the archaeological and cultural heritage is deemed to be ***positive*** and ***moderate***.

Please note that the recommendations given here are subject to the approval of the Dublin City Archaeologist and the National Monuments Service, Department of Housing, Local Government and Heritage.

11.6.2 Operational Phase

No mitigation measures are required for archaeological and cultural heritage during the operational phase of the Proposed Development.

11.7 Monitoring or Reinstatement Measures

11.7.1 Construction Phase

There are no ongoing monitoring or reinstatement requirements during the construction phase relating to archaeological and cultural heritage.

11.7.2 Operational Phase

There are no identified residual effects during the operational phase relating to archaeological and cultural heritage.

11.8 Residual Effects of the Proposed Development

11.8.1 Construction Phase

There are no identified residual effects during the construction phase relating to archaeological and cultural heritage. Should previously unknown sub-surface archaeological features be encountered during the course of the implementation of mitigation measures, the excavation of these will add to the academic knowledge and therefore be a ***positive***, ***long term*** and ***moderate*** effect.

11.8.2 Operational Phase

There are no identified residual effects during the operational phase relating to archaeological and cultural heritage.

11.9 Cumulative Impacts of the Proposed Development

11.9.1 Construction Phase

During construction there is low potential for cumulative impact as the lands on which the proposed development are sited, as they have been extensively and significantly developed in the past. Should any features exist, they will be archaeologically recorded in advance of construction works in these areas.

Previous development in the wider area has uncovered previously unrecorded archaeology. The academic knowledge gained from the excavation of these features, has resulted in a net cumulative ***permanent***, ***significant***, ***positive*** impact.

11.9.2 Operational Phase

During operation there is no potential for cumulative impact as there will be no disturbance to ground.

Chapter 12 – Traffic and Transportation

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12. TRAFFIC AND TRANSPORTATION

12.1 Introduction

This Chapter of the EIAR assesses and evaluates the likely impact of the proposed development on the operation of the surrounding transportation infrastructure and nearby transport services.
This assessment has been carried out in accordance with the following guidance and established best practice:

- Environmental Protection Agency (EPA) (2022). Guidelines on the Information to be Contained in Environmental Impact Assessment Reports
- Transport Infrastructure Ireland (TII) (2014). Traffic and Transport Assessment Guidelines
- TII (2011). Project Appraisal Guidelines

Reference has also been made to:

- the Dublin City Development Plan 2022–2028
- the Trip Rate Information Computer System (TRICS) database
- CSO 2016 and 2022 Census data
- the UK Homes & Community Agency Employment Density Guide (3rd Edition, 2015)
- CSO Labour Force Survey (Q2 2023)
- Public Transport Capacity Assessment, North Wall Quay (Derry O'Leary, 2025)
- the Design Manual for Urban Roads and Streets (DMURS) (2019)
- the NTA Cycle Design Manual (2023)
- Greater Dublin Area Cycle Network (2022)

This chapter presents an analysis of the proposed development's operational trip generation potential, traffic impact, and public transport demand contribution, which is also presented in the Traffic and Transport Assessment (TTA) report prepared by CS Consulting and submitted separately in support of this planning application. While this chapter includes content common to both documents, the TTA also examines certain further aspects of the proposed development (e.g. vehicular access arrangements) that are not pertinent to an EIAR.

Construction phase vehicular trip generation and construction traffic management, including mitigation measures, are also examined in this chapter.

12.2 Methodology

The methodology adopted for the traffic and transportation assessment is summarised as follows:

- A desktop study of the area surrounding the development site was conducted, examining the nature of the surrounding existing transport infrastructure, the existing public transport services nearby, and proposed future improvements to public transport services and transport infrastructure.
- Classified junction turning count vehicular traffic surveys were conducted at 7 no. existing junctions in the vicinity of the development site. These surveys were undertaken by Idaso Ltd on behalf of CS Consulting from 06:00 to 20:00 on Tuesday the 16th of May 2023. Raw traffic survey data are provided in Appendix 12.1.
- A multi-modal development trip generation assessment was carried out using data extracted from the Trip Rate Information Computer System (TRICS) database of traffic surveys (refer to Appendix 12.2), in conjunction with CSO national census data. This quantifies potential trips to and from the proposed development site, across several modes of transport, both for the existing building on the site and for the proposed development once completed. The site's projected trip generation during the proposed development's construction phase has also been established.

- A specialist Public Transport Capacity Assessment was conducted, which established the capacity of existing public transport services close to the development site and compared this to the development's projected public transport demand at peak times. The Public Transport Capacity Assessment report is attached as Appendix 12.3.

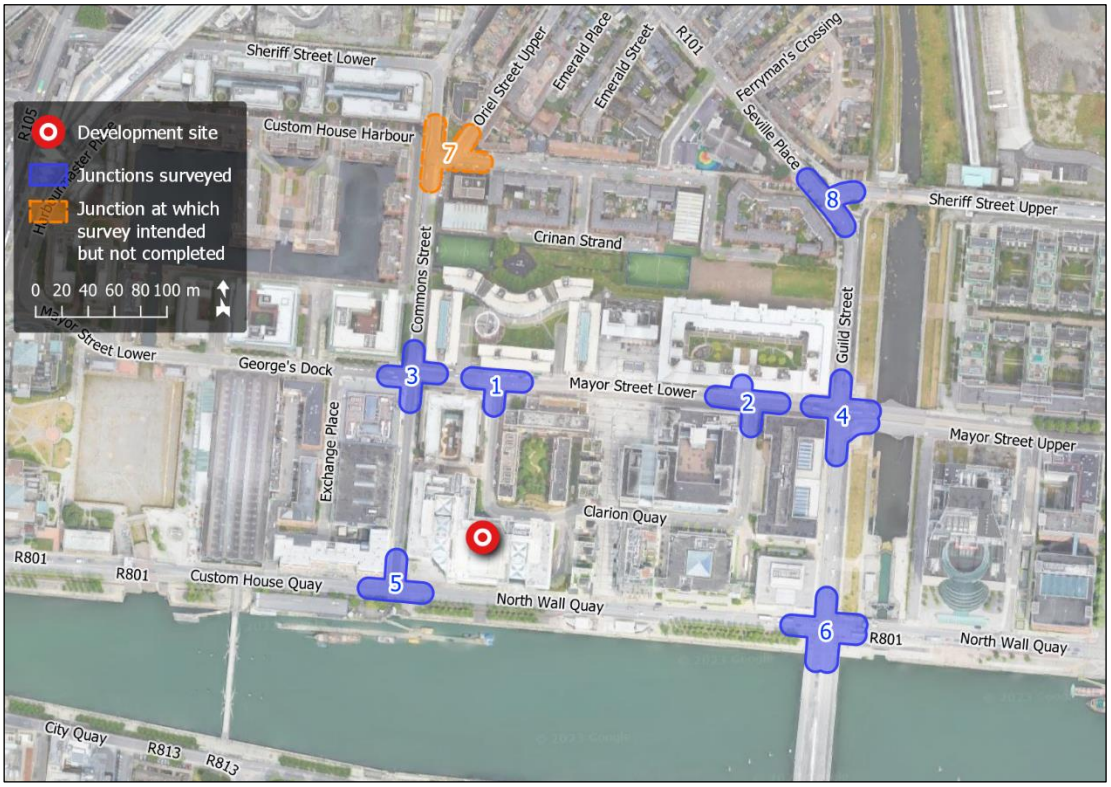
12.2.1 Vehicular Traffic Survey

Full turning movement classified traffic counts were carried out by Idaso Ltd, on behalf of CS Consulting, over a 14-hour period (06:00–20:00) on Tuesday the 16th of May 2023. This traffic survey was intended to include the following 8no. sites (see Figure 12.1):

- J1. R750 / Mayor Street Lower / Clarion Quay (West) (3-arm priority-controlled junction with Luas track)
- J2. Mayor Street Lower / Clarion Quay (East) / Custom House Square (staggered 4-arm priority-controlled junction with Luas track)
- J3. Commons Street / Mayor Street Lower / George's Dock (4-arm signal-controlled junction with Luas track)
- J4. Guild Street / Mayor Street Upper / Mayor Street Lower (4-arm signal-controlled junction with Luas track)
- J5. Custom House Quay / Commons Street / North Wall Quay (3-arm signal-controlled junction)
- J6. North Wall Quay / Guild Street / Beckett Bridge (4-arm signal-controlled junction)
- J7. Sheriff Street Lower / Oriel Street Upper / Commons Street (4-arm priority-controlled junction)
- J8. Seville Place / Sheriff Street Upper / Guild Street (3-arm signal-controlled junction)

Idaso personnel were however prevented from installing survey equipment at site J7 (Sheriff Street Lower / Oriel Street Upper / Commons Street) by antisocial behaviour. Consequently, no traffic data were recorded at this location.

Figure 12-1 Taffic Survey Sites (Sources: OSM Contributors, Google)



The peak hour traffic flows across all seven surveyed sites were found to occur between 08:00 and 09:00 (AM peak hour) and between 17:00 and 18:00 (PM peak hour).

Raw data from this traffic survey are provided in Appendix 12.1. The peak hour traffic movements at each of the surveyed junctions have been isolated from the count data and converted to Passenger Car Units (with the exception of Luas trams). A summary of total peak hour traffic movements at the surveyed junctions is given in Table 12-1.

Table 12-1 Surveyed Traffic Flows Summary

Time Period	Traffic Type	Total Vehicular Movements at Survey Junction Site:						
		J1	J2	J3	J4	J5	J6	J8
Weekday AM Peak (08:00-09:00)	General (as PCU)	266	226	693	701	1289	1802	908
	Luas trams	17	18	17	18	n/a	n/a	n/a
Weekday PM Peak (17:00-18:00)	General (as PCU)	152	194	453	793	1163	1753	911
	Luas trams	19	19	19	19	n/a	n/a	n/a

12.2.2 Development Population and Modal Split

The proposed development primarily comprises offices with a total Gross Internal Area (GIA) of 53,774m^2 and a total Net Internal Area (NIA) of 39,151m^2. The development also includes community space with a GIA of 660m^2; staff within this ancillary element will however represent only a fraction of the development's total population.

To calculate the predicted number of office employees within the development, the following average staff density figure has been sourced from the UK Homes & Community Agency's Employment Density Guide (3rd Edition):

- General Offices (max. density) – 1 staff member per 10m^2 NIFA

This gives a projected total office population of 3,915 people, at full occupancy. A maximum total of 5no. staff members is assumed for the development's cultural elements. A typical daily staff absence rate of 7% is assumed across the development as a whole (in line with CSO Labour Force Survey findings). For all assessment purposes, the proposed development's operational design population is therefore taken to be 3,646 people.

To establish indicative baseline modal splits for occupants of (and visitors to) the development site, reference has been made to CSO data derived from the 2016 census, in the form of Workplace Zone (WPZ) statistics that give modal splits for daytime occupants' trips to places of work or study. For the purposes of the present assessment, these splits are assumed to apply also to office visitors. The development site is located within Workplace Zone no. DC0364 (see Figure 12.2). The census modal splits for this WPZ are given in **Error! Reference source not found.**

Figure 12-2 Census Workplace Zones (Sources: OSI, CSO, OSM, Contributors, Google)

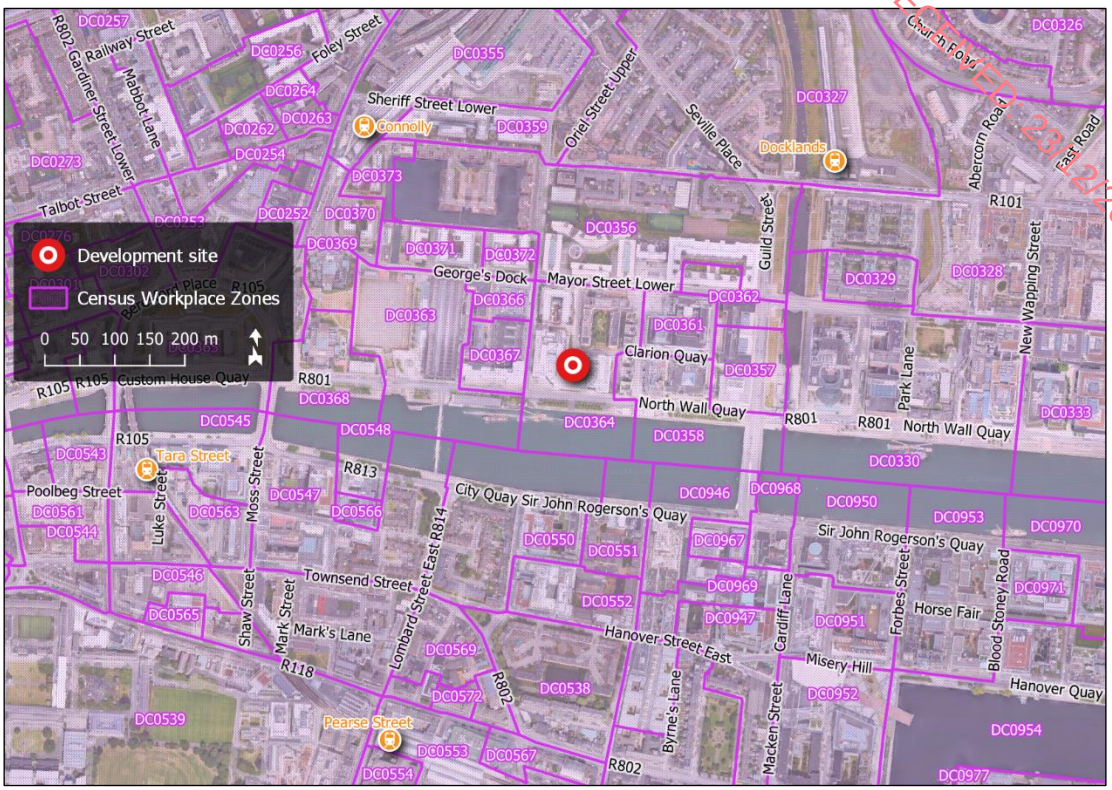


Table 12-2 CSO 2016 Census Data - Existing Modal Split

Transport Mode	WPZ DC0364 Modal Shares
Driving a Car or Van	17%
Passenger in a Car	1%
Bicycle	9%
Motorcycle	1%
Bus	22%
Train or Tram	36%
Walking	14%
Other / Work from Home	0%
Not Stated	0%

It should be noted that these modal shares refer to the greatest proportion (by distance) of each journey. A train journey, for example, is likely to involve walking or cycling at one or both ends of the trip but will not be classified as a walking or cycling journey.

As the proposed development has a projected design population of 3,646 people, the direct application of the current WPZ modal shares would result in 620 people commuting to the development by car. As described in section 12.4.2, however, the proposed development has a total car parking provision of only 32no. spaces (equivalent to 0.9% of development occupants). Adjusting the census data to reflect this limited car parking provision yields the adjusted development-specific modal shares given in Table 12-3 Site-Specific Modal Splits for Development Occupants and Visitors. A modal share of 5% (equivalent to 182 people) has nevertheless been retained for private car use, to reflect the fact that some development occupants or visitors will nevertheless elect to drive to the area and use nearby on-street or off-street parking facilities.

Table 12-3 Site-Specific Modal Splits for Development Occupants and Visitors

Transport Mode	Assumed Initial Modal Share
Driving a Car or Van	5%
Passenger in a Car	2%
Bicycle	10%
Motorcycle	1%
Bus	25%
Train or Tram	41%
Walking	16%

12.2.3 Development Occupant and Visitor Trip Generation by Mode

With respect to trip generation, the proposed development has a total effective Gross Floor Area (GFA) of 54,434m2, comprising 53,774m2 of office space and 660m2 of community space.

Trip generation factors from the Trip Rate Information Computer System (TRICS) database have been used to predict the total trip generation to and from the proposed development (across all modes) for the AM and PM peak hour periods, as well as for a full day. The TRICS survey database is maintained by a consortium of English County Councils but covers the entirety of Great Britain and Ireland. Full details of the TRICS information used are provided in Appendix 12.2.

In calculating total person-trips to and from the proposed development, only its office GFA of 53,774m2 has been considered, as this shall account for 99.9% of the design population. The TRICS sub-category '02 Employment / A – Office' has been employed; this is described in the TRICS land use category definitions as follows:

"Single office building. May include a number of different organisations within the same building. If there is more than one building, then only include if the buildings belong to the same organisation. If there are different buildings for separate organisations then include as 02/B. Trip rates are calculated by Gross Floor Area, or Employees."

The TRICS trip rates for the proposed development have been selected from the above category, restricted insofar as possible to similar city centre locations, and further refined with reference to 2022 CSO census data on the basis of:

- the population within 1 mile of the development site (60,000 approx.);
- the population within 5 miles of the development site (520,000 approx.);
- the mean car ownership rate within 5 miles of the development site (1.0 cars per household).

The selected trip rates are given in Table 12.4.

Table 12-4 TRICS Weekday Person-Trip Generation Rates

Time Period	Arrivals per 100m^2 GFA	Departures per 100m^2 GFA
AM Peak (08:00-09:00)	1.997	0.229
PM Peak (17:00-18:00)	0.151	1.759
Full Day (07:00-21:00)	7.517	7.517

The total person-trip generation figures obtained for the proposed development are given in Table 12-5.

Table 12-5 Development Weekday Person-Trip Generation from TRICS

Time Period	Arrivals	Departures	Total Trips
AM Peak (08:00-09:00)	1,074	123	1,197
PM Peak (17:00-18:00)	81	946	1,027
Full Day (07:00-21:00)	4,042	4,042	8,084

The development-specific modal splits given in Table 12-3 have been applied to all weekday person-trips to be generated by the proposed development, as given in Table 12-5.

For assessment purposes, a slight adjustment has been made to the development's operational phase vehicular trip generation during the peak hours. This removes car trips above the development's onsite car parking provision of 32no. spaces, on the basis that:

- At most 32no. car driver trips will be made to the site itself during the AM peak hour.
- At most 32no. car driver trips will be made from the site itself during the PM peak hour.

This adjustment does not affect trips made by cars that drop off or collect passengers at the development but do not park at or near the site.

Table 12-6 gives the resultant distribution of development trips across transport modes.

Table 12-6 Development Occupant/Visitor Weekday Trip Generation by Mode

Transport Mode	Direction and Time Period					
	Arrivals			Departures		
	AM Peak	PM Peak	Full Day	AM Peak	PM Peak	Full Day
Driving a Car or Van	32	0	62	0	32	62
Passenger in a Car	17	1	60	2	15	60
Bicycle	114	9	397	13	100	397
Motorcycle	8	1	28	1	7	28
Bus	266	20	929	30	234	929
Train or Tram	445	34	1,556	51	392	1,556
Walking	171	13	599	20	151	599

12.2.4 Development Servicing Vehicle Trip Generation

In addition to trips made to and from the site by occupants and visitors, the proposed development shall also generate vehicular trips by servicing vehicles. These shall be required for operations such as deliveries, maintenance works, and refuse collection, and shall be made by either Ordinary Goods Vehicles (rigid or articulated lorries over 7.5t) or Light Goods Vehicles (vans).

To separate these trips from those made by development occupants and visitors, specific OGV and LGV trip generation rates have been sourced from the TRICS database; these are given in Table 12.7. In contrast to the total person-trip generation for the development, servicing vehicle trips have been calculated separately for the development's office and cultural elements. For the latter, the TRICS sub-category '07 Leisure / Q - Community Centre' has been employed; this is described in the TRICS land use category definitions as follows:

- Community Centre: *"Dedicated centre for community activities. Trip rates are calculated by Gross Floor Area, Site Area, Employees, or Parking Spaces."*

Table 12-7 TRICS Weekday Servicing Vehicle Trip Generation Rates

Time Period	Arrivals per 100m² GFA		Departures per 100m² GFA	
	OGVs	LGVs	OGVs	LGVs
Offices				
AM Peak (08:00-09:00)	0.002	0.011	0.002	0.007
PM Peak (17:00-18:00)	0.000	0.002	0.000	0.002
Community Centre				
AM Peak (08:00-09:00)	0.000	0.084	0.000	0.084
PM Peak (17:00-18:00)	0.000	0.084	0.000	0.084

The development's resultant predicted weekday peak hour servicing vehicle trip generation is given in Table 12-8.

Table 12-8 Development Weekday Servicing Vehicle Trips from TRICS

Time Period	Arrivals		Departures		Total Trips	
	OGVs	LGVs	OGVs	LGVs	OGVs	LGVs
Offices						
AM Peak (08:00-09:00)	1	6	1	4	2	10
PM Peak (17:00-18:00)	0	1	0	1	0	2
Community Centre						
AM Peak (08:00-09:00)	0	1	0	1	0	2
PM Peak (17:00-18:00)	0	1	0	1	0	2

12.2.5 Maximum Motor Vehicle Trip Generation in Operational Phase

The total person-trip generation figures already established for the development technically include servicing trips, although these have not been removed from the trip numbers calculated for occupants and visitors. To estimate the development's maximum potential motor vehicle trip generation, however, a worst-case scenario has been considered, whereby:

- All car drivers and car passengers drive (or are driven) directly to site.
- All car passengers represent distinct trips, independent of drivers.
- Servicing vehicle trips are applied in addition to the development's total person-trip generation.

The vehicular trip generation figures calculated under this scenario are given in Table 12-9. These include all motorised vehicles, including cars, vans, OGVs, and motorcycles, but excluding bicycles.

Table 12-9 Maximum Potential Development Motor Vehicle Trip Generation

Time Period	Arrivals	Departures	Total Trips
Development Occupants and Visitors			
AM Peak (08:00-09:00)	49	2	51
PM Peak (17:00-18:00)	1	47	48
Development Servicing Vehicles			
AM Peak (08:00-09:00)	8	6	14
PM Peak (17:00-18:00)	2	2	4

Development Total			
AM Peak (08:00-09:00)	57	8	65
PM Peak (17:00-18:00)	3	49	52

12.2.6 Trip Generation of Existing Site

The existing office building occupying the development site has a total Gross Internal Area of 34,506m^2 and a total Net Internal Area of 21,223m^2 for office use, and includes 164no. internal car parking spaces. The theoretical population of the existing building has been calculated as 1,974 people, using the same staff density figure of 1 staff member per 10m^2 NIFA that has been used for the proposed development, and the same typical daily staff absence rate of 7%.

Modal splits and trip generation figures for the existing office building have been determined using the same methodology as for the proposed development (described in sections **Error! Reference source not found.** to 12.2.5) and are given in Table 12-10 to Table 12-12. The modal share for driving a car or van has been set on the assumption that all onsite car parking spaces are in use and assigned to individual users.

Table 12-10 Modal Splits for Existing Development Occupants/Visitors

Transport Mode	Calculated Modal Share
Driving a Car or Van	8%
Passenger in a Car	2%
Bicycle	10%
Motorcycle	1%
Bus	24%
Train or Tram	40%
Walking	15%

Table 12-11 Calculated Existing Development Weekday Trip Generation by Mode

Transport Mode	Direction and Time Period					
	Arrivals			Departures		
	AM Peak	PM Peak	Full Day	AM Peak	PM Peak	Full Day
Driving a Car or Van	43	3	160	5	37	160
Passenger in a Car	8	1	31	1	7	31
Bicycle	56	4	213	6	50	213
Motorcycle	4	0	15	0	3	15
Bus	132	10	496	15	116	496
Train or Tram	221	17	832	25	195	832
Walking	85	7	320	10	75	320

Table 12-12 Calculated Existing Motor Vehicle Trip Generation

Time Period	Arrivals	Departures	Total Trips
Occupants and Visitors			
AM Peak (08:00-09:00)	51	6	57
PM Peak (17:00-18:00)	4	44	48
Servicing Vehicles			
AM Peak (08:00-09:00)	4	3	7
PM Peak (17:00-18:00)	1	1	2
Total			
AM Peak (08:00-09:00)	55	9	64
PM Peak (17:00-18:00)	5	45	50

12.2.7 Net Operational Trip Generation Figures

Table 12-13 and Table 12-14 give the net operational trip generation figures for the proposed development, obtained by subtracting the site's existing trip generation (Table 12-11 and 12-12) from that projected for the proposed development in its operational phase (Table 12-6 and 12-9).

Table 12-13 Net Change in Weekday Direct Trip Generation by Mode

Transport Mode	Direction and Time Period					
	Arrivals			Departures		
	AM Peak	PM Peak	Full Day	AM Peak	PM Peak	Full Day
Driving a Car or Van	-11	-3	-98	-5	-5	-98
Passenger in a Car	+9	0	+29	+1	+8	+29
Bicycle	+58	+5	+184	+7	+50	+184
Motorcycle	+4	+1	+13	+1	+4	+13
Bus	+134	+10	+433	+15	+118	+433
Train or Tram	+224	+17	+724	+26	+197	+724
Walking	+86	+6	+279	+10	+76	+279

Table 12-14 Net Change in Motor Vehicle Trip Generation

Time Period	Arrivals (as PCU)	Departures (as PCU)	Total Trips (as PCU)
Occupants and Visitors			
AM Peak (08:00-09:00)	-2	-4	-6
PM Peak (17:00-18:00)	-3	+3	0
Servicing Vehicles			
AM Peak (08:00-09:00)	+4	+3	+7
PM Peak (17:00-18:00)	+1	+1	+2
Total			
AM Peak (08:00-09:00)	+2	-1	+1
PM Peak (17:00-18:00)	-2	+4	+2

This comparison shows that the net effect of the proposed development shall be only a very modest increase in motor vehicle trip generation: 1no. trip (arrivals and departures) during the AM peak hour and 2no. trips (arrivals and departures) during the PM peak hour.

12.2.8 Vehicular Trip Distribution – Operational Phase

All vehicular traffic accessing the development's basement car parking shall do so via its access ramp off Clarion Quay, which connects at either end to Mayor Street Lower. It has likewise been assumed that all operational-phase vehicular servicing, including passenger set-down and collection, shall be conducted on Clarion Quay.

As general traffic along Mayor Street Lower is restricted to the eastbound direction, it has been assumed that all operational-phase vehicular traffic to and from the development shall arrive from the west along Mayor Street Lower and Clarion Quay (via surveyed junction J1), and depart to the east along Clarion Quay and Mayor Street Lower (via surveyed junction J2), as illustrated in Figure 12.3 and Figure 12.4.

At the remaining 5no. junctions surveyed (see Figure 12.1), it is assumed that vehicular traffic to and from the proposed development shall be distributed according to the relevant directional splits currently observed for general traffic at these junctions. These splits, for both the AM and PM peak periods, are given in

Table 12.15 to Table 12.19.

Figure 12-3 Operational phase vehicle arrival routes (sources: OSM Contributors, Google)

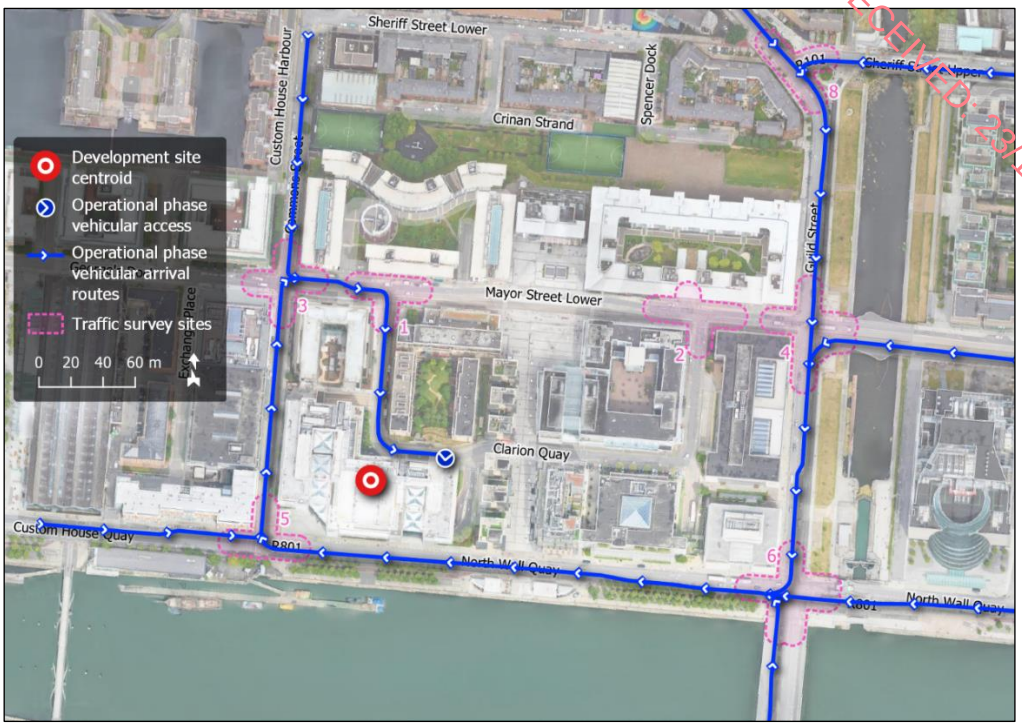


Figure 12-4 Operational phase vehicle departure routes (sources: OSM Cont., Google)

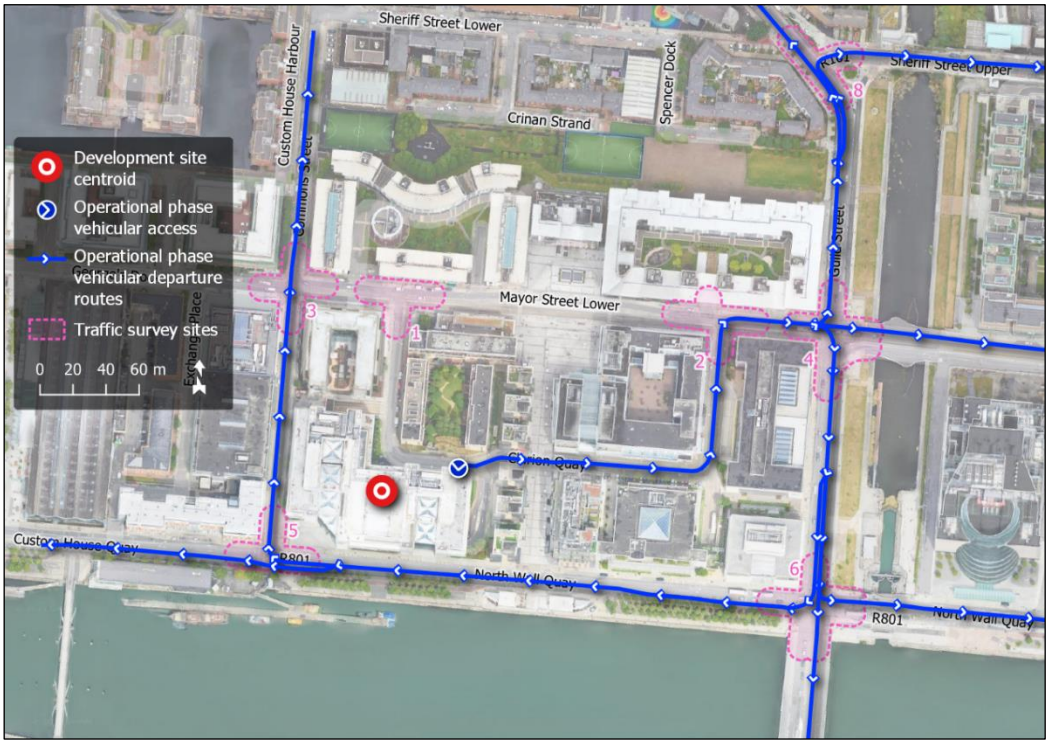


Table 12.15 Relevant Directional Splits at Traffic Survey Site J3

Time Period	Arrivals TO Mayor Street Lower (East) FROM:		
	Commons Street (North)	Commons Street (South)	George's Dock (West)
AM Peak	55%	45%	0%
PM Peak	41%	59%	0%

Table 12.16 Relevant Directional Splits at Traffic Survey Site J4

Time Period	Arrivals TO Guild Street (South) FROM:		
	Guild Street (North)	Mayor St Upper (East)	Mayor St Lower (West)
AM Peak	76%	24%	0%
PM Peak	58%	42%	0%
Time Period	**Departures FROM Mayor Street Lower (West) TO:**		
	Guild Street (North)	Mayor St Upper (East)	Guild Street (South)
AM Peak	46%	12%	42%
PM Peak	57%	1%	42%

Table 12.17 Relevant Directional Splits at Traffic Survey Site J5

Time Period	Arrivals TO Commons Street (North) FROM:	
	Custom House Quay (West)	North Wall Quay (East)
AM Peak	41%	59%
PM Peak	38%	62%
Time Period	**Departures FROM North Wall Quay (East) TO:**	
	Custom House Quay (West)	Commons Street (North)
AM Peak	67%	33%
PM Peak	66%	34%

Table 12.18 Relevant Directional Splits at Traffic Survey Site J6

Time Period	Arrivals TO North Wall Quay (West) FROM:		
	Guild Street (North)	North Wall Quay (East)	Beckett Bridge (South)
AM Peak	3%	69%	28%
PM Peak	6%	64%	30%
Time Period	**Departures FROM Guild Street (North) TO:**		
	North Wall Quay (East)	Beckett Bridge (South)	North Wall Quay (West)
AM Peak	4%	91%	5%
PM Peak	12%	79%	9%

Table 12.19 Relevant Directional Splits at Traffic Survey Site J8

Time Period	Arrivals TO Guild Street (South) FROM:	
	Seville Place (North)	Sheriff Street Upper (East)
AM Peak	94%	6%
PM Peak	95%	5%
Time Period	**Departures FROM Guild Street (South) TO:**	
	Seville Place (North)	Sheriff Street Upper (East)

AM Peak	46%	54%
PM Peak	40%	60%

The above-described vehicular trip distribution methodology has been employed both for adding the proposed development's projected vehicular trips to the surrounding street network and for removing those of the existing office building on the subject site.

12.2.9 Vehicular Trip Generation in Construction Phase

The following factors, which shall influence the maximum potential construction traffic generation to and from the site in the development's construction phase, shall be determined by the appointed Main Contractor (subject to planning conditions) and cannot be predicted with certainty:

- Site working hours.
- The scheduling of HGV-intensive operations, such as spoil removal or fill importation.
- The maximum number of construction personnel to be employed on the site at any one time.
- The provision of on-site car parking (which shall influence the modal share of private car use by construction personnel).

For the purposes of the present assessment, the following assumptions have therefore been made and are considered generally representative of typical conditions on similar construction sites:

- Site working hours shall be 07:00-19:00, Monday to Friday, and 08:00-14:00 on Saturdays.
- The maximum frequency of HGV trips to and from the site shall be 4 vehicles per hour.
- The maximum frequency of LGV trips to and from the site (excluding commuting personnel) shall be 6 vehicles per hour.
- A maximum of 125no. construction operatives will be employed full time on the site.
- 10no. car parking spaces will be provided on-site for construction personnel, and all of these shall be used (i.e. 10no. car trips shall be made to and from the site each day by personnel commuting).
- 17no. construction operatives will commute to and from the site by bicycle.
- At most 50% of weekday construction personnel commuting trips to the site shall be made during the AM peak hour, and at most 50% of weekday return commuting trips from the site shall be made during the PM peak hour.

The maximum potential construction traffic vehicular trip generation calculated from these assumptions is given in Table 12.20.

Table 12.20 Maximum Construction Phase Vehicular Trip Generation

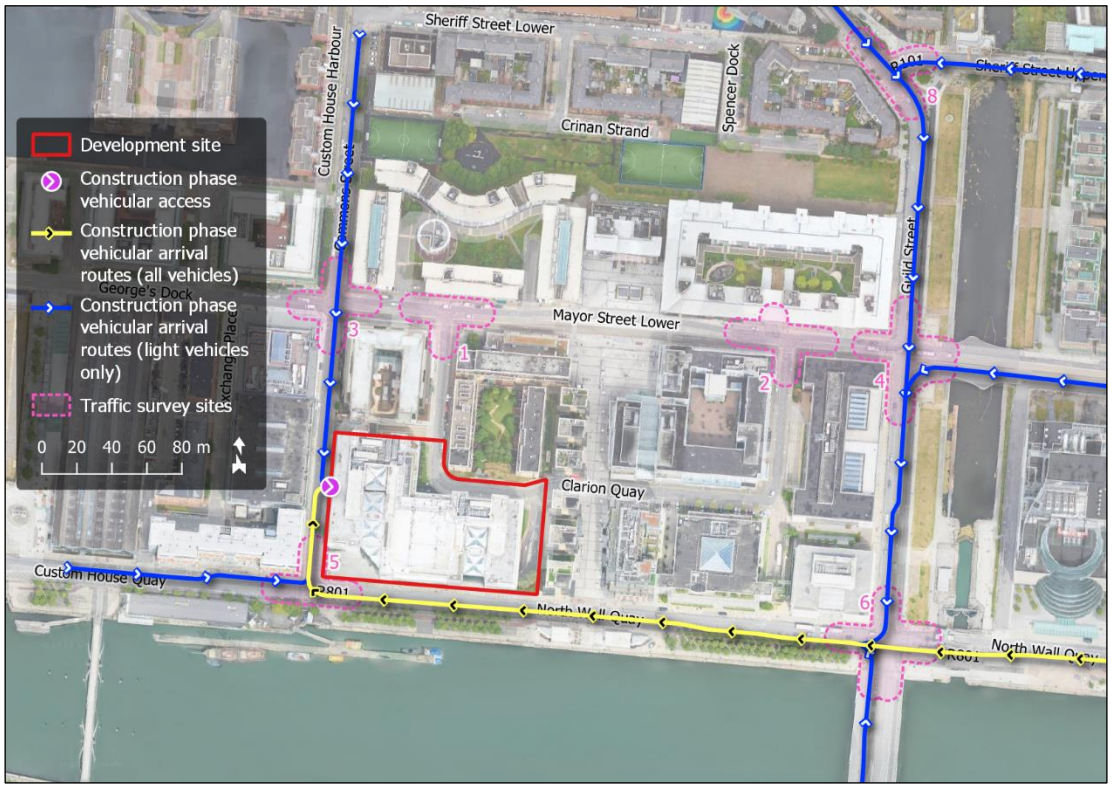
Time Period	Heavy Vehicles	Light Vehicles	TOTAL
Arrivals			
Weekday AM Peak	4	13	17
Weekday PM Peak	4	6	10
Departures			
Weekday AM Peak	4	6	10
Weekday PM Peak	4	13	17
Total Trips			
Weekday AM Peak	8	19	27
Weekday PM Peak	8	19	27

The above vehicular trip generation figures include all motorised vehicles, including cars, vans, and HGVs, but excluding bicycles.

12.2.10 Vehicular Trip Distribution – Construction Phase

In the proposed development's construction phase, vehicular access to the development site is expected to be via a dedicated temporary access on Commons Street, at the site's western boundary.

Figure 12-5 Construction phase vehicle arrival routes (sources: OSM Contributors, Google)



Heavy construction vehicles travelling to and from the site will be restricted to a designated route from/to the M50 motorway (Dublin Tunnel) via the north quays, as shown in Figure 12-5 and Figure 12-6. Other construction traffic may arrive and depart along Commons Street either from/to the north or from/to the south, and is expected to do so in accordance with the prevailing peak hour directional splits along this street (given in Table 12.21).

Figure 12-6 Construction phase vehicle departure routes (sources: OSM Cont., Google)

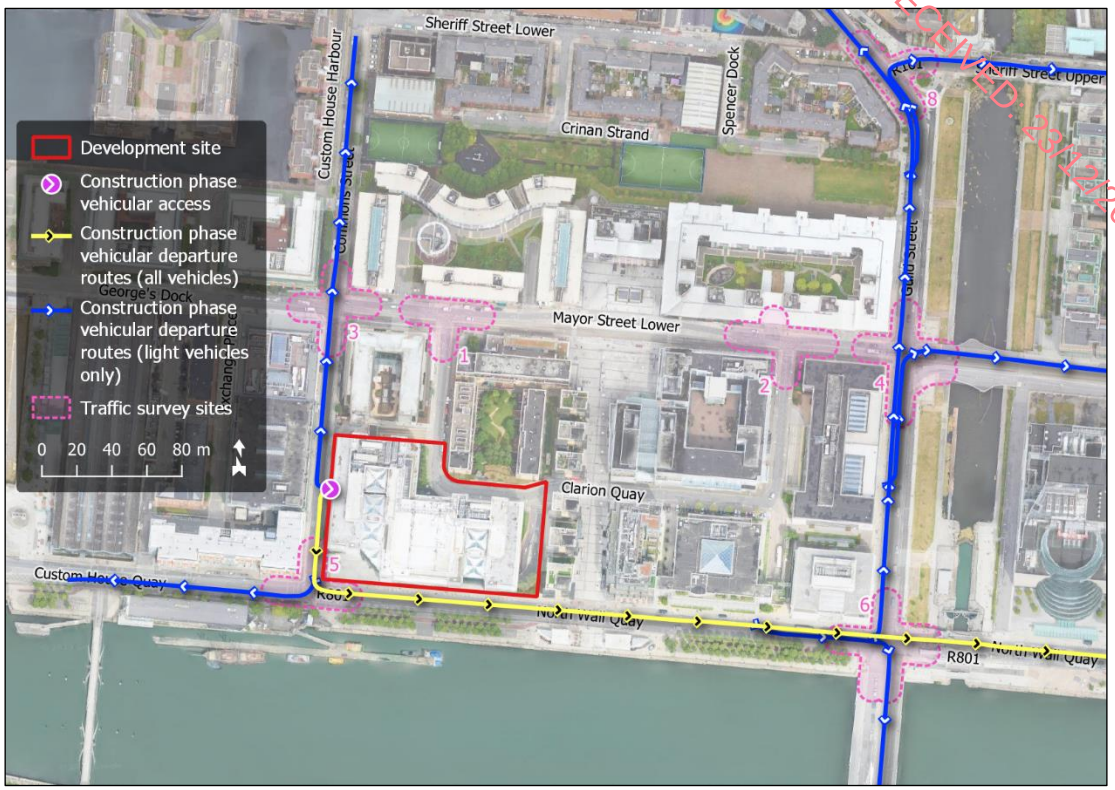


Table 12.21 Peak Hour Directional Splits along Commons Street

Time Period	Traffic Direction	
	Northbound	Southbound
Weekday AM Peak	65%	35%
Weekday PM Peak	73%	27%

At traffic survey site J3 (the junction of Commons Street with Mayor Street Lower and George's Dock), it is assumed that all arriving and departing construction traffic will proceed straight along Commons Street. As for operational-phase traffic, it is assumed that construction traffic shall be distributed according to the relevant existing directional splits at each of the other surveyed junctions on the surrounding road network (see Figure 12-1). The following tables give these directional splits, where these differ from those already given in

Table 12.15 to Table 12.19.

Table 12.22 Relevant Directional Splits at Traffic Survey Site J4

Time Period	Departures FROM Guild Street (South) TO:		
	Guild Street (North)	Mayor St Upper (East)	Mayor St Lower (West)
AM Peak	81%	19%	0%
PM Peak	98%	2%	0%

Table 12.23 Relevant Directional Splits at Traffic Survey Site J5

Time Period	Departures FROM Commons Street (North) TO:	
	Custom House Quay (West)	North Wall Quay (East)
AM Peak	23%	77%
PM Peak	38%	62%

Table 12.24 Relevant Directional Splits at Traffic Survey Site J6

Time Period	Departures FROM North Wall Quay (West) TO:		
	Guild Street (North)	North Wall Quay (East)	Beckett Bridge (South)
AM Peak	4%	68%	28%
PM Peak	1%	78%	21%

12.2.11 Proportional Increases in Vehicular Traffic

At each surveyed junction, the projected net changes in construction phase and operational phase vehicular traffic flows were calculated to determine the nature and significance of the development's influence on junction operation. In accordance with the TII Traffic and Transport Assessment Guidelines (PE-PDV-02045), an increase of 10% or more in total peak hour traffic flows at any junction was taken as the threshold value beyond which operational modelling of junction performance would be required.

12.2.12 Public Transport Capacity and Demand Assessment

A full description of public transport services in the vicinity of the development site is given in section 12.3.6.

A development-specific Public Transport Capacity Assessment has been carried out by specialist Transport Consultant Derry O'Leary, on behalf of CS Consulting. This takes account of the proposed development's public transport demand, as established in section 12.2.3.

Briefly summarised, the Public Transport Capacity Assessment determines that "the proposed development at North Wall Quay can be easily accommodated by the sheer scale of the public transport offering open to future commuters to and from the subject site", and reaches the following specific conclusions:

- The development site is very well located close to both extensive bus and rail networks, adjacent to the heart of Dublin's city centre.
- A bus survey undertaken in the key evening peak shows the local network of services to be functioning well. This analysis showed a significant degree of spare capacity in the existing bus network passing the development site. The spare capacity was measured following the full post-pandemic recovery in bus patronage brought about by an increasing return to work and the positive effects of the 20% reduction in public transport fares.
- When the generated bus trips anticipated from the development were added to observed passenger data, the impact on bus spare capacity was limited. There remained more than adequate spare capacity in the bus network available to passengers.
- Some of the key BusConnects routes already operate close to the subject site. In the event of any material rise in patronage in the years to come, the National Transport Authority, through "Measure Bus5", will respond to this increased demand with even higher bus frequencies, in keeping with its transport strategy for the Dublin area. It is anticipated that commercial bus operators will likely follow with enhanced services, as required.

- Similar analyses carried out on the 2023 surveys of LUAS passenger numbers at nearby Mayor Square showed significant levels of existing spare capacity, even with the reduced levels of service observed. The LUAS is currently closed in the vicinity of the subject site[1].
- The overall trend data shows strong recovery (especially with bus demand) from the lows of the pandemic. The number of generated trips expected to use the Luas service from the planned development will not challenge existing LUAS network capacity at this location.
- DART and commuter rail services operating out of nearby Connolly, Tara St Station and Pearse St, like LUAS, have recovered from the falls in patronage during the pandemic but there remains significant spare capacity in the system.
- The future infrastructure and service enhancements expected with Metrolink, DART+ and BusConnects (including the new CBCs), will further boost the capacity and quality of the public transport network in the vicinity of the development site at North Wall Quay.

The Public Transport Capacity Assessment report is attached as Appendix 12.3.

12.2.13 Forecasting Methods and Difficulties Encountered

As previously described (section 12.2.1, Idaso personnel were prevented from installing survey equipment at one of the intended traffic survey sites, and no traffic data could be gathered at this location. This junction was however the least important of those to be surveyed, and the absence of survey data from this site did not impede analysis of the proposed development's potential influence on surrounding traffic flows.

As described in section **Error! Reference source not found.**, certain factors yet to be determined by the appointed Main Contractor (and subject to planning conditions) shall influence the maximum potential construction traffic generation to and from the site in the development's construction phase. These are:

- Site working hours.
- The scheduling of HGV-intensive operations, such as spoil removal or fill importation.
- The maximum number of construction personnel to be employed on the site at any one time.
- The provision of on-site car parking (which shall influence the modal share of private car use by construction personnel).

For the purposes of the present assessment, the following assumptions have therefore been made:

- Site working hours shall be 07:00-19:00, Monday to Friday, and 08:00-14:00 on Saturdays.
- The maximum frequency of HGV trips to and from the site shall be 4 vehicles per hour.
- The maximum frequency of LGV trips to and from the site (excluding commuting personnel) shall be 6 vehicles per hour.
- A maximum of 125no. construction operatives will be employed full time on the site.
- 10no. car parking spaces will be provided on-site for construction personnel, and all of these shall be used (i.e. 10no. car trips shall be made to and from the site each day by personnel commuting).
- 17no. construction operatives will commute to and from the site by bicycle.
- At most 50% of weekday construction personnel commuting trips to the site shall be made during the AM peak hour, and at most 50% of weekday return commuting trips from the site shall be made during the PM peak hour.

These assumptions are however considered generally representative of typical conditions on similar construction sites, and do not fundamentally compromise the forecasting methodology for this assessment.

[1] The surveys informing the Public Transport Capacity Assessment were conducted prior to the resumption of full Luas Red Line services on the 28th of November 2025.

In respect of the development's operational phase, standard trip generation forecasting methodology was employed for this assessment, using TRICS rates and census data, and no particular difficulties were encountered.

Finally, the assessment of cumulative effects (described in Section 12.9) relies in large part on the application of Transport Infrastructure Ireland (TII) standard traffic growth rates to account for the influence of additional vehicular traffic to be generated by other developments in the surrounding area and further afield. These growth rates are derived from the National Transportation Model (NTpM) managed by TII and the National Transport Authority.

As noted in Unit 5.3 of the TII Project Appraisal Guidelines (PE-PAG-02017 Travel Demand Projections), the NTpM growth scenario projections depend on "explicit projections of population, settlement patterns, employment, and job location". In addition, the NTpM incorporates "a large number of implicit assumptions about the performance of the transport network and vehicles, the costs of travel, personal tastes and preferences and all of the other factors that actually determine individual decisions about travel behaviour". The TII Project Appraisal Guidelines therefore caution that "making future projections over an extended time period is highly uncertain".

12.3 Receiving Environment

Figure 12-7 Site extents and environs (sources: NTA, OSM Contributors, Google)

12.3.1 Existing Site Use

Figure 12-8 Existing office building on development site (sources: OSM Cont., Google)

The development site is brownfield and is occupied by an existing office building (the Citigroup headquarters), which is presently still in full use.

The existing office building comprises 6no. storeys over a single-level basement and has a total Gross Internal Area of 34,506m^2 (a total Net Internal Area of 21,223m^2). It includes 164no. car parking spaces at basement level, accessed via a ramp off Clarion Quay (see Figure 12-8). As detailed in section 12.2.2, the theoretical population of the existing building has been calculated as 1,974 people.

12.3.2 Existing Road Network Characteristics

The development site proper has frontage onto the three streets described below (see Figure 12-7).

North Wall Quay (R801)

- Single carriageway two-way road with a total pavement width of approx. 11m generally along the development site boundary, inclusive of a bus lane in the westbound direction.
- Regional road with an east-west alignment, connecting to the R131 in the east and to the R105 in the west.
- Raised footpaths are present along both sides of North Wall Quay in the vicinity of the development site. An advisory cycle lane is in place in the eastbound direction, and segregated two-way cycle lanes are present along the southern road edge.
- On-street parking is not permitted on North Wall Quay in the vicinity of the development site. A single recessed loading bay is present on the northern side of the street, close to the development site's south-western corner.
- North Wall Quay is subject to a 50km/h speed limit.

Commons Street

- Single carriageway two-way road with a pavement width of approx. 7m along the development site boundary.
- Local street 320m in length with a north-south alignment, connecting to Sheriff Street in the north and to North Wall Quay in the south, and intersecting with Mayor Street Lower and George's Dock approx. halfway along its length.
- Raised footpaths are present along both sides of Commons Street, for its full length. No bus lanes or cycle tracks/lanes are present.
- On-street parking is not permitted on Commons Street between North Wall Quay and Mayor Street Lower.
- Commons Street is subject to a 30km/h speed limit.

Clarion Quay

- Single carriageway two-way road with a typical pavement width of approx. 5.5m along its full length.
- 'U'-shaped local access street 380m in length, connecting at either end to Mayor Street Lower.
- Raised footpaths are present along both sides of Clarion Quay, for its full length. No bus lanes or cycle tracks/lanes are present.
- On-street parking is not permitted on Clarion Quay.
- Clarion Quay is subject to a 30km/h speed limit.

Mayor Street Lower, to which Clarion Quay connects at either end, is described below.

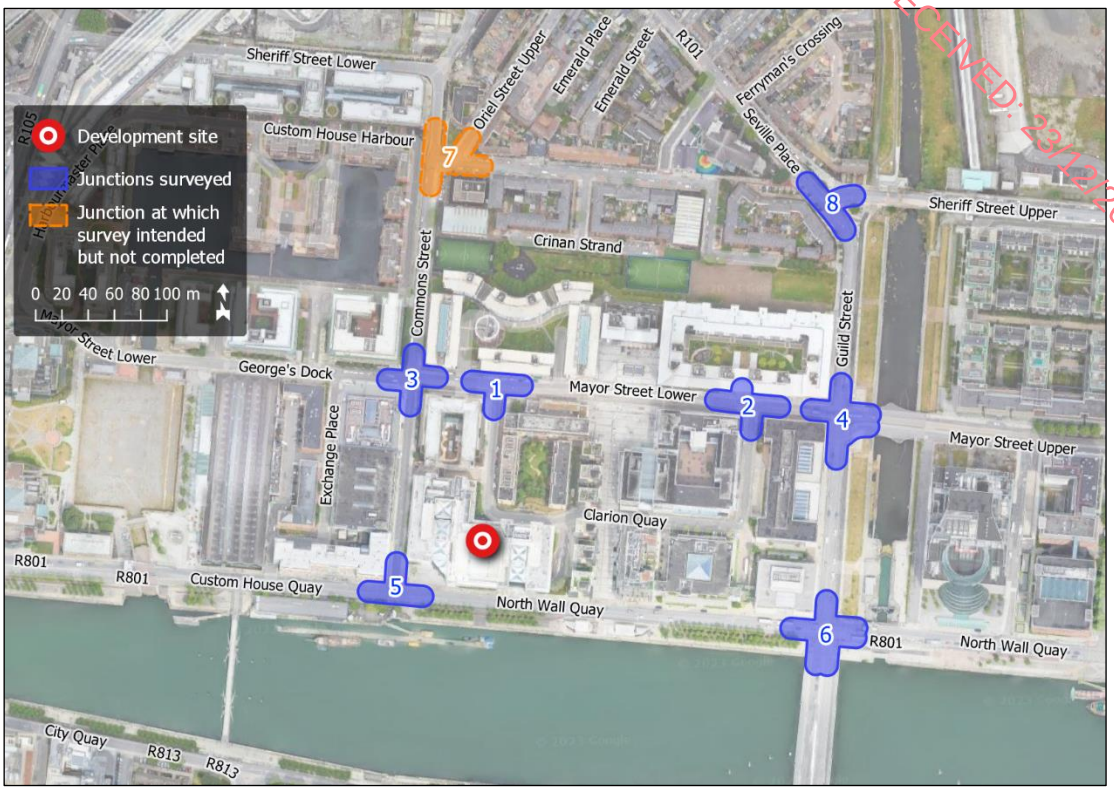
Mayor Street Lower

- Single carriageway road with a typical total pavement width of approx. 11m generally in the vicinity of the development site, including partially segregated tram lanes.
- Local street with an east-west alignment, running from George's Dock in the west to the Royal Canal in the east (there becoming Mayor Street Upper).
- Two-way LUAS light rail traffic runs along Mayor Street Lower. General traffic is restricted to the eastbound direction only (from Commons Street to Guild Street).
- Raised footpaths are present along both sides of Mayor Street Lower. No cycle lanes or bus lanes are present.
- Limited recessed on-street parking (12no. spaces approx. in total) is in place at 3no. locations on the north side of Mayor Street Lower. No other on-street parking is permitted.
- Mayor Street Lower is subject to a 30km/h speed limit.

12.3.3 Existing Local Vehicular Traffic Flows

As described in section 12.2.1, existing vehicular traffic flows at key junctions on the surrounding street network were established by full turning movement classified traffic counts carried out at 7no. locations on Tuesday the 16th of May 2023.

Figure 12-9 Traffic survey sites (sources: OSM Contributors, Google)



The peak hour traffic flows across all seven surveyed sites were found to occur between 08:00 and 09:00 (AM peak hour) and between 17:00 and 18:00 (PM peak hour). The peak hour traffic movements at each of the surveyed junctions have been isolated from the count data and converted to Passenger Car Units (with the exception of Luas trams). A summary of total peak hour traffic movements at the surveyed junctions is given in Table 12.25.

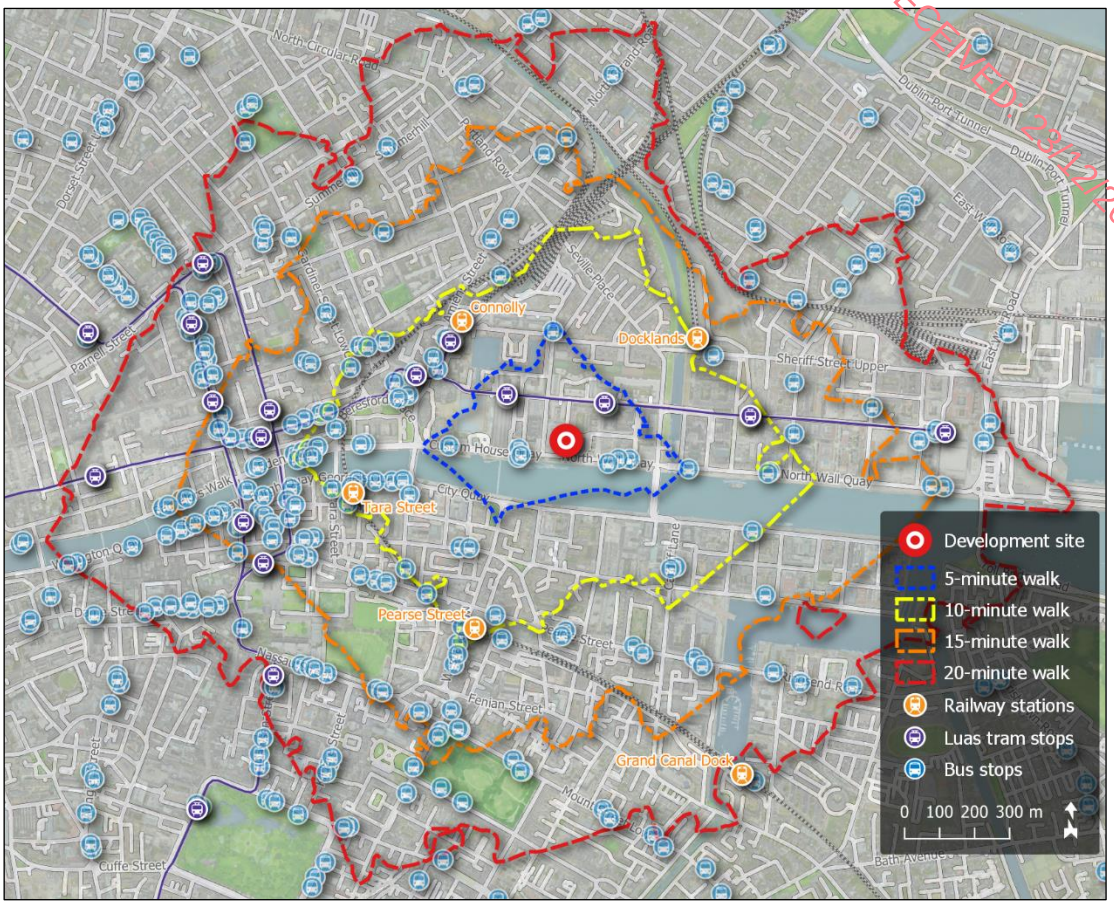
Table 12.25 Surveyed Total Traffic Flows Summary

Time Period	Traffic Type	Total Vehicular Movements at Survey Junction Site:						
		J1	J2	J3	J4	J5	J6	J8
Weekday AM Peak (08:00-09:00)	General (as PCU)	266	226	693	701	1289	1802	908
	Luas trams	17	18	17	18	n/a	n/a	n/a
Weekday PM Peak (17:00-18:00)	General (as PCU)	152	194	453	793	1163	1753	911
	Luas trams	19	19	19	19	n/a	n/a	n/a

12.3.4 Pedestrian Accessibility

As shown in Figure 12-10, the development site is highly accessible on foot and is within a 15-minute walk of O'Connell Street. Connolly, Tara Street, Pearse Street, and Docklands railway stations are all within approx. 10 minutes' walk. 2no Luas tram stops on Mayor Street Lower and George's Dock are within a 5-minute walk, as are numerous bus stops. All walking times are based on a 4.5km/h average walking speed.

Figure 12-10 Walking times (sources: NTA, OSi, OSM Contributors, Google)



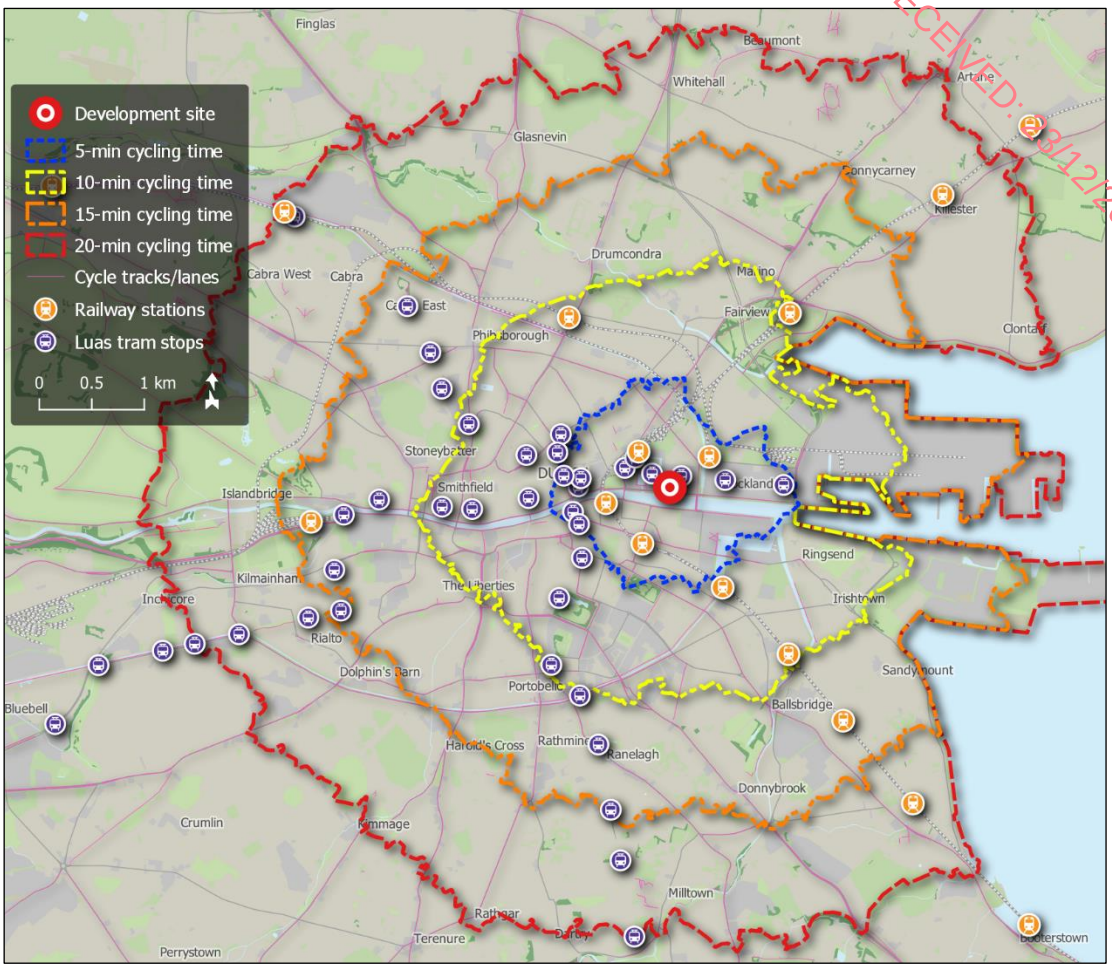
Existing pedestrian infrastructure surrounding the development site is extensive and of a good standard. Wide, raised footpaths and public lighting are in place on all surrounding streets, and signal-controlled pedestrian crossings are present at all nearby major junctions and at intermediate points along the Quays. Two bridges across the Liffey are within a 5-minute walk, one of which carries only pedestrian traffic.

12.3.5 Bicycle Infrastructure and Accessibility

Cycling infrastructure in the vicinity of the development site is generally of a good standard and includes:

- Eastbound bus lanes and advisory cycle lanes on the north side of Custom House Quay and North Wall Quay.
- Two-way segregated cycle tracks and westbound bus lanes on the south side of North Wall Quay and Custom House Quay.
- A two-way segregated cycle track along Guild Street, which connects to the Royal Canal Greenway (currently extending as far as North Strand Road).
- Cycle tracks or lanes on the Samuel Beckett Bridge and the Talbot Memorial Bridge.
- A two-way segregated cycle track along City Quay and Sir John Rogerson's Quay, on the opposite side of the Liffey.

Figure 12-11 Bicycle journey times (sources: DCC, NTA, OSi, OSM Contributors)



Recent years have seen rapid improvement in many elements of bicycle infrastructure in Dublin City. This includes numerous small-scale interventions, as well as larger-scale projects such as the interim Liffey Cycle Route and the initial phases of the Royal Canal Greenway, all of which contribute to making bicycle journeys to and from this area safer and more efficient.

Figure 12-11 shows bicycle journey times to and from the development site (based on a 16km/h average speed). Almost all parts of Dublin city centre are within a 15-minute bicycle journey of the development site, including Heuston railway station and the Phoenix Park. Suburbs as far as Beaumont, Cabra, Inchicore, and Rathgar are all within a 20-minute bicycle journey of the site.

12.3.6 Local Public Transport Services

12.3.6.1 Light Rail Services

The Luas light rail network consists of two principal lines with an interchange at Abbey Street/Marlborough Street/O'Connell Street in Dublin city centre.

- LUAS Red Line (E-W) Dublin Docklands to Tallaght/Saggart
- LUAS Green Line (N-S) Broombridge to Bride's Glen

The development site is within a 4-minute walk of the George's Dock and Mayor Square tram stops, both on the Luas Red Line. Light rail services operating to and from these stops run to The Point, 1km to the

east, and to Tallaght or Saggart in the south-west (11km and 15km away, respectively). Trams serve the George's Dock and Mayor Square stops at average intervals of 3-4 minutes at peak times.

Table 12.26 Luas Light Rail Services within 4-minute Walk

Direction	Destination	Average Weekday Services	Peak Time Headway
Eastbound	The Point	145	3 min
Westbound	Tallaght / Saggart	141	4 min

It is noted that tram services on the easternmost section of the Luas Red Line, between Connolly Station and The Point (the section including the George's Dock and Mayor Square tram stops) were suspended from the 19th of August 2025, as a result of fire damage to a bridge at George's Dock. Following bridge replacement works, full service on this line was restored on the 28th of November 2025.

12.3.6.2 Bus Services

Bus stops within a 5-minute walk of the site are served by a total of 45no. NTA-licenced bus routes operated by Dublin Bus, Bus Éireann, Go-Ahead Ireland, and other private operators. These include 2no. very high frequency routes (G1 and G2) with more than 80 services per day in either direction. A further 99no. bus routes serve stops within a 10-minute walk of the development site.

More detailed information on local bus services is given in The Public Transport Capacity Assessment report prepared by Derry O'Leary, which is attached as Appendix 12.3.

12.3.6.3 Rail Services

The development site is within a 10-minute walk of Connolly railway station, as well as the other two principal city-centre stations on the Dundalk-Dublin-Wexford railway line (Tara Street and Pearse Street). Connolly Station is also on the Maynooth-Longford-Sligo line, is connected to the southern Kildare line via the Phoenix Park tunnel, and forms the southern terminus of the Dublin-Belfast Enterprise service. Frequent Dublin Area Rapid Transit (DART) trains also serve this station, running between Howth/Malahide in the north and Bray/Greystones in the south. Commuter rail services operating to and from Connolly Station directly serve towns as far as Dundalk in the north, Wexford in the south, and Newbridge and Maynooth in the west, while Intercity services to and from this station extend as far as Belfast and Sligo. Table 12.27 gives a summary of rail services to and from Connolly Station.

Table 12.27 Direct Rail Services to/from Connolly Station

Service Type	Origins / Destinations	Daily Services (Mon-Fri average, each direction)
DART	Howth / Malahide	95
	Bray / Greystones	95
Commuter Rail	Balbriggan / Drogheda / Dundalk	18
	Gorey / Wexford / Rosslare	5
	Hazelhatch-Celbridge / Newbridge	25
	Maynooth	15
Intercity	Newry / Portadown / Belfast	9
	Longford / Sligo	10

Also within a 10-minute walk of the development site is the Docklands railway station. Commuter rail services operate between this station and the M3 Parkway Park & Ride facility near Dunboyne.

Table 12.28 Direct Rail Services to/from Docklands Station

Service Type	Origins / Destinations	Daily Services (Mon-Fri average, each direction)
Commuter Rail	Clonsilla / M3 Parkway	11

12.3.6.4 Public Transport Overview

Figure 12-12 shows the extents of the direct rail, light rail, and bus routes within a 10-minute walk of the development site, within the greater Dublin area. Figure 12-13 shows the reach of public transport journeys to the development site by total travel time (including service interchanges, and walking to and between stops), based upon an arrival time of 09:00 on a typical weekday.

Figure 12-12 Nearby public transport routes (sources: NTA, OSM Contributors)

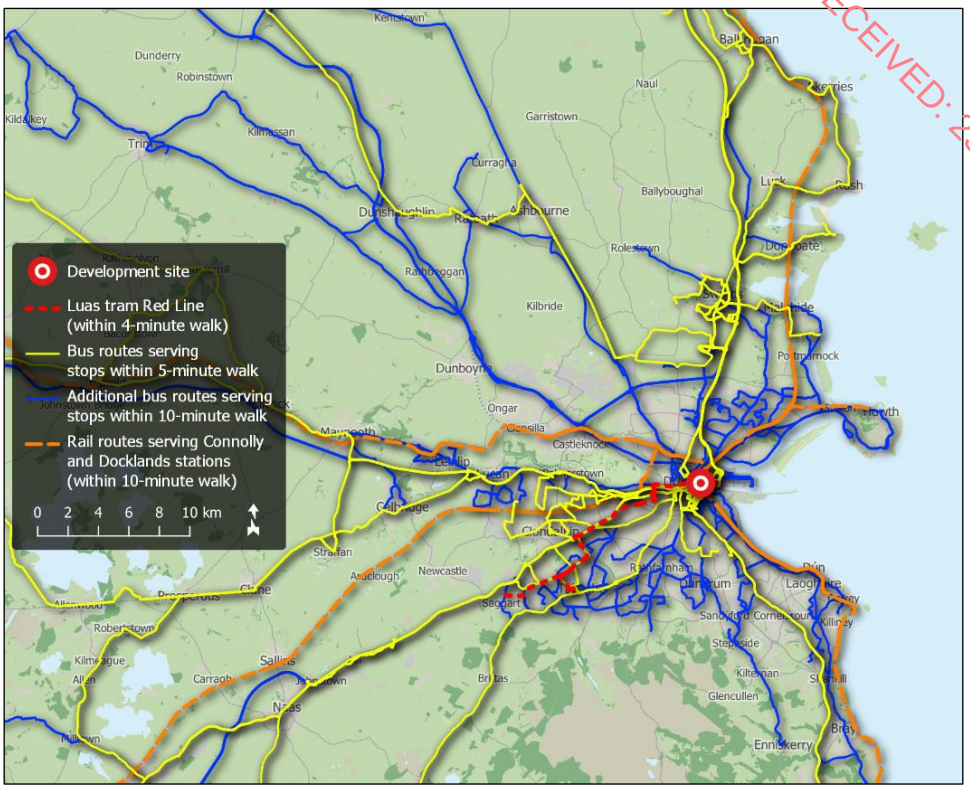
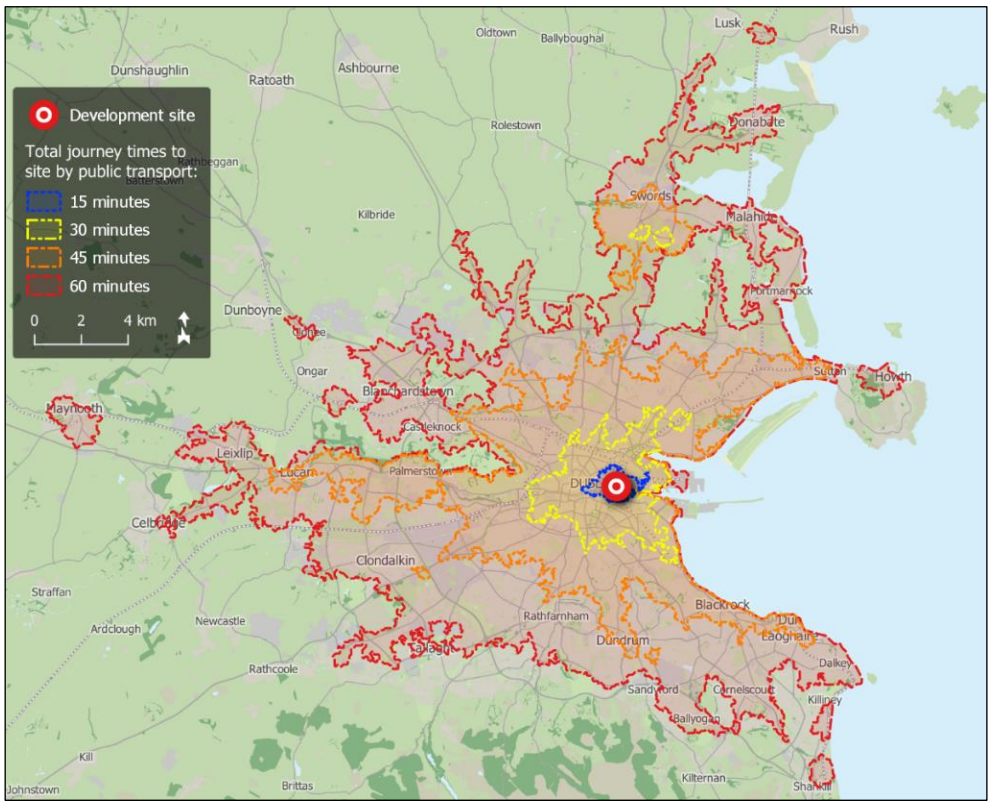


Figure 12-13 Public transport travel times (sources: EPA, OSM Contributors, TravelTime)

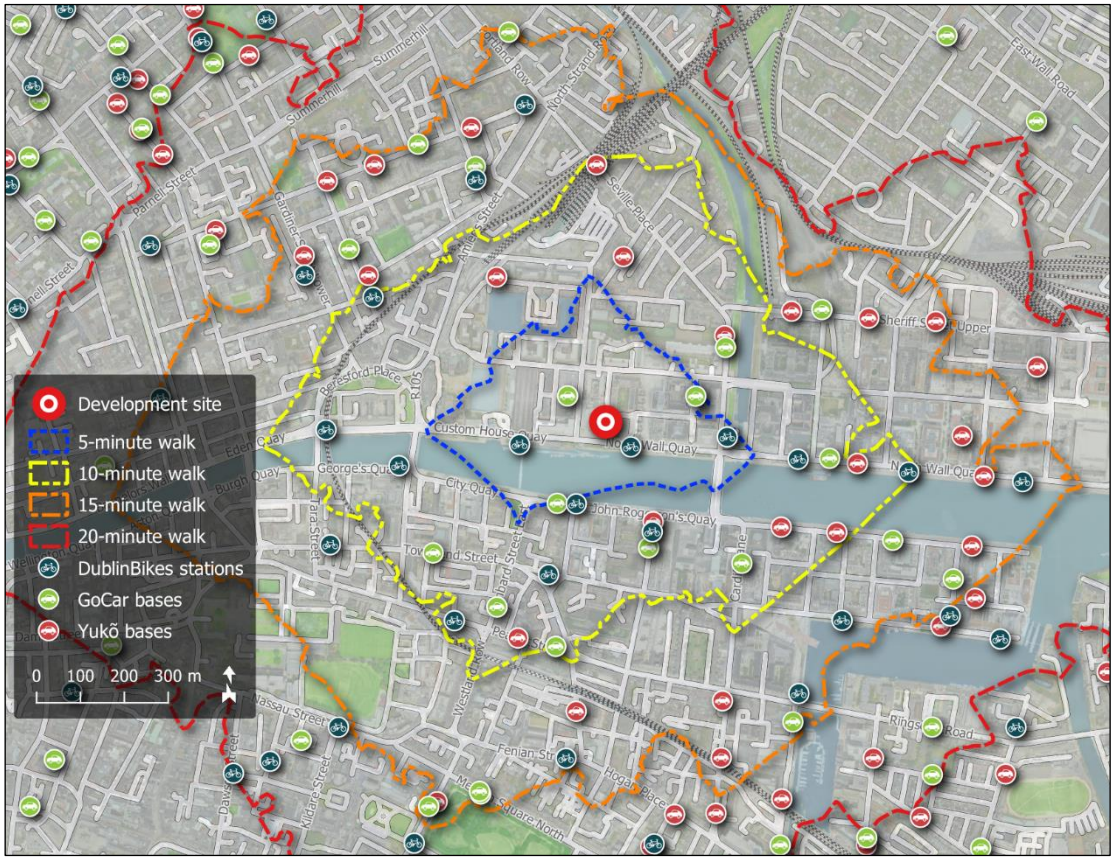


12.3.7 External Shared Transport

The area surrounding the subject site is well served by commercial car-share services and by the DublinBikes, Bleeper Bikes, and Moby Bikes bicycle sharing schemes.

- 3no. DublinBikes stations are located within a 5-minute walk of the subject site. A further 9no. DublinBikes stations are located within a 10-minute walk.
- 3no. bases for the GoCar commercial car-sharing service are located within a 5-minute walk of the development site; these host a total of 7no. vehicles. A further 7no. GoCar bases (with 12no. vehicles) are located within a 10-minute walk.
- 9no. bases for the Yukõ commercial car-sharing service are located within a 10-minute walk of the development site.
- The development site is situated within the geofenced operating zones for the Bleeper Bikes and Moby Bikes commercial bicycle sharing schemes. Within these areas, these shared bicycles may be collected from or returned to any public bicycle parking stand.

Figure 12-14 Shared transport services (sources: DCC, GoCar, Yuko, OSM Cont., Google)



Note: The above car sharing locations represent the most up to date information available on the publicly-accessible GoCar and Yukõ bases at the time of preparing this report. These base locations are subject to periodic alteration by the scheme operators, in response to usage demand and to traffic management considerations.

12.4 Characteristics of the Proposed Development

The purpose of this section is to provide an overview of the key relevant details of the construction phase and operational phase of the proposed development. The information presented in this section is informed by the project design, but it is not a complete description of the Proposed Development. Therefore, it should be read in conjunction with the full development package. For a more comprehensive understanding of the Proposed Development, please refer to Chapter 2 (Description of the Proposed Development) of the EIA Report. Chapter 2 provides a detailed overview of the lifecycle of the project, including reference to the architectural and civil engineering, drawings, plans, reports, and other relevant document in order to define the proposed development.

Briefly summarised, the development is to entail the partial demolition of an existing office building and the incorporation of its remaining structure into a new commercial development comprising a 12-storey over basement office building. The proposed development primarily comprises offices with a total Gross Internal Area (GIA) of 53,774m^2 and a total Net Internal Area (NIA) of 39,151m^2. The development also includes community space with a GIA of 660m^2.

The site of the proposed development is on Dublin's North Quays, in the eastern city centre, some 200m to the west of the Samuel Beckett Bridge and some 400m to the east of the Custom House. The area subject to this application extends to approx. 0.90ha and is within the operational area of Dublin City Council.

12.4.1 Construction Phase

The proposed development includes demolition of the existing office building that currently occupies that subject site. It is expected that construction traffic to and from the site shall reach a peak during the removal of demolition waste material from the site. Construction activity onsite is expected to reach a peak in the year 2030.

As described in section 12.2.9, the development's construction phase shall generate vehicular traffic comprising Heavy Goods Vehicles (HGVs), Light Goods Vehicles (LGVs), cars, and bicycles, increasing traffic flows at nearby existing junctions. In addition, the development shall generate increased demand for public transport services.

12.4.2 Operational Phase

The proposed development shall include a total of 32no. car parking spaces. This represents a reduction of 132no. car parking spaces (an 80% reduction) in comparison to the existing office building on the site. The proposed car parking provision equates to 1no. car parking space per 1,680m^2 office GFA, whereas the existing office building has a car parking ratio of 1no. space per 129m^2 GFA.

Once operational, the proposed development shall generate regular vehicular trips on the surrounding road network, increasing traffic flows at nearby existing junctions. In addition, the development shall generate increased demand for public transport services. Conversely, the development shall also remove the trips currently generated by the office building that now occupies the site.

The development's projected net weekday peak hour trip generation across all vehicular and non-vehicular modes is given in section 12.2.7. For assessment purposes, it has been assumed that the proposed development shall be completed and operational by the year 2032.

12.5 Potential Impacts of the Proposed Development

12.5.1 Construction Phase

It is estimated that a maximum of 125no. construction operatives will be employed full time on the site. In the absence of mitigation measures, it may be expected that their journeys to and from the site be distributed across transport modes as shown in Table 12.29. These modal splits are based on the CSO 2016 Census WPZ statistics given in Table 12-2 (section 12.2.2), adjusted to reflect the fact that construction operatives are less likely to live within walking distance of the development site than operational-phase employees.

Table 12.29 Potential Construction Operative Modal Splits and Weekday Trip Generation

Transport Mode	Estimated Modal Share	Weekday Trips by Mode	
		Arrivals	Departures
Driving a Car or Van	25%	16	16
Passenger in a Car	5%	3	3
Bicycle	9%	6	6
Motorcycle	1%	1	1
Bus	21%	13	13
Train or Tram	34%	21	21
Walking	5%	3	3

Subject to planning conditions, site working hours are expected to be 07:00-19:00, Monday to Friday, and 08:00-14:00 on Saturdays. Construction operatives' trips to and from site are therefore expected to take place largely outside the weekday background peak hours of 08:00-09:00 and 17:00-18:00. To ensure a robust assessment of the development's impact, it has however been assumed that 50% of all such arrival trips shall be made during the background AM peak hour, and 50% of departure trips made during the background PM peak hour.

In conjunction with the other LGV and HGV trips to be generated during construction (as given in section 12.2.9), the development therefore has the following potential peak hour motor vehicle trip generation in its construction phase:

Table 12.30 Potential Construction Phase Peak Hour Motor Vehicle Trip Generation as PCU

Time Period	Heavy Vehicles (as PCU)	Light Vehicles (as PCU)	TOTAL (PCU)
Arrivals			
Weekday AM Peak	8	25	33
Weekday PM Peak	8	6	14
Departures			
Weekday AM Peak	8	6	14
Weekday PM Peak	8	25	33
Total Trips			
Weekday AM Peak	16	31	47
Weekday PM Peak	16	31	47

To quantify the development's potential construction-phase impact on the surrounding road network and on local public transport services, the net peak hour vehicular traffic generated (taking into account the removal of traffic currently generated by the existing office building on the site) has been distributed

across the surrounding street network as described in section 12.2.10, and the resultant changes in total traffic flows at surveyed junctions have been calculated.

Table 12.31 and Table 12.32 show the absolute and proportional changes in weekday peak hour traffic flows (excluding Luas trams) at each of the 7no. surveyed junctions shown in Figure 12-1 that shall be produced by the following combined effects:

- The removal of vehicular traffic currently generated by the existing building on the development site.
- The addition of vehicular traffic potentially generated by the proposed development in its construction phase.

Table 12.31 Changes in Junction Traffic Flows – Construction Potential – AM Peak

Total Motor Vehicle Movements (as PCU)	Survey Junction Site:						
	J1	J2	J3	J4	J5	J6	J8
2023 Surveyed Baseline Flows	266	226	693	701	1289	1802	908
Effect of Removing Existing Building	-58	-10	-58	-10	-26	-18	-5
Potential Development Construction Traffic	+4	+4	+20	+4	+43	+35	+2
Combined Change in Total Flows	-54	-6	-38	-6	+17	+17	-3
Change in Flows as Proportion of Baseline	-20.3%	-2.7%	-5.5%	-0.9%	+1.3%	+0.9%	-0.3%

Table 12.32 Changes in Junction Traffic Flows – Construction Potential – PM Peak

Total Motor Vehicle Movements (as PCU)	Survey Junction Site:						
	J1	J2	J3	J4	J5	J6	J8
2023 Surveyed Baseline Flows	152	194	453	793	1163	1753	911
Effect of Removing Existing Building	-5	-46	-6	-46	-5	-21	-26
Potential Development Construction Traffic	+5	+5	+28	+5	+35	+30	+3
Combined Change in Total Flows	0	-41	+22	-41	+30	+9	-23
Change in Flows as Proportion of Baseline	0.0%	-21.1%	+4.9%	-5.2%	+2.6%	+0.5%	-2.5%

At most of the surveyed junctions, the net potential effect of the development in its construction phase shall be to reduce the total traffic flows during peak hours. At junctions that shall experience a net increase in traffic flows, this peak hour increase is always less than 10% of the existing baseline flows. In its construction phase, the proposed development shall therefore have a ***slight, positive, short-term*** potential effect on the operation of the surrounding road network.

It is also recognised that there is potential during the construction phase for construction-related activity to affect the surrounding road network in ways beyond junction operational performance. These further effects would potentially take the form of surrounding streets being temporarily obstructed by stopped/parked construction vehicles or by delivery/loading operations, or their condition being temporarily degraded by the presence of dirt/debris originating from the construction site. There is also a risk of overspill car parking on surrounding streets by construction operatives driving to work but not being

able to park within the development site. In the absence of mitigation measures, these effects would likely be ***negative*** in nature, ***short-term*** in duration, and ***significant***. The construction phase mitigation measures detailed in section **Error! Reference source not found.** will prevent or minimise these impacts, and these measures will be strictly adhered to.

The overall potential construction-phase effect of the proposed development on the operation of the surrounding road network (absent mitigation measures) is therefore considered to be ***negative*** in nature, ***short-term*** in duration, and of ***moderate*** significance.

12.5.2 Operational Phase

To quantify the development's potential operational-phase impact on the surrounding road network, the net peak hour vehicular traffic generated (taking into account the removal of traffic currently generated by the existing office building on the site) has been distributed across the surrounding street network as described in section 12.2.8, and the resultant changes in total traffic flows at surveyed junctions have been calculated.

The development's projected operational-phase trip generation across all transport modes (presented in sections 12.2.2 to 12.2.5) takes into account certain mitigation measures that form part of its design. These include a restricted car parking provision, a significant secure bicycle parking provision, and ancillary facilities such as showers and lockers to support active travel modes. These intrinsic mitigation measures are therefore not presented separately and will not result in any difference between the development's potential effects and its residual effects.

Table 12.33 and Table 12.34 show the absolute and proportional changes in weekday peak hour traffic flows (excluding Luas trams) at each of the 7no. surveyed junctions shown in Figure 12-1 that shall be produced by the following combined effects:

- The removal of vehicular traffic currently generated by the existing building on the development site.
- The addition of vehicular traffic to be generated by the proposed new building, once operational.

These illustrate that the proposed development will result in negligible changes to the existing vehicular traffic flows on the surrounding street network, and it has accordingly not been deemed necessary to conduct operational modelling of any existing surveyed junction. In its operational phase, the proposed development shall therefore have a ***long-term imperceptible neutral*** effect on the operation of the surrounding road network.

Table 12.33 Changes in Junction Traffic Flows – Operational Potential – AM Peak

Total Motor Vehicle Movements (as PCU)	Survey Junction Site:						
	J1	J2	J3	J4	J5	J6	J8
2023 Surveyed Baseline Flows	266	226	693	701	1289	1802	908
Effect of Removing Existing Building	-58	-10	-58	-10	-26	-18	-5
Potential Development Operational Traffic	+61	+9	+61	+9	+27	+20	+4
Combined Change in Total Flows	+3	-1	+3	-1	+1	+2	-1
Change in Flows as Proportion of Baseline	+1.1%	-0.4%	0.4%	-0.1%	+0.1%	+0.1%	-0.1%

Table 12.34 Changes in Junction Traffic Flows – Operational Potential – PM Peak

Total Motor Vehicle Movements (as PCU)	Survey Junction Site:						
	J1	J2	J3	J4	J5	J6	J8
2023 Surveyed Baseline Flows	152	194	453	793	1163	1753	911
Effect of Removing Existing Building	-5	-46	-6	-46	-5	-21	-26
Potential Development Operational Traffic	+3	+52	+4	+53	+4	+23	+30
Combined Change in Total Flows	-2	+6	-2	+7	-1	+2	+4
Change in Flows as Proportion of Baseline	-1.3%	+3.1%	-0.4%	+0.9%	-0.1%	+0.1%	+0.4%

Similarly to the construction phase, there is also the potential during the development's operational phase for the surrounding road network to be affected in ways beyond junction operational performance. This relates primarily to waste collection and deliveries, which, if not properly managed, could result in adjacent streets being temporarily obstructed by stopped/parked servicing vehicles. There is also a risk of overspill car parking on surrounding streets by development occupants driving to work but not being able to park on site.

In the absence of mitigation measures, these effects would likely be ***negative*** in nature, ***long-term*** in duration, and **moderate** in significance. The servicing management and travel planning mitigation measures detailed in section 12.6.2 will prevent or minimise these impacts, and these measures will be strictly adhered to.

The overall potential operational-phase effect of the proposed development on the operation of the surrounding road network (absent servicing-related mitigation measures) is therefore considered to be ***negative*** in nature, ***long-term*** in duration, and of ***slight*** significance.

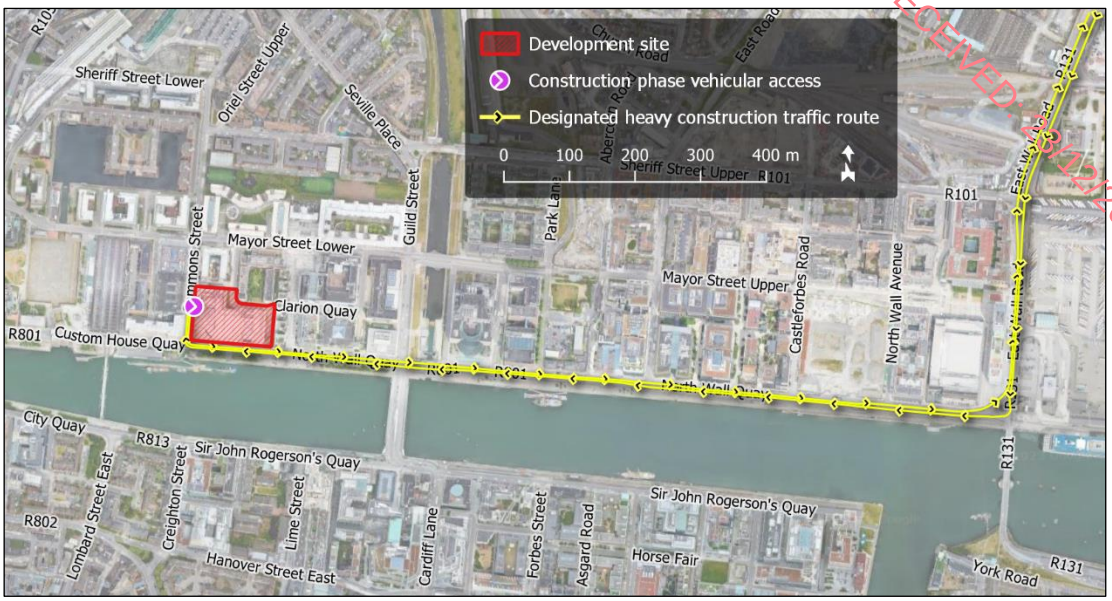
The potential operational-phase effect of the proposed development on the operation of local public transport services is determined in the Public Transport Capacity Assessment report prepared by Derry O'Leary, which is attached as Appendix 12.3 and is summarised in section 12.2.12. This effect is considered to be ***negative*** in nature, ***long-term*** in duration, and of ***slight*** significance.

12.6 Mitigation Measures

12.6.1 Construction Phase

Heavy Goods Vehicle traffic (vehicles 3.5t or over) to and from the construction site shall comprise primarily 3-axle and 4-axle lorries for the removal of construction waste and the delivery of large structural elements or plant. All HGV construction traffic to and from the site will follow a designated route, ensuring that heavy construction vehicles avoid sensitive streets to the greatest extent possible and travel as little as possible within the city centre. Subject to final agreement between the lead Contractor and DCC (as part of the Contractor's Construction Management Plan), this designated route will require heavy construction vehicles travelling to and from the site to arrive and depart from/to the M50 motorway (Dublin Tunnel) via the north quays, as shown in Figure 12-15.

Figure 12-15 Designated HGV access routes (sources: OSM Contributors, Google)



The lead contractor appointed for the construction of the development will be required to prepare a site-specific Construction Management Plan (CMP), including a plan for the scheduling and management of construction traffic, which will outline measures to be taken to mitigate the effects of construction traffic on the surrounding road network. A Designated Community Liaison Officer (DCLO) will be nominated for the proposed development, who will act as a point of contact for local residents, Dublin City Council, and An Garda Síochána.

The final site-specific CMP will include the following measures for minimising construction traffic and mitigating its effects:

- Limiting onsite car parking for construction operatives.
- Restricting all heavy construction traffic to a designated route, ensuring that heavy construction vehicles avoid sensitive streets to the greatest extent possible and travel as little as possible within the city centre.
- Conducting all loading and unloading operations within the site.
- Scheduling deliveries outside of peak hour periods to avoid disturbance to surrounding pedestrian and vehicular traffic.
- Staggering HGV movements to/from site to avoid site queues.
- Preventing haulage vehicles travelling in convoys of more than two vehicles at any time and spacing haulage vehicles by a minimum of 250m at all times.
- Installation of a wheel wash at exit from the site to prevent any dirt being carried out onto surrounding roads.
- Deployment of a road sweeper as necessary to keep roads around the site clean.

The following specific traffic control and marshalling measures will be included in the CTMP, to minimise the potential for obstruction of surrounding streets:

- At no time will construction associated vehicles be stopped or parked along haulage routes.
- Haulage vehicles will not travel in convoys of greater than two vehicles at any time.
- Haulage vehicles will be spaced by a minimum of 250m at all times.
- At no time will haulage vehicles be parked or stopped at the entrance to the site.
- All loading of excess material will occur within the site boundary.

- All off-loading of deliveries will take place within the site, away from the public road and will access via the construction site access.

Construction vehicle movements will be minimised through:

- 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.
- Reuse on site of any 'cut' material generated by the construction works, where possible, through various accommodation works.
- Provision of adequate storage space on site.
- Development of a strategy to minimise construction material quantities as much as possible.

Construction personnel will be encouraged to make use of the available high-quality public transport links to the area and/or to commute by bicycle, to minimise private car trips to and from the site. To avoid problems of parking overspill on surrounding streets, parking restrictions and management measures on surrounding streets will be reviewed and implemented as necessary in agreement with local residents and Dublin City Council.

12.6.2 Operational Phase

Development occupants' use of sustainable travel modes (public transport, walking, and cycling) constitutes the primary means by which the development will avoid the excessive generation of motor vehicle trips. As described in the Public Transport Capacity Assessment report prepared by Derry O'Leary (attached as Appendix 12.3 and summarised in section 12.2.12), use of these travel modes will however have only slightly significant potential effects on the operation of nearby public transport services. No mitigation measures are therefore required in this respect. It is however noted that, should additional public transport capacity be required on services in proximity to the development site, this can be provided by means of increased frequency on the existing services or by the use of higher-capacity trains, trams, or buses. Such a decision would be made on the basis of observed demand, of which regular monitoring is undertaken by the National Transport Authority.

As described in the Workplace Travel Plan Framework prepared in support of this planning application and provided separately, a Travel Plan Coordinator shall be appointed for the proposed development, with the remit to implement and oversee an ongoing Workplace Travel Plan (WTP). In conjunction with the development's intrinsic mitigation measures (reduced car parking, significant bicycle parking, and ancillary facilities), this shall assist development occupants and visitors in making the most of sustainable transport opportunities and in avoiding single-occupant car journeys to and from the development site, which shall in turn reduce the likelihood of overspill parking on surrounding streets.

The development's facilities management will prepare and implement a Development Servicing Management Plan that will specifically aim to ensure that servicing of the development can be carried out efficiently, whilst minimising both:

- conflicts between vehicular servicing traffic and internal pedestrian and cyclist traffic, and
- any effects on the operational performance of the surrounding road network.

<u>Delivery scheduling</u>

Peak hour deliveries will be discouraged throughout the development. On the basis that the AM peak is often the busiest hour for servicing, the operation of the development will spread deliveries throughout the day wherever possible. The majority of postal deliveries will be made to grouped mailboxes or to reception areas, reducing delivery time in this instance.

Waste management

The development shall provide sufficient facilities for storage and collection of segregated waste. Refuse collection will be undertaken outside of peak hours where possible, with the specific collection times being arranged with the private waste contractors to minimise the impacts on the operation of the site and of the surrounding street network.

Operational coordination, restrictions, and enforcement

Facilities management shall be responsible for establishing and enforcing restrictions on the nature and scheduling of permitted vehicular servicing operations relating to the development. Facilities management shall maintain records of all large deliveries and shall coordinate with all development occupants to ensure that regular scheduled servicing operations are conducted at suitable times and do not conflict with one another. Facilities management shall take enforcement measures where such operations are conducted without its approval.

Accommodating special deliveries

Any special deliveries to the subject development will need to be arranged with facilities management in advance. Special deliveries are defined as unusually large items which would arrive on an infrequent basis. The delivery time and duration will be agreed with facilities management to minimise the impact upon the routine daily servicing requirements of the development and the operation of the surrounding street network. All special deliveries should be arranged for off-peak periods, where possible.

12.7 Monitoring or Reinstatement Measures

12.7.1 Construction Phase

The lead contractor appointed for the construction of the development will be required to prepare a site-specific Construction Management Plan (CMP) that shall include a Construction Traffic Management Plan for the scheduling and management of construction traffic. This CMP shall outline measures for monitoring the impact of construction traffic on the operation and condition of the surrounding street network, including remedial actions to be taken in the event of construction traffic causing damage to road infrastructure.

The lead contractor will also be required to monitor the travel habits of construction personnel and to tailor supports for public and shared transport use accordingly. Surrounding streets will be monitored to ensure that no nuisance parking associated with construction activity takes place.

No reinstatement works of relevance to traffic and transport are proposed as part of the subject development, with the exception of any repair works made necessary by the passage of construction traffic.

12.7.2 Operational Phase

Post-development monitoring of the surrounding street network's performance is not required or proposed in this case.

Within the scope of the Workplace Travel Plan (WTP) to be implemented for the development, a Travel Plan Coordinator shall be responsible for monitoring the travel habits of development occupants and visitors. A WTP is a dynamic process whereby a package of measures and campaigns is identified, piloted, and then monitored on an ongoing basis. The WTP will identify specific targets against which the effectiveness of the plan can be assessed at each review; these will typically take the form of target modal

splits for journeys to and from a site. The Travel Plan Coordinator shall gather data on travel patterns, for instance by conducting periodic travel surveys of development occupants. A Workplace Travel Plan Framework has been prepared by CS Consulting and is submitted under separate cover as part of this planning application; that document provides a template for the implementation of a full WTP once the development is completed and operational.

As part of the Service Delivery and Access Strategy to be implemented for the development, facilities management shall be responsible for establishing and enforcing restrictions on the nature and scheduling of permitted vehicular servicing operations relating to the development. Facilities management shall maintain records of all large deliveries and shall coordinate with all development occupants to ensure that regular scheduled servicing operations are conducted at suitable times and do not conflict with one another. Facilities management shall take enforcement measures where such operations are conducted without its approval. The Service Delivery and Access Strategy has been prepared by CS Consulting and is submitted under separate cover as part of this planning application.

No reinstatement works of relevance to traffic and transport are proposed as part of the subject development in its operational phase.

12.8 Residual Effects of the Proposed Development

12.8.1 Construction Phase

Limited onsite parking (maximum 10no. spaces) is to be provided for construction operatives, as one means of limiting vehicular traffic to and from the site during the construction phase. This shall alter the potential modal splits given previously in Table 12.29, producing the following residual distribution of construction operative trips across travel modes:

Table 12.35 Residual Construction Operative Modal Splits and Weekday Trip Generation

Transport Mode	Estimated Modal Share	Weekday Trips by Mode	
		Arrivals	Departures
Driving a Car or Van	8%	10	10
Passenger in a Car	2%	2	2
Bicycle	14%	17	17
Motorcycle	2%	2	2
Bus	26%	32	32
Train or Tram	44%	55	55
Walking	5%	6	6

Table 12.36 and Table 12.37 show the absolute and proportional changes in weekday peak hour traffic flows (excluding Luas trams) at each of the 7no. surveyed junctions shown in Figure 12-1 that shall be produced by the following combined effects:

- The removal of vehicular traffic currently generated by the existing building on the development site.
- The addition of residual vehicular traffic generated by the proposed development in its construction phase.

At most of the surveyed junctions, the net residual effect of the development in its construction phase shall be to reduce the total traffic flows during peak hours. At junctions that shall experience a net increase in traffic flows, this peak hour increase is always less than 10% of the existing baseline flows. In its construction phase, the proposed development shall therefore have a ***slight positive short-term*** residual effect on the operation of the surrounding road network.

With the implementation of the construction-phase mitigation measures described in section 12.6.1, which will minimise the risk of construction-related activity affecting the surrounding road network in ways beyond junction operational performance, the overall residual construction-phase effect of the proposed development on the operation of the surrounding road network shall be ***negative*** in nature, ***short-term*** in duration, and of ***slight*** significance.

Table 12.36 Changes in Junction Traffic Flows – Construction Residual – AM Peak

Total Vehicle Movements (as PCU)	Survey Junction Site:						
	J1	J2	J3	J4	J5	J6	J8
2023 Surveyed Baseline Flows	266	226	693	701	1289	1802	908
Effect of Removing Existing Building	-58	-10	-58	-10	-26	-18	-5
Residual Development Construction Traffic	+4	+4	+16	+4	+34	+29	+2
Combined Change in Total Flows	-54	-6	-42	-6	+8	+11	-3
Change in Flows as Proportion of Baseline	-20.3%	-2.7%	-6.1%	-0.9%	+0.6%	+0.6%	-0.3%

Table 12.37 Changes in Junction Traffic Flows – Construction Residual – PM Peak

Total Vehicle Movements (as PCU)	Survey Junction Site:						
	J1	J2	J3	J4	J5	J6	J8
2023 Surveyed Baseline Flows	152	194	453	793	1163	1753	911
Effect of Removing Existing Building	-5	-46	-6	-46	-5	-21	-26
Residual Development Construction Traffic	+3	+3	+19	+3	+31	+26	+2
Combined Change in Total Flows	-2	-43	+13	-43	+26	+5	-24
Change in Flows as Proportion of Baseline	-1.3%	-22.2%	+2.9%	-5.4%	+2.2%	+0.3%	-2.6%

12.8.2 Operational Phase

The operational-phase mitigation measures to be implemented for the proposed development shall not alter the modal splits of occupant and visitor trips, nor shall they influence the generation of servicing vehicle trips. In terms of the development's vehicular trip generation and its impact on the operation of surrounding junctions, the development's operational-phase residual effects are therefore equivalent to its potential effects: these shall be ***neutral*** in nature, ***long-term*** in duration, and ***imperceptible***.

Additional mitigation measures are to be implemented primarily in the context of the Development Servicing Management Plan, which shall regulate vehicular servicing operations and thereby reduce the likelihood of adjacent streets being temporarily obstructed by stopped/parked servicing vehicles. Alongside this, the implementation of the Workplace Travel Plan will complement the development's intrinsic mitigation measures (reduced car parking, significant bicycle parking, and ancillary facilities) by supporting development occupants in making the most effective use of sustainable and active travel modes. This shall reduce the likelihood of overspill parking on surrounding streets.

With the implementation of these additional mitigation measures, the overall residual operational-phase effect of the proposed development on the operation of the surrounding road network shall be ***negative*** in nature, ***long-term*** in duration, but ***not significant***.

12.9 Cumulative Impacts of the Proposed Development

Planning permission is in place for a number of committed developments close to the subject site, some of which are currently under construction. All of these committed developments are on brownfield sites and are not expected to result in significant increases in the vehicular traffic flows near the subject development site, as they are either:

- already in operation for a similar use to that proposed, or a more intensive use; or
- currently under construction and generating construction traffic that is likely equal to or greater than the development's future operational traffic.

Nevertheless, the application of Transport Infrastructure Ireland (TII) standard traffic growth rates provides a means of accounting for the potential influence of other traffic-generating developments in the area of the proposed development, whether or not already planned or permitted.

Unit 5.3 of the TII Project Appraisal Guidelines (PE-PAG-02017 Travel Demand Projections) has been used to apply growth factors to the recorded background traffic flows (from 2023), to obtain traffic flows for the years 2030 (construction peak) and 2047 (15 years after development completion). The TII annual growth rates applied are given in Table 12.38, and the resultant compound growth in background traffic for each of the relevant years is given in Table 12.39.

Table 12.38 TII Central Growth Rates per Year (Light Vehicles or PCU)

Geographic Area	2016-2030	2030-2040	2040-2050
Dublin Metropolitan	+ 1.62%	+ 0.51%	+ 0.44%

Table 12.39 Predicted Background Traffic Growth (over 2023 surveyed traffic levels)

2030 Construction peak	2032 Development completion	2047 Completion +15 years
+ 11.9%	+ 13.1%	+ 21.4%

12.9.1 Construction Phase

Table 12.40 and Table 12.41 show the absolute and proportional changes in weekday peak hour traffic flows (excluding Luas trams) at each of the 7no. surveyed junctions shown in Figure 12-1 that shall be produced by the following cumulative effects:

- Projected growth in background traffic between the years 2023 and 2030, unrelated to the proposed development, derived from TII growth factors.
- The removal of vehicular traffic currently generated by the existing building on the development site.
- The addition of residual vehicular traffic generated by the proposed development in its construction phase.

At these surveyed junctions, the cumulative construction-phase effect of the proposed development (in conjunction with background traffic growth) varies between a net decrease of 10.3% in total peak hour traffic flows and a net increase of 14.8%. Across all junctions, in both peak hour periods, there is a mean average net increase of 10.5% in total traffic flows. In the proposed development's construction phase,

there shall therefore be a ***moderate negative short-term*** cumulative effect on the operation of the surrounding road network.

Table 12.40 Changes in Junction Traffic Flows – Construction Cumulative 2030 – AM Peak

Total Vehicle Movements (as PCU)	Survey Junction Site:						
	J1	J2	J3	J4	J5	J6	J8
2023 Surveyed Baseline Flows	266	226	693	701	1289	1802	908
TII Background Traffic Increase 2023-2030	+31	+27	+81	+84	+154	+217	+109
Effect of Removing Existing Building	-58	-10	-58	-10	-26	-18	-5
Residual Development Construction Traffic	+4	+4	+16	+4	+34	+29	+2
Cumulative Change in Total Flows	-23	+21	+39	+78	+162	+228	+106
Cumulative Change as Proportion of Baseline	-8.6%	+9.3%	+5.6%	+11.1%	+12.6%	+12.7%	+11.7%

Table 12.41 Changes in Junction Traffic Flows – Construction Cumulative 2030 – PM Peak

Total Vehicle Movements (as PCU)	Survey Junction Site:						
	J1	J2	J3	J4	J5	J6	J8
2023 Surveyed Baseline Flows	152	194	453	793	1163	1753	911
TII Background Traffic Increase 2023-2030	+18	+23	+54	+92	+139	+209	+109
Effect of Removing Existing Building	-5	-46	-6	-46	-5	-21	-26
Residual Development Construction Traffic	+3	+3	+19	+3	+31	+26	+2
Cumulative Change in Total Flows	+16	-20	+67	+49	+165	+214	+85
Cumulative Change as Proportion of Baseline	+10.5%	-10.3%	+14.8%	+6.2%	+14.2%	+12.2%	+9.3%

With the implementation of the construction-phase mitigation measures described in section 12.6.1, which will minimise the risk of construction-related activity affecting the surrounding road network in ways beyond junction operational performance, the overall cumulative construction-phase effect of the proposed development on the operation of the surrounding road network (in conjunction with background traffic growth) shall be ***negative*** in nature, ***short-term*** in duration, and of ***slight*** significance.

12.9.2 Operational Phase

Table 12.42 and **Table 12.43** show the absolute and proportional changes in weekday peak hour traffic flows (excluding Luas trams) at each of the 7no. surveyed junctions shown in Figure 12-1 that shall be produced by the following cumulative effects:

- Projected growth in background traffic between the years 2023 and 2047, unrelated to the proposed development, derived from TII growth factors.

- The removal of vehicular traffic currently generated by the existing building on the development site.
- The addition of vehicular traffic to be generated by the proposed new building once operational.

Across all junctions, in both peak hour periods, there is a mean average net increase of 21.5% in total traffic flows. In the proposed development's operational phase, by the design horizon year of 2047, there shall therefore be a ***long-term significant negative*** cumulative effect on the operation of the surrounding road network. This cumulative effect is however due almost entirely to the TII-derived projected growth in background traffic over the coming 22 years, which is unrelated to the proposed development.

Table 12.42 Changes in Junction Traffic Flows – Operational Cumulative 2047 – AM Peak

Total Vehicle Movements (as PCU)	Survey Junction Site:						
	J1	J2	J3	J4	J5	J6	J8
2023 Surveyed Baseline Flows	266	226	693	701	1289	1802	908
TII Background Traffic Increase 2023-2047	+57	+48	+147	+149	+275	+385	+195
Effect of Removing Existing Building	-58	-10	-58	-10	-26	-18	-5
Residual Development Operational Traffic	+61	+9	+61	+9	+27	+20	+4
Cumulative Change in Total Flows	+60	+47	+150	+148	+276	+387	+194
Cumulative Change as Proportion of Baseline	+22.6%	+20.8%	+21.6%	+21.1%	+21.4%	+21.5%	+21.4%

Table 12.43 Changes in Junction Traffic Flows – Operational Cumulative 2047 – PM Peak

Total Vehicle Movements (as PCU)	Survey Junction Site:						
	J1	J2	J3	J4	J5	J6	J8
2023 Surveyed Baseline Flows	152	194	453	793	1163	1753	911
TII Background Traffic Increase 2023-2047	+33	+41	+95	+170	+249	+375	+194
Effect of Removing Existing Building	-5	-46	-6	-46	-5	-21	-26
Residual Development Operational Traffic	+3	+52	+4	+53	+4	+23	+30
Cumulative Change in Total Flows	+31	+47	+93	+177	+248	+377	+198
Cumulative Change as Proportion of Baseline	+20.4%	+24.2%	+20.5%	+22.3%	+21.3%	+21.5%	+21.7%

12.10 References

- BRE (2003) Controlling Particles, Vapours & Noise Pollution from Construction Sites
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- Met Éireann (2024) Met Éireann website: https://www.met.ie/
- The Scottish Office (1996) Planning Advice Note PAN50 Annex B: Controlling The Environmental Effects Of Surface Mineral Workings Annex B: The Control of Dust at Surface Mineral Workings
- Transport Infrastructure Ireland (2022) Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106
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- USEPA (1997) Fugitive Dust Technical Information Document for the Best Available Control Measures
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- World Health Organisation (2021) Air Quality Guidelines 2021

Chapter 13 – Material Assets – Waste Management

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13.1 Introduction

This chapter evaluates the impacts, if any, which the Proposed Development may have on Material Assets - Waste as defined in the EIA Directive (Directive 2011/92/EU as amended by Directive 2014/52/EU) and the EPA 2022 Guidelines on the information to be contained in Environmental Impact Assessment Reports during the construction and operational phases of the Proposed Development, as described in Chapter 2 (Description of Proposed Development).

A site-specific Resource Waste Management Plan (RWMP) has been prepared by AWN to guide and manage the waste generated during the construction phase of the Proposed Development and will be included as Appendix 13.1. The RWMP was prepared in accordance with the Environmental Protection Agency's (EPA) document *Best Practice Guidelines for the Preparation of Resource and Waste Management Plans for Construction & Demolition Projects (2021)*.

The RWMP should be viewed as a live document and is regularly being revisited throughout the Proposed Development's lifecycle so that opportunities to maximise waste reduction / efficiencies are exploited throughout, and that data is collected on an ongoing basis so that it is as accurate as possible.

A separate Operational Waste Management Plan (OWMP) has been prepared by AWN for the operational phase of the Proposed Development and is included as Appendix 13.2.

These documents will ensure the management of wastes arising at the site in accordance with legislative requirements and best practice standards.

This chapter has been prepared in accordance with European Commissions Guidelines, Guidance on the preparation of the Environmental Impact Assessment Report (2017), the EPA Guidelines on the Information to be contained in EIAR (2022). It should be read in conjunction with Chapter 2 (Description of Proposed Development), Chapter 5 (Land, Soils and Geology), and Chapter 15 (Interactions) of the EIAR.

13.2 Methodology

The assessment of the impacts of the Proposed Development, arising from the consumption of resources and the generation of waste materials, was carried out taking into account the methodology specified in relevant guidance documents, along with an extensive document review to assist in identifying current and future requirements for waste management; including national and regional waste policy, waste strategies, management plans, legislative requirements and relevant reports.

This chapter is based on the Proposed Development, as described in Chapter 2 (Description of the Proposed Development) and considers the following aspects:

- Legislative context;
- Construction phase (including site demolition and excavation); and
- Operational phase.

A desktop study was carried out which included the following:

- Review of applicable policy and legislation which creates the legal framework for resource and waste management in Ireland;
- Description of the typical waste materials that will be generated during the Construction and Operational phases; and

- Identification of mitigation measures to prevent waste generation and promote management of waste in accordance with the waste hierarchy.

Estimates of waste generation during the construction and operational phases of the Proposed Development have been calculated and are included in Section 13.4 of this chapter. The waste types and estimated quantities are based on published data by the EPA in the National Waste Reports and National Waste Statistics, data recorded from similar previous developments, Irish and US EPA waste generation research as well as other available research sources.

Mitigation measures are proposed to minimise the effect of the Proposed Development on the environment during the construction and operational phases, to promote efficient waste segregation and to reduce the quantity of waste requiring disposal. This information is presented in Section 13.6.

A detailed review of the existing ground conditions on a regional, local and site-specific scale is presented in Chapter 5 of this EIAR (Land, Soils & Geology). Chapter 5 also discusses the environmental quality of any soils which will have to be excavated to facilitate construction of the Proposed Development.

13.2.1 Legislative and Policy Framework

Waste management in Ireland is subject to EU and national waste legislation and control, which defines how waste materials must be managed, transported and treated. The overarching EU legislation is the Waste Framework Directive (2008/98/EC) which is transposed into national legislation in Ireland. The cornerstone of Irish waste legislation is the Waste Management Acts 1996-2021. European and national waste management policy is based on the concept of the 'waste hierarchy', which sets out an order of preference for managing waste (prevention > preparing for reuse > recycling > recovery > disposal) (Figure 13-1).

Figure 13-1. Waste Hierarchy (Source: European Commission, 2018)

EU and Irish National waste policy also aims to contribute to the circular economy by extracting high-quality resources from waste as much as possible. Circular Economy (CE) is a sustainable alternative to the traditional linear (take-make-dispose) economic model, reducing waste to a minimum by reusing, repairing, refurbishing and recycling existing materials and products. (Figure 13-2).

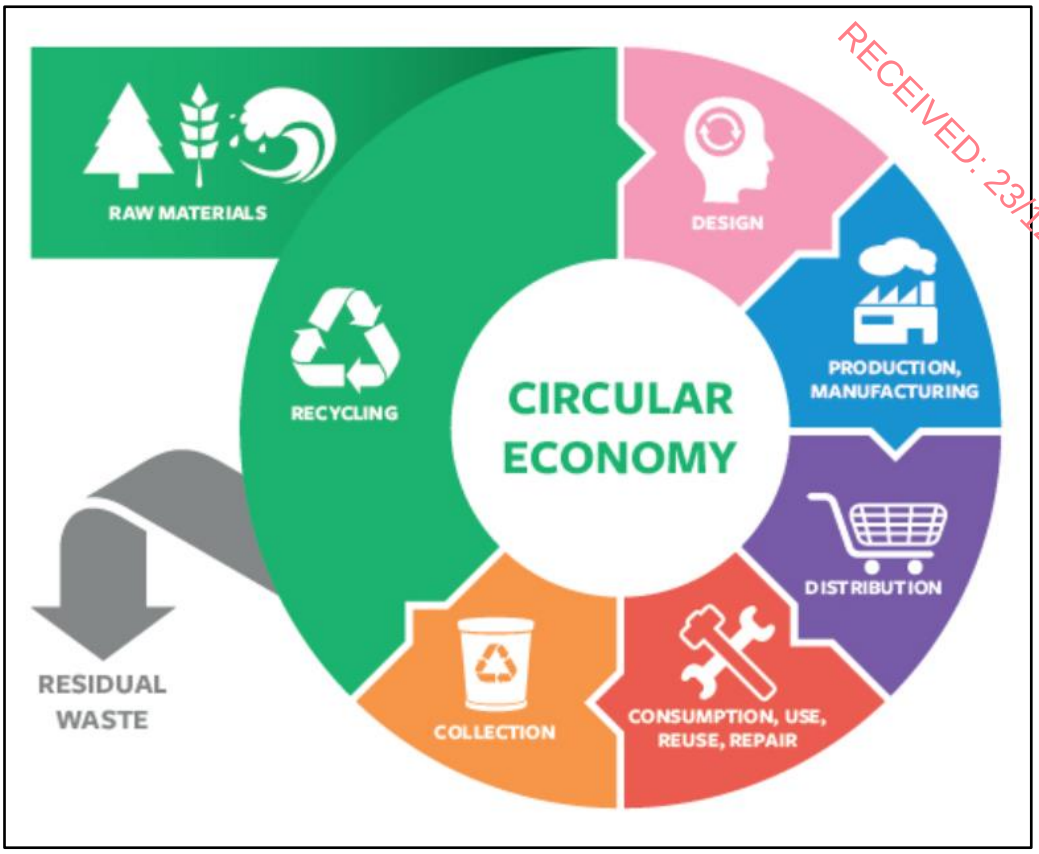

Figure 13-2. Circular Economy (Source: Repak, 2021)

The Irish government issues policy documents which outline measures to improve waste management practices in Ireland and help the country to achieve EU targets in respect of recycling and disposal of waste. The most recent policy document, *Waste Action Plan for a Circular Economy (WAPCE) – Waste Management Policy in Ireland*, was published in 2020 and shifts focus away from waste disposal and moves it back up the production chain. The move away from targeting national waste targets is due to the Irish and international waste context changing in the years since the launch of the previous waste management plan, A Resource Opportunity, in 2012.

One of the first actions to be taken from the WAPCE was the development of the *Whole of Government Circular Economy Strategy 2022-2023 'Living More, using Less' (2021)* to set a course for Ireland to transition across all sectors and at all levels of Government toward circularity and was issued in December 2021.

The Circular Economy and Miscellaneous Provisions Act 2022 was signed into law in July 2022. The Act underpins Ireland's shift from a "take-make-waste" linear model to a more sustainable pattern of production and consumption, that retains the value of resources in our economy for as long as possible and that will work to significantly reduce our greenhouse gas emissions. The Act defines Circular Economy for the first time in Irish law, incentivises the use of recycled and reusable alternatives to wasteful, single-use disposable packaging, introduces a mandatory segregation and incentivised charging regime for commercial waste, streamlines the national processes for End-of-Waste and By-Products decisions.

The strategy for the management of waste from the construction phase is in line with the requirements of the EPA's *'Best Practice Guidelines for the Preparation of Resource and Waste Management Plans for Construction & Demolition Projects' (2021)*. The following guidance document was also consulted in the preparation of this assessment:

- *Construction and Demolition Waste Management: A Handbook for Contractors and Site Managers* (FÁS & Construction Industry Federation, 2002).

There are currently no Irish guidelines on the assessment of operational waste generation, and guidance is taken from industry guidelines, plans and reports including:

- The *National Waste Management Plan for a Circular Economy 2024 - 2030 (NWMPCE)* (2024);
- *BS 5906:2005 Waste Management in Buildings – Code of Practice*;
- Dublin City Council (DCC) *Waste Management (Storage, Presentation and Segregation of Household and Commercial Waste) Bye-Laws 2018)*;
- The *EPA National Waste Database Reports 1998 – 2020*;
- The *Circular Economy and National Waste Database Report 2021-2023* (2025); and
- *EPA National Waste Statistics Web Resource.*

Regulation 27 of the European Communities (Waste Directive) Regulations 2011 (SI No.126 2011) will be utilised as part of this development. Regulation 27 sets out the conditions for production residue to be classified as a by-product rather than a waste, the four conditions of being a by-product as defined under Article 27 are required to be met. These four conditions are:

- The further use of the substance or object is certain; (Article 27(1)(a));
- The substance or object can be used directly without any further processing other than normal industrial practice; (Article 27(1)(b));
- The substance or object is produced as an integral part of a production process; (Article 27(1)(c)); and
- The further use is lawful in that the substance or object fulfils all relevant product, environmental and health protection requirements for the specific use and will not lead to overall adverse environmental or human health impacts (Article 27(1)(d)).

13.2.1.1 Terminology

Note that the terminology used herein is generally consistent with the definitions set out in Article 3 of the Waste Framework Directive. Key terms are defined as follows:

Waste - Any substance or object which the holder discards or intends or is required to discard.

Prevention - Measures taken before a substance, material or product has become waste, that reduce:

- a) the quantity of waste, including through the re-use of products or the extension of the life span of products;
- b) the adverse impacts of the generated waste on the environment and human health; or
- c) the content of harmful substances in materials and products.

Reuse - Any operation by which products or components that are not waste are used again for the same purpose for which they were conceived.

Preparing for Reuse - Checking, cleaning or repairing recovery operations, by which products or components of products that have become waste are prepared so that they can be re-used without any other pre-processing.

Treatment - Recovery or disposal operations, including preparation prior to recovery or disposal.

Recovery - Any operation the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function, or waste being prepared to fulfil that function, in the plant or in the wider economy. Annex II of the Waste Framework Directive sets out a non-exhaustive list of recovery operations.

Recycling - Any recovery operation by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes. It includes the reprocessing of organic material but does not include energy recovery and the reprocessing into materials that are to be used as fuels or for backfilling operations.

Disposal - Any operation which is not recovery even where the operation has as a secondary consequence the reclamation of substances or energy. Annex I of the Waste Framework Directive sets out a non-exhaustive list of disposal operations.

13.2.2 Forecasting Methods and Difficulties Encountered

The assessment of waste generation at the Proposed Development has been carried out using standard forecasting methods informed by published guidance, including the *EPA Best Practice Guidelines for the Preparation of Resource and Waste Management Plans for Construction and Demolition Projects (2021)* and *BS 5906:2005 Waste Management in Buildings – Code of Practice*.

For the construction phase, waste volumes were estimated using typical generation rates for demolition and office fit-out projects, scaled to reflect the scope of partial demolition, façade removal, and structural extensions. Calculations for waste volume estimations were based on the gross floor area (GFA) and the architect's schedule of development areas, with indicative reuse, recycling, and disposal targets applied in line with industry norms.

For the operational phase, AWN's Waste Generation Model (WGM) was used to predict waste types and volumes, incorporating building area and use, and benchmarking against similar large-scale office and mixed-use schemes. This approach provides representative estimates of likely waste arisings, reflecting realistic occupancy patterns and waste segregation practices.

Until final materials and detailed construction methodologies have been confirmed, it is difficult to predict with a high level of accuracy the construction waste that will be generated, as exact materials and quantities may vary during the build process. While an initial licensed facility may be selected for soil disposal, there is potential to encounter contaminated material or naturally occurring variations in minerals and chemicals that necessitate routing to a different suitably licensed facility. Site Investigation (SI) sampling provides spot data; further testing may be required during excavation, as the true condition of all excavated materials cannot be verified until works commence.

There are numerous licensed, permitted, and registered waste facilities in Dublin, the surrounding counties, and across the former Eastern Midlands Waste Region (EMR), as well as other regions in Ireland and Northern Ireland. However, facility availability, capacity, and contractor service constraints may limit options at a given time. Licensed facilities operate under annual intake limits; therefore, it is not feasible to commit to a single receiving facility throughout the excavation phase. In practice, facilities may change over time as capacity becomes available or as more suitably located recovery facilities commence operations, which can be preferable from an environmental perspective.

Licensed waste facilities have annual limitations on material that they can import as part of their license agreements. Because of this it would not make it possible to commit to a singular specific receiving facility as it is not available throughout the excavation phase. It would not be viable to cease a development and wait until a receiving facilities annual receiving quotas are reset. In a normal development waste facilities would switch between facilities with available capacity.

There are a large number of available waste facilities for this project to potentially utilise. The materials used during the construction of this project will be standard construction materials and it is envisaged that there will be capacity to receive any waste materials generated by the development during the construction phase.

The ultimate selection of waste contractors and receiving facilities will be based on proximity, competency, capacity, serviceability, and cost, with the objective of minimising environmental impacts and maximising recovery in line with the waste hierarchy.

Where uncertainty existed, conservative assumptions were applied to ensure robustness of the forecast. These uncertainties are typical for projects at the planning stage.

13.3 Receiving Environment

In terms of waste management, the receiving environment is largely defined by DCC a as the local authority responsible for setting and administering waste management activities in the area. This is governed by the requirements set out in the *NWMPCE 2024 – 2030* and the *Waste Action Plan for a Circular Economy – Waste Management Policy in Ireland*.

The waste management plans set out the following targets for waste management in the region:

- *Achieve a recycling rate of 55% of managed municipal waste by 2025; and*
- *Reduce to 0% the direct disposal of unprocessed residual municipal waste to landfill (from 2016 onwards) in favour of higher value pre-treatment processes and indigenous recovery practices.*

The Regional Waste Management Planning Offices have issued a National Waste Management Plan for a Circular Economy 2024 - 2030 in March 2024, which supersedes the Eastern-Midlands regional waste management plan and the two other regional waste management plans. The NWMPCE does not however dissolve the three regional waste areas. The NWCPCE sets the ambition of the plan to have a 0% total waste growth per person over the life of the Plan with an emphasis on non-household wastes including waste from commercial activities and the construction and demolition sector.

The *Dublin City Development Plan 2022 – 2028* (2022) sets out the policies and objectives for the DCC area which reflect those sets out in the regional waste management plan.

In terms of physical waste infrastructure, DCC no longer operates any municipal waste landfill in the area. There are a number of waste permitted and licensed facilities located in the EMR Waste Region for management of waste from the construction industry as well as municipal sources. These include soil recovery facilities, inert C&D waste facilities, municipal waste landfills, material recovery facilities and waste transfer stations.

However, these sites may not be available for use when required or may be limited by the waste contractor selected to service the development in the appropriate phase. In addition, there is potential for more suitably placed waste facilities or recovery facilities to become operational in the future which will be more beneficial from an environmental perspective.

The ultimate selection of waste contractors and waste facilities would be subject to appropriate selection criteria proximity, competency, capacity and serviceability.

13.4 Characteristics of the Proposed Development

The Proposed Development involves the partial demolition of an existing office building, removal of façades, and construction of an extended office scheme ranging from 7 to 12 storeys over the existing basement.

A full description is included in Chapter 2 of this EIAR and in the statutory notices.

The characteristics of the Proposed Development that are relevant in terms of waste management are summarised below.

13.4.1 Demolition Phase

The demolition phase will involve the partial demolition and renovation of the existing office building, including removal of external façades and structural elements to accommodate the proposed extension. These works will generate a range of construction and demolition (C&D) waste streams, primarily associated with façade systems and internal strip-out.

Further detail on the estimated quantities of these waste streams is provided in the project-specific RWMP in Appendix 13.1. The RWMP includes predicted tonnages based on the demolition area (9,739 m²) and material densities, and applies reuse, recycling/recovery, and disposal rates derived from EPA National Waste Reports and industry benchmarks. A summary of these estimates is presented in Table 13-1.

Table 13-1. Predicted On and Off-Site Reuse, Recycle and Disposal Rates for Demolition Waste

Waste Type	Tonnes	Reuse		Recycle / Recovery		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Glass	860.3	0	0	85	731.2	15	129.0
Concrete, Bricks, Tiles, Ceramics	4874.8	85	4143.6	5	243.7	10	487.5
Plasterboard	382.3	30	114.7	60	229.4	10	38.2
Asphalts	95.6	25	23.9	70	66.9	5	4.8
Metals	1433.8	5	71.7	80	1147.0	15	215.1
Slate	764.7	0	0	85	650.0	15	114.7
Timber	1147.0	10	114.7	60	688.2	30	344.1
Total	**9558.5**		**4468.6**		**3756.5**		**1333.4**

13.4.2 Construction Phase

During the construction phase, waste will be produced from surplus materials such as broken or off-cuts of timber, plasterboard, concrete, tiles, bricks, etc. Waste from packaging (cardboard, plastic, timber) and oversupply of materials may also be generated. The appointed Contractor will be contractually required to ensure that oversupply of materials is kept to a minimum and opportunities for reuse of suitable materials is maximised.

There will be soil excavated to facilitate the proposed piling works and underground services. It is currently envisaged that none of this excavated material will be reused on site due to the limited opportunities for reuse on site, meaning the full volume will need to be removed offsite for appropriate offsite reuse, recovery, recycling and / or disposal.

All material requiring removal from the site is deemed to be a waste, removal and reuse / recycling / recovery / disposal of the material will be carried out in accordance with the *Waste Management Act 1996 (as amended*), the *Waste Management (Collection Permit) Regulations 2007 (as amended)* and the *Waste Management (Facility Permit & Registration) Regulations 2007 (as amended).* The volume of waste requiring recovery / disposal will dictate whether a Certificate of Registration (COR), permit or licence is required for the receiving facility. Alternatively, the material may be classed as by-product under *Regulation 27 (By-products)*, as amended, of *S.I. No. 323/2020 - European Union (Waste Directive) Regulations 2011-2020*, (previously Article 27 of the European Communities (Waste Directive)). For more information in relation to the envisaged management of by-products, refer to the RWMP (Appendix 13.1).

In order to establish the appropriate reuse, recovery and / or disposal route for the soils and stones to be removed off-site, it will first need to be classified. Waste material will initially need to be classified as hazardous or non-hazardous in accordance with the EPA publication *Waste Classification – List of Waste*

& Determining if Waste is Hazardous or Non-Hazardous (2018). Environmental soil analysis will be carried out prior to removal of the material on a number of the soil samples in accordance with the requirements for acceptance of waste at landfills (Council Decision 2003/33/EC Waste Acceptance Criteria). This legislation sets limit values on landfills for acceptance of waste material based on properties of the waste, including potential pollutant concentrations and leachability. It is anticipated that the surplus material will be suitable for acceptance at either inert or non-hazardous soil recovery facilities / landfills in Ireland or, in the unlikely event of hazardous material being encountered, be transported for treatment / recovery or exported abroad for disposal in suitable facilities.

Waste will also be generated from construction phase workers e.g. organic / food waste, dry mixed recyclables (wastepaper, newspaper, plastic bottles, packaging, aluminium cans, tins and Tetra Pak cartons), mixed non-recyclables and, potentially, sewage sludge from temporary welfare facilities provided on-site during the Construction phase. Waste printer / toner cartridges, waste electrical and electronic equipment (WEEE) and waste batteries may also be generated in small volumes from site offices.

Further detail on the waste materials likely to be generated during the excavation and construction works are presented in the project-specific RWMP (Appendix 13.1). The RWMP provides an estimate (of the main waste types likely to be generated during the Construction phase of the proposed development. These are summarised in Table 13-2.

Table 13-2. Predicted On and Off-Site Reuse, Recycle and Disposal Rates for Construction Waste

Waste Type	Tonnes	Reuse		Recycle / Recovery		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Mixed C&D	850.3	10	85	80	680.3	10	85
Timber	721.5	40	288.6	55	396.8	5	36.1
Plasterboard	257.7	30	77.3	60	154.6	10	25.8
Metals	206.1	5	10.3	90	185.5	5	10.3
Concrete	77.3	30	23.2	65	50.2	5	3.9
Other	386.5	20	77.3	60	231.9	20	77.3
Total	**2499.4**		**561.7**		**1699.4**		**238.3**

13.4.3 Operational Phase

As noted in Section 13.1, an OWMP has been prepared for the Proposed Development and is included as Appendix 13.2. The OWMP provides a strategy for segregation (at source), storage and collection of all wastes generated within the building during the operational phase. This includes waste generated from office floors and the two community spaces at the ground floor level and includes the main waste streams, Mixed Non-Recyclable Waste (MNR), Dry Mixed Recyclables (DMR), Organic Waste, Glass, Paper & Cardboard, Plastics, and Confidential Paper, as well as a strategy for managing additional waste types such as batteries, WEEE, printer/toner cartridges, chemicals, textiles, waste cooking oil, and furniture.

The total estimated waste generation for the Proposed Development for the main waste types based on the AWN waste generation model is presented in Table 13-3 below and is based on the uses and areas as advised by the project architects (Henry J Lyons Architects). Further breakdowns can be found with in Appendix 13.2 OWMP.

Table 13-3. Estimated Waste Generation During Operational Phase Main Waste Types

Waste Type	Waste Volume (m^3 / week)
Organic Waste	6.33
Paper (Confidential)	3.80
Paper & Cardboard	31.70
Plastics	29.78
Glass	0.76
DMR	31.66
MNR	39.38
Total	**143.40**

Waste generation estimates include all functional areas, including office floors and community spaces. The office tenants will be required to provide and maintain appropriate waste receptacles within their units to facilitate segregation at source of these waste types. As required, the tenants, staff and facilities management will need to bring these segregated wastes from their units to their allocated Waste Storage Area (WSA).

The WSA can be viewed on the plans submitted with the application and in the OWMP (Appendix 13.2).

The OWMP seeks to ensure the Proposed Development contributes to the targets outlined in the NWMPCE and the DCC waste Bye-laws, achieving maximum reuse, recycling, and recovery in line with the waste hierarchy and circular economy principles.

13.5 Potential Impacts of the Proposed Development

13.5.1 Construction Phase

The Proposed Development will generate a range of non-hazardous and hazardous waste materials during site demolition, excavation and construction (see Appendix 13.1 for further detail). General housekeeping and packaging will also generate waste materials, as well as typical municipal waste generated by demolition and construction employees, including food waste. Waste materials will be required to be temporarily stored in the construction site compound or adjacent to it, on-site, pending collection by a waste contractor. If waste material is not managed and stored correctly, it is likely to lead to litter or pollution issues at the site and in adjacent areas. The indirect effect of litter issues is the presence of vermin in areas affected. In the absence of mitigation, the effect on the local and regional environment is likely to be ***indirect, short-term, significant*** and ***negative***.

The use of non-permitted waste contractors or unauthorised waste facilities could give rise to inappropriate management of waste, resulting in indirect negative environmental impacts, including pollution. It is essential that all waste materials are dealt with in accordance with regional and national legislation, as outlined previously, and that time and resources are dedicated to ensuring efficient waste management practices. In the absence of mitigation, the effect on the local and regional environment is likely to be ***indirect long-term, significant*** and ***negative***.

Wastes arising will need to be taken to suitably registered / permitted / licensed waste facilities for processing and segregation, reuse, recycling, recovery, and / or disposal, as appropriate. There are numerous licensed waste facilities in the EMR which can accept hazardous and non-hazardous waste materials, and acceptance of waste from the Development Site would be in line with daily activities at these facilities. At present, there is sufficient capacity for the acceptance of the likely C&D waste arisings at facilities in the region. The majority of construction materials are either recyclable or recoverable. However, in the absence of mitigation, the effect on the local and regional environment is likely to be ***indirect short-term, significant*** and ***negative***.

There is a quantity of topsoil and subsoil will need to be excavated to facilitate the Proposed Development. A detailed review of the existing ground conditions on a regional, local site-specific scale is presented in Chapter 5. Excavated material that cannot be reused onsite will need to be removed off-site. Correct classification and segregation of the excavated material is required to ensure that any potentially contaminated materials are identified and handled in a way that will not impact negatively on workers as well as on water and soil environments, both on and off-site. However, in the absence of mitigation, the effect on the local and regional environment is likely to be ***indirect, short-term, significant*** and ***negative***.

13.5.2 Operational Phase

The potential impacts on the environment from improper, or inadequate waste management during the operational phase would represent a diversion from the waste hierarchy, resulting in small volumes of waste being unnecessarily sent to landfill. In the absence of mitigation, the effect on the local and regional environment is likely to be ***indirect, long-term, significant*** and ***negative***.

The nature of the Proposed Development means the generation of waste materials during the operational phase is unavoidable. Established networks of waste collection, treatment, recovery and disposal infrastructure are in place in the region to manage waste from this type of development efficiently. Waste unsuitable for recycling is typically sent for energy recovery. There are also facilities in the region for segregation of municipal recyclables which is typically exported for conversion in recycled products (e.g. paper mills and glass recycling).

If waste material is not managed and stored correctly, it could lead to litter or pollution issues on-site and in adjacent areas, with associated risks such as vermin infestation. Similarly, the use of non-permitted waste contractors or unauthorized facilities could result in inappropriate waste handling and negative environmental impacts. It is essential that all waste materials are managed in accordance with regional and national legislation and that adequate resources are dedicated to implementing efficient waste management practices. In the absence of mitigation, the effect on the local and regional environment is likely to be ***indirect, long-term, significant*** and ***negative***.

13.6 Mitigation Measures

This section outlines the measures that will be implemented to reduce waste generation, manage waste responsibly and minimise environmental effects. All mitigation measures are guided by the principles of the 'Waste Hierarchy' and 'Circular Economy'. The waste hierarchy sets out waste management options in order of preference, from most to least preferred, based on environmental impact and compliance with EU and national policy: prevention and minimisation of waste, followed by preparing for reuse and recycling / recovery, energy recovery (i.e. incineration) and, as a last resort, disposal. The circular economy principle aims to keep materials, components, and products in-use for as long as possible, designing systems that create and retain value. Both principles have been applied and will further be applied during the detailed design, construction and operational phases.

The waste management objectives for the Proposed Development are as follows. These measures will facilitate material reuse and recycling, where possible, and seek to divert waste from landfill:

- Prevention (Construction Phase): The Main Contractor will prevent and minimise waste generation where possible by ensuring large surpluses of construction materials are not delivered to the site through coordination with the suppliers, operating a 'just-in-time' delivery scheme and ensuring sub-contractors conform to the Contractor(s) RWMP. The RWMP submitted with this application (under separate cover) outlines the overarching principles, and a more detailed, site-specific version will be prepared by the Main Contractor prior to the commencement of the works;

- Reuse (Construction and Operational Phases): Reuse of waste and surplus materials will be prioritised during construction, with efforts made to repurpose materials in high value applications. During the operational phase, reuse will be encouraged through appropriate waste segregation and management practices within the Proposed Development;
- Recycle (Construction and Operational Phases): Recycling will be implemented during construction, including the potential use of on-site crushers to produce waste-derived aggregates, subject to testing and approvals. During operation, recycling facilities will be provided to support waste segregation in line with DCC requirements and national waste policy.; and
- Disposal (Construction and Operational Phases): Where waste disposal is unavoidable, it will be carried out in accordance with the Waste Management Act 1996, as amended, and relevant guidance. This applies to both construction waste and operational waste streams, with licensed waste contractors used for all disposal activities.

13.6.1 Construction Phase

The primary waste management objective during construction will be to prevent waste from arising in the first place and to reuse, recycle or recover waste materials, where possible. The following mitigation measures will be implemented during the construction phase of the Proposed Development:

Waste Management (WM)_1:
As previously stated, a project specific RWMP has been prepared in line with the requirements of the EPA's *Best Practice Guidelines for the Preparation of Resource and Waste Management Plans for Construction & Demolition Projects'* (2021) and is included as Appendix 13.1. The mitigation measures outlined in the RWMP will be implemented in full and form part of the mitigation strategy for the site. The mitigation measures presented in the RWMP will ensure effective waste management through minimisation, reuse, recycling, recovery and disposal of waste material generated during the demolition, excavation and construction stages of the Proposed Development.

- Prior to commencement, the appointed Contractor(s) will be required to refine / update the RWMP (Appendix 13.1) in agreement with DCC and in compliance with any planning conditions, or submit an addendum to the RWMP to DCC, detailing specific measures to minimise waste generation and resource consumption, and provide details of the proposed waste contractors and destinations of each waste stream; and
- The Contractor will implement the RWMP throughout the duration of the proposed demolition, excavation and construction stages in the construction phase.

Additionally, the following mitigation measures will be implemented:

WM_2:
- A quantity of topsoil and sub soil will need to be excavated to facilitate the Proposed Development. All excavated material will be removed off-site. Proper classification and segregation of the excavated material will be required to ensure that any potentially contaminated materials are identified and management in a manner that prevents negative impacts on workers and on water and soil environments, both on and off-site.

WM_3:
- Building materials will be chosen to 'design out waste', in line with circular economy principles and green procurement strategies outlined in the RWMP.

WM_4:
- On-site segregation of waste materials will be carried out to increase opportunities for off-site reuse, recycling and recovery. The following waste types, at a minimum, will be segregated:
  - Concrete rubble (including ceramics, tiles and bricks);

- Soil and stones;
- Concrete, bricks, tiles and ceramics;
- Wood, glass and plastics;
- Metals;
- Gypsum-based construction material;
- Paper and cardboard;
- Mixed construction and demolition (C&D) waste; and
- Chemicals (solvents, paints, adhesives, detergents etc.).

WM_5:

- Leftover materials (e.g. timber off-cuts, broken concrete blocks / bricks) and any suitable construction materials shall be re-used on-site, where possible (alternatively, the waste will be sorted for recycling, recovery or disposal).

WM_6:

- All waste materials will be stored in skips or other suitable receptacles in designated areas of the site.

WM_7:

- Any hazardous wastes generated (such as chemicals, solvents, glues, fuels, oils) will also be segregated and will be stored in appropriate receptacles (in suitably bunded areas, where required).

WM_8:

- A Resource Manager (RM) will be appointed by the main Contractor(s) to ensure effective management of waste during the demolition, excavation and construction works.

WM_9:

- All construction staff will receive training in site-specific waste management procedures as part of the induction process.

WM_10:

- All waste leaving the site will be reused, recycled or recovered where possible, to avoid material designated for disposal.

WM_11:

- All waste leaving the site will be transported by suitably permitted contractors and taken to suitably registered, permitted or licensed facilities.

WM_12:

- All waste leaving the site will be recorded and copies of relevant documentation maintained.

WM_13:

- Nearby sites requiring clean fill material will be contacted to investigate reuse opportunities for clean and inert material, if required. If any of the material is to be reused on another site as by-product (and not as a waste), this will be done in accordance with *Regulation 27 (By-products),* as amended, *European Union (Waste Directive) Regulations 2011-2020*. EPA approval will be obtained prior to moving material as a by-product.

These mitigation measures will ensure that the waste arising from the construction stage of the Proposed Development is dealt with in compliance with the provisions of the *Waste Management Act 1996, as amended*, associated Regulations and the *Litter Pollution Act 1997* and the *NWCPE*. They will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved and will promote more sustainable consumption of resources.

13.6.2 Operational Phase

The primary waste management objective during the operational phase will be to ensure that all waste generated within the Proposed Development is managed in accordance with the *Waste Management Act 1996, as amended*, associated Regulations and the *Litter Pollution Act 1997* and the *NWCPE*. Measures will focus on segregation, reuse, recycling, and recovery, with disposal as a last resort, in line with the waste hierarchy and circular economy principles.

The following mitigation measures will be implemented during the operational phase of the Proposed Development:

WM_14:

- All waste materials will be segregated into appropriate categories and will be temporarily stored in appropriate bins or other suitable receptacles in a designated, easily accessible areas of the site.

WM_15:

- As previously stated, a project specific OWMP has been prepared and is included as Appendix 13.2. The mitigation measures outlined in the OWMP will be implemented in full and form part of the mitigation strategy for the site. Implementation of this OWMP will ensure a high level of recycling, reuse and recovery at the 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 *NWMPCE* , *Waste Action Plan for a Circular Economy – Waste Management Policy in Ireland* and the DCC waste bye-laws.
- The facilities management team of the site during the operational stage will be responsible for ensuring the ongoing implementation of this OWMP and the abiding of DCC waste bye-laws, ensuring a high level of recycling, reuse and recovery at the site of the Proposed Development.

WM_16:

- On-site segregation of all waste materials into appropriate categories including (but not limited to):
  - Organic waste;
  - Dry Mixed Recyclables;
  - Mixed Non-Recyclable Waste;
  - Glass;
  - Cardboard (for baling);
  - Plastic packaging (for baling);
  - Confidential paper waste;
  - Deposit return scheme;
  - Waste electrical and electronic equipment (WEEE);
  - Batteries (non-hazardous and hazardous);
  - Cooking oil;
  - Light bulbs;
  - Cleaning chemicals (pesticides, paints, adhesives, resins, detergents, etc.);
  - Furniture (and from time-to-time other bulky waste); and
  - Abandoned bicycles.

WM_17:

- The facilities management team will ensure that all waste materials will be stored in colour-coded bins or other suitable receptacles in designated, easily accessible locations. Bins will be clearly identified with the approved waste type to ensure there is no cross contamination of waste materials.

WM_18:

- The facilities management team will ensure that all waste collected from the site of the Proposed Development will be reused, recycled or recovered, where possible, with the exception of those waste streams where appropriate facilities are currently not available.

WM_19:

- The facilities management team will ensure that all waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licensed facilities.

These mitigation measures will ensure the waste arising from the development is dealt with in compliance with the provisions of the *Waste Management Act 1996*, as amended, associated Regulations, the *Litter Pollution Act 1997*, *The NWMPCE* and the DCC waste bye-laws. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved.

13.7 Monitoring Measures

The management of waste during the construction phase will be monitored by the Contactor's appointed RM to ensure compliance with the above-listed mitigation measures, and relevant waste management legislation and local authority requirements, including maintenance of waste documentation. Monitoring proposals for the construction phase are summarised in Table 13.4.

The management of waste during the operational phase will be monitored by the facilities management team to ensure effective implementation of the OWMP internally and by the nominated waste contractor(s). Monitoring proposals for the operational phase are summarised in Table 13.5.

Table 13-4. Monitoring Proposals

Likely Significant Effect	Monitoring Proposals
Litter Pollution	The Contractor will review and maintain waste records and site audits.
Unlicensed Waste Collection (Illegal Dumping)	A register will be maintained and reviewed. A copy of all waste collection permits will be maintained.
Insufficient Waste Facilities	A register will be maintained and reviewed. A copy of all waste collection permits will be maintained.
Lack of Waste Classification	An appointed RM will monitor all on-site waste segregation and classification.

Table 13-5. Monitoring Proposals

Likely Significant Effect	Monitoring Proposals
Litter Pollution	Waste storage areas will be monitored by the facilities management team.

Likely Significant Effect	Monitoring Proposals
Unlicensed Waste Collection (Illegal Dumping)	The facilities management team will maintain waste receipts on-site for a period of 7 years and make available to DCC as requested.
Poor Waste Segregation	Waste generation volumes and cross contamination will be monitored by the facilities management team and their selected waste management company.
Litter Pollution	Waste storage areas will be monitored by the facilities management team.

13.7.1 Construction Phase

The objective of setting targets for waste management can only achieved if the actual waste generation volumes are calculated and compared. This is particularly important during the demolition, excavation and construction works, where there is a potential for waste management objectives to become secondary to other priorities, such as progress and meeting construction schedule targets. The mitigation measures in the RWMP specify the need for an RM to be appointed, who will have responsibility for monitoring the actual waste volumes being generated and ensuring that contractors and sub-contractors are segregating waste as required. Where targets are not met, the RM will identify the reasons for this and work to resolve any issues. Recording waste generation during the construction phase of the Proposed Development will enable better management of waste contractor requirements and identify trends. The data should be maintained to inform future developments.

13.7.2 Operational Phase

During the operational phase, waste generation volumes will be monitored by the facilities management team against the predicted waste volumes outlined in the OWMP. Monitoring will apply to all functional areas of the Proposed Development, including office floors and the two community spaces at ground floor level, to ensure compliance with the segregation and storage requirements. There may be opportunities to reduce the number of bins and equipment required, where estimates have been too conservative. Reductions in bin and equipment requirements will improve efficiency and reduce waste contractor costs.

13.8 Residual Effects of the Proposed Development

13.8.1 Construction Phase

A carefully planned approach to waste management as set out in Section 13.6.1 and adherence to the RWMP (which includes mitigation) (Appendix 13.1) during the construction phase will promote resource efficiency and waste minimisation. When the mitigation measures are implemented and a high rate of prevention reuse, recycling and recovery is achieved, the predicted impact of the construction phase on the environment will be ***short-term, imperceptible*** and ***neutral***.

13.8.2 Operational Phase

During the operational phase, a structured approach to waste management as set out in Section 13.6.2 and adherence to the OWMP (which includes mitigation) (Appendix 13.2) will promote resource efficiency and waste minimisation. When the mitigation measures are implemented and a high rate of reuse, recycling and recovery is achieved, the predicted impact of the operational phase on the environment will be ***long-term, imperceptible*** and ***neutral***.

13.9 Cumulative Impacts of the Proposed Development

This section assesses the potential cumulative effects of the Proposed Development in combination with other permitted or under-construction projects within the vicinity of 1 North Wall Quay, Dublin 1. A list of relevant planning permissions from the surrounding area over the past five years is provided in Appendix 2.1 and has been considered in this assessment. The analysis focuses on cumulative impacts relating to waste arisings, segregation, reuse/recycling opportunities, and disposal routes during both the construction and operational phases.

13.9.1 Construction Phase

The Proposed Development is located within Dublin 1, in the North Docklands area, which has experienced significant commercial and mixed-use development in recent years. Multiple large-scale office, residential, and hotel projects have been permitted or are under construction along North Wall Quay, Mayor Street, and surrounding streets, as part of the Docklands Strategic Development Zone (SDZ).

Given the scale and nature of these developments, there is potential for overlapping construction phases, which could result in cumulative impacts on construction waste generation, material sourcing, and disposal capacity. These impacts primarily relate to increased volumes of demolition debris, packaging waste, and surplus construction materials requiring recovery or recycling. However, due to the high number of permitted waste contractors operating within Dublin area, as listed in Appendix A of the RWMP (Appendix 13.1 of the EIAR) and registered with the National Waste Collection Permit Office (NWCPO) and Environmental Protection Agency (EPA), there is sufficient capacity to manage waste generated from multiple sites simultaneously, if required. It is anticipated that similar waste streams (e.g. excavated soils, concrete, timber, metals and packaging materials) would be generated across these developments, allowing for consistent segregation and recycling practices.

Other developments in the area will be required to manage waste in compliance with national and local legislation, policies and plans, which will help mitigate against any potential cumulative effects associated with waste generation and waste management. As such the cumulative effect will be ***short-term, not significant*** and ***neutral***.

13.9.2 Operational Phase

During operation, cumulative impacts may arise from increased volumes of commercial waste streams within the Docklands area, including mixed recyclables, organic waste, glass, cardboard, plastics, and confidential paper. The concentration of large office developments and associated food service facilities in the area may place additional demand on permitted waste collection contractors and recycling infrastructure.

A list of relevant planning permissions for developments within the vicinity of the Proposed Development over the past five years is provided in Appendix 2.1. This assessment considers the combined effect of the Proposed Development alongside these permitted developments, with respect to waste arisings, segregation, reuse/recycling opportunities, and disposal routes. While specific disposal routes will be confirmed by the appointed waste contractor during operation, the availability of licensed municipal and recycling facilities in the Dublin area (refer to Appendix A of the OWMP and Appendix 13.2 of the EIAR) ensures that appropriate routes and destinations are accessible for all waste streams.

The implementation of the OWMP for the Proposed Development, in conjunction with compliance with the Dublin City Council Waste Bye-Laws and the *National Waste Management Plan for a Circular Economy* (*NWMPCE*), will minimise cumulative impacts and promote high levels of recycling and recovery. All developments, including the Proposed Development, will be required to comply with relevant waste legislation and ensure segregation, reuse, and recycling of materials wherever possible. As such the cumulative effect will be ***long-term, imperceptible*** and ***neutral***.

13.10 Interactions and Interrelationships

13.10.1 Human Health and Population

Waste management practices have the potential to affect human health through exposure to improperly handled waste during construction and / or operation, which could result in littering and presence of vermin, with associated risks to human health. A carefully planned approach to waste management, adherence to the project specific RWMP and OWMP, along with the mitigation measures in Chapter 4 (Human Health & Population) and this chapter, will minimise risks associated with odour, pests, and contamination, thereby protecting the health and well-being of workers at the Proposed Development and the local population. Potential effects on population and human health are addressed in Chapter 5. Following mitigation, the effects are expected to be ***long-term, imperceptible*** and ***neutral***.

13.10.2 Lands, Soils and Geology

During the construction phase, there will be soil excavated to facilitate the proposed piling works and installation of new services. It is currently envisaged that none of this excavated material will be reused on site due to the limited opportunities for reuse on site, meaning the full volume will need to be removed offsite for appropriate offsite reuse, recovery, recycling and / or disposal.

The management of contaminated soil, if encountered, will be undertaken in accordance with the Land and Soils chapter and the RWMP. Proper classification and handling of soil waste will prevent degradation of land quality and avoid cross-contamination with clean materials. Potential effects on land and soils are addressed in Chapter 7. Adherence to the mitigation measures in Chapter 7 (Land, Soils & Geology), this chapter, and the requirements of the RWMP (Appendix 15.1), will ensure the effect is ***long-term, imperceptible*** and ***neutral***.

No significant soil-related waste is expected during the operational phase.

13.10.3 Hydrology and Hydrogeology

Improper storage or disposal of waste, particularly hazardous substances, has the potential to impact surface water and groundwater quality during the construction phase. The RWMP includes provisions for bunded storage of hazardous materials and protocols for managing contaminated soil. These measures will mitigate the risk of leachate or runoff entering watercourses and protect the hydrological environment. During the operational phase, the OWMP will ensure that liquid and cleaning chemicals are stored and disposed of in compliance with best practice to avoid water contamination. Potential effects on hydrology and hydrogeology are addressed in Chapter 6 and, following the implementation of mitigation measures, are expected to be ***short-term, imperceptible*** and ***neutral***.

13.10.4 Biodiversity

The potential impacts on biodiversity in relation to the generation of waste during the construction or operational phases are that the incorrect management of waste could result in littering, pollution issues or vermin in areas affected. Operational waste will be management to through segregation and covered storage to prevent litter and pest attraction. Adherence to the mitigation measures set out in this chapter, and in Chapter 7 (Biodiversity) will ensure the associated effect is ***long-term, imperceptible*** and ***neutral***.

13.10.5 Climate

Waste management contributes to greenhouse gas (GHG) emissions, particularly through landfill disposal and transport. The RWMP prioritises reuse, recycling, and recovery of materials, which will reduce the volume of waste sent to landfill and associated emissions. Similarly, the OWMP will promote recycling and minimise residual waste during operation, reducing indirect emissions from waste transport and disposal.

The direct and indirect effects of the Proposed Development on climate, such as GHG are addressed in Chapter 9, and following implementation of mitigation measures, are expected to be ***long-term, imperceptible*** and ***neutral***.

13.10.6 Traffic and Transport

Local traffic and transport will be impacted by the additional vehicle movements generated by removal of waste from the site during the construction and operational phases of the Proposed Development. The increase in vehicle movements as a result of waste generated during the construction phase will be temporary in duration. There will be an increase in vehicle movements in the area as a result of waste collections during the operational phase, but these movements will be imperceptible in the context of the overall traffic and transportation increase. Traffic-related impacts during the construction and operational phases are addressed in Chapter 12 (Material Assets: Traffic & Transport). Provided the mitigation measures detailed in Chapter 12 and this chapter are adhered to, the predicted effects are ***short to long-term, imperceptible*** and ***neutral***.

13.11 References

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- Circular Economy and Miscellaneous Provisions Act 2022.
- Council Decision 2003/33/EC, establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 of and Annex II to Directive 1999/31/EC.
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- Hazardous Waste List - Council Decision 94/904/EC (as per Council Directive 91/689/EEC).
- Litter Pollution Act 1997 as amended.
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- Regional Waste Management Planning Offices, The National Waste Management Plan for a Circular Economy 2024 - 2030 (2024).
- Waste Management Act 1996 as amended.
- Waste Management (Landfill Levy) Regulations 2015 (as amended).

Chapter 14 – Material Assets - Utilities

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14. MATERIAL ASSETS - UTILITIES

14.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) evaluates the potential impacts that the Proposed Development may have on a range of Material Assets as defined in the EPA Guidelines 'Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA, 2022).

The EPA Guidance (EPA, 2022) discuss material assets as follows: " In Directive 2011/92/EU this factor included architectural and archaeological heritage. Directive 2014/52/EU includes those heritage aspects as components of cultural heritage. Material assets can now be taken to mean built services and infrastructure. Traffic is included because in effect traffic consumes transport infrastructure. Sealing of agricultural land and effects on mining or quarrying potential come under the factors of land and soils."

The EPA Guidelines (EPA, 2022) specifically lists and provides sample headings and topics for material assets that include: Roads and Traffic, (Construction Phase, Operational Phase, Unplanned Events [i.e. Accidents]), Built Services (Electricity, Telecommunications, Gas, Water Supply Infrastructure, and Sewerage), Waste Management (Construction Waste, and Operational Waste).

The impact assessment presented in this chapter aims to identify potential impacts that have not been previously addressed in other sections of the EIA report.

The purpose of this chapter is to identify and evaluate any potential significant impacts that the Proposed Development may have on these utilities, such as damage to infrastructure or disruptions to essential services. By conducting this assessment, appropriate mitigation measures can be developed and implemented to minimise any negative impacts and ensure that the development project is carried out in an environmentally responsible manner.

14.2 Methodology

In this EIAR, the impacts on the material assets described in the above guidance have already been considered in the following chapters and therefore these aspects will not be addressed in specific detail within this chapter.

- Chapter 4 - Human Health and Populations;
- Chapter 5 - Land, Soils, Geology, and Hydrogeology;
- Chapter 6 – Hydrology;
- Chapter 8 - Air Quality;
- Chapter 9 – Climate;
- Chapter 10 – Noise and Vibration;
- Chapter 11 – Archaeological and Cultural Heritage;
- Chapter 12 - Traffic and Transportation;
- Chapter 13 – Material Assets – Waste; and
- EIAR Volume 3 – Townscape, Heritage, Landscape and Visual

This chapter assesses material assets major infrastructure and utilities which have not already been addressed elsewhere in this EIAR. The potential impacts, if any, are assessed in terms of the following:

- Land Use, Property, and Access.
- Power and Electrical Supply.
- Telecommunications.
- Surface water infrastructure.
- Foul drainage infrastructure.
- Potable Water infrastructure, and

- Natural Gas infrastructure

Detailed water supply and drainage design information and details of consultation with utility suppliers is provided in the Engineering Services Report prepared by CS Consulting Engineers, and the Telecommunications Report prepared by ISM, which accompanies the planning application. The assessment of impact on utilities is considered with respect to the availability and capacity within the utility network(s) and consultation with ESB Networks, Telecommunication Companies and Uisce Éireann.

14.2.1 Forecasting Methods and Difficulties Encountered

Compiling the material assets (utilities) chapter of an EIAR can be a complex process, especially when it involves ongoing consultations with various service providers like Uisce Éireann, EirGrid, ESB Networks, and other relevant entities within the locality.

The finalisation of agreements related to utilities may only be concluded at the connection agreement stage after planning permission has been granted. This introduces an additional layer of complexity, as the terms and conditions of these agreements may not be fully known until later stages of the project, potentially impacting the accuracy and completeness of the assessment.

14.3 Receiving Environment

Land Use, Property and Access

The land designated for this development spans approximately 0.88 hectares. The development site is presently occupied by the Citigroup Building, a six-storey, over-one-storey-basement office building, which shall be partially demolished (c. 33% floor area) as part of the Proposed Development. The office building is currently still in use. The immediate vicinity surrounding the proposed site shares a similar landscape, with existing commercial and residential buildings adjoin the site to the north and east.

The subject site falls into the River Liffey Conservation Area (CA), as the River Liffey is located immediately south of the proposed site.

The existing one-storey basement is accessible to vehicles via the car ramp on Clarion Quay.

The Dublin City Development Plan 2022 - 2028 zoning designations have been reviewed. The Proposed Development is located within lands designated Zone Z5 – City Centre, a zoning to consolidate and facilitate the development of the central area, and to identify, reinforce, strengthen and protect its civic design character and dignity.

The proposed use is permitted under this zoning designation in the DCC Development Plan 2022 – 2028. Chapter 14 of the DCC Development Plan 2022-2028 states that 'Ideally, a mix of uses should occur both vertically through the floors of buildings as well as horizontally along the street frontage' – this landmark office development will contribute to the vertical expansion of the city.

14.3.1.1.1 Power and Electrical Supply

The existing site is served by the electrical network. There are existing substations on Commons Street and Clarion Quay respectively, directly adjacent to the development site.

14.3.1.1.2 Telecommunications

There are telecommunication lines in existence for telephone and broadband services in the area and fibre provisions for the Proposed Development. Connections will be made to the existing services locally.

14.3.1.1.3 Surface Water Infrastructure

As outlined in the Engineering Services Report (CS Consulting, 2023) (included with the planning application documentation), Uisce Éireann drainage and supply records indicate that the following relevant existing drainage infrastructure elements are in place surrounding the development site:

- An existing 375mm vitrified clay combined sewer running east to west in North Wall Quay, along the development site's southern boundary. This combined sewer turns north at the junction of North Wall Quay and Commons Street and continues to flow northward along the development's western boundary.
- An existing 225mm concrete foul sewer to the east and north of the development's site boundary.
- An existing 375mm storm sewer running west to east in North Wall Quay, along development site's southern boundary. This sewer connects to an existing 1870 brick storm sewer at the junction of North Wall Quay and Commons Street, which discharges into River Liffey. In addition, there is also an existing 525mm concrete storm sewer running east to west and then turning northwards in Clarion Quay along development site's northern boundary.

Hydraulic performance maps prepared by Dublin City Council as part of the 2005 Greater Dublin Strategic Drainage Study (GDSDS) indicate that the existing public combined sewers on North Wall Quay is under hydraulic pressure in the 2031 modelling scenario, surcharging for 1-year and 2-year storm events.

For further details on the existing stormwater infrastructure see the Engineering Services Report (CS Consulting, 2023) included with the planning application documentation.

14.3.1.1.4 Foul Drainage Infrastructure

Uisce Éireann drainage and supply records provided by Dublin City Council indicate that the following relevant existing drainage infrastructure elements are in place surrounding the development site:

- An existing 375mm vitrified clay combined sewer running east to west in North Wall Quay, along the development site's southern boundary. This combined sewer turns north at the junction of North Wall Quay and Commons Street and continues to flow northward along the development's western boundary.
- An existing 225mm concrete foul sewer to the east and north of the development's site boundary.
- An existing 375mm storm sewer running west to east in North Wall Quay, along development site's southern boundary. This sewer connects to an existing 1870 brick storm sewer at the junction of North Wall Quay and Commons Street, which ultimately discharges into River Liffey. In addition, there is also an existing 525mm concrete storm sewer running east to west and then turning northwards in Clarion Quay along development site's northern boundary.

As per the Engineering Services Report (CS Consulting, 2023), the foul sewer in Clarion Quay joins a 375mm diameter foul sewer flowing east to west in Mayor Street Lower, which in turn joins the combined sewer in North Wall Quay. This discharges to the Mayor Street Wastewater Pumping Station (WwPS), from which all effluent ultimately reaches the Ringsend Wastewater Treatment Plant (WwTP).

14.3.1.1.5 Potable Water Supply

As outlined in the CS Consulting Engineering Services Report (2023) (included with the application documentation), Uisce Éireann Drainage Records indicates an existing 200mm ductile iron and an existing 600mm cast-iron watermains along North Wall Quay to the development's site southern boundary. The records also indicate an existing 6-inch (150mm approx.) diameter cast-iron watermain is in place in Commons Street as well as the existing 150mm ductile iron watermain in place in Clarion Quay along the western and northern boundaries of the development site, respectively.

For further details on the existing potable water infrastructure see the Engineering Services Report (CS Consulting, 2023) included with the planning application documentation.

14.3.1.1.6 Natural Gas

The site currently has a gas connection, although this will not be required for the Proposed Development.

14.4 Characteristics of the Proposed Development

This section describes the built services and infrastructure for the Proposed Development during both construction and operation are described below.

Chapter 2 provides a detailed overview of the lifecycle of the project, including reference to the architectural and civil engineering, drawings, plans, reports, and other relevant document to define the Proposed Development.

14.4.1 Construction Phase

14.4.1.1.1 Land Use, Property, and Access

The Proposed Development site covers an area of c. 0.88 hectares.

In the development's construction phase, vehicular access to the development site is expected to be via a dedicated temporary access on Commons Street, at the site's western boundary. This access shall serve during all demolition, clearance, piling, excavation, and construction works.

Revised access measures may be developed further as part of the final Construction Traffic Management Plan (CTMP) to be prepared by the lead Contractor.

All HGV construction traffic to and from the site will follow a designated route, ensuring that heavy construction vehicles avoid sensitive streets to the greatest extent possible and travel as little as possible within the city centre. Subject to final agreement between the lead Contractor and DCC (as part of the Contractor's final Construction Traffic Management Plan), this designated route will require heavy construction vehicles travelling to and from the site to arrive and depart from/to the M50 motorway (Dublin Tunnel) via the north quays, as shown in Figure 4 of the Traffic and Transport Assessment (CS Consulting, 2025).

Due to the location and restricted nature of the site, it has been assumed for assessment purposes that a maximum of 10no. car parking spaces will be provided on-site for construction personnel. Construction personnel shall be encouraged to use public transport and information on local transportation will be published on site

Access arrangements and potential traffic safety impacts are considered in Chapter 12 (Traffic and Transportation) and the Traffic and Transport Assessment (CS Consulting, 2025) included with the planning documentation.

14.4.1.1.2 Power and Electrical Supply and Telecommunications

During construction, contractors will require temporary power for onsite accommodation, and construction equipment /plant. The power requirements will be relatively minor.

Electricity will be provided to the site via the national grid, subject to the restrictions and requirements of ESB Networks.

Construction plant shall be powered by mains electricity wherever possible, rather than by generators.

14.4.1.1.3 Telecommunications

The construction site will require internet phone connectivity for external communication with clients, contractors, and suppliers. Mobile phones are expected to be used for this purpose. Internet connectivity will be achieved through the use of wireless networks.

This will involve installing additional chambers and ducts on the Common's road, North Wall Quay and on Clarion road.

14.4.1.1.4 Surface Water Infrastructure

Included in this application is the Surface Water Management Plan and the Outline Construction Management Plan (oCMP) (CS Consulting, 2025). for further details on stormwater management during construction phase. A detailed CMP will be developed by the Applicant and the construction contractor prior to commencement of construction. The CMP will incorporate mitigation measures outlined in the EIA report as they relate to the construction phase.

Surface water discharge from the site will be managed and controlled for the duration of the construction works until the permanently attenuated surface water drainage system of the proposed site is complete. The lead Contractor will be required to secure a Trade Effluent Licence from Uisce Éireann, permitting the discharge of pumped groundwater to the public drainage network.

Measures will be employed to protect surface water in the receiving environment during construction, and to prevent its contamination by direct run-off or by infiltration from the development site. An Emergency Response Plan shall be prepared, and procedures outlined in a discharge licence will be followed. Measures have been included in the Outline Construction Management Plan prepared by CS Consulting (2024) to address the following:

- Overground oil/diesel storage
- Refuelling
- Concrete preparation, placement, and washout
- Soil movement
- Groundwater management
- Disposal of wastewater off site
- Road sweepers/cleaning
- Maintenance of existing gullies

During construction run-off from excavations/earthworks cannot be prevented entirely and is largely a function of prevailing weather conditions.

14.4.1.1.5 Foul Drainage Infrastructure

Welfare facilities will be provided for the construction workers on site during the construction works. It is anticipated that for the initial stages of construction portable sanitary facilities will be provided. The facilities will need to have the foul water collected by a licensed waste sewerage contractor. Wastewater will be disposed of off-site in an appropriate manner and in accordance with the relevant statutory regulations, to prevent the pollution of watercourses. A temporary connection for foul water drainage will be made to the public network. The locations and size of the temporary connection will be determined through consultation with Uisce Éireann and DCC and shall be subject to any restrictions and requirements they may impose.

14.4.1.1.6 Potable Water Supply

The Main Contractor will require a water source for the duration of the construction works. Water will be required for welfare facilities, dust suppression and general construction activities. For the construction

phase, water supply to the site will be provided by means of a temporary connection to the public watermain.

14.4.1.1.7 Natural Gas

A connection to the natural gas mains is not required for the construction phase of the Proposed Development.

14.4.2 Operational Phase

14.4.2.1.1 Land Use, Property, and Access

The Proposed Development will deliver on the Z5 zoning objective of the site, which has a zoning objective 'to consolidate and facilitate the development of the central area, and to identify, reinforce, strengthen, and protect its civic design character and dignity'.

The proposed development will provide 32no. car parking spaces internally, at basement level -1. No other access for motor vehicles to the interior of the development is required or proposed, with the exception of scheduled visits by smaller servicing vehicles. Vehicular access to the basement car park shall be via the existing ramp from Clarion Quay, which shall be retained.

Pedestrian access to the proposed development shall principally be via 4no. pedestrian entrances on North Wall Quay, at the development site's southern boundary.

The development shall include a total of 744no. bicycle parking spaces, comprising 718no. long-term bicycle parking spaces for staff and 26no. publicly accessible short-stay bicycle parking spaces for visitors. The development's long-term bicycle parking is provided in secure dedicated bicycle stores located at basement level -1, accessed via internal lifts from ground floor level.

Existing pedestrian facilities on North Wall Quay, Commons Street and Excise Walk and neighbouring streets in the vicinity of the development site are of good quality and condition, with raised footpaths, public lighting and signal-controlled pedestrian crossings are present at all nearby major junctions and at intermediate points along the Quays. Two bridges across the Liffey are within a 5-minute walk, one of which carries only pedestrian traffic.

Access arrangements and potential traffic safety impacts are considered in Chapter 12 (Traffic and Transportation) and the Traffic and Transport Assessment (CS Consulting, 2025) included with the planning documentation.

14.4.2.1.2 Power and Electrical Supply and Telecommunications

Once in operation, electricity will be provided to the site via the national grid tying in with existing infrastructure. New electricity and services infrastructure will be put in place to serve the Proposed Development.

The combined electrical load for the development is estimated to be c. 5MW.

A full connection application will be submitted to ESB following planning permission being received for the Proposed Development.

14.4.2.1.3 Telecommunications

As outlined in the Telecommunications Assessment conducted by ISM and submitted with the planning application, it is proposed to install 4 no. support poles, affixed to ballast mounts within the designated plant area on both Blocks A & B, to provide an adequate allowance for the retention of the 3No. identified Microwave links that will be impacted by the Development.

Given the central positioning of the Proposed Development, several telecom providers operate in the vicinity of the site. The existing telecom ducts will undergo expansion to incorporate the site, necessitating the installation of extra chambers and ducts along Common's Road, North Wall Quay, and Clarion Road.

This will be carried out in accordance with the requirements of the various service providers / authorities.

14.4.2.1.4 Surface Water Infrastructure

Please refer to CS Consulting drawing no. 1NWQ-CSC-ZZ-00-DR-C-0104 and 1NWQ-CSC-ZZ-B1-DR-C-0105, for details of the proposed surface water drainage network layout and connections.

The proposed stormwater drainage arrangements have been designed in accordance with Part H of the Building Regulations 2010, the Greater Dublin Regional Code of Practice for Drainage Works (Version 6), and the Greater Dublin Strategic Drainage Study (GDSDS).

14.4.2.1.5 Foul Drainage Infrastructure

As detailed in the Engineering Services Report (CS Consulting, 2025) It is proposed to discharge all foul effluent from the Proposed Development's ground floor and upper storeys by gravity to the existing 375mm combined sewer on Commons Street, as recommended by Uisce Éireann in its Confirmation of Feasibility.

The last private manhole within the site shall be in accordance with DCC and Uisce Éireann requirements and accessible for maintenance purposes.

All water drained from the development's basement levels, shall drain to an internal pumping chamber at the basement level. From here, it shall be pumped via a rising main to the development's stand-off manhole at the ground level, and subsequently discharged by gravity into the existing 375mm combined sewer on Commons Street.

An oil separator shall be installed prior to the inlet of the internal pumping chamber that collects runoff from the internal car parking areas.

Estimated foul water flows from the site have been calculated in accordance with The proposed foul drainage arrangements have been designed in accordance with Part H of the Building Regulations 2010, the Greater Dublin Regional Code of Practice for Drainage Works (Version 6), the Greater Dublin Strategic Drainage Study (GDSDS), Uisce Éireann Code of Practice for Wastewater Infrastructure and the Regional Code of Practice Drainage Works.

Based on the development's calculated design population of 3,641 no. people, the peak effluent flow (Design Flow) has been calculated to be 9.481 litres per second (detailed calculations can be seen in the Engineering Services Report, CS Consulting, 2025).

A Pre-Connection Enquiry (CDS23006147) was submitted to Uisce Éireann in 2023. A Confirmation of Feasibility was received from Uisce Éireann in October 2023 as response.

Please refer to CS Consulting drawings nos. 1NWQ-CSC-ZZ-00-DR-C-0104 and 1NWQ-CSC-ZZ-B1-DR-C-0105 , included with this application, for details of the proposed foul drainage network layout.

14.4.2.1.6 Potable Water Supply

It is proposed to supply the development with potable water via a new 150mm diameter connection to the existing 150mm diameter ductile iron watermain in Clarion Quay, at the development site's north-eastern boundary, as recommended by Uisce Éireann in its Confirmation of Feasibility (CoF). Refer to CS Consulting drawing no. 1NWQ-CSC-ZZ-00-DR-C-0108 for details of the development's proposed water supply connection, which has been designed in accordance with the Uisce Éireann Code of Practice for Water Infrastructure.

The water metering arrangements at the connection location will be enhanced to align with Uisce Éireann criteria. A bulk water meter will be installed at the connection point to the public watermain at the development entrance, adhering to Uisce Éireann requirements. Water demand calculations have been conducted in accordance with the current Uisce Éireann Code of Practice.

The maximum average potable water demand was calculated as 2.107 l/s, with a peak demand of 10.535 l/s, as detailed in the calculations shown in the Engineering Services Report (CS Consulting, 2025).

14.4.2.1.7 Natural Gas

Upon receiving planning permission, an application to remove gas services from the site will be submitted to Gas Networks Ireland.

14.4.3 Do-Nothing Scenario

In the event that the Proposed Development does not proceed, the specific need for this building would still exist for the intended occupier, and as such the Proposed Development would need to be built elsewhere. The Proposed Development lands would remain as is, i.e. with the existing office building on the site.

14.4.4 Decommissioning

Should the site be decommissioned it is likely that the building will be redeveloped for an alternative use. Any change to design will have to be undertaken in compliance with planning requirements and an EIA undertaken if required.

14.5 Potential Impacts of the Proposed Development

14.5.1 Construction Phase

14.5.1.1.1 Land Use, Property, and Access

The Proposed Development will result in the partial demolition of an existing office building and the construction of a new 12 no. storey development.

To minimise nuisance for neighbouring properties, the Outline Construction Management Plan (OCMP) prepared by CS Consulting will be implemented and adhered to by the construction Contractor and will be overseen and updated as required if site conditions change by the Project Manager, Environmental Manager, Resource Manager, and Ecological Clerk of Works where relevant.

All mitigation measures outlined within this EIAR, and within the OCMP will be implemented during the construction phase. The construction contractor will update this CMP/CEMP to include any additional mitigation required to ensure compliance with any subsequent planning conditions relevant to the Proposed Development.

The potential impact associated with land use, property, and access for the construction phase will be, ***negative, not significant,*** and ***short term.***

14.5.1.1.2 Power and Electrical Supply and Telecommunications

Any excavations within the vicinity of existing electrical services will be carried out in consultation with ESB Networks to ensure there is no impact on existing users. The electrical connection should have no disruptions to the national grid during connection works.

All utilities work shall be carried out in accordance with the relevant requirements of the respective service providers. These works will be carried out in a manner that is safe, and which minimises interruptions of service which might affect residents and businesses, and adjacent developments.

The potential impact associated with power and electrical supply for the construction phase in the absence of mitigation measures will be a ***negative, not significant,*** and ***short term***.

14.5.1.1.3 Telecommunications

The use of telecom lines will not be required during the construction phase. The locations of existing services (underground and overhead, where applicable) will be confirmed prior to the commencement of on-site works. The connection into the wider telecommunications network will be undertaken by a statutory telecommunications operator.

The potential impact on telecommunications infrastructure during the construction phase in the absence of mitigation measures is ***neutral, not significant,*** and ***short term.***

14.5.1.1.4 Surface Water Infrastructure

During the construction phase, there is potential for rainfall run-off and dewatering water during the construction phase may contain increased silt levels or otherwise become polluted from construction activities. Suspended solids in runoff water may result in an increase in suspended sediment load, resulting in increased turbidity, which may in turn impact on local infiltration capacity, or downstream infrastructure or watercourses.

The potential impact of this is a possible increase surface water run-off and sediment loading which could potentially overwhelm existing drainage systems, leading to localized flooding. Run-off containing substantial amounts of silt can cause damage to surface water networks.

The potential impact on surface water networks during the construction phase in the absence of mitigation measures is ***negative, slight,*** and ***short term.***

14.5.1.1.5 Foul Drainage Infrastructure

Welfare facilities will be provided for the construction workers on site during the construction works; foul effluent will be appropriately managed and treated off site. The works contractor will be obliged to comply with any conditions of a temporary connection agreement with Uisce Éireann, if required, to control discharge quality and rate of flow and remove any wastewater collected on site.

The potential impact on foul drainage for the construction phase is ***negative, not significant,*** and ***short term.***

14.5.1.1.6 Potable Water Supply

The water demand during the construction phase will not be significant enough to affect existing pressures. The potential impact on potable water supplies and infrastructure during the construction phase is ***negative, imperceptible,*** and ***short term.***

14.5.1.1.7 Natural Gas

There is no requirement for natural gas connection, therefore during the construction phase there is no potential impact.

14.5.2 Operational Phase

14.5.2.1.1 Land Use, Property, and Access

During the operational phase the Proposed Development is not anticipated to generate significant air (including odour), noise, water emissions or traffic impacts during normal operating conditions; these have been discussed further in the respective EIAR chapters, Chapter 6 (Hydrology), Chapter 8 (Air Quality and Climate) Chapter 10 (Noise and Vibration), and Chapter 12 (Traffic and Transportation).

The Proposed Development is consistent with the zoning of these lands.

The overall potential impact associated with land use, property, and access during the operational phase will be localised ***neutral, not significant,*** and ***long term.***

14.5.2.1.2 Power and Electrical Supply and Telecommunications

Once the Proposed Development is operational, electricity will be provided to the site via the national grid tying in with existing infrastructure in neighbouring areas, thus, the Proposed Development will increase the demand on existing power and electrical utilities. As detailed in Chapter 2 (Section 2.5.5) sustainable energy measures including PV (Photovoltaics) on the roof have been considered and incorporated into the design of the Proposed Development. The PV will reduce demand and effects on the mains network. Excess power generated from on-site PV has the potential to be feed back onto the electrical grid.

Maintenance of power and electrical utilities infrastructure on the site during the operational phase will be carried out in accordance with the relevant requirements of the utility supplier.

Based on these discussions on availability of supply, there is a ***neutral, slight,*** and ***long term*** effect on electrical supply during the operational phase of the Proposed Development.

14.5.2.1.3 Telecommunications

ISM's Telecommunication Assessment (2025) conclude that the proposal being made by the Applicant within its submission to Dublin City Council allows for the retention of important Telecommunication Channels, such as Microwave links, to satisfy both the criteria of Section 3.2 of the Building Height Guidelines(2018) and Objective 5, within Table 4 of Appendix 3 of the Dublin City Council Development Plan2022-2028.

There will be an increase in demand on the local telecommunications network during the operation phase. Connections will be made to the existing services locally. This will be carried out in accordance with the requirements of the various service providers / authorities.

The connection into the wider telecommunications network will be undertaken by a statutory telecommunications operator. The potential impact on telecommunications infrastructure for the operational phase is ***neutral, imperceptible*** and ***long term.***

14.5.2.1.4 Surface Water Infrastructure

During operation, the primary risk of water quality impact is surface water runoff from roads, car parking and hardstand areas which can potentially contain elevated levels of contaminants such as hydrocarbons.

The potential impacts during the operational phase on surface water quality are ***neutral, imperceptible,*** and ***long-term.***

14.5.2.1.5 Foul Drainage Infrastructure

Foul water will be discharged in accordance with Uisce Éireann licence requirements. Considering the design of the wastewater infrastructure on and off site, the impact is expected to be ***neutral, imperceptible,*** and ***long-term.***

14.5.2.1.6 Potable Water Supply

The Proposed Development has considered the sustainable use of water within its design. Water saving devices are considered for use within the Proposed Development units, to conserve the use of water, as part of the internal fit-out. A bulk water meter is to be provided at the connection to the public watermain, at the development entrance. All metering is to be provided in accordance with Uisce Éireann'ss requirements.

Based on the feasibility of connection issued by Uisce Éireann, the potential impact on potable water infrastructure for the operational phase is ***neutral, imperceptible,*** and ***long term***.

14.5.2.1.7 Natural Gas

There is no requirement for natural gas connection, therefore during the operational phase there is no potential impact.

14.6 Mitigation Measures

14.6.1 Construction Phase

Consultation with Dublin City Council, Uisce Éireann, EirGrid, ESB Networks and other relevant service providers within the locality and compliance with any requirements or guidelines they may have will ensure a smooth construction schedule without disruption to local and business community. The works contractor will be obliged to put best practice measures in place to ensure, any planned interruptions are agreed in advance with the utilities suppliers.

The construction contractor will employ strict quality control measures will be undertaken while laying pipes and utilities to minimise or eradicate infiltration and ex-filtration.

Prior to commencing any construction activities, the contractor shall conduct a comprehensive utility locating survey using advanced technologies such as ground-penetrating radar (GPR) and electromagnetic induction methods. This survey will accurately identify the location and depth of all existing underground services, including high voltage (HV) cables, water and gas pipelines, and telecommunication lines. Based on the results of the utility locating survey, exclusion zones will be demarcated around identified utilities. These zones will indicate areas where construction activities are restricted or subject to specific safety protocols.

CS Consulting have prepared a Outline Construction Management Plan (OCMP) (2024) which is included with the planning application documentation. This outlines the construction techniques and methodologies which will be implemented during construction of the Proposed Development. The mitigation measures set out in this EIAR and the OCMP will be implemented and adhered to by the construction contractor and will be overseen and updated as required if site conditions change by the Project Manager, Environmental Manager, Resource Manager and Ecological Clerk of Works where relevant. All personnel working on the Site will be trained in the implementation of the procedures. The construction contractor will provide a detailed Construction Environmental Management Plan (CEMP) that will include any subsequent planning conditions relevant to the Proposed Development and set out further detail of the overarching vision of how the construction Contractor of the Proposed Development manage the Site in a safe and organised manner.

14.6.2 Operational Phase

A Pre-Connection Enquiry (CDS23006147) was submitted to Uisce Éireann in 2023 on the basis of an office development with a design population of 4,923 people on the subject site. A Confirmation of Feasibility was received in response, stating that a wastewater connection to the public system was feasible subject to upgrades and a potable water connection to the public system was feasible without infrastructure upgrade by Uisce Éireann.

The Proposed Development stormwater drainage network design includes sustainable drainage systems (SuDS) these measures by design ensure the stormwater leaving the site is of a suitable quality.

Water metering arrangements are to be implemented at the potable water connection location, in line with Uisce Éireann standards.

Any necessary maintenance or upgrades of on-site utilities infrastructure during the operational phase of the Proposed Development will be carried out in accordance with the specifications of the relevant service providers and facilitated by facilities management.

14.7 Monitoring or Reinstatement Measures

No additional monitoring or reinstatement is required.

14.8 Residual Effects of the Proposed Development

14.8.1 Construction Phase

The works contractor will be obliged to put best practice measures in place and work in accordance with the CEMP. The implementation of mitigation measures within each chapter of this EIA and measures detailed in Section 14.6.1 of this chapter will ensure that the residual impacts on the material assets considered in this chapter during the construction phase will be ***neutral, not significant,*** and ***short term***.

14.8.2 Operational Phase

The Proposed Development requires electrical power, water supply and connection to the stormwater and foul water networks, respectively.

The implementation of mitigation measures within each chapter of this EIA and detailed in Section 14.6.2 of this chapter will ensure that the residual impacts on the material assets considered in this chapter during the operational phase will be ***neutral, imperceptible,*** and ***long-term***.

14.9 Cumulative Impacts of the Proposed Development

The cumulative impact of the Proposed Development with any relevant other planned or permitted developments are discussed below. For details on the developments considered for cumulative impacts refer to Chapter 2 and Appendix 2.1 of this EIAR.

14.9.1 Construction Phase

The Proposed Development entails minimal use of public material assets (utilities) during construction therefore there is limited opportunity for the causation of cumulative impacts during the construction phase of the Proposed Development in combination with other planned or permitted developments (as described in Chapter 2).

This list of developments (Chapter 2, Appendix 2.1 of this EIAR) have been reviewed all developments are capable of combining with the Proposed Development and resulting cumulative effects on material assets. Coordination and consultation will be had between the construction contractor and relevant service providers within the locality to facility the Proposed Development. The Proposed Development will be in accordance with the requirements of statutory providers for electrical infrastructure, surface water drainage, foul drainage, and water infrastructure.

The implementation of mitigation measures during construction works as well as the compliance of adjacent development with their respective agreement with network providers (Uisce Éireann, ESB, and Telecoms) means that the Proposed Development in combination with other exiting and permitted development is not likely to result in prolonged utility disruption; notable extra demand on a utility; or medium-term disruption to a significant piece of infrastructure. It is unlikely that there will be significant cumulative effects with other planned or permitted developments (as described in Chapter 2).

The residual cumulative effects on the material assets during the construction phase for the Proposed Development will be ***negative, not significant,*** and ***short-term.***

14.9.2 Operational Phase

The Proposed Development and all permitted developments considered are required to engage with DCC, Uisce Éireann and ESB to ensure that there is sufficient capacity to cater for the increase in water, wastewater, and electricity requirements.

This list of developments (Chapter 2, Appendix 2.1 of this EIAR) have been reviewed all developments are capable of combining with the Proposed Development and resulting cumulative effects on material assets.

Consultations have been undertaken with Uisce Éireann, no significant supply constraints have been identified for development at this location. Consultation will take place with DCC and ESB subject to the grant of the planning application associated with the Propose Development. These National Authorities in considering future connections, take into consideration the environmental impacts of planned developments within the wider network. In developing long term plans for security of supply, these National Authorities for water and energy supply are required to develop resources in compliance with sustainable environmental planning. Therefore, the Proposed Development in combination with other exiting and permitted development is not likely to result in prolonged utility disruption; notable extra demand on a utility; or medium-term disruption to a significant piece of infrastructure. As such, there will therefore be no significant effects on material assets to the wider economy or environment.

Based on the above, it is predicted that the cumulative effects of the Proposed Development with other permitted, planned, and existing developments is, ***neutral, imperceptible,*** and ***long-term*** and during the operational phase.

Chapter 15 – Interactions

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15. INTERACTIONS

15.1 Introduction

This chapter of the EIA Report addresses potential interactions and inter-relationships between the environmental factors discussed in the preceding chapters. This covers both the construction and operational phase of the Proposed Development.

This chapter has been produced following the guidance within, the EIA Directive, the *Planning and Development Act 2000* (as amended), the EPA *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* 2022. Directive 2011/92/EU, as amended by Directive 2014/52/EU, and section 171A of the Planning and Development Act, as amended, both provide that an EIA shall identify, describe and assess in an appropriate manner, in the light of each individual case, the interaction between the following factors:

- Human beings, fauna and flora population and human health;
- Biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC;
- Land, soil, water, air and climate and landscape;
- Material assets, cultural heritage and the landscape.

In accordance with the guidance, not only are the individual significant impacts required to be considered when assessing the impact of a development on the environment, but also the interactions and interrelationships between these environmental factors be identified and assessed. The interactions and interrelationships between the environmental factors have been considered under the subheadings as set out in the EIA Report.

The quality, magnitude and duration of potential impacts are defined in accordance with the criteria provided in the EPA 2022 Guidance as outlined in Chapter 1 (Introduction). This section of the assessment presents a summary and assessment of the identified interactions.

15.2 Population and Human Health and its Interaction with:

15.2.1 Land, Soils, Geology, and Hydrogeology

Construction Phase

The Proposed Development land use is permitted under the lands' zoning designation in the DCC Development Plan 2022 – 2028. Chapter 14 of the DCC Development Plan 2022-2028 states that for lands zoned as Z5-City Centre, '*Ideally, a mix of uses should occur both vertically through the floors of buildings as well as horizontally along the street frontage.'* This office development will contribute to the vertical expansion of the city while maintain consistency with the civic design character of Dublin City Centre.

If contaminated material is encountered it will be required to be removed and disposed by a licenced contractor to an appropriate waste facility. Material that is exported from site, if not correctly managed or handled, could impact negatively on human beings (onsite and offsite) as well as water and soil environments. Construction of the Proposed Development will not impact on any domestic wells or any groundwater protection areas.

Taking into account the design and mitigation measures set out in Chapter 5 of this EIA Report, there is no potential for negative interaction between Population and Human Health, and Land, Soils, Geology and Hydrogeology during the construction phase. The interaction is considered to be ***neutral***, ***imperceptible***, and ***short term***.

Operational Phase

There are no potentially significant interactions identified between Human Health and Populations, and Land, Soils, Geology and Hydrogeology during the operational phase.

15.2.2 Hydrology

Construction Phase

The construction phase of the Proposed Development has the potential to impact (without mitigation) on the water quality via unmitigated pollutants entering the Liffey Estuary. Potential pollutants include increased suspended solids, concrete washout through accidental spillage, hydrocarbons and other ecotoxic chemicals through accidental spillage and wastewater through accidental discharge. These have the potential to interact negatively on human health, if downstream watercourses are used for water supply or recreational use, although this is not the case for the Liffey Estuary.

Taking into account the design and mitigation measures set out in Chapter 6 of this EIA Report, there is no potential for negative interaction between Human Health and Populations, and Hydrology during the construction phase. The interaction is considered to be ***neutral, imperceptible*** and ***short-term.***

Operational Phase

A reduction in water quality via unmitigated pollutants entering the Liffey Estuary has the potential to lead to negative impacts on human health and populations. Hydrocarbons and petroleum products for example have the greatest risk for human health when they are in drinking water. However, it is noted that there are no recorded Recreational Waters, Bathing Waterbodies, or Surface Water Drinking RPA, located downstream in the Liffey Estuary.

The potential for unmitigated off-site flooding as a result of the proposed hardstanding areas, and due to the flood risk at the site the Proposed Development has the potential to impact on human health, populations, and material assets located downstream of the site. However, adequate mitigation and sustainable urban drainage systems to attenuate stormwater is designed into the development and will mitigate this risk.

Taking into account the design and mitigation measures set out in Chapter 6 of this EIA Report, there is no potential for negative interaction between Human Health and Populations, and Hydrology during the operational phase. The interaction is considered to be ***neutral, imperceptible,*** and ***long term.***

15.2.3 Biodiversity

Construction Phase

There are no potentially significant interactions identified between Human Health and Populations, and Biodiversity during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Human Health and Populations, and Biodiversity during the operational phase.

15.2.4 Air Quality and Climate

Construction Phase

There is a low risk of dust-related human health impacts during the construction phase of the Proposed Development. As a result, best practice mitigation measures will be put in place during the construction

of the Proposed Development (as outlined in Chapter 8) to ensure that the impact of the Proposed Development complies with all ambient air quality legislative limits.

Taking into account the design and mitigation measures set out in Chapter 8 of this EIA Report, there is no potential for negative interaction between Human Health and Populations, and Air Quality and Climate during the construction phase. The interaction is considered to be ***short-term, direct, negative, imperceptible***.

Operational Phase

There are no potentially significant interactions identified between Human Health and Populations, and Air Quality and Climate during the operational phase.

15.2.5 Noise and Vibration

Construction Phase

As detailed in Chapter 10 (Noise and Vibration), during the construction phase of the project there is the potential for short-term noise impacts on nearby noise sensitive properties due to noise emissions from site activities. The application of binding noise limits and hours of operation, along with implementation of appropriate noise and vibration control measures, will ensure that noise and vibration impact is kept to a minimum as far as practicable.

Taking into account the design and mitigation measures set out in Chapter 10 of this EIA Report, there is potential for negative interaction between Human Health and Populations, and Noise and Vibration during the construction phase. The interaction is considered to be ***negative, moderate*** to ***significant*** and ***short term impact*** at the nearest sensitive receptors.

Operational Phase

There are no potentially significant interactions identified between Population and Human Health, and Noise and Vibration during the operational phase.

15.2.6 Landscape and Visual Impacts

Construction Phase

The physical construction stage works will have an impact on the landscape in the immediate context of the Proposed Development. The mitigation measures set out in Volume 3 (Townscape, Heritage, Landscape and Visual Impact Assessment) of this EIAR are likely to have the greatest effect in the areas closer to the site, where hoarding would screen views of the construction activities related to the lower elements of the Proposed Development.

Taking into account the design and mitigation measures set out in Volume 3 (Townscape, Heritage, Landscape and Visual Impact Assessment) of this EIA Report, there is potential for negative interaction between Human Health and Populations, and Landscape and Visuals during the construction phase. The interaction is considered to be ***negative, not significant,*** and ***short term***.

Operational Phase

The high quality design of the Proposed Development ensures that it is likely to complement and enhance the character, legibility and connectivity of the North Wall Quay area, and it is considered that the Proposed Development would add interest to North Wall Quay's regenerated waterfront.

Taking into account the design and mitigation measures set out in Volume 2 (Heritage, Townscape, Landscape and Visual Impact Assessment) of this EIA Report, there is potential for interactions between

Human Health and Populations, and Landscape and Visual Impact during the operational phase. The interaction is considered to be ***permanent*** and range from ***neutral*** (the significance of ***neutral*** impacts are ***imperceptible*** to ***moderate***) to ***positive*** (the significance of ***positive*** impacts are ***slight*** to ***substantial***).

15.2.7 Archaeological, Architectural, and Cultural Heritage

Construction Phase

There are no potentially significant interactions identified between Population and Human Health, and Archaeological, Architectural and Cultural Heritage during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Population and Human Health, and Archaeological, Architectural and Cultural Heritage during the operational phase.

15.2.8 Material Assets, including Utilities, Waste Management, and Transport

Construction Phase

Construction phase impacts to human health as a result of waste are primarily associated the indirect effect of litter issues resulting in increase in vermin. Mismanagement of demolition and soil material can potentially lead to air / dust impacts. There are all also potential risks to human health associated with accidents when handling and transporting earthworks and wastes.

The Proposed Development will have an impact on material assets such as water supply, power supply and road infrastructure. The individual chapters of this EIA Report Chapters 12, 13, and 14 (Traffic and Transportation; Waste Management; and Material Assets - Utilities) have assessed the capacities of the available infrastructure to accommodate the Proposed Development and the implementation of the mitigation measure proposed in these chapters will ensure there are no residual negative impacts on the local population.

Taking into account the design and mitigation measures set out in Chapters 12, 13, and 14 (Traffic and Transportation; Waste Management; and Material Assets - Utilities) of this EIA Report, there is no potential for negative interaction between Human Health and Populations, and Material Assets during the construction phase. The interaction is considered to be ***neutral, not significant,*** and ***short-term.***

Operational Phase

Similar risks to those described above for the construction phase associated with improper waste management during the operational phase could lead to litter and associated vermin. There is the potential risks when untrained staff and waste contractors use waste equipment or move waste receptacles improperly.

The Proposed Development will have a demand on material assets such as surface water drainage, water supply, wastewater drainage, power supply and road infrastructure. Chapters 12, 13, and 14 (Traffic and Transportation; Waste Management; and Material Assets - Utilities) have reviewed the capacities of the available infrastructure to accommodate the Proposed Development and the implementation of the mitigation measure proposed in these chapters will ensure there are no residual negative impacts on the local population.

Taking into account the design and mitigation measures set out in Chapters 12, 13, and 14 (Traffic and Transportation; Waste Management; and Material Assets - Utilities) of this EIA Report, there is no potential for negative interaction between Human Health and Populations, and Material Assets during the operational phase. The interaction is considered to be ***neutral, not significant*** and ***long term***.

15.3 Land, Soils, Geology, and Hydrology and its Interaction with:

15.3.1 Hydrology:

Construction Phase

The construction phase of the Proposed Development has the potential for contaminated run-off from accidental leakages and discharges to ground which has the potential to result in a local impact on soil and water quality, which could then migrate. The proposed construction phase mitigation means that the Proposed Development will not result in significant negative impact on surface water quality in the local area.

Taking into account the design and mitigation measures set out in Chapter 5 and 6 of this EIA Report, there is a residual negative interaction between Land, Soil, Geology and Hydrogeology and Hydrology during the construction phase. The interaction is considered to be ***neutral***, ***imperceptible*** and ***short term***.

Operational Phase

The development site and its surrounding area have in their recent history generally comprised impermeable surfaces, with minimal opportunity for direct infiltration of surface water to ground.

There are therefore no potentially significant interactions identified between Land, Soils, Geology and Hydrogeology, and Hydrology during the operational phase.

15.3.2 Biodiversity:

Construction Phase

The construction phase of the Proposed Development has the potential for contaminated run-off from accidental leakages to contaminate soil and groundwater, enter the watercourse and impact on local biodiversity and European Sites downstream. Furthermore, dust emissions from exposed earthworks has the potential to settle on plants causing impacts to local ecology.

Taking into account the design and mitigation measures set out in Chapters 5 and 7 of this EIA Report, there remains a residual negative interaction between Land, Soil, and Biodiversity during the construction phase. The interaction is considered to be ***negative***, ***not significant***, and ***short term***.

Operational Phase

There are no potentially significant interactions identified between Land, Soils and Hydrogeology, and Biodiversity during the operational phase.

15.3.3 Air Quality and Climate:

Construction Phase

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. In this assessment, the impact of the interactions between land and soils and air quality are considered to be ***long-term***, ***imperceptible*** and ***neutral***.

Operational Phase

There are no potentially significant interactions identified between Land, Soils and Hydrogeology, and Air Quality and Climate during the operational phase.

15.3.4 Noise and Vibration:

Construction Phase

There are no potentially significant interactions identified between Land, Soils and Hydrogeology, and Noise and Vibration during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Land, Soils and Hydrogeology, and Noise and Vibration during the operational phase.

15.3.5 Landscape and Visual Impacts:

Construction Phase

There are no potentially significant interactions identified between Land, Soils and Hydrogeology, and Landscape and Visual Impacts during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Land, Soils and Hydrogeology, and Landscape and Visual Impacts during the operational phase.

15.3.6 Archaeological, Architectural and Cultural Heritage:

Construction Phase

There are no potentially significant interactions identified between Land, Soils and Hydrogeology, and Archaeological, Architectural and Cultural Heritage during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Land, Soils and Hydrogeology, and Archaeological, Architectural and Cultural Heritage during the operational phase.

15.3.7 Material Assets, including Utilities, Waste Management, and Transport:

Construction Phase

During the construction phase, a minor quantity of soil will be generated from the excavations required to facilitate piling works and installations of site services. It is estimated that all of the excavated material will need to be removed off-site. When material has to be taken off-site, it will be taken for reuse or recovery, where practical, with disposal as a last resort. Land, Soils, Geology and Hydrogeology impacts during the construction and operational phases are addressed in Chapter 5 (Land, Soils, Geology and Hydrogeology) Adherence to the mitigation measures in Chapter 5, Chapter 13 and the requirements of the RWMP (Appendix 13.1), will ensure the effect is ***long-term, imperceptible*** and ***neutral.***

Operational Phase

There are no potentially significant interactions identified between Land, Soils, Geology and Hydrogeology, and Material Assets during the operational phase.

15.4 Hydrology and Its Interaction With:

15.4.1 Biodiversity:

Construction Phase

In the absence of mitigation, surface water run-off during the construction phase may contain increased silt levels or otherwise become polluted from construction activities. Suspended solids in runoff water may result in an increase in suspended sediment load, resulting in increased turbidity, which may damage downstream water quality and habitats. The design measures and mitigation measures (outlined in Chapters 6 and 7) will be implemented by the construction contractor to ensure that there is no change in the overall water regime at water dependent habitats on site.

Taking into account the design and mitigation measures set out in Chapters 6 and 7 of this EIA Report, there remains a residual negative interaction between Hydrology, and Biodiversity during the construction phase. The interaction is considered to be ***negative***, ***not significant***, and ***short term***.

Operational Phase

The use of SuDS during operations (in particular a combined green/blue roof system) will mean that the development will result in neutral water impacts in the operational phase with regard to runoff rates and flooding risk. Furthermore, with the implementation of mitigation (design) measures there will be no measurable impact on the receiving water quality as a result of the development.

Taking into account the design and mitigation measures set out in Chapters 6 and 7 of this EIA Report, there remains a residual interaction between Hydrology, and Biodiversity during the operational phase. The interaction is considered to be ***neutral***, ***imperceptible*** and ***long term***.

15.4.2 Air Quality and Climate:

Construction Phase

Construction phase activities such as land clearing, excavations, stockpiling of materials etc. have the potential for interactions between air quality and hydrology in the form of dust emissions that may deposit in surface waters.

Mitigation measures implemented during the construction phase will ensure that the deposition of dust is minimised. With the appropriate mitigation measures to prevent fugitive dust emissions, it is predicted that there will be no significant interactions between air quality and hydrology. The interaction is considered to be ***negative***, ***not significant***, and ***short term***.

Operational Phase

Climate change has the potential to increase the risk of flooding in future years due to increased rainfall. The hydrology assessment has concluded that the Proposed Development is deemed to be suitable for the site location with regard to flood risk. The development has been designed to retain stormwater volumes predicted to be experienced during extreme rainfall events. This is defined as the volume of storm water generated during a 1-in-100-year storm event, increased by 30% for the predicted effects of climate change.

Therefore it can be determined that there is no significant risk to the Proposed Development or off site as a result of increased rainfall. The interaction is considered to be ***neutral***, ***not significant***, and ***long term***.

15.4.3 Noise and Vibration:

Construction Phase

There are no potentially significant interactions identified between Hydrology, and Noise and Vibration during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Hydrology, and Noise and Vibration during the operational phase.

15.4.4 Landscape and Visual Impacts:

Construction Phase

There are no potentially significant interactions identified between Hydrology, and Landscape and Visual Impacts during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Hydrology, and Landscape and Visual Impacts during the construction phase.

15.4.5 Archaeological, Architectural and Cultural Heritage:

Construction Phase

There are no potentially significant interactions identified between Hydrology, and Archaeological, Architectural and Cultural Heritage during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Hydrology, and Archaeological, Architectural and Cultural Heritage during the operational phase.

15.4.6 Material Assets, including Utilities Waste Management, and Transport:

Construction Phase

In the absence of mitigation, surface water run-off during the construction phase may contain increased silt levels or otherwise become polluted from construction activities. Suspended solids in runoff water may result in an increase in suspended sediment load, resulting in increased turbidity, which may damage downstream surface water infrastructure.

Taking into account the design and mitigation measures set out in Chapter 6 (Hydrology) and Chapter 15 (Material Assets - Utilities) of this EIA Report, there remains a residual neutral interaction between Land, Soils, Geology and Hydrogeology, and Material Assets during the construction phase. The interaction is considered to be ***neutral***, ***imperceptible***, and ***short term***.

Operational Phase

The use of SuDS during operations will mean that the development will result in neutral water impacts in the operational phase with regard to runoff rates and flooding risk.

Taking into account the design and mitigation measures set out in Chapter 6 (Hydrology) and Chapter 15 (Material Assets - Utilities) of this EIA Report, there remains a residual neutral interaction between Land,

Soils, Geology and Hydrogeology, and Material Assets during the construction phase. The interaction is considered to be ***neutral***, ***imperceptible***, and ***long term***.

15.5 Biodiversity and Its Interaction With:

15.5.1 Air Quality and Climate:

Construction Phase

Dust generation can occur during extended dry weather periods as a result of construction traffic along haul routes and from construction activities such as excavations and infilling works. Dust emissions can coat vegetation leading to a reduction in the photosynthesising ability of the plant as well as other effects. Dust mitigation measures will be implemented on site as set out in Chapter 8 of the EIAR. With the implementation of these mitigation measures dust emissions will be ***short-term, negative*** and ***imperceptible*** with respect to biodiversity.

Operational Phase

There are no potentially significant interactions identified between Air Quality and Climate, and Biodiversity during the operational phase.

15.5.2 Noise and Vibration:

Construction Phase

There is a potential risk of noise and vibration disturbance to birds during the construction phase. Mitigation measures include limiting working hours and timing the daily construction activities and keeping the most noisy activities around the midday period where bird activity is at a minimum. It is anticipated potential effects will not be significant above local geographic scale.

Taking into account the design and mitigation measures set out in Chapter 9 of this EIA Report, there is a residual negative interaction between Noise and Vibration, and Biodiversity during the construction phase. The interaction is considered to be ***negative***, ***not significant***, and ***short term***.

Operational Phase

There are no potentially significant interactions identified between Noise and Vibration, and Biodiversity during the operational phase

15.5.3 Landscape and Visual Impacts:

Construction Phase

No significant biodiversity of conservation value was noted the on site. There are no potentially significant interactions identified between Landscape and Visual Impacts, and Biodiversity during the construction phase

Operational Phase

The implementation of a high quality landscaping scheme will have a ***neutral, not significant***, and ***long term*** interaction with biodiversity.

15.5.4 Archaeological, Architectural and Cultural Heritage:

Construction Phase

There are no potentially significant interactions identified between Biodiversity, and Archaeological, Architectural and Cultural Heritage during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Biodiversity, and Archaeological, Architectural and Cultural Heritage during the operational phase.

15.5.5 Material Assets, including Utilities Waste Management, and Transport:

Construction Phase

There are no potentially significant interactions identified between Biodiversity, and Material Assets during the operational phase.

Operational Phase

There are no potentially significant interactions identified between Biodiversity, and Material Assets during the operational phase.

15.6 Air Quality and Climate and its Interaction with:

15.6.1 Noise and Vibration:

Construction Phase

There are no potentially significant interactions identified between Air Quality and Climate, and Noise and Vibration during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Air Quality and Climate, and Noise and Vibration during the operational phase.

15.6.2 Landscape and Visual Impacts:

Construction Phase

There are no potentially significant interactions identified between Air Quality and Climate, and Landscape and Visual during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Air Quality and Climate, and Landscape and Visual during the operational phase.

15.6.3 Archaeological, Architectural and Cultural Heritage:

Construction Phase

There are no potentially significant interactions identified between Air Quality and Climate, and Archaeological, Architectural and Cultural Heritage during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Air Quality and Climate, and Archaeological, Architectural and Cultural Heritage during the operational phase.

15.6.4 Material Assets, including Utilities Waste Management, and Transport:

Construction Phase

Waste management measures (as outlined in Appendix 13.1 Resource and Waste Management Plan) will be put in place during the construction phase to minimise the amount of waste entering landfill, which has higher associated embodied carbon emissions than other waste management such as recycling. The impact to climate as a result of embodied carbon in waste materials during the construction phase is not considered significant.

Interactions between Air Quality and Traffic can be significant. With increased traffic movements and reduced engine efficiency, i.e. due to congestion, the emissions of vehicles increase. The impacts of the Proposed Development on air quality are assessed by reviewing the change in annual average daily traffic on roads close to the site. In this assessment, the impact of the interactions between traffic and air quality are considered to be ***short-term, imperceptible*** and ***neutral*** during the construction phase.

Operational Phase

Waste management measures (as outlined in Appendix 13.2 Operational Waste Management Plan) will be put in place during the operational phase to minimise the amount of waste entering landfill, which has higher associated embodied carbon emissions than other waste management such as recycling. The impact to climate as a result of embodied carbon in waste materials during the operational phase is not considered significant.

During operation traffic emissions have the potential to emit GHGs, such as CO_2, which impact climate, and pollutants which impact air quality. However, the change in traffic as a result of the Proposed Development is not predicted to result in significant emissions. The interaction is considered to be ***neutral***, ***imperceptible***, and ***long term***.

15.7 Noise and Vibration and Its Interaction With:

15.7.1 Landscape and Visual Impacts:

Construction Phase

There are no potentially significant interactions identified between Noise and Vibration, and Landscape and Visual during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Noise and Vibration, and Landscape and Visual during the operational phase.

15.7.2 Archaeological, Architectural and Cultural Heritage:

Construction Phase

There are no potentially significant interactions identified between Noise and Vibration, and Archaeological, Architectural and Cultural Heritage during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Noise and Vibration, and Archaeological, Architectural and Cultural Heritage during the operational phase.

15.7.3 Material Assets, including Utilities Waste Management, and Transport:

Construction Phase

As stated in the DMRB Noise and Vibration (UKHA 2020), Volume 11, Section 3, Part 7, in order to increase traffic noise levels by 1 dB traffic volumes would need to increase by the order of 25% it is considered that additional traffic introduced onto the local road network due to the construction phase, as outlined in the relevant sections of the Material Assets: Traffic and Transport Chapter, will not result in a significant noise impact.

The calculated change in traffic noise associated with the addition of construction related traffic is less than 1 dB (A) along the site access roads. The potential related impact is ***negative, imperceptible*** and ***short-term.***

Operational Phase

Traffic along the surrounding road network will not lead to a change in noise level that would pose any significant effect. The resultant impact is ***neutral, imperceptible,*** and ***long-term.***

15.8 Landscape and Visual Impacts and its Interaction with:

15.8.1 Archaeological, Architectural and Cultural Heritage:

Construction Phase

There are no potentially significant interactions identified between Landscape and Visual Impacts, and Archaeological, Architectural and Cultural Heritage during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Landscape and Visual Impacts, and Archaeological, Architectural and Cultural Heritage during the operational phase.

15.8.2 Material Assets, including Utilities Waste Management, and Transport:

Construction Phase

There are no potentially significant interactions identified between Landscape and Visual Impacts, and Material Assets during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Landscape and Visual Impacts, and Material Assets during the operational phase.

15.9 Archaeological, architectural and cultural heritage and its interaction

15.9.1 Material Assets, including Utilities Waste Management, and Transport:

Construction Phase

There are no potentially significant interactions identified between Material Assets, and Archaeological, Architectural and Cultural Heritage during the operational phase.

Operational Phase

There are no potentially significant interactions identified between Material Assets, and Archaeological, Architectural and Cultural Heritage during the operational phase.

15.10 Summary

In summary, the interactions between the environmental factors and impacts discussed in this EIAR have been assessed and the majority of interactions are neutral. Negative interactions are generally associated with the construction phase and will be short term in nature. There are some long term positive interactions associated with the operation of the Proposed Development.

The reasoning behind the conclusion that certain interactions are considered to have a positive, neutral or negative effect is outlined in this Chapter. A summary of the potential interactions is presented in Table 15.1 below.

15.11 Table of Interactions

Table 15.1 Summary of Interrelationships between the Aspects

	Population & Human Health		Land, Soils & Geology		Hydrology & Hydrogeology		Biodiversity		Air Quality & Climate		Noise & Vibration		Landscape & Visual Impact		Archaeological Architectural & Cultural Heritage		Material Assets (including Transport & Waste)	
	Con.	Op.	Con.	Op.	Con.	Op.	Con.	Op.	Con.	Op.	Con.	Op.	Con.	Op.	Con.	Op.	Con.	Op.
Population & Human Health			o	o	o	o	X	X	–	X	–	X	–	o /+	X	X	o	o
Land, Soils & Geology					o	X	–	X	o	X	X	X	X	X	X	X	o	X
Hydrology & Hydrogeology							–	o	–	o	X	X	X	X	X	X	o	o
Biodiversity									–	X	–	X	–	o	X	X	X	X
Air Quality & Climate											X	X	X	X	X	X	o	o
Noise & Vibration													X	X	X	X	–	o
Landscape & Visual Impact															X	X	X	X
Archaeological Architectural and Cultural Heritage																	X	X
Material Assets (including Transport & Waste)																		

Con.	Construction Phase
Op.	Operational Phase
X	No Interaction

+	Positive Interaction
o	Neutral Interaction
–	Negative Interaction